6 Transmitter Characteristics

6.1 General

Unless otherwise stated, the transmitter characteristics are specified at the antenna connector of the UE with a single transmit antenna. For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed.

The transient periods due to power steps, OFF/ON and ON/OFF transitions could occur at slot or symbol boundary with transients, on one or both sides of the boundary. The measurement period and whether to exclude the transient periods are specified in the respective sections below.

Unless otherwise stated, the Test Equipment shall be synchronised to the Uplink signal for measurement of TDD transmitter characteristics.

For CA tests, Cell ID = 0 applies to P-Cell, and Cell ID = 1 is used for S-Cell.

Parameters given in table 6.1-1 are used throughout this section for CA, unless otherwise stated by the test case.

Table 6.1-1: Common Test Parameters

Parameter	Value	Comments
Cross carrier scheduling	Not configured	

6.2 Transmit power

6.2.1 Void

Editor's note: This "void" section was introduced because TS 36.101 v8.1.0 also contains a "void" sub-clause with in the transmit power clause 6.2, and there is a strong desire in RAN5 to keep the test cases clauses numbering matching their specific core requirements as much as possible.

6.2.2 UE Maximum Output Power

6.2.2.1 Test purpose

To verify that the error of the UE maximum output power does not exceed the range prescribed by the specified nominal maximum output power and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

6.2.2.2 Test applicability

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

6.2.2.3 Minimum conformance requirements

The following UE Power Classes defines the maximum output power for any transmission bandwidth within the channel bandwidth. The period of measurement shall be at least one sub frame (1ms).

Table 6.2.2.3-1: UE Power Class

EUTRA band	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
1					23	±2		
2					23	±2[2]		
3					23	±2[2]		
4					23	±2		
5					23	±2		
6					23	±2		
7					23	±2[2]		
8					23	±2[2]		
9					23	±2		
10					23	±2		
11					23	±2		
12					23	±2[2]		
13					23	±2		
14					23	±2		
…								
17					23	±2		
18					23	±2[6]		
19					23	±2		
20					23	±2[2]		
21					23	±2		
22					23	+2/-3.5[2]		
23					23[5]	±2[5]		
24					23	±2		
25					23	±2[2]		
26					23	±2[2]		
27					23	±2		
28					23	+2/-2.5		
31					23	±2		
...								
33					23	±2		
34					23	±2		
35					23	±2		
36					23	±2		
37					23	±2		
38					23	±2		
39					23	±2		
40					23	±2		
41					23	±2[2]		
42					23	+2/-3		
43					23	+2/-3		
44					23	+2/[-3]		
…								

Note 1: The above tolerances are applicable for UE(s) that support up to 4 E-UTRA operating bands. For UE(s) that support 5 or more E-UTRA bands the maximum output power is expected to decrease with each additional band and is FFS

Note 2: For transmission bandwidths (Figure 5.4.2-1) confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high}, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB

Note 3: $P_{PowerClass}$ is the maximum UE power specified without taking into account the tolerance

Note 4: For the UE which supports both Band 11 and Band 21 operating frequencies, the tolerance is FFS.

Note 5: When NS_20 is signalled, the total output power within 2000-2005 MHz shall be limited to 7 dBm.

Note 6: For a UE that supports both Band 18 and Band 26, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5dB for transmission bandwidths confined within 815 MHz and 818 MHz

The normative reference for this requirement is TS 36.101 clause 6.2.2.

6.2.2.4 Test description

6.2.2.4.1 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 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 6.2.2.4.1-1. 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 6.2.2.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, 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	N/A for Max UE output power testing	Mod'n	RB allocation	
			FDD	TDD
1.4MHz		QPSK	1	1
1.4MHz		QPSK	5	5
3MHz		QPSK	1	1
3MHz		QPSK	4	4
5MHz		QPSK	1	1
5MHz		QPSK	8	8
10MHz		QPSK	1	1
10MHz		QPSK	12	12
15MHz		QPSK	1	1
15MHz		QPSK	16	16
20MHz		QPSK	1	1
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.
Note 2: For E-UTRA bands not applied with Note 2 in Table 6.2.2.3-1:
- The 1 RB allocation shall be tested at RB#0 for low and mid range, RB #max for high range test frequency.
- The RBstart of non-1RB allocation shall be RB #0 for low and mid range, RB# (max +1 - RB allocation) for high range test frequency.

Note 3: For E-UTRA bands applied with Note 2 in Table 6.2.2.3-1:
- If the test channel bandwidth is larger than 4MHz, then the 1 RB allocation shall be tested at both RB #0 and RB #max.
- If the test channel bandwidth is smaller or equal to 4MHz, then the 1 RB allocation shall be tested at RB #0.
- If the test channel bandwidth = (FUL_high - FUL_low) specified by the operating band, then only one frequency range shall be tested and the 1 RB allocation shall be tested at RB #0, RB # $\lceil N_{\mathrm{RB}}^{\mathrm{UL}} / 2 \rceil$ and RB #max.
- For non-1RB allocation, test frequency is middle range, and the RBstart shall be RB #0.

Note 4: For E-UTRA band 28, when the test frequency is high range for lower duplexer, 20MHz bandwidth is only testable.

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 6.2.2.4.1-1.
5. Propagation conditions are set according to Annex B.0.
6. Ensure the UE is in State 3A-RFaccording to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.2.2.4.3.

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 Table 6.2.2.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.
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 P_{UMAX} level.
3. Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.2.4.3 Message contents

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

6.2.2.5 Test requirements

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2.2.5-1.

Table 6.2.2.5-1: UE Power Class test requirements

EUTRA band	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
1					23	±2.7		
2					23	±2.7[2]		
3					23	±2.7[2]		
4					23	±2.7		
5					23	±2.7		
6					23	±2.7		
7					23	±2.7[2]		
8					23	±2.7[2]		
9					23	±2.7		
10					23	±2.7		
11					23	±2.7		
12					23	±2.7[2]		
13					23	±2.7		
14					23	±2.7		
…								
17					23	±2.7		
18					23	±2.7[6]		
19					23	±2.7		
20					23	±2.7[2]		
21					23	±2.7		
22					23	+3.0/-4.5		
23					23[5]	±2.7[5]		
24					23	±2.7		
25					23	±2.7[2]		
26					23	±2.7[2]		
27					23	±2.7		
28					23	+2.7/-3.2		
31					23	±2.7		
...								
33					23	±2.7		
34					23	±2.7		
35					23	±2.7		
36					23	±2.7		
37					23	±2.7		
38					23	±2.7		
39					23	±2.7		
40					23	±2.7		
41					23	±2.7[2]		
42					23	+3.0/-4.0		
43					23	+3.0/-4.0		
44					23	+2.7/[-3.7]		
…								

Note 1: The above tolerances are applicable for UE(s) that support up to 4 E-UTRA operating bands. For UE(s) that support 5 or more E-UTRA bands the maximum output power is expected to decrease with each additional band and is FFS

Note 2: For transmission bandwidths (Figure 5.4.2-1, Table 5.4.4-1) confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high}, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB

Note 3: $P_{PowerClass}$ is the maximum UE power specified without taking into account the tolerance.

Note 4: For the UE which supports both Band 11 and Band 21 operating frequencies, the tolerance is FFS.

Note 5: When NS_20 is signalled, the total output power within 2000-2005 MHz shall be limited to 7 dBm.

Note 6: For a UE that supports both Band 18 and Band 26, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5dB for transmission bandwidths confined within 815 MHz and 818 MHz.

6.2.2_1 Maximum Output Power for HPUE

6.2.2_1.1 Test purpose

Same test purpose as in clause 6.2.2.1.

6.2.2_1.2 Test applicability

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

6.2.2_1.3 Minimum conformance requirements

The following defines the maximum output power for any transmission bandwidth within the channel bandwidth for Power Class 1 UE. The period of measurement shall be at least one sub frame (1ms).

Table 6.2.2_1.3-1: HPUE Power Class

EUTRA band	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
14	31	+2/-3	N/A	N/A	N/A	N/A	N/A	N/A
Note 1: The above tolerances are applicable for UE(s) that support up to 4 E-UTRA operating bands. For UE(s) that support 5 or more E-UTRA bands the maximum output power is expected to decrease with each additional band and is FFS Note 2-3: N/A Note 4: $P_{PowerClass}$ is the maximum UE power specified without taking into account the tolerance Note 5-6: N/A								

The normative reference for this requirement is TS 36.101 clause 6.2.2.

6.2.2_1.4 Test description

Same test description as in clause 6.2.2.4 with the following exception:

- Instead of Table 6.2.2.4.1-1→ use Table 6.2.2_1.4-1

Table 6.2.2_1.4-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, 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	N/A for Max UE output power testing	Mod'n	RB allocation	
			FDD	TDD
1.4MHz		QPSK	1	1
1.4MHz		QPSK	5	5
3MHz		QPSK	1	1
3MHz		QPSK	4	4
5MHz		QPSK	1	1
5MHz		QPSK	8	8
10MHz		QPSK	1	1
10MHz		QPSK	12	12
15MHz		QPSK	1	1
15MHz		QPSK	16	16
20MHz		QPSK	1	1
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. Note 2: The 1 RB allocation shall be tested at RB#0 for low and mid range, RB #max for high range test frequency. The RBstart of non-1RB allocation shall be RB #0 for low and mid range, RB# (max +1 - RB allocation) for high range test frequency.				

6.2.2_1.5 Test requirements

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2.2_1.5-1

Table 6.2.2_1.5-1: HPUE Power Class test requirements

EUTRA band	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
14	31	+2.7/-3.7	N/A	N/A	N/A	N/A	N/A	N/A
Note 1: The above tolerances are applicable for UE(s) that support up to 4 E-UTRA operating bands. For UE(s) that support 5 or more E-UTRA bands the maximum output power is expected to decrease with each additional band and is FFS								

6.2.2A UE Maximum Output Power for CA

6.2.2A.1 UE Maximum Output Power for CA (intra-band contiguous DL CA and UL CA)

6.2.2A.1.1 Test purpose

To verify that the error of UE maximum output power in intra-band contiguous carrier aggregation does not exceed the range prescribed by the specified CA Power Class and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

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.

6.2.2A.1.3 Minimum conformance requirements

The following UE Power Classes define the maximum output power for any transmission bandwidth within the aggregated channel bandwidth.

- For inter-band carrier aggregation with uplink assigned to one E-UTRA band the requirements in subclause 6.2.2 apply.

- For intra-band contiguous carrier aggregation the maximum output power is specified in Table 6.2.2A.1.3-1.

The maximum output power is measured as the sum of the maximum output power at each UE antenna connector. The period of measurement shall be at least one sub frame (1ms).

Table 6.2.2A.1.3-1: CA UE Power Class

E-UTRA CA Configuration	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
CA_1C					23	+2/-2		
CA_7C					23	+2/-2[2]		
CA_38C					23	+2/-2		
CA_40C					23	+2/-2		
CA_41C					23	+2/-2[2]		

Note 1: The above tolerances are applicable for UE(s) that support up to 4 E-UTRA operating bands. For UE(s) that support 5 or more E-UTRA bands the maximum output power is expected to decrease with each additional band and is FFS

Note 2: For transmission bandwidths (Figure 5.4.2-1) confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high}, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB

Note 3: $P_{PowerClass}$ is the maximum UE power specified without taking into account the tolerance

Note 4: For intra-band contiguous carrier aggregation the maximum power requirement should apply to the total transmitted power over all component carriers (per UE).

The normative reference for this requirement is in TS 36.101 [2] clause 6.2.2A.

6.2.2A.1.4 Test description

6.2.2A.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 6.2.2A.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 6.2.2A.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 and 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**	**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/Afor this test	QPSK	1	P_1@0	S_0@0	-	-	
75	75		QPSK	16	P_16@0	S_0@0	-	-	
100	50		QPSK	1	P_1@0	S_0@0	-	-	
100	50		QPSK	12	P_12@0	S_0@0	-	-	
100	75		QPSK	1	P_1@0	S_0@0			
100	75		QPSK	16	P_16@0	S_0@0			
100	100		QPSK	1	P_1@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.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 6.2.2A.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 6.2.2A.1.4.3.

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 6.2.2A.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 for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to Table 6.2.2A.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; allow at least 200ms for the UE to reach P_{UMAX} level.

6. Measure the mean transmitted power over all component carriers in the CA configuration of the radio access mode. The period of measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.2A.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.

6.2.2A.1.5 Test Requirements

The maximum output power for the CA configuration, derived in step 3 shall be within the range prescribed by the CA UE Power Class and tolerance in Table 6.2.2A.1.5-1.

Table 6.2.2A.1.5-1: CA UE Power Class test requirements

CA Conf	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
CA_1C					23	±2.7		
CA_7C					23	±2.7[2]		
CA_38C					23	±2.7		
CA_40C					23	±2.7		
CA_41C					23	±2.7[2]		
Note 1:	The above tolerances are applicable for UE(s) that support up to 4 E-UTRA operating bands. For UE(s) that support 5 or more E-UTRA bands the maximum output power is expected to decrease with each additional band and is FFS							
Note 2:	For transmission bandwidths (Figure 5.4.2-1) confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high}, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB							
Note 3:	$P_{PowerClass}$ is the maximum UE power specified without taking into account the tolerance							
Note 4:	For intra-band contiguous carrier aggregation the maximum power requirement should apply to the total transmitted power over all component carriers (per UE).							

6.2.2B UE Maximum Output Power for UL-MIMO

6.2.2B.1 Test purpose

To verify that the error of UE maximum output power in UL MIMO does not exceed the range prescribed by the specified UL MIMO Power Class and tolerance.

An excess maximum output power has the possibility to interfere to other channels or other systems. A small maximum output power decreases the coverage area.

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.

6.2.2B.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the maximum output power for any transmission bandwidth within the channel bandwidth is specified in Table 6.2.2B.3-1 with the UL-MIMO configurations specified in Table 6.2.2B.3-2. The maximum output power is measured as the sum of the maximum output power at each UE antenna connector. The period of measurement shall be at least one sub frame (1ms).

Table 6.2.2B.3-1: UE Power Class for UL-MIMO in closed loop spatial multiplexing scheme

EUTRA band	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
1					23	+2/-3		
2					23	+2/-3[2]		
3					23	+2/-3[2]		
4					23	+2/-3		
5					23	+2/-3		
6					23	+2/-3		
7					23	+2/-3[2]		
8					23	+2/-3[2]		
9					23	+2/-3		
10					23	+2/-3		
11					23	+2/-3		
12					23	+2/-3[2]		
13					23	+2/-3		
14					23	+2/-3		
…								
17					23	+2/-3		
18					23	+2/-3		
19					23	+2/-3		
20					23	+2/-3[2]		
21					23	+2/-3		
22					23	+2/-4.5[2]		
23					23	+2/-3		
24					23	+2/-3		
25					23	+2/-3[2]		
26					23	+2/-3[2]		
27					23	+2/-3		
28					23	+2/[-3]		
31					23	+2/-3		
…								
33					23	+2/-3		
34					23	+2/-3		
35					23	+2/-3		
36					23	+2/-3		
37					23	+2/-3		
38					23	+2/-3		
39					23	+2/-3		
40					23	+2/-3		
41					23	+2/-3[2]		
42					23	+2/-4		
43					23	+2/-4		
44					23	+2/[-3]		

Note 1: Void
Note 2: For transmission bandwidths (Figure 5.4.2-1) confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high}, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB
Note 3: For the UE which supports both Band 11 and Band 21 operating frequencies, the tolerance is FFS.
Note 4: $P_{PowerClass}$ is the maximum UE power specified without taking into account the tolerance

Table 6.2.2B.3-2: 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 clause 6.2.2B.

6.2.2B.4 Test description

6.2.2B.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 6.2.2B.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 6.2.2B.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, 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	N/A for Max UE output power testing	Mod'n	RB allocation	
			FDD	TDD
1.4MHz		QPSK	1	1
1.4MHz		QPSK	5	5
3MHz		QPSK	1	1
3MHz		QPSK	4	4
5MHz		QPSK	1	1
5MHz		QPSK	8	8
10MHz		QPSK	1	1
10MHz		QPSK	12	12
15MHz		QPSK	1	1
15MHz		QPSK	16	16
20MHz		QPSK	1	1
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.

Note 2: For E-UTRA bands not applied with Note 2 in Table 6.2.2B.3-1:
- The 1 RB allocation shall be tested at RB#0 for low and mid range, RB #max for high range test frequency.
- The starting resource block of non-1RB allocation shall be RB #0 for low and mid range, RB# (max +1 - RB allocation) for high range test frequency.

Note 3: For E-UTRA bands applied with Note 2 in Table 6.2.2B.3-1:
- If the test channel bandwidth is larger than 4MHz, then the 1 RB allocation shall be tested at both RB #0 and RB #max.
- If the test channel bandwidth is smaller or equal to 4MHz, then the 1 RB allocation shall be tested at RB #0.
- If the test channel bandwidth = (F_{UL_high} - F_{UL_low}) specified by the operating band, then only one frequency range shall be tested and the 1 RB allocation shall be tested at RB #0, RB # $\left\lceil N_{RB}^{UL}/2 \right\rceil$ and RB #max.
- For non-1RB allocation, test frequency is middle range, and the starting resource block shall be RB #0.

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 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 6.2.2B.4.1-1.

5. Propagation conditions are set according to Annex B.0.

6. Ensure the UE is in State 3A-RFaccording to TS 36.508 [7] clause 5.2A.2. Message contents are defined in clause 6.2.2B.4.3.

6.2.2B.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 6.2.2B.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 P_{UMAX} level.

3. Measure the mean sum power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.2B.4.3 Message contents

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

6.2.2B.5 Test requirements

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2.2B.5-1.

Table 6.2.2B.5-1: UE Power Class for UL-MIMO in closed loop spatial multiplexing scheme

EUTRA band	Class 1 (dBm)	Tolerance (dB)	Class 2 (dBm)	Tolerance (dB)	Class 3 (dBm)	Tolerance (dB)	Class 4 (dBm)	Tolerance (dB)
1					23	+2.7/-3.7		
2					23	+2.7/-3.7[2]		
3					23	+2.7/-3.7[2]		
4					23	+2.7/-3.7		
5					23	+2.7/-3.7		
6					23	+2.7/-3.7		
7					23	+2.7/-3.7[2]		
8					23	+2.7/-3.7[2]		
9					23	+2.7/-3.7		
10					23	+2.7/-3.7		
11					23	+2.7/-3.7		
12					23	+2.7/-3.7[2]		
13					23	+2.7/-3.7		
14					23	+2.7/-3.7		
…								
17					23	+2.7/-3.7		
18					23	+2.7/-3.7		
19					23	+2.7/-3.7		
20					23	+2.7/-3.7[2]		
21					23	+2.7/-3.7		
22					23	+3/-5.5[2]		
23					23	+2.7/-3.7		
24					23	+2.7/-3.7		
25					23	+2.7/-3.7[2]		
26					23	+2.7/-3.7		
27					23	+2.7/-3.7		
28					23	+2.7/[-3.7]		
31					23	+2.7/-3.7		
…								
33					23	+2.7/-3.7		
34					23	+2.7/-3.7		
35					23	+2.7/-3.7		
36					23	+2.7/-3.7		
37					23	+2.7/-3.7		
38					23	+2.7/-3.7		
39					23	+2.7/-3.7		
40					23	+2.7/-3.7		
41					23	+2.7/-3.7[2]		
42					23	+3/-5		
43					23	+3/-5		
44					23	+2.7/[-3.7]		

Note 1: Void
Note 2: For transmission bandwidths (Figure 5.4.2-1) confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high}, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB
Note 3: For the UE which supports both Band 11 and Band 21 operating frequencies, the tolerance is FFS.
Note 4: $P_{PowerClass}$ is the maximum UE power specified without taking into account the tolerance

6.2.3 Maximum Power Reduction (MPR)

Editor's note:

- Requirement for Band 44 is not yet finalised due to square brackets in core specification TS 36.101 Table 6.2.2-1.

