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 ±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

Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1	NC, TL/VL, TL/VH, TH/VL, TH/VH					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	Low range, Mid range, High range					
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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.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 Δf results must fulfil the test requirement:

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

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 ±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 Environment as specified in TS 36.508[7] subclause 4.1				NC, TL/VL, TL/VH, TH/VL, TH/VH					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.				C: Low range, High range					
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration				Lowest N_{RB_agg} Highest N_{RB_agg}					
Test Parameters for CA Configurations									
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**					
PCC N_{RB}	**SCCs N_{RB}**	**CC Mod**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
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	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: 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 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 Δf results per test point must fulfil the test requirement:

$|\Delta f| \leq (0.1 \text{ PPM} + 15 \text{ Hz})$ 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 ±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 Environment as specified in TS 36.508[7] subclause 4.1	NC, TL/VL, TL/VH, TH/VL, TH/VH					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	Low range, Mid range, High range					
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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 transmit 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 Δf results must fulfil the test requirement:

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

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		Normal 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 (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**		
Test Parameters for Channel Bandwidths				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for PUSCH EVM testing	Mod'n	RB allocation	
			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 (Note 3)	50 (Note 3)
10MHz		16QAM	12	12
15MHz		QPSK	75	75
15MHz		QPSK	16	16
15MHz		16QAM	75 (Note 3)	75 (Note 3)
15MHz		16QAM	16	16
20MHz		QPSK	100	100
20MHz		QPSK	18	18
20MHz		16QAM	100 (Note 3)	100 (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_{start} 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 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	
Test Parameters for Channel Bandwidths				
	Downlink Configuration			**Uplink Configuration**
Ch BW	Mod'n	RB allocation		FDD: PUCCH format = Format 1a TDD: PUCCH format = Format 1a / 1b
		FDD	TDD	
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 channel bandwidths are specified in Table 5.4.2.1-1.				

Table 6.5.2.1.4.1-3: Test Configuration for PRACH

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

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 $P_{UMAX\,level}$.

1.3 Measure the EVM and $\overline{EVM}_{DMRS}$ 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 –36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

1.5 Measure the EVM and $\overline{EVM}_{DMRS}$ 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_{UMAX} 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 -36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 PRACH 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-ConfCommonDEFAULT			
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: *RACH-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		
preamblesGroupAConfig SEQUENCE {}	Not present		
}			
powerRampingParameters SEQUENCE {			
powerRampingStep	dB0		
preambleInitialReceivedTargetPower	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 $\overline{EVM}_{DMRS}$ 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 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. …..

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.

6.5.2.1A.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 Environment as specified in TS 36.508[7] subclause 4.1	Normal Conditions			
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	Low range			
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	10 MHz			
Test Parameters for Channel Bandwidths				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A	Mod'n	RB allocation	
			FDD	TDD
10MHz		QPSK	Alternating 12 and 1 (as shown in Figure 6.5.2.1A.4.2-1)	Alternating 12 and 1 (as shown in Figure 6.5.2.1A.4.2-1)
10MHz		16 QAM	Alternating 12 and 1 (as shown in Figure 6.5.2.1A.4.2-1)	Alternating 12 and 1 (as shown in Figure 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.

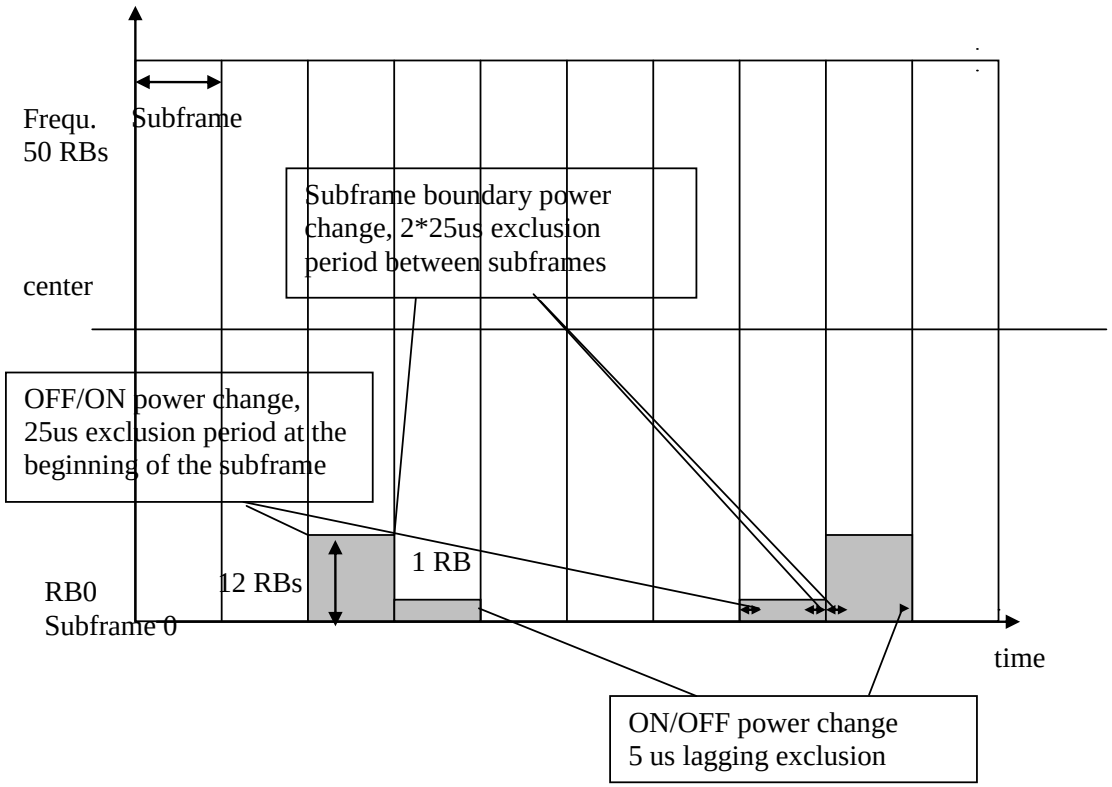

Figure 6.5.2.1A.4.2-1: Test pattern

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 transmits 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 ±3.2dB for carrier frequency f ≤ 3.0GHz or 0dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

2. Schedule the UE's PUSCH data transmission as described in Figure 6.5.2.1A.4.2-1 for 16[1)] 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[1)] timeslots 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 Conditions				
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				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	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
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_{start} 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.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
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 ±3.2dB for carrier frequency f ≤ 3.0GHz or 3.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -26.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.
5. Measure carrier leakage using Global In-Channel Tx-Test (Annex E). 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 -36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.
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 3.0GHz < f ≤ 4.2GHz: 3.5 dBm ±3.5dB	-24.2
	f ≤ 3.0GHz: -26.8 dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -26.5 dBm ±3.5dB	-19.2
	f ≤ 3.0GHz: -36.8dBm±3.2dB 3.0GHz < f ≤ 4.2GHz: -36.5 dBm ±3.5dB	-9.2

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 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.

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 6.5.2.3.3-1: Minimum requirements for in-band emissions

Parameter Description	Unit	Limit (Note 1)		Applicable Frequencies
General	dB	$\max\{ -25-10\cdot\log_{10}(N_{RB}/L_{CRB}),$ $20\cdot\log_{10} EVM -3-5\cdot(\lvert\Delta_{RB}\rvert-1)/L_{CRB},$ $-57\,dBm/180kHz-P_{RB}\}$		Any non-allocated (Note 2)
IQ Image	dB	-25		Image frequencies (Notes 2, 3)
Carrier leakage	dBc	-25	Output power > 0 dBm	LO frequency (Notes 4, 5)
		-20	-30 dBm ≤ Output power ≤ 0 dBm	
		-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 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_{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: Δ_{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_{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 Conditions				
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				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for in-band emissions 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
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 6.5.2.3.4.1-2: 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			
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				
	Downlink Configuration			**Uplink Configuration**
Ch BW	Mod'n	RB allocation		FDD: PUCCH format = Format 1a TDD: PUCCH format = Format 1a / 1b
		FDD	TDD	
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 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 ±3.2dB for carrier frequency f ≤ 3.0GHz or 3.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 ±3.2dB for carrier frequency f ≤ 3.0GHz or 3.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 ±3.2dB for carrier frequency f ≤ 3.0GHz or -26.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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-ConfigCommon*: 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	Limit (Note 1)		Applicable Frequencies
General	dB	$\max\{ -25-10\cdot\log_{10}(N_{RB}/L_{CRBs}),$ $20\cdot\log_{10} EVM -3-5\cdot(\lvert\Delta_{RB}\rvert-1)/L_{CRBs},$ $-57\,dBm/180kHz-P_{RB}\}$ +0.8		Any non-allocated (Note 2)
IQ Image	dB	-24.2		Image frequencies (Notes 2, 3)
DC	dBc	-24.2	Output power f ≤ 3.0GHz: 3.2dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: 3.5 dBm ±3.5dB	LO frequency (Notes 4, 5)
		-19.2	Output power f ≤ 3.0GHz: -26.8 dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -26.5 dBm ±3.5dB	
		-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 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_{CRBs} 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: Δ_{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_{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]
$F_{UL\_Meas} - F_{UL\_Low} \geq 3$ MHz and $F_{UL\_High} - F_{UL\_Meas} \geq 3$ MHz (Range 1)	4 (p-p)
$F_{UL\_Meas} - F_{UL\_Low} < 3$ MHz or $F_{UL\_High} - F_{UL\_Meas} < 3$ MHz (Range 2)	8 (p-p)
Note 1: F_{UL_Meas} refers to the sub-carrier frequency for which the equalizer coefficient is evaluated Note 2: F_{UL_Low} and F_{UL_High} refer to each E-UTRA frequency band specified in Table 5.2-1	

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

$F_{UL\_Meas} - F_{UL\_Low} \geq 5$ MHz and $F_{UL\_High} - F_{UL\_Meas} \geq 5$ MHz (Range 1)	4 (p-p)
$F_{UL\_Meas} - F_{UL\_Low} < 5$ MHz or $F_{UL\_High} - F_{UL\_Meas} < 5$ MHz (Range 2)	12 (p-p)
Note 1: F_{UL_Meas} refers to the sub-carrier frequency for which the equalizer coefficient is evaluated Note 2: F_{UL_Low} and F_{UL_High} refer to each E-UTRA frequency band specified in Table 5.2-1	

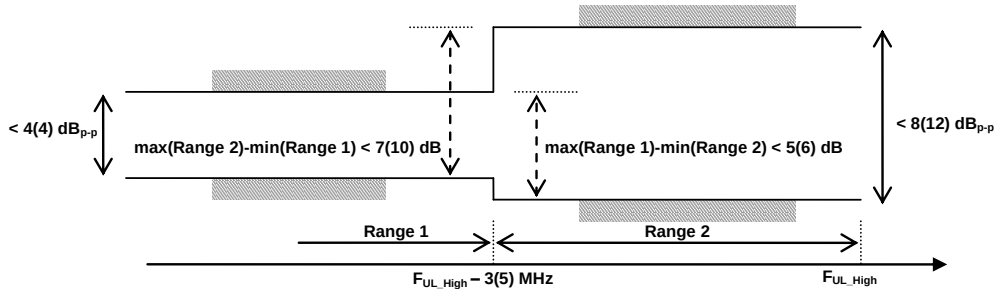

Figure 6.5.2.4.3-1: The limits for EVM equalizer spectrum flatness with the maximum allowed variation of the coefficients indicated (the ETC minimum requirement within brackets).

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.

Table 6.5.2.4.4.1-1: Test Configuration Table

Initial Conditions				
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				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for EVM equalizer spectrum flatness testing	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, which 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 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]
$F_{UL\_Meas} - F_{UL\_Low} \geq 3$ MHz and $F_{UL\_High} - F_{UL\_Meas} \geq 3$ MHz (Range 1)	5.4 (p-p)
$F_{UL\_Meas} - F_{UL\_Low} < 3$ MHz or $F_{UL\_High} - F_{UL\_Meas} < 3$ MHz (Range 2)	9.4 (p-p)
Note 1: F_{UL_Meas} refers to the sub-carrier frequency for which the equalizer coefficient is evaluated Note 2: F_{UL_Low} and F_{UL_High} refer to each E-UTRA frequency band specified in Table 5.2-1	

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

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

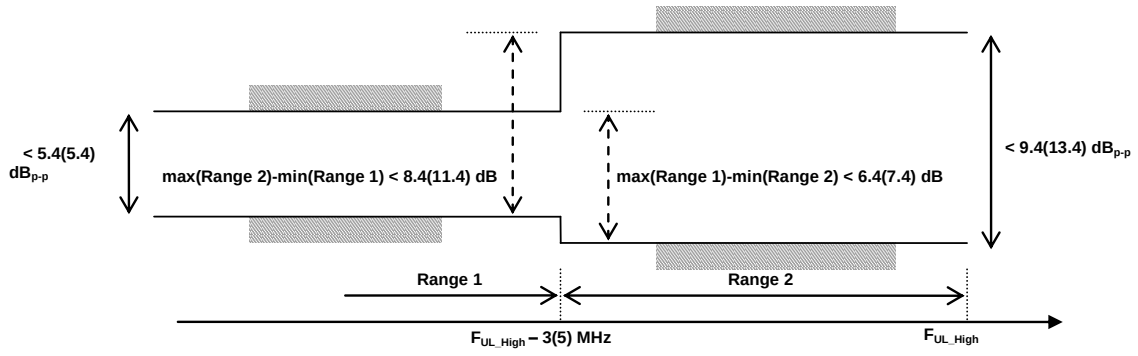

Figure 6.5.2.4.5-1: The limits for EVM equalizer spectrum flatness with the maximum allowed variation of the coefficients indicated (the ETC minimum requirement within brackets).

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

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.			See Table 6.5.1A.4.1-1:						
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration			See Table 6.5.1A.4.1-1:						
Test Parameters for CA Configurations									
Config ID	**CA Configuration / N_{RB_agg}**		**DL Allocation (PDCCH on PCC)**	**CC MOD**	**UL Allocation**				
	PCC N_{RB} Note 2	**SCCs N_{RB} Note 2**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
1	75	75	N.A.	QPSK	75	P_75@0	S_0@0	-	-
2	75	75		QPSK	16	P_16@0	S_0@0	-	-
3	75	75		QPSK	16	P_16@59	S_0@0	-	-
4	75	75		16QAM	75	P_75@0	S_0@0	-	-
5	75	75		16QAM	16	P_16@0	S_0@0	-	-
6	75	75		16QAM	16	P_16@59	S_0@0	-	-
7	100	50		QPSK	100	P_100@0	S_0@0	-	-
8	100	50		QPSK	50	P_50@0	S_0@0	-	-
9	100	50		QPSK	50	P_50@50	S_0@0	-	-
10	100	50		QPSK	12	P_12@0	S_0@0	-	-
11	100	50		QPSK	12	P_12@88	S_0@0	-	-
12	100	50		16QAM	100	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		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		16QAM	50	P_50@0	S_0@0	-	-
21	50	100		16QAM	12	P_12@0	S_0@0	-	-
22	50	100		16QAM	12	P_12@38	S_0@0	-	-
23	100	100		QPSK	100	P_100@0	S_0@0	-	-
24	100	100		QPSK	18	P_18@0	S_0@0	-	-
25	100	100		QPSK	18	P_18@82	S_0@0	-	-
26	100	100		16QAM	100	P_100@0	S_0@0	-	-
27	100	100		16QAM	18	P_18@0	S_0@0	-	-
28	100	100		16QAM	18	P_18@82	S_0@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: The frequencies of PCC and SCC shall be switched and tested in each 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 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 $P_{UMAX level}$.

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 –36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

5 Measure the EVM and $\overline{EVM}_{DMRS}$ 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 $\overline{EVM}_{DMRS}$ 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 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.				See Table 6.5.1A.4.1-1:					
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration				See Table 6.5.1A.4.1-1:					
Test Parameters for CA Configurations									
Config ID	**CA Configuration / N_{RB_agg}**		**DL Allocation (PDCCH on PCC)**	**CC MOD**	**UL Allocation**				
	PCC N_{RB} Note 2	**SCCs N_{RB} Note 2**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
1	75	75	NA	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		QPSK	12	P_12@88	S_0@0	-	-
5	50	100		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: 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: The frequencies of PCC and SCC shall be switched and tested in each configuration.									

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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or 3.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -26.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

5. Measure carrier leakage on PCC using Global In-Channel Tx-Test (Annex E). 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 -36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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

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	$\max\{ -25-10\cdot\log_{10}(N_{RB}/L_{CRB}),$ $20\cdot\log_{10} EVM -3-5\cdot(\lvert\Delta_{RB}\rvert-1)/L_{CRB},$ $-57\,dBm/180kHz-P_{RB}\}$		Any non-allocated (Note 1)
IQ Image	dB	-25		Exception for IQ image (Note 2)
Carrier leakage	dBc	-25	Output power > 0 dBm	Exception for Carrier frequency (Note 3)
		-20	-30 dBm ≤ Output power ≤ 0 dBm	
		-10	-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_{CRB} RBs within a contiguous width of L_{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_{CRB} is the Transmission Bandwidth (see Figure 5.4.2-1) not exceeding $\lfloor N_{RB}/2-1\rfloor$

Note 5: N_{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: Δ_{RB} is the starting frequency offset between the allocated RB and the measured non-allocated RB in the allocated component carrier (e.g. $\Delta_{RB}=1$ or $\Delta_{RB}=-1$ 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)

Para-meter	Unit	Meas BW Note 1	Limit		remark	Applicable Frequencies
General	dB	BW of 1 RB (180KHz rectangular)	$\max\{ -25-10\cdot\log_{10}(N_{RB}/L_{CRB}),$ $20\cdot\log_{10} EVM -3-5\cdot(\lvert\Delta_{RB}\rvert-1)/L_{CRB}$ $-57\,dBm/180kHz-P_{RB}\}$		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)	-25 Note 2		The reference value is the average power per allocated RB in the allocated component carrier	The frequencies of the L_{CRB} conti guous non-allocated 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 total power of the allocated RBs in the allocated component carrier	The frequencies of 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
			-25	Output power > 0 dBm		
			-20	-30 dBm ≤ Output power ≤ 0 dBm		
			-10	-40 dBm ≤ Output power < -30 dBm		

Note1: Resolution BWs smaller than the measurement BW may be integrated to achieve the measurement bandwidth.

Note 2: Exceptions to the general limit are allowed for up to L_{CRB} RBs within a contiguous width of L_{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: Δ_{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, Δ_{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 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.				See Table 6.5.1A.4.1-1:					
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration				See Table 6.5.1A.4.1-1:					
Test Parameters for CA Configurations									
Config ID	CA Configuration / N_{RB_agg}		DL Allocation (PDCCH on PCC)	CC MOD	UL Allocation				
	PCC	SCC	PCC & SCC RB allocation		N_{RB_alloc}	PCC & SCC RB allocations (L_{CRB} @ RB_{start})			
1 Note 2	75	75	N.A.	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		QPSK	12	P_12@88	S_0@0	-	-
5 Note 2	50	100		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: 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: PCC at low frequency, SCC at high frequency. Note 3: PCC at high frequency, SCC at low frequency.									

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 ±3.2dB for carrier frequency f ≤ 3.0GHz or 3.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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	Limit (Note 1)		Applicable Frequencies
General	dB	$\max\{ -25-10\cdot\log_{10}(N_{RB}/L_{CRBs}),$ $20\cdot\log_{10} EVM -3-5\cdot(\lvert\Delta_{RB}\rvert-1)/L_{CRBs},$ $-57\,dBm/180kHz-P_{RB}\}$ +0.8		Any non-allocated (Note 2)
IQ Image	dB	-24.2		Image frequencies (Notes 2, 3)
DC	dBc	-24.2	Output power f ≤ 3.0GHz: 3.2dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: 3.5 dBm ±3.5dB	LO frequency (Notes 4, 5)
		-19.2	Output power f ≤ 3.0GHz: -26.8 dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -26.5 dBm ±3.5dB	
		-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_{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: Δ_{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_{RB} 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-meter	Unit	Meas BW Note 1	Limit		remark	Applicable Frequencies
General	dB	BW of 1 RB (180KHz rectangular)	$\max\{ -25-10\cdot\log_{10}(N_{RB}/L_{CRBs}),$ $20\cdot\log_{10} EVM -3-5\cdot(\lvert\Delta_{RB}\rvert-1)/L_{CRBs}$ $-57\,dBm/180kHz-P_{RB}\}$		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_{CRB} contig uous non-allocated 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 total power of the allocated RBs in the allocated component carrier	The frequencies of 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
			-24.2	Output power > 0 dBm		
			-19.2	-30 dBm ≤ Output power ≤ 0 dBm		
			-9.2	-40 dBm ≤ Output power < -30 dBm		

Note1: Resolution BWs smaller than the measurement BW may be integrated to achieve the measurement bandwidth.

Note 2: Exceptions to the general limit are allowed for up to L_{CRB} RBs within a contiguous width of L_{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: Δ_{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, Δ_{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 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.

6.5.2B.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				
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		
Test Parameters for Channel Bandwidths				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for PUSCH EVM testing	Mod'n	RB allocation	
			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 (Note 3)	50 (Note 3)
10MHz		16QAM	12	12
15MHz		QPSK	75	75
15MHz		QPSK	16	16
15MHz		16QAM	75 (Note 3)	75 (Note 3)
15MHz		16QAM	16	16
20MHz		QPSK	100	100
20MHz		QPSK	18	18
20MHz		16QAM	100 (Note 3)	100 (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_{start} 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 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	
Test Parameters for Channel Bandwidths				
	Downlink Configuration			**Uplink Configuration**
Ch BW	Mod'n	RB allocation		FDD: PUCCH format = Format 1a TDD: PUCCH format = Format 1a / 1b
		FDD	TDD	
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 channel bandwidths are specified in 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.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.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 $P_{UMAX\,level}$.

