# 6.5 Transmit signal quality

Editor's note: The test cases for transmit signal quality: frequency error, EVM, carrier leakage, IBE, EVM equalizer spectrum flatness are complete, except the following aspect is not determined:

Reference signal EVM and PRACH EVM minimum requirements from the core specification are still in brackets

In this clause a multitude of results are derived, all using one common algorithm returning these results: Global In-Channels TX-Test (Annex E). Each sub clause of this clause contains a procedure and test requirements described for a specific measurement. If all relevant test parameters in different sub clauses are the same, then the results, returned by the Global In-Channel TX-Test, may be used across the applicable sub clauses.

# 6.5.1 Frequency Error

## 6.5.1.1 Test purpose

This test verifies the ability of both, the receiver and the transmitter, to process frequency correctly.

Receiver: to extract the correct frequency from the stimulus signal, offered by the System simulator, under ideal propagation conditions and low level.

Transmitter: to derive the correct modulated carrier frequency from the results, gained by the receiver.

## 6.5.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

## 6.5.1.3 Minimum conformance requirements

The UE modulated carrier frequency shall be accurate to within  $\pm 0.1$  PPM observed over a period of one time slot (0.5ms) compared to the carrier frequency received from the E-UTRA Node B.

The normative reference for this requirement is TS 36.101 clause 6.5.1

## 6.5.1.4 Test description

## 6.5.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.1.4.1-1: Test Configuration Table

NC, TL/VL, TL/VH, TH/VL, TH/VH			In	itial Condition			
Low range, Mid range, High range	Test Enviror	nment as specifi	ed in	NC, TL/VL, T	L/VH, TH/VL, T	H/VH	
Test Channel Bandwidths as spedified in Ts 36.508 [7] subclause 4.3.1	TS 36.508[7	] subclause 4.1					
Lowest, 5MHz, Highest	Test Frequencies as specified in		Low range, M	lid range, High	range		
Test Parameters for Channel Bandwidths	TS36.508 [7	] subclause 4.3.	.1				
Test Parameters for Channel Bandwidths				Lowest, 5MH	z, Highest		
Ch BW         Mod'n         RB allocation         Mod'n         RB allocation           FDD         TDD         FDD         TDD           1.4MHz         QPSK         6         6         QPSK         6         6           3MHz         QPSK         15         15         QPSK         15         15           5MHz         QPSK         25         25         QPSK         25         25           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         20         N/A           10MHz         QPSK         50         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK <t< td=""><td>TS 36.508 [</td><td>7] subdause 4.3</td><td>.1</td><td></td><td></td><td></td><td></td></t<>	TS 36.508 [	7] subdause 4.3	.1				
Ch BW         Mod'n         RB allocation         Mod'n         RB allocation           1.4MHz         QPSK         6         6         QPSK         6         6           3MHz         QPSK         15         15         QPSK         15         15           5MHz         QPSK         25         25         QPSK         25         25           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         20         N/A           10MHz         QPSK         50         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           15MHz         QPSK         50         N/A         QPSK         75         N/A           15MHz         QPSK		•	Test Paramete	ers for Channe			
I.4MHz         QPSK         6         6         QPSK         6         6           3MHz         QPSK         15         15         QPSK         15         15           5MHz         QPSK         25         25         QPSK         25         25           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         20         N/A           10MHz         QPSK         50         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QP		Dowr			Upl	ink Configura	tion
1.4MHz         QPSK         6         6         QPSK         15         15           3MHz         QPSK         15         15         QPSK         15         15           5MHz         QPSK         25         25         QPSK         25         25           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         15         N/A           10MHz         QPSK         50         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           15MHz         QPSK         50         N/A         QPSK         15         N/A           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz <t< td=""><td>Ch BW</td><td>Mod'n</td><td>RB all</td><td>ocation</td><td>Mod'n</td><td>RB all</td><td>ocation</td></t<>	Ch BW	Mod'n	RB all	ocation	Mod'n	RB all	ocation
3MHz         QPSK         15         15         QPSK         15         15           5MHz         QPSK         25         25         QPSK         25         25           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         20         N/A           10MHz         QPSK         50         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         15         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz			FDD	TDD		FDD	TDD
5MHz         QPSK         25         25         QPSK         25         25           5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         15         N/A           10MHz         QPSK         50         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz	1.4MHz	QPSK	6	6	QPSK	6	6
5MHz         QPSK         25         N/A         QPSK         20         N/A           5MHz         QPSK         25         N/A         QPSK         15         N/A           10MHz         QPSK         50         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           20MHz	3MHz	QPSK	15	15	QPSK	15	15
5MHz         QPSK         25         N/A         QPSK         15         N/A           10MHz         QPSK         50         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         15         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           15MHz         QPSK         100         100         QPSK         100         N/A           20MHz	5MHz	QPSK	25	25	QPSK	25	25
10MHz         QPSK         50         QPSK         50         50           10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         15         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           15MHz         QPSK         100         100         QPSK         20         N/A           15MHz         QPSK         100         100         QPSK         100         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK	5MHz	QPSK	25	N/A	QPSK	20	N/A
10MHz         QPSK         50         N/A         QPSK         25         N/A           10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         15         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           15MHz         QPSK         100         100         QPSK         20         N/A           15MHz         QPSK         100         100         QPSK         100         100           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           20MH	5MHz	QPSK	25	N/A	QPSK	15	N/A
10MHz         QPSK         50         N/A         QPSK         20         N/A           10MHz         QPSK         50         N/A         QPSK         15         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           20MHz         QPSK         100         100         QPSK         100         100           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           20MHz         QPSK         100         N/A         QPSK         20         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which	10MHz	QPSK	50	50	QPSK	50	50
10MHz         QPSK         50         N/A         QPSK         15         N/A           15MHz         QPSK         75         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           20MHz         QPSK         100         100         QPSK         100         100           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which	10MHz	QPSK	50	N/A	QPSK	25	N/A
15MHz         QPSK         75         QPSK         75         75           15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           20MHz         QPSK         100         100         QPSK         100         100           20MHz         QPSK         100         N/A         QPSK         75         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which	10MHz	QPSK	50	N/A	QPSK	20	N/A
15MHz         QPSK         75         N/A         QPSK         50         N/A           15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           20MHz         QPSK         100         100         QPSK         100         100           20MHz         QPSK         100         N/A         QPSK         75         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which	10MHz	QPSK	50	N/A	QPSK	15	N/A
15MHz         QPSK         75         N/A         QPSK         25         N/A           15MHz         QPSK         75         N/A         QPSK         20         N/A           20MHz         QPSK         100         100         QPSK         100         100           20MHz         QPSK         100         N/A         QPSK         75         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           20MHz         QPSK         100         N/A         QPSK         20         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which	15MHz	QPSK	75	75	QPSK	75	75
15MHz         QPSK         75         N/A         QPSK         20         N/A           20MHz         QPSK         100         100         QPSK         100         100           20MHz         QPSK         100         N/A         QPSK         75         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           20MHz         QPSK         100         N/A         QPSK         20         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which	15MHz	QPSK	75	N/A	QPSK	50	N/A
20MHz         QPSK         100         100         QPSK         100         100           20MHz         QPSK         100         N/A         QPSK         75         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           20MHz         QPSK         100         N/A         QPSK         20         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which		QPSK	75	N/A	QPSK	25	N/A
20MHz         QPSK         100         N/A         QPSK         75         N/A           20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           20MHz         QPSK         100         N/A         QPSK         20         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which	15MHz	QPSK	75	N/A	QPSK	20	N/A
20MHz         QPSK         100         N/A         QPSK         50         N/A           20MHz         QPSK         100         N/A         QPSK         25         N/A           20MHz         QPSK         100         N/A         QPSK         20         N/A           Note 1:         Test Channel Bandwidths are checked separately for each E-UTRA band, which	20MHz	QPSK	100	100	QPSK	100	100
20MHzQPSK100N/AQPSK25N/A20MHzQPSK100N/AQPSK20N/ANote 1:Test Channel Bandwidths are checked separately for each E-UTRA band, which	20MHz	QPSK	100	N/A	QPSK	75	N/A
20MHz QPSK 100 N/A QPSK 20 N/A Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which	20MHz	QPSK	100	N/A	QPSK	50	N/A
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which	20MHz	QPSK	100	N/A	QPSK	25	N/A
	20MHz	QPSK	100	N/A	QPSK	20	N/A
applicable channel bandwidths are specified in Table 5.4.2.1-1.							
Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth.						anocation valu	e according

- 1. Connect the SS to the UE to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508[7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL and DL Reference Measurement channels are set according to Table 6.5.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.1.4.3.

## 6.5.1.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 6.5.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.1.4.1-1, since the UE has no payload data to send, the UE transmit uplink MAC padding bits on the UL RMC
- 3. Set the Downlink signal level to the appropriate REFSENS value defined in Table 7.3.5-1. Send continuously uplink power control "up" commands to the UE in every uplink scheduling information to the UE so that the UE transmits at  $P_{UMAX}$  level for the duration of the test.
- 4. Measure the Frequency Error using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test.

## 6.5.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the exceptions in subclause 7.3.4.3 and Table 7.3.3-3.

## 6.5.1.5 Test requirement

The 20 frequency error  $\Delta f$  results must fulfil the test requirement:

 $|\Delta f| \le (0.1 \text{ PPM} + 15 \text{ Hz})$ 

# 6.5.1A Frequency error for CA

## 6.5.1A.1 Frequency error for CA (intra-band contiguous DL CA and UL CA)

### 6.5.1A.1.1 Test purpose

This test verifies the ability of both, receiver and the transmitter, to process frequency for intra-band CA correctly.

Receiver: to extract the correct frequency from the stimulus signal, offered by the System simulator, under ideal propagation conditions and low level.

Transmitter: to derive the correct modulated carrier frequency from the results, gained by the receiver.

## 6.5.1A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

## 6.5.1A.1.3 Minimum conformance requirements

For intra-band contiguous carrier aggregation the UE modulated carrier frequencies per band shall be accurate to within  $\pm 0.1$  PPM observed over a period of one timeslot compared to the carrier frequency of primary component carrier received from the E-UTRA in the corresponding band.

The normative reference for this requirement is TS 36.101[2] clause 6.5.1A.

#### 6.5.1A.1.4 Test description

## 6.5.1A.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in table 6.5.1A.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexe A.2 and A3. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.1A.1.4.1-1: Test Configuration Table

	Initial Conditions								
Test Env	ironment as	s specified in			NC, TL/VL, TL/VH, TH/VL, TH/VH				
	)8[7] subcla								
	Test Frequencies as specified in				C: Low ra	ange, High range			
	8 [7] subcla	use 4.3.1 for	different CA ba	ındwidth					
classes.									
Test CC	Combination	n setting (N <sub>R</sub>	B_agg) as specif	ied in	Lowest N	√RB_agg			
subclaus	e 5.4.2A.1	for the CACo	nfiguration		Highest N	V <sub>RB_agg</sub>			
Test Par	ameters for	CA Configur	ations						
CA Conf	iguration	DL Allocati	on	UL Alloc	ation				
/ N <sub>RB_agg</sub>									
PCC	SCCs	CC Mod	PCC &		N <sub>RB_alloc</sub>	PCC & SCC RI	B allocation:	S	
$N_{RB}$	N <sub>RB</sub>		SCC RB	CC		(L <sub>CRB</sub> @ RB <sub>start</sub>	)		
			allocation	MOD					
75	75	QPSK	75+75	QPSK	130	P_75@0	S_55@0	-	-
75	75			QPSK	150	P_75@0	S_75@0		_
	_	QPSK	75+75			_		-	-
100	50	QPSK	100+50	QPSK	150 P_100@0 S_50@0 -			-	
100	75	QPSK	100+75	QPSK	175	P_100@0	S_75@0	-	-
100	100	QPSK	100+100	QPSK	130	P_100@0	S_30@0	-	-
						_			
100	100	QPSK	100+100	QPSK	75	P_75@0	S_0@0	•	-
Note 1:	Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which								

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1

Note 3: Depending on CA configurations, apply the appropriate Unlink RP allocations value according to table 7.3.4.

Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3 A.3-1 for UE supporting two uplink carriers is tested per Test CA configuration.

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508[7] Annex A Figure group A.32 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL and DL Reference Measurement channel is set according to Table 6.5.1A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A. 2. Message contents are defined in clause 6.5.1A.1.4.3.

## 6.5.1A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.5.1A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Tables 6.5.1A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.1A.1.4.1-1 on both PCC and SCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

- 6. Set the Downlink signal level for PCC and SCC to the appropriate REFSENS value defined in Table 7.3A.2.5-1. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE to ensure the UE transmits  $P_{UMAX}$  level for at least the duration of the test.
- 7. Measure the Frequency Error on PCC and SCC using Global In-Channel Tx-Test (Annex E) respectively. For TDD slots with transient periods are not under test.

#### 6.5.1A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

### 6.5.1A.1.5 Test Requirements

The 20 frequency error  $\Delta f$  results per test point must fulfil the test requirement:

 $|\Delta f| \le (0.1 \text{ PPM} + 15 \text{ Hz})$  for each test point.

## 6.5.1B Frequency Error for UL-MIMO

## 6.5.1B.1 Test purpose

This test verifies the ability of both, the receiver and the transmitter for UL-MIMO, to process frequency correctly.

Receiver: to extract the correct frequency from the stimulus signal, offered by the System simulator, under ideal propagation conditions and low level.

Transmitter: to derive the correct modulated carrier frequency for each transmitter connector from the results, gained by the receiver.

## 6.5.1B.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

## 6.5.1B.3 Minimum conformance requirements

The UE modulated carrier frequency for each transmit antenna shall be accurate to within  $\pm 0.1$  PPM observed over a period of one time slot (0.5ms) compared to the carrier frequency received from the E-UTRA Node B.

The normative reference for this requirement is TS 36.101 clause 6.5.1B

## 6.5.1B.4 Test description

## 6.5.1B.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.1B.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.1B.4.1-1: Test Configuration Table

Initial Conditions						
Test Environ	ment as specific	ed in	NC, TL/VL, T	L/VH, TH/VL, T	H/VH	
	subclause 4.1					
	ncies as specific		Low range, N	/lid range, High	range	
	subclause 4.3.					
	l Bandwidths as		Lowest, 5MH	lz, Highest		
TS 36.508 [7]	] subdause 4.3					
				el Bandwidths		
	Downlink Configuration Uplink Configuration					
Ch BW	Mod'n	RB all	ocation	Mod'n	RB all	ocation
		FDD	TDD		FDD	TDD
1.4MHz	QPSK	6	6	QPSK	6	6
3MHz	QPSK	15	15	QPSK	15	15
5MHz	QPSK	25	25	QPSK	25	25
5MHz	QPSK	25	N/A	QPSK	20	N/A
5MHz	QPSK	25	N/A	QPSK	15	N/A
10MHz	QPSK	50	50	QPSK	50	50
10MHz	QPSK	50	N/A	QPSK	25	N/A
10MHz	QPSK	50	N/A	QPSK	20	N/A
10MHz	QPSK	50	N/A	QPSK	15	N/A
15MHz	QPSK	75	75	QPSK	75	75
15MHz	QPSK	75	N/A	QPSK	50	N/A
15MHz	QPSK	75	N/A	QPSK	25	N/A
15MHz	QPSK	75	N/A	QPSK	20	N/A
20MHz	QPSK	100	100	QPSK	100	100
20MHz	QPSK	100	N/A	QPSK	75	N/A
20MHz	QPSK	100	N/A	QPSK	50	N/A
20MHz	QPSK	100	N/A	QPSK	25	N/A
	20MHz         QPSK         100         N/A         QPSK         20         N/A					
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.  Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth.						

- 1. Connect the SS to the UE to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508[7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL and DL Reference Measurement channels are set according to Table 6.5.1B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.1B.4.3.

## 6.5.1B.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 6.5.1B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.5.1B.4.1-1, since the UE has no payload data to send, the UE transmit uplink MAC padding bits on the UL RMC.
- 3. Set the Downlink signal level to the appropriate REFSENS value defined in Table 7.3B.5-1. Send continuously uplink power control "up" commands to the UE in every uplink scheduling information to the UE so that the UE transmits at PUMAX level for the duration of the test.

4. Measure the Frequency Error using Global In-Channel Tx-Test (Annex E) for each of trans mit antenna of the UE. For TDD slots with transient periods are not under test.

## 6.5.1B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the exceptions in clause 7.3.4.3 and Table 7.3.3-3.

## 6.5.1B.5 Test requirement

The requirements apply to each transmit antenna connector.

The 20 frequency error  $\Delta f$  results must fulfil the test requirement:

 $|\Delta f| \le (0.1PPM + 15 Hz)$ 

## 6.5.2 Transmit modulation

Transmit modulation defines the modulation quality for expected in-channel RF transmissions from the UE. This transmit modulation limit is specified in terms of:

- Error Vector Magnitude (EVM) for the allocated resources blocks (RB),
- EVM equalizer spectrum flatness derived from the equalizer coefficients generated by the EVM measurement process
- Carrier leakage (caused by IQ offset)

In-band emissions for the non-allocated RB

## 6.5.2.1 Error Vector Magnitude (EVM)

#### 6.5.2.1.1 Test Purpose

The Error Vector Magnitude is a measure of the difference between the reference waveform and the measured waveform. This difference is called the error vector. Before calculating the EVM the measured waveform is corrected by the sample timing offset and RF frequency offset. Then the IQ origin offset shall be removed from the measured waveform before calculating the EVM.

The measured waveform is further modified by selecting the absolute phase and absolute amplitude of the Tx chain. The EVM result is defined after the front-end IDFT as the square root of the ratio of the mean error vector power to the mean reference power expressed as a %.

The basic EVM measurement interval in the time domain is one preamble sequence for the PRACH and is one slot for the PUCCH and PUSCH in the time domain. When the PUSCH or PUCCH transmission slot is shortened due to multiplexing with SRS, the EVM measurement interval is reduced by one symbol, accordingly. The PUSCH or PUCCH EVM measurement interval is also reduced when the mean power, modulation or allocation between slots is expected to change. In the case of PUSCH transmission, the measurement interval is reduced by a time interval equal to the sum of 5 µs and the applicable exclusion period defined in subclause 6.3.4, adjacent to the boundary where the power change is expected to occur. The PUSCH exclusion period is applied to the signal obtained after the front-end IDFT. In the case of PUCCH transmission, the PUCCH EVM measurement interval is reduced by one symbol adjacent to the slot boundary.

#### 6.5.2.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

## 6.5.2.1.3 Minimum conformance requirements

EVM measurements are evaluated for 10 uplink sub-frames excluding any transient period for the average EVM case, and 60 subframes excluding any transient period for the reference signal EVM case, the different modulations schemes shall not exceed the values specified in Table 6.5.2.1.3-1 for the parameters defined in Table 6.5.2.1.3-2. For EVM

evaluation purposes, [all PRACH preamble formats 0-4 and] all PUCCH formats 1, 1a, 1b, 2, 2a and 2b are considered to have the same EVM requirement as QPSK modulated.

Table 6.5.2.1.3-1: Minimum requirements for Error Vector Magnitude

Parameter	Unit	Average EVM Level	Reference Signal EVM Level
QPSK or BPSK	%	17.5	[17.5]
16QAM	%	12.5	[12.5]

Table 6.5.2.1.3-2: Parameters for Error Vector Magnitude

Parameter	Unit	Level
UE Output Power	dBm	≥ -40
Operating conditions		Nomal conditions

The normative reference for this requirement is TS 36.101 [2] clause 6.5.2.1.1.

## 6.5.2.1.4 Test description

#### 6.5.2.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.2.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2.1.4.1-1: Test Configuration Table for PUSCH

	Initial Conditions					
	Test Environment		NC			
(as spe	cified in TS 36.508 [7] subclause 4.1)					
	Test Frequencies	Sec	e Table 6.5.1.4	1_1		
(as spec	ified in TS36.508 [7] subclause 4.3.1)		Table 0.0.1.4	•• •		
	Test Channel Bandwidths	See Table 6.5.1.4.1-1				
(as speci	(as specified in TS 36.508 [7] subclause 4.3.1)					
	Test Parameters for Channe	el Bandwidths				
	Downlink Configuration	n Uplink Configuration				
Ch BW	N/A for PUSCH EVM testing	Mod'n RB allocation		ocation		
			FDD	TDD		

1.4MHz	QPSK	6	6
1.4MHz	QPSK	1	1
1.4MHz	16QAM	6	6
1.4MHz	16QAM	1	1
3MHz	QPSK	15	15
3MHz	QPSK	4	4
3MHz	16QAM	15	15
3MHz	16QAM	4	4
5MHz	QPSK	25	25
5MHz	QPSK	8	8
5MHz	16QAM	25	25
5MHz	16QAM	8	8
10MHz	QPSK	50	50
10MHz	QPSK	12	12
10MHz	16QAM	50	50
		(Note 3)	(Note 3)
10MHz	16QAM	12	12
15MHz	QPSK	75	75
15MHz	QPSK	16	16
15MHz	16QAM	75	75
		(Note 3)	(Note 3)
15MHz	16QAM	16	16
20MHz	QPSK	100	100
20MHz	QPSK	18	18
20MHz	16QAM	100	100
		(Note 3)	(Note 3)
20MHz	16QAM	18	18

Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.

Note 2: For partial RB allocation, the RB<sub>start</sub> shall be RB #0 and RB# (max+1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories ≥2

Table 6.5.2.1.4.1-2: Test Configuration Table for PUCCH

	Initial Conditions						
Test Env	ironment as sp	ecified in	NC				
TS 36	.508[7] subclau	se 4.1					
	quencies as sp			See Table 6.5.1.4.1-1			
	08 [7] subclau:						
	Bandwidths a			See Table 6.5.1.4.1-1			
TS 36.5	08 [7] subclau						
				el Bandwidths			
	Dowr	nlink Configur	ation	Uplink Configuration			
OL DW		55 "		EDD DUOQUE . E			
Ch BW	Mod'n		ocation	FDD: PUCCH format = Format 1a			
		FDD	TDD	TDD: PUCCH format = Format 1a / 1b			
	0.7017						
1.4MHz	QPSK	3	3				
3MHz	QPSK	4	4				
5MHz	QPSK	8	8				
10MHz	QPSK	16	16				
15MHz	QPSK	25	25				
20MHz							
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable channel bandwidths are specified in Table 5.4.2.1-1.							

Initial Conditions				
Test Environment (as specified in TS 36.508 [7] subclause 4.1)	NC			
Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1)	See Table 6.5.1.4.1-1			
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	See Table 6.5.1.4.1-1			
PRACH preamble format				
	FDD	TDD		
PRACH Configuration Index	4	53		
RS EPRE setting for test point 1 (dBm/15kHz)	-71	-63		
RS EPRE setting for test point 2 (dBm/15kHz)	-86	-78		

Table 6.5.2.1.4.1-3: Test Configuration for PRACH

- 1. Connect the SS to the UE to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508[7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2.1.4.3.

#### 6.5.2.1.4.2 Test procedure

Test procedure for PUSCH:

- 1.1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.2.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 1.2 Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at P<sub>UMAX1evel</sub>.
- 1.3 Measure the EVM and  $EVM_{DMRS}$  using Global In-Channel Tx-Test (Annex E).
- 1.4 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $-36.8 d\, Bm \pm 3.2 dB$  for carrier frequency  $f \le 3.0 GHz$  or  $-36.5 d\, Bm \pm 3.5 d\, B$  for carrier frequency  $3.0 GHz < f \le 4.2 GHz$ .
- 1.5 Measure the EVM and EVM DMRS using Global In-Channel Tx-Test (Annex E).

Test procedure for PUCCH:

- 2.1 PUCCH are set according to Table 6.5.2.1.4.1-2.
- 2.2 SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 6.5.2.1.4.1-2. The SS sends downlink MAC padding bits on the DL RMC. The transmission of PDSCH will make the UE send uplink ACK/NACK using PUCCH. There is no PUSCH transmission.
- 2.3 SS send appropriate TPC commands for PUCCH to the UE until the UE transmit PUCCH at P<sub>UMAX</sub> level.
- 2.4 Measure PUCCH EVM using Global In-Channel Tx-Test (Annex E).
- 2.5 Send the appropriate TPC commands for PUCCH to the UE until the UE transmits PUCCH at -36.8d Bm  $\pm 3.2$ d B for carrier frequency f  $\leq 3.0$ GHz or -36.5dBm  $\pm 3.5$  dB for carrier frequency 3.0GHz  $< f \leq 4.2$ GHz.
- 2.6 Measure PUCCH EVM using Global In-Channel Tx-Test (Annex E).

Test procedure for PRACH:

- 3.1 The SS shall set RS EPRE according to Table 6.5.2.1.4.1-3.
- 3.2 PRACH is set according to Table 6.5.2.1.4.1-3.
- 3.3 The SS shall signal a Random Access Preamble ID via a PDCCH order to the UE and initiate a Non-contention based Random Access procedure
- 3.4 The UE shall send the signalled preamble to the SS.
- 3.5 In response to the preamble, the SS shall transmit a random access response not corresponding to the transmitted random access preamble, or send no response.
- 3.6 The UE shall consider the random access response reception not successful then re-transmit the preamble with the calculated PRA CH transmission power.
- 3.7 Repeat step 5 and 6 until the SS collect enough PRACH preambles (2 preambles for format 0 and 10 preambles for format 4). Measure the EVM in PRACH channel using Global In-Channel Tx-Test (Annex E).

#### 6.5.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exceptions:

Table 6.5.2.1.4.3-1: PRACH-ConfCommonDEFAULT: PRACH EVM measurement for FDD

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-7 PRACH-Conf Common DEFAULT					
Information Element	Value/remark	Comment	Condition		
PRACH-ConfigInfo SEQUENCE {					
prach-ConfigIndex	4				

Table 6.5.2.1.4.3-2: PRACH-ConfCommonDEFAULT: PRACH EVM measurement for TDD

Derivation Path: TS 36.508 [7] clause 5.3.1, Table 5.3.1-1 PRACH-ConfCommonDEFAULT					
Information Element	Value/remark	Comment	Condition		
PRACH-ConfigInfo SEQUENCE {					
prach-ConfigIndex	53				

Table 6.5.2.1.4.3-4: RA CH-ConfigCommon-DEFAULT: PRACH EVM measurement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-12 RACH-ConfigCommon-DEFAULT				
Information Element	Value/remark	Comment	Condition	
RACH-ConfigCommon-DEFAULT ::= SEQUENCE {				
preambleInfo SEQUENCE {				
numberOfRA-Preambles	n52			
	-			
preambles Group AConfig SEQUENCE {}	Not present			
}				
powerRampingParameters SEQUENCE {				
powerRampingStep	dB0			
preambleInitialReœivedTargetPower	dBm-120 Test point 1 dBm-90 Test point 2			
}	·			
ra-SupervisionInfo SEQUENCE {				
preambleTransMax	n10		FDD	
	n20		TDD	
ra-ResponseWindowSize	Sf10			
mac-ContentionResolutionTimer	sf48			
}				
ra-SupervisionInfo SEQUENCE {				

#### Table 6.5.2.1.4.3-5: TDD-Config-DEFAULT: PRACH EVM measurement for TDD

Derivation Path: TS 36.508 [7] clause 5.3.1, Table 5.3.1-1: TDD-Config-DEFAULT				
Information Element	Value/remark	Comment	Condition	
TDD-Config-DEFAULT ::= SEQUENCE {				
subframeAssignment	sa1			
specialSubframePatterns	ssp5	To enable two symbol UpPTS, and to have 9 symbols GP.		
}				

## 6.5.2.1.5 Test requirement

The PUSCH EVM derived in E.4.2 shall not exceed 17,5 % for QPSK and BPSK, 12,5% for 16 QAM.

The PUSCH *EVM* <sub>DMRS</sub> derived in E.4.6.2 shall not exceed [17,5 %] when embedded with data symbols of QPSK and BPSK, [12,5%] for 16 QAM.

The PUCCH EVM and derived in E.5.9.2 shall not exceed 17,5%.

The PRACH EVM derived in FFS shall not exceed 17.5%.

## 6.5.2.1A PUSCH-EVM with exclusion period

#### 6.5.2.1A.1 Test purpose

To verify the ability of the UE transmitter to keep the EVM minimum requirements, even in the presence of transients according to subclause 6.5.2.1.1 third paragraph:

.....In the case of PUSCH transmission, the measurement interval is reduced by a time interval equal to the sum of 5  $\mu$ s and the applicable exclusion period defined in subclause 6.3.4, adjacent to the boundary where the power change is expected to occur. The PUSCH exclusion period is applied to the signal obtained after the front-end IDFT. .....

#### 6.5.2.1A.2 Test applicability

This test applies to all types of E-UTRA UE release 8 and forward.

#### 6.5.2.1A.3 Minimum conformance requirement

EVM measurements are evaluated for 10 uplink sub-frames in a reduced time interval due to exclusion periods for the average EVM. The different modulations schemes shall not exceed the values specified in Table 6.5.2.1.3-1 for the parameters defined in Table 6.5.2.1.3-2.

## 6.5.2.1 A.4 Test description

#### 6.5.2.1A.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.2.1A.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

## Table 6.5.2.1A.4.1-1: Test Configuration Table

	Initial Conditions					
Test Environr	ment as specified in	Normal Cond	litions			
TS 36.508[7]	subclause 4.1					
Test Frequer	icies as specified in	Low range				
	subclause 4.3.1					
	Bandwidths as specified in	10 MHz				
TS 36.508 [7] subdause 4.3.1						
Test Parameters for Channel Bandwidths						
	Downlink Configur	ation		Uplink Configura	ation	
Ch BW	N/A		Mod'n		ocation	
				FDD	TDD	
10MHz			QPSK	Alternating 12	Alternating 12	
				and 1 (as	and 1 (as	
				shown in	shown in	
				Figure	Figure	
				6.5.2.1A.4.2-1)	6.5.2.1A.4.2-1)	
10MHz			16 QAM	Alternating 12	Alternating 12	
				and 1 (as	and 1 (as	
				shown in	shown in	
				Figure	Figure	
				6.5.2.1A.4.2-1)	6.5.2.1A.4.2-1)	

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C.0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channel is set according to table 6.5.2.1A.4.1-1
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.3.5.2.4.3.

## 6.5.2.1A.4.2 Test procedure

The test pattern is illustrated in figure 6.5.2.1A.4.2-1.

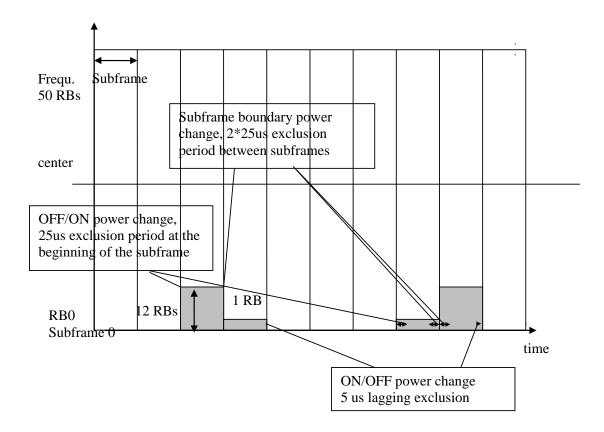


Figure 6.5.2.1A.4.2-1: Test pattern

NOTE 1: In TDD the free subframes are special subframes or DL, in FDD the free subframes are OFF.

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the PUSCH... Since the UE has no payload data to send, the UE trans mits uplink MAC padding bits on the UL RMC. The initial uplink RB allocation is 12. Send appropriate TPC commands for PUSCH to the UE to ensure the UE transmits PUSCH at 0dBm  $\pm 3.2$ dB for carrier frequency  $f \leq 3.0$ GHz or 0dBm  $\pm 3.5$  dB for carrier frequency  $f \leq 3.0$ GHz or 0dBm  $f \leq 3.0$ GHz.
- 2. Schedule the UE's PUSCH data transmission as described in Figure 6.5.2.1A.4.2-1 for 16<sup>1)</sup> active time slots with an uplink RB allocation alternating pattern as described in table 6.5.2.1A.4.1-1 while transmitting 0dB TPC command for PUSCH via the PDCCH.
- 3. Measure the EVM using Global In-Channel Tx-Test. The averaging across 16<sup>1)</sup> times lots is done across mixed RB allocations, as illustrated in Figure 6.5.2.1A.4.2-1

NOTE 1: Averaging across 16 timeslots is used to represent each type of transition equally in the average.

## 6.5.2.1A.5 Test requirement

The PUSCH EVM derived in Annex E.4.2 taking into account Annex E.7 shall not exceed 17,5 % for QPSK and 12,5% for 16 QAM. The test requirements shall be fulfilled for early and late EVM window.

## 6.5.2.2 Carrier leakage

## 6.5.2.2.1 Test Purpose

Carrier leakage (the I/Q origin offset) is an interference caused by crosstalk or DC offset and expresses itself as unmodulated sine wave with the carrier frequency. It is an interference of approximately constant amplitude and independent of the amplitude of the wanted signal. I/Q origin offset interferes with the centre sub carriers of the UE under test (if allocated), especially, when their amplitude is small. The measurement interval is defined over one slot in the time domain.

The purpose of this test is to exercise the UE transmitter to verify its modulation quality in terms of carrier leakage.

## 6.5.2.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

### 6.5.2.2.3 Minimum conformance requirements

The relative carrier leakage power (IQ origin offset power) is a power ratio of the additive sinusoid waveform and the modulated waveform. The relative carrier leakage power shall not exceed the values specified in Table 6.5.2.2.3-1.

Table 6.5.2.2.3-1: Minimum requirements for Relative Carrier Leakage Power

LO Leakage	Parameters	Relative Limit (dBc)
	Output power >0 dBm	-25
	-30 dBm ≤ Output power ≤0 dBm	-20
	-40 dBm ≤ Output power < -30 dBm	-10

The normative reference for this requirement is TS 36.101 clause 6.5.2.2.1

#### 6.5.2.2.4 Test description

#### 6.5.2.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.2.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2.2.4.1-1: Test Configuration Table

	Initial Condition	ns		
Test Environr	ment	See Table 6.5.1.4.1-1		
(as specified in TS 36.508 [7] subclause 4.1)		366	5 Table 0.5.1.4	. 1 - 1
Test Frequencies		900	e Table 6.5.1.4	1_1
(as specified	in TS36.508 [7] subclause 4.3.1)	366	5 Table 0.5.1.4	. 1 - 1
Test Channe	Bandwidths	Sou	e Table 6.5.1.4	1_1
(as specified	in TS 36.508 [7] subclause 4.3.1)	366	5 Table 0.5.1.4	. 1 - 1
	Test Parameters for Channe	el Bandwidths		
	Downlink Configuration	Uplink Configuration		
Ch BW	N/A for carrier leakage testing	Mod'n RB allocation		ocation
			FDD	TDD
1.4MHz		QPSK	1	1
3MHz		QPSK	4	4
5MHz		QPSK	8	8
10MHz		QPSK	12	12
15MHz		QPSK	16	16
20MHz		QPSK	18	18
ар	st Channel Bandwidths are checked separa plicable channel bandwidths are specified in partial RB allocation, the RB <sub>start</sub> shall be R	n Table 5.4.2.1	-1.	

- 1. Connect the SS to the UE to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508[7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2.2.4.1-1.
- 5. Propagation conditions are set according to Annex B.0

the channel bandwidth.

6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2.2.4.3.

## 6.5.2.2.4.2 Test procedure

SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.2.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC

Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is 3.2 dBm  $\pm 3.2$ dB for carrier frequency  $f \le 3.0$ GHz or 3.5dBm  $\pm 3.5$ dB for carrier frequency 3.0GHz  $< f \le 4.2$ GHz.

Measure carrier leakage using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test.

- 4. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $-26.8 \text{ dBm} \pm 3.2 \text{dB}$  for carrier frequency  $f \le 3.0 \text{GHz}$  or  $-26.5 \text{dBm} \pm 3.5 \text{dB}$  for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ .
- 5. Measure carrier leakage using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test
- Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is -36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.</li>
- 7. Measure carrier leakage using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test

#### 6.5.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

## 6.5.2.2.5 Test requirement

Each of the 20 IQ offset results, derived in Annex E.3.1, shall not exceed the values in table 6.5.2.2.5-1

Table 6.5.2.2.5-1: Test requirements for Relative Carrier Leakage Power

LO Leakage	Parameters	Relative Limit (dBc)
	f ≤ 3.0GHz: 3.2 dBm ±3.2dB	-24.2
	3.0GHz < f ≤ 4.2GHz: 3.5 dBm	
	±3.5dB	
	f ≤ 3.0GHz: -26.8 dBm ±3.2dB	-19.2
	3.0GHz < f ≤ 4.2GHz: -26.5 dBm	
	±3.5dB	
	f ≤ 3.0GHz: -36.8dBm±3.2dB	-9.2
	3.0GHz < f ≤ 4.2GHz: -36.5 dBm	
	±3.5dB	

#### 6.5.2.3 In-band emissions for non allocated RB

## 6.5.2.3.1 Test Purpose

The in-band emissions are a measure of the interference falling into the non-allocated resources blocks

The in-band emission is defined as the average across 12 sub-carrier and as a function of the RB offset from the edge of the allocated UL trans mission bandwidth. The in-band emission is measured as the ratio of the UE output power in a non-allocated RB to the UE output power in an allocated RB. The basic in-band emissions measurement interval is defined over one slot in the time domain. When the PUSCH or PUCCH transmission slot is shortened due to multiplexing with SRS, the in-band emissions measurement interval is reduced by one SC-FDMA symbol, accordingly.

## 6.5.2.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

## 6.5.2.3.3 Minimum conformance requirements

The relative in-band emission shall not exceed the values specified in Table 6.5.2.3.3-1.

Table	C E O O O 1.	Minimo	******************************	2	in band	
rabie	0.3.Z.3.3-1.	wiinimum	requirements	TOI	ın-pand	emissions

Parameter Description	Unit	Limit (	Applicable Frequencies	
General	dB	$\max \left\{ -25 - 10 \cdot \log_{10}(N_{RB} / L_{CRB}), \\ 20 \cdot \log_{10} EVM - 3 - 5 \cdot (\left  \Delta_{RB} \right  - 1) / L_{CRB}, \\ -57  dBm / 180 kHz - P_{RB} \right\}$		Any non-allocated (Note 2)
IQ Image	dB	-25		Image frequencies (Notes 2, 3)
		-25	Output power > 0 dBm	
Carrier leakage	dBc	-20  -30 dBm ≤ Output power ≤ 0 dBm		LO frequency (Notes 4, 5)
		-10	-40 dBm ≤ Output power < -30 dBm	

- Note 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the minimum requirement is calculated as the higher of  $P_{RB}$  30 dB and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply.  $P_{RB}$  is defined in Note 10.
- Note 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs.
- Note 3: The applicable frequencies for this limit are those that are enclosed in the reflection of the allocated bandwidth, based on symmetry with respect to the centre carrier frequency, but excluding any allocated RBs.
- Note 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.
- Note 5: The applicable frequencies for this limit are those that are endosed in the RBs containing the DC frequency if  $N_{\it RB}$  is odd, or in the two RBs immediately adjacent to the DC frequency if  $N_{\it RB}$  is even, but excluding any allocated RB.
- Note 6:  $L_{CRB}$  is the Transmission Bandwidth (see Figure 5.4.2-1).
- Note 7:  $N_{RB}$  is the Transmission Bandwidth Configuration (see Figure 5.4.2-1).
- Note 8: *EVM* is the limit specified in Table 6.5.2.1.1-1 for the modulation format used in the allocated RBs.
- Note 9:  $\Delta_{RB}$  is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g.
  - $\Delta_{RB}=1$  or  $\Delta_{RB}=-1$  for the first adjacent RB outside of the allocated bandwidth.
- Note 10:  $P_{\rm RB}$  is the transmitted power per 180 kHz in allocated RBs, measured in dBm.

The normative reference for this requirement is TS 36.101 [2] clause 6.5.2.3.1.

The in-band emission is defined as the average across 12 sub-carrier and as a function of the RB offset from the edge of the allocated UL transmission bandwidth. The in-band emission is measured as the ratio of the UE output power in a non-allocated RB to the UE output power in an allocated RB. The basic in-band emissions measurement interval is defined over one slot in the time domain.

## 6.5.2.3.4 Test description

#### 6.5.2.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.2.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2.3.4.1-1: Test Configuration Table for PUSCH

	Initial Conditio	ns			
Test Environm		See	Table 6.5.1.4	.1-1	
(as specified in TS 36.508 [7] subclause 4.1)		000	14510 0.0.1.1		
Test Frequencies		See	Table 6.5.1.4	1_1	
	n TS36.508 [7] subclause 4.3.1)	000	14510 0.0.1.4		
Test Channel Bandwidths		See	Table 6.5.1.4	1_1	
(as specified i	n TS 36.508 [7] subclause 4.3.1)	000	14510 0.0.1.4		
	Test Parameters for Chann	el Bandwidths			
	Downlink Configuration	Uplink Configuration			
Ch BW	N/A for in-band emissions testing	Mod'n	I'n RB allocation		
	Ç		FDD	TDD	
1.4MHz		QPSK	1	1	
3MHz		QPSK	4	4	
5MHz		QPSK	8	8	
10MHz		QPSK	12	12	
15MHz		QPSK	16	16	
20MHz QPSK 18 18					
	st Channel Bandwidths are checked separa	•		hich	
apı	olicable channel bandwidths are specified i	n Table 5.4.2.1 -	1.		

For partial RB allocation, the starting resource block shall be RB #0 and RB# (max+1 -Note 2: RB allocation) of the channel bandwidth.

Table 6.5.2.3.4.1-2: Test Configuration Table for PUCCH

		In	itial Conditio	ns			
Test Environment as specified in TS 36.508[7] subclause 4.1			See Table 6.5.1.4.1-1				
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1		See Table 6.5.1.4.1-1					
	Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1			See Table 6.5.1.4.1-1			
Test Parameters for Channel Bandwidths							
	Dowr	link Configur	nk Configuration Uplink Configuration				
Ch BW	Mod'n	RB allo	ocation	FDD: PUCCH format = Format 1a			
		FDD	TDD	TDD: PUCCH format = Format 1a /			
1.4MHz	QPSK	3	3	1b			
3MHz	QPSK	4	4				
5MHz	QPSK	8	8				
10MHz	QPSK	16	16				
15MHz	QPSK	25	25				
20MHz	QPSK	30	30				
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable channel bandwidths are specified in Table 5.4.2.1-1.							

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2.3.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2.3.4.3.

#### 6.5.2.3.4.2 Test procedure

Test procedure for PUSCH:

- 1.1 SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.2.3.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC
- 1.2 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $3.2\,dBm\pm3.2dB$  for carrier frequency  $f\le 3.0GHz$  or  $3.5dBm\pm3.5\,dB$  for carrier frequency  $3.0GHz < f\le 4.2GHz$ .
- 1.3 Measure In-band emission using Global In-Channel Tx-Test (Annex E)
- 1.4 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $-26.8 \text{ dBm} \pm 3.2 \text{dB}$  for carrier frequency  $f \le 3.0 \text{GHz}$  or  $-36.5 \text{dBm} \pm 3.5 \text{dB}$  for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ .
- 1.5 Measure In-band emission using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test
- 1.6 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is to -36.8 dBm  $\pm 3.2$ dB for carrier frequency f  $\leq 3.0$ GHz or -36.5dBm  $\pm 3.5$  dB for carrier frequency 3.0GHz < f  $\leq 4.2$ GHz.
- 1,7 Measure In-band emission using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test

#### Test procedure for PUCCH:

- 2.1 PUCCH is set according to Table 6.5.2.3.4.1-2. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 6.5.2.3.4.1-2. The SS sends downlink MAC padding bits on the DL RMC. The transmission of PDSCH will make the UE send uplink ACK/NACK using PUCCH.
- 2.2 Send the appropriate TPC commands in the uplink scheduling information for PUCCH to the UE until UE output power is 3.2 dBm  $\pm 3.2$ dB for carrier frequency  $f \le 3.0$ GHz or 3.5dBm  $\pm 3.5$ dB for carrier frequency 3.0GHz  $< f \le 4.2$ GHz.
- 2.3 Measure In-band emission using Global In-Channel Tx-Test (Annex E)
- 2.4 Send the appropriate TPC commands for PUCCH in the uplink scheduling information to the UE until UE output power is -26.8 dBm  $\pm 3.2$ dB for carrier frequency  $f \le 3.0$ GHz or -26.5dBm  $\pm 3.5$  dB for carrier frequency 3.0GHz  $< f \le 4.2$ GHz.
- 2.5 Measure In-band emission using Global In-Channel Tx-Test (Annex E)
- 2.6 Send the appropriate TPC commands for PUCCH in the uplink scheduling information to the UE until UE output power is to -36.8 dBm  $\pm 3.2$ dB for carrier frequency f  $\leq 3.0$ GHz or -36.5dBm  $\pm 3.5$  dB for carrier frequency 3.0GHz < f  $\leq 4.2$ GHz.
- 2.7 Measure In-band emission using Global In-Channel Tx-Test (Annex E)

## 6.5.2.3.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exceptions:

#### Table 4.6.3-8: PUCCH-Config Common: PUCCH in-band emissions measurement

Derivation Path: 36.331 clause 6.3.2, Table 4.6.3-8: PUCCH-ConfigCommon-DEFAULT				
Information Element	Value/remark	Comment	Condition	
PUCCH-ConfigCommon-DEFAULT ::= SEQUENCE {				
nRB-CQI	0			
}				

## 6.5.2.3.5 Test requirement

Each of the 20 In-band emissions results, derived in Annex E.4.3 shall not exceed the corresponding values in Table 6.5.2.3.5-1

Table 6.5.2.3.5-1: Test requirements for in-band emissions

Parameter Description	Unit	1	Limit (Note 1)			
General	dB	$\max \left\{ -25 - 10 \cdot \log_{10}(N_{RB} / L_{CRBs}), \\ 20 \cdot \log_{10} EVM - 3 - 5 \cdot (\left  \Delta_{RB} \right  - 1) / L_{CRBs}, +0.8 \\ -57 dBm / 180kHz - P_{RB} \right\}$		$20 \cdot \log_{10} EVM - 3 - 5 \cdot ( \Delta_{RB}  - 1) / L_{CRBs},$ +0.8		Any non-allocated (Note 2)
IQ Image	dB		-24.2			
		-24.2	Output power f ≤ 3.0GHz: 3.2dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: 3.5 dBm ±3.5dB			
DC	dBc	-19.2	Output power f ≤ 3.0GHz: -26.8 dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -26.5 dBm ±3.5dB	LO frequency (Notes 4, 5)		
		-9.2	Output power f ≤ 3.0GHz: -36.8 dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -36.5 dBm ±3.5dB			

- Note 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the test requirement is calculated as the higher of  $P_{RB}$  29.2 dB and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply.  $P_{RB}$  is defined in Note 10.
- Note 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one nonallocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs.
- Note 3: The applicable frequencies for this limit are those that are enclosed in the reflection of the allocated bandwidth, based on symmetry with respect to the centre carrier frequency, but excluding any allocated RBs.
- Note 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.
- Note 5: The applicable frequencies for this limit are those that are enclosed in the RBs containing the DC frequency if  $N_{RB}$  is odd, or in the two RBs immediately adjacent to the DC frequency if  $N_{RB}$  is even, but excluding any allocated RB.
- Note 6:  $L_{\it CRBs}$  is the Transmission Bandwidth (see Figure 5.4.2-1).
- Note 7:  $N_{\it RR}$  is the Transmission Bandwidth Configuration (see Figure 5.4.2-1).
- Note 8: *EVM* is the limit specified in Table 6.5.2.1.1-1 for the modulation format used in the allocated RBs.
- Note 9:  $\Delta_{RB}$  is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g.
  - $\Delta_{RR} = 1$  or  $\Delta_{RR} = -1$  for the first adjacent RB outside of the allocated bandwidth.
- Note 10:  $P_{RB}$  is the transmitted power per 180 kHz in allocated RBs, measured in dBm.

## 6.5.2.4 EVM equalizer spectrum flatness

## 6.5.2.4.1 Test Purpose

The zero-forcing equalizer correction applied in the EVM measurement process (as described in Annex E) must meet a spectrum flatness requirement for the EVM measurement to be valid. The EVM equalizer spectrum flatness is defined in terms of the maximum peak-to-peak ripple of the equalizer coefficients (dB) across the allocated uplink block variation in dB of the equalizer coefficients generated by the EVM measurement process. The EVM equalizer spectrum flatness requirement does not limit the correction applied to the signal in the EVM measurement process but for the EVM result to be valid, the equalizer correction that was applied must meet the EVM equalizer spectrum flatness minimum requirements. The basic measurement interval is the same as for EVM.

## 6.5.2.4.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

## 6.5.2.4.3 Minimum conformance requirements

The peak-to-peak variation of the EVM equalizer coefficients contained within the frequency range of the uplink allocation shall not exceed the maximum ripple. The EVM equalizer spectrum flatness shall not exceed the values specified in Table 6.5.2.4.3-1 for normal conditions. For uplink allocations contained within both Range 1 and Range 2, the coefficients evaluated within each of these frequency ranges shall meet the corresponding ripple requirement and the following additional requirement: the relative difference between the maximum coefficient in Range 1 and the minimum coefficient in Range 2 must not be larger than 5 dB, and the relative difference between the maximum coefficient in Range 2 and the minimum coefficient in Range 1 must not be larger than 7 dB (see Figure 6.5.2.4.3-1).

The EVM equalizer spectrum flatness shall not exceed the values specified in Table 6.5.2.4.3-2 for extreme conditions. For uplink allocations contained within both Range 1 and Range 2, the coefficients evaluated within each of these frequency ranges shall meet the corresponding ripple requirement and the following additional requirement: the relative difference between the maximum coefficient in Range 1 and the minimum coefficient in Range 2 must not be larger than 6 dB, and the relative difference between the maximum coefficient in Range 2 and the minimum coefficient in Range 1 must not be larger than 10 dB (see Figure 6.5.2.4.3-1).

Table 6.5.2.4.3-1: Minimum requirements for EVM equalizer spectrum flatness (normal conditions)

	Frequency Range	Maximum Ripple [dB]
F <sub>UL_Mea</sub>	s-F <sub>UL_Low</sub> ≥ 3 MHz and F <sub>UL_High</sub> -F <sub>UL_Meas</sub> ≥ 3 MHz	4 (p-p)
	(Range 1)	
F <sub>UL_Me</sub>	as - F <sub>UL_Low</sub> < 3 MHzor F <sub>UL_High</sub> - F <sub>UL_Meas</sub> < 3 MHz	8 (p-p)
	(Range 2)	
Note 1:	Ful_Meas refers to the sub-carrier frequency for which evaluated	the equalizer coefficient is
Note 2:	$F_{UL\_Low}$ and $F_{UL\_High}$ refer to each E-UTRA frequency 5.2-1	band specified in Table

Table 6.5.2.4.3-2: Minimum requirements for EVM equalizer spectrum flatness (extreme conditions)

F <sub>UL_Mea</sub>	s – F <sub>UL_Low</sub> ≥ 5 MHz and F <sub>UL_High</sub> – F <sub>UL_Meas</sub> ≥ 5 MHz	4 (p-p)
	(Range 1)	
F <sub>UL_Me</sub>	as - F <sub>UL_Low</sub> < 5 MHzor F <sub>UL_High</sub> - F <sub>UL_Meas</sub> < 5 MHz	12 (p-p)
	(Range 2)	
Note 1:	Ful_Meas refers to the sub-carrier frequency for which evaluated	the equalizer coefficient is
Note 2:	$F_{\text{UL\_Low}}$ and $F_{\text{UL\_High}}$ refer to each E-UTRA frequency 5.2-1	band specified in Table

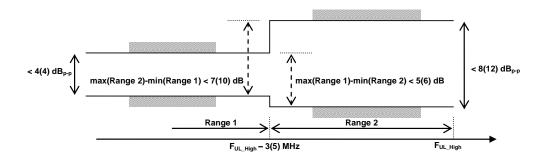


Figure 6.5.2.4.3-1: The limits for EVM equalizer spectrum flatness with the maximum allowed variation of the coefficients indicated (the ETC minimum requirement within brackets).

The normative reference for this requirement is TS 36.101 clause 6.5.2.4.1.

#### 6.5.2.4.4 Test description

#### 6.5.2.4.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.4.2.4.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Initial Conditions Test Environment See Table 6.5.1.4.1-1 (as specified in TS 36.508 [7] subclause 4.1) Test Frequencies See Table 6.5.1.4.1-1 (as specified in TS36.508 [7] subclause 4.3.1) Test Channel Bandwidths See Table 6.5.1.4.1-1 (as specified in TS 36.508 [7] subclause 4.3.1) Test Parameters for Channel Bandwidths **Uplink Configuration Downlink Configuration** Ch BW N/A for EVM equalizer spectrum flatness Mod'n RB allocation testing FDD TDD QPSK 1.4MHz 6 6 3MHz **QPSK** 15 15 5MHz **QPSK** 25 25 QPSK 10MHz 50 50 QPSK 15MHz 75 75 20MHz **QPSK** 100 100 Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.

Table 6.5.2.4.4.1-1: Test Configuration Table

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2.4.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2.4.4.3.

#### 6.5.2.4.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.2.4.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure spectrum flatness using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test.

#### 6.5.2.4.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

#### 6.5.2.4.5 Test requirement

Each of the 20 spectrum flatness functions, shall derive four ripple results in Annex E.4.4, The derived results shall not exceed the values in Figure 6.5.2.4.5-1:

For normal conditions, the maximum ripple in Range 1 and Range 2 shall not exceed the values specified in Table 6.5.2.4.5-1 and the following additional requirement: the relative difference between the maximum coefficient in Range 1 and the minimum coefficient in Range 2 must not be larger than 6.4 dB, and the relative difference between the maximum coefficient in Range 2 and the minimum coefficient in Range 1 must not be larger than 8.4 dB (see Figure 6.5.2.4.5-1).

For extreme conditions, the maximum ripple in Range 1 and Range 2 shall not exceed the values specified in Table 6.5.2.4.5-2 and the following additional requirement: the relative difference between the maximum coefficient in Range 1 and the minimum coefficient in Range 2 must not be larger than 7.4 dB, and the relative difference between the maximum coefficient in Range 2 and the minimum coefficient in Range 1 must not be larger than 11.4 dB (see Figure 6.5.2.4.5-1).

Table 6.5.2.4.5-1: Test requirements for EVM equalizer spectrum flatness (normal conditions)

	Frequency Range	Maximum Ripple [dB]
F <sub>UL_Mea</sub>	as – F <sub>UL_Low</sub> ≥ 3 MHz and F <sub>UL_High</sub> – F <sub>UL_Meas</sub> ≥ 3 MHz	5.4 (p-p)
	(Range 1)	
F <sub>UL_Me</sub>	as - Ful_Low < 3 MHzor Ful_High - Ful_Meas < 3 MHz	9.4 (p-p)
	(Range 2)	
Note 1:	F <sub>UL_Meas</sub> refers to the sub-carrier frequency for which evaluated	
Note 2:	$F_{UL\_Low}$ and $F_{UL\_High}$ refer to each E-UTRA frequency 5.2-1	band specified in Table

Table 6.5.2.4.5-2: Test requirements for spectrum flatness (extreme conditions)

	Frequency Range	Maximum Ripple [dB]
F <sub>UL_Me</sub>	as - F <sub>UL_Low</sub> ≥ 5 MHz and F <sub>UL_High</sub> - F <sub>UL_Meas</sub> ≥ 5 MHz	5.4 (p-p)
	(Range 1)	
F <sub>UL_Me</sub>	as - F <sub>UL_Low</sub> < 5 MHz or F <sub>UL_High</sub> - F <sub>UL_Meas</sub> < 5 MHz (Range 2)	13.4 (p-p)
Note 1:	F <sub>UL_Meas</sub> refers to the sub-carrier frequency for which evaluated	the equalizer coefficient is
Note 2:	$F_{UL\_Low}$ and $F_{UL\_High}$ refer to each E-UTRA frequency 5.2-1	band specified in Table

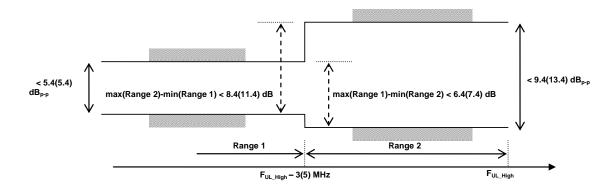


Figure 6.5.2.4.5-1: The limits for EVM equalizer spectrum flatness with the maximum allowed variation of the coefficients indicated (the ETC minimum requirement within brackets).

## 6.5.2A Transmit modulation for CA

The requirements in this clause apply with PCC and SCC in the UL configured and activated: PCC with PRB allocation and SCC without PRB allocation and without CSI reporting and SRS configured.

## 6.5.2A.1 Error Vector Magnitude (EVM) for CA

## 6.5.2A.1.1 Error Vector Magnitude (EVM) for CA (intra-band contiguous DL CA and UL CA)

Editor's notes: The following items are missing or incomplete:

- Initial conditions (test setup for SCC is FFS, references need update, test state for CA RF testing is FFS)
- Test procedure (incomplete, references need update)
- Message Contents
- Connection diagram is missing

#### 6.5.2A.1.1.1 Test Purpose

For the intra-band contiguous carrier aggregation, the Error Vector Magnitude requirement should be defined for each component carrier. Requirement applies for the allocated component carrier, when all other component carriers are activated, but not allocated.

#### 6.5.2A.1.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

#### 6.5.2A.1.1.3 Minimum conformance requirements

When a single component carrier is configured Table 6.5.2.1.4.1-1 apply.

The EVM requirements are according to Table 6.5.2A.1.1.3-1 if CA is configured in uplink.

Table 6.5.2A.1.1.3-1: Minimum requirements for Error Vector Magnitude

Parameter	Unit	Average EVM Level per CC	Reference Signal EVM Level
QPSK or BPSK	%	17.5	17.5
16QAM	%	12.5	12.5

#### 6.5.2A.1.1.4 Test description

#### 6.5.2A.1.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in table 6.5.2A.1.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2A.1.1.4.1-1: Test Configuration Table

			Init	tial Condit	ions				
Test Envi	ronment a	s specified	lin	NC					
	8[7] subcla								
Test Frequencies as specified in						See Table 6.5.1A.4.1-1:			
TS36.508 [7] subclause 4.3.1 for different CA bandwidth									
classes.									
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in						e 6.5.1A.4.1-	1:		
subclause 5.4.2A.1 for the CA Configuration									
			Test Paramete		Configura				
Config	_	Α	DL Allocation	CC		UL A	Allocation		
ID		ıration /	(PDCCH on	MOD					
	N <sub>RB</sub>		PCC)						
	PCC	SCCs	PCC & SCC RB		N <sub>RB_alloc</sub>	PCC 8	& SCC RB		ns
	N <sub>RB</sub>	N <sub>RB</sub>	allocation				(L <sub>CRB</sub> @ F	RB <sub>start</sub> )	
4	Note 2	Note 2		ODCK	75	D 75@0	C 0@0		
1	75	75	-	QPSK	75	P_75@0	S_0@0	-	-
3	75 75	75 75		QPSK	16	P_16@0	S_0@0	-	-
4	75 75	75 75		QPSK 16QAM	16 75	P_16@59 P_75@0	S_0@0 S_0@0	-	-
5	75 75	75		16QAM	16	P_75@0 P_16@0	S_0@0	-	-
	75 75	75 75		16QAM	16	P_16@0 P_16@59	S_0@0 S_0@0	-	-
7	100	50		QPSK	100	P_16@59 P_100@0		-	-
8	100	50		QPSK	50		S_0@0 S_0@0	-	
9	100	50		QPSK	50	P_50@0		-	-
10	100	50		QPSK	12	P_50@50 P_12@0	S_0@0 S_0@0	-	-
11	100	50		QPSK	12	P_12@88	S_0@0	-	-
12	100	50		16QAM	100	P_12@00 P_100@0	S_0@0	-	
13	100	50		16QAM	50	P_50@0	S_0@0	-	
14	100	50	-	16QAM	50	P_50@50	S_0@0	-	
15	100	50	N.A.	16QAM	12	P_12@0	S_0@0	-	
16	100	50	-	16QAM	12	P 12@88	S_0@0	-	-
17	50	100	-	QPSK	50	P_50@0	S_0@0	_	
18	50	100		QPSK	12	P 12@0	S 0@0	-	-
19	50	100	-	QPSK	12	P_12@38	S_0@0	-	-
20	50	100	1	16QAM	50	P_50@0	S 0@0	-	-
21	50	100	1	16QAM	12	P_12@0	S 0@0	-	-
22	50	100	1	16QAM	12	P 12@38	S_0@0	-	-
23	100	100	1	QPSK	100	P_100@0	S_0@0	-	-
24	100	100	1	QPSK	18	P_18@0	S_0@0	-	-
25	100	100	1	QPSK	18	P_18@82	S_0@0	-	-
26	100	100	1	16QAM	100	P_100@0	S 0@0	-	-
27	100	100	1	16QAM	18	P_18@0	S_0@0	-	-
28	100	100	1	16QAM	18	P_18@82	S_0@0	-	-
Note 1:	CA Confi		est CC Combination					Configura	tion
	which ap	plicable ag	gregated channel ba	andwidths a	are specifie	d in Table 5.4	4.2A.1 -1	ū	
Note 2:	The frequ	uencies of	PCC and SCC shall	be switche	d and teste	ed in each co	nfiguration.	<u> </u>	

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508[7] Annex A, Figure group A.32 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channel is set according to Table 6.5.2A.1.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in [State 3A-RF] according to TS 36.508 [7] clause [5.2A.2]. Message contents are defined in clause 6.5.2A.1.1.4.3.

#### 6.5.2A.1.1.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.2A.1.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2 Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at P<sub>UMAX level</sub>.
- 3 Measure the EVM and  $\overline{EVM}_{DMRS}$  on PCC using Global In-Channel Tx-Test (Annex E).
- 4 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is 36.8d Bm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5d Bm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.</p>
- 5 Measure the EVM and EVM DMRS on PCC using Global In-Channel Tx-Test (Annex E).

#### 6.5.2A.1.1.4.3 Message contents

FFS.

#### 6.5.2A.1.1.5 Test requirement

The PUSCH EVM derived in E.4.2 shall not exceed 17,5 % for QPSK and BPSK, 12,5% for 16 QAM.

The PUSCH *EVM* <sub>DMRS</sub> derived in E.4.6.2 shall not exceed [17,5 %] when embedded with data symbols of QPSK and BPSK, [12,5%] for 16 QAM.

## 6.5.2A.2 Carrier leakage for CA

#### 6.5.2A.2.1 Carrier leakage for CA (intra-band contiguous DL CA and UL CA)

Editor's notes: The following items are missing or incomplete:

- Initial conditions (test setup for SCC is FFS, references need update, test state for CA RF testing is FFS)
- Test procedure (incomplete, references need update)
- Message Contents
- Test tolerances not yet in the annex
- Connection diagram is missing

## 6.5.2A.2.1.1 Test Purpose

Carrier leakage (The IQ origin offset) is an additive sinusoid waveform that has the same frequency as the modulated waveform carrier frequency. Carrier leakage is defined for each component carrier and is measured on the carrier with PRBs allocated. The measurement interval is one slot in the time domain.

#### 6.5.2A.2.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

#### 6.5.2A.2.1.3 Minimum conformance requirements

The relative carrier leakage power is a power ratio of the additive sinusoid waveform and the modulated waveform. The relative carrier leakage power shall not exceed the values specified in Table 6.5.2A.2.1.3-1.

Table 6.5.2A.2.1.3-1: Minimum requirements for Relative Carrier Leakage Power

Parameters	Relative Limit (dBc)
Output power >0 dBm	-25
-30 dBm ≤ Output power ≤0 dBm	-20
-40 dBm ≤ Output power < -30 dBm	-10

## 6.5.2A.2.1.4 Test description

#### 6.5.2A.2.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in table 6.5.2A.2.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2A.2.1.4.1-1: Test Configuration Table

	Initial Conditions									
Test Environment as specified in					NC					
TS 36.508[7] subclause 4.1										
Test Fre	quencies	as specified	in		See Tabl	e 6.5.1A.4.1-	1:			
TS36.508 [7] subclause [4.3.1] for different CA bandwidth				dwidth						
classes.										
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subclause 5.4.2A.1 for the CA Configuration					See Tabl	e 6.5.1A.4.1-	1:			
			Test Paramete	ers for CA	Configura	tions				
Config	CA Con	figuration	DL Allocation	CC		UL	Allocation			
ID	/ N	RB_agg	(PDCCH on	MOD						
			PCC)							
	PCC	SCCs	PCC & SCC RB		N <sub>RB_alloc</sub> PCC & SCC RB allocations			ns		
	N <sub>RB</sub>	N <sub>RB</sub> Note	allocation		(L <sub>CRB</sub> @ RB <sub>start</sub> )					
	Note 2	2								
1	75	75		QPSK	16	P_16@0	S_0@0	-	-	
2	75	75		QPSK	16	P_16@59	S_0@0	-	-	
3	100	50		QPSK	12	P_12@0	S_0@0	-	-	
4	100	50	NA	QPSK	12	P_12@88	_	-	-	
5	50	100	INA	QPSK	12	P_12@0	S_0@0	-	-	
6	50	100		QPSK	12	P_12@38	S_0@0	-	-	
7	100	100		QPSK	18	P_18@0	S_0@0	-	-	
8	100	100		QPSK	18	P_18@82	S_0@0	-	-	
Note 1: Note 2:	Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1									

- 1. Connect the SS to the UE to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure group A.32 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508[7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2A.2.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in [State 3A-RF] according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2A.2.1.4.3.

#### 6.5.2A.2.1.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.2A.2.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $3.2\,d\,Bm\,\pm 3.2d\,B$  for carrier frequency  $f \le 3.0GHz$  or  $3.5dBm\,\pm 3.5\,d\,B$  for carrier frequency  $3.0GHz < f \le 4.2GHz$ .
- 3. Measure carrier leakage on PCC using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test.
- 4. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $-26.8 \text{ dBm} \pm 3.2 \text{dB}$  for carrier frequency  $f \le 3.0 \text{GHz}$  or  $-26.5 \text{dBm} \pm 3.5 \text{dB}$  for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ .
- 5. Measure carrier leakage on PCC using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test.
- Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is -36.8d Bm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5d Bm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.</li>
- 7. Measure carrier leakage on PCC using Global In-Channel Tx-Test (Annex E). For TDD slots with transient periods are not under test.

6.5.2A.2.1.4.3 Message contents

FFS.

#### 6.5.2A.2.1.5 Test requirement

Each of the 20 IQ offset results, derived in Annex E.3.1, shall not exceed the values in table 6.5.2A.2.1.5-1.

Table 6.5.2A.2.1.5-1: Test requirements for Relative Carrier Leakage Power

Carrier	Parameters	Relative Limit (dBc)
Leakage	f ≤ 3.0GHz: 3.2 dBm ±3.2dB	-24.2
	3.0GHz < f ≤ 4.2GHz: 3.5 dBm	
	±3.5dB	
	f ≤ 3.0GHz: -26.8 dBm ±3.2dB	-19.2
	3.0GHz < f ≤ 4.2GHz: -26.5 dBm	
	±3.5dB	
	f ≤ 3.0GHz: -36.8dBm±3.2dB	-9.2
	3.0GHz < f ≤ 4.2GHz: -36.5 dBm	
	±3.5dB	

#### 6.5.2A.3 In-band emissions for non allocated RB for CA

# 6.5.2A.3.1 In-band emissions for non allocated RB for CA (intra-band contiguous DL CA and UL CA)

Editor's notes: The following items are missing or incomplete:

- Test procedure(incomplete, references need update)
- Test tolerances not yet in the annex

## 6.5.2A.3.1.1 Test Purpose

The in-band emissions are a measure of the interference falling into the non-allocated resources blocks.

For an allocated component carrier, the in-band emission is defined as the average across 12 sub-carrier and as a function of the RB offset from the edge of the allocated UL transmission bandwidth. The in-band emission is measured as the ratio of the UE output power in a non-allocated RB to the UE output power in an allocated RB. The basic in-band emissions measurement interval is defined over one slot in the time domain. When the PUSCH or PUCCH transmission slot is shortened due to multiplexing with SRS, the in-band emissions measurement interval is reduced by one SC-FDMA symbol, accordingly.

For a non allocated component carrier a spectral measurement is specified.

#### 6.5.2A.3.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

### 6.5.2A.3.1.3 Minimum conformance requirements

For intra-band contiguous carrier aggregation, the requirements in Table 6.5.2A.3.1.3-1 and 6.5.2A.3.1.3-2 apply within the aggregated transmission bandwidth configuration with both component carrier (s) active and one single contiguous PRB allocation of bandwidth  $L_{CRB}$  at the edge of the aggregated transmission bandwidth configuration.

The in-band emission is defined as the interference falling into the non allocated resource blocks for all component carriers. The measurement method for the in band emissions in the component carrier with PRB allocation is specified in Annex E Global In-Channel Tx-Test. For a non allocated component carrier a spectral measurement is specified.

Table 6.5.2A.3.1.3-1: Minimum requirements for in-band emissions (allocated component carrier)

Parameter	Unit	Limit	Applicable Frequencies
General	dB	$\max \left\{ -25 - 10 \cdot \log_{10}(N_{RB} / L_{CRB}), \\ 20 \cdot \log_{10} EVM - 3 - 5 \cdot ( \Delta_{RB}  - 1) / L_{CRB}, \\ -57 dBm / 180kHz - P_{RB} \right\}$	Any non-allocated (Note 1)
IQ Image	dB	-25	Exception for IQ image (Note 2)
Carrier leakage	dBc	-25 Output power > 0 dBm -20 -30 dBm ≤ Output power ≤ 0 dB -40 dBm ≤ Output power < -30 dBm	

- Note 1: An in-band emissions combined limit is evaluated in each non-allocated RB in the allocated component carrier. For each such RB, the minimum requirement is calculated as the higher of  $P_{RB}$  30 dB and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply.  $P_{RB}$  is defined in Note 8. The limit is evaluated in each non-allocated RB. The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs
- Note 2: Exceptions to the general limit are allowed for up to  $L_{\it CRB}$  RBs within a contiguous width of  $L_{\it CRB}$  non-allocated RBs in the allocated component carrier. The measurement bandwidth is 1 RB. The measurement bandwidth is 1 RB.
- Note 3: Exceptions to the general limit are allowed for up to two contiguous non-allocated RBs in the allocated component carrier. The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in the non-allocated RB to the measured total power in all allocated RBs.
- Note 4:  $L_{\it CRB}$  is the Transmission Bandwidth (see Figure 5.4.2-1) not exceeding  $\lfloor N_{\it RB}/2-1 \rfloor$
- Note 5:  $N_{\it RB}$  is the Transmission Bandwidth Configuration (see Figure 5.4.2-1) of the component carrier with RBs allocated.
- Note 6: EVM is the limit specified in Table 6.5.2.1.3-1 for the modulation format used in the allocated RBs.
- Note 7:  $\Delta_{\it RB}$  is the starting frequency offset between the allocated RB and the measured non-allocated RB in the allocated component carrier (e.g.  $\Delta_{\it RB}=1$  or  $\Delta_{\it RB}=-1$  for the first adjacent RB outside of the allocated bandwidth.
- Note 8:  $P_{RB}$  is the transmitted power per 180 kHz in allocated RBs, measured in dBm.

Table 6.5.2A.3.1.3-2: Minimum requirements for in-band emissions (not allocated component carrier)

dB	BW of 1 RB (180KHz rectangular)	$20 \cdot \log_{10}$	$_{0}EVM - 3 - 5 \cdot (\left \Delta_{RB}\right  - 1) / L_{CRB}$	The reference value is the average power per allocated RB in the allocated component carrier	Any RB in the non allocated component carrier. The frequency raster of the RBs is derived when this component carrier is				
		$-57  dBm / 180kHz - P_{RB} \big\}$		$20 \cdot \log_{10} EVM - 3 - 5 \cdot (\left \Delta_{RB}\right  - 1) / L_{CRB}$		$20 \cdot \log_{10} EVM - 3 - 5 \cdot (\left  \Delta_{RB} \right  - 1) / L_{CRB}$			allocated with RBs
dB	BW of 1 RB (180KHz rectangular)		-25 Note 2	The reference value is the average power per allocated RB in the allocated component carrier	The frequencies of the $L_{CRB}$ continguous non-allocated RBs are unknown. The frequency raster of the RBs is derived when this component carrier is allocated with RBs				
	BW of 1 RB (180KHz rectangular)	25	Note 3	The reference value is the total power of	The frequencies of the up to 2				
dBc	- 1	-20	-30 dBm ≤ Output power ≤ 0 dBm	the allocated RBs in the allocated component carrier	non-allocated RBs are unknown. The frequency raster of the RBs is derived when this				
		-10	-40 dBm ≤ Output power < - 30 dBm		component carrier is allocated with RBs				
r	dBc solution	BW of 1 RB (180KHz rectangular)  BW of 1 RB (180KHz rectangular)	BW of 1 RB (180KHz rectangular)  BW of 1 RB (180KHz rectangular)  -25  dBc -20  -10  solution BWs smaller than the meandwidth.	dB (180KHz rectangular)  BW of 1 RB (180KHz rectangular)  -25 Output power > 0 dBm  dBc  -20 -30 dBm ≤ Output power ≤ 0 dBm  -10 -40 dBm ≤ Output power < -30 dBm  solution BWs smaller than the measurement BW may be integrated adwidth.	BW of 1 RB (180KHz rectangular)  BW of 1 RB (180KHz rectangular)  BW of 1 RB (180KHz rectangular)  -25 Output power > 0 dBm  dBc  -25 Output power > 0 dBm  -30 dBm ≤ Output power < - 30 dBm  Solution BWs smaller than the measurement BW may be integrated to achieve the new surement				

Note 2: Exceptions to the general limit are allowed for up to  $L_{\it CRB}$  RBs within a contiguous width of  $L_{\it CRB}$ non-allocated RBs.

Exceptions to the general limit are allowed for up to two contiguous non-allocated RBs Note 3:

Note 4 and note 8 from Table 6.5.2A.3.3-1 apply for Table 6.5.2A.3.1-2 as well. Note 4:

 $\Delta_{\it RB}$  is the starting frequency offset between the allocated RB in the allocated component carrier and Note 5: the measured non-allocated RB in the non allocated component carrier. For non allocated component carrier,  $\Delta_{\it RB}$  may take non-integer values when the carrier spacing between the CCs is not a multiple of RB.

#### 6.5.2A.3.1.4 Test description

#### 6.5.2A.3.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in table 6.5.2A.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2A.3.1.4.1-1: Test Configuration Table

Initial Conditions									
Test Environment as specified in					NC				
TS 36.508[7] subclause 4.1									
Test Frequencies as specified in					See Tabl	e 6.5.1A.4.1-	1:		
TS36.508	[7] subcla	use 4.3.1 fc	or different CA bandv	/idth					
classes.									
Test CC (	Combinatio	n setting (N	I <sub>RB_agg</sub> ) as specified i	n	See Tabl	e 6.5.1A.4.1-	1:		
			Configuration						
Test Para		CA Configu	urations						
Config	CA Config	guration /	DL Allocation	CC	UL Alloca	ation			
ID	N <sub>RB_agg</sub>		(PDCCH on PCC)	MOD					
	PCC	SCC	PCC & SCC RB		N <sub>RB_alloc</sub>	PCC & SC	C RB alloca	ations	
			allocation			(L <sub>CRB</sub> @ RE	3 <sub>start</sub> )		
1 Note 2	75	75		QPSK	16	P_16@0	S_0@0	-	-
2 Note 3	75	75		QPSK	16	P_16@59	S_0@0	-	-
3 Note 2	100	50		QPSK	12	P_12@0	S_0@0	-	-
4 Note 3	100	50	N.A.	QPSK	12	P_12@88	S_0@0	-	-
5 Note 2	50	100	IN./%	QPSK	12	P_12@0	S_0@0	-	-
6 Note 3	50	100		QPSK	12	P_12@38	S_0@0	-	-
7 Note 2	100	100		QPSK	18	P_18@0	S_0@0	-	-
8 Note 3	100	100		QPSK	18	P_18@82	S_0@0	-	-
Note 1:									

- 1. Connect the SS to the UE to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure group A.32 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508[7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2A.3.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2A.3.1.4.3.

#### 6.5.2A.3.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.5.2A.3.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.5.2A.3.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

- 5. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $3.2 \, dBm \pm 3.2 dB$  for carrier frequency  $f \le 3.0 GHz$  or  $3.5 dBm \pm 3.5 dB$  for carrier frequency  $3.0 GHz < f \le 4.2 GHz$ .
- 6. Measure In-band emission on PCC using Global In-Channel Tx-Test (Annex E). Measure power spectral density on the SCC. For TDD slots with transient periods are not under test.
- 7. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is 26.8 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.
- 8. Measure In-band emission on PCC using Global In-Channel Tx-Test (Annex E). Measure power spectral density on the SCC. For TDD slots with transient periods are not under test.
- 9. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is to  $-36.8 \text{ dBm} \pm 3.2 \text{dB}$  for carrier frequency  $f \le 3.0 \text{GHz}$  or  $-36.5 \text{dBm} \pm 3.5 \text{dB}$  for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ .
- 10. Measure In-band emission on PCC using Global In-Channel Tx-Test (Annex E). Measure power spectral density on the SCC. For TDD slots with transient periods are not under test.

#### 6.5.2A.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 6.5.2A.3.1.5 Test requirement

Each of the 20 In-band emissions results, derived in Annex E.4.3 shall not exceed the corresponding values in Table 6.5.2A.3.1.5-1.

Table 6.5.2A.3.1.5-1: Test requirements for in-band emissions (allocated component carrier)

Parameter Description	Unit	L	Applicable Frequencies							
General	dB	$\max \left\{ -25 - 10 \cdot \log_{10}(N_{RB} / L_{CRBs}), \\ 20 \cdot \log_{10} EVM - 3 - 5 \cdot (\left \Delta_{RB}\right  - 1) / L_{CRBs}, +0.8 \\ -57 dBm / 180kHz - P_{RB} \right\}$		$20 \cdot \log_{10} EVM - 3 - 5 \cdot (\left \Delta_{RB}\right  - 1) / L_{CRBs},$ +0.8		$20 \cdot \log_{10} EVM - 3 - 5 \cdot (\left \Delta_{RB}\right  - 1) / L_{CRBs},$ +0.8		$20 \cdot \log_{10} EVM - 3 - 5 \cdot ( \Delta_{RB}  - 1) / L_{CRBs},$ +0.8		Any non-allocated (Note 2)
IQ Image	dB		Image frequencies (Notes 2, 3)							
		-24.2	Output power f ≤ 3.0GHz: 3.2dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: 3.5 dBm ±3.5dB							
DC	dBc	-19.2	Output power f ≤ 3.0GHz: -26.8 dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -26.5 dBm ±3.5dB	LO frequency (Notes 4, 5)						
		-9.2	Output power f ≤ 3.0GHz: -36.8 dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -36.5 dBm ±3.5dB							

- Note 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the test requirement is calculated as the higher of  $P_{RB}$  29.2 dB and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply.  $P_{RB}$  is defined in Note 10.
- Note 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs.
- Note 3: The applicable frequencies for this limit are not known due to unknown LO frequency. See Note 2 in Table 6.5.2A.3.3-1.
- Note 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.
- Note 5: The applicable frequencies for this limit are not known due to unknown LO frequency. See Note 3 in Table 6.5.2A.3.3-1.
- Note 6:  $L_{CRB}$  is the Transmission Bandwidth (see Figure 5.4.2-1).
- Note 7:  $N_{RR}$  is the Transmission Bandwidth Configuration (see Figure 5.4.2-1).
- Note 8: EVM is the limit specified in Table 6.5.2.1.1-1 for the modulation format used in the allocated RBs.
- Note 9:  $\Delta_{RB}$  is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g.
  - $\Delta_{\it RB}=1$  or  $\Delta_{\it RB}=-1$  for the first adjacent RB outside of the allocated bandwidth.
- Note 10:  $P_{RR}$  is the transmitted power per 180 kHz in allocated RBs, measured in dBm.

The in-band emissions results, measured with the spectral test shall not exceed the corresponding values in Table 6.5.2A.3.5-2

Table 6.5.2A.3.1.5-2: Test requirements for in-band emissions (not allocated component carrier)

Para-	Unit	Meas BW		Limit	remark	Applicable
meter		Note 1				Frequencies
General	dB	BW of 1 RB (180KHz rectangular)	$20 \cdot \log_{10}$	$(25-10 \cdot \log_{10}(N_{RB} / L_{CRBs}),$ $(5EVM - 3 - 5 \cdot ( \Delta_{RB}  - 1) / L_{CRBs})$ $(5EVM - 180kHz - P_{RB})$	The reference value is the average power per allocated RB in the allocated component carrier	Any RB in the non allocated component carrier. The frequency raster of the RBs is derived when this component carrier is allocated with RBs
IQ Image	dB	BW of 1 RB (180KHz rectangular)		-24.2 Note 2	The reference value is the average power per allocated RB in the allocated component carrier	The frequencies of the $L_{\it CRB}$ contiguous nonallocated RBs are unknown. The frequency raster of the RBs is derived when this component carrier is allocated with RBs
Carrier leakage	dBc	BW of 1 RB (180KHz rectangular)	Note 3		The reference value is the	The frequencies of
			-24.2	Output power > 0 dBm	total power of the allocated RBs in the allocated component carrier	the up to 2 non-allocated RBs are unknown. The frequency raster of the RBs is derived when this component carrier is allocated with RBs
			-19.2	-30 dBm ≤ Output power ≤ 0 dBm		
			-9.2	-40 dBm ≤ Output power < - 30 dBm		

Note 2: Exceptions to the general limit are allowed for up to  $L_{\it CRB}$  RBs within a contiguous width of  $L_{\it CRB}$  non-allocated RBs

Note 3: Exceptions to the general limit are allowed for up to two contiguous non-allocated RBs.

Note 4: Note 4 and note 8 from Table 6.5.2A.3.3-1 apply for Table 6.5.2A.3.1-2 as well.

Note 5:  $\Delta_{RB}$  is the starting frequency offset between the allocated RB in the allocated component carrier and the measured non-allocated RB in the non allocated component carrier. For non allocated component carrier,  $\Delta_{RB}$  may take non-integer values when the carrier spacing between the CCs is not a multiple of RB.

## 6.5.2B Transmit modulation for UL- MIMO

## 6.5.2B.1 Error Vector Magnitude (EVM) for UL-MIMO

## 6.5.2B.1.1 Test Purpose

The Error Vector Magnitude is a measure of the difference between the reference waveform and the measured waveform. This difference is called the error vector. Before calculating the EVM the measured waveform is corrected

by the sample timing offset and RF frequency offset. Then the IQ origin offset shall be removed from the measured waveform before calculating the EVM.

The measured waveform is further modified by selecting the absolute phase and absolute amplitude of the Tx chain. The EVM result is defined after the front-end IDFT as the square root of the ratio of the mean error vector power to the mean reference power expressed as a %.

When the PUSCH or PUCCH transmission slot is shortened due to multiplexing with SRS, the EVM measurement interval is reduced by one symbol, accordingly. The PUSCH or PUCCH EVM measurement interval is also reduced when the mean power, modulation or allocation between slots is expected to change. In the case of PUSCH transmission, the measurement interval is reduced by a time interval equal to the sum of 5  $\mu$ s and the applicable exclusion period defined in subclause 6.3.4, adjacent to the boundary where the power change is expected to occur. The PUSCH exclusion period is applied to the signal obtained after the front-end IDFT. In the case of PUCCH transmission, the PUCCH EVM measurement interval is reduced by one symbol adjacent to the slot boundary.

## 6.5.2B.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

## 6.5.2B.1.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the Error Vector Magnitude requirements specified in Table 6.5.2.1.1-1 which is defined in sub-clause 6.5.2.1 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B-2.

The normative reference for this requirement is TS 36.101 [2] clause 6.5.2B.1.1.

## 6.5.2B.1.4 Test description

#### 6.5.2B.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.2B.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2B.1.4.1-1: Test Configuration Table for PUSCH

Initial Conditions									
(as spe	Test Environment cified in TS 36.508 [7] subclause 4.1)	NC							
(as spec	Test Frequencies ified in TS36.508 [7] subclause 4.3.1)	See Table 6.5.1.4.1-1							
(as speci	Test Channel Bandwidths fied in TS 36.508 [7] subclause 4.3.1)	See Table 6.5.1.4.1-1							
Test Parameters for Channel Bandwidths									
	Downlink Configuration	Uplink Configuration							
Ch BW	N/A for PUSCH EVM testing	Mod'n RB allocation		ocation					
			FDD	TDD					

1.4MHz	QPSK	6	6
1.4MHz	QPSK	1	1
1.4MHz	16QAM	6	6
1.4MHz	16QAM	1	1
3MHz	QPSK	15	15
3MHz	QPSK	4	4
3MHz	16QAM	15	15
3MHz	16QAM	4	4
5MHz	QPSK	25	25
5MHz	QPSK	8	8
5MHz	16QAM	25	25
5MHz	16QAM	8	8
10MHz	QPSK	50	50
10MHz	QPSK	12	12
10MHz	16QAM	50	50
		(Note 3)	(Note 3)
10MHz	16QAM	12	12
15MHz	QPSK	75	75
15MHz	QPSK	16	16
15MHz	16QAM	75	75
		(Note 3)	(Note 3)
15MHz	16QAM	16	16
20MHz	QPSK	100	100
20MHz	QPSK	18	18
20MHz	16QAM	100	100
		(Note 3)	(Note 3)
20MHz	16QAM	18	18

Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.

Note 2: For partial RB allocation, the RB<sub>start</sub> shall be RB #0 and RB# (max+1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories [FFS].

Table 6.5.2B.1.4.1-2: Test Configuration Table for PUCCH

	Initial Conditions					
Test Env	Test Environment as specified in		NC			
	.508[7] subclau					
	quencies as sp			See Table 6.5.1.4.1-1		
TS36.5	08 [7] subclaus	se 4.3.1				
	el Bandwidths a			See Table 6.5.1.4.1-1		
TS 36.5	08 [7] subclau					
Test Parameters for Cha						
	Dowr	nlink Configuration		Uplink Configuration		
Ch BW	Mod'n		ocation	FDD: PUCCH format = Format 1a		
		FDD	TDD	TDD: PUCCH format = Format 1a / 1b		
1.4MHz	QPSK	3	3			
3MHz	QPSK	4	4			
5MHz	QPSK	8	8			
10MHz	QPSK	16	16			
15MHz	QPSK	25	25			
20MHz	QPSK	30	30			
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable						

- 1. Connect the SS to the UE to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508[7] subclause 4.4.3.

channel bandwidths are specified in Table 5.4.2.1-1.

- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2B.1.4.1-1.

- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2B.1.4.3.

#### 6.5.2B.1.4.2 Test procedure

Test procedure for PUSCH:

- 1.1.SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.5.2B.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 1.2 Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAXlevel}$ .
- 1.3 Measure the EVM and  $EVM_{DMRS}$  using Global In-Channel Tx-Test (Annex E) for each of transmit antenna of the UE.
- 1.4 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $-36.8 d\, Bm \pm 3.2 dB$  for carrier frequency  $f \le 3.0 GHz$  or  $-36.5 d\, Bm \pm 3.5 d\, B$  for carrier frequency  $3.0 GHz < f \le 4.2 GHz$ .
- 1.5 Measure the EVM and *EVM* <sub>DMRS</sub> using Global In-Channel Tx-Test (Annex E) for each of transmit antenna of the UE.

Test procedure for PUCCH:

- 2.1 PUCCH are set according to Table 6.5.2B.1.4.1-2.
- 2.2 SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 6.5.2B.1.4.1-2. The SS sends downlink MAC padding bits on the DL RMC. The transmission of PDSCH will make the UE send uplink ACK/NACK using PUCCH. There is no PUSCH transmission.
- 2.3 SS send appropriate TPC commands for PUCCH to the UE until the UE transmit PUCCH at P<sub>UMAX</sub> level.
- 2.4 Measure PUCCH EVM using Global In-Channel Tx-Test (Annex E) for each of trans mit antenna of the UE.
- 2.5 Send the appropriate TPC commands for PUCCH to the UE until the UE transmits PUCCH at -36.8d Bm  $\pm 3.2$ d B for carrier frequency  $f \le 3.0$ GHz or -36.5dBm  $\pm 3.5$  dB for carrier frequency 3.0GHz  $< f \le 4.2$ GHz.
- 2.6 Measure PUCCH EVM using Global In-Channel Tx-Test (Annex E) for each of trans mit antenna of the UE.

#### 6.5.2B.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.5.2B.1.4.3-1: PUCCH-Config Dedicated-v1020-DEFAULT

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-9A: PUCCH-ConfigDedicated-v1020-DEFAULT					
Information Element	Value/remark	Comment	Condition		
PUCCH-ConfigDedicated-v1020 ::= SEQUENCE {					
twoAntennaPortActivatedPUCCH-Format1a1b-r10	true				
}					

### 6.5.2B.1.5 Test requirement

The requirements apply to each transmit antenna connector.

The PUSCH EVM derived in E.4.2 shall not exceed 17.5 % for QPSK and BPSK, 12.5% for 16 QAM.

The PUSCH *EVM* <sub>DMRS</sub> derived in E.4.6.2 shall not exceed [17.5 %] when embedded with data symbols of QPSK and BPSK, [12,5%] for 16 QAM.

The PUCCH EVM and derived in E.5.9.2 shall not exceed 17.5%.

# 6.5.2B.2 Carrier leakage for UL-MIMO

### 6.5.2B.2.1 Test Purpose

The purpose of this test is to exercise the transmitter of UE that support UL-MIMO to verify its modulation quality in terms of carrier leakage for UL-MIMO.

### 6.5.2B.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

# 6.5.2B.2.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the Relative Carrier Leakage Power requirements specified in Table 6.5.2.2.3-1 which is defined in subclause 6.5.2.2 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

The normative reference for this requirement is TS 36.101 clause 6.5.2B.2

### 6.5.2B.2.4 Test description

#### 6.5.2B.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.2.2B.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2.2B.4.1-1: Test Configuration Table

		•		
	Initial Condition	ns		
Test Environment		Soc	e Table 6.5.1.4	1_1
	in TS 36.508 [7] subclause 4.1)	366	5 Table 0.5.1.4	. 1 - 1
Test Frequen		See	e Table 6.5.1.4	1-1
	in TS36.508 [7] subclause 4.3.1)	000	7 14510 0.0.1.4	
Test Channel		See	e Table 6.5.1.4	1-1
(as specified	in TS 36.508 [7] subclause 4.3.1)			
Test Parameters for Channel Bandwidths				
	Downlink Configuration	Uplink Configuration		ion
Ch BW	NI/A for corrier lookage testing	Modia	DD all	a cotion
CILDAA	N/A for carrier leakage testing	Mod'n RB allocation		
			FDD	TDD
1.4MHz		QPSK	1	1
3MHz		QPSK	4	4
5MHz		QPSK	8	8
10MHz		QPSK	12	12
15MHz		QPSK	16	16
20MHz		QPSK	18	18
	st Channel Bandwidths are checked separa	•		hich
applicable channel bandwidths are specified in Table 5.4.2.1-1.				
Note 2: For partial RB allocation, the RB <sub>start</sub> shall be RB #0 and RB# (max+1- RB allocation) of				
the channel bandwidth.				