6.2.3.1 Test purpose

The number of RB identified in Table 6.2.3.3-1 is based on meeting the requirements for adjacent channel leakage ratio and the maximum power reduction (MPR) due to Cubic Metric (CM).

Simple scaling can be used to derive the requirement for other bandwidth based on the previously agreed value for 5MHz channel bandwidth.

6.2.3.2 Test applicability

The requirements of this test apply in test cases 6.6.2.3 Adjacent Channel Leakage power Ratio to all types of E-UTRA UE release 8 and forward.

6.2.3.3 Minimum conformance requirements

For UE Power Class 3, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2.3-1 due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3.3-1.

Table 6.2.3.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5.3 apply.

The normative reference for this requirement is TS 36.101 clause 6.2.3.

6.2.3.4 Test description

6.2.3.4.1 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 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 6.2.3.4.1-1. 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 6.2.3.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, 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	N/A for Maximum Power Reduction (MPR) test case	Mod'n	RB allocation	
			FDD	TDD

1.4MHz		QPSK	5	5
1.4MHz		QPSK	6	6
1.4MHz		16QAM	5	5
1.4MHz		16QAM	6	6
3.0MHz		QPSK	4	4
3.0MHz		QPSK	15	15
3.0MHz		16QAM	4	4
3.0MHz		16QAM	15	15
5MHz		QPSK	8	8
5MHz		QPSK	25	25
5MHz		16QAM	8	8
5MHz		16QAM	25	25
10MHz		QPSK	12	12
10MHz		QPSK	50	50
10MHz		16QAM	12	12
10MHz		16QAM	50 (Note 3)	50 (Note 3)
15MHz		QPSK	16	16
15MHz		QPSK	75	75
15MHz		16QAM	16	16
15MHz		16QAM	75 (Note 3)	75 (Note 3)
20MHz		QPSK	18	18
20MHz		QPSK	100	100
20MHz		16QAM	18	18
20MHz		16QAM	100 (Note 3)	100 (Note 3)
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.				

1. Connect the SS and interfering sources 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 channels are set according to Table 6.2.3.4.1-1.
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 6.2.2.4.3.

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 6.2.3.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC
2. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE to ensure that the UE transmits at $P_{UMAX level}$.
3. Measure the mean power of the UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.3.4.3 Message contents

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

6.2.3.5 Test requirements

The maximum output power, derived in step 2 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2.3.5-1.

Table 6.2.3.5-1: UE Power Class test requirements

E-UTRA Band	Class 1 (dBm)	Tol. (Db)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	QPSK partial RB allocation Tol. (dB))	QPSK full RB allocation Tol. (dB))	16QAM partial RB allocation Tol. (dB)	16QAM full RB allocation Tol. (dB)
1					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
2					23	±2.7[1]	+2.7 / [1,2] -3.7	+2.7 / [1,2] -3.7	+2.7 / [1,2] -4.7
3					23	±2.7[1]	+2.7 / [1,2] -3.7	+2.7 / [1,2] -3.7	+2.7 / [1,2] -4.7
4					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
5					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
6					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
7					23	±2.7[1]	+2.7 / [1,2] -3.7	+2.7 / [1,2] -3.7	+2.7 / [1,2] -4.7
8					23	±2.7[1]	+2.7 / [1,2] -3.7	+2.7 / [1,2] -3.7	+2.7 / [1,2] -4.7
9					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
10					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
11					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
12					23	±2.7[1]	+2.7 / [1,2] -3.7	+2.7 / [1,2] -3.7	+2.7 / [1,2] -4.7
13					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
14					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
…									
17					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
18					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
19					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
20					23	±2.7[1]	+2.7 / [1,2] -3.7	+2.7 / [1,2] -3.7	+2.7 / [1,2] -4.7
21					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
22					23	+3.0/-4.5	+3.0/-5.5	+3.0/-5.5	+3.0/-6.5
23					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
24					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
25					23	±2.7[1]	+2.7 / [1,2] -3.7	+2.7 / [1,2] -3.7	+2.7 / [1,2] -4.7
26					23	±2.7[1]	+2.7 / [1,2] -3.7	+2.7 / [1,2] -3.7	+2.7 / [1,2] -4.7
27					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
28					23	+2.7/-3.2	+2.7/-4.2	+2.7/-4.2	+2.7/-5.2
31					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
...									
33					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
34					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
35					23	±2.7	+2.7 /	+2.7 /	+2.7 /

							-3.7	-3.7	-4.7
36					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
37					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
38					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
39					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
40					23	±2.7	+2.7 / -3.7	+2.7 / -3.7	+2.7 / -4.7
41					23	±2.7[1]	+2.7 / -3.7 [1,2]	+2.7 / -3.7 [1,2]	+2.7 / -4.7 [1,2]
42					23	+3.0 / -4.0	+3.0 / -5.0	+3.0 / -5.0	+3.0 / -6.0
43					23	+3.0 / -4.0	+3.0 / -5.0	+3.0 / -5.0	+3.0 / -6.0
44					23	+2.7/ [-3.7]	+2.7 / [-4.7]	+2.7 / [-4.7]	+2.7 / [-5.7]

Note 1: For transmission bandwidths (Figure 5.4.2-1) confined within FUL_low and FUL_low + 4 MHz or FUL_high – 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.

Note 2: For the UE maximum output power modified by MPR, the power limits specified in Table 6.2.5.3-1 apply

6.2.3_1 Maximum Power Reduction (MPR) for HPUE

6.2.3_1.1 Test purpose

Same test purpose as in clause 6.2.3.1 with the following exception:

- Instead of Table 6.2.3.3-1 → use Table 6.2.3_1.3-1

6.2.3_1.2 Test applicability

The requirements of this test apply in test cases 6.6.2.3_1 Adjacent Channel Leakage power Ratio for HPUE to all types of E-UTRA Power Class 1 UE release 11 and forward.

6.2.3_1.3 Minimum conformance requirements

For UE Power Class 1, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2_1.3-1 due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3_1.3-1.

Table 6.2.3_1.3-1: Maximum Power Reduction (MPR) for Power Class 1

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5_1.3 apply.

The normative reference for this requirement is TS 36.101 clause 6.2.3.

6.2.3_1.4 Test description

Same test description as in clause 6.2.3.4.

6.2.3_1.5 Test requirements

Same test requirements as in clause 6.2.3.5 with the following exceptions:

- Instead of Table 6.2.3.5-1 → use Table 6.2.3_1.5-1

Table 6.2.3_1.5-1: UE Power Class 1 test requirements

E-UTRA Band	Class 1 (dBm)	QPSK partial RB allocation Tol. (dB))	QPSK full RB allocation Tol. (dB))	16QAM partial RB allocation Tol. (dB)	16QAM full RB allocation Tol. (dB)
14	31	+2.7/ -3.7	+2.7 / -4.7	+2.7 / -4.7	+2.7 / -5.7
Note 1: For transmission bandwidths (Figure 5.4.2-1) confined within FUL_low and FUL_low + 4 MHz or FUL_high – 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.					
Note 2: For the UE maximum output power modified by MPR, the power limits specified in Table 6.2.5_1.3-1 apply					

6.2.3A Maximum Power Reduction (MPR) for CA

6.2.3A.1 Maximum Power Reduction (MPR) for CA (intra-band contiguous DL CA and UL CA)

6.2.3A.1.1 Test purpose

The number of RB identified in Table 6.2.3A.1.3-1 is based on meeting the requirements for Adjacent Channel Leakage power Ratio (ACLR) for CA and the maximum power reduction (MPR) for intra-band contiguous CA Bandwidth Class C due to Cubic Metric (CM).

6.2.3A.1.2 Test applicability

The requirements of this test apply in test case 6.6.2.3A.1 Adjacent Channel Leakage power Ratio (ACLR) for CA to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

6.2.3A.1.3 Minimum conformance requirements

The following is specified for maximum power reduction (MPR) for CA.

- For inter-band carrier aggregation with uplink assigned to one E-UTRA band (Table 5.4.2A-1) the requirements in clause 6.2.3 apply.

- For intra-band contiguous carrier aggregation the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2A.1.3-1 due to higher order modulation and contiguously aggregated transmits bandwidth configuration (resource blocks) is specified in Table 6.2.3A.1.3-1. In case the modulation format is different on different component carriers then the MPR is determined by the rules applied to higher order of those modulations.

Table 6.2.3A.1.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	CA bandwidth Class C				MPR (dB)
	50 RB + 100 RB	75 RB + 75 RB	75 RB + 100 RB	100 RB + 100 RB	
QPSK	> 12 and ≤ 50	> 16 and ≤ 75	> 16 and ≤ 75	> 18 and ≤ 100	≤ 1
QPSK	> 50	> 75	> 75	> 100	≤ 2
16 QAM	≤ 12	≤ 16	≤ 16	≤ 18	≤ 1
16 QAM	> 12 and ≤ 50	> 16 and ≤ 75	> 16 and ≤ 75	> 18 and ≤ 100	≤ 2
16 QAM	> 50	> 75	> 75	> 100	≤ 3

For intra-band contiguous CA Bandwidth Class C the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2A.1.3-1due to multi-cluster transmission is specified as follows:

$$MPR = CEIL \{M_A, 0.5\}$$

Where M_A is defined as follows:

$M_A = 8.2;\ 0 \leq A < 0.025,$

$9.2 - 40A;\ 0.025 \leq A < 0.05,$

$8 - 16A;\ 0.05 \leq A < 0.25,$

$4.83 - 3.33A;\ 0.25 \leq A \leq 0.4,$

$3.83 - 0.83A;\ 0.4 \leq A \leq 1$

Where

$A = N_{RB\_alloc} / N_{RB\_agg.}$

$CEIL\{M_A, 0.5\}$ means rounding upwards to closest 0.5dB, i.e. MPR $\in$ [3.0, 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5, 8.0, 8.5]

For intra-band non-contiguous carrier aggregation with uplink carrier on the PCC, the requirements in subclause 6.2.3 apply.For the UE maximum output power modified by MPR, the power limits specified in sub-clause 6.2.5A.1 apply.

The normative reference for this requirement is in TS 36.101 [2] clause 6.2.3A.

6.2.3A.1.4 Test description

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 6.2.3A.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 6.2.3A.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 and 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**	**CC MOD**	**UL Allocation**				
ID	**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 for this test	QPSK	16	P_16@0	S_0@0		
2	75	75		QPSK	75	P_75@0	S_0@0		
3	75	75		QPSK	150	P_75@0	S_75@0		
4	75	75		16QAM	16	P_16@0	S_0@0		
5	75	75		16QAM	75	P_75@0	S_0@0		
6	75	75		16QAM	150	P_75@0	S_75@0		
7	75	75		QPSK	2	P_1@0	S_1@74		
8	75	75		QPSK	8	P_2@0	P_2@73	S_2@0	S_2@73
9	75	75		QPSK	60	P_15@0	P_15@60	S_15@0	S_15@60
10	100	50		QPSK	12	P_12@0	S_0@0		
11	100	50		QPSK	50	P_50@0	S_0@0		
12	100	50		QPSK	150	P_100@0	S_50@0		
13	100	50		16QAM	12	P_12@0	S_0@0		
14	100	50		16QAM	50	P_50@0	S_0@0		
15	100	50		16QAM	150	P_100@0	S_50@0		
16	100	50		QPSK	2	P_1@0	S_1@49		
17	100	50		QPSK	8	P_2@0	P_2@60	S_2@10	S_2@48
18	100	50		QPSK	60	P_15@0	P_15@50	S_15@0	S_15@35
19	100	100		QPSK	18	P_18@0	S_0@0		
20	100	100		QPSK	100	P_100@0	S_0@0		
21	100	100		QPSK	200	P_100@0	S_100@0		
22	100	100		16QAM	18	P_18@0	S_0@0		
23	100	100		16QAM	100	P_100@0	S_0@0		
24	100	100		16QAM	200	P_100@0	S_100@0		
25	100	100		QPSK	2	P_1@0	S_1@99		
26	100	100		QPSK	10	P_3@0	P_2@70	S_3@30	S_2@98
27	100	100		QPSK	80	P_20@0	P_20@80	S_20@0	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 and interfering sources 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 6.2.3A.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 6.2.3A.1.4.3.

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 6.2.3A.1.4.3.
3. SS activates SCC by sending the MAC-CE according to TS 36.321 [13] clauses 5.13 and 6.1.3.8. Wait for at least 2 seconds as per TS 36.133 [4] clause 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 6.2.5A.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.
5. Send continuously uplink power control "up" commands in the uplink scheduling information to the UE to ensure that 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. The period of measurement shall be at least the continuous duration one sub-frame (1ms). For TDD slots with transient periods are not under test.

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.

6.2.3A.1.5 Test Requirements

The maximum output power, derived in step 2 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2.3A.1.5-1.

Table 6.2.3A.1.5-1: CA UE Power Class test requirements

Configuration ID	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1					23	+2.7/-3.7
2					23	+2.7/-3.7
3					23	+2.7/-4.7
4					23	+2.7/-3.7
5					23	+2.7/-4.7
6					23	+2.7/-5.7
7					23	+2.7/-11.2
8					23	+2.7/-10.2
9					23	+2.7/-6.2
10					23	+2.7/-3.7
11					23	+2.7/-3.7
12					23	+2.7/-4.7
13					23	+2.7/-3.7
14					23	+2.7/-4.7
15					23	+2.7/-5.7
16					23	+2.7/-11.2
17					23	+2.7/-10.2
18					23	+2.7/-6.2
19					23	+2.7/-3.7
20					23	+2.7/-3.7
21					23	+2.7/-4.7
22					23	+2.7/-3.7
23					23	+2.7/-4.7
24					23	+2.7/-5.7
25					23	+2.7/-11.2
26					23	+2.7/-10.2
27					23	+2.7/-6.2

6.2.3B Maximum Power Reduction (MPR) for UL-MIMO

6.2.3B.1 Test purpose

The number of RB identified in Table 6.2.3B.3-1 is based on meeting the requirements for adjacent channel leakage ratio for UL-MIMO and the maximum power reduction (MPR) for UL-MIMO due to Cubic Metric (CM).

6.2.3B.2 Test applicability

The requirements of this test apply in test cases 6.6.2.3B Adjacent Channel Leakage power Ratio to all types of E-UTRA UE release 10 and forward that support UL-MIMO.

6.2.3B.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the maximum output power is measured as the sum of the maximum output power at each UE antenna connector. For UE Power Class 3, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2B.3-1 due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3B.3-1 with UL-MIMO configurations defined in Table 6.2.2B.3-2.

Table 6.2.3B.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

For the UE maximum output power modified by MPR, the power limits specified in clause 6.2.5B.3 apply.

The normative reference for this requirement is TS 36.101 clause 6.2.3B.

6.2.3B.4 Test description

6.2.3B.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 clause 5.4.2B.1. All of these configurations shall be tested with applicable test parameters for each channel bandwidth, and are shown in table 6.2.3B.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 6.2.3B.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH			
Test Frequencies as specified in TS36.508 [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 Maximum Power Reduction (MPR) test case	Mod'n	RB allocation	
			FDD	TDD
1.4MHz		QPSK	5	5
1.4MHz		QPSK	6	6
1.4MHz		16QAM	5	5
1.4MHz		16QAM	6	6
3.0MHz		QPSK	4	4
3.0MHz		QPSK	15	15
3.0MHz		16QAM	4	4
3.0MHz		16QAM	15	15
5MHz		QPSK	8	8
5MHz		QPSK	25	25
5MHz		16QAM	8	8
5MHz		16QAM	25	25
10MHz		QPSK	12	12
10MHz		QPSK	50	50
10MHz		16QAM	12	12
10MHz		16QAM	50 (Note 3)	50 (Note 3)
15MHz		QPSK	16	16
15MHz		QPSK	75	75
15MHz		16QAM	16	16
15MHz		16QAM	75 (Note 3)	75 (Note 3)
20MHz		QPSK	18	18
20MHz		QPSK	100	100
20MHz		16QAM	18	18
20MHz		16QAM	100 (Note 3)	100 (Note 3)

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.

1. Connect the SS and interfering sources 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 channels are set according to Table 6.2.3B.4.1-1.
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 6.2.3B.4.3.

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 6.2.3B.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 to ensure that the UE transmits at PUMAX level.
3. Measure the sum of mean power of the UE at each transmit antenna connector in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.3B.4.3 Message contents

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

6.2.3B.5 Test requirements

The maximum output power, derived in step 2 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2.3B.5-1.

Table 6.2.3B.5-1: UE Power Class test requirements

E-UTRA Band	Class 1 (dBm)	Tol. (Db)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	QPSK partial RB allocation Tol. (dB))	QPSK full RB allocation Tol. (dB))	16QAM partial RB allocation Tol. (dB)	16QAM full RB allocation Tol. (dB)
1					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
2					23	+2.7/-3.7[1]	+2.7/-4.7[1,2]	+2.7/-4.7[1,2]	+2.7/-5.7[1,2]
3					23	+2.7/-3.7[1]	+2.7/-4.7[1,2]	+2.7/-4.7[1,2]	+2.7/-5.7[1,2]
4					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
5					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
6					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
7					23	+2.7/-3.7[1]	+2.7/-4.7[1,2]	+2.7/-4.7[1,2]	+2.7/-5.7[1,2]
8					23	+2.7/-3.7[1]	+2.7/-4.7[1,2]	+2.7/-4.7[1,2]	+2.7/-5.7[1,2]
9					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
10					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
11					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
12					23	+2.7/-3.7[1]	+2.7/-4.7[1,2]	+2.7/-4.7[1,2]	+2.7/-5.7[1,2]
13					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
14					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
…									
17					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
18					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
19					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
20					23	+2.7/-3.7[1]	+2.7/-4.7[1,2]	+2.7/-4.7[1,2]	+2.7/-5.7[1,2]
21					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
22					23	+3.0/-5.5	+3.0/-6.5	+3.0/-6.5	+3.0/-7.5
…									
23					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
24					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
25					23	+2.7/-3.7[1]	+2.7/-[4.7][1,2]	+2.7/-[4.7][1,2]	+2.7/-[5.7][1,2]
26					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
27					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7

28					23	+2.7/[-3.7]	+2.7/[-4.7]	+2.7/[-4.7]	+2.7/[-5.7]
31					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
...									
33					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
34					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
35					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
36					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
37					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
38					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
39					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
40					23	+2.7/-3.7	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
41					23	+2.7/-3.7[1]	+2.7/-4.7	+2.7/-4.7	+2.7/-5.7
42					23	+3.0/-5.0	+3.0/-6.0[1,2]	+3.0/-6.0[1,2]	+3.0/-7.0[1,2]
43					23	+3.0/-5.0	+3.0/-6.0	+3.0/-6.0	+3.0/-7.0[1,2]
44					23	+2.7/[-3.7]	+2.7/[-4.7]	+2.7/[-4.7]	+2.7/[-5.7]

Note 1: For transmission configurations (Figure 5.4.2-1) confined within FUL_low and FUL_low + 4 MHz or FUL_high – 4 MHz and FUL_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.

Note 2: For the UE maximum output power modified by MPR, the power limits specified in Table 6.2.5B.3-1 apply

6.2.4 Additional Maximum Power Reduction (A-MPR)

6.2.4.1 Test purpose

Additional ACLR and spectrum emission requirements can be signalled by the network to indicate that the UE shall also meet additional requirements in a specific deployment scenario. To meet these additional requirements, Additional Maximum Power Reduction A-MPR is allowed for the output power as specified in Table 6.2.2.3-1. Unless stated otherwise, an A-MPR of 0 dB shall be used.