1.3 Measure the EVM and $\overline{EVM}_{DMRS}$ 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 –36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

1.5 Measure the EVM and $\overline{EVM}_{DMRS}$ 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_{UMAX} level.

2.4 Measure PUCCH EVM using Global In-Channel Tx-Test (Annex E) for each of transmit antenna of the UE.

2.5 Send the appropriate TPC commands for PUCCH to the UE until the UE transmits PUCCH at -36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

2.6 Measure PUCCH EVM using Global In-Channel Tx-Test (Annex E) for each of transmit 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-ConfigDedicated-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 $\overline{EVM}_{DMRS}$ 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 Conditions				
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				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	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
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_{start} 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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or 3.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -26.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 -36.8dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 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 3.0GHz < f ≤ 4.2GHz: 3.5 dBm ±3.5dB	24.2
	f ≤ 3.0GHz: -26.8 dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -26.5 dBm ±3.5dB	19.2
	f ≤ 3.0GHz: -36.8dBm ±3.2dB 3.0GHz < f ≤ 4.2GHz: -36.5 dBm ±3.5dB	9.2

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 transmission 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	$\max\{ -25-10\cdot\log_{10}(N_{RB}/L_{CRBs}),$ $20\cdot\log_{10} EVM -3-5\cdot(\lvert\Delta_{RB}\rvert-1)/L_{CRBs},$ $-57\,dBm/180kHz-P_{RB}\}$		Any non-allocated (Note 2)
IQ Image	dB	-25		Image frequencies (Notes 2, 3)
Carrier leakage	dBc	-25	Output power > 0 dBm	LO frequency (Notes 4, 5)
		-20	-30 dBm ≤ Output power ≤ 0 dBm	
		-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 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_{CRBs} 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: Δ_{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_{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 6.5.2B.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 Conditions				
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				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for in-band emissions 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
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		
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				
	Downlink Configuration			**Uplink Configuration**
Ch BW	Mod'n	RB allocation		FDD: PUCCH format = Format 1a TDD: PUCCH format = Format 1a / 1b
		FDD	TDD	
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 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.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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or 3.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 dBm ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 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 ±3.2dB for carrier frequency f ≤ 3.0GHz or 3.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 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 ±3.2dB for carrier frequency f ≤ 3.0GHz or -26.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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 ±3.2dB for carrier frequency f ≤ 3.0GHz or -36.5dBm ±3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

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-ConfigDedicated-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 (Note 1)		Applicable Frequencies
General	dB	$\max\{ -25-10\cdot\log_{10}(N_{RB}/L_{CRBs}),$ $20\cdot\log_{10} EVM -3-5\cdot(\lvert\Delta_{RB}\rvert-1)/L_{CRBs},$ $-57\,dBm/180kHz-P_{RB}\}$	+0.8	Any non-allocated (Note 2)
IQ Image	dB	-24.2		Image frequencies (Notes 2, 3)
Carrier leakage	dBc	-24.2	Output power > 0 dBm	LO frequency (Notes 4, 5)
		-19.2	-30 dBm ≤ Output power ≤ 0 dBm	
		-9.2	-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 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_{CRBs} 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: Δ_{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_{RB} 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 Conditions				
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				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for EVM equalizer spectrum flatness testing	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, which 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.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]
$F_{UL\_Meas} - F_{UL\_Low} \geq 3$ MHz and $F_{UL\_High} - F_{UL\_Meas} \geq 3$ MHz (Range 1)	5.4 (p-p)
$F_{UL\_Meas} - F_{UL\_Low} < 3$ MHz or $F_{UL\_High} - F_{UL\_Meas} < 3$ MHz (Range 2)	9.4 (p-p)
Note 1: F_{UL_Meas} refers to the sub-carrier frequency for which the equalizer coefficient is evaluated Note 2: F_{UL_Low} and F_{UL_High} 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)

$F_{UL\_Meas} - F_{UL\_Low} \geq 5$ MHz and $F_{UL\_High} - F_{UL\_Meas} \geq 5$ MHz (Range 1)	5.4 (p-p)
$F_{UL\_Meas} - F_{UL\_Low} < 5$ MHz or $F_{UL\_High} - F_{UL\_Meas} < 5$ MHz (Range 2)	13.4 (p-p)
Note 1: F_{UL_Meas} refers to the sub-carrier frequency for which the equalizer coefficient is evaluated Note 2: F_{UL_Low} and F_{UL_High} refer to each E-UTRA frequency band specified in Table 5.2-1	

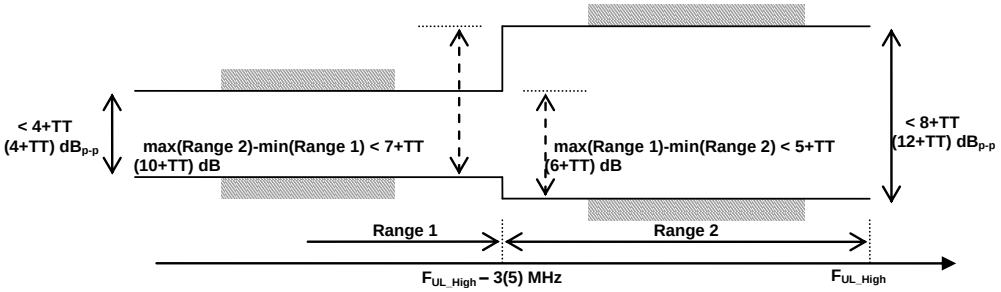

Figure 6.5.2B.4.5-1: The limits for EVM equalizer spectrum flatness with the maximum allowed variation of the coefficients indicated (the ETC minimum requirement within brackets).

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 bandwidth (channel bandwidth), the Out Of Band (OOB) emissions and the far out spurious emission domain.

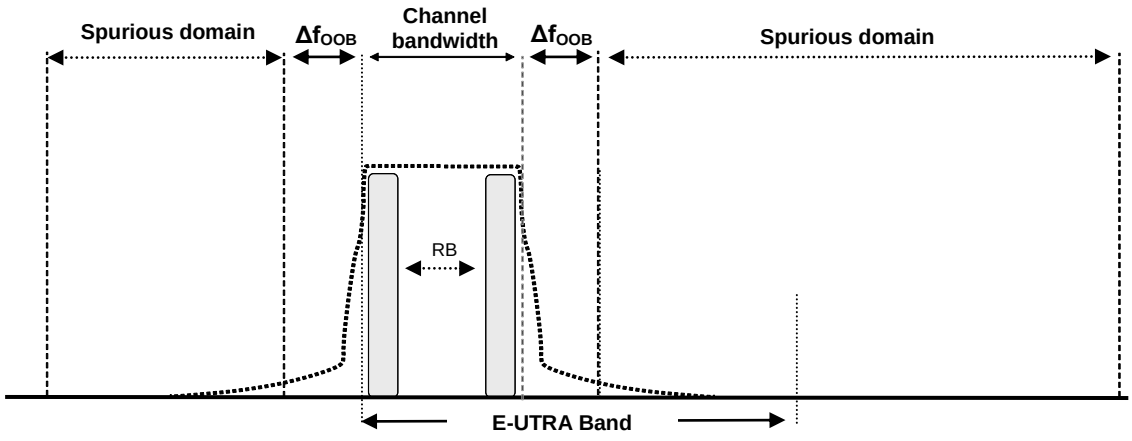

Figure 6.6-1: Transmitter RF spectrum

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 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

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal			
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**	All			
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
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_{UMAX} 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 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								
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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration		C: All						
Test Parameters for CA Configurations								
CA Configuration / N_{RB_agg}		**DL Allocation**	**CC MOD**	**UL Allocation**				
PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
75	75	N/A for this test	QPSK	150	P_75@0	S_75@0	-	-
100	50		QPSK	150	P_100@0	S_50@0	-	-
100	75		QPSK	175	P_100@0	S_75@0	-	-
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.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 transmits at P_{UMAX} 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 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.

Table 6.6.1B.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal			
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**	All			
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
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.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 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

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_{UMAX} 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 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 (Δf_{OOB}) starting from the edge of the assigned E-UTRA channel bandwidth. For frequencies greater than (Δf_{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_{OOB} (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 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)		Low range, Mid range, High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)		Lowest, 5MHz, 10MHz, Highest		
Test Parameters for Channel Bandwidths				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for SEM testing	Mod'n	RB allocation	
			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 (Note 4)	50 (Note 4)
15MHz		QPSK	75	75
15MHz		QPSK	16	16
15MHz		16QAM	16	16
15MHz		16QAM	75 (Note 4)	75 (Note 4)
20MHz		QPSK	100	100
20MHz		QPSK	18	18
20MHz		16QAM	18	18
20MHz		16QAM	100 (Note 4)	100 (Note 4)

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 allowed MPR for maximum output power UE might apply is described in clause 6.2.3.3.
Note 3: The RB_{start} of partial RB allocation shall be RB#0 and RB# (max+1 – RB allocation) of the channel bandwidth.
Note 4: Applies 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_{OOB} (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 MHz
20-25						-23.5	1 MHz

Note 1: The first and last measurement position with a 30 kHz filter is at Δf_{OOB} 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 Δf_{OOB} equals to 3 MHz.

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

	Spectrum emission limit (dBm)/ Channel bandwidth

Δf_{OOB} (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_{OOB} 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 Δf_{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 (Δf_{OOB}) starting from the ± 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_{OOB} (MHz)	**50RB+100RB (29.9 MHz)**	**75RB+75RB (30 MHz)**	**75RB+100RB (34.85 MHz)**	**100RB+100RB (39.8 MHz)**	**Measurement 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 Environment as specified in TS 36.508 [7] clause 4.1		NC, TL/VL, TL/VH, TH/VL, TH/VH						
Test Frequencies as specified in TS 36.508 [7] clause 4.3.1 for different CA bandwidth classes.		C: Low range, High range						
Test CC Combination setting (N_{RB_agg}) as specified in clause 5.4.2A.1 for the CA Configuration		Lowest N_{RB_agg}, Highest N_{RB_agg}						
Test Parameters for CA Configurations								
CA Configuration / N_{RB_agg}		**DL Allocation**	**CC MOD**	**UL Allocation**				
PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations(L_{CRB} @ RB_{start})**			
75	75	N/A for this test	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		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		16QAM	100	P_100@0	S_0@0	-	-
100	50		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		16QAM	200	P_100@0	S_100@0	-	-
100	100		QPSK	2	P_1@0	S_1@99	-	-
100	100		QPSK	20	P_5@0	P_5@50	S_5@0	S_5@50
100	100		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] 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_{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 6.2.3A.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 clause 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]/$BW_{Channel\_CA}$					
Δf_{OOB} (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]/$BW_{Channel\_CA}$					
Δf_{OOB} (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 (Δf_{OOB}) starting from the edge of the assigned E-UTRA channel bandwidth. For frequencies greater than (Δf_{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_{OOB} (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

Initial Conditions				
Test Environment (as specified in TS 36.508 [7] clause 4.1)		NC		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)		Low range, Mid range, High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)		Lowest, 5MHz, 10MHz, Highest		
Test Parameters for Channel Bandwidths				
Downlink Configuration		**Uplink Configuration**		
Ch BW	N/A for SEM testing	Mod'n	RB allocation	
			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 (Note 4)	50 (Note 4)
15MHz		QPSK	75	75
15MHz		QPSK	16	16
15MHz		16QAM	16	16
15MHz		16QAM	75 (Note 4)	75 (Note 4)
20MHz		QPSK	100	100
20MHz		QPSK	18	18
20MHz		16QAM	18	18
20MHz		16QAM	100 (Note 4)	100 (Note 4)

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 allowed MPR for maximum output power UE might apply is described in clause 6.2.3B.3.
Note 3: The RB_{start} of partial RB allocation shall be RB#0 and RB# (max+1 - RB allocation) of the channel bandwidth.
Note 4: 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 6.6.2.1B.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 6.6.2.1B.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.6.6.2.1B.5-1 or Table.6.6.2.1B.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_{OOB} (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 MHz
20-25						-23.5	1 MHz

Note 1: The first and last measurement position with a 30 kHz filter is at Δf_{OOB} 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 Δf_{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_{OOB} (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_{OOB} 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 Δf_{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_{OOB} (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 [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_{OOB} (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_{OOB} (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 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						
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)				Low range, Mid range, High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)				Lowest, 5MHz, 10MHz, Highest		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
1.4MHz	N/A for Additional Spectrum Emission Mask testing.			QPSK	6	6
1.4MHz				QPSK	5	5
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				QPSK	6	6
5MHz				16QAM	25	25
5MHz				16QAM	8	8
10MHz				QPSK	50	50
10MHz				QPSK	12	12
10MHz				QPSK	6	6
10MHz				16QAM	50 (Note 3)	50 (Note 3)
10MHz				16QAM	12	12
15MHz				QPSK	75	75
15MHz				QPSK	16	16
15MHz				QPSK	8	8
15MHz				16QAM	75 (Note 3)	75 (Note 3)
15MHz				16QAM	16	16
20MHz				QPSK	100	100
20MHz				QPSK	18	18
20MHz				QPSK	10	10
20MHz				16QAM	100 (Note 3)	100 (Note 3)
20MHz				16QAM	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.

Note 2: The RB_{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

Table 6.6.2.2.4.1-2: Test Configuration Table (network signalled value "NS_06")

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)				Low range, Mid range, High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)				Lowest, 5MHz, 10MHz, Highest		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
1.4MHz	N/A for Additional Spectrum Emission Mask testing.			QPSK	6	NA
1.4MHz				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	
20MHz				QPSK	100	
20MHz				QPSK	18	
20MHz				16QAM	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.

Note 2: The RB_{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 (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)				10MHz		
Test Parameters for Channel Bandwidths						
		Downlink Configuration		**Uplink Configuration**		
Test Number	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD	RB_{start}
1	10MHz	N/A for Additional Spectrum Emission Mask testing.		QPSK	1	0
2	10MHz			QPSK	8	0
3	10MHz			QPSK	6	13
4	10MHz			QPSK	20	13
5	10MHz			QPSK	12	13
6	10MHz			16QAM	36 (Note 1)	13
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	6	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: 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 36.508 [7] subclause 4.1)		NC	
Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1)		Low range, Mid range, High range	
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)		5MHz, 10 MHz, 15 MHz, 20MHz	
Test Parameters for NS_04 A-MPR			
		Downlink Configuration	**Uplink Configuration**

Configuration ID	Ch BW	Mod'n	RB allocation TDD	Mod'n	RB allocation TDD	RB_{start} TDD
1	5MHz	N/A for Additional Spectrum Emission Mask testing.		QPSK	25	Note 2
2	5MHz			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 (Note 3)	0
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 (Note 3)	0
19	15MHz			QPSK	36	19
20	15MHz			16QAM	36 (Note 3)	19
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 (Note 3)	0
28	20MHz			QPSK	50	25
29	20MHz			16QAM	50 (Note 3)	25
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_{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)	Normal

Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1)	Low range, Mid range, High range For 3 MHz Channel Bandwidth: a. 2001.5 MHz (N_{UL} = 25515) b. 2004.5 MHz (N_{UL} = 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_{UL} = 25575) For 10 MHz Channel Bandwidth a. 2005 MHz (N_{UL} = 25550) b. 2005.5 MHz (N_{UL} = 25555) c. 2015 MHz (N_{UL} = 25650) For 15 MHz Channel Bandwidth a. 2007.5 MHz (N_{UL} = 25575) b. 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)	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-MPR 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

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_{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.

Table 6.6.2.2.4.1-6: Test Configuration Table (network signalled value "NS_20")

Initial Conditions			
Test Environment (as specified in TS 36.508 [7] subclause 4.1)			Normal
Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1)			Low range, Mid range, High range For 5 MHz Channel Bandwidth a. 2002.5 MHz (N_{UL} = 25525) b. 2007.5 MHz (N_{UL} = 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_{UL} = 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 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-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_{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.

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 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 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**
additionalSpectrumEmission	6 (NS_06)		

6.6.2.2.4.3.4 Message contents exceptions (network signalled value "NS_07")

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 6.6.2.2.4.3.4-1: *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**	**Condition**
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**	**Condition**
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**
additionalSpectrumEmission	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_{OOB} (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: 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 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 Δf_{OOB} equals to 3 MHz.

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_{OOB} (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					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 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 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 Δf_{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 requirements 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 ≤ 3GHz

	Spectrum emission limit (dBm)/ Channel bandwidth						
Δf_{OOB} (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
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 NS_04 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 Δf_{OOB} 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_{OOB} (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 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 NS_04 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 Δf_{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.

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 l,

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

	Spectrum emission limit (dBm)/ Channel bandwidth				
Δf_{OOB} (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	-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
Note 1: The first and last measurement position with a 30 kHz filter is at ΔfOOB equals to 0.015 MHz and 0.085 MHz. The first and last measurement position with a 100 kHz filter is at ΔfOOB 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] 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 Δf_{OOB} equals to 3 MHz.					

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_{OOB} (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	-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

Note 1: The first and last measurement position with a 30 kHz filter is at ΔfOOB equals to 0.015 MHz and 0.085 MHz. The first and last measurement position with a 100 kHz filter is at ΔfOOB 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] 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 Δf_{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.

6.6.2.2A 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]/$BW_{Channel\_CA}$					
Δf_{OOB} (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

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 and High range
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration	As in Table 6.6.2.2A.1.3.1-1

Test Parameters for CA Configurations									
ID	CA Configuration / N_{RB_agg}		DL Allocation (PDCCH on PCC)	CC MOD	UL Allocation				
	PCC N_{RB}	SCCs N_{RB}	PCC & SCC RB allocation		N_{RB_alloc}	PCC & SCC RB allocations (L_{CRB} @ RB_{start})			
1	100	50	N/A	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		QPSK	10	P_10@20	S_0@0		
8	75	75		QPSK	75	P_30@45	S_45@0		
9	75	75		QPSK	2	P_1@0	S_1@74		
10	75	75		QPSK	24	P_6@0	P_6@60	S_6@10	S_6@69
11	75	75		QPSK	60	P_15@0	P_15@45	S_15@15	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		16QAM	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]/$BW_{Channel\_CA}$					
Δf_{OOB} (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] subclause 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_{OOB} (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_{OOB} (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_{OOB} (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 bandwidth.

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 Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)				NC		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)				Low range, Mid range, High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)				Lowest, 5MHz, 10MHz, Highest		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
1.4MHz	N/A for Additional Spectrum Emission Mask testing.			QPSK	6	6
1.4MHz				QPSK	5	5
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				QPSK	6	6
5MHz				16QAM	25	25
5MHz				16QAM	8	8
10MHz				QPSK	50	50
10MHz				QPSK	12	12
10MHz				QPSK	6	6
10MHz				16QAM	50 (Note 3)	50 (Note 3)
10MHz				16QAM	12	12
15MHz				QPSK	75	75
15MHz				QPSK	16	16
15MHz				QPSK	8	8
15MHz				16QAM	75 (Note 3)	75 (Note 3)
15MHz				16QAM	16	16
20MHz				QPSK	100	100
20MHz				QPSK	18	18
20MHz				QPSK	10	10
20MHz				16QAM	100 (Note 3)	100 (Note 3)
20MHz				16QAM	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.

Note 2: The RB_{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")

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)	NC					
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)	Low range, Mid range, High range					
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)	Lowest, 5MHz, 10MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
1.4MHz	N/A for Additional Spectrum Emission Mask testing.			QPSK	6	NA
1.4MHz				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	
20MHz				QPSK	100	
20MHz				QPSK	18	
20MHz				16QAM	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.

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

Table 6.6.2.2B.4.1-3: Test Configuration Table (network signalled value "NS_07")

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)				NC		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)				Mid range		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)				10MHz		
Test Parameters for Channel Bandwidths						
		Downlink Configuration		**Uplink Configuration**		
Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	RB_{start}
1	10MHz	N/A for Additional Spectrum Emission Mask testing.		QPSK	1	0
2	10MHz			QPSK	8	0
3	10MHz			QPSK	6	13
4	10MHz			QPSK	20	13
5	10MHz			QPSK	12	13
6	10MHz			16QAM	36 (Note 1)	13
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	6	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: Applies only for UE-Categories[FFS].						

Table 6.6.2.2B.4.1-4: Test Configuration Table (network signalled value "NS_04")

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)				NC		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)				Low range, Mid range, High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)				5MHz, 10 MHz, 15 MHz, 20MHz		
Test Parameters for NS_04 A-MPR						
		Downlink Configuration		**Uplink Configuration**		
Configuration ID	Ch BW	Mod'n	RB allocation TDD	Mod'n	RB allocation TDD	RB_{start} TDD
1	5MHz	N/A for Additional Spectrum Emission Mask testing.		QPSK	25	Note 2
2	5MHz			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 (Note 3)	0
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 (Note 3)	0
19	15MHz			QPSK	36	19
20	15MHz			16QAM	36 (Note 3)	19
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 (Note 3)	0
28	20MHz			QPSK	50	25
29	20MHz			16QAM	50 (Note 3)	25
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_{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].

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 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 6.6.2.2B.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**
additionalSpectrumEmission	3 (NS_03)		

6.6.2.2B.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 6.6.2.2B.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 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 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 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 6.6.2.2B.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**
additionalSpectrumEmission	7 (NS_07)		

6.6.2.2B.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 6.6.2.2B.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 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 6.6.2.2B.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**
additionalSpectrumEmission	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.5.1-1 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_{OOB} (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: The first and last measurement position with a 30 kHz filter is at Δf_{OOB} 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 Δf_{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							
Δf_{OOB} (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					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_{OOB} 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 Δf_{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_{OOB} (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_{OOB} 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 Δf_{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_{OOB} (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_{OOB} 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 Δf_{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 l,

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				
Δf_{OOB} (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	-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

Note 1: The first and last measurement position with a 30 kHz filter is at Δf_{OOB} equals to 0.015 MHz and 0.085 MHz.
The first and last measurement position with a 100 kHz filter is at Δf_{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 Δf_{OOB} equals to 3 MHz.

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_{OOB} (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 Δf_{OOB} equals to 0.015 MHz and 0.085 MHz.
The first and last measurement position with a 100 kHz filter is at Δf_{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 Δf_{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$_{ACLR}$ and UTRA$_{ACLR1/2}$ as shown in Figure 6.6.2.3.3-1.

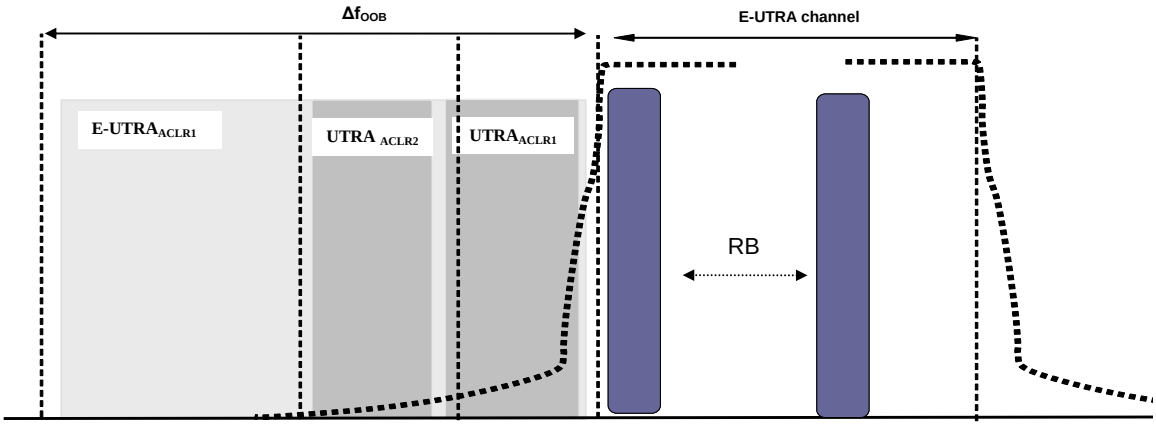

Figure 6.6.2.3.3-1: Adjacent Channel Leakage Power Ratio requirements

6.6.2.3.3.1 Minimum conformance requirements for E-UTRA

E-UTRA ACLR (E-UTRA$_{ACLR}$) 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$_{ACLR}$ shall be higher than the valued specified in Table 6.6.2.3.3.1-1.