- 1. Connect the SS to the UE to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508[7] subclause 4.4.3.

- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2B.2.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2B.2.4.3.

### 6.5.2B.2.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.5.2B.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC
- 2. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $3.2 \, d\, Bm \pm 3.2 d\, B$  for carrier frequency  $f \le 3.0 \, GHz$  or  $3.5 \, d\, Bm \pm 3.5 \, d\, B$  for carrier frequency  $3.0 \, GHz < f \le 4.2 \, GHz$ .
- 3. Measure carrier leakage using Global In-Channel Tx-Test (Annex E) for each of transmit antenna of the UE. For TDD slots with transient periods are not under test.
- 4. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $-26.8 \text{ dBm} \pm 3.2 \text{dB}$  for carrier frequency  $f \le 3.0 \text{GHz}$  or  $-26.5 \text{dBm} \pm 3.5 \text{dB}$  for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ .
- 5. Measure carrier leakage using Global In-Channel Tx-Test (Annex E) for each of transmit antenna of the UE. For TDD slots with transient periods are not under test.
- 6. Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $-36.8d\,Bm \pm 3.2dB$  for carrier frequency  $f \le 3.0GHz$  or  $-36.5d\,Bm \pm 3.5\,dB$  for carrier frequency  $3.0GHz < f \le 4.2GHz$ .
- 7. Measure carrier leakage using Global In-Channel Tx-Test (Annex E) for each of transmit antenna of the UE. For TDD slots with transient periods are not under test

#### 6.5.2B.2.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6.

### 6.5.2B.2.5 Test requirement

The requirements apply to each transmit antenna connector.

Each of the 20 IQ offset results, derived in Annex E.3.1, shall not exceed the values in table 6.5.2B.2.5-1

Table 6.5.2B.2.5-1: Test requirements for Relative Carrier Leakage Power

LO Leakage	Parameters	Relative Limit (dBc)
	f ≤ 3.0GHz: 3.2 dBm ±3.2dB	24.2
	3.0GHz < f ≤ 4.2GHz: 3.5 dBm	
	±3.5dB	
	f ≤ 3.0GHz: -26.8 dBm ±3.2dB	19.2
	3.0GHz < f ≤ 4.2GHz: -26.5 dBm	
	±3.5dB	
	f ≤ 3.0GHz: -36.8dBm±3.2dB	9.2
	3.0GHz < f ≤ 4.2GHz: -36.5 dBm	
	±3.5dB	

### 6.5.2B.3 In-band emissions for non allocated RB for UL-MIMO

# 6.5.2B.3.1 Test Purpose

The in-band emissions are a measure of the interference falling into the non-allocated resources blocks.

The in-band emission is defined as the average across 12 sub-carrier and as a function of the RB offset from the edge of the allocated UL trans mission bandwidth. The in-band emission for UL-MIMO is measured as the ratio of the output power of UE that support UL-MIMO in a non-allocated RB to the output power of UE that support UL-MIMO in an allocated RB. The basic in-band emissions measurement interval is defined over one slot in the time domain. When the PUSCH or PUCCH transmission slot is shortened due to multiplexing with SRS, the in-band emissions measurement interval is reduced by one SC-FDMA symbol, accordingly.

### 6.5.2B.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

### 6.5.2B.3.3 Minimum conformance requirements

The relative in-band emission shall not exceed the values specified in Table 6.5.2B.3.3-1.

Table 6.5.2B.3.3-1: Minimum requirements for in-band emissions

Parameter Description	Unit	Limit (Note 1)		Applicable Frequencies
General	dB	$\max \{ -25 - 10 \cdot \log_{10}(N_{RB} / L_{CRBs}), \\ 20 \cdot \log_{10} EVM - 3 - 5 \cdot ( \Delta_{RB}  - 1) / L_{CRBs}, \\ -57 dBm / 180kHz - P_{RB} \}$		Any non-allocated (Note 2)
IQ Image	dB	-25		Image frequencies (Notes 2, 3)
		-25	Output power > 0 dBm	
Carrier leakage	dBc	-20	-30 dBm ≤ Output power ≤ 0 dBm	LO frequency (Notes 4, 5)
		-10	-40 dBm ≤ Output power < -30 dBm	

- Note 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the minimum requirement is calculated as the higher of  $P_{RB}$  30 dB and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply.  $P_{RB}$  is defined in Note 10.
- Note 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one nonallocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs.
- Note 3: The applicable frequencies for this limit are those that are endosed in the reflection of the allocated bandwidth, based on symmetry with respect to the centre carrier frequency, but excluding any allocated RBs.
- Note 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.
- Note 5: The applicable frequencies for this limit are those that are enclosed in the RBs containing the DC frequency if  $N_{RB}$  is odd, or in the two RBs immediately adjacent to the DC frequency if  $N_{RB}$  is even, but excluding any allocated RB.
- Note 6:  $L_{\it CRBs}$  is the Transmission Bandwidth (see Figure 5.4.2-1).
- Note 7:  $N_{RR}$  is the Transmission Bandwidth Configuration (see Figure 5.4.2-1).
- Note 8: *EVM* is the limit specified in Table 6.5.2.1.1-1 for the modulation format used in the allocated RBs.
- Note 9:  $\Delta_{RB}$  is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g.
  - $\Delta_{\it RB}=1$  or  $\Delta_{\it RB}=-1$  for the first adjacent RB outside of the allocated bandwidth.
- Note 10:  $P_{RR}$  is the transmitted power per 180 kHz in allocated RBs, measured in dBm.

The normative reference for this requirement is TS 36.101 [2] clause 6.5.2B.3.

The in-band emission is defined as the average across 12 sub-carrier and as a function of the RB offset from the edge of the allocated UL transmission bandwidth. The in-band emission is measured as the ratio of the UE output power in a non-allocated RB to the UE output power in an allocated RB. The basic in-band emissions measurement interval is defined over one slot in the time domain.

### 6.5.2B.3.4 Test description

#### 6.5.2B.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.2B.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2B.3.4.1-1: Test Configuration Table for PUSCH

	Initial Condition	ıs		
Test Environn (as specified i	nent in TS 36.508 [7] subclause 4.1)	ubclaus e 4.1) See Table 6.5.1.4.1-1		.1-1
Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1)		See	e Table 6.5.1.4	.1-1
Test Channel (as specified i	Bandwidths in TS 36.508 [7] subclause 4.3.1)	See	e Table 6.5.1.4	.1-1
Test Parameters for Channel Bandwidths				
	Downlink Configuration	Upli	ink Configurat	tion
Ch BW	N/A for in-band emissions testing	Mod'n RB allocation		ocation
			FDD	TDD
1.4MHz		QPSK	1	1
3MHz		QPSK	4	4
5MHz		QPSK	8	8
10MHz		QPSK	12	12
15MHz		QPSK	16	16
20MHz		QPSK	18	18
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.				
Note 2: For partial RB allocation, the starting resource block shall be RB #0 and RB# (max+1 - RB allocation) of the channel bandwidth.				

Table 6.5.2B.3.4.1-2: Test Configuration Table for PUCCH

	Initial Conditions				
	Test Environment as specified in TS 36.508[7] subclause 4.1			See Table 6.5.1.4.1-1	
	quencies as sp			See Table 6.5.1.4.1-1	
TS36.50	08 [7] subclau:	se 4.3.1			
Test Channe	el Bandwidths a	s specified in		See Table 6.5.1.4.1-1	
TS 36.5	08 [7] subclau	se 4.3.1			
Test Paramete			ers for Channe	l Bandwidths	
	Dowr	nlink Configur	ation	Uplink Configuration	
Ch BW	Mod'n	RB alle	ocation	FDD: PUCCH format = Format 1a	
		FDD	TDD	TDD: PUCCH format = Format 1a / 1b	
1.4MHz	QPSK	3	3		
3MHz	QPSK	4	4		
5MHz	QPSK	8	8		
10MHz	QPSK	16	16		
15MHz	QPSK	25	25		
20MHz	QPSK	30	30		
	· · · · · · · · · · · · · · · · · · ·				
channel bandwidths are specified in Table			ed in Table 5.4.	2.1-1.	

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2B.3.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2B.3.4.3.

### 6.5.2B.3.4.2 Test procedure

#### Test procedure for PUSCH:

- 1.1 SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.5.2B.3.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 1.2 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $3.2\,d\,B\,m\pm3.2d\,B$  for carrier frequency  $f\leq 3.0GHz$  or  $3.5d\,B\,m\pm3.5\,d\,B$  for carrier frequency  $3.0GHz < f\leq 4.2GHz$ .
- 1.3 Measure In-band emission using Global In-Channel Tx-Test (Annex E) for each of transmit antennas of the UE.
- 1.4 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is  $-26.8 \text{ dBm} \pm 3.2 \text{dB}$  for carrier frequency  $f \leq 3.0 \text{GHz}$  or  $-36.5 \text{dBm} \pm 3.5 \text{dB}$  for carrier frequency  $3.0 \text{GHz} < f \leq 4.2 \text{GHz}$ .
- 1.5 Measure In-band emission using Global In-Channel Tx-Test (Annex E) for each of transmit antennas of the UE. For TDD slots with transient periods are not under test.
- 1.6 Send the appropriate TPC commands in the uplink scheduling information to the UE until UE output power is to  $-36.8\,d\,Bm\,\pm3.2d\,B$  for carrier frequency  $f\leq 3.0GHz$  or  $-36.5d\,Bm\,\pm3.5\,d\,B$  for carrier frequency  $3.0GHz< f\leq 4.2GHz$ .
- 1,7 Measure In-band emission using Global In-Channel Tx-Test (Annex E) for each of transmit antennas of the UE. For TDD slots with transient periods are not under test.

### Test procedure for PUCCH:

- 2.1 PUCCH is set according to Table 6.5.2B.3.4.1-2. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 6.5.2B.3.4.1-2. The SS sends downlink MAC padding bits on the DL RMC. The transmission of PDSCH will make the UE send uplink ACK/NACK using PUCCH.
- 2.2 Send the appropriate TPC commands in the uplink scheduling information for PUCCH to the UE until UE output power is 3.2 dBm  $\pm$ 3.2dB for carrier frequency f  $\leq$  3.0GHz or 3.5dBm  $\pm$ 3.5 dB for carrier frequency 3.0GHz < f  $\leq$  4.2GHz.
- 2.3 Measure In-band emission using Global In-Channel Tx-Test (Annex E) for each of transmit antennas of the UE.
- 2.4 Send the appropriate TPC commands for PUCCH in the uplink scheduling information to the UE until UE output power is  $-26.8 \, dBm \pm 3.2 dB$  for carrier frequency  $f \le 3.0 GHz$  or  $-26.5 dBm \pm 3.5 \, dB$  for carrier frequency  $3.0 GHz < f \le 4.2 GHz$ .
- 2.5 Measure In-band emission using Global In-Channel Tx-Test (Annex E) for each of transmit antennas of the UE.
- 2.6 Send the appropriate TPC commands for PUCCH in the uplink scheduling information to the UE until UE output power is to -36.8 dBm  $\pm 3.2$ dB for carrier frequency f  $\leq 3.0$ GHz or -36.5dBm  $\pm 3.5$  dB for carrier frequency 3.0GHz < f  $\leq 4.2$ GHz.
- 2.7 Measure In-band emission using Global In-Channel Tx-Test (Annex E) for each of transmit antennas of the UE.

#### 6.5.2B.3.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions:

Table 6.5.2B.3.4.3-1: PUCCH-Config Dedicated-v1020-DEFAULT

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-9A: PUCCH-ConfigDedicated-v1020-DEFAULT					
Information Element	Value/remark	Comment	Condition		
PUCCH-ConfigDedicated-v1020 ::= SEQUENCE {					
twoAntennaPortActivatedPUCCH-Format1a1b-r10	true				
}					

### 6.5.2B.3.5 Test requirement

The requirements apply to each transmit antenna connector.

Each of the 20 In-band emissions results, derived in Annex E.4.3 shall not exceed the corresponding values in Table 6.5.2B.3.5-1.

Table 6.5.2B.3.5-1: Test requirements for in-band emissions

Parameter Description	Unit	Limit	Applicable Frequencies					
General	dB	$\max \left\{ -25 - 10 \cdot \log_{10}(N_{RB}/L_{CRBs}), \\ 20 \cdot \log_{10} EVM - 3 - 5 \cdot (\left \Delta_{RB}\right  - 1)/L_{CRBs}, \right. +0.8 \\ -57  dBm/180kHz - P_{RB} \right\}$		$20 \cdot \log_{10} EVM - 3 - 5 \cdot ( \Delta_{RB}  - 1) / L_{CRBs},$ +0.8		$20 \cdot \log_{10} EVM - 3 - 5 \cdot ( \Delta_{RB}  - 1) / L_{CRBs},$ +0.8		Any non-allocated (Note 2)
IQ Image	dB	-24.2		Image frequencies (Notes 2, 3)				
		-24.2	Output power > 0 dBm					
Carrier leakage	dBc	-19.2	-30 dBm ≤ Output power ≤ 0 dBm	LO frequency (Notes 4, 5)				
		-9.2	-40 dBm ≤ Output power < -30 dBm	4,3)				

- Note 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the minimum requirement is calculated as the higher of  $P_{RB}$  30 dB and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply.  $P_{RB}$  is defined in Note 10.
- Note 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs.
- Note 3: The applicable frequencies for this limit are those that are enclosed in the reflection of the allocated bandwidth, based on symmetry with respect to the centre carrier frequency, but excluding any allocated RBs.
- Note 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.
- Note 5: The applicable frequencies for this limit are those that are enclosed in the RBs containing the DC frequency if  $N_{RB}$  is odd, or in the two RBs immediately adjacent to the DC frequency if  $N_{RB}$  is even, but excluding any allocated RB.
- Note 6:  $L_{\it CRBs}$  is the Transmission Bandwidth (see Figure 5.4.2-1).
- Note 7:  $N_{RR}$  is the Transmission Bandwidth Configuration (see Figure 5.4.2-1).
- Note 8: *EVM* is the limit specified in Table 6.5.2.1.1-1 for the modulation format used in the allocated RBs.
- Note 9:  $\Delta_{RB}$  is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g.
  - $\Delta_{RB} = 1$  or  $\Delta_{RB} = -1$  for the first adjacent RB outside of the allocated bandwidth.
- Note 10:  $P_{RR}$  is the transmitted power per 180 kHz in allocated RBs, measured in dBm.

### 6.5.2B.4 EVM equalizer spectrum flatness for UL-MIMO

### 6.5.2B.4.1 Test Purpose

The zero-forcing equalizer correction applied in the EVM measurement process (as described in Annex E) must meet a spectrum flatness requirement for the EVM measurement to be valid. The EVM equalizer spectrum flatness is defined

in terms of the maximum peak-to-peak ripple of the equalizer coefficients (dB) across the allocated uplink block variation in dB of the equalizer coefficients generated by the EVM measurement process. The EVM equalizer spectrum flatness requirement does not limit the correction applied to the signal in the EVM measurement process but for the EVM result to be valid, the equalizer correction that was applied must meet the EVM equalizer spectrum flatness minimum requirements. The basic measurement interval is the same as for EVM.

### 6.5.2B.4.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

### 6.5.2B.4.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the EVM Equalizer Spectrum Flatness requirements specified in Table 6.5.2B.4.3-1 and Table 6.5.2B.4.3-2 which are defined in sub-clause 6.5.2B.4 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

The normative reference for this requirement is TS 36.101 clause 6.5.2B.4.

### 6.5.2B.4.4 Test description

#### 6.5.2B.4.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.5.2B.4.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.5.2B.4.4.1-1: Test Configuration Table

	Initial Condition	าร		
Test Environr (as specified	ment in TS 36.508 [7] subclause 4.1)	See	e Table 6.5.1.4	.1-1
Test Frequen (as specified	icies in TS36.508 [7] subclause 4.3.1)	See	e Table 6.5.1.4	.1-1
Test Channel (as specified	l Bandwidths in TS 36.508 [7] subclause 4.3.1)	See	e Table 6.5.1.4	.1-1
Test Parameters for Channel Bandwidths				
	Downlink Configuration	Uplink Configuration		
Ch BW	N/A for EVM equalizer spectrum flatness	Mod'n	RB allo	ocation
	testing		FDD TDD	
1.4MHz		QPSK	6	6
3MHz		QPSK	15	15
5MHz		QPSK	25	25
10MHz		QPSK	50	50
15MHz		QPSK	75	75
20MHz		QPSK	100	100

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to in Table 6.5.2B.4.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.5.2B.4.4.3.

### 6.5.2B.4.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.5.2B.4.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure spectrum flatness using Global In-Channel Tx-Test (Annex E) for each of transmit antennas of the UE. For TDD slots with transient periods are not under test.

### 6.5.2B.4.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6.

### 6.5.2B.4.5 Test requirement

The requirements apply to each transmit antenna connector.

Each of the 20 spectrum flatness functions, shall derive four ripple results in Annex E.4.4, The derived results shall not exceed the values in Figure 6.5.2B.4.5-1:

For normal conditions, the maximum ripple in Range 1 and Range 2 shall not exceed the values specified in Table 6.5.2B.4.5-1 and the following additional requirement: the relative difference between the maximum coefficient in Range 1 and the minimum coefficient in Range 2 must not be larger than 6.4 dB, and the relative difference between the maximum coefficient in Range 2 and the minimum coefficient in Range 1 must not be larger than 8.4 dB (see Figure 6.5.2B.4.5-1).

For extreme conditions, the maximum ripple in Range 1 and Range 2 shall not exceed the values specified in Table 6.5.2B.4.5-2 and the following additional requirement: the relative difference between the maximum coefficient in Range 1 and the minimum coefficient in Range 2 must not be larger than 7.4 dB, and the relative difference between the maximum coefficient in Range 2 and the minimum coefficient in Range 1 must not be larger than 11.4 dB (see Figure 6.5.2B.4.5-1).

Table 6.5.2B.4.5-1: Test requirements for EVM equalizer spectrum flatness (normal conditions)

	Frequency Range	Maximum Ripple [dB]
F <sub>UL_Mea</sub>	as - F <sub>UL_Low</sub> ≥ 3 MHz and F <sub>UL_High</sub> - F <sub>UL_Meas</sub> ≥ 3 MHz	5.4 (p-p)
	(Range 1)	
F <sub>UL_Me</sub>	as - Ful_Low < 3 MHzor Ful_High - Ful_Meas < 3 MHz	9.4 (p-p)
	(Range 2)	
Note 1:	F <sub>UL_Meas</sub> refers to the sub-carrier frequency for which	the equalizer coefficient is
	evaluated	
Note 2:	F <sub>UL_Low</sub> and F <sub>UL_High</sub> refer to each E-UTRA frequency	band specified in Table
	5.2-1	

Table 6.5.2B.4.5-2: Test requirements for spectrum flatness (extreme conditions)

F <sub>UL_Mea</sub>	s-F <sub>UL_Low</sub> ≥ 5 MHz and F <sub>UL_High</sub> -F <sub>UL_Meas</sub> ≥ 5 MHz	5.4 (p-p)
	(Range 1)	
F <sub>UL_Me</sub>	as - F <sub>UL_Low</sub> < 5 MHz or F <sub>UL_High</sub> - F <sub>UL_Meas</sub> < 5 MHz	13.4 (p-p)
	(Range 2)	
Note 1:	$F_{\text{UL\_Meas}}$ refers to the sub-carrier frequency for which evaluated	•
Note 2:	$F_{\text{UL\_Low}}$ and $F_{\text{UL\_High}}$ refer to each E-UTRA frequency 5.2-1	band specified in Table

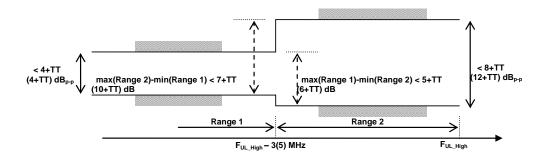


Figure 6.5.2B.4.5-1: The limits for EVM equalizer spectrum flatness with the maximum allowed variation of the coefficients indicated (the ETC minimum requirement within brackets).

# 6.6 Output RF spectrum emissions

Unwanted emissions are divided into "Out-of-band emission" and "Spurious emissions" in 3GPP RF specifications. This notation is in line with ITU-R recommendations such as SM.329 [2] and the Radio Regulations [3].

#### ITU defines:

Out-of-band emission = Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions.

Spurious emission = Emission on a frequency, or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out-of-band emissions.

Unwanted emissions = Consist of spurious emissions and out-of-band emissions.

The UE transmitter spectrum emission consists of the three components; the occupied band width (channel bandwidth), the Out Of Band (OOB) emissions and the far out spurious emission domain.

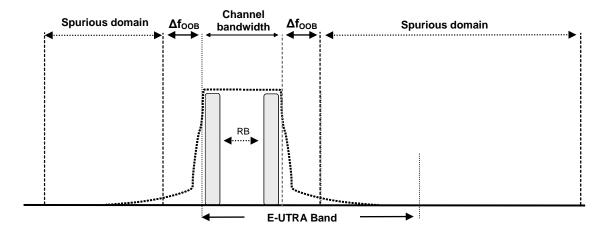


Figure 6.6-1: Transmitter RF spectrum

# 6.6.1 Occupied bandwidth

# 6.6.1.1 Test purpose

To verify that the UE occupied bandwidth for all transmission bandwidth configurations supported by the UE are less than their specific limits

# 6.6.1.2 Test applicability

This test applies to all types of E-UTRA UE release 8 and forward.

# 6.6.1.2 Minimum conformance requirements

Occupied bandwidth is a measure of the bandwidth containing 99 % of the total integrated mean power of the transmitted spectrum on the assigned channel. The occupied channel bandwidth for all transmission bandwidth configurations (Resources Blocks) should be less than the channel bandwidth specified in Table 6.6.1.2-1

Table 6.6.1.2-1: Occupied channel bandwidth

	Occupied c	Occupied channel bandwidth / channel bandwidth						
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
Channel bandwidth [MHz]	1.4	3	5	10	15	20		

The normative reference for this requirement is TS 36.101 [2] clause 6.6.1.

# 6.6.1.4 Test description

#### 6.6.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6. 1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.1.4.1-1: Test Configuration Table

	In	itial Conditior	าร		
	ironment as specified in .508[7] subclause 4.1		Nor	mal	
	quencies as specified in 08 [7] subclause 4.3.1		Mid r	ange	
	el Bandwidths as specified in 08 [7] subclause 4.3.1 Test Paramete	are for Channe	A Bondwidtho		
	Downlink Configur	ation	Upl	ink Configura	tion
Ch BW	N/A for Occupied ban	ndwidth Mod'n RB allocation			
				FDD	TDD

1.4MHz	QPSK	6	6
3MHz	QPSK	15	15
5MHz	QPSK	25	25
10MHz	QPSK	50	50
15MHz	QPSK	75	75
20MHz	QPSK	100	100

Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable channel bandwidths are specified in Table 5.4.2.1-1.

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.1.4.3

# 6.6.1.4.2 Test procedure

SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

Send continuously power control "up" commands to the UE until the UE transmits at P<sub>UMAX</sub> level.

Measure the power spectrum distribution within two times or more range over the requirement for Occupied Bandwidth specification centring on the current carrier frequency. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). Other methods to measure the power spectrum distribution are allowed. The measuring duration is one active uplink subframe. For TDD slots with transient periods are not under test.

Calculate the total power within the range of all frequencies measured in '3)' and save this value as "Total Power".

Sum up the power upward from the lower boundary of the measured frequency range in '3)' and seek the limit frequency point by which this sum becomes 0,5 % of "Total Power" and save this point as "Lower Frequency".

Sum up the power downward from the upper boundary of the measured frequency range in '3)' and seek the limit frequency point by which this sum becomes 0,5 % of "Total Power" and save this point as "Upper Frequency".

Calculate the difference ("Upper Frequency" – "Lower Frequency" = "Occupied Bandwidth") between two limit frequencies obtained in '5)' and '6)'.

### 6.6.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6

### 6.6.1.5 Test requirement

The measured Occupied Bandwidth shall not exceed values in Table 6.6.1.5-1.

Table 6.6.1.5-1: Occupied channel bandwidth

	Occupied c	Occupied channel bandwidth / channel bandwidth						
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
Channel bandwidth [MHz]	1.4	3	5	10	15	20		

# 6.6.1A Occupied bandwidth for CA

# 6.6.1A.1 Occupied bandwidth for CA (intra-band contiguous DL CA and UL CA)

### 6.6.1A.1.1 Test purpose

To verify that the UE occupied bandwidth for intra-band contiguous CA for all transmission bandwidth configurations supported by the UE are less than their specific limits

### 6.6.1A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

### 6.6.1A.1.3 Minimum conformance requirements

For intra-band contiguous carrier aggregation, occupied bandwidth is a measure of the bandwidth containing 99 % of the total integrated power of the transmitted spectrum. The OBW shall be less than the aggregated channel bandwidth defined in section 5.4.2A.

The normative reference for this requirement is TS 36.101[2] clause 6.6.1A.

### 6.6.1A.1.4 Test description

### 6.6.1A.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA configuration, and are shown in table 6.6.1A.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

### Table 6.6.1A.1.4.1-1: Test Configuration Table

			Initial (	Conditions				
	nvironment a: 508[7] subcla	s specified in ause 4.1		NC				
	508 [7] subcla	s specified in ause 4.3.1 for different C	A bandwidth	C: Mid ra	nge			
		on setting ( $N_{RB\_agg}$ ) as sport for the CA Configuration		C: All				
		r CA Configurations						
CA Co	nfiguration	r CA Configurations  DL Allocation	CC	UL Alloc	ation			
	nfiguration			UL Alloc		RB allocations		
CA Co / N <sub>RB_ag</sub> PCC	nfiguration	DL Allocation PCC & SCC RB			PCC & SCC F		-	-
CA CO / N <sub>RB_aq</sub> PCC N <sub>RB</sub>	nfiguration gg SCCs N <sub>RB</sub>	DL Allocation  PCC & SCC RB allocation	MOD	N <sub>RB_alloc</sub>	PCC & SCC F (L <sub>CRB</sub> @ RB <sub>stz</sub>	art)	-	-
CA Co / N <sub>RB_aq</sub> PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	DL Allocation PCC & SCC RB	MOD	N <sub>RB_alloc</sub>	PCC & SCC F (LCRB @ RBstz P_75@0	S_75@0		

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508[7] Annex A Figure group A.32 as appropriate .
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channel is set according to Table 6.6.1A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.1A.1.4.3.

#### 6.6.1A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.6.1A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.2.2A.4.1-1 on both PCC and SCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 5. Send continuously uplink power control "up" commands to the UE until the UE trans mits at P<sub>UMAX</sub> level.
- 6. Measure the power spectrum distribution over all component carriers within two times or more range over the requirement for Occupied Bandwidth for CA specification centring on the current carrier frequency in CA configuration. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter).

Other methods to measure the power spectrum distribution are allowed. The measuring duration is one active uplink subframe. For TDD slots with transient periods are not under test.

- 7. Calculate the total power for the total integrated power of the transmitted spectrum within the range of all frequencies measured in '3)' and save this values as "Total Power".
- 8. Sum up the power upward from the lower boundary of the measured frequency range in '3)' and seek the limit frequency point by which this sum becomes 0,5 % of "Total Power" and save this point as "Lower Frequency".
- 9. Sum up the power downward from the upper boundary of the measured frequency range in '3)' and seek the limit frequency point by which this sum becomes 0,5 % of "Total Power" and save this point as "Upper Frequency".
- 10. Calculate the difference ("Upper Frequency" "Lower Frequency" = "Occupied Bandwidth") between two limit frequencies obtained in '5)' and '6)'.

#### 6.6.1A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

### 6.6.1A.1.5 Test Requirements

The measured Occupied Bandwidth shall not exceed values in Table 5.4.2.A.

# 6.6.1B Occupied bandwidth for UL-MIMO

# 6.6.1B.1 Test purpose

To verify that the UE occupied bandwidth for all transmission bandwidth configurations supported by each of transmit antenna of the UE are less than their specific limits.

### 6.6.1B.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

### 6.6.1B.3 Minimum conformance requirements

For UE with multiple transmit antenna connectors, the requirements for occupied bandwidth is specified at each transmit antenna connector. The occupied bandwidth is defined as the bandwidth containing 99 % of the total integrated mean power of the transmitted spectrum on the assigned channel at each transmit antenna connector.

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the occupied bandwidth at each transmitter antenna shall be less than the channel bandwidth specified in Table 6.6.1B.3-1 with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

Table 6.6.1B.3-1: Occupied channel bandwidth

	Occupied c	Occupied channel bandwidth / Channel bandwidth						
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
Channel bandwidth (MHz)	1.4	3	5	10	15	20		

The normative reference for this requirement is TS 36.101 [2] clause 6.6.1B.

# 6.6.1B.4 Test description

### 6.6.1B.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6. 1B.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Initial Conditions Test Environment as specified in Normal TS 36.508[7] subclause 4.1 Test Frequencies as specified in Mid range TS36.508 [7] subclause 4.3.1 Test Channel Bandwidths as specified in All TS 36.508 [7] subclause 4.3.1 Test Parameters for Channel Bandwidths Downlink Configuration Uplink Configuration Ch BW N/A for Occupied bandwidth Mod'n RB allocation FDD TDD 1.4MHz QPSK 6 6 3MHz QPSK 15 15 5MHz QPSK 25 25 10MHz **QPSK** 50 50 QPSK 15MHz 75 75

QPSK

Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable

100

100

Table 6.6.1B.4.1-1: Test Configuration Table

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.

channel bandwidths are specified in Table 5.4.2.1-1.

- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.1B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.1B.4.3.

# 6.6.1B.4.2 Test procedure

20MHz

Note 1:

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.6.1B.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2. Send continuously power control "up" commands to the UE until the UE transmits at P<sub>UMAX</sub> level.
- 3. Measure the power spectrum distribution within two times or more range over the requirement for Occupied Bandwidth specification centring on the current carrier frequency. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). Other methods to measure the power spectrum distribution are allowed. The measuring duration is one active uplink subframe. For TDD slots with transient periods are not under test.

- 4. Calculate the total power within the range of all frequencies measured in '3)' and save this value as "Total Power".
- 5. Sum up the power upward from the lower boundary of the measured frequency range in '3)' and seek the limit frequency point by which this sum becomes 0.5 % of "Total Power" and save this point as "Lower Frequency".
- 6. Sum up the power downward from the upper boundary of the measured frequency range in '3)' and seek the limit frequency point by which this sum becomes 0,5 % of "Total Power" and save this point as "Upper Frequency".
- 7. Calculate the difference ("Upper Frequency" "Lower Frequency" = "Occupied Bandwidth") between two limit frequencies obtained in '5)' and '6)'.
- 8. Repeat step 3) until 7) for each of transmit antenna of the UE.

### 6.6.1B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6.6.6.1B.5 Test requirement

The measured Occupied Bandwidth at each transmit antenna of UE shall not exceed values in Table 6.6.1B.5-1.

Table 6.6.1B.5-1: Occupied channel bandwidth

	Occupied c	Occupied channel bandwidth / channel bandwidth						
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
Channel bandwidth [MHz]	1.4	3	5	10	15	20		

# 6.6.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a Spectrum Emission Mask and Adjacent Channel Leakage power Ratio.

# 6.6.2.1 Spectrum Emission Mask

### 6.6.2.1.1 Test purpose

To verify that the power of any UE emission shall not exceed specified lever for the specified channel bandwidth.

### 6.6.2.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

### 6.6.2.1.3 Minimum conformance requirements

The spectrum emission mask of the UE applies to frequencies ( $\Delta f_{OOB}$ ) starting from the edge of the assigned E-UTRA channel bandwidth. For frequencies greater than ( $\Delta f_{OOB}$ ) as specified in Table 6.6.2.1.3-1 the spurious requirements in clause 6.6.3 are applicable.

The power of any UE emission shall not exceed the levels specified in Table 6.6.2.1.3-1 for the specified channel bandwidth.

Table 6.6.2.1.3-1: General E-UTRA spectrum emission mask

	Spectrum emission limit (dBm)/ Channel bandwidth										
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth				
± 0-1	-10	-13	-15	-18	-20	-21	30 kHz				
± 1-2.5	-10	-10	-10	-10	-10	-10	1 MHz				
± 2.5-2.8	-25	-10	-10	-10	-10	-10	1 MHz				
± 2.8-5		-10	-10	-10	-10	-10	1 MHz				
± 5-6		-25	-13	-13	-13	-13	1 MHz				
± 6-10			-25	-13	-13	-13	1 MHz				
± 10-15				-25	-13	-13	1 MHz				
± 15-20					-25	-13	1 MHz				
± 20-25						-25	1 MHz				

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The normative reference for this requirement is TS 36.101 [2] clause 6.6.2.1.

### 6.6.2.1.4 Test description

### 6.6.2.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6.2.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2 respectively. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.1.4.1-1: Test Configuration Table

	Initial Condition	ns		
Test Environm				
	n TS 36.508 [7] subclause 4.1)	NC		
Test Frequence				
	n TS36.508 [7] subclause 4.3.1)	Low range, N	lid range, High	range
Test Channel	Bandwidths		408411 11: 1	
(as specified i	n TS 36.508 [7] subclause 4.3.1)	Lowest, 5MH	z, 10MHz, High	nest
	Test Parameters for Channe	el Bandwidths		
	Downlink Configuration		ink Configurat	ion
Ch BW	N/A for SEM testing	Mod'n	RB allo	ocation
	ŭ		FDD	TDD
1.4MHz		QPSK	6	6
1.4MHz		QPSK	5	5
1.4MHz		16QAM	5	5
1.4MHz		16QAM	6	6
3MHz		QPSK	15	15
3MHz		QPSK	4	4
3MHz		16QAM	4	4
3MHz		16QAM	15	15
5MHz		QPSK	25	25
5MHz		QPSK	8	8
5MHz		16QAM	8	8
5MHz		16QAM	25	25
10MHz		QPSK	50	50
10MHz		QPSK	12	12
10MHz		16QAM	12	12
10MHz		16QAM	50	50
			(Note 4)	(Note 4)
15MHz		QPSK	75	75
15MHz		QPSK	16	16
15MHz		16QAM	16	16
15MHz		16QAM	75	75
			(Note 4)	(Note 4)
20MHz		QPSK	100	100
20MHz		QPSK	18	18
20MHz		16QAM	18	18
20MHz		16QAM	100	100
			(Note 4)	(Note 4)
app Note 2: The	st Channel Bandwidths are checked separa blicable channel bandwidths are specified in a allowed MPR for maximum output power .3.3.	n Table 5.4.2.1-	-1.	
	e RB <sub>start</sub> of partial RB allocation shall be RB	#0 and RB# (m	nax+1 - RB all	ocation) of
	channel bandwidth.	(		, -
	olies only for UE-Categories ≥2			
	,			

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.2.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.1.4.3.

#### 6.6.2.1.4.2 Test procedure

- SS sends uplink scheduling information via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in Table 6.2.3.5-1. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 4. Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 6.6.2.1.5-1 or 6.6.2.1.5-2, as applicable. The centre frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.

### 6.6.2.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

### 6.6.2.1.5 Test requirements

The measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.3.5-1 as appropriate, and the power of any UE emission shall fulfil requirements in Table.6.6.2.1.5-1 or Table.6.6.2.1.5-2, as applicable.

Table 6.6.2.1.5-1: General E-UTRA spectrum emission mask, E-UTRA bands ≤ 3GHz

		Spectrum emission limit (dBm)/ Channel bandwidth								
Δf <sub>OOB</sub>	1.4	3.0	5	10	15	20	Measurement			
(MHz)	MHz	MHz	MHz	MHz	MHz	MHz	bandwidth			
0-1	-8.5	-11.5	-13.5	-16.5	-18.5	-19.5	30 kHz			
1-2.5	-8.5						1 MHz			
2.5-2.8	-23.5	-8.5	-8.5	-8.5	-8.5	-8.5	1 MHz			
2.8-5							1 MHz			
5-6		-23.5	-11.5	-11.5	-11.5	-11.5	1 MHz			
6-10			-23.5				1 MHz			
10-15				-23.5			1 MHz			
15-20					-23.5		1 MHz			
20-25						-23.5	1 MHz			
Note 1:	The first ar	nd last mea	surement	osition wi	th a 30 kHz	filter is at	Δf <sub>OOB</sub> equals to			
	0.015 MHz	and 0.985	MH z.							
Note 2:	At the bour	ndary of sp	ectrum em	ission limit	, the first ar	nd last mea	asurement			
							z, respectively.			
Note 3:	The measu	irements a	re to be pe	rformed ab	ove the up	per edge o	of the channel			
	and below									
Note 4:	For the 2.5	-2.8 MHzo	ffset range	with 1.4 N	/IHz channe	el bandwid	th, the			

Table 6.6.2.1.5-2: General E-UTRA spectrum emission mask, 3GHz < E-UTRA bands ≤ 4.2GHz

measurement position is at Δf<sub>OOB</sub> equals to 3 MHz.

Spectrum emission limit (dBm)/ Channel bandwidth	
--	--

Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth
0-1	-8.2	-11.2	-13.2	-16.2	-18.2	-19.2	30 kHz
1-2.5	-8.2						1 MHz
2.5-2.8	-23.2	-8.2	-8.2	-8.2	-8.2	-8.2	1 MHz
2.8-5							1 MHz
5-6		-23.2	-11.2	-11.2	-11.2	-11.2	1 MHz
6-10			-23.2				1 MHz
10-15				-23.2			1 MHz
15-20					-23.2		1 MHz
20-25						-23.2	1 MHz

Note 1: The first and last measurement position with a 30 kHz filter is at Δf<sub>OOB</sub> equals to 0.015 MHz and 0.985 MHz.

Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

Note 3: The measurements are to be performed above the upper edge of the channel

and below the lower edge of the channel

Note 4: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the

measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

### 6.6.2.1A Spectrum emission mask for CA

### 6.6.2.1A.1 Spectrum emission mask for CA (intra-band contiguous DL CA and UL CA)

#### 6.6.2.1A.1.1 Test purpose

To verify that the power of any UE emission shall not exceed specified lever for the specified channel bandwidth for CA.

# 6.6.2.1A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

### 6.6.2.1A.1.3 Minimum conformance requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.1.3-1.

For intra-band contiguous carrier aggregation the spectrum emission mask of the UE applies to frequencies ( $\Delta f_{OOB}$ ) starting from the  $\pm$  edge of the aggregated channel bandwidth (Table 5.4.2A-1) For intra-band contiguous carrier aggregation the bandwidth class C, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.1A.1.3-1 for the specified channel bandwidth.

Table 6.6.2.1A.1.3-1: General E-UTRA CA spectrum emission mask for Bandwidth Class C

	Spectrum emission limit [dBm]/BWChannel_CA									
Δf <sub>OOB</sub> (MHz)	50RB+100RB	75RB+75RB	75RB+100RB	100RB+100RB	Measurement					
	(29.9 MHz)	(30 MHz)	(34.85 MHz)	(39.8 MHz)	bandwidth					
± 0-1	-22.5	-22.5	-23.5	-24	30 kHz					
± 1-5	-10	-10	-10	-10	1 MHz					
± 5-29.9	-13	-13	-13	-13	1 MHz					
± 29.9-30	-25	-13	-13	-13	1 MHz					
± 30-34.85	-25	-25	-13	-13	1 MHz					
± 34.85-34.9	-25	-25	-25	-13	1 MHz					
± 34.9-35		-25	-25	-13	1 MHz					
± 35-39.8			-25	-13	1 MHz					
±39.8-39.85			-25	-25	1 MHz					
± 39.85-44.8				-25	1 MHz					

The normative reference for this requirement is TS 36.101 subclause 6.6.2.1A.

6.6.2.1A.1.4 Test description

6.6.2.1A.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6.2.1A.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.1A.1.4.1-1: Test Configuration Table

	Initial Conditions									
Test Env	ironment as	s specified in		NC, TL/VL, TL/VH, TH/VL, TH/VH						
	8 [7] claus e									
		specified in		C: Low range, High range						
TS 36.50	8 [7] claus 6	4.3.1 for different CA ba	andwidth							
classes.										
		n setting ( $N_{RB\_agg}$ ) as sp	Lowest N <sub>1</sub>							
		he CA Configuration	Highest N	RB_agg						
		CA Configurations								
	iguration	DL Allocation	CC		UL	. Allocation				
	B_agg		MOD							
PCC	SCCs	PCC & SCC RB		N <sub>RB_alloc</sub>	PCC & SCC	RB allocation	ons(L <sub>CRB</sub> @	RB <sub>start</sub> )		
N <sub>RB</sub>	N <sub>RB</sub>	allocation	0001/		D ===		•	1		
75	75		QPSK	75	P_75@0	S_0@0	-	-		
75 75	75 75		QPSK	16	P_16@0	S_0@0	-	-		
75	75		QPSK	130	P_75@0	S_55@0	-	-		
75 75	75 75		QPSK	150	P_75@0	S_75@0	-	-		
75	75		16QAM	75	P_75@0	S_0@0	-	-		
75	75		16QAM	16	P_16@0	S_0@0	-	-		
75	75		16QAM	130	P_75@0	S_55@0	-	-		
75	75		16QAM	150	P_75@0	S_75@0	-	-		
75	75		QPSK	2	P_1@0	S_1@74	-	-		
75	75		QPSK	15	P_5@0	P_5@35	S_5@0	-		
75	75		QPSK	75	P_25@0	P_20@35	S_15@0	S_15@34		
100	50		QPSK	100	P_100@0	S_0@0	-	-		
100	50		QPSK	12	P_12@0	S_0@0	-	-		
100	50		QPSK	150	P_100@0	S_50@0	-	-		
100	50	N/A	16QAM	100	P_100@0	S_0@0	-	-		
100	50	for this test	16QAM	12	P_12@0	S_0@0	-	-		
100	50		16QAM	150	P_100@0	S_50@0	-	-		
100	50		QPSK	2	P_1@0	S_1@49	-	-		
100	50		QPSK	15	P_5@0	P_5@50	S_5@0	-		
100	50		QPSK	75	P_25@0	P_20@34	S_15@0	S_15@34		
100	100		QPSK	100	P_100@0	S_0@0	-	-		
100	100		QPSK	18	P_18@0	S_0@0	-	-		
100	100		QPSK	130	P_100@0	S_30@0	-	-		
100	100		QPSK	200	P_100@0	S_100@0	-	-		
100	100		16QAM	100	P_100@0	S_0@0	-	-		
100	100		16QAM	18	P_18@0	S_0@0	-	-		
100	100		16QAM	130	P_100@0	S_30@0	-	-		
100 100	100 100		16QAM QPSK	200	P_100@0	S_100@0	-	-		
100				2	P_1@0 P 5@0	S_1@99 P 5@50	- C E@O	- C F@F0		
	100 100		QPSK QPSK	20 100			S_5@0	S_5@50		
100		munation Tast OO O- 11			P_25@0	P_25@50	S_25@0	S_25@50		
Note 1:		guration Test CC Combin					uniguration	, wnich		
	applicable	e aggregated channel ba	muwiaths ar	e specilled i	III Table 5.4.2A.1	-1.				

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure group A.32 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.2.1A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.1A.1.4.3.

#### 6.6.2.1A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.6.2.1A.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.1.4.1-1 on both PCC and SCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 5. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at P<sub>UMAX</sub> level.
- 6. Measure the mean power over all component carriers in the CA configuration of the radio access mode, which shall meet the requirements described in Table 6.2.3A.1.5-1. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 7. Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 6.6.2.1A.1.5-1 or 6.6.2.1A.1.5-2, as applicable. The centre frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.

#### 6.6.2.1A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 . In test procedure step 2, for SCC configuration there are no additional message contents.

#### 6.6.2.1A.1.5 Test Requirements

The measured UE mean power with the aggregated channel bandwidth as specified in c lause 5.4.2A, derived in step [FFS], shall fulfil requirements in Table 6.2.3A.1.5-1 as appropriate,

and

the power of any UE emission shall fulfil requirements in Table. 6.6.2.1A. 1.5-1 or Table. 6.6.2.1A. 1.5-2, as applicable.

Table 6.6.2.1A.1.5-1: General E-UTRA spectrum emission mask for CA, E UTRA bands ≤ 3GHz

	Spectrum emission limit [dBm]/BW <sub>Channel_CA</sub>										
Δf <sub>OOB</sub> (MHz)	50RB+100RB (29.9 MHz)	75RB+75RB (30 MHz)	75RB+100RB (34.85 MHz)	100RB+100RB (39.8 MHz)	Measurement bandwidth						
± 0-1	-21	-21	-22	-22.5	30 kHz						
± 1-5	-8.5	-8.5	-8.5	-8.5	1 MHz						
± 5-29.9	-11.5	-11.5	-11.5	-11.5	1 MHz						
± 29.9-30	-23.5				1 MHz						
± 30-34.85		-23.5			1 MHz						
± 34.85-34.9			-23.5		1 MHz						
± 34.9-35					1 MHz						
± 35-39.8					1 MHz						
±39.8-39.85				-23.5	1 MHz						
± 39.85-44.8					1 MHz						

Table 6.6.2.1A.1.5-2: General E-UTRA spectrum emission mask for CA, 3GHz < E UTRA bands ≤ 4.2GHz

	Spectrum emission limit [dBm]/BW <sub>Channel_CA</sub>										
Δf <sub>OOB</sub> (MHz)	50RB+100RB (29.9 MHz)	75RB+75RB (30 MHz)	75RB+100RB (34.85 MHz)	100RB+100RB (39.8 MHz)	Measurement bandwidth						
± 0-1	-20.7	-20.7	-21.7	-22.2	30 kHz						
± 1-5	-8.2	-8.2	-8.2	-8.2	1 MHz						
± 5-29.9	-11.2	-11.2	-11.2	-11.2	1 MHz						
± 29.9-30	-23.2				1 MHz						
± 30-34.85		-23.2			1 MHz						
± 34.85-34.9			-23.2		1 MHz						
± 34.9-35					1 MHz						
± 35-39.8					1 MHz						
±39.8-39.85				-23.2	1 MHz						
± 39.85-44.8					1 MHz						

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

### 6.6.2.1B Spectrum Emission Mask for UL-MIMO

### 6.6.2.1B.1 Test purpose

To verify that the power of any UE emission at each transmit antenna shall not exceed specified lever for the specified channel bandwidth.

### 6.6.2.1B.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

## 6.6.2.1B.3 Minimum conformance requirements

For UE with multiple transmit antenna connectors, the requirements for the spectrum emission mask are specified at each transmit antenna connector. The spectrum emission mask of the UE applies to frequencies ( $\Delta f_{OOB}$ ) starting from the edge of the assigned E-UTRA channel bandwidth. For frequencies greater than ( $\Delta f_{OOB}$ ) as specified in Table 6.6.2.1B.3-1.

For UEs with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the requirements in Table 6.6.2.1B.3-1 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

Table 6.6.2.1B.3-1: General E-UTRA spectrum emission mask

	Spectrum emission limit (dBm)/ Channel bandwidth									
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth			
± 0-1	-10	-13	-15	-18	-20	-21	30 kHz			
± 1-2.5	-10	-10	-10	-10	-10	-10	1 MHz			
± 2.5-2.8	-25	-10	-10	-10	-10	-10	1 MHz			
± 2.8-5		-10	-10	-10	-10	-10	1 MHz			
± 5-6		-25	-13	-13	-13	-13	1 MHz			
± 6-10			-25	-13	-13	-13	1 MHz			
± 10-15				-25	-13	-13	1 MHz			
± 15-20					-25	-13	1 MHz			
± 20-25						-25	1 MHz			

NOTE:

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The normative reference for this requirement is TS 36.101 clause 6.6.2B.

# 6.6.2.1B.4 Test description

#### 6.6.2.1B.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6.2.1B.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2 respectively. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.1B.4.1-1: Test Configuration Table

Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)  Lowest, 5MHz  Test Parameters for Channel Bandwidths	id range, High							
(as specified in TS 36.508 [7] clause 4.1)  Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)  Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)  Test Parameters for Channel Bandwidths  Downlink Configuration  Upli  Ch BW  N/A for SE M testing  Mod'n  1.4MHz  1.4MHz  1.4MHz  1.4MHz  1.4MHz  3MHz  3MHz  3MHz  3MHz  3MHz  3MHz  5MHz  5MHz  QPSK	id range, High							
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)  Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)  Test Parameters for Channel Bandwidths  Downlink Configuration  Upli  Ch BW  N/A for SE M testing  Mod'n  1.4MHz  1.4MHz  1.4MHz  1.4MHz  1.4MHz  3MHz  3MHz  3MHz  3MHz  3MHz  5MHz  5MHz  Channel Bandwidths  Lowest, 5MHz  Apolic Channel Bandwidths  Upli  Apolic Channel Bandwidths  Apolic Channel Ba	id range, High							
Low range, M           Test Channel Bandwidths           (as specified in TS 36.508 [7] clause 4.3.1)         Lowest, 5MHz           Test Parameters for Channel Bandwidths           Downlink Configuration         Upli           Ch BW         N/A for SE M testing         Mod'n           1.4MHz         QPSK           1.4MHz         16QAM           1.4MHz         16QAM           3MHz         QPSK           3MHz         16QAM           3MHz         16QAM           5MHz         QPSK           5MHz         QPSK	id range, High	Low range Mid range High range						
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)  Test Parameters for Channel Bandwidths  Downlink Configuration  N/A for SEM testing  Mod'n  1.4MHz 1.4MHz 1.4MHz 1.4MHz 1.4MHz 1.4MHz 3MHz 3MHz 3MHz 3MHz 3MHz 3MHz 5MHz 5MHz 5MHz QPSK QPSK QPSK QPSK QPSK QPSK QPSK QPSK	Low range, Mid range, High range							
Test Parameters for Channel Bandwidths   Downlink Configuration   Upli	- 40041- 11:	4						
Downlink Configuration         Upli           Ch BW         N/A for SEM testing         Mod'n           1.4MHz         QPSK           1.4MHz         16QAM           1.4MHz         16QAM           3MHz         QPSK           3MHz         QPSK           3MHz         16QAM           3MHz         16QAM           5MHz         QPSK           5MHz         QPSK	z, Tulvin z, Higi	nest						
Ch BW         N/A for SEM testing         Mod'n           1.4MHz         QPSK           1.4MHz         16QAM           1.4MHz         16QAM           3MHz         QPSK           3MHz         QPSK           3MHz         16QAM           3MHz         16QAM           3MHz         16QAM           5MHz         QPSK           5MHz         QPSK								
1.4MHz 1.4MHz 1.4MHz 1.4MHz 1.4MHz 1.4MHz 16QAM 1.4MHz 3MHz 3MHz 3MHz 3MHz 16QAM 3MHz 16QAM 3MHz 16QAM 2PSK 3MHz 16QAM 3MHz 2PSK 3MHz 4PSK 4PSK 4PSK 4PSK 4PSK 4PSK 4PSK 4PSK	nk Configura	tion						
1.4MHz       QPSK         1.4MHz       16QAM         1.4MHz       16QAM         3MHz       QPSK         3MHz       QPSK         3MHz       16QAM         3MHz       16QAM         5MHz       QPSK         5MHz       QPSK	RB all	ocation						
1.4MHz       QPSK         1.4MHz       16QAM         1.4MHz       16QAM         3MHz       QPSK         3MHz       QPSK         3MHz       16QAM         3MHz       16QAM         5MHz       QPSK         5MHz       QPSK	FDD	TDD						
1.4MHz       16QAM         1.4MHz       16QAM         3MHz       QPSK         3MHz       QPSK         3MHz       16QAM         3MHz       16QAM         5MHz       QPSK         5MHz       QPSK	6	6						
1.4MHz       16QAM         3MHz       QPSK         3MHz       QPSK         3MHz       16QAM         3MHz       16QAM         5MHz       QPSK         5MHz       QPSK	5	5						
3MHz         QPSK           3MHz         QPSK           3MHz         16QAM           3MHz         16QAM           5MHz         QPSK           5MHz         QPSK	5	5						
3MHz         QPSK           3MHz         16QAM           3MHz         16QAM           5MHz         QPSK           5MHz         QPSK	6	6						
3MHz         16QAM           3MHz         16QAM           5MHz         QPSK           5MHz         QPSK	15	15						
3MHz         16QAM           5MHz         QPSK           5MHz         QPSK	4	4						
5MHz QPSK QPSK QPSK	4	4						
5MHz QPSK	15	15						
	25	25						
5MHz 16QAM	8	8						
	8	8						
5MHz 16QAM	25	25						
10MHz QPSK	50	50						
10MHz QPSK	12	12						
10MHz 16QAM	12	12						
10MHz 16QAM	50	50						
	(Note 4)	(Note 4)						
15MHz QPSK	75	75						
15MHz QPSK	16	16						
15MHz 16QAM	16	16						
15MHz 16QAM	75	75						
	(Note 4)	(Note 4)						
20MHz QPSK	100	100						
20MHz QPSK	18	18						
20MHz 16QAM	18	18						
20MHz 16QAM	100	100						
	(Note 4)	(Note 4)						
Note 1: Test Channel Bandwidths are checked separately for each E- applicable channel bandwidths are specified in Table 5.4.2.1-		hich						
Note 2: The allowed MPR for maximum output power UE might apply clause 6.2.3B.3.		า						
Note 3: The RB <sub>start</sub> of partial RB allocation shall be RB#0 and RB# (machannel bandwidth.	Note 3: The RB <sub>start</sub> of partial RB allocation shall be RB#0 and RB# (max+1 - RB allocation) of the							

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.

Applies only for UE-Categories [FFS].

- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.2.1B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.

Note 4:

6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.1B.4.3.

#### 6.6.2.1B.4.2 Test procedure

- 1. SS sends uplink scheduling information via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.1B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
- 3. Measure the sum of the mean power at each antenna connector of UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in clause 6.2.3B.5. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 4. Measure the power of the transmitted signal at each antenna connector of UE with a measurement filter of bandwidths according to table 6.6.2.1B.5-1 or 6.6.2.1B.5-2 as applicable. The centre frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.

#### 6.6.2.1B.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

#### 6.6.2.1B.5 Test requirements

The measured sum of mean power at each antenna connector of UE in the channel bandwidth, derived in step 3, shall fulfil requirements in clause 6.2.3B.5 as appropriate,

And the power of any UE emission at each transmit antenna connector shall fulfil requirements in Table. 6.6.2.1 B.5-1 or Table. 6.6.2.1 B.5-2 as applicable.

Table 6.6.2.1B.5-1: General E-UTRA spectrum emission mask, E UTRA bands ≤ 3GHz

	Spectrum emission limit (dBm)/ Channel bandwidth									
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth			
0-1	-8.5	-11.5	-13.5	-16.5	-18.5	-19.5	30 kHz			
1-2.5	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5	1 MHz			
2.5-2.8	-23.5						1 MHz			
2.8-5							1 MHz			
5-6		-23.5	-11.5	-11.5	-11.5	-11.5	1 MHz			
6-10			-23.5				1 MHz			
10-15				-23.5			1 MHz			
15-20					-23.5	1	1 MHz			
20-25						-23.5	1 MHz			

Note 1: The first and last measurement position with a 30 kHz filter is at Δf<sub>OOB</sub> equals to 0.015 MHz and 0.985 MHz.

Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

Note 3: The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel

Note 4: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

Table 6.6.2.1B.5-2: General E-UTRA spectrum emission mask, 3GHz < E UTRA bands ≤ 4.2GHz

	Spectrum emission limit (dBm)/ Channel bandwidth									
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth			
0-1	-8.2	-11.2	-13.2	-16.2	-18.2	-19.2	30 kHz			
1-2.5	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	1 MHz			
2.5-2.8	-23.2						1 MHz			
2.8-5							1 MHz			
5-6		-23.2	-11.2	-11.2	-11.2	-11.2	1 MHz			
6-10			-23.2				1 MHz			
10-15				-23.2			1 MHz			
15-20					-23.2		1 MHz			
20-25						-23.2	1 MHz			

Note 1: The first and last measurement position with a 30 kHz filter is at Δf<sub>OOB</sub> equals to 0.015 MHz and 0.985 MHz

Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

Note 3: The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel

Note 4: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

# 6.6.2.2 Additional Spectrum Emission Mask

### 6.6.2.2.1 Test purpose

To verify that the power of any UE emission shall not exceed specified level for the specified channel bandwidth under the deployment scenarios where additional requirements are specified.

### 6.6.2.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

### 6.6.2.2.3 Minimum conformance requirements

6.6.2.2.3.1 Minimum requirement (network signalled value "NS\_03", "NS\_11", and "NS\_20")

When "NS\_03", "NS\_11" or "NS\_20" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.2.3.1-1.

Table 6.6.2.2.3.1-1: Additional requirements (network signalled value "NS\_03", "NS\_11", and "NS\_20")

Spectrum emission limit (dBm)/ Channel bandwidth

Δf <sub>OOB</sub>	1.4	3.0	5	10	15	20	Measurement
(MHz)	MHz	MHz	MHz	MHz	MHz	MHz	bandwidth
± 0-1	-10	-13	-15	-18	-20	-21	30 kHz
± 1-2.5	-13	-13	-13	-13	-13	-13	1 MHz
± 2.5-2.8	-25	-13	-13	-13	-13	-13	1 MHz
± 2.8-5		-13	-13	-13	-13	-13	1 MHz
± 5-6		-25	-13	-13	-13	-13	1 MHz
± 6-10			-25	-13	-13	-13	1 MHz
± 10-15				-25	-13	-13	1 MHz
± 15-20					-25	-13	1 MHz
± 20-25						-25	1 MHz

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The normative reference for this requirement is TS 36.101 [2] clause 6.6.2.2.1.

#### 6.6.2.2.3.2 Minimum requirement (network signalled value "NS\_04")

When "NS\_04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.2.3.2-1.

Table 6.6.2.2.3.2-1: Additional requirements (network signalled value "NS\_04")

	Spectrum emission limit (dBm)/ Channel bandwidth								
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth		
± 0-1	-10	-13	-15	-18	-20	-21	30 kHz		
± 1-2.5	-13	-13	-13	-13	-13	-13	1 MHz		
± 2.5-2.8	-25	-13	-13	-13	-13	-13	1 MHz		
± 2.8-5		-13	-13	-13	-13	-13	1 MHz		
± 5-6		-25	-25	-25	-25	-25	1 MHz		
± 6-10			-25	-25	-25	-25	1 MHz		
± 10-15				-25	-25	-25	1 MHz		
± 15-20					-25	-25	1 MHz		
± 20-25						-25	1 MHz		

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The normative reference for this requirement is TS 36.101 [2] clause 6.6.2.2.2.

### 6.6.2.2.3.3 Minimum requirement (network signalled value "NS\_06" or NS\_07)

When "NS\_06" or "NS\_07" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.2.3.3-1.

Table 6.6.2.2.3.3-1: Additional requirements (network signalled value "NS 06" or "NS 07")

	Spectrum emission limit (dBm)/ Channel bandwidth				
Δf <sub>OOB</sub>	1.4	1.4 3.0 5 10 Mea		Measurement	
(MHz)	MHz	MHz	MHz	MHz	bandwidth
± 0-0.1	-13	-13	-15	-18	30 kHz
± 0.1-1	-13	-13	-13	-13	100 kHz
± 1-2.5	-13	-13	-13	-13	1 MHz
± 2.5-2.8	-25	-13	-13	-13	1 MHz
± 2.8-5		-13	-13	-13	1 MHz
± 5-6		-25	-13	-13	1 MHz
± 6-10			-25	-13	1 MHz
± 10-15				-25	1 MHz

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The normative reference for this requirement is TS 36.101 [2] clause 6.6.2.2.3.

### 6.6.2.2.4 Test description

#### 6.6.2.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Tables 6.6.2.2.4.1-1, 6.6.2.2.4.1-2, and 6.6.2.2.4.1-3. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2 respectively. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.2.4.1-1: Test Configuration Table (network signalled value "NS\_03")

Initial Conditions						
Toot Environment						
(as specified in TS 36.508 [7] subclause 4.1)			NC			
Test Frequencies						
(as specified	in TS36.508 [7	] subclause 4.3.1)	Low range, Mid range, High range			
Test Channe			Lowest 5MH	z 10MH z High	noct	
(as specified		7] subclause 4.3.1)		Lowest, 5MHz, 10MHz, Highest		
		Test Parameters for Channe				
		nlink Configuration	Uplink Configuration			
Ch BW	Mod'n	RB allocation	Mod'n		ocation	
		FDD TDD		FDD	TDD	
1.4MHz	N/A for Add	litional Spectrum Emission	QPSK	6	6	
1.4MHz		Mask testing.	QPSK	5	5	
1.4MHz			16QAM	5	5	
3MHz			QPSK	15	15	
3MHz			QPSK	4	4	
3MHz			16QAM	15	15	
3MHz	1		16QAM	4	4	
5MHz			QPSK	25	25	
5MHz			QPSK	8	8	
5MHz	1		QPSK	6	6	
5MHz			16QAM	25	25	
5MHz			16QAM	8	8	
10MHz	1		QPSK	50	50	
10MHz			QPSK	12	12	
10MHz	1		QPSK	6	6	
10MHz			16QAM	50	50	
				(Note 3)	(Note 3)	
10MHz	1		16QAM	12	12	
15MHz	1		QPSK	75	75	
15MHz	1		QPSK	16	16	
15MHz	1		QPSK	8	8	
15MHz	1		16QAM	75	75	
				(Note 3)	(Note 3)	
15MHz	1		16QAM	16	16	
20MHz	1		QPSK	100	100	
20MHz	1		QPSK	18	18	
20MHz	1		QPSK	10	10	
20MHz	1		16QAM	100	100	
				(Note 3)	(Note 3)	
20MHz			16QAM	18	18	
Note 1: Te	st Channel Ba	ndwidths are checked senara		UTRA hand th	ne annlicable	

Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable channel bandwidths are specified in Table 5.4.2.1-1.

Note 2: The RB  $_{\text{start}}$  of partial RB allocation shall be RB# 0 and RB# (max  $^{+1}\,$  – RB allocation) of the channel bandwidth.
Applies only for UE-Categories ≥2

Note 3:

Table 6.6.2.2.4.1-2: Test Configuration Table (network signalled value "NS\_06")

Initial Conditions							
Test Environment				NC			
(as specified in TS 36.508 [7] subclause 4.1)				NC			
Test Frequen				Low range M	Low range, Mid range, High range		
	in TS36.508 [7]	subclause 4	.3.1)	Low range, iv	Low range, wild range, ringir range		
Test Channel			Lowest, 5MHz, 10MHz, Highest				
(as specified	in TS 36.508 [7			·			
			ters for Channe			_	
		llink Configu			Uplink Configuration		
Ch BW	Mod'n		location	Mod'n		ocation	
		FDD	TDD		FDD	TDD	
1.4MHz	N/A for Addi	itional Spectr		QPSK	6	NA	
1.4MHz		Mask testing		QPSK	5		
1.4MHz				16QAM	5		
3MHz				QPSK	15		
3MHz				QPSK	4		
3MHz				16QAM	4		
5MHz				QPSK	25		
5MHz				QPSK	8		
5MHz				16QAM	8	]	
10MHz				QPSK	50		
10MHz				QPSK	12		
10MHz				16QAM	12	]	
15MHz				QPSK	75		
15MHz				QPSK	16		
15MHz				16QAM	16	1	
20MHz				QPSK	100	1	
20MHz				QPSK	18		
20MHz				16QAM	18	1	
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable							

Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable channel bandwidths are specified in Table 5.4.2.1-1.

Note 2: The RB $_{\text{start}}$  of partial RB allocation shall be RB# 0 and RB# (max  $^{+1}$  - RB allocation) of the channel bandwidth.

Table 6.6.2.2.4.1-3: Test Configuration Table (network signalled value "NS\_07")

Initial Conditions								
Test Environment				NC				
(as specified in TS 36.508 [7] subclause 4.1)				NC				
Test Freque				Mid range				
(as specified	d in TS36.508	[7] subclause	e 4.3.1)	a .age				
	el Bandwidths		4.0.4)	10MHz				
(as specified in TS 36.508 [7] subclause 4.3.1)				1 5 1 1 1 1 1				
			ameters for Channe					
	01 514		c Configuration		plink Configurat			
Test	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation	RB <sub>start</sub>		
Number	4 0 5 41 1	N1/A ( A 1		00014	FDD			
1	10MHz		ditional Spectrum	QPSK	1	0		
2	10MHz	Emissio	n Mask testing.	QPSK	8	0		
3	10MHz			QPSK	6	13		
4	10MHz			QPSK	20	13		
5	10MHz			QPSK	12	13		
6	10MHz			16QAM	36	13		
					(Note 1)			
7	10MHz			QPSK	16	19		
8	10MHz			QPSK	12	19		
9	10MHz			16QAM	16	19		
10	10MHz			QPSK	30	19		
11	10MHz			16QAM	30	19		
					(Note 1)			
12	10MHz			QPSK	6	43		
13	10MHz			QPSK	2	48		
14	10MHz			QPSK	50	0		
15	10MHz			QPSK	12	0		
16	10MHz			16QAM	50	0		
(Note 1)								
Note 1: Applies only for UE-Categories 2-5								

Table 6.6.2.2.4.1-4: Test Configuration Table (network signalled value "NS\_04")

Initial Conditions					
Test Environment (as specified in TS 36.50	8 [7] subclause 4.1)	NC			
Test Frequencies (as specified in TS36.508		Low range, Mid range, High range			
Test Channel Bandwidths (as specified in TS 36.508		5MHz, 10 MHz, 15 MHz, 20MHz			
Test Parameters for NS_04 A-MPR					
	Downlink Configuration	Uplink Configuration			

Configuration	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	RB <sub>start</sub>
ID			TDD		TDD	TDD
1	5MHz		ditional Spectrum	QPSK	25	Note 2
2	5MHz	Emissio	n Mask testing.	QPSK	8	Note 2
3	5MHz			QPSK	6	Note 2
4	5MHz			16QAM	25	Note 2
5	5MHz			16QAM	8	Note 2
6	10MHz			QPSK	1	0
7	10MHz			QPSK	12	0
8	10MHz			QPSK	50	0
9	10MHz			16QAM	50	0
					(Note 3)	
10	10MHz			QPSK	24	13
11	10MHz			16QAM	24	13
12	10MHz			QPSK	36	13
13	10MHz			QPSK	12	37
14	10MHz			QPSK	1	49
15	15MHz			QPSK	1	0
16	15MHz			QPSK	16	0
17	15MHz			QPSK	75	0
18	15MHz			16QAM	75	0
					(Note 3)	
19	15MHz			QPSK	36	19
20	15MHz			16QAM	36	19
					(Note 3)	
21	15MHz			QPSK	50	19
22	15MHz			QPSK	18	56
23	15MHz			QPSK	1	74
24	20MHz			QPSK	1	0
25	20MHz			QPSK	18	0
26	20MHz			QPSK	100	0
27	20MHz			16QAM	100	0
					(Note 3)	
28	20MHz			QPSK	50	25
29	20MHz			16QAM	50	25
				0.701/	(Note 3)	
30	20MHz			QPSK	75	25
31	20MHz			QPSK	25	75
32	20MHz			QPSK	1	99

Note 1: Test Channel Bandwidths are checked separately for E-UTRA band, the applicable channel bandwidths are specified in Table 5.4.2.1-1.

Note 2: The RB $_{\text{start}}$  of partial RB allocation shall be RB# 0 and RB# (max +1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories 2-5

Table 6.6.2.2.4.1-5: Test Configuration Table (network signalled value "NS\_11")

Initial Conditions				
Test Environment (as specified in TS 36.508 [7] subclause 4.1)				
	Nomal			

Test Frequencies	Low range, Mid range, High range
(as specified in TS36.508 [7] subclause 4.3.1)	
	For 3 MHz Channel Bandwidth:
	a. 2001.5 MHz (N <sub>UL</sub> = 25515)
	b. 2004.5 MHz (N <sub>UL</sub> = 25545)
	For 5 MHz Channel Bandwidth
	a. 2002.5 MHz ( $N_{UL} = 25525$ )
	b. 2004.5 MHz ( $N_{UL} = 25545$ )
	c. 2007.5 MHz (N <sub>UL</sub> = 25575)
	For 10 MHz Channel Bandwidth
	a. 2005 MHz ( $N_{UL} = 25550$ )
	b. 2005.5 MHz ( $N_{UL} = 25555$ )
	c. 2015 MHz (N <sub>UL</sub> = 25650)
	For 15 MHz Channel Bandwidth
	a. 2007.5 MHz (N <sub>UL</sub> = 25575)
	b. 2012.5 MHz (N <sub>UL</sub> = 25625)
	For 20 MHz Channel Bandwidth
	a. 2010 MHz (N <sub>UL</sub> = 25600)
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	3MHz, 5MHz, 10MHz, 15MHz, 20MHz

# Test Parameters for NS\_11 A-MPR

		Downlink Configuration			Uplink Configuration
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	3MHz	N/A for A-N	IPR testing	QPSK	6
2	3MHz			QPSK	15
3	3MHz			16QAM	6
4	3MHz			16QAM	15
5	5MHz			QPSK	1
6	5MHz			QPSK	8
7	5MHz			QPSK	25
8	5MHz			16QAM	8
9	5MHz			16QAM	25
10	10MHz			QPSK	1
11	10MHz			QPSK	12
12	10MHz			QPSK	50
13	10MHz			16QAM	12
14	10MHz			16QAM	50 (Note 3)
15	15MHz			QPSK	1
16	15MHz			QPSK	7
17	15MHz			QPSK	25
18	15MHz			QPSK	30
19	15MHz			QPSK	75
20	15MHz			16QAM	7

21	15MHz	16QAM	25
22	15MHz	16QAM	30
23	15MHz	16QAM	75
24	20MHz	QPSK	1
25	20MHz	QPSK	10
26	20MHz	QPSK	25
27	20MHz	QPSK	100
28	20MHz	16QAM	10
29	20MHz	16QAM	25
30	20MHz	16QAM	100

The Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Note 1: Requirement in subclause 6.2.4.5 as not all combinations are necessarily required based on the

applicability of the UE.

The RB<sub>start</sub> of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel Note 2:

bandwidth.

Note 3: Applies only for UE-Categories ≥2.

Table 6.6.2.2.4.1-6: Test Configuration Table (network signalled value "NS\_20")

Initial C	conditions
Test Environment (as specified in TS 36.508 [7] subclause 4.1)	
	Nomal
Test Frequencies	Low range, Mid range, High range
(as specified in TS36.508 [7] subclause 4.3.1)	For F. M. L. Olonou al Donahaidh
	For 5 MHz Channel Bandwidth
	a. 2002.5 MHz (N <sub>UL</sub> = 25525)
	b. 2007.5 MHz (N <sub>UL</sub> = 25575)
	c. 2012.5 MHz ( $N_{UL} = 25625$ )
	d. 2017.5 MHz ( $N_{UL} = 25675$ )
	For 10 MHz Channel Bandwidth
	a. 2005 MHz ( $N_{UL} = 25550$ )
	b. 2015 MHz (N <sub>UL</sub> = 25650)
	For 15 MHz Channel Bandwidth
	a. 2012.5 MHz ( $N_{UL} = 25625$ )
	For 20 MHz Channel Bandwidth
	a. 2010 MHz ( $N_{UL} = 25600$ )
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	5MHz, 10MHz, 15MHz, 20MHz
Test Parameters	s for NS_20 A-MPR
Downlink Configuration	Uplink Configuration

Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	5MHz	N/A for A-N	MPR testing	QPSK	8
2	5MHz			QPSK	15
3	5MHz			QPSK	25
4	5MHz			16QAM	15
5	5MHz			16QAM	25
6	10MHz			QPSK	8
7	10MHz			QPSK	12
8	10MHz			QPSK	50
9	10MHz			16QAM	12
10	10MHz			16QAM	50 (Note 3)
11	15MHz			QPSK	6
12	15MHz			QPSK	25
13	15MHz			QPSK	36
14	15MHz			QPSK	75
15	15MHz			16QAM	25
16	15MHz			16QAM	36
17	15MHz			16QAM	75
18	20MHz			QPSK	8
19	20MHz			QPSK	18
20	20MHz			QPSK	25
21	20MHz			QPSK	75
22	20MHz			QPSK	100
23	20MHz			16QAM	18
24	20MHz			16QAM	25
25	20MHz			16QAM	75
26	20MHz			16QAM	100

Note 1: The Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Requirement in subclause 6.2.4.5 as not all combinations are necessarily required based on the applicability of the UE.

Note 2: The RB<sub>start</sub> of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories ≥2.

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.

- 4. The DL Reference Measurement channels are set according to Tables 6.6.2.2.4.1-1, 6.6.2.2.4.1-2, 6.6.2.2.4.1-3 and 6.6.2.2.4.1-4.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.2.4.3.

#### 6.6.2.2.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to applicable table from Table 6.6.2.2.4.1-1 to 6.6.2.2.4.1-6., Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in Table 6.2.4.5-1 to 6.2.4.5-9 as appropriate. The period of the measurement shall be at least one sub-frame (1ms).
- 4. Measure the power of the transmitted signal with a measurement filter of bandwidths according to Table 6.6.2.2.5.1-1, 6.6.2.2.5.2-1, 6.6.2.2.5.3-1 or Table 6.6.2.2.5.1-2, 6.6.2.2.5.2-2, 6.6.2.2.5.3-2, as applicable. The centre frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.

# 6.6.2.2.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions for each network signalled value.

#### 6.6.2.2.4.3.1 Message contents exceptions (network signalled value "NS\_03")

1. Information element additionalSpectrumEmission is set to NS\_03. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.2.2.4.3.1-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1							
Information Element	Value/remark	Comment	Condition				
additionalSpectrumEmission	3 (NS_03)						

# 6.6.2.2.4.3.2 Message contents exceptions (network signalled value "NS\_04")

1. Information element additionalSpectrumEmission is set to NS\_04. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.2.2.4.3.2-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Condition						
additionalSpectrumEmission	4 (NS_04)					

# 6.6.2.2.4.3.3 Message contents exceptions (network signalled value "NS\_06")

1. Information element additional Spectrum Emission is set to NS\_06. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

### Table 6.6.2.2.4.3.3-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Condition						
additional Spectrum Emission	6 (NS_06)					

#### 6.6.2.2.4.3.4 Message contents exceptions (network signalled value "NS\_07")

1. Information element additional Spectrum Emission is set to NS\_07. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

### Table 6.6.2.2.4.3.4-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Conditio						
additionalSpectrumEmission	7 (NS_07)					

#### 6.6.2.2.4.3.5 Message contents exceptions (network signalled value "NS\_11")

1. Information element additionalSpectrumEmission is set to NS\_11. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.2.2.4.3.5-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Condit						
additionalSpectrumEmission	11 (NS_11)					

#### 6.6.2.2.4.3.6 Message contents exceptions (network signalled value "NS\_20")

1. Information element additionalSpectrumEmission is set to NS\_20. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.2.2.4.3.6-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Condition						
additional Spectrum Emission	20 (NS_20)					

#### 6.6.2.2.5 Test requirements

#### 6.6.2.2.5.1 Test requirements (network signalled value "NS 03", "NS 11", and "NS 20")

When "NS\_03" or "NS\_11" or "NS\_20" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-1 and 6.2.4.5-2 as appropriate,

and

the power of any UE emission shall fulfil requirements in Table 6.6.2.2.5.1-1 or 6.6.2.2.5.1-2, as applicable.

Table 6.6.2.2.5.1-1: Additional requirements (network signalled value "NS\_03", "NS\_11", and "NS\_20"), E-UTRA bands ≤ 3GHz

		Spectrum emission limit (dBm)/ Channel bandwidth						
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth	
0-1	-8.5	-11.5	-13.5	-16.5	-18.5	-19.5	30 kHz	
1-2.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	1 MHz	
2.5-2.8	-23.5						1 MHz	
2.8-5							1 MHz	
5-6		-23.5					1 MHz	
6-10			-23.5				1 MHz	
10-15				-23.5			1 MHz	
15-20					-23.5		1 MHz	
20-25						-23.5	1 MHz	
Note 1:	to 0.015 MH	Hz and 0.9	85 MHz.				ΔfOOB equals	
Note 2:		ha1MHz	filter is the	inside of +	∙0.5MHzar	nd -0.5MH z	z, respectively.	
Note 3:	The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel							
Note 4:	Above SEM requirement applies to bands corresponding to network signalling value NS_03 as defined in TS 36.101 [2] subclause 6.2.4 Table 6.2.4-1.							
Note 5:	For the 2.5 measureme					el bandwid	th, the	

Table 6.6.2.2.5.1-2: Additional requirements (network signalled value "NS\_03", "NS\_11", and "NS\_20"), 3GHz < E-UTRA bands ≤ 4.2GHz

Spectrum emission limit (dBm)/ Channel bandwidth

		-		•	•		
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth
0-1	-8.2	-11.2	-13.2	-16.2	-18.2	-19.2	30 kHz
1-2.5	-11.2						1 MHz
2.5-2.8	-23.2	-11.2	-11.2				1 MHz
2.8-5			-11.2	-11.2	-11.2		1 MHz
5-6		-23.2			-11.2	-11.2	1 MHz
6-10			-23.2				1 MHz
10-15				-23.2			1 MHz
15-20					-23.2		1 MHz
20-25						-23.2	1 MHz
Note 1:	to 0.015 MH	Hz and 0.9	85 MHz.				ΔfOOB equals
Note 2:	At the bour position wit						z, respectively.
Note 3:	The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel						
Note 4:	Above SEN	•			•	•	ork signalling

value NS\_03 as defined in TS 36.101 [2] subclause 6.2.4 Table 6.2.4-1.

Note 5: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

# NOTE (only for emission measurement):

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

# 6.6.2.2.5.2 Test requirements (network signalled value "NS\_04")

When "NS\_04" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil require ments in Table 6.2.4.5-3 as appropriate,

and

- the power of any UE emission shall fulfil requirements in Table 6.6.2.2.5.2-1 or Table.6.6.2.2.5.2-2, as applicable.

Table 6.6.2.2.5.2-1: Additional requirements (network signalled value "NS\_04"), E-UTRA bands  $\leq$  3GHz

		Spectrum emission limit (dBm)/ Channel bandwidth							
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth		
0-1	-8.5	-11.5	-13.5	-16.5	-18.5	-19.5	30 kHz		
1-2.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	1 MHz		
2.5-2.8	-23.5						1 MHz		
2.8-5							1 MHz		
5-6		-23.5	-23.5	-23.5	-23.5	-23.5	1 MHz		
6-10							1 MHz		
10-15							1 MHz		
15-20							1 MHz		
20-25							1 MHz		
	The first ar to 0.015 M			osition wit	h a 30 kHz	filter is at	ΔfOOB equals		
Note 2:	At the bour	ndary of sp	ectrum em	ission limit,	the first ar	nd last mea	asurement		
	position wit	tha 1 MHz	filter is the	inside of +	0.5MHz ar	nd -0.5MH z	z, respectively.		
					ove the up	per edge o	f the channel		
	and below								
							ork signalling		
	value NS_0								
	For the 2.5					el bandwid	th, the		
	m eas urem	ent positior	n is at Δf <sub>OOl</sub>	B equals to	3 MHz.				

Table 6.6.2.2.5.2-2: Additional requirements (network signalled value "NS\_04"), 3GHz < E-UTRA bands ≤ 4.2GHz

Spectrum emission limit (dBm)/ Channel bandwidth

Δf <sub>OOB</sub>	1.4	3.0	5	10	15	20	Measurement	
(MHz)	MHz	MHz	MHz	MHz	MHz	MHz	bandwidth	
0-1	-8.2	-11.2	-13.2	-16.2	-18.2	-19.2	30 kHz	
1-2.5	-11.2						1 MHz	
2.5-2.8	-23.2	-11.2	-11.2	-11.2	-11.2	-11.2	1 MHz	
2.8-5							1 MHz	
5-6		-23.2	-23.2				1 MHz	
6-10			-20.2	-23.2	-23.2		1 MHz	
10-15					-23.2	-23.2	1 MHz	
15-20							1 MHz	
20-25							1 MHz	
Note 1:	The first an	ıd last mea	surement p	osition wit	h a 30 kHz	filter is at	ΔfOOB equals	
	to 0.015 MI	Hz and 0.9	85 MHz.					
	At the bour							
	•						z, respectively.	
					ove the up	per edge o	f the channel	
	and below					_		
		•			•	•	ork signalling	
	value NS_0							
	For the 2.5					el bandwid	th, the	
	measurement position is at Δf <sub>OOB</sub> equals to 3 MHz.							

NOTE (only for emission measurement):

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

Test requirements (network signalled value "NS 06" or "NS 07")

When "NS\_06" or "NS\_07" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-5, 6.2.4.5-6 and 6.2.4.5-7 as appropriate 1,

and

- the power of any UE emission shall fulfil requirements in Table 6.6.2.2.5.3-1 or Table.6.6.2.2.5.3-2, as applicable.

Table 6.6.2.2.5.3-1: Additional requirements (network signalled value "NS\_06" or "NS\_07"), E-UTRA bands ≤ 3GHz

	Spectr	Spectrum emission limit (dBm)/ Channel bandwidth						
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	Measurement bandwidth			
0-0.1	-11.5	-11.5	-13.5	-16.5	30 kHz			
0.1-1	-11.5	-11.5	-11.5	-11.5	100 kHz			
1-2.5	-11.5				1 MHz			
2.5-2.8	-23.5	-11.5	-11.5		1 MHz			
2.8-5			11.5	-11.5	1 MHz			
5-6		-23.5			1 MHz			
6-10			-23.5		1 MHz			
10-15				-23.5	1 MHz			
Note 1:								
Note 2:	The first ar filter is at £	dOOB equa	surement p als to 0.15	oosition wit MHz and 0	h a 100 kHz			
Note 3:	of +0.5MH: The measu	z and -0.5N	MHz, resperenter to be pe	ctively. rformed ab	er is the inside ove the upper dge of the			
Note 4: Note 5:	network sig TS 36.101 For the 2.5	gnalling val [2] subdau -2.8 MHz o	ue NS_06 ise 6.2.4 Ta iffset range	and NS_07 able 6.2.4- with 1.4 M	corresponding to ' as defined in 1. Hz channel Δf <sub>OOB</sub> equals to			

Table 6.6.2.2.5.3-2: Additional requirements (network signalled value "NS\_06" or "NS\_07"), 3GHz < E-UTRA bands ≤ 4.2GHz

Spectrum emission limit (dBm)/ Channel bandwidth

Δf <sub>OOB</sub>	1.4	3.0	5	10	Measurement		
(MHz)	MHz	MHz	MHz	MHz	bandwidth		
0-0.1	-11.2	-11.2	-13.2	-16.2	30 kHz		
0.1-1	-11.2	-11.2	-11.2	-11.2	100 kHz		
1-2.5	-11.2				1 MHz		
2.5-2.8	-23.2	-11.2	-11.2		1 MHz		
2.8-5			-11.2	-11.2	1 MHz		
5-6		-23.2			1 MHz		
6-10			-23.2		1 MHz		
10-15				-23.2	1 MHz		
					h a 30 kHz filter		
	is at ΔfOOB equals to 0.015 MHz and 0.085 MHz.						
					h a 100 kHz		
		fOOB equa					
					the first and		
		•			er is the inside		
		zand -0.5N					
					ove the upper		
	channel	channel a	na below t	ne lower ed	age of the		
		1	ant annliae	to bondo d	orroon on din a to		
					corresponding to		
					as defined in		
		[2] subdau			i. IHz channel		
			•		$\Delta f_{OOB}$ equals to		
	3 MHz.	, u101110a50	nement po	Siuuli is al	TIOOR Educio (O		
,	J IVII I Z.						

#### NOTE (only for emission measurement):

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

# 6.6.2.2A Additional Spectrum Emission Mask for CA

# 6.6.2.2A.1 Additional Spectrum Emission Mask for CA (intra-band contiguous DL CA and UL CA)

Editor's notes: The following items are missing or incomplete:

- Need to update Annex F and 36.521-2 with this new test case.

#### 6.6.2.2A.1.1 Test purpose

To verify that the power of any UE emission shall not exceed specified lever for the specified channel bandwidth for CA under the deployment scenarios where additional requirements are specified.

#### 6.6.2.2A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

# 6.6.2.2A.1.3 Minimum conformance requirements

### 6.6.2.2A.1.3.1 Minimum requirements (network signalled value "CA\_NS\_04")

Additional spectrum emission requirements are signalled by the network to indicate that the UE shall meet an additional requirement for a specific deployment scenario as part of the cell handover/broadcast message.

When "CA\_NS\_04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.2A.1.3.1-1.

Table 6.6.2.2A.1.3.1-1: Additional requirements

	Spectrum emission limit [dBm]/BW <sub>Channel_CA</sub>									
Δf <sub>OOB</sub> (MHz)	50+100RB (29.9 MHz)	75+75B (30 MHz)	75+100RB (34.85 MHz)	100+100RB (39.8 MHz)	Measurement bandwidth					
± 0-1	-22.5	-22.5	-23.5	-24	30 kHz					
± 1-5.5	-13	-13	-13	-13	1 MHz					
± 5.5-34.9	-25	-25	-25	-25	1 MHz					
± 34.9-35		-25	-25	-25	1 MHz					
± 35-39.85			-25	-25	1 MHz					
± 39.85-44.8				-25	1 MHz					

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The normative reference for this requirement is TS 36.101[2] subclause 6.6.2.2A.

#### 6.6.2.2A.1.4 Test description

#### 6.6.2.2A.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6.2.2A.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.2A.1.4.1-1: Test Configuration Table

						•				
				Initia	Conditio	ns				
		nent as spe			NC					
		subclause								
		cies as spe				ow and High r	ange			
TS36.508 [7] subclause 4.3.1 for different CA bandwidth										
classes.										
			etting ( $N_{RB\_agg}$ ) as spe	cified in	As ir	As in Table 6.6.2.2A.1.3.1-1				
subc	lause 5.4	.2A.1 for th	ne CA Configuration							
			Test P		for CA Co	onfigurations				
ID		CA	DL Allocation	CC			UL Allocation	n		
		juration /	(PDCCH on PCC)	MOD						
	$N_R$	B_agg								
	PCC	SCCs	PCC & SCC RB		N <sub>RB_allo</sub>	P	CC & SCC R	B allocations	S	
	N <sub>RB</sub>	N <sub>RB</sub>	allocation		С		(L <sub>CRB</sub> @	RB <sub>start</sub> )		
1	100	50		QPSK	10	P_10@20	S_0@0			
2	100	50		QPSK	60	P_50@50	S_10@0			
3	100	50		16QAM	15	P_0@0	S_15@0			
4	100	50		QPSK	2	P_1@0	S_1@49			
5	100	50	]	QPSK	24	P_6@0	P_6@50	S_6@0	S_6@44	
6	100	50		QPSK	60	P_20@0	P_20@50	S_10@0	S_10@40	
7	75	75	N/A	QPSK	10	P_10@20	S_0@0			
8	75	75	] IN//\(\tau_1\)	QPSK	75	P_30@45	S_45@0			
9	75	75		QPSK	2	P_1@0	S_1@74			
10	75	75		QPSK	24	24 P_6@0 P_6@60 S_6@10 S_6@6				
11	75	75		QPSK					S_15@60	
12	100	75		QPSK	10	P_10@20	S_0@0			
13	100	75		QPSK	80	P_50@50	S_30@0			
14	100	75	1	160AM	20	P 0@0	S 20@15			

15	100	75	QPSK	2	P_1@0	S_1@74		
16	100	75	QPSK	28	P_8@0	P_8@60	S_6@10	S_6@69
17	100	75	QPSK	75	P_25@0	P_20@55	S_15@10	S_15@60
18	100	100	QPSK	10	P_10@25	S_0@0		
19	100	100	QPSK	90	P_40@60	S_50@0		
20	100	100	16QAM	15	P_0@0	S_15@40		
21	100	100	16QAM	20	P_0@0	S_20@30		
22	100	100	QPSK	2	P_1@0	S_1@99		
23	100	100	QPSK	30	P_10@0	P_5@65	S_10@30	S_5@95
24	100	100	QPSK	80	P_20@0	P_20@60	S_20@20	S_20@80

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure group A.32 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.2.2A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.2A.1.4.3.

#### 6.6.2.2A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.6.2.2A.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.2A.1.4.1-1 on both PCC and SCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 5. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 6. Measure the mean power over all component carriers in the CA configuration of the radio access mode, which shall meet the requirements described in Table 6.2.4A.1.5-4. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 7. Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 6.6.2.2A.1.5.1-1. The centre frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.

#### 6.6.2.2A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6. The following exceptions apply for each network signalled value.

# 6.6.2.2A.1.4.3.1 Message contents exceptions (network signalled value "CA\_NS\_04")

1. Information element additionalSpectrumEmissionSCell-r10 is set to CA\_NS\_04. This can be set in the *RadioResourceConfigCommonSCell-r10-DEFAULT* as part of the common RRC messages. This exception indicates that the UE shall meet the additional spectrum emission requirement for a specific deployment scenario.

Table 6.6.2.2A.1.4.3.1-1: RadioResourceConfigCommonSCell-r10-DEFAULT: Additional spectrum emission test requirement for "CA NS 04"

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-13A								
Information Element Value/remark Comment Condition								
additionalSpectrumEmissionSCell-r10	4 (CA_NS_04)							

#### 6.6.2.2A.1.5 Test Requirements

#### 6.6.2.2A.1.5.1 Test requirement for CA (network signalled value "CA NS 04")

When "CA\_NS\_04" is indicated in the cell

- the measured UE mean power with the aggregated channel bandwidth as specified in clause 5.4.2A, derived in step 6, shall fulfil requirements in Table 6.2.4A.1.5-4 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.2.2A.1.5.1-1.

Table 6.6.2.2A.1.5.1-1: Additional requirements

	Spectrum emission limit [dBm]/BW <sub>Channel_CA</sub>									
Δf <sub>OOB</sub> (MHz)	50+100RB (29.9 MHz)	75+75B (30 MHz)	75+100RB (34.85 MHz)	100+100RB (39.8 MHz)	Measurement bandwidth					
± 0-1	-21	-21	-22	-22.5	30 kHz					
± 1-5.5	-11.5	-11.5	-11.5	-11.5	1 MHz					
± 5.5-34.9	-23.5	-23.5	-23.5	-23.5	1 MHz					
± 34.9-35		-23.5	-23.5	-23.5	1 MHz					
± 35-39.85			-23.5	-23.5	1 MHz					
± 39.85-44.8				-23.5	1 MHz					

Note 1: The first and last measurement position with a 30 kHz filter is at ΔfOOB equals to 0.015 MHz and 0.985 MHz.

Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

Note 3: The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel

Note 4: Above SEM requirement applies to bands corresponding to network signalling value CA\_NS\_04 as defined in TS 36.101 [2] subdause 6.6.2.2A Table 6.2.2.2A-1.

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

# 6.6.2.2B Additional Spectrum Emission Mask for UL-MIMO

# 6.6.2.2B.1 Test purpose

To verify that the power of any UE emission at each transmit antenna shall not exceed specified lever for the specified channel bandwidth under the deployment scenarios where additional requirements are specified.

# 6.6.2.2B.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO

#### 6.6.2.2B.3 Minimum conformance requirements

#### 6.6.2.2B.3.1 Minimum requirement (network signalled value "NS\_03", "NS\_11", and "NS\_20")

For UEs with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the requirements in Table 6.6.2.2B.3.1-1 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

When "NS\_03", "NS\_11" or "NS\_20" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.2B.3.1-1.

Table 6.6.2.2B.3.1-1: Additional requirements (network signalled value "NS\_03", "NS\_11", and "NS\_20")

	Spectrum emission limit (dBm)/ Channel bandwidth									
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth			
± 0-1	-10	-13	-15	-18	-20	-21	30 kHz			
± 1-2.5	-13	-13	-13	-13	-13	-13	1 MHz			
± 2.5-2.8	-25	-13	-13	-13	-13	-13	1 MHz			
± 2.8-5		-13	-13	-13	-13	-13	1 MHz			
± 5-6		-25	-13	-13	-13	-13	1 MHz			
± 6-10			-25	-13	-13	-13	1 MHz			
± 10-15				-25	-13	-13	1 MHz			
± 15-20					-25	-13	1 MHz			
± 20-25						-25	1 MHz			

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The normative reference for this requirement is TS 36.101 clause 6.6.2B.

# 6.6.2.2B.3.2 Minimum requirement (network signalled value "NS\_04")

For UEs with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the requirements in Table 6.6.2.2B.3.2-1 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

When "NS\_04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.2B.3.2-1.

Table 6.6.2.2B.3.2-1: Additional requirements (network signalled value "NS\_04")

	Spectrum emission limit (dBm)/ Channel bandwidth								
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth		
± 0-1	-10	-13	-15	-18	-20	-21	30 kHz		
± 1-2.5	-13	-13	-13	-13	-13	-13	1 MHz		
± 2.5-2.8	-25	-13	-13	-13	-13	-13	1 MHz		
± 2.8-5		-13	-13	-13	-13	-13	1 MHz		
± 5-6		-25	-25	-25	-25	-25	1 MHz		
± 6-10			-25	-25	-25	-25	1 MHz		
± 10-15				-25	-25	-25	1 MHz		
± 15-20					-25	-25	1 MHz		
± 20-25						-25	1 MHz		

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The normative reference for this requirement is TS 36.101 clause 6.6.2B.

6.6.2.2B.3.3 Minimum requirement (network signalled value "NS 06" or "NS 07")

For UEs with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the requirements in Table 6.6.2.2B.3.3-1 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

When "NS\_06" or "NS\_07" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.2.2B.3.3-1.

Table 6.6.2.2B.3.3-1: Additional requirements (network signalled value "NS\_06" or "NS\_07")

Spectrum emission limit (dBm)/ Channel bandwidth							
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	Measurement bandwidth		
± 0-0.1	-13	-13	-15	-18	30 kHz		
± 0.1-1	-13	-13	-13	-13	100 kHz		
± 1-2.5	-13	-13	-13	-13	1 MHz		
± 2.5-2.8	-25	-13	-13	-13	1 MHz		
± 2.8-5		-13	-13	-13	1 MHz		
± 5-6		-25	-13	-13	1 MHz		
± 6-10			-25	-13	1 MHz		
± 10-15				-25	1 MHz		

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement band width.

The normative reference for this requirement is TS 36.101 clause 6.6.2B.

# 6.6.2.2B.4 Test description

#### 6.6.2.2B.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6.2.2B.4.1-1, 6.6.2.2B.4.1-2, 6.6.2.2B.4.1-3 and 6.6.2.2B.4.1-4. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2 respectively. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.2B.4.1-1: Test Configuration Table (network signalled value "NS\_03", "NS\_11", and "NS\_20")

		Initial Condition	ns			
Test Environ			NC			
	in TS 36.508 [	[7] clause 4.1)	NO	110		
Test Frequer			Low range M	lid range, High	range	
		[7] clause 4.3.1)	Low range, iv	arango, riigii	Tango	
Test Channe			Lowest 5MH	z, 10MHz, High	hest	
(as specified	in TS 36.508 [	[7] clause 4.3.1)		z, 101vii 12, 111gi	1001	
		Test Parameters for Chann				
		nlink Configuration		ink Configura		
Ch BW	Mod'n	RB allocation	Mod'n		ocation	
		FDD TDD		FDD	TDD	
1.4MHz	N/A for Add	ditional Spectrum Emission	QPSK	6	6	
1.4MHz		Mask testing.	QPSK	5	5	
1.4MHz			16QAM	5	5	
3MHz	1		QPSK	15	15	
3MHz	1		QPSK	4	4	
3MHz	1		16QAM	15	15	
3MHz	1		16QAM	4	4	
5MHz	1		QPSK	25	25	
5MHz	1		QPSK	8	8	
5MHz	1		QPSK	6	6	
5MHz			16QAM	25	25	
5MHz			16QAM	8	8	
10MHz			QPSK	50	50	
10MHz			QPSK	12	12	
10MHz	1		QPSK	6	6	
10MHz			16QAM	50	50	
				(Note 3)	(Note 3)	
10MHz			16QAM	12	12	
15MHz			QPSK	75	75	
15MHz			QPSK	16	16	
15MHz	1		QPSK	8	8	
15MHz	1		16QAM	75	75	
- · · <del></del>				(Note 3)	(Note 3)	
15MHz	1		16QAM	16	16	
20MHz	1		QPSK	100	100	
20MHz	1		QPSK	18	18	
20MHz	1		QPSK	10	10	
20MHz	1		16QAM	100	100	
				(Note 3)	(Note 3)	
20MHz	1		16QAM	18	18	
	st Channel Ba	indwidths are checked separ		_	ne applicable	
		Iths are specified in Table 5.4		, <b></b>	-11 1	
		rtial RB allocation shall be RI		nax+1 - RB all	ocation) of	

Note 2: The RB $_{\text{start}}$  of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories [FFS].

Table 6.6.2.2B.4.1-2: Test Configuration Table (network signalled value "NS\_06")

		In	itial Conditio	ns		
Test Environ	ment			NC		
(as specified	in TS 36.508 [7	7] clause 4.1)		INC		
Test Frequer				Low range, M	id range High	range
	in TS 36.508 [7	7] clause 4.3.1	)	Low range, w	id range, riigii	range
	l Bandwidths			Lowest, 5MHz	z 10MH z Hial	nest
(as specified	in TS 36.508 [7			,	<u>-, 10141112, 1119</u> 1	1001
				el Bandwidths		
		nlink Configur		•	nk Configura	
Ch BW	Mod'n		ocation	Mod'n		ocation
		FDD	TDD		FDD	TDD
1.4MHz	N/A for Add	itional Spectru	m Emission	QPSK	6	NA
1.4MHz		Mask testing.		QPSK	5	
1.4MHz				16QAM	5	
3MHz				QPSK	15	
3MHz				QPSK	4	
3MHz				16QAM	4	
5MHz				QPSK	25	
5MHz				QPSK	8	
5MHz				16QAM	8	
10MHz				QPSK	50	
10MHz				QPSK	12	
10MHz				16QAM	12	
15MHz				QPSK	75	
15MHz				QPSK	16	1
15MHz				16QAM	16	
20MHz				QPSK	100	1
20MHz				QPSK	18	
20MHz				16QAM	18	1
Note 1: Te	st Channel Bai	ndwidths are c	hecked separa	ately for each E-	UTRA band, th	ne applicabl
ch	annel bandwid	ths are specifie	ed in Table 5.4	.2.1-1.		

The RB<sub>start</sub> of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel bandwidth. Note 2:

Table 6.6.2.2B.4.1-3: Test Configuration Table (network signalled value "NS\_07")

			Initial Conditio	ns		
Test Enviror	nment d in TS 36.508	3 [7] clause 4	.1)	NC		
Test Freque			,	N 4: -1		
(as specifie	d in TS 36.508	8 [7] clause 4	.3.1)	Mid range		
	el Bandwidths			10MHz		
(as specified	d in TS 36.508					
			ameters for Chann			
			k Configuration		plink Configuration	
Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	RB <sub>start</sub>
1	10MHz	N/A for Ad	ditional Spectrum	QPSK	1	0
2	10MHz	Emissio	n Mask testing.	QPSK	8	0
3	10MHz			QPSK	6	13
4	10MHz			QPSK	20	13
5	10MHz			QPSK	12	13
6	10MHz			16QAM	36	13
					(Note 1)	
7	10MHz			QPSK	16	19
8	10MHz			QPSK	12	19
9	10MHz			16QAM	16	19
10	10MHz			QPSK	30	19
11	10MHz			16QAM	30 (Note 1)	19
12	10MHz			QPSK	(Note 1)	43
13	10MHz			QPSK	2	48
14	10MHz			QPSK	50	0
15	10MHz			QPSK	12	0
16	10MHz			16QAM	50 (Note 1)	0
Note 1: A	pplies only fo	r UE-Categor	ies[FFS].	•	<u> </u>	

Table 6.6.2.2B.4.1-4: Test Configuration Table (network signalled value "NS\_04")

			Initial Conditions				
Test Environme	ent						
(as specified in	TS 36.508 [	7] clause 4	.1)	NC	NC		
Test Frequencies		Low range N	Low range, Mid range, High range				
(as specified in		7] clause 4	.3.1)	Low range, n	/lia range, riigir ra	iige	
Test Channel B		<b>-</b> 1	0.4\	5MHz, 10 MH	Hz, 15 MHz, 20MH	łz	
(as specified in	18 36.508 [			,			
	1		Parameters for NS_0 ink Configuration		ink Configuration		
Configuration	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	RB <sub>star</sub>	
ID	CILDAA	WOUTI	TDD	Modifi	TDD	TDD	
1	5MHz	N/A for	Additional Spectrum	QPSK	25	Note 2	
2	5MHz		sion Mask testing.	QPSK	8	Note 2	
3	5MHz	2111101	orom maon too ang.	QPSK	6	Note 2	
4	5MHz			16QAM	25	Note 2	
5	5MHz			16QAM	8	Note 2	
6	10MHz			QPSK	1	0	
7	10MHz			QPSK	12	0	
8	10MHz			QPSK	50	0	
9	10MHz			16QAM	50	0	
					(Note 3)		
10	10MHz			QPSK	24	13	
11	10MHz			16QAM	24	13	
12	10MHz			QPSK	36	13	
13	10MHz			QPSK	12	37	
14	10MHz			QPSK	1	49	
15	15MHz			QPSK	1	0	
16	15MHz			QPSK	16	0	
17	15MHz			QPSK	75	0	
18	15MHz			16QAM	75	0	
					(Note 3)		
19	15MHz			QPSK	36	19	
20	15MHz			16QAM	36	19	
	45501			00014	(Note 3)	10	
21	15MHz			QPSK	50	19	
22	15MHz			QPSK	18	56 74	
23	15MHz			QPSK	1		
24 25	20MHz 20MHz			QPSK QPSK	1 18	0	
26	20MHz			QPSK	100	0	
27	20MHz			16QAM	100	0	
۷.	201711 12			IOQAIVI	(Note 3)		
28	20MHz			QPSK	50	25	
29	20MHz			16QAM	50	25	
_5				10001111	(Note 3)	20	
30	20MHz			QPSK	75	25	
31	20MHz			QPSK	25	75	
32	20MHz			QPSK	1	99	

- Note 2: The RB<sub>start</sub> of partial RB allocation shall be RB# 0 and RB# (max+1 RB allocation) of the channel bandwidth.
- Note 3: Applies only for UE-Categories [FFS].
- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.2.2B.4.1-1, 6.6.2.2B.4.1-2, 6.6.2.2B.4.1-3 and 6.6.2.2B.4.1-4.

- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.2B.4.3.

#### 6.6.2.2B.4.2 Test procedure

- 1. SS sends uplink scheduling information via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.1B.4.1-1, 6.6.2.2B.4.1-2, 6.6.2.2B.4.1-3 or 6.6.2.2B.4.1-4. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
- 3. Measure the sum of the mean power at each antenna connector of UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in Table 6.2.3B.5-1. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 4. Measure the power of the transmitted signal at each antenna connector of UE with a measurement filter of bandwidths according to table 6.6.2.2B5.1-1, 6.6.2.2B.5.2-1, 6.6.2.2B.5.3-1 or Table 6.6.2.2B.5.1-2, 6.6.2.2B.5.2-2, and 6.6.2.2B.5.3-2 as applicable. The centre frequency of the filter shall be stepped in continuous steps according to the same table. The measured power shall be recorded for each step. The measurement period shall capture the active TSs.

#### 6.6.2.2B.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions for each network signalled value.

#### 6.6.2.2B.4.3.1 Message contents exceptions (network signalled value "NS\_03")

1. Information element additional Spectrum Emission is set to NS\_03. This can be set in the SystemInformationblock Type2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.2.2B.4.3.1-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element	Value/remark	Comment	Condition	
additional Spectrum Emission	3 (NS_03)			

#### 6.6.2.2B.4.3.2 Message contents exceptions (network signalled value "NS\_04")

1. Information element additional Spectrum Emission is set to NS\_04. This can be set in the SystemInformationblock Type2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.2.2B.4.3.2-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element	Value/remark	Comment	Condition	
additionalSpectrumEmission	4 (NS_04)			

#### 6.6.2.2B.4.3.3 Message contents exceptions (network signalled value "NS 06")

1. Information element additional Spectrum Emission is set to NS\_06. This can be set in the SystemInformationblock Type2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.2.2B.4.3.3-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element	Value/remark	Comment	Condition	
additionalSpectrumEmission	6 (NS_06)			

#### 6.6.2.2B.4.3.4 Message contents exceptions (network signalled value "NS\_07")

1. Information element additional Spectrum Emission is set to NS\_07. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.2.2B.4.3.4-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element	Value/remark	Comment	Condition		
additional Spectrum Emission	7 (NS_07)				

#### 6.6.2.2B.4.3.5 Message contents exceptions (network signalled value "NS\_11")

1. Information element additional Spectrum Emission is set to NS\_11. This can be set in the SystemInformationblock Type2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.2.2B.4.3.5-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element	Value/remark	Comment	Condition	
additionalSpectrumEmission	11(NS_11)			

#### 6.6.2.2B.4.3.6 Message contents exceptions (network signalled value "NS\_20")

1. Information element additional Spectrum Emission is set to NS\_20. This can be set in the SystemInformationblock Type2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.2.2B.4.3.6-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element	Value/remark	Comment	Condition	
additional Spectrum Emission	20 (NS_20)			

#### 6.6.2.2B.5 Test requirements

#### 6.6.2.2B.5.1 Test requirements (network signalled value "NS\_03", "NS\_11", and "NS\_20")

When "NS\_03" is indicated in the cell:

- the measured sum of mean power at each antenna connector of UE in the channel bandwidth, derived in step 3, shall fulfil requirements in clause 6.2.4B Table [TBD] as appropriate,

and

the power of any UE emission at each transmit antenna connector shall fulfil requirements in Table 6.6.2.2B.5.1 or 6.6.2.2B.5.1-2, as applicable.

Table 6.6.2.2B.5.1-1: Additional requirements (network signalled value "NS\_03", "NS\_11", and "NS\_20"), E UTRA bands ≤ 3GHz

	Spectrum emission limit (dBm)/ Channel bandwidth									
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth			
0-1	-8.5	-11.5	-13.5	-16.5	-18.5	-19.5	30 kHz			
1-2.5	-11.5	-11.5	-11.5	-11.5	-11.5	-11.5	1 MHz			
2.5-2.8	-23.5						1 MHz			
2.8-5							1 MHz			
5-6		-23.5	1				1 MHz			
6-10			-23.5				1 MHz			
10-15				-23.5	1		1 MHz			
15-20					-23.5	1	1 MHz			
20-25						-23.5	1 MHz			

Note 1: The first and last measurement position with a 30 kHz filter is at Δf<sub>OOB</sub> equals to 0.015 MHz and 0.985 MHz

Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

Note 3: The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel

Note 4: Above SEM requirement applies to bands corresponding to network signalling value NS\_03 as defined in TS 36.101 [2] clause 6.2.4B

Note 5: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

Table 6.6.2.2B.5.1-2: Additional requirements (network signalled value "NS\_03", "NS\_11", and "NS\_20"), 3GHz < E UTRA bands ≤ 4.2GHz

	Spectrum emission limit (dBm)/ Channel bandwidth										
$\Delta f_{OOB}$	1.4	3.0	5	10	15	20	Measurement				
(MHz)	MHz	MHz	MHz	MHz	MHz	MHz	bandwidth				
0-1	-8.2	-11.2	-13.2	-16.2	-18.2	-19.2	30 kHz				
1-2.5	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	1 MHz				
2.5-2.8	-23.2						1 MHz				
2.8-5							1 MHz				
5-6		-23.2					1 MHz				
6-10			-23.2				1 MHz				
10-15				-23.2			1 MHz				
15-20					-23.2		1 MHz				
20-25						-23.2	1 MHz				

Note 1: The first and last measurement position with a 30 kHz filter is at Δf<sub>OOB</sub> equals to 0.015 MHz and 0.985 MHz.

Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

Note 3: The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel

Note 4: Above SEM requirement applies to bands corresponding to network signalling value NS\_03 as defined in TS 36.101 [2] clause 6.2.4B

Note 5: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

#### NOTE (only for emission measurement):

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

## 6.6.2.2B.5.2 Test requirements (network signalled value "NS\_04")

When "NS\_04" is indicated in the cell:

- the measured sum of mean power at each antenna connector of UE in the channel bandwidth, derived in step 3, shall fulfil requirements in clause 6.2.4B Table [TBD] as appropriate,

and

- the power of any UE emission at each antenna connector shall fulfil requirements in Table 6.6.2.2B.5.2-1 or Table 6.6.2.2B.5.2-2, as applicable.

Table 6.6.2.2B.5.2-1: Additional requirements (network signalled value "NS\_04"), E UTRA bands ≤ 3GHz

	Spectrum emission limit (dBm)/ Channel bandwidth									
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth			
0-1	-8.5	-11.5	-13.5	-16.5	-18.5	-19.5	30 kHz			
1-2.5	-11.5	-11.5		-11.5	-11.5	-11.5	1 MHz			
2.5-2.8	-23.5						1 MHz			
2.8-5							1 MHz			
5-6		-23.5	-23.5	-23.5	-23.5	-23.5	1 MHz			
6-10							1 MHz			
10-15							1 MHz			
15-20							1 MHz			
20-25							1 MHz			

- Note 1: The first and last measurement position with a 30 kHz filter is at Δf<sub>OOB</sub> equals to 0.015 MHz and 0.985 MHz.
- Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.
- Note 3: The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel.
- Note 4: Above SEM requirement applies to bands corresponding to network signalling value NS\_04 as defined in TS 36.101 [2] clause 6.2.4B.
- Note 5: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

Table 6.6.2.2B.5.2-2: Additional requirements (network signalled value "NS\_04"), 3GHz < E UTRA bands ≤ 4.2GHz

	Spectrum emission limit (dBm)/ Channel bandwidth									
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Measurement bandwidth			
0-1	-8.2	-11.2	-13.2	-16.2	-18.2	-19.2	30 kHz			
1-2.5	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2	1 MHz			
2.5-2.8	-23.2						1 MHz			
2.8-5							1 MHz			
5-6		-23.2	-23.2	-23.2	-23.2	-23.2	1 MHz			
6-10							1 MHz			
10-15							1 MHz			
15-20							1 MHz			
20-25							1 MHz			

- Note 1: The first and last measurement position with a 30 kHz filter is at Δf<sub>OOB</sub> equals to 0.015 MHz and 0.985 MHz.
- Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.
- Note 3: The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel.
- Note 4: Above SEM requirement applies to bands corresponding to network signalling value NS\_04 as defined in TS 36.101 [2] clause 6.2.4 Table 6.2.4-1.
- Note 5: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

#### NOTE (only for emission measurement):

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

6.6.2.2B.5.3 Test requirements (network signalled value "NS\_06" or "NS\_07")

When "NS\_06" or "NS\_07" is indicated in the cell:

- the measured sum of mean power at each antenna connector of UE in the channel bandwidth, derived in step 3, shall fulfil requirements in clause 6.2.4B Table [TBD]as appropriate 1,

and

- the power of any UE emission at each antenna connector shall fulfil requirements in Table 6.6.2.2B.5.3-1 or Table 6.6.2.2B.5.3-2, as applicable.

Table 6.6.2.2B.5.3-1: Additional requirements (network signalled value "NS\_06" or "NS\_07") , E UTRA bands ≤ 3GHz

	Spectrum emission limit (dBm)/ Channel bandwidth						
Δfoc	В	1.4	3.0	5	10	Measurement	
(MHz	z)	MHz	MHz	MHz	MHz	bandwidth	
0-0.	1	-11.5	-11.5	-13.5	-16.5	30 kHz	
0.1-	1	-11.5	-11.5	-11.5	-11.5	100 kHz	
1-2.	5	-11.5	-11.5	-11.5	-11.5	1 MHz	
2.5-2	1.8	-23.5				1 MHz	
2.8-	5					1 MHz	
5-6	i		-23.5			1 MHz	
6-1				-23.5		1 MHz	
10-1	0-15 -23.5			1 MHz			
Note 1: The first and last measurement position with a 30 kHz filter is at							
		equals to 0.					
						kHz filter is at	
		equals to 0.					
Note 2:		boundary o					
		•		1 IVIHZ TIITE	er is the ins	side of +0.5MHz	
Note O		0.5MHz, res	•		l = l= =		
Note 3:						upper edge of	
Niete 4.		nannel and b					
Note 4:		e SEM requi ork signalling					
		5.101 [2] clau			_ur as ue	IIIIGU III	
Note 5:					1 MHz cho	annel bandwidth,	
11016 3.		easurement					
	uic III	cas ai cilicili	Position is	ar AIOOR EC	Judio io o i	VII IZ.	

Table 6.6.2.2B.5.3-2: Additional requirements (network signalled value "NS\_06" or "NS\_07") , 3GHz < E UTRA bands ≤ 4.2GHz

	Spectrum emission limit (dBm)/ Channel bandwidth							
Δf <sub>OOB</sub> (MHz)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	Measurement bandwidth			
0-0.1	-11.2	-11.2	-13.2	-16.2	30 kHz			
0.1-1	-11.2	-11.2	-11.2	-11.2	100 kHz			
1-2.5	-11.2	-11.2	-11.2	-111.2	1 MHz			
2.5-2.8	-23.2				1 MHz			
2.8-5					1 MHz			
5-6		-23.2			1 MHz			
6-10			-23.2		1 MHz			
10-15				-23.2	1 MHz			

Note 1: The first and last measurement position with a 30 kHz filter is at  $\Delta f_{OOB}$  equals to 0.015 MHz and 0.085 MHz.

The first and last measurement position with a 100 kHz filter is at  $\Delta f_{OOB}$  equals to 0.15 MHz and 0.95 MHz.

Note 2: At the boundary of spectrum emission limit, the first and last measurement position with a 1 MHz filter is the inside of +0.5MHz and -0.5MHz, respectively.

Note 3: The measurements are to be performed above the upper edge of the channel and below the lower edge of the channel.

Note 4: Above SEM requirement applies to bands corresponding to network signalling value NS\_06 and NS\_07 as defined in TS 36.101 [2] clause 6.2.4B.

Note 5: For the 2.5-2.8 MHz offset range with 1.4 MHz channel bandwidth, the measurement position is at  $\Delta f_{OOB}$  equals to 3 MHz.

#### NOTE (only for emission measurement):

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

# 6.6.2.3 Adjacent Channel Leakage power Ratio

# 6.6.2.3.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to adjacent channels in terms of Adjacent Channel Leakage power Ratio (ACLR).

# 6.6.2.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

#### 6.6.2.3.3 Minimum conformance requirements

ACLR requirements are specified for two scenarios for an adjacent E -UTRA<sub>ACLR</sub> and UTRA<sub>ACLR1/2</sub> as shown in Figure 6.6.2.3.3-1.

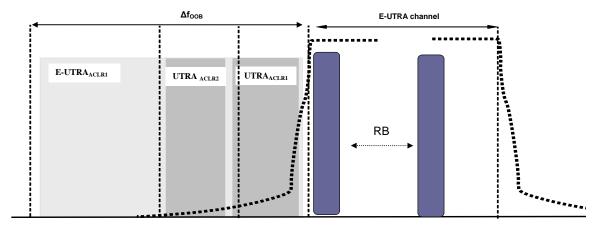


Figure 6.6.2.3.3-1: Adjacent Channel Leakage Power Ratio requirements

### 6.6.2.3.3.1 Minimum conformance requirements for E-UTRA

E-UTRA ACLR (E-UTRA<sub>ACLR</sub>) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency at nominal channel spacing. The assigned E-UTRA channel power and adjacent E-UTRA channel power are measured with rectangular filters with measurement bandwidth specified in Table 6.6.2.3.3.1-1.

If the measured adjacent channel power is greater than -50dBm then the E-UTRA<sub>ACLR</sub> shall be higher than the valued specified in Table 6.6.2.3.3.1-1.

Channel bandwidth / E-UTRA<sub>ACLR1</sub> / measurement bandwidth 3.0 10 20 1.4 5 15 MHz MHz MHz MHz MHz MHz E-UTRA<sub>ACLR1</sub> 30 dB 30 dB 30 dB 30 dB 30 dB 30 dB 1.08 MHz 2.7 MHz 4.5 MHz 9.0 MHz 13.5 MHz E-UTRA channel 18 MHz Measurement bandwidth

Table 6.6.2.3.3.1-1: General requirements for E-UTRA<sub>ACLR</sub>

The normative reference for this requirement is TS 36.101 [2] subclause 6.6.2.3.1.

#### 6.6.2.3.3.2 Minimum conformance requirements for UTRA

UTRA ACLR (UTRA<sub>ACLR</sub>) is the ratio of the filtered mean power centred on the assigned E-UTRA channel frequency to the filtered mean power centred on an adjacent UTRA channel frequency.

UTRA ACLR is specified for both the first UTRA adjacent channel (UTRA  $_{ACLR1}$ ) and the  $2^{nd}$  UTRA adjacent channel (UTRA  $_{ACLR2}$ ). The UTRA channel power is measured with a RRC bandwidth filter with roll-off factor  $\alpha=0.22$ . The assigned E-UTRA channel power is measured with a rectangular filter with measurement bandwidth specified in Table 6.6.2.3.3.2-1.

If the measured UTRA channel power is greater than  $-50d\,Bm$  then the UTRA<sub>ACLR1</sub>, and UTRA<sub>ACLR2</sub> shall be higher than the valued specified in Table 6.6.2.3.3.2-1.

Table 6.6.2.3.3.2-1: General requirements for UTRA ACLR1/2

Channel bandwidth / UTRA <sub>ACLR1/2</sub> / measurement bandwidth							
1.4	3.0	5	10	15	20		
MHz	MHz	MHz	MHz	MHz	MHz		

UTRA <sub>ACLR1</sub>	33 dB					
Adjacent	0.7+BW <sub>∪</sub>	1.5+BW <sub>∪</sub>	2.5+BW <sub>∪</sub>	5+BW <sub>UTR</sub>	7.5+BW <sub>∪</sub>	10+BW <sub>UT</sub>
channel centre	TRA/2	TRA/2	TRA/2	<sub>A</sub> /2	TRA/2	RA/2
frequency offset	/	/	/	/	/	/
(in MHz)	-0.7-	-1.5-	-2.5-	-5-	-7.5-	-10-
	BW <sub>UTRA</sub> /2					
UTRA <sub>ACLR2</sub>	-	-	36 dB	36 dB	36 dB	36 dB
Adjacent	-	-	2.5+3*B	5+3*BW <sub>U</sub>	7.5+3*B	10+3*BW
channel centre			W <sub>UTRA</sub> /2	TRA/2	W <sub>UTRA</sub> /2	UTRA/2
frequency offset			/	/	/	/
(in MHz)			-2.5-	-5-	-7.5-	-10-
			3*BW <sub>UTR</sub>	3*BW <sub>UTR</sub>	3*BW <sub>UTR</sub>	$3*BW_{UTR}$
			<sub>A</sub> /2	<sub>A</sub> /2	<sub>A</sub> /2	<sub>A</sub> /2
E-UTRA channel						
Measurement	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
bandwidth						
UTRA 5MHz						
channel	3.84 MHz					
Measurement	0.0111112	0.01 11112	0.0111112	0.0111112	0.0111112	0.0111112
bandwidth <sup>1</sup>						
UTRA 1.6MHz						
channel	1.28 MHz					
measurement	1.20 14.1.2	1.20 11.12	1.20 11.12	1.20 11.12	1.20 11.12	1.20 11.12
bandwidth <sup>2</sup>						
	e for E-UTR					
Note 2: Applicable	e for E-UTR	A TDD co-ex	istence with	UTRA TDD i	n unpaired s	pectrum.

Applicable for E-UTRATDD co-existence with UTRATDD in unpaired spectrum.

The normative reference for this requirement is TS 36.101 subclause 6.6.2.3.2.

#### 6.6.2.3.4 Test description

#### 6.6.2.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6.2.3.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in AnnexeA.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.3.4.1-1: Test Configuration Table

	Initial Conditions							
Test Environ				NC, TL/VL, TL/VH, TH/VL, TH/VH				
(as specified in TS 36.508 [7] subclause 4.1)				110, 12, 12, 1	⊏/ VII, III/ V⊏, I	11/ 111		
Test Frequer	ncies		Low range M	lid range, High	rango			
(as specified in TS36.508 [7] subclause 4.3.1)				Low range, iv	ilu range, riign	range		
Test Channel Bandwidths			Lowest, 5MHz, 10MHz, Highest					
(as specified	(as specified in TS 36.508 [7] subclause 4.3.1)			, , , , , ,				
	,	Test Paramete	ers for Channe	el Bandwidths				
	Down	nlink Configur	ation	Uplink Configuration				
Ch BW	Mod'n	RB all	ocation	Mod'n RB allocation		ocation		
		FDD	TDD		FDD	TDD		

1.4MHz	N/A for ACLR testing	QPSK	6	6
1.4MHz		QPSK	5	5
1.4MHz		16QAM	6	6
1.4MHz		16QAM	5	5
3MHz		QPSK	15	15
3MHz		QPSK	4	4
3MHz		16QAM	15	15
3MHz		16QAM	4	4
5MHz		QPSK	25	25
5MHz		QPSK	8	8
5MHz		16QAM	25	25
5MHz		16QAM	8	8
10MHz		QPSK	50	50
10MHz		QPSK	12	12
10MHz		16QAM	50	50
			(Note 3)	(Note 3)
10MHz		16QAM	12	12
15MHz		QPSK	75	75
15MHz		QPSK	16	16
15MHz		16QAM	75	75
			(Note 3)	(Note 3)
15MHz		16QAM	16	16
20MHz		QPSK	100	100
20MHz		QPSK	18	18
20MHz		16QAM	100	100
			(Note 3)	(Note 3)
20MHz		16QAM	18	18

Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.

Note 2: The RB<sub>start</sub> of partial RB allocation shall be RB#0 and RB# (max + 1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories 2-5

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.2.3.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.3.4.3.

#### 6.6.2.3.4.2 Test procedure

- SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in Table 6.2.3.5-1. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 4. Measure the rectangular filtered mean power for E-UTRA.
- 5. Measure the rectangular filtered mean power of the first E-UTRA adjacent channel on both lower and upper side of the E-UTRA channel, respectively.

- 6. Measure the RRC filtered mean power of the first and the second UTRA adjacent channel on both lower and upper side of the E-UTRA channel, respectively.
- 7. Calculate the ratios of the power between the values measured in step 4 over step 5 for lower and upper E-UTRA<sub>ACLR</sub>, respectively.
- 8. Calculated the ratios of the power between the values measured in step 4 over step 6 for lower and upper UTRA<sub>ACLR1</sub>, UTRA<sub>ACLR2</sub>, respectively.

#### 6.6.2.3.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

# 6.6.2.3.5 Test requirement

# 6.6.2.3.5.1 Test requirements E-UTRA

- The measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.3.5-1 as appropriate,

and

- if the measured adjacent channel power is greater than -50 dBm then the measured E-UTRA<sub>ACLR</sub>, derived in step 7, shall be higher than the limits in table 6.6.2.3.5.1-1.

Table 6.6.2.3.5.1-1: E-UTRA UE ACLR

	Cha	Channel bandwidth / E-UTRA <sub>ACLR1</sub> / measurement bandwidth								
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz				
E-UTRA <sub>ACLR1</sub>	29.2 dB	29.2 dB	29.2 dB	29.2 dB	29.2 dB	29.2 dB				
E-UTRA channel	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz				
Measurement										
bandwidth										
UE channel	+1.4 MHz	+3 MHz or	+5MHz or	+10MHz or	+15MHz or	+20MHz or				
	or -1.4 MHz	-3 MHz	-5MHz	-10MHz	-15MHz	-20MHz				

#### Test requirements UTRA

If the measured UTRA channel power is greater than -50dBm then the measured UTRA<sub>ACLR1</sub>, UTRA<sub>ACLR2</sub>, derived in step 8, shall be higher than the limits in table 6.6.2.3.5.2-1.

Table 6.6.2.3.5.2-1: UTRA UE ACLR

Channel bandwidth / UTRA <sub>ACLR1/2</sub> / measurement bandwidth							
1.4	3.0	5	10	15	20		
MHz	MHz	MHz	MHz	MHz	MHz		

UTRA <sub>ACLR1</sub>	32.2 dB	32.2 dB	32.2 dB	32.2 dB	32.2 dB	32.2 dB
Adjacent	0.7+BW <sub>UTR</sub>	1.5+BW <sub>UTR</sub>	2.5+BW <sub>UTR</sub>	5+BW <sub>UTRA</sub> /	7.5+BW <sub>UTR</sub>	10+BW <sub>UTRA</sub>
channel centre	<sub>A</sub> /2	<sub>A</sub> /2	<sub>A</sub> /2	2	<sub>A</sub> /2	/2
frequency offset	/	/	/	/	/	/
(in MHz)	-0.7-	-1.5-	-2.5-	-5-	-7.5-	-10-
	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2
UTRA <sub>ACLR2</sub>	-	-	35.2 dB	35.2 dB	35.2 dB	35.2 dB
Adjacent	-	-	2.5+3*BW <sub>∪</sub>	5+3*BW <sub>UTR</sub>	7.5+3*BW <sub>∪</sub>	10+3*BW <sub>∪T</sub>
channel centre			TRA/2	<sub>A</sub> /2	TRA/2	<sub>RA</sub> /2
frequency offset			/	/	/	/
(in MHz)			-2.5-	-5-	-7.5-	-10-
			3*BW <sub>UTRA</sub> /2	3*BW <sub>UTRA</sub> /2	3*BW <sub>UTRA</sub> /2	3*BW <sub>UTRA</sub> /2
E-UTRA channel						
Measurement	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
bandwidth						
UTRA 5MHz						
channel	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz
Measurement	0.0+ IVII 12	0.04 IVII 12	0.0+ IVII 12	0.0+ IVII IZ	0.04 IVII 12	0.04 IVII 12
bandwidth <sup>1</sup>						
UTRA 1.6MHz						
channel	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz
measurement	1.20 1/11/12	1.20 IVII IZ	1.20 101112	1.20 IVII IZ	1.20 1/11/12	1.20 101112
bandwidth <sup>2</sup>						

Note 1: Applicable for E-UTRA FDD co-existence with UTRA FDD in paired spectrum.

Note 2: Applicable for E-UTRATDD co-existence with UTRATDD in unpaired spectrum.

Note 3: BW<sub>UTRA</sub> for UTRA FDD is 5MHz and for UTRA TDD is 1.6MHz.

# 6.6.2.3\_1 Adjacent Channel Leakage power Ratio for HPUE

# 6.6.2.3\_1.1 Test purpose

To verify that HPUE transmitter does not cause unacceptable interference to adjacent channels in terms of Adjacent Channel Leakage power Ratio (ACLR).

# 6.6.2.3\_1.2 Test applicability

This test case applies to all types of E-UTRA Power Class 1 UE release 11 and forward.

# 6.6.2.3\_1.3 Minimum conformance requirements

ACLR requirements are specified for an adjacent E-UTRA<sub>ACLR</sub> as shown in Figure 6.6.2.3\_1.3-1.

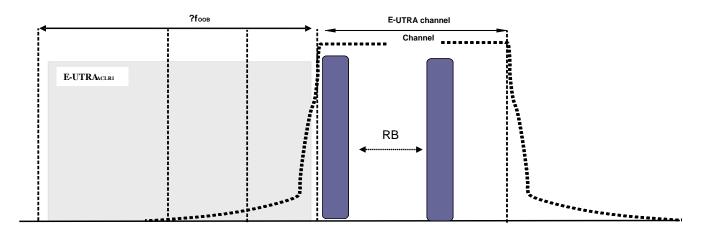


Figure 6.6.2.3\_1.3-1: Adjacent Channel Leakage Power Ratio requirements

#### 6.6.2.3\_1.3.1 Minimum conformance requirements for E-UTRA for HPUE

Same minimum conformance requirements as in clause 6.6.2.3.3.1 with for following exceptions:

- Instead of Table 6.6.2.3.3.1-1 → use Table 6.6.2.3\_1.3.1-1

Table 6.6.2.3\_1.3.1-1: Additional E-UTRA<sub>ACLR</sub> requirements for Power Class 1

	Channel bandwidth / E-UTRA <sub>ACLR1</sub> / Measurement bandwidth					
	1.4	3.0	5	10	15	20
	MHz	MHz	MHz	MHz	MHz	MHz
E-UTRA <sub>ACLR1</sub>	N/A	N/A	37 dB	37 dB	N/A	N/A
E-UTRA channel Measurement bandwidth	N/A	N/A	4.5 MHz	9.0 MHz	N/A	N/A
Adjacent channel centre frequency offset [MHz]	N/A	N/A	+5 / -5	+10 / -10	N/A	N/A
NOTE 1: E-UTRA <sub>ACLR1</sub> shall be applicable for >23dBm						

The normative reference for this requirement is TS 36.101 [2] clause 6.6.2.1.

#### 6.6.2.3\_1.4 Test description

#### 6.6.2.3\_1.4.1 Initial conditions

Same initial conditions as in clause 6.6.2.3.4.1.

#### 6.6.2.3\_1.4.2 Test procedure

- SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in Table 6.2.3\_1.5-1. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 4. Measure the rectangular filtered mean power for E-UTRA.
- 5. Measure the rectangular filtered mean power of the first E-UTRA adjacent channel on both lower and upper side of the E-UTRA channel, respectively.
- 6. Calculate the ratios of the power between the values measured in step 4 over step 5 for lower and upper E-UTRA<sub>ACLR</sub>, respectively.

#### 6.6.2.3\_1.4.3 Message contents

Same message contents as in clause 6.6.2.3.4.3

# 6.6.2.3\_1.5 Test requirement

#### 6.6.2.3 1.5.1 Test requirements E-UTRA

- The measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.3\_1.5-1 as appropriate,

and

- if the measured adjacent channel power is greater than -50 dBm then the measured E-UTRA<sub>ACLR</sub>, derived in step 7, shall be higher than the limits in table 6.6.2.3\_1.4.1-1.

	Channel bandwidth / E-UTRA <sub>ACLR1</sub> / measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
E-UTRA <sub>ACLR1</sub>	N/A	N/A	36.2 dB	36.2 dB	N/A	N/A
E-UTRA channel Measurement bandwidth	N/A	N/A	4.5 MHz	9.0 MHz	N/A	N/A
UE channel	N/A	N/A	+5MHz or -5MHz	+10MHz or -10MHz	N/A	N/A

Table 6.6.2.3 1.4.1-1: E-UTRA UE ACLR

# 6.6.2.3A Adjacent Channel Leakage power Ratio for CA

# 6.6.2.3A.1 Adjacent Channel Leakage power Ratio for CA (intra-band contiguous DL CA and UL CA)

#### 6.6.2.3A.1.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to adjacent channels in terms of Adjacent Channel Leakage power Ratio (ACLR) for CA.

# 6.6.2.3A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra band contiguous DL CA and UL CA.

#### 6.6.2.3A.1.3 Minimum conformance requirements

ACLR for CA requirements are specified for two scenarios for an adjacent E-UTRA $_{ACLR}$  and UTRA $_{ACLRI/2}$  as shown in Figure 6.6.2.3A.1.3-1.

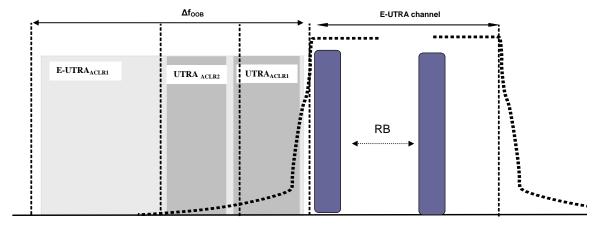


Figure 6.6.2.3A.1.3-1: Adjacent Channel Leakage Power Ratio for CA requirements

#### 6.6.2.3A.1.3.1 Minimum conformance requirements of UTRA for CA

For intra-band contiguous carrier aggregation the UTRA Adjacent Channel Leakage power Ratio (UTRA ACLR) is the ratio of the filtered mean power centred on the assigned carrier aggregated channel bandwidth to the filtered mean power centred on an adjacent(s) UTRA channel frequency.

UTRA Adjacent Channel (UTRA  $_{ACLR1}$ ) and the  $2^{nd}$  UTRA adjacent channel (UTRA  $_{ACLR1}$ ). The UTRA channel power is measured with a RRC bandwidth filter with roll-off factor  $\alpha=0.22$ . The assigned aggregated channel bandwidth power is measured with a rectangular filter with measurement bandwidth specified in Table 6.6.2.3A.1.3.1-1. If the measured UTRA channel power is greater than -50d Bm then the UTRA  $_{ACLR1}$  shall be higher than the valued specified in Table 6.6.2.3A.1.3.1-1.

	CA bandwidth class / UTRA <sub>ACLR1/2</sub> / measurement bandwidth
	CA bandwidth class C
UTRA <sub>ACLR1</sub>	33 dB
Adjacent channel centre frequency offset (in MHz)	+ BW <sub>Channel_CA</sub> /2 + BW <sub>UTRA</sub> /2 / - BW <sub>Channel_CA</sub> / 2 - BW <sub>UTRA</sub> /2
UTRA <sub>ACLR2</sub>	36 dB
Adjacent channel centre frequency offset (in MHz)	+ BW <sub>Channel_CA</sub> /2 + 3*BW <sub>UTRA</sub> /2 / - BW <sub>Channel_CA</sub> /2 - 3*BW <sub>UTRA</sub> /2
CA E-UTR Achannel Measurement bandwidth	BW <sub>Channel_CA</sub> - 2* BW <sub>GB</sub>
UTRA 5MHz channel Measurement bandwidth*	3.84 MHz

Applicable for E-UTRA FDD co-existence with UTRA FDD in paired spectrum.

1.28 MHz

Table 6.6.2.3A.1.3.1-1: General requirements of UTRA ACLR1/2 for CA

\*\* Note: Applicable for E-UTRA TDD co-existence with UTRA TDD in unpaired spectrum.

The normative reference for this requirement is TS 36.101 [2] subclause 6.6.2.3.2A.

UTRA 1.6 MHz channel

measurement bandwidth\*\*

# 6.6.2.3A.1.3.2 Minimum conformance requirements of CA E-UTRA

For intra-band contiguous carrier aggregation the carrier aggregation E-UTRA Adjacent Channel Leakage power Ratio (CA E-UTRA $_{ACLR}$ ) is the ratio of the filtered mean power centred on the aggregated channel bandwidth to the filtered mean power centred on an adjacent aggregated channel bandwidth at nominal channel spacing. The assigned aggregated channel bandwidth power are measured with rectangular filters with measurement bandwidth specified in Table 6.6.2.3A.1.3.2-1.

If the measured adjacent channel power is greater than  $-50d\,Bm$  then the E-UTRA  $_{ACLR}$  shall be higher than the value specified in Table 6.6.2.3A.1.3.2-1.

Table 6.6.2.3A.1.3.2-1: General requirements of E-UTRA<sub>ACLR</sub> for CA

CA bandwidth class / CA E-UTRA<sub>ACLR</sub> / measur

	CA bandwidth class / CA E-UTRA <sub>ACLR</sub> / measurement bandwidth
	CA bandwidth class C
CA E-UTR A <sub>ACLR</sub>	30 dB
CAE-UTRAchannel Measurement bandwidth	BW <sub>Channel_CA</sub> - 2* BW <sub>GB</sub>
Adjacent channel centre frequency offset (in MHz)	+ BWchannel_CA / - BWchannel_CA

The normative reference for this requirement is TS 36.101 [2] subclause 6.6.2.3.3A.

6.6.2.3A.1.4 Test description

6.6.2.3A.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6.2.3A. 1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.3A.1.4.1-1: Test Configuration Table

			Initial	Condition	S			
Test Environment as specified in			NC, TL/VL, TL/VH, TH/VL, TH/VH					
Test Fr	08 [7] subcl	lause 4.1 as specified in lause 4.3.1 for different Ca	A bandwidth	C: Low ra	ange, High range			
Test Co subclau	C Combinat use 5.4.2A.1	ion setting ( $N_{RB\_agg}$ ) as sp for the CA Configuration		Lowest N	$I_{RB\_agg}, HighestN$	RB_agg		
		or CA Configurations						
CA Configuration DL Allocation CC MOD		UL Alloc	ation					
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	PCC & SCC RB allocation		N <sub>RB_alloc</sub> PCC & SCC RB allocations(L <sub>CRB</sub> @ RB <sub>start</sub> )			start)	
75	75		QPSK	75	P_75@0	S_0@0	-	-
75	75		QPSK	16	P_16@0	S_0@0	-	-
75	75		QPSK	130	P_75@0	S_55@0	-	-
75	75	-	QPSK	150	P_75@0	S_75@0	-	-
75	75		16QAM	75	P_75@0	S_0@0	-	-
75	75		16QAM	16	P_16@0	S_0@0	-	-
75	75		16QAM	130	P_75@0	S_55@0	-	-
75	75		16QAM	150	P_75@0	S_75@0	-	-
75	75		QPSK	2	P_1@0	S_1@74	-	-
75	75		QPSK	15	P_5@0	P_5@35	S_5@0	-
75	75	1	QPSK	75	P_25@0	P_20@35	S_15@0	S_15@34
100	50	†	QPSK	100	P_100@0	S_0@0	-	-
100	50	1	QPSK	12	P_12@0	S_0@0	-	-
100	50		QPSK	150	P_100@0	S_50@0	-	-
100	50		16QAM	100	P_100@0	S_0@0	-	-
100	50	N/A for this test	16QAM	12	P_12@0	S_0@0	-	-
100	50	_ ioi tilis test	16QAM	150	P_100@0	S_50@0	-	-
100	50		QPSK	2	P_1@0	S_1@49	-	-
100	50		QPSK	15	P_5@0	P_5@50	S_5@0	-
100	50		QPSK	75	P_25@0	P_20@34	S_15@0	S_15@34
100	100	1	QPSK	100	P_100@0	S_0@0	-	-
100	100	1	QPSK	18	P_18@0	S_0@0	-	-
100	100		QPSK	130	P_100@0	S_30@0	-	-
100	100		QPSK	200	P_100@0	S_100@0	-	-
100	100	1	16QAM	100	P_100@0	S_0@0	-	-
100	100		16QAM	18	P_18@0	S_0@0	-	-
100	100	1	16QAM	130	P_100@0	S_30@0	-	-
100	100	1	16QAM	200	P_100@0	S_100@0	-	-
100	100	1	QPSK	2	P_1@0	S_1@99	-	-
100	100	1	QPSK	20	P_5@0	P_5@50	S_5@0	S_5@50
100	100	1	QPSK	100	P_25@0	P_25@50	S_25@0	S_25@50

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1.

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure group A.32 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.2.3A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.3A.1.4.3.

#### 6.6.2.3A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.6.2.3A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.3A.1.4.1-1 on both PCC and SCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 5. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 6. Measure the mean power over all component carriers of the UE in the CA configuration of the radio access mode according to the test configuration, which shall meet the requirements described in Table 6.2.3A.1.5-1. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 7. Measure the rectangular filtered mean power for CA E-UTRA.
- 8. Measure the rectangular filtered mean power of the first CA E-UTRA adjacent channel on both lower and upper side of the CA E-UTRA channel, respectively.
- 9. Measure the RRC filtered mean power of the first and the second UTRA adjacent channel on both lower and upper side of the CA E-UTRA channel, respectively.
- 10. Calculate the ratio of the power between the values measured in step 7 over step 8 for CA E-UTRA<sub>ACLR</sub>.
- 11. Calculate the ratio of the power between the values measured in step 7 over step 9 for UTRA<sub>ACLR1</sub>, UTRA<sub>ACLR2</sub>.

#### 6.6.2.3A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 6.6.2.3A.1.5 Test Requirements

## 6.6.2.3A.1.5.1 Test requirements of UTRA for CA

If the measured UTRA channel power is greater than -50dBm then the measured UTRA<sub>ACLR1</sub> and UTRA<sub>ACLR2</sub>, derived in step 11, shall be higher than the limits in table 6.6.2.3A.1.5.1-1.

#### Table 6.6.2.3A.1.5.1-1: UTRA UE ACLR for CA

CA bandwidth class / UTRA <sub>ACLR1/2</sub> / measurement
bandwidth

	CA bandwidth class C
UTRA <sub>CLR1</sub>	32.2 dB
Adjacent channel centre frequency offset (in MHz)	+ BW <sub>Channel_CA</sub> /2 + BW <sub>UTRA</sub> /2 / - BW <sub>Channel_CA</sub> /2 - BW <sub>UTRA</sub> /2
UTRA <sub>ACLR2</sub>	35.2 dB
Adjacent channel centre frequency offset (in MHz)	+ BW <sub>Channel_CA</sub> /2 + 3*BW <sub>UTRA</sub> /2 / - BW <sub>Channel_CA</sub> /2 - 3*BW <sub>UTRA</sub> /2
CA E-UTR Achannel Measurement bandwidth	BW <sub>Channel_CA</sub> - 2* BW <sub>GB</sub>
UTRA 5 MHz channel Measurement bandwidth (Note 1)	3.84 MHz
UTRA 1.6 MHz channel measurement bandwidth (Note 2)	1.28 MHz
	DD co-existence with UTRA FDD in paired spectrum. DD co-existence with UTRA TDD in unpaired spectrum.

### 6.6.2.3A.1.5.2 Test requirements of CA E-UTRA

- The measured UE mean power in the channel bandwidth as specified in clause 5.4.2A, derived in step 6, shall fulfil requirements in Table 6.2.3A.1.5-1 as appropriate,

and

- if the measured adjacent channel power is greater than -50 dBm then the measured CA E-UTRA<sub>ACLR</sub>, derived in step 10, shall be higher than the limits in table 6.6.2.3A.1.5.2-1.

Table 6.6.2.3A.1.5.2-1: CA E-UTRA ACLR

CA bandwidth class / CA E-UTRA

	CA bandwidth class / CA E-UTRA <sub>ACLR</sub> / Measurement bandwidth
	CA bandwidth class C
CA E-UTR A <sub>ACLR</sub>	29.2 dB
CA E-UTR A channel Measurement bandwidth	BW <sub>Channel_CA</sub> - 2* BW <sub>GB</sub>
Adjacent channel centre frequency offset (in MHz)	+ BW <sub>Channel_CA</sub> / - BW <sub>Channel_CA</sub>

# 6.6.2.3B Adjacent Channel Leakage power Ratio for UL-MIMO

# 6.6.2.3B.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to adjacent channels in terms of Adjacent Channel Leakage power Ratio (ACLR) for UL-MIMO.

# 6.6.2.3B.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

# 6.6.2.3B.3 Minimum conformance requirements

For UE with multiple transmit antenna connectors, the requirements for ACLR are specified at each transmit antenna connector. ACLR requirements are specified for two scenarios for an adjacent E -UTRAACLR and UTRAACLR1/2 as shown in Figure 6.6.2.3B.3-1.

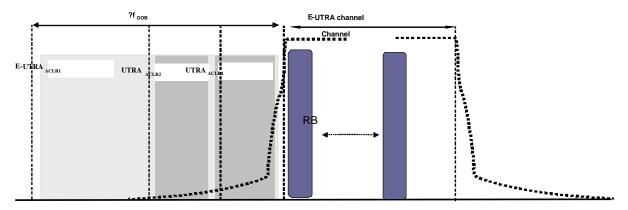


Figure 6.6.2.3B.3-1: Adjacent Channel Leakage Power Ratio requirements

### 6.6.2.3B.3.1 Minimum conformance requirements for E-UTRA

E-UTRA ACLR (E-UTRAACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency at nominal channel spacing. The assigned E-UTRA channel power and adjacent E-UTRA channel power are measured with rectangular filters with measurement bandwidth specified in Table 6.6.2.3B.3.1-1.

For UEs with two transmit antenna connectors in closed-loop spatial multiplexing scheme,, the requirements in Table 6.6.2.3B.3.1-1 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

If the measured adjacent channel power is greater than -50dBm then the E-UTRAACLR shall be higher than the valued specified in Table 6.6.2.3B.3.1-1.

	Channe	Channel bandwidth / E-UTRA <sub>ACLR1</sub> / measurement bandwidth						
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
E-UTRA <sub>ACLR1</sub>	30 dB	30 dB	30 dB	30 dB	30 dB	30 dB		
E-UTRA channel	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz		
Measurement bandwidth								

Table 6.6.2.3B.3.1-1: General requirements for E-UTRA<sub>ACLR</sub>

The normative reference for this requirement is TS 36.101 clause 6.6.2B.

# 6.6.2.3B.3.2 Minimum conformance requirements for UTRA

UTRA ACLR (UTRA<sub>ACLR</sub>) is the ratio of the filtered mean power centred on the assigned E-UTRA channel frequency to the filtered mean power centred on an adjacent UTRA channel frequency.

UTRA ACLR is specified for both the first UTRA adjacent channel (UTRAACLR1) and the 2nd UTRA adjacent channel (UTRA $_{ACLR2}$ ). The UTRA channel power is measured with a RRC bandwidth filter with roll-off factor  $\alpha\Box=0.22$ . The assigned E-UTRA channel power is measured with a rectangular filter with measurement bandwidth specified in Table 6.6.2.3B.3.2-1.

For UEs with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the requirements in Table 6.6.2.3B.3.2-1 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

If the measured UTRA channel power is greater than -50dBm then the UTRAACLR1, and UTRAACLR2 shall be higher than the valued specified in Table 6.6.2.3B.3.2-1.

Table 6.6.2.3B.3.2-1: General requirements for UTRA ACLR1/2

		Channel bandw	idth / E-UTRA <sub>ACI</sub>	<sub>R1/2</sub> / measuren	nent bandwidth	
	1.4	3.0	5	10	15	20
	MHz	MHz	MHz	MHz	MHz	MHz
E-UTRA <sub>ACLR1</sub>	33 dB	33 dB	33 dB	33 dB	33 dB	33 dB
Adjacent channel	0.7+BW <sub>UTRA</sub> /2	1.5+BW <sub>UTRA</sub> /2 /	2.5+BW <sub>UTRA</sub> /2	5+BW <sub>UTRA</sub> /2	7.5+BW <sub>UTRA</sub> /2 /	10+BW <sub>UTRA</sub> /2 /
centre	-0.7-BW <sub>UTRA</sub> /2	-1.5-BW <sub>UTRA</sub> /2	-2.5-BW <sub>UTRA</sub> /2	-5-BW <sub>UTRA</sub> /2	-7.5-BW <sub>UTRA</sub> /2	-10-BW <sub>UTRA</sub> /2
frequency						
offset (in MHz)						
UTRA <sub>ACLR2</sub>	-	-	36 dB	36 dB	36 dB	36 dB
Adjacent	-	-	2.5+3*BWutra/	5+3*BWutra/	7.5+3*BWutra/	10+3*BWutra/
channel			2	2	2	2
centre			/	/	/	/
frequency			-2.5-	-5-	-7.5-	-10-
offset (in			3*BWutra/2	3*BWutra/2	3*BWutra/2	3*BWutra/2
MHz)						
E-UTRA	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
channel						
Measurement bandwidth						
UTRA 5MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz
channel Measurement bandwidth <sup>1</sup>						
UTRA 1.6MHz channel measurement bandwidth <sup>2</sup>	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz

Note 1: Applicable for E-UTRA FDD co-existence with UTRA FDD in paired spectrum.

Note 2: Applicable for E-UTRA TDD co-existence with UTRA TDD in unpaired spectrum.

The normative reference for this requirement is TS 36.101 clause 6.6.2B.

# 6.6.2.3B.4 Test description

# 6.6.2.3B.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.6.2.3B.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in AnnexeA.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.2.3B.4.1-1: Test Configuration Table

		Init	ial Conditions			
Test Environment			NC, TL/VL, TL/VH, TH/VL, TH/VH			
	(as specified in TS 36.508 [7] clause 4.1)			NC, 1L/VL, 1L/VII, 111/VL, 111/VII		
Test Frequencie				Low range, Mi	d range High	range
	TS 36.508 [7] cla	ause 4.3.1)		Low range, wi	a range, riigii	lange
Test Channel B				Lowest, 5MHz	10MHz High	nest
(as specified in	TS 36.508 [7] cla				,	
			s for Channel I			
		link Configur		•	k Configurat	
Ch BW	Mod'n		location	Mod'n		ocation
		FDD	TDD		FDD	TDD
1.4MHz	N/A	for ACLR tes	ting	QPSK	6	6
1.4MHz				QPSK	5	5
1.4MHz				16QAM	6	6
1.4MHz				16QAM	5	5
3MHz				QPSK	15	15
3MHz				QPSK	4	4
3MHz				16QAM	15	15
3MHz				16QAM	4	4
5MHz				QPSK	25	25
5MHz				QPSK	8	8
5MHz				16QAM	25	25
5MHz				16QAM	8	8
10MHz				QPSK	50	50
10MHz				QPSK	12	12
10MHz				16QAM	50	50
					(Note 3)	(Note 3)
10MHz				16QAM	12	12
15MHz				QPSK	75	75
15MHz				QPSK	16	16
15MHz				16QAM	75	75
					(Note 3)	(Note 3)
15MHz				16QAM	16	16
20MHz				QPSK	100	100
20MHz				QPSK	18	18
20MHz				16QAM	100	100
					(Note 3)	(Note 3)
20MHz				16QAM	18	18

- Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.
- Note 2: The RBstart of partial RB allocation shall be RB#0 and RB# (max + 1 RB allocation) of the channel bandwidth.
- Note 3: Applies only for UE-Categories [FFS].
- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.2.3B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.2.3B.4.3.

# 6.6.2.3B.4.2 Test procedure

1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.6.2.3B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.

- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the sum of the mean power at each antenna connector of UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in clause 6.2.3B.5. The period of the measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.
- 4. Measure the rectangular filtered mean power for E-UTRA at each antenna connector of UE.
- 5. Measure the rectangular filtered mean power of the first E-UTRA adjacent channel at each antenna connector of UE
- 6. Measure the RRC filtered mean power of the first and the second UTRA adjacent channel at each antenna connector of UE.
- 7. Calculate the ratio of the power between the values measured in step 4 over step 5 for E-UTRA<sub>ACLR</sub>.
- 8. Calculated the ratio of the power between the values measured in step 4 over step 6 for UTRA<sub>ACLRI</sub>, UTRA<sub>ACLR2</sub>.

### 6.6.2.3B.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

### 6.6.2.3B.5 Test requirement

### 6.6.2.3B.5.1 Test requirements E-UTRA

- The measured sum of mean power at each transmit antenna connector for UE in the channel bandwidth, derived in step 3, shall fulfil requirements in clause 6.2.3B.5 as appropriate,

and

- The requirements apply to each transmit antenna connector.
- if the measured adjacent channel power is greater than -50 dBm then the measured E-UTRAACLR, derived in step 7, shall be higher than the limits in table 6.6.2.3B.5.1-1.

Table 6.6.2.3B.5.1-1: E-UTRA UE ACLR

	Cha	Channel bandwidth / E-UTRA <sub>ACLR1</sub> / measurement bandwidth					
	1.4	3.0	5	10	15	20	
	MHz	MHz	MHz	MHz	MHz	MHz	
E-UTRA <sub>ACLR1</sub>	29.2 dB	29.2 dB	29.2 dB	29.2 dB	29.2 dB	29.2 dB	
E-UTRA channel	1.08 MHz	2.7 MHz	4.5 MH z	9.0 MHz	13.5 MHz	18 MHz	
Measurement							
bandwidth							
UE channel	+1.4 MHzor	+3 MHz or	+5MHz or	+10MHz or	+15MHz or	+20MHz or	
	-1.4 MHz	-3 MHz	-5MHz	-10MHz	-15MHz	-20MHz	

### 6.6.2.3B.5.2 Test requirements UTRA

The requirements apply to each transmit antenna connector.

If the measured UTRA channel power is greater than -50dBm then the measured UTRA  $_{ACLR1}$ , UTRA  $_{ACLR2}$ , derived in step 8, shall be higher than the limits in table 6.6.2.3B.5.2-1.

Table 6.6.2.3B.5.2-1: UTRA UE ACLR

	Cha	Channel bandwidth / E-UTRA <sub>ACLR1/2</sub> / measurement bandwidth					
	1.4	3.0	5	10	15	20	
	MHz	MHz	MHz	MHz	MHz	MHz	
UTRA <sub>ACLR1</sub>	32.2 dB	32.2 dB	32.2 dB	32.2 dB	32.2 dB	32.2 dB	
Adjacent channel	0.7+BW <sub>UTRA</sub> /	1.5+BW <sub>UTR</sub>	2.5+BW <sub>UTR</sub>	5+BW <sub>UTRA</sub> /	7.5+BW <sub>UTRA</sub> /	10+BW <sub>UTRA</sub> /	
centre frequency	2	<sub>A</sub> /2	<sub>A</sub> /2	2	2	2	
offset (in MHz)	/	/	/	/	/	/	
	-0.7-	-1.5-	-2.5-	-5-	-7.5-	-10-	
	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	BW <sub>UTRA</sub> /2	
UTRA <sub>ACLR2</sub>	-	-	35.2 dB	35.2 dB	35.2 dB	35.2 dB	
Adjacent channel	-	-	2.5+3*BW <sub>∪</sub>	5+3*BW <sub>UTR</sub>	7.5+3*BW <sub>UT</sub>	10+3*BW <sub>∪T</sub>	
centre frequency			TRA/2	<sub>A</sub> /2	RA/2	RA∕2	
offset (in MHz)			/	/	/	/	
			-2.5-	-5-	-7.5-	-10-	
			3*BW <sub>UTRA</sub> /	3*BW <sub>UTRA</sub> /	3*BW <sub>UTRA</sub> /2	3*BW <sub>UTRA</sub> /2	
			2	2			
E-UTRA channel	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz	
Measurement							
bandwidth							
UTRA 5MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	
channel							
Measurement							
bandwidth <sup>1</sup>							
UTRA 1.6MHz	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz	1.28 MHz	
channel							
measurement							
bandwidth <sup>2</sup>							

Note 1: Applicable for E-UTRA FDD co-existence with UTRA FDD in paired spectrum.

Note 2: Applicable for E-UTRATDD co-existence with UTRATDD in unpaired spectrum.

Note 3: BW<sub>UTRA</sub> for UTRA FDD is 5MHz and for UTRA TDD is 1.6MHz.

### 6.6.2.4 Void

# 6.6.3 Spurious emissions

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products, but exclude out of band emissions. The spurious emission limits are specified in terms of general requirements inline with SM.329 [3] and E-UTRA operating band requirement to address UE co-existence.

Unless otherwise stated, the spurious emission limits apply for the frequency ranges that are more than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

# 6.6.3.1 Transmitter Spurious emissions

### 6.6.3.1.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions.

### 6.6.3.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

### 6.6.3.1.3 Minimum conformance requirements

The spurious emission limits apply for the frequency ranges that are more than  $\Delta f_{OOB}$  (MHz) from the edge of the channel bandwidth.

Table 6.6.3.1.3-1: Δf<sub>OOB</sub> boundary between E-UTRA channel and spurious emission domain

Channel bandwidth	1.4	3.0	5	10	15	20
	MHz	MHz	MHz	MHz	MHz	MHz
Δf <sub>OOB</sub> (MHz)	2.8	6	10	15	20	25

The spurious emission limits in Table 6.6.3.1.3-2 apply for all transmitter band configurations (RB) and channel bandwidths.

NOTE: In order that the measurement of spurious emissions falls within the frequency ranges that are more than  $\Delta fOOB$  (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be  $\Delta fOOB + MBW/2$ . MBW denotes the measurement bandwidth defined in Table 6.6.3.1.3-2.

Table 6.6.3.1.3-2: Spurious emissions limits

Frequency Range	Maximum Level	Measurement Bandwidth	Notes
9 kHz≤f < 150 kHz	-36 dBm	1 kHz	
150 kHz≤f<30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1000 MHz	-36 dBm	100 kHz	
1 GHz≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 5 <sup>th</sup> harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	Note 1
Note 1: Applies for Ban	d 22, Band 42 and B	and 43	•

The normative reference for this requirement is TS 36.101 [2] subclause 6.6.3.1.

### 6.6.3.1.4 Test description

### 6.6.3.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in Table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 6.6.3.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3.1.4.1-1: Test Configuration Table

Initial Conditions								
Test Environr	ment		NC					
(as specified	in TS 36.508 [7	7] subclause 4.	.1)	INC				
Test Frequen				Low range M	id range, High	range		
	in TS36.508 [7	] subclause 4.3	3.1)	Low range, w	iu range, mgn	range		
Test Channel	Bandwidths			Lowest, 5MHz	z Highest			
(as specified	in TS 36.508 [7	7] subclause 4.	.3.1)	LOWEST, SIVII 12	z, riigiiest			
				el Bandwidths				
	Dowr	nlink Configur	ation	Upli	nk Configura	tion		
Ch BW	Mod'n	RB allo	ocation	Mod'n		ocation		
		FDD	TDD		FDD	TDD		
1.4MHz	N/A for Sp	urious Emission	ons testing	QPSK	6	6		
1.4MHz				QPSK	1	1		
3MHz				QPSK	15	15		
3MHz				QPSK	1	1		
5MHz				QPSK	25	25		
5MHz				QPSK	1	1		
10MHz				QPSK	50	50		
10MHz				QPSK	1	1		
15MHz				QPSK	75	75		
15MHz				QPSK	1	1		
20MHz				QPSK	100	100		
20MHz QPSK 1 1								
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which								
applicable channel bandwidths are specified in Table 5.4.2.1-1.								
Note 2: The 1 RB allocation shall be tested at both RB #0 and RB #max.								

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.7.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.3.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3.1.4.3.

#### 6.6.3.1.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.3.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{\rm UMAX}$  level.
- 3. Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 6.6.3.1.5-1. The centre frequency of the filter shall be stepped in contiguous steps according to table 6.6.3.1.5-1. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

### 6.6.3.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

### 6.6.3.1.5 Test requirement

The measured average power of spurious emission, derived in step 3, shall not exceed the described value in Table 6.6.3.1.5-1.

The spurious emission limits apply for the frequency ranges that are more than  $\Delta f_{OOB}$  (MHz) from the edge of the channel bandwidth shown in Table 6.6.3.1.3-1.

Table 6.6.3.1.5-1: General spurious emissions test requirements

Frequency Range	Maximum Level	Measurement Bandwidth	Notes
9 kHz≤f < 150 kHz	-36 dBm	1 kHz	
150 kHz≤f<30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1000	-36 dBm	100 kHz	
MHz			
1 GHz≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 5 <sup>th</sup> harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	Note 1
Note 1: Applies for Ba	nd 22, Band 42 and Band	43	ı

NOTE: In order that the measurement of spurious emissions falls within the frequency ranges that are more than  $\Delta fOOB$  (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be  $\Delta fOOB + MBW/2$ . MBW denotes the measurement bandwidth defined in Table 6.6.3.1.3-2.

# 6.6.3.1A Transmitter Spurious emissions for CA

# 6.6.3.1A.1 Transmitter Spurious emissions for CA (intra-band contiguous DL CA and UL CA)

### 6.6.3.1A.1.1 Test purpose

To verify that transmitter of UE that support CA does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions.

### 6.6.3.1A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

### 6.6.3.1A.1.3 Minimum conformance requirements

For intra-band contiguous carrier aggregation the spurious emission limits apply for the frequency ranges that are more than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1A.1.3-1 from the  $\pm$  edge of the aggregated channel bandwidth (Table 5.4.2A-1). For frequencies  $\Delta f_{OOB}$  greater than  $F_{OOB}$  as specified in Table 6.6.3.1A.1.3-1 the spurious requirements in Table 6.6.3.1.3-2 are applicable.

Table 6.6.3.1A.1.3-1: Boundary between E-UTRA Δf<sub>OOB</sub> and spurious emission domain for intra-band contiguous carrier aggregation

CA Bandwidth Class	OOB boundary F <sub>OOB</sub> [(MHz)
Α	Table 6.6.3.1.3-1
В	FFS
С	BW <sub>Chan nel_CA</sub> + 5

To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

NOTE: In order that the measurement of spurious emissions falls within the frequency ranges that are more than  $\Delta f_{OOB}$  (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be  $\Delta f_{OOB} + MBW/2$ . MBW denotes the measurement bandwidth defined in Table 6.6.3.1.3-2.

The normative reference for this requirement is TS 36.101[2] clause 6.6.3.1A

6.6.3.1A.1.4 Test description

6.6.3.1A.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA bands specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA configuration, and are shown in table 6.6.3.1A.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3.1A.1.4.1-1: Test Configuration Table

Initial Conditions									
Test Environment as specified in TS 36.508[7] subclause 4.1						NC			
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.					C: Low ran	ge, High rang	e		
	Combination or the CA Co	setting (N <sub>RB_agg</sub> ) as sponfiguration	pecified in s	subclause	Lowest N <sub>R</sub>	<sub>B_agg</sub> , Highest N	N <sub>RB_agg</sub>		
		A Configurations							
	iguration / B_agg	DL Allocation	СС			UL Allocation			
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	PCC & SCC RB allocation	MOD	N <sub>RB_alloc</sub>	PCC & SCC RB allocations (L <sub>CRB</sub> @ RB <sub>start</sub> )				
75	75		QPSK	75	P_75@0	S_0@0	-	-	
75	75		QPSK	1	P_1@0	S_0@0	-	-	
75	75		QPSK	1	P_1@74	S_0@0	-	-	
75	75		QPSK	2	P_1@0	S_1@74	-	-	
75	75		QPSK	150	P_75@0	S_75@0	-	-	
100	50		QPSK	50	P_50@0	S_0@0	-	-	
100	50		QPSK	1	P_1@0	S_0@0	-	-	
100	50	N/A for Spurious Emissions testing	QPSK	1	P_1@99	S_0@0	-	-	
100	50	3	QPSK	2	P_1@0	S_1@49	-	-	
100	50		QPSK	150	P_100@0	S_50@0	-	-	
100	100		QPSK	100	P_100@0	S_0@0	-	-	
100	100		QPSK	1	P_1@0	S_0@0	-	-	
100	100		QPSK	1	P_1@99	S_0@0	-	-	
100	100		QPSK	2	P_1@0	S_1@99	-	-	
100	100		QPSK	200	P_100@0	S_100@0	-	-	

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1

1. Connect the SS to the UE antenna connectors as shown in TS 36.508[7] Annex A Figure group A.33 as appropriate.

- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channel is set according to Table 6.6.3.1A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3.1A.1.4.3.

### 6.6.3.1A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.63.1A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.3.1A.1.4.1-1 on both PCC and SCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 5. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 6. Measure the power of the transmitted signal with a measurement filter of bandwidths according to Table 6.6.3.1A.1.5-1 for each component carrier. The centre frequency of the filter shall be stepped in contiguous steps according to Table 6.6.3.1A.1.5-1. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

### 6.6.3.1A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

### 6.6.3.1A.1.5 Test Requirements

For frequencies  $\Delta f_{OOB}$  greater than  $F_{OOB}$  as specified in Table 6.6.3.1A.1.3-1the measured average power of spurious emission, derived in step 6, shall not exceed the described value in Table 6.6.3.1A.1.5-1.

Table 6.6.3.1A.1.5-1: Spurious emissions limits

Frequency Range	Maximum Level	Measurement Bandwidth	Notes
9 kHz≤f < 150 kHz	-36 dBm	1 kHz	
150 kHz≤f<30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1000 MHz	-36 dBm	100 kHz	
1 GHz≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 5 <sup>th</sup>	-30 dBm	1 MHz	Note 1
harmonic of the upper			
frequency edge of the			
UL operating band in			
GHz			
Note1: Applicability of	this test requirement	is FFS.	•

NOTE: In order that the measurement of spurious emissions falls within the frequency ranges that are more than  $\Delta f_{OOB}$  (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be  $\Delta f_{OOB} + MBW/2$ . MBW denotes the measurement bandwidth defined in Table 6.6.3.1A.1.5-1.

# 6.6.3.2 Spurious emission band UE co-existence

Editor's note: This test case contains different requirements for different UE releases

# 6.6.3.2.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to co-existing systems for the specified bands which has specific requirements in terms of transmitter spurious emissions.

# 6.6.3.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

# 6.6.3.2.3 Minimum conformance requirements

This clause specifies the requirements for the specified E-UTRA band for coexistence with protected bands as indicated in Table 6.6.3.2.3-1.

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 6.6.3.2.3-1: Spurious emission band UE co-existence limits Rel-8

Protected band   Proquency range (MHz)   Maximum (MHz)   Comment (Abraham 1, 3, 7, 8, 9, 11, 34, 38, 40   FDL_low   FDL_high   -50   1			Spurio	ous	emission			
S8, 40   FUL_low   FUL_ngh   -50   1			Frequenc	y ra	ange (MHz)	Level		Comment
Frequency range	1		FDL_low	-	FDL_high	-50	1	
Frequency range		Frequency range	860	-	895	-50	1	
Frequency range		Frequency range	1475.9	-	1510.9	-50	1	
Frequency range		Frequency range	1884.5	-	1915.7	-41	0.3	Note '*
E-UTRABand 4, 5, 10, 12, 13, 14, 17   FDL_low   FDL_high   -50   1		Frequency range	1895	-	1915	-15.5	5	Note <sup>14</sup> , Note <sup>17</sup>
E-UTRABand 2, 7, 8, 33, 34, 38 FDL_low - FDL_high -50 1  E-UTRABand 3, 7, 8, 33, 34, 38 FDL_low - FDL_high -50 1  E-UTRABand 3, FDL_low - FDL_high -50 1  Frequency range			1915	-		+1.6	5	Note 17, Note 17
E-UTRA Band 1, 7, 8, 33, 34, 38   FDL_low   FDL_high   FDL_high	2			-		-50	1	
E-UTRA Band 3				-				Note <sup>14</sup>
Frequency range	3			-			1	4.4
Frequency range				-				
Frequency range				-				
B-UTRABand 2, 4, 5, 10, 12, 13, 14, 17   FDL_low   FDL_high   -50   1		. , ,		-				
17			1884.5	-	1915.7	-41	0.3	Note <sup>13</sup>
17		17	FDL_low	-	FDL_high	-50	1	
Frequency range		17		-		-50	1	
Frequency range	6	E-UTRA Band 1, 9, 11, 34	FDL_low	-	FDL_high	-50	1	
1884.5   1919.6   -41   0.3   Note   Note		Frequency range	860	-		-37	1	
Frequency range		Frequency range	875	-	895	-50	1	
Te-UTRA Band 1, 3, 7, 8, 33, 34   FDL_low   FDL_high   -50   1		Frequency range	1884.5	-	1919.6	-41	0.3	
Frequency range				-				Note <sup>8</sup>
Frequency range	7	E-UTRA Band 1, 3, 7, 8, 33, 34	FDL_low	-	FDL_high	-50	1	
Frequency range		Frequency range	2570	-	2575	+1.6	5	Note <sup>15</sup> , Note <sup>18</sup>
8         E-UTRA Band 1, 33, 34, 38, 39, 40         FDL_low         -         FDL_high         -50         1           E-UTRA band 3         FDL_low         -         FDL_high         -50         1         Note <sup>2</sup> E-UTRA band 7         FDL_low         -         FDL_high         -50         1         Note <sup>2</sup> E-UTRA Band 8         FDL_low         -         FDL_high         -50         1         Note <sup>3</sup> 9         E-UTRA Band 1, 9, 11, 34         FDL_low         -         FDL_high         -50         1           Frequency range         1475.9         -         1510.9         -50         1           Frequency range         1884.5         -         1915.7         -41         0.3         Note <sup>8</sup> 10         E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17         FDL_low         -         FDL_high         -50         1           11         E-UTRA Band 1, 9, 11, 34         FDL_low         -         FDL_high         -50         1           Frequency range         1457.9         -         1510.9         -50         1           Frequency range         860         -         895         -50         1           Frequency range		Frequency range	2575	-	2595	-15.5	5	Note <sup>14</sup> , Note <sup>15</sup> , Note <sup>18</sup>
E-UTRA band 7	8	E-UTRA Band 1, 33, 34, 38, 39, 40	FDL_low	-	FDL_high	-50	1	
E-UTRA Band 8		E-UTRA band 3	_	-	,		1	
9       E-UTRA Band 1, 9, 11, 34       FDL_low       -       FDL_high       -50       1         Frequency range       860       -       895       -50       1         Frequency range       1475.9       -       1510.9       -50       1         Frequency range       1884.5       -       1915.7       -41       0.3       Note <sup>8</sup> 10       E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17       FDL_low       -       FDL_high       -50       1         11       E-UTRA Band 1, 9, 11, 34       FDL_low       -       FDL_high       -50       1         Frequency range       1457.9       -       1510.9       -50       1         Frequency range       860       -       895       -50       1         Frequency range       1884.5       -       1915.7       -41       0.3       Note <sup>8</sup> 12       E-UTRA Band 2, 5, 13, 14, 17       FDL_low       -       FDL_high       -50       1				-			1	
Frequency range         860         -         895         -50         1           Frequency range         1475.9         -         1510.9         -50         1           Frequency range         1884.5         -         1915.7         -41         0.3         Note <sup>8</sup> 10         E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17         FDL_low         -         FDL_high         -50         1           11         E-UTRA Band 1, 9, 11, 34         FDL_low         -         FDL_high         -50         1           Frequency range         1457.9         -         1510.9         -50         1           Frequency range         860         -         895         -50         1           Frequency range         1884.5         -         1915.7         -41         0.3         Note <sup>8</sup> 12         E-UTRA Band 2, 5, 13, 14, 17         FDL_low         -         FDL_high         -50         1				-	·		1	Note <sup>14</sup>
Frequency range 1475.9 - 1510.9 -50 1  Frequency range 1884.5 - 1915.7 -41 0.3 Note <sup>8</sup> 10 E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17  E-UTRA Band 1, 9, 11, 34 FDL_low - FDL_high -50 1  Frequency range 1457.9 - 1510.9 -50 1  Frequency range 860 - 895 -50 1  Frequency range 1884.5 - 1915.7 -41 0.3 Note <sup>8</sup> 12 E-UTRA Band 2, 5, 13, 14, 17 FDL_low - FDL_high -50 1	9	E-UTRA Band 1, 9, 11, 34	FDL_low	-			1	
Frequency range 1884.5 - 1915.7 -41 0.3 Note <sup>8</sup> 10 E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17 FDL_low - FDL_high -50 1  E-UTRA Band 1, 9, 11, 34 FDL_low - FDL_high -50 1  Frequency range 1457.9 - 1510.9 -50 1  Frequency range 860 - 895 -50 1  Frequency range 1884.5 - 1915.7 -41 0.3 Note <sup>8</sup> 12 E-UTRA Band 2, 5, 13, 14, 17 FDL_low - FDL_high -50 1		Frequency range		-				
10		Frequency range	1475.9	-	1510.9	-50	1	
17		Frequency range	1884.5	-	1915.7	-41	0.3	Note <sup>8</sup>
Frequency range         1457.9         -         1510.9         -50         1           Frequency range         860         -         895         -50         1           Frequency range         1884.5         -         1915.7         -41         0.3         Note <sup>8</sup> 12         E-UTRA Band 2, 5, 13, 14, 17         FDL_low         -         FDL_high         -50         1	10		FDL_low	-	FDL_high	-50	1	
Frequency range         1457.9         -         1510.9         -50         1           Frequency range         860         -         895         -50         1           Frequency range         1884.5         -         1915.7         -41         0.3         Note <sup>8</sup> 12         E-UTRA Band 2, 5, 13, 14, 17         FDL_low         -         FDL_high         -50         1	11	E-UTRA Band 1, 9, 11, 34	FDL_low	<b> </b> -	FDL_high	-50	1	
Frequency range 1884.5 - 1915.7 -41 0.3 Note <sup>8</sup> 12 E-UTRA Band 2, 5, 13, 14, 17 FDL_low - FDL_high -50 1			1457.9	<b>†</b> -		-50	1	
12 E-UTRA Band 2, 5, 13, 14, 17 FDL_low - FDL_high -50 1			860	T -	895	-50	1	
		Frequency range	1884.5	-	1915.7	-41	0.3	Note <sup>8</sup>
	12	E-UTRA Band 2, 5, 13, 14, 17	FDL_low	<del>  -</del>	FDL_high	-50	1	
			I	† -	_		1	Note <sup>2</sup>

	E-UTRA Band 12	FDL_low	-	FDL_high	-50	1	Note <sup>14</sup>
13	E-UTRA Band 2, 4, 5, 10, 12, 13, 17	FDL_low	-	FDL_high	-50	1	
	E-UTRA Band 14	FDL_low	-	FDL_high	-50	1	Note <sup>14</sup>
	Frequency range	769	-	775	-35	0.00625	Note <sup>14</sup>
	Frequency range	799	-	805	-35	0.00625	Note <sup>11</sup> , Note <sup>14</sup>
14	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17	FDL_low	-	FDL_high	-50	1	
	Frequency range	769	-	775	-35	0.00625	Note <sup>12</sup> Note <sup>14</sup>
	Frequency range	799	-	805	-35	0.00625	Note <sup>11</sup> , Note <sup>12</sup> Note <sup>14</sup>
17	E-UTRA Band 2, 5, 13, 14, 17	FDL_low	-	FDL_high	-50	1	
	E-UTRA Band 4, 10	FDL_low	-	FDL_high	-50	1	Note <sup>2</sup>
	E-UTRA Band 12	FDL_low	-	FDL_high	-50	1	Note <sup>14</sup>
33	E-UTRA Band 1, 7, 8, 34, 38, 39, 40	FDL_low	-	FDL_high	-50	1	Note <sup>5</sup>
	E-UTRA Band 3	FDL_low	-	FDL_high	-50	1	Note <sup>14</sup>
34	E-UTRA Band 1, 3, 7, 8, 9, 11, 33, 38,39, 40	FDL_low	-	FDL_high	-50	1	Note <sup>5</sup>
	Frequency range	860	-	895	-50	1	
	Frequency range	1475.9	-	1510.9	-50	1	
	Frequency range	1884.5	-	1915.7	-41	0.3	Note <sup>8</sup>
35							
36							
37			-				
38	E-UTRA Band 1, 3, 8, 33, 34	FDL_low	-	FDL_high	-50	1	
	Frequency range	2620	-	2645	-15.5	5	Note <sup>14</sup> , Note <sup>16</sup> , Note <sup>18</sup>
39	E-UTRA Band 34, 40	FDL_low	-	FDL_high	-50	1	
40	E-UTRA Band 1, 3, 33, 34, 39	FDL_low	-	FDL_high	-50	1	

- Note 1: FDL low and FDL high refer to each E-UTRA frequency band specified in Table 5.2-1
- Note 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1.3-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2nd or 3rd harmonic spurious emissions. An exception is allowed if there is at least one individual RE within the transmission bandwidth (see Figure 5.4.2-1) for which the 2nd or 3rd harmonic, i.e. the frequency equal to two or three times the frequency of that RE, is within the measurement bandwidth (MBW).
- Note 3: To meet these requirements some restriction will be needed for either the operating band or protected band
- Note 4: N/A
- Note 5: For non synchronised TDD operation to meet these requirements some restriction will be needed for either the operating band or protected band
- Note 6: Applicable when NS\_05 in section 6.6.3.3.3.1 is signalled by the network.
- Note 7: Applicable when co-existence with PHS system operating in 1884.5-1919.6MHz.
- Note 8: Applicable when co-existence with PHS system operating in 1884.5-1915.7MHz.
- Note 9: N/A
- Note 10: N/A
- Note 11: Whether the applicable frequency range should be 793-805MHz instead of 799-805MHz is TBD
- Note 12: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB
- Note 13: Applicable when UE transmits anywhere within 1749.9 1784.9MHz. Applicable when the assigned E-UTRA UL operating channel is ≥1 749.9MHz and ≤ 1 784.9MHz.
- Note 14: These requirements also apply for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.
- Note 15: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 2560 MHz. This requirement is applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range 2500 2570 MHz.
- Note 16: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2605.5 2607.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2597 2605 MHz. This requirement is applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range

2570 – 2615 MHz. For assigned carriers with bandwidths overlapping the frequency range 2615-2620 MHz the requirements apply with the maximum output power configured to +20 dBm in the IE *P-Max*.

Note 17: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 - 1929.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 1930 - 1938 MHz. This requirement is applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range 1920 - 1980 MHz.

Note 18: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.

NOTE: The restriction on the maximum uplink transmission to 54 RB in Notes 15, 16, and 17 of Table 6.6.3.2.3-1 is intended for conformance testing and may be applied to network operation to facilitate coexistence when the aggressor and victim bands are deployed in the same geographical area. The applicable spurious emission requirement of -15.5 dBm/5MHz is a least restrictive technical condition for FDD/TDD coexistence and may have to be revised in the future.

Table 6.6.3.2.3-1A: Spurious emission band UE co-existence limits Rel-9

Protected band   Productive   Maximu   May   Mean   Mean			Spurious	em	ission			
S8,40	Band					m level		NOTE
Frequency range	1		FDL low	_	FDL bigh	-50	1	
Frequency range		<u> </u>		<b> </b>		-50	1	
Frequency range				† <u>-</u>			1	14.18
Frequency range								,
Frequency range				† <u>-</u>			5	14.18.19
Frequency range				١_				
E-UTRA Band 2 Follow - Follow		. , ,						
E-UTRA Band 2 Follow - Follow	2	F-UTRA Band 4 5 10 12 13 14 17	FDL low	-	FDL bigh	-50	1	
Be-UTRABand 1, 7, 8, 20, 33, 34, 38				<b> </b>			1	14
E-UTRA Band 3	3			<b> </b>			1	
E-UTRA Band 11, 21				<b> </b>		-50	1	14
Frequency range				-		-50	1	13
A   E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17   FDL_jow		·		-		-50	1	13
A   E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17   FDL_jow		. , ,		-			0.3	
S	4			-		-50	1	
E-UTRA Band 1, 9, 11, 34	5			-			1	
Frequency range	6			<b>-</b>		-50	1	
Frequency range				<b> </b> -		-37	1	
Requency range				-				
Frequency range				-		-41	0.3	7
F-UTRABand 1, 3, 7, 8, 20, 33, 34		Frequency range	1884.5	_	1915.7	71	0.5	8
Frequency range	7			-		-50	1	
Frequency range				<del>  -</del>				14, 15, 19
Frequency range				<b> </b>				
B				<del>  -</del>				
E-UTRA band 3	8			<del> </del>		-50	1	,
E-UTRA band 7				<b> </b>				2
E-UTRA Band 8				-			1	
E-UTRA Band 11, 21				-		-50	1	14
Frequency range				<b> </b>			1	
Frequency range		·		<del> </del>				
9         E-UTRA Band 1, 11, 21, 34         FDLJoW         -         FDLJOW         -<		. , ,		<del> </del>		-41	0.3	
Frequency range	9			<b>-</b>		-50		
Frequency range				-			1	
Frequency range				<b> </b>			0.3	8
Frequency range				-		-50		
The second color of the		. , ,		<b> </b> -			1	
The frequency range   The follow   Find the first state   Find the	10		$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
Frequency range         860         -         895         -50         1           Frequency range         1884.5         -         1915.7         -41         0.3         8           Frequency range         945         -         960         -50         1           12         E-UTRA Band 2, 5, 13, 14, 17         FDLJow         -         FDL_high         -50         1           E-UTRA Band 4, 10         FDLJow         -         FDL_high         -50         1         2           E-UTRA Band 12         FDLJow         -         FDL_high         -50         1         14           E-UTRA Band 2, 4, 5, 10, 12, 13, 17         FDLJow         -         FDL_high         -50         1         14           Frequency range         769         -         775         -35         0.00625         14           Frequency range         799         -         805         -35         0.00625         11, 14           14         E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17         FDL_low         -         FDL_high         -50         1	11	E-UTRA Band 1, 9, 11, 21, 34		-		-50	1	
Frequency range				-		-50	1	
12		. , ,		-		-41	0.3	8
12       E-UTRA Band 2, 5, 13, 14, 17       FDL_low       -       FDL_high       -50       1         E-UTRA Band 4, 10       FDL_low       -       FDL_high       -50       1       2         E-UTRA Band 12       FDL_low       -       FDL_high       -50       1       14         13       E-UTRA Band 2, 4, 5, 10, 12, 13, 17       FDL_low       -       FDL_high       -50       1         E-UTRA Band 14       FDL_low       -       FDL_high       -50       1       14         Frequency range       769       -       775       -35       0.00625       14         Frequency range       799       -       805       -35       0.00625       11, 14         14       E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17       FDL_low       -       FDL_high       -50       1		Frequency range	945	-	960	-50	1	
E-UTRA Band 4, 10     FDL_low     -     FDL_low     -     FDL_ligh     -50     1     2       E-UTRA Band 12     FDL_low     -     FDL_low     -     FDL_high     -50     1     14       13     E-UTRA Band 2, 4, 5, 10, 12, 13, 17     FDL_low     -     FDL_high     -50     1     14       E-UTRA Band 14     FDL_low     -     FDL_high     -50     1     14       Frequency range     769     -     775     -35     0.00625     14       Frequency range     799     -     805     -35     0.00625     11, 14       14     E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17     FDL_low     -     FDL_high     -50     1	12			<b> </b> -		-50	1	
E-UTRA Band 12     FDL_low     -     FDL_low     -     FDL_high     -50     1     14       13     E-UTRA Band 2, 4, 5, 10, 12, 13, 17     FDL_low     -     FDL_high     -50     1     14       E-UTRA Band 14     FDL_low     -     FDL_high     -50     1     14       Frequency range     769     -     775     -35     0.00625     14       Frequency range     799     -     805     -35     0.00625     11, 14       14     E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17     FDL_low     -     FDL_high     -50     1				-				2
13 E-UTRA Band 2, 4, 5, 10, 12, 13, 17 F <sub>DL_low</sub> - F <sub>DL_high</sub> -50 1 E-UTRA Band 14 F <sub>DL_low</sub> - F <sub>DL_high</sub> -50 1 14 Frequency range 769 - 775 -35 0.00625 14 Frequency range 799 - 805 -35 0.00625 11, 14  14 E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17 F <sub>DL_low</sub> - F <sub>DL_high</sub> -50 1				-	_	-50	1	14
E-UTRA Band 14     FDL_low     -     FDL_high     -50     1     14       Frequency range     769     -     775     -35     0.00625     14       Frequency range     799     -     805     -35     0.00625     11, 14       14     E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17     FDL_low     -     FDL_high     -50     1	13			-		-50	1	
Frequency range         769         -         775         -35         0.00625         14           Frequency range         799         -         805         -35         0.00625         11, 14           14         E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17         F <sub>DL_low</sub> -         F <sub>DL_high</sub> -50         1				-	_		1	14
Frequency range 799 - 805 -35 0.00625 11, 14  14 E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17 F <sub>DL_low</sub> - F <sub>DL_high</sub> -50 1				-		-35	0.00625	14
14 E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17 F <sub>DL_low</sub> - F <sub>DL_high</sub> -50 1		. , ,		-				
	14			-			1	
				-		-35	0.00625	12, 14

	Frequency range	799	-	805	-35	0.00625	11, 12, 14
17	E-UTRA Band 2, 5, 13, 14, 17	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	, ,
	E-UTRA Band 4, 10	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 12	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	14
18	E-UTRA Band 1, 11, 21, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	860	-	895	-40	1	
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	† <u>-</u>	1879.9	-50	1	
19	E-UTRA Band 1, 11, 21, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	860	-	895	-40	1	9, 14
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	-
	Frequency range	1839.9	-	1879.9	-50	1	
20	E-UTRA Band 1, 3, 7, 8, 33, 34,	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 20	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	14
	E-UTRA Band 38	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
21	E-UTRA Band 11	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-35	1	10, 14
	E-UTRA Band 1, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-35	1	10
	Frequency range	860	-	895	-50	1	
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
			-				
33	E-UTRA Band 1, 7, 8, 20, 34, 38, 39, 40	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	5
	E-UTRA Band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	14
34	E-UTRA Band 1, 3, 7, 8, 11, 20, 21, 33,				-50	1	5
	38,39, 40	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			
	Frequency range	860	-	895	-50	1	
	Frequency range	1884.5	-	1915.7	-41	0.3	8
25	Frequency range	1839.9	-	1879.9	-50	1	5
35 36			-				
36			-				
38	F HTD A Bond 1.2. 0.20.22.24	<u> </u>	<u> </u>	F	50	1	
36	E-UTRA Band 1,3, 8, 20, 33, 34	F <sub>DL_low</sub>	<u> </u>	F <sub>DL_high</sub>	-50 -15.5	5	14, 16, 19
	Frequency range	2620	-	2645	-15.5 -40	1	14, 16, 19
39	Frequency range	2645	-	2690	-40 -50	1	14, 10
40	E-UTRA Band 34, 40	F <sub>DL_low</sub>	<u> </u>	F <sub>DL_high</sub>	-50 -50	1	
40	E-UTRA Band 1, 3, 33, 34, 39	$F_{DL\_low}$	-	$F_{DL\_high}$	-50	'	

NOTE 1: FDL\_low and FDL\_high refer to each E-UTRA frequency band specified in Table 5.2-1

NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1.3-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2nd or 3rd harmonic spurious emissions. An exception is allowed if there is at least one individual RE within the transmission bandwidth (see Figure 5.4.2-1) for which the 2nd or 3rd harmonic, i.e. the frequency equal to two or three times the frequency of that RE, is within the measurement bandwidth (MBW).