6.2.4.2 Test applicability

The requirements of this test apply in test case 6.6.2.2 Additional Spectrum Emission Mask for network signalled values NS_03, NS_04, NS_06, NS_07, NS_11, and NS_20 to all types of E-UTRA UE release 8 and forward.

The requirements of this test apply in test case 6.6.3.3 Additional Spurious Emissions for network signalled values NS_05, NS_07, NS_08, NS_09, NS_12, NS_13, NS_14, NS_15, NS_16 ,NS_17 and NS_18 to all types of E-UTRA UE release 8 and forward.

6.2.4.3 Minimum conformance requirements

For UE Power Class 3 the specific requirements and identified sub-clauses are specified in Table 6.2.4.3-1 along with the allowed A-MPR values that may be used to meet these requirements. The allowed A-MPR values specified below in

Table 6.2.4.3.-1 to 6.2.4.3-15 are in addition to the allowed MPR requirements specified in clause 6.2.3. For the UE maximum output power modified by A-MPR, the power limits specified in clause 6.2.5 apply.

Table 6.2.4.3-1: Additional Maximum Power Reduction (A-MPR) / Spectrum Emission requirements

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.2-1	1.4,3,5,10,15,20	Table 5.4.2-1	N/A
NS_03	6.6.2.2.3.1	2,4,10, 23, 25,35,36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.3.2	41	5	>6	≤1
			10, 15, 20	Table 6.2.4.3-4	
NS_05	6.6.3.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.4.2-1	N/A
NS_07	6.6.2.2.3.3 6.6.3.3.3.2	13	10	Table 6.2.4.3-2	Table 6.2.4.3-2
NS_08	6.6.3.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4.3-3	Table 6.2.4.3-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10,15,20	Table 6.2.4.3-5	Table 6.2.4.3-5
NS_12	6.6.3.3.5	26	1.4, 3, 5	Table 6.2.4.3-6	Table 6.2.4.3-6
NS_13	6.6.3.3.6	26	5	Table 6.2.4.3-7	Table 6.2.4.3-7
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4.3-8	Table 6.2.4.3-8
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4.3-9 Table 6.2.4.3-10	Table 6.2.4.3-9, Table 6.2.4.3-10
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4.3-11, Table 6.2.4.3-12, Table 6.2.4.3-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.4.2-1	N/A
NS_18	6.6.3.3.11	28	5	≥ 2	≤ 1
			10, 15, 20	≥ 1	≤ 4
..					
NS_20	6.2.2, 6.6.2.2.1, 6.6.3.2	23	5, 10, 15, 20	Table 6.2.4.3-14	Table 6.2.4.3-14
NS_32	-	-	-	-	-

Table 6.2.4.3-2: A-MPR for "NS_07"

Parameters	Region A		Region B				Region C	
RB_{start} [1]	0 – 12		13 –18		19 – 42		43 – 49	
L_{CRB} [2] [RBs]	6 – 8	1 to 5 and 9-50	<8	≥8	<18	≥18	≤2	>2
A-MPR [dB]	≤8	≤12	0	≤12	0	≤6	≤3	0

Note 1: RB_{start} indicates the lowest RB index of transmitted resource blocks
Note 2: L_{CRB} is the length of a contiguous resource block allocation
Note 3: For intra-subframe frequency hopping between two regions, notes 1 and 2 apply on a per slot basis.
Note 4: For intra-subframe frequency hopping between two regions, the larger A-MPR value of the two regions may be applied for both slots in the subframe.

Table 6.2.4.3-3: A-MPR for "NS_10"

Channel bandwidth [MHz]	Parameters	Region A
15	RB_{start} [1]	0 – 10
	L_{CRB} [RBs]	1 -20
	A-MPR [dB]	≤ 2
20	RB_{start} [1]	0 – 15
	L_{CRB} [RBs]	1 -20
	A-MPR [dB]	≤ 5

Note 1: RB_{start} indicates the lowest RB index of transmitted resource blocks.
Note 2: L_{CRB} is the length of a contiguous resource block allocation.
Note 3: For intra-subframe frequency hopping which intersects Region A, notes 1 and 2 apply on a per slot basis.
Note 4: For intra-subframe frequency hopping which intersect Region A, the larger A-MPR value may be applied for both slots in the subframe.

Table 6.2.4.3-4: A-MPR for NS_04 for bandwidths > 5MHz

Channel bandwidth [MHz]	Parameters	Region A	Region B		Region C
10	RB_{start} [1]	0 – 12	13 – 36		37 – 49
	RB_{start} [1] + L_{CRB} [2] [RBs]	N/A (Note 3)	14 - 37	>37	N/A (Note 3)
	A-MPR [dB]	≤3dB	0	≤2dB	≤3dB
15	RB_{start} [1]	0 – 18	19 – 55		56 – 74
	RB_{start} [1] + L_{CRB} [2] [RBs]	N/A (Note 3)	20 - 56	>56	N/A (Note 3)
	A-MPR [dB]	≤3dB	0	≤2dB	≤3dB
20	RB_{start} [1]	0 – 24	25 – 74		75 – 99
	RB_{start} [1] + L_{CRB} [2] [RBs]	N/A (Note 3)	26 - 75	>75	N/A (Note 3)
	A-MPR [dB]	≤3dB	0	≤2dB	≤3dB

Note 1: RB_{start} indicates the lowest RB index of transmitted resource blocks.
Note 2: L_{CRB} is the length of a contiguous resource block allocation.
Note 3: Any RB allocation that starts in Region A or C is allowed the specified A-MPR.
Note 4: For intra-subframe frequency hopping which intersects regions, notes 1 and 2 apply on a per slot basis.
Note 5: For intra-subframe frequency hopping which intersects regions, the larger A-MPR value may be applied for both slots in the subframe.

Table 6.2.4.3-5: A-MPR for NS_11

Channel Bandwidth [MHz]	Parameters					
3	Fc [MHz]	<2004	≥2004			
	L_{CRB} [RBs]	1-15	>5			
	A-MPR [dB]	≤5	≤ 1			
5	Fc [MHz]	<2004	2004 ≤ Fc <2007		≥2007	
	L_{CRB} [RBs]	1-25	1-6 & 15-25	8-12	>6	
	A-MPR [dB]	≤7	≤ 4	0	≤ 1	
10	Fc [MHz]	2005 ≤ Fc <2015		2015		
	RB_{start}	0-49		0-49		
	L_{CRB} [RBs]	1-50		1-50		
	A-MPR [dB]	≤ 12		0		
15	Fc [MHz]	<2012.5				
	RB_{start}	0-4	5-21		22-56	57-74
	L_{CRB} [RBs]	≥1	7-50	0-6 & ≥50	≤25	>25	>0
	A-MPR [dB]	≤15	≤7	≤10	0	≤6	≤15
	Fc [MHz]	2012.5				
	RB_{start}	0-12	13-39		40-65	66-74
	L_{CRB} [RBs]	≥1	≥30	<30	≥ (69 – RB_{start})	≥1
	A-MPR [dB]	≤10	≤6	0	≤2	≤6.5
20	Fc [MHz]	2010				
	RB_{start}	0-12	13-29		30-68	69-99
	L_{CRB} [RBs]	≥1	10-60	1-9 & >60	1-24	≥25	≥1
	A-MPR [dB]	≤15	≤7	≤10	0	≤7	≤15

Table 6.2.4.3-6: A-MPR for "NS_12"

Channel bandwidth [MHz]	Parameters	Region A		Region B
1.4	RB_{start}	0		1-2
	L_{CRB} [RBs]	≤3	≥4	≥4
	A-MPR [dB]	≤3	≤6	≤3
3	RB_{start}	0-3		4-5
	L_{CRB} [RBs]	4-9	1-3 and 10-15	≥9
	A-MPR [dB]	≤4	≤3	≤3
5	RB_{start}	0-6		7-9
	L_{CRB} [RBs]	≤8	≥9	≥15
	A-MPR [dB]	≤5	≤3	≤3

Table 6.2.4.3-7: A-MPR for "NS_13"

Channel bandwidth [MHz]	Parameters	Region A	
5	RB_{start}	0-2	
	L_{CRB} [RBs]	≤5	≥18
	A-MPR [dB]	≤3	≤2

Table 6.2.4.3-8: A-MPR for "NS_14"

Channel bandwidth [MHz]	Parameters	Region A	
10	RB_{start}	0	
	L_{CRB} [RBs]	≤5	≥50
	A-MPR [dB]	≤3	≤1
15	RB_{start}	≤8	
	L_{CRB} [RBs]	≤16	≥50
	A-MPR [dB]	≤3	≤1

Table 6.2.4.3-9: A-MPR for "NS_15" for E-UTRA highest channel edge > 845 MHz and ≤ 849 MHz

Channel bandwidth [MHz]	Parameters	Region A	Region B	Region C
1.4	RB_{end} [RB]			4-5
	A-MPR [dB]			≤3
3	RB_{end} [RB]	0-1	8-12	13-14
	L_{CRB} [RB]	≤2	≥8	>0
	A-MPR [dB]	≤4	≤4	≤9
5	RB_{end} [RB]	0-4	12-19	20-24
	L_{CRB} [RB]	≤2	≥8	>0
	A-MPR [dB]	≤4	≤5	≤9
10	RB_{end} [RB]	0-12	23-36	37-49
	L_{CRB} [RB]	≤2	≥15	>0
	A-MPR [dB]	≤4	≤6	≤9
15	RB_{end} [RB]	0-20	26-53	54-74
	L_{CRB} [RB]	≤2	≥20	>0
	A-MPR [dB]	≤4	≤5	≤9

Table 6.2.4.3-10: A-MPR for "NS_15" for E-UTRA highest channel edge ≤ 845 MHz

Channel bandwidth [MHz]	Parameters	Region A	Region B	Region C
5	RB_{end} [RB]			19-24
	L_{CRB} [RB]			≥18
	A-MPR [dB]			≤2
10	RB_{end} [RB]	0-4	29-44	45-49
	L_{CRB} [RB]	≤2	≥24	>0
	A-MPR [dB]	≤4	≤4	≤9
15	RB_{end} [RB]	0-12	44-61	62-74
	L_{CRB} [RB]	≤2	≥20	>0
	A-MPR [dB]	≤4	≤5	≤9

Table 6.2.4.3-11: A-MPR for "NS_16" with channel lower edge at ≥807 MHz and <808.5 MHz

Channel bandwidth [MHz]	Parameter	Region A	Region B	Region C	Region D	Region E
3 MHz	RB_{start}	0	1-2			
	L_{CRB} [RBs]	≥12	12			
	A-MPR [dB]	≤2	≤1			
5 MHz	RB_{start}	0-1	2	2-9	2-5	
	L_{CRB} [RBs]	1 - 25	12	15-18	20	
	A-MPR [dB]	≤5	≤1	≤2	≤3	
10 MHz	RB_{start}	0 - 8	0-14		15-20	15-24
	L_{CRB} [RBs]	1 - 12	15-20	≥24	≥30	24-27
	A-MPR [dB]	≤5	≤3	≤7	≤3	≤1

Table 6.2.4.3-12: A-MPR for "NS_16" with channel lower edge at ≥808.5 MHz and <812 MHz

Channel bandwidth [MHz]	Parameter	Region A	Region B	Region C	Region D	Region E
5 MHz	RB_{start}	0	0-1	1-5		
	L_{CRB} [RBs]	16-20	≥24	16-20		
	A-MPR [dB]	≤2	≤3	≤1		
10 MHz	RB_{start}	0-6		0-10	0-14	11-20
	L_{CRB} [RBs]	1-12	15-20	24-32	≥36	24-32
	A-MPR [dB]	≤5	≤2	≤4	≤5	≤1

Table 6.2.4.3-13: A-MPR for "NS_16" with channel lower edge at ≥812 MHz

Channel bandwidth [MHz]	Parameter	Region A	Region B	Region C	Region D
10 MHz	RB_{start}	0 - 9	0	1-14	0-5
	L_{CRB} [RBs]	27-32	36-40	36-40	≥45
	A-MPR [dB]	≤1	≤2	≤1	≤3

Table 6.2.4.3-14: A-MPR for "NS_20"

Channel bandwidth [MHz]	Parameters							
5	Fc (MHz)	< 2007.5	2007.5 ≤ Fc < 2012.5			2012.5 ≤ Fc ≤ 2017.5		
	RB_{start}	≤24	0-3		4-6	≤24		
	L_{CRB} (RBs)	>0	15-19	≥20	≥18	1-25		
	A-MPR [dB]	≤17	≤1	≤4	≤2	≤ 0		
10	Fc (MHz)	2005						
	RB_{start}	0-25		26-34		35-49		
	L_{CRB} (RBs)	>0		8-15	>15	>0		
	A-MPR [dB]	≤16		≤2	≤5	≤ 6		
	Fc (MHz)	2015						
	RB_{start}	0-5			6-10			
	L_{CRB} (RBs)	≥32			≥40			
	A-MPR [dB]	≤4			≤2			
15	Fc (MHz)	2012.5						
	RB_{start}	0-14		15-24		25-39	61-74	
	L_{CRB} (RBs)	1-9 & 40-75	10-39	24-29	≥30	≥36	≤6	
	A-MPR [dB]	≤11	≤6	≤1	≤7	≤5	≤6	
20	Fc (MHz)	2010						
	RB_{start}	0-21	22-31		32-38	39-49	50-69	70-99
	L_{CRB} (RBs)	>0	1-9 & 31-75	10-30	≥15	≥24	≥25	>0
	A-MPR [dB]	≤17	≤12	≤6	≤9	≤7	≤5	≤16

NOTE 1: When NS_20 is signalled the minimum requirements for the 10 MHz bandwidth are specified for E-UTRA UL carrier centre frequencies of 2005 MHz or 2015 MHz.
NOTE 2: When NS_20 is signalled the minimum requirements for the 15 MHz channel bandwidth are specified for E-UTRA UL carrier centre frequency of 2012.5 MHz.

Table 6.2.4.3-15: A-MPR for "NS_19"

Channel bandwidth [MHz]	Parameters	Region A		Region B
10	RB_{start}			0-6
	L_{CRB} [RBs]			≥40
	A-MPR [dB]			≤1
15	RB_{start}	0-6		7-20
	L_{CRB} [RBs]	≤18	≥36	≥42
	A-MPR [dB]	≤2	≤3	≤2
20	RB_{start}	0-14		15-30
	L_{CRB} [RBs]	≤40	≥45	≥50
	A-MPR [dB]	≤2	≤3	≤2

The normative reference for this requirement is TS 36.101 clause 6.2.4.

6.2.4.4 Test description

6.2.4.4.1 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 6.2.4.4.1-1 through table 6.2.4.4.1-13. 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 6.2.4.4.1-1: 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 NS_03 A-MPR							
		Downlink Configuration			**Uplink Configuration**		
Configuration ID	Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
			FDD	TDD		FDD	TDD

1	1.4MHz	N/A for A-MPR testing.	QPSK	6	6
2	1.4MHz		QPSK	5	5
3	1.4MHz		16QAM	5	5
4	3MHz		QPSK	15	15
5	3MHz		QPSK	4	4
6	3MHz		16QAM	15	15
7	3MHz		16QAM	4	4
8	5MHz		QPSK	25	25
9	5MHz		QPSK	8	8
10	5MHz		QPSK	6	6
11	5MHz		16QAM	25	25
12	5MHz		16QAM	8	8
13	10MHz		QPSK	50	50
14	10MHz		QPSK	12	12
15	10MHz		QPSK	6	6
16	10MHz		16QAM	50 (Note 4)	50 (Note 4)
17	10MHz		16QAM	12	12
18	15MHz		QPSK	75	75
19	15MHz		QPSK	16	16
20	15MHz		QPSK	8	8
21	15MHz		16QAM	75 (Note 4)	75 (Note 4)
22	15MHz		16QAM	16	16
23	20MHz		QPSK	100	100
24	20MHz		QPSK	18	18
25	20MHz		QPSK	10	10
26	20MHz		16QAM	100 (Note 4)	100 (Note 4)
27	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 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 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.

Note 5: For band 23, above table only applies to mid and high range test frequencies. Low range test frequencies will be covered by NS_11 test configuration table.

Table 6.2.4.4.1-2: 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 A-MPR testing		QPSK	25	Note 3
2	5MHz			QPSK	8	Note 3
3	5MHz			QPSK	6	Note 3
4	5MHz			16QAM	25	Note 3
5	5MHz			16QAM	8	Note 3
6	10MHz			QPSK	1	0
7	10MHz			QPSK	12	0
8	10MHz			QPSK	50	0
9	10MHz			16QAM	50 (Note 4)	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 4)	0
19	15MHz			QPSK	36	19
20	15MHz			16QAM	36 (Note 4)	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 4)	0
28	20MHz			QPSK	50	25
29	20MHz			16QAM	50 (Note 4)	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 configuration ID will be used to map the applicable Test Configuration to be corresponding Test Requirement in subclause 6.2.4 as not all combinations are necessarily required based on the applicability of the UE.

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.

Table 6.2.4.4.1-3: 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 (NUL = 18072) - For 10 MHz Channel Bandwidth: 1934.7 MHz (NUL = 18147) - For 15 MHz Channel Bandwidth: 1932.5 MHz (NUL = 18125) - For 20 MHz Channel Bandwidth: 1930 MHz (NUL = 18100)
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)			5MHz, 10MHz, 15MHz, 20MHz
Test Parameters for NS_05 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	1
2	5MHz			QPSK	25
3	10MHz			QPSK	1
4	10MHz			QPSK	12
5	10MHz			QPSK	48
6	10MHz			QPSK	50
7	10MHz			16QAM	50 (Note 4)
8	15MHz			QPSK	1
9	15MHz			QPSK	16
10	15MHz			QPSK	30 (Note 5)
11	15MHz			QPSK	48 (Note 6)
12	15MHz			QPSK	75 (Note 6)
13	15MHz			16QAM	75 (Note 4, 6)
14	20MHz			QPSK	1
15	20MHz			QPSK	18
16	20MHz			QPSK	24 (Note 5)
17	20MHz			QPSK	48 (Note 6)
18	20MHz			QPSK	100 (Note 6)
19	20MHz			16QAM	100 (Note 4, 6)

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: 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 4: Applies only for UE-Categories ≥2.

Note 5: Required for Low Range only.

Note 6: Not available for Low Range.

Table 6.2.4.4.1-4: Test Configuration Table (network signalled value "NS_06")

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
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)			Lowest, 5MHz, 10MHz, Highest
Test Parameters for NS_06 A-MPR			
		Downlink Configuration	**Uplink Configuration**

Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	1.4MHz	N/A for A-MPR testing		QPSK	6
2	1.4MHz			QPSK	5
3	1.4MHz			16QAM	5
4	3MHz			QPSK	15
5	3MHz			QPSK	4
6	3MHz			16QAM	4
7	5MHz			QPSK	25
8	5MHz			QPSK	8
9	5MHz			16QAM	8
10	10MHz			QPSK	50
11	10MHz			QPSK	12
12	10MHz			16QAM	12
13	15MHz			QPSK	75
14	15MHz			QPSK	16
15	15MHz			16QAM	16
16	20MHz			QPSK	100
17	20MHz			QPSK	18
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 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 3: The RB_{start} of partial RB allocation shall be RB# 0 and RB# (max +1 - RB allocation) of the channel bandwidth.

Table 6.2.4.4.1-5: 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 NS_07 A-MPR			
		Downlink Configuration	**Uplink Configuration**

Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD	RB_{start} FDD
1	10MHz	N/A for A-MPR 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 2)	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 2)	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 2)	0

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: Applies only for UE-Categories ≥2.