Table 6.6.2.3.3.1-1: General requirements for E-UTRA$_{ACLR}$

	Channel bandwidth / E-UTRA$_{ACLR1}$ / measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
E-UTRA$_{ACLR1}$	30 dB	30 dB	30 dB	30 dB	30 dB	30 dB
E-UTRA channel Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz

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$_{ACLR}$) 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 2nd UTRA adjacent channel (UTRA$_{ACLR2}$). The UTRA channel power is measured with a RRC bandwidth filter with roll-off factor α = 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 –50dBm then the UTRA$_{ACLR1}$, and UTRA$_{ACLR2}$ 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$_{ACLR1/2}$ / measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz

$UTRA_{ACLR1}$	33 dB	33 dB	33 dB	33 dB	33 dB	33 dB
Adjacent channel centre frequency offset (in MHz)	0.7+BW_{UTRA}/2 / -0.7-BW_{UTRA}/2	1.5+BW_{UTRA}/2 / -1.5-BW_{UTRA}/2	2.5+BW_{UTRA}/2 / -2.5-BW_{UTRA}/2	5+BW_{UTRA}/2 / -5-BW_{UTRA}/2	7.5+BW_{UTRA}/2 / -7.5-BW_{UTRA}/2	10+BW_{UTRA}/2 / -10-BW_{UTRA}/2
$UTRA_{ACLR2}$	-	-	36 dB	36 dB	36 dB	36 dB
Adjacent channel centre frequency offset (in MHz)	-	-	2.5+3*BW_{UTRA}/2 / -2.5-3*BW_{UTRA}/2	5+3*BW_{UTRA}/2 / -5-3*BW_{UTRA}/2	7.5+3*BW_{UTRA}/2 / -7.5-3*BW_{UTRA}/2	10+3*BW_{UTRA}/2 / -10-3*BW_{UTRA}/2
E-UTRA channel Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
UTRA 5MHz channel Measurement bandwidth[1]	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz
UTRA 1.6MHz channel measurement bandwidth[2]	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 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 Environment (as specified in TS 36.508 [7] subclause 4.1)				NC, TL/VL, TL/VH, TH/VL, TH/VH		
Test Frequencies (as specified in TS36.508 [7] subclause 4.3.1)				Low range, Mid range, High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)				Lowest, 5MHz, 10MHz, Highest		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		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 (Note 3)	50 (Note 3)
10MHz		16QAM	12	12
15MHz		QPSK	75	75
15MHz		QPSK	16	16
15MHz		16QAM	75 (Note 3)	75 (Note 3)
15MHz		16QAM	16	16
20MHz		QPSK	100	100
20MHz		QPSK	18	18
20MHz		16QAM	100 (Note 3)	100 (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_{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				

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

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 6.6.2.3.4.1-1. 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$_{ACLR}$, respectively.

8. Calculated the ratios of the power between the values measured in step 4 over step 6 for lower and upper UTRA$_{ACLR1}$, UTRA$_{ACLR2}$, 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$_{ACLR}$, 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

	Channel bandwidth / E-UTRA$_{ACLR1}$ / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
E-UTRA$_{ACLR1}$	29.2 dB	29.2 dB	29.2 dB	29.2 dB	29.2 dB	29.2 dB
E-UTRA channel Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
UE channel	+1.4 MHz or -1.4 MHz	+3 MHz or -3 MHz	+5MHz or -5MHz	+10MHz or -10MHz	+15MHz or -15MHz	+20MHz or -20MHz

Test requirements UTRA

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 6.6.2.3.5.2-1.

Table 6.6.2.3.5.2-1: UTRA UE ACLR

	Channel bandwidth / UTRA$_{ACLR1/2}$ / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**

$UTRA_{ACLR1}$	32.2 dB	32.2 dB	32.2 dB	32.2 dB	32.2 dB	32.2 dB
Adjacent channel centre frequency offset (in MHz)	0.7+BW_{UTRA}/2 / -0.7-BW_{UTRA}/2	1.5+BW_{UTRA}/2 / -1.5-BW_{UTRA}/2	2.5+BW_{UTRA}/2 / -2.5-BW_{UTRA}/2	5+BW_{UTRA}/2 / -5-BW_{UTRA}/2	7.5+BW_{UTRA}/2 / -7.5-BW_{UTRA}/2	10+BW_{UTRA}/2 / -10-BW_{UTRA}/2
$UTRA_{ACLR2}$	-	-	35.2 dB	35.2 dB	35.2 dB	35.2 dB
Adjacent channel centre frequency offset (in MHz)	-	-	2.5+3*BW_{UTRA}/2 / -2.5-3*BW_{UTRA}/2	5+3*BW_{UTRA}/2 / -5-3*BW_{UTRA}/2	7.5+3*BW_{UTRA}/2 / -7.5-3*BW_{UTRA}/2	10+3*BW_{UTRA}/2 / -10-3*BW_{UTRA}/2
E-UTRA channel Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
UTRA 5MHz channel Measurement bandwidth[1]	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz
UTRA 1.6MHz channel measurement bandwidth[2]	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. Note 3: BW_{UTRA} 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 -$UTRA_{ACLR}$ as shown in Figure 6.6.2.3_1.3-1.

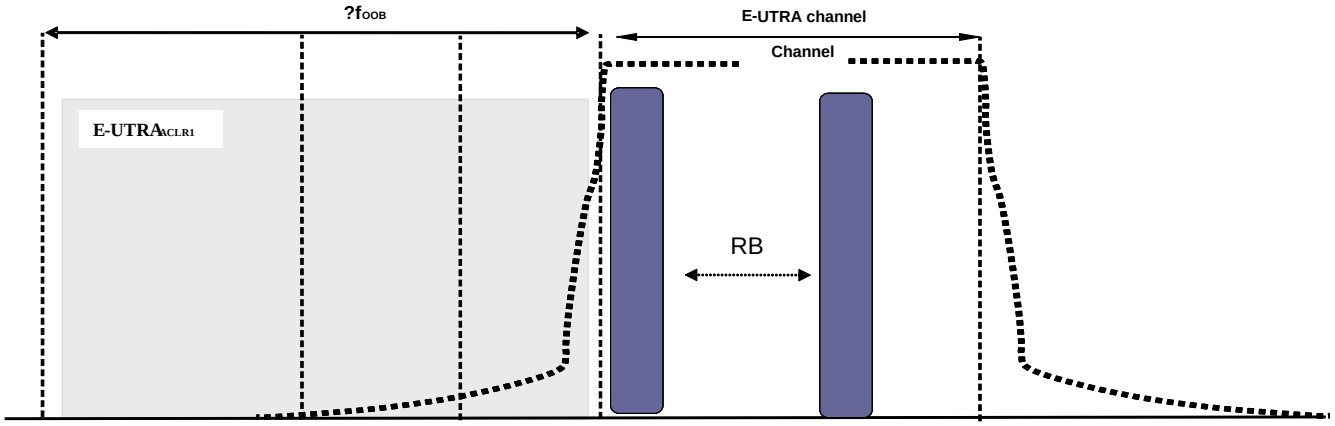

Figure 6.6.2.3_1.3-1: Adjacent Channel Leakage Power Ratio requirements

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$_{ACLR}$ requirements for Power Class 1

	Channel bandwidth / E-UTRA$_{ACLR1}$ / Measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
E-UTRA$_{ACLR1}$	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$_{ACLR1}$ 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

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 6.6.2.3.4.1-1. 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$_{ACLR}$, 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$_{ACLR}$, derived in step 7, shall be higher than the limits in table 6.6.2.3_1.4.1-1.

Table 6.6.2.3_1.4.1-1: E-UTRA UE ACLR

	Channel bandwidth / E-UTRA$_{ACLR1}$ / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
E-UTRA$_{ACLR1}$	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

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$_{ACLR1/2}$ as shown in Figure 6.6.2.3A.1.3-1.

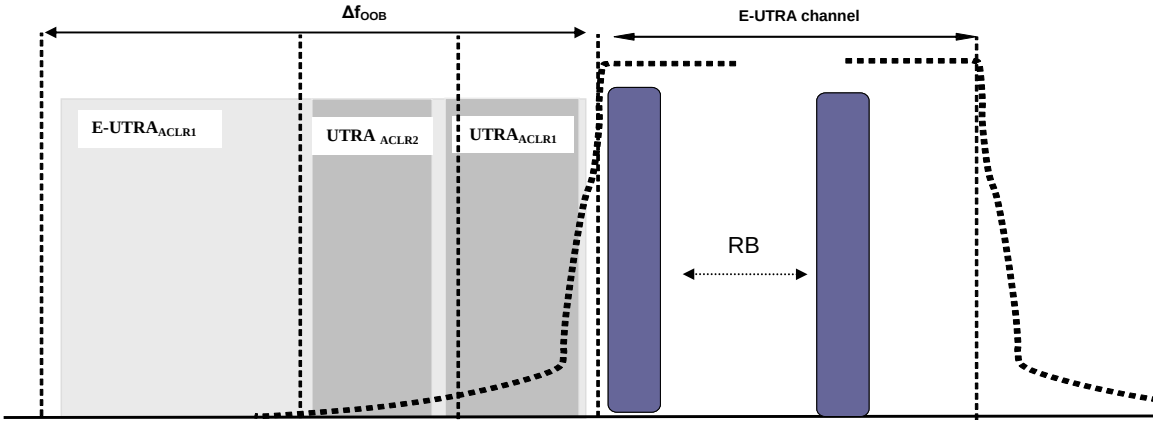

Figure 6.6.2.3A.1.3-1: Adjacent Channel Leakage Power Ratio for CA requirements

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 Leakage power Ratio is specified for both the first UTRA adjacent channel ($UTRA_{ACLR1}$) and the 2nd 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 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 –50dBm then the $UTRA_{ACLR1}$ shall be higher than the valued specified in Table 6.6.2.3A.1.3.1-1.

Table 6.6.2.3A.1.3.1-1: General requirements of $UTRA_{ACLR1/2}$ for CA

	CA bandwidth class / $UTRA_{ACLR1/2}$ / measurement bandwidth
	CA bandwidth class C
$UTRA_{ACLR1}$	33 dB
Adjacent channel centre frequency offset (in MHz)	+ $BW_{Channel\_CA}$ /2 + BW_{UTRA}/2 / - $BW_{Channel\_CA}$ / 2 - BW_{UTRA}/2
$UTRA_{ACLR2}$	36 dB
Adjacent channel centre frequency offset (in MHz)	+ $BW_{Channel\_CA}$ /2 + 3*BW_{UTRA}/2 / - $BW_{Channel\_CA}$ /2 – 3*BW_{UTRA}/2
CA E-UTRA channel Measurement bandwidth	$BW_{Channel\_CA}$ - 2* BW_{GB}
UTRA 5 MHz channel Measurement bandwidth*	3.84 MHz
UTRA 1.6 MHz channel measurement bandwidth**	1.28 MHz
* Note: Applicable for E-UTRA FDD co-existence with UTRA FDD in paired spectrum. ** 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.

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 $E\text{-}UTRA_{ACLR}$) 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 and adjacent 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 –50dBm then the $E\text{-}UTRA_{ACLR}$ 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 $E\text{-}UTRA_{ACLR}$ for CA

	CA bandwidth class / CA $E\text{-}UTRA_{ACLR}$ / measurement bandwidth
	CA bandwidth class C
CA $E\text{-}UTRA_{ACLR}$	30 dB
CA E-UTRA channel Measurement bandwidth	$BW_{Channel\_CA}$ - 2* BW_{GB}
Adjacent channel centre frequency offset (in MHz)	+ $BW_{Channel\_CA}$ / - $BW_{Channel\_CA}$

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 Conditions								
Test Environment as specified in TS 36.508[7] subclause 4.1		NC, TL/VL, TL/VH, TH/VL, TH/VH						
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.		C: Low range, High range						
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration		Lowest N_{RB_agg}, Highest N_{RB_agg}						
Test Parameters for CA Configurations								
CA Configuration / N_{RB_agg}		**DL Allocation**	**CC MOD**	**UL Allocation**				
PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations(L_{CRB} @ RB_{start})**			
75	75	N/A for this test	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		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		16QAM	100	P_100@0	S_0@0	-	-
100	50		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		16QAM	200	P_100@0	S_100@0	-	-
100	100		QPSK	2	P_1@0	S_1@99	-	-
100	100		QPSK	20	P_5@0	P_5@50	S_5@0	S_5@50
100	100		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-$UTRA_{ACLR}$.
11. Calculate the ratio of the power between the values measured in step 7 over step 9 for $UTRA_{ACLR1}$, $UTRA_{ACLR2}$.

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 $UTRA_{ACLR1}$ and $UTRA_{ACLR2}$, 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 / $UTRA_{ACLR1/2}$ / measurement bandwidth

	CA bandwidth class C
$UTRA_{ACLR1}$	32.2 dB
Adjacent channel centre frequency offset (in MHz)	+ $BW_{Channel\_CA}$ /2 + BW_{UTRA}/2 / - $BW_{Channel\_CA}$ / 2 - BW_{UTRA}/2
$UTRA_{ACLR2}$	35.2 dB
Adjacent channel centre frequency offset (in MHz)	+ $BW_{Channel\_CA}$ /2 + 3*BW_{UTRA}/2 / - $BW_{Channel\_CA}$ /2 – 3*BW_{UTRA}/2
CA E-UTRA channel Measurement bandwidth	$BW_{Channel\_CA}$ - 2* BW_{GB}
UTRA 5 MHz channel Measurement bandwidth (Note 1)	3.84 MHz
UTRA 1.6 MHz channel measurement bandwidth (Note 2)	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.	

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 $E\text{-}UTRA_{ACLR}$, 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 $E\text{-}UTRA_{ACLR}$ / Measurement bandwidth
	CA bandwidth class C
CA $E\text{-}UTRA_{ACLR}$	29.2 dB
CA E-UTRA channel Measurement bandwidth	$BW_{Channel\_CA}$ - 2* BW_{GB}
Adjacent channel centre frequency offset (in MHz)	+ $BW_{Channel\_CA}$ / - $BW_{Channel\_CA}$

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-UTRA ACLR and UTRA ACLR1/2 as shown in Figure 6.6.2.3B.3-1.

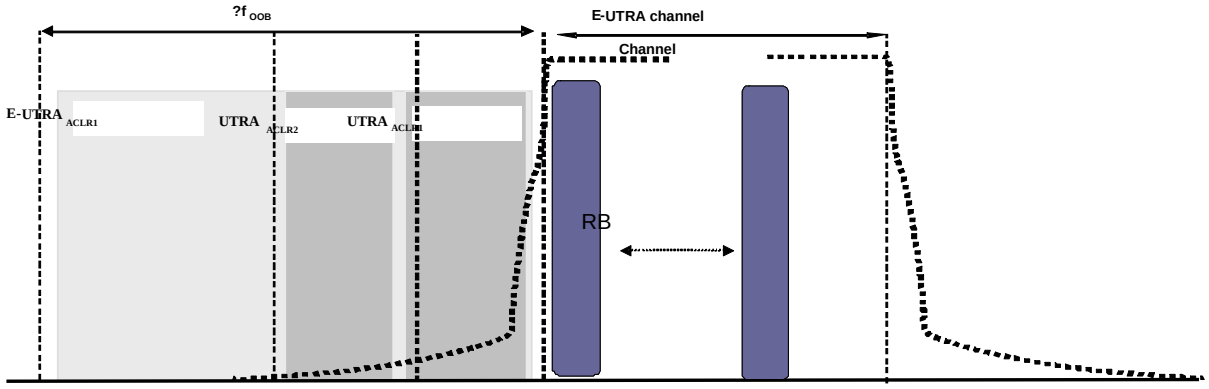

Figure 6.6.2.3B.3-1: Adjacent Channel Leakage Power Ratio requirements

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.

Table 6.6.2.3B.3.1-1: General requirements for E-UTRA$_{ACLR}$

	Channel bandwidth / E-UTRA$_{ACLR1}$ / measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
E-UTRA$_{ACLR1}$	30 dB	30 dB	30 dB	30 dB	30 dB	30 dB
E-UTRA channel Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz

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$_{ACLR}$) 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 α = 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 bandwidth / $E\text{-}UTRA_{ACLR1/2}$ / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
$E\text{-}UTRA_{ACLR1}$	33 dB	33 dB	33 dB	33 dB	33 dB	33 dB
Adjacent channel centre frequency offset (in MHz)	$0.7+BW_{UTRA}/2$ / $-0.7-BW_{UTRA}/2$	$1.5+BW_{UTRA}/2$ / $-1.5-BW_{UTRA}/2$	$2.5+BW_{UTRA}/2$ / $-2.5-BW_{UTRA}/2$	$5+BW_{UTRA}/2$ / $-5-BW_{UTRA}/2$	$7.5+BW_{UTRA}/2$ / $-7.5-BW_{UTRA}/2$	$10+BW_{UTRA}/2$ / $-10-BW_{UTRA}/2$
$UTRA_{ACLR2}$	-	-	36 dB	36 dB	36 dB	36 dB
Adjacent channel centre frequency offset (in MHz)	-	-	$2.5+3*BW_{UTRA}/2$ / $-2.5-3*BW_{UTRA}/2$	$5+3*BW_{UTRA}/2$ / $-5-3*BW_{UTRA}/2$	$7.5+3*BW_{UTRA}/2$ / $-7.5-3*BW_{UTRA}/2$	$10+3*BW_{UTRA}/2$ / $-10-3*BW_{UTRA}/2$
E-UTRA channel Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
UTRA 5MHz channel Measurement bandwidth[1]	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz
UTRA 1.6MHz channel measurement bandwidth[2]	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

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)				NC, TL/VL, TL/VH, TH/VL, TH/VH		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)				Low range, Mid range, High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)				Lowest, 5MHz, 10MHz, Highest		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		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 (Note 3)	50 (Note 3)
10MHz				16QAM	12	12
15MHz				QPSK	75	75
15MHz				QPSK	16	16
15MHz				16QAM	75 (Note 3)	75 (Note 3)
15MHz				16QAM	16	16
20MHz				QPSK	100	100
20MHz				QPSK	18	18
20MHz				16QAM	100 (Note 3)	100 (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 $E\text{-}UTRA_{ACLR}$.
8. Calculated the ratio of the power between the values measured in step 4 over step 6 for $UTRA_{ACLR1}$, $UTRA_{ACLR2}$.

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-UTRA ACLR, 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

	Channel bandwidth / $E\text{-}UTRA_{ACLR1}$ / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
$E\text{-}UTRA_{ACLR1}$	29.2 dB	29.2 dB	29.2 dB	29.2 dB	29.2 dB	29.2 dB
E-UTRA channel Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
UE channel	+1.4 MHz or -1.4 MHz	+3 MHz or -3 MHz	+5MHz or -5MHz	+10MHz or -10MHz	+15MHz or -15MHz	+20MHz or -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

	Channel bandwidth / E-UTRA$_{ACLR1/2}$ / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
UTRA$_{ACLR1}$	32.2 dB	32.2 dB	32.2 dB	32.2 dB	32.2 dB	32.2 dB
Adjacent channel centre frequency offset (in MHz)	0.7+BW$_{UTRA}$/2 / -0.7-BW$_{UTRA}$/2	1.5+BW$_{UTRA}$/2 / -1.5-BW$_{UTRA}$/2	2.5+BW$_{UTRA}$/2 / -2.5-BW$_{UTRA}$/2	5+BW$_{UTRA}$/2 / -5-BW$_{UTRA}$/2	7.5+BW$_{UTRA}$/2 / -7.5-BW$_{UTRA}$/2	10+BW$_{UTRA}$/2 / -10-BW$_{UTRA}$/2
UTRA$_{ACLR2}$	-	-	35.2 dB	35.2 dB	35.2 dB	35.2 dB
Adjacent channel centre frequency offset (in MHz)	-	-	2.5+3*BW$_{UTRA}$/2 / -2.5-3*BW$_{UTRA}$/2	5+3*BW$_{UTRA}$/2 / -5-3*BW$_{UTRA}$/2	7.5+3*BW$_{UTRA}$/2 / -7.5-3*BW$_{UTRA}$/2	10+3*BW$_{UTRA}$/2 / -10-3*BW$_{UTRA}$/2
E-UTRA channel Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
UTRA 5MHz channel Measurement bandwidth[1]	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz	3.84 MHz
UTRA 1.6MHz channel measurement bandwidth[2]	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.						
Note 3: BW$_{UTRA}$ 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 Δf_{OOB} (MHz) in Table6.6.3.1.3-1 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 Δf_{OOB} (MHz) from the edge of the channel bandwidth.