- NOTE 3: To meet these requirements some restriction will be needed for either the operating band or protected band
- NOTE 4: N/A
- NOTE 5: For non synchronised TDD operation to meet these requirements some restriction will be needed for either the operating band or protected band
- NOTE 6: Applicable when NS\_05 in section 6.6.3.3.3.1 is signalled by the network.
- NOTE 7: Applicable when co-existence with PHS system operating in 1884.5-1919.6MHz.
- NOTE 8: Applicable when co-existence with PHS system operating in 1884.5 -1915.7MHz.
- NOTE 9: Applicable when NS\_08 in section 6.6.3.3.3.3 is signalled by the network
- NOTE 10: Applicable when NS\_09 in section 6.6.3.3.3.4 is signalled by the network
- NOTE 11: Whether the applicable frequency range should be 793-805MHz instead of 799-805MHz is TBD
- NOTE 12: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB
- NOTE 13: Applicable when the assigned E-UTRAUL operating channel is ≥1744.9MHz and ≤ 1784.9MHz.
- NOTE 14: These requirements also apply for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1-1 from the edge of the channel bandwidth.
- NOTE 15: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 2560 MHz. This requirement is

- applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range 2500 2570 MHz.
- NOTE 16: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2605.5 2607.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2597 2605 MHz. This requirement is applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range 2570 2615 MHz. For assigned carriers with bandwidths overlapping the frequency range 2615-2620 MHz the requirements apply with the maximum output power configured to +20 dBm in the IE *P-Max*.
- NOTE 17: For carriers of 5 MHz channel bandwidth with carrier centre frequencies ( $F_c$ ) in the range 902.5MHz  $\leq F_c < 907.5$  MHz, the requirement applies for uplink transmission bandwidths less than or equal to 20 RB. No restrictions apply in the range 907.5 MHz  $\leq F_c \leq 912.5$  MHz. For carriers of 10 MHz channel bandwidth, the requirement only applies for  $F_c = 910$  MHz and uplink transmission bandwidths less than or equal to 32 RB with RB<sub>start</sub> > 3.
- NOTE 18: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 1929.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 1930 1938 MHz. This requirement is applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range 1920 1980 MHz.
- NOTE 19: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.
- NOTE: The restriction on the maximum uplink transmission to 54 RB in Notes 15, 16 and 18 of Table 6.6.3.2.3-1A is intended for conformance testing and may be applied to network operation to facilitate coexistence when the aggressor and victim bands are deployed in the same geographical area. The applicable spurious emission requirement of -15.5 dBm/5MHz is a least restrictive technical condition for FDD/TDD coexistence and may have to be revised in the future.

Table 6.6.3.2.3-1B: Spurious emission band UE co-existence limits Rel-10

		Spurious	em	ission			
E-UTRA Band	Protected band	Freque		y range	Maximu m Level (dBm)	MBW (MHz)	Note
1	E-UTRA Band 1, 7, 8, 11, 18, 19, 20, 21, 22, 38, 40, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 3, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	Frequency range	1880	-	1895	-40	1	15,19
	Frequency range	1895	-	1915	-15.5	5	15,19,20
	Frequency range	1915	-	1920	+1.6	5	15,19,20
	Frequency range	1884.5	-	1915.7	-41	0.3	6, 8, 15
	Frequency range	1839.9	-	1879.9	-50	1	15
2	E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 41, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 2, 25	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
3	E-UTRA Band 1, 7, 8, 20, 33, 34, 38, 43	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 11, 18, 19, 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	13
	E-UTRA Band 22, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	Frequency range	1884.5	-	1915.7	-41	0.3	13
4	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 25, 41, 43	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
5	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 25, 42, 43	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 41	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	2
6	E-UTRA Band 1, 9, 11, 34	F <sub>DL_low</sub>	-	$F_{DL\_high}$	-50	1	
	Frequency range	860	-	875	-37	1	
	Frequency range	875	-	895	-50	1	
	Frequency range	1884.5	-	1919.6	-41	0.3	7
7	E-UTRA Band 1, 3, 7, 8, 20, 22, 33, 34,	1884.5 F <sub>DL_low</sub>	-	1915.7 F <sub>DL_high</sub>	-50	1	8
	42, 43						
	Frequency range	2570	-	2575	+1.6	5	15, 16, 20
	Frequency range	2575	-	2595	-15.5	5	15, 16, 20
	Frequency range			_	-40	1	15, 16
8	E-UTRA Band 1, 20, 33, 34, 38, 39, 40	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA band 7	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 8	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15 2
	E-UTRA Band 22, 42, 43 E-UTRA Band 11, 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	F <sub>DL_low</sub>	-	F <sub>DL_high</sub> 890	-50	1	18
	Frequency range	1884.5		1915.7	-40	1	15, 18
9	E-UTRA Band 1, 11, 18, 19, 21, 34				-41 -50	0.3	8, 18
9		F <sub>DL_low</sub> 1884.5	-	F <sub>DL_high</sub> 1915.7	-30	0.3	8
	Frequency range Frequency range	945	-	960	-50		0
	. , ,		-	1879.9		1	
10	Frequency range E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17,	1839.9 F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50 -50	<u>1</u> 1	
	23, 24, 25, 41, 43 E-UTRA Band 22, 42				-50	1	2
11	E-UTRA Band 22, 42 E-UTRA Band 1, 11, 18, 19, 21, 34	F <sub>DL_low</sub>	Η-	FDL_high	-50	1	
1.1	Frequency range	F <sub>DL_low</sub> 1884.5	Η-	F <sub>DL_high</sub> 1915.7	-50 -41	0.3	8
		945	-	960	-41	1	U
	Frequency range		<u> </u>				
	Frequency range	1839.9	-	1879.9	-50	1	
12	E-UTRA Band 2, 5, 13, 14, 17, 23, 24, 25, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 4, 10	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 12	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
13	E-UTRA Band 2, 4, 5, 10, 12, 13, 17, 23, 25, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	

	Frequency range	769	l -	775	-35	0.00625	15
	Frequency range	799	-	805	-35	0.00625	11, 15
	E-UTRA Band 14	F <sub>DL_low</sub>	<u> </u>	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 24	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
14	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17,	F <sub>DL low</sub>	-	F <sub>DL_high</sub>	-50	1	
14	23, 24, 25, 41		_				
	Frequency range	769	-	775	-35	0.00625	12, 15
	Frequency range	799	-	805	-35	0.00625	11, 12, 15
17	E-UTRA Band 2, 5, 13, 14, 17, 23, 24, 25, 41	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 4, 10	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 12	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
18	E-UTRA Band 1, 11, 21, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	860	-	890	-40	1	
	. , ,	1884.5	-	1915.7	-41	0.3	8
	Frequency range						
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
19	E-UTRA Band 1, 11, 21, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	860	-	890	-40	1	9, 15
		1884.5	-	1915.7	-41	0.3	8
	Frequency range						
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
20	E-UTRA Band 1, 3, 7, 8, 20, 22, 33, 34, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 20	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 38, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
21	E-UTRA Band 11	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-35	1	10, 15
	E-UTRA Band 1, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	•
	E-UTRA Band 21	F <sub>DL_low</sub>	-		-50	1	10
	Frequency range	1884.5	-	F <sub>DL_high</sub> 1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
22	E-UTRA Band 1, 3, 7, 8, 20, 33, 34, 38, 39, 40, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	3510	-	3525	-40	1	15
	Frequency range	3525	-	3590	-50	1	-
23	E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 23,	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	24, 41						44.45
	E-UTRA Band 2	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	14, 15
	Frequency range	1998	-	1999	-21	1	14, 15
	Frequency range	1997	-	1998	-27	1	14, 15
	Frequency range	1996	-	1997	-32	1	14, 15
	Frequency range	1995	-	1996	-37	1	14, 15
	Frequency range	1990	-	1995	-40	1	14, 15
	Frequency range	1990	-	1999	-40	1	15, 21
	Frequency range	1999	-	2000	-40	Note 22	15, 21

0.4	F HTDA D 10 A F 40 40 40 44 47	_		l	50		T
24	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
25	E-UTRA Band 4, 5, 10,12, 13, 14, 17, 22, 23, 24, 41, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 2	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 25	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
33	E-UTRA Band 1, 7, 8, 20, 22, 34, 38, 39, 40, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	5
	E-UTRA Band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
34	E-UTRA Band 1, 3, 7, 8, 11, 18, 19, 20, 21, 22, 33, 38,39, 40, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	5
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	1839.9	-	1879.9	-50	1	5
35							
36							
37			-				
38	E-UTRA Band 1,3, 8, 20, 22, 33, 34, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	2620	-	2645	-15.5	5	15, 17, 20
	Frequency range	2645	-	2690	-40	1	15, 17
39	E-UTRA Band 22, 34, 40, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	,
	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
40	E-UTRA Band 1, 3, 22, 33, 34, 39, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
41	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
42	E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 20, 25, 33, 34, 38, 40	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	3
43	E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 20, 25, 33, 34, 38, 40	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	3
	E-UTRA Band 22	$F_{DL\_low}$	-	F <sub>DL_high</sub>	[-50]	[1]	3

- NOTE 1: FDL low and FDL high refer to each E-UTRA frequency band specified in Table 5.2-1
- NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1.3-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup> harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.4.2-1) for which the 2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup> harmonic totally or partially overlaps the measurement bandwidth (MBW).
- NOTE 3: To meet these requirements some restriction will be needed for either the operating band or protected band
- NOTE 4: N/A
- NOTE 5: For non synchronised TDD operation to meet these requirements some restriction will be needed for either the operating band or protected band
- NOTE 6: Applicable when NS\_05 in section 6.6.3.3.3.1 is signalled by the network.
- NOTE 7: Applicable when co-existence with PHS system operating in 1884.5-1919.6MHz.
- NOTE 8: Applicable when co-existence with PHS system operating in 1884.5 -1915.7MHz.
- NOTE 9: Applicable when NS\_08 in section 6.6.3.3.3 is signalled by the network
- NOTE 10: Applicable when NS\_09 in section 6.6.3.3.3.4 is signalled by the network
- NOTE 11: Whether the applicable frequency range should be 793-805MHz instead of 799-805MHz is TBD
- NOTE 12: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB
- NOTE 13: This requirement applies for 5, 10, 15 and 20 MHz E-UTR A channel bandwidth allocated within 1744.9MHz and 1784.9MHz.
- NOTE 14: To meet this requirement NS\_11 value shall be signalled when operating in 2000-2020 MHz
- NOTE 15: These requirements also apply for the frequency ranges that are less than F<sub>OOB</sub> (MHz) in Table 6.6.3.1.3-1 and Table 6.6.3.1A.1.3-1 from the edge of the channel bandwidth.
- NOTE 16: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 2560 MHz. No other restrictions apply for carriers with bandwidths confined in 2500-2570 MHz.
- NOTE 17: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2605.5 2607.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2597 2605 MHz. No other restrictions apply for carriers with bandwidths confined in 2570-2615 MHz. For assigned carriers with bandwidths overlapping the frequency range 2615-2620 MHz the requirements apply with the maximum output power configured to +20 dBm in the IE *P-Max*.
- NOTE 18: For carriers of 5 MHz channel bandwidth with carrier centre frequencies ( $F_c$ ) in the range 902.5MHz  $\leq F_c <$  907.5 MHz, the requirement applies for uplink transmission bandwidths less than or equal to 20 RB. No restrictions apply in the range 907.5 MHz  $\leq F_c \leq$  912.5 MHz. For carriers of 10 MHz channel bandwidth, the requirement only applies for  $F_c =$  910 MHz and uplink transmission bandwidths less than or equal to 32 RB with RB<sub>start</sub> > 3.
- NOTE 19: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 1929.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 1930 1938 MHz. This requirement is applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range 1920 1980 MHz.
- NOTE 20: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.
- NOTE 21 Applicable when NS 20 is signalled by the network.
- NOTE 22 The measurement bandwidth is 1% of the applicable E-UTRA channel bandwidth (Table 5.4.2-1).

NOTE: The restriction on the maximum uplink transmission to 54 RB in Notes 16, 17, and 19 of Table 6.6.3.2.3-1B is intended for conformance testing and may be applied to network operation to facilitate coexistence when the aggressor and victim bands are deployed in the same geographical area. The applicable spurious emission requirement of -15.5 dBm/5MHz is a least restrictive technical condition for FDD/TDD coexistence and may have to be revised in the future.

Table 6.6.3.2.3-1C: Spurious emission band UE co-existence limits Rel-11

		Spurious	em	1551011			
E-UTRA Band	Protected band		enc y MHz	range :)	Maximum Level (dBm)	MBW (MHz)	Note
1	E-UTRA Band 1, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 38, 40, 41, 42, 43, 44	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 3, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	Frequency range	1880		1895	-40	1	15,27
	Frequency range	1895		1915	-15.5	5	15, 26, 27
	Frequency range	1915		1920	+1.6	5	15, 26, 27
	Frequency range	1884.5	•	1915.7	-41	0.3	6, 8, 15
	Frequency range	1839.9	-	1879.9	-50	1	15
2	E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 26, 27, 28, 29, 41, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 2, 25	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
3	E-UTRA Band 1, 7, 8, 20, 26, 27, 28, 33, 34, 38, 41, 43, 44	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 11, 18, 19, 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	13
	E-UTRA Band 22, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	Frequency range	1884.5	-	1915.7	-41	0.3	13
4	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 25, 26, 27, 28, 29, 41, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
5	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 25, 28, 29,42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	_
	E-UTRA Band 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 26	859	-	869	-27	1	
6	E-UTRA Band 1, 9, 11, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	860	-	875	-37	1	
	Frequency range	875	-	895	-50	1	
		1884.5	-	1919.6	-41	0.3	7
	Frequency range	1884.5	-	1915.7			8
7	E-UTRA Band 1, 3, 7, 8, 20, 22, 27, 28, 29, 33, 34, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	2570	-	2575	+1.6	5	15, 21, 26
	Frequency range	2575	-	2595	-15.5	5	15, 21, 26
	Frequency range	2595	-	2620	-40	1	15, 21
8	E-UTRA Band 1, 20, 28, 33, 34, 38, 39, 40	F <sub>DL low</sub>	_	F <sub>DL_high</sub>	-50	1	
	E-UTRA band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA band 7	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 8	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 22, 41, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 11, 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	23
	Frequency range	860	-	890	-40	1	15, 23
	Frequency range	1884.5	-	1915.7	-41	0.3	8, 23
9	E-UTRA Band 1, 11, 18, 19, 21, 26, 28, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	1884.5	L-	1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
	Frequency range	2545	-	2575	-50	1	
	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17,		_	F <sub>DL_high</sub>	-50	1	
10	23, 24, 25, 26, 27, 28, 29, 41, 43	F <sub>DL_low</sub>		I DL_nign			
	23, 24, 25, 26, 27, 28, 29, 41, 43 E-UTRA Band 22, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
10					-50 -50 -41	1 1 0.3	2 8

	Frequency range	1839.9		1879.9	-50	1	
	Frequency range Frequency range	2545	-	2575	-50	1	
12	E-UTRA Band 2, 5, 13, 14, 17, 23, 24,	2343	_	2373			
12	25, 26, 27, 41	F <sub>DL low</sub>	-	F <sub>DL high</sub>	-50	1	
	E-UTRA Band 4, 10	F <sub>DL low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 12	F <sub>DL_low</sub>	-	F <sub>DL high</sub>	-50	1	15
13	E-UTRA Band 2, 4, 5, 10, 12, 13, 17, 23,				-50	1	
	25, 26, 27, 29, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			
	Frequency range	769	-	775	-35	0.00625	15
	Frequency range	799	-	805	-35	0.00625	11, 15
	E-UTRA Band 14	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 24	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
14	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17,	_		_	-50	1	
	23, 24, 25, 26, 27, 29, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-35	0.00625	12, 15
	Frequency range	769	-	_	-35	0.00625	11, 12, 15
17	Frequency range E-UTRA Band 2, 5, 13, 14, 17, 23, 24,	799	-	805			11, 12, 15
17	25, 26, 27, 41	F <sub>DL low</sub>	-	F <sub>DL high</sub>	-50	1	
	E-UTRA Band 4, 10	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 12	F <sub>DL_low</sub>	_	F <sub>DL high</sub>	-50	1	15
18	E-UTRA Band 1, 11, 21, 34	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	
	Frequency range	860	-	890	-40	1	
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	758	_	799	-50	1	
	Frequency range	799	-	803	-40	1	15
	Frequency range	945	_	960	-50	1	_
	Frequency range	1839.9	_	1879.9	-50	1	
	Frequency range	2545	_	2575	-50	1	
19	E-UTRA Band 1, 11, 21, 28, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	860	_	890	-40	1	9, 15
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
	Frequency range	2545	-	2575	-50	1	
20	E-UTRA Band 1, 3, 7, 8, 20, 22, 33, 34, 43	F <sub>DL_low</sub>	_	F <sub>DL high</sub>	-50	1	
	E-UTRA Band 20	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 38, 42	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	2
21	E-UTRA Band 11	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-35	1	10, 15
	E-UTRA Band 1, 18, 19, 28, 34	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	10, 10
	E-UTRA Band 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	10
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
	Frequency range	2545	-	2575	-50	1	
22	E-UTRA Band 1, 3, 7, 8, 20, 26, 27, 28,	_			-50	1	
	33, 34, 38, 39, 40, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			45
	Frequency range	3510	-	3525	-40	1	15
00	Frequency range	3525	-	3590	-50	1	
23	E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 23, 24, 26, 27, 29, 41	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 2	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	14, 15
	Frequency range	1998	-	1999	-21	1	14, 15
	Frequency range	1997	-	1998	-27	1	14, 15
	Frequency range	1996	-	1997	-32	1	14, 15
	Frequency range	1995	-	1996	-37	1	14, 15
	Frequency range	1990	-	1995	-40	1	14, 15
	Frequency range Frequency range	1990	Ė	1995	-40 -40	1	15, 28
	Frequency range Frequency range	1990		2000	-40 -40	Note 29	15, 28
24	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17,	1999		2000			10, 20
	23, 24, 25, 26, 29, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
25	E-UTRA Band 4, 5, 10,12, 13, 14, 17, 22,				-50	1	
	23, 24, 26, 27, 28, 29, 41, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			45
	E-UTRA Band 2	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	15

	T =				50		45
	E-UTRA Band 25	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
26	E-UTRA Band 1, 2, 3, 4, 5, 10, 11, 12, 13, 14, 17, 18,19, 21, 22, 23, 24, 25, 26,				-50	1	
	29, 34, 40, 42, 43	F <sub>DL low</sub>	_	F <sub>DL high</sub>	-50	ı	
	E-UTRA Band 41	F <sub>DL_low</sub>	_	F <sub>DL high</sub>	-50	1	2
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	1 , 3	703	_	799	-50	1	-
	Frequency range	799	-	803	-40	1	15
	Frequency range	851	-	859	-53	0.00625	20
	E-UTRA Band 27			859	-32	1	20
		F <sub>DL_low</sub>	-		-50	1	20
	Frequency range	945	-	960		1	
27	Frequency range E-UTRA Band 1, 2, 3, 4, 5, 7, 10, 12, 13,	1839.9	-	1879.9	-50	1	
21	14, 17, 22, 23, 25, 26, 27, 29, 41, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	0.0062	
	Frequency range	799	-	805	-35	5	
		790	-	F <sub>DL_high</sub>	-32	1	16
	E-UTRA Band 28	$F_{DL\_low}$	-	790	-50	1	
28	E-UTRA Band 2, 3, 5, 7, 8, 18, 19, 25, 26, 27, 34, 38, 41	F <sub>DL_low</sub>	1	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 1, 4, 10, 22, 42, 43	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 11, 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	19, 24
	E-UTRA Band 1	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	19, 25
	Frequency range	758	-	773	-32	1	15
	Frequency range	773	-	803	-50	1	
	Frequency range	662	-	694	-26.2	6	15
	Frequency range	1884.5	-	1915.7	-41	0.3	8, 19
	Frequency range	1839.9		1879.9	-50	1	,
	Trequency range	1000.0		107 3.3		•	
33	E-UTRA Band 1, 7, 8, 20, 22, 34, 38, 39,						
	40, 42, 43	F <sub>DL low</sub>	-	F <sub>DL high</sub>	-50	1	5
	E-UTRA Band 3	F <sub>DL low</sub>	-	F <sub>DL high</sub>	-50	1	15
34	E-UTRA Band 1, 3, 7, 8, 11, 18, 19, 20,	- DL_10W		· DE_mgn			
	21, 22, 26, 28, 33, 38,39, 40, 41, 42, 43,				-50	1	5
	44	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			
	Frequency range	1884.5	-	1915.7	-41	0.3	8
35	Frequency range	1839.9	-	1879.9	-50	1	5
36							
37			-				
38	E-UTRA Band 1,3, 8, 20, 22, 28, 29, 33,	_		_	-50	1	
	34, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-15.5	5	15, 22, 26
	Frequency range	2620	-	2645	-15.5		
39	Frequency range	2645	-	2690		1	15, 22
40	E-UTRA Band 22, 34, 40, 41, 42, 44 E-UTRA Band 1, 3, 22, 26, 27, 33, 34,	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
40	39, 41, 42, 43, 44	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	
41	E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 12, 13,	- DL_IUW		- DE_IIIGII			
	14, 17, 23, 24, 25, 26, 27, 28, 29, 34, 39, 40, 42, 44	F <sub>DL low</sub>	_	F <sub>DL high</sub>	-50	1	
	E-UTRA Band 9, 11, 18, 19, 21	F <sub>DL low</sub>	-	F <sub>DL_high</sub>	-50	1	30
	Frequency range	1839.9		1879.9	-50	1	30
	Frequency range	1884.5		1915.7	-41	0.3	8, 30
42	E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 20,						•
	25, 26, 27, 28, 33, 34, 38, 40, 41, 44	_		_	-50	1	
		F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	50	4	
40	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	3
43	E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 20, 25, 26, 27, 28, 33, 34, 38, 40	F <sub>2</sub>	_	F <sub>5</sub>	-50	1	
	E-UTRA Band 42	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	3
	E-UTRA Band 22	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>		[1]	3
44	E-UTRA Band 22	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	[-50]	1	J
444	E-UTRA Band 3, 5, 6, 34, 39, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	-50	2
	L 0 11VA Dallu 1, 40, 42	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>		-50	

- NOTE 1: FDL low and FDL high refer to each E-UTRA frequency band specified in Table 5.2-1
- NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1.3-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> [or 5<sup>th</sup>] harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.4.2-1) for which the 2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup> harmonic totally or partially overlaps the measurement bandwidth (MBW).
- NOTE 3: To meet these requirements some restriction will be needed for either the operating band or protected band
- NOTE 4: N/A
- NOTE 5: For non synchronised TDD operation to meet these requirements some restriction will be needed for either the operating band or protected band
- NOTE 6: Applicable when NS\_05 in section 6.6.3.3.3.1 is signalled by the network.
- NOTE 7: Applicable when co-existence with PHS system operating in 1884.5-1919.6MHz.
- NOTE 8: Applicable when co-existence with PHS system operating in 1884.5 -1915.7MHz.
- NOTE 9: Applicable when NS\_08 in subdause 6.6.3.3.3.3 is signalled by the network
- NOTE 10: Applicable when NS\_09 in subdause 6.6.3.3.3.4 is signalled by the network
- NOTE 11: Whether the applicable frequency range should be 793-805MHz instead of 799-805MHz is TBD
- NOTE 12: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB
- NOTE 13: This requirement applies for 5, 10, 15 and 20 MHz E-UTR A channel bandwidth allocated within 1744.9MHz and 1784.9MHz.
- NOTE 14: To meet this requirement NS\_11 value shall be signalled when operating in 2000-2020 MHz
- NOTE 15: These requirements also apply for the frequency ranges that are less than F<sub>OOB</sub> (MHz) in Table 6.6.3.1.3-1 and Table 6.6.3.1A.1.3-1 from the edge of the channel bandwidth.
- NOTE 16: Applicable when NS\_16 in subclause 6.6.3.3.3.9 is signalled by the network.
- NOTE 17: N/A
- NOTE 18: N/A
- NOTE 19: Applicable when the assigned E-UTRA carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz.
- NOTE 20: Applicable when NS\_15 in subdause 6.6.3.3.3.8 is signalled by the network.
- NOTE 21: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 2560 MHz. No other restrictions apply for carriers with bandwidths confined in 2500-2570 MHz.
- NOTE 22: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2605.5 2607.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2597 2605 MHz. No other restrictions apply for carriers with bandwidths confined in 2570-2615 MHz. For assigned carriers with bandwidths overlapping the frequency range 2615-2620 MHz the requirements apply with the maximum output power configured to +20 dBm in the IE *P-Max*.
- NOTE 23 For carriers of 5 MHz channel bandwidth with carrier centre frequencies ( $F_c$ ) in the range 902.5MHz  $\leq F_c <$  907.5 MHz, the requirement applies for uplink transmission bandwidths less than or equal to 20 RB. No restrictions apply in the range 907.5 MHz  $\leq F_c \leq$  912.5 MHz. For carriers of 10 MHz channel bandwidth, the requirement only applies for  $F_c =$  910 MHz and uplink transmission bandwidths less than or equal to 32 RB with RB<sub>start</sub> > 3.
- NOTE 24: As exceptions, measurements with a level up to the applicable requirement of -38 dBm/MHz is permitted for each assigned E-UTRA carrier used in the measurement due to 2<sup>nd</sup> harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.6-1) for which the 2<sup>nd</sup> harmonic totally or partially overlaps the measurement bandwidth (MBW).
- NOTE 25: As exceptions, measurements with a level up to the applicable requirement of -36 dBm/MHz is permitted for each assigned E-UTRA carrier used in the measurement due to 3<sup>rd</sup> harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.6-1) for which the 3<sup>rd</sup> harmonic totally or partially overlaps the measurement bandwidth (MBW).
- NOTE 26: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.
- NOTE 27: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 1929.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 1930 1938 MHz. This requirement is applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range 1920 1980 MHz.
- NOTE 28: Applicable when NS\_20 is signalled by the network.
- NOTE 29: The measurement bandwidth is 1% of the applicable E-UTRA channel bandwidth (Table 5.4.2-1).
- NOTE 30: This requirement applies when the E-UTRA carrier is confined within 2545-2575 MHz and the channel bandwidth is 10 or 20 MHz

Table 6.6.3.2.3-1D: Spurious emission band UE co-existence limits Rel-12

		Spurious	em	ission			
E-UTRA Band	Protected band		enc y MHz	range :)	Maximum Level (dBm)	MBW (MHz)	Note
1	E-UTRA Band 1, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 38, 40, 41, 42, 43, 44	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 3, 34	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	15
	Frequency range	1880		1895	-40	1	15,27
	Frequency range	1895		1915	-15.5	5	15, 26, 27
	Frequency range	1915		1920	+1.6	5	15, 26, 27
	Frequency range	1884.5	-	1915.7	-41	0.3	6, 8, 15
	Frequency range	1839.9	-	1879.9	-50	1	15
2	E-UTRA Band 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 26, 27, 28, 29, 41, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 2, 25	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
3	E-UTRA Band 43 E-UTRA Band 1, 7, 8, 20, 26, 27, 28, 31,	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50 -50	1	2
	33, 34, 38, 41, 43, 44	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			45
	E-UTRA Band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 11, 18, 19, 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50 -50	1	13
	E-UTRA Band 22, 42	F <sub>DL_low</sub> 1884.5	-	F <sub>DL_high</sub>	-50 -41	0.3	13
4	Frequency range  E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 25, 26, 27, 28, 29, 41, 43	F <sub>DL_low</sub>	-	1915.7 F <sub>DL high</sub>	-50	1	13
	E-UTRA Band 42	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	2
5	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 25, 28, 29, 31, 42, 43	F <sub>DL low</sub>	_	F <sub>DL high</sub>	-50	1	
	E-UTRA Band 41	F <sub>DL low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 26	859	-	869	-27	1	
6	E-UTRA Band 1, 9, 11, 34	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	860	•	875	-37	1	
	Frequency range	875	-	895	-50	1	
		1884.5	-	1919.6	-41	0.3	7
7	Frequency range E-UTRA Band 1, 3, 7, 8, 20, 22, 27, 28,	1884.5	-	1915.7			8
	29, 31, 33, 34, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	45.04.00
	Frequency range	2570	-	2575	+1.6	5	15, 21, 26
	Frequency range	2575	-	2595	-15.5	5	15, 21, 26
8	Frequency range E-UTRA Band 1, 20, 28, 31, 33, 34, 38,	2595	-	2620	-40	1	15, 21
O	39, 40	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA band 7	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 8	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 22, 41, 42, 43	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 11, 21	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	23
	Frequency range	860	-	890	-40	1	15, 23
	Frequency range	1884.5	-	1915.7	-41	0.3	8, 23
9	E-UTRA Band 1, 11, 18, 19, 21, 26, 28, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
10	Frequency range E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17,	2545	-	2575	-50 -50	1	
	23, 24, 25, 26, 27, 28, 29, 41, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			_
4.4	E-UTRA Band 22, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
11	E-UTRA Band 1, 11, 18, 19, 21, 28, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	0
	Frequency range	1884.5 945	-	1915.7 960	-41 -50	0.3	8
	Frequency range	940		900	-50	· ·	1

							1
	Frequency range	1839.9	-	1879.9	-50	1	
40	Frequency range	2545	-	2575	-50	1	
12	E-UTRA Band 2, 5, 13, 14, 17, 23, 24, 25, 26, 27, 41	F <sub>DL low</sub>	_	F <sub>DL high</sub>	-50	1	
	E-UTRA Band 4, 10	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 12	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
13	E-UTRA Band 2, 4, 5, 10, 12, 13, 17, 23,	· DL_10W		· DE_mgn	50	1	
	25, 26, 27, 29, 41	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	ı	
	Frequency range	769	-	775	-35	0.00625	15
	Frequency range	799	-	805	-35	0.00625	11, 15
	E-UTRA Band 14	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 24	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
14	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17,	_		_	-50	1	
	23, 24, 25, 26, 27, 29, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			10.15
	Frequency range	769	-	775	-35	0.00625	12, 15
17	Frequency range	799	-	805	-35	0.00625	11, 12, 15
17	E-UTRA Band 2, 5, 13, 14, 17, 23, 24, 25, 26, 27, 41	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 4, 10	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	2
	E-UTRA Band 12	F <sub>DL low</sub>		F <sub>DL_high</sub>	-50	1	15
18	E-UTRA Band 1, 11, 21, 34	_			-50	1	10
		F <sub>DL_low</sub> 860	-	F <sub>DL_high</sub> 890	-40	1	
	Frequency range Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	758	-	799	-50	1	0
	1 , 0	799	-	803	-40	1	15
	Frequency range	945	-	960	-50	1	15
	Frequency range				-50	1	
	Frequency range	1839.9	-	1879.9	-50	1	
19	Frequency range	2545	-	2575	-50	1	
15	E-UTRA Band 1, 11, 21, 28, 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			0.45
	Frequency range Frequency range	860 1884.5	-	890 1915.7	-40 -41	0.3	9, 15 8
	Frequency range	945	-	960	-50	1	8
	Frequency range	1839.9	-	1879.9	-50	1	
	Frequency range	2545	-	2575	-50	1	
20	E-UTRA Band 1, 3, 7, 8, 20, 22, 33, 34, 43	F		F	-50	1	
	E-UTRA Band 20	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
	E-UTRA Band 38, 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
21	E-UTRA Band 11	F <sub>DL_low</sub>			-35	1	10, 15
	E-UTRA Band 1, 18, 19, 28, 34	F <sub>DL_low</sub>		F <sub>DL_high</sub>	-50	1	10, 10
	E-UTRA Band 21		-		-50	1	10
	Frequency range	F <sub>DL_low</sub> 1884.5	-	F <sub>DL_high</sub> 1915.7	-41	0.3	8
	Frequency range	945	-	960	-50	1	Ü
	Frequency range	1839.9	-	1879.9	-50	1	
	Frequency range	2545	-	2575	-50	1	
22	E-UTRA Band 1, 3, 7, 8, 20, 26, 27, 28,				-50	1	
	33, 34, 38, 39, 40, 43 Frequency range	F <sub>DL_low</sub> 3510		F <sub>DL_high</sub> 3525	-40	1	15
	Frequency range	3525		3590	-50	1	
23	E-UTRA Band 4, 5, 10, 12, 13, 14, 17,	3323	-	3330	30	'	
	23, 24, 26, 27, 29, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 2	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	14, 15
	Frequency range	1998	-	1999	-21	1	14, 15
	Frequency range	1997	-	1998	-27	1	14, 15
	Frequency range	1996	-	1997	-32	1	14, 15
	Frequency range	1995	-	1996	-37	1	14, 15
	Frequency range	1990	-	1995	-40	1	14, 15
	Frequency range	1990		1999	-40	1	15, 28
	Frequency range	1999		2000	-40	Note 29	15, 28
24	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17,				-50	1	
25	23, 24, 25, 26, 29, 41 E-UTRA Band 4, 5, 10,12, 13, 14, 17, 22,	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	50	_	
	23, 24, 26, 27, 28, 29, 41, 42	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 2	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	15

	T ===	_		Ι_	50	1 4	45
	E-UTRA Band 25	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
00	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
26	E-UTRA Band 1, 2, 3, 4, 5, 10, 11, 12, 13, 14, 17, 18,19, 21, 22, 23, 24, 25, 26, 29, 31, 34, 40, 42, 43	F <sub>DL low</sub>	_	F <sub>DL high</sub>	-50	1	
	E-UTRA Band 41		-		-50	1	2
	Frequency range	F <sub>DL_low</sub> 1884.5	-	F <sub>DL_high</sub> 1915.7	-41	0.3	8
	, , ,	703	-	799	-50	1	
	Frequency range	799	-	803	-40	1	15
	Frequency range	851	_	859	-53	0.00625	20
	E-UTRA Band 27	F <sub>DL low</sub>	-	859	-32	1	20
	Frequency range	945	-	960	-50	1	
	Frequency range	1839.9		1879.9	-50	1	
27	E-UTRA Band 1, 2, 3, 4, 5, 7, 10, 12, 13,	1039.9	-	1079.9	-30	'	
	14, 17, 22, 23, 25, 26, 27, 29, 31, 41, 42, 43	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
					-35	0.0062	
	Frequency range	799	-	805		5	
		790	-	F <sub>DL_high</sub>	-32	1	16
	E-UTRA Band 28	$F_{DL\_low}$	-	790	-50	1	
28	E-UTRA Band 2, 3, 5, 7, 8, 18, 19, 25,	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	26, 27, 31, 34, 38, 41	F <sub>DL_low</sub>	-	F <sub>DL high</sub>	-50	1	2
	E-UTRA Band 1, 4, 10, 22, 42, 43	F <sub>DL low</sub>		FDL_high	-50	1	19, 24
	E-UTRA Band 11, 21	F <sub>DL_low</sub>	-	FDL_high	-50 -50	1	19, 24
	E-UTRA Band 1	758	-	773	-32	1	15, 23
	Frequency range		-	803	-52 -50	1	15
	Frequency range	773		694	-26.2	6	15
	Frequency range	662	-			_	_
	Frequency range	1884.5	-	1915.7	-41	0.3	8, 19
0.4	Frequency range	1839.9	-	1879.9	-50	1	
31	E-UTRA Band 1, 5, 7, 8, 26, 27, 28, 38, 42	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	2
				- 0			
33	E-UTRA Band 1, 7, 8, 20, 22, 34, 38, 39, 40, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	5
	E-UTRA Band 3	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	15
34	E-UTRA Band 1, 3, 7, 8, 11, 18, 19, 20, 21, 22, 26, 28, 33, 38,39, 40, 41, 42, 43, 44	$F_{DL\_low}$	_	F <sub>DL high</sub>	-50	1	5
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	1839.9	-	1879.9	-50	1	5
35							
36							
37			-				
38	E-UTRA Band 1,3, 8, 20, 22, 28, 29, 31, 33, 34, 42, 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	Frequency range	2620	-	2645	-15.5	5	15, 22, 26
	Frequency range	2645	-	2690	-40	1	15, 22
39	E-UTRA Band 22, 34, 40, 41, 42, 44	F <sub>DL_low</sub>		F <sub>DL_high</sub>	-50	1	
40	E-UTRA Band 1, 3, 22, 26, 27, 33, 34, 39, 41, 42, 43, 44	$F_{DL\_low}$	-	F <sub>DL_high</sub>	-50	1	
41	E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 12, 13, 14, 17, 23, 24, 25, 26, 27, 28, 29, 34, 39, 40, 42, 44	$F_{DL_{low}}$	_	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 9, 11, 18, 19, 21	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	30
	Frequency range	1839.9		1879.9	-50	1	30
	Frequency range	1884.5		1915.7	-41	0.3	8, 30
42	E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 20, 25, 26, 27, 28, 31, 33, 34, 38, 40, 41, 44	1004.0			-50	1	-,
		F <sub>DL_low</sub>	-	F <sub>DL_high</sub>			
46	E-UTRA Band 43	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	3
43	E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 20, 25, 26, 27, 28, 33, 34, 38, 40	F <sub>DL low</sub>	_	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 42	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	3
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	E-UTRA Band 22	F <sub>DL_low</sub>	•	F <sub>DL_high</sub>	[-50]	[1]	3
44	E-UTRA Band 3, 5, 8, 34, 39, 41	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
	E-UTRA Band 1, 40, 42	$F_{DL\_low}$	-	F <sub>DL_high</sub>		-50	2

- Note 1: F<sub>DL low</sub> and F<sub>DL high</sub> refer to each E-UTRA frequency band specified in Table 5.5-1
- Note 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1.3-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> [or 5<sup>th</sup>] harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.6-1) for which the 2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup> harmonic totally or partially overlaps the measurement bandwidth (MBW).
- Note 3: To meet these requirements some restriction will be needed for either the operating band or protected band
- Note 4: N/A
- Note 5: For non synchronised TDD operation to meet these requirements some restriction will be needed for either the operating band or protected band
- Note 6: Applicable when NS\_05 in section 6.6.3.3.3.1 is signalled by the network.
- Note 7: Applicable when co-existence with PHS system operating in 1884.5-1919.6MHz.
- Note 8: Applicable when co-existence with PHS system operating in 1884.5 -1915.7MHz.
- Note 9: Applicable when NS\_08 in subdause 6.6.3.3.3.3 is signalled by the network
- Note 10: Applicable when NS 09 in subdause 6.6.3.3.3.4 is signalled by the network
- Note 11: Whether the applicable frequency range should be 793-805MHz instead of 799-805MHz is TBD
- Note 12: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB
- Note 13: This requirement applies for 5, 10, 15 and 20 MHz E-UTR A channel bandwidth allocated within 1744.9MHz and 1784.9MHz.
- Note 14: To meet this requirement NS\_11 value shall be signalled when operating in 2000-2020 MHz
- Note 15: These requirements also apply for the frequency ranges that are less than F<sub>OOB</sub> (MHz) in Table 6.6.3.1.3-1 and Table 6.6.3.1A.1.3-1 from the edge of the channel bandwidth.
- Note 16: Applicable when NS\_16 in subdause 6.6.3.3.3.9 is signalled by the network.
- Note 17: N/A
- Note 18: N/A
- Note 19: Applicable when the assigned E-UTRA carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz.
- Note 20: Applicable when NS\_15 in subclause 6.6.3.3.3.8 is signalled by the network.
- Note 21: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 2560 MHz. No other restrictions apply for carriers with bandwidths confined in 2500-2570 MHz.
- Note 22: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2605.5 2607.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2597 2605 MHz. No other restrictions apply for carriers with bandwidths confined in 2570-2615 MHz. For assigned carriers with bandwidths overlapping the frequency range 2615-2620 MHz the requirements apply with the maximum output power configured to +20 dBm in the IE *P-Max*.
- Note 23 For carriers of 5 MHz channel bandwidth with carrier centre frequencies ( $F_c$ ) in the range 902.5MHz  $\leq F_c < 907.5$  MHz, the requirement applies for uplink transmission bandwidths less than or equal to 20 RB. No restrictions apply in the range 907.5 MHz  $\leq F_c \leq 912.5$  MHz. For carriers of 10 MHz channel bandwidth, the requirement only applies for  $F_c = 910$  MHz and uplink transmission bandwidths less than or equal to 32 RB with RB<sub>start</sub> > 3.
- Note 24: As exceptions, measurements with a level up to the applicable requirement of -38 dBm/MHz is permitted for each assigned E-UTRA carrier used in the measurement due to 2<sup>nd</sup> harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.6-1) for which the 2<sup>nd</sup> harmonic totally or partially overlaps the measurement bandwidth (MBW).
- Note 25: As exceptions, measurements with a level up to the applicable requirement of -36 dBm/MHz is permitted for each assigned E-UTRA carrier used in the measurement due to 3<sup>rd</sup> harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.6-1) for which the 3<sup>rd</sup> harmonic totally or partially overlaps the measurement bandwidth (MBW).
- Note 26: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.
- Note 27: This requirement is applicable for an uplink transmission bandwidth less than or equal to 54 RB for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 1929.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 1930 1938 MHz. This requirement is applicable without any other uplink transmission bandwidth restriction for channel bandwidths within the range 1920 1980 MHz.
- Note 28: Applicable when NS\_20 is signalled by the network.
- Note 29: The measurement bandwidth is 1% of the applicable E-UTRA channel bandwidth (Table 5.4.2-1).
- Note 30: This requirement applies when the E-UTRA carrier is confined within 2545-2575 MHz and the channel bandwidth is 10 or 20 MHz

The normative reference for this requirement is TS 36.101 [2] subclause 6.6.3.2.

This test use minimum requirements from many releases of TS 36.101 [2] due to release independence defined in TS 36.307 [16]

# 6.6.3.2.4 Test description

#### 6.6.3.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in Table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 6.6.3.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3.2.4.1-1: Test Configuration Table						
		Initial C	ondition	S		
(as specif	Test Environment (as specified in TS 36.508 [7] subclause 4.1)			NC		
Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1) (Note 6, Note 7)			Low range, Mid range, High range (Note 6, Note 7)			
	nnel Bandwidths ied in TS 36.508	[7] subclause 4.3.1)  Test Parameters for	Channa	Lowest, 5MH	z, Highest	
	Dow	nlink Configuration	Channe		nk Configurat	ion
Ch BW	Mod'n	RB allocation	1	Mod'n	nk Configurat	ocation
CITEVV	IVIOUTI		DD	WOUT	FDD	TDD
1.4MHz	N/A for S	purious Emissions tes		QPSK	6	6
1.4MHz		pullous Lillissions les	ung	QPSK	1	1
3MHz			ŀ	QPSK	15	15
3MHz	<del></del>			QPSK	1	1
5MHz			ŀ	QPSK	25	25'2
5MHz				QPSK	1	112
5MHz			ŀ	QPSK	20 <sup>8</sup>	-
10MHz			ŀ	QPSK	50	50
10MHz				QPSK	1	1
10MHz				QPSK	32 <sup>9</sup>	-
10MHz				QPSK	110	-
15MHz				QPSK	75	75
15MHz				QPSK	54 <sup>3, 11</sup>	54 <sup>4</sup>
15MHz				QPSK	1°	1°
20MHz				QPSK	100	100
20MHz				QPSK	54 <sup>3, 11</sup>	54 <sup>4</sup>
20MHz				QPSK	1°	1°
Note 1:		andwidths are checked				hich
		nel bandwidths are sp				
Note 2:		tion shall be tested at				
Note 3:	Note 3: To be used for requirements under note 15 in table 6.6.3.2.3-1 and table 6.6.3.2.3-1A, note 16 in table 6.6.3.2.3-1B, note 21 in table 6.6.3.2.3-1C in high channel at RB#(full					
		instead of full allocation				
Note 4:	34: To be used for requirements under note 16 in table 6.6.3.2.3-1 and table 6.6.3.2.3-1A, note 17 in table 6.6.3.2.3-1B, note 22 in table 6.6.3.2.3-1C in high channel - 5MHz at					
		on – 54), instead of ful				
Note 5:	5: For requirements under note 15 in table 6.6.3.2.3-1and table 6.6.3.2.3-1A, note 16 in					

Note 5: For requirements under note 15 in table 6.6.3.2.3-1and table 6.6.3.2.3-1A, note 16 in table 6.6.3.2.3-1B, note 21 in table 6.6.3.2.3-1C the allocation in high channel shall be only at RB#max.

For requirements under note 16 in table 6.6.3.2.-1 and table 6.6.3.2.3-1A, note 17 in table 6.6.3.2.3-1B, note 22 in table 6.6.3.2.3-1C (high channel – 5MHz) is tested instead of high channel. The allocation in (high channel – 5MHz) shall be only at RB#max. For requirements under note 17 in table 6.6.3.2.-1, note 18 in table 6.6.3.2.-1A, note 19 in table 6.6.3.2.-1B and note 27 in table 6.6.3.2.-1C the allocation in low channel shall be only at RB#0.

Note 6: Do not apply for requirements under Note 13 in Tables 6.6.3.2.3-1 to 6.6.3.2.3-1 C. Test frequencies for these requirements are defined in Table 6.6.3.2.4.1-2.

Note 7: For E-UTRA band 28, when the test frequency is low range of upper duplexer (as shown in TS 36.508[7] Table 4.3.1.1.28-2) and CBW is 5MHz and 10MHz, the test shall be conducted under NS\_17 in Table 6.2.4.3-1.

Note 8: For requirements under note 17 in table 6.6.3.2.3-1A, note 18 in table 6.6.3.2.3-1B, note 23 in table 6.6.3.2.3-1C (high channel – 10MHz) is tested with RB #0 to RB #19 used.

Note 9: For requirements under note 17 in table 6.6.3.2.3-1A, note 18 in table 6.6.3.2.3-1B, note 23 in table 6.6.3.2.3-1C high channel is tested with RB #4 to RB #35 used.

Note 10: For requirements under note 17 in table 6.6.3.2.3-1A, note 18 in table 6.6.3.2.3-1B, note 23 in table 6.6.3.2.3-1C high channel is tested with RB #4 and (RB#max -4) used.

Note 11: To be used for requirements under note 17 in table 6.6.3.2.3-1, note 18 in table 6.6.3.2.3-1A, note 19 in table 6.6.3.2.3-1B and note 27 in table 6.6.3.2.3-1C in low channel at RB#0, instead of full allocation.

Note 12: For requirements under note 16 in table 6.6.3.2.3-1 and table 6.6.3.2.3-1A, note 17 in table 6.6.3.2.3-1B, note 22 in table 6.6.3.2.3-1C, the message exception in Table 6.6.3.2.4.3-1 is used to test with the high channel.

Table 6.6.3.2.4.1-2: Test frequencies for E-UTRA channel bandwidth for operating band 3 with Note 13 (in Tables 6.6.3.2.3-1 to 6.6.3.2.3-1D)

Bandwidth [MHz]	N <sub>UL</sub>	Frequency of Uplink [MHz]	N <sub>DL</sub>	Frequency of Downlink [MHz]	
1.4	19942	1784.2	1942	1879.2	
3	19934	1783.4	1934	1878.4	
5	19924	1782.4	1924	1877.4	
10	19899	1779.9	1899	1874.9	
15	19874	1777.4	1874	1872.4	
20	19849	1774.9	1849	1869.9	
Note: 1.4 and 3 MHz only tested for Rel8 and Rel9.					

- 1. Connect the SS to the UE to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.7.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.3.2.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3.2.4.3.

### 6.6.3.2.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.3.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the power of the transmitted signal with a measurement filter of bandwidths according to table 6.6.3.2.3-1 to 6.6.3.2.3-1C. For band 14 measurements made in a bandwidth of 6.25kHz, measurement parameter settings defined in table 6.6.3.2.4.2-1 shall be used. The centre frequency of the filter shall be stepped in contiguous steps according to table 6.6.3.2.5-1. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

Table 6.6.3.2.4.2-1: Measurement setup for band 14

	Option 1 : Measurement with No RMS VBW available	Option2 Measurement with VBW Filtering on Power scale
VBW	>=62.5 kHz (10 times or more the RBW)	<=43Hz
RBW	<=6.25kHz	<=6.25kHz
Detector type	Averages signal envelope during each measurement point, such as "RMS detector"	Peak
Averaging mode (Trace averaging)	Power (RMS voltage)	Power (RMS voltage), as controlled by "Average Type"
Average Type (applies to detector)	Power (RMS voltage) (automatically occurs with "RMS detector")	Not applicable
Average Type (applies to VBW filter)	Not applicable	Power (RMS voltage)
Number of averages	30, to reduce variance as required, or use an even longer sweep time	1 or use an even narrower VBW filter, thus a longer sweep time
Sweep time	[Don't specify]	Sweep rate (span divided by sweep time) <= 0.8 * RBW*VBW

### 6.6.3.2.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exceptions:

Table 6.6.3.2.4.3-1: SystemInformationBlockType1 for Note 16 in table 6.6.3.2.3-1 and table 6.6.3.2.3-1A, Note 17 in table 6.6.3.2.3-1B, Note 22 in table 6.6.3.2.3-1C

Derivation Path: TS 36.508 [7] clause 4.4.3.2, Table 4.4.3.2-3 SystemInformationBlockType1						
Information Element Value/remark Comment Condition						
p-Max	20					

# 6.6.3.2.5 Test requirement

Test requirements for Spurious Emissions UE Co-existence are the same as the minimum requirements and are not repeated in this section.

The measured average power of spurious emission, derived in step 3, shall not exceed the described value in tables 6.6.3.2.3-1 to 6.6.3.2.3-1C according to the following rule:

The requirements for the UE are release specific and can be found in Tables 6.6.3.2.3-1 to 6.6.3.2.3-1C. If the UE support a band, which is not defined in the table corresponding UE's release, the requirements for this band are taken from the table of earliest release where requirements for this band are defined. This has been described in following Table 6.6.3.2.5-1.

Table 6.6.3.2.5-1: UE Requirements according to UE E-UTRA release and supported E-UTRA band

Band	UE Requirements per release					
	Rel-8	Rel-9	Rel-10	Rel-11	Rel-12	
1	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
2	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
3	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
4	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
5	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
6	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
7	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
8	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
9	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
10	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
11	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
12	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
13	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
14	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
17	Table 6.6.3.2.3-1	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
18	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
19	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
20	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
21	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1A	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	
22	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D	

	Table	Table	Table	Table	Table
23	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
25	1B	1B	1B	1C	1D
	Table	Table	Table	Table	Table
24	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
27	1B	1B	1B	1C	1D
	Table	Table	Table	Table	Table
25	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
25	1B	1B	1B	1C	1D
	Table	Table	Table	Table	Table
26	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
20	1C	1C	1C	1C	1D
	Table	Table	Table	Table	Table
27	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
21	1C	1C	1C	1C	1D
	Table	Table	Table	Table	Table
28	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
20	1C	1C	1C	1C	1D
	Table	Table	Table	Table	Table
31	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
31	1D	1D	1D	1D	1D
	וטו	וט	וט	וט	וט
	Table	Table	Table	Table	Table
22	6.6.3.2.3-1	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
33	0.0.3.2.3-1			1C	1D
	Table	1A Table	1B Table	Table	Table
34	6.6.3.2.3-1	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
34	0.0.3.2.3-1	1A	1B	1C	1D
35		IA	ID	10	טו
36					
31	Table	Table	Table	Table	Table
38	Table 6.6.3.2.3-1	Table 6.6.3.2.3-	Table 6.6.3.2.3-	Table 6.6.3.2.3-	Table 6.6.3.2.3-
30	0.0.3.2.3-1	1A	1B	1C	1D
	Table	Table	Table	Table	Table
39	6.6.3.2.3-1	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
39	0.0.3.2.3-1	1A	1B	1C	1D
	Table	Table	Table	Table	Table
40	6.6.3.2.3-1	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
40	0.0.3.2.3-1	1A	1B	1C	1D
	Table	Table	Table	Table	Table
41	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
41	1B	1B	1B	1C	1D
42	Table	Table	Table	Table 6.6.3.2.3-	Table 6.6.3.2.3-
44	6.6.3.2.3- 1B	6.6.3.2.3- 1B	6.6.3.2.3- 1B	1C	1D
	Table	Table	Table	Table	Table
43	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
43	0.0.3.2.3- 1B	0.6.3.2.3- 1B	1B	1C	1D
		Table	Table		
44	Table			Table	Table
44	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-
	1C	1C	1C	1C	1D

NOTE: The frequency range applicable with network signalled values of NS\_05, NS\_08, NS\_09, NS\_15 and NS\_16 are covered in 6.6.3.3 Additional Spurious Emissions.

NOTE 3: The restriction on the maximum uplink transmission to 54 RB in Notes 14 and 15 of Table 6.6.3.2.5-1 is intended for conformance testing and may be applied to network operation to facilitate coexistence when the aggressor and victim bands are deployed in the same geographical area. The applicable spurious emission requirement of -15.5 dBm/5MHz is a least restrictive technical condition for FDD/TDD coexistence and may have to be revised in the future.

## 6.6.3.2\_1 Void

## 6.6.3.2A Spurious emission band UE co-existence for CA

# 6.6.3.2A.1 Spurious emission band UE co-existence for CA (intra-band contiguous DL CA and UL CA)

## 6.6.3.2A.1.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to co-existing systems for the specified bands which has specific requirements in terms of transmitter spurious emissions for intra-band contiguous DL CA and UL CA.

## 6.6.3.2A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

## 6.6.3.2A.1.3 Minimum conformance requirements

This clause specifies the requirements for the specified carrier aggregation configurations for coexistence with protected bands

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 6.6.3.2A.1.3-1: Spurious emission band UE co-existence for CA (intra-band contiguous DL CA and UL CA) limits

E-UTRA	Spurious emission						
CA Configur ation	Protected band	Frequency range (MHz)			Maximu m Level (dBm)	MBW (MHz)	Note
CA_1C	E-UTRA Band 1, 3, 7, 8, 9, 11, 18, 19, 20, 21, 22, 38, 40, 41, 42, 43	$F_{DL\_low}$	1	$F_{DL\_high}$	-50	1	
	E-UTRA band 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	4, 6, 7
	Frequency range	1900	-	1915	-15.5	5	6, 10, 12
	Frequency range	1915	-	1920	+1.6	5	6, 7, 10, 12
	Frequency range	1880		1895	-40	1	7,10
	Frequency range	1895		1915	-15.5	5	7,10
	Frequency range	1884.5	-	1915.7	-41	0.3	4, 5
CA_7C	E-UTRA Band 1, 3, 7, 8, 20, 22, 33, 34, 42, 43	F <sub>DL_low</sub>	_	F <sub>DL_high</sub>	-50	1	
	Frequency range	2570	-	2575	+1.6	5	12
	Frequency range	2575	-	2595	-15.5	5	8, 12
	Frequency range	2595	-	2620	-40	1	8
CA_38C	E-UTRA Band 1,3, 8, 20, 22, 33, 34, 42, 43	$F_{DL\_low}$	1	$F_{DL\_high}$	-50	1	
	Frequency range	2620	-	2645	-15.5	5	9, 10, 11, 12
	Frequency range	2645	-	2690	-40	1	9, 10,11
CA_40C	E-UTRA Band 1, 3, 33, 34, 39, 41, 42, 43	$F_{DL\_low}$	-	$F_{DL\_high}$	-50	1	
CA_41C	E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 12, 13, 14, 17, 23, 24, 25, 26, 34, 39, 40, 42, 44	F <sub>DL_low</sub>	-	$F_DL\_high$	-50	1	

- NOTE 1: FDL low and FDL high refer to each E-UTRA frequency band specified in Table 5.2-1
- NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1.3-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2nd or 3rd harmonic spurious emissions. An exception is allowed if there is at least one individual RE within the transmission bandwidth (see Figure 5.4.2-1) for which the 2nd or 3rd harmonic, i.e. the frequency equal to two or three times the frequency of that RE, is within the measurement bandwidth (MBW).
- NOTE 3: To meet these requirements some restriction will be needed for either the operating band or protected band
- NOTE 4: Applicable when CA\_NS\_01 in section 6.6.3.3A.1.3.1 is signalled by the network.
- NOTE 5: Applicable when co-existence with PHS system operating in 1884.5 -1915.7MHz.
- NOTE 6: Applicable when CA\_NS\_02 in section 6.6.3.3A.1.3.2 is signalled by the network.
- NOTE 7: Applicable when CA\_NS\_03 in section 6.6.3.3A.1.3.3 is signalled by the network.
- NOTE 8: Applicable when CA\_NS\_06 in section 6.6.3.3A.1.3.5 is signalled by the network. NOTE 9: Applicable when CA\_NS\_05 in section 6.6.3.3A.1.3.4 is signalled by the network.
- NOTE 10: The requirement also applies for the frequency ranges that are less than F<sub>OOB</sub> (MHz) in Table 6.6.3.1.3-1 and Table 6.6.3.1A.1.3-1 from the edge of the channel bandwidth.
- NOTE 11: This requirement is applicable for carriers with bandwidths confined in 2570-2615 MHz. For assigned carriers with bandwidths overlapping the frequency range 2615-2620 MHz the requirements apply with the maximum output power configured to +20 dBm in the IE P-Max.
- NOTE 12: For these adjacent bands, the emission limit could imply risk of hamful interference to UE(s) operating in the protected operating band.

The normative reference for this requirement is TS 36.101 [2] subclause 6.6.3.2A.

6.6.3.2A.1.4 Test description

6.6.3.2A.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in Table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 6.6.3.2A.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3.2A.1.4.1-1: Test Configuration Table

llocations		
S_1@74		
S_75@0		
S_1@49		
S_50@0		
S_1@99		
S_100@0		
S S S		

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure group A.33 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1 and Annex C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.3.2A. 1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3.2A.1.4.3.

#### 6.6.3.2A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.6.3.2A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.3.2A.1.4.1-1 on both PCC and SCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 5. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 6. Measure the power of the transmitted signal with a measurement filter of bandwidths according to Table 6.6.3.2A.1.5-1. The centre frequency of the filter shall be stepped in contiguous steps according to Table 6.6.3.2A.1.5-1. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

## 6.6.3.2A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause subclause 4.6 with the following exceptions:

Table 6.6.3.2A.1.4.3-1: SystemInformationBlockType1 with Note 11 in table 6.6.3.2A.1.3-1

Derivation Path: TS 36.508 [7] clause 4.4.3.2, Table 4.4.3.2-3 SystemInformationBlockType1				
Information Element Value/remark Comment Condition				
p-Max	20			

#### 6.6.3.2A.1.5 Test requirement

The measured average power of spurious emission, derived in step 6, shall not exceed the described value in Tables 6.6.3.2A.1.5-1.

Table 6.6.3.2A.1.5-1: Spurious emission band UE co-existence for CA (intra-band contiguous DL CA and UL CA) limits

E-UTRA	Spurious emission						
CA Configur ation	Protected band	Frequency range (MHz)		Maximu m Level (dBm)	MBW (MHz)	Note	
CA_1C	E-UTRA Band 1, 3, 7, 8, 9, 11, 18, 19, 20, 21, 22, 38, 40, 41, 42, 43	$F_{DL\_low}$	1	$F_{DL\_high}$	-50	1	
	E-UTRA band 34	$F_{DL\_low}$		F <sub>DL_high</sub>	-50	1	4, 6, 7
	Frequency range	1900	-	1915	-15.5	5	6, 10, 12
	Frequency range	1915	-	1920	+1.6	5	6, 7, 10, 12
	Frequency range	1880		1895	-40	1	7,10
	Frequency range	1895		1915	-15.5	5	7,10
	Frequency range	1884.5	-	1915.7	-41	0.3	4, 5
CA_7C	E-UTRA Band 1, 3, 7, 8, 20, 22, 33, 34, 42, 43	F <sub>DL_low</sub>	-	$F_{DL\_high}$	-50	1	
	Frequency range	2570	-	2575	+1.6	5	12
	Frequency range	2575	-	2595	-15.5	5	8, 12
	Frequency range	2595	-	2620	-40	1	8
CA_38C	E-UTRA Band 1,3, 8, 20, 22, 33, 34, 42, 43	$F_{DL\_low}$	1	$F_{DL\_high}$	-50	1	
	Frequency range	2620	-	2645	-15.5	5	9, 10, 11, 12
	Frequency range	2645	-	2690	-40	1	9, 10,11
CA_40C	E-UTRA Band 1, 3, 33, 34, 39, 41, 42, 43	$F_{DLLlow}$		$F_{DL\_high}$	-50	1	
CA_41C	E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 12, 13, 14, 17, 23, 24, 25, 26, 34, 39, 40, 42, 44	$F_{DL\_low}$	-	$F_DL\_high$	-50	1	

- NOTE 1: FDL\_low and FDL\_high refer to each E-UTRA frequency band specified in Table 5.2-1
- NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1.3-2 are permitted for each assigned E-UTRA carrier used in the measurement due to 2nd or 3rd harmonic spurious emissions. An exception is allowed if there is at least one individual RE within the transmission bandwidth (see Figure 5.4.2-1) for which the 2nd or 3rd harmonic, i.e. the frequency equal to two or three times the frequency of that RE, is within the measurement bandwidth (MBW).
- NOTE 3: To meet these requirements some restriction will be needed for either the operating band or protected band
- NOTE 4: Applicable when CA\_NS\_01 in section 6.6.3.3A.1.3.1 is signalled by the network.
- NOTE 5: Applicable when co-existence with PHS system operating in 1884.5 -1915.7MHz.
- NOTE 6: Applicable when CA\_NS\_02 in section 6.6.3.3A.1.3.2 is signalled by the network.
- NOTE 7: Applicable when CA NS 03 in section 6.6.3.3A.1.3.3 is signalled by the network.
- NOTE 8: Applicable when CA\_NS\_06 in section 6.6.3.3A.1.3.5 is signalled by the network.
- NOTE 9: Applicable when CA\_NS\_05 in section 6.6.3.3A.1.3.4 is signalled by the network.
- NOTE 10: The requirement also applies for the frequency ranges that are less than F<sub>OOB</sub> (MHz) in Table 6.6.3.1.3-1 and Table 6.6.3.1A.1.3-1 from the edge of the channel bandwidth.
- NOTE 11: This requirement is applicable for carriers with bandwidths confined in 2570-2615 MHz. For assigned carriers with bandwidths overlapping the frequency range 2615-2620 MHz the requirements apply with the maximum output power configured to +20 dBm in the IE P-Max.
- NOTE 12: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.

NOTE: The frequency range applicable with network signalled values of CA\_NS\_01, CA\_NS\_02, and CA\_NS\_03 are covered in 6.6.3.3A Additional spurious emissions for CA.

## 6.6.3.3 Additional spurious emissions

## 6.6.3.3.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions under the deployment scenarios where additional requirements are specified.

## 6.6.3.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 8 and forward.

## 6.6.3.3.3 Minimum conformance requirements

## 6.6.3.3.3.1 Minimum conformance requirements (network signalled value "NS\_05")

When "NS\_05" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.3.1-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.1-1: Additional requirements (PHS)

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)		Measurement bandwidth		
	5 MHz	10 MHz	15 MHz	20 MHz	
1884.5 ≤ f ≤1915.7 <sup>*1</sup>	-41	-41	-41	-41	300 KHz

Note 1: Applicable when the lower edge of the assigned E-UTRAUL channel bandwidth frequency is larger than or equal to the upper edge of PHS band (1915.7 MHz) + 4 MHz + the Channel BW assigned, where Channel BW is as defined in sub-dause 5.4.2. Additional restrictions apply for operations below this point.

The requirements in Table 6.6.3.3.3.1-1 apply with the additional restrictions specified in Table 6.6.3.3.3.1-2 when the lower edge of the assigned E-UTRA UL channel bandwidth frequency is less than the upper edge of PHS band (1915.7 MHz) + 4 MHz + the channel BW assigned.

Table 6.6.3.3.3.1-2: RB restrictions for additional requirement (PHS)

15 MHz channel bandwidth with f <sub>c</sub> = 1932.5 MHz						
RB <sub>start</sub>	0-7	8-66	67-74			
L <sub>CRB</sub>	N/A	$\leq$ MIN(30, 67 – RB <sub>start</sub> )	N/A			
	20 MHz channel bandwidth with f c = 1930 MHz					
RB <sub>start</sub>	0-23	24-75	76-99			
L <sub>CRB</sub>	N/A	$\leq$ MIN(24, 76 – RB <sub>start</sub> )	N/A			

NOTE 1: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (300 kHz).

The normative reference for this requirement is TS 36.101[2] subclause 6.6.3.3.1.

#### 6.6.3.3.3.2 Minimum conformance requirements (network signalled value "NS 07")

When "NS\_07" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.3.2-1. These requirements also apply for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.2-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)	Measurement bandwidth	
	10 MHz		
769 ≤ f ≤ 775	-57	6.25 kHz	
Note: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB.			

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (6.25 kHz).

The normative reference for this requirement is TS 36.101[2] subclause 6.6.3.3.2.

#### 6.6.3.3.3.3 Minimum requirement (network signalled value "NS\_08")

When "NS\_08" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.3-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3-1: Additional requirement

Frequency band	Channel band	Measurement bandwidth		
(MHz)	5MHz	10MHz	15MHz	
860 ≤ f ≤ 895	-40	-40	-40	1 MHz

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (1 MHz).

## 6.6.3.3.3.4 Minimum requirement (network signalled value "NS\_09")

When "NS 09" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.3.4-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.4-1: Additional requirement

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)			Measurement bandwidth
	5MHz	10MHz	15MHz	
1475.9 ≤ f ≤ 1510.9	-35	-35	-35	1 MHz

NOTE 1: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (1 MHz).

NOTE 2: To improve measurement accuracy, A-MPR values for NS\_09 specified in Table 6.2.4.3-1 in sub-clause 6.2.4 are derived based on both the above NOTE 1 and 100 kHz RBW.

## 6.6.3.3.3.5 Minimum requirement (network signalled value "NS\_12")

When "NS 12" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.5-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.5-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)  1.4, 3, 5 MHz	Measurement bandwidth	Note
806 ≤ f ≤ 813.5	-42	6.25 kHz	1
NOTE 1: The emission limit appl carriers	ies at an offset of 0.7 MHz be	low any block of E	-UTRA

#### 6.6.3.3.3.6 Minimum requirement (network signalled value "NS\_13")

When "NS 13" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.6-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.6-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5 MHz	Measurement bandwidth	Note
806 ≤ f ≤ 816	-42	6.25 kHz	1
NOTE 1: The emission limit app carriers	lies at an offset of 3 MHz belo	w any block of E-L	JTRA

## 6.6.3.3.3.7 Minimum requirement (network signalled value "NS\_14")

When "NS 14" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.7-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.7-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)	Measurement bandwidth	Note
(141112)	10, 15 MHz		
806 ≤ f ≤ 816	-42	6.25 kHz	1
NOTE 1: The emi	ssion limit applies at an offset of 8 MH	z below any block of E-	·UTRA
carriers	3		

## 6.6.3.3.3.8 Minimum requirement (network signalled value "NS\_15")

When "NS 15" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.8-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.8-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 1.4, 3, 5, 10, 15 MHz	Measurement bandwidth	Note			
851 ≤ f ≤ 859	-53	6.25 kHz	1			
852 ≤ f ≤ 859	-32	1 MHz	1			
NOTE 1: The emissions measurement shall be sufficiently power averaged to ensure						

6.6.3.3.3.9 Minimum requirement (network signalled value "NS\_16")

standard deviation < 0.5 dB.

When "NS\_16" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.9-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.9-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 1.4, 3, 5, 10 MHz	Measurement bandwidth	Note
790 ≤ f ≤ 803	-32	1 MHz	

6.6.3.3.3.10 Minimum requirement (network signalled value "NS\_17")

When "NS\_17" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.3.10-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.3.3.10-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.10-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5, 10 MHz	Measurement bandwidth	Note			
470 ≤ f ≤ 710	-26.2	6 MHz	1			
NOTE 1: Applicable when the assigned E-UTRA carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz.						

6.6.3.3.3.11 Minimum requirement (network signalled value "NS\_18")

When "NS\_18" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.3.11-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.3.3.11-1 from the edge of the channel bandwidth.

Table 6.6.3.3.3.11-1: Additional requirements

	Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5, 10, 15, 20 MHz	Measurement bandwidth	Note
Ī	692-698	-26.2	6 MHz	

## 6.6.3.3.4 Test description

## 6.6.3.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in tables 6.6.3.3.4.1-1 through table, 6.6.3.3.4.1-8. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3.3.4.1-1: Test Configuration Table (network signalled value "NS\_05")

		ln.	itial Condition	NC		
Test Environment as specified in		Nomal	15			
TS 36.508[7] subclause 4.1						
	encies as specific 7] subclause 4.3.		Low range, M	lid range		
1000.000 [	7 ] Subclause 4.5.		In case of Lo	w range.		
					dwidth: 1927.2	MHz (Nur =
			18072)			(- (- 102
			- For 10MH	Iz Channel Ba	ndwidth: 1934.7	7MHz (N∪L =
			18147)			
				tz Channel Ba	ndwidth: 1932.	$5MHz(N_{UL} =$
			18125)	Jz Channal Ba	ndwidth: 1930N	/∐ - /N
			18100)	iz Channei ba	nawiatii. 1930N	/II 12 (1 <b>1</b> UL =
Test Chann	nel Bandwidths as	s specified in		z, 15MHz, 20 N	1Hz	
TS 36.508	[7] subdause 4.3		no for Channa	l Bandwidths		
		link Configur			nk Configurat	ion
Ch BW	Mod'n		ocation	Mod'n	RB allo	
OH DVV	IVIOUTI	FDD	TDD	IVIOUTI	FDD	TDD
5MHz	N/A for Add	itional Spurious		QPSK	1	N/A
5MHz		testing		QPSK	25	
10MHz		. 3		QPSK	1	
10MHz	7			QPSK	12	
10MHz				QPSK	48	
10MHz				QPSK	50	
10MHz				16QAM	50 (Nata 2)	
15MHz				QPSK	(Note 3)	
15MHz	-			QPSK	16	
15MHz				QPSK	30	
					(Note 4)	
15MHz				QPSK	48 (Note 5)	
15MHz	_			QPSK	75	
				α. σ. τ	(Note 5)	
15MHz				16QAM	75	
					(Note 3, 5)	
20MHz				QPSK	1	
20MHz				QPSK	18	
20MHz				QPSK	24 (Note 4)	
201/14-	_			OBSIA	(Note 4) 48	
20MHz				QPSK	48 (Note 5)	
20MHz	$\dashv$			QPSK	100	
_012				2. 5.1	(Note 5)	
20MHz	7			16QAM	100	
					(Note 3, 5)	
Note 1: The 1 RB allocation shall be tested at both RB #0 and RB #max except for 15MHz and						
	20MHz of Low Ra For 15MHz of Lov		RR allocation	shall he tested	l at hoth RR#9	and RR#66
	For 20MHz of Lov					
	RB#75.		==			
Note 2: The RB <sub>start</sub> of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel bandwidth except for 15MHz and 20MHz of Low Range.						
Т	tne cnanner band For 15MHz of Lov	•			-	ation)
		w nange, life f	Start Stidil De l	ND#O AND KD#	JOILE D'A LO	auuii).
F		-	D chall had	DB#34 and DB	# /76 - DD alla	cation)
F F	For 20MHz of Lov	w Range, the F		RB#24 and RB	s# (76 - RB allo	cation).
Note 3:		w Range, the F E-Categories		RB#24 and RB	s# (76 - RB allo	cation).

Table 6.6.3.3.4.1-2: Test Configuration Table (network signalled value "NS\_07")

Initial Conditions						
Test Environment			NC			
	d in TS 36.508	8 [7] subclaus	e 4.1)	140		
Test Freque				Mid range		
	d in TS36.508		e 4.3.1)			
	el Bandwidths		4.0.4)	10MHz		
(as specifie	d in TS 36.508			<u> </u>		
	T		ameters for Chann			
	01.511		Configuration		plink Configurati	
Test	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	RB <sub>start</sub>
Number	40041	N1/0 C 0 1	1565	ODOL		•
1	10MHz		ditional Spurious	QPSK	1	0
2	10MHz	Emiss	sions testing.	QPSK	8	0
3	10MHz			QPSK	6	13
4	10MHz			QPSK	20	13
5	10MHz			QPSK	12	13
6	10MHz			16QAM	36	13
_					(Note 1)	
7	10MHz			QPSK	16	19
8	10MHz			QPSK	12	19
9	10MHz			16QAM	16	19
10	10MHz			QPSK	30	19
11	10MHz			16QAM	30	19
					(Note 1)	
12	10MHz			QPSK	6	43
13	10MHz			QPSK	2	48
14	10MHz			QPSK	50	0
15	10MHz			QPSK	12	0
16	10MHz			16QAM	50	0
					(Note 1)	
Note 1: A	Note 1: Applies only for UE-Categories ≥2.					

Table 6.6.3.3.4.1-3: Test Configuration Table (network signalled value "NS\_08")

Initial Conditions						
Test Environment as specified in		Nomal				
	08[7] subclau					
	uencies as spe			High ı	range	
	8 [7] subclaus					
	Bandwidths as			5MHz, 10MI	Hz, 15MHz	
TS 36.50	8 [7] subclaus					
				el Bandwidths		
	Down	link Configura	ation		nk Configurat	ion
Ch BW	Mod'n	RB allo		Mod'n	RB allo	cation
		FDD	TDD		FDD	TDD
5MHz	N/A for Addi	tional Spurious	s Emissions	QPSK	1	N/A
5MHz		testing		QPSK	8	
5MHz				QPSK	25	
10MHz				QPSK	1	
10MHz				QPSK	12	
10MHz				QPSK	40	
10MHz				QPSK	50	
10MHz				16QAM	50	
					(Note 3)	
15MHz				QPSK	1	
15MHz				QPSK	16	
15MHz				QPSK	40	
15MHz				QPSK	75	
15MHz				16QAM	75	
					(Note 3)	
				8 #0 and RB #m		
	RB <sub>start</sub> of part		on shall be RB	#0 and RB# (m	ıax+1 - RB all	ocation) of

the channel bandwidth

Applies only for UE-Categories ≥2.

Table 6.6.3.3.4.1-4: Test Configuration Table (network signalled value "NS\_09")

TS 36.5	ronment as sp 508[7] subclau			Non	1	
				NOII	nai	
Test Fred						
	quencies as sp			High r	ange	
	8 [7] subclaus					
	Bandwidths a			5MHz, 10M	∃z, 15MHz	
TS 36.50	)8 [7] subclau					
				I Bandwidths		
	Dowr	nlink Configur	ation	•	nk Configurat	
Ch BW	Mod'n	RB allo		Mod'n	RB allo	cation
		FDD	TDD		FDD	TDD
5MHz	N/A for Add	itional Spurious	s Emissions	QPSK	1	N/A
5MHz		testing		QPSK	8	
5MHz				QPSK	25	
10MHz				QPSK	1	
10MHz				QPSK	12	
10MHz				QPSK	40	
10MHz				QPSK	50	
10MHz				16QAM	50	
					(Note 3)	
15MHz				QPSK	1	
15MHz				QPSK	16	
15MHz				QPSK	40	
15MHz				QPSK	54	
15MHz				QPSK	75	
15MHz				16QAM	75	
					(Note 3)	
Note 2: Th	e RB <sub>start</sub> of part channel band	tial RB allocation	on shall be RB	8 #0 and RB #m #0 and RB# (m		ocation) of

Table 6.6.3.3.4.1-5: Test Configuration Table (network signalled value "NS\_12")

Initial Conditions					
Test Environment					
(as specified in TS 36.508 [7] subclause 4.1)		NC			
Test Frequencies					
(as specified in TS36.508 [7]	subclause 4.3.1)	Mid range			
Test Channel Bandwidths					
(as specified in TS 36.508 [7]	subclause 4.3.1)	1.4 MHz, 3 MHz and 5 MHz			
Test Parameters for Channel Bandwidths					
	Downlink Configuration	Uplink Configuration			

Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RBstart FDD
1	1.4 MHz		onal Spurious	QPSK	1	0
2	1.4 MH z	Emission	ns testing	QPSK	6	0
3	1.4 MHz			QPSK	1	1
4	1.4 MH z			QPSK	5	1
5	1.4 MHz			16QAM	6	0
6	3 MHz			QPSK	4	0
7	3 MHz			QPSK	10	0
8	3 MHz			QPSK	4	4
9	3 MHz			QPSK	10	4
10	3 MHz			16QAM	15	0
11	5 MHz			QPSK	8	0
12	5 MHz			QPSK	15	0
13	5 MHz			QPSK	8	7
14	5 MHz			QPSK	15	7
15	5 MHz			16QAM	25	0

Table 6.6.3.3.4.1-6: Test Configuration Table (network signalled value "NS\_13")

Initial Conditions						
Test Environm	ent					
(as specified in	n TS 36.508 [7]	subclause 4.1	)	NC		
Test Frequenc	cies					
(as specified in	n TS36.508 [7]	subclause 4.3.	1)	Mid range		
Test Channel	Bandwidths					
(as specified in	n TS 36.508 [7]	subclause 4.3	.1)	5 MHz		
Test Parameters for Channel Bandwidths						
		Downlink C	onfiguration	Uplink Configuration		
Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RBstart FDD
1	5 MHz		onal Spurious	QPSK	1	0
2	5 MHz	Emissions testing		QPSK	25	0
3	5 MHz			QPSK	15	0
4	5 MHz			QPSK	15	7
5	5 MHz			16QAM	25	0

Table 6.6.3.3.4.1-7: Test Configuration Table (network signalled value "NS\_14")

Initial Conditions					
Test Environment					
(as specified in TS 36.508 [7] subclause 4.1)		NC			
Test Frequencies					
(as specified in TS36.508 [7]	subclause 4.3.1)	Mid range			
Test Channel Bandwidths					
(as specified in TS 36.508 [7]	subclause 4.3.1)	10 MHz, 15 MHz			
Test Parameters for Channel Bandwidths					
	Downlink Configuration	Uplink Configuration			

Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RBstart FDD
1	10 MHz		onal Spurious	QPSK	1	0
2	10 MHz	Emission	ns testing	QPSK	25	0
3	10 MHz			QPSK	50	0
4	10 MHz			QPSK	25	1
5 (Note 1)	10 MHz			16QAM	50	0
6	15 MHz			QPSK	8	0
7	15 MHz			QPSK	25	0
8	15 MHz			QPSK	75	0
9	15 MHz			QPSK	50	15
10 (Note 1)	15 MHz			16QAM	75	0
Note 1: Applie	s only for UE-C	ategories ≥2.				

Table 6.6.3.3.4.1-8: Test Configuration Table (network signalled value "NS\_15")

Test Environment (as specified in TS 36.508 [7] subclause 4.1)	
(as specified in 15 36.508 [/] subclause 4.1)	
NC For 4 4 Miles Observed	Danish dalah dalah
Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1) For 1.4 MHz Channel range	Bandwidth: High
For 3 MHz Channel Ba MHz (N <sub>UL</sub> = 26985) or	
For 5 MHz Channel Ba MHz (N <sub>UL</sub> = 26975) or	
For 10 MHz Channel E (NUL = 26950) or High	
For 15 MHz Channel E MHz (NUL = 26925) o	
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	
1.4 MHz, 3 MHz, 5 MH	
Test Parameters for Channel Bandwidths	12, 10 MHZ, 13 MHZ
Downlink Configuration Uplink Conf	iguration
ID allocation alloc	RB RBstart cation FDD DD
1 (note 3) 1.4 MHz QPSK	4 0
	6 0
	6 7
	12 1
	15 0
6 (note 2) 3 MHz QPSK	15 0
7 (note 3) 5 MHz QPSK	6 14
8 (note 3) 5 MHz QPSK 2	20 0
9 (note 3) 5 MHz N/A for A-MPR testing. 16QAM 2	25 0
10 (note 2) 5 MHz QPSK	16 9
11 (note 2) 5 MHz QPSK 2	25 0
12 (note 3) 10 MHz QPSK	1 39
13 (note 3) 10 MHz QPSK	1 10
14 (note 3) 10 MHz QPSK	3 0
15 (note 3) 10 MHz QPSK 2	20 3
16 (note 3) 10 MHz QPSK 3	36 1
17 (note 3) 10 MHz QPSK 9	50 0
18 (note 3) 10 MHz 16QAM	50 0
19 (note 2) 10 MHz QPSK 2	20 25
	45 0
21 (note 3) 15 MHz QPSK	18 36
22 (note 3) 15 MHz QPSK 2	25 1
	54 0
23 (note 3) 15 MHz QPSK 9	·   ·

25 (note 2)	15 MHz		QPSK	18	44
26 (note 2)	15 MHz		QPSK	60	2
Note 1: Applies	only for UE-0	Categories ≥2.			

Note 2: Applicable only test frequency < high range
Note 3: Applicable only to high range frequency testing

Table 6.6.3.3.4.1-9: Test Configuration Table (network signalled value "NS\_16")

		In	itial Condition	S		
Test Environme (as specified in		subclause 4.1)		NC		
Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1)			For 1.4 MHz Channel Bandwidth: Low			
(as specified in 1336.506 [7] subclause 4.3.1)			range			
					annel Bandwid Hz (N∪L= 27070	
					annel Bandwid Hz (N∪L= 27080 ′115)	
					channel Bandwi MHz (N <sub>UL</sub> = 271	
Test Channel Ba (as specified in		subclause 4.3.	1)	1.4 MHz, 3 MI	Hz, 5 MHz, 10	MHz
	,	Test Paramete	ers for Channe	Bandwidths		
			onfiguration	_	ink Configurat	
Configuration ID	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RBstart FDD
1	1.4 MHz	N/A for Addition	onal Spurious as testing.	QPSK	1	0
2	1.4 MHz			QPSK	6	0
3 (Note 1)	1.4 MHz			16QAM	6	0
4	3 MHz			QPSK	1	0
5	3 MHz	-		QPSK	12	1
6	3 MHz			QPSK	15	0
7 (Note 1)	3 MHz	-		16QAM	15	0
8	5 MHz	-		QPSK	1	0
9	5 MHz			QPSK	12	2
10	5 MHz			QPSK	18	2
11	5 MHz	1		QPSK	20	0
12	5 MHz	-		QPSK	20	2
13	5 MHz	-		QPSK	25	0
14 (Note 1)	5 MHz			16QAM	25	0
15	10 MHz			QPSK	1	0
16 (Note 2)	10 MHz			QPSK	1	10

12

50 50

(Note 3)

**QPSK** 

**QPSK** 

16QAM

17 (Note 2)	10 MHz	QPSK	20	0
18 (Note 2)	10 MHz	QPSK	27	15
19 (Note 2)	10 MHz	QPSK	32	15
20	10 MHz	QPSK	32	0
21	10 MHz	QPSK	50	0
22 (Note 1)	10 MHz	16QAM	50	0
23 (Note 3)	10 MHz	QPSK	40	0
24 (Note 3)	10 MHz	QPSK	40	1

Note 1: Applies only for UE-Categories ≥2.

Note 2: Applies only for 10 MHz channel for Low Range, and 813.5 MHz

Note 3: Applies only for 10 MHz channel for 817 MHz range

Table 6.6.3.3.4.1-10: Test Configuration Table (network signalled value "NS\_17")

		Initial C	conditions			
Test Environment (as specified in TS 3	36.508[7] subcla	ause 4.1)		Nomal		
Test Frequencies (as specified inTS36	6.508 [7] subda	use 4.3.1)		Low range		
Test Channel Band (as specified in TS 3		ause 4.3.1)		5MHz, 10MHz		
		Test Parameters for	r Channel Bandwidt	hs		
		Downlink C	onfiguration	Uplink Configuration		
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD	
1	5MHz		1	QPSK	1	
2	5MHz			QPSK	8	
3	5MHz	]		QPSK	25	
4	5MHz	N/A for Additional	Spurious Emissions	16QAM	25 (Note 3)	
5	10MHz		ting	QPSK	1	

Note 1: The 1 RB allocation shall be tested at both RB #0 and RB #max.

Note 2: The RBstart of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories ≥2.

10MHz

10MHz

10MHz

6

7

8

Table 6.6.3.3.4.1-11: Test Configuration Table (network signalled value "NS\_18")

I	Initial Conditions

Test Environment (as specified in TS 36.508[7] subclause 4.1)	Nomal
Test Frequencies (as specified inTS36.508 [7] subdause 4.3.1)	Low range
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	5MHz, 10MHz, 15MHz, 20MHz

#### **Test Parameters for Channel Bandwidths**

		Downlink C	Configuration	Uplink Co	nfiguration
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	5MHz			QPSK	1
2	5MHz			QPSK	8
3	5MHz			QPSK	25
4	5MHz			16QAM	25 (Note 3)
5	10MHz			QPSK	1
6	10MHz			QPSK	12
7	10MHz		N/A for Additional Spurious Emissions testing		50
8	10MHz				50 (Note 3)
9	15MHz		Sung	QPSK	1
10	15MHz			QPSK	16
11	15MHz			QPSK	75
12	15MHz				75 (Note 3)
13	20MHz			QPSK	1
14	20MHz	]			18
15	20MHz				100
16	20MHz			16QAM	100 (Note 3)

Note 1: The 1 RB allocation shall be tested at both RB #0 and RB #max.

Note 2: The RBstart of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories ≥2.

Editor's note: The following lines belong at the end of section 6.2.4.4.1. As new tables are added to this section, these lines should always follow the tables.

- 1. Connect the SS to the UE to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.7.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.3.3.4.1-1, Table 6.6.3.3.4.1-2 or Table 6.6.3.3.4.1-3 depending on network signal value.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3.3.4.3.