Table 6.2.4.4.1-6: 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 NS_08 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	1
2	5MHz			QPSK	8
3	5MHz			QPSK	25
4	10MHz			QPSK	1
5	10MHz			QPSK	12
6	10MHz			QPSK	40
7	10MHz			QPSK	50
8	10MHz			16QAM	50 (Note 4)
9	15MHz			QPSK	1
10	15MHz			QPSK	16
11	15MHz			QPSK	40
12	15MHz			QPSK	75
13	15MHz			16QAM	75 (Note 4)

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 1 RB allocation shall be tested at both RB #0 and RB #max.
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.

Table 6.2.4.4.1-7: 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**	
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	5MHz	N/A for A-MPR testing		QPSK	1
2	5MHz			QPSK	8
3	5MHz			QPSK	25
4	10MHz			QPSK	1
5	10MHz			QPSK	12
6	10MHz			QPSK	40
7	10MHz			QPSK	50
8	10MHz			16QAM	50 (Note 4)
9	15MHz			QPSK	1
10	15MHz			QPSK	16
11	15MHz			QPSK	40
12	15MHz			QPSK	54
13	15MHz			QPSK	75
14	15MHz			16QAM	75 (Note 4)

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 1 RB allocation shall be tested at both RB #0 and RB #max.
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.

Table 6.2.4.4.1-8: Test Configuration Table (network signalled value "NS_10")

Void, not tested

Table 6.2.4.4.1-9: 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 6.2.4.4.1-10: 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**		
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation**	**Mod'n**	**RB allocation FDD**	**RBstart FDD**
1	1.4 MHz	N/A for A-MPR 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

Table 6.2.4.4.1-11: 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**		
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation**	**Mod'n**	**RB allocation FDD**	**RBstart FDD**
1	5 MHz	N/A for A-MPR 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 6.2.4.4.1-12: 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**		
Configuration ID	**Ch BW**	**Mod'n**	**RB allocation**	**Mod'n**	**RB allocation FDD**	**RBstart FDD**
1	10 MHz	N/A for A-MPR 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 6.2.4.4.1-13: 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: UL 843.5 MHz (N_{UL} = 26985) or High range For 5 MHz Channel Bandwidth: UL 842.5 MHz (N_{UL} = 26975) or High range For 10 MHz Channel Bandwidth: UL 840 MHz (N_{UL} = 26950) or High range For 15 MHz Channel Bandwidth: UL 837.5 MHz (N_{UL} = 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 1, 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 1, 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 6.2.4.4.1-14: 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 A-MPR testing.		QPSK	1	0
2	1.4 MHz			QPSK	6	0
3	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	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	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 6.2.4.4.1-15: 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 A-MPR 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 6.2.4.4.1-16: 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 A-MPR 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 6.2.4.4.1-17: 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.

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.3.
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 channels are set according to the applicable table from Table 6.2.4.4.1-1 to Table 6.2.4.4.1-6.
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 6.2.4.4.3.

6.2.4.4.2 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 the applicable table from Table 6.2.4.4.1-1 to Table 6.2.4.4.1-17. 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. The period of measurement shall be at least the continuous duration one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.4.4.3 Message contents

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

6.2.4.4.3.1 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 6.2.4.4.3.1-1: *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)		

6.2.4.4.3.2 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 6.2.4.4.3.2-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_04"

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)		

6.2.4.4.3.3 Message contents exceptions (network signalled value "NS_05")

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 6.2.4.4.3.3-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_05"

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)		

6.2.4.4.3.4 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 6.2.4.4.3.4-1: *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)		

6.2.4.4.3.5 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 6.2.4.4.3.5-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_07"

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)		

6.2.4.4.3.6 Message contents exceptions (network signalled value "NS_08")

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 6.2.4.4.3.6-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_08"

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)		

6.2.4.4.3.7 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 6.2.4.4.3.7-1: *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	9 (NS_09)		

6.2.4.4.3.8 Message contents exceptions (network signalled value "NS_10")

Void

6.2.4.4.3.9 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 6.2.4.4.3.9-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_11"

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)		

6.2.4.4.3.10 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 6.2.4.4.3.10-1: *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)		

6.2.4.4.3.11 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 6.2.4.4.3.11-1: *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)		

6.2.4.4.3.12 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 6.2.4.4.3.12-1: *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)		

6.2.4.4.3.13 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 6.2.4.4.3.13-1: *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)		

6.2.4.4.3.14 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 6.2.4.4.3.14-1: *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)		

6.2.4.4.3.15 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 6.2.4.4.3.15-1: *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)		

6.2.4.4.3.16 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 6.2.4.4.3.16-1: *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)		

6.2.4.5 Test requirements

The maximum output power, derived in step 2 shall be within the range prescribed by the nominal maximum output power and tolerance in the applicable table from Table 6.2.4.5-1 to Table 6.2.4.5-16. The allowed A-MPR values specified in Table 6.2.4.3-1 are in addition to the allowed MPR requirements specified in clause 6.2.3. For the UE maximum output power modified by MPR and/or A-MPR, the power limits specified in Table 6.2.5.3-1 apply.

Table 6.2.4.5-1: UE Power Class test requirements (network signalled value "NS_03") (for Bands 4, 10, 23, 35, and 36)

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	4,10, 23,35,36					23	+2.7 / -3.7
2	4,10, 23,35,36					23	+2.7 / -2.7
3	4,10, 23,35,36					23	+2.7 / -3.7
4	4,10, 23,35,36					23	+2.7 / -4.7
5	4,10, 23,35,36					23	+2.7 / -2.7
6	4,10, 23,35,36					23	+2.7 / -6.2
7	4,10, 23,35,36					23	+2.7 / -3.7
8	4,10, 23,35,36					23	+2.7 / -4.7
9	4,10, 23,35,36					23	+2.7 / -3.7
10	4,10, 23,35,36					23	+2.7 / -2.7
11	4,10, 23,35,36					23	+2.7 / -6.2
12	4,10, 23,35,36					23	+2.7 / -4.7
13	4,10, 23,35,36					23	+2.7 / -4.7
14	4,10, 23,35,36					23	+2.7 / -3.7
15	4,10, 23,35,36					23	+2.7 / -2.7
16	4,10, 23,35,36					23	+2.7 / -6.2
17	4,10, 23,35,36					23	+2.7 / -4.7
18	4,10,35,36					23	+2.7 / -4.7
19	4,10,35,36					23	+2.7 / -3.7
20	4,10,35,36					23	+2.7 / -2.7
21	4,10,35,36					23	+2.7 / -6.2
22	4,10,35,36					23	+2.7 / -4.7
23	4,10,35,36					23	+2.7 / -4.7
24	4,10,35,36					23	+2.7 / -3.7
25	4,10,35,36					23	+2.7 / -2.7
26	4,10,35,36					23	+2.7 / -6.2
27	4,10,35,36					23	+2.7 / -4.7

Table 6.2.4.5-2: UE Power Class test requirements (network signalled value "NS_03") (for Bands 2 and 25)

Configuration ID	EUTRA band	Test Freq.	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	2, 25	Mid					23	+2.7 / -3.7
1	2, 25	Low, High					23	+2.7 / -5.7
2	2, 25	Mid					23	+2.7 / -2.7
2	2, 25	Low, High					23	+2.7 / -4.2
3	2, 25	Mid					23	+2.7 / -3.7
3	2, 25	Low, High					23	+2.7 / -5.7
4	2, 25	Mid					23	+2.7 / -4.7
4	2, 25	Low, High					23	+2.7 / -7.7
5	2, 25	Mid					23	+2.7 / -2.7
5	2, 25	Low, High					23	+2.7 / -4.2
6	2, 25	Mid					23	+2.7 / -6.2
6	2, 25	Low, High					23	+2.7 / -9.2
7	2, 25	Mid					23	+2.7 / -3.7
7	2, 25	Low, High					23	+2.7 / -5.7
8	2, 25	All					23	+2.7 / -4.7
9	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
9	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -5.7
10	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
10	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
11	2, 25	All					23	+2.7 / -6.2
12	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -4.7
12	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -7.7
13	2, 25	All					23	+2.7 / -4.7
14	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
14	2, 25	Low @ RB#0, High @ RB#(max+1-RB					23	+2.7 / -5.7

		allocation)						
15	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
15	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
16	2, 25	All					23	+2.7 / -6.2
17	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -4.7
17	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -7.7
18	2, 25	All					23	+2.7 / -4.7
19	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
19	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -5.7
20	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
20	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
21	2, 25	All					23	+2.7 / -6.2
22	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -4.7
22	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -7.7
23	2, 25	All					23	+2.7 / -4.7
24	2, 25	All					23	+2.7 / -3.7
25	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
25	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
26	2, 25	All					23	+2.7 / -6.2
27	2, 25	All					23	+2.7 / -4.7

Table 6.2.4.5-3: UE Power Class test requirements (network signalled value "NS_04")

Configuration ID	EUTRA band	Bandwidth (MHz)	Class 3 (dBm)	Tol. (dB)
1	41	5 MHz	23	+2.7 / -4.7
2	41	5 MHz	23	+2.7 / -3.7
3	41	5 MHz	23	+2.7 / -2.7
4	41	5 MHz	23	+2.7 / -6.2
5	41	5 MHz	23	+2.7 / -4.7
6	41	10MHz	23	+2.7/ -6.2
7	41	10MHz	23	+2.7/ -6.2
8	41	10MHz	23	+2.7/ -8.2
9	41	10MHz	23	+2.7/ -9.7
10	41	10MHz	23	+2.7/ -3.7
11	41	10MHz	23	+2.7/ -4.7
12	41	10MHz	23	+2.7/ -6.2
13	41	10MHz	23	+2.7/ -6.2
14	41	10MHz	23	+2.7/ -6.2
15	41	15MHz	23	+2.7/ -6.2
16	41	15MHz	23	+2.7/ -6.2
17	41	15MHz	23	+2.7/ -8.2
18	41	15MHz	23	+2.7/ -9.7
19	41	15MHz	23	+2.7/ -3.7
20	41	15MHz	23	+2.7/ -4.7
21	41	15MHz	23	+2.7/ -6.2
22	41	15MHz	23	+2.7/ -8.2
23	41	15MHz	23	+2.7/ -6.2
24	41	20MHz	23	+2.7/ -6.2
25	41	20MHz	23	+2.7/ -6.2
26	41	20MHz	23	+2.7/ -8.2
27	41	20MHz	23	+2.7/ -9.7
28	41	20MHz	23	+2.7/ -3.7
29	41	20MHz	23	+2.7/ -4.7
30	41	20MHz	23	+2.7/ -6.2
31	41	20MHz	23	+2.7/ -8.2
32	41	20MHz	23	+2.7/

				-6.2

Table 6.2.4.5-4: UE Power Class test requirements (network signalled value "NS_05")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	1					23	+2.7 / -2.7
2	1					23	+2.7 / -3.7
3	1					23	+2.7 / -2.7
4	1					23	+2.7 / -2.7
5	1					23	+2.7 / -3.7
6	1					23	+2.7 / -4.7
7	1					23	+2.7 / -6.2
8	1					23	+2.7 / -2.7
9	1					23	+2.7 / -2.7
10	1					23	+2.7/ -3.7
11	1					23	+2.7 / -3.7
12	1					23	+2.7 / -4.7
13	1					23	+2.7 / -6.2
14	1					23	+2.7 / -2.7
15	1					23	+2.7 / -2.7
16	1					23	+2.7/ -3.7
17	1					23	+2.7 / -3.7
18	1					23	+2.7 / -4.7
19	1					23	+2.7 / -6.2

Table 6.2.4.5-5: UE Power Class test requirements (network signalled value "NS_06") (for Bands 13, 14, and 17)

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	13,14,17					23	+2.7 / -3.7
2	13,14,17					23	+2.7 / -2.7
3	13,14,17					23	+2.7 / -2.7
4	13,14,17					23	+2.7 / -3.7
5	13,14,17					23	+2.7 / -2.7
6	13,14,17					23	+2.7 / -3.7
7	13,14,17					23	+2.7 / -3.7
8	13,14,17					23	+2.7 / -2.7
9	13,14,17					23	+2.7 / -3.7
10	13,14,17					23	+2.7 / -3.7
11	13,14,17					23	+2.7 / -2.7
12	13,14,17					23	+2.7 / -3.7
13	13,14,17					23	+2.7 / -3.7
14	13,14,17					23	+2.7 / -2.7
15	13,14,17					23	+2.7 / -3.7
16	13,14,17					23	+2.7 / -3.7
17	13,14,17					23	+2.7 / -2.7
18	13,14,17					23	+2.7 / -3.7

Table 6.2.4.5-6: UE Power Class test requirements (network signalled value "NS_06") (for Band 12)

Configuration ID	EUTRA band	Test Freq.	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	12	Mid					23	+2.7 / -3.7
1	12	Low, High					23	+2.7 / -5.7
2	12	Mid					23	+2.7 / -2.7
2	12	Low, High					23	+2.7 / -4.2
3	12	Mid					23	+2.7 / -2.7
3	12	Low, High					23	+2.7 / -4.2
4	12	Mid					23	+2.7 / -3.7
4	12	Low, High					23	+2.7 / -5.7
5	12	Mid					23	+2.7 / -2.7
5	12	Low, High					23	+2.7 / -4.2
6	12	Mid					23	+2.7 / -3.7
6	12	Low, High					23	+2.7 / -5.7
7	12	All					23	+2.7 / -3.7
8	12	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
8	12	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
9	12	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
9	12	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -5.7
10	12	All					23	+2.7 / -3.7
11	12	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
11	12	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
12	12	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
12	12	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -5.7

Table 6.2.4.5-7: UE Power Class test requirements (network signalled value "NS_07")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	13					23	+2.7 / -18.7
2	13					23	+2.7 / -13.7
3	13					23	+2.7 / -2.7
4	13					23	+2.7 / -19.7
5	13					23	+2.7 / -18.7
6	13					23	+2.7 / -20.7
7	13					23	+2.7 / -3.7
8	13					23	+2.7 / -2.7
9	13					23	+2.7 / -4.7
10	13					23	+2.7 / -12.7
11	13					23	+2.7 / -13.7
12	13					23	+2.7 / -2.7
13	13					23	+2.7 / -6.2
14	13					23	+2.7 / -19.7
15	13					23	+2.7 / -18.7
16	13					23	+2.7 / -20.7

Table 6.2.4.5-8: UE Power Class test requirements (network signalled value "NS_08")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	19					23	+2.7 / -2.7
2	19					23	+2.7 / -2.7
3	19					23	+2.7 / -3.7
4	19					23	+2.7 / -2.7
5	19					23	+2.7 / -2.7
6	19					23	+2.7 / -3.7
7	19					23	+2.7 / -8.2
8	19					23	+2.7 / -9.7
9	19					23	+2.7 / -2.7
10	19					23	+2.7 / -2.7
11	19					23	+2.7 / -3.7
12	19					23	+2.7 / -8.2
13	19					23	+2.7 / -9.7

Table 6.2.4.5-9: UE Power Class test requirements (network signalled value "NS_09")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	21					23	+2.7 / -2.7
2	21					23	+2.7 / -2.7
3	21					23	+2.7 / -3.7
4	21					23	+2.7 / -2.7
5	21					23	+2.7 / -2.7
6	21					23	+2.7 / -3.7
7	21					23	+2.7 / -4.7
8	21					23	+2.7 / -6.2
9	21					23	+2.7 / -2.7
19	21					23	+2.7 / -2.7
11	21					23	+2.7 / -3.7
12	21					23	+2.7 / -4.7
13	21					23	+2.7 / -6.2
14	21					23	+2.7 / -8.2

Table 6.2.4.5-10: UE Power Class test requirements (network signalled value "NS_10")

Void, not tested

Table 6.2.4.5-11: UE Power Class test requirements (network signalled value "NS_11 for Band 23")

Configuration ID	EUTRA Band	Centre Frequency	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1a	23	2001.5 MHz						+ 2.7 / -11.7
1b	23	2004.5 MHz						+ 2.7 / -4.7
2a	23	2001.5 MHz						+ 2.7 / -11.7
2b	23	2004.5 MHz						+ 2.7 / -4.7
3a	23	2001.5 MHz						+ 2.7 / -12.7
3b	23	2004.5 MHz						+ 2.7 / -6.2
4a	23	2001.5 MHz						+ 2.7 / -12.7
4b	23	2004.5 MHz						+ 2.7 / -6.2
5a	23	2002.5 MHz						+ 2.7 / -12.7
5b	23	2004.5 MHz						+ 2.7 / -8.2
5c	23	2007.5 MHz						+ 2.7 / -2.7
6a	23	2002.5 MHz						+ 2.7 / -12.7
6b	23	2004.5 MHz						+ 2.7 / -2.7
6c	23	2007.5 MHz						+ 2.7 / -3.7
7a	23	2002.5 MHz						+ 2.7 / -13.7
7b	23	2004.5 MHz						+ 2.7 / -9.7
7c	23	2007.5 MHz						+ 2.7 / -4.7
8a	23	2002.5 MHz						+ 2.7 / -13.7
8b	23	2004.5 MHz						+ 2.7 / -3.7
8c	23	2007.5 MHz						+ 2.7 / -4.7
9a	23	2002.5 MHz						+ 2.7 / -14.7
9b	23	2004.5 MHz						+ 2.7 / -11.7
9c	23	2007.5 MHz						+ 2.7 / -6.2
10a	23	2005 MHz						+ 2.7 / -17.7
10b	23	2005.5 MHz						+ 2.7 /

Configuration ID	EUTRA Band	Centre Frequency	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
								-17.7
10c	23	2015 MHz						+ 2.7 / -2.7
11a	23	2005 MHz						+ 2.7 / -17.7
11b	23	2005.5 MHz						+ 2.7 / -17.7
11c	23	2015 MHz						+ 2.7 / -2.7
12a	23	2005 MHz						+ 2.7 / -18.7
12b	23	2005.5 MHz						+ 2.7 / -18.7
12c	23	2015 MHz						+ 2.7 / -3.7
13a	23	2005 MHz						+ 2.7 / -18.7
13b	23	2005.5 MHz						+ 2.7 / -18.7
13c	23	2015 MHz						+ 2.7 / -3.7
14a	23	2005 MHz						+ 2.7 / -20.7
14b	23	2005.5 MHz						+ 2.7 / -20.7
14c	23	2015 MHz						+ 2.7 / -4.7
15a	23	2007.5 MHz						+ 2.7 / -21.7
15b	23	2012.5 MHz						+ 2.7 / -16.7
16a	23	2007.5 MHz						+ 2.7 / -13.7
16b	23	2012.5 MHz						+ 2.7 / -13.2
17a	23	2007.5 MHz						+ 2.7 / -3.7
17b	23	2012.5 MHz						+ 2.7 / -3.7
18a	23	2007.5 MHz						+ 2.7 / -12.7
18b	23	2012.5 MHz						+ 2.7 / -12.7
19a	23	2007.5 MHz						+ 2.7 / -16.7
19b	23	2012.5 MHz						+ 2.7 / -8.7
20a	23	2007.5 MHz						+ 2.7 / -13.7
20b	23	2012.5 MHz						+ 2.7 / -13.2
21a	23	2007.5 MHz						+ 2.7 / -4.7
21b	23	2012.5 MHz						+ 2.7 / -3.7
22a	23	2007.5 MHz						+ 2.7 / -13.7
22b	23	2012.5 MHz						+ 2.7 / -13.7

Configuration ID	EUTRA Band	Centre Frequency	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
23a	23	2007.5 MHz						+ 2.7 / -17.7
23b	23	2012.5 MHz						+ 2.7 / -9.7
24	23	2010 MHz						+ 2.7 / -20.7
25	23	2010 MHz						+ 2.7 / -2.7
26	23	2010 MHz						+ 2.7 / -13.7
27	23	2010 MHz						+ 2.7 / -16.7
28	23	2010 MHz						+ 2.7 / -3.7
29	23	2010 MHz						+ 2.7 / -14.7
30	23	2010 MHz						+ 2.7 / -17.7