Table 6.6.3.1.3-1: Δf_{OOB} boundary between E-UTRA channel and spurious emission domain

Channel bandwidth	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Δf_{OOB} (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 ΔfOOB (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be ΔfOOB + 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 < 5th harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	Note 1
Note 1: Applies for Band 22, Band 42 and Band 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 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 Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)				Lowest, 5MHz, Highest		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	**Mod'n**	**RB allocation**		**Mod'n**	**RB allocation**	
		FDD	**TDD**		**FDD**	**TDD**
1.4MHz	N/A for Spurious Emissions 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_{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 Δf_{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 MHz	-36 dBm	100 kHz	
1 GHz ≤ f < 12.75 GHz	-30 dBm	1 MHz	
12.75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	Note 1
Note 1: Applies for Band 22, Band 42 and Band 43			

NOTE: In order that the measurement of spurious emissions falls within the frequency ranges that are more than ΔfOOB (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be ΔfOOB + 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 Δf_{OOB} (MHz) in Table 6.6.3.1A.1.3-1 from the ± edge of the aggregated channel bandwidth (Table 5.4.2A-1). For frequencies Δf_{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_{OOB} and spurious emission domain for intra-band contiguous carrier aggregation

CA Bandwidth Class	OOB boundary F_{OOB} [(MHz)
A	Table 6.6.3.1.3-1
B	FFS
C	$BW_{Channel\_CA}$ + 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 Δf_{OOB} (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be Δf_{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 range, High range					
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration			Lowest N_{RB_agg}, Highest N_{RB_agg}					
Test Parameters for CA Configurations								
CA Configuration / N_{RB_agg}		**DL Allocation**	**CC MOD**	**UL Allocation**				
PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
75	75	N/A for Spurious Emissions testing	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		QPSK	1	P_1@99	S_0@0	-	-
100	50		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 6.6.3.1A.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 Δf_{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 < 5th harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	Note 1
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 Δf_{OOB} (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be Δf_{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

E-UTRA Band	Spurious emission						
	Protected band	Frequency range (MHz)			Maximum Level (dBm)	MBW (MHz)	Comment
1	E-UTRA Band 1, 3, 7, 8, 9, 11, 34, 38, 40	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 6, Note 8, Note 14
	Frequency range	1895	-	1915	-15.5	5	Note 14, Note 17
	Frequency range	1915	-	1920	+1.6	5	Note 14, Note 17
2	E-UTRA Band 4, 5, 10, 12, 13, 14, 17	FDL_low	-	FDL_high	-50	1	
	E-UTRA Band 2	FDL_low	-	FDL_high	-50		Note 14
3	E-UTRA Band 1, 7, 8, 33, 34, 38	FDL_low	-	FDL_high	-50	1	
	E-UTRA Band 3	FDL_low	-	FDL_high	-50		Note 14
	Frequency range	860	-	895	-50	1	Note 13
	Frequency range	1475.9	-	1510.9	-50	1	Note 13
	Frequency range	1884.5	-	1915.7	-41	0.3	Note 13
4	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17	FDL_low	-	FDL_high	-50	1	
5	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17	FDL_low	-	FDL_high	-50	1	
6	E-UTRA Band 1, 9, 11, 34	FDL_low	-	FDL_high	-50	1	
	Frequency range	860	-	875	-37	1	
	Frequency range	875	-	895	-50	1	
	Frequency range	1884.5	-	1919.6	-41	0.3	Note 7
		1884.5	-	1915.7			Note 8
7	E-UTRA Band 1, 3, 7, 8, 33, 34	FDL_low	-	FDL_high	-50	1	
	Frequency range	2570	-	2575	+1.6	5	Note 14, Note 15, Note 18
	Frequency range	2575	-	2595	-15.5	5	Note 14, Note 15, Note 18
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 2
	E-UTRA band 7	FDL_low	-	FDL_high	-50	1	Note 2
	E-UTRA Band 8	FDL_low	-	FDL_high	-50	1	Note 14
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 8
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 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	Note 2

	E-UTRA Band 12	FDL_low	-	FDL_high	-50	1	Note[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	Note[14]
	Frequency range	769	-	775	-35	0.00625	Note[14]
	Frequency range	799	-	805	-35	0.00625	Note[11], Note[14]
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[12] Note[14]
	Frequency range	799	-	805	-35	0.00625	Note[11], Note[12] Note[14]
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[2]
	E-UTRA Band 12	FDL_low	-	FDL_high	-50	1	Note[14]
…							
33	E-UTRA Band 1, 7, 8, 34, 38, 39, 40	FDL_low	-	FDL_high	-50	1	Note[5]
	E-UTRA Band 3	FDL_low	-	FDL_high	-50	1	Note[14]
34	E-UTRA Band 1, 3, 7, 8, 9, 11, 33, 38,39, 40	FDL_low	-	FDL_high	-50	1	Note[5]
	Frequency range	860	-	895	-50	1	
	Frequency range	1475.9	-	1510.9	-50	1	
	Frequency range	1884.5	-	1915.7	-41	0.3	Note[8]
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[14], Note[16], Note[18]
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 Δf_{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

E-UTRA Band	Spurious emission						
	Protected band	Frequency range (MHz)			Maximum level (dBm)	MBW (MHz)	NOTE
1	E-UTRA Band 1, 3, 7, 8, 11, 20, 21, 34, 38, 40	F_{DL_low}	-	F_{DL_high}	-50	1	
	Frequency range	860	-	895	-50	1	
	Frequency range	1880	-	1895	-40	1	14,18
	Frequency range	1839.9	-	1879.9	-50	1	
	Frequency range	1895	-	1915	-15.5	5	14,18,19
	Frequency range	1915	-	1920	+1.6	5	14,18,19
	Frequency range	1884.5	-	1915.7	-41	0.3	6, 8, 14
2	E-UTRA Band 4, 5, 10, 12, 13, 14, 17	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2	F_{DL_low}	-	F_{DL_high}	-50	1	14
3	E-UTRA Band 1, 7, 8, 20, 33, 34, 38	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-50	1	14
	E-UTRA Band 11, 21	F_{DL_low}	-	F_{DL_high}	-50	1	13
	Frequency range	860	-	895	-50	1	13
	Frequency range	1884.5	-	1915.7	-41	0.3	13
4	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17	F_{DL_low}	-	F_{DL_high}	-50	1	
5	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17	F_{DL_low}	-	F_{DL_high}	-50	1	
6	E-UTRA Band 1, 9, 11, 34	F_{DL_low}	-	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
		1884.5	-	1915.7			8
7	E-UTRA Band 1, 3, 7, 8, 20, 33, 34	F_{DL_low}	-	F_{DL_high}	-50	1	
	Frequency range	2570	-	2575	-+1.6	5	14, 15, 19
	Frequency range	2575	-	2595	-15.5	5	14, 15, 19
	Frequency range	2595	-	2620	-40	1	14, 15
8	E-UTRA Band 1, 20, 33, 34, 38, 39, 40	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA band 3	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA band 7	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 8	F_{DL_low}	-	F_{DL_high}	-50	1	14
	E-UTRA Band 11, 21	F_{DL_low}	-	F_{DL_high}	-50	1	17
	Frequency range	860	-	890	-40	1	14, 17
	Frequency range	1884.5	-	1915.7	-41	0.3	8, 17
9	E-UTRA Band 1, 11, 21, 34	F_{DL_low}	-	F_{DL_high}	-50	1	
	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	
10	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17	F_{DL_low}	-	F_{DL_high}	-50	1	
11	E-UTRA Band 1, 9, 11, 21, 34	F_{DL_low}	-	F_{DL_high}	-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	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 4, 10	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 12	F_{DL_low}	-	F_{DL_high}	-50	1	14
13	E-UTRA Band 2, 4, 5, 10, 12, 13, 17	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 14	F_{DL_low}	-	F_{DL_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	F_{DL_low}	-	F_{DL_high}	-50	1	
	Frequency range	769	-	775	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 4, 10	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 12	F_{DL_low}	-	F_{DL_high}	-50	1	14
18	E-UTRA Band 1, 11, 21, 34	F_{DL_low}	-	F_{DL_high}	-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	-	1879.9	-50	1	
19	E-UTRA Band 1, 11, 21, 34	F_{DL_low}	-	F_{DL_high}	-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_{DL_high}	-50	1	
	E-UTRA Band 20	F_{DL_low}	-	F_{DL_high}	-50	1	14
	E-UTRA Band 38	F_{DL_low}	-	F_{DL_high}	-50	1	2
21	E-UTRA Band 11	F_{DL_low}	-	F_{DL_high}	-35	1	10, 14
	E-UTRA Band 1, 34	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 21	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	5
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-50	1	14
34	E-UTRA Band 1, 3, 7, 8, 11, 20, 21, 33, 38,39, 40	F_{DL_low}	-	F_{DL_high}	-50	1	5
	Frequency range	860	-	895	-50	1	
	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, 33, 34	F_{DL_low}	-	F_{DL_high}	-50	1	
	Frequency range	2620	-	2645	-15.5	5	14, 16, 19
	Frequency range	2645	-	2690	-40	1	14, 16
39	E-UTRA Band 34, 40	F_{DL_low}	-	F_{DL_high}	-50	1	
40	E-UTRA Band 1, 3, 33, 34, 39	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: 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-UTRA UL operating channel is ≥1744.9MHz and ≤ 1784.9MHz.
NOTE 14: These requirements also apply for the frequency ranges that are less than Δf_{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 ≤ 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 ≤ F_c ≤ 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_{start} > 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

E-UTRA Band	Spurious emission						
	Protected band	Frequency range (MHz)			Maximum Level (dBm)	MBW (MHz)	Note
1	E-UTRA Band 1, 7, 8, 11, 18, 19, 20, 21, 22, 38, 40, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 3, 34	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2, 25	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
3	E-UTRA Band 1, 7, 8, 20, 33, 34, 38, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 11, 18, 19, 21	F_{DL_low}	-	F_{DL_high}	-50	1	13
	E-UTRA Band 22, 42	F_{DL_low}	-	F_{DL_high}	-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_{DL_high}	-50	1	
	E-UTRA Band 42	F_{DL_low}	-	F_{DL_high}	-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_{DL_high}	-50	1	
	E-UTRA Band 41	F_{DL_low}	-	F_{DL_high}	-50	1	2
6	E-UTRA Band 1, 9, 11, 34	F_{DL_low}	-	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
		1884.5	-	1915.7			8
7	E-UTRA Band 1, 3, 7, 8, 20, 22, 33, 34, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA band 3	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA band 7	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 8	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 22, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 11, 21	F_{DL_low}	-	F_{DL_high}	-50	1	18
	Frequency range	860		890	-40	1	15, 18
	Frequency range	1884.5		1915.7	-41	0.3	8, 18
9	E-UTRA Band 1, 11, 18, 19, 21, 34	F_{DL_low}	-	F_{DL_high}	-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	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 41, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 22, 42	F_{DL_low}	-	F_{DL_high}	-50	1	2
11	E-UTRA Band 1, 11, 18, 19, 21, 34	F_{DL_low}	-	F_{DL_high}	-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	
12	E-UTRA Band 2, 5, 13, 14, 17, 23, 24, 25, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 4, 10	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 12	F_{DL_low}	-	F_{DL_high}	-50	1	15
13	E-UTRA Band 2, 4, 5, 10, 12, 13, 17, 23, 25, 41	F_{DL_low}	-	F_{DL_high}	-50	1	

	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_{DL_high}	-50	1	15
	E-UTRA Band 24	F_{DL_low}	-	F_{DL_high}	-50	1	2
14	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	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_{DL_high}	-50	1	
	E-UTRA Band 4, 10	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 12	F_{DL_low}	-	F_{DL_high}	-50	1	15
18	E-UTRA Band 1, 11, 21, 34	F_{DL_low}	-	F_{DL_high}	-50	1	
	Frequency range	860	-	890	-40	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	
19	E-UTRA Band 1, 11, 21, 34	F_{DL_low}	-	F_{DL_high}	-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	
20	E-UTRA Band 1, 3, 7, 8, 20, 22, 33, 34, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 20	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 38, 42	F_{DL_low}	-	F_{DL_high}	-50	1	2
21	E-UTRA Band 11	F_{DL_low}	-	F_{DL_high}	-35	1	10, 15
	E-UTRA Band 1, 34	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 21	F_{DL_low}	-	F_{DL_high}	-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	
22	E-UTRA Band 1, 3, 7, 8, 20, 33, 34, 38, 39, 40, 43	F_{DL_low}	-	F_{DL_high}	-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, 24, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2	F_{DL_low}	-	F_{DL_high}	-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

24	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
25	E-UTRA Band 4, 5, 10,12, 13, 14, 17, 22, 23, 24, 41, 42	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 25	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
…							
33	E-UTRA Band 1, 7, 8, 20, 22, 34, 38, 39, 40, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	5
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-50	1	15
34	E-UTRA Band 1, 3, 7, 8, 11, 18, 19, 20, 21, 22, 33, 38,39, 40, 42, 43	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
40	E-UTRA Band 1, 3, 22, 33, 34, 39, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
41	E-UTRA Band 2, 4, 5, 10, 12, 13 , 14, 17, 23, 24, 25	F_{DL_low}	-	F_{DL_high}	-50	1	
42	E-UTRA Band 1, 2, 3, 4, 5, 7, 8 , 10, 20, 25, 33, 34, 38, 40	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-50	1	3
43	E-UTRA Band 1, 2, 3, 4, 5, 7, 8 , 10, 20, 25, 33, 34, 38, 40	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 42	F_{DL_low}	-	F_{DL_high}	-50	1	3
	E-UTRA Band 22	F_{DL_low}	-	F_{DL_high}	[-50]	[1]	3

NOTE 1: F_{DL_low} and F_{DL_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, 3rd or 4th 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 2nd, 3rd or 4th 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 6.6.3.3.3.3 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-UTRA 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_{OOB} (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 ≤ 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 ≤ F_c ≤ 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_{start} > 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

E-UTRA Band	Spurious emission						
	Protected band	Frequency range (MHz)			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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 3, 34	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2, 25	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
3	E-UTRA Band 1, 7, 8, 20, 26, 27, 28, 33, 34, 38, 41, 43, 44	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 11, 18, 19, 21	F_{DL_low}	-	F_{DL_high}	-50	1	13
	E-UTRA Band 22, 42	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 42	F_{DL_low}	-	F_{DL_high}	-50	1	2
5	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 22, 23, 24, 25, 28, 29,42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 41	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 26	859	-	869	-27	1	
6	E-UTRA Band 1, 9, 11, 34	F_{DL_low}	-	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
		1884.5	-	1915.7			8
7	E-UTRA Band 1, 3, 7, 8, 20, 22, 27, 28, 29, 33, 34, 42, 43	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA band 3	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA band 7	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 8	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 22, 41, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 11, 21	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-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	
	Frequency range	2545	-	2575	-50	1	
10	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 26, 27, 28, 29, 41, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 22, 42	F_{DL_low}	-	F_{DL_high}	-50	1	2
11	E-UTRA Band 1, 11, 18, 19, 21, 28, 34	F_{DL_low}	-	F_{DL_high}	-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	
	Frequency range	2545	-	2575	-50	1	
12	E-UTRA Band 2, 5, 13, 14, 17, 23, 24, 25, 26, 27, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 4, 10	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 12	F_{DL_low}	-	F_{DL_high}	-50	1	15
13	E-UTRA Band 2, 4, 5, 10, 12, 13, 17, 23, 25, 26, 27, 29, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	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_{DL_high}	-50	1	15
	E-UTRA Band 24	F_{DL_low}	-	F_{DL_high}	-50	1	2
14	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 26, 27, 29, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	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, 26, 27, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 4, 10	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 12	F_{DL_low}	-	F_{DL_high}	-50	1	15
18	E-UTRA Band 1, 11, 21, 34	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 20	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 38, 42	F_{DL_low}	-	F_{DL_high}	-50	1	2
21	E-UTRA Band 11	F_{DL_low}	-	F_{DL_high}	-35	1	10, 15
	E-UTRA Band 1, 18, 19, 28, 34	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 21	F_{DL_low}	-	F_{DL_high}	-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, 33, 34, 38, 39, 40, 43	F_{DL_low}	-	F_{DL_high}	-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, 24, 26, 27, 29, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2	F_{DL_low}	-	F_{DL_high}	-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, 23, 24, 25, 26, 29, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
25	E-UTRA Band 4, 5, 10,12, 13, 14, 17, 22, 23, 24, 26, 27, 28, 29, 41, 42	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2	F_{DL_low}	-	F_{DL_high}	-50	1	15

	E-UTRA Band 25	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-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, 34, 40, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 41	F_{DL_low}	-	F_{DL_high}	-50	1	2
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	703	-	799	-50	1	
		799	-	803	-40	1	15
	Frequency range	851	-	859	-53	0.00625	20
	E-UTRA Band 27	F_{DL_low}	-	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, 14, 17, 22, 23, 25, 26, 27, 29, 41, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	Frequency range	799	-	805	-35	0.00625	
		790	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 1, 4, 10, 22, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 11, 21	F_{DL_low}	-	F_{DL_high}	-50	1	19, 24
	E-UTRA Band 1	F_{DL_low}	-	F_{DL_high}	-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	
…							
33	E-UTRA Band 1, 7, 8, 20, 22, 34, 38, 39, 40, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	5
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-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_{DL_high}	-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, 33, 34, 42, 43	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
40	E-UTRA Band 1, 3, 22, 26, 27, 33, 34, 39, 41, 42, 43, 44	F_{DL_low}	-	F_{DL_high}	-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_{DL_high}	-50	1	
	E-UTRA Band 9, 11, 18, 19, 21	F_{DL_low}	-	F_{DL_high}	-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	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 42	F_{DL_low}	-	F_{DL_high}	-50	1	3
	E-UTRA Band 22	F_{DL_low}	-	F_{DL_high}	[-50]	[1]	3
44	E-UTRA Band 3, 5, 8, 34, 39, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 1, 40, 42	F_{DL_low}	-	F_{DL_high}		-50	2

NOTE 1: F_{DL_low} and F_{DL_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, 3rd, 4th [or 5th] 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 2nd, 3rd or 4th 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 subclause 6.6.3.3.3.3 is signalled by the network
NOTE 10: Applicable when NS_09 in subclause 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-UTRA 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_{OOB} (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 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 ≤ 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 ≤ F_c ≤ 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_{start} > 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 2nd 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 2nd 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 3rd 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 3rd 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

E-UTRA Band	Spurious emission						
	Protected band	Frequency range (MHz)			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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 3, 34	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2, 25	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
3	E-UTRA Band 1, 7, 8, 20, 26, 27, 28, 31, 33, 34, 38, 41, 43, 44	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 11, 18, 19, 21	F_{DL_low}	-	F_{DL_high}	-50	1	13
	E-UTRA Band 22, 42	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 42	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 41	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 26	859	-	869	-27	1	
6	E-UTRA Band 1, 9, 11, 34	F_{DL_low}	-	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
		1884.5	-	1915.7			8
7	E-UTRA Band 1, 3, 7, 8, 20, 22, 27, 28, 29, 31, 33, 34, 42, 43	F_{DL_low}	-	F_{DL_high}	-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, 31, 33, 34, 38, 39, 40	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA band 3	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA band 7	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 8	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 22, 41, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 11, 21	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-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	
	Frequency range	2545	-	2575	-50	1	
10	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 26, 27, 28, 29, 41, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 22, 42	F_{DL_low}	-	F_{DL_high}	-50	1	2
11	E-UTRA Band 1, 11, 18, 19, 21, 28, 34	F_{DL_low}	-	F_{DL_high}	-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	
	Frequency range	2545	-	2575	-50	1	
12	E-UTRA Band 2, 5, 13, 14, 17, 23, 24, 25, 26, 27, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 4, 10	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 12	F_{DL_low}	-	F_{DL_high}	-50	1	15
13	E-UTRA Band 2, 4, 5, 10, 12, 13, 17, 23, 25, 26, 27, 29, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	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_{DL_high}	-50	1	15
	E-UTRA Band 24	F_{DL_low}	-	F_{DL_high}	-50	1	2
14	E-UTRA Band 2, 4, 5, 10, 12, 13, 14, 17, 23, 24, 25, 26, 27, 29, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	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, 26, 27, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 4, 10	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 12	F_{DL_low}	-	F_{DL_high}	-50	1	15
18	E-UTRA Band 1, 11, 21, 34	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 20	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 38, 42	F_{DL_low}	-	F_{DL_high}	-50	1	2
21	E-UTRA Band 11	F_{DL_low}	-	F_{DL_high}	-35	1	10, 15
	E-UTRA Band 1, 18, 19, 28, 34	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 21	F_{DL_low}	-	F_{DL_high}	-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, 33, 34, 38, 39, 40, 43	F_{DL_low}	-	F_{DL_high}	-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, 24, 26, 27, 29, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2	F_{DL_low}	-	F_{DL_high}	-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, 23, 24, 25, 26, 29, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
25	E-UTRA Band 4, 5, 10,12, 13, 14, 17, 22, 23, 24, 26, 27, 28, 29, 41, 42	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 2	F_{DL_low}	-	F_{DL_high}	-50	1	15

	E-UTRA Band 25	F_{DL_low}	-	F_{DL_high}	-50	1	15
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 41	F_{DL_low}	-	F_{DL_high}	-50	1	2
	Frequency range	1884.5	-	1915.7	-41	0.3	8
	Frequency range	703	-	799	-50	1	
		799	-	803	-40	1	15
	Frequency range	851	-	859	-53	0.00625	20
	E-UTRA Band 27	F_{DL_low}	-	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, 14, 17, 22, 23, 25, 26, 27, 29, 31, 41, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	
	Frequency range	799	-	805	-35	0.00625	
		790	-	F_{DL_high}	-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, 31, 34, 38, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 1, 4, 10, 22, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	2
	E-UTRA Band 11, 21	F_{DL_low}	-	F_{DL_high}	-50	1	19, 24
	E-UTRA Band 1	F_{DL_low}	-	F_{DL_high}	-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	
31	E-UTRA Band 1, 5, 7, 8, 26, 27, 28, 38, 42	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-50	1	2
…							
33	E-UTRA Band 1, 7, 8, 20, 22, 34, 38, 39, 40, 42, 43	F_{DL_low}	-	F_{DL_high}	-50	1	5
	E-UTRA Band 3	F_{DL_low}	-	F_{DL_high}	-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_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
40	E-UTRA Band 1, 3, 22, 26, 27, 33, 34, 39, 41, 42, 43, 44	F_{DL_low}	-	F_{DL_high}	-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_{DL_high}	-50	1	
	E-UTRA Band 9, 11, 18, 19, 21	F_{DL_low}	-	F_{DL_high}	-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	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 43	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 42	F_{DL_low}	-	F_{DL_high}	-50	1	3

	E-UTRA Band 22	F_{DL_low}	-	F_{DL_high}	[-50]	[1]	3
44	E-UTRA Band 3, 5, 8, 34, 39, 41	F_{DL_low}	-	F_{DL_high}	-50	1	
	E-UTRA Band 1, 40, 42	F_{DL_low}	-	F_{DL_high}		-50	2

Note 1: F_{DL_low} and F_{DL_high} 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 2nd, 3rd, 4th [or 5th] 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 2nd, 3rd or 4th 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 subclause 6.6.3.3.3.3 is signalled by the network
Note 10: Applicable when NS_09 in subclause 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-UTRA 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_{OOB} (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 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 ≤ 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 ≤ F_c ≤ 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_{start} > 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 2nd 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 2nd 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 3rd 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 3rd 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 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) (Note 6, Note 7)	Low range, Mid range, High range (Note 6, Note 7)					
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
1.4MHz	N/A for Spurious Emissions testing			QPSK	6	6
1.4MHz				QPSK	1	1
3MHz				QPSK	15	15
3MHz				QPSK	1	1
5MHz				QPSK	25	25[12]
5MHz				QPSK	1	1[12]
5MHz				QPSK	20[8]	-
10MHz				QPSK	50	50
10MHz				QPSK	1	1
10MHz				QPSK	32[9]	-
10MHz				QPSK	1[10]	-
15MHz				QPSK	75	75
15MHz				QPSK	54[3, 11]	54[4]
15MHz				QPSK	1[5]	1[5]
20MHz				QPSK	100	100
20MHz				QPSK	54[3, 11]	54[4]
20MHz				QPSK	1[5]	1[5]

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.

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 allocation – 54), instead of full allocation.

Note 4: 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 RB#(full allocation – 54), instead of full allocation.

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 6.6.3.2.3-1C. 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_{UL}	Frequency of Uplink [MHz]	N_{DL}	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

23	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
24	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
25	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
26	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D
27	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D
28	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D
31	Table 6.6.3.2.3-1D	Table 6.6.3.2.3-1D	Table 6.6.3.2.3-1D	Table 6.6.3.2.3-1D	Table 6.6.3.2.3-1D
...					
33	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
34	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
35					
36					
37					
38	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
39	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
40	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
41	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
42	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
43	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
44	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D

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 CA Configuration	Spurious emission						
	Protected band	Frequency range (MHz)			Maximum 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}	-	F_{DL_high}	-50	1	
	E-UTRA band 34	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	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}	-	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_{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_{OOB} (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.