#### 6.6.3.3.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.3.3.4.1-1 and Table 6.6.3.3.4.1-2. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in Tables 6.2.4.5-1to 6.2.4.5-9 as appropriate. The period of the measurement shall be at least one sub-frame (1ms).
- 4. Measure the power of the transmitted signal with a measurement filter of bandwidths according to Table 6.6.3.3.5.1-1, 6.6.3.3.5.2-1, 6.6.3.3.5.3-1, 6.6.3.3.5.3-1, 6.6.3.3.5.5-1, 6.6.3.3.5.6-1, 6.6.3.3.5.7-1, 6.6.3.3.5.8-1, 6.6.3.3.5.9-1, 6.6.3.3.5.10-1 and 6.6.3.3.5.11-1 as appropriate. The centre frequency of the filter shall be stepped in contiguous steps according to the same table. For NS\_07 measurements made in a bandwidth of 6.25kHz, measurement parameter settings defined in table 6.6.3.3.4.2-1 shall be used. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

Table 6.6.3.3.4.2-1: Measurement setup for NS\_07

	Option 1: Measurement with No RMS VBW available	Option2 Measurement with VBW Filtering on Power scale
VBW	>=62.5 kHz (10 times or more the RBW)	<=43Hz
RBW	<=6.25kHz	<=6.25kHz
Detector type	A verages signal envelope during each measurement point, such as "RMS detector"	Peak
Averaging mode (Trace averaging)	Power (RMS voltage)	Power (RMS voltage), as controlled by "Average Type"
Average Type (applies to detector)	Power (RMS voltage) (automatically occurs with "RMS detector")	Not applicable
Average Type (applies to VBW filter)	Not applicable	Power (RMS voltage)
Number of averages	30, to reduce variance as required, or use an even longer sweep time	1 or use an even narrower VBW filter, thus a longer sweep time
Sweep time	[Don't specify]	Sweep rate (span divided by sweep time) <= 0.8 * RBW*VBW

#### 6.6.3.3.4.3 Message contents

6.6.3.3.4.3.1 Message contents (network signalled value "NS 05")

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions:

1. Information element additionalSpectrumEmission is set to NS\_05. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.3.3.4.3.1-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element	Value/remark	Comment	Condition		
additionalSpectrumEmission	5 (NS_05)				

## 6.6.3.3.4.3.2 Message contents (network signalled value "NS\_07")

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions:

1. Information element additionalSpectrumEmission is set to NS\_07. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3.4.3.2-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additionalSpectrumEmission	7 (NS_07)				

## 6.6.3.3.4.3.3 Message contents (network signalled value "NS\_08")

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions:

1. Information element additionalSpectrumEmission is set to NS\_08. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3.4.3.3-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additionalSpectrumEmission	8 (NS_08)				

## 6.6.3.3.4.3.4 Message contents (network signalled value "NS\_09")

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions:

1. Information element additionalSpectrumEmission is set to NS\_09. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3.4.3.4-1: SystemInformationBlockType2 :Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additionalSpectrumEmission	9 (NS_09)				

## 6.6.3.3.4.3.5 Message contents exceptions (network signalled value "NS\_12")

1. Information element additionalSpectrumEmission is set to NS\_12. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3.4.3.5-1: SystemInformationBlockType2 :Additional spurious emissions test requirement for "NS 12"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additionalSpectrumEmission	12 (NS_12)				

## 6.6.3.3.4.3.6 Message contents exceptions (network signalled value "NS\_13")

1. Information element additionalSpectrumEmission is set to NS\_13. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3.4.3.6-1: SystemInformationBlockType2 :Additional spurious emissions test requirement for "NS 13"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additionalSpectrumEmission	13 (NS_13)				

#### 6.6.3.3.4.3.7 Message contents exceptions (network signalled value "NS\_14")

1. Information element additionalSpectrumEmission is set to NS\_14. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3.4.3.7-1: SystemInformationBlockType2 :Additional spurious emissions test requirement for "NS 14"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additionalSpectrumEmission	14 (NS_14)				

#### 6.6.3.3.4.3.8 Message contents exceptions (network signalled value "NS 15")

1. Information element additionalSpectrumEmission is set to NS\_15. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3.4.3.8-1: SystemInformationBlockType2 :Additional spurious emissions test requirement for "NS 15"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element Value/remark Comment Condition				
additional Spectrum Emission	15 (NS_15)			

## 6.6.3.3.4.3.9 Message contents exceptions (network signalled value "NS\_16")

1. Information element additionalSpectrumEmission is set to NS\_16. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3.4.3.9-1: SystemInformationBlockType2 :Additional spurious emissions test requirement for "NS 16"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additional Spectrum Emission	16 (NS_16)				

6.6.3.3.4.3.10 Message contents exceptions (network signalled value "NS 17")

1. Information element additionalSpectrumEmission is set to NS\_17. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.6.3.3.4.3.10-1: SystemInformationBlockType2 : Additional spurious emissions test requirement for "NS 17"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additional Spectrum Emission	17 (NS_17)				

6.6.3.3.4.3.11 Message contents exceptions (network signalled value "NS\_18")

1. Information element additionalSpectrumEmission is set to NS\_18. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.6.3.3.4.3.11-1: SystemInformationBlockType2 : Additional spurious emissions test requirement for "NS\_18"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1					
Information Element Value/remark Comment Condition					
additional Spectrum Emission	18 (NS_18)				

## 6.6.3.3.5 Test requirement

6.6.3.3.5.1 Test requirement (network signalled value "NS\_05")

below this point.

When "NS\_05" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-4 as appropriate,

and

the measured average power of spurious emission, derived in step 2, shall not exceed the described value in Table 6.6.3.3.5.1-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.1-1: Additional requirements (PHS) test requirements

Frequency band (MHz)		Channel bandwidth / Spectrum emission limit (dBm)			Measurement bandwidth	
		5 MHz	10 MHz	15 MHz	20 MHz	
	$1884.5 \le f \le 1915.7^{*1}$	-41	-41	-41	-41	300 KHz
Note 1: Applicable when the lower edge of the assigned E-UTRAUL channel bandwidth frequency is larger than or equal to the upper edge of PHS band (1915.7 MHz) + 4 MHz + the Channel BW assigned, where Channel BW is as defined in sub-dause 5.4.2. Additional restrictions apply for operations				e upper edge of PHS band ed, where Channel BW is		

The requirements in Table 6.6.3.3.5.1-1 apply with the additional restrictions specified in Table 6.6.3.3.5.1-2 when the lower edge of the assigned E-UTRA UL channel bandwidth frequency is less than the upper edge of PHS band (1915.7 MHz) + 4 MHz + the channel BW assigned.

15 MHz channel bandwidth with fc = 1932.5 MHz						
RB <sub>start</sub> 0-7 8-66 67-74						
L <sub>CRB</sub>	N/A	$\leq$ MIN(30, 67 – RB <sub>start</sub> )	N/A			
20 MHz channel bandwidth with f <sub>c</sub> = 1930 MHz						
RB <sub>start</sub> 0-23 24-75 76-99						
L <sub>CRB</sub>	N/A	≤ MIN(24, 76 – RB <sub>start</sub> )	N/A			

NOTE 1: (only for testing requirements in Table 6.6.3.3.5.1-1): For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (300 kHz).

#### 6.6.3.3.5.2 Test requirement (network signalled value "NS\_07")

When "NS\_07" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-7 as appropriate,

and

the measured average power of spurious emission, derived in step 4, shall not exceed the described value in Table 6.6.3.3.5.2-1. These requirements also apply for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.2-1: Additional requirements (network signalled value "NS\_07")

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)	Measurement bandwidth		
	10 MHz			
769 ≤ f ≤ 775	-55.5	6.25 kHz		
Note: The emissions measurement shall be sufficiently power averaged to ensure a				
standard de	viation < 0.5 dB	-		

NOTE (only for testing requirements in Table 6.6.3.3.5.2-1): For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (6.25 kHz).

## 6.6.3.3.5.3 Test requirement (network signalled value "NS\_08")

When "NS\_08" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-8 as appropriate,

and

the measured average power of spurious emission, derived in step 4, shall not exceed the described value in Table 6.6.3.3.5.3-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.3-1: Additional requirements (network signalled value "NS\_08")

Frequency band (MHz)	Channel band	lwidth / Spectrum (dBm)	emission limit	Measurement bandwidth
	5MHz	10MHz	15MHz	

860 ≤ f ≤ 895	-40	-40	-40	1 MHz

NOTE (only for testing requirements in Table 6.6.3.3.5.3-1): For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (1 MHz).

## 6.6.3.3.5.4 Test requirement (network signalled value "NS 09")

When "NS\_09" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-9 as appropriate,

and

the measured average power of spurious emission, derived in step 4, shall not exceed the described value in table 6.6.3.3.5.4-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.4-1: Additional requirements (network signalled value "NS\_09")

Frequency band (MHz)	Channel ban	dwidth / Spectro limit (dBm)	um emission	Measurement bandwidth
	5MHz	10MHz	15MHz	
1475.9 ≤ f ≤ 1510.9	-35	-35	-35	1 MHz

NOTE 1 (only for testing requirements in Table 6.6.3.3.5.4-1): For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (1 MHz).

NOTE 2: To improve measurement accuracy, A-MPR values for NS\_09 specified in Table 6.2.4.3-1 in sub-clause 6.2.4 are derived based on both the above NOTE 1 and 100 kHz RBW.

#### 6.6.3.3.5.5 Test requirement (network signalled value "NS\_12")

When "NS 12" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-12 as appropriate,

and

the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.5-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.5-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)  1.4, 3, 5 MHz	Measurement bandwidth	Note
806 ≤ f ≤ 813.5	-42	6.25 kHz	1
NOTE 1: The emission limit apparents	olies at an offset of 0.7 MHz be	low any block of E	-UTRA

6.6.3.3.5.6 Test requirement (network signalled value "NS\_13")

When "NS 13" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-13 as appropriate,

and

the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.5.6-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.6-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5 MHz	Measurement bandwidth	Note
806 ≤ f ≤ 816	-42	6.25 kHz	1
NOTE 1: The emission limit app carriers	lies at an offset of 3 MHz belo	w any block of E-l	JTRA

6.6.3.3.5.7 Test requirement (network signalled value "NS\_14")

When "NS 14" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-14 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.5.7-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.7-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)	Measurement bandwidth	Note	
(1411 12)	10, 15 MHz			
806 ≤ f ≤ 816	-42	6.25 kHz	1	
NOTE 1: The emission limit applies at an offset of 8 MHz below any block of E-U				
carriers	3			

6.6.3.3.5.8 Test requirement (network signalled value "NS\_15")

When "NS 15" is indicated in the cell:

the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-15 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.5.8-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.8-1: Additional requirements

Frequency band (MHz)	band (MHz)     emission limit (dBm)       1.4, 3, 5, 10, 15 MHz       51 ≤ f ≤ 859     -53		Note
851 ≤ f ≤ 859	-53	6.25 kHz	
852 ≤ f ≤ 859	-32	1 MHz	

## 6.6.3.3.5.9 Test requirement (network signalled value "NS\_16")

When "NS 16" is indicated in the cell:

the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5-16 as appropriate,

and

the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.5.9-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.9-1: Additional requirements

Frequ bai (Mi	nd	Channel bandwidth / Spectrum emission limit (dBm) 1.4, 3, 5, 10 MHz	Measurement bandwidth	Note
790 ≤ f	≤ 803	-32	1 MHz	

## 6.6.3.3.5.10 Test requirement (network signalled value "NS\_17")

When "NS 17" is indicated in the cell:

the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5 - 17 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.5.10-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.10-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5, 10 MHz	Measurement bandwidth	Note	
470 ≤ f ≤ 710	-26.2	6 MHz	1	
NOTE 1: Applicable when the assigned E-UTRA carrier is confined within 718 MHz				
and 74	8 MHz and when the channel bandwi	dth used is 5 or 10 MHz		

#### 6.6.3.3.5.11 Test requirement (network signalled value "NS\_18")

When "NS 18" is indicated in the cell:

the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4.5 - 18 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3.5.11-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3.5.11-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5, 10, 15, 20 MHz	Measurement bandwidth	Note
692-698	-26.2	6 MHz	

## 6.6.3.3A Additional spurious emissions for CA

## 6.6.3.3A.1 Additional spurious emissions for CA (intra-band contiguous DL CA and UL CA)

## 6.6.3.3A.1.1 Test purpose

To verify that UE transmitter does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions in intra-band contiguous carrier aggregation under the deployment scenarios where additional requirements are specified.

## 6.6.3.3A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

#### 6.6.3.3A.1.3 Minimum conformance requirements

6.6.3.3A.1.3.1 Minimum conformance requirements for CA\_1C (network signalled value "CA\_NS\_01")

When "CA\_NS\_01" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3A.1.3.1-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1A.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3A.1.3.1-1: Additional requirements (PHS) for CA

Protected band	Frequenc	y rar	nge (MHz)	Maximum Level (dBm)	MBW (MHz)	Note
E-UTRA band 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1	
Frequency range	1884.5	-	1915.7	-41	0.3	1
NOTE 1: Applicable when the aggregated channel bandwidth is confined within frequency range 1940 – 1980 MHz						

NOTE 1: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (300 kHz).

The normative reference for this requirement is TS 36.101[2] subclause 6.6.3.3A.1.

6.6.3.3A.1.3.2 Minimum conformance requirements for CA\_1C (network signalled value "CA\_NS\_02")

When "CA\_NS\_02" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3A.1.3.2-1. These requirements also apply for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1A.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3A.1.3.2-1: Additional requirements for CA

Protected band	Frequency range (MHz)			Maximum Level (dBm)	MBW (MHz)
E-UTRA band 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1
Frequency range	1900	-	1915	-15.5	5
Frequency range	1915	-	1920	+1.6	5

The normative reference for this requirement is TS 36.101[2] subclause 6.6.3.3A.2.

## 6.6.3.3A.1.3.3 Minimum requirement for CA\_1C (network signalled value "CA\_NS\_03")

When "CA\_NS\_03" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3A.1.3.3-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1A.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3A.1.3.3-1: Additional requirement for CA

Protected band	Frequency range (MHz)		nge (MHz)	Maximum Level (dBm)	MBW (MHz)
E-UTRA band 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1
Frequency range	1880	-	1895	-40	1
Frequency range	1895	-	1915	-15.5	5
Frequency range	1915	-	1920	+1.6	5

## 6.6.3.3A.1.3.4 Minimum requirement for CA\_38C (network signalled value "CA\_NS\_05")

When "CA\_NS\_05" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3A.1.3.4-1. This requirement also applies for the frequency ranges that are less than  $F_{OOB}$  (MHz) in Table 6.6.3.1A.3-1 from the edge of the aggregated channel bandwidth.

Table 6.6.3.3A.1.3.4-1: Additional requirements

	Protected band	Frequency range (MHz)		Frequency ra		nge (MHz)	Maximum Level (dBm)	MBW (MHz)
ſ	Frequency range	2620	-	2645	-15.5	5		
ĺ	Frequency range	2645	-	2690	-40	1		

## 6.6.3.3A.1.3.5 Minimum requirement for CA\_7C (network signalled value "CA\_NS\_06")

When "CA\_NS\_06" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.6.3.3A.1.3.5-1. This requirement also applies for the frequency ranges that are less than  $F_{OOB}$  (MHz) in Table 6.6.3.1A.3-1 from the edge of the aggregated channel bandwidth.

Table 6.6.3.3A.1.3.5-1: Additional requirements

Protected band	Frequency range (MHz)		nge (MHz)	Maximum Level (dBm)	MBW (MHz)
Frequency range	2570	-	2575	+1.6	5
Frequency range	2575	-	2595	-15.5	5
Frequency range	2595	-	2620	-40	1

The normative reference for this requirement is TS 36.101[2] subclause 6.6.3.3A. 3.

6.6.3.3A.1.4 Test description

#### 6.6.3.3A.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in tables' 6.6.3.3A.1.4.1-1 to 6.6.3.3A.1.4.1-3. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3.3A.1.4.1-1: Test Configuration Table for CA (network signalled value "CA\_NS\_01")

				luitia	Conditio				
<b>-</b>			1.	initia	l Conditio	ns			
		nent as spe			NC				
		subclause			0.1	118.1			
		cies as spe				ow and High r	ange		
		subclause	4.3.1 for different CA	bandwidth	l				
class			(C /N)	.6. 1.					
			etting (N <sub>RB_agg</sub> ) as spe	citied in		est N <sub>RB_agg</sub>			
subc	lause 5.4	.2A.1 for tr	e CA Configuration		Higr	nest N <sub>RB_agg</sub>			
···		~ .			TOP CA C	onfigurations			
ID		CA ,	DL Allocation	CC			UL Allocation	n	
		uration/	(PDCCH on PCC)	MOD					
	PCC	B_agg SCCs	PCC & SCC RB		NI .		PCC & SCC R	D all as ation	
			allocation		N <sub>RB_alloc</sub>	T T			5
1	<b>N</b> <sub>RB</sub>	<b>N</b> <sub>RB</sub>	allocation	QPSK	1	P_1@0	S_0@0	RB <sub>start</sub> )	T
2	75	75	  -	QPSK	150	P 75@0	S 75@0		
3	75	75		QPSK	45	P_45@7	S_0@0		
4	75 75	75		QPSK	8	P_43@7 P_0@0	S_8@67		
5	75 75	75 75		QPSK	128		_		
6	75 75	75 75		QPSK	2	P_75@0 P_1@0	S_53@0 S_1@74		
		_					_	0 5 805	C 40@CF
7	75	75		QPSK	30	P_10@0	P_5@50	S_5@25	S_10@65
8	75	75	N/A	QPSK	105	P_35@0	P_20@55	S_15@0	S_35@40
9	100	100		QPSK	200	P_100@0	S_100@0		
10	100	100		QPSK	1	P_1@0	S_0@0		
11	100	100		QPSK	175	P_75@25	S_100@0		
12	100	100		QPSK	25	P_0@0	S_25@75		
13	100	100		QPSK	64	P_64@24	S_0@0		
14	100	100		QPSK	2	P_1@0	S_1@99	0.40.005	0.40.000
15	100	100		QPSK	40	P_10@0	P_10@65	S_10@35	S_10@90
16	100	100		QPSK	150	P_40@0	P_35@65	S_35@0	S_40@60
Note			tion Test CC Combina gregated channel bar					A Configuration	on which

Table 6.6.3.3A.1.4.1-2: Test Configuration Table for CA (network signalled value "CA\_NS\_02")

	Initial Conditions							
	Test Environment as specified in							
TS 36.508[7] subclause 4.1								
Test	Frequen	cies as spe	cified in		C: Lo	ow and High range		
TS36	TS36.508 [7] subclause 4.3.1 for different CA bandwidth							
class	es.							
	Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in					est N <sub>RB_agg</sub>		
subc	lause 5.4	.2A.1 for th	e CA Configuration			est N <sub>RB_agg</sub>		
			Test P	arameters	for CA Co	onfigurations		
ID		CA	DL Allocation	CC		UL Allocation		
	Config	uration/	(PDCCH on PCC)	MOD				
	N <sub>RB_agg</sub>							
	PCC	SCCs	PCC & SCC RB		N <sub>RB_allo</sub>	PCC & SCC RB allocations		
	$N_{RB}$	N <sub>RB</sub>	allocation		С	(L <sub>CRB</sub> @ RB <sub>start</sub> )		

1	75	75		QPSK	1	P_1@0	S_0@0	
2	75	75		QPSK	75	P_75@0	S_0@0	
3	75	75		QPSK	128	P_75@0	S_53@0	
4	75	75		QPSK	128	P_53@22	S_75@0	
5	75	75		QPSK	1	P_0@0	S_1@74	
6	75	75		QPSK	1	P_0@0	S_1@54	
7	75	75		QPSK	TBD	TBD	TBD	
8	75	75	N/A	QPSK	TBD	TBD	TBD	
9	100	100	IN/A	QPSK	1	P_1@0	S_0@0	
10	100	100		QPSK	1	P_1@21	S_0@0	
11	100	100		QPSK	90	P_90@0	S_0@0	
12	100	100		QPSK	180	P_100@0	S_80@0	
13	100	100		QPSK	1	P_0@0	S_1@99	
14	100	100		QPSK	1	P_0@0	S_1@83	
15	100	100		QPSK	TBD	TBD	TBD	
16	100	100		QPSK	TBD	TBD	TBD	

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1

Table 6.6.3.3A.1.4.1-3: Test Configuration Table for CA (network signalled value "CA\_NS\_03")

				Initia	I Conditio	าร			
		nent as spe			NC				
TS 36	6.508[7]	subclause	4.1						
		cies as spe				ow and High r	ange		
		subclause	4.3.1 for different CA	bandwidth	1				
class									
Гest	CC Com	bination se	etting (N <sub>RB_agg</sub> ) as spe	cified in		est N <sub>RB_agg</sub>			
subc	lause 5.4	.2A.1 for th	e CA Configuration			est N <sub>RB_agg</sub>			
					for CA Co	onfigurations			
ID		CA	DL Allocation	CC			UL Allocation	on	
	Configuration / (PDCCH on PCC) MOD								
	N <sub>RB_agg</sub>			NI NI		000 0000 0	ND -!! (!		
	PCC	SCCs	PCC & SCC RB		N <sub>RB_allo</sub>		CC & SCC R		15
	<b>N</b> <sub>RB</sub>	<b>N</b> <sub>RB</sub>	allocation	QPSK	1 c	P_1@0	S_0@0	RB <sub>start</sub> )	
2	75 75	75 75	-	QPSK	1	P_1@0 P_1@21	S_0@0		
<u>-</u> 3	75	75		QPSK	75	P_75@0	S_0@0		
1	75 75	75		QPSK	90	P_75@0 P_75@0	S_15@0		
5	75	75		QPSK	150	P 75@0	S 75@0		
3	75	75		QPSK	1 1	P_0@0	S_1@74		
, 7	75	75		QPSK	1	P 0@0	S_1@44		
3	75	75		QPSK	TBD	TBD	TBD		
9	100	100	N/A	QPSK	1	P_1@0	S_0@0		
10	100	100		QPSK	60	P_60@0	S_0@0		
11	100	100		QPSK	1	P_1@63	S_0@0		+
12	100	100		QPSK	90	P_90@0	S_0@0		
13	100	100		QPSK	162	P_100@0	S_62@0		
14	100	100	1	QPSK	1	P 0@0	S_1@99		
15	100	100		QPSK	1	P_0@0	S_1@70		
16	100	100		QPSK	TBD	TBD	TBD		
Vote			tion Test CC Combina					A Configurat	ion which
			gregated channel bar					3	

- 1. Connect the SS to the UE to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure group A.33 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.3.3A.1.4.1-1, Table 6.6.3.3A.1.4.1-2 or Table 6.6.3.3A.1.4.1-3 depending on network signal value.

- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3.3A.1.4.3.

#### 6.6.3.3A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.6.2.3A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.6.3.3A.1.4.1-1 on both PCC and SCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 5. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE until the UE transmits at P<sub>UMAX</sub> level.
- 3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in Tables 6.2.4A.1.5-1 to 6.2.4A.1.5-3 as appropriate. The period of the measurement shall be at least one sub-frame (1ms).
- 4. Measure the power of the transmitted signal with a measurement filter of bandwidths according to Table 6.6.3.3A.1.5.1-1, 6.6.3.3A.1.5.2-1 and 6.6.3.3A.1.5.3-1 as appropriate. The centre frequency of the filter shall be stepped in contiguous steps according to the same table. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

#### 6.6.3.3A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions for each network signalled value.

## 6.6.3.3A.1.4.3.1 Message contents (network signalled value "CA\_NS\_01")

1. Information element additional Spectrum Emission SCell-r10 is set to CA\_NS\_01. This can be set in the *RadioResourceConfigCommonSCell-r10-DEFAULT* as part of the common RRC messages. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3.3A.1.4.3.1-1: RadioResourceConfigCommonSCell-r10-DEFAULT: Additional spectrum emission test requirement for "CA\_NS\_01"

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-13A						
Information Element Value/remark Comment Condition						
additionalSpectrumEmissionSCell-r10	1 (CA_NS_01)					

## 6.6.3.3A.1.4.3.2 Message contents exceptions (network signalled value "CA\_NS\_02")

1. Information element additionalSpectrumEmissionSCell-r10 is set to CA\_NS\_02. This can be set in the *RadioResourceConfigCommonSCell-r10-DEFAULT* as part of the common RRC messages. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 6.6.3.3A.1.4.3.2-1: RadioResourceConfigCommonSCell-r10-DEFAULT: Additional spectrum emission test requirement for "CA\_NS\_02"

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-13A						
Information Element Value/remark Comment Condition						
additionalSpectrumEmissionSCell-r10	2 (CA_NS_02)					

#### 6.6.3.3A.1.4.3.3 Message contents exceptions (network signalled value "CA NS 03")

1. Information element additionalSpectrumEmission is set to NS\_08. This can be set in the *RadioResourceConfigCommonSCell-r10-DEFAULT* as part of the common RRC messages. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 6.6.3.3A.1.4.3.3-1: RadioResourceConfigCommonSCell-r10-DEFAULT: Additional spectrum emission test requirement for "CA NS 03"

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-13A							
Information Element	Value/remark	Comment	Condition				
additionalSpectrumEmissionSCell-r10	3 (CA_NS_03)						

6.6.3.3A.1.5 Test requirement

6.6.3.3A.1.5.1 Test requirement for CA (network signalled value "CA\_NS\_01")

When "CA\_NS\_01" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fu lfil requirements in Table 6.2.4A.1.5-1 as appropriate,

and

the measured average power of spurious emission, derived in step 2, shall not exceed the described value in Table 6.6.3.3A.1.5.1-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1A.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3A.1.5.1-1: Additional requirements (PHS) for CA

Protected band	Frequency range (MHz)		nge (MHz)	Maximum Level (dBm)	MBW (MHz)	Note		
E-UTRA band 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1			
Frequency range	1884.5	-	1915.7	-41	0.3	1		
NOTE 1: Applicable when the aggregated channel bandwidth is confined within frequency range 1940 – 1980 MHz								

NOTE 1: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (300 kHz).

6.6.3.3A.1.5.2 Test requirement for CA (network signalled value "CA\_NS\_02")

When "CA\_NS\_02" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4A.1.5-2 as appropriate,

and

the measured average power of spurious emission, derived in step 2, shall not exceed the described value in Table 6.6.3.3A.1.5.2-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1A.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3A.1.5.2-1: Additional requirements for CA

Protected band	Frequency range (MHz)			Maximum Level (dBm)	MBW (MHz)
E-UTRA band 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1
Frequency range	1900	-	1915	-15.5	5
Frequency range	1915	-	1920	+1.6	5

#### 6.6.3.3A.1.5.3 Test requirement for CA (network signalled value "CA NS 03")

When "CA\_NS\_03" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4A.1.5-3 as appropriate,

and

the measured average power of spurious emission, derived in step 2, shall not exceed the described value in Table 6.6.3.3A.1.5.3-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1A.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3.3A.1.5.3-1: Additional requirement for CA

Protected band	Frequency range (MHz)			Maximum Level (dBm)	MBW (MHz)
E-UTRA band 34	F <sub>DL_low</sub>	-	F <sub>DL_high</sub>	-50	1
Frequency range	1880	-	1895	-40	1
Frequency range	1895	-	1915	-15.5	5
Frequency range	1915	-	1920	+1.6	5

## 6.6.3B Spurious emission for UL-MIMO

For UE supporting UL-MIMO, the requirements for Spurious emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products are specified at each transmit antenna connector.

For UEs with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the requirements in subclause 6.6.3 apply to each transmit antenna connector. The requirements shall be met with the UL-MIMO configurations specified in Table 6.2.2B-1.

For single-antenna port scheme, the general requirements in subclause 6.6.2 apply.

## 6.6.3B.1 Transmitter Spurious emissions for UL-MIMO

## 6.6.3B.1.1 Test purpose

To verify that UE transmitter with a UL-MIMO does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions.

## 6.6.3B.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

## 6.6.3B.1.3 Minimum conformance requirements

For UE with multiple transmit antenna connectors, the requirements for Spurious emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products are specified at each transmit antenna connector.

For UEs with two transmit antenna connectors, the requirements in clause 6.6.3 apply to each transmit antenna with the UL-MIMO configurations specified in Table 6.2.2B-1 for closed-loop spatial multiple xing scheme.

The normative reference for this requirement is TS 36.101 [2] clause 6.6.3B.

## 6.6.3B.1.4 Test description

#### 6.6.3B.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in Table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 6.6.3B.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3B.1.4.1-1: Test Configuration Table

		In	itial Condition	ns			
Test Environr	ment	•••	NC				
(as specified	in TS 36.508 [	71 clause 4.1)					
(as specified in TS 36.508 [7] clause 4.1) Test Frequencies		Low range, Mid range, High range					
(as specified in TS 36.508 [7]							
clause 4.3.1)	-	1					
Test Channel Bandwidths			Lowest, 5MHz, Highest				
(as specified in TS 36.508 [7]							
clause 4.3.1)		•					
		Test Paramete	ers for Channe	el Bandwidths			
	Dowr	link Configur	ation	Uplink Configuration			
Ch BW	Mod'n	RB all	ocation	Mod'n	RB all	ocation	
		FDD	TDD		FDD	TDD	
1.4MHz	N/A for Sp	urious Emissio	ns testing	QPSK	6	6	
1.4MHz				QPSK	1	1	
3MHz				QPSK	15	15	
3MHz				QPSK	1	1	
5MHz				QPSK	25	25	
5MHz				QPSK	1	1	
10MHz				QPSK	50	50	
10MHz				QPSK	1	1	
15MHz				QPSK	75	75	
15MHz				QPSK	1	1	
20MHz				QPSK	100	100	
20MHz				QPSK	1	1	
Note 1: Te	st Channel Bai	ndwidths are c	hecked separa	tely for each E-	UTRA band, w	hich	
ар	plicable chann	el bandwidths	are specified in	Table 5.4.2.1-	1.		
Note 2: Th	e 1 RB allocati	on shall be tes	ted at both RB	#0 and RB #ma	ax.		

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.38.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.3B.1.4.1-1.

- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3B.1.4.3.

#### 6.6.3B.1.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HA RQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.6.3B.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at PUMAX level.
- 3. Measure the power of the transmitted signal at each UE antenna connector with a measurement filter of bandwidths according to table 6.6.3B.1.5-1. The centre frequency of the filter shall be stepped in contiguous steps according to table 6.6.3B.1.5-1. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

#### 6.6.3B.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

#### 6.6.3B.1.5 Test requirement

The measured average power of spurious emission, derived in step 3, shall not exceed the described value in table 6.6.3B.1.5-1.

The spurious emission limits apply for the frequency ranges that are more than  $\Delta fOOB$  (MHz) from the edge of the channel bandwidth shown in Table 6.6.3.1.3-1.

Table 6.6.3B.1.5-1: General spurious emissions test requirements

Frequency Range	Maximum Level	Measurement Bandwidth	Notes
9 kHz≤f < 150 kHz	-36 dBm	1 kHz	
150 kHz≤f<30 MHz	-36 dBm	10 kHz	
30 MHz ≤ f < 1000 MHz	-36 dBm	100 kHz	
1 GHz≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 5th	-30 dBm	1 MHz	Note 1
harmonic of the upper			
frequency edge of the UL			
operating band in GHz			
Note 1: Applies for Band 2	22, Band 42 and Band 43.		

NOTE: In order that the measurement of spurious emissions falls within the frequency ranges that are more than  $\Delta fOOB$  (MHz) from the edge of the channel bandwidth, the min imu m offset of the measurement frequency from each edge of the channel should be  $\Delta fOOB + MBW/2$ . MBW denotes the measurement bandwidth defined in Table 6.6.3B.1.5-1.

## 6.6.3B.2 Spurious emission band UE co-existence for UL-MIMO

Editor's note: This test case contains different requirements for different UE releases

#### 6.6.3B.2.1 Test purpose

To verify that UE transmitter with a UL-MIMO does not cause unacceptable interference to co-existing systems for the specified bands which has specific requirements in terms of transmitter spurious emissions.

#### 6.6.3B.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

#### 6.6.3B.2.3 Minimum conformance requirements

For UE with multiple transmit antenna connectors, the requirements for Spurious emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products are specified at each transmit antenna connector.

For UEs with two transmit antenna connectors, the requirements in clause 6.6.3 apply to each transmit antenna with the UL-MIMO configurations specified in Table 6.2.2B-1 for closed-loop spatial multiplexing scheme.

The normative reference for this requirement is TS 36.101 [2] clause 6.6.3B.

This test use minimum requirements from many releases of TS 36.101 [2] due to release independence defined in TS 36.307 [16].

#### 6.6.3B.2.4 Test description

#### 6.6.3B.2.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in Table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in Table 6.6.3B.2.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3B.2.4.1-1: Test Configuration Table

			In	nitial Condition	าร		
1			NC				
(as specified in TS 36.508 [7] clause 4.1)							
Test Freq	uen	cies			Low range, M	id range, High	range
	ied	in TS 36.508 [7	7] clause 4.3.1	)	(Note 3, Note	4)	
(Note 3)							
		Bandwidths			Lowest, 5MH:	z, Highest	
(as specif	ied	in TS 36.508 [7					
				ers for Channe			
			llink Configur			nk Configurat	
Ch BW		Mod'n		ocation	Mod'n	RB allo	
			FDD	TDD		FDD	TDD
1.4MHz		N/A for Sp	urious Emissio	ons testing	QPSK	6	6
1.4MHz					QPSK	1	1
3MHz					QPSK	15	15
3MHz					QPSK	1	1
5MHz					QPSK	25	25°
5MHz					QPSK	1	1 <sup>5</sup>
10MHz					QPSK	50	50
10MHz					QPSK	1	1
15MHz					QPSK	75	75
15MHz					QPSK	1	1
20MHz					QPSK	100	100
20MHz					QPSK	1	1
Note 1:					tely for each E-		hich
					Table 5.4.2.1		
Note 2:					#0 and RB #m		0.0.45
Note 3:					n Tables 6.6.3.		
Note 4:					efined in Table		
Note 4:					is low range o		
				8-2) and CBW ble 6.2.4B.3-1].	is 5MHz and 10	JIVI⊟Z, the test s	snall be
Note 5:					B.2.5-1, the me	ecana avconti	on in Table
Note 5.				ith the high cha		ssaye exception	טוו ווו ומטוכ
	0.0		used to test WI	iui uie nign cha	iiiici.		

Table 6.6.3B.2.4.1-2: Test frequencies for E-UTRA channel bandwidth for operating band 3 with Note 13 (in Tables 6.6.3.2.3-1B to 6.6.3.2.3-1D)

Bandwidth [MHz]	N <sub>UL</sub>	Frequency of Uplink [MHz]	N <sub>DL</sub>	Frequency of Downlink [MHz]
5	19924	1782.4	1924	1877.4
10	19899	1779.9	1899	1874.9
15	19874	1777.4	1874	1872.4
20	19849	1774.9	1849	1869.9

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.38.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.6.3B.2.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3B.2.4.3.

#### 6.6.3B.2.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.6.3B.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the power of the transmitted signal at each UE antenna connector with a measurement filter of bandwidths according to table 6.6.3B.2.5-1. For band 14 measurements made in a bandwidth of 6.25kHz, measurement parameter settings defined in table 6.6.3B.2.4.2-1 shall be used. The centre frequency of the filter shall be stepped in contiguous steps according to table 6.6.3B.2.5-1. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

Table 6.6.3B.2.4.2-1: Measurement setup for band 14

	Option 1:	Option2
	Measurement with No RMS VBW available	Measurement with VBW Filtering on Power scale
VBW	>=62.5 kHz (10 times or more the RBW)	<=43Hz
RBW	<=6.25kHz	<=6.25kHz
Detector type	Averages signal envelope during each measurement point, such as "RMS detector"	Peak
Averaging mode (Trace averaging)	Power (RMS voltage)	Power (RMS voltage), as controlled by "Average Type"
Average Type (applies to detector)	Power (RMS voltage) (automatically occurs with "RMS detector")	Not applicable
Average Type (applies to VBW filter)	Not applicable	Power (RMS voltage)
Number of averages	30, to reduce variance as required, or use an even longer sweep time	1 or use an even narrower VBW filter, thus a longer sweep time
Sweep time	[Don't specify]	Sweep rate (span divided by sweep time) <= 0.8 * RBW*VBW

#### 6.6.3B.2.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exceptions:

Table 6.6.3B.2.4.3-1: SystemInformationBlockType1 with Note 22 in table 6.6.3B.2.5-1

Derivation Path: TS 36.508 [7] clause 4.4.3.2, Table 4.4.3.2-3 SystemInformationBlockType1							
Information Element Value/remark Comment Con							
p-Max	20						

#### 6.6.3B.2.5 Test requirement

Test requirements for Spurious Emissions UE Co-existence for UL-MIMO are the same as the minimum requirements and are not repeated in this section.

The measured average power of spurious emission, derived in step 3, shall not exceed the described value in tables 6.6.3.2.3-1B to 6.6.3.2.3-1D according to the following rule:

The requirements for the UE are release specific and can be found in Tables 6.6.3.2.3-1B to 6.6.3.2.3-1D. If the UE support a band, which is not defined in the table corresponding UE's release, the requirements for this band are taken from the table of earliest release where requirements for this band are defined. This has been described in following Table 6.6.3B.2.5-1.

The spurious emission limits apply for the frequency ranges that are more than  $\Delta fOOB$  (MHz) from the edge of the channel bandwidth shown in Table 6.6.3.1.3-1.

Table 6.6.3B.2.5-1: UE Requirements according to UE E-UTRA release and supported E-UTRA band

Band	UE Requirements per release					
	Rel-10	Rel-11	Rel-12			
1	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
2	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
3	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
4	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
5	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
6	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
7	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
8	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
9	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
10	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
11	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
12	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
13	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
14	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
17	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
18	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
19	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
20	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
21	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			
22	Table 6.6.3.2.3- 1B	Table 6.6.3.2.3- 1C	Table 6.6.3.2.3- 1D			

	T-1-1-	T-1-1-	T-1-1-	1	l
00	Table	Table	Table		
23	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table		
24	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table		
25	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table		
26	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1C	1C	1D		
	Table	Table	Table		
27	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
21	1C	1C	1D		
	Table	Table	Table		
20			6.6.3.2.3-		
28	6.6.3.2.3-	6.6.3.2.3-			
	1C	1C	1D		
0.4	Table	Table	Table		
31	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1D	1D	1D		
	Table	Table	Table		
33	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table		
34	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
35					
36					
37					
- 07	Table	Table	Table		
38	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
30	1B	1C	1D		
00	Table	Table	Table		
39	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table		
40	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table		
41	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table		
42	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table	İ	
43	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1B	1C	1D		
	Table	Table	Table		
44	6.6.3.2.3-	6.6.3.2.3-	6.6.3.2.3-		
	1C	1C	1D		
1	10	10	טו	1	

NOTE: The frequency range applicable with network signalled values of NS\_05, NS\_08, and NS\_09 are covered in 6.6.3B.3 Additional Spurious Emissions for UL-MIMO.

### 6.6.3B.3 Additional spurious emissions for UL-MIMO

Editor's note: This clause is incomplete. for Rel-10 as it is also testing Rel-11 minimum requirements.

### 6.6.3B.3.1 Test purpose

To verify that UE transmitter with a UL-MIMO does not cause unacceptable interference to other channels or other systems in terms of transmitter spurious emissions under the deployment scenarios where additional requirements are specified.

#### 6.6.3B.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

#### 6.6.3B.3.3 Minimum conformance requirements

For UE with multiple transmit antenna connectors, the requirements for Spurious emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emissions, intermodulation products and frequency conversion products are specified at each transmit antenna connector.

For UEs with two transmit antenna connectors, the requirements in clause 6.6.3 apply to each transmit antenna with the UL-MIMO configurations specified in Table 6.2.2B-1 for closed-loop spatial multiple xing scheme.

The normative reference for this requirement is TS 36.101 [2] clause 6.6.3B.

#### 6.6.3B.3.4 Test description

#### 6.6.3B.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in tables 6.6.3B.3.4.1-1 through table, 6.6.3B.3.4.1-12. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.6.3B.3.4.1-1: Test Configuration Table (network signalled value "NS\_05")

		In	itial Conditio	ns		
Test Environ	ment as specific			Nomal		
TS 36.508 [7						
	ncies as specific	ed in	Low range, M	lid range		
15 36.508 [7	] clause 4.3.1					
				In case of Lo	w range: z Channel Band	du i dth i
					z Channei Band Hz (N∪L = 1807	
					Iz (Not = 1807 Iz Channel Bai	
					Hz (N <sub>UL</sub> = 1814	
					Iz Channel Bai	
				1932.5MI	$Hz(N_{UL} = 1812)$	5)
					Iz Channel Baı	
					$2(N_{UL} = 18100)$	
	el Bandwidths as [] clause 4.3.1	s specified in		5MHz, 10MH	z, 15MHz, 20N	Hz
	•			el Bandwidths		
		llink Configur		•	ink Configurat	
Ch BW	Mod'n		ocation	Mod'n		ocation
	1 1/0 1	FDD	TDD		FDD	TDD
5MHz	N/A for Addi	itional Spurious	s Emissions	QPSK	1	N/A
5MHz	4	testing		QPSK	25	
10MHz				QPSK	1	
10MHz				QPSK	12	
10MHz 10MHz	_			QPSK QPSK	48	
10MHz	-			16QAM	50 50	
TUIVIHZ				TOQAW	(Note 3)	
15MHz	1			QPSK	1	
15MHz	1			QPSK	16	
15MHz				QPSK	30	
				Q. 0.1	(Note 4)	
15MHz				QPSK	48	
					(Note 5)	
15MHz				QPSK	75	
					(Note 5)	
15MHz				16QAM	75	
000411	1			ODOK	(Note 3, 5)	
20MHz 20MHz	1			QPSK QPSK	1	
20MHz				QPSK	18 24	
ZUIVII IZ				QI SIN	(Note 4)	
20MHz				QPSK	48	
i <b>_</b>					(Note 5)	
20MHz	1			QPSK	100	
					(Note 5)	
20MHz	1			16QAM	100	
	<u> </u>			<u> </u>	(Note 3, 5)	
	ne 1 RB allocati		ted at both RE	3 #0 and RB #m	ax except for 1	5MHzand
	MHz of Low Ra		DD 11 11			1.00,000
	or 15MHz of Lov					
	or 20MHz of Lov ne RBstart of pa					
	ie RBStart of pa e channel band					nocalion) of
	or 15MHz of Lov	-			-	ation)
	or 20MHz of Lov					
	oplies only for U			ND#27 aliu ND	m (10 IND allC	calion).
	equired for Low		<b></b> .			
	ot available for l					

Table 6.6.3B.3.4.1-2: Test Configuration Table (network signalled value "NS\_07")

Initial Conditions									
Test Environ	ment as specifie	ed in	NC						
TS 36.508 [7] clause 4.1									
Test Freque	ncies as specifie	ed in		Mid range					
TS 36.508 [7	7] clause 4.3.1								
Test Channe	el Bandwidths as	specified in		10MHz					
TS 36.508 [7	7] clause 4.3.1	-							
_	-	Test P	arameters for Ch	annel Bandw	ridths				
		Downlink	Configuration		Uplink Configurat	ion			
Test	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	TDD			
Number									
1	10MHz	N/A for Add	ditional Spurious	QPSK	1	0			
2	10MHz	Emiss	ions testing.	QPSK	8	0			
3	10MHz			QPSK	6	13			
4	10MHz			QPSK	20	13			
5	10MHz	1		QPSK	12	13			
6	10MHz	1		16QAM	36	13			
					(Note 1)				
7	10MHz			QPSK	16	19			
8	10MHz			QPSK	12	19			
9	10MHz	1		16QAM	16	19			
10	10MHz			QPSK	30	19			
11	10MHz	1		16QAM	30	19			
					(Note 1)				
12	10MHz	1		QPSK	6	43			
13	10MHz	]		QPSK	2	48			
14	10MHz	1		QPSK	50	0			
15	10MHz	]		QPSK	12	0			
16	10MHz	1		16QAM	50	0			
					(Note 1)				
Note 1: Ap	oplies only for U	E-Categories	3 ≥2.						

Note 3:

Applies only for UE-Categories ≥2.

Table 6.6.3B.3.4.1-3: Test Configuration Table (network signalled value "NS\_08")

		In	itial Conditio	ns		
			Nomal			
TS 36.508 [7] clause 4.1						
	icies as specifie	ed in		High range		
TS 36.508 [7]						
	Bandwidths as	s specified in		5MHz, 10MH	z, 15MHz	
TS 36.508 [7]						
				el Bandwidths		
		llink Configur		•	nk Configurat	
Ch BW	Mod'n		ocation	Mod'n		cation
		FDD	TDD		FDD	TDD
5MHz	N/A for Addi	tional Spuriou	s Emissions	QPSK	1	N/A
5MHz		testing		QPSK	8	
5MHz				QPSK	25	
10MHz				QPSK	1	
10MHz				QPSK	12	
10MHz				QPSK	40	
10MHz				QPSK	50	
10MHz				16QAM	50	
					(Note 3)	
15MHz				QPSK	1	
15MHz				QPSK	16	
15MHz				QPSK	40	
15MHz				QPSK	75	
15MHz				16QAM	75	
					(Note 3)	
Note 2: Th		rtial RB alloca		B #0 and RB #m B#0 and RB# (r		llocation) of

Table 6.6.3B.3.4.1-4: Test Configuration Table (network signalled value "NS\_09")

		Ir	nitial Condition	าร		
Test Environment as specified in			Nomal			
TS 36.508 [7]	TS 36.508 [7] clause 4.1					
Test Frequen	cies as specific	ed in		High range		
TS 36.508 [7]	] clause 4.3.1					
	l Bandwidths as	s specified in		5MHz, 10MH	z, 15MH z	
TS 36.508 [7]						
			ers for Channe			
		nlink Configur			ink Configurat	
Ch BW	Mod'n		location	Mod'n	RB allo	
		FDD	TDD		FDD	TDD
5MHz	N/A for Add	itional Spuriou	is Emissions	QPSK	1	N/A
5MHz		testing		QPSK	8	
5MHz				QPSK	25	
10MHz				QPSK	1	
10MHz				QPSK	12	
10MHz				QPSK	40	
10MHz	]			QPSK	50	
10MHz				16QAM	50	
					(Note 3)	
15MHz				QPSK	1	
15MHz				QPSK	16	
15MHz				QPSK	40	
15MHz				QPSK	54	
15MHz				QPSK	75	
15MHz				16QAM	75	
					(Note 3)	
Note 2: Th	e RBstart of pa e channel band	artial RB alloca lwidth.	sted at both RB ation shall be R			llocation) of
Note 3: Ap	plies only for U	ı⊏-∪ategories	<b>&lt;∠</b> .			

Table 6.6.3B.3.4.1-5: Test Configuration Table (network signalled value "NS\_12")

Initial Conditions									
				NC					
(as specified	in TS 36.508 [7	] clause 4.1)	)						
Test Frequen				Mid range					
(as specified	in TS 36.508 [7	] clause 4.3.	.1)						
Test Channel				1.4 MHz, 3 I	MHzand 5 MHz				
(as specified	in TS 36.508 [7								
		Test P	arameters for Ch	annel Bandw	vidths				
		Downlink	Configuration		Uplink Configurat	tion			
Test	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	RB <sub>start</sub>			
Number					FDD	FDD			
1	1.4 MHz	N/A for Ad	ditional Spurious	QPSK	1	0			
2	1.4 MHz	Emiss	sions testing	QPSK	6	0			
3	1.4 MHz			QPSK	1	1			
4	1.4 MHz			QPSK	5	1			
5	1.4 MHz			16QAM	6	0			
6	3 MHz			QPSK	4	0			
7	3 MHz			QPSK	10	0			
8	3 MHz			QPSK	4	4			
9	3 MHz			QPSK	10	4			
10	3 MHz			16QAM	15	0			
11	5 MHz			QPSK	8	0			
12 5 MHz		QPSK	15	0					
13	5 MHz			QPSK	8	7			
14	5 MHz			QPSK	15	7			
15	5 MHz			16QAM	25	0			

Table 6.6.3 B.3.4.1-6: Test Configuration Table (network signalled value "NS\_13")

Initial Conditions						
Test Environment			NC			
(as specified	in TS 36.508 [7	] clause 4.1	)			
Test Frequer	ncies			Mid range		
(as specified	in TS 36.508 [7	] clause 4.3	.1)			
Test Channe	l Bandwidths			5 MHz		
(as specified	in TS 36.508 [7	] clause 4.3	.1)			
		Test P	arameters for Ch	annel Bandw	ridths	
		Downlink	Configuration	Uplink Configuration		tion
T4						
Test	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	RB <sub>start</sub>
Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RB <sub>start</sub> FDD
	Ch BW 5 MHz		RB allocation ditional Spurious	Mod'n QPSK		
		N/A for Ad				FDD
Number 1	5 MHz	N/A for Ad	ditional Spurious	QPSK	FDD 1	FDD 0
Number 1 2	5 MHz 5 MHz	N/A for Ad	ditional Spurious	QPSK QPSK	FDD 1 25	FDD 0 0

Table 6.6.3B.3.4.1-7: Test Configuration Table (network signalled value "NS\_14")

			Initial Cond	ditions		
Test Environn	nent			NC		
(as specified in TS 36.508 [7] clause 4.1)						
Test Frequencies			Mid range			
	in TS 36.508 [7	'] clause 4.3.	.1)			
Test Channel				10 MHz, 15	MHz	
as specified	in TS 36.508 [7					
			arameters for Ch	annel Bandw		
		Downlink	Configuration		Uplink Configurat	ion
Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RB <sub>start</sub> FDD
1	10 MHz	N/A for Add	ditional Spurious	QPSK	1	0
2	10 MHz	Emiss	sions testing	QPSK	25	0
3	10 MHz			QPSK	50	0
4	10 MHz			QPSK	25	1
5	10 MHz			16QAM	50	0
(Note 1)						
6	15 MHz			QPSK	8	0
7	15 MHz			QPSK	25	0
8	15 MHz			QPSK	75	0
9	15 MHz			QPSK	50	15
10	15 MHz			16QAM	75	0
(Note 1)						
Note 1: Ap	plies only for U	E-Categories	s ≥2.	1		

Table 6.6.3B.3.4.1-8: Test Configuration Table (network signalled value "NS\_15")

		Ini	itial Conditions	<b>3</b>		
Test Environment		ubalaua a 4.1)				
(as specified in TS	30.300 [7] 8	ubciause 4.1)				
Test Frequencies				NC For 1.4 MHz Ck	nannel Bandwid	th: High
(as specified in TS	36.508 [7] su	ubclause 4.3.1	)	range		
					nnel Bandwidth 985) or High rar	
				For 5 MHz Cha	nnel Bandwidth	: 842.5
				$MHz (N_{UL} = 26)$	975) or High rar	nge
				For 10 MHz Ch (NUL = 26950)	annel Bandwidt or High range	h: 840 MHz
					annel Bandwidt 3925) or High ra	
Test Channel Ban			`		, 5	
(as specified in TS	36.508 [7] s	ubclause 4.3.1	)			
	٦	Fact Paramata	ers for Channel		z, 5 MHz, 10 MH	Hz, 15 MHz
	<u>'</u>		onfiguration		nk Configuratio	n
Configuration	Ch BW	Mod'n	RB	Mod'n	RB	RBstart
ĬD			allocation		allocation FDD	FDD
1 (note 3)	1.4 MHz			QPSK	4	0
2 (note 3)	1.4 MHz			16QAM	6	0
3 (note 3)	3 MHz			QPSK	6	7
4 (note 3)	3 MHz			QPSK	12	1
5 (note 3)	3 MHz			16QAM	15	0
6 (note 2)	3 MHz			QPSK	15	0
7 (note 3)	5 MHz			QPSK	6	14
8 (note 3)	5 MHz			QPSK	20	0
9 (note 3)	5 MHz			16QAM	25	0
10 (note 2)	5 MHz			QPSK	16	9
11 (note 2)	5 MHz			QPSK	25	0
12 (note 3)	10 MHz			QPSK	1	49
13 (note 3)	10 MHz	N/A for A-N	MPR testing.	QPSK	1	0
14 (note 3)	10 MHz			QPSK	3	0
15 (note 3)	10 MHz			QPSK	20	3
16 (note 3)	10 MHz			QPSK	36	1
17 (note 3)	10 MHz			QPSK	50	0
18 (note 3)	10 MHz			16QAM	50	0
19 (note 2)	10 MHz			QPSK	20	25
20 (note 2)	10 MHz			QPSK	45	0
21 (note 3)	15 MHz			QPSK	18	36
22 (note 3)	15 MHz			QPSK	25	1
23 (note 3)	15 MHz			QPSK	54	0
24 (note 3)	15 MHz			16QAM	75	0
25 (note 2)	15 MHz			QPSK	18	44

26 (no	ote 2)	15 MHz		QPSK	60	2
Note 1:	Note 1: Applies only for UE-Categories ≥2.					
Note 2:	Note 2: Applicable only test frequency < high range					
Note 3:						

Table 6.6.3B.3.4.1-9: Test Configuration Table (network signalled value "NS\_16")

		In	itial Condition	ıs		
Test Environme	nt			I		
(as specified in		subclause 4.1)		NC		
Test Frequencie	es			For 1.4 MHz Channel Bandwidth: Low		
(as specified in	TS36.508 [7] :	subclause 4.3.1	1)	range		
					nannel Bandwid Hz (N <sub>UL</sub> = 27070	
					nannel Bandwid Hz (N <sub>UL</sub> = 27080 7115)	
					Channel Bandwi MHz (N <sub>UL</sub> = 271 )	
Test Channel Ba (as specified in <sup>-</sup>		subclause 4.3.	1)	1.4 MHz. 3 M	Hz, 5 MHz, 10 I	MHz
		Test Paramete	ers for Channe			<del>-</del>
		Downlink C	onfiguration	Un	link Configurat	ion
Configuration ID	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RBstart FDD
1	1.4 MHz	N/A for Additi Emissions A	l onal Spurious -MPR testing.	QPSK	1	0
2	1.4 MHz			QPSK	6	0
3 (Note 1)	1.4 MHz			16QAM	6	0
4	3 MHz			QPSK	1	0
5	3 MHz			QPSK	12	1
6	3 MHz	-		QPSK	15	0
7 (Note 1)	3 MHz	-		16QAM	15	0
8	5 MHz			QPSK	1	0
9	5 MHz	-		QPSK	12	2
10	5 MHz	-		QPSK	18	2
11	5 MHz	-		QPSK	20	0
12	5 MHz	1		QPSK	20	2
13	5 MHz			QPSK	25	0
14 (Note 1)	5 MHz	-		16QAM	25	0
15	10 MHz	-		QPSK	1	0
16 (Note 2)	10 MHz	1		QPSK	1	10

17 (Note 2)	10 MHz	QPSK	20	0
18 (Note 2)	10 MHz	QPSK	27	15
19 (Note 2)	10 MHz	QPSK	32	15
20	10 MHz	QPSK	32	0
21	10 MHz	QPSK	50	0
22 (Note 1)	10 MHz	16QAM	50	0
23 (Note 3)	10 MHz	QPSK	40	0
24 Note 3)	10 MHz	QPSK	40	1

Note 1: Applies only for UE-Categories ≥2.

Note 2: Applies only for 10 MHz channel for Low Range, and 813.5 MHz

Note 3: Applies only for 10 MHz channel for 817 MHz range

Table 6.6.3B.3.4.1-10: Test Configuration Table (network signalled value "NS\_17")

Initial Conditions				
Test Environment (as specified in TS 36.508[7] subclause 4.1)	Nomal			
Test Frequencies (as specified inTS36.508 [7] subdause 4.3.1)	Low range			
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	5MHz, 10MHz			

#### **Test Parameters for Channel Bandwidths**

		Downlink Configuration		Uplink Co	nfiguration
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	5MHz			QPSK	1
2	5MHz			QPSK	8
3	5MHz				25
4	5MHz	N/A for Additional	Spurious Emissions	16QAM	25 (Note 3)
5	10MHz	tes	sting	QPSK	1
6	10MHz			QPSK	12
7	10MHz				50
8	10MHz			16QAM	50 (Note 3)

Note 1: The 1 RB allocation shall be tested at both RB #0 and RB #max.

Note 2: The RBstart of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories ≥2.

Table 6.6.3B.3.4.1-11: Test Configuration Table (network signalled value "NS\_18")

I	Initial Conditions

Test Environment (as specified in TS 36.508[7] subclause 4.1)	Nomal
Test Frequencies (as specified inTS36.508 [7] subdause 4.3.1)	Low range
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	5MHz, 10MHz, 15MHz, 20MHz

#### **Test Parameters for Channel Bandwidths**

		Downlink Configuration		Uplink Co	nfiguration
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	5MHz			QPSK	1
2	5MHz			QPSK	8
3	5MHz			QPSK	25
4	5MHz			16QAM	25 (Note 3)
5	10MHz			QPSK	1
6	10MHz			QPSK	12
7	10MHz			QPSK	50
8	10MHz		Spurious Emissions	16QAM	50 (Note 3)
9	15MHz		sung	QPSK	1
10	15MHz	7		QPSK	16
11	15MHz			QPSK	75
12	15MHz			16QAM	75 (Note 3)
13	20MHz			QPSK	1
14	20MHz	1			18
15	20MHz			QPSK	100
16	20MHz			16QAM	100 (Note 3)

Note 1: The 1 RB allocation shall be tested at both RB #0 and RB #max.

Note 2: The RBstart of partial RB allocation shall be RB# 0 and RB# (max+1 - RB allocation) of the channel bandwidth.

Note 3: Applies only for UE-Categories ≥2.

#### Table 6.6.3B.3.4.1-12: Test Configuration Table (network signalled value "NS\_19")

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Editor's note: The following lines belong at the end of section 6.2.4.4.1. As new tables are added to this section, these lines should always follow the tables.

- 1. Connect the SS to the UE antenna connectors as shown in Figure TS 36.508 [7] Annex A, Figure A.38.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Tables 6.6.3B.3.4.1-1 through Table, 6.6.3B.3.4.1-8 depending on network signal value.
- 5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.6.3B.3.4.3.

#### 6.6.3B.3.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Tables 6.6.3B.3.4.1-1 through table, 6.6.3B.3.4.1-8. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE until the UE transmits at  $P_{UMAX}$  level.
- 3. Measure the mean power of the UE in the channel bandwidth of the radio access mode according to the test configuration, which shall meet the requirements described in Tables 6.2.4B.5-1 to 6.2.4B.5 9 as appropriate. The period of the measurement shall be at least one sub-frame (1ms).
- 4. Measure the power of the transmitted signal at each UE antenna connector with a measurement filter of bandwidths according to Tables 6.6.3B.3.5.1-1 through table, 6.6.3B.3.5.1-8 as appropriate. The centre frequency of the filter shall be stepped in contiguous steps according to the same table. For NS\_07 measurements made in a bandwidth of 6.25kHz, measurement parameter settings defined in table 6.6.3B.3.4.2-1 shall be used. The measured power shall be verified for each step. The measurement period shall capture the active time slots.

Table 6.6.3B.3.4.2-1: Measurement setup for NS\_07

	Option 1 : Measurement with No RMS VBW available	Option 2: Measurement with VBW Filtering on Power scale
VBW	>=62.5 kHz (10 times or more the RBW)	<=43Hz
RBW	<=6.25kHz	<=6.25kHz
Detector type	Averages signal envelope during each measurement point, such as "RMS detector"	Peak
Averaging mode (Trace averaging)	Power (RMS voltage)	Power (RMS voltage), as controlled by "Average Type"
Average Type (applies to detector)	Power (RMS voltage) (automatically occurs with "RMS detector")	Not applicable
Average Type (applies to VBW filter)	Not applicable	Power (RMS voltage)
Number of averages	30, to reduce variance as required, or use an even longer sweep time	1 or use an even narrower VBW filter, thus a longer sweep time
Sweep time	[Don't specify]	Sweep rate (span divided by sweep time) <= 0.8 * RBW*VBW

6.6.3B.3.4.3 Message contents

6.6.3B.3.4.3.1 Message contents (network signalled value "NS\_05")

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions:

1. Information element additionalSpectrumEmission is set to NS\_05. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.3B.3.4.3.1-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additionalSpectrumEmission	5 (NS_05)		

#### 6.6.3B.3.4.3.2 Message contents (network signalled value "NS\_07")

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions:

1. Information element additionalSpectrumEmission is set to NS\_07. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.3B.3.4.3.2-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additionalSpectrumEmission	7 (NS_07)		

#### 6.6.3B.3.4.3.3 Message contents (network signalled value "NS\_08")

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions:

1. Information element additionalSpectrumEmission is set to NS\_08. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.3B.3.4.3.3-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additionalSpectrumEmission	8 (NS_08)		

#### 6.6.3B.3.4.3.4 Message contents (network signalled value "NS\_09")

Message contents are according to TS 36.508 [7] subclause 4.6, with the following exceptions:

1. Information element additionalSpectrumEmission is set to NS\_09. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

#### Table 6.6.3B.3.4.3.4-1: SystemInformationBlockType2: Additional spurious emissions requirement

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additional Spectrum Emission	9 (NS_09)		

#### 6.6.3B.3.4.3.5 Message contents exceptions (network signalled value "NS\_12")

1. Information element additionalSpectrumEmission is set to NS\_12. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3B.3.4.3.5-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS\_12"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element	Value/remark	Comment	Condition	
additional Spectrum Emission	12 (NS_12)			

#### 6.6.3B.3.4.3.6 Message contents exceptions (network signalled value "NS\_13")

1. Information element additionalSpectrumEmission is set to NS\_13. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3B.3.4.3.6-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS\_13"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element	Value/remark	Comment	Condition	
additionalSpectrumEmission	13 (NS_13)			

#### 6.6.3B.3.4.3.7 Message contents exceptions (network signalled value "NS\_14")

1. Information element additionalSpectrumEmission is set to NS\_14. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3B.3.4.3.7-1: SystemInformationBlockType2 : Additional spurious emissions test requirement for "NS\_14"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additional Spectrum Emission	14 (NS_14)		

#### 6.6.3B.3.4.3.8 Message contents exceptions (network signalled value "NS\_15")

1. Information element additionalSpectrumEmission is set to NS\_15. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3B.3.4.3.8-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS\_15"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additional Spectrum Emission	15 (NS_15)		

#### 6.6.3B.3.4.3.9 Message contents exceptions (network signalled value "NS\_16")

1. Information element additionalSpectrumEmission is set to NS\_16. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3B.3.4.3.9-1: SystemInformationBlockType2 : Additional spurious emissions test requirement for "NS\_16"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1				
Information Element Value/remark Comment Condition				
additional Spectrum Emission	16 (NS_16)			

#### 6.6.3B.3.4.3.10 Message contents exceptions (network signalled value "NS 17")

1. Information element additionalSpectrumEmission is set to NS\_17. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3B.3.4.3.10-1: SystemInformationBlockType2 :Additional spurious emissions test requirement for "NS\_17"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additional Spectrum Emission	17 (NS_17)		

#### 6.6.3B.3.4.3.11 Message contents exceptions (network signalled value "NS\_18")

1. Information element additionalSpectrumEmission is set to NS\_18. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3B.3.4.3.11-1: SystemInformationBlockType2 :Additional spurious emissions test requirement for "NS\_18"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additional Spectrum Emission	18 (NS_18)		

#### 6.6.3B.3.4.3.12 Message contents exceptions (network signalled value "NS\_19")

1. Information element additionalSpectrumEmission is set to NS\_19. This can be set in the *SystemInformationblockType2* as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

# Table 6.6.3B.3.4.3.12-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS\_19"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/remark	Comment	Condition
additional Spectrum Emission	19 (NS_19)		

#### 6.6.3B.3.5 Test requirement

### 6.6.3B.3.5.1 Test requirement (network signalled value "NS\_05")

When "NS\_05" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-4 as appropriate,

and

- the measured average power of spurious emission, derived in step 2, shall not exceed the described value in Table 6.6.3B.3.5.1-1. This requirement also applies for the frequency ranges that are less than  $\Delta fOOB$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.1-1: Additional requirements (PHS) test requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)		Measurement bandwidth			
	5 MHz	10 MHz	15 MHz	20 MHz		
1884.5 ≤ □f ≤ 1915.7*1	-41	-41	-41	-41	300 KHz	
Note 1: Applicable when the lower edge of the assigned E-UTRAUL channel bandwidth frequency is larger than or equal to the upper edge of PHS band (1915.7 MHz) + 4 MHz + the Channel BW assigned, where Channel BW is as defined in clause 5.4.2.  **Additional restrictions apply for operations below this point.**						

The requirements in Table 6.6.3B.3.5.1-1 apply with the additional restrictions specified in Table 6.6.3B.3.5.1-2 when the lower edge of the assigned E-UTRA UL channel bandwidth frequency is less than the upper edge of PHS band  $(1915.7\,\mathrm{MHz}) + 4\,\mathrm{MHz} + \mathrm{the}$  channel BW assigned.

Table 6.6.3B.3.5.1-2: RB restrictions for additional requirement (PHS)

15 MHz channel bandwidth with f <sub>c</sub> = 1932.5 MHz					
RB <sub>start</sub>	0-7	8-66	67-74		
L <sub>CRB</sub>	N/A	$\leq$ MIN(30, 67 – RB <sub>start</sub> )	N/A		
	20 MHz channel bandwidth with f <sub>c</sub> = 1930 MHz				
RB <sub>start</sub>	RB <sub>start</sub> 0-23 24-75 76-99				
L <sub>CRB</sub>	N/A	≤ MIN(24, 76 – RB <sub>start</sub> )	N/A		

NOTE: (only for testing requirements in Table 6.6.3B.3.5.1-1):

For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (300 kHz).

#### 6.6.3B.3.5.2 Test requirement (network signalled value "NS\_07")

When "NS\_07" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-7 as appropriate,

and

the measured average power of spurious emission, derived in step 4, shall not exceed the described value in Table 6.6.3B.3.5.2-1. These requirements also apply for the frequency ranges that are less than  $\Delta fOOB$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.2-1: Additional requirements (network signalled value "NS\_07")

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)	Measurement bandwidth	
	10 MHz		
769 ≤ f ≤ 775	-55.5	6.25 kHz	
Note: The emissions measurement shall be sufficiently power averaged to ensure a standard deviation < 0.5 dB.			

NOTE: (only for testing requirements in Table 6.6.3B.3.5.2-1):

For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (6.25 kHz).

#### 6.6.3B.3.5.3 Test requirement (network signalled value "NS 08")

When "NS 08" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-8 as appropriate,

and

- the measured average power of spurious emission, derived in step 4, shall not exceed the described value in Table 6.6.3B.3.5.3-1. This requirement also applies for the frequency ranges that are less than ΔfOOB (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.3-1: Additional requirements (network signalled value "NS 08")

Frequency band	Channel bandwidth / Spectrum emission limit (dBm)			Measurement	
(MHz)	5MHz 10MHz 15MHz		bandwidth		
860 ≤ f ≤ 890	-40	-40	-40	1 MHz	

NOTE: (only for testing requirements in Table 6.6.3B.3.5.3-1):

For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (1 MHz).

#### 6.6.3B.3.5.4 Test requirement (network signalled value "NS\_09")

When "NS\_09" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-9 as appropriate,

and

- the measured average power of spurious emission, derived in step 4, shall not exceed the described value in table 6.6.3B.3.5.4-1. This requirement also applies for the frequency ranges that are less than ΔfOOB (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.4-1: Additional requirements (network signalled value "NS\_09")

Frequency band	Channel bandwid	Measurement		
(MHz)	5MHz	bandwidth		
1475.9 ≤ f ≤ 1510.9	-35	-35	-35	1 MHz

NOTE 1: (only for testing requirements in Table 6.6.3B.3.5.4-1):

For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth (1 MHz).

NOTE 2: To improve measurement accuracy, A-MPR values for NS\_09 specified in Table 6.2.4B.3-1 in clause 6.2.4B are derived based on both the above NOTE 1 and 100 kHz RBW.

#### 6.6.3B.3.5.5 Test requirement (network signalled value "NS\_12")

When "NS 12" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-12 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3B.3.5-1. This requirement also applies for the frequency ranges that are less than ΔfOOB (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.5-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 1.4, 3, 5 MHz	Measurement bandwidth	Note
806 ≤ f ≤ 813.5	-42	6.25 kHz	1
NOTE 1: The emission li	mit applies at an offset of 0.7 MHz	below any block of E-UT	RA carriers.

#### 6.6.3B.3.5.6 Test requirement (network signalled value "NS\_13")

When "NS 13" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-13 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3B.3.5.6-1. This requirement also applies for the frequency ranges that are less than ΔfOOB (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.6-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5 MHz	Measurement bandwidth	Note	
806 ≤ f ≤ 816	-42	6.25 kHz	1	
NOTE 1: The emission li	NOTE 1: The emission limit applies at an offset of 3 MHz below any block of E-UTRA carriers.			

#### 6.6.3B.3.5.7 Test requirement (network signalled value "NS\_14")

When "NS 14" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-14 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3B.3.5.7-1. This requirement also applies for the frequency ranges that are less than ΔfOOB (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.7-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 10, 15 MHz	Measurement bandwidth	Note
806 ≤ f ≤ 816	-42	6.25 kHz	1
NOTE 1: The emission li	NOTE 1: The emission limit applies at an offset of 8 MHz below any block of E-UTRA carriers.		

#### 6.6.3B.3.5.8 Test requirement (network signalled value "NS\_15"

When "NS 15" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-15 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3B.3.5.8-1. This requirement also applies for the frequency ranges that are less than  $\Delta fOOB$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.8-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 1.4, 3, 5, 10, 15 MHz	Measurement bandwidth	Note	
851 ≤ f ≤ 859	-53	6.25 kHz		
NOTE: The emissions measurement shall be sufficiently power averaged to ensure standard deviation < 0.5 dB.				

6.6.3B.3.5.9 Test requirement (network signalled value "NS\_16")

When "NS 16" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-16 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3B.3.5.9-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.9-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 1.4, 3, 5, 10 MHz	Measurement bandwidth	Note
790 ≤ f ≤ 803	-32	1 MHz	

6.6.3B.3.5.10 Test requirement (network signalled value "NS\_17")

When "NS 17" is indicated in the cell:

the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-17 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3 B.3.5.10-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.10-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5, 10 MHz	Measurement bandwidth	Note
470 ≤ f ≤ 710	-26.2	6 MHz	1
NOTE 4. Applies	hala walana da a agai ayaad E HTD A agawi	ania agrafica di within 740	NALL.

NOTE 1: Applicable when the assigned E-UTRA carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz.

6.6.3B.3.5.11 Test requirement (network signalled value "NS\_18")

When "NS 18" is indicated in the cell:

the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-18 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table 6.6.3 B.3.5.11-1. This requirement also applies for the frequency ranges that are less than  $\Delta f_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.11-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 5, 10, 15, 20 MHz	Measurement bandwidth	Note
692-698	-26.2	6 MHz	

6.6.3B.3.5.12 Test requirement (network signalled value "NS 19")

When "NS 19" is indicated in the cell:

- the measured UE mean power in the channel bandwidth, derived in step 3, shall fulfil requirements in Table 6.2.4B.5-18 as appropriate,

and

- the power of any UE emission shall not exceed the levels specified in Table  $6.6.3\,B.3.5.12-1$ . This requirement also applies for the frequency ranges that are less than  $F_{OOB}$  (MHz) in Table 6.6.3.1.3-1 from the edge of the channel bandwidth.

Table 6.6.3B.3.5.12-1: Additional requirements

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm) 3, 5, 10, 15, 20 MHz	Measurement bandwidth	Note
662 ≤ f ≤ 694	-25	8 MHz	

### 6.7 Transmit intermodulation

## 6.7.1 Test purpose

To verify that the UE transmit intermodulation does not exceed the described value in the test requirement.

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.

# 6.7.2 Test applicability

This test applies to all types of E-UTRA UE release 8 and forward.

# 6.7.3 Minimum conformance requirements

User Equipment(s) transmitting in close vicinity of each other can produce intermodulation products, which can fall into the UE, or eNode B receive band as an unwanted interfering signal. The UE intermodulation attenuation is defined by

the ratio of the mean power of the wanted signal to the mean power of the intermodulation product when an interfering CW signal is added at a level below the wanted signal at each of the transmitter antenna port with the other antenna port(s) if any is terminated. Both the wanted signal power and the intermodulation product power are measured through E-UTRA rectangular filter with measurement bandwidth shown in Table 6.7.3-1.

The requirement of transmitting intermodulation is prescribed in Table 6.7.3-1.

BWChannel (UL) 5MHz 10MHz 15MHz 20MHz Interference Signal 5MHz 10MHz 40MHz 10MHz 20MHz 15MHz 30MHz 20MHz Frequency Offset Interference CW Signal Level -40dBc Intermodulation Product -29dBc -35dBc -29dBc -35dBc -29dBc -35dBc -29dBc -35dBc Measurement bandwidth 4.5MHz 4.5MHz 9.0MHz 9.0MHz 13.5MHz 13.5MHz 18MHz 18MHz

Table 6.7.3-1: Transmit Intermodulation

The normative reference for this requirement is TS 36.101 [2] clause 6.7.1.

## 6.7.4 Test description

#### 6.7.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.7.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Initial Conditions Test Environment as specified in Nomal TS 36.508[7] subclause 4.1 Test Frequencies as specified in Mid range TS36.508 [7] subclause 4.3.1 Test Channel Bandwidths as specified in 5MHz and Highest TS 36.508 [7] subdause 4.3.1 Test Parameters for Channel Bandwidths **Downlink Configuration** Uplink Configuration Ch BW N/A for Transmit Intermodulation Mod'n RB allocation FDD TDD 5MHz QPSK 8 8 10MHz **QPSK** 12 12 15MHz QPSK 16 16 QPSK 20MHz 18 Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable channel bandwidths are specified in Table 5.4.2.1-1.

Table 6.7.4.1-1: Test Configuration Table

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.2.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.

- 4. The UL Reference Measurement channels are set according to Table 6.7.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.7.4.3.

### 6.7.4.3 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.7.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands to the UE until the UE trans mits at its  $P_{UMAX}$  level.
- 3. Measure the rectangular filtered mean power of the UE. For TDD slots with transient periods are not under test for the wanted signal and for the intermodulation product.
- 4. Set the interference signal frequency below the UL carrier frequency using the first offset in table 6.7.5-1.
- 5. Set the interference CW signal level according to table 6.7.5-1.
- 6. Search the intermodulation product signals below and above the UL carrier frequency, then measure the rectangular filtered mean power of transmitting intermodulation for both signals, and calculate the ratios with the power measured in step 3.
- 7. Set the interference signal frequency above the UL carrier frequency using the first offset in table 6.7.5-1.
- 8. Search the intermodulation product signals below and above the UL carrier frequency, then measure the rectangular filtered mean power of transmitting intermodulation for both signals, and calculate the ratios with the power measured in step 3.

Repeat the measurement using the second offset in table 6.7.5-1.

#### 6.7.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6.

## 6.7.5 Test requirement

The ratio derived in step 5 and 7, shall not exceed the described value in table 6.7.5-1

Table 6.7.5-1: Transmit Intermodulation

BWChannel (UL)	5MHz		10MHz		15MHz		20MHz	
Interference Signal Frequency Offset	5MHz	10MHz	10MHz	20MHz	15MHz	30MHz	20MHz	40MHz (Note 1)
Interference CW Signal Level		-40dBc						
Intermodulation Product	-29dBc	-35dBc	-29dBc	-35dBc	-29dBc	-35dBc	-29dBc	-35dBc
Measurement bandwidth	4.5MHz	4.5MHz	9.0MHz	9.0MHz	13.5MHz	13.5MHz	18MHz	18MHz
Note 1: For Pand 20, anly applicable for interference signal frequency above the LIL corrier frequency								

### 6.7A Transmit intermodulation for CA

# 6.7A.1 Transmit intermodulation for CA (intra-band contiguous DL CA and UL CA)

#### Editor's notes:

The following items are missing or incomplete:

- Test tolerances

#### 6.7A.1.1 Test purpose

To verify that the UE transmit intermodulation does not exceed the described value in the test requirement.

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.

### 6.7A.1.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that supports intra-band contiguous DL CA and UL CA.

#### 6.7A.1.3 Minimum conformance requirements

User Equipment(s) transmitting in close vicinity of each other can produce intermodulation products, which can fall into the UE, or eNode B receive band as an unwanted interfering signal. The UE intermodulation attenuation is defined by the ratio of the mean power of the wanted signal to the mean power of the intermodulation product on both component carriers when an interfering CW signal is added at a level below the wanted signal at each of the transmitter antenna port with the other antenna port(s) if any is terminated. Both the wanted signal power and the intermodulation product power are measured through rectangular filter with measurement bandwidth shown in Table 6.7A.1-1.

For intra-band contiguous carrier aggregation the requirement of transmitting intermodulation is specified in Table 6.7.1A-1.

CA bandwidth class(UL)

Interference Signal Frequency Offset
Interference CW Signal Level

Intermodulation Product

Measurement bandwidth

C

BWChannel\_CA

2\*BWChannel\_CA

-40dBc

[-29dBc]

[-35dBc]

BWChannel\_CA-2\*BWGB

Table 6.7A.1-1: Transmit Intermodulation

The normative reference for this requirement is TS 36.101 [2] clause 6.7.1A.

#### 6.7A.1.4 Test description

#### 6.7A.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test

parameters for each channel bandwidth, and are shown in table 6.7A.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.7A.1.4.1-1: Test Configuration Table

Initial C	onditions							
	est Environment as spedfied in S 36.508[7] subclause 4.1		Nomal					
13 30.0	OO[1] SUDCIA	1u5e 4.1						
	08 [7] subcla	s specified in ause 4.3.1 for different CA	A bandwidth	C: Mid ra	nge			
subclau	se 5.4.2A.1	on setting (N <sub>RB_agg</sub> ) as sponsor the CA Configuration CA Configurations		Lowest N Highest N				
	figuration	DL Allocation	CC MOD	UL Alloc	ation			
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	PCC & SCC RB allocation		N <sub>RB_alloc</sub>	PCC & SCC (L <sub>CRB</sub> @ RB <sub>st</sub>	RB allocations <sub>art</sub> )	S	
75	75		QPSK	16	P_16@0	S_0@0	-	-
100	50	N/A	QPSK	12	P_12@0	S_0@0	-	<del> </del> -
100	100		QPSK	18 P_18@0 S_0@0				
Note 1:		ration Test CC Combinat e aggregated channel ba					uration, v	vhich

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure group A.37 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. Propagation conditions are set according to Annex B.0.
- 5. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.7A.1.4.3.

#### 6.7A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.0 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 6.7A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 6.7A.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 5. Send continuously uplink power control "up" commands on PCC and SCC to the UE until the UE transmits at its P<sub>UMAX</sub> level; allow at least 200ms for the UE to reach PUMAX level.

- 6. Measure the rectangular filtered mean power of the UE. For TDD slots with transient periods are not under test for the wanted signal and for the intermodulation product.
- 7. Set the interference signal frequency below  $F_{CA}$  low using the first offset in table 6.7A.1-1.
- 8. Set the interference CW signal level according to table 6.7A.1-1.
- 9. Search the intermodulation product signals below and above the aggregated UL carrier, then measure the rectangular filtered mean power of transmitting intermodulation for both signals, and calculate the ratios with the power measured in step 6.
- 10. Set the interference signal frequency above F<sub>CA high</sub> using the first offset in table 6.7A.1-1.
- 11. Search the intermodulation product signals below and above the aggregated UL carrier, then measure the rectangular filtered mean power of transmitting intermodulation for both signals, and calculate the ratios with the power measured in step 6.
- 12. Repeat the measurement using the second offset in table 6.7A.1-1.

#### 6.7A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

### 6.7A.1.5 Test requirement

The ratio derived in step 9 and 11, shall not exceed the described value in table 6.7A.1.5-1

CA bandwidth class(UL)

Interference Signal Frequency Offset
Interference CW Signal Level

Intermodulation Product

Measurement bandwidth

C

BWChannel\_CA

2\*BWChannel\_CA

-40dBc

[-35dBc]

BWChannel\_CA-2\*BWGB

Table 6.7A.1.5-1: Transmit Intermodulation

## 6.7B Transmit intermodulation for UL-MIMO

# 6.7B.1 Test purpose

To verify that the UE transmit intermodulation at each transmit antenna does not exceed the described value in the test requirement.

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.

# 6.7B.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

## 6.7B.3 Minimum conformance requirements

For UE with multiple antenna transmit connectors, the transmit intermodulation requirements are specified at each transmit antenna connector and the wanted signal is defined as the sum of output power at each transmit antenna connector.

For UEs with two transmit antenna connectors supporting dual-layer transmission, the requirements in subclause 6.7.3-1 apply to each transmit antenna connector with the UL-MIMO configurations specified in Table 6.2.2B.3-2.

The normative reference for this requirement is TS 36.101 [2] clause 6.7.1B.

## 6.7B.4 Test description

#### 6.7B.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.7B.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.7B.4.1-1: Test Configuration Table

Initial Conditions					
Test Environment as specified in		Nomal			
TS 36.	508[7] subclause 4.1				
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1		Mid range			
Test Channe	Bandwidths as specified in		5MHz and	l Highest	
TS 36.50	08 [7] subclause 4.3.1				
Test Parameters for Channel Bandwidths					
	Downlink Configur	ation	ion Uplink Configuration		
Ch BW	N/A for Transmit Interm	nodulation Mod'n RB alloca		ocation	
				FDD	TDD
5MHz			QPSK	8	8
10MHz			QPSK	12	12
15MHz			QPSK	16	16
20MHz			QPSK	18	18
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable channel bandwidths are specified in Table 5.4.2.1-1.					

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.39.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channels are set according to Table 6.7B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.7B.4.3.

#### 6.7B.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.7B.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands to the UE until the UE trans mits at its P<sub>UMAX</sub> level.
- 3. Measure the rectangular filtered mean power of the UE. For TDD slots with transient periods are not under test for the wanted signal and for the intermodulation product.
- 4. Set the interference signal frequency below the UL carrier frequency using the first offset in table 6.7B.5-1.
- 5. Set the interference CW signal level according to table 6.7B.5-1.
- 6. Search the intermodulation product signals below and above the UL carrier frequency, then measure the rectangular filtered mean power of transmitting intermodulation for both signals, and calculate the ratios with the power measured in step 3.
- 7. Set the interference signal frequency above the UL carrier frequency using the first offset in table 6.7B.5-1.
- 8. Search the intermodulation product signals below and above the UL carrier frequency, then measure the rectangular filtered mean power of transmitting intermodulation for both signals, and calculate the ratios with the power measured in step 3.
- 9. Repeat the measurement using the second offset in table 6.7B.5-1.
- 10. Repeat step 3) until 9) for each of transmit antenna of the UE.

#### 6.7B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6.6.7B.5 Test requirement

The ratio derived in step 5 and 7 at each transmit antenna of UE shall not exceed the described value in table 6.7B.5-1.

Table 6.7B.5-1: Transmit Intermodulation

BWChannel (UL)	5MHz		10MHz		15MHz		20MHz	
Interference Signal Frequency Offset	5MHz	10MHz	10MHz	20MHz	15MHz	30MHz	20MHz	40MHz (Note 1)
Interference CW Signal Level	-40dBc							
Intermodulation Product	-29dBc	-35dBc	-29dBc	-35dBc	-29dBc	-35dBc	-29dBc	-35dBc
Measurement bandwidth	4.5MHz	4.5MHz	9.0MHz	9.0MHz	13.5MHz	13.5MHz	18MHz	18MHz
Note 1: For Band 20, only applicable for interference signal frequency above the UL carrier frequency.								

# 6.8 Time alignment

FFS.

- 6.8.1 Void
- 6.8A Void

# 6.8B Time alignment error for UL-MIMO

## 6.8B.1 Test purpose

To verify that the error of time alignment in UL MIMO does not exceed the range prescribed by the specified UL MIMO Time Alignment Error (TAE) and tolerance.

An excess time alignment error has the possibility to interfere to other channels or other systems and decrease UL MIMO performance because of the timing unsynchronization.

## 6.8B.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support UL MIMO.

## 6.8B.3 Minimum conformance requirements

For UE(s) with multiple transmit antenna connectors, the Time Alignment Error (TAE) shall not exceed 130 ns.

Table 6.8B.3-1: UL-MIMO configuration in closed-loop spatial multiplexing scheme

Transmission mode	DCI format	Codebook Index
Mode 2	DCI format 4	Codebook index 0

The normative reference for this requirement is TS 36.101 [2] clause 6.8B.

# 6.8B.4 Test description

#### 6.8B.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA operating bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.8B.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annexe A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.8B.4.1-1: Test Configuration Table

Initial Conditions					
Test Environment as specified in		Nomal			
TS 36.508[7]	clause 4.1				
Test Frequen	cies as specified in	Mid range			
TS36.508 [7]	clause 4.3.1				
Test Channel	Bandwidths as specified in	Lowest, 5MH	z, Highest		
TS 36.508 [7]	clause 4.3.1				
	Test Parameters for Channel Bandwidths				
	Downlink Configur	Uplink Configuration			
Ch BW			Mod'n	RB allo	ocation
				FDD	TDD
1.4MHz				6	6
3MHz	3MHz N/A 5MHz 10MHz 15MHz		QPSK	15	15
5MHz			QPSK	25	25
10MHz			QPSK	50	50
15MHz			QPSK	75	75
20MHz			QPSK	100	100
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, the applicable					
ch	channel bandwidths are specified in Table 5.4.2.1-1.				

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508[7] Annex A Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C.0, C.1, and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL Reference Measurement channel is set according to Table 6.8B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.8B.4.3.

### 6.8B.4.2 Test procedure

- 1. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 6.8B.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 2. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms for the UE to reach PUMAX level for UE.
- 3. Measure the timing of one sub-frame at each antenna connector.

#### 6.8B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6.

#### 6.8B.5 Test requirements

For UE(s) with multiple transmit antenna connectors, the Time Alignment Error (TAE) shall not exceed 155 ns.

# 7 Receiver Characteristics

## 7.1 General

Unless otherwise stated the receiver characteristics are specified at the antenna connector(s) of the UE. For UE(s) with an integral antenna only, a reference antenna(s) with a gain of 0 dBi is assumed for each antenna port(s). UE with an

integral antenna(s) may be taken into account by converting these power levels into field strength requirements, assuming a 0 dBi gain antenna. For UEs with more than one receiver antenna connector, identical interfering signals shall be applied to each receiver antenna port if more than one of these is used (diversity).

Unless otherwise stated, the test signal levels are defined at each antenna port, and specified in the respective sections below. Any specific test conditions are defined in the paragraph for each test. Unless stated otherwise, power control of the Downlink is OFF.

In general, the UE is set into the correct state in the "Initial conditions" part of the test, using normal SS signalling procedures over the air interface under easy radio conditions to ensure reliable message exchange. In the "Test procedure" part of the test, specific radio conditions are applied according to the test requirement and the desired measurement is made or the desired response is tested.

The ACS, blocking, spurious emissions and intermodulation requirements in sections 7.5, 7.6, 7.7 and 7.8 are defined for full band width signals i.e. for signals where all resource blocks are allocated for a specific user.

With the exception of Clause 7.3, the requirements shall be verified with the network signalling value NS\_01 configured (Table 6.2.4.3-1).

All the parameters in clause 7 are defined using the UL reference measurement channels specified in Annexes A.2.2 and A.2.3, the DL reference measurement channels specified in Annex A.3.2 and using the set-up specified in Annex C.3.1.

For CA tests, Cell ID = 0 applies to P-Cell, and Cell ID = 1 is used for S-Cell.

Parameters given in table 7.1-1 are used throughout this section for CA, unless otherwise stated by the test case.

Table 7.1-1: Common Test Parameters

Parameter	Value	Comments
Cross carrier	Not configured	
scheduling		

# 7.2 Diversity characteristics

The requirements in Section 7 assume that the receiver is equipped with two Rx port as a baseline. Requirements for 4 ports are FFS. With the exception of clause 7.9, All requirements shall be verified by using both (all) antenna ports simultaneously.

# 7.3 Reference sensitivity level

Editor's note: FDD/TDD aspects missing or not yet determined:

- The Maximum Sensitivity Degradation figures for large transmission configurations are not finalised in the core specification.

# 7.3.1 Test purpose

To verify the UE's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of low signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the effective coverage area of an e-NodeB.

# 7.3.2 Test applicability

This test applies to all types of E-UTRA UE release 8 and forward.

## 7.3.3 Minimum conformance requirements

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3.3-1, Table 7.3.3-2 and Table 7.3.3-3.

Table 7.3.3-1: Reference sensitivity QPSK PREFSENS

E-UTRA	1.4 MHz	3 MHz	annel ban	awiath 10 MHz	15 MHz	20 MHz	Duplex
E-UTRA Band	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	Mode
1	-	-	-100	-97	-95.2	-94	FDD
2	-102.7	-99.7	-98	-95	-93.2	-92	FDD
3	-101.7	-98.7	-97	-94	-92.2	-91	FDD
4	-104.7	-101.7	-100	-97	-95.2	-94	FDD
5	-103.2	-100.2	-98	-95			FDD
6	-	-	-100	-97			FDD
7	-	-	-98	-95	-93.2	-92	FDD
8	-102.2	-99.2	-97	-94			FDD
9	-	-	-99	-96	-94.2	-93	FDD
10	-	-	-100	-97	-95.2	-94	FDD
11	-	-	-100	-97			FDD
12	-101.7	-98.7	-97	-94			FDD
13			-97	-94			FDD
14		-	-97	-94			FDD
17	-	-	-97	-94			FDD
18	-	-	-100 <sup>7</sup>	-97 <sup>7</sup>	-95.2	-	FDD
19	-	-	-100	-97	-95.2	-	FDD
20			-97	-94	-91.2	-90	FDD
21			-100	-97	-95.2		FDD
22			-97	-94	-92.2	-91	FDD
23	-104.7	-101.7	-100	-97	-95.2	-94	FDD
24			-100	-97			FDD
25	-101.2	-98.2	-96.5	-93.5	-91.7	-90.5	FDD
26	-102.7	-99.7	-97.5 <sup>6</sup>	-94.5 <sup>6</sup>	-92.7 <sup>6</sup>		FDD
27	-103.2	-100.2	-98	-95			FDD
28		-100.2	-98.5	-95.5	-93.7	-91	FDD
31	-99.0	-95.7	-93.5				FDD
33	-	-	-100	-97	-95.2	-94	TDD
34	-	-	-100	-97	-95.2	-	TDD
35	-106.2	-102.2	-100	-97	-95.2	-94	TDD
36	-106.2	-102.2	-100	-97	-95.2	-94	TDD
37	-	-	-100	-97	-95.2	-94	TDD
38	-	-	-100	-97	-95.2	-94	TDD
39	-	-	-100	-97	-95.2	-94	TDD
40	-	-	-100	-97	-95.2	-94	TDD
41	-	-	-98	-95	-93.2	-92	TDD
42	-	-	-99	-96	-94.2	-93	TDD
43	-	-	-99	-96	-94.2	-93	TDD
44		[-100.2]	[-98]	[-95]	[-93.2]	[-92]	TDD

Note 1: The transmitter shall be set to P<sub>UMAX</sub> as defined in clause 6.2.5

Note 2: The reference measurement channel is specified in A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1

Note 3: The signal power is specified per port

Note 4: For the UE which supports both Band 3 and Band 9 the reference sensitivity level is FFS.

Note 5: For the UE which supports both Band 11 and Band 21 the reference sensitivity

level is FFS.

Note 6: findicates that the requirement is modified by -0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

Note 7: For a UE that support both Band 18 and Band 26, the reference sensitivity level

for Band 26 applies for the applicable channel bandwidths.

The reference receive sensitivity (REFSENS) requirement specified in Table 7.3.3-1 shall be met for an uplink transmission bandwidth less than or equal to that specified in Table 7.3.3-2.

NOTE: Table 7.3.3-2 does not necessarily reflect the operational conditions of the network, where the number of uplink and downlink allocated resource blocks will be practically constrained by other factors.