Table 6.2.4.5-12: UE Power Class test requirements (network signalled value "NS_12")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	26					23	+2.7 / -6.2
2	26					23	+2.7 / -12.7
3	26					23	+2.7 / -2.7
4	26					23	+2.7 / -6.2
5	26					23	+2.7 / -13.7
6	26					23	+2.7 / -8.2
7	26					23	+2.7 / -8.2
8	26					23	+2.7 / -2.7
9	26					23	+2.7 / -8.2
10	26					23	+2.7 / -9.7
11	26					23	+2.7 / -9.7
12	26					23	+2.7 / -8.2
13	26					23	+2.7 / -2.7
14	26					23	+2.7 / -8.2
15	26					23	+2.7 / -9.7

Table 6.2.4.5-13: UE Power Class test requirements (network signalled value "NS_13")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	26					23	+2.7 / -6.2
2	26					23	+2.7 / -6.2
3	26					23	+2.7 / -3.7
4	26					23	+2.7 / -3.7
5	26					23	+2.7 / -8.2

Table 6.2.4.5-14: UE Power Class test requirements (network signalled value "NS_14")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	26					23	+2.7 / -6.2
2	26					23	+2.7 / -3.7
3	26					23	+2.7 / -4.7
4	26					23	+2.7 / -3.7
5	26					23	+2.7 / -6.2
6	26					23	+2.7 / -6.2
7	26					23	+2.7 / -3.7
8	26					23	+2.7 / -4.7
9	26					23	+2.7 / -3.7
10	26					23	+2.7 / -6.2

Table 6.2.4.5-15: UE Power Class test requirements (network signalled value "NS_15")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	26					23	+2.7 / -3.2
2	26					23	+2.7 / -8.2
3	26					23	+2.7 / -4.2
4	26					23	+2.7 / -8.2
5	26					23	+2.7 / -14.2
6	26					23	+2.7 / -4.2
7	26					23	+2.7 / -3.2
8	26					23	+2.7 / -9.2
9	26					23	+2.7 / -14.2
10	26					23	+2.7 / -4.2
11	26					23	+2.7 / -6.2
12	26					23	+2.7 / -12.2
13	26					23	+2.7 / -7.2
14	26					23	+2.7 / -3.2
15	26					23	+2.7 / -4.2
16	26					23	+2.7 / -8.2
17	26					23	+2.7 / -3.2
18	26					23	+2.7 / -12.2
19	26					23	+2.7 / -4.2
20	26					23	+2.7 / -8.2
21	26					23	+2.7 / -3.2
22	26					23	+2.7 / -4.2
23	26					23	+2.7 / -9.2
24	26					23	+2.7 / -14.2
25	26					23	+2.7 / -3.2
26	26					23	+2.7 / -9.2

Table 6.2.4.5-16A: UE Power Class test requirements (network signalled value "NS_16") when lower channel edge is at 807 MHz

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	27					23	+2.7/-2.7
2	27					23	+2.7/-3.7
3	27					23	+2.7-4.7
4	27					23	+2.7/-2.7
5	27					23	+2.7 / -4.7
6	27					23	+2.7 / -6.2
7	27					23	+2.7 / -8.2
8	27					23	+2.7 / -9.7
9	27					23	+2.7 / -4.7
10	27					23	+2.7 / -6.2
11	27					23	+2.7 / -11.7
12	27					23	+2.7 / -8.2
13	27					23	+2.7 / -11.7
14	27					23	+2.7 / -12.7
15	27					23	+2.7 / -9.7
16	27					23	+2.7/-2.7
17	27					23	+2.7 / -8.2
18	27					23	+2.7 / -4.7
19	27					23	+2.7 / -8.2
20	27					23	+2.7 / -13.7
21	27					23	+2.7 / -13.7
22	27					23	+2.7 / -14.7
23	27					23	+2.7 / -13.7
24	27					23	+2.7 / -13.7

Table 6.2.4.5-16B: UE Power Class test requirements (network signalled value "NS_16") when lower channel edge is at 808.5 MHz

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	27					23	+2.7/-2.7
2	27					23	+2.7/-3.7
3	27					23	+2.7/-5.2
4	27					23	+2.7/-2.7
5	27					23	+2.7 / -3.7
6	27					23	+2.7 / -3.7
7	27					23	+2.7 / -4.7
8	27					23	+2.7 / -2.7
9	27					23	+2.7 / -3.7
10	27					23	+2.7 / -4.7
11	27					23	+2.7 / -6.2
12	27					23	+2.7 / -6.2
13	27					23	+2.7 / -8.2
14	27					23	+2.7 / -9.7
15	27					23	+2.7 / -9.7
16	27					23	+2.7/-2.7
17	27					23	+2.7 / -6.2
18	27					23	+2.7 / -4.7
19	27					23	+2.7 / -4.7
20	27					23	+2.7 / -9.7
21	27					23	+2.7 / -11.7
22	27					23	+2.7 / -12.7
23	27					23	+2.7 / -11.7
24	27					23	+2.7 / -11.7

Table 6.2.4.5-16C: UE Power Class test requirements (network signalled value "NS_16") when lower channel edge is at 812 MHz

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	27					23	+2.7/-2.7
2	27					23	+2.7/-3.7
3	27					23	+2.7/-4.7
4	27					23	+2.7/-2.7
5	27					23	+2.7 / -3.7
6	27					23	+2.7 / -3.7
7	27					23	+2.7 / -4.7
8	27					23	+2.7 / -2.7
9	27					23	+2.7 / -3.7
10	27					23	+2.7 / -3.7
11	27					23	+2.7 / -3.7
12	27					23	+2.7 / -3.7
13	27					23	+2.7 / -3.7
14	27					23	+2.7 / -4.7
15	27					23	+2.7 / -2.7
16						23	+2.7/-2.7
17	27					23	+2.7 / -3.7
18	27					23	+2.7 / -3.7
19	27					23	+2.7 / -3.7
20	27					23	+2.7 / -4.7
21	27					23	+2.7 / -8.2
22	27					23	+2.7 / -9.7
23	27					23	+2.7 / -6.2
24	27					23	+2.7 / -4.7

Table 6.2.4.5-17: UE Power Class test requirements (network signalled value "NS_17")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	28					23	+2.7 / -3.2
2	28					23	+2.7 / -3.2
3	28					23	+2.7 / -4.2
4	28					23	+2.7 / -5.2
5	28					23	+2.7 / -3.2
6	28					23	+2.7 / -3.2
7	28					23	+2.7 / -4.2
8	28					23	+2.7 / -5.2

Table 6.2.4.5-18: UE Power Class test requirements (network signalled value "NS_18")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)

1	28					23	+2.7 / -3.2
2	28					23	+2.7 / -4.2
3	28					23	+2.7 / -5.2
4	28					23	+2.7 / -6.2
5	28					23	+2.7 / -7.2
6	28					23	+2.7 / -7.2
7	28					23	+ 2.7 / -8.7
8	28					23	+2.7 / -9.2
9	28					23	+2.7 / -7.2
10	28					23	+2.7 / -7.2
11	28					23	+2.7 / -8.7
12	28					23	+2.7 / -9.2
13	28					23	+2.7 / -7.2
14	28					23	+2.7 / -7.2
15	28					23	+2.7 / -8.7
16	28					23	+2.7 / -9.2

Table 6.2.4.5-17: UE Power Class test requirements (network signalled value "NS_20 for Band 23")

Configuration ID	EUTRA Band	Centre Frequency	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1a	23	2002.5 MHz						+ 2.7 / -22.7
1b	23	2007.5 MHz						+ 2.7 / -2.7
1c	23	2012.5 MHz						+ 2.7 / -2.7
1d	23	2017.5 MHz						+ 2.7 / -2.7
2a	23	2002.5 MHz						+ 2.7 / -23.7
2b	23	2007.5 MHz						+ 2.7 / -7.7
2c	23	2012.5 MHz						+ 2.7 / -7.7
2d	23	2017.5 MHz						+ 2.7 / -3.7
3a	23	2002.5 MHz						+ 2.7 / -23.7
3b	23	2007.5 MHz						+ 2.7 / -11.7
3c	23	2012.5 MHz						+ 2.7 / -11.7
3d	23	2017.5 MHz						+ 2.7 / -3.7
4a	23	2002.5 MHz						+ 2.7 / -23.7
4b	23	2007.5 MHz						+ 2.7 / -7.7
4c	23	2012.5 MHz						+ 2.7 / -7.7
4d	23	2017.5 MHz						+ 2.7 / -3.7
5a	23	2002.5 MHz						+ 2.7 / -23.7
5b	23	2007.5 MHz						+ 2.7 / -11.7
5c	23	2012.5 MHz						+ 2.7 / -11.7
5d	23	2017.5 MHz						+ 2.7 / -3.7
6a	23	2005 MHz						+ 2.7 / -21.7
6b	23	2015 MHz						+ 2.7 / -2.7
7a	23	2005 MHz						+ 2.7 / -7.7
7b	23	2015 MHz						+ 2.7 / -2.7

Configuration ID	EUTRA Band	Centre Frequency	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
8a	23	2005 MHz						+ 2.7 / -11.7
8b	23	2015 MHz						+ 2.7 / -8.7
9a	23	2005 MHz						+ 2.7 / -8.7
9b	23	2015 MHz						+ 2.7 / -3.7
10a	23	2005 MHz						+ 2.7 / -11.7
10b	23	2005 MHz						+ 2.7 / -8.7
11	23	2012.5 MHz						+ 2.7 / -11.7
12	23	2012.5 MHz						+ 2.7 / -7.7
13	23	2012.5 MHz						+ 2.7 / -11.7
14	23	2012.5 MHz						+ 2.7 / -17.7
15	23	2012.5 MHz						+ 2.7 / -8.7
16	23	2012.5 MHz						+ 2.7 / -12.7
17	23	2012.5 MHz						+ 2.7 / -18.7
18	23	2010 MHz						+ 2.7 / -22.7
19	23	2010 MHz						+ 2.7 / -14.7
20	23	2010 MHz						+ 2.7 / -13.7
21	23	2010 MHz						+ 2.7 / -8.7
22	23	2010 MHz						+ 2.7 / -11.7
23	23	2010 MHz						+ 2.7 / -15.7
24	23	2010 MHz						+ 2.7 / -14.7
25	23	2010 MHz						+ 2.7 / -19.7
26	23	2010 MHz						+ 2.7 / -12.7

6.2.4_1 Additional Maximum Power Reduction (A-MPR) for HPUE

6.2.4_1.1 Test purpose

Same test purpose as in clause 6.2.4.1 with the follow exception:

- Instead of Table 6.2.2.3-1 → use Table 6.2.2_1.3-1

6.2.4_1.2 Test applicability

The requirements of this test apply in test case 6.6.2.2 Additional Spectrum Emission Mask for network signalled values NS_06, to all types of E-UTRA Power Class 1 UE release 11 and forward.

6.2.4_1.3 Minimum conformance requirements

For UE Power Class 1 the specific requirements and identified sub-clauses are specified in Table 6.2.4.3-1 along with the allowed A-MPR values that may be used to meet these requirements. The allowed A-MPR values specified in Table 6.2.4.3-1 are in addition to the allowed MPR requirements specified in clause 6.2.3_1. For the UE maximum output power modified by A-MPR, the power limits specified in clause 6.2.5_1 apply.

The normative reference for this requirement is TS 36.101 clause 6.2.4.

6.2.4_1.4 Test description

Same test description as in clause 6.2.4.4 with the following exceptions:

- Instead of Table 6.2.4.4.1-4 → use Table 6.2.4_1.4.1-1

Table 6.2.4_1.4.1-1: Test Configuration Table (network signalled value "NS_06")

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	
Test Channel Bandwidths (as specified in TS 36.508 [7] subclause 4.3.1)				Lowest, 5MHz, 10MHz, Highest	
Test Parameters for NS_06 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	25
2	5MHz			QPSK	8
3	5MHz			16QAM	8
4	10MHz			QPSK	50
5	10MHz			QPSK	12
6	10MHz			16QAM	12

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

6.2.4_1.5 Test requirements

The maximum output power, derived in step 2 of clause 6.2.4_1.4.2 shall be within the range prescribed by the nominal maximum output power and tolerance in Table 6.2.4_1.5-1. The allowed A-MPR values specified in Table 6.2.4.3-1 are in addition to the allowed MPR requirements specified in clause 6.2.3_1. For the UE maximum output power modified by MPR and/or A-MPR, the power limits specified in Table 6.2.5_1.3-1 apply.

Table 6.2.4_1.5-1: HPUE Power Class test requirements (network signalled value "NS_06")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)
1	14	31	+2.7 / -4.7
2	14	31	+2.7 / -3.7
3	14	31	+2.7 / -4.7
4	14	31	+2.7 / -4.7
5	14	31	+2.7 / -3.7
6	14	31	+2.7 / -4.7

6.2.4A Additional Maximum Power Reduction (A-MPR) for CA

6.2.4A.1 Additional Maximum Power Reduction (A-MPR) for CA (intra-band contiguous DL CA and UL CA)

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

- For CA_NS_02 and CA_NS_03 and CA_NS_06 the UL multicluster allocation A-MPR requirements are TBD

6.2.4A.1.1 Test purpose

Additional ACLR, spectrum emission and spurious emission requirements for carrier aggregation can be signalled by the network to indicate that the UE shall also meet additional requirements in a specific deployment scenario. To meet these additional requirements, Additional Maximum Power Reduction (A-MPR) is allowed for the CA Power Class as specified in Table 6.2.2A-1.

6.2.4A.1.2 Test applicability

The requirements of this test apply in test case 6.6.2.2A.1 Additional Spectrum Emission Mask for CA (intra-band contiguous DL CA and UL CA) for network signalled value NS_04 to all types of E-UTRA UE release 8 and forward.

The requirements of this test apply in test case 6.6.3.3A.1 Additional spurious emissions for CA (intra-band contiguous DL CA and UL CA) for network signalled values CA_NS_01, CA_NS_02 and CA_NS_03, CA_NS_05, CA_NS_06 to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

6.2.4A.1.3 Minimum conformance requirements

If the UE is configured for carrier aggregation and receives CA_NS value indicated by IE *additionalSpectrumEmissionSCell-r10*, the allowed maximum output power reduction is specified in Table 6.2.4A.1.3-1 and clause 6.2.3A.1 does not apply, i.e. carrier aggregation MPR = 0.

Table 6.2.4A.1.3-1: Additional Maximum Power Reduction (A-MPR) for CA

CA Network Signalling value	Requirements (clause)	Uplink CA Configuration	A-MPR [dB] (subclause)
CA_NS_01	6.6.3.3A.1.3.1	CA_1C	6.2.4A.1.3.1
CA_NS_02	6.6.3.3A.1.3.2	CA_1C	6.2.4A.1.3.2
CA_NS_03	6.6.3.3A.1.3.3	CA_1C	6.2.4A.1.3.3
CA_NS_04	6.6.2.2A.1.3.1	CA_41C	6.2.4A.1.3.4
CA_NS_05	6.6.3.3A.1.3.4	CA_38C	6.2.4A.1.3.5
CA_NS_06	6.6.3.3A.1.3.5	CA_7C	6.2.4A.1.3.6

For intra-band contiguous carrier aggregation if the UE is configured for CA and it receives CA_NS value indicated by IE *additionalSpectrumEmissionSCell-r10* and if UE has configured the transmitter for transmissions within the aggregated channel bandwidth the requirements for applicable CA_NS value indicated by IE *additionalSpectrumEmissionSCell-r10* according to Table 6.2.4A.1.3-1 apply. If UE has configured the transmitter for transmissions within E-UTRA channel bandwidths the requirements for NS value indicated in the PCC IE *additionalSpectrumEmission* according to subclause 6.2.4 apply. For the UE maximum output power modified by A-MPR specified in table 6.2.4A.1.3-1, the power limits specified in subclause 6.2.5A.1 apply.

6.2.4A.1.3.1 A-MPR for CA_NS_01 for CA_1C

If the UE is configured to CA_1C and it receives IE CA_NS_01 the allowed maximum output power reduction applied to transmissions on the PCC and the SCC for contiguously aggregated signals is specified in table 6.2.4A.1.3.1-1.

Table 6.2.4A.1.3.1-1: Contiguous allocation A-MPR for CA_NS_01

CA_1C: CA_NS_01	RB_{start}	L_{CRB} [RBs]	RB_{start} + L_{CRB} [RBs]	A-MPR for QPSK and 16-QAM [dB]
100 RB / 100 RB	0 – 23 and 176 - 199	> 0	N/A	≤ 12.0
	24 – 105	> 64	N/A	≤ 6.0
	106 – 175	N/A	> 175	≤ 5.0
75 RB / 75 RB	0 – 6 and 143 – 149	$0 < L_{CRB} \leq 10$	N/A	≤ 11.0
		> 10	N/A	≤ 6.0
	7 – 90	> 44	N/A	≤ 5.0
	91 – 142	N/A	> 142	≤ 2.0

NOTE 1: RB_start indicates the lowest RB index of transmitted resource blocks
NOTE 2: L_CRB is the length of a contiguous resource block allocation
NOTE 3: For intra-subframe frequency hopping which intersects regions, notes 1 and 2 apply on a per slot basis
NOTE 4: For intra-subframe frequency hopping which intersects regions, the larger A-MPR value may be applied for both slots in the subframe

If the UE is configured to CA_1C and it receives IE CA_NS_01 the allowed maximum output power reduction applied to transmissions on the PCell and the SCell due to multi-cluster transmission is defined as follows

$$\text{A-MPR} = \text{CEIL}\{M_A, 0.5\}$$

Where M_A is defined as follows:

$$M_A = -22.5\,A + 17 \quad ; 0 \leq A < 0.20$$

$$-11.0\,A + 14.7 \quad ; 0.20 \leq A < 0.70$$

$$-1.7\,A + 8.2 \quad ; 0.70 \leq A \leq 1$$

Where $A = N_{RB\_alloc} / N_{RB\_agg}$

The normative reference for requirement is in TS 36.101 [2] clause 6.2.4A

6.2.4A.1.3.2 A-MPR for CA_NS_02 for CA_1C

If the UE is configured to CA_1C and it receives IE CA_NS_02 the allowed maximum output power reduction applied to transmission on the PCC and the SCC for contiguously aggregated signals is specified in Table 6.2.4A.1.3.2-1.

Table 6.2.4A.1.3.2-1: Contiguous allocation A-MPR for CA_NS_02

CA_1C: CA_NS_02	RB_{end}	L_{CRB} [RBs]	A-MPR for QPSK and 16 -QAM [dB]
100 RB / 100 RB	0 –20	> 0	≤ 4 dB
	21 – 46	> 0	≤ 3 dB
	47 – 99	> RB_{end} – 20	≤ 3 dB
	100 – 184	> 75	≤ 6 dB
	185 – 199	> 0	≤ 10 dB
75 RB / 75 RB	0 – 48	> 0	≤ 2 dB
	49 – 80	> RB_{end} – 20	≤ 3 dB
	81 – 129	> 60	≤ 5 dB
	130 – 149	> 85	≤ 6 dB
	130 – 149	1 – 84	≤ 2 dB

If the UE is configured to CA_1C and it receives IE CA_NS_02 the allowed maximum output power reduction applied to transmissions on the PCell and the SCell due to multi-cluster transmission is defined as follows:

$$\text{A-MPR} = \text{CEIL}\{M_A, 0.5\}$$

Where M_A is defined as follows

$$[M_A = -22.5\,A + 17 \quad ; 0 \le A < 0.20$$

$$-11.0\,A + 14.7 \quad ; 0.20 \le A < 0.70$$

$$-1.7\,A + 8.2 \quad ; 0.70 \le A \le 1]$$

Where $A = N_{RB\_alloc} / N_{RB\_agg}$.