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

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: Low range, High range						
Test CC Combination setting (NRB_agg) as specified in clause 5.4.2A.1 for the CA Configuration			Lowest N_{RB_agg} Highest N_{RB_agg}						
Test Parameters for CA Configurations									
CA Configuration / N_{RB_agg}		**DL Allocation**	**CC MOD**	**UL Allocation**					
PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**				
75	75		QPSK	2	P_1@0	S_1@74			
75	75		QPSK	150	P_75@0	S_75@0			
100	50		QPSK	2	P_1@0	S_1@49			
100	50		QPSK	150	P_100@0	S_50@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 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 CA Configuration	Spurious emission						
	Protected band	Frequency range (MHz)			Maximum 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}	-	F_{DL_high}	-50	1	
	E-UTRA band 34	F_{DL_low}	-	F_{DL_high}	-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_{DL_low}	-	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}	-	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_{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_{OOB} (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 Δf_{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	
$1884.5 \le f \le 1915.7$ *1	-41	-41	-41	-41	300 KHz
Note 1: Applicable when the lower edge of the assigned E-UTRA UL 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-clause 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_c = 1932.5 MHz			
RB_{start}	0-7	8-66	67-74
L_{CRB}	N/A	$\le MIN(30, 67 - RB_{start})$	N/A
20 MHz channel bandwidth with f_c = 1930 MHz			
RB_{start}	0-23	24-75	76-99
L_{CRB}	N/A	$\le MIN(24, 76 - RB_{start})$	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 Δf_{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 Δf_{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 (MHz)	Channel bandwidth / Spectrum emission limit (dBm)			Measurement bandwidth
	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 Δf_{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 Δf_{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)	Measurement bandwidth	Note
	1.4, 3, 5 MHz		
806 ≤ f ≤ 813.5	-42	6.25 kHz	1
NOTE 1: The emission limit applies at an offset of 0.7 MHz below any block of E-UTRA carriers			

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 Δf_{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)	Measurement bandwidth	Note
	5 MHz		
806 ≤ f ≤ 816	-42	6.25 kHz	1
NOTE 1: The emission limit applies at an offset of 3 MHz below any block of E-UTRA carriers			

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 Δf_{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
	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-UTRA carriers			

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 Δf_{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)	Measurement bandwidth	Note
	1.4, 3, 5, 10, 15 MHz		
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 standard deviation < 0.5 dB.			

6.6.3.3.3.9 Minimum requirement (network signalled value "NS_16")

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 Δf_{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)	Measurement bandwidth	Note
	1.4, 3, 5, 10 MHz		
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 Δf_{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)	Measurement bandwidth	Note
	5, 10 MHz		
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 Δf_{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)	Measurement bandwidth	Note
	5, 10, 15, 20 MHz		
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")

Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	Low range, Mid range In case of Low range: - For 5MHz Channel Bandwidth: 1927.2MHz (N_{UL} = 18072) - For 10MHz Channel Bandwidth: 1934.7MHz (N_{UL} = 18147) - For 15MHz Channel Bandwidth: 1932.5MHz (N_{UL} = 18125) - For 20MHz Channel Bandwidth: 1930MHz (N_{UL} = 18100)					
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 Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
5MHz	N/A for Additional Spurious Emissions testing			QPSK	1	N/A
5MHz				QPSK	25	
10MHz				QPSK	1	
10MHz				QPSK	12	
10MHz				QPSK	48	
10MHz				QPSK	50	
10MHz				16QAM	50 (Note 3)	
15MHz				QPSK	1	
15MHz				QPSK	16	
15MHz				QPSK	30 (Note 4)	
15MHz				QPSK	48 (Note 5)	
15MHz				QPSK	75 (Note 5)	
15MHz				16QAM	75 (Note 3, 5)	
20MHz				QPSK	1	
20MHz				QPSK	18	
20MHz				QPSK	24 (Note 4)	
20MHz				QPSK	48 (Note 5)	
20MHz				QPSK	100 (Note 5)	
20MHz				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 Range.
For 15MHz of Low Range, the 1 RB allocation shall be tested at both RB#8 and RB#66.
For 20MHz of Low Range, the 1 RB allocation shall be tested at both RB#24 and RB#75.

Note 2: The RB_{start} 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.
For 15MHz of Low Range, the RB_{start} shall be RB#8 and RB# (67 – RB allocation).
For 20MHz of Low Range, the RB_{start} shall be RB#24 and RB# (76 – RB allocation).

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

Note 4: Required for Low Range only.

Note 5: Not available for Low Range.

Table 6.6.3.3.4.1-2: Test Configuration Table (network signalled value "NS_07")

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)				10MHz		
Test Parameters for Channel Bandwidths						
		Downlink Configuration		**Uplink Configuration**		
Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	RB_{start}
1	10MHz	N/A for Additional Spurious Emissions testing.		QPSK	1	0
2	10MHz			QPSK	8	0
3	10MHz			QPSK	6	13
4	10MHz			QPSK	20	13
5	10MHz			QPSK	12	13
6	10MHz			16QAM	36 (Note 1)	13
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	6	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: 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 **TS 36.508[7] subclause 4.1**			Normal			
Test Frequencies as specified in **TS36.508 [7] subclause 4.3.1**			High range			
Test Channel Bandwidths as specified in **TS 36.508 [7] subclause 4.3.1**			5MHz, 10MHz, 15MHz			
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
5MHz	N/A for Additional Spurious Emissions testing			QPSK	1	N/A
5MHz				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 1: The 1 RB allocation shall be tested at both RB #0 and RB #max.						
Note 2: The RB_{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.						

Table 6.6.3.3.4.1-4: Test Configuration Table (network signalled value "NS_09")

Initial Conditions						
Test Environment as specified in **TS 36.508[7] subclause 4.1**			Normal			
Test Frequencies as specified in **TS36.508 [7] subclause 4.3.1**			High range			
Test Channel Bandwidths as specified in **TS 36.508 [7] subclause 4.3.1**			5MHz, 10MHz, 15MHz			
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
5MHz	N/A for Additional Spurious Emissions testing			QPSK	1	N/A
5MHz				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 1: The 1 RB allocation shall be tested at both RB #0 and RB #max.						
Note 2: The RB_{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.						

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	N/A for Additional Spurious Emissions testing		QPSK	1	0
2	1.4 MHz			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

Table6.6.3.3.4.1-6: Test Configuration Table (network signalled value "NS_13")

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)				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	5 MHz	N/A for Additional Spurious Emissions testing		QPSK	1	0
2	5 MHz			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	N/A for Additional Spurious Emissions testing		QPSK	1	0
2	10 MHz			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: Applies only for UE-Categories ≥2.						

Table 6.6.3.3.4.1-8: Test Configuration Table (network signalled value "NS_15")

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 1.4 MHz Channel Bandwidth: High range For 3 MHz Channel Bandwidth: 843.5 MHz (N_{UL} = 26985) or High range For 5 MHz Channel Bandwidth: 842.5 MHz (N_{UL} = 26975) or High range For 10 MHz Channel Bandwidth: 840 MHz (NUL = 26950) or High range For 15 MHz Channel Bandwidth: 837.5 MHz (NUL = 26925) or High range
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz

Test Parameters for Channel Bandwidths						
		Downlink Configuration		Uplink Configuration		
Configuration ID	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RBstart FDD
1 (note 3)	1.4 MHz	N/A for A-MPR testing.		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	39
13 (note 3)	10 MHz			QPSK	1	10
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 (note 2)	15 MHz		QPSK	60	2
Note 1: Applies only for UE-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")

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 1.4 MHz Channel Bandwidth: Low range For 3 MHz Channel Bandwidth: Low range, 810 MHz (N_{UL}= 27070) For 5 MHz Channel Bandwidth: Low range, 811 MHz (N_{UL}= 27080) , 814.5 MHz (N_{UL}= 27115) For 10 MHz Channel Bandwidth: Low range, 813.5 MHz (N_{UL}= 27105), 817 MHz (N_{UL}= 27140)		
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)				1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
Test Parameters for Channel Bandwidths						
		Downlink Configuration		**Uplink Configuration**		
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation**	**Mod'n**	**RB allocation FDD**	**RBstart FDD**
1	1.4 MHz	N/A for Additional Spurious Emissions 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			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

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 Conditions					
Test Environment (as specified in TS 36.508[7] subclause 4.1)				Normal	
Test Frequencies (as specified inTS36.508 [7] subclause 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 Configuration**	
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation FDD**	**Mod'n**	**RB allocation FDD**
1	5MHz	N/A for Additional Spurious Emissions testing		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			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 6.6.3.3.4.1-11: Test Configuration Table (network signalled value "NS_18")

Initial Conditions

Test Environment (as specified in TS 36.508[7] subclause 4.1)				Normal	
Test Frequencies (as specified inTS36.508 [7] subclause 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 Configuration**	
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation FDD**	**Mod'n**	**RB allocation FDD**
1	5MHz	N/A for Additional Spurious Emissions testing		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			16QAM	50 (Note 3)
9	15MHz			QPSK	1
10	15MHz			QPSK	16
11	15MHz			QPSK	75
12	15MHz			16QAM	75 (Note 3)
13	20MHz			QPSK	1
14	20MHz			QPSK	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.					

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, 6.6.3.3.5.4-1, 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	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

6.6.3.3.4.3 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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	18 (NS_18)		

6.6.3.3.5 Test requirement

6.6.3.3.5.1 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 6.2.4.5-4 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 Δf_{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-UTRA UL 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-clause 5.4.2. Additional restrictions apply for operations below this point.					

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.

Table 6.6.3.3.5.1-2: RB restrictions for additional requirement (PHS)

15 MHz channel bandwidth with f_c = 1932.5 MHz			
RB_{start}	0-7	8-66	67-74
L_{CRB}	N/A	≤ MIN(30, 67 – RB_{start})	N/A
20 MHz channel bandwidth with f_c = 1930 MHz			
RB_{start}	0-23	24-75	76-99
L_{CRB}	N/A	≤ MIN(24, 76 – RB_{start})	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 Δf_{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 deviation < 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 Δf_{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 bandwidth / Spectrum emission limit (dBm)			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 Δf_{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 bandwidth / Spectrum emission limit (dBm)			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 Δf_{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)	Measurement bandwidth	Note
	1.4, 3, 5 MHz		
806 ≤ f ≤ 813.5	-42	6.25 kHz	1
NOTE 1: The emission limit applies at an offset of 0.7 MHz below any block of E-UTRA carriers			

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 Δf_{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)	Measurement bandwidth	Note
	5 MHz		
806 ≤ f ≤ 816	-42	6.25 kHz	1
NOTE 1: The emission limit applies at an offset of 3 MHz below any block of E-UTRA carriers			

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 Δf_{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
	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-UTRA carriers			

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 Δf_{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)	Channel bandwidth / Spectrum emission limit (dBm)	Measurement bandwidth	Note
	1.4, 3, 5, 10, 15 MHz		
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 Δf_{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

Frequency band (MHz)	Channel bandwidth / Spectrum emission limit (dBm)	Measurement bandwidth	Note
	1.4, 3, 5, 10 MHz		
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 Δf_{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)	Measurement bandwidth	Note
	5, 10 MHz		
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.			

6.6.3.3.5.11 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 Δf_{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)	Measurement bandwidth	Note
	5, 10, 15, 20 MHz		
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 Δf_{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	Frequency range (MHz)			Maximum Level (dBm)	MBW (MHz)	Note
E-UTRA band 34	F_{DL_low}	-	F_{DL_high}	-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 Δf_{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_{DL_low}	-	F_{DL_high}	-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 Δf_{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)			Maximum Level (dBm)	MBW (MHz)
E-UTRA band 34	F_{DL_low}	-	F_{DL_high}	-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)			Maximum Level (dBm)	MBW (MHz)
Frequency range	2620	-	2645	-15.5	5
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)			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")

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 and High range						
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration			Lowest N_{RB_agg} Highest N_{RB_agg}						
Test Parameters for CA Configurations									
ID	**CA Configuration / N_{RB_agg}**		**DL Allocation (PDCCH on PCC)**	**CC MOD**	**UL Allocation**				
	PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
1	75	75	N/A	QPSK	1	P_1@0	S_0@0		
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		QPSK	8	P_0@0	S_8@67		
5	75	75		QPSK	128	P_75@0	S_53@0		
6	75	75		QPSK	2	P_1@0	S_1@74		
7	75	75		QPSK	30	P_10@0	P_5@50	S_5@25	S_10@65
8	75	75		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		
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 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.1.4.1-2: 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			NC			
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.			C: Low and High range			
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration			Lowest N_{RB_agg} Highest N_{RB_agg}			
Test Parameters for CA Configurations						
ID	**CA Configuration / N_{RB_agg}**		**DL Allocation (PDCCH on PCC)**	**CC MOD**	**UL Allocation**	
	PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**

1	75	75	N/A	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		QPSK	TBD	TBD	TBD		
9	100	100		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")

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 and High range						
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration			Lowest N_{RB_agg} Highest N_{RB_agg}						
Test Parameters for CA Configurations									
ID	**CA Configuration / N_{RB_agg}**		**DL Allocation (PDCCH on PCC)**	**CC MOD**	**UL Allocation**				
	PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
1	75	75	N/A	QPSK	1	P_1@0	S_0@0		
2	75	75		QPSK	1	P_1@21	S_0@0		
3	75	75		QPSK	75	P_75@0	S_0@0		
4	75	75		QPSK	90	P_75@0	S_15@0		
5	75	75		QPSK	150	P_75@0	S_75@0		
6	75	75		QPSK	1	P_0@0	S_1@74		
7	75	75		QPSK	1	P_0@0	S_1@44		
8	75	75		QPSK	TBD	TBD	TBD		
9	100	100		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		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		
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 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_{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 6.2.4A.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 additionalSpectrumEmissionSCell-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 fulfil 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 Δf_{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)			Maximum Level (dBm)	MBW (MHz)	Note
E-UTRA band 34	F_{DL_low}	-	F_{DL_high}	-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 Δf_{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_{DL_low}	-	F_{DL_high}	-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 Δf_{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_{DL_low}	-	F_{DL_high}	-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 multiplexing 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

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)	NC					
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)	Low range, Mid range, High range					
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
1.4MHz	N/A for Spurious Emissions 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.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 HARQ 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 ΔfOOB (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 harmonic of the upper frequency edge of the UL operating band in GHz	-30 dBm	1 MHz	Note 1
Note 1: Applies for Band 22, Band 42 and Band 43.			

NOTE: In order that the measurement of spurious emissions falls within the frequency ranges that are more than ΔfOOB (MHz) from the edge of the channel bandwidth, the minimum offset of the measurement frequency from each edge of the channel should be ΔfOOB + 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

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)				NC		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1) (Note 3)				Low range, Mid range, High range (Note 4)		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)				Lowest, 5MHz, Highest		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
1.4MHz	N/A for Spurious Emissions testing			QPSK	6	6
1.4MHz				QPSK	1	1
3MHz				QPSK	15	15
3MHz				QPSK	1	1
5MHz				QPSK	25	25[5]
5MHz				QPSK	1	1[5]
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.
Note 3: Do not apply for requirements under Note 13 in Tables 6.6.3.2.3-1B to 6.6.3.2.3-1D . Test frequencies for these requirements are defined in Table 6.6.3B.2.4.1-2.
Note 4: 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 6.2.4B.3-1].
Note 5: For requirements under note 22 in Table 6.6.3B.2.5-1, the message exception in Table 6.6.3B.2.4.3-1 is used to test with the high channel.

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_{UL}	Frequency of Uplink [MHz]	N_{DL}	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: 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

6.6.3B.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**	**Condition**
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 ΔfOOB (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		

23	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
24	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
25	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
26	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
27	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
28	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
31	Table 6.6.3.2.3-1D	Table 6.6.3.2.3-1D	Table 6.6.3.2.3-1D		
...					
33	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
34	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
35					
36					
37					
38	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
39	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
40	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
41	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
42	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
43	Table 6.6.3.2.3-1B	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		
44	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1C	Table 6.6.3.2.3-1D		

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 multiplexing 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")

Initial Conditions						
Test Environment as specified in TS 36.508 [7] clause 4.1	Normal					
Test Frequencies as specified in TS 36.508 [7] clause 4.3.1	Low range, Mid range In case of Low range: - For 5MHz Channel Bandwidth: 1927.2MHz (N_{UL} = 18072) - For 10MHz Channel Bandwidth: 1934.7MHz (N_{UL} = 18147) - For 15MHz Channel Bandwidth: 1932.5MHz (N_{UL} = 18125) - For 20MHz Channel Bandwidth: 1930MHz (N_{UL} = 18100)					
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.1	5MHz, 10MHz, 15MHz, 20MHz					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
5MHz	N/A for Additional Spurious Emissions testing			QPSK	1	N/A
5MHz				QPSK	25	
10MHz				QPSK	1	
10MHz				QPSK	12	
10MHz				QPSK	48	
10MHz				QPSK	50	
10MHz				16QAM	50 (Note 3)	
15MHz				QPSK	1	
15MHz				QPSK	16	
15MHz				QPSK	30 (Note 4)	
15MHz				QPSK	48 (Note 5)	
15MHz				QPSK	75 (Note 5)	
15MHz				16QAM	75 (Note 3, 5)	
20MHz				QPSK	1	
20MHz				QPSK	18	
20MHz				QPSK	24 (Note 4)	
20MHz				QPSK	48 (Note 5)	
20MHz				QPSK	100 (Note 5)	
20MHz				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 Range.
For 15MHz of Low Range, the 1 RB allocation shall be tested at both RB#8 and RB#66.
For 20MHz of Low Range, the 1 RB allocation shall be tested at both RB#24 and RB#75.

Note 2: The RBstart 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.
For 15MHz of Low Range, the RB_{start} shall be RB#8 and RB# (67 – RB allocation).
For 20MHz of Low Range, the RB_{start} shall be RB#24 and RB# (76 – RB allocation).

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

Note 4: Required for Low Range only.

Note 5: Not available for Low Range.

Table 6.6.3B.3.4.1-2: Test Configuration Table (network signalled value "NS_07")

Initial Conditions						
Test Environment as specified in TS 36.508 [7] clause 4.1				NC		
Test Frequencies as specified in TS 36.508 [7] clause 4.3.1				Mid range		
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.1				10MHz		
Test Parameters for Channel Bandwidths						
		Downlink Configuration		**Uplink Configuration**		
Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation	TDD
1	10MHz	N/A for Additional Spurious Emissions testing.		QPSK	1	0
2	10MHz			QPSK	8	0
3	10MHz			QPSK	6	13
4	10MHz			QPSK	20	13
5	10MHz			QPSK	12	13
6	10MHz			16QAM	36 (Note 1)	13
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	6	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: Applies only for UE-Categories ≥2.						

Table 6.6.3B.3.4.1-3: Test Configuration Table (network signalled value "NS_08")

Initial Conditions						
Test Environment as specified in TS 36.508 [7] clause 4.1				Normal		
Test Frequencies as specified in TS 36.508 [7] clause 4.3.1				High range		
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.1				5MHz, 10MHz, 15MHz		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
5MHz	N/A for Additional Spurious Emissions testing			QPSK	1	N/A
5MHz				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 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.3.4.1-4: Test Configuration Table (network signalled value "NS_09")

Initial Conditions						
Test Environment as specified in TS 36.508 [7] clause 4.1				Normal		
Test Frequencies as specified in TS 36.508 [7] clause 4.3.1				High range		
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.1				5MHz, 10MHz, 15MHz		
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
		FDD	TDD		FDD	TDD
5MHz	N/A for Additional Spurious Emissions testing			QPSK	1	N/A
5MHz				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 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.3.4.1-5: Test Configuration Table (network signalled value "NS_12")

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)				NC		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)				Mid range		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 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	RB_{start} FDD
1	1.4 MHz	N/A for Additional Spurious Emissions testing		QPSK	1	0
2	1.4 MHz			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

Table6.6.3B.3.4.1-6: Test Configuration Table (network signalled value "NS_13")

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)				NC		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)				Mid range		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)				5 MHz		
Test Parameters for Channel Bandwidths						
		Downlink Configuration		**Uplink Configuration**		
Test Number	Ch BW	Mod'n	RB allocation	Mod'n	RB allocation FDD	RB_{start} FDD
1	5 MHz	N/A for Additional Spurious Emissions testing		QPSK	1	0
2	5 MHz			QPSK	25	0
3	5 MHz			QPSK	15	0
4	5 MHz			QPSK	15	7
5	5 MHz			16QAM	25	0

Table 6.6.3B.3.4.1-7: Test Configuration Table (network signalled value "NS_14")

Initial Conditions						
Test Environment (as specified in TS 36.508 [7] clause 4.1)				NC		
Test Frequencies (as specified in TS 36.508 [7] clause 4.3.1)				Mid range		
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 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	RB_{start} FDD
1	10 MHz	N/A for Additional Spurious Emissions testing		QPSK	1	0
2	10 MHz			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: Applies only for UE-Categories ≥2.						

Table 6.6.3B.3.4.1-8: Test Configuration Table (network signalled value "NS_15")

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 1.4 MHz Channel Bandwidth: High range For 3 MHz Channel Bandwidth: 843.5 MHz (N_{UL} = 26985) or High range For 5 MHz Channel Bandwidth: 842.5 MHz (N_{UL} = 26975) or High range For 10 MHz Channel Bandwidth: 840 MHz (NUL = 26950) or High range For 15 MHz Channel Bandwidth: 837.5 MHz (NUL = 26925) or High range		
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)				1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz		
Test Parameters for Channel Bandwidths						
		Downlink Configuration		**Uplink Configuration**		
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation**	**Mod'n**	**RB allocation FDD**	**RBstart FDD**
1 (note 3)	1.4 MHz	N/A for A-MPR testing.		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			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 (note 2)	15 MHz		QPSK	60	2

Note 1: Applies only for UE-Categories ≥2.
Note 2: Applicable only test frequency < high range
Note 3: Applicable only to high range frequency testing

Table 6.6.3B.3.4.1-9: Test Configuration Table (network signalled value "NS_16")

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 1.4 MHz Channel Bandwidth: Low range For 3 MHz Channel Bandwidth: Low range, 810 MHz (N_{UL}= 27070) For 5 MHz Channel Bandwidth: Low range, 811 MHz (N_{UL}= 27080) , 814.5 MHz (N_{UL}= 27115) For 10 MHz Channel Bandwidth: Low range, 813.5 MHz (N_{UL}= 27105), 817 MHz (N_{UL}= 27140)		
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)				1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
Test Parameters for Channel Bandwidths						
		Downlink Configuration		**Uplink Configuration**		
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation**	**Mod'n**	**RB allocation FDD**	**RBstart FDD**
1	1.4 MHz	N/A for Additional Spurious Emissions A-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			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

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)				Normal	
Test Frequencies (as specified inTS36.508 [7] subclause 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 Configuration**	
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation FDD**	**Mod'n**	**RB allocation FDD**
1	5MHz	N/A for Additional Spurious Emissions testing		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			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")

Initial Conditions

Test Environment (as specified in TS 36.508[7] subclause 4.1)				Normal	
Test Frequencies (as specified inTS36.508 [7] subclause 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 Configuration**	
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation FDD**	**Mod'n**	**RB allocation FDD**
1	5MHz	N/A for Additional Spurious Emissions testing		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			16QAM	50 (Note 3)
9	15MHz			QPSK	1
10	15MHz			QPSK	16
11	15MHz			QPSK	75
12	15MHz			16QAM	75 (Note 3)
13	20MHz			QPSK	1
14	20MHz			QPSK	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")

FFS

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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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 ΔfOOB (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-UTRA UL 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 MHz) + 4 MHz + the channel BW assigned.