Table 7.3.3-2: Uplink configuration for reference sensitivity

	E-UTRA Band / Channel bandwidth / N <sub>RB</sub> / Duplex mode								
E- UTRA Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Duplex Mode		
1	-	-	25	50	75	100	FDD		
2	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD		
3	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD		
4	6	15	25	50	75	100	FDD		
5	6	15	25	25 <sup>1</sup>	-	-	FDD		
6	-	-	25	25 <sup>1</sup>	-	-	FDD		
7	-	-	25	50	75	75 <sup>1</sup>	FDD		
8	6	15	25	25 <sup>1</sup>	-	-	FDD		
9	-	-	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD		
10	-	-	25	50	75	100	FDD		
11	-	-	25	25 <sup>1</sup>			FDD		
12	6	15	20 <sup>1</sup>	20 <sup>1</sup>			FDD		
13			20 <sup>1</sup>	20 <sup>1</sup>			FDD		
14		-	15 <sup>1</sup>	15 <sup>1</sup>			FDD		
17	-	-	20 <sup>1</sup>	20 <sup>1</sup>			FDD		
18	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	FDD		
19	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	FDD		
20			25	20 <sup>1</sup>	20 <sup>3</sup>	20 <sup>3</sup>	FDD		
21			25	25 <sup>1</sup>	25 <sup>1</sup>		FDD		
22			25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD		
23	6	15	25	50	75	100	FDD		
24			25	50			FDD		
25	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD		
26	6	15	25	25 <sup>1</sup>	25 <sup>1</sup>		FDD		
27	6	15	25	25 <sup>1</sup>			FDD		
28		15	25	25 <sup>1</sup>	25 <sup>1</sup>	25 <sup>1</sup>	FDD		
31	6	5 <sup>4</sup>	5 <sup>4</sup>				FDD		
33	-	-	25	50	75	100	TDD		
34	-	-	25	50	75	-	TDD		
35	6	15	25	50	75	100	TDD		
36	6	15	25	50	75	100	TDD		
37	-	-	25	50	75	100	TDD		
38	-	-	25	50	75	100	TDD		
39			25	50	75	100	TDD		
40			25	50	75	100	TDD		
41			25	50	75	100	TDD		
42			25	50	75	100	TDD		
43			25	50	75	100	TDD		
44		15	25	50	75	100	TDD		
Note 1:						s possible			

Note 1: The UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).

Note 2: For the UE which supports both Band 11 and Band 21 the uplink configuration for reference sensitivity is FFS.

Note 3: For Band 20; in the case of 15MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>=11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>=16.

Note 4: <sup>4</sup> refers to Band 31; in the case of 3 MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub> 9 and in the case of 5 MHz

channel bandwidth, the UL resource blocks shall be located at RB  $_{\mbox{\scriptsize start}}$  10

Unless given by Table 7.3.3-3, the minimum requirements specified in Tables 7.3.3-1 and 7.3.3-2 shall be verified with the network signalling value NS\_01 (Table 6.2.4.3-1) configured.

Table 7.3.3-3: Network Signalling Value for reference sensitivity

E-UTRA Band	Network Signalling value
2	NS_03
4	NS_03
10	NS_03
12	NS_06
13	NS_06
14	NS_06
17	NS_06
19	NS_08
21	NS_09
23	NS_03

The normative reference for this requirement is TS 36.101 [2] clause 7.3.1.

## 7.3.4 Test description

#### 7.3.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.3.4.1-1. The details of the downlink and uplink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.3.4.1-1: Test Configuration Table

Initial Conditions								
Test Environment as specified in			NC, TL/VL, TL/VH, TH/VL, TH/VH					
	subclause 4.1							
Test Frequer	ncies as specifie	ed in	Low range, M	lid range, High	range			
TS36.508 [7]	subclause 4.3.	1			-			
	l Bandwidths as		Lowest, 5MH	z, Highest				
TS 36.508 [7	] subdause 4.3							
				I Bandwidths				
		llink Configur		•	nk Configurat			
Ch BW	Mod'n		ocation	Mod'n		ocation		
		FDD	TDD		FDD	TDD		
1.4MHz	QPSK	6	6	QPSK	6	6		
3MHz	QPSK	15	15	QPSK	15	15		
5MHz	QPSK	25	25	QPSK	25	25		
5MHz	QPSK	25	N/A	QPSK	20	N/A		
5MHz	QPSK	25	N/A	QPSK	15	N/A		
10MHz	QPSK	50	50	QPSK	50	50		
10MHz	QPSK	50	N/A	QPSK	25	N/A		
10MHz	QPSK	50	N/A	QPSK	20	N/A		
10MHz	QPSK	50	N/A	QPSK	15	N/A		
15MHz	QPSK	75	75	QPSK	75	75		
15MHz	QPSK	75	N/A	QPSK	50	N/A		
15MHz	QPSK	75	N/A	QPSK	25	N/A		
15MHz	QPSK	75	N/A	QPSK	20	N/A		
20MHz	QPSK	100	100	QPSK	100	100		
20MHz	QPSK	100	N/A	QPSK	75	N/A		
20MHz	QPSK	100	N/A	QPSK	50	N/A		
20MHz	QPSK	100	N/A	QPSK	25	N/A		
20MHz	QPSK	100	N/A	QPSK	20	N/A		
	est Channel Bar					/hich		
	plicable channe							
Note 2. Depending on E-UTRA band, only the appropriate Uplink RB allocation value according								
to table 7.3.3-2 is tested per Test Channel Bandwidth. The allocation shall be located as close as possible to the downlink operating band but confined within the transmission								
						ISITISSION		
	andwidth config					1		
Note 3: For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.								

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.3.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.3.4.3.

#### 7.3.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.3.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the Downlink signal level to the appropriate REFSENS value defined in Table 7.3.5-1. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE to ensure the UE transmits P<sub>UMAX</sub> level for at least the duration of the Throughput measurement.

4. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.

#### 7.3.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exceptions.

#### 7.3.4.3.1 Message contents exceptions (network signalled value "NS 01")

Message contents according to TS 36.508 [7] subclause 4.6 can be used without exceptions.

#### 7.3.4.3.2 Message contents exceptions (network signalled value "NS\_03")

1. Information element additional Spectrum Emission is set to NS\_03. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 7.3.4.3.2-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS 03"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Conditio						
additionalSpectrumEmission	3 (NS_03)					

#### 7.3.4.3.3 Message contents exceptions (network signalled value "NS\_06")

1. Information element additional Spectrum Emission is set to NS\_06. This can be set in the SystemInformationblock Type2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 7.3.4.3.3-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS 06"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element	Value/remark	Comment	Condition			
additional Spectrum Emission	6 (NS_06)					

#### 7.3.4.3.4 Message contents exceptions (network signalled value "NS\_[09]")

1. Information element additional Spectrum Emission is set to NS\_[09]. This can be set in the SystemInformationblock Type2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 7.3.4.3.4-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS [09]"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Condition						
additional Spectrum Emission	TBD					

## 7.3.5 Test requirement

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.3.5-1 and Table 7.3.5-2.

Table 7.3.5-1: Reference sensitivity QPSK PREFSENS

E LITDA	4 4 14 14		annel ban		15 MHz	20 MU-	Dunler
E-UTRA Band	1.4 MHz (dBm)	3 MHz (dBm)	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	Duplex Mode
1	(dBiii)	- (ubiii)	-99.3	-96.3	-94.5	-93.3	FDD
2	-102.0	-99.0	-97.3	-94.3	-92.5	-91.3	FDD
3	-101.0	-98.0	-96.3	-93.3	-91.5	-90.3	FDD
4	-104.0	-101	-99.3	-96.3	-94.5	-93.3	FDD
5	-102.5	-99.5	-97.3	-94.3	0 1.0	00.0	FDD
6	-	-	-99.3	-96.3			FDD
7	-	_	-97.3	-94.3	-92.5	-91.3	FDD
8	-101.5	-98.5	-96.3	-93.3	02.0	01.0	FDD
9	-	-	-98.3	-95.3	-93.5	-92.3	FDD
10	_	_	-99.3	-96.3	-94.5	-93.3	FDD
11	_	_	-99.3	-96.3	0		FDD
12	-101.0	-98.0	-96.3	-93.3			FDD
13	.01.0	30.0	-96.3	-93.3			FDD
14		-	-96.3	-93.3			FDD
			00.0	00.0			
17	-	-	-96.3	-93.3			FDD
18	-	-	-99.3 <sup>7</sup>	-96.3 <sup>7</sup>	-94.5	-	FDD
19	_	-	-99.3	-96.3	-94.5	-	FDD
20			-96.3	-93.3	-90.5	-89.3	FDD
21			-99.3	-96.3	-94.5		FDD
22			-96.0	-93.0	-91.2	-90.0	FDD
23	-104.0	-101	-99.3	-96.3	-94.5	-93.3	FDD
24			-99.3	-96.3			FDD
25	-100.5	-97.5	-95.8	-92.8	-91.0	-89.8	FDD
26	-102	-99	-96.8 <sup>6</sup>	-93.8 <sup>6</sup>	-92 <sup>6</sup>		FDD
27	-102.5	-99.5	-97.3	-94.3			FDD
28		-99.5	-97.8	-94.8	-93.0	-90.3	FDD
31	-98.3	-95.0	-92.8				FDD
33	-	-	-99,3	-96.3	-94.5	-93.3	TDD
34	-	-	-99.3	-96.3	-94.5	-	TDD
35	-105.5	-101.5	-99.3	-96.3	-94.5	-93.3	TDD
36	-105.5	-101.5	-99.3	-96.3	-94.5	-93.3	TDD
37	-	-	-99.3	-96.3	-94.5	-93.3	TDD
38	-	-	-99.3	-96.3	-94.5	-93.3	TDD
39	-	-	-99.3	-96.3	-94.5	-93.3	TDD
40	-	-	-99.3	-96.3	-94.5	-93.3	TDD
41	-	-	-97.3	-94.3	-92.5	-91.3	TDD
42	-	-	-98.0	-95.0	-93.2	-92.0	TDD
43	-	-	-98.0	-95.0	-93.2	-92.0	TDD
44		[-99.5]	[-97.3]	[-94.3]	[-92.5]	[-91.3]	TDD

Note 1: The transmitter shall be set to maximum output power level (Table 7.3.5-2)

Note 2: The reference measurement channel is specified in A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1

Note 3: The signal power is specified per port

Note 4: For the UE which supports both Band 3 and Band 9 the reference sensitivity level is FFS.

Note 5: For the UE which supports both Band 11 and Band 21 the reference sensitivity

level is FFS.

Note 6: level is FFS.

6 indicates that the requirement is modified by -0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

Note 7: For a UE that support both Band 18 and Band 26, the reference sensitivity level

for Band 26 applies for the applicable channel bandwidths.

NOTE 1: The relation to the received PSD is  $\langle \text{REF}\,\hat{I}_{or} \rangle = P_{REFSENS} \left( N_{sc}^{RB} N_{RB} \Delta f \right)^{-1}$  with  $N_{RB}$  is the transmission bandwidth configuration according to Table 5.4.2-1.

The reference receive sensitivity (REFSENS) requirement specified in Table 7.3.5-1 shall be met for an uplink transmission bandwidth less than or equal to that specified in Table 7.3.5-2.

NOTE 2: Table 7.3.5-2 does not necessarily reflect the operational conditions of the network, where the number of uplink and downlink allocated resource blocks will be practically constrained by other factors.

Table 7.3.5-2: Uplink configuration for reference sensitivity

E-UTRA Band / Channel bandwidth / N <sub>RB</sub> / Duplex mode								
E- UTRA Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Duplex Mode	
1	-	-	25	50	75	100	FDD	
2	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD	
3	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD	
4	6	15	25	50	75	100	FDD	
5	6	15	25	25 <sup>1</sup>	-	-	FDD	
6	-	-	25	25 <sup>1</sup>	-	-	FDD	
7	-	-	25	50	75	75 <sup>1</sup>	FDD	
8	6	15	25	25 <sup>1</sup>	-	-	FDD	
9	-	-	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD	
10	-	-	25	50	75	100	FDD	
11	-	-	25	25 <sup>1</sup>			FDD	
12	6	15	20 <sup>1</sup>	20 <sup>1</sup>			FDD	
13			20 <sup>1</sup>	20 <sup>1</sup>			FDD	
14		-	15 <sup>1</sup>	15 <sup>1</sup>			FDD	
17	-	-	20 <sup>1</sup>	20 <sup>1</sup>			FDD	
18	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	FDD	
19	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	FDD	
20			25	20 <sup>1</sup>	20 <sup>3</sup>	20 <sup>3</sup>	FDD	
21			25	25 <sup>1</sup>	25 <sup>1</sup>		FDD	
22			25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD	
23	6	15	25	50	75	100	FDD	
24			25	50			FDD	
25	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD	
26	6	15	25	25 <sup>1</sup>	25 <sup>1</sup>		FDD	
27	6	15	25	25 <sup>1</sup>			FDD	
28		15	25	25 <sup>1</sup>	25 <sup>1</sup>	25 <sup>1</sup>	FDD	
31	6	5 <sup>4</sup>	5 <sup>4</sup>				FDD	
33	-	-	25	50	75	100	TDD	
34	-	-	25	50	75	-	TDD	
35	6	15	25	50	75	100	TDD	
36	6	15	25	50	75	100	TDD	
37	-	-	25	50	75	100	TDD	
38	-	-	25	50	75	100	TDD	
39			25	50	75	100	TDD	
40			25	50	75	100	TDD	
41			25	50	75	100	TDD	
42			25	50	75	100	TDD	
43			25	50	75	100	TDD	
44		15	25	50	75	100	TDD	
Note 1:						s possible		
downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).								

configuration for the channel bandwidth (Table 5.4.2-1).

Note 2: For the UE which supports both Band 11 and Band 21 the uplink configuration for reference sensitivity is FFS.

Note 3: For Band 20; in the case of 15MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>=11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>=16

<sup>4</sup>refers to Band 31; in the case of 3 MHz channel bandwidth, the UL Note 4: resource blocks shall be located at  $RB_{\text{start}}\,9$  and in the case of  $5\,\text{MHz}$  channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub> 10

## 7.3A Reference sensitivity level for CA

## 7.3A.1 Reference sensitivity level for CA (intra-band contiguous DL CA and UL CA)

#### 7.3A.1.1 Test purpose

To verify the ability of UE that support CA to receive data with a given average throughput for a specified reference measurement channel, under conditions of low signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the effective coverage area of an e-NodeB.

### 7.3A.1.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

#### 7.3A.1.3 Minimum conformance requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3.3-1 and Table 7.3.3-2. The reference sensitivity is defined to be met with both downlink component carriers active and either of the uplink component carriers active. The UE shall meet the requirements specified in clause 7.3.1 with the following exceptions.

For the UE which supports inter-band carrier aggregation configuration in Table 7.3A.1.3-0 with uplink in one E-UTRA band, the min imu m requirement for reference sensitivity in Table 7.3.1-1 shall be increased by the amount given in  $\Delta R_{IB,c}$  in Table 7.3A.1.3-0 for the applicable E-UTRA bands.

Inter-band CA Configuration	E-UTRA Band	ΔR <sub>IB,c</sub> [dB]
CA_1A-5A	1	0
OA_IA-JA	5	0
CA_1A-18A	1	0
CA_IA-10A	18	0
CA_1A-19A	1	0
CA_IA-IBA	19	0
CA_1A-21A	1	0
CA_TA-ZTA	21	0
CA 2A 47A	2	0
CA_2A-17A	17	0.5
CA_3A-5A	3	0
	5	0
CA 2A 7A	3	0
CA_3A-7A	7	0
CA_3A-8A	3	0
	8	0
CA_3A-20A	3	0
	20	0
CA 4A 5A	4	0
CA_4A-5A	5	0
CA_4A-7A	4	0.5
	_	^ F

Table 7.3A.1.3-0: ΔR<sub>IB,c</sub>

Inter-band CA Configuration	E-UTRA Band	ΔR <sub>IB,c</sub> [dB]
CA_4A-12A	4	0
UA_4A-12A	12	0.5
CA_4A-13A	4	0
0/ <u>1</u> 4/(10/(	13	0
CA_4A-17A	4	0
	17	0.5
CA_5A-12A	5	0.5
	12	0.3
CA_5A-17A	5	0.5
	17	0.3
CA_7A-20A	7	0
CA_1 A-20A	20	0
CA_8A-20A	8	0
	20	0
CA_11A-18A	11	0
CA_TTA-TOA	18	0

- NOTE 1: The above additional tolerances are only applicable for the E-UTRA operating bands that belong to the supported inter-band carrier aggregation configurations
- NOTE 2: The above additional tolerances also apply in non-aggregated operation for the supported E-UTRA operating bands that belong to the supported inter-band carrier aggregation configurations
- NOTE 3: In case the UE supports more than one of the above inter-band carrier aggregation configurations and a E-UTRA operating band belongs to more than one inter-band carrier aggregation configurations then:
  - When the E-UTRA operating band frequency range is ≤ 1GHz, the applicable additional tolerance shall be the average of the tolerances in Table 7.3A.1.3-0, truncated to one decimal place that would apply for that operating band among the supported CA configurations. In case there is a harmonic relation between low band UL and high band DL, then the maximum tolerance among the different supported carrier aggregation configurations involving such band shall be applied
  - When the E-UTRA operating band frequency range is >1GHz, the applicable additional tolerance shall be the maximum tolerance in Table 7.3A.1.3-0 that would apply for that operating band among the supported CA configurations

NOTE: The above additional tolerances do not apply to supported UTRA operating bands with frequency range below 1 GHz that correspond to the E-UTRA operating bands that belong to the supported inter-band carrier aggregation configurations when such bands are belonging only to band combination(s) where one band is <1 GHz and another band is >1.7 GHz and there is no harmonic relationship between the low band UL and high band DL. Otherwise the above additional tolerances also apply to supported UTRA operating bands that correspond to the E-UTRA operating bands that belong to the supported inter-band carrier aggregation configurations.

For the UE that supports any of the E-UTRA CA configurations given in Table 7.3A.1.3-0a, exceptions are allowed when the uplink active in the lower-frequency operating band is within a specified frequency range as noted in Table 7.3A.1.3-0a. For these exceptions, the UE shall meet the requirements specified in Table 7.3A.1.3-0a, Table 7.3A.1.3-0b and Table 7.3A.1.3-0c.

Table 7.3A.1.3-0a: Reference sensitivity for carrier aggregation QPSK PREFSENS, CA

Channel bandwidth								
EUTRA CA Configuration	EUTRA band	1.4 MHz (dBm)	3 MHz (dBm)	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	Duplex mode
CA_3A-8 A <sup>4</sup>	3				N/A	N/A	N/A	FDD
	8			N/A	N/A			רטט
CA_4A-12A <sup>5</sup>	4	[-89.2]	[-89.2]	[-90]	[-89.5]			FDD
	12			- 96.5	- 93.5			רטט
CA_4A-17A <sup>5</sup>	4			[-90]	[-89.5]			FDD
0A_ <del>1</del> A-17A	17			-96.5	-93.5			טט ו

NOTE 1: The transmitter shall be set to Pumax as defined in subdause 6.2.5A.

NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1

NOTE 3: The signal power is specified per port

NOTE 4: No requirements apply when there is at least one individual RE within the transmission bandwidth of the low band for which the 2nd harmonic is within the transmission bandwidth of the high band. The reference sensitivity is only verified when this is not the case (the requirements specified in clause 7.3.3 apply).

NOTE 5: These requirements apply when there is at least one individual RE within the transmission bandwidth of the low band for which the 3rd harmonic is within transmission bandwidth of the high band. The requirements should be verified for UL EARFCN of the low band (superscript LB) such that  $f_{UL}^{LB} = \left \lfloor f_{DL}^{HB} / 0.3 \right \rfloor 0.1$  in MHz and

 $F_{UL\_low}^{LB} + BW_{Channel}^{LB}/2 < f_{UL}^{LB} < F_{UL\_high}^{LB} - BW_{Channel}^{LB}/2 \ \, \text{with} \, f_{DL}^{HB} \, \, \text{the carrier frequency of the high}$ 

band in MHz and  $\mathit{BW}^\mathit{LB}_\mathit{Channel}$  the channel bandwidth configured in the low band.

Table 7.3A.1.3-0b: Uplink configuration for the low band

E-1	E-UTRA Band / Channel bandwidth of the high band / NRB / Duplex mode											
EUTRA CA Configuration UL band 1.4 MHz (dBm) 3 MHz (dBm) 5 MHz (dBm) 15 MHz (dBm) 15 MHz (dBm) (dBm) (dBm) (dBm) (dBm) mod												
CA_4A-12A	12	2	5	8	16			FDD				
CA_4A-17A	17			8	16			FDD				

NOTE 1: refers to the UL resource blocks, which shall be centred within the transmission bandwidth configuration for the channel bandwidth

NOTE 2: the UL configuration applies regardless of the channel bandwidth of the low band unless the UL resource blocks exceed that specified in Table 7.3.3-2 for the uplink bandwidth in which case the allocation according to Table 7.3.3-2 applies

Unless given by Table 7.3A.1.3-0c, the minimum requirements specified in Tables 7.3A.1.3-0a and 7.3.A.1.3-0b shall be verified with the network signalling value NS\_01 (Table 6.2.4.3-1) configured.

Table 7.3A.1.3-0c: Network signalling value for reference sensitivity

E-UTRA CA Configuration	Uplink Band	Network Signalling value
CA_4A-12A	12	NS_06
CA_4A-17A	17	NS_06

For band combinations including operating bands without uplink band (as noted in Table 5.2-1), the requirements are specified in Table 7.3A.1-3-0d, Table 7.3A.1.3-0e and Table 7.3A.1.3-0f.

Table 7.3A.1.3-0d: Reference sensitivity QPSK PREFSENS

	Channel bandwidth											
EUTRA CA EUTRA 1.4 MHz 3 MHz 5 MHz 10 MHz 15 MHz 20 MHz Duplex Configuration band (dBm) (dBm) (dBm) (dBm) (dBm) (dBm) (dBm)												
CA 2A-29A	2			-98	-95			FDD				
CA_2A-29A	29		-98.7	-97	-94			רטט				

NOTE 1: The transmitter shall be set to Pumax as defined in subdause 6.2.5A.

NOTE 2: Reference measurement channel is A.3.2 with one sided dynamic OCNG Pattern OP.1

FDD/TDD as described in Annex A.5.1.1/A.5.2.1

NOTE 3: The signal power is specified per port

Table 7.3A.1.3-0e: Uplink configuration for reference sensitivity

E-UTRA Band / Channel bandwidth / NRB / Duplex mode											
E-UTRA CA EUTRA 1.4 MHz 3 MHz 5 MHz 10 MHz 15 MHz 20 MHz Duplex Configuration band (dBm) (dBm) (dBm) (dBm) (dBm) (dBm) (dBm) mode											
CA 2A-29A	2			25	50			FDD			
CA_2A-29A 29 N/A N/A N/A FD											

Unless given by Table 7.3A.1.3-0f, the minimum requirements specified in Tables 7.3A.1.3-0d and 7.3A.1.3-0e shall be verified with the network signalling value NS\_01 (Table 6.2.4.3-1) configured.

Table 7.3A.1.3-0f: Network signalling value for reference sensitivity

EUTRA CA Configuration	Uplink Band	Network Signalling value
CA 2A-29A	2	NS 03

For intra-band contiguous carrier aggregation the throughput of each component carrier shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3.3-1 and table 7.3A.1.3-1. Table 7.3A.1.3-1 specifies the maximum number of allocated uplink resource blocks for which the intra-band contiguous carrier aggregation reference sensitivity requirement shall be met. The PCC and SCC allocations follow Table 7.3.3-2 and form a contiguous allocation where TX–RX frequency separations are as defined in Table 5.3-1. For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.3-2.

Table 7.3A.1.3-1: Intra-band CA uplink configuration for reference sensitivity

	CA	configura	tion / CC	combina	tion / N <sub>RB_</sub>	<sub>agg</sub> / Duple	x mode			
CA configuration	100RB+50RB		75RB-	75RB+75RB		100RB+75RB		-100RB	Duplex	
	PCC	scc	PCC	scc	PCC	scc	PCC	scc	Mode	
CA_1C	n/a	n/a	75	55	<u>n/a</u>	<u>n/a</u>	100	30	FDD	
CA_7C	n/a	n/a	75	0	n/a	n/a	75	0	FDD	
CA_38C			75	75			100	100	TDD	
CA_40C	100	50	75	75	n/a	n/a	100	100	TDD	
CA_41C	100	50	75	75	100	75	100	100	TDD	

- NOTE 1: The carrier centre frequency of SCC in the UL operating band is configured closer to the DL operating band.
- NOTE 2: The transmitted power over both PCC and SCC shall be set to PUMAX as defined in subdause 6.2.5A.
- NOTE 3: The UL resource blocks in both PCC and SCC shall be confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).
- NOTE 4: The UL resource blocks in PCC shall be located as close as possible to the downlink operating band, while the UL resource blocks in SCC shall be located as far as possible from the downlink operating band.

For intra-band non-contiguous carrier aggregation with one uplink carrier on the PCC, the throughput of each downlink component carrier shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3.3-1. The reference sensitivity is defined to be met with both downlink component carriers active and one uplink carrier active. For reference sensitivity measured on the downlink PCC, the parameters in Table 7.3.3-2 apply. For reference sensitivity measured on the downlink SCC, the parameters in Table 7.3A.1.3-2 apply. The minimum requirement for reference sensitivity in Table 7.3.3-1 shall be increased by the amount given in DR<sub>IBNC</sub> in Table 7.3A.1.3-2 for the downlink SCC.

Table 7.3A.1.3-2: Intra-band non-contiguous CA uplink configuration for reference sensitivity

CA configuration	Aggregated channel bandwidth (PCC+SCC)	W <sub>gap</sub> / [MHz]	UL PCC allocation	ΔR <sub>IBNC</sub> (dB)	Duplex mode
	25RB+25RB	$30.0 < W_{gap} \le 55.0$	10 <sup>1</sup>	5.0	
	23110+23110	$0.0 < W_{gap} \le 30.0$	25 <sup>1</sup>	0.0	
	25RB+50RB	25.0 < W <sub>gap</sub> ≤ 50.0		4.5	
CA 25A-25A	25110+30110	$0.0 < W_{gap} \le 25.0$	25 <sup>1</sup>	0.0	FDD
OA_23A-23A	50RB+25RB	$15.0 < W_{gap} \le 50.0$	10 <sup>4</sup>	5.5	100
	3011D+2311D	$0.0 < W_{gap} \le 15.0$	32 <sup>1</sup>	0.0	
	50RB+50RB	$10.0 < W_{gap} \le 45.0$	10 <sup>4</sup>	5.0	
	30KB 730KB	$0.0 < W_{gap} \le 10.0$	32 <sup>1</sup>	0.0	
CA_41A-41A <sup>5</sup>	NOTE 6	NOTE 7	NOTE 8	0.0	TDD

NOTE 1: refers to the UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission.

NOTE 2: W<sub>gap</sub> is the sub-block gap between the two sub-blocks.

NOTE 3: The carrier centre frequency of PCC in the UL operating band is configured closer to the DL operating band.

NOTE 4: <sup>4</sup> refers to the UL resource blocks shall be located at RB<sub>start</sub>=33.

NOTE 5: For the TDD intra-band non-contiguous CA configurations, the minimum requirements apply only in synchronized operation between all component carriers.

NOTE 6: All combinations of channel bandwidths defined in Table [5.2A-3].

NOTE 7: All applicable sub-block gap sizes.

NOTE 8: The PCC allocation is same as Transmission bandwidth configuration  $N_{\text{RB}}$  as defined in

Table 5.4.2-1.

The normative reference for this requirement is TS 36.101[2] clause 7.3.1 and 7.3.1A.

#### 7.3A.1.4 Test description

#### 7.3A.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.3A.1.4.1-1. The details of the uplink reference measurement channels (RMCs) are specified in Annex A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.3A.1.4.1-1: Test Configuration Table

				Initial C	onditi	ons				
Test Env	vironment as	specified in	<u> </u>				H, TH/VL, TH/	\/H		
	08[7] subclau		•		,,,					
	quencies as		)		C: Low range, High range					
			r different CA		0	,	.gago			
	th classes.									
Test CC	Combination	n setting (N	RB_agg) as specifi	ed in	Low	est N <sub>RB agg</sub> ,	Highest N <sub>RB aq</sub>	a		
			onfiguration acr			99,	J	5		
bandwic	th combinati	on sets sup	ported by the UE	Ξ.						
			Test Para	meters fo	or CA	Configuration	ns			
CA Con	figuration	DL A	llocation				<b>UL Allocation</b>	า		
/ N	RB_agg									
PCC	SCCs	CC	PCC & SCC	CC		N <sub>RB_alloc</sub>	PCC &	SCC RB allo	catior	ıs
$N_{RB}$	$N_{RB}$	MOD	RB	MOE	)		(	L <sub>CRB</sub> @ RB <sub>sta</sub>	rt)	
			allocation							
75	75	QPSK	75+75	QPS		75	P_75@0	S_0@0	-	-
75	75	QPSK	75+75	QPS		50	P_50@25	S_0@0	-	-
75	75	QPSK	75+75	QPS		25	P_25@50	S_0@0	-	-
75	75	QPSK	75+75	QPS		20	P_20@55	S_0@0	-	-
75	75	QPSK	75+75	QPS		130	P_75@0	S_55@0	-	-
75	75	QPSK	75+75	QPS		150	P_75@0	S_75@0	-	-
100	50	QPSK	100+50	QPS		100	P_100@0	S_0@0	-	-
100	50	QPSK	100+50	QPS		75	P_75@25	S_0@0	-	-
100	50	QPSK	100+50	QPS		50	P_50@50	S_0@0	-	-
100	50	QPSK	100+50	QPS		25	P_25@75	S_0@0	-	-
100	50	QPSK	100+50	QPS		20	P_20@80	S_0@0	-	-
100	50	QPSK	100+50	QPS		150	P_100@0	S_50@0	-	-
100	100	QPSK	100+100	QPS		100	P_100@0	S_0@0	-	-
100	100	QPSK	100+100	QPS		75	P_75@25	S_0@0	-	-
100	100	QPSK	100+100	QPS		50	P_50@50	S_0@0	-	-
100	100	QPSK	100+100	QPS		25	P_25@75	S_0@0	-	-
100	100	QPSK	100+100	QPS		20	P_20@80	S_0@0	-	-
100	100	QPSK	100+100	QPS		130	P_100@0	S_30@0	-	-
100	100	QPSK	100+100	QPS		200	P_100@0	S_100@0	<b>-</b>	-
Note 1:			t CC Combination							
N-4- C			regated channel							
Note 2:			nfigurations, only						to tabl	е
	7.3A.1.3-1	tor UE sup	porting two uplin	ik carners	s is tes	sted per Les	t CA configura	tion.		

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508[7] Annex A Figure group A.32 as appropriate .
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1, and C.3.1, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL and DL Reference Measurement channel is set according to Table 7.3A. 1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.3A. 1.4.3.

#### 7.3A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.3A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).

- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Tables 7.3A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.3A.1.4.1-1 on both PCC and SCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level for PCC and SCC to the appropriate REFSENS value defined in Table 7.3A.1.5-1. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE to ensure the UE transmits  $P_{UMAX}$  level for at least the duration of the Throughput measurement.
- 7. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2A.

#### 7.3A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.3A.1.5 Test requirement

For intra-band contiguous carrier aggregation the throughput of each component carrier shall be  $\geq$  95% of the maximum throughput of the reference measurement channels as specified in as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.3A.1.5-1 and table 7.3A.1.5-2.

Table 7.3A.1.5-1: Reference sensitivity QPSK P<sub>REFSENS</sub> for intra-band

		CA Band / Aggregated channel bandwidth / NRB / Duplex mode										
CA	100RB+50RB		75RB+75RB		100RB+75RB		100RB-	+100RB	Duplex			
Configuration	100RB	50RB	75RB	75RB	100RB	75RB	100RB	100RB	Mode			
CA_1C	-	-	-94.5	-94.5	-	-	-93.3	-93.3	FDD			
CA_7C	-	-	-92.5	-92.5	-	-	-91.3	-91.3	FDD			
CA_38C	-	-	-94.5	-94.5	-	-	-93.3	-93.3	TDD			
CA_40C	-93.3	-96.3	-94.5	-94.5	-	-	-93.3	-93.3	TDD			
CA_41C	-91.3	-94.3	-92.5	-92.5	-91.3	-92.5	-91.3	-91.3	TDD			
	Note 1: Note 2:	The transmitter shall be set to P <sub>UMAX</sub> as defined in clause 6.2.5A  The reference measurement channel is specified in A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1										
	Note 3:	The signa	al power is	specified p	er port							

The reference receive sensitivity (REFSENS) requirement for intra-band specified in Table 7.3A.1.5-1 shall be met for each uplink CA configurations less than or equal to that specified in Table 7.3A.1.5-2.

NOTE: Table 7.3A.1.5-2 does not necessarily reflect the operational conditions of the network, where the number of uplink and downlink allocated resource blocks will be practically constrained by other factors.

Table 7.3A.1.5-2: Intra-band CA uplink configuration for reference sensitivity

CA configuration / CC combination / NRB_agg / Duplex mode											
04	100RB+50RB		75RB-	75RB+75RB		100RB+75RB		+100RB	Duplex		
CA configuration	PCC	SCC	PCC	scc	PCC	SCC	PCC	SCC	Mode		
CA_1C	n/a	n/a	75	55	n/a	<u>n/a</u>	100	30	FDD		
CA_7C	n/a	n/a	75	0	n/a	n/a	75	0	FDD		
CA_38C	n/a	n/a	75	75	n/a	n/a	100	100	TDD		
CA_40C	100	50	75	75	<u>n/a</u>	<u>n/a</u>	100	100	TDD		
CA_41C	100	50	75	75	100	75	100	100	TDD		

NOTE 1: The carrier centre frequency of SCC in the UL operating band is configured closer to the DL operating band.

# 7.3A.2 Reference sensitivity level for CA (intra-band contiguous DL CA without UL CA)

#### 7.3A.2.1 Test purpose

Same as in clause 7.3A.1.1.

#### 7.3A.2.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and but no UL CA.

#### 7.3A.2.3 Minimum conformance requirements

Same as in clause 7.3A.1.3.

#### 7.3A.2.4 Test description

#### 7.3A.2.4.1 Initial conditions

Same as in clause 7.3A.1.4.1 with the following exceptions:

- Instead of Table 7.3A.1.4.1-1  $\rightarrow$  use Table 7.3A.2.4.1-1.

NOTE 2: The transmitted power over both PCC and SCC shall be set to P<sub>UMAX</sub> as defined in subdause 6.2.5A.

NOTE 3: The UL resource blocks in both PCC and SCC shall be confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2A-1).

NOTE 4: The UL resource blocks in PCC shall be located as close as possible to the downlink operating band, while the UL resource blocks in SCC shall be located as far as possible from the downlink operating band.

Table 7.3A.2.4.1-1: Test Configuration Table

				Initial C	ondit	ions				
Test Env	ironment as	specified in	1		NC,	TL/VL, TL/V	H, TH/VL, TH/	VH		
TS 36.50	08[7] subclau	use 4.1			·					
Test Fre	quencies as	specified in	)		C: L	ow range, H	igh range			
TS36.50	8 [7] subclau	ise 4.3.1 fo	r different CA							
bandwid	th classes.									
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in Lowest N <sub>RB_agg</sub> , Highest N <sub>RB_agg</sub>										
subclause 5.4.2A.1 for the CA Configuration across										
bandwid	th combination	on sets sup	ported by the UE	Ξ.						
			Test Para	meters f	or CA	Configuration	ns			
	figuration	DL A	llocation				<b>UL Allocation</b>	)		
/ N <sub>F</sub>	RB_agg									
PCC	SCCs	CC	PCC & SCC	CC		N <sub>RB_alloc</sub>	PCC & SCC		ns	
$N_{RB}$	$N_{RB}$	MOD	RB	MOI	)		(L <sub>CRB</sub> @ RB <sub>s</sub>	tart)		
			allocation							
75	75	QPSK	75+75	QPS	K	75	P_75@0	-	-	-
75	75	QPSK	75+75	QPS		50	P_50@0	ı	-	-
75	75	QPSK	75+75	QPS		25	P_25@0	-	-	-
75	75	QPSK	75+75	QPS		20	P_20@0	-	-	-
100	50	QPSK	100+50	QPS		100	P_100@0	-	-	-
100	50	QPSK	100+50	QPS		75	P_75@0	-	-	-
100	50	QPSK	100+50	QPS		50	P_50@0	-	-	-
100	50	QPSK	100+50	QPS		25	P_25@0	-	-	-
100	50	QPSK	100+50	QPS		20	P_20@0	-	-	-
100	100	QPSK	100+100	QPS	K	100	P_100@0	-	-	-
100	100	QPSK	100+100	QPS	K	75	P_75@0	-	-	-
100	100	QPSK	100+100	QPS	K	50	P_50@0	-	-	-
100	100	QPSK	100+100	00 QPSK 25 P_25@0						-
100	100	QPSK	100+100	QPS	K	20	P_20@0	-	-	-
Note 1:			t CC Combination							
	wnich app	iicabie agg	regated channel	pandwic	itns ai	e specified i	n Table 5.4.2A	.1-1 and lab	ie 5.4.	ZA.1-2.

#### 7.3A.2.4.2 Test procedure

Note 2:

1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.

Depending on CA configurations, only the appropriate Uplink RB allocation value according to table

2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.3A.1.4.3

7.3.3-2 for UE supporting one uplink carrier is tested per Test CA configuration.

- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Tables 7.3A.2.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.3A.2.4.1-1 on PCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level for PCC and SCC to the appropriate REFSENS value defined in Table 7.3A.1.5-1. Send continuously uplink power control "up" commands in every uplink scheduling information to the UE to ensure the UE transmits  $P_{UMAX}$  level for at least the duration of the Throughput measurement.
- 7. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2A.

#### 7.3A.2.4.3 Message contents

Same as in clause 7.3A.1.4.3.

#### 7.3A.2.5 Test requirement

Same as in clause 7.3A.1.5.

## 7.3A.3 Reference sensitivity level for CA (inter-band DL CA without UL CA)

#### 7.3A.3.1 Test purpose

Same as in clause 7.3A.1.1.

### 7.3A.3.2 Test applicability

This test case applies to all types of E-UTRA UE release 10 and forward that support inter-band DL CA but no UL CA.

#### 7.3A.3.3 Minimum conformance requirements

Same as in clause 7.3A.1.3.

#### 7.3A.3.4 Test description

#### 7.3A.3.4.1 Initial conditions

Same as in clause 7.3A.1.4.1 with the following exceptions:

- Instead of Table 7.3A.1.4.1-1  $\rightarrow$  use Table 7.3A.3.4.1-1.
- Instead of clause 7.3A.1.4.3 use clause 7.3A.3.4.3.

Table 7.3A.3.4.1-1: Test Configuration Table

		Initial Co	nditions			
	ronment as spedif B[7] subclause 4.1				NC, TL/V TH/VL, T	L, TL/VH, H/VH
	uencies as specif CA bandwidth clas	e 4.3.1 for	A: Mid range for PCC and SCC, unless otherwise specified in the Tables 7.3A.3.4.1-2 to 7.3A.3.4.1-9			
5.4.2A.1 fd	Combination settir or the CA Configu orted by the UE.	Highest N <sub>RB_agg</sub> , unless otherwise specified in the Tables 7.3A.3.4.1- 2 to 7.3A.3.4.1-9 NS_01				
Network s	Unless g Table 7.3					
		st Parameters for	CA Configu	urations		
	onfiguration / N <sub>RB_agg</sub>	DL /	Allocation		UL AII	ocation
PCC NRB	SCCs N <sub>RB</sub>	CC MOD	CC MOD	PCC N <sub>RB_alloc</sub>		
50	50	QPSK	50	50	QPSK	50
50	50	QPSK	50	50	QPSK	25
50	50	QPSK	50	50	QPSK	20
50	50	QPSK	50	50	QPSK	16
50	75	QPSK	50	75	QPSK	50
50	75	QPSK	50	75	QPSK	25
50	75	QPSK	50	75	QPSK	20
50	100	QPSK	50	100	QPSK	50
50	100	QPSK	50	100	QPSK	25
50	100	QPSK	50	100	QPSK	20
75	50	QPSK	75	50	QPSK	75
75	50	QPSK	75	50	QPSK	75
75	50	QPSK	75	50	QPSK	50
75	50	QPSK	75	50	QPSK	25
75	50	QPSK	75	50	QPSK	20
75	75	QPSK	75	75	QPSK	75
75	75	QPSK	75	75	QPSK	50
75	75	QPSK	75	75	QPSK	25
75	75	75	QPSK	20		
75	100	QPSK	75	100	QPSK	75
75	100	QPSK	75	100	QPSK	50
75	100	QPSK	75	100	QPSK	25
75	100	QPSK	75	100	QPSK	20
100	50	QPSK	100	50	QPSK	100
100	50	QPSK	100	50	QPSK	75
100	50	QPSK	100	50	QPSK	50

100	50	QPSK	100	50	QPSK	25
100	50	QPSK	100	50	QPSK	20
100	75	QPSK	100	75	QPSK	100
100	75	QPSK	100	75	QPSK	75
100	75	QPSK	100	75	QPSK	50
100	75	QPSK	100	75	QPSK	25
100	75	QPSK	100	75	QPSK	20

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-2.

Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier is tested per Test CA configuration.

Note 3: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).

Note 4: The frequencies of PCC and SCC shall be switched and tested in each configuration (given UL is supported in PCC band as per Table 5.2-1).

Table 7.3A.3.4.1-1a: Network signalling value for reference sensitivity

E-UTRA CA Configuration	Uplink Band	Network Signalling value
CA_4A-12A	12	NS_06
CA_4A-17A	17	NS_06

Table 7.3A.3.4.1-2: Test frequencies and Test CC combinations for CA\_1 A-18A

		Band 18		
	CBW	10MHz	15MHz	
			Low range	Mid range
	10MHz		Х	
Band 1	15MHz	Low range	Х	
	20MHz		Х	Х

Table 7.3A.3.4.1-3: Test frequencies and Test CC combinations for CA\_1A-19A

		Band 19		
	CBW	10MHz	15MHz	
		High range	Mid range	
	10MHz			Х
Band 1	15MHz	Mid range	Х	
	20MHz	190		Х

Table 7.3A.3.4.1-4: Test frequencies and Test CC combinations for CA\_1A-21A

		Band 21		
	CBW	15MHz		
		High	Mid	
			range	range
Band 1	15MHz	Mid	Χ	Х
Danu i	20MHz	range	-	Х

Table 7.3A.3.4.1-5: Test frequencies and Test CC combinations for CA\_3A-8A

		Band 8		
	CBW	5 MHz	10 MHz	
			High	range
	10MHz		-	Х
Band 3	15MHz	Mid range	Х	-
	20MHz		Х	Х

Table 7.3A.3.4.1-6: Test frequencies and Test CC combinations for CA\_4A-5A

			Band 5 10 MHz			
	CBW					
			Low range	Mid range	High range	
Band 4	10MHz	Mid range	Х	Х	Х	

Table 7.3A.3.4.1-7: Test frequencies and Test CC combinations for CA\_4A-13A

			Band 13			
	10MHz					
	10MHz	Low range	Х			
Band 4	15 MHz	Mid range	Х			
	20 MHz	High range	Х			

Table 7.3A.3.4.1-8: Test frequencies and Test CC combinations for CA 4A-17A

				Band 17				
		CBW	10MHz					
				Low range	Mid range	High range		
Band 4 PCC	as	10 MHz	Mid range	X - X				
Band 4	Band 4 as		Low range	X <sup>2</sup>	-	-		
SCC		10MHz	Mid range	-	X <sup>3</sup>	-		
(Note 1	1)		High range	-	-	X <sup>4</sup>		
Note 1:	teste	Band 4 as SCC ed. For this purp ation in Table 7.3	ose the test freq	juencies a				
Note 2:	Ban	d 17: $f_{UL} = 709$ .	1 MHz (N <sub>UL</sub> = 23	3781), f <sub>DL</sub> =	: 739.1 MHz	$(N_{DL} = 5781)$		
Note 3:	Band 4: $f_{DL} = 2127.3 \text{ MHz} (N_{DL} = 2123)$ Note 3: Band 17: $f_{UL} = 710 \text{ MHz} (N_{UL} = 23790), f_{DL} = 740 \text{ MHz} (N_{DL} = 5790)$ Band 4: $f_{DL} = 2130 \text{ MHz} (N_{DL} = 2150)$							
Note 4:		d 17: $f_{UL} = 710$ . d 4: $f_{DL} = 2132$			: 740.9 MHz	$(N_{DL} = 5799)$		

Table 7.3A.3.4.1-9: Test frequencies and Test CC combinations for CA\_11A-18A

		Band 18		
	CBW		10MHz	15MHz
			Low range	Mid range
Band 11	10MHz	High range	X	X

#### 7.3A.3.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.3A 3.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Tables 7.3A.3.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.3A.3.4.1-1 on PCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level for PCC and SCC to the appropriate REFSENS value defined in Table 7.3A.3.5-1. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE to ensure the UE transmits  $P_{UMAX}$  level for at least the duration of the Throughput measurement.
- 7. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2A.

#### 7.3A3.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.3A.3.5 Test requirement

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.3A.3.5-1 and Table 7.3A.3.5-2. The test requirement tables are originated from Table 7.3.5-1 and Table 7.3.5-2.

Table 7.3A.3.5-1: Reference sensitivity QPSK PREFSENS for inter-band

			Channe	el bandwid	lth			
CA Configuration	E-UTRA Band	1.4 MHz (dBm)	3 MHz (dBm)	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	Duplex Mode
CA_1A-5A	1	-	-	-	-96.3	-	-	FDD
CA_TA-SA	5	-	-	-	-94.3	-	-	רטט
CA_1A-18A	1	-	-	-99.3	-96.3	-94.5	-93.3	FDD
OA_1A-10A	18	-	-	-99.3	-96.3	-94.5	-	100
CA_1A-19A	1	-	-	-99.3	-96.3	-94.5	-93.3	FDD
0/[////0//	19	-	-	-99.3	-96.3	-94.5	-	100
CA_1A-21A	1	-	-	-99.3	-96.3	-94.5	-93.3	FDD
0/(1/(21/(	21	-	-	-99.3	-96.3	-94.5	-	100
CA_2A-17A	2	-	-	-97.3	-94.3	-	-	FDD
<u> </u>	17	-	-	-95.8	-92.8	-	-	
CA_3A-7A	3	-	-	-96.3	-93.3	-91.5	-90.3	FDD
<u> </u>	7	-	-	-	-94.3	-92.5	-91.3	. 55
CA_3A-8A	3	-	-	-	-93.3	-91.5	-90.3	FDD
<u> </u>	8	-	-	-96.3	-93.3	-	-	
CA_4A-5A	4	-	-	-99.3	-96.3	-	-	- FDD
<u> </u>	5	-	-	-97.3	-94.3	-	-	
	4	-104	-101	-99.3	-96.3	-	-	
CA_4A-12A	4 (Note 4)	[-88.5]	[-88.5]	[-89.3]	[-88.8]	-	-	FDD
	12	-	-	-95.8	-92.8	-	-	
CA_4A-13A	4	-	-	-99.3	-96.3	-94.5	-93.3	FDD
0/12/1/10/1	13	-	-	-	-93.3	-	-	
	4	-	-	-99.3	-96.3	-	-	FDD
CA_4A-17A	4 (Note 4)	-	-	[-89.3]	[-88.8]	-	-	
	17	-	-	-95.8	-92.8	-	-	
CA_4A-29A	4	-	-	-99.3	-96.3	-	-	FDD
_	29	-	-98	-96.3	-93.3	-	-	
CA_5A-12A	5			-96.8	-93.8			FDD
	12			-96.0	-93.0			
CA_7A-20A	7	-	-	-	-94.3	-92.5	-91.3	FDD
5/1//20/	20	-	-	-96.3	-93.3	-	-	- רטט
CA_11A-18A	11	-	-	-99.3	-96.3	-	-	FDD
	18	-	-	-99.3	-96.3	-94.5	-	
CA_2A-29A	2	-	-	-97.3	-94.3	-	-	FDD
3/ _2/ (20/ (	29	-	-98	-96.3	-93.3	-	-	יטט ו

Note 1: The transmitter shall be set to maximum output power level (Table 7.3A.3.5-2)

Note 2: The reference measurement channel is specified in A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1

Note 3: The signal power is specified per port

Note 4: Reference sensitivity for the high band for which the 3rd harmonic of the low band is within transmission bandwidth, as specified in Table 7.3A.1.3-0a.

The reference receive sensitivity (REFSENS) requirement for inter-band specified in Table 7.3A.3.5-1 shall be met for an uplink CA configurations than or equal to that specified in Table 7.3A.3.5-2.

NOTE: Table 7.3A.3.5-2 does not necessarily reflect the operational conditions of the network, where the number of uplink and downlink allocated resource blocks will be practically constrained by other factors.

Table 7.3A.3.5-2: Inter-band CA uplink configuration for reference sensitivity

			Chann	el bandwic	lth			
CA Configuration	E-UTRA Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Duplex Mode
CA 4A 5A	1	-	-	-	50	-	-	רב
CA_1A-5A	5	-	-	-	25 <sup>1</sup>	-	-	FDD
CA 4A 40A	1	-	-	25	50	75	100	רחח
CA_1A-18A	18	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	FDD
CA_1A-19A	1	-	-	25	50	75	100	FDD
CA_TA-T9A	19	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	טטי
CA_1A-21A	1	-	-	25	50	75	100	FDD
OA_IA-ZIA	21	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	טטי
CA_2A-17A	2	-	-	25	50	-	-	FDD
OA_ZATTA	17	-	-	20 <sup>1</sup>	20 <sup>1</sup>			טטי
CA_3A-7A	3	-	-	25	50	501	501	FDD
0/1_0/(//(	7	-	-		50	75	75]	100
CA_3A-8A	3	-	-	25	50	50¹	50¹	FDD
OA_SA-OA	8	-	-	25	25 <sup>1</sup>	-	-	
CA_4A-5A	4	-	-	25	50	-	-	FDD
0/ <u>1</u> ///0//	5	-	-	25	25 <sup>1</sup>	-	-	100
CA_4A-12A	4	6	15	25	50	-	-	FDD
<u> </u>	12	-	-	20 <sup>1</sup>	20 <sup>1</sup>	-	-	100
CA_4A-13A	4	-	-	25	50	75	100	FDD
<u> </u>	13	-	-	-	20 <sup>1</sup>	-	-	100
CA_4A-17A	4	-	-	25	50	-	-	FDD
	17	-	-	8 <sup>2, 3</sup>	16 <sup>2, 3</sup>	-	-	100
CA_4A-29A	4	-	-	25	50	-	-	FDD
	29	-	-	-	-	-	-	
CA_5A-12A	5			25	25			FDD
	12			201	20'			
CA_7A-20A	7	-	-	-	50	75 <sup>1</sup>	75 <sup>1</sup>	FDD
	20	-	-	25	20'	-	-	
CA_11A-18A	11	-	-	25	25	-	-	FDD
	18	-	-	25	25'	25'	-	
CA_2A-29A	2	-	-	25	50	-	-	FDD
O/(_Z/\Z5/\	29	-	-	-	-	-	-	100

Note 1: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configurations (Table 5.4.2-1).

Note 3: In the case of 5MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>=9 and in the case of 10MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>=17 according to Note 1 in Table 7.3A.1.3-0b

# 7.3A.4 Reference sensitivity level for CA (intra-band non-contiguous DL CA without UL CA)

Editor's notes: The following items are missing or incomplete:

- Initial conditions
- Test procedure
- Message contents
- Test requirement
- Test Tolerance

Note 2: Configuration for the low band for which the 3rd harmonic is within transmission bandwidth of the high band, as specified in Table 7.3A.1.3-0b.

#### 7.3A.4.1 Test purpose

Same as in clause 7.3A.1.1.

#### 7.3A.4.2 Test applicability

This test case applies to all types of E-UTRA UE release 11 and forward that support intra-band non-contiguous DL CA but no UL CA.

#### 7.3A.4.3 Minimum conformance requirements

Same as in clause 7.3A.1.3.

7.3A.4.4 Test description

7.3A.4.4.1 Initial conditions

**FFS** 

7.3A.4.4.2 Test procedure

**FFS** 

7.3A.4.4.3 Message contents

**FFS** 

7.3A.4.5 Test requirement

**FFS** 

## 7.3B Reference sensitivity level for UL-MIMO

#### 7.3B.1 Test purpose

To verify the ability of UE that support UL-MIMO to receive data with a given average throughput for a specified reference measurement channel, under conditions of low signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the effective coverage area of an e-NodeB.

## 7.3B.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

## 7.3B.3 Minimum conformance requirements

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements in Clause 7.3.3 shall be met with the UL-MIMO configurations specified in Table 6.2.2B.3-2. For UL-MIMO, the parameter  $P_{UMAX}$  is the total transmitter power over the two transmit antenna connectors.

The normative reference for this requirement is TS 36.101 [2] clause 7.3.1B.

#### 7.3B.4 Test description

#### 7.3B.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.3B.4.1-1. The details of the downlink and uplink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.3B.4.1-1: Test Configuration Table

		In	itial Condition					
Test Environment as specified in			NC, TL/VL, T	NC, TL/VL, TL/VH, TH/VL, TH/VH				
TS 36.508[7] subclause 4.1								
Test Frequencies as specified in			Low range, M	lid range, High	range			
	subclause 4.3.							
Test Channel Bandwidths as specified in			Lowest, 5MH	z, Highest				
TS 36.508 [7	] subdause 4.3							
				l Bandwidths				
	Down	link Configur	ation	Upli	nk Configura	tion		
Ch BW	Mod'n	RB all	ocation	Mod'n	RB all	ocation		
		FDD	TDD		FDD	TDD		
1.4MHz	QPSK	6	6	QPSK	6	6		
3MHz	QPSK	15	15	QPSK	15	15		
5MHz	QPSK	25	25	QPSK	25	25		
5MHz	QPSK	25	N/A	QPSK	20	N/A		
5MHz	QPSK	25	N/A	QPSK	15	N/A		
10MHz	QPSK	50	50	QPSK	50	50		
10MHz	QPSK	50	N/A	QPSK	25	N/A		
10MHz	QPSK	50	N/A	QPSK	20	N/A		
10MHz	QPSK	50	N/A	QPSK	15	N/A		
15MHz	QPSK	75	75	QPSK	75	75		
15MHz	QPSK	75	N/A	QPSK	50	N/A		
15MHz	QPSK	75	N/A	QPSK	25	N/A		
15MHz	QPSK	75	N/A	QPSK	20	N/A		
20MHz	QPSK	100	100	QPSK	100	100		
20MHz	QPSK	100	N/A	QPSK	75	N/A		
20MHz	QPSK	100	N/A	QPSK	50	N/A		
20MHz	QPSK	100	N/A	QPSK	25	N/A		
20MHz	QPSK	100	N/A	QPSK	20	N/A		
ap Note 2: De	est Channel Bar oplicable channe epending on E-U table 7.3.3-2 is	el bandwidths JTRA band, o	are specified ir	n Table 5.4.2.1- riate Uplink RB	1.			

- For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used. Note 3:
- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.3 B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.3B.4.3.

#### 7.3B.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.3B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 7.3B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the Downlink signal level to the appropriate REFSENS value defined in Table 7.3 B.5-1. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE to ensure the UE transmits  $P_{\rm UMAX}$  level for at least the duration of the throughput measurement.
- 4. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.

#### 7.3B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exceptions.

#### 7.3B.4.3.1 Message contents exceptions (network signalled value "NS\_01")

Message contents according to TS 36.508 [7] clause 4.6 can be used without exceptions.

#### 7.3B.4.3.2 Message contents exceptions (network signalled value "NS\_03")

1. Information element additionalSpectrumEmission is set to NS\_03. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 7.3B.4.3.2-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS 03"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element	Value/remark	Comment	Condition			
additional Spectrum Emission	3 (NS 03)					

#### 7.3B.4.3.3 Message contents exceptions (network signalled value "NS\_06")

1. Information element additionalSpectrumEmission is set to NS\_06. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

## Table 7.3B.4.3.3-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS\_06"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Condition						
additional Spectrum Emission	6 (NS_06)					

#### 7.3B.4.3.4 Message contents exceptions (network signalled value "NS\_[09]")

1. Information element additionalSpectrumEmission is set to NS\_[09]. This can be set in the SystemInformationblockType2 as part of the cell broadcast message. This exception indicates that the UE shall meet the additional spurious emission requirement for a specific deployment scenario.

Table 7.3B.4.3.4-1: SystemInformationBlockType2: Additional spurious emissions test requirement for "NS\_[09]"

Derivation Path: TS 36.508 [7] clause 4.4.3.3, Table 4.4.3.3-1						
Information Element Value/remark Comment Condition						
additional Spectrum Emission	TBD					

## 7.3B.5 Test requirement

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.3B.5-1 and Table 7.3B.5-2.

Table 7.3B.5-1: Reference sensitivity QPSK PREFSENS

	Channel bandwidth							
E-UTRA Band	1.4 MHz (dBm)	3 MHz (dBm)	5 MHz (dBm)	10 MHz (dBm)	15 MHz (dBm)	20 MHz (dBm)	Duplex Mode	
1	-	-	-99.3	-96.3	-94.5	-93.3	FDD	
2	-102.0	-99.0	-97.3	-94.3	-92.5	-91.3	FDD	
3	-101.0	-98.0	-96.3	-93.3	-91.5	-90.3	FDD	
4	-104.0	-101.0	-99.3	-96.3	-94.5	-93.3	FDD	
5	-102.5	-99.5	-97.3	-94.3			FDD	
6	-	-	-99.3	-96.3			FDD	
7	-	-	-97.3	-94.3	-92.5	-91.3	FDD	
8	-101.5	-98.5	-96.3	-93.3			FDD	
9	-	-	-98.3	-95.3	-93.5	-92.3	FDD	
10	-	-	-99.3	-96.3	-94.5	-93.3	FDD	
11	-	-	-99.3	-96.3			FDD	
12	-101.0	-98.0	-96.3	-93.3			FDD	
13			-96.3	-93.3			FDD	
14		-	-96.3	-93.3			FDD	
17	-	-	-96.3	-93.3			FDD	
18	-	-	-99.3	-96.3	-94.5	-	FDD	
19	-	-	-99.3	-96.3	-94.5	-	FDD	
20			-96.3	-93.3	-90.5	-89.3	FDD	
21			-99.3	-96.3	-94.5		FDD	
22			-96.0	-93.0	-91.2	-90.0	FDD	
23	-104.0	-101.0	-99.3	-96.3	-94.5	-93.3	FDD	
24			-99.3	-96.3			FDD	
25	-100.5	-97.5	-95.8	-92.8	-91.0	-89.8	FDD	
26	-102	-99	-96.8 <sup>6</sup>	-93.8 <sup>6</sup>	-92°		FDD	
27	-102.5	-99.5	-97.3	-94.3			FDD	
28		-99.5	-97.8	-94.8	-93.0	-90.3	FDD	
31	-98.3	-95.0	-92.8				FDD	
33	-	-	-99.3	-96.3	-94.5	-93.3	TDD	
34	-	-	-99.3	-96.3	-94.5	-	TDD	
35	-105.5	-101.5	-99.3	-96.3	-94.5	-93.3	TDD	
36	-105.5	-101.5	-99.3	-96.3	-94.5	-93.3	TDD	
37	-	-	-99.3	-96.3	-94.5	-93.3	TDD	
38	-	-	-99.3	-96.3	-94.5	-93.3	TDD	
39	-	-	-99.3	-96.3	-94.5	-93.3	TDD	
40	-	-	-99.3	-96.3	-94.5	-93.3	TDD	
41	-	-	-97.3	-94.3	-92.5	-91.3	TDD	
42	-	-	-98.0	-95.0	-93.2	-92.0	TDD	
43	-	-	-98.0	-95.0	-93.2	-92.0	TDD	
Note 1:	The transmitter	aball ba aat			in alauna 6	2.5	I	

Note 1: The transmitter shall be set to P<sub>UMAX</sub> as defined in clause 6.2.5

Note 2: The reference measurement channel is specified in A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1

Note 3: The signal power is specified per port

Note 4: For the UE which supports both Band 3 and Band 9 the reference sensitivity level is FFS.

Note 5: For the UE which supports both Band 11 and Band 21 the reference sensitivity

Note 6: <sup>6</sup> indicates that the requirement is modified by -0.5 dB when the carrier frequency of the assigned E-UTRA channel bandwidth is within 865-894 MHz.

NOTE: The relation to the received PSD is  $\langle \text{REF } \hat{I}_{or} \rangle = P_{REFSENS} \left( N_{sc}^{RB} N_{RB} \Delta f \right)^{-1}$  with  $N_{\text{RB}}$  is the transmission bandwidth configuration according to Table 5.4.2-1.

The reference receive sensitivity (REFSENS) requirement specified in Table 7.3 B.5-1 shall be met for an uplink transmission bandwidth less than or equal to that specified in Table 7.3 B.5-2.

NOTE: Table 7.3B.5-2 does not necessarily reflect the operational conditions of the network, where the number of uplink and downlink allocated resource blocks will be practically constrained by other factors.

Table 7.3B.5-2: Uplink configuration for reference sensitivity

E-UTRA Band / Channel bandwidth / N <sub>RB</sub> / Duplex mode							
E- UTRA Band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Duplex Mode
1	-	-	25	50	75	100	FDD
2	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD
3	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD
4	6	15	25	50	75	100	FDD
5	6	15	25	25 <sup>1</sup>	-	-	FDD
6	-	-	25	25 <sup>1</sup>	-	-	FDD
7	-	-	25	50	75 <sup>1</sup>	75 <sup>1</sup>	FDD
8	6	15	25	25 <sup>1</sup>	-	-	FDD
9	-	-	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD
10	-	-	25	50	75	100	FDD
11	-	-	25	25 <sup>1</sup>			FDD
12	6	15	20 <sup>1</sup>	20 <sup>1</sup>			FDD
13			20 <sup>1</sup>	20 <sup>1</sup>			FDD
14		-	15 <sup>1</sup>	15 <sup>1</sup>			FDD
17	-	-	20 <sup>1</sup>	20 <sup>1</sup>			FDD
18	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	FDD
19	-	-	25	25 <sup>1</sup>	25 <sup>1</sup>	-	FDD
20			25	20 <sup>1</sup>	20 <sup>3</sup>	20 <sup>3</sup>	FDD
21			25	25 <sup>1</sup>	25 <sup>1</sup>		FDD
22			25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD
23	6	15	25	50	75 <sup>1</sup>	100 <sup>1</sup>	FDD
24			25	50			FDD
25	6	15	25	50	50 <sup>1</sup>	50 <sup>1</sup>	FDD
26	6	15	25	25 <sup>1</sup>	25 <sup>1</sup>		FDD
27	6	15	25	25 <sup>1</sup>	-	-	FDD
28		15	25	25 <sup>1</sup>	25 <sup>1</sup>	25 <sup>1</sup>	FDD
31	6	5 <sup>4</sup>	5 <sup>4</sup>				FDD
33	-	-	25	50	75	100	TDD
34	-	-	25	50	75	-	TDD
35	6	15	25	50	75	100	TDD
36	6	15	25	50	75	100	TDD
37	-	-	25	50	75	100	TDD
38	-	-	25	50	75	100	TDD
39			25	50	75	100	TDD
40			25	50	75	100	TDD
41			25	50	75	100	TDD
42			25	50	75	100	TDD
43			25	50	75	100	TDD
Note 1:	The III re	source blo		he located			to the

Note 1: The UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).

Note 2: For the UE which supports both Band 11 and Band 21 the uplink configuration for reference sensitivity is FFS.

Note 3: For Band 20; in the case of 15MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>=11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>=16.

Note 4: <sup>4</sup> refers to Band 31; in the case of 3 MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub> 9 and in the case of 5 MHz channel bandwidth, the UL resource blocks shall be located at RB<sub>start</sub>

10.

## 7.4 Maximum input level

### 7.4.1 Test purpose

Maximum input level tests the UE's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of high signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area near to an e-NodeB.

## 7.4.2 Test applicability

This test applies to all types of E-UTRA UE release 8 and forward.

## 7.4.3 Minimum conformance requirements

Maximum input level is defined as the maximum mean power received at the UE antenna port, at which the specified relative throughput shall meet or exceed the minimum requirements for the specified reference measurement channel.

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.4.3-1.

Rx Parameter Units Channel bandwidth 3 MHz 5 MHz 1.4 20 10 15 MHz MHz MHz MHz Power in Transmission dBm -25 Bandwidth Configuration

The transmitter shall be set to 4dB below PCMAX\_L at the minimum uplink configuration

Table 7.4.3-1: Maximum input level

specified in Table 7.3.3-2 with PcMAX\_L as defined in clause 6.2.5.

Note 2: Reference measurement channel is Annex A.3.2 64QAM R=3/4 variant with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

The normative reference for this requirement is TS 36.101 [2] clause 7.4.1.

## 7.4.4 Test description

Note 1:

#### 7.4.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.4.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

**Table 7.4.4.1-1: Test Configuration Table** 

Initial Conditions					
Test Environment as specified in TS 36.508[7] clause 4.1	NC				
Test Frequencies as specified in	Mid range				
TS36.508 [7] clause 4.3.1					
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.1	Lowest, 5MHz, Highest				
Test Parameters for Channel Bandwidths					

	Test Parameters for Channel Bandwidths							
	Downlink Configuration				Uplink Configuration			
Ch BW	Mod'n		cation	Mod'n			UE	
		FDD	TDD		FDD	TDD	Category	
1.4MHz	64-QAM	6	6	QPSK	6	6	1-5	
3MHz	64-QAM	15	15	QPSK	15	15	1-5	
5MHz	64-QAM	25	25	QPSK	25	25	2-5	
5MHz	64-QAM	25	N/A	QPSK	20	N/A	2-5	
5MHz	64-QAM	25	N/A	QPSK	15	N/A	2-5	
5MHz	64-QAM	18	18	QPSK	25	25	1	
5MHz	64-QAM	18	18	QPSK	20	20	1	
5MHz	64-QAM	18	18	QPSK	15	15	1	
10MHz	64-QAM	50	50	QPSK	50	50	2-5	
10MHz	64-QAM	50	N/A	QPSK	25	N/A	2-5	
10MHz	64-QAM	50	N/A	QPSK	20	N/A	2-5	
10MHz	64-QAM	50	N/A	QPSK	15	N/A	2-5	
10MHz	64-QAM	17	17	QPSK	50	50	1	
10MHz	64-QAM	17	N/A	QPSK	25	N/A	1	
10MHz	64-QAM	17	N/A	QPSK	20	N/A	1	
10MHz	64-QAM	17	N/A	QPSK	15	N/A	1	
15MHz	64-QAM	75	75	QPSK	75	75	2-5	
15MHz	64-QAM	75	N/A	QPSK	50	N/A	2-5	
15MHz	64-QAM	75	N/A	QPSK	25	N/A	2-5	
15MHz	64-QAM	75	N/A	QPSK	20	N/A	2-5	
15MHz	64-QAM	17	17	QPSK	75	75	1	
15MHz	64-QAM	17	N/A	QPSK	50	N/A	1	
15MHz	64-QAM	17	N/A	QPSK	25	N/A	1	
15MHz	64-QAM	17	N/A	QPSK	20	N/A	1	
20MHz	64-QAM	100	100	QPSK	100	100	3-5	
20MHz	64-QAM	100	N/A	QPSK	75	N/A	3-5	
20MHz	64-QAM	100	N/A	QPSK	50	N/A	3-5	
20MHz	64-QAM	100	N/A	QPSK	25	N/A	3-5	
20MHz	64-QAM	100	N/A	QPSK	20	N/A	3-5	
20MHz	64-QAM	83	83	QPSK	100	100	2	
20MHz	64-QAM	83	N/A	QPSK	75	N/A	2	
20MHz	64-QAM	83	N/A	QPSK	50	N/A	2	
20MHz	64-QAM	83	N/A	QPSK	25	N/A	2	
20MHz	64-QAM	83	N/A	QPSK	20	N/A	2	
20MHz	64-QAM	17	17	QPSK	100	100	1	
20MHz	64-QAM	17	N/A	QPSK	75	N/A	1	
20MHz	64-QAM	17	N/A	QPSK	50	N/A	1	
20MHz	64-QAM	17	N/A	QPSK	25	N/A	1	
20MHz	64-QAM	17	N/A	QPSK	20	N/A	1	
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Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band. The applicable channel bandwidths are specified in Table 5.4.2.1-1.

Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth. The allocation shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).

Note 3: For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Figure A.3.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.

- 4. The UL and DL Reference Measurement channels are set according to Table 7.4.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.4.4.3.

## 7.4.4.2 Test procedure

- SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.4.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.4.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- Set the Downlink signal level to the value defined in Table 7.4.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.4.5-1 for carrier frequency  $f \le 3.0 GHz$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 GHz < f \le 4.2 GHz$ , for at least the duration of the Throughput measurement.

Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.

### 7.4.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exception.

Derivation Path: 36.331 clause 6.3.2 Information Element Value/remark Condition Comment UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE { p0-UePUSCH deltaMCS-Enabled en0 accumulationEnabled TRUE p0-uePUCCH 0 pSRS-Offset 3 (-6 dB) filterCoefficient larger filter length fc8 is used to reduce the RSRP measurement variation

Table 7.4.4.3-1: UplinkPowerControlDedicated

# 7.4.5 Test requirement

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.4.5-1.

Table 7.4.5-1: Maximum input level

Rx	Parameter	Units	Channel bandwidth					
			1.4   3 MHz   5 MHz   10   15   20   MHz   MHz					
Power in	Transmission	dBm	For carrier frequency f ≤ 3.0GHz: -25.7					
Bandwidtl	h Configuration		For carrier frequency 3.0GHz < f ≤ 4.2GHz: -26.0					
Note 1:	The transmitter shall	l be set to	4dB belo	w P <sub>CMAX_L</sub> v	with P <sub>CMAX</sub>	_∟ as defi	ned in cla	use
	6.2.5.							
Note 2:	0.2.0							

# 7.4A Maximum input level for CA

# 7.4A.1 Maximum input level for CA (intra-band contiguous DL CA and UL CA)

#### 7.4A.1.1 Test purpose

Maximum input level for CA test verifies the UE's ability to receive data with a given average throughput for a specified reference measurement channel, under conditions of high signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area near to an e-NodeB.

#### 7.4A.1.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

## 7.4A.1.3 Minimum conformance requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the maximum input level is defined with the uplink active on the band other than the band whose downlink is being tested. The UE shall meet the requirements specified in subclause 7.4.1 for each component carrier while both downlink carriers are active.

For intra-band contiguous carrier aggregation UE maximum input level is defined as a mean power received at the UE antenna port over the aggregated channel bandwidth, at which the specified relative throughput shall meet or exceed the minimum requirements for the specified reference measurement channel over each component carrier. The downlink SCC shall be configured at no minal channel spacing to the PCC with the PCC configured closest to the uplink band. Downlink PCC and SCC are both activated. The uplink output power shall be set as specified in Table 7.4A.1.3-1 with the uplink configuration set according to Table 7.3A.1.3-1 for the applicable carrier aggregation configuration. For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.3-2.

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels over each component carrier as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.4A.1.3-1.

Table 7.4A.1.3-1: Maximum input level for intra-band contiguous CA

Rx Parameter	Units		CA	Bandwid	h Class		
		Α	В	С	D	E	F
Power in Transmission Aggregated Bandwidth Configuration	dBm			-22			
Note 1: The transmitter sha	Il be set to	4dB below	PCMAX_L or	PCMAX_L_CA	as defin	ed in clau	use

Note 2: Reference measurement channel is Annex A.3.2: 64QAM, R=3/4 variant with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

The normative reference for this requirement is TS 36.101 [2] clause 7.4.1A.

## 7.4A.1.4 Test description

#### 7.4A.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in table 7.4A.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.4A.1.4.1-1: Test Configuration Table

Test Enviro	onment as sp	edfied in TS	36.508[7] clause 4.1	NC			
	iencies as spe fferent CA ba		336.508 [7] clause sses .	C: Mid ra	nge		
			<sub>gg</sub> ) as specified in	Lowest	√RB_agg		
	.2A.1 for the (			Highest	<b>V</b> <sub>RB_agg</sub>		
<u>sanawiath</u>	combination	sets suppor	ted by the UE.  Test Parameters f	or CA Conf	figurations		
CA Configuration / DL Allocation NRB_agg						UL Allocation	
PCC N <sub>RB</sub>	SCC N <sub>RB</sub>	CC MOD	PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SCC RB a (L <sub>CRB</sub> @ RB <sub>start</sub> )	llocations
75	75	QPSK	75+75	QPSK	75	P_75@0	S_0@0
75	75	QPSK	75+75	QPSK	130	P_75@0	S_55@0
75	75	QPSK	75+75	QPSK	150	P_75@0	S_75@0
100	50	QPSK	100+50	QPSK	150	P_100@0	S_50@0
100	100	QPSK	100+100	QPSK	75	P_75@25	S_0@0
100	100	QPSK	100+100	QPSK	130	P_100@0	S_30@0
100		QPSK	100+100	QPSK	200	P_100@0	S_100@0

Depending on CA Configuration only the appropriate Uplink RB allocation value according to table 7.3A.1.3 1 is tested per CA Configuration Test CC combination.

- 1 Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure group A.32 as appropriate
- 2 The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1
- 4. The UL and DL Reference Measurement channels are set according to Table 7.4A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.4A.1.4.3.

#### 7.4A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C0, C.1 and Annex C.3.2 for all down link physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.4A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).

- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.4A.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.4A.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level to the value defined in Table 7.4A.1.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.4A.1.5-1 for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement.
- 7. Measure the average throughput for each component carrier for duration sufficient to achieve statistical significance according to Annex G.2A.

#### 7.4A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] clause subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.4A.1.5 Test requirement

The throughput measurement of each carrier derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.4A.1.5-1.

Table 7.4A.1.5-1: Maximum input level for intra-band contiguous CA

Rx Parameter	Units			CA Bandwidth Class			
		Α	В	С	D	Е	F
Power in Transmission Aggregated Bandwidth Configuration	dBm			For carrier frequency f ≤ 3.0GHz: -22.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: -23.0			
clause 6 Note 2: Referen	.2.5A. ce measure	ment c	hannel	B below PCMAX_L or PcMAX_L_CA a is Annex A.3.2: 64QAM, R=3/4 va D/TDD as described in Annex A.5.	riant wi	th one	sided

# 7.4A.2 Maximum input level for CA (intra-band contiguous DL CA without UL CA)

#### 7.4A.2.1 Test purpose

Same test purpose as in clause 7.4A.1.1

#### 7.4A.2.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA but no UL CA.

#### 7.4A.2.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 7.4A.1.3

# 7.4A.2.4 Test description

## 7.4A.2.4.1 Initial conditions

Same initial conditions as in clause 7.4A.1.4.1 with the following exceptions:

- Instead of Table 7.4A.1.4.1-1 → use Table 7.4A.2.4.1-1

Table 7.4A.2.4.1-1: Test Configuration Table

Test Enviro	onment as sp	edfied in TS	36.508[7] clause 4.1	NC						
Test Frequ 4.3.1 for di	uencies as spe ifferent CA ba	ecified in TS ndwidth cla	336.508 [7] clause sses.	C: Mid range						
clause 5.4	.2A.1 for the C	CA Configur	ted by the UE.	Lowest N Highest I	V <sub>RB_agg</sub>					
			Test Parameters for	or CA Con	figurations					
	figuration /		DL Allocation			UL Allocation				
PCC N <sub>RB</sub>	SCC N <sub>RB</sub>	CC MOD	PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SCC RB allocations (L <sub>CRB</sub> @ RB <sub>start</sub> )				
75	75	QPSK	75+75	QPSK	75	P_75@0	NA			
75	75	QPSK	75+75	QPSK	50	P_50@0	NA			
75	75	QPSK	75+75	QPSK	25	P_25@0	NA			
75	75	QPSK	75+75	QPSK	20	P_20@0	NA			
100	50	QPSK	100+50	QPSK	100	P_100@0	NA			
100	50	QPSK	100+50	QPSK	75	P_75@0	NA			
100	50	QPSK	100+50	QPSK	50	P_50@0	NA			
100	50	QPSK	100+50	QPSK	25	P_25@0	NA			
100	50	QPSK	100+50	QPSK	20	P_20@0	NA			
100	100	QPSK	100+100	QPSK	100	P_100@0	NA			
100	100	QPSK	100+100	QPSK	75	P_75@0	NA			
	100	QPSK	100+100	QPSK	50	P_50@0	NA			
100		QPSK	100+100	QPSK	25	P_25@0	NA			
100	100	QI SIN	1001100							

Note 2: Depending on CA Configuration only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per CA Configuration Test CC combination.

# 7.4A.2.4.2 Test procedure

Same test procedure as in clause 7.4A.1.4.2 with the following exceptions:

- Instead of Table 7.4A.1.4.1-1 → use Table 7.4A.2.4.1-1

## 7.4A.2.4.3 Message contents

Same message contents as in clause 7.4A.1.4.3

# 7.4A.2.5 Test requirement

Same test requirements as in clause 7.4A.1.5.

# 7.4A.3 Maximum input level for CA (inter-band DL CA without UL CA)

## 7.4A.3.1 Test purpose

Same test purpose as in clause 7.4A.1.1

## 7.4A.3.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support inter-band DL CA but no UL CA.

## 7.4A.3.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 7.4A.1.3

## 7.4A.3.4 Test description

#### 7.4A.3.4.1 Initial conditions

Same initial conditions as in clause 7.4A.1.4.1 with the following exceptions:

- Instead of Table 7.4A.1.4.1-1  $\rightarrow$  use Table 7.4A.3.4.1-1

Table 7.4A.3.4.1-1: Test Configuration Table

	Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1	NC						
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.	A: Mid range for PCC and SCC						
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subdause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N <sub>RB_agg</sub> for PCC and SCC						

Test Parameters for CA Configurations

CA Configura	ation / N <sub>RB_agg</sub>		DL Allocation		UL Allocation		
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	CC MOD		& SCC ocation	CC MOD	PCC N <sub>RB_alloc</sub>	
50	50	QPSK	50	50	QPSK	50	
50	50	QPSK	50	50	QPSK	25	
50	50	QPSK	50	50	QPSK	20	
50	50	QPSK	50	50	QPSK	16	
50	75	QPSK	50	75	QPSK	25	
50	100	QPSK	50	100	QPSK	50	
50	100	QPSK	50	100	QPSK	25	
50	100	QPSK	50	100	QPSK	20	
75	50	QPSK	75	50	QPSK	25	
75	100	QPSK	75	100	QPSK	25	
100	50	QPSK	100	50	QPSK	100	
100	50	QPSK	100	50	QPSK	75	
100	50	QPSK	100	50	QPSK	50	
100	75	QPSK	100	75	QPSK	100	
100	100	QPSK	100	100	QPSK	75	
100	100	QPSK	100	100	QPSK	50	

- Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-2.
- Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier is tested per Test CA configuration, unless otherwise stated in table 7.3A.1.3-0b.
- Note 3: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).
- Note 4: The frequencies of PCC and SCC shall be switched and tested in each configuration (given UL is supported in PCC band as per Table 5.2-1).

## 7.4A.3.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.4A.3.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).

- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Tables 7.4A.3.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.4A.3.4.1-1 on PCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level to the value as defined in Table 7.4A.3.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.4A.3.5-1 for carrier frequency  $f \le 3.0 \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ , for at least the duration of the Throughput measurement.
- 7. Measure the average throughput of SCC for a duration sufficient to achieve statistical significance according to Annex G.2.

#### 7.4A.3.4.3 Message contents

Same message contents as in clause 7.4A.1.4.3

#### 7.4A.3.5 Test requirement

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the maximum input level is defined with the uplink active on the band other than the band whose downlink is being tested, i.e. the requirements are tested only for the SCell downlink. The throughput for each component carrier, when operated as S-Cell, shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.4A.3.5-1. The parameters are related to both carriers in this table. The test requirement tables are originated from Table 7.4.5-1.

Table 7.4A.3.5-1: Maximum input level for inter-band DL CA without UL CA

Rx	c Parameter	Units							
			1.4	3 MHz	5 MHz	10	15	20	
			MHz			MHz	MHz	MHz	
Power in	Transmission	dBm	For carrier frequency f ≤ 3.0GHz: -25.7						
Bandwidt	h Configuration		For carrier frequency 3.0GHz < f ≤ 4.2GHz: -26.0						
Note 1:	The transmitter shall	be set to	4dB belo	w P <sub>CMAX_L</sub> v	with P <sub>CMAX</sub>	∟ as defi	ned in cla	use	
	6.2.5.								
Note 2:	•								

# 7.4B Maximum input level for UL-MIMO

# 7.4B.1 Test purpose

Maximum input level tests the ability of UE that support UL- MIMO to receive data with a given average throughput for a specified reference measurement channel, under conditions of high signal level, ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area near to an e-NodeB.

# 7.4B.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

# 7.4B.3 Minimum conformance requirements

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing, the minimum requirements in Clause 7.4.3 shall be met with the UL-MIMO configurations specified in Table 6.2.2B.3-2. For UL-MIMO, the parameter P<sub>CMAX\_L</sub> is defined as the total transmitter power over the two transmit antenna connectors.

The normative reference for this requirement is TS 36.101 [2] clause 7.4.1B.

# 7.4B.4 Test description

#### 7.4B.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.4B.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.4B.4.1-1: Test Configuration Table

			In	itial Co	onditions			
Test Envir	onment as sp	ecified in		NC				
TS 36.508	[7] subclause	4.1						
Test Frequ	iencies as sp	ecified in		Mid ra	ange			
TS36.508	[7] subclause	4.3.1						
Test Chan	nel Bandwidt	hs as specifi	ed in	Lowe	st, 5MHz, Hig	ghest		
TS 36.508	[7] subdause	4.3.1						
		Test Pai	amete	ers for	Channel Bar	ndwidths		
Downlink Configuration					Upli	nk Configur	ation	
Ch BW	Mod'n	RB all	ocatio	n	Mod'n	RB al	location	UE
		FDD	T	DD		FDD	TDD	Category
1.4MHz	64-QAM	6	6		QPSK	5	5	1-5
3MHz	64-QAM	15	15		QPSK	4	4	1-5
5MHz	64-QAM	25	25		QPSK	8	8	2-5
5MHz	64-QAM	18	18		QPSK	8	8	1
10MHz	64-QAM	50	50		QPSK	12	12	2-5
10MHz	64-QAM	17	17		QPSK	12	12	1
15MHz	64-QAM	75	75		QPSK	16	16	2-5
15MHz	64-QAM	17	17		QPSK	16	16	1
20MHz	64-QAM	100	100		QPSK	18	18	3-5
20MHz	64-QAM	83	83		QPSK	18	18	2
20MHz	64-QAM	17	17		QPSK	18	18	1
Note 1:	Test Channe	Bandwidths	are c	hecked	separately fo	or each E-U	RA band. T	he
Note 2:	applicable ch For the DL si						TDD is used	

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Figure A.28.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.4 B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.4B.4.3.

## 7.4B.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.4B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 7.4B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the Downlink signal level to the value defined in Table 7.4B.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB-of the target level in Table 7.4B.5-1 for carrier frequency  $f \le 3.0 GHz$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 GHz < f \le 4.2 GHz$ , for at least the duration of the throughput measurement.
- 4. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.

# 7.4B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exception.

Table 7.4B.4.3-1: UplinkPowerControl Dedicated

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::=			
SEQUENCE {			
p0-UePUSCH	0		
deltaMCS-Enabled	en0		
accumulationEnabled	TRUE		
p0-uePUCCH	0		
pSRS-Offset	3 (-6 dB)		
filterCoefficient	fc8	larger filter length is used to reduce the RSRP measurement variation	
}			

# 7.4B.5 Test requirement

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.4B.5-1.

Table 7.4B.5-1: Maximum input level

Rx	Representation (Parameter	Units Channel bandwidth							
			1.4 MHz	3MHz	5MHz	10 MHz	15 MHz	20 MHz	
Power in	Transmission	dBm	For carrier frequency f ≤ 3.0GHz:- 25.7						
Bandwidth Configuration For carrier frequency 3.0GHz					GHz < f ≤	4.2GHz: -	26.0		
Note 1:	The transmitter shal	l be set to	4dB belo	w Pcmax_l a	at the min	imum uplir	nk configu	ration	
	specified in Table 7.	3.1-2 with	PCMAX_L &	as defined i	n clause 6	3.2.5.			
Note 2:	specified in Table 7.3.1-2 with Pcmax_L as defined in clause 6.2.5. e 2: Reference measurement channel is Annex A.3.2: 64QAM, R=3/4 variant with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.								

# 7.5 Adjacent Channel Selectivity (ACS)

# 7.5.1 Test purpose

Adjacent channel selectivity tests the UE's ability to receive data with a given average throughput for a specified reference measurement channel, in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel, under conditions of ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area when other e-NodeB transmitters exist in the adjacent channel.

# 7.5.2 Test applicability

This test applies to all types of E-UTRA UE release 8 and forward.

# 7.5.3 Minimum conformance requirements

Adjacent Channel Selectivity (ACS) is a measure of a receiver's ability to receive an E-UTRA signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

The UE shall fulfil the minimum requirement specified in Table 7.5.3-1 for all values of an adjacent channel interferer up to -25 dBm. However it is not possible to directly measure the ACS, instead the lower and upper range of test parameters are chosen in Table 7.5.3-2 and Table 7.5.3-3 where the throughput  $R_{av}$  shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1).

Table 7.5.3-1: Adjacent channel selectivity

		Channel bandwidth							
Rx Parameter	Units	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
ACS	dB	33.0	33.0	33.0	33.0	30	27		

Table 7.5.3-2: Test parameters for Adjacent channel selectivity, Case 1

Rx	Units			Channel ba	andwidt h		
Parameter		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm			REFSENS	s + 14 dB		
P <sub>Interferer</sub>	dBm	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +42.5dB	REFSENS +39.5dB
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5
Finterferer (offset)	MHz	<b>1.4+0.0025</b> / -1.4-0.0025	<b>3+0.0075</b> / -3-0.0075	<b>5+0.0025</b> / -5-0.0025	<b>7.5+0.0075</b> / -7.5- 0.0075	<b>10+0.0125</b> / -10-0.0125	12.5+0.002 5 / -12.5- 0.0025

Note 1: The transmitter shall be set to 4dB below PCMAX\_ at the minimum uplink configuration specified in Table 7.3.3-2 with PCMAX\_ as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

0.0025

Units Channel bandwidth Rx Parameter 1.4 MHz 3 MHz 5 MHz 10 MHz 15 MHz 20 MHz Power in Transmission dBm -56.5 -56.5 -56.5 -56.5 -53.5 -50.5 Bandwidth Configuration dBm PInterferer -25 MHz BW<sub>Interferer</sub> 1.4 5 5 7.5+0.0075 12.5+0.002 MHz 1.4+0.0025 3+0.0075 5+0.0025 10+0.0125 FInterferer (offset) 5 1 1 -1.4--3-0.0075 -5-0.0025 -7.5--10-0.0125 1 0.0025 0.0075 -12.5-

Table 7.5.3-3: Test parameters for Adjacent channel selectivity, Case 2

Note 1: The transmitter shall be set to 24dB below PCMAX\_L at the minimum uplink configuration specified in Table 7.3.3-2 with PCMAX L as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

The normative reference for this requirement is TS 36.101 [2] clause 7.5.1.

# 7.5.4 Test description

#### 7.5.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.5.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.5.4.1-1: Test Configuration Table

		In	itial Condition	าร				
Test Environ	ment as specific	ed in	NC					
TS 36.508[7]								
Test Frequencies as specified in			Mid range					
TS36.508 [7]	clause 4.3.1							
Test Channe	Bandwidths as	s specified in	Lowest, 5MH	z, Highest				
TS 36.508 [7	] clause 4.3.							
		Test Paramete	ers for Channe	el Bandwidths				
	Down	link Configur	ation	Upli	nk Configurat	ion		
Ch BW	Mod'n	RB all	ocation	Mod'n	RB allo	ocation		
		FDD	TDD		FDD	TDD		
1.4MHz	QPSK	6	6	QPSK	6	6		
3MHz	QPSK	15	15	QPSK	15	15		
5MHz	QPSK	25	25	QPSK	25	25		
5MHz	QPSK	25	N/A	QPSK	20	N/A		
5MHz	QPSK	25	N/A	QPSK	15	N/A		
10MHz	QPSK	50	50	QPSK	50	50		
10MHz	QPSK	50	N/A	QPSK	25	N/A		
10MHz	QPSK	50	N/A	QPSK	20	N/A		
10MHz	QPSK	50	N/A	QPSK	15	N/A		
15MHz	QPSK	75	75	QPSK	75	75		
15MHz	QPSK	75	N/A	QPSK	50	N/A		
15MHz	QPSK	75	N/A	QPSK	25	N/A		
15MHz	QPSK	75	N/A	QPSK	20	N/A		
20MHz	QPSK	100	100	QPSK	100	100		
20MHz	QPSK	100	N/A	QPSK	75	N/A		
20MHz	QPSK	100	N/A	QPSK	50	N/A		
20MHz	QPSK	100	N/A	QPSK	25	N/A		
20MHz	QPSK	100	N/A	QPSK	20	N/A		
				tely for each E-		hich		
Note 2: De	epending on E-	UTRA band, oi	nly the appropr	n Table 5.4.2.1 - riate Uplink RB andwidth. The all	allocation value			
clo	ose as possible	to the downlin	k operating ba	nd but confined	within the tran	smission		
				idth (Table 5.4				
Note 3: Fo	or the DL signal	one sided dyn	amic OCNG P	attern OP.1 FD	D/TDD is used			

- 1. Connect the SS and interfering source to the UE antenna connectors as shown in TS 36.508 [7] Figure A.4.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.5.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.5.4.3.

# 7.5.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.5.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.5.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the Downlink signal level to the value as defined in Table 7.5.5-2 (Case 1). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in Table 7.5.5-2 (Case 1) for carrier frequency  $f \le 3.0$ GHz or within +0, -4.0 dB

of the target level for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ , for at least the duration of the Throughput measurement.

- 4. Set the Interferer signal level to the value as defined in Table 7.5.5-2 (Case 1) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 4.
- 7. Set the Downlink signal level to the value as defined in Table 7.5.5-3 (Case 2). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.5.5-3 (Case 2) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement.
- 8. Set the Interferer signal level to the value as defined in Table 7.5.5-3 (Case 2) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 9. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G 2
- 10. Repeat steps from 7 to 9, using an interfering signal above the wanted signal in Case 2 at step 8.
- 11. Repeat for applicable channel bandwidths and operating band combinations in both Case 1 and Case 2.

## 7.5.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exception

Derivation Path: 36.331 clause 6.3.2 Information Element Value/remark Comment Condition UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE { p0-UePUSCH 0 deltaMCS-Enabled en0 accumulationEnabled TRUE p0-uePUCCH 0 pSRS-Offset 3 (-6 dB) filterCoefficient fc8 larger filter length is used to reduce the RSRP measurement variation

Table 7.5.4.3-1: UplinkPowerControlDedicated

# 7.5.5 Test requirement

The throughput  $R_{av}$  shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 under the conditions specified in table 7.5.5-2, and also under the conditions specified in table 7.5.5-3.