6.2.4A.1.3.3 A-MPR for CA_NS_03 for CA_1C

If the UE is configured to CA_1C and it receives IE CA_NS_03 the allowed maximum output power reduction applied to transmission on the PCC and the SCC for contiguously aggregated signals is specified in Table 6.2.4A.1.3.3-1.

Table 6.2.4A.1.3.3-1: Contiguous allocation A-MPR for CA_NS_03

CA_1C: CA_NS_03	RB_{end}	L_{CRB} [RBs]	A-MPR for QPSK and 16-QAM [dB]
100 RB / 100 RB	0 – 26	> 0	≤ 10 dB
	27 – 63	≥ RB_{end} – 27	≤ 6 dB
	27 – 63	< RB_{end} – 27	≤ 1 dB
	64 – 100	> RB_{end} – 20	≤ 4 dB
	101 – 171	> 68	≤ 7 dB
	172 – 199	> 0	≤ 10 dB
75 RB / 75 RB	0 – 20	> 0	≤ 10 dB
	21 – 45	> 0	≤ 4 dB
	46 – 75	> RB_{end} – 13	≤ 2 dB
	76 – 95	> 45	≤ 5 dB
	96 – 149	> 43	≤ 8 dB
	120 – 149	1 – 43	≤ 6 dB

If the UE is configured to CA_1C and it receives IE CA_NS_03 the allowed maximum output power reduction applied to transmissions on the PCell and the SCell due to multi-cluster transmission is defined as follows:

$$A\text{-}MPR = CEIL\{M_A, 0.5\}$$

Where M_A is defined as follows

$$[M_A = -23.33A + 17.5 \quad ; 0 \leq A < 0.15$$

$$-7.65A + 15.15 \quad ; 0.15 \leq A \leq 1]$$

Where $A = N_{RB\_alloc} / N_{RB\_agg}$.

6.2.4A.1.3.4 A-MPR for CA_NS_04 for CA_41C

If the UE is configured to CA_41C and it receives IE CA_NS_04 the allowed maximum output power reduction applied to transmission on the PCC and the SCC for contiguously aggregated signals is specified in Table 6.2.4A.1.3.4-1.

Table 6.2.4A.1.3.4-1: Contiguous Allocation A-MPR for CA_NS_04

CA Bandwidth Class C	RB_{Start}	L_{CRB} [RBs]	$RB_{start} + L_{CRB}$ [RBs]	A-MPR for QPSK [dB]	A-MPR for 16QAM [dB]
50RB / 100 RB	0 – 44 and 105 – 149	>0	N/A	≤4dB	≤4dB
	45 – 104	N/A	>105	≤3dB	≤4dB
75 RB / 75 RB	0 – 44 and 105 – 149	>0	N/A	≤4dB	≤4dB
	45 – 104	N/A	>105	≤4dB	≤4dB
100 RB / 75 RB	0 – 49 and 125 – 174	>0	N/A	≤4dB	≤4dB
	50 - 124	N/A	>125	≤3dB	≤4dB
100 RB / 100 RB	0 – 59 and 140 – 199	>0	N/A	≤3dB	≤4dB
	60– 139	N/A	>140	≤3dB	≤4dB
NOTE 1: RB_{start} indicates the lowest RB index of transmitted resource blocks NOTE 2: L_{CRB} is the length of a contiguous resource block allocation NOTE 3: For intra-subframe frequency hopping which intersects regions, notes 1 and 2 apply on a per slot basis NOTE 4: For intra-subframe frequency hopping which intersects regions, the larger A-MPR value may be applied for both slots in the subframe					

If the UE is configured to CA_41C and it receives IE CA_NS_04 the allowed maximum output power reduction applied to transmissions on the PCell and the SCell due to multi-cluster transmission is defined as follows

$$A\text{-}MPR = CEIL\{M_A, 0.5\}$$

Where M_A is defined as follows

$$M_A = 10.5, \quad 0 \leq A < 0.05$$

$$= -50.0A + 13.00, \quad 0.05 \leq A < 0.15$$

$$= -4.0A + 6.10, \quad 0.15 \leq A < 0.40$$

$$= -0.83A + 4.83, \quad 0.40 \leq A \leq 1$$

Where $A = N_{RB\_alloc} / N_{RB\_agg}$.

6.2.4A.1.3.5 A-MPR for CA_NS_05 for CA_38C

If the UE is configured to CA_38C and it receives IE CA_NS_05 the allowed maximum output power reduction applied to transmission on the PCC and the SCC for contiguously aggregated signals is specified in Table 6.2.4A. 1.3.5-1.

Table 6.2.4A.1.3.5-1: Contiguous Allocation A-MPR for CA_NS_05

CA_38C	RB_{end}	L_{CRB} [RBs]	A-MPR for QPSK and 16-QAM [dB]
100RB/100RB	0 – 12	>0	≤ 5 dB
	13 – 79	> RB_{end} – 13	≤ 2 dB
	80 – 180	>60	≤ 6 dB
	181 – 199	> 0	≤ 11 dB
75RB/75RB	0 – 70	> max(0, RB_{end} -10)	≤ 2 dB
	71- 108	> 60	≤ 5 dB
	109 – 140	>0	≤ 5 dB
	140 – 149	≤ 70	≤ 2 dB
	140 – 149	>70	≤ 6 dB
NOTE 1: RB_{end} indicates the highest RB index of transmitted resource blocks NOTE 2: L_{CRB} is the length of a contiguous resource block allocation NOTE 3: For intra-subframe frequency hopping which intersects regions, notes 1 and 2 apply on a per slot basis NOTE 4: For intra-subframe frequency hopping which intersects regions, the larger A-MPR value may be applied for both slots in the subframe			

If the UE is configured to CA_38C and it receives IE CA_NS_05 the allowed maximum output power reduction applied to transmissions on the PCell and the SCell due to multi-cluster transmission is defined as follows

$$\text{A-MPR} = \text{CEIL}\{M_A, 0.5\}$$

Where MA is defined as follows

$$M_A = -14.17\,A + 16.50 \quad ; 0 \le A < 0.60$$

$$-2.50\,A + 9.50 \quad ; 0.60 \le A \le 1$$

Where $A = N_{RB\_alloc} / N_{RB\_agg}$.

6.2.4A.1.3.6 A-MPR for CA_NS_06 for CA_7C

If the UE is configured to CA_7C and it receives IE CA_NS_06 the allowed maximum output power reduction applied to transmission on the PCC and the SCC for contiguously aggregated signals is specified in Table 6.2.4A. 1.3.6-1.

Table 6.2.4A.1.3.6-1: Contiguous Allocation A-MPR for CA_NS_06

CA Bandwidth Class C	$RB_{\_end}$	L_{CRB} [RBs]	A-MPR for QPSK and 16-QAM [dB]
100RB/100RB	[0 –22]	>[0]	≤ [4] dB
	[23 – 33]	> [RB_{end} – 10]	≤ [2] dB
	[106 – 142]	> [75]	≤ [3] dB
	[143 – 178]	>[70]	≤ [5] dB
	[179 – 199]	> [0]	≤ [10] dB
75RB/75RB	[0 – 7]	>[0]	≤ [5] dB
	[20- 75]	> [RB_{end} – 10]	≤ [2] dB
	[75 – 110]	>[64]	≤ [2] dB
	[110 – 144]	>[35]	≤ [6] dB
	[145 – 149]	>[0]	≤ [10] dB

If the UE is configured to CA_7C and it receives IE CA_NS_06 the allowed maximum output power reduction applied to transmissions on the PCell and the SCell due to multi-cluster transmission is defined as follows:

$$A\text{-}MPR = CEIL\ \{M_A, 0.5\}$$

Where M_A is defined as follows

$$M_A = [-23.33A + 17.5;\ 0 \leq A < 0.15$$

$$-7.65A + 15.15;\ 0.15 \leq A \leq 1]$$

Where $A = N_{RB\_alloc} / N_{RB\_agg}$.

6.2.4A.1.4 Test description

6.2.4A.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 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 6.2.4A.1.4.1-1 to 6.2.4A.1.4.1-5. 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 6.2.4A.1.4.1-1: Test Configuration Table (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 across bandwidth combination sets supported by the UE.			As in Table 6.2.4A.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	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 6.2.4A.1.4.1-2: Test Configuration Table (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 across bandwidth combination sets supported by the UE.			As in Table 6.2.4A.1.3.2-1						
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	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 6.2.4A.1.4.1-3: Test Configuration Table (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 across bandwidth combination sets supported by the UE.			As in Table 6.2.4A.1.3.3-1						
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	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									

Table 6.2.4A.1.4.1-4: Test Configuration Table (network signalled value "CA_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 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 across bandwidth combination sets supported by the UE.	As in Table 6.2.4A.1.3.4-1

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									

Table 6.2.4A.1.4.1-5: Test Configuration Table (network signalled value "CA_NS_05")

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 across bandwidth combination sets supported by the UE.			As in Table 6.2.4A.1.3.5-1						
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	75	75	N/A	QPSK	40	P_40@0	S_0@0		
2	75	75		QPSK	80	P_50@25	S_30@0		
3	75	75		QPSK	60	P_10@65	S_50@0		
4	75	75		QPSK	64	P_1@74	S_63@0		
5	75	75		QPSK	90	P_20@55	S_70@0		
6	75	75		QPSK	2	P_1@0	S_1@74		
7	75	75		QPSK	90	P_30@0	P_15@40	S_15@25	S_30@45
8	100	100		QPSK	8	P_8@0	S_0@0		
9	100	100		QPSK	40	P_40@0	S_0@0		
10	100	100		QPSK	80	P_50@50	S_30@0		
11	100	100		QPSK	150	P_60@40	S_90@0		
12	100	100		QPSK	2	P_1@0	S_1@99		
13	100	100		QPSK	120	P_30@0	P_30@45	S_30@25	S_30@70
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 6.2.4A.1.4.1-6: Test Configuration Table (network signalled value "CA_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 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 6.2.4A.1.3.6-1						
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	75	75	N/A	QPSK	5	P_5@0	S_0@0		
2	75	75		QPSK	45	P_45@0	S_0@0		
3	75	75		QPSK	75	P_60@15	S_15@0		
4	75	75		QPSK	60	P_10@65	S_50@0		
5	75	75		QPSK	90	P_18@57	S_72@0		
6	75	75		QPSK	2	P_1@0	S_1@74		
7	75	75		QPSK	24	P_6@0	P_6@40	S_6@5	S_6@45
8	100	100		QPSK	10	P_10@0	S_0@0		
9	100	100		QPSK	30	P_30@0	S_0@0		
10	100	100		QPSK	100	P_75@25	S_25@0		
11	100	100		QPSK	90	P_40@60	S_50@0		
12	100	100		QPSK	100	P_15@85	S_85@0		
13	100	100		QPSK	2	P_1@0	S_1@99		
14	100	100		QPSK	32	P_8@0	P_8@50	S_8@0	S_8@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 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 the applicable table from Table 6.2.4A.1.1.4.1-1 to 6.2.4A.1.4.1-3.
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 6.2.4A.1.4.3.

6.2.4A.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 6.2.4A.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 sends uplink scheduling information for each UL HARQ process via PDCCH DCI format 0 for C_RNTI to schedule the UL RMC according to the applicable from Table 6.2.4A.1.4.1-1 to Table 6.2.4A.1.4.1-5 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; allow at least 200ms for the UE to reach P_{UMAX} level.
6. Measure the mean transmitted power over all component carriers in the CA configuration of the radio access mode. The period of measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.4A.1.4.3 Message contents

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

6.2.4A.1.4.3.1 Message contents exceptions (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 spectrum emission requirement for a specific deployment scenario.

Table 6.2.4A.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)		

6.2.4A.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 spectrum emission requirement for a specific deployment scenario.

Table 6.2.4A.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)		

6.2.4A.1.4.3.3 Message contents exceptions (network signalled value "CA_NS_03")

1. Information element additionalSpectrumEmissionSCell-r10 is set to CA_NS_03. 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 6.2.4A.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)		

6.2.4A.1.4.3.4 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 6.2.4A.1.4.3.4-1: *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)		

6.2.4A.1.4.3.5 Message contents exceptions (network signalled value "CA_NS_05")

1. Information element additionalSpectrumEmissionSCell-r10 is set to CA_NS_05. 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 6.2.4A.1.4.3.5-1: *RadioResourceConfigCommonSCell-r10-DEFAULT*: Additional spectrum emission test requirement for "CA_NS_05"

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-13A			
Information Element	**Value/remark**	**Comment**	**Condition**
additionalSpectrumEmissionSCell-r10	5 (CA_NS_05)		

6.2.4A.1.5 Test requirements

The maximum output power, derived in step 3 shall be within the range prescribed by the nominal maximum output power and tolerance in the applicable table from Table 6.2.4A.1.5-1 to Table 6.2.4A.1.5-3. The allowed maximum output power reduction is specified in Table 6.2.4A.1.3-1 and clause 6.2.3A.1 does not apply, i.e. carrier aggregation MPR = 0. For the UE maximum output power modified by A-MPR specified in table 6.2.4A.1.3-1, the power limits specified in Table 6.2.5A.1.3-2 apply.

Table 6.2.4A.1.5-1: Test requirement (network signalled value "CA_NS_01")

Configuration ID	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1					23	+2.7 / -17.7
2					23	+2.7 / -11.7
3					23	+2.7 / -9.7
4					23	+2.7 / -4.7
5					23	+2.7 / -2.7
6					23	+2.7 / -23.7
7					23	+2.7 / -20.2
8					23	+2.7 / -13.2
9					23	+2.7 / -18.7
10					23	+2.7 / -18.7
11					23	+2.7 / -11.7
12					23	+2.7 / -9.7
13					23	+2.7 / -2.7
14					23	+2.7 / -23.7
15					23	+2.7 / -20.2
16					23	+2.7 / -12.7

Table 6.2.4A.1.5-2: Test requirement (network signalled value "CA_NS_02")

Configuration ID	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1					23	+2.7 / -4.7
2					23	+2.7 / -5.2
3					23	+2.7 / -9.7
4					23	+2.7 / -11.7
5					23	+2.7 / -4.7
6					23	+2.7 / -2.7
7					23	TBD
8					23	TBD
9					23	+2.7 / -8.2
10					23	+2.7 / -5.2
11					23	+2.7 / -5.2
12					23	+2.7 / -11.7
13					23	+2.7 / -15.7
14					23	+2.7 / -2.7
15					23	TBD
16					23	TBD

Table 6.2.4A.1.5-3: Test requirement (network signalled value "CA_NS_03")

Configuration ID	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1					23	+2.7 / -15.7
2					23	+2.7 / -8.2
3					23	+2.7 / -4.7
4					23	+2.7 / -9.7
5					23	+2.7 / -13.7
6					23	+2.7 / -11.7
7					23	+2.7 / -2.7
8					23	TBD
9					23	+2.7 / -15.7
10					23	+2.7 / -11.7
11					23	+2.7 / -3.7
12					23	+2.7 / -8.2
13					23	+2.7 / -12.7
14					23	+2.7 / -15.7
15					23	+2.7 / -2.7
16					23	TBD

Table 6.2.4A.1.5-4: Test requirement (network signalled value "CA_NS_04")

Configuration ID	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1					23	+2.7 / -8.2
2					23	+2.7 / -6.2
3					23	+2.7 / -8.2
4					23	+2.7 / -17.2
5					23	+2.7 / -11.2
6					23	+2.7 / -9.2
7					23	+2.7 / -8.2
8					23	+2.7 / -8.2
9					23	+2.7 / -17.2
10					23	+2.7 / -11.2
11					23	+2.7 / -9.2
12					23	+2.7 / -8.2
13					23	+2.7 / -6.2
14					23	+2.7 / -8.2
15					23	+2.7 / -17.2
16					23	+2.7 / -11.2
17					23	+2.7 / -9.2
18					23	+2.7 / -6.2
19					23	+2.7 / -6.2
20					23	+2.7 / -8.2
21					23	+2.7 / -8.2
22					23	+2.7 / -17.2
23					23	+2.7 / -11.2
24					23	+2.7 / -9.2

Table 6.2.4A.1.5-5: Test requirement (network signalled value "CA_NS_05")

Configuration ID	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1					23	+2.7 / -6.2
2					23	+2.7 / -12.7
3					23	+2.7 / -11.7
4					23	+2.7 / -6.2
5					23	+2.7 / -13.7
6					23	+2.7 / -32.7
7					23	+2.7 / -18.2
8					23	+2.7 / -9.7
9					23	+2.7 / -6.2
10					23	+2.7 / -12.7
11					23	+2.7 / -19.7
12					23	+2.7 / -32.7
13					23	+2.7 / -18.2

Table 6.2.4A.1.5-6: Test requirement (network signalled value "CA_NS_06")

Configuration ID	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1					23	+2.7 / -9.7
2					23	+2.7 / -4.7
3					23	+2.7 / -4.7
4					23	+2.7 / -11.7
5					23	+2.7 / -15.7
6					23	+2.7 / -24.7
7					23	+2.7 / -20.7
8					23	+2.7 / -8.2
9					23	+2.7 / -4.7
10					23	+2.7 / -6.2
11					23	+2.7 / -9.7
12					23	+2.7 / -15.7
13					23	+2.7 / -24.7
14					23	+2.7 / --20.7

6.2.4B Additional Maximum Power Reduction (A-MPR) for UL-MIMO

6.2.4B.1 Test purpose

Additional ACLR and spectrum emission requirements can be signalled by the network to indicate that the UE shall also meet additional requirements in a specific deployment scenario. To meet these additional requirements, Additional Maximum Power Reduction A-MPR is allowed for the sum output power at each antenna connector as specified in Table 6.2.2B.3-1. Unless stated otherwise, an A-MPR of 0 dB shall be used.

6.2.4B.2 Test applicability

The requirements of this test apply in test case 6.6.2.2 Additional Spectrum Emission Mask for network signalled values NS_03, NS_04, NS_06 and NS_07 to all types of E-UTRA UE release 10 and forward that support UL MIMO.

The requirements of this test apply in test case 6.6.3.3 Additional Spurious Emissions for network signalled values NS_05, NS_07 and NS_08, NS_09 to all types of E-UTRA UE release 10 and forward that support UL MIMO.

6.2.4B.3 Minimum conformance requirements

For UE Power Class 3 the specific requirements and identified clauses are specified in Table 6.2.4B.3-1 along with the allowed A-MPR values that may be used to meet these requirements. The allowed A-MPR values specified below in Table 6.2.4B.3.-1 and 6.2.4B.3-2 are in addition to the allowed MPR requirements specified in clause 6.2.3B. For the UE maximum output power modified by A-MPR, the power limits specified in clause 6.2.5B apply.

Table 6.2.4B.3-1: Additional Maximum Power Reduction (A-MPR) / Spectrum Emission requirements

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.2-1	1.4,3,5,10,15,20	Table 5.4.2-1	NA
NS_03	6.6.2.2.3.1	2,4,10, 23, 25,35,36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.3.2	41	5	>6	≤1
			10, 15, 20	See Table 6.2.4B.3-4	
NS_05	6.6.3.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.4.2-1	n/a
NS_07	6.6.2.2.3.3 6.6.3.3.3.2	13	10	Table 6.2.4B.3-2	Table 6.2.4B.3-2
NS_08	6.6.3.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4B.3-3	Table 6.2.4B.3-3
NS_11	6.6.2.2.1	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4B.3-5	Table 6.2.4B.3-5
NS_12	6.6.3.3.5	26	1.4, 3, 5	Table 6.2.4B.3-6	Table 6.2.4B.3-6
NS_13	6.6.3.3.6	26	5	Table 6.2.4B.3-7	Table 6.2.4B.3-7
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4B.3-8	Table 6.2.4B.3-8
NS_15	6.6.3.3.9	26	1.4, 3, 5, 10, 15	Table 6.2.4B.3-9 Table 6.2.4B.3-10	Table 6.2.4B.3-9, Table 6.2.4B.3-10
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4B.3-11, Table 6.2.4B.3-12, Table 6.2.4B.3-13	
..					
NS_20	6.2.2, .6.2.2.1, 6.6.3.2	23	5, 10, 15, 20	Table 6.2.4B.3-14	Table 6.2.4B.3-14
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

Table 6.2.4B.3-2: A-MPR for "NS_07"

Parameters	Region A		Region B				Region C	
RB_{start} [1]	0 – 12		13 –18		19 – 42		43 – 49	
L_CRB[2] [RBs]	6 – 8	1 to 5 and 9-50	<8	≥8	<18	≥18	≤2	>2
A-MPR [dB]	≤8	≤12	0	≤12	0	≤6	≤3	0

Note 1: RB_{start} indicates the lowest RB index of transmitted resource blocks
Note 2: L_CRB is the length of a contiguous resource block allocation
Note 3: For intra-subframe frequency hopping between two regions, notes 1 and 2 apply on a per slot basis.
Note 4: For intra-subframe frequency hopping between two regions, the larger A-MPR value of the two regions may be applied for both slots in the subframe.