Table 6.6.3B.3.5.1-2: RB restrictions for additional requirement (PHS)

15 MHz channel bandwidth with f_c = 1932.5 MHz			
RB_{start}	0-7	8-66	67-74
L_{CRB}	N/A	≤ MIN(30, 67 – RB_{start})	N/A
20 MHz channel bandwidth with f_c = 1930 MHz			
RB_{start}	0-23	24-75	76-99
L_{CRB}	N/A	≤ MIN(24, 76 – RB_{start})	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 ΔfOOB (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 (MHz)	Channel bandwidth / Spectrum emission limit (dBm)			Measurement bandwidth
	5MHz	10MHz	15MHz	
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 (MHz)	Channel bandwidth / Spectrum emission limit (dBm)			Measurement bandwidth
	5MHz	10MHz	15MHz	
1475.9 ≤ f ≤ 1510.9	-35	-35	-35	1 MHz

NOTE 1: (only for testing requirements in Table 6.6.3B.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)	Measurement bandwidth	Note
	1.4, 3, 5 MHz		
806 ≤ f ≤ 813.5	-42	6.25 kHz	1
NOTE 1: The emission limit applies at an offset of 0.7 MHz below any block of E-UTRA 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)	Measurement bandwidth	Note
	5 MHz		
806 ≤ f ≤ 816	-42	6.25 kHz	1
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)	Measurement bandwidth	Note
	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-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 ΔfOOB (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)	Measurement bandwidth	Note
	1.4, 3, 5, 10, 15 MHz		
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 Δf_{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)	Measurement bandwidth	Note
	1.4, 3, 5, 10 MHz		
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 6.6.3B.3.5.10-1. This requirement also applies for the frequency ranges that are less than Δf_{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)	Measurement bandwidth	Note
	5, 10 MHz		
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.			

6.6.3B.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 6.6.3B.3.5.11-1. This requirement also applies for the frequency ranges that are less than Δf_{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)	Measurement bandwidth	Note
	5, 10, 15, 20 MHz		
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 6.6.3B.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)	Measurement bandwidth	Note
	3, 5, 10, 15, 20 MHz		
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.

Table 6.7.3-1: Transmit Intermodulation

BWChannel (UL)	5MHz		10MHz		15MHz		20MHz	
Interference Signal Frequency Offset	5MHz	10MHz	10MHz	20MHz	15MHz	30MHz	20MHz	40MHz
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

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.

Table 6.7.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal			
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	5MHz and Highest			
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
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.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 transmits 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 Band 20, only applicable for interference signal frequency above the UL carrier 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.

Table 6.7A.1-1: Transmit Intermodulation

CA bandwidth class(UL)	C	
Interference Signal Frequency Offset	$BW_{Channel\_CA}$	$2*BW_{Channel\_CA}$
Interference CW Signal Level	-40dBc	
Intermodulation Product	[-29dBc]	[-35dBc]
Measurement bandwidth	$BW_{Channel\_CA}$- 2* BW_{GB}	

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 Conditions								
Test Environment as specified in TS 36.508[7] subclause 4.1		Normal						
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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration		Lowest N_{RB_agg} Highest N_{RB_agg}						
Test Parameters for CA Configurations								
CA Configuration / N_{RB_agg}		**DL Allocation**	**CC MOD**	**UL Allocation**				
PCC N_{RB}	**SCCs N_{RB}**	**PCC & SCC RB allocation**		**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
75	75	N/A	QPSK	16	P_16@0	S_0@0	-	-
100	50		QPSK	12	P_12@0	S_0@0	-	-
100	100		QPSK	18	P_18@0	S_0@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.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_{UMAX} 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_{CA_high} 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

Table 6.7A.1.5-1: Transmit Intermodulation

CA bandwidth class(UL)	C	
Interference Signal Frequency Offset	$BW_{Channel\_CA}$	$2*BW_{Channel\_CA}$
Interference CW Signal Level	-40dBc	
Intermodulation Product	[-29dBc]	[-35dBc]
Measurement bandwidth	$BW_{Channel\_CA}$- 2* BW_{GB}	

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 TS 36.508[7] subclause 4.1	Normal			
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**	5MHz and Highest			
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
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 transmits 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 6.7B.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 TS 36.508[7] clause 4.1	Normal			
Test Frequencies as specified in TS36.508 [7] clause 4.3.1	Mid range			
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.1	Lowest, 5MHz, Highest			
Test Parameters for Channel Bandwidths				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A	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.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 scheduling	Not configured	

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 ≥ 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, Table7.3.3-2 and Table 7.3.3-3.

Table 7.3.3-1: Reference sensitivity QPSK $P_{REFSENS}$

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	-	-	-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[7]	-97[7]	-95.2[7]	-	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[6]	-94.5[6]	-92.7[6]		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_{UMAX} 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: [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.

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_{RB} / 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[1]	50[1]	FDD
3	6	15	25	50	50[1]	50[1]	FDD
4	6	15	25	50	75	100	FDD
5	6	15	25	25[1]	-	-	FDD
6	-	-	25	25[1]	-	-	FDD
7	-	-	25	50	75	75[1]	FDD
8	6	15	25	25[1]	-	-	FDD
9	-	-	25	50	50[1]	50[1]	FDD
10	-	-	25	50	75	100	FDD
11	-	-	25	25[1]			FDD
12	6	15	20[1]	20[1]			FDD
13			20[1]	20[1]			FDD
14		-	15[1]	15[1]			FDD
...							
17	-	-	20[1]	20[1]			FDD
18	-	-	25	25[1]	25[1]	-	FDD
19	-	-	25	25[1]	25[1]	-	FDD
20			25	20[1]	20[3]	20[3]	FDD
21			25	25[1]	25[1]		FDD
22			25	50	50[1]	50[1]	FDD
23	6	15	25	50	75	100	FDD
24			25	50			FDD
25	6	15	25	50	50[1]	50[1]	FDD
26	6	15	25	25[1]	25[1]		FDD
27	6	15	25	25[1]			FDD
28		15	25	25[1]	25[1]	25[1]	FDD
31	6	5[4]	5[4]				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: 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_{start}=11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RB_{start}=16.

Note 4: [4] refers to Band 31; in the case of 3 MHz channel bandwidth, the UL resource blocks shall be located at RB_{start} 9 and in the case of 5 MHz

channel bandwidth, the UL resource blocks shall be located at RB_{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 TS 36.508[7] subclause 4.1	NC, TL/VL, TL/VH, TH/VL, TH/VH					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	Low range, Mid range, High range					
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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, 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_{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.

7.3.4.3 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 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 7.3.4.3.2-1: *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**	**Condition**
additionalSpectrumEmission	3 (NS_03)		

7.3.4.3.3 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 7.3.4.3.3-1: *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**
additionalSpectrumEmission	6 (NS_06)		

7.3.4.3.4 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 7.3.4.3.4-1: *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**
additionalSpectrumEmission	TBD		

7.3.5 Test requirement

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 Tables 7.3.5-1 and Table 7.3.5-2.

Table 7.3.5-1: Reference sensitivity QPSK $P_{REFSENS}$

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	-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[7]	-96.3[7]	-94.5[7]	-	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[6]	-93.8[6]	-92[6]		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: [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 $\left\langle \mathrm{REF}\,\hat{I}_{or} \right\rangle = P_{REFSENS}\left(N_{sc}^{RB} N_{RB} \Delta f\right)^{-1}$ 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_{RB} / 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[1]	50[1]	FDD
3	6	15	25	50	50[1]	50[1]	FDD
4	6	15	25	50	75	100	FDD
5	6	15	25	25[1]	-	-	FDD
6	-	-	25	25[1]	-	-	FDD
7	-	-	25	50	75	75[1]	FDD
8	6	15	25	25[1]	-	-	FDD
9	-	-	25	50	50[1]	50[1]	FDD
10	-	-	25	50	75	100	FDD
11	-	-	25	25[1]			FDD
12	6	15	20[1]	20[1]			FDD
13			20[1]	20[1]			FDD
14		-	15[1]	15[1]			FDD
...							
17	-	-	20[1]	20[1]			FDD
18	-	-	25	25[1]	25[1]	-	FDD
19	-	-	25	25[1]	25[1]	-	FDD
20			25	20[1]	20[3]	20[3]	FDD
21			25	25[1]	25[1]		FDD
22			25	50	50[1]	50[1]	FDD
23	6	15	25	50	75	100	FDD
24			25	50			FDD
25	6	15	25	50	50[1]	50[1]	FDD
26	6	15	25	25[1]	25[1]		FDD
27	6	15	25	25[1]			FDD
28		15	25	25[1]	25[1]	25[1]	FDD
31	6	5[4]	5[4]				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: 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_{start}=11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RB_{start}=16

Note 4: [4] refers to Band 31; in the case of 3 MHz channel bandwidth, the UL resource blocks shall be located at RB_{start} 9 and in the case of 5 MHz

channel bandwidth, the UL resource blocks shall be located at RB_{start} 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 ≥ 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 minimum requirement for reference sensitivity in Table 7.3.1-1 shall be increased by the amount given in $\Delta R_{IB,c}$ in Table7.3A.1.3-0 for the applicable E-UTRA bands.

Table 7.3A.1.3-0: $\Delta R_{IB,c}$

Inter-band CA Configuration	E-UTRA Band	$\Delta R_{IB,c}$ [dB]
CA_1A-5A	1	0
	5	0
CA_1A-18A	1	0
	18	0
CA_1A-19A	1	0
	19	0
CA_1A-21A	1	0
	21	0
CA_2A-17A	2	0
	17	0.5
CA_3A-5A	3	0
	5	0
CA_3A-7A	3	0
	7	0
CA_3A-8A	3	0
	8	0
CA_3A-20A	3	0
	20	0
CA_4A-5A	4	0
	5	0
CA_4A-7A	4	0.5
	7	0.5

Inter-band CA Configuration	E-UTRA Band	$\Delta R_{IB,c}$ [dB]
CA_4A-12A	4	0
	12	0.5
CA_4A-13A	4	0
	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
	20	0
CA_8A-20A	8	0
	20	0
CA_11A-18A	11	0
	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 <1GHz and another band is >1.7GHz 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-8A[4]	3				N/A	N/A	N/A	FDD
	8			N/A	N/A			
CA_4A-12A[5]	4	[-89.2]	[-89.2]	[-90]	[-89.5]			FDD
	12			- 96.5	- 93.5			
CA_4A-17A[5]	4			[-90]	[-89.5]			FDD
	17			-96.5	-93.5			

NOTE 1: The transmitter shall be set to P_{UMAX} as defined in subclause 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 $f_{UL}^{LB} = \lfloor f_{DL}^{HB}/0.3 \rfloor 0.1$ in MHz and $F_{UL\_low}^{LB} + BW_{Channel}^{LB}/2 < f_{UL}^{LB} < F_{UL\_high}^{LB} - BW_{Channel}^{LB}/2$ with f_{DL}^{HB} the carrier frequency of the high band in MHz and $BW_{Channel}^{LB}$ the channel bandwidth configured in the low band.

Table 7.3A.1.3-0b: Uplink configuration for the low band

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)**	**10 MHz (dBm)**	**15 MHz (dBm)**	**20 MHz (dBm)**	**Duplex mode**
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 $P_{REFSENS}$

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_2A-29A	2			-98	-95			FDD
	29		-98.7	-97	-94			

NOTE 1: The transmitter shall be set to P_{UMAX} as defined in subclause 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 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_2A-29A	2			25	50			FDD
	29		N/A	N/A	N/A			

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 ≥ 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 configuration / CC combination / N_{RB_agg} / Duplex mode									
CA configuration	100RB+50RB		75RB+75RB		100RB+75RB		100RB+100RB		Duplex Mode
	PCC	SCC	PCC	SCC	PCC	SCC	PCC	SCC	
CA_1C	n/a	n/a	75	55	n/a	n/a	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 P_{UMAX} as defined in subclause 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 ≥ 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_{IBNC} 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_{gap} / [MHz]	UL PCC allocation	ΔR_{IBNC} (dB)	Duplex mode
CA_25A-25A	25RB+25RB	$30.0 < W_{gap} \leq 55.0$	10[1]	5.0	FDD
		$0.0 < W_{gap} \leq 30.0$	25[1]	0.0	
	25RB+50RB	$25.0 < W_{gap} \leq 50.0$	10[1]	4.5	
		$0.0 < W_{gap} \leq 25.0$	25[1]	0.0	
	50RB+25RB	$15.0 < W_{gap} \leq 50.0$	10[4]	5.5	
		$0.0 < W_{gap} \leq 15.0$	32[1]	0.0	
	50RB+50RB	$10.0 < W_{gap} \leq 45.0$	10[4]	5.0	
		$0.0 < W_{gap} \leq 10.0$	32[1]	0.0	
CA_41A-41A[5]	NOTE 6	NOTE 7	NOTE 8	0.0	TDD

NOTE 1: [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_{gap} 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: [4] refers to the UL resource blocks shall be located at RB_{start}=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_{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 Conditions									
Test Environment as specified in TS 36.508[7] subclause 4.1		NC, TL/VL, TL/VH, TH/VL, TH/VH							
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.		C: Low range, High range							
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.		Lowest N_{RB_agg}, Highest N_{RB_agg}							
Test Parameters for CA Configurations									
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**					
PCC N_{RB}	**SCCs N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
75	75	QPSK	75+75	QPSK	75	P_75@0	S_0@0	-	-
75	75	QPSK	75+75	QPSK	50	P_50@25	S_0@0	-	-
75	75	QPSK	75+75	QPSK	25	P_25@50	S_0@0	-	-
75	75	QPSK	75+75	QPSK	20	P_20@55	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	100	P_100@0	S_0@0	-	-
100	50	QPSK	100+50	QPSK	75	P_75@25	S_0@0	-	-
100	50	QPSK	100+50	QPSK	50	P_50@50	S_0@0	-	-
100	50	QPSK	100+50	QPSK	25	P_25@75	S_0@0	-	-
100	50	QPSK	100+50	QPSK	20	P_20@80	S_0@0	-	-
100	50	QPSK	100+50	QPSK	150	P_100@0	S_50@0	-	-
100	100	QPSK	100+100	QPSK	100	P_100@0	S_0@0	-	-
100	100	QPSK	100+100	QPSK	75	P_75@25	S_0@0	-	-
100	100	QPSK	100+100	QPSK	50	P_50@50	S_0@0	-	-
100	100	QPSK	100+100	QPSK	25	P_25@75	S_0@0	-	-
100	100	QPSK	100+100	QPSK	20	P_20@80	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 and Table 5.4.2A.1-2.									
Note 2: Depending on CA configurations, only the appropriate Uplink RB allocation value according to table 7.3A.1.3-1for 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.3.1, 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 ≥ 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 $P_{REFSENS}$ for intra-band

	CA Band / Aggregated channel bandwidth / NRB / Duplex mode								
CA Configuration	100RB+50RB		75RB+75RB		100RB+75RB		100RB+100RB		Duplex Mode
	100RB	50RB	75RB	75RB	100RB	75RB	100RB	100RB	
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: The transmitter shall be set to P_{UMAX} as defined in clause 6.2.5A 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								

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									
CA configuration	100RB+50RB		75RB+75RB		100RB+75RB		100RB+100RB		Duplex Mode
	PCC	SCC	PCC	SCC	PCC	SCC	PCC	SCC	
CA_1C	n/a	n/a	75	55	n/a	n/a	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	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 P_{UMAX} as defined in subclause 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.

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→ use Table 7.3A.2.4.1-1.

Table 7.3A.2.4.1-1: Test Configuration Table

Initial Conditions									
Test Environment as specified in TS 36.508[7] subclause 4.1		NC, TL/VL, TL/VH, TH/VL, TH/VH							
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.		C: Low range, High range							
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.		Lowest N_{RB_agg}, Highest N_{RB_agg}							
Test Parameters for CA Configurations									
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**					
PCC N_{RB}	**SCCs N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
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 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 is tested per Test CA configuration.									

7.3A.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 7.3A.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.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→ 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 Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1					NC, TL/VL, TL/VH, TH/VL, TH/VH	
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.					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	
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.					Highest N_{RB_agg}, unless otherwise specified in the Tables 7.3A.3.4.1-2 to 7.3A.3.4.1-9	
Network signalling value					NS_01 Unless given by Table 7.3A.3.4.1-1a	
Test Parameters for CA Configurations						
CA Configuration / N_{RB_agg}		**DL Allocation**			**UL Allocation**	
PCC NRB	**SCCs N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**		**CC MOD**	**PCC N_{RB_alloc}**
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	QPSK	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_1A-18A

CBW			Band 18	
			10MHz	15MHz
			Low range	Mid range
Band 1	10MHz	Low range	X	
	15MHz		X	
	20MHz		X	X

Table 7.3A.3.4.1-3: Test frequencies and Test CC combinations for CA_1A-19A

CBW			Band 19	
			10MHz	15MHz
			High range	Mid range
Band 1	10MHz	Mid range		X
	15MHz		X	
	20MHz			X

Table 7.3A.3.4.1-4: Test frequencies and Test CC combinations for CA_1A-21A

CBW			Band 21	
			15MHz	
			High range	Mid range
Band 1	15MHz	Mid range	X	X
	20MHz		-	X

Table 7.3A.3.4.1-5: Test frequencies and Test CC combinations for CA_3A-8A

CBW			Band 8	
			5 MHz	10 MHz
			High range	
Band 3	10MHz	Mid range	-	X
	15MHz		X	-
	20MHz		X	X

Table 7.3A.3.4.1-6: Test frequencies and Test CC combinations for CA_4A-5A

CBW			Band 5		
			10 MHz		
			Low range	Mid range	High range
Band 4	10MHz	Mid range	X	X	X

Table 7.3A.3.4.1-7: Test frequencies and Test CC combinations for CA_4A-13A

CBW			Band 13
			10MHz
			Mid range
Band 4	10MHz	Low range	X
	15 MHz	Mid range	X
	20 MHz	High range	X

Table 7.3A.3.4.1-8: Test frequencies and Test CC combinations for CA_4A-17A

CBW			Band 17		
			10MHz		
			Low range	Mid range	High range
Band 4 as PCC	10 MHz	Mid range	X	-	X
Band 4 as SCC (Note 1)	10MHz	Low range	X[2]	-	-
		Mid range	-	X[3]	-
		High range	-	-	X[4]

Note 1: For Band 4 as SCC the exceptions described in Table 7.3A.1.3-0 are tested. For this purpose the test frequencies are selected to fulfil the equation in Table 7.3A.1.3-0 Note 5.
Note 2: Band 17: f_{UL} = 709.1 MHz (N_{UL} = 23781), f_{DL} = 739.1 MHz (N_{DL} = 5781)
Band 4: f_{DL} = 2127.3 MHz (N_{DL} = 2123)
Note 3: Band 17: f_{UL} = 710 MHz (N_{UL} = 23790), f_{DL} = 740 MHz (N_{DL} = 5790)
Band 4: f_{DL} = 2130 MHz (N_{DL} = 2150)
Note 4: Band 17: f_{UL} = 710.9 MHz (N_{UL} = 23799), f_{DL} = 740.9 MHz (N_{DL} = 5799)
Band 4: f_{DL} = 2132.7 MHz (N_{DL} = 2177)

Table 7.3A.3.4.1-9: Test frequencies and Test CC combinations for CA_11A-18A

CBW			Band 18	
			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 ≥ 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 $P_{REFSENS}$ for inter-band

Channel bandwidth								
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
	5	-	-	-	-94.3	-	-	
CA_1A-18A	1	-	-	-99.3	-96.3	-94.5	-93.3	FDD
	18	-	-	-99.3	-96.3	-94.5	-	
CA_1A-19A	1	-	-	-99.3	-96.3	-94.5	-93.3	FDD
	19	-	-	-99.3	-96.3	-94.5	-	
CA_1A-21A	1	-	-	-99.3	-96.3	-94.5	-93.3	FDD
	21	-	-	-99.3	-96.3	-94.5	-	
CA_2A-17A	2	-	-	-97.3	-94.3	-	-	FDD
	17	-	-	-95.8	-92.8	-	-	
CA_3A-7A	3	-	-	-96.3	-93.3	-91.5	-90.3	FDD
	7	-	-	-	-94.3	-92.5	-91.3	
CA_3A-8A	3	-	-	-	-93.3	-91.5	-90.3	FDD
	8	-	-	-96.3	-93.3	-	-	
CA_4A-5A	4	-	-	-99.3	-96.3	-	-	FDD
	5	-	-	-97.3	-94.3	-	-	
CA_4A-12A	4	-104	-101	-99.3	-96.3	-	-	FDD
	4 (Note 4)	[-88.5]	[-88.5]	[-89.3]	[-88.8]	-	-	
	12	-	-	-95.8	-92.8	-	-	
CA_4A-13A	4	-	-	-99.3	-96.3	-94.5	-93.3	FDD
	13	-	-	-	-93.3	-	-	
CA_4A-17A	4	-	-	-99.3	-96.3	-	-	FDD
	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
	20	-	-	-96.3	-93.3	-	-	
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
	29	-	-98	-96.3	-93.3	-	-	

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

CA Configuration	E-UTRA Band	Channel bandwidth 1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Duplex Mode
CA_1A-5A	1	-	-	-	50	-	-	FDD
	5	-	-	-	25[1]	-	-	
CA_1A-18A	1	-	-	25	50	75	100	FDD
	18	-	-	25	25[1]	25[1]	-	
CA_1A-19A	1	-	-	25	50	75	100	FDD
	19	-	-	25	25[1]	25[1]	-	
CA_1A-21A	1	-	-	25	50	75	100	FDD
	21	-	-	25	25[1]	25[1]	-	
CA_2A-17A	2	-	-	25	50	-	-	FDD
	17	-	-	20[1]	20[1]	-	-	
CA_3A-7A	3	-	-	25	50	50[1]	50[1]	FDD
	7	-	-		50	75[1]	75[1]	
CA_3A-8A	3	-	-	25	50	50[1]	50[1]	FDD
	8	-	-	25	25[1]	-	-	
CA_4A-5A	4	-	-	25	50	-	-	FDD
	5	-	-	25	25[1]	-	-	
CA_4A-12A	4	6	15	25	50	-	-	FDD
	12	-	-	20[1]	20[1]	-	-	
CA_4A-13A	4	-	-	25	50	75	100	FDD
	13	-	-	-	20[1]	-	-	
CA_4A-17A	4	-	-	25	50	-	-	FDD
	17	-	-	8[2, 3]	16[2, 3]	-	-	
CA_4A-29A	4	-	-	25	50	-	-	FDD
	29	-	-	-	-	-	-	
CA_5A-12A	5			25	25[1]			FDD
	12			20[1]	20[1]			
CA_7A-20A	7	-	-	-	50	75[1]	75[1]	FDD
	20	-	-	25	20[1]	-	-	
CA_11A-18A	11	-	-	25	25[1]	-	-	FDD
	18	-	-	25	25[1]	25[1]	-	
CA_2A-29A	2	-	-	25	50	-	-	FDD
	29	-	-	-	-	-	-	

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 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.