Table 7.5.5-1: Adjacent channel selectivity

		Channel bandwidth							
Rx Parameter	Units	1.4 3 5 10 15 20 MHz MHz MHz MHz MHz MHz							
ACS	dB	33.0 33.0 33.0 30 27							

Rx Parameter	Units			Channel ba	andwidt h			
		1.4MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
Power in	dBm							
Transmission				REFSENS	. 11 dD			
Bandwidth				KEFSENS	+ 14 UD			
Configuration								
	dBm	REFSENS	REFSENS	REFSENS	REFSENS	REFSENS	REFSENS	
P <sub>Interferer</sub>		+45.5dB	+45.5dB	+45.5dB	+45.5dB	+42.5dB	+39.5dB	
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5	
Finterferer	MHz	1.4+0.0025/	3+0.0075	5+0.0025	7.5+0.0075	10+0.0125	12.5+0.002	
(offset)		-1.4-0.0025	/	/	/	/	5	
			-3-0.0075	-5-0.0025	-7.5-	-10-0.0125	/	
					0.0075		-12.5-	
							0.0025	
				CMAX_L with PCM				
Note 2: The in	The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one							
sided	l dynamic	OCNG Patterr	OP.1 FDD/TI	DD as describe	d in Annex A.5.	.1.1/A.5.2.1 an	d set-up	

Table 7.5.5-2: Test parameters for Adjacent channel selectivity, Case 1

Table 7.5.5-3: Test parameters for Adjacent channel selectivity, Case 2

Rx Parameter	Units	Channel bandwidth						
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
Power in Transmission Bandwidth Configuration	dBm	-56.5	-56.5	-56.5	-56.5	-53.5	-50.5	
PInterferer	dBm			-2	5		•	
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5	
Finterferer	MHz	1.4+0.0025	3+0.0075	5+0.0025	7.5+0.0075	10+0.0125	12.5+0.002	
(offset)		/	/	/	/	/	5	
		-1.4-	-3-0.0075	-5-0.0025	-7.5-	-10-0.0125	/	
		0.0025			0.0075		-12.5-	
							0.0025	

Note 1: The transmitter shall be set to 24dB below P<sub>CMAX\_L</sub> with P<sub>CMAX\_L</sub> as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

# 7.5A Adjacent Channel Selectivity (ACS) for CA

according to Annex C.3.1.

# 7.5A.1 Adjacent Channel Selectivity (ACS) for CA (intra-band contiguous DL CA and UL CA)

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The test is still under discussion for the value for within how much the total power in each of the assigned carriers should be equal to each other

## 7.5A.1.1 Test purpose

Adjacent channel selectivity for CA test verifies the UE's ability to receive data with a given average throughput for a specified reference measurement channel, in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel, under conditions of ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area when other e-NodeB transmitters exist in the adjacent channel.

## 7.5A.1.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA

#### 7.5A.1.3 Minimum conformance requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band, the adjacent channel requirements are defined with the uplink active on the band other than the band whose downlink is being tested. The UE shall meet the requirements specified in subclause 7.5.1 for each component carrier while both downlink carriers are active. For E-UTRA CA configurations including an operating band without uplink band (as noted in Table 5.2-1), the requirements for both downlinks shall be met with the uplink active in the band capable of UL operation. For E-UTRA CA configurations listed in Table 7.3A.1.3-0a under conditions for which reference sensitivity for the operating band being tested is N/A, the adjacent channel requirements of subclause 7.5A.1.3 do not apply.

For intra-band contiguous carrier aggregation the downlink SCC shall be configured at no minal channel spacing to the PCC with the PCC configured closest to the uplink band. Downlink PCC and SCC are both activated. The uplink output power shall be set as specified in Tables 7.5A.1.3-2 or 7.5A.1.3-3 with the uplink configuration set according to Table 7.3A.1.3-1 for the applicable carrier aggregation configuration. For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.5-2. The UE shall fulfil the minimum requirement specified in Table 7.5A.1.3-1 for an adjacent channel interferer on either side of the aggregated downlink signal at a specified frequency offset and for an interferer power up to -25 dBm. The throughput of each carrier shall be  $\geq$  95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.5A.1.3-2 and 7.5A.1.3-3.

Table 7.5A.1.3-1: Adjacent channel selectivity

		CA Bandwidth Class								
Rx Parameter	Units	В	B C D E F							
ACS	dB		24							

Table 7.5A.1.3-2: Test parameters for Adjacent channel selectivity, Case 1

Rx Parameter	Units	CA Bandwidth Class						
		В	С	D	E	F		
Power per CC in Aggregated			REFSENS +					
Transmission Bandwidth			14 dB					
Configuration								
	dBm		Aggregated					
			power + 22.5					
PInterferer			dB					
BWInterferer	MHz		5					
FInterferer (offset)	MHz		2.5 + Foffset					
			/					
			-2.5 - Foffset					

NOTE 1: The transmitter shall be set to 4dB below PCMAX L or PCMAX L-CA as defined in subclause 6.2.5A.

NOTE 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1

NOTE 3: The F<sub>interferer</sub> (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to  $\left\lfloor F_{\text{interferer}} / 0.015 + 0.5 \right\rfloor 0.015 + 0.0075 \, \text{MHz}$  to be offset from the sub-carrier raster.

Table 7.5A.1.3-3: Test parameters for Adjacent channel selectivity, Case 2

Rx Parameter	Units	CA Bandwidth Class					
		В	С	D	E	F	

Power per CC in Aggregated Transmission Bandwidth	dBm		-50.5		
Configuration					
Pinterferer	dBm	·		-25	
BW <sub>Interferer</sub>	MHz		5		
F <sub>Interferer</sub> (offset)	MHz	2.	5+ F <sub>offs et</sub>		
			/		
		-2	.5- F <sub>offs et</sub>		

NOTE 1: The transmitter shall be set to 24dB below PCMAX\_L or PCMAX\_LCA as defined in subclause 6.2.5A.

NOTE 2: The interferer consists of the Reference measurement channel specified in Annex 3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1

NOTE 3: The F<sub>interferer</sub> (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to  $|F_{interferer}|/0.015 + 0.5| 0.015 + 0.0075 \,\text{MHz}$  to be offset from the sub-carrier raster.

The normative reference for this requirement is TS 36.101 [2] clause 7.5.1A.

#### 7.5A.1.4 Test description

#### 7.5A.1.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.5A.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

100

Table 7.5A.1.4.1-1: Test Configuration Table

Initial Conditions							
Test Environment as specified in TS 36.508[7] clause 4.1	NC						
Test Frequencies as specified in TS36.508 [7] clause 4.3.1 for different CA bandwidth classes.	C: Mid range						
Test CC Combination setting (NRB_agg) as specified in clause 5.4.2A.1 for the CA Configuration across	Lowest N <sub>RB_agg</sub>						
bandwidth combination sets supported by the UE.	Highest N <sub>RB_agg</sub>						
Test Parameters for CA Configurations							

	figuration /										
PCC N <sub>RB</sub>	SCC N <sub>RB</sub>	CC MOD	PCC & SCC CC RB allocation MOD		N <sub>RB_allo</sub>	PCC & SCC RB allocations (L <sub>CRB</sub> @ RB <sub>start</sub> )					
75	75	QPSK	75+75	QPSK	75	P_75@0	S_0@0	-	-		
75	75	QPSK	75+75	QPSK	130	P_75@0	S_55@0	-	-		
75	75	QPSK	75+75	QPSK	150	P_75@0	S_75@0	-	-		
100	50	QPSK	100+50	QPSK	150	P_100@0	S_50@0	-	-		
100	100	QPSK	100+100	QPSK	75	P_75@25	S_0@0	-	-		
100	100	QPSK	100+100	QPSK	130	P 100@0	S 30@0	-	-		

NOTE 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1 and Table 5.4.2A.1-2.

QPSK

200

P 100@0

S 100@0

- NOTE 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier and to table 7.3A.1.3-1 for UE supporting two uplink carriers are tested per Test CA configuration.
  - 1. Connect the SS and interfering source to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure group A.34 as appropriate.
  - 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.

100+100

- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1 and C.3.0, and uplink signals according to Annex H.1 and H.3.0.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.5A.1.4.1-1.
- 5, Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.5A.1.4.3.

#### 7.5A.1.4.2 Test procedure

100

**QPSK** 

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.5A.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Tables 7.5A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.

- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.5A.1.4.1-1 on both PCC and SCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level for PCC and SCC to the value as defined in Table 7.5A.1.5-2 (Case 1). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.5A.1.5-2 (Case 1) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement. Suitable uplink power control commands should be sent to ensure the total power in each of the assigned carriers to be equal to each other within +/-[2] dB.
- 7. Set the Interferer signal level to the value as defined in Table 7.5A.1.5-2 (Case 1) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 8. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted signal in Case 1 at step 7.
- 10. Set the Downlink signal level for PCC and SCC to the value as defined in Table 7.5A.1.5-3 (Case 2). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.5A.1.5-3 (Case 2) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement. Suitable uplink power control commands should be sent to ensure the total power in each of the assigned carriers to be equal to each other within +/-[2] dB.
- 11. Set the Interferer signal level to the value as defined in Table 7.5A.1.5-3 (Case 2) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 12. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2A.
- 13. Repeat steps from 10 to 12, using an interfering signal above the wanted signal in Case 2 at step 11.

#### 7.5A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exception.

Table 7.5A.1.4.3-1: UplinkPowerControlDedicatedSCell-r10

Derivation Path: 36.508 clause 4.6.3			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::=			
SEQUENCE {			
p0-UE-PUSCH-r10	0		
deltaMCS-Enabled-r10	en0		
accumulationEnabled-r10	TRUE		
pSRS-Offset	7 (0 dB)	The actual parameter value is -10.5 + 1.5*pSRS-Offset value; 0 is the actual value in dB (-10.5 + 1.5*7 dB).	
pSRS-OffsetAp-r10	7 (0 dB)	The actual parameter value is -10.5 + 1.5*pSRS-Offset value; 0 is the actual value in dB (-10.5 + 1.5*7 dB).	
filterCoefficient-r10	fc8	larger filter length is used to reduce the RSRP measurement variation	
pathlossReferenceLinking-r10	sCell		
}			

# 7.5A.1.5 Test Requirements

The throughput of each carrier shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 under the conditions specified in table 7.5A.1.5-2, and also under the conditions specified in table 7.5A.1.5-3.

Table 7.5A.1.5-1: Adjacent channel selectivity

		CA Bandwidth Class						
Rx Parameter	Units	В	С	D	E	F		
ACS	dB		24					

Table 7.5A.1.5-2: Test parameters for Adjacent channel selectivity, Case 1

Rx Parameter	Units		CA	Bandwidth (	Class	
		В	С	D	E	F
Power per CC in Aggregated			REFSENS +			
Transmission Bandwidth			14 dB			
Configuration						
-	dBm		Aggregated			
			power + 22.5			
			dB			
P <sub>Interferer</sub>						
BW <sub>Interferer</sub>	MHz		5			
F <sub>Interferer</sub> (offset)	MHz		2.5 + F <sub>offset</sub>			
			/			
			-2.5 - F <sub>offset</sub>			

- NOTE 1: The transmitter shall be set to 4dB below PCMAX\_L or PCMAX\_L\_CA as defined in subclause 6.2.5A.
- NOTE 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1
- NOTE 3: The F<sub>interferer</sub> (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to  $\left[F_{\text{interferer}}/0.015+0.5\right]0.015+0.0075\,\text{MHz}$  to be offset from the sub-carrier raster.

Table 7.5A.1.5-3: Test parameters for Adjacent channel selectivity, Case 2

Rx Parameter	Units		ass			
		В	С	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm		-50.5			
P <sub>Interferer</sub>	dBm			-25		
BW <sub>Interferer</sub>	MHz		5			
Finterferer (Offset)	MHz		2.5+ F <sub>offs et</sub> / -2.5- F <sub>offs et</sub>			

NOTE 1: The transmitter shall be set to 24dB below PCMAX\_L or PCMAX\_LCA as defined in subclause 6.2.5A.

NOTE 2: The interferer consists of the Reference measurement channel specified in Annex 3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1

NOTE 3: The  $F_{\text{interferer}}$  (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to  $\left| F_{\text{interferer}} \right| / 0.015 + 0.5 \left| 0.015 + 0.0075 \right|$  MHz to be offset from the sub-carrier raster.

# 7.5A.2 Adjacent Channel Selectivity (ACS) for CA (intra-band contiguous DL CA without UL CA)

#### 7.5A.2.1 Test purpose

The test purpose is the same as in clause 7.5A.1.1.

#### 7.5A.2.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA without UL CA.

#### 7.5A.2.3 Minimum conformance requirements

Minimum conformance requirements for intra-band contiguous carrier aggregation with one uplink carrier support as in clause 7.5A.1.3.

## 7.5A.2.4 Test description

#### 7.5A.2.4.1 Initial conditions

Same as in clause 7.5A.1.4.1 with the following exceptions:

- Instead of Table 7.5A.1.4.1-1  $\rightarrow$  use Table 7.5A.2.4.1-1.

Table 7.5A.2.4.1-1: Test Configuration Table

					•				
Initial Con	ditions								
Test Enviro	ecified in		NC						
TS 36.508[7] clause 4.1									
Test Frequ TS36.508 classes.	ecified in .1 for differe	ent CA bandwidth	C: Mid ra	nge					
Toot CC C	ombination a	tting /NDD	_agg) as specified	Lowest	1				
in clause 5	.4.2A.1 for the	e CĂ Config	_agg) as specified guration across ted by the UE.	Highest					
Danuwiuin	Combinations	seis suppoi	Test Paramete	ers for CA	Configurati	ions			
	iguration /	DL	. Allocation			UL Alloca	ation		
PCC N <sub>RB</sub>	SCC N <sub>RB</sub>	CC MOD	PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SC (L <sub>CRB</sub> @ RE	C RB allocat S <sub>start</sub> )	ions	
75	75	QPSK	75+75	QPSK	75	P_75@0	-	-	T -
75	75	QPSK	75+75	QPSK	50	P_50@0	-	-	-
75	75	QPSK	75+75	QPSK	25	P_25@0	-	-	-
75	75	QPSK	75+75	QPSK	20	P_20@0	-	-	-
100	50	QPSK	100+50	QPSK	100	P_100@ 0	-	-	-
100	50	QPSK	100+50	QPSK	75	P_75@0	-	-	-
100	50	QPSK	100+50	QPSK	50	P_50@0	-	-	-
100	50	QPSK	100+50	QPSK	25	P_25@0	-	-	-
100	50	QPSK	100+50	QPSK	20	P_20@0	-	-	-
100	100	QPSK	100+100	QPSK	100	P_100@ 0	-	-	-
100	100	QPSK	100+100	QPSK	75	P_75@0	-	-	-
100	100	QPSK	100+100	QPSK	50	P_50@0	-	-	-
100	100	QPSK	100+100	QPSK	25	P_25@0	-	-	<u> </u>
100	100	QPSK	100+100	QPSK	20	P_20@0	-	-	<u> </u>
NOTE 4.	CA Configura	tion Toot C	C Combination set	ingo oro ol		rotoly for ooo	o CA Configu	rotion wh	ioh

NOTE 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1 and Table 5.4.2A.1-2.

NOTE 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier and to table 7.3A.1.3-1 for UE supporting two uplink carriers are tested per Test CA configuration.

## 7.5A.2.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.5A.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).

- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Tables 7.5A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.5A.2.4.1-1 on PCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level for PCC and SCC to the value as defined in Table 7.5A.1.5-2 (Case 1). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.5A.1.5-2 (Case 1) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement.
- 7. Set the Interferer signal level to the value as defined in Table 7.5A.1.5-2 (Case 1) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 8. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted signal in Case 1 at step 7.
- 10. Set the Downlink signal level for PCC and SCC to the value as defined in Table 7.5A.1.5-3 (Case 2). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.5A.1.5-3 (Case 2) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement.
- 11. Set the Interferer signal level to the value as defined in Table 7.5A.1.5-3 (Case 2) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 12. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2A.
- 13. Repeat steps from 10 to 12, using an interfering signal above the wanted signal in Case 2 at step 11.

#### 7.5A.2.4.3 Message contents

The message contents are the same as in clause 7.5A.1.4.3.

#### 7.5A.2.5 Test Requirements

The test requirements are the same as in clause 7.5A.1.5.

# 7.5A.3 Adjacent Channel Selectivity (ACS) for CA (inter-band DL CA without UL CA)

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The test is still under discussion for Inter-band

#### 7.5A.3.1 Test purpose

The test purpose is the same as in clause 7.5A.1.1.

#### 7.5A.3.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support inter-band DL CA without UL CA.

#### 7.5A.3.3 Minimum conformance requirements

Minimum conformance requirements for inter-band carrier aggregation with one uplink carrier support as in clause 7.5A.1.3.

## 7.5A.3.4 Test description

#### 7.5A.3.4.1 Initial conditions

Same as in clause 7.5A.1.4.1 with the following exceptions:

- Instead of Table 7.5A.1.4.1-1  $\rightarrow$  use Table 7.5A.3.4.1-1.

Table 7.5A.3.4.1-1: Test Configuration Table

Initial Conditions					
Test Environment as specified in TS 36.508[7] subclause 4.1	NC				
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.	A: Mid range for PCC and SCC				
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subdause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N <sub>RB_agg</sub> for PCC and SCC				

CA Configur	ation / N <sub>RB_agg</sub>	<b>3</b>	UL Alle	ocation		
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	CC MOD		PCC & SCC RB allocation		PCC N <sub>RB_alloc</sub>
50	50	QPSK	50	50	QPSK	50
50	50	QPSK	50	50	QPSK	25
50	50	QPSK	50	50	QPSK	20
50	50	QPSK	50	50	QPSK	16
50	75	QPSK	50	75	QPSK	25
50	100	QPSK	50	100	QPSK	50
50	100	QPSK	50	100	QPSK	25
50	100	QPSK	50	100	QPSK	20
75	50	QPSK	75	50	QPSK	25
75	100	QPSK	75	100	QPSK	25
100	50	QPSK	100	50	QPSK	100
100	50	QPSK	100	50	QPSK	75
100	50	QPSK	100	50	QPSK	50
100	75	QPSK	100	75	QPSK	100
100	100	QPSK	100	100	QPSK	75
100	100	QPSK	100	100	QPSK	50

- Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A1-2.
- Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier is tested per Test CA configuration, unless otherwise stated in table 7.3A.1.3-0b.
- Note 3: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).
- Note 4: The frequencies of PCC and SCC shall be switched and tested in each configuration (given UL is supported in PCC band as per Table 5.2-1).

#### 7.5A.3.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.5A.1.4.3.

- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Tables 7.5A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.5A.3.4.1-1 on PCC. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level for PCC and SCC to the value as defined in Table 7.5A.3.5-2 (Case 1). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.5A. 3.5-2 (Case 1) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement.
- 7. Set the Interferer signal level to the value as defined in Table 7.5A. 3.5-2 (Case 1) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 8. Measure the average throughput of SCC for a duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted signal in Case 1 at step 7.
- 10. Set the Downlink signal level for PCC and SCC to the value as defined in Table 7.5A.3.5-3 (Case 2). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.5A.3.5-3 (Case 2) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement.
- 11. Set the Interferer signal level to the value as defined in Table 7.5A.3.5-3 (Case 2) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 12. Measure the average throughput of SCC for a duration sufficient to achieve statistical significance according to Annex G.2A.
- 13. Repeat steps from 10 to 12, using an interfering signal above the wanted signal in Case 2 at step 11.

#### 7.5A.3.4.3 Message contents

The message contents are the same as in clause 7.5A.1.4.3.

## 7.5A.3.5 Test Requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band, the adjacent channel requirements are defined with the uplink active on the band other than the band whose downlink is being tested i.e. the requirements are tested only for the SCell downlink. The UE shall meet the requirements specified in Table 7.5A.3.5-2 and Table 7.5A.3.5-3 for each component carrier, when operated as SCell, while both downlink carriers are active. The requirements for each component carrier are the same as single carrier requirements in Table 7.5.5-2 and Table 7.5.5-3. The parameters in these tables are related to the carrier operated as SCell.

Table 7.5A.3.5-1: Adjacent channel selectivity

		Channel bandwidth					
Rx Parameter	Units	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
ACS	dB	33.0	33.0	33.0	33.0	30	27

Table 7.5A.3.5-2: Test parameters for Adjacent channel selectivity, Case 1

Rx	Units		Channel bandwidth								
Parameter		1.4 MH z	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz				

Power in Transmission Bandwidth Configuration	dBm		REFSENS + 14 dB					
	dBm	REFSENS	REFSENS	REFSENS	REFSENS	REFSENS	REFSENS	
P <sub>Interferer</sub>		+45.5dB	+45.5dB	+45.5dB	+45.5dB	+42.5dB	+39.5dB	
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5	
Finterferer (offset)	MHz	<b>1.4+0.0025</b> / -1.4-0.0025	<b>3+0.0075</b> / -3-0.0075	<b>5+0.0025</b> / -5-0.0025	<b>7.5+0.0075</b> / -7.5- 0.0075	<b>10+0.0125</b> / -10-0.0125	12.5+0.002 5 / -12.5- 0.0025	

Note 1: The transmitter shall be set to 4dB below PcMax\_L at the minimum uplink configuration specified in Table 7.3.3-2 with PcMax\_L as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

Table 7.5A.3.5-3: Test parameters for Adjacent channel selectivity, Case 2

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	-56.5	-56.5	-56.5	-56.5	-53.5	-50.5
P <sub>Interferer</sub>	dBm			-2	5		
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5
F <sub>Interferer</sub>	MHz	1.4+0.0025	3+0.0075	5+0.0025	7.5+0.0075	10+0.0125	12.5+0.002
(offset)		1	1	1	1	1	5
		-1.4-	-3-0.0075	-5-0.0025	-7.5-	-10-0.0125	1
		0.0025			0.0075		-12.5-
							0.0025

Note 1: The transmitter shall be set to 24dB below PCMAX\_L at the minimum uplink configuration specified in Table 7.3.3-2 with PCMAX\_L as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

# 7.5B Adjacent Channel Selectivity (ACS) for UL-MIMO

# 7.5B.1 Test purpose

Adjacent channel selectivity tests the ability of UE that support UL-MIMO to receive data with a given average throughput for a specified reference measurement channel, in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel, under conditions of ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area when other e-NodeB transmitters exist in the adjacent channel.

# 7.5B.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

# 7.5B.3 Minimum conformance requirements

For UE(s) with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements in Clause 7.5.3 shall be met with the UL-MIMO configurations specified in Table 6.2.2B.3-2. For UL-MIMO, the parameter  $P_{\text{CMAX\_L}}$  is defined as the total transmitter power over the two transmit antenna connectors.

The normative reference for this requirement is TS 36.101 [2] clause 7.5.1B.

# 7.5B.4 Test description

#### 7.5B.4.1 Initial conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.5B.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.5B.4.1-1: Te	est Configuration Ta	ble
----------------------	----------------------	-----

Tuble 7.05.4.1 1. 103. Configuration Tuble									
		In	itial Conditior	าร					
	ment as specifi	ed in	NC						
	subclause 4.1								
	icies as specifi		Mid range						
	subclause 4.3								
	l Bandwidths a	•	Lowest, 5MH	z, Highest					
TS 36.508 [7]	] subdause 4.3								
		Test Paramete							
		nlink Configur							
Ch BW	Mod'n		cation	Mod'n	RB allocation				
		FDD	TDD		FDD	TDD			
1.4MHz	QPSK	Full	Full	QPSK	5	5			
3MHz	QPSK	Full	Full	QPSK	4	4			
5MHz	QPSK	Full	Full	QPSK	8	8			
10MHz	QPSK	Full	Full	QPSK	12	12			
15MHz	QPSK	Full	Full	QPSK	16	16			
20MHz	QPSK	Full	Full	QPSK	18	18			
	st Channel Ba		•	•		he			
	applicable channel bandwidths are specified in Table 7.3.3-2.								
Note 2: Fo	r the DL signal	one sided dyn	amic OCNG P	attern OP.1 FD	D/TDD is used	d.			

- 1. Connect the SS and interfering source to the UE antenna connectors as shown in TS 36.508 [7] Figure A.29.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.5B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.5B.4.3.

#### 7.5B.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.5B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 7.5B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the Downlink signal level to the value as defined in Table 7.5 B.5-2 (Case 1). Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within

- +0, 3.4 dB of the target level in Table 7.5B.5-2 (Case 1) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement.
- 4. Set the Interferer signal level to the value as defined in Table 7.5 B.5-2 (Case 1) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 4.
- 7. Set the Downlink signal level to the value as defined in Table 7.5B.5-3 (Case 2). Send Up link power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.5B.5-3 (Case 2) for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the throughput measurement.
- 8. Set the Interferer signal level to the value as defined in Table 7.5B.5-3 (Case 2) and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 9. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 10. Repeat steps from 7 to 9, using an interfering signal above the wanted signal in Case 2 at step 8.
- 11. Repeat for applicable channel bandwidths and operating band combinations in both Case 1 and Case 2.

### 7.5B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exception

Derivation Path: 36.331 clause 6.3.2 Value/remark Comment Condition Information Element UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE { p0-UePUSCH 0 deltaMCS-Enabled en0 accumulationEnabled TRUE p0-uePUCCH Λ pSRS-Offset 3 (-6 dB) filterCoefficient fc8 larger filter length is used to reduce the **RSRP** measurement variation

Table 7.5B.4.3-1: UplinkPowerControlDedicated

# 7.5B.5 Test requirement

The throughput  $R_{av}$  shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 under the conditions specified in table 7.5B.5-2, and also under the conditions specified in table 7.5B.5-3.

Table 7.5B.5-1: Adjacent channel selectivity

		Channel bandwidth					
Rx Parameter	Units	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
ACS	dB	33.0	33.0	33.0	33.0	30	27

Rx Parameter	Units	Channel bandwidth							
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
Power in	dBm					•	•		
Transmission			REFSENS + 14 dB						
Bandwidth				KEFSENS	5 + 14 UD				
Configuration									
	dBm	REFSENS	REFSENS	REFSENS	REFSENS	REFSENS	REFSENS		
P <sub>Interferer</sub>		+45.5dB	+45.5dB	+45.5dB*	+45.5dB	+42.5dB	+39.5dB		
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5		
Finterferer	MHz	1.4+0.0025	3+0.0075	5+0.0025	7.5+0.0075	10+0.0125	12.5+0.002		
(offset)							5		
Note 1: The transmitter shall be set to 4dB below PCMAX_L at the minimum uplink configuration specified in									
Table	e 7.3.3-2	with Pcmax_L as	defined in cla	use 6.2.5.	-	-			
Note 2: The i	interferer	ferer consists of the Reference measurement channel specified in Annex A.3.2 with one							

sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up

Table 7.5B.5-2: Test parameters for Adjacent channel selectivity, Case 1

Table 7.5B.5-3: Test parameters for Adjacent channel selectivity, Case 2

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	-56.5	-56.5	-56.5	-56.5	-53.5	-50.5
P <sub>Interferer</sub>	dBm		-25				
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5
F <sub>Interferer</sub> (offset)	MHz	1.4+0.0025	3+0.0075	5+0.0025	7.5+0.0075	10+0.0125	12.5+0.002 5

Note 1: The transmitter shall be set to 24dB below Pcmax\_L at the minimum uplink configuration specified in Table 7.3.3-2 with Pcmax\_L as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

# 7.6 Blocking characteristics

according to Annex C.3.1.

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

# 7.6.1 In-band blocking

## 7.6.1.1 Test Purpose

In-band blocking is defined for an unwanted interfering signal falling into the range from 15MHz below to 15MHz above the UE receive band, at which the relative throughput shall meet or exceed the requirement for the specified measurement channels.

The lack of in-band blocking ability will decrease the coverage area when other e-NodeB transmitters exist (except in the adjacent channels and spurious response).

#### 7.6.1.2 Test Applicability

This test applies to all types of E-UTRA UE release 8 and forward..

## 7.6.1.3 Minimum Conformance Requirements

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.6.1.3-1 and 7.6.1.3-2.

Table 7.6.1.3-1: In band blocking parameters

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in			REFSENS	+ channel band	width specific	value below	
Transmission Bandwidth Configuration	dBm	6	6	6	6	7	9
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5
Floffs et, case 1	MHz	2.1+0.0125	4.5+0.0075	7.5+0.0125	7.5+0.0025	7.5+0.0075	7.5+0.0125
Floffs et, case 2	MHz	3.5+0.0075	7.5+0.0075	12.5+0.0075	12.5+0.012	12.5+0.002	12.5+0.007
					5	5	5

Note 1: The transmitter shall be set to 4dB below PcMax\_L at the minimum uplink configuration specified in Table 7.3.3-2 with PcMax\_L as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

Table 7.6.1.3-2: In-band blocking

E-UTRA band	Parameter	Unit	Case 1	Case 2	Case 3	Case 4
	P <sub>Interferer</sub>	dBm	-56	-44	-30	[-30]
	F <sub>Interferer</sub> (offset)	MHz	=-BW/2 - Floffs et, case 1 & =+BW/2 + Floffset, case 1	≤-BW/2 — Floffset,case 2 & ≥+BW/2 + Floffset,case 2	-BW/2 – 15 & -BW/2 – 9	-BW/2 – 10
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41,42,43,44	F <sub>Interferer</sub> MHz (Note 2)		F <sub>DL_low</sub> – 15 to F <sub>DL_high</sub> + 15			
12	Finterferer	MHz	(Note 2)	F <sub>DL_low</sub> - 10 to F <sub>DL_ligh</sub> + 15		F <sub>DL_low</sub> – 10
17	F <sub>Interferer</sub>	MHz	(Note 2)	F <sub>DL_low</sub> -9 to F <sub>DL_ligh</sub> +15	F <sub>DL_low</sub> – 15 and F <sub>DL_low</sub> – 9	

Note 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band

Note 2: For each carrier frequency the requirement is valid for two frequencies:

a. the carrier frequency -BW/2 -  $F_{\text{loffs\,et},\,\text{case}\,\,1}$  and

b. the carrier frequency +BW/2 +  $F_{loffs\,et,\,case\,1}$ 

Note 3: F<sub>Interferer</sub> range values for unwanted modulated interfering signal are interferer centre frequencies

Note 4: Case 3 and Case 4 only apply to assigned UE channel bandwidth of 5 MHz

The normative reference for this requirement is TS 36.101 [2] clause 7.6.1.

#### 7.6.1.4 Test Description

#### 7.6.1.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.6.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.6.1.4.1-1: Test Configuration Table

Initial Conditions										
Test Environ	ment as specific	ed in	NC							
	subclause 4.1									
	ncies as specific	ed in	Mid range							
	subclause 4.3.		i i i i i i i i i i i i i i i i i i i							
	Bandwidths as		Lowest, 5MH	łz, Highest						
	] subdause 4.3		, , ,	, 3						
			ers for Chann	el Bandwidths						
	Dowr	nlink Configur	ation	Upli	ink Configura	tion				
Ch BW	Mod'n	RB allo	cation	Mod'n	RB allo	cation				
		FDD	TDD		FDD	TDD				
1.4MHz	QPSK	6	6	QPSK	6	6				
3MHz	QPSK	15	15	QPSK	15	15				
5MHz	QPSK	25	25	QPSK	25	25				
5MHz	QPSK	25	N/A	QPSK	20	N/A				
5MHz	QPSK	25	N/A	QPSK	15	N/A				
10MHz	QPSK	50	50	QPSK	50	50				
10MHz	QPSK	50	N/A	QPSK	25	N/A				
10MHz	QPSK	50	N/A	QPSK	20	N/A				
10MHz	QPSK	50	N/A	QPSK	15	N/A				
15MHz	QPSK	75	75	QPSK	75	75				
15MHz	QPSK	75	N/A	QPSK	50	N/A				
15MHz	QPSK	75	N/A	QPSK	25	N/A				
15MHz	QPSK	75	N/A	QPSK	20	N/A				
20MHz	QPSK	100	100	QPSK	100	100				
20MHz	QPSK	100	N/A	QPSK	75	N/A				
20MHz	QPSK	100	N/A	QPSK	50	N/A				
20MHz	QPSK	100	N/A	QPSK	25	N/A				
20MHz	QPSK	100	N/A	QPSK	20	N/A				
						hich				
applicable channel bandwidths are specified in Table 5.4.2.1-1.  Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth. The allocation shall be located as close as possible to the downlink operating band but confined within the transmission										
bandwidth configuration for the channel bandwidth (Table 5.4.2-1).										

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, in Figure A.4.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.

For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.

- 4. The UL and DL Reference Measurement channels are set according to in Table 7.6.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.

Note 3:

6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.1.4.3.

#### 7.6.1.4.2 Test Procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the parameters of the signal generator for an interfering signal below the wanted signal in Case 1 according to Tables 7.6.1.5-1 and 7.6.1.5-2.
- 4. Set the downlink signal level according to the table 7.6.1.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.1.5-1 for carrier frequency  $f \le 3.0 GHz$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 GHz < f \le 4.2 GHz$ , for at least the duration of the throughput measurement.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 3.
- 7. Repeat steps from 3 to 6, using interfering signals in Case 2 at step 3 and 6. The ranges of case 2 are covered in steps equal to the interferer bandwidth. The test frequencies are chosen in analogy to table 7.6.1.4.2-1.
- 8. Repeat steps from 3 to 5, using successively all interfering signals in Case 3 and Case 4 at step 3.

Table 7.6.1.4.2-1: Example for interferer frequencies

	Lower frequency	Upper frequency		
Band 1 DL	2110 MHz	2170 MHz		
Band 1 Midrange	2140 MHz			
Receive band wanted signal (BW 5MHz)	2137.5 MHz	2142.5 MHz		
Interferer case 1	2129.9875 MHz	2150.0125 MHz		
Interferer case 2 (inner frequency)	2124.9925 MHz	2155.0075 MHz		
Interferer case 2 (outer frequency)	2099.9925 MHz	2180.0075 MHz		
Outer limit for in band blocking	2095MHz	2185MHz		
Number of test frequencies case 2	6	6		
Number of test frequencies for Band 17(asymmetric!), BW 5MHz, case 2	0	2		

#### 7.6.1.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exception

Table 7.6.1.4.3-1: UplinkPowerControlDedicated

Derivation Path: 36.331 clause 6.3.2									
Information Element	Value/remark	Comment	Condition						
UplinkPowerControlDedicated-DEFAULT ::=									
SEQUENCE {									
p0-UePUSCH	0								
deltaMCS-Enabled	en0								
accumulationEnabled	TRUE								
p0-uePUCCH	0								
pSRS-Offset	3 (-6 dB)								
filterCoefficient	fc8	larger filter length is used to reduce the RSRP measurement variation							
}									

# 7.6.1.5 Test Requirement

The throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.6.1.5-1 and 7.6.1.5-2.

Table 7.6.1.5-1: In band blocking parameters

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in			REFSENS	+ channel band	width specific v	<i>r</i> alue below	
Transmission Bandwidth Configuration	dBm	6	6	6	6	7	9
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5
Floffs et, case 1	MHz	2.1+0.0125	4.5+0.0075	7.5+0.0125	7.5+0.0025	7.5+0.0075	7.5+0.0125
Floffs et, case 2	MHz	3.5+0.0075		12.5+0.0075	12.5+0.012	12.5+0.002	12.5+0.007
			7.5+0.0075		5	5	5

Note 1: The transmitter shall be set to 4dB below P<sub>CMAX</sub> with P<sub>CMAX</sub> as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up

according to Annex C.3.1.

Table 7.6.1.5-2: In-band blocking

E-UTRA band	Parameter	Unit	Case 1	Case 2	Case 3	Case 4
	P <sub>Interferer</sub>	dBm	-56	-44	-30	[-30]
Finterferer		MHz	=-BW/2 - F <sub>loffs et,c ase 1</sub>	≤-BW/2 − F <sub>loffset,cas e 2</sub> &	-BW/2 – 15 &	-BW/2 – 10
	(offset)		=+BW/2 + F <sub>loffset,case 1</sub>	≥+BW/2 + F <sub>loffs et,cas e 2</sub>	-BW/2 - 9	

1, 2, 3, 4, 5, 6,						
7, 8, 9, 10, 11,						
13, 14, 18, 19,				F 45		
20, 21, 22, 23, 25, 26, 27, 28,	F <sub>Interferer</sub>	MHz	(Note 2)	F <sub>DL_low</sub> – 15 to		
31, 33, 34, 35,	i interrerer	IVIIIZ	(NOIG Z)	F <sub>DL_high</sub> + 15		
36, 37, 38, 39,				52g		
40,						
41,42,43,44						
				F <sub>DL_low</sub> - 10		
12	Finterferer	MHz	(Note 2)	to		F <sub>DL_low</sub> - 10
				F <sub>DL_high</sub> + 15		
				F <sub>DL_low</sub> -9	F <sub>DL_low</sub> - 15	
17	Finterferer	MHz	(Note 2)	to	and	
				F <sub>DL high</sub> + 15	F <sub>DL low</sub> -9	

Note 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the

first 15 MHz below or above the UE receive band

Note 2: For each carrier frequency the requirement is valid for two frequencies:

a. the carrier frequency -BW/2 -  $F_{\text{loffs\,et},\,\text{case}\,1}$  and

b. the carrier frequency +BW/2 + F<sub>loffs et, case 1</sub>

Note 3: Finterferer range values for unwanted modulated interfering signal are interferer centre frequencies

Note 4: Case 3 and Case 4 only apply to assigned UE channel bandwidth of 5 MHz

# 7.6.1A In-band blocking for CA

#### 7.6.1A.1 In-band blocking for CA (intra-band contiguous DL CA and UL CA)

#### 7.6.1A.1.1 Test Purpose

In-band blocking is defined for an unwanted interfering signal falling into the range from 15MHz below to 15MHz above the UE receive band, at which the relative throughput shall meet or exceed the requirement for the specified measurement channels.

The lack of in-band blocking ability will decrease the coverage area when other e-NodeB transmitters exist (except in the adjacent channels and spurious response).

#### 7.6.1A.1.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

#### 7.6.1A.1.3 Minimum Conformance Requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the in-band blocking requirements are defined with the uplink active on the band other than the band whose downlink is being tested. The UE shall meet the requirements specified in subclause 7.6.1 for each component carrier while both downlink carriers are active. For the UE which supports inter band CA configuration in Table 7.3A.3-0,  $P_{Interferer}$  power defined in Table 7.6.1.3-2 is increased by the amount given by  $\Delta R_{IB,c}$  in Table 7.3A.3-0. For E-UTRA CA configurations including an operating band without uplink band (as noted in Table 5.2-1), the requirements for both downlinks shall be met with the uplink in the band capable of UL operation.. The requirements for the component carrier configured in the operating band without uplink band are specified in Table 7.6.1.3-1 and Table 7.6.1.A.1.3-0.

Table 7.6.1A.1.3-0: In-band blocking for additional operating bands for carrier aggregation

E-UTRA band		Parameter	Unit	Case 1	Case 2			
		P <sub>Interferer</sub>	dBm	-56	-44			
		F <sub>Interferer</sub> (offset)	MHz	=-BW/2 - Floffset,case 1 & =+BW/2 + Floffset,case 1	≤-BW/2 - F <sub>loffset,case 2</sub> & ≥+BW/2 + F <sub>loffset,case</sub> 2			
	29	F <sub>Interferer</sub>	MHz	(Note 2)	F <sub>DL_low</sub> – 15 to F <sub>DL_high</sub> + 15			
	NOTE 1: For certain bands, the unwanted modulated interfering signal may not finiside the UE receive band, but within the first 15 MHz below or above receive band.  NOTE 2: For each carrier frequency the requirement is valid for two frequencies:  a. the carrier frequency -BW/2 - Floffset, case 1 and b. the carrier frequency +BW/2 + Floffset, case 1							

For E-UTRA CA configurations listed in Table 7.3A.1.3-0a under conditions for which reference sensitivity for the operating band being tested is N/A, the in-band blocking requirements of subclause 7.6.1A.1.3 do not apply.

centre frequencies.

NOTE 3: Finterferer range values for unwanted modulated interfering signal are interferer

For intra-band contiguous carrier aggregation the downlink SCC shall be configured at no minal channel spacing to the PCC with the PCC configured closest to the uplink band. Downlink PCC and SCC are both activated. The uplink output power shall be set as specified in Table 7.6.1A.1.3-1 with the uplink configuration set according to Table 7.3A.3-1 for the applicable carrier aggregation configuration. For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.3-2. The UE shall fulfil the minimum requirement in presence of an interfering signal specified in Tables 7.6.1A.3-1 and Tables 7.6.1A.1.3-2 being on either side of the aggregated signal. The throughput of each carrier shall be  $\geq$  95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.6.1A.1.3-1 and 7.6.1A.1.3-2.

Table 7.6.1A.1.3-1: In band blocking parameters

Rx Parameter	Units	CA Bandwidth Class						
		В	С	D	E	F		
Power per CC in		REFSENS + CA Bandwidth Class specific value below						
Aggregated								
Transmission	dBm		10					
Bandwidth			12					
Configuration								
BW <sub>Interferer</sub>	MHz		5					
Floffs et, case 1	MHz		7.5					
Floffs et, case 2	MHz		12.5					
Note 1: The transmitter shall be set to 4dB below PCMAX L OF PCMAX L CA as defined in subclause 6.2.5A								

Note 1: The transmitter shall be set to 4dB below PCMAX\_L or PCMAX\_L\_CA as defined in subclause 6.2.5A

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to

Annex C.3.1

Table 7.6.1A.1.3-2: In-band blocking

CA configuration	Parameter	Unit	Case 1	Case 2
	P <sub>Interferer</sub>	dBm	-56	-44
			=-F <sub>offs et</sub> — F <sub>loffs et, cas e 1</sub>	≤-F <sub>offset</sub> — F <sub>loffset,case 2</sub>
	Finterferer	MHz	&	&
			=+F <sub>offs et</sub> + F <sub>loffset,cas e 1</sub>	≥+F <sub>offset</sub> + F <sub>loffset,case 2</sub>

CA_1C, CA_7C, CA_38C, CA_40C,CA_41C		F <sub>Interferer</sub> (Range)	MHz	(Note 2)	F <sub>DL_low</sub> – 15 to F <sub>DL_high</sub> + 15			
Note 1:	For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band							
Note 2:	: For each carrier frequency the requirement is valid for two frequencies: a. the carrier frequency -F <sub>offset</sub> - F <sub>loffset, case 1</sub> and b. the carrier frequency +F <sub>offset</sub> + F <sub>loffset, case 1</sub>							
Note 3:	Foffset is the frequency offset from the centre frequency of the adjacent CC being tested to the edge of aggregated channel bandwidth.							
Note 4:	The F <sub>interferer</sub> (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\left[F_{\text{interferer}}/0.015+0.5\right]0.015+0.0075\text{MHz}$ to be offset from the sub-carrier raster.							

The normative reference for this requirement is TS 36.101 [2] clause 7.6.1.1A.

## 7.6.1A.1.4 Test Description

#### 7.6.1A.1.4.1 Initial Conditions

Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in table 7.6.1A.1.4.1-1. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.6.1A.1.4.1-1: Test Configuration Table

initial Conditions											
Test Enviro			NC								
15 36.508[	7] subclause	4.1									
	encies as spe		"	C: Mid ra	C: Mid range						
1836.508     classes.	/] subclause	4.3.1 for di	ferent CA bandwidth								
Classes.											
Test CC Co	Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in					Lowest N <sub>RB_agg</sub>					
	subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.					Highest N <sub>RB_agg</sub>					
bandwidth	combinations	seis suppor	Test Parameters f	or CA Con	figurations						
CA Confi	iguration /		DL Allocation	T		UL Allocation					
	B_agg	'	DE Anocation			OL Anocation					
PCC	PCC SCC CC		PCC & SCC RB	CC	N <sub>RB_alloc</sub> PCC & SCC RB allocations		llocations				
N <sub>RB</sub>	N <sub>RB</sub>	MOD	allocation	MOD		(L <sub>CRB</sub> @ RB <sub>start</sub> )					
75	75	QPSK	75+75	QPSK	75	P_75@0	S_0@0				
75	75	QPSK	75+75	QPSK	130	P_75@0	S_55@0				
75	75	QPSK	75+75	QPSK	150	P_75@0	S_75@0				
100	50	QPSK	100+50	QPSK	150	P_100@0	S_50@0				
100	100	QPSK	100+100	QPSK	75	P_75@25	S_0@0				
100	100	QPSK	100+100	QPSK	130	P_100@0	S_30@0				
100	100	QPSK	100+100	QPSK	200	P_100@0	S_100@0				
applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1.											
Note 2: Depending on CA Configuration only the appropriate Uplink RB allocation value according to table 7.3A.1.3-1 is tested per CA Configuration Test CC combination.											
, , , , , , , , , , , , , , , , , , , ,											
1											

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure group A.34 as appropriate. .
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.6.1A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.1A.1.4.3.

#### 7.6.1A.1.4.2 Test Procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.2 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.6.1A.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.1A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.1A.1.4.1-1 on both PCC and SCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the parameters of the signal generator for an interfering signal below the wanted aggregated signal in Case 1 according to Tables 7.6.1A.1.5-1 and 7.6.1A.1.5-2.
- 7. Set the downlink signal level according to the table 7.6.1A.1.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.1A.1.5-1 for carrier frequency  $f \le 3.0 \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz <  $f \le 4.2 \text{GHz}$ , for at least the duration of the throughput measurement. Suitable uplink power control commands should be sent to ensure the total power in each of the assigned carriers to be equal to each other within +/-[2] dB.
- 8. Measure the average throughput for each component carrier for duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted aggregated signal in Case 1 at step 6.
- 10. Repeat steps from 6 to 9, using interfering signals in Case 2 at step 6 and 9. The ranges of case 2 are covered in steps equal to the interferer bandwidth. The test frequencies are chosen in analogy to table 7.6.1A.1.4.2-1.

Table 7.6.1A.1.4.2-1: Example for interferer frequencies

	Lower frequency	Upper frequency
Band 1 DL	2110 MHz	2170 MHz
Band 1 Midrange		132.5 MHz 147.5 MHz
Receive band wanted signal (CC Configuration / N <sub>RB_agg</sub> 75 + 75)	PCC: 2125 MHz SCC: 2140 MHz	2140 MHz 2155 MHz
Interferer case 1	2117.5125 MHz	2162.5125 MHz
Interferer case 2 (inner frequency)	2112.5025 MHz	2167.5075 MHz
Interferer case 2 (outer frequency)	2097.5025 MHz	2177.5075 MHz
Outer limit for in band blocking	2095MHz	2185MHz
Number of test frequencies case 2	4	3

#### 7.6.1A.1.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.6.1A.1.5 **Test Requirement**

The throughput measurement of each carrier derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.6.1A.1.5-1 and 7.6.1A.1.5-2.

Table 7.6.1A.1.5-1: In band blocking parameter

Rx Parameter	Units	CA Bandwidth Class				
		В	С	D	E	F
Power per CC in		R	EFSENS + CA Ba	ndwidth Class s	pecific value belo	)W
Aggregated						
Transmission	dBm		40			
Bandwidth			12			
Configuration						
BW <sub>Interferer</sub>	MHz		5			
Floffs et, case 1	MHz		7.5			
Floffs et, case 2	MHz		12.5			

Note 1: The transmitter shall be set to 4dB below PCMAX\_L or PCMAX\_L\_CA as defined in subclause 6.2.5A

The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided Note 2: dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1

Table 7.6.1A.1.5-2: In-band blocking

C	A configuration	Parameter	Unit	Case 1	Case 2
		P <sub>Interferer</sub>	dBm	-56	-44
				=-F <sub>offs et</sub> — F <sub>loffs et,cas e 1</sub>	≤-F <sub>offset</sub> — F <sub>loffset,case 2</sub>
		Finterferer	MHz	&	&
				=+F <sub>offs et</sub> + F <sub>loffset,cas e 1</sub>	≥+F <sub>offset</sub> + F <sub>loffset,case 2</sub>
CA 10	CA_1C, CA_7C, CA_38C,				F <sub>DL_low</sub> - 15
	A_40C,CA_41C	F <sub>Interferer</sub> (Range)	MHz	(Note 2)	to
0.	<u></u>	(italige)			F <sub>DL_high</sub> + 15
Note 1:	For certain bands, the	unwanted modu	ılated interf	ering signal may not fall	inside the UE receive
	band, but within the fire	st 15 MHz below	v or above t	the UE receive band	
Note 2:	For each carrier freque	ency the require	ment is vali	d for two frequencies:	
a. the carrier frequency					
b. the carrier frequency +F <sub>offset</sub> + F <sub>loffset, case 1</sub>					
Note 3:	Foffset is the frequency	offset from the c	entre frequ	ency of the adjacent CC	being tested to the
	and an anti-community of the latest	and the second state of the	_		

edge of aggregated channel bandwidth.

Note 4: The Finterferer (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to  $\left\lfloor F_{\text{interferer}} / 0.015 + 0.5 \right\rfloor 0.015 + 0.0075$  MHz to be offset from the sub-carrier raster.

#### 7.6.1A.2 In-band blocking for CA (intra-band contiguous DL CA without UL CA)

#### 7.6.1A.2.1 **Test Purpose**

Same test purpose as in clause 7.6.1A.1.

#### 7.6.1A.2.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA without UL CA.

## 7.6.1A.2.3 Minimum Conformance Requirements

Minimum conformance requirements for intra-band contiguous carrier aggregation with one uplink carrier support as in clause 7.6.1A.1.

## 7.6.1A.2.4 Test Description

#### 7.6.1A.2.4.1 Initial Conditions

Same initial conditions as in clause 7.6.1A.1.4.1 with the following exceptions:

- Instead of Table 7.6.1A.1.4.1-1  $\rightarrow$  use Table 7.6.1A.2.4.1-1

Table 7.6.1A.2.4.1-1: Test Configuration Table

Initial Con	ditions						
Test Environment as specified in TS 36.508[7] subclause 4.1				NC			
	iencies as spe [7] subclause		ferent CA bandwidth	C: Mid ra	nge		
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.				Lowest N Highest N			
			Test Parameters f	or CA Conf	igurations		
	iguration / B_agg		DL Allocation			UL Allocation	
PCC N <sub>RB</sub>	SCC N <sub>RB</sub>	CC MOD	PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SCC RB a (L <sub>CRB</sub> @ RB <sub>start</sub> )	llocations
75	75	QPSK	75+75	QPSK	75	P_75@0	-
75	75	QPSK	75+75	QPSK	50	P_50@0	-
75	75	QPSK	75+75	QPSK	25	P_25@0	-
75	75	QPSK	75+75	QPSK	20	P_20@0	-
100	50	QPSK	100+50	QPSK	100	P 100@0	-
100	50	QPSK	100+50	QPSK	75	P_75@0	-
100	50	QPSK	100+50	QPSK	50	P_50@0	-
100	50	QPSK	100+50	QPSK	25	P_25@0	-
100	50	QPSK	100+50	QPSK	20	P_20@0	-
100	100	QPSK	100+100	QPSK	100	P 100@0	-
100	100	QPSK	100+100	QPSK	75	P_75@0	-
100	100	QPSK	100+100	QPSK	50	P_50@0	-
100	100	QPSK	100+100	QPSK	25	P_25@0	-
100	100	QPSK	100+100	QPSK	20	P_20@0	-

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1.

Note 2: Depending on CA Configuration only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per CA Configuration Test CC combination.

#### 7.6.1A.2.4.2 Test Procedure

Same test procedure as in clause 7.6.1A.1.4.2 with the following exceptions:

- Instead of Table 7.6.1A.1.4.1-1 → use Table 7.6.1A.2.4.1-1

#### 7.6.1A.2.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

## 7.6.1A.2.5 Test Requirement

Same test requirement as in clause 7.6.1A.1.5.

## 7.6.1A.3 In-band blocking for CA (inter-band DL CA without UL CA)

## 7.6.1A.3.1 Test Purpose

Same test purpose as in clause 7.6.1A.1.

## 7.6.1A.3.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support inter-band DL CA without UL CA.

## 7.6.1A.3.3 Minimum Conformance Requirements

Minimum conformance requirements for inter-band carrier aggregation with one uplink carrier support as in clause 7.6.1A.1.

## 7.6.1A.3.4 Test Description

#### 7.6.1A.3.4.1 Initial Conditions

Same initial conditions as in clause 7.6.1A.1.4.1 with the following exceptions:

- Instead of Table 7.6.1A.1.4.1-1 → use Table 7.6.1A.3.4.1-1

Table 7.6.1A.3.4.1-1: Test Configuration Table

	Initial Conditions
Test Environment as specified in TS 36.508[7] subclause 4.1	NC
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.	A: Mid range for PCC and SCC
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subdause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N <sub>RB_agg</sub> for PCC and SCC

#### **Test Parameters for CA Configurations**

CA Configura	ation / N	1	DI Allegation		I III AII.	
	ation / N <sub>RB_agg</sub>		DL Allocation			ocation
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	CC MOD		& SCC ocation	CC MOD	PCC N <sub>RB_alloc</sub>
50	50	QPSK	50	50	QPSK	50
50	50	QPSK	50	50	QPSK	25
50	50	QPSK	50	50	QPSK	20
50	50	QPSK	50	50	QPSK	16
50	75	QPSK	50	75	QPSK	25
50	100	QPSK	50	100	QPSK	50
50	100	QPSK	50	100	QPSK	25
50	100	QPSK	50	100	QPSK	20
75	50	QPSK	75	50	QPSK	25
75	100	QPSK	75	100	QPSK	25
100	50	QPSK	100	50	QPSK	100
100	50	QPSK	100	50	QPSK	75
100	50	QPSK	100	50	QPSK	50
100	75	QPSK	100	75	QPSK	100
100	100	QPSK	100	100	QPSK	75
100	100	QPSK	100	100	QPSK	50

- Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-2.
- Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier is tested per Test CA configuration, unless otherwise stated in table 7.3A.1.3-0b.
- Note 3: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).
- Note 4: The frequencies of PCC and SCC shall be switched and tested in each configuration (given UL is supported in PCC band as per Table 5.2-1).

#### 7.6.1A.3.4.2 Test Procedure

- 1. Configure SCC according to Annex C0, C.1 and Annex C.3.2 for all down link physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.6.1A.3.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.1A.3.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.

- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.1A.3.4.1-1 on PCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the parameters of the signal generator for an interfering signal below the SCC's wanted signal in Case 1 according to Tables 7.6.1.5-1 and 7.6.1.5-2, or 7.6.1.5-1 and 7.6.1A.3.5-0 for operating bands without uplink band (as noted in Table 5.2-1).
- 7. Set the downlink signal level according to the table 7.6.1.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.1.5-1 for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the throughput measurement.
- 8. Measure the average throughput of SCC for duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Repeat steps from 6 to 8, using an interfering signal above the SCC's wanted signal in Case 1 at step 6.
- 10. Repeat steps from 6 to 9, using interfering signals in Case 2 at step 6 and 9. The ranges of case 2 are covered in steps equal to the interferer bandwidth. The test frequencies are chosen in analogy to table 7.6.1.4.2-1.

#### 7.6.1A.3.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

## 7.6.1A.3.5 Test Requirement

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the in-band blocking requirements are defined with the uplink active on the band other than the band whose downlink is being tested i.e. the requirements are tested only for the S-Cell downlink. The UE shall meet the requirements specified in Tables 7.6.1A.3.5-1 and 7.6.1A.3.5-2 for each component carrier, when operated as S-Cell, while both downlink carriers are active. The requirements for each component carrier are the same as single carrier requirements in Tables 7.6.1.5-1 and 7.6.1.5-2.

For band combinations including an operating band without uplink band (as noted in Table 5.2-1), the requirements for both downlinks shall be met with the uplink in the band capable of UL operation.. The requirements for the component carrier configured in the operating band without uplink band are specified in Table 7.6.1.5-1 and Table 7.6.1A.3.5-0.

The throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.6.1A.3,5-1 and 7.6.1A.3.5-2. The parameters in these tables are related to the carrier operated as S-Cell.

Table 7.6.1A.3.5-0: In-band blocking for additional operating bands for carrier aggregation

E-UTRA band	Parameter	Unit	Case 1	Case 2
	P <sub>Interferer</sub>	dBm	-56	-44
	F <sub>Interferer</sub> (offset)	MHz	=-BW/2 - F <sub>loffset,case 1</sub> & =+BW/2 + F <sub>loffset,case 1</sub>	≤-BW/2 - F <sub>loffset,case 2</sub> & ≥+BW/2 + F <sub>loffset,case</sub> 2
29	F <sub>Interferer</sub>	MHz	(Note 2)	F <sub>DL_low</sub> – 10 to F <sub>DL_high</sub> + 15

NOTE 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band.

NOTE 2: For each carrier frequency the requirement is valid for two frequencies:

a. the carrier frequency -BW/2 - Floffs et, case 1 and

b. the carrier frequency +BW/2 + Floffs et, case 1

NOTE 3: F<sub>Interferer</sub> range values for unwanted modulated interfering signal are interferer centre frequencies.

NOTE 4: Case 3 only apply to assigned UE channel bandwidth of 5 MHz.

Table 7.6.1A.3.5-1: In band	l blocking param	eters
-----------------------------	------------------	-------

Rx Parameter	Units		Channel bandwidth				
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in			REFSENS	+ channel band	width specific v	<i>a</i> lue below	
Transmission Bandwidth Configuration	dBm	6	6	6	6	7	9
BW <sub>Interferer</sub>	MHz	1.4	3	5	5	5	5
Floffs et, case 1	MHz	2.1+0.0125	4.5+0.0075	7.5+0.0125	7.5+0.0025	7.5+0.0075	7.5+0.0125
Floffs et, case 2	MHz	3.5+0.0075	7.5+0.0075	12.5+0.0075	12.5+0.012	12.5+0.002	12.5+0.007
					5	5	5

Note 1: The transmitter shall be set to 4dB below P<sub>CMAX</sub> with P<sub>CMAX</sub> as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

Table 7.6.1A.3.5-2: In-band blocking

E-UTRA band	Parameter	Unit	Case 1	Case 2	Case 3	Case 4
	P <sub>Interferer</sub>	dBm	-56	-44	-30	[-30]
	F <sub>Interferer</sub> (offset)	MHz	=-BW/2 - Floffset,case 1 & =+BW/2 + Floffset,case 1	≤-BW/2 - F <sub>loffset,case 2</sub> & ≥+BW/2 + F <sub>loffset,case 2</sub>	-BW/2 – 15 & -BW/2 – 9	-BW/2 – 10
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 18, 19, 20, 21, 22, 23, 25, 26, 33, 34, 35, 36, 37, 38, 39, 40, 41	Finterferer	MHz	(Note 2)	F <sub>DL_low</sub> – 15 to F <sub>DL_high</sub> + 15		
12	F <sub>Interferer</sub>	MHz	(Note 2)	F <sub>DL_low</sub> – 10 to F <sub>DL_high</sub> + 15		F <sub>DL_low</sub> - 10
17	F <sub>Interferer</sub>	MHz	(Note 2)	F <sub>DL_low</sub> – 9 to F <sub>DL_high</sub> + 15	F <sub>DL_low</sub> – 15 and F <sub>DL_low</sub> – 9	

Note 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band

Note 2: For each carrier frequency the requirement is valid for two frequencies:

a. the carrier frequency -BW/2 - F<sub>loffset, case 1</sub> and b. the carrier frequency +BW/2 + F<sub>loffset, case 1</sub>

Note 3: F<sub>Interferer</sub> range values for unwanted modulated interfering signal are interferer centre frequencies

Note 4: Case 3 and Case 4 only apply to assigned UE channel bandwidth of 5 MHz

# 7.6.1B In-band blocking for UL-MIMO

## 7.6.1B.1 Test Purpose

In-band blocking for UL- MIMO is defined for an unwanted interfering signal falling into the range from 15MHz below to 15MHz above the UE that support UL-MIMO receive band, at which the relative throughput shall meet or exceed the requirement for the specified measurement channels.

The lack of in-band blocking ability will decrease the coverage area when other e-NodeB transmitters exist (except in the adjacent channels and spurious response).

## 7.6.1B.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

## 7.6.1B.3 Minimum Conformance Requirements

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements in subclause 7.6 shall be met with the UL-MIMO configurations specified in Table 6.2.2B.3-2. For UL-MIMO, the parameter  $P_{\text{CMAX\_L}}$  is defined as the total transmitter power over the two transmit antenna connectors.

The normative reference for this requirement is TS 36.101 [2] clause 7.6B.

## 7.6.1B.4 Test Description

#### 7.6.1B.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.6.1B.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.6.1B.4.1-1: Test Configuration Table

		In	itial Condition	าร		
		NC				
TS 36.508[7] subclause 4.1						
	cies as specifie	ed in	Mid range			
	subclause 4.3.					
Test Channe	l Bandwidths as	specified in	Lowest, 5MH	z, Highest		
TS 36.508 [7]	] subdause 4.3					
		Test Paramete	ers for Channe	el Bandwidths		
		llink Configur			ink Configurat	
Ch BW	Mod'n		cation	Mod'n	RB allo	cation
		FDD	TDD		FDD	TDD
1.4MHz	QPSK	6	6	QPSK	6	6
3MHz	QPSK	15	15	QPSK	15	15
5MHz	QPSK	25	25	QPSK	25	25
5MHz	QPSK	25	N/A	QPSK	20	N/A
5MHz	QPSK	25	N/A	QPSK	15	N/A
10MHz	QPSK	50	50	QPSK	50	50
10MHz	QPSK	50	N/A	QPSK	25	N/A
10MHz	QPSK	50	N/A	QPSK	20	N/A
10MHz	QPSK	50	N/A	QPSK	15	N/A
15MHz	QPSK	75	75	QPSK	75	75
15MHz	QPSK	75	N/A	QPSK	50	N/A
15MHz	QPSK	75	N/A	QPSK	25	N/A
15MHz	QPSK	75	N/A	QPSK	20	N/A
20MHz	QPSK	100	100	QPSK	100	100
20MHz	QPSK	100	N/A	QPSK	75	N/A
20MHz	QPSK	100	N/A	QPSK	50	N/A
20MHz	QPSK	100	N/A	QPSK	25	N/A
20MHz	QPSK	100	N/A	QPSK	20	N/A
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which						
	plicable channe					
	epending on E-				allocation valu	e according
	table 7.3.3-2 is					_
Note 3: Fo	r the DL signal	one sided dyn	amic OCNG P	attern OP.1 FD	D/TDD is used	l.

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, in Figure A.29.
- 2. The parameter settings for the cell are set up according to TS  $36.508\,[7]$  subclause 4.4.3.

- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to in Table 7.6.1B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.1B.4.3.

#### 7.6.1B.4.2 Test Procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.1B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 7.6.1B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the parameters of the signal generator for an interfering signal below the wanted signal in Case 1 according to Tables 7.6.1B.5-1 and 7.6.1B.5-2.
- 4. Set the downlink signal level according to the table 7.6.1B.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.1B.5-1 for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the throughput measurement.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal in Case 1 at step 3.
- 7. Repeat steps from 3 to 6, using interfering signals in Case 2 at step 3 and 6. The ranges of case 2 are covered in steps equal to the interferer bandwidth. The test frequencies are chosen in analogy to table 7.6.1B.4.2-1.
- 8. Repeat steps from 3 to 5, using successively all interfering signals in Case 3 and Case 4 at step 3.

Table 7.6.1B.4.2-1: Example for interferer frequencies

	Lower frequency	Upper frequency
Band 1 DL	2110 MHz	2170 MHz
Band 1 Midrange	2140	MHz
Receive band wanted signal (BW 5MHz)	2137.5 MHz	2142.5 MHz
Interferer case 1	2129.9875 MHz	2150.0125 MHz
Interferer case 2 (inner frequency)	2124.9925 MHz	2155.0075 MHz
Interferer case 2 (outer frequency)	2099.9925 MHz	2180.0075 MHz
Outer limit for in band blocking	2095MHz	2185MHz
Number of test frequencies case 2	6	6
Number of test frequencies for	0	2
Band 17(asymmetric!), BW 5MHz,		
case 2		

#### 7.6.1B.4.3 Message Contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exception:

Table 7.6.1B.4.3-1: UplinkPowerControlDedicated

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::=			
SEQUENCE {			
p0-UePUSCH	0		
deltaMCS-Enabled	en0		
accumulationEnabled	TRUE		
p0-uePUCCH	0		
pSRS-Offset	3 (-6 dB)		
filterCoefficient	fc8	larger filter length is used to reduce the RSRP measurement variation	
}			

# 7.6.1B.5 Test Requirement

The throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.6.1B.5-1 and 7.6.1B.5-2.

Table 7.6.1B.5-1: In band blocking parameters

Units	Channel bandwidth							
Į.	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
		REFSENS + channel bandwidth specific value below						
dBm	6	6	6	6	7	9		
MHz	1.4	3	5	5	5	5		
MHz	2.1+0.0125	4.5+0.0075	7.5+0.0125	7.5+0.0025	7.5+0.0075	7.5+0.0125		
MHz	3.5+0.0075		12.5+0.0075	12.5+0.012	12.5+0.002	12.5+0.007		
		7.5+0.0075		5	5	5		
	dBm MHz MHz	dBm 6 MHz 1.4 MHz 2.1+0.0125	dBm         6         6           MHz         1.4         3           MHz         1.4         3           MHz         2.1+0.0125         4.5+0.0075           MHz         3.5+0.0075	dBm         6         6         6           MHz         1.4         3         5           MHz         1.4         3         5           MHz         2.1+0.0125         4.5+0.0075         7.5+0.0125           MHz         3.5+0.0075         12.5+0.0075	1.4 MHz         3 MHz         5 MHz         10 MHz           REFSENS + channel bandwidth specific value         REFSENS + channel bandwidth specific value           dBm         6         6         6           MHz         1.4         3         5         5           MHz         2.1+0.0125         4.5+0.0075         7.5+0.0125         7.5+0.0025           MHz         3.5+0.0075         12.5+0.0075         12.5+0.012	1.4 MHz         3 MHz         5 MHz         10 MHz         15 MHz           REFSENS + channel bandwidth specific value below           dBm         6         6         6         7           MHz         1.4         3         5         5         5           MHz         2.1+0.0125         4.5+0.0075         7.5+0.0125         7.5+0.0025         7.5+0.0075           MHz         3.5+0.0075         12.5+0.0075         12.5+0.012         12.5+0.002		

Note 1: The transmitter shall be set to 4dB below P<sub>CMAX\_L</sub> with P<sub>CMAX\_L</sub> as defined in clause 6.2.5.

Note 2: The interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.

## Table 7.6.1B.5-2: In-band blocking

E-UTRA band	Parameter	Unit	Case 1	Case 2	Case 3	Case 4
	P <sub>Interferer</sub>	dBm	-56	-44	-30	[-30]
	F <sub>Interferer</sub> (offs et)	MHz	=-BW/2 - Floffset,case 1 & =+BW/2 + Floffset,case 1	≤-BW/2 - F <sub>loffset,case 2</sub> & ≥+BW/2 + F <sub>loffset,case 2</sub>	-BW/2 – 15 & -BW/2 – 9	-BW/2 – 10

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41,42,43,44	Finterferer	MHz	(Note 2)	F <sub>DL_Jow</sub> – 15 to F <sub>DL_high</sub> + 15		
12	F <sub>Interferer</sub>	MHz	(Note 2)	F <sub>DL_low</sub> – 10 to F <sub>DL_ligh</sub> + 15		F <sub>DL_low</sub> 10
17	F <sub>Interferer</sub>	MHz	(Note 2)	F <sub>DL_low</sub> - 9 to F <sub>DL_high</sub> + 15	F <sub>DL_low</sub> – 15 and F <sub>DL_low</sub> – 9	

Note 1: For certain bands, the unwanted modulated interfering signal may not fall inside the UE receive band, but within the first 15 MHz below or above the UE receive band

Note 2: For each carrier frequency the requirement is valid for two frequencies:

a. the carrier frequency -BW/2 -  $F_{loffs\,et,\,c\,ase\,1}$  and b. the carrier frequency +BW/2 +  $F_{loffs\,et,\,c\,ase\,1}$ 

Note 3: F<sub>Interferer</sub> range values for unwanted modulated interfering signal are interferer centre frequencies

Note 4: Case 3 and Case 4 only apply to assigned UE channel bandwidth of 5 MHz

# 7.6.2 Out-of-band blocking

## 7.6.2.1 Test Purpose

Out-of-band band blocking is defined for an unwanted CW interfering signal falling more than 15 MHz below or above the UE receive band, at which a given average throughput shall meet or exceed the requirement for the specified measurement channels.

For the first 15 MHz below or above the UE receive band the appropriate in-band blocking or adjacent channel selectivity in sub-clause 7.5.1 and sub-clause 7.6.1 shall be applied.

The lack of out-of-band blocking ability will decrease the coverage area when other e-NodeB transmitters exist (except in the adjacent channels and spurious response).

#### 7.6.2.2 Test Applicability

This test applies to all types of E-UTRA UE release 8 and forward.

## 7.6.2.3 Minimum Conformance Requirements

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.6.2.3-1 and 7.6.2.3-2.

For Table 7.6.2.3-2 in frequency range 1, 2 and 3, up to  $\max(24, 6 \cdot \lceil N_{RB} / 6 \rceil)$  exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1MHz step size, where  $N_{RB}$  is the number of resource blocks in the downlink transmission bandwidth configuration (see Figure 5.4.2-1). For these

response frequencies in each assigned frequency channel when measured using a IMHz step size, where  $N_{RB}$  is the number of resource blocks in the downlink transmission bandwidth configuration (see Figure 5.4.2-1). For these exceptions the requirements of clause 7.7 Spurious Response are applicable.

For Table 7.6.2.3-2 in frequency range 4, up to  $\max \left( 8, \lceil (N_{RB} + 2 \cdot L_{CRBs})/8 \rceil \right)$  exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1MHz step size, where  $N_{RB}$  is the number of resource blocks in the downlink transmission bandwidth configurations (see Figure 5.4.2-1) and  $L_{CRBs}$  is the number of resource blocks allocated in the uplink. For these exceptions the requirements of clause 7.7 Spurious Response are applicable.

Table 7.6.2.3-1: Out-of-band blocking parameters

Units	Channel bandwidth					
	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MH <del>2</del>	20 MHz
		ENS + ch	annel ban		ecific valu	
dBm	6	6	6	6	7	9
		1.4 MHz REFS	1.4 3 MHz MHz  REFSENS + cha	1.4 3 MHz 5 MHz MHz  REFSENS + channel ban	1.4 3 MHz 5 MHz 10 MHz  REFSENS + channel bandwidth sp	1.4 3 MHz 5 MHz 10 15 MHz MHz REFSENS + channel bandwidth specific value

Note 1: The transmitter shall be set to 4dB below Pcmax\_L at the minimum uplink configuration specified in Table 7.3.3-2 with Pcmax\_L as defined in clause 6.2.5.

Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Table 7.6.2.3-2: Out of band blocking

E-UTRA band	Parameter	Units		Fred	quency	
			range 1	range 2	range 3	range 4
	P <sub>Interferer</sub>	dBm	-44	-30	-15	-15
1, 2, 3, 4, 5, 6, 7, 8, 9, 10,			F <sub>DL_low</sub> -15 to F <sub>DL_low</sub> -60	F <sub>DL_low</sub> -60 to F <sub>DL_low</sub> -85	F <sub>DL_low</sub> -85 to 1 MHz	-
11, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43,44	F <sub>Interferer</sub> (CW)	MHz	F <sub>DL_high</sub> +15 to F <sub>DL_high</sub> +60	F <sub>DL_high</sub> +60 to F <sub>DL_high</sub> +85	F <sub>DL_high</sub> +85 to +12750 MHz	-
2, 5, 12, 17	Finterferer	MHz	-	-	-	Ful_low- Ful_high
Note: For the UE	which support	s both Bar	nd 11 and Band 21	the out of blocking	g is FFS.	

The normative reference for this requirement is TS 36.101 [2] clause 7.6.2.

## 7.6.2.4 Test Description

#### 7.6.2.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.6.2.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.6.2.4.1-1: Test Configuration Table

Initial Conditions							
Test Environment as specified in	NC						
TS 36.508[7] subclause 4.1							
Test Frequencies as specified in	One frequency chosen arbitrarily from low or high range						
TS36.508 [7] subclause 4.3.1							
Test Channel Bandwidths as specified in	Lowest, 5MHz, Highest						
TS 36.508 [7] subdause 4.3.1							
Test Parame	eters for Channel Bandwidths						
Downlink Configu	uration Uplink Configuration						

Ch BW	Mod'n	RB allo	cation	Mod'n	RB allo	cation
		FDD	TDD		FDD	TDD
1.4MHz	QPSK	6	6	QPSK	6	6
3MHz	QPSK	15	15	QPSK	15	15
5MHz	QPSK	25	25	QPSK	25	25
5MHz	QPSK	25	N/A	QPSK	20	N/A
5MHz	QPSK	25	N/A	QPSK	15	N/A
10MHz	QPSK	50	50	QPSK	50	50
10MHz	QPSK	50	N/A	QPSK	25	N/A
10MHz	QPSK	50	N/A	QPSK	20	N/A
10MHz	QPSK	50	N/A	QPSK	15	N/A
15MHz	QPSK	75	75	QPSK	75	75
15MHz	QPSK	75	N/A	QPSK	50	N/A
15MHz	QPSK	75	N/A	QPSK	25	N/A
15MHz	QPSK	75	N/A	QPSK	20	N/A
20MHz	QPSK	100	100	QPSK	100	100
20MHz	QPSK	100	N/A	QPSK	75	N/A
20MHz	QPSK	100	N/A	QPSK	50	N/A
20MHz	QPSK	100	N/A	QPSK	25	N/A
20MHz	QPSK	100	N/A	QPSK	20	N/A

- Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.
- Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth. The allocation shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).
- Note 3: For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.
- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, in Figure A.5.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.6.2.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.2.4.3.

#### 7.6.2.4.2 Test Procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to Table 7.6.2.5-2. The frequency step size is 1MHz.
- 4. Set the downlink signal level according to the table 7.6.2.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.2.5-1 for carrier frequency  $f \le 3.0 GHz$  or within +0, -4.0 dB of the target level for carrier frequency 3.0 GHz <  $f \le 4.2 GHz$ , for at least the duration of the throughput measurement.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2
- 6. Record the frequencies for which the throughput doesn't meet the requirements.
- 7. Repeat steps from 3 to 6, using an interfering signal above the wanted signal at step 3.

#### 7.6.2.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exception.

Table 7.6.2.4.3-1: UplinkPowerControlDedicated

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {			
p0-UePUSCH	0		
deltaMCS-Enabled	en0		
accumulationEnabled	TRUE		
p0-uePUCCH	0		
pSRS-Offset	3 (-6 dB)		
filterCoefficient	fc8	larger filter length is used to reduce the RSRP measurement variation	
}			

#### 7.6.2.5 Test Requirement

Except for the spurious response frequencies recorded at the final step of test procedure, the throughput measurement derived in test procedure shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.6.2.5-1 and 7.6.2.5-2.

For frequency range 1, 2, and 3, the number of spurious response frequencies recorded in the final step of test procedure shall not exceed  $\max(24, 6 \cdot \lceil N_{RB} / 6 \rceil)$  in each assigned frequency channel when measured using a 1MHz step size. For these exceptions the requirements of clause 7.7 Spurious Response are applicable.

For frequency range 4, the number of spurious response frequencies recorded in the final step of test procedure shall not exceed  $\max \left(8, \ \left\lceil (N_{RB} + 2 \cdot L_{CRBs})/8 \right\rceil \right)$  in each assigned frequency channel when measured using a 1MHz step size. For these exceptions the requirements of clause 7.7 Spurious Response are applicable.

Table 7.6.2.5-1: Out-of-band blocking parameters

Rx Pa	arameter	Units	Channel bandwidth					
			1.4	3 MHz	5 MHz	10	15	20
			MHz			MHz	MHz	MHz
Po	wer in		REFS	ENS + ch	annel ban	dwidth sp	ecific valu	e below
	smission ndwidth	dBm	6	6	6	6	7	9
Conf	figuration							
Note 1:	The transmit	set to 4d	B below	P <sub>CMAX_L</sub> wi	th P <sub>CMAX</sub>	∟ as defin	ed in	
clause 6.2.5.								
Note 2:	Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided						e sided	

Table 7.6.2.5-2: Out of band blocking

dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

E-UTRA band	Parameter	Units	Frequency					
			range 1 range 2 range 3 range 4					
	P <sub>Interferer</sub>	dBm	-44	-30	-15	-15		

1, 2, 3, 4 7, 8, 9, 7	10, 11,			F <sub>DL_low</sub> -15 to F <sub>DL_low</sub> -60	$F_{DL\_low}$ -60 to $F_{DL\_low}$ -85	F <sub>DL_low</sub> -85 to 1 MHz	-
12, 13, 18, 19, 22, 23, 26, 27, 23, 34, 37, 38, 34, 41, 42,	20, 21, 24, 25, 28, 31, 35, 36, 39, 40,	F <sub>Interferer</sub> (CW)	MHz	F <sub>DL_high</sub> +15 to F <sub>DL_high</sub> +60	F <sub>DL_high</sub> +60 to F <sub>DL_high</sub> +85	F <sub>DL_high</sub> +85 to +12750 MHz	-
2, 5, 12,	17	Finterferer	MHz	-	-	-	Ful low- Ful high

Note 1: Range 3 shall be tested only with the highest channel bandwidth.

Note 2: For the UE which supports both Band 11 and Band 21 the out of blocking is FFS.

# 7.6.2A Out-of-band blocking for CA

## 7.6.2A.1 Out-of-band blocking for CA (intra-band contiguous DL CA and UL CA)

## 7.6.2A.1.1 Test Purpose

Out-of-band blocking for CA is defined for an unwanted CW interfering signal falling more than 15 MHz below or above the UE receive band, at which a given average throughput shall meet or exceed the requirement for the specified measurement channels in aggregated signals.

For the first 15 MHz below or above the UE receive band the appropriate in-band blocking or adjacent channel selectivity in sub-clause 7.5A and sub-clause 7.6.1A shall be applied.

The lack of out-of-band blocking ability will decrease the coverage area when other e-NodeB trans mitters exist (except in the adjacent channels and spurious response).

## 7.6.2A.1.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

## 7.6.2A.1.3 Minimum Conformance Requirements

For inter-band carrier aggregation with the uplink assigned to one E-UTRA band, the out-of-band blocking requirements are defined with the uplink active on the band other than the band whose downlink is being tested. The throughput in the downlink measured shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.6.2.3-1 and 7.6.2A.1.3-0. The UE shall meet these requirements for each component carrier while both downlink carriers are active.

For E-UTRA CA configurations listed in Table 7.3A.1.3-0a under conditions for which reference sensitivity for the operating band being tested is N/A, the out-of-band blocking requirements of subclause 7.6.2A.1.3 do not apply.

For Table 7.6.2A.1.3-0 in frequency ranges 1, 2 and 3, up to  $\max(24.6 \cdot \lceil N_{RB} \cdot /6 \rceil)$  exceptions per downlink are allowed for spurious response frequencies when measured using a step size of 1 MHz. For these exceptions the requirements in clause 7.7A.1.3 apply.

For intra-band contiguous carrier aggregations the downlink SCC shall be configured at no minal channel spacing to the PCC with the PCC configured closest to the uplink band. Downlink PCC and SCC are both activated. The uplink output power shall be set as specified in Table 7.6.2A.1.3-1 with the uplink configuration set according to Table 7.3A.1.3-1 for the applicable carrier aggregation configuration. For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.3-2.

The UE shall fulfil the minimum requirement in presence of an interfering signal specified in Tables 7.6.2A.1.3-1 and Tables 7.6.2A.1.3-2 being on either side of the aggregated signal. The throughput of each carrier shall be  $\geq$  95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.6.2A.1.3-1 and 7.6.2A.1.3-2.

For Table 7.6.2A.1.3-2 in frequency range 1, 2 and 3, up to  $\max\left(24, 6 \cdot \left\lceil N_{RB,agg} / 6 \right.\right)$  exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1MHz step size, where  $N_{RB,agg}$  is the number of aggregated resource blocks in the downlink transmission bandwidth configuration. For these exceptions the requirements of subclause 7.7A Spurious response for CA are applicable.

For Table 7.6.2A.1.3-2 in frequency range 4, up to  $\max\left(8, \lceil (N_{RB,agg} + 2 \cdot L_{CRBs})/8 \right)$  exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1MHz step size, where  $N_{RB,agg}$  is the number of aggregated resource blocks in the downlink transmission bandwidth configurations and  $L_{CRBs}$  is the number of resource blocks allocated in the uplink. For these exceptions the requirements of subclause 7.7A spurious response for CA are applicable.

Table 7.6.2A.1.3-0: Out-of-band blocking for inter-band carrier aggregation with one active uplink

Parameter	Unit	Range 1	Range 2	Range 3			
P <sub>wanted</sub>	dBm	Table 7.6.2.3-1 for both component carriers					
Pinterferer	dBm	-44 + ∆R <sub>IB,c</sub>	-30 + ∆R <sub>IB,c</sub>	-15 + ∆R <sub>IB,c</sub>			
Finterferer (CW)	MHz	$-60 < f - F_{DL\_Low(1)} < -15$ or $-60 < f - F_{DL\_Low(2)} < -15$ or $15 < f - F_{DL\_High(1)} < 60$ or $15 < f - F_{DL\_High(2)} < 60$	$-85 < f - F_{DL\_Low(1)} \le -60$ or $-85 < f - F_{DL\_Low(2)} \le -60$ or $60 \le f - F_{DL\_High(1)} < 85$ or $60 \le f - F_{DL\_High(2)} < 85$	$1 \le f \le FDL_{Low(1)} - 85$ or $F_{DL_{High(1)}} + 85 \le f \le F_{DL_{Low(2)}} - 85$ or $F_{DL_{High(2)}} + 85 \le f \le 12750$			

- Note 1: F<sub>DL\_Low(1)</sub> and F<sub>DL\_High(1)</sub> denote the respective lower and upper frequency limits of the lower operating band, F<sub>DL\_Low(2)</sub> and F<sub>DL\_High(2)</sub> the respective lower and upper frequency limits of the upper operating band
- Note 2: For  $F_{DL\_Low(2)} F_{DL\_High(1)} < 145$  MHz and FInterferer in  $F_{DL\_High(1)} < f < F_{DL\_Low(2)}$ ,  $F_{Interferer}$  can be in both Range 1 and Range 2. Then the lower of the  $P_{Interferer}$  applies.
- Note 3: For  $F_D = L_{Low(1)} 15$  MHz  $\leq f \leq F_D = High(1) + 15$  MHz and  $F_D = Low(2) 15$  MHz  $\leq f \leq F_D = High(2) + 15$  MHz the appropriate adjacent channel selectivity and in-band blocking in the respective subdauses 7.5A.1.3 and 7.6.1A.3 shall be applied.
- Note 4:  $\Delta R_{IB,c}$  according to Table 7.3A.1.3-0 applies when serving cell c is measured.

Table 7.6.2A.1.3-1: Out-of-band blocking parameters

Rx Parameter Units				CA B	andwidth C	lass	
			В	С	D	E	F
Power p	er CC in Aggregated Transmission	dBm	REFSEN	S + CA Band	dwidth Class	specific valu	ie below
	Bandwidth Configuration			9			
Note 1:	The transmitter shall be set to 4dB b	elow Pcmax	x_L or Pcmax_l	_ca as defin	ed in subclau	ise 6.2.5A.	
Note 2:	Reference measurement channel is	n Annex A.3.2	2 with one si	ded dynamic	OCNG Patt	ern OP.1	
	FDD/TDD as described in Annex A.5	5.1.1/A.5.2.					

Table 7.6.2A.1.3-2: Out of band blocking

CA configuration	Parameter	Units	Frequency		
			range 1	range 2	range 3
	P <sub>Interferer</sub>	dBm	-44	-30	-15
CA_1C, CA_7C, CA_38C,	F <sub>Interferer</sub>		$F_{DL\_low}$ -15 to $F_{DL\_low}$ -60	$F_{DL\_low}$ -60 to $F_{DL\_low}$ -85	F <sub>DL_low</sub> -85 to 1 MHz
CA_40C,CA_41C	(CW)	MHz	$F_{DL\_high}$ +15 to $F_{DL\_high}$ + 60	F <sub>DL_high</sub> +60 to F <sub>DL_high</sub> +85	F <sub>DL_high</sub> +85 to +12750 MHz

The normative reference for this requirement is TS 36.101 [2] clause 7.6.2.1A.

## 7.6.2A.1.4 Test Description

#### 7.6.2A.1.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in table 7.6.2A.1.4.1-1. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

#### Table 7.6.2A.1.4.1-1: Test Configuration Table

Initial Conditions	
Test Environment as specified in TS 36.508[7] subclause 4.1	NC
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.	C: Mid range
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N <sub>RB_agg</sub>
Test Parameters for CA Configurations	-

	CA Configuration / N <sub>RB_agg</sub>		DL Allocation		UL Allocation			
PCC N <sub>RB</sub>	SCC N <sub>RB</sub>	CC MOD	PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SCC RB allocations (L <sub>CRB</sub> @ RB <sub>start</sub> )		
75	75	QPSK	75+75	QPSK	75	P_75@0	S_0@0	
75	75	QPSK	75+75	QPSK	130	P_75@0	S_55@0	
75	75	QPSK	75+75	QPSK	150	P_75@0	S_75@0	
100	50	QPSK	100+50	QPSK	150	P_100@0	S_50@0	
100	100	QPSK	100+100	QPSK	75	P_75@25	S_0@0	
100	100	QPSK	100+100	QPSK	130	P_100@0	S_30@0	
100	100	QPSK	100+100	QPSK	200	P_100@0	S_100@0	

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1.

Note 2: Depending on CA Configuration only the appropriate Uplink RB allocation value according to table 7.3A.1.3-1 is tested per CA Configuration Test CC combination.

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure group A.34 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1
- 4. The UL and DL Reference Measurement channels are set according to Table 7.6.2A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.2A.1.4.3.

#### 7.6.2A.1.4.2 Test Procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.6.2A.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.2A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.2A.1.4.1-1 on both PCC and SCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the parameters of the CW signal generator for an interfering signal below the wanted aggregated signal according to Table 7.6.2A.1.5-2. The frequency step size is 1MHz.
- 7. Set the downlink signal level according to the table 7.6.2A.1.5-1 for both carriers. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is with in +0, -3.4 dB of the target level in table 7.6.2A.1.5-1 for carrier frequency  $f \le 3.0$ GHz or with in +0, -4.0 dB of the target level for carrier frequency 3.0GHz  $< f \le 4.2$ GHz, for at least the duration of the throughput measurement. Suitable uplink power control commands should be sent to ensure the total power in each of the assigned carriers to be equal to each other with in +/-[2] dB.
- 8. Measure the average throughput for each component carrier for duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Record the frequencies for which the throughput doesn't meet the requirements.
- 10. Repeat steps from 6 to 9, using an interfering signal above the wanted aggregated signal at step 5.

#### 7.6.2A.1.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.6.2A.1.5 Test Requirement

Except for the spurious response frequencies recorded at the final step of test procedure, the throughput measurement of each carrier derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.6.2A.1.5-1 and 7.6.2A.1.5-2.

For Table 7.6.2A.1.5-2 in frequency range 1, 2 and 3, up to  $\max\left(24, 6 \cdot \left\lceil N_{RB,agg} / 6 \right.\right)$  exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1MHz step size, where  $N_{RB,agg}$  is the number of aggregated resource blocks in the downlink transmission bandwidth configuration. For these exceptions the requirements of subclause 7.7A Spurious response for CA are applicable.

For Table 7.6.2A.1.5-2 in frequency range 4, up to  $\max\left(8, \left\lceil (N_{RB,agg} + 2 \cdot L_{CRBs})/8 \right\rceil \right)$  exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1MHz step size, where  $N_{RB,agg}$  is the number of aggregated resource blocks in the downlink transmission bandwidth configurations and

 $L_{CRBs}$  is the number of resource blocks allocated in the uplink. For these exceptions the requirements of subclause 7.7A Spurious response for CA are applicable.

Table 7.6.2A.1.5-1: Out-of-band blocking parameters

Rx Parameter	Units		CA B	andwidth C	lass	
		В	С	D	E	F

Power per CC in Aggregated Transmission			REFSEN	S + CA Band	dwidth Class	specific valu	ie pelow
Bandwidth Configuration		dBm		9			
Note 1:	The transmitter shall be set to 4dB b						•
Note 2:	Reference measurement channel is	specified in	n Annex A.3.2	2 with one si	ded dyna mid	OCNG Patt	tern OP.1
	FDD/TDD as described in Annex A.5						

## Table 7.6.2A.1.5-2: Out of band blocking

CA configuration	Parameter	Units	Frequency		
			range 1	range 2	range 3
	P <sub>Interferer</sub>	dBm	-44	-30	-15
CA_1C, CA_7C, CA_38C,	Florestone		$F_{DL\_low}$ -15 to $F_{DL\_low}$ -60	$F_{DL\_low}$ -60 to $F_{DL\_low}$ -85	F <sub>DL_low</sub> -85 to 1 MHz
CA_40C,CA_41C	Finterferer (CW)	MHz	F <sub>DL_high</sub> +15 to F <sub>DL_high</sub> + 60	F <sub>DL_high</sub> +60 to F <sub>DL_high</sub> +85	F <sub>DL_high</sub> +85 to +12750 MHz

## 7.6.2A.2 Out-of-band blocking for CA (intra-band contiguous DL CA without UL CA)

## 7.6.2A.2.1 Test Purpose

Same test purpose as 7.6.2A.1.

## 7.6.2A.2.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA without UL CA.

## 7.6.2A.2.3 Minimum Conformance Requirements

Minimum conformance requirements for intra-band contiguous carrier aggregation with one uplink carrier support as in clause 7.6.2A.1.

## 7.6.2A.2.4 Test Description

#### 7.6.2A.2.4.1 Initial Conditions

Same initial conditions as in clause 7.6.2A.1.4.1 with the following exceptions:

- Instead of Table 7.6.2A.1.4.1-1 → use Table 7.6.2A.2.4.1-1

Table 7.6.2A.2.4.1-1: Test Configuration Table

Initial Conditions	
Test Environment as specified in TS 36.508[7] subclause 4.1	NC
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.	C: Mid range
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N <sub>RB_agg</sub>
Test Parameters f	or CA Configurations

	figuration / RB_agg		DL Allocation	UL Allocation			
PCC N <sub>RB</sub>	SCC N <sub>RB</sub>	CC MOD	PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SCC RB a	llocations
75	75	QPSK	75+75	QPSK	75	P_75@0	-
75	75	QPSK	75+75	QPSK	50	P_50@0	-
75	75	QPSK	75+75	QPSK	25	P_25@0	-
75	75	QPSK	75+75	QPSK	20	P_20@0	-
100	50	QPSK	100+50	QPSK	100	P 100@0	-
100	50	QPSK	100+50	QPSK	75	P_75@0	-
100	50	QPSK	100+50	QPSK	50	P_50@0	-
100	50	QPSK	100+50	QPSK	25	P_25@0	-
100	50	QPSK	100+50	QPSK	20	P_20@0	-
100	100	QPSK	100+100	QPSK	100	P 100@0	-
100	100	QPSK	100+100	QPSK	75	P_75@0	-
100	100	QPSK	100+100	QPSK	50	P_50@0	-
100	100	QPSK	100+100	QPSK	25	P_25@0	-
100	100	QPSK	100+100	QPSK	20	P_20@0	-

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1.