Table 6.2.4B.3-3: A-MPR for "NS_10"

Channel BW	Parameters	Region A
15	RB_{start} [1]	0 – 10
	L_CRB [RBs]	1 -20
	A-MPR [dB]	≤ 2
20	RB_{start} [1]	0 – 15
	L_CRB [RBs]	1 -20
	A-MPR [dB]	≤ 5

Note 1: RB_{start} indicates the lowest RB index of transmitted resource blocks.
Note 2: L_CRB is the length of a contiguous resource block allocation.
Note 3: For intra-subframe frequency hopping which intersects Region A, notes 1 and 2 apply on a per slot basis.
Note 4: For intra-subframe frequency hopping which intersect Region A, the larger A-MPR value may be applied for both slots in the subframe.

Table 6.2.4B.3-4: A-MPR for NS_04 for bandwidths > 5MHz

Channel BW	Parameters	Region A	Region B		Region C
10	RB_{start} [1]	0 – 12	13 – 36		37 – 49
	RB_{start} [1] + L_{CRB} [2] [RBs]	NA (Note 3)	14 - 37	>37	NA (Note 3)
	A-MPR [dB]	≤3dB	0	≤2dB	≤3dB
15	RB_{start} [1]	0 – 18	19 – 55		56 – 74
	RB_{start} [1] + L_{CRB} [2] [RBs]	NA (Note 3)	20 - 56	>56	NA (Note 3)
	A-MPR [dB]	≤3dB	0	≤2dB	≤3dB
20	RB_{start} [1]	0 – 24	25 – 74		75 – 99
	RB_{start} [1] + L_{CRB} [2] [RBs]	NA (Note 3)	26 - 75	>75	NA (Note 3)
	A-MPR [dB]	≤3dB	0	≤2dB	≤3dB

Note 1: RB_{start} indicates the lowest RB index of transmitted resource blocks.
Note 2: L_{CRB} is the length of a contiguous resource block allocation.
Note 3: Any RB allocation that starts in Region A or C is allowed the specified A-MPR.
Note 4: For intra-subframe frequency hopping which intersects regions, notes 1 and 2 apply on a per slot basis.
Note 5: For intra-subframe frequency hopping which intersects regions, the larger A-MPR value may be applied for both slots in the subframe.

Table 6.2.4B.3-5: A-MPR for "NS_11"

Channel Bandwidth	Parameters					
3	Fc (MHz)	<2004	≥2004			
	L_{CRB} (RBs)	1-15	>5			
	A-MPR	≤5	≤ 1			
5	Fc (MHz)	<2004	2004 ≤ Fc <2007		≥2007	
	L_{CRB} (RBs)	1-25	1-6 & 15-25	8-12	>6	
	A-MPR	≤7	≤ 4	0	≤ 1	
10	Fc (MHz)	2005				
	RB_{start} (RBs)	0-49				
	L_{CRB} (RBs)	1-50				
	A-MPR	≤ 12				
15	Fc (MHz)	[<2012.5]				
	RB_{start} (RBs)	[0-4]	[5-21]		[22-56]	[57-74]
	L_{CRB} (RBs)	[≥1]	[7-50]	[0-6 & ≥50]	[≤25]	[>25]	[>0]
	A-MPR	[≤15]	[≤7]	[≤10]	[0]	[≤6]	[≤15]
	Fc (MHz)	[2012.5]				
	RB_{start} (RBs)	[0-12]	[13-39]		[40-65]	[66-74]
	L_{CRB} (RBs)	[≥1]	[≥30]	[<30]	[≥ (69 – RB_{start})]	[≥1]
	A-MPR	[≤10]	[≤6]	[0]	[≤2]	[≤6.5]
20	Fc (MHz)	2010				
	RB_{start} (RBs)	[0-12]	[13-29]		[30-68]	[69-99]
	L_{CRB} (RBs)	[≥1]	[10-60]	[1-9 & >60]	[1-24]	[≥25]	[≥1]
	A-MPR	[≤15]	[≤7]	[≤10]	[0]	[≤7]	[≤15]

Table 6.2.4B.3-6: A-MPR for "NS_12"

Channel BW	Parameters	Region A		Region B
1.4	RB_{start}	0		1-2
	L_{CRB} [RBs]	≤3	≥4	≥4
	A-MPR [dB]	≤3	≤6	≤3
3	RB_{start}	0-3		4-5
	L_{CRB} [RBs]	4-9	1-3 and 10-15	≥9
	A-MPR [dB]	≤4	≤3	≤3
5	RB_{start}	0-6		7-9
	L_{CRB} [RBs]	≤8	≥9	≥15
	A-MPR [dB]	≤5	≥3	≤3

Table 6.2.4B.3-7: A-MPR for "NS_13"

Channel BW	Parameters	Region A	
5	RB_{start}	0-2	
	L_{CRB} [RBs]	≤5	≥18
	A-MPR [dB]	≤3	≤2

Table 6.2.4B.3-8: A-MPR for "NS_14"

Channel BW	Parameters	Region A	
10	RB_{start}	0	
	L_{CRB} [RBs]	≤5	≥50
	A-MPR [dB]	≤3	≤1
15	RB_{start}	≤8	
	L_{CRB} [RBs]	≤16	≥50
	A-MPR [dB]	≤3	≤1

Table 6.2.4B.3-9: A-MPR for "NS_15" for E-UTRA highest channel edge > 845 MHz and ≤ 849 MHz

E-UTRA Channel bandwidth [MHz]	Parameters	Region A	Region B	Region C
1.4	RB_{end} [RB]			4-5
	A-MPR [dB]			≤3
3	RB_{end} [RB]	0-1	8-12	13-14
	L_{CRB} [RB]	≤2	≥8	>0
	A-MPR [dB]	≤4	≤4	≤9
5	RB_{end} [RB]	0-4	12-19	20-24
	L_{CRB} [RB]	≤2	≥8	>0
	A-MPR [dB]	≤4	≤5	≤9
10	RB_{end} [RB]	0-12	23-36	37-49
	L_{CRB} [RB]	≤2	≥15	>0
	A-MPR [dB]	≤4	≤6	≤9
15	RB_{end} [RB]	0-20	26-53	54-74
	L_{CRB} [RB]	≤2	≥20	>0
	A-MPR [dB]	≤4	≤5	≤9

Table 6.2.4B.3-10: A-MPR for "NS_15" for E-UTRA highest channel edge ≤ 845 MHz

E-UTRA Channel bandwidth [MHz]	Parameters	Region A	Region B	Region C
5	RB_{end} [RB]			19-24
	L_{CRB} [RB]			≥18
	A-MPR [dB]			≤2
10	RB_{end} [RB]	0-4	29-44	45-49
	L_{CRB} [RB]	≤2	≥24	>0
	A-MPR [dB]	≤4	≤4	≤9
15	RB_{end} [RB]	0-12	44-61	62-74
	L_{CRB} [RB]	≤2	≥20	>0
	A-MPR [dB]	≤4	≤5	≤9

Table 6.2.4B.3-11: A-MPR for "NS_16" with channel lower edge at ≥807 MHz and <808.5 MHz

CBW	Parameter	Region A	Region B	Region C	Region D	Region E
3 MHz	RB_{start}	0	1-2			
	L_{CRB} [RBs]	≥12	12			
	A-MPR [dB]	≤2	≤1			
5 MHz	RB_{start}	0-1	2	2-9	2-5	
	L_{CRB} [RBs]	1 - 25	12	15-18	20	
	A-MPR [dB]	≤5	≤1	≤2	≤3	
10 MHz	RB_{start}	0 - 8	0-14		15-20	15-24
	L_{CRB} [RBs]	1 - 12	15-20	≥24	≥30	24-27
	A-MPR [dB]	≤5	≤3	≤7	≤3	≤1

Table 6.2.4B.3-12: A-MPR for "NS_16" with channel lower edge at ≥808.5 MHz and <812 MHz

CBW	Parameter	Region A	Region B	Region C	Region D	Region E
5 MHz	RB_{start}	0	0-1	1-5		
	L_{CRB} [RBs]	16-20	≥24	16-20		
	A-MPR [dB]	≤2	≤3	≤1		
10 MHz	RB_{start}	0-6		0-10	0-14	11-20
	L_{CRB} [RBs]	1-12	15-20	24-32	≥36	24-32
	A-MPR [dB]	≤5	≤2	≤4	≤5	≤1

Table 6.2.4B.3-13: A-MPR for "NS_16" with channel lower edge at ≥812 MHz

CBW	Parameter	Region A	Region B	Region C	Region D
10 MHz	RB_{start}	0 - 9	0	1-14	0-5
	L_{CRB} [RBs]	27-32	36-40	36-40	≥45
	A-MPR [dB]	≤1	≤2	≤1	≤3

Table 6.2.4B.3-14: A-MPR for "NS_20"

Channel Bandwidth	Parameters											
5	Fc (MHz)	< 2007.5		2007.5 ≤ Fc < 2012.5				2012.5 ≤ Fc ≤ 2017.5				
	RBstart (RBs)	≤24		0-3			4-6	≤24				
	L_{CRB} (RBs)	>0		15-19		≥20	≥18	1-25				
	A-MPR	≤17		≤1		≤4	≤2	≤ 0				
10	Fc (MHz)	2005										
	RBstart (RBs)	0-25			26-34			35-49				
	L_{CRB} (RBs)	>0			8-15		>15	>0				
	A-MPR	≤16			≤2		≤5	≤ 6				
	Fc (MHz)	2015										
	RB_{start} (RBs)	0-5						6-10				
	L_{CRB} (RBs)	≥32						≥40				
	A-MPR	≤4						≤2				
15	Fc (MHz)	2012.5										
	RB_{start} (RBs)	0-14				15-24				25-39		61-74
	L_{CRB} (RBs)	1-9 & 40-75		10-39		24-29		≥30		≥36		≤6
	A-MPR	≤11		≤6		≤1		≤7		≤5		≤6
20	Fc (MHz)	2010										
	RB_{start} (RBs)	0-21	22-31			32-38		39-49		50-69		70-99
	L_{CRB} (RBs)	>0	1-9 & 31-75		10-30	≥15		≥24		≥25		>0
	A-MPR	≤17	≤12		≤6	≤9		≤7		≤5		≤16

NOTE 1: When NS_20 is signalled the minimum requirements for the 10 MHz bandwidth are specified for E-UTRA UL carrier centre frequencies of 2005 MHz or 2015 MHz.

NOTE 2: When NS_20 is signalled the minimum requirements for the 15 MHz channel bandwidth are specified for E-UTRA UL carrier centre frequency of 2012.5 MHz.

6.2.4B.4 Test description

6.2.4B.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 6.2.4B.4.1-1 through table 6.2.4B.4.1-12. 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 6.2.4B.4.1-1: Test Configuration Table (network signalled value "NS_03")

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 NS_03 A-MPR							
		Downlink Configuration			Uplink Configuration		
Configuration ID	Ch BW	Mod'n	RB allocation		Mod'n	RB allocation	
			FDD	TDD		FDD	TDD
1	1.4MHz	N/A for A-MPR testing.			QPSK	6	6
2	1.4MHz				QPSK	5	5
3	1.4MHz				16QAM	5	5
4	3MHz				QPSK	15	15
5	3MHz				QPSK	4	4
6	3MHz				16QAM	15	15
7	3MHz				16QAM	4	4
8	5MHz				QPSK	25	25
9	5MHz				QPSK	8	8
10	5MHz				QPSK	6	6
11	5MHz				16QAM	25	25
12	5MHz				16QAM	8	8
13	10MHz				QPSK	50	50
14	10MHz				QPSK	12	12
15	10MHz				QPSK	6	6
16	10MHz				16QAM	50	50
17	10MHz				16QAM	12	12
18	15MHz				QPSK	75	75
19	15MHz				QPSK	16	16
20	15MHz				QPSK	8	8
21	15MHz				16QAM	75	75
22	15MHz				16QAM	16	16
23	20MHz				QPSK	100	100
24	20MHz				QPSK	18	18
25	20MHz				QPSK	10	10
26	20MHz				16QAM	100	100
27	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 Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Requirement in clause 6.2.4B.5 as not all combinations are necessarily required based on the applicability of the UE.

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: For band 23, above table only applies to mid and high range test frequencies. Low range test frequencies will be covered by NS_11 test configuration table.

Table 6.2.4B.4.1-2: 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)				Lowest, 5MHz, 10MHz, Highest		
Test Parameters for NS_03 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 A-MPR testing.		QPSK	25	Note 3
2	5MHz			QPSK	8	Note 3
3	5MHz			QPSK	6	Note 3
4	5MHz			16QAM	25	Note 3
5	5MHz			16QAM	8	Note 3
6	10MHz			QPSK	1	0
7	10MHz			QPSK	12	0
8	10MHz			QPSK	50	0
9	10MHz			16QAM	50	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	0
19	15MHz			QPSK	36	19
20	15MHz			16QAM	36	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	0
28	20MHz			QPSK	50	25
29	20MHz			16QAM	50	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 configuration ID will be used to map the applicable Test Configuration to be corresponding Test Requirement in clause 6.2.4B as not all combinations are necessarily required based on the applicability of the UE.

Note 3: The RB_{start} of partial RB allocation shall be RB# 0 and RB# (max +1 - RB allocation) of the channel bandwidth.

Table 6.2.4B.4.1-3: 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 (NUL = 18072) - For 10MHz Channel Bandwidth: 1934.7MHz (NUL = 18147) - For 15 MHz Channel Bandwidth: 1932.5 MHz (NUL = 18125) - For 20MHz Channel Bandwidth: 1930 MHz (NUL = 18100)	
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)				5MHz, 10MHz, 15MHz, 20MHz	
Test Parameters for NS_05 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	1
2	5MHz			QPSK	25
3	10MHz			QPSK	1
4	10MHz			QPSK	12
5	10MHz			QPSK	48
6	10MHz			QPSK	50
7	10MHz			16QAM	50
8	15MHz			QPSK	1
9	15MHz			QPSK	16
10	15MHz			QPSK	48
11	15MHz			QPSK	75
12	15MHz			16QAM	75
13	20MHz			QPSK	1
14	20MHz			QPSK	18
15	20MHz			QPSK	48
16	20MHz			QPSK	100
17	20MHz			16QAM	100

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: The Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Requirement in clause 6.2.4B.5 as not all combinations are necessarily required based on the applicability of the UE.

Table 6.2.4B.4.1-4: Test Configuration Table (network signalled value "NS_06")

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, High range	
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)				Lowest, 5MHz, 10MHz, Highest	
Test Parameters for NS_05 A-MPR					
		Downlink Configuration		**Uplink Configuration**	
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	1.4MHz	N/A for A-MPR testing		QPSK	6
2	1.4MHz			QPSK	5
3	1.4MHz			16QAM	5
4	3MHz			QPSK	15
5	3MHz			QPSK	4
6	3MHz			16QAM	4
7	5MHz			QPSK	25
8	5MHz			QPSK	8
9	5MHz			16QAM	8
10	10MHz			QPSK	50
11	10MHz			QPSK	12
12	10MHz			16QAM	12
13	15MHz			QPSK	75
14	15MHz			QPSK	16
15	15MHz			16QAM	16
16	20MHz			QPSK	100
17	20MHz			QPSK	18
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 Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Requirement in clause 6.2.4B.5 as not all combinations are necessarily required based on the applicability of the UE.

Note 3: The RBstart of partial RB allocation shall be RB# 0 and RB# (max +1 - RB allocation) of the channel bandwidth.

Table 6.2.4B.4.1-5: 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 NS_07 A-MPR						
		Downlink Configuration		**Uplink Configuration**		
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD	RB_{start} FDD
1	10MHz	N/A for A-MPR 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	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	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	0
Note 1: The Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Requirement in clause 6.2.4B.5 as not all combinations are necessarily required based on the applicability of the UE.						

Table 6.2.4B.4.1-6: 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 NS_08 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	1
2	5MHz			QPSK	8
3	5MHz			QPSK	25
4	10MHz			QPSK	1
5	10MHz			QPSK	12
6	10MHz			QPSK	40
7	10MHz			QPSK	50
8	10MHz			16QAM	50
9	15MHz			QPSK	1
10	15MHz			QPSK	16
11	15MHz			QPSK	40
12	15MHz			QPSK	75
13	15MHz			16QAM	75

Note 1: The Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Requirement in clause 6.2.4B.5 as not all combinations are necessarily required based on the applicability of the UE.
Note 2: The 1 RB allocation shall be tested at both RB #0 and RB #max.
Note 3: The RB_{start} of partial RB allocation shall be RB# 0 and RB# (max + 1 - RB allocation) of the channel bandwidth.

Table 6.2.4B.4.1-7: 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**	
Configuration ID	Ch BW	Mod'n	RB allocation FDD	Mod'n	RB allocation FDD
1	5MHz	N/A for A-MPR testing		QPSK	1
2	5MHz			QPSK	8
3	5MHz			QPSK	25
4	10MHz			QPSK	1
5	10MHz			QPSK	12
6	10MHz			QPSK	40
7	10MHz			QPSK	50
8	10MHz			16QAM	50
9	15MHz			QPSK	1
10	15MHz			QPSK	16
11	15MHz			QPSK	40
12	15MHz			QPSK	54
13	15MHz			QPSK	75
14	15MHz			16QAM	75

Note 1: The Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Requirement in clause 6.2.4B.5 as not all combinations are necessarily required based on the applicability of the UE.
Note 2: The 1 RB allocation shall be tested at both RB #0 and RB #max.
Note 3: The RB_{start} of partial RB allocation shall be RB# 0 and RB# (max + 1 - RB allocation) of the channel bandwidth.

Table 6.2.4B.4.1-8: Test Configuration Table (network signalled value "NS_11")

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 For 3 MHz Channel Bandwidth: a. UL 2001.5 MHz (N_UL=25515), DL 2181.5 MHz(N_DL=7515) b UL 2004.5 MHz (N_UL=25545), DL 2184.5 (N_DL=7545) For 5 MHz Channel Bandwidth: a. UL 2002.5 MHz (N_UL=25525), DL 2182.5 MHz(N_DL=7525) b. UL 2004.5 MHz (N_UL=25545), DL 2184.5 MHz(N_DL=7545) c. UL 2007.5 MHz (N_UL=25575), DL 2187.5 MHz(N_DL=7575) For 10 MHz Channel Bandwidth: UL 2005 MHz (N_UL=25550), DL 2185 MHz (N_DL=7550)
Test Channel Bandwidths (as specified in TS 36.508 [7] clause 4.3.1)	1.4MHz, 3MHz, 5MHz, 10MHz

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 1: The Configuration ID will be used to map the applicable Test Configuration to the corresponding Test Requirement in clause 6.2.4B.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.