Note 3: In the case of 5MHz channel bandwidth, the UL resource blocks shall be located at RB_{start}=9 and in the case of 10MHz channel bandwidth, the UL resource blocks shall be located at RB_{start}=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

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

Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1	NC, TL/VL, TL/VH, TH/VL, TH/VH					
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	Low range, Mid range, High range					
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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.						

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 7.3B.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 7.3B.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 7.3B.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.

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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	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**
additionalSpectrumEmission	TBD		

7.3B.5 Test requirement

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 Tables 7.3B.5-1 and Table 7.3B.5-2.

Table 7.3B.5-1: Reference sensitivity QPSK $P_{REFSENS}$

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[6]	-93.8[6]	-92[6]		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 shall be set to P_{UMAX} 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: [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: The relation to the received PSD is $\left\langle \mathrm{REF}\,\hat{I}_{or} \right\rangle = P_{REFSENS}\left(N_{sc}^{RB} N_{RB} \Delta f\right)^{-1}$ with N_{RB} is the transmission bandwidth configuration according to Table 5.4.2-1.

The reference receive sensitivity (REFSENS) requirement specified in Table 7.3B.5-1 shall be met for an uplink transmission bandwidth less than or equal to that specified in Table 7.3B.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_{RB} / 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[1]	50[1]	FDD
3	6	15	25	50	50[1]	50[1]	FDD
4	6	15	25	50	75	100	FDD
5	6	15	25	25[1]	-	-	FDD
6	-	-	25	25[1]	-	-	FDD
7	-	-	25	50	75[1]	75[1]	FDD
8	6	15	25	25[1]	-	-	FDD
9	-	-	25	50	50[1]	50[1]	FDD
10	-	-	25	50	75	100	FDD
11	-	-	25	25[1]			FDD
12	6	15	20[1]	20[1]			FDD
13			20[1]	20[1]			FDD
14		-	15[1]	15[1]			FDD
...							
17	-	-	20[1]	20[1]			FDD
18	-	-	25	25[1]	25[1]	-	FDD
19	-	-	25	25[1]	25[1]	-	FDD
20			25	20[1]	20[3]	20[3]	FDD
21			25	25[1]	25[1]		FDD
22			25	50	50[1]	50[1]	FDD
23	6	15	25	50	75[1]	100[1]	FDD
24			25	50			FDD
25	6	15	25	50	50[1]	50[1]	FDD
26	6	15	25	25[1]	25[1]		FDD
27	6	15	25	25[1]	-	-	FDD
28		15	25	25[1]	25[1]	25[1]	FDD
31	6	5[4]	5[4]				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 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_{start}=11 and in the case of 20MHz channel bandwidth, the UL resource blocks shall be located at RB_{start}=16.

Note 4: [4] refers to Band 31; in the case of 3 MHz channel bandwidth, the UL resource blocks shall be located at RB_{start} 9 and in the case of 5 MHz channel bandwidth, the UL resource blocks shall be located at RB_{start}

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 ≥ 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.

Table 7.4.3-1: Maximum input level

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	-25					
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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

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 TS36.508 [7] clause 4.3.1	Mid range						
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.1	Lowest, 5MHz, Highest						
Test Parameters for Channel Bandwidths							
	Downlink Configuration			**Uplink Configuration**			
Ch BW	**Mod'n**	**RB allocation**		**Mod'n**	**RB allocation**		**UE Category**
		FDD	**TDD**		**FDD**	**TDD**	
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

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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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.

Table 7.4.4.3-1: 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	
}			

7.4.5 Test requirement

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 7.4.5-1.

Table 7.4.5-1: Maximum input level

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	For carrier frequency f ≤ 3.0GHz: -25.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: -26.0					
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_L} as defined in clause 6.2.5. Note 2: Reference measurement channel is Annex A.3.2 64QAM R=3/4variant with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.							

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 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 7.4A.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 ≥ 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 Bandwidth Class					
		A	B	C	D	E	F
Power in Transmission Aggregated Bandwidth Configuration	dBm			-22			
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ as defined in clause 6.2.5A.							
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

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 (N_{RB_agg}) as specified in clause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.		Lowest N_{RB_agg} Highest N_{RB_agg}					
Test Parameters for CA Configurations							
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**			
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**	
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.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 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.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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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 ≥ 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					
		A	B	C	D	E	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			
Note 1: The transmitter shall be set to 4dB below PCMAX_L or $P_{CMAX\_L\_CA}$ as defined in clause 6.2.5A. 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.							

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

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 (N_{RB_agg}) as specified in clause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.			Lowest N_{RB_agg} Highest N_{RB_agg}				
Test Parameters for CA Configurations							
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**			
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**	
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	100	QPSK	100+100	QPSK	50	P_50@0	NA
100	100	QPSK	100+100	QPSK	25	P_25@0	NA
100	100	QPSK	100+100	QPSK	20	P_20@0	NA
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.							

7.4A.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 → 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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N_{RB_agg} for PCC and SCC

Test Parameters for CA Configurations

CA Configuration / N_{RB_agg}		DL Allocation			UL Allocation	
PCC N_{RB}	SCCs N_{RB}	CC MOD	PCC & SCC RB allocation		CC MOD	PCC N_{RB_alloc}
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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$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 ≥ 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 Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	For carrier frequency f ≤ 3.0GHz: -25.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: -26.0					
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_L} as defined in clause 6.2.5. Note 2: Reference measurement channel is Annex A.3.2 64QAM R=3/4variant with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1.							

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_{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 7.4.1B.

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

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			Lowest, 5MHz, Highest				
Test Parameters for Channel Bandwidths							
	Downlink Configuration			**Uplink Configuration**			
Ch BW	Mod'n	RB allocation		Mod'n	RB allocation		UE Category
		FDD	TDD		FDD	TDD	
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 Channel Bandwidths are checked separately for each E-UTRA band. The applicable channel bandwidths are specified in Table 7.3.3-2.							
Note 2: 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.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 7.4B.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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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: 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	
}			

7.4B.5 Test requirement

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 7.4B.5-1.

Table 7.4B.5-1: Maximum input level

Rx Parameter	**Units**	**Channel bandwidth**					
		1.4 MHz	**3MHz**	**5MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Power in Transmission Bandwidth Configuration	dBm	For carrier frequency f ≤ 3.0GHz:- 25.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: -26.0					
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.1-2 with P_{CMAX_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.							

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 ≥ 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 Parameter	**Units**	**Channel bandwidth**					
		1.4 MHz	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Power in Transmission Bandwidth Configuration	dBm	REFSENS + 14 dB					
$P_{Interferer}$	dBm	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +42.5dB	REFSENS +39.5dB
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	**1.4+0.0025 /** -1.4-0.0025	**3+0.0075 /** -3-0.0075	**5+0.0025 /** -5-0.0025	**7.5+0.0075 /** -7.5-0.0075	**10+0.0125 /** -10-0.0125	**12.5+0.0025 /** -12.5-0.0025
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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 7.5.3-3: 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
$P_{Interferer}$	dBm	-25					
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	**1.4+0.0025** / -1.4-0.0025	**3+0.0075** / -3-0.0075	**5+0.0025** / -5-0.0025	**7.5+0.0075** / -7.5-0.0075	**10+0.0125** / -10-0.0125	**12.5+0.0025** / -12.5-0.0025
Note 1: The transmitter shall be set to 24dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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

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	Mid range					
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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 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 $f \leq 3.0$GHz or within +0, -4.0 dB

of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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

Table 7.5.4.3-1: 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	
}			

7.5.5 Test requirement

The throughput R_{av} shall be ≥ 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 MHz**	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
ACS	dB	33.0	33.0	33.0	33.0	30	27

Table 7.5.5-2: Test parameters for Adjacent channel selectivity, Case 1

Rx Parameter	Units	Channel bandwidth					
		1.4MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + 14 dB					
$P_{Interferer}$	dBm	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +42.5dB	REFSENS +39.5dB
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	1.4+0.0025/ -1.4-0.0025	3+0.0075 / -3-0.0075	5+0.0025 / -5-0.0025	7.5+0.0075 / -7.5-0.0075	10+0.0125 / -10-0.0125	12.5+0.0025 / -12.5-0.0025
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.5.5-3: 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
$P_{Interferer}$	dBm	-25					
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	1.4+0.0025 / -1.4-0.0025	3+0.0075 / -3-0.0075	5+0.0025 / -5-0.0025	7.5+0.0075 / -7.5-0.0075	10+0.0125 / -10-0.0125	12.5+0.0025 / -12.5-0.0025
Note 1: The transmitter shall be set to 24dB below P_{CMAX_L} with P_{CMAX_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.							

7.5A Adjacent Channel Selectivity (ACS) for CA

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 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 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 ≥ 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**	**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				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration			REFSENS + 14 dB			
PInterferer	dBm		Aggregated power + 22.5 dB			
BWInterferer	MHz		5			
FInterferer (offset)	MHz		2.5 + Foffset / -2.5 - Foffset			
NOTE 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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 $F_{interferer}$ (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\lfloor F_{interferer}/0.015 + 0.5 \rfloor 0.015 + 0.0075$ 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				
		B	C	D	E	F

Power per CC in Aggregated Transmission Bandwidth Configuration	dBm		-50.5			
$P_{Interferer}$	dBm	-25				
$BW_{Interferer}$	MHz		5			
$F_{Interferer}$ (offset)	MHz		2.5+ F_{offset} / -2.5- F_{offset}			

NOTE 1: The transmitter shall be set to 24dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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 $F_{interferer}$ (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\lfloor F_{interferer}/0.015 + 0.5 \rfloor 0.015 + 0.0075$ MHz to be offset from the sub-carrier raster.

The normative reference for this requirement is TS 36.101 [2] clause 7.5.1A.

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.

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 bandwidth combination sets supported by the UE.			Lowest N_{RB_agg} Highest N_{RB_agg}						
Test Parameters for CA Configurations									
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**					
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
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 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.									

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.

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

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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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 ≥ 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**	**B**	**C**	**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				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration			REFSENS + 14 dB			
$P_{Interferer}$	dBm		Aggregated power + 22.5 dB			
$BW_{Interferer}$	MHz		5			
$F_{Interferer}$ (offset)	MHz		2.5 + F_{offset} / -2.5 - F_{offset}			

NOTE 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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 $F_{Interferer}$ (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\lfloor F_{interferer}/0.015 + 0.5 \rfloor 0.015 + 0.0075$ 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	CA Bandwidth Class				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm		-50.5			
$P_{Interferer}$	dBm	-25				
$BW_{Interferer}$	MHz		5			
$F_{Interferer}$ (offset)	MHz		2.5+ F_{offset} / -2.5- F_{offset}			

NOTE 1: The transmitter shall be set to 24dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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 $F_{Interferer}$ (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\lfloor F_{interferer}/0.015 + 0.5 \rfloor 0.015 + 0.0075$ 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→ use Table 7.5A.2.4.1-1.

Table 7.5A.2.4.1-1: 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 bandwidth combination sets supported by the UE.			Lowest N_{RB_agg} Highest N_{RB_agg}						
Test Parameters for CA Configurations									
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**					
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
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 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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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→ 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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N_{RB_agg} for PCC and SCC					
Test Parameters for CA Configurations						
CA Configuration / N_{RB_agg}		**DL Allocation**			**UL Allocation**	
PCC N_{RB}	**SCCs N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**		**CC MOD**	**PCC N_{RB_alloc}**
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).						

7.5A.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 $f \leq$ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq$ 4.2GHz, 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 $f \leq$ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq$ 4.2GHz, 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 Parameter	**Units**	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz

Power in Transmission Bandwidth Configuration	dBm	REFSENS + 14 dB					
$P_{Interferer}$	dBm	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +42.5dB	REFSENS +39.5dB
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	**1.4+0.0025** / -1.4-0.0025	**3+0.0075** / -3-0.0075	**5+0.0025** / -5-0.0025	**7.5+0.0075** / -7.5-0.0075	**10+0.0125** / -10-0.0125	**12.5+0.0025** / -12.5-0.0025
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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
$P_{Interferer}$	dBm	-25					
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	**1.4+0.0025** / -1.4-0.0025	**3+0.0075** / -3-0.0075	**5+0.0025** / -5-0.0025	**7.5+0.0075** / -7.5-0.0075	**10+0.0125** / -10-0.0125	**12.5+0.0025** / -12.5-0.0025
Note 1: The transmitter shall be set to 24dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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_{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: 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	Mid range					
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
Ch BW	**Mod'n**	**RB allocation**		**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
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.						
Note 2: For the DL signal one sided dynamic OCNG Pattern OP.1 FDD/TDD is used.						

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 7.5B.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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, for at least the duration of the Throughput measurement.

4. Set the Interferer signal level to the value as defined in Table 7.5B.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 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.5-3 (Case 2) for carrier frequency f ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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

Table 7.5B.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	
}			

7.5B.5 Test requirement

The throughput R_{av} shall be ≥ 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

Table 7.5B.5-2: Test parameters for Adjacent channel selectivity, Case 1

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + 14 dB					
$P_{Interferer}$	dBm	REFSENS +45.5dB	REFSENS +45.5dB	REFSENS +45.5dB*	REFSENS +45.5dB	REFSENS +42.5dB	REFSENS +39.5dB
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	1.4+0.0025	3+0.0075	5+0.0025	7.5+0.0075	10+0.0125	12.5+0.0025

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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 7.5B.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
$P_{Interferer}$	dBm	-25					
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Interferer}$ (offset)	MHz	1.4+0.0025	3+0.0075	5+0.0025	7.5+0.0075	10+0.0125	12.5+0.0025

Note 1: The transmitter shall be set to 24dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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

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 ≥ 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 Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Ioffset,\ case\ 1}$	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
$F_{Ioffset,\ case\ 2}$	MHz	3.5+0.0075	7.5+0.0075	12.5+0.0075	12.5+0.0125	12.5+0.0025	12.5+0.0075
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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
	$P_{Interferer}$	dBm	-56	-44	-30	[-30]
	$F_{Interferer}$ (offset)	MHz	$=-BW/2 - F_{Ioffset,case\ 1}$ & $=+BW/2 + F_{Ioffset,case\ 1}$	$\leq -BW/2 - F_{Ioffset,case\ 2}$ & $\geq +BW/2 + F_{Ioffset,case\ 2}$	-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	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 15$ to $F_{DL\_high} + 15$		
12	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 10$ to $F_{DL\_high} + 15$		$F_{DL\_low} - 10$
17	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 9$ to $F_{DL\_high} + 15$	$F_{DL\_low} - 15$ and $F_{DL\_low} - 9$	
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 - $F_{Ioffset,\ case\ 1}$ and b. the carrier frequency +BW/2 + $F_{Ioffset,\ case\ 1}$						
Note 3: $F_{Interferer}$ 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 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	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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.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 in Table 7.6.1.4.1-1.
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 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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$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 3and 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 ≥ 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 Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Ioffset,\ case\ 1}$	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
$F_{Ioffset,\ case\ 2}$	MHz	3.5+0.0075	7.5+0.0075	12.5+0.0075	12.5+0.0125	12.5+0.0025	12.5+0.0075
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.6.1.5-2: In-band blocking

E-UTRA band	**Parameter**	**Unit**	**Case 1**	**Case 2**	**Case 3**	**Case 4**
	$P_{Interferer}$	dBm	-56	-44	-30	[-30]
	$F_{Interferer}$ (offset)	MHz	=-BW/2 – $F_{Ioffset,case\ 1}$ & =+BW/2 + $F_{Ioffset,case\ 1}$	≤-BW/2 – $F_{Ioffset,case\ 2}$ & ≥+BW/2 + $F_{Ioffset,case\ 2}$	-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	$F_{Interferer}$	MHz	(Note 2)	F_{DL_low} – 15 to F_{DL_high} + 15		
12	$F_{Interferer}$	MHz	(Note 2)	F_{DL_low} – 10 to F_{DL_high} + 15		F_{DL_low} – 10
17	$F_{Interferer}$	MHz	(Note 2)	F_{DL_low} – 9 to F_{DL_high} + 15	F_{DL_low} – 15 and F_{DL_low} – 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 - $F_{Ioffset,\ case\ 1}$ and
b. the carrier frequency +BW/2 + $F_{Ioffset,\ case\ 1}$
Note 3: $F_{Interferer}$ 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 7.6.1A.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
	$P_{Interferer}$	dBm	-56	-44
	$F_{Interferer}$ (offset)	MHz	=-BW/2 – $F_{Ioffset,case\ 1}$ & =+BW/2 + $F_{Ioffset,case\ 1}$	≤-BW/2 – $F_{Ioffset,case\ 2}$ & ≥+BW/2 + $F_{Ioffset,case\ 2}$
29	$F_{Interferer}$	MHz	(Note 2)	F_{DL_low} – 15 to F_{DL_high} + 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 - $F_{Ioffset,\ case\ 1}$ and
b. the carrier frequency +BW/2 + $F_{Ioffset,\ case\ 1}$
NOTE 3: $F_{Interferer}$ range values for unwanted modulated interfering signal are interferer centre frequencies.

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.

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 7.6.1A.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 ≥ 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				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			12			
$BW_{Interferer}$	MHz		5			
$F_{Ioffset,\ case\ 1}$	MHz		7.5			
$F_{Ioffset,\ case\ 2}$	MHz		12.5			

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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
	$P_{Interferer}$	dBm	-56	-44
	$F_{Interferer}$	MHz	=-F_{offset} – $F_{Ioffset,case\ 1}$ & =+F_{offset} + $F_{Ioffset,case\ 1}$	≤-F_{offset} – $F_{Ioffset,case\ 2}$ & ≥+F_{offset} + $F_{Ioffset,case\ 2}$

CA_1C, CA_7C, CA_38C, CA_40C,CA_41C	$F_{Interferer}$ (Range)	MHz	(Note 2)	F_{DL_low} – 15 to F_{DL_high} + 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_{offset} - $F_{Ioffset,\ case\ 1}$ and
b. the carrier frequency +F_{offset} + $F_{Ioffset,\ case\ 1}$
Note 3: F_{offset} is the frequency offset from the centre frequency of the adjacent CC being tested to the edge of aggregated channel bandwidth.
Note 4: The $F_{interferer}$ (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\lfloor F_{interferer}/0.015 + 0.5 \rfloor 0.015 + 0.0075$ MHz to be offset from the sub-carrier raster.

The normative reference for this requirement is TS 36.101 [2] clause 7.6.1.1A.

7.6.1A.1.4 Test Description

7.6.1A.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 7.6.1A.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 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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.			Lowest N_{RB_agg} Highest N_{RB_agg}				
Test Parameters for CA Configurations							
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**			
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**	
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 7.6.1A.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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz $< f \leq$ 4.2GHz, 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	PCC: 2132.5 MHz SCC: 2147.5 MHz	
Receive band wanted signal (CC Configuration / N_{RB_agg} 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 ≥ 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				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			12			
$BW_{Interferer}$	MHz		5			
$F_{Ioffset,case\ 1}$	MHz		7.5			
$F_{Ioffset,case\ 2}$	MHz		12.5			
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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.1.5-2: In-band blocking

CA configuration	Parameter	Unit	Case 1	Case 2
	$P_{Interferer}$	dBm	-56	-44
	$F_{Interferer}$	MHz	$=-F_{offset} - F_{Ioffset,case\ 1}$ & $=+F_{offset} + F_{Ioffset,case\ 1}$	$\leq -F_{offset} - F_{Ioffset,case\ 2}$ & $\geq +F_{offset} + F_{Ioffset,case\ 2}$
CA_1C, CA_7C, CA_38C, CA_40C,CA_41C	$F_{Interferer}$ (Range)	MHz	(Note 2)	$F_{DL\_low} - 15$ to $F_{DL\_high} + 15$
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 $-F_{offset} - F_{Ioffset,case\ 1}$ and b. the carrier frequency $+F_{offset} + F_{Ioffset,case\ 1}$ Note 3: F_{offset} is the frequency offset from the centre frequency of the adjacent CC being tested to the edge of aggregated channel bandwidth. Note 4: The $F_{interferer}$ (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\lfloor F_{interferer}/0.015 + 0.5 \rfloor 0.015 + 0.0075$ 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 → use Table 7.6.1A.2.4.1-1

Table 7.6.1A.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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.			Lowest N_{RB_agg} Highest N_{RB_agg}				
Test Parameters for CA Configurations							
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**			
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**	
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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.	Highest N_{RB_agg} for PCC and SCC

Test Parameters for CA Configurations						
CA Configuration / N_{RB_agg}		**DL Allocation**			**UL Allocation**	
PCC N_{RB}	**SCCs N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**		**CC MOD**	**PCC N_{RB_alloc}**
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 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.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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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 ≥ 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
	$P_{Interferer}$	dBm	-56	-44
	$F_{Interferer}$ (offset)	MHz	=-BW/2 – $F_{Ioffset,case\ 1}$ & =+BW/2 + $F_{Ioffset,case\ 1}$	≤-BW/2 – $F_{Ioffset,case\ 2}$ & ≥+BW/2 + $F_{Ioffset,case\ 2}$
29	$F_{Interferer}$	MHz	(Note 2)	F_{DL_low} – 10 to F_{DL_high} + 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 - $F_{Ioffset,\ case\ 1}$ and b. the carrier frequency +BW/2 + $F_{Ioffset,\ case\ 1}$				
NOTE 3: $F_{Interferer}$ 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 blocking parameters

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Ioffset, case\ 1}$	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
$F_{Ioffset, case\ 2}$	MHz	3.5+0.0075	7.5+0.0075	12.5+0.0075	12.5+0.0125	12.5+0.0025	12.5+0.0075
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.6.1A.3.5-2: In-band blocking

E-UTRA band	Parameter	Unit	Case 1	Case 2	Case 3	Case 4
	$P_{Interferer}$	dBm	-56	-44	-30	[-30]
	$F_{Interferer}$ (offset)	MHz	$=-BW/2 - F_{Ioffset,case\ 1}$ & $=+BW/2 + F_{Ioffset,case\ 1}$	$\leq -BW/2 - F_{Ioffset,case\ 2}$ & $\geq +BW/2 + F_{Ioffset,case\ 2}$	-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, 33, 34, 35, 36, 37, 38 ,39, 40, 41	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 15$ to $F_{DL\_high} + 15$		
12	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 10$ to $F_{DL\_high} + 15$		$F_{DL\_low} - 10$
17	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 9$ to $F_{DL\_high} + 15$	$F_{DL\_low} - 15$ and $F_{DL\_low} - 9$	
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 - $F_{Ioffset, case\ 1}$ and b. the carrier frequency +BW/2 + $F_{Ioffset, case\ 1}$						
Note 3: $F_{Interferer}$ 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_{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

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	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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.						