Depending on CA Configuration only the appropriate Uplink RB allocation value according to table 7.3.3-2 is Note 2: tested per CA Configuration Test CC combination.

#### 7.6.2A.2.4.2 Test Procedure

Same test procedure as in clause 7.6.2A.1.4.2 with the following exceptions:

- Instead of Table 7.6.2A.1.4.1-1 → use Table 7.6.2A.2.4.1-1

#### 7.6.2A.2.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.6.2A.2.5 **Test Requirement**

Same test requirement as in clause 7.6.2A.1.5.

# 7.6.2A.3 Out-of-band blocking for CA (inter-band DL CA without UL CA)

## 7.6.2A.3.1 Test Purpose

Same test purpose as 7.6.2A.1.

## 7.6.2A.3.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support inter-band DL CA without UL CA.

## 7.6.2A.3.3 Minimum Conformance Requirements

Minimum conformance requirements for inter-band carrier aggregation with one uplink carrier support as in clause 7.6.2A.1.

## 7.6.2A.3.4 Test Description

#### 7.6.2A.3.4.1 Initial Conditions

Same initial conditions as in clause 7.6.2A.1.4.1 with the following exceptions:

- Instead of Table 7.6.2A.1.4.1-1 → use Table 7.6.2A.3.4.1-1

Table 7.6.2A.3.4.1-1: Test Configuration Table

		Table 7.6.2	2A.3.4.1-1: I	est Config	uration Table				
			Initial Cond	itions					
	ronment as spo subdause 4.1	edfied in TS	NC						
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.			A: Mid rang	A: Mid range for PCC and SCC					
b(N <sub>RB_agg</sub> ) 5.4.2A.1 fo across ba	Combination se as specified in or the CA Confindwidth combined to the combined	n subclause iguration nation sets		$_{\sf B\_agg}$ for PCC					
		Test Parai	meters for CA	A Configura	tions				
	iguration / B_agg	DL	Allocation		UL Alle	ocation			
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	CC MOD	PCC 8 RB allo		CC MOD	PCC N <sub>RB_alloc</sub>			
50	50	QPSK	50	50 50		50			
50	50	QPSK	50	50	QPSK	25			
50	50	QPSK	50	50	QPSK	20			
50	50	QPSK	50	50	QPSK	16			
50	75	QPSK	50	75	QPSK	25			
50	100	QPSK	50	100	QPSK	50			
50	100	QPSK	50	100	QPSK	25			
50	100	QPSK	50	100	QPSK	20			
75	50	QPSK	75	50	QPSK	25			
75	100	QPSK	75	100	QPSK	25			
100	50	QPSK	100	50	QPSK	100			
100	50	QPSK	100	50	QPSK	75			
100	50	QPSK	100	50	QPSK	50			
100	75	QPSK	100	75	QPSK	100			
100	100	QPSK	100	100	QPSK	75			
100	100	QPSK	100	100	QPSK	50			
Note 1:	Configuration 5.4.2A.1-2.	, which applical	ble aggregate	d channel ba	necked separately andwidths are spe	ecified in Table			
Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier is tested per Test CA configuration, unless otherwise stated in table 7.3A.1.3-0b.  Note 3: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configuration for the channel bandwidth									

Note 3: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).

Note 4: The frequencies of PCC and SCC shall be switched and tested in each configuration (given UL is supported in PCC band as per Table 5.2-1).

## 7.6.2A.3.4.2 Test Procedure

- 1. Configure SCC according to Annex C0, C.1 and Annex C.3.2 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.6.2A.3.4.3.

- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.2A.3.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.2A.3.4.1-1 on PCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the parameters of the signal generator for an interfering signal below the SCC's wanted signal according to Table 7.6.2.5-2. The frequency step size is 1 MHz.
- 7. Set the downlink signal level according to the table 7.6.2.5-1 for both carriers. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.1.5-1 for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the throughput measurement.
- 8. Measure the average throughput of SCC for duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Record the frequencies for which the throughput doesn't meet the requirements.
- 10. Repeat steps from 6 to 9, using an interfering signal above the SCC's wanted signal at step 6.
- 11. Switch the SCell into PCell and repeat steps 1 to 10, except for operating bands without uplink band (as noted in Table 5.2-1).

#### 7.6.2A.3.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.6.2A.3.5 Test Requirement

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the out-of-band blocking requirements are defined with the uplink active on the band other than the band whose downlink is being tested i.e. the requirements are tested only for the S-Cell downlink. The out-of-band blocking parameters in table 7.6.2A.3.5-1 for each component carrier are the same as single carrier requirements in Table 7.6.2.5-1. Out-of-band blocking for inter-band carrier aggregation with one active uplink requirements are found in table 7.6.2A.1.3-0.

Except for the spurious response frequencies recorded at step 9, the throughput measurement in the downlink derived in the test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.6.2A.3.5-1 and 7.6.2A.3.5-2. The parameters in these tables are related to the carrier operated as S-Cell.

For frequency range 1, 2, and 3, the number of spurious response frequencies recorded in the step 9 of the test procedure shall not exceed  $\max\left(24, 6\cdot \lceil N_{RB} / 6 \rceil\right)$  exceptions per downlink in each assigned frequency channel when measured using a 1MHz step size. For these exceptions the requirements of clause 7.7A.3 Spurious Response are applicable.

Table 7.6.2A.3.5-1: Out-of-band blocking parameters

Rx Parameter	Units	Channel bandwidth						
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
Power in		REFSENS + channel bandwidth specific value below						
Transmission Bandwidth Configuration	dBm	6	6	6	6	7	9	

Note 1:	The transmitter shall be set to 4dB below P <sub>CMAX_L</sub> with P <sub>CMAX_L</sub> as defined in
	clause 6.2.5.
Note 2:	The reference measurement channel is specified in Annex A.3.2 with one sided
	dynamic OCNG Pattorn OP 1 EDD/TDD as described in Annay A 5 1 1/A 5 2 1

Table 7.6.2A.3.5-2: Out-of-band blocking for inter-band carrier aggregation with one uplink carrier

Paramete	er Unit	Range 1	Range 2	Range 3				
Pwanted	dBm	Т	able 7.6.2.5-1 for both com	ponent carriers				
Pinterferer	dBm	-44 + ∆R <sub>IB,c</sub>	-30 + ∆R <sub>IB,c</sub>	-15 + ∆R <sub>IB,c</sub>				
Finterfere	<sub>r</sub> MHz	$-60 < f - F_{DL\_Low(1)} < -15$	$-85 < f - F_{DL\_Low(1} \le -60$	$1 \le f \le_{FDL\_Low(1)} - 85$				
(CW)		or	or	or				
(- )		$-60 < f - F_{DL\_Low(2)} < -15$	$-85 < f - F_{DL\_Low(2)} \le -60$	$F_{DL\_High(1)} + 85 \le f \le F_{DL\_Low(2)} - 85$				
		or	or	or				
		$15 < f - F_{DL\_High(1)} < 60$	$60 \le f - F_{DL\_High(1)} < 85$	$F_{DL\_High(2)} + 85 \le f \le 12750$				
		or	or					
		$15 < f - F_{DL\_High(2)} < 60$	$60 \le f - F_{DL\_High(2)} < 85$					
Note 1:	F <sub>DL_Low(1)</sub> ar	nd F <sub>DL_High(1)</sub> denote the res	pective lower and upper fre	equency limits of the lower operating				
	band, F <sub>DL_L</sub>	$_{ow(2)}$ and $F_{DL\_High(2)}$ the resp	pective lower and upper free	quency limits of the upper operating				
	band.							
Note 2:	For F <sub>DL_Low(</sub>	$_{2)} - F_{DL\_High(1)} < 145 \text{ MHz a}$	nd FInterferer in FDL_High(1)	< f < F <sub>DL_Low(2)</sub> , F <sub>Interferer</sub> can be in both				
	Range 1 ar	nd Range 2. Then the lowe	r of the P <sub>Interferer</sub> applies.					
Note 3:	For $F_{DL\_Low(1)} - 15$ MHz $\leq f \leq F_{DL\_High(1)} + 15$ MHz and $F_{DL\_Low(2)} - 15$ MHz $\leq f \leq F_{DL\_High(2)} + 15$ MHz the							
	appropriate adjacent channel selectivity and in-band blocking in the respective subdauses 7.5A.1.5 and							
	7.6.1A.5 sh	all be applied.						
Note 4:	$\Delta R_{IB,c}$ acco	rding to Table 7.3A.1.3-0 a	pplies when serving cell c i	is measured.				

# 7.6.2B Out-of-band blocking for UL-MIMO

## 7.6.2B.1 Test Purpose

Out-of-band band blocking for UL-MIMO is defined for an unwanted CW interfering signal falling more than 15 MHz below or above the UE that support UL- MIMO receive band, at which a given average throughput shall meet or exceed the requirement for the specified measurement channels.

For the first 15 MHz below or above the UE that support UL-MIMO receive band the appropriate in-band blocking for UL-MIMO or adjacent channel selectivity for UL-MIMO in sub-clause 7.5.3 and sub-clause 7.6.1.3 shall be applied.

The lack of out-of-band blocking ability will decrease the coverage area when other e-NodeB trans mitters exist (except in the adjacent channels and spurious response).

## 7.6.2B.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

## 7.6.2B.3 Minimum Conformance Requirements

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements in subclause 7.6 shall be met with the UL-MIMO configurations specified in Table 6.2.2B.3-2. For UL-MIMO, the parameter P<sub>CMAX\_L</sub> is defined as the total transmitter power over the two transmit antenna connectors.

The normative reference for this requirement is TS 36.101 [2] clause 7.6B.

## 7.6.2B.4 Test Description

#### 7.6.2B.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.6.2B.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.6.2B.4.1-1: Test Configuration Table

	Initial Conditions								
Test Environ	ment as specifi	ed in	NC						
	subclause 4.1								
Test Frequer	ncies as specifi	ed in	One frequen	cy chos en arbit	rarily from low	or high range			
TS36.508 [7]	subclause 4.3	.1	· ·	•	•	0 0			
Test Channe	Test Channel Bandwidths as specified in			z, Highest					
TS 36.508 [7	TS 36.508 [7] subdause 4.3.1								
				el Bandwidths					
	Down	nlink Configur	ation	Upl	ink Configurat				
Ch BW	Mod'n		ocation	Mod'n		ocation			
		FDD	TDD		FDD	TDD			
1.4MHz	QPSK	6	6	QPSK	6	6			
3MHz	QPSK	15	15	QPSK	15	15			
5MHz	QPSK	25	25	QPSK	25	25			
5MHz	QPSK	25	N/A	QPSK	20	N/A			
5MHz	QPSK	25	N/A	QPSK	15	N/A			
10MHz	QPSK	50	50	QPSK	50	50			
10MHz	QPSK	50	N/A	QPSK	25	N/A			
10MHz	QPSK	50	N/A	QPSK	20	N/A			
10MHz	QPSK	50	N/A	QPSK	15	N/A			
15MHz	QPSK	75	75	QPSK	75	75			
15MHz	QPSK	75	N/A	QPSK	50	N/A			
15MHz	QPSK	75	N/A	QPSK	25	N/A			
15MHz	QPSK	75	N/A	QPSK	20	N/A			
20MHz	QPSK	100	100	QPSK	100	100			
20MHz	QPSK	100	N/A	QPSK	75	N/A			
20MHz	QPSK	100	N/A	QPSK	50	N/A			
20MHz	QPSK	100	N/A	QPSK	25	N/A			
20MHz	QPSK	100	N/A	QPSK	20	N/A			
	est Channel Ba					/hich			
Note 2: Do	applicable channel bandwidths are specified in Table 5.4.2.1-1.								
Note 3: Fo	or the DL signal	one sided dyn	amic OCNG P	attern OP.1 FD	D/TDD is used	1.			

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, in Figure A.30.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.6.2B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.2B.4.3.

#### 7.6.2B.4.2 Test Procedure

1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.2B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.

- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 7.6.2B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to Table 7.6.2B.5-2. The frequency step size is 1MHz.
- 4. Set the downlink signal level according to the table 7.6.2B.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.2B.5-1 for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the throughput measurement.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Record the frequencies for which the throughput doesn't meet the requirements.
- 7. Repeat steps from 3 to 6, using an interfering signal above the wanted signal at step 3.

#### 7.6.2B.4.3 Message Contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exception.

Table 7.6.2B.4.3-1: UplinkPowerControlDedicated

Derivation Path: 36.331 clause 6.3.2	W.L.	0	0 1141
Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::=			
SEQUENCE {			
p0-UePUSCH	0		
deltaMCS-Enabled	en0		
accumulationEnabled	TRUE		
p0-uePUCCH	0		
pSRS-Offset	3 (-6 dB)		
filterCoefficient	fc8	larger filter length is	
		used to reduce the	
		RSRP	
		measurement	
		variation	
}			

## 7.6.2B.5 Test Requirement

Except for the spurious response frequencies recorded at the final step of test procedure, the throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.6.2B.5-1 and 7.6.2B.5-2.

For frequency range 1, 2, and 3, the number of spurious response frequencies recorded in the final step of test procedure shall not exceed  $\max(24, 6 \cdot \lceil N_{RB} / 6 \rceil)$  in each assigned frequency channel when measured using a 1MHz step size. For these exceptions the requirements of clause 7.7 Spurious Response are applicable.

For frequency range 4, the number of spurious response frequencies recorded in the final step of test procedure shall not exceed  $\max\left(8, \lceil (N_{RB}+2\cdot L_{CRBs})/8 \rceil\right)$  in each assigned frequency channel when measured using a 1MHz step size. For these exceptions the requirements of clause 7.7 Spurious Response are applicable.

Table 7.6.2B.5-1: Out-of-band blocking parameters

Rx Parameter	Units			Channel bandwidth				
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
Power in Transmission	dBm	REFSENS + channel bandwidth specific value belov				e below 9		

Bandwidth Configuration							
Note 1:	e 1: The transmitter shall be set to 4dB below P <sub>CMAX_L</sub> with P <sub>CMAX_L</sub> as defined in clause 6.2.5.					ied in	
Note 2:	The reference dynamic OCI						

Table 7.6.2B.5-2: Out of band blocking

E-UTRA band	Parameter	Units		Free	quency	
			range 1	range 2	range 3	range 4
	P <sub>Interferer</sub>	dBm	-44	-30	-15	-15
1, 2, 3, 4, 5, 6, 7, 8, 9, 10,			F <sub>DL_low</sub> -15 to F <sub>DL_low</sub> -60	F <sub>DL_low</sub> -60 to F <sub>DL_low</sub> -85	F <sub>DL_low</sub> -85 to 1 MHz	-
11, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44	F <sub>Interferer</sub> (CW)	MHz	FDL_high +15 to FDL_high +60	F <sub>DL_high</sub> +60 to F <sub>DL_high</sub> +85	F <sub>DL_high</sub> +85 to +12750 MHz	-
2, 5, 12, 17	Finterferer	MHz	-	-	-	Ful_low- Ful_high

Note 1: Range 3 shall be tested only with the highest channel bandwidth.

Note 2: For the UE which supports both Band 11 and Band 21 the out of blocking is FFS.

# 7.6.3 Narrow band blocking

## 7.6.3.1 Test Purpose

Verifies a receiver's ability to receive an E-UTRA signal at its assigned channel frequency in the presence of an unwanted narrow band CW interferer at a frequency, which is less than the nominal channel spacing.

The lack of narrow-band blocking ability will decrease the coverage area when other e-NodeB transmitters exist (except in the adjacent channels and spurious response).

## 7.6.3.2 Test Applicability

This test applies to all types of E-UTRA UE release 8 and forward.

## 7.6.3.3 Minimum Conformance Requirements

The relative throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.6.3.3-1.

Table 7.6.3.3-1: Narrow-band blocking

Parameter	Unit		Channel Bandwidth				
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
P <sub>w</sub>	dBm	P <sub>R</sub>	<sub>EFSENS</sub> + cha	nnel-bandwi	dth specific	c value belo	ow
		22	18	16	13	14	16
P <sub>uw</sub> (CW)	dBm	-55	-55	-55	-55	-55	-55
F <sub>uw</sub> (offset for	MHz	0.9075	1.7025	2.7075	5.2125	7.7025	10.2075
$\Delta f = 15 \text{ kHz}$							
F <sub>uw</sub> (offset for	MHz						
⊿f = 7.5 kHz)							

Note 1: The transmitter shall be set a 4 dB below PcMax\_L at the minimum uplink configuration specified in Table 7.3.3-2 with PcMax\_L as defined in clause 6.2.5.

Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic

OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

The normative reference for this requirement is TS 36.101 [2] clause 7.6.3.

## 7.6.3.4 Test Description

#### 7.6.3.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.6.3.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.6.3.4.1-1: Test Configuration Table

		In	itial Conditio	ns					
Test Environ	ment as specifi	ed in	NC	-					
TS 36.508 [7	] subdause 4.1								
Test Frequer	rcies as specific	ed in	Mid range						
TS 36.508 [7	] subdause 4.3	.1	_						
	l Bandwidths as		Lowest, 5MH	lz, Highest					
TS 36.508 [7	] subdause 4.3								
				el Bandwidths					
	Downlink Configuration Uplink Configuration								
Ch BW	Mod'n		ocation	Mod'n		ocation			
		FDD	TDD		FDD	TDD			
1.4MHz	QPSK	6	6	QPSK	6	6			
3MHz	QPSK	15	15	QPSK	15	15			
5MHz	QPSK	25	25	QPSK	25	25			
5MHz	QPSK	25	N/A	QPSK	20	N/A			
5MHz	QPSK	25	N/A	QPSK	15	N/A			
10MHz	QPSK	50	50	QPSK	50	50			
10MHz	QPSK	50	N/A	QPSK	25	N/A			
10MHz	QPSK	50	N/A	QPSK	20	N/A			
10MHz	QPSK	50	N/A	QPSK	15	N/A			
15MHz	QPSK	75	75	QPSK	75	75			
15MHz	QPSK	75	N/A	QPSK	50	N/A			
15MHz	QPSK	75	N/A	QPSK	25	N/A			
15MHz	QPSK	75	N/A	QPSK	20	N/A			
20MHz	QPSK	100	100	QPSK	100	100			
20MHz	QPSK	100	N/A	QPSK	75	N/A			
20MHz	QPSK	100	N/A	QPSK	50	N/A			
20MHz	QPSK	100	N/A	QPSK	25	N/A			
20MHz	QPSK	100	N/A	QPSK	20	N/A			
						/hich			
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.  Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth. The allocation shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).									

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.5.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1

For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.

4. The UL and DL Reference Measurement channels are set according to Table 7.6.3.4.1-1.

- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.3.4.3.

#### 7.6.3.4.2 Test Procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.3.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to Table 7.6.3.5-1.
- 4. Set the downlink signal level according to the table 7.6.3.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in table 7.6.3.5-1 for carrier frequency  $f \le 3.0$ GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz  $< f \le 4.2$ GHz, for at least the duration of the throughput measurement.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal at step 3.

#### 7.6.3.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exception.

Table 7.6.3.4.3-1: UplinkPowerControlDedicated

Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::=			
SEQUENCE {			
p0-UePUSCH	0		
deltaMCS-Enabled	en0		
accumulationEnabled	TRUE		
p0-uePUCCH	0		
pSRS-Offset	3 (-6 dB)		
filterCoefficient	fc8	larger filter length is used to reduce the RSRP measurement variation	

## 7.6.3.5 Test Requirement

The throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.6.3.5-1.

Parameter	Unit			Channel Ba	ndwidth		
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Pw	dBm	PR	EFSENS + cha	nnel-bandwi	dth specific	value belo	DW .
		22	18	16	13	14	16
P <sub>uw</sub> (CW)	dBm	-55	-55	-55	-55	-55	-55
F <sub>uw</sub> (offset for	MHz	0.9075	1.7025	2.7075	5.2125	7.7025	10.2075
$\Delta f = 15 \text{ kHz}$							
F <sub>uw</sub> (offset for	MHz						
$\Delta f = 7.5 \text{ kHz}$							

Table 7.6.3.5-1: Narrow-band blocking

Note 1: The transmitter shall be set a 4 dB below P<sub>CMAX L</sub> with P<sub>CMAX L</sub> as defined in clause 6.2.5. Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic

OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

# 7.6.3A Narrow band blocking for CA

## 7.6.3A.1 Narrow band blocking for CA (intra-band contiguous DL CA and UL CA)

#### 7.6.3A.1.1 Test Purpose

Verifies a receiver's ability to receive an E-UTRA signal at its assigned CA channel frequencies in the presence of an unwanted narrow band CW interferer at a frequency, which is less than the nominal channel spacing.

The lack of narrow-band blocking ability will decrease the coverage area when other e-NodeB transmitters exist (except in the adjacent channels and spurious response).

#### 7.6.3A.1.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

#### 7.6.3A.1.3 Minimum Conformance Requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the narrow-band blocking requirements are defined with the uplink active on the band other than the band whose downlink is being tested. The UE shall meet the requirements specified in subclause 7.6.3 for each component carrier while both downlink carriers are active. For E-UTRA CA configurations including an operating band without uplink band (as noted in Table 5.2-1), the requirements for both downlinks shall be met with the uplink active in the band capable of UL operation. For E-UTRA CA configurations listed in Table 7.3A.1.3-0a under conditions for which reference sensitivity for the operating band being tested is N/A, the narrow-band blocking requirements of subclause 7.6.3A.1.3 do not apply.

For intra-band contiguous carrier aggregation the downlink SCC shall be configured at nominal channel spacing to the PCC with the PCC configured closest to the uplink band. Downlink PCC and SCC are both activated. The uplink output power shall be set as specified in Table 7.6.3A.1.3-1 with the uplink configuration set according to Table 7.3A.1.3-1 for the applicable carrier aggregation configuration. For UE(s) supporting one uplink, the uplink configuration of the PCC shall be in accordance with Table 7.3.3-2.

The UE shall fulfil the minimum requirement in presence of an interfering signal specified in Table 7.6.3A.1.3-1 being on either side of the aggregated signal. The throughput of each carrier shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.6.3A.1.3-1.

Table 7.6.3A.1.3-1: Narrow-band blocking

Parameter	Unit		CA Ba	ndwidth Cla	SS	
	O i iii	В	С	D	E	F

Power per CC in Aggregated	dBm -	REFSENS + CA Bandwidth Class specific value below			
Transmission Bandwidth Configuration		16			
P <sub>uw</sub> (CW)	dBm	-55			
$F_{uw}$ (offset for $\Delta f = 15 \text{ kHz}$ )	MHz	- F <sub>offset</sub> - 0.2 / + F <sub>offset</sub> + 0.2			
F <sub>uw</sub> (offset for ⊿f = 7.5 kHz)	MHz				

Note 1: The transmitter shall be set to 4dB below PCMAX L or PCMAX L CA as defined in subclause 6.2.5A.

Note 2: Reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Note 3: The  $F_{\text{interferer}}$  (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to  $\left[F_{\text{interferer}}/0.015+0.5\right]0.015+0.0075$  MHz to be offset from the sub-carrier raster.

The normative reference for this requirement is TS 36.101 [2] clause 7.6.3.1A.

## 7.6.3A.1.4 Test Description

#### 7.6.3A.1.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and CC combinations based on E-UTRA CA configurations specified in table 5.4.2A.1-1. All of these configurations shall be tested with applicable test parameters for each CA Configuration, and are shown in table 7.6.3A.1.4.1-1. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.6.3A.1.4.1-1: Test Configuration Table

Initial Cond	litions							
Test Environment as specified in TS 36.508[7] subclause 4.1			NC					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.			C: Mid range					
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.  Test Parameters for CA Configurations				Lowest N <sub>RB_agg</sub> Highest N <sub>RB_agg</sub>				
CA Configu N <sub>RB_agg</sub>	ration /	DL Alloca	ation	UL Alloc	ation			
PCC N <sub>RB</sub>	SCC N <sub>RB</sub>	CC MOD	PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SCC RB allocations (L <sub>CRB</sub> @ RB <sub>start</sub> )		
75	75	QPSK	75+75	QPSK	75	P_75@0	S_0@0	
75	75	QPSK	75+75	QPSK	130	P_75@0	S_55@0	
75	75	QPSK	75+75	QPSK	150	P_75@0	S_75@0	
100	50	QPSK	100+50	QPSK	150	P_100@0	S_50@0	
100	100	QPSK	100+100	QPSK	75	P_75@25	S_0@0	
100	100	QPSK	100+100	QPSK	130	P_100@0	S_30@0	
100	100	QPSK	100+100	QPSK	200			

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1.

Note 2: Depending on CA Configuration only the appropriate Uplink RB allocation value according to table 7.3A.1.3-1 is tested per CA Configuration Test CC combination.

- 1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure group A.34 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.6.3A.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF-CA according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.3A.1.4.3.

#### 7.6.3A.1.4.2 Test Procedure

- 1. Configure SCC according to Annex C0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.6.3A.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.3A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.3A.1.4.1-1 on both PCC and SCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to Table 7.6.3A.1.5-1.
- 7. Set the downlink signal level according to the table 7.6.3A.1.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.3A.1.5-1 for carrier frequency  $f \le 3.0 \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz <  $f \le 4.2 \text{GHz}$ , for at least the duration of the throughput measurement. Suitable uplink power control commands should be sent to ensure the total power in each of the assigned carriers to be equal to each other within +/-[2] dB.
- 8. Measure the average throughput for each component carrier for duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted signal at step 6.

#### 7.6.3A.1.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.6.3A.1.5 Test Requirement

The throughput measurement of each carrier derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.6.3A.5-1.

Table 7.6.3A.1.5-1: Narrow-band blocking

Parameter	Unit	CA Bandwidth Class					
i arameter	Oille	В	С	D	E	F	l

Power per CC in Aggregated	dBm -	REFSENS + CA Bandwidth Class specific value below			
Transmission Bandwidth Configuration		16			
P <sub>uw</sub> (CW)	dBm	-55			
$F_{uw}$ (offset for $\Delta f = 15 \text{ kHz}$ )	MHz	- F <sub>offset</sub> - 0.2 / + F <sub>offset</sub> + 0.2			
F <sub>uw</sub> (offset for ⊿f = 7.5 kHz)	MHz				

Note 1: The transmitter shall be set to 4dB below PCMAX L or PCMAX L CA as defined in subclause 6.2.5A.

Note 2: Reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Note 3: The  $F_{\text{interferer}}$  (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to  $\left| F_{\text{interferer}} \right| / 0.015 + 0.5 \left| 0.015 + 0.0075 \right|$  MHz to be offset from the sub-carrier raster.

## 7.6.3A.2 Narrow band blocking for CA (intra-band contiguous DL CA without UL CA)

## 7.6.3A.2.1 Test Purpose

Same test purpose as 7.6.3A.1.

## 7.6.3A.2.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA without UL CA.

#### 7.6.3A.2.3 Minimum Conformance Requirements

Minimum conformance requirements for intra-band contiguous carrier aggregation with one uplink carrier support as in clause 7.6.3A.1.

## 7.6.3A.2.4 Test Description

#### 7.6.3A.2.4.1 Initial Conditions

Same initial conditions as in clause 7.6.3A.1.4.1 with the following exceptions:

- instead of Table 7.6.3A.1.4.1-1 → use Table 7.6.3A.2.4.1-1

Table 7.6.3A.2.4.1-1: Test Configuration Table

Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1	NC					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.	C: Mid range					
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Lowest N <sub>RB_agg</sub> Highest N <sub>RB_agg</sub>					
Test Parameters for CA Configurations						

	figuration / RB_agg	DL Allocation  CC   PCC & SCC RB			UL Allocation				
PCC N <sub>RB</sub>	PCC SCC		PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SCC RB allocations (L <sub>CRB</sub> @ RB <sub>start</sub> )			
75	75	QPSK	75+75	QPSK	75	P_75@0	-		
75	75	QPSK	75+75	QPSK	50	P_50@0	-		
75	75	QPSK	75+75	QPSK	25	P_25@0	-		
75	75	QPSK	75+75	QPSK	20	P_20@0	-		
100	50	QPSK	100+50	QPSK	100	P 100@0	-		
100	50	QPSK	100+50	QPSK	75	P_75@0	-		
100	50	QPSK	100+50	QPSK	50	P_50@0	-		
100	50	QPSK	100+50	QPSK	25	P_25@0	-		
100	50	QPSK	100+50	QPSK	20	P_20@0	-		
100	100	QPSK	100+100	QPSK	100	P 100@0	-		
100	100	QPSK	100+100	QPSK	75	P_75@0	-		
100	100	QPSK	100+100	QPSK	50	P_50@0	-		
100	100	QPSK	100+100	QPSK	25	P_25@0	-		
100	100	QPSK	100+100	QPSK	20	P_20@0	-		

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1.

Note 2: Depending on CA Configuration only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per CA Configuration Test CC combination.

#### 7.6.3A.2.4.2 Test Procedure

Same test procedure as in clause 7.6.3A.1.4.2 with the following exceptions:

- Instead of Table 7.6.3A.1.4.1-1 → use Table 7.6.3A.2.4.1-1

#### 7.6.3A.2.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

## 7.6.3A.2.5 Test Requirement

Same test requirement as in clause 7.6.3A.1.5.

# 7.6.3A.3 Narrow band blocking for CA (inter-band DL CA without UL CA)

## 7.6.3A.3.1 Test Purpose

Same test purpose as 7.6.3A.1.

## 7.6.3A.3.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support inter-band DL CA without UL CA.

## 7.6.3A.3.3 Minimum Conformance Requirements

Minimum conformance requirements for inter-band carrier aggregation with one uplink carrier support as in clause 7.6.3A.1.

## 7.6.3A.3.4 Test Description

#### 7.6.3A.3.4.1 Initial Conditions

Same initial conditions as in clause 7.6.3A.1.4.1 with the following exceptions:

- instead of Table 7.6.3A.1.4.1-1 → use Table 7.6.3A.3.4.1-1

Table 7.6.3A.3.4.1-1: Test Configuration Table

Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1	NC					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.	A: Mid range for PCC and SCC					
Test CC Combination setting (N <sub>RB_agg</sub> ) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N <sub>RB_agg</sub> for PCC and SCC					

#### **Test Parameters for CA Configurations**

CA Configu	CA Configuration / N <sub>RB_agg</sub>		DL Allocation	UL Allocation		
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	CC MOD	PCC & SCC RB allocation		CC MOD	PCC N <sub>RB_alloc</sub>
50	50	QPSK	50	50 50		50
50	50	QPSK	50	50	QPSK	25
50	50	QPSK	50	50	QPSK	20
50	50	QPSK	50	50	QPSK	16
50	75	QPSK	50	75	QPSK	25
50	100	QPSK	50	100	QPSK	50
50	100	QPSK	50	100	QPSK	25
50	100	QPSK	50	100	QPSK	20
75	50	QPSK	75	50	QPSK	25
75	100	QPSK	75	100	QPSK	25
100	50	QPSK	100	50	QPSK	100
100	50	QPSK	100	50	QPSK	75
100	50	QPSK	100	50	QPSK	50
100	75	QPSK	100	75	QPSK	100
100	100	QPSK	100	100	QPSK	75
100	100	QPSK	100	100	QPSK	50

- Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-2.
- Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier is tested per Test CA configuration, unless otherwise stated in table 7.3A1.3-0b.
- Note 3: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).
- Note 4: The frequencies of PCC and SCC shall be switched and tested in each configuration (given UL is supported in PCC band as per Table 5.2-1).

#### 7.6.3A.3.4.2 Test Procedure

- 1. Configure SCC according to Annex C0, C.1 and Annex C.3.1 for all down link physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.6.3A.3.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).

- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.3A.3.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.3A.3.4.1-1 on PCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to Table 7.6.3A.1.5-1.
- 7. Set the downlink signal level according to the table 7.6.3A.1.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.3A.1.5-1 for carrier frequency  $f \le 3.0 \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $f \le 3.0 \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $f \le 4.2 \text{GHz}$ , for at least the duration of the throughput measurement.
- 8. Measure the average throughput of SCC for duration sufficient to achieve statistical significance according to Annex G.2A.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted signal at step 6.

#### 7.6.3A.3.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.6.3A.3.5 Test Requirement

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the narrow-band blocking requirements are defined with the uplink active on the band other than the band whose downlink is being tested, i.e., the requirements are tested only for the S-Cell downlink. The UE shall meet the requirements specified in Table 7.6.3A.3.5-1 for each component carrier, when operated as S-Cell, while both downlink carriers are active. The requirements for each component carrier are the same as single carrier requirements in Table 7.6.3.5-1.

The throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.6.3A.3.5-1. The parameters in these tables are related to the carrier operated as S-Cell.

Parameter Unit Channel Bandwidth 1.4 MHz 3 MHz 5 MHz 10 MHz 15 MHz 20 MHz dBm Prefsens + channel-bandwidth specific value below 22 18 13 14 16 16 P<sub>uw</sub> (CW) dBm -55 -55 -55 -55 -55 -55 Fuw (offset for 0.9075 2.7075 MHz 1.7025 5.2125 7.7025 10.2075  $\Delta f = 15 \text{ kHz}$ Fuw (offset for MHz  $\Delta f = 7.5 \text{ kHz}$ 

Table 7.6.3A.3.5-1: Narrow-band blocking

Note 1: The transmitter shall be set a 4 dB below P<sub>CMAX\_L</sub> with P<sub>CMAX\_L</sub> as defined in clause 6.2.5.

Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

# 7.6.3B Narrow band blocking for UL-MIMO

#### 7.6.3B.1 Test Purpose

Narrow band blocking for UL-MIMO is defined for an unwanted CW interfering signal falling near the UE that supports UL-MIMO receive band, at which a given average throughput shall meet or exceed the requirement for the specified measurement channels,

The lack of narrow-band blocking ability will decrease the coverage area when other e-NodeB transmitters exist (except in the adjacent channels and spurious response).

### 7.6.3B.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

#### 7.6.3B.3 Minimum Conformance Requirements

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements in clause 7.6 shall be met with the UL-MIMO configurations specified in Table 6.2.2B-2. For UL-MIMO, the parameter  $P_{CMAX\ L}$  is defined as the total transmitter power over the two transmit antenna connectors.

#### 7.6.3B.4 Test Description

#### 7.6.3B.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.6.3B.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.6.3B.4.1-1: Test Configuration Table

Initial Conditions							
Test Environment as specified in			NC	NC			
TS 36.508 [7] clause 4.1							
Test Frequer	ncies as specific	ed in	Mid range				
TS 36.508 [7			_				
	l Bandwidths as	s specified in	Lowest, 5MH	łz, Highest			
TS 36.508 [7							
				el Bandwidths			
		ılink Configur			nk Configura		
Ch BW	Mod'n		ocation	Mod'n		ocation	
		FDD	TDD		FDD	TDD	
1.4MHz	QPSK	6	6	QPSK	6	6	
3MHz	QPSK	15	15	QPSK	15	15	
5MHz	QPSK	25	25	QPSK	25	25	
5MHz	QPSK	25	N/A	QPSK	20	N/A	
5MHz	QPSK	25	N/A	QPSK	15	N/A	
10MHz	QPSK	50	50	QPSK	50	50	
10MHz	QPSK	50	N/A	QPSK	25	N/A	
10MHz	QPSK	50	N/A	QPSK	20	N/A	
10MHz	QPSK	50	N/A	QPSK	15	N/A	
15MHz	QPSK	75	75	QPSK	75	75	
15MHz	QPSK	75	N/A	QPSK	50	N/A	
15MHz	QPSK	75	N/A	QPSK	25	N/A	
15MHz	QPSK	75	N/A	QPSK	20	N/A	
20MHz	QPSK	100	100	QPSK	100	100	
20MHz	QPSK	100	N/A	QPSK	75	N/A	
20MHz	QPSK	100	N/A	QPSK	50	N/A	
20MHz	QPSK	100	N/A	QPSK	25	N/A	
20MHz	QPSK	100	N/A	QPSK	20	N/A	
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.  Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth.  Note 3: For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.							
Note 3: Fo	or the DL signal	one sided dyn	amic OCNG P	attern OP.1 FD	D/IDD is used	1.	

<sup>1.</sup> Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.30.

- 2. The parameter settings for the cell are set up according to TS 36.508 [7] clause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1
- 4. The UL and DL Reference Measurement channels are set according to Table 7.6.3B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.6.3B.4.3.

#### 7.6.3B.4.2 Test Procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.3B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 7.6.3B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the parameters of the CW signal generator for an interfering signal below the wanted signal according to Table 7.6.3B.5-1.
- 4. Set the downlink signal level according to the table 7.6.3B.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.6.3B.5-1 for carrier frequency  $f \le 3.0 \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ , for at least the duration of the throughput measurement and the UE output power is mean sum power of each antenna connector for UE.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal at step 3.

#### 7.6.3B.4.3 Message Contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exception.

Table 7.6.3B.4.3-1: UplinkPowerControlDedicated

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::=			
SEQUENCE {			
p0-UePUSCH	0		
deltaMCS-Enabled	en0		
accumulationEnabled	TRUE		
p0-uePUCCH	0		
pSRS-Offset	3 (-6 dB)		
filterCoefficient	fc8	larger filter length is	
		used to reduce the	
		RSRP	
		measurement	
		variation	
}			

#### 7.6.3B.5 Test Requirement

The throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.6.3B.5-1.

Parameter	Unit	Channel Bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Pw	dBm	Prefsens + channel-bandwidth specific value below					OW
		22	18	16	13	14	16
P <sub>uw</sub> (CW)	dBm	-55	-55	-55	-55	-55	-55
$F_{uw}$ (offset for $\Delta f = 15 \text{ kHz}$ )	MHz	0.9075	1.7025	2.7075	5.2125	7.7025	10.2075

Table 7.6.3B.5-1: Narrow-band blocking

Note 1: The transmitter shall be set a 4 dB below P<sub>CMAX\_L</sub> with P<sub>CMAX\_L</sub> as defined in clause 6.2.5.

Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic

OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

# 7.7 Spurious response

### 7.7.1 Test Purpose

Fuw (offset for

 $\Delta f = 7.5 \text{ kHz}$ 

Spurious response verifies the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out of band blocking limit as specified in sub-clause 7.6.2 is not met.

The lack of the spurious response ability decreases the coverage area when other unwanted interfering signal exists at any other frequency.

### 7.7.2 Test Applicability

This test applies to all types of E-UTRA UE release 8 and forward.

MH z

# 7.7.3 Minimum Conformance Requirements

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.7.3-1 and 7.7.3-2.

Table 7.7.3-1: Spurious response parameters

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in		REF	SENS + ch	nannel band	dwidth spec	ific value be	low
Transmission Bandwidth Configuration	dBm	6	6	6	6	7	9

Note 1:The transmitter shall be set to 4dB below PcMax\_L at the minimum uplink configuration specified in Table 7.3.3-2 with PcMax\_L as defined in clause 6.2.5.

Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Table 7.7.3-2: Spurious Response

Parameter	Unit	Level
P <sub>Interferer</sub> (CW)	dBm	-44
F <sub>Interferer</sub>	MHz	Spurious response frequencies

The normative reference for this requirement is TS 36.101 [2] clause 7.7.

### 7.7.4 Test Description

#### 7.7.4.1 Initial Conditions

The initial conditions shall be the same as in clause 7.6.2.4.1 in order to test spurious responses obtained in clause 7.6.2 under the same conditions.

#### 7.7.4.2 Test Procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.2.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the parameters of the CW signal generator for an interfering signal according to Table 7.7.5-2. The spurious frequencies are taken from records in the final step of test procedures in clause 7.6.2.4.2.
- 4. Set the downlink signal level according to the table 7.7.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.7.5-1 for carrier frequency  $f \le 3.0 GHz$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 GHz < f \le 4.2 GHz$ , for at least the duration of the throughput measurement.
- 5. For the spurious frequency, measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.

### 7.7.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exception.

Derivation Path: 36.331 clause 6.3.2 Value/remark Information Element Comment Condition UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE { p0-UePUSCH 0 deltaMCS-Enabled en0 accumulationEnabled TRUE p0-uePUCCH pSRS-Offset 3 (-6 dB) filterCoefficient larger filter length fc8 is used to reduce the RSRP measurement variation

Table 7.7.4.3-1: UplinkPowerControlDedicated

# 7.7.5 Test Requirement

The throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.7.5-1 and 7.7.5-2.

Table 7.7.5-1: Spurious response parameters

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in		REF	SENS + ch	annel band	width speci	fic value bel	ow
Transmission Bandwidth	dBm	6	6	6	6	7	9
Configuration			U	U	U	,	9

Note 1:	The transmitter shall be set to 4dB below	v P <sub>CMAX_L</sub> with P <sub>CMAX_L</sub>	as defined in clause
---------	---	--	----------------------

6.2.5.

Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Table 7.7.5-2: Spurious Response

Parameter	Unit	Level
P <sub>Interferer</sub> (CW)	dBm	-44
F <sub>Interferer</sub>	MHz	Spurious response frequencies

# 7.7A Spurious response for CA

# 7.7A.1 Spurious response for CA (intra-band contiguous DL CA and UL CA)

#### 7.7A.1.1 Test Purpose

Spurious response for CA verifies the receiver's ability to receive a wanted aggregated signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out of band blocking limit as specified in sub-clause 7.6.2A is not met.

The lack of the spurious response ability decreases the coverage area when other unwanted interfering signal exists at any other frequency.

#### 7.7A.1.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

### 7.7A.1.3 Minimum Conformance Requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the spurious response requirements are defined with the uplink active on the band other than the band whose downlink is being tested. The throughput measured in each downlink with  $F_{interferer}$  in Table 7.6.2A.1.3-0 at spurious response frequencies shall be  $\geq$  95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.7.3-1 and 7.7.3-2. The UE shall meet these requirements for each component carrier while both downlink carriers are active.

For E-UTRA CA configurations including an operating band without uplink band (as noted in Table 5.2-1), the requirements for both downlinks shall be met with the uplink active in the band capable of UL operation. For E-UTRA CA configurations listed in Table 7.3A.1.3-0a under conditions for which reference sensitivity for the operating band being tested is N/A, the spurious response requirements of subclause 7.7A.1.3 do not apply.

For intra-band contiguous carrier aggregation the downlink SCC shall be configured at no minal channel spacing to the PCC with the PCC configured closest to the uplink band. Downlink PCC and SCC are both activated. The uplink output power shall be set as specified in Table 7.7A.1.3-1 with the uplink configuration set according to Table 7.3A.1A.3-1 for the applicable carrier aggregation configuration. For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.3-2. The throughput shall be  $\geq$  95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.7A.1.3-1 and 7.7A.1.3-2.

#### Table 7.7A.1.3-1: Spurious response parameters

Rx Parameter	Units	Inits CA Bandwidth Class				
		В	С	D	Е	F
Power per CC in Aggregated		REFSE	NS + CA Ban	dwidth Class	specific value	below
Transmission Bandwidth	dBm		0			
Configuration			9			
Note 1: The transmitter shall be set to 4dB below PCMAX_L or PCMAX_L_CA as defined in subclause 6.2.5A.						
Note 2: Deference reconstruction and the product of a product of the product of t						

Note 1: The transmitter shall be set to 4dB below PcMax\_L or PcMax\_L\_ca as defined in subclause 6.2.5A.

Note 2: Reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern

OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Table 7.7A.1.3-2: Spurious response

Parameter	Unit	Level
P <sub>Interferer</sub> (CW)	dBm	-44
F <sub>Interferer</sub>	MHz	Spurious response frequencies

The normative reference for this requirement is TS 36.101 [2] clause 7.7.1A.

#### 7.7A.1.4 Test Description

#### 7.7A.1.4.1 Initial Conditions

The initial conditions shall be the same as in clause 7.6.2A.1.4.1 in order to test spurious responses obtained in clause 7.6.2A.1 under the same conditions.

#### 7.7A.1.4.2 Test Procedure

- 1. Configure SCC according to Annex C0, C.1 and Annex C.3.1 for all down link physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.7A.1.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.2A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.2A.1.4.1-1 on both PCC and SCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the parameters of the CW signal generator for an interfering signal below the wanted aggregated signal according to Table 7.7A.1.5-2. The spurious frequencies are taken from records in the final step of test procedures in clause 7.6.2A.1.4.2.
- 7. Set the downlink signal level according to the table 7.7A.1.5-1 for both carriers. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.7A.1.5-1 for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the throughput measurement. Suitable uplink power control commands should be sent to ensure the total power in each of the assigned c arriers to be equal to each other within +/-[2] dB.
- 8. For each spurious frequency, measure the average throughput for each component carrier for duration sufficient to achieve statistical significance according to Annex G.2A.

#### 7.7A.1.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

### 7.7A.1.5 Test Requirement

The throughput measurement of each carrier derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.7A.1.5-1 and 7.7A.1.5-2.

Table 7.7A.1.5-1: Spurious response parameters

R	Rx Parameter U		CA Bandwidth Class				
			В	С	D	E	F
	er CC in Aggregated	REFSENS + CA Bandwidth Class specific value below				e below	
Transmis	sion Bandwidth	dBm		۵			
Configura	ation			9			
Note 1:	Note 1: The transmitter shall be set to 4dB below PcMax_L or PcMax_L_cA as defined in subclause 6.2.5A.						
Note 2:	e 2: Reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern						
	OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.						

Table 7.7A.1.5-2: Spurious response

Parameter	Unit	Level
P <sub>Interferer</sub> (CW)	dBm	-44
F <sub>Interferer</sub>	MHz	Spurious response frequencies

# 7.7A.2 Spurious response for CA (intra-band contiguous DL CA without UL CA)

#### 7.7A.2.1 Test Purpose

Same test purpose as in clause 7.7A.1.

#### 7.7A.2.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA without UL CA.

#### 7.7A.2.3 Minimum Conformance Requirements

Minimum conformance requirements for intra-band contiguous carrier aggregation with one uplink carrier support as in clause 7.7A.1.

#### 7.7A.2.4 Test Description

#### 7.7A.2.4.1 Initial Conditions

The initial conditions shall be the same as in clause 7.6.2A.2.4.1 in order to test spurious responses obtained in clause 7.6.2A.2 under the same conditions.

#### 7.7A.2.4.2 Test Procedure

Same test procedure as in clause 7.7A.1.4.2 with the following exceptions:

- In step 6, the spurious frequencies are taken from records in the final step of test procedures in clause 7.6.2A.2.4.2.

### 7.7A.2.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.7A.2.5 Test Requirement

Same test requirement as in clause 7.7A.1.5.

### 7.7A.3 Spurious response for CA (inter-band DL CA without UL CA)

#### 7.7A.3.1 Test Purpose

Same test purpose as in clause 7.7A.1.

#### 7.7A.3.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support inter-band DL CA without UL CA.

#### 7.7A.3.3 Minimum Conformance Requirements

Minimum conformance requirements for inter-band carrier aggregation with one uplink carrier support as in clause 7.7A.1.

#### 7.7A.3.4 Test Description

#### 7.7A.3.4.1 Initial Conditions

The initial conditions shall be the same as in clause 7.6.2A.3.4.1 in order to test spurious responses obtained in clause 7.6.2A.3 under the same conditions.

#### 7.7A.3.4.2 Test Procedure

- 1. Configure SCC according to Annex C0, C.1 and Annex C.3.1 for all down link physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.7A.3.4.3.
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.2A.3.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.6.2A.3.4.1-1 on PCC. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the parameters of the CW signal generator for an interfering signal below or above the wanted aggregated signal according to Table 7.7A.3.5-2. The spurious frequencies are taken from records in the step 9 of test procedures in clause 7.6.2A.3.4.2.
- 7. Set the downlink signal level according to the table 7.7A.3.5-1 for both carriers. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in table 7.7A.3.5-1 for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the throughput measurement. Suitable uplink power control commands should be sent to ensure the total power in each of the assigned carriers to be equal to each other within +/-[2] dB.
- 8. For each spurious frequency, measure the average throughput of SCC for duration sufficient to achieve statistical significance according to Annex G.2A.

#### 7.7A.3.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6.

#### 7.7A.3.5 Test Requirement

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the out-of-band blocking requirements are defined with the uplink active on the band other than the band whose downlink is being tested i.e. the requirements are tested only for the S-Cell downlink. The requirements for each component carrier are the same as single carrier requirements in Tables 7.7.5-1 and 7.7.5-2.

The throughput measurement derived in the test procedure for each downlink shall be  $\geq$  95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Tables 7.7A.3.5-1 and 7.7A.3.5-2. The parameters in these tables are related to the carrier operated as S-Cell.

Rx Parameter Units Channel bandwidth 15 MHz 1.4 MHz 3 MHz 5 MHz | 10 MHz 20 MHz Power in REFSENS + channel bandwidth specific value below Transmission dBm Bandwidth 6 6 Configuration Note 1: The transmitter shall be set to 4dB below P<sub>CMAX\_L</sub> with P<sub>CMAX\_L</sub> as defined in clause 6.2.5. Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided

Table 7.7A.3.5-1: Spurious response parameters

Table	7 7 A 3	5-2	Spurio	nis Re	sponse
Iable	/ . / A.s	).J-Z.	Spuik	JUS NE	SUULISE

dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Parameter	Unit	Level		
P <sub>Interferer</sub> (CW)	dBm	-44		
Finterferer	MHz	Spurious response frequencies		

# 7.7B Spurious response for UL-MIMO

## 7.7B.1 Test Purpose

Spurious response verifies the ability of the UE that support UL-MIMO to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the out of band blocking limit as specified in subclause 7.6B.2 is not met.

The lack of the spurious response ability decreases the coverage area when other unwanted interfering signal exists at any other frequency.

# 7.7B.2 Test Applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

# 7.7B.3 Minimum Conformance Requirements

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements in Clause 7.7.3 shall be met with the UL-MIMO configurations specified in Table 6.2.2B.3-2. For UL-MIMO, the parameter Pcmax\_L is defined as the total transmitter power over the two transmit antenna connectors.

The normative reference for this requirement is TS 36.101 [2] clause 7.7.1B.

### 7.7B.4 Test Description

#### 7.7B.4.1 Initial Conditions

The initial conditions shall be the same as in clause 7.6B.2.4.1 in order to test spurious responses obtained in clause 7.6B.2 under the same conditions.

#### 7.7B.4.2 Test Procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.6.2B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 7.6B.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the parameters of the CW signal generator for an interfering signal according to Table 7.7 B.5-2. The spurious frequencies are taken from records in the final step of test procedures in clause 7.6 B.2.4.2.
- 4. Set the downlink signal level according to the table 7.7B.5-1. Send uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in table 7.7B.5-1 for carrier frequency  $f \le 3.0$ GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz  $< f \le 4.2$ GHz, for at least the duration of the throughput measurement.
- 5. For the spurious frequency, measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.

#### 7.7B.4.3 Message Contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exception.

Table 7.7B.4.3-1: UplinkPowerControl Dedicated

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::=			
SEQUENCE {			
p0-UePUSCH	0		
deltaMCS-Enabled	en0		
accumulationEnabled	TRUE		
p0-uePUCCH	0		
pSRS-Offset	3 (-6 dB)		
filterCoefficient	fc8	larger filter length is used to reduce the RSRP	
		measurement variation	
}			

### 7.7B.5 Test Requirement

The throughput measurement derived in test procedure shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Tables 7.7B.5-1 and 7.7B.5-2.

Table 7.7B.5-1: Spurious response parameters

Rx Parameter	Units	Channel bandwidth							
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
Power in	dBm	REF	REFSENS + channel bandwidth specific value below						
Transmission	ubili	6	6	6	6	7	9		

Bandv	vidth							
Configu	ration							
Note 1: The transmitter shall be set to 4dB below P <sub>CMAX L</sub> with P <sub>CMAX L</sub> as defined in clause								
	6.2.5.							
Note 2:			asurement cl attern OP.1 I					

Table 7.7B.5-2: Spurious Response

Parameter	Unit	Level		
P <sub>Interferer</sub> (CW)	dBm	-44		
F <sub>Interferer</sub>	MHz	Spurious response frequencies		

### 7.8 Intermodulation characteristics

#### 7.8.1 Wide band Intermodulation

#### 7.8.1.1 Test purpose

Intermodulation response tests the UE's ability to receive data with a given average throughput for a specified reference measurement channel, in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal, under conditions of ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area when two or more interfering signals exist which have a specific frequency relationship to the wanted signal.

### 7.8.1.2 Test applicability

This test applies to all types of E-UTRA UE release 8 and forward.

#### 7.8.1.3 Minimum conformance requirements

Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.8.1.3-1 for the specified wanted signal mean power in the presence of two interfering signals.

Table 7.8.1.3-1: Wide band intermodulation

Rx Parameter	Units	Channel bandwidth						
		1.4 MHz	3 1	ИHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in		REFSENS + channel bandwidth specific value below						
Transmission Bandwidth Configuration	dBm	12		8	6	6	7	9

P <sub>Interferer 1</sub> (CW)	dBm	-46						
P <sub>Interferer 2</sub> (Modulated)	dBm		-46					
BW <sub>Interferer 2</sub>		1.4	3	5				
F <sub>Interferer 1</sub> (Offset)	MHz	-BW/2 –2.1 / +BW/2+ 2.1	-BW/2 -4.5 / +BW/2 + 4.5	-BW/2 - 7.5 / +BW/2 + 7.5				
F <sub>Interferer 2</sub> (Offs et)	MHz	2*Finterferer 1						

- Note 1: The transmitter shall be set to 4dB below PcMax L at the minimum uplink configuration specified in Table 7.3.3-2 with PcMax L as defined in clause 6.2.5.
- Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OC NG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.
- Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 with set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz

For the UE which supports inter band CA configuration in Table 7.3.1A-2,  $P_{interferer1}$  and  $P_{interferer2}$  powers defined in Table 7.8.1.1-1 are increased by the amount given by  $\Delta R_{IB}$  in Table 7.3.1A-2.

The normative reference for this requirement is TS 36.101 [2] clause 7.8.1 and TS 36.101 [2] Annexes A and D.

[FFS: Although it is not explicitly stated in TS 36.101 [2] whether the modulated interferer defined in 36.101 Annex D applies to wanted channel bandwidths of less than 5MHz, this test specification has assumed that the modulated interferer definition applies to all channel bandwidths. The content of TS 36.101 [2] Annex D.2 has been copied into Annex FFS of the present document]

#### 7.8.1.4 Test description

#### 7.8.1.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.8.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.8.1.4.1-1: Test Configuration Table

Initial Conditions								
Test Environment as specified in	NC							
TS 36.508[7] subclause 4.1								
Test Frequencies as specified in	Mid range							
TS36.508 [7] subclause 4.3.1								
Test Channel Bandwidths as specifie	d in Lowest, 5MHz, Highest							
TS 36.508 [7] subdause 4.3.1								
Test Para	Test Parameters for Channel Bandwidths							
Downlink Con	figuration Uplink Configuration							

Ch BW	Mod'n	RB allocation		Mod'n	RB alle	ocation
		FDD	TDD		FDD	TDD
1.4MHz	QPSK	6	6	QPSK	6	6
3MHz	QPSK	15	15	QPSK	15	15
5MHz	QPSK	25	25	QPSK	25	25
5MHz	QPSK	25	N/A	QPSK	20	N/A
5MHz	QPSK	25	N/A	QPSK	15	N/A
10MHz	QPSK	50	50	QPSK	50	50
10MHz	QPSK	50	N/A	QPSK	25	N/A
10MHz	QPSK	50	N/A	QPSK	20	N/A
10MHz	QPSK	50	N/A	QPSK	15	N/A
15MHz	QPSK	75	75	QPSK	75	75
15MHz	QPSK	75	N/A	QPSK	50	N/A
15MHz	QPSK	75	N/A	QPSK	25	N/A
15MHz	QPSK	75	N/A	QPSK	20	N/A
20MHz	QPSK	100	100	QPSK	100	100
20MHz	QPSK	100	N/A	QPSK	75	N/A
20MHz	QPSK	100	N/A	QPSK	50	N/A
20MHz	QPSK	100	N/A	QPSK	25	N/A
20MHz	QPSK	100	N/A	QPSK	20	N/A

- Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.
- Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth. The allocation shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth (Table 5.4.2-1).
- Note 3: For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.
- 1. Connect the SS and interfering sources to the UE antenna connectors as shown in TS 36.508 [7] Figure A.6.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C.0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.8.1.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.8.1.4.3.

### 7.8.1.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.8.1.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNT I to schedule the UL RMC according to Table 7.8.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the Downlink signal level to the value as defined in Table 7.8.1.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.8.1.5-1 for carrier frequency  $f \le 3.0$ GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz <  $f \le 4.2$ GHz, for at least the duration of the Throughput measurement.
- 4. Set the Interfering signal levels to the values as defined in Table 7.8.1.5-1 and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal at step 4.

#### 7.8.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6 with the following exception.

Table 7.8.1.4.3-1: UplinkPowerControlDedicated

	•		Derivation Path: 36.331 clause 6.3.2
ment Condition	Comment	Va	Information Element
			UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {
		0	p0-UePUSCH
		en0	deltaMCS-Enabled
		TRUE	accumulationEnabled
		0	p0-uePUCCH
		3 (-6 dB)	pSRS-Offset
reduce	larger filter length is used to reduce the RSRP measurement variation	fc8	filterCoefficient
)	the RSRP measureme		}

#### 7.8.1.5 Test requirements

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.8.1.5-1 for the specified wanted signal mean power in the presence of two interfering signals.

Table 7.8.1.5-1: Test parameters for Wide band intermodulation

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in		RE	REFSENS + channel bandwidth specific value below				
Transmission Bandwidth Configuration	dBm	12	8	6	6	7	9
P <sub>Interferer 1</sub> (CW)	dBm	-46					
P <sub>Interferer 2</sub> (Modulated)	dBm		-46				
BW <sub>Interferer 2</sub>		1.4	1.4 3 5				
F <sub>Interferer 1</sub> (Offs et)	MHz	-BW/2 –2.1 / +BW/2+ 2.1	-BW/2 -4.5 / +BW/2 + 4.5	-BW/2 - 7.5 / +BW/2 + 7.5			
F <sub>Interferer 2</sub> (Offs et)	MHz	2*Finterferer 1					

Note 1:

The transmitter shall be set to 4dB below P<sub>CMAX\_L</sub> with P<sub>CMAX\_L</sub> as defined in clause 6.2.5. The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Note 2: Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5 MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz

Note 4: For the UE which supports inter band CA configuration in Table 7.3A.3-0, Pinterferer1 and Pinterferer2 powers are increased by the amount given by  $\Delta R_{IB}$  in Table 7.3A.3-0

#### 7.8.1A Wide band Intermodulation for CA

### 7.8.1A.1 Wideband intermodulation for CA (intra-band contiguous DL CA and UL CA)

#### 7.8.1A.1.1 Test purpose

Intermodulation response tests the UE's ability to receive data with a given average throughput for a specified reference measurement channel, in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal, under conditions of ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area when two or more interfering signals exist which have a specific frequency relationship to the wanted signal.

### 7.8.1A.1.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that supports intra-band contiguous DL CA and UL CA.

#### 7.8.1A.1.3 Minimum conformance requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the wide band intermodulation requirements are defined with the uplink active on the band other than the band whose downlink is being tested. The UE shall meet the requirements specified in subclause 7.8.1.3 for each component carrier while both downlink carriers are active. For E-UTRA CA configurations including an operating band without uplink band (as noted in Table 5.2-1), the requirements for both downlinks shall be met with the uplink active in the band capable of UL operation. For E-UTRA CA configurations listed in Table 7.3A.1.3-0a under conditions for which reference sensitivity for the operating band being tested is N/A, the wideband intermodulation requirements of subclause 7.8.1A.1.3 do not apply.

For intra-band contiguous carrier aggregation the downlink SCC shall be configured at no minal channel spacing to the PCC with the PCC configured closest to the uplink band. Downlink PCC and SCC are both activated. The uplink output power shall be set as specified in Table 7.8.1A.1.3-1 with the uplink configuration set according to Table 7.3A.1.3-1 for the applicable carrier aggregation configuration. For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.3-2. The UE shall fulfil the minimum requirement in presence of an interfering signal specified in Table 7.8.1A.1.3-1 being on either side of the aggregated signal. The throughput of each carrier shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.8.1A.1.3-1

Table 7.8.1A.1.3-1: Wide band intermodulation

Rx parameter	Units	CA Bandwidth Class						
		В	С	D	E	F		
Power per CC in		REFSENS + CA Bandwidth Class specific value below						
Aggregated Transmission	dBm		40					
Bandwidth Configuration			12					

P <sub>Interferer 1</sub> (CW)		dBm	-46						
PInterferer 2	P <sub>Interferer 2</sub> dBm (Modulated)				-46				
BW <sub>Interferer</sub>		MHz		5			1		
	2	MHz		-F <sub>offset</sub> -7.5					
F <sub>Interferer 1</sub> (Offset)		IVIIIZ		-Foffset-7.3					
				+ F <sub>offset</sub> +7.5					
F <sub>Interferer 2</sub> (Offset)		MHz	2*Finterferer 1						
NOTE 1:	The trans	smitter sha	all be set to 4dB	B below PCMAX_L O	r Pcmax_L_ca as	s defined in subc	lause 6.2.5A.		
NOTE 2:	Referen	œ measur	ement channel	is specified in An	nex A.3.2 with	one sided dynan	nic OCNG		
	Pattern (	OP.1 FDD/	TDD as describ	ed in Annex A.5.	1.1/A.5.2.1.	•			
NOTE 3:	OTE 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 with set-up according to Annex C.3.1.								
NOTE 4:	The inter		•	•		ribed in Annex D	for channel		

The normative reference for this requirement is TS 36.101 [2] clause 7.8.1A and TS 36.101 [2] Annexes A and D.

#### 7.8.1A.1.4 Test description

#### 7.8.1A.1.4.1 Initial condition

Test Environment as specified in

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.8.1A.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.8.1A.1.4.1-1: Test Configuration Table

	08[7] subclaus									
	quencies as s			C: Mid range	Э					
TS36.508	8 [7] subclaus	se 4.3.1 for	r different CA bandwidth							
classes.										
			RB_agg) as specified in subdause	Lowest N <sub>RB</sub>	<sub>agg</sub> , Highest N	RB_agg				
			n across bandwidth combination							
	ported by the									
Test Para	ameters for C	CA Configu	rations							
	iguration /	DL Alloc	ation	UL Allocation						
$N_{RB\_agg}$										
PCC	SCCs	CC	PCC & SCC RB allocation	CC	N <sub>RB_alloc</sub>	PCC & SCC	RB allocation	s		
PCC N <sub>RB</sub>	SCCs NRB	CC MOD	PCC & SCC RB allocation	CC MOD	N <sub>RB_alloc</sub>	PCC & SCC (L <sub>CRB</sub> @ RB <sub>s</sub>		S		
			PCC & SCC RB allocation 75+75		N <sub>RB_alloc</sub>		start <b>)</b> S_0@0	s		
N <sub>RB</sub>	NRB	MOD		MOD		(L <sub>CRB</sub> @ RB <sub>s</sub>	start)	s		
<b>N</b> <sub>RB</sub> 75	<b>NRB</b> 75	MOD QPSK	75+75	MOD QPSK	75	(L <sub>CRB</sub> @ RB <sub>s</sub> P_75@0	start <b>)</b> S_0@0	s		
<b>N</b> <sub>RB</sub> 75 75	<b>NRB</b> 75 75	MOD QPSK QPSK	75+75 75+75	MOD QPSK QPSK	75 130	(L <sub>CRB</sub> @ RB <sub>s</sub> P_75@0 P_75@0	S_0@0 S_55@0	S		
N <sub>RB</sub> 75 75 75	75 75 75	MOD QPSK QPSK QPSK	75+75 75+75 75+75	MOD QPSK QPSK QPSK	75 130 150	(L <sub>CRB</sub> @ RB <sub>s</sub> P_75@0 P_75@0 P_75@0	S_0@0 S_55@0 S_75@0	S		
N <sub>RB</sub> 75 75 75 100	75 75 75 75 50	MOD QPSK QPSK QPSK QPSK	75+75 75+75 75+75 100+50	MOD  QPSK  QPSK  QPSK  QPSK	75 130 150 150	(LCRB @ RBs P_75@0 P_75@0 P_75@0 P_100@0	S_0@0 S_55@0 S_75@0 S_50@0	S		
N <sub>RB</sub> 75 75 75 100 100	75 75 75 75 50 100 100	MOD  QPSK  QPSK  QPSK  QPSK  QPSK  QPSK  QPSK  QPSK	75+75 75+75 75+75 100+50 100+100	MOD  QPSK  QPSK  QPSK  QPSK  QPSK  QPSK  QPSK  QPSK	75 130 150 150 75 130 200	(Lcrb @ RBs P_75@0 P_75@0 P_75@0 P_100@0 P_75@25 P_100@0 P_100@0	S_0@0 S_55@0 S_75@0 S_75@0 S_50@0 S_0@0 S_30@0 S_100@0			

**Initial Conditions** 

Nomal

Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregation channel bandwidths are specified in Table 5.4.2A.1-1.

Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3A.3-1 is tested per configuration.

Note 3: PCC and SCC should be ordered so that PCC is configured closest to the uplink band.

- 1. Connect the SS and interfering sources to the UE antenna connectors as shown in TS 36.508 [7] Figure group A.34 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. Propagation conditions are set according to Annex B.0.
- 5. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.8.1A.4.3.

#### 7.8.1A.1.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.8.1A.1.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 2A for C\_RNTI to transmit the DL RMC according to Table 7.8.1A.1.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.8.1A.1.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level to the value as defined in Table 7.8.1A.1.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, -3.4 dB of the target level in Table 7.8.1A.5-1 for carrier frequency  $f \le 3.0$ GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz  $< f \le 4.2$ GHz, for at least the duration of the Throughput measurement. Suitable uplink power control commands should be sent to ensure the total power in each of the assigned c arriers to be equal to each other within +/-[2] dB.
- 7. Set the Interfering signal levels to the values as defined in Table 7.8.1A.1.5-1 and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 8. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted signal at step 7.

#### 7.8.1A.1.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.8.1A.1.5 Test requirements

The throughput of each carrier shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.8.1A.1.5-1 for the specified wanted signal mean power in the presence of two interfering signals.

Table 7.8.1A.1.5-1: Test parameters for Wide band intermodulation

Rx parameter	Units	CA Bandwidth Class							
	1	В	С	D	E	F			
Power per CC in		REFSENS + CA Bandwidth Class specific value below							
Aggregated Transmission Bandwidth Configuration	dBm		12						

P <sub>Interferer 1</sub> (CW)		dBm	-46						
P <sub>Interferer 2</sub>		dBm			-46				
(Modulate	,				-40				
BW <sub>Interferer</sub>	2	MHz		5					
Finterferer 1		MHz		-F <sub>offset</sub> -7.5					
(Offset)				/					
				+ F <sub>offset</sub> +7.5					
Finterferer 2		MHz			2*F <sub>Interferer 1</sub>				
(Offset)									
				below Pcmax_L o					
NOTE 2:				is specified in An		one sided dynam	nic OCNG		
	Pattern C	)P.1 FDD/	TDD as describ	ed in Annex A.5.	1.1/A.5.2.1.				
NOTE 3:	The mod	ulated inte	erferer consists	of the Reference	measurement	channel specifie	d in Annex		
				NG Pattern OP.1		es cribed in Anne	X		
	A.5.1.1/A	.5.2.1 with	th set-up according to Annex C.3.1.						
NOTE 4:	The inter	fering mod	dulated signal is	Iulated signal is 5MHz E-UTR Asignal as described in Annex D for channel					
	bandwid	th≥5MHz							

# 7.8.1A.2 Wideband intermodulation for CA (intra-band contiguous DL CA without UL CA)

### 7.8.1A.2.1 Test purpose

Same as 7.8.1A.1

#### 7.8.1A.2.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that supports intra-band contiguous DL CA but not UL CA.

#### 7.8.1A.2.3 Minimum conformance requirements

Same as 7.8.1A.1

#### 7.8.1A.2.4 Test description

#### 7.8.1A.2.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.8.1A.2.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.8.1A.2.4.1-1: Test Configuration Table

				nitial Conditi	ons			
Test En	vironment as	specified in	າ	Nomal				
TS 36.5	08[7] subcla	use 4.1						
Test Fre	quencies as	specified in	1	C: Mid range	)			
TS36.50	)8 [7] subcla	use 4.3.1 fo	r different CA					
bandwid	lth classes.							
Test CC	Combinatio	n setting (N	RB_agg) as	Lowest N <sub>RB</sub>	<sub>agg</sub> , Highest N	RB_agg		
specified	d in subdaus	se 5.4.2A.1 f	for the CA					
Configu	ration across	bandwidth	combination					
	ported by the							
Test Pa	rameters for	CA Configu	ırations					
CA Con	figuration	DL Alloca	ation	UL Allocation	n			
/ N <sub>RB_agg</sub>								
PCC	SCCs	CC	PCC &	CC	N <sub>RB_alloc</sub>	PCC & SCC RB allocations		
$N_{RB}$	NRB	MOD	SCC RB	MOD		(L <sub>CRB</sub> @ RB <sub>start</sub> )		
			allocation					
75	75	QPSK	75+75	QPSK	75	P_75@0		
75	75	QPSK	75+75	QPSK	50	P_50@0		
75	75	QPSK	75+75	QPSK	25	P_25@0		
75	75	QPSK	75+75	QPSK	20	P_20@0		
100	50	QPSK	100+50	QPSK	100	P_100@0		
100	50	QPSK	100+50	QPSK	75	P_75@0		
100	50	QPSK	100+50	QPSK	50	P_50@0		
100	50	QPSK	100+50	QPSK	25	P_25@0		
100	50	QPSK	100+50	QPSK	20	P_20@0		
100	100	QPSK	100+100	QPSK	100	P_100@0		
100	100	QPSK	100+100	QPSK	75	P_75@0		
100	100	QPSK	100+100	QPSK	50	P_50@0		
100	100	QPSK	100+100	QPSK	25	P_25@0		
100	100	QPSK	100+100	QPSK	20	P_20@0		
Note 1:	CA Confi	guration Te	st CC Combina	tion settings a	re checked se	eparately for eac	ch CA Config	uration
						in Table 5.4.2A.		
Note 2:	Dependin	g on CA co	nfigurations, or	nly the appropr	iate Üplink R	B allocation valu	ue according	to tabl
			Test CA configu		-		· ·	
Note 3:	PCC and	SCC shoul	d be ordered so	that PCC is o	onfigured clo	sest to the uplin	k band.	

- 1. Connect the SS and interfering sources to the UE antenna connectors as shown in TS 36.508 [7] Figure group A.34 as appropriate.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. Propagation conditions are set according to Annex B.0.
- 5. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.8.1A.4.3.

#### 7.8.1A.2.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.8.1A.2.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 2A for C\_RNTI to transmit the DL RMC according to Table 7.8.1A.2.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.

- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.8.1A.2.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level to the value as defined in Table 7.8.1A.2.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.8.1A.2.5-1 for carrier frequency  $f \le 3.0 \, \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \, \text{GHz} < f \le 4.2 \, \text{GHz}$ , for at least the duration of the Throughput measurement.
- 7. Set the Interfering signal levels to the values as defined in subclause 7.8.1A.2.5 and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 8. Measure the average throughput for each component carrier for a duration sufficient to achieve statistical significance according to Annex G.2.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted signal at step 7.

#### 7.8.1A.2.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.8.1A.2.5 Test requirements

Same as 7.8.1A.1

#### 7.8.1A.3 Wideband intermodulation for CA (inter-band DL CA without UL CA)

#### 7.8.1A.3.1 Test purpose

Intermodulation response tests the UE's ability to receive data with a given average throughput for a specified reference measurement channel, in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal, under conditions of ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area when two or more interfering signals exist which have a specific frequency relationship to the wanted signal.

#### 7.8.1A.3.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that supports inter-band contiguous DL CA but not UL CA.

#### 7.8.1A.3.3 Minimum conformance requirements

Same as 7.8.1A.1

#### 7.8.1A.3.4 Test description

#### 7.8.1A.3.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.8.1A.3.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.8.1A.3.4.1-1: Test Configuration Table

			Initial Cond	itions			
Test Envi 36.508[7]	ronment as sp subdause 4.1	edified in TS	NC				
TS36.508	uencies as spe B [7] subclause CA bandwidth o	4.3.1 for	A: Mid rang	ge for PCC a	nd SCC		
as specifi the CAC	ed in subdaus onfiguration ac n combination		Highest N <sub>R</sub>	<sub>B_agg</sub> for PCC	and SCC		
		Test Paran	neters for C/	A Configura	tions		
	figuration /	DL	Allocation		UL Alle	ocation	
PCC N <sub>RB</sub>	SCCs N <sub>RB</sub>	CC MOD	PCC 8	& SCC ocation	CC MOD	PCC N <sub>RB_alloc</sub>	
50	50	QPSK	50	50	QPSK	50	
50	50	QPSK	50	50	QPSK	25	
50	50	QPSK	50	50	QPSK	20	
50	50	QPSK	50	50	QPSK	16	
50	75	QPSK	50	75	QPSK	25	
50	100	QPSK	50	100	QPSK	50	
50	100	QPSK	50	100	QPSK	25	
50	100	QPSK	50	100	QPSK	20	
75	50	QPSK	75	50	QPSK	25	
75	100	QPSK	75	100	QPSK	25	
100	50	QPSK	100	50	QPSK	100	
100	50	QPSK	100	50	QPSK	75	
100	50	QPSK	100	50	QPSK	50	
100	75	QPSK	100	75	QPSK	100	
100	100	QPSK	100	100	QPSK	75	
100	100	QPSK	100	100	QPSK	50	
Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-2.  Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 for UE supporting one uplink carrier is tested per Test CA configuration, unless otherwise stated in table 7.3A.1.3-0b.  Note 3: The UL resource blocks shall be located as close as possible to the downlink SCC but confined within the transmission bandwidth configuration for the channel bandwidth							
(Table 5.4.2-1).  Note 4: The frequencies of PCC and SCC shall be switched and tested in each configuration							

1. Connect the SS and interfering sources to the UE antenna connectors as shown in TS 36.508 [7] Figure group A.34 as appropriate.

The frequencies of PCC and SCC shall be switched and tested in each configuration

2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.

(given UL is supported in PCC band as per Table 5.2-1).

- 3. Downlink signals for PCC are initially set up according to Annex C.0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. Propagation conditions are set according to Annex B.0.

Note 4:

5. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.8.1A.4.3.

#### 7.8.1A.3.4.2 Test procedure

- 1. Configure SCC according to Annex C.0, C.1 and Annex C.3.1 for all downlink physical channels except PHICH.
- 2. The SS shall configure SCC as per TS 36.508 [7] clause 5.2A.4. Message contents are defined in clause 7.8.1A.3.4.3
- 3. SS activates SCC by sending the activation MAC-CE (Refer TS 36.321 [13], clauses 5.13, 6.1.3.8). Wait for at least 2 seconds (Refer TS 36.133, clauses 8.3.3.2).
- 4. SS transmits PDSCH via PDCCH DCI format 2A for C\_RNTI to transmit the DL RMC according to Table 7.8.1A.3.4.1-1 on both PCC and SCC. The SS sends downlink MAC padding bits on the DL RMC.
- 5. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C\_RNTI to schedule the UL RMC according to Table 7.8.1A.3.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 6. Set the Downlink signal level to the value as defined in Table 7.8.1A.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.8.1A.3.5-1 for carrier frequency  $f \le 3.0 \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ , for at least the duration of the Throughput measurement.
- 7. Set the Interfering signal levels to the values as defined in Table 7.8.1A.3.5-1 and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 8. Measure the average throughput of SCC for a duration sufficient to achieve statistical significance according to Annex G.2.
- 9. Repeat steps from 6 to 8, using an interfering signal above the wanted signal at step 4.

#### 7.8.1A.3.4.3 Message contents

Message contents are according to TS 36.508 [7] subclause 4.6. In test procedure step 2, for SCC configuration there are no additional message contents.

#### 7.8.1A.3.5 Test requirements

For inter-band carrier aggregation with uplink assigned to one E-UTRA band the in-band blocking requirements are defined with the uplink active on the band other than the band whose downlink is being tested, i.e., the requirements are tested only for the S-Cell downlink. The UE shall meet the requirements specified in Table 7.8.1A.3.5-1 for each component carrier, when operated as S-Cell, while both downlink carriers are active. The requirements for each component carrier are the same as single carrier requirements in Table 7.8.1.5-1. The parameters in these tables are related to the carrier operated as S-Cell.

Table 7.8.1A.3.5-1: Test parameters for Wide band intermodulation

Rx Parameter	Units	Channel bandwidth							
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
Power in		RE	REFSENS + channel bandwidth specific value below						
Transmission Bandwidth Configuration	dBm	12	8	6	6	7	9		

Plnterferer 2 (Modulated)  BWInterferer 2 1.4 3 5  Finterferer 1 (Offset)	P <sub>Interf</sub> (C\		dBm			-46			
BW <sub>Interferer 2</sub> F <sub>Interferer 1</sub> (Offset)  MHz  -BW/2 -2.1  -BW/2 -4.5  /  +BW/2 + 2.1  -BW/2 -4.5  F <sub>Interferer 2</sub> (Offset)  Note 1: The transmitter shall be set to 4dB below P <sub>CMAX_L</sub> with P <sub>CMAX_L</sub> as defined in clause 6.2.5.  Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.  Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.3.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz			dBm			-46			
Finterferer 1 (Offset)    HBW/2 - 2.1	`	,		1.4	2	5			
(Offset)  / HBW/2+2.1				111		-			
HBW/2 + 2.1		F <sub>Interferer 1</sub> MHz		-BW/2 –2.1	-BW/2 –4.5	-BW/2 - 7.5			
Finterferer 2 (Offset)  Note 1: The transmitter shall be set to 4dB below P <sub>CMAX_L</sub> with P <sub>CMAX_L</sub> as defined in clause 6.2.5.  Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.  Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz	(Offs	(Offset)		/	/	/			
Note 1: The transmitter shall be set to 4dB below P <sub>CMAX_L</sub> with P <sub>CMAX_L</sub> as defined in clause 6.2.5.   Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.   Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz		(===,		+BW/2+ 2.1	+BW/2 + 4.5	+BW/2 + 7.5			
Note 1: The transmitter shall be set to 4dB below P <sub>CMAX_L</sub> with P <sub>CMAX_L</sub> as defined in clause 6.2.5.  Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.  Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz			MHz	2*Finterforer 1					
Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.  Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz	(Offs	set)							
Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.  Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz	Note 1:	The trans	smitter sha	all be set to 4dB	below P <sub>CMAX_L</sub> v	vith P <sub>CMAX_L</sub> as defined in clause 6.2.5.			
Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.  Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz	Note 2:	The refer	rence mea	surement chanr	nel is specified in	n Annex A.3.2 with one sided dynamic OCNG			
A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz									
A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz	Note 3:	The mod	ulated inte	erferer consists o	of the Reference	measurement channel specified in Annex			
A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz		A.3.2 witl	n one side	d dynamic OCN	G Pattern OP.1	FDD/TDD as described in Annex			
UTRA signal as described in Annex D for channel bandwidth ≥5MHz									
				·					
	Note 4								
powers are increased by the amount given by ΔR <sub>IB</sub> in Table 7.3A.3-0	14016 4.			• •	•				

#### 7.8.1B Wide band Intermodulation for UL-MIMO

### 7.8.1B.1 Test purpose

Intermodulation response tests the ability of UE that support UL-MIMO to receive data with a given average throughput for a specified reference measurement channel, in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal, under conditions of ideal propagation and no added noise.

A UE unable to meet the throughput requirement under these conditions will decrease the coverage area when two or more interfering signals exist which have a specific frequency relationship to the wanted signal.

#### 7.8.1B.2 Test applicability

This test applies to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

#### 7.8.1B.3 Minimum conformance requirements

For UE(s) with two transmitter antenna connectors in closed-loop spatial multiple xing scheme, the minimum requirements in subclause 7.8.1B.3 shall be met with the UL-MIMO configurations specified in Table 6.2.2B.3-2. For UL-MIMO, the parameter PCMAX\_L is defined as the total transmitter power over the two transmit antenna connectors.

The normative reference for this requirement is TS 36.101 [2] clause 7.8.1B and TS 36.101 [2] Annexes A and D.

#### 7.8.1B.4 Test description

#### 7.8.1B.4.1 Initial condition

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.8.1B.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3 respectively. The details of the OCNG patterns used are specified in Annex A.5. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 7.8.1B.4.1-1: Test Configuration Table

		In	itial Conditio	ns				
Test Environ	nment as specifi	ed in	NC					
	] subclause 4.1							
Test Freque	ncies as specifi	ed in	Mid range					
TS36.508 [7	] subclause 4.3	.1						
Test Channe	el Bandwidths a	s specified in	Lowest, 5MHz, Highest					
TS 36.508 [7	7] subdause 4.3	3.1						
		Test Paramete	ers for Channe	el Bandwidths				
	Dow	nlink Configur	ation	Upl	ink Configura	tion		
Ch BW	Mod'n	RB all	ocation	Mod'n	RB all	ocation		
		FDD	TDD		FDD	TDD		
1.4MHz	QPSK	6	6	QPSK	6	6		
3MHz	QPSK	15	15	QPSK	15	15		
5MHz	QPSK	25	25	QPSK	25	25		
5MHz	QPSK	25	N/A	QPSK	20	N/A		
5MHz	QPSK	25	N/A	QPSK	15	N/A		
10MHz	QPSK	50	50	QPSK	50	50		
10MHz	QPSK	50	N/A	QPSK	25	N/A		
10MHz	QPSK	50	N/A	QPSK	20	N/A		
10MHz	QPSK	50	N/A	QPSK	15	N/A		
15MHz	QPSK	75	75	QPSK	75	75		
15MHz	QPSK	75	N/A	QPSK	50	N/A		
15MHz	QPSK	75	N/A	QPSK	25	N/A		
15MHz	QPSK	75	N/A	QPSK	20	N/A		
20MHz	QPSK	100	100	QPSK	100	100		
20MHz	QPSK	100	N/A	QPSK	75	N/A		
20MHz	QPSK	100	N/A	QPSK	50	N/A		
20MHz	QPSK	100	N/A	QPSK	25	N/A		
20MHz	QPSK	100	N/A	QPSK	20	N/A		
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band, which applicable channel bandwidths are specified in Table 5.4.2.1-1.  Note 2: Depending on E-UTRA band, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test Channel Bandwidth.								
	or the DL signa				DD/TDD is use	d.		

- 1. Connect the SS and interfering sources to the UE antenna connectors as shown in TS 36.508 [7] Figure A.31.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1, and uplink signals according to Annex H.1 and H.3.1.
- 4. The UL and DL Reference Measurement channels are set according to Table 7.8.1B.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.8.1B.4.3.

#### 7.8.1B.4.2 Test procedure

- 1. SS transmits PDSCH via PDCCH DCI format 1A for C\_RNTI to transmit the DL RMC according to Table 7.8.1B.4.1-1. The SS sends downlink MAC padding bits on the DL RMC.
- 2. SS sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 4 for C\_RNTI to schedule the UL RMC according to Table 7.8.1 B.4.1-1. Since the UE has no payload data to send, the UE transmits uplink MAC padding bits on the UL RMC.
- 3. Set the Downlink signal level to the value as defined in Table 7.8.1 B.5-1. Send Uplink power control commands to the UE (less or equal to 1dB step size should be used), to ensure that the UE output power is within +0, 3.4 dB of the target level in Table 7.8.1 B.5-1 for carrier frequency  $f \le 3.0 \text{GHz}$  or within +0, -4.0 dB of the target level for carrier frequency  $3.0 \text{GHz} < f \le 4.2 \text{GHz}$ , for at least the duration of the throughput measurement.

- 4. Set the Interfering signal levels to the values as defined in Table 7.8.1 B.5-1 and frequency below the wanted signal, using a modulated interferer bandwidth as defined in Annex D of the present document.
- 5. Measure the average throughput for a duration sufficient to achieve statistical significance according to Annex G.2.
- 6. Repeat steps from 3 to 5, using an interfering signal above the wanted signal at step 4.

#### 7.8.1B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6 with the following exception.

Table 7.8.1B.4.3-1: UplinkPowerControlDedicated

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlDedicated-DEFAULT ::=			
SEQUENCE {			
p0-UePUSCH	0		
deltaMCS-Enabled	en0		
accumulationEnabled	TRUE		
p0-uePUCCH	0		
pSRS-Offset	3 (-6 dB)		
filterCoefficient	fc8	larger filter length is	
		used to reduce the	
		RSRP	
		measurement	
		variation	
}			

#### 7.8.1B.5 Test requirements

The throughput shall be  $\geq 95\%$  of the maximum throughput of the reference measurement channels as specified in Annex A.3.2 with parameters specified in Table 7.8.1B.5-1 for the specified wanted signal mean power in the presence of two interfering signals.

Table 7.8.1B.5-1: Test parameters for Wide band intermodulation

Rx Parameter	Units	Channel bandwidth						
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
Power in		RE	FSENS + char	nnel bandw	idth specific	value below	I	
Transmission Bandwidth Configuration	dBm	12	8	6	6	7	9	
P <sub>Interferer 1</sub> (CW)	dBm	-46						
P <sub>Interferer 2</sub> (Modulated)	dBm		-46					
BW <sub>Interferer 2</sub>		1.4	3			5		
F <sub>Interferer 1</sub> (Offset)	MHz	-BW/2 –2.1 / +BW/2+ 2.1	-BW/2 -4.5 / +BW/2 + 4.5	-BW/2 - 7.5 / +BW/2 + 7.5				
F <sub>Interferer 2</sub> (Offset)	MHz		2*F <sub>Interferer 1</sub>					

Note 1: The transmitter shall be set to 4dB below P<sub>CMAX</sub> with P<sub>CMAX</sub> as defined in clause 6.2.5.

Note 2: The reference measurement channel is specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.

Note 3: The modulated interferer consists of the Reference measurement channel specified in Annex A.3.2 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1.The interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz.

#### 7.8.2 Void

#### 7.9 Spurious emissions

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the UE antenna connector.

#### 7.9.1 **Test Purpose**

Test verifies the UE's spurious emissions meet the requirements described in clause 7.9.3.

Excess spurious emissions increase the interference to other systems.

#### 7.9.2 **Test Applicability**

This test applies to all types of E-UTRA UE release 8 and forward.

#### 7.9.3 Minimum Conformance Requirements

The power of any narrow band CW spurious emission shall not exceed the maximum level specified in Table 7.9.3-1

Table 7.9.3-1: General receiver spurious emission requirements

Frequency Band	Measurement	Maximum	Note		
	Bandwidth	level			
30MHz ≤ f < 1GHz	100 kHz	-57 dBm			
1GHz ≤ f ≤ 12.75 GHz	1 MHz	-47 dBm			
12.75 GHz ≤ f ≤ 5 <sup>th</sup> harmonic of the upper frequency edge of the DL operating band in GHz	1 MHz	-47 dBm	Note 1		
Note 1: Applies only for Band 22, Band 42 and Band 43.					

Note 2: Unused PDCCH resources are padded with resource element groups with power level given by PDCCH\_RA/RB as defined in Annex C.3.1.

The normative reference for this requirement is TS 36.101 [2] clause 7.9.

#### 7.9.4 **Test Description**

#### 7.9.4.1 Initial Conditions

Initial conditions are a set of test configurations the UE needs to be tested in and the steps for the SS to take with the UE to reach the correct measurement state.

The initial test configurations consist of environmental conditions, test frequencies, and channel bandwidths based on E-UTRA bands specified in table 5.4.2.1-1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 7.9.4.1-1. The details of the downlink and uplink reference measurement channels (RMCs) are specified in Annexes A.3 and A.2 respectively.

**Table 7.9.4.1-1: Test Configuration Table** 

Initial Conditions							
Test Environment as specified in		NC					
TS 36.508[7] subclause 4.1							
Test Frequencies as specified in		Low range, Mid range, High range					
TS36.508 [7] subclause 4.3.1							
Test Channel Bandwidths as specified in		Highest					
TS 36.508 [7] subdause 4.3.1							
Test Parameters for Channel Bandwidths							
	Downlink Co	nfiguration	Uplink Configuration				
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation		
		FDD	TDD		FDD	TDD	
1.4MHz	QPSK	0	0	QPSK	0	0	
3MHz	QPSK	0	0	QPSK	0	0	
5MHz	QPSK	0	0	QPSK	0	0	
10MHz	QPSK	0	0	QPSK	0	0	
15MHz	QPSK	0	0	QPSK	0	0	
20MHz	QPSK	0	0	QPSK	0	0	
Note 1: Test Channel Bandwidths are checked separately for each E-UTRA band. The applicable channel bandwidths are specified in Table 7.3.3-2.							

- 1. Connect a spectrum analyzer (or other suitable test equipment) to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A.8.
- 2. The parameter settings for the cell are set up according to TS 36.508 [7] subclause 4.4.3.
- 3. Downlink signals are initially set up according to Annex C0, C.1 and C.3.1.
- 4. The DL Reference Measurement channels are set according to Table 7.9.4.1-1.
- 5. Propagation conditions are set according to Annex B.0.
- 6. Ensure the UE is in State 3A-RF according to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 7.9.4.3.

#### 7.9.4.2 Test Procedure

- 1. Sweep the spectrum analyzer (or equivalent equipment) over a frequency range and measure the average power of spurious emission.
- 2. Repeat step 1 for all E-UTRA Rx antennas of the UE.

#### 7.9.4.3 Message Contents

Message contents are according to TS 36.508 [7] subclause 4.6.

## 7.9.5 Test Requirement

The measured spurious emissions derived in step 1), shall not exceed the maximum level specified in Table 7.9.5-1

Table 7.9.5-1: General receiver spurious emission requirements

Frequency Band	Measurement Bandwidth	Maximum level	Note		
30MHz≤f<1GHz	100 kHz	-57 dBm			
1GHz ≤ f ≤ 12.75 GHz	1 MHz	-47 dBm			
12.75 GHz ≤ f ≤ 5 <sup>th</sup> harmonic of the upper frequency edge of the DL operating band in GHz	1 MHz	-47 dBm	Note 1		
Note 1: Applies only for Band 22, Band 42 and Band 43.  Note 2: Unused PDCCH resources are padded with resource element groups with power level given by PDCCH_RA/RB as defined in Annex C.3.1.					

7.10

Void

# 7.10A Receiver image for CA

TS 36.101 [2] clause 7.10.1A specifies minimum requirements for receiver image for CA but recommends that these requirements do not need to be tested.