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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz $< f \leq 4.2$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 3and 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 Band 17(asymmetric!), BW 5MHz, case 2	0	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 ≥ 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

Rx Parameter	**Units**	**Channel bandwidth**					
		1.4 MHz	**3 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
$BW_{Interferer}$	MHz	1.4	3	5	5	5	5
$F_{Ioffset,\ case\ 1}$	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
$F_{Ioffset,\ case\ 2}$	MHz	3.5+0.0075	7.5+0.0075	12.5+0.0075	12.5+0.0125	12.5+0.0025	12.5+0.0075
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.6.1B.5-2: In-band blocking

E-UTRA band	**Parameter**	**Unit**	**Case 1**	**Case 2**	**Case 3**	**Case 4**
	$P_{Interferer}$	dBm	-56	-44	-30	[-30]
	$F_{Interferer}$ (offset)	MHz	$=-BW/2 - F_{Ioffset,case\ 1}$ & $=+BW/2 + F_{Ioffset,case\ 1}$	$\leq -BW/2 - F_{Ioffset,case\ 2}$ & $\geq +BW/2 + F_{Ioffset,case\ 2}$	-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	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 15$ to $F_{DL\_high} + 15$		
12	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 10$ to $F_{DL\_high} + 15$		$F_{DL\_low} - 10$
17	$F_{Interferer}$	MHz	(Note 2)	$F_{DL\_low} - 9$ to $F_{DL\_high} + 15$	$F_{DL\_low} - 15$ and $F_{DL\_low} - 9$	
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 - $F_{Ioffset,\ case\ 1}$ and b. the carrier frequency +BW/2 + $F_{Ioffset,\ case\ 1}$ Note 3: $F_{Interferer}$ 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 ≥ 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 exceptions the requirements of clause 7.7 Spurious Response are applicable.

For Table 7.6.2.3-2 in frequency range 4, up to $\max(8,\ \lceil(N_{RB}+2\cdot L_{CRBs})/8\rceil)$ 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 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

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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	Frequency			
			range 1	range 2	range 3	range 4
	$P_{Interferer}$	dBm	-44	-30	-15	-15
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 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	$F_{Interferer}$ (CW)	MHz	F_{DL_low} -15 to F_{DL_low} -60	F_{DL_low} -60 to F_{DL_low} -85	F_{DL_low} -85 to 1 MHz	-
			F_{DL_high} +15 to F_{DL_high} + 60	F_{DL_high} +60 to F_{DL_high} +85	F_{DL_high} +85 to +12750 MHz	-
2, 5, 12, 17	$F_{Interferer}$	MHz	-	-	-	F_{UL_low}- F_{UL_high}
Note: For the UE which supports both Band 11 and Band 21 the out of blocking 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 TS 36.508[7] subclause 4.1	NC	
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1	One frequency chosen arbitrarily from low or high range	
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	Lowest, 5MHz, Highest	
Test Parameters for Channel Bandwidths		
	Downlink Configuration	**Uplink Configuration**

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	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.
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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$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 $\max(8,\ \lceil(N_{RB}+2\cdot L_{CRBs})/8\rceil)$ 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.

Table 7.6.2.5-1: 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 Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.6.2.5-2: Out of band blocking

E-UTRA band	**Parameter**	**Units**	**Frequency**			
			range 1	**range 2**	**range 3**	**range 4**
	$P_{Interferer}$	dBm	-44	-30	-15	-15

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 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	$F_{Interferer}$ (CW)	MHz	F_{DL_low} -15 to F_{DL_low} -60	F_{DL_low} -60 to F_{DL_low} -85	F_{DL_low} -85 to 1 MHz	-
			F_{DL_high} +15 to F_{DL_high} + 60	F_{DL_high} +60 to F_{DL_high} +85	F_{DL_high} +85 to +12750 MHz	-
2, 5, 12, 17	$F_{Interferer}$	MHz	-	-	-	F_{UL_low}- F_{UL_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 transmitters 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 ≥ 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 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 7.6.2A.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 ≥ 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 $\max\left(24,\ 6\cdot\left\lceil N_{RB,agg}/6\right\rceil\right)$ 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 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 $\max\left(8,\ \left\lceil (N_{RB,agg}+2\cdot L_{CRBs})/8\right\rceil\right)$ 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.1.3-0: Out-of-band blocking for inter-band carrier aggregation with one active uplink

Parameter	Unit	Range 1	Range 2	Range 3
P_{wanted}	dBm	Table 7.6.2.3-1 for both component carriers		
$P_{interferer}$	dBm	-44 + $\Delta R_{IB,c}$	-30 + $\Delta R_{IB,c}$	-15 + $\Delta R_{IB,c}$
$F_{interferer}$ (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 – $F_{DL\_Low(1)}$ ≤ -60 or -85 < f – $F_{DL\_Low(2)}$ ≤ -60 or 60 ≤ f – $F_{DL\_High(1)}$ < 85 or 60 ≤ f – $F_{DL\_High(2)}$ < 85	1 ≤ f ≤ $F_{DL\_Low(1)}$ – 85 or $F_{DL\_High(1)}$ + 85 ≤ f ≤ $F_{DL\_Low(2)}$ – 85 or $F_{DL\_High(2)}$ + 85 ≤ f ≤ 12750

Note 1: $F_{DL\_Low(1)}$ and $F_{DL\_High(1)}$ denote the respective lower and upper frequency limits of the lower operating band, $F_{DL\_Low(2)}$ and $F_{DL\_High(2)}$ 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 $F_{DL\_Low(1)}$ – 15 MHz ≤ f ≤ $F_{DL\_High(1)}$ + 15 MHz and $F_{DL\_Low(2)}$ – 15 MHz ≤ f ≤ $F_{DL\_High(2)}$ + 15 MHz the appropriate adjacent channel selectivity and in-band blocking in the respective subclauses 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 Bandwidth Class				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			9			

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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.

Table 7.6.2A.1.3-2: Out of band blocking

CA configuration	Parameter	Units	Frequency		
			range 1	range 2	range 3
	$P_{Interferer}$	dBm	-44	-30	-15
CA_1C, CA_7C, CA_38C, CA_40C,CA_41C	$F_{Interferer}$ (CW)	MHz	F_{DL_low} -15 to F_{DL_low} -60	F_{DL_low} -60 to F_{DL_low} -85	F_{DL_low} -85 to 1 MHz
			F_{DL_high} +15 to F_{DL_high} + 60	F_{DL_high} +60 to F_{DL_high} +85	F_{DL_high} +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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.			Highest N_{RB_agg}				
Test Parameters for CA Configurations							
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**			
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**	
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 within +0, - 3.4 dB of the target level in table 7.6.2A.1.5-1 for carrier frequency f ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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. 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 ≥ 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 $\max\left(24,\ 6\cdot\left\lceil N_{RB,agg}/6\right\rceil\right)$ 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 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 Bandwidth Class				
		B	C	D	E	F

Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			9			
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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.						

Table 7.6.2A.1.5-2: Out of band blocking

CA configuration	Parameter	Units	Frequency		
			range 1	range 2	range 3
	$P_{Interferer}$	dBm	-44	-30	-15
CA_1C, CA_7C, CA_38C, CA_40C,CA_41C	$F_{Interferer}$ (CW)	MHz	F_{DL_low} -15 to F_{DL_low} -60	F_{DL_low} -60 to F_{DL_low} -85	F_{DL_low} -85 to 1 MHz
			F_{DL_high} +15 to F_{DL_high} + 60	F_{DL_high} +60 to F_{DL_high} +85	F_{DL_high} +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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.		Highest N_{RB_agg}					
Test Parameters for CA Configurations							
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**			
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**	
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.							

7.6.2A.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

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 b(N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.		Highest N_{RB_agg} for PCC and SCC				
Test Parameters for CA Configurations						
CA Configuration / N_{RB_agg}		**DL Allocation**			**UL Allocation**	
PCC N_{RB}	**SCCs N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**		**CC MOD**	**PCC N_{RB_alloc}**
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).						

7.6.2A.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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$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 ≥ 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 $\max(24, \ 6 \cdot \lceil N_{RB} / 6 \rceil)$ 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 Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9

Note 1:	The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.6.2A.3.5-2: Out-of-band blocking for inter-band carrier aggregation with one uplink carrier

Parameter	Unit	Range 1	Range 2	Range 3
P_{wanted}	dBm	Table 7.6.2.5-1 for both component carriers		
$P_{interferer}$	dBm	$-44 + \Delta R_{IB,c}$	$-30 + \Delta R_{IB,c}$	$-15 + \Delta R_{IB,c}$
$F_{interferer}$ (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 $15 < f - F_{DL\_High(2)} < 60$	$-85 < f - F_{DL\_Low(1} \leq -60$ or $-85 < f - F_{DL\_Low(2)} \leq -60$ or $60 \leq f - F_{DL\_High(1)} < 85$ or $60 \leq f - F_{DL\_High(2)} < 85$	$1 \leq f \leq F_{DL\_Low(1)} - 85$ or $F_{DL\_High(1)} + 85 \leq f \leq F_{DL\_Low(2)} - 85$ or $F_{DL\_High(2)} + 85 \leq f \leq 12750$
Note 1:	$F_{DL\_Low(1)}$ and $F_{DL\_High(1)}$ denote the respective lower and upper frequency limits of the lower operating band, $F_{DL\_Low(2)}$ and $F_{DL\_High(2)}$ 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 $F_{DL\_Low(1)} - 15$ 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 subclauses 7.5A.1.5 and 7.6.1A.5 shall be applied.			
Note 4:	$\Delta R_{IB,c}$ according to Table 7.3A.1.3-0 applies when serving cell c 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 transmitters 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_{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.

7.6.2B.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 Environment as specified in TS 36.508[7] subclause 4.1			NC			
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1			One frequency chosen arbitrarily from low or high range			
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1			Lowest, 5MHz, Highest			
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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.						

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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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			
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 ≥ 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 $\max(8,\ \lceil(N_{RB}+2\cdot L_{CRBs})/8\rceil)$ 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.

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 below					
		6	6	6	6	7	9

Bandwidth Configuration							
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.6.2B.5-2: Out of band blocking

E-UTRA band	Parameter	Units	Frequency			
			range 1	range 2	range 3	range 4
	$P_{Interferer}$	dBm	-44	-30	-15	-15
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 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	$F_{Interferer}$ (CW)	MHz	F_{DL_low} -15 to F_{DL_low} -60	F_{DL_low} -60 to F_{DL_low} -85	F_{DL_low} -85 to 1 MHz	-
			F_{DL_high} +15 to F_{DL_high} + 60	F_{DL_high} +60 to F_{DL_high} +85	F_{DL_high} +85 to +12750 MHz	-
2, 5, 12, 17	$F_{Interferer}$	MHz	-	-	-	F_{UL_low}- F_{UL_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 ≥ 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_w	dBm	$P_{REFSENS}$ + channel-bandwidth specific value below					
		22	18	16	13	14	16
P_{uw} (CW)	dBm	-55	-55	-55	-55	-55	-55
F_{uw} (offset for Δf = 15 kHz)	MHz	0.9075	1.7025	2.7075	5.2125	7.7025	10.2075
F_{uw} (offset for Δf = 7.5 kHz)	MHz						
Note 1: The transmitter shall be set a 4 dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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

Initial Conditions						
Test Environment as specified in TS 36.508 [7] subclause 4.1		NC				
Test Frequencies as specified in TS 36.508 [7] subclause 4.3.1		Mid range				
Test Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1		Lowest, 5MHz, Highest				
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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, 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
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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz $< f \leq 4.2$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

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	
}			

7.6.3.5 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.

Table 7.6.3.5-1: Narrow-band blocking

Parameter	Unit	Channel Bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
P_w	dBm	$P_{REFSENS}$ + channel-bandwidth specific value below					
		22	18	16	13	14	16
P_{uw} (CW)	dBm	-55	-55	-55	-55	-55	-55
F_{uw} (offset for Δf = 15 kHz)	MHz	0.9075	1.7025	2.7075	5.2125	7.7025	10.2075
F_{uw} (offset for Δf = 7.5 kHz)	MHz						
Note 1: The transmitter shall be set a 4 dB below P_{CMAX_L} with P_{CMAX_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.							

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 ≥ 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 Bandwidth Class				
		B	C	D	E	F

Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			16			
P_{uw} (CW)	dBm		-55			
F_{uw} (offset for Δf = 15 kHz)	MHz		- F_{offset} – 0.2 / + F_{offset} + 0.2			
F_{uw} (offset for Δf = 7.5 kHz)	MHz					

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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 $F_{interferer}$ (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\lfloor F_{interferer}/0.015 + 0.5 \rfloor 0.015 + 0.0075$ 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 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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.			Lowest N_{RB_agg} Highest N_{RB_agg}				
Test Parameters for CA Configurations							
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**			
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**	
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 7.6.3A.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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz $< f \leq$ 4.2GHz, 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 ≥ 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				
		B	C	D	E	F

Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			16			
P_{uw} (CW)	dBm		-55			
F_{uw} (offset for Δf = 15 kHz)	MHz		- F_{offset} – 0.2 / + F_{offset} + 0.2			
F_{uw} (offset for Δf = 7.5 kHz)	MHz					

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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 $F_{interferer}$ (offset) is relative to the centre frequency of the adjacent CC being tested and shall be further adjusted to $\lfloor F_{interferer} / 0.015 + 0.5 \rfloor 0.015 + 0.0075$ 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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.		Lowest N_{RB_agg} Highest N_{RB_agg}					
Test Parameters for CA Configurations							
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**			
PCC N_{RB}	**SCC N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**	
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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.		Highest N_{RB_agg} for PCC and SCC				
Test Parameters for CA Configurations						
CA Configuration / N_{RB_agg}		**DL Allocation**			**UL Allocation**	
PCC N_{RB}	**SCCs N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**		**CC MOD**	**PCC N_{RB_alloc}**
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).						

7.6.3A.3.4.2 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.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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz $< f \leq$ 4.2GHz, 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 ≥ 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.

Table 7.6.3A.3.5-1: Narrow-band blocking

Parameter	Unit	Channel Bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
P_w	dBm	$P_{REFSENS}$ + channel-bandwidth specific value below					
		22	18	16	13	14	16
P_{uw} (CW)	dBm	-55	-55	-55	-55	-55	-55
F_{uw} (offset for Δf = 15 kHz)	MHz	0.9075	1.7025	2.7075	5.2125	7.7025	10.2075
F_{uw} (offset for Δf = 7.5 kHz)	MHz						
Note 1: The transmitter shall be set a 4 dB below P_{CMAX_L} with P_{CMAX_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.							

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 TS 36.508 [7] clause 4.1			NC			
Test Frequencies as specified in TS 36.508 [7] clause 4.3.1			Mid range			
Test Channel Bandwidths as specified in TS 36.508 [7] clause 4.3.1			Lowest, 5MHz, Highest			
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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.						

1. 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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz $< f \leq 4.2$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 ≥ 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.

Table 7.6.3B.5-1: Narrow-band blocking

Parameter	Unit	Channel Bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
P_w	dBm	$P_{REFSENS}$ + channel-bandwidth specific value below					
		22	18	16	13	14	16
P_{uw} (CW)	dBm	-55	-55	-55	-55	-55	-55
F_{uw} (offset for Δf = 15 kHz)	MHz	0.9075	1.7025	2.7075	5.2125	7.7025	10.2075
F_{uw} (offset for Δf = 7.5 kHz)	MHz						
Note 1: The transmitter shall be set a 4 dB below P_{CMAX_L} with P_{CMAX_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.							

7.7 Spurious response

7.7.1 Test Purpose

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.

7.7.3 Minimum Conformance Requirements

The throughput shall be ≥ 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 Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
Note 1:The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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
$P_{Interferer}$ (CW)	dBm	-44
$F_{Interferer}$	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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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.

Table 7.7.4.3-1: 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	
}			

7.7.5 Test Requirement

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 7.7.5-1 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 Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9

Note 1:	The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.7.5-2: Spurious Response

Parameter	Unit	Level
$P_{Interferer}$ (CW)	dBm	-44
$F_{Interferer}$	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 ≥ 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 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 7.7A.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 ≥ 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	CA Bandwidth Class				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			9			
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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
$P_{Interferer}$ (CW)	dBm	-44
$F_{Interferer}$	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 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 7.7A.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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$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 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 ≥ 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

Rx Parameter	Units	CA Bandwidth Class				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			9			
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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.1.5-2: Spurious response

Parameter	Unit	Level
$P_{Interferer}$ (CW)	dBm	-44
$F_{Interferer}$	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 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 7.7A.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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz $< f \leq$ 4.2GHz, 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 ≥ 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.

Table 7.7A.3.5-1: Spurious response parameters

Rx Parameter	Units	Channel bandwidth					
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.7A.3.5-2: Spurious Response

Parameter	Unit	Level
$P_{Interferer}$ (CW)	dBm	-44
$F_{Interferer}$	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 sub-clause 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 P_{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 7.7.1B.

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 7.7B.5-2. The spurious frequencies are taken from records in the final step of test procedures in clause 7.6B.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 ≤ 3.0GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < f ≤ 4.2GHz, 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: 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	
}			

7.7B.5 Test Requirement

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 7.7B.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 Transmission	dBm	REFSENS + channel bandwidth specific value below					
		6	6	6	6	7	9

Bandwidth Configuration							
Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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 7.7B.5-2: Spurious Response

Parameter	Unit	Level
$P_{Interferer}$ (CW)	dBm	-44
$F_{Interferer}$	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 ≥ 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 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Power in Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		12	8	6	6	7	9

$P_{Interferer\ 1}$ (CW)	dBm	-46		
$P_{Interferer\ 2}$ (Modulated)	dBm	-46		
$BW_{Interferer\ 2}$		1.4	3	5
$F_{Interferer\ 1}$ (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
$F_{Interferer\ 2}$ (Offset)	MHz	$2*F_{Interferer\ 1}$		

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} at the minimum uplink configuration specified in Table 7.3.3-2 with P_{CMAX_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.

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 ΔR_{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 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	Lowest, 5MHz, Highest	
Test Parameters for Channel Bandwidths		
	Downlink Configuration	**Uplink Configuration**

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	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_RNTI 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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$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			
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	
}			

7.8.1.5 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 Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		12	8	6	6	7	9
$P_{Interferer\ 1}$ (CW)	dBm	-46					
$P_{Interferer\ 2}$ (Modulated)	dBm	-46					
$BW_{Interferer\ 2}$		1.4	3	5			
$F_{Interferer\ 1}$ (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			
$F_{Interferer\ 2}$ (Offset)	MHz	$2*F_{Interferer\ 1}$					

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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.
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, $P_{interferer1}$ and $P_{interferer2}$ powers are increased by the amount given by ΔR_{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 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 7.8.1A.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 ≥ 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				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			12			

$P_{Interferer\ 1}$ (CW)	dBm	-46				
$P_{Interferer\ 2}$ (Modulated)	dBm	-46				
$BW_{Interferer\ 2}$	MHz		5			
$F_{Interferer\ 1}$ (Offset)	MHz		$-F_{offset}$-7.5 / + F_{offset}+7.5			
$F_{Interferer\ 2}$ (Offset)	MHz	$2*F_{Interferer\ 1}$				

NOTE 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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 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 interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥5MHz

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

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

Initial Conditions								
Test Environment as specified in TS 36.508[7] subclause 4.1				Normal				
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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.				Lowest N_{RB_agg}, Highest N_{RB_agg}				
Test Parameters for CA Configurations								
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**				
PCC N_{RB}	**SCCs NRB**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**		
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 aggre 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 T 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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$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 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 ≥ 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				
		B	C	D	E	F
Power per CC in Aggregated Transmission Bandwidth Configuration	dBm	REFSENS + CA Bandwidth Class specific value below				
			12			

$P_{Interferer\ 1}$ (CW)	dBm	-46				
$P_{Interferer\ 2}$ (Modulated)	dBm	-46				
$BW_{Interferer\ 2}$	MHz		5			
$F_{Interferer\ 1}$ (Offset)	MHz		$-F_{offset}$-7.5 / + F_{offset}+7.5			
$F_{Interferer\ 2}$ (Offset)	MHz	$2*F_{Interferer\ 1}$				

NOTE 1: The transmitter shall be set to 4dB below P_{CMAX_L} or $P_{CMAX\_L\_CA}$ 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 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 interfering modulated signal is 5MHz E-UTRA signal as described in Annex D for channel bandwidth ≥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

Initial Conditions									
Test Environment as specified in TS 36.508[7] subclause 4.1			Normal						
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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.			Lowest N_{RB_agg}, Highest N_{RB_agg}						
Test Parameters for CA Configurations									
CA Configuration / N_{RB_agg}		**DL Allocation**		**UL Allocation**					
PCC N_{RB}	**SCCs NRB**	**CC MOD**	**PCC & SCC RB allocation**	**CC MOD**	**N_{RB_alloc}**	**PCC & SCC RB allocations (L_{CRB} @ RB_{start})**			
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 configurations, only the appropriate Uplink RB allocation value according to table 7.3.3-2 is tested per Test CA 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.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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$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 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_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration across bandwidth combination sets supported by the UE.		Highest N_{RB_agg} for PCC and SCC				
Test Parameters for CA Configurations						
CA Configuration / N_{RB_agg}		**DL Allocation**			**UL Allocation**	
PCC N_{RB}	**SCCs N_{RB}**	**CC MOD**	**PCC & SCC RB allocation**		**CC MOD**	**PCC N_{RB_alloc}**
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).						

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.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 $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz $< f \leq$ 4.2GHz, 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 Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		12	8	6	6	7	9

$P_{Interferer\ 1}$ (CW)	dBm	-46		
$P_{Interferer\ 2}$ (Modulated)	dBm	-46		
$BW_{Interferer\ 2}$		1.4	3	5
$F_{Interferer\ 1}$ (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
$F_{Interferer\ 2}$ (Offset)	MHz	$2*F_{Interferer\ 1}$		

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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.
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 4: For the UE which supports inter band CA configuration in Table 7.3A.3-0, $P_{interferer1}$ and $P_{interferer2}$ powers are increased by the amount given by ΔR_{IB} in Table 7.3A.3-0

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 multiplexing 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 P_{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 7.8.1B 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

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	Lowest, 5MHz, Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**Uplink Configuration**		
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	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.						

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 7.8.1B.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 Downlink signal level to the value as defined in Table 7.8.1B.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 7.8.1B.5-1 for carrier frequency $f \leq 3.0$GHz or within +0, -4.0 dB of the target level for carrier frequency 3.0GHz < $f \leq 4.2$GHz, for at least the duration of the throughput measurement.

4. Set the Interfering signal levels to the values as defined in Table 7.8.1B.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 ≥ 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 Transmission Bandwidth Configuration	dBm	REFSENS + channel bandwidth specific value below					
		12	8	6	6	7	9
$P_{Interferer\ 1}$ (CW)	dBm	-46					
$P_{Interferer\ 2}$ (Modulated)	dBm	-46					
$BW_{Interferer\ 2}$		1.4	3	5			
$F_{Interferer\ 1}$ (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			
$F_{Interferer\ 2}$ (Offset)	MHz	$2*F_{Interferer\ 1}$					

Note 1: The transmitter shall be set to 4dB below P_{CMAX_L} with P_{CMAX_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.
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 Bandwidth	Maximum level	Note
30MHz ≤ f < 1GHz	100 kHz	-57 dBm	
1GHz ≤ f ≤ 12.75 GHz	1 MHz	-47 dBm	
12.75 GHz ≤ f ≤ 5th 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 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 Channel Bandwidths as specified in TS 36.508 [7] subclause 4.3.1	Highest					
Test Parameters for Channel Bandwidths						
	Downlink Configuration			**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 ≤ 5th 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.