Table 6.2.4B.4.1-9: 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	RBstart FDD
1	1.4 MHz	N/A for A-MPR 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	6	0
8	3 MHz			QPSK	4	4
9	3 MHz			QPSK	6	4
10	3 MHz			16QAM	15	0
11	5 MHz			QPSK	8	0
12	5 MHz			QPSK	15	0
13	5 MHz			QPSK	8	7
14	5 MHz			QPSK	15	7
15	5 MHz			16QAM	25	0

Table 6.2.4B.4.1-10: 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**	**RBstart FDD**
1	5 MHz	N/A for A-MPR 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 6.2.4B.4.1-11: 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	RBstart FDD
1	10 MHz	N/A for A-MPR testing.		QPSK	1	0
2	10 MHz			QPSK	25	0
3	10 MHz			QPSK	50	0
4	10 MHz			QPSK	25	1
5	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	15 MHz			16QAM	75	0

Table 6.2.4B.4.1-12: 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: UL 843.5 MHz (N_{UL} = 26985) or High range For 5 MHz Channel Bandwidth: UL 842.5 MHz (N_{UL} = 26975) or High range For 10 MHz Channel Bandwidth: UL 840 MHz (N_{UL} = 26950) or High range For 15 MHz Channel Bandwidth: UL 837.5 MHz (N_{UL} = 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 1, 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 1, 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 6.2.4B.4.1-13: 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 A-MPR testing.		QPSK	1	0
2	1.4 MHz			QPSK	6	0
3	1.4 MHz			16QAM	6	0
4	3 MHz			QPSK	1	0
5	3 MHz			QPSK	12	1
62	3 MHz			QPSK	15	0
7	3 MHz			16QAM	15	0
8	5 MHz			QPSK	1	0
95	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	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 6.2.4B.4.1-14: Test Configuration Table (network signalled value "NS_20")

TBD

Editor's note: The following lines belong at the end of section 6.2.4B.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.3.
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 channels are set according to the applicable table from Table 6.2.4.4.1-1 to Table 6.2.4.4.1-6.
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 6.2.4.4.3.

6.2.4B.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 the applicable table from Table 6.2.4B.4.1-1 to Table 6.2.4B.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 output power for UE in the channel bandwidth of the radio access mode. The period of measurement shall be at least the continuous duration one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.4B.4.3 Message contents

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

6.2.4B.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 6.2.4B.4.3.1-1: *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)		

6.2.4B.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 6.2.4B.4.3.2-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_04"

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)		

6.2.4B.4.3.3 Message contents exceptions (network signalled value "NS_05")

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 6.2.4B.4.3.3-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_05"

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)		

6.2.4B.4.3.4 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 6.2.4B.4.3.4-1: *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)		

6.2.4B.4.3.5 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 6.2.4B.4.3.5-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_07"

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)		

6.2.4B.4.3.6 Message contents exceptions (network signalled value “NS_08”)

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 6.2.4B.4.3.6-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_08"

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)		

6.2.4B.4.3.7 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 6.2.4B.4.3.7-1: *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	9 (NS_09)		

6.2.4B.4.3.8 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 6.2.4B.4.3.8-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_11"

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)		

6.2.4B.4.3.9 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 6.2.4B.4.3.9-1: *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)		

6.2.4B.4.3.10 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 6.2.4B.4.3.10-1: *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)		

6.2.4B.4.3.11 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 6.2.4B.4.3.11-1: *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)		

6.2.4B.4.3.12 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 6.2.4B.4.3.12-1: *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)		

6.2.4B.4.3.13 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 6.2.4B.4.3.13-1: *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)		

6.2.4B.4.3.14 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 6.2.4B.4.3.14-1: *SystemInformationBlockType2*: Additional spurious emissions test requirement for "NS_20"

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)		

6.2.4B.5 Test requirements

The maximum output power, derived in step 2 shall be within the range prescribed by the nominal maximum output power and tolerance in the applicable table from Table 6.2.4B.5-1 to Table 6.2.4B.5-15. The allowed A-MPR values specified in Table 6.2.4B.3-1 are in addition to the allowed MPR requirements specified in clause 6.2.3B. For the UE maximum output power modified by MPR and/or A-MPR, the power limits specified in Table 6.2.5B.3-1 apply.

Table 6.2.4B.5-1: UE Power Class test requirements (network signalled value "NS_03") (for Bands 4, 10, 23, 35, and 36)

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	4,10, 23,35,36					23	+2.7 / -3.7
2	4,10, 23,35,36					23	+2.7 / -2.7
3	4,10, 23,35,36					23	+2.7 / -3.7
4	4,10, 23,35,36					23	2.7 / -4.7
5	4,10, 23,35,36					23	+2.7 / -2.7
6	4,10, 23,35,36					23	+2.7 / -6.2
7	4,10, 23,35,36					23	+2.7 / -3.7
8	4,10, 23,35,36					23	2.7 / -4.7
9	4,10, 23,35,36					23	+2.7 / -3.7
10	4,10, 23,35,36					23	+2.7 / -2.7
11	4,10, 23,35,36					23	+2.7 / -6.2
12	4,10, 23,35,36					23	2.7 / -4.7
13	4,10, 23,35,36					23	2.7 / -4.7
14	4,10, 23,35,36					23	+2.7 / -3.7
15	4,10, 23,35,36					23	+2.7 / -2.7
16	4,10, 23,35,36					23	+2.7 / -6.2
17	4,10, 23,35,36					23	2.7 / -4.7
18	4,10,35,36					23	2.7 / -4.7
19	4,10,35,36					23	+2.7 / -3.7
20	4,10,35,36					23	+2.7 / -2.7
21	4,10,35,36					23	+2.7 / -6.2
22	4,10,35,36					23	2.7 / -4.7
23	4,10,35,36					23	2.7 / -4.7
24	4,10,35,36					23	+2.7 / -3.7
25	4,10,35,36					23	+2.7 / -2.7
26	4,10,35,36					23	+2.7 / -6.2
27	4,10,35,36					23	2.7 / -4.7

Table 6.2.4B.5-2: UE Power Class test requirements (network signalled value "NS_03") (for Bands 2 and 25)

Configuration ID	EUTRA band	Test Freq.	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	2, 25	Mid					23	+2.7 / -3.7
1	2, 25	Low, High					23	+2.7 / -5.7
2	2, 25	Mid					23	+2.7 / -2.7
2	2, 25	Low, High					23	+2.7 / -4.2
3	2, 25	Mid					23	+2.7 / -3.7
3	2, 25	Low, High					23	+2.7 / -5.7
4	2, 25	Mid					23	+2.7 / -4.7
4	2, 25	Low, High					23	+2.7 / -7.7
5	2, 25	Mid					23	+2.7 / -2.7
5	2, 25	Low, High					23	+2.7 / -4.2
6	2, 25	Mid					23	+2.7 / -6.2
6	2, 25	Low, High					23	+2.7 / -9.2
7	2, 25	Mid					23	+2.7 / -3.7
7	2, 25	Low, High					23	+2.7 / -5.7
8	2, 25	All					23	+2.7 / -4.7
9	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
9	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -5.7
10	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
10	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
11	2, 25	All					23	+2.7 / -6.2
12	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -4.7
12	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -7.7
13	2, 25	All					23	+2.7 / -4.7
14	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
14	2, 25	Low @ RB#0, High @ RB#(max+1-RB					23	+2.7 / -5.7

		allocation)						
15	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
15	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
16	2, 25	All					23	+2.7 / -6.2
17	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -4.7
17	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -7.7
18	2, 25	All					23	+2.7 / -4.7
19	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
19	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -5.7
20	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
20	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
21	2, 25	All					23	+2.7 / -6.2
22	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -4.7
22	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -7.7
23	2, 25	All					23	+2.7 / -4.7
24	2, 25	All					23	+2.7 / -3.7
25	2, 25	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
25	2, 25	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
26	2, 25	All					23	+2.7 / -6.2
27	2, 25	All					23	+2.7 / -4.7

Table 6.2.4B.5-3: UE Power Class test requirements (network signalled value "NS_04")

Configuration ID	EUTRA band	Bandwidth (MHz)	Class 3 (dBm)	Tol. (dB)
1	41	5 MHz	23	+2.7 / -4.7
2	41	5 MHz	23	+2.7 / -3.7
3	41	5 MHz	23	+2.7 / -2.7
4	41	5 MHz	23	+2.7 / -6.2
5	41	5 MHz	23	+2.7 / -4.7
6	41	10MHz	23	+2.7 / -6.2
7	41	10MHz	23	+2.7 / -6.2
8	41	10MHz	23	+2.7 / -8.2
9	41	10MHz	23	+2.7 / -9.7
10	41	10MHz	23	+2.7 / -3.7
11	41	10MHz	23	+2.7 / -4.7
12	41	10MHz	23	+2.7 / -6.2
13	41	10MHz	23	+2.7 / -6.2
14	41	10MHz	23	+2.7 / -6.2
15	41	15MHz	23	+2.7 / -6.2
16	41	15MHz	23	+2.7 / -6.2
17	41	15MHz	23	+2.7 / -8.2
18	41	15MHz	23	+2.7 / -9.7
19	41	15MHz	23	+2.7 / -3.7
20	41	15MHz	23	+2.7 / -4.7
21	41	15MHz	23	+2.7 / -6.2
22	41	15MHz	23	+2.7 / -8.2
23	41	15MHz	23	+2.7 / -6.2
24	41	20MHz	23	+2.7 / -6.2
25	41	20MHz	23	+2.7 / -6.2
26	41	20MHz	23	+2.7 / -8.2
27	41	20MHz	23	+2.7 / -9.7
28	41	20MHz	23	+2.7 / -3.7
29	41	20MHz	23	+2.7 / -4.7
30	41	20MHz	23	+2.7 / -6.2
31	41	20MHz	23	+2.7 / -8.2
32	41	20MHz	23	+2.7 /

				-6.2

Table 6.2.4B.5-4: UE Power Class test requirements (network signalled value "NS_05")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	1					23	+2.7 / -2.7
2	1					23	+2.7 / -3.7
3	1					23	+2.7 / -2.7
4	1					23	+2.7 / -2.7
5	1					23	+2.7 / -3.7
6	1					23	+2.7 / -4.7
7	1					23	+2.7 / -6.2
8	1					23	+2.7 / -2.7
9	1					23	+2.7 / -2.7
10	1					23	+2.7 / -3.7
11	1					23	+2.7 / -4.7
12	1					23	+2.7 / -6.2
13	1					23	+2.7 / -2.7
14	1					23	+2.7 / -2.7
15	1					23	+2.7 / -3.7
16	1					23	+2.7 / -4.7
17	1					23	+2.7 / -6.2

Table 6.2.4B.5-5: UE Power Class test requirements (network signalled value "NS_06") (for Bands 13, 14, and 17)

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	13,14,17					23	+2.7 / -3.7
2	13,14,17					23	+2.7 / -2.7
3	13,14,17					23	+2.7 / -2.7
4	13,14,17					23	+2.7 / -3.7
5	13,14,17					23	+2.7 / -2.7
6	13,14,17					23	+2.7 / -3.7
7	13,14,17					23	+2.7 / -3.7
8	13,14,17					23	+2.7 / -2.7
9	13,14,17					23	+2.7 / -3.7
10	13,14,17					23	+2.7 / -3.7
11	13,14,17					23	+2.7 / -2.7
12	13,14,17					23	+2.7 / -3.7
13	13,14,17					23	+2.7 / -3.7
14	13,14,17					23	+2.7 / -2.7
15	13,14,17					23	+2.7 / -3.7
16	13,14,17					23	+2.7 / -3.7
17	13,14,17					23	+2.7 / -2.7
18	13,14,17					23	+2.7 / -3.7

Table 6.2.4B.5-6: UE Power Class test requirements (network signalled value "NS_06") (for Band 12)

Configuration ID	EUTRA band	Test Freq.	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	12	Mid					23	+2.7 / -3.7
1	12	Low, High					23	+2.7 / -5.7
2	12	Mid					23	+2.7 / -2.7
2	12	Low, High					23	+2.7 / -4.2
3	12	Mid					23	+2.7 / -2.7
3	12	Low, High					23	+2.7 / -4.2
4	12	Mid					23	+2.7 / -3.7
4	12	Low, High					23	+2.7 / -5.7
5	12	Mid					23	+2.7 / -2.7
5	12	Low, High					23	+2.7 / -4.2
6	12	Mid					23	+2.7 / -3.7
6	12	Low, High					23	+2.7 / -5.7
7	12	All					23	+2.7 / -3.7
8	12	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
8	12	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
9	12	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
9	12	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -5.7
10	12	All					23	+2.7 / -3.7
11	12	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -2.7
11	12	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -4.2
12	12	Low @ RB#(max+1-RB allocation), Mid, High @ RB#0					23	+2.7 / -3.7
12	12	Low @ RB#0, High @ RB#(max+1-RB allocation)					23	+2.7 / -5.7

Table 6.2.4B.5-7: UE Power Class test requirements (network signalled value "NS_07")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	13					23	+2.7 / -18.7
2	13					23	+2.7 / -13.7
3	13					23	+2.7 / -2.7
4	13					23	+2.7 / -19.7
5	13					23	+2.7 / -18.7
6	13					23	+2.7 / -20.7
7	13					23	+2.7 / -3.7
8	13					23	+2.7 / -2.7
9	13					23	+2.7 / -4.7
10	13					23	+2.7 / -12.7
11	13					23	+2.7 / -13.7
12	13					23	+2.7 / -2.7
13	13					23	+2.0 / -5.5±TT
14	13					23	+2.7 / -19.7
15	13					23	+2.7 / -18.7
16	13					23	+2.7 / -20.7

Table 6.2.4B.5-8: UE Power Class test requirements (network signalled value "NS_08")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	19					23	+2.7 / -2.7
2	19					23	+2.7 / -2.7
3	19					23	+2.7 / -3.7
4	19					23	+2.7 / -2.7
5	19					23	+2.7 / -2.7
6	19					23	+2.7 / -3.7
7	19					23	+2.7 / -8.2
8	19					23	+2.7 / -9.7
9	19					23	+2.7 / -2.7
10	19					23	+2.7 / -2.7
11	19					23	+2.7 / -3.7
12	19					23	+2.7 / -8.2
13	19					23	+2.7 / -9.7

Table 6.2.4B.5-9: UE Power Class test requirements (network signalled value "NS_09")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	21					23	+2.7 / -2.7
2	21					23	+2.7 / -2.7
3	21					23	+2.7 / -3.7
4	21					23	+2.7 / -2.7
5	21					23	+2.7 / -2.7
6	21					23	+2.7 / -3.7
7	21					23	+2.7 / -4.7
8	21					23	+2.7 / -6.2
9	21					23	+2.7 / -2.7
19	21					23	+2.7 / -2.7
11	21					23	+2.7 / -3.7
12	21					23	+2.7 / -4.7
13	21					23	+2.7 / -6.2
14	21					23	+2.7 / -8.2

Table 6.2.4B.5-10: UE Power Class test requirements (network signalled value "NS_11 for Band 23")

Configuration ID	EUTRA band	Centre Frequency	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1a	23	UL 2001.5 MHz DL 2181.5 MHz						+2.7 / -11.7
1b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -4.7
2a	23	UL 2001.5 MHz DL 2181.5 MHz						+2.7 / -11.7
2b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -4.7
3a	23	UL 2001.5 MHz DL 2181.5 MHz						+2.7 / -12.7
3b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -6.2
4a	23	UL 2001.5 MHz DL 2181.5 MHz						+2.7 / -12.7
4b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -6.2
5a	23	UL 2002.5 MHz DL 2182.5 MHz						+2.7 / -12.7
5b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -8.2
5c	23	UL 2007.5 MHz DL 2187.5 MHz						+2.7 / -2.7
6a	23	UL 2002.5 MHz DL 2182.5 MHz						+2.7 / -12.7
6b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -2.7
6c	23	UL 2007.5 MHz DL 2187.5 MHz						+2.7 / -3.7
7a	23	UL 2002.5 MHz DL 2182.5 MHz						+2.7 / -13.7
7b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -9.7
7c	23	UL 2007.5 MHz DL 2187.5 MHz						+2.7 / -4.7
8a	23	UL 2002.5 MHz DL 2182.5 MHz						+2.7 / -13.7
8b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -3.7
8c	23	UL 2007.5 MHz DL 2187.5 MHz						+2.7 / -4.7
9a	23	UL 2002.5 MHz DL 2182.5 MHz						+2.7 / -14.7
9b	23	UL 2004.5 MHz DL 2184.5 MHz						+2.7 / -11.7
9c	23	UL 2007.5 MHz DL 2187.5 MHz						+2.7 / -6.2
10	23	UL 2005 MHz DL 2185 MHz						+2.7 / -18.7
11	23	UL 2005 MHz DL 2185 MHz						+2.7 / -18.7
12	23	UL 2005 MHz DL 2185 MHz						+2.7 / -19.7
13	23	UL 2005 MHz DL 2185 MHz						+2.7 / -19.7
14	23	UL 2005 MHz DL 2185 MHz						+2.7 / -20.7

Table 6.2.4B.5-11: UE Power Class test requirements (network signalled value "NS_12")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	26					23	+2.7 / -6.2
2	26					23	+2.7 / -12.7
3	26					23	+2.7 / -2.7
4	26					23	+2.7 / -6.2
5	26					23	+2.7 / -13.7
6	26					23	+2.7 / -8.2
7	26					23	+2.7 / -8.2
8	26					23	+2.7 / -2.7
9	26					23	+2.7 / -8.2
10	26					23	+2.7 / -11.7
11	26					23	+2.7 / -9.7
12	26					23	+2.7 / -8.2
13	26					23	+2.7 / -2.7
14	26					23	+2.7 / -8.2
15	26					23	+2.7 / -9.7

Table 6.2.4B.5-12: UE Power Class test requirements (network signalled value "NS_13")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	26					23	+2.7 / -6.2
2	26					23	+2.7 / -6.2
3	26					23	+2.7 / -3.7
4	26					23	+2.7 / -3.7
5	26					23	+2.7 / -8.2

Table 6.2.4B.5-13: UE Power Class test requirements (network signalled value "NS_14")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	26					23	+2.7 / -6.2
2	26					23	+2.7 / -3.7
3	26					23	+2.7 / -4.7
4	26					23	+2.7 / -3.7
5	26					23	+2.7 / -6.2
6	26					23	+2.7 / -6.2
7	26					23	+2.7 / -3.7
8	26					23	+2.7 / -4.7
9	26					23	+2.7 / -3.7
10	26					23	+2.7 / -6.2

Table 6.2.4B.5-14: UE Power Class test requirements (network signalled value "NS_15")

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	26					23	+2.7 / -3.2
2	26					23	+2.7 / -8.2
3	26					23	+2.7 / -4.2
4	26					23	+2.7 / -8.2
5	26					23	+2.7 / -14.2
6	26					23	+2.7 / -4.2
7	26					23	+2.7 / -3.2
8	26					23	+2.7 / -9.2
9	26					23	+2.7 / -14.2
10	26					23	+2.7 / -4.2
11	26					23	+2.7 / -6.2
12	26					23	+2.7 / -12.2
13	26					23	+2.7 / -7.2
14	26					23	+2.7 / -3.2
15	26					23	+2.7 / -4.2
16	26					23	+2.7 / -8.2
17	26					23	+2.7 / -3.2
18	26					23	+2.7 / -12.2
19	26					23	+2.7 / -4.2
20	26					23	+2.7 / -8.2
21	26					23	+2.7 / -3.2
22	26					23	+2.7 / -4.2
23	26					23	+2.7 / -9.2
24	26					23	+2.7 / -14.2
25	26					23	+2.7 / -3.2
26	26					23	+2.7 / -9.2

Table 6.2.4B.5-15A: UE Power Class test requirements (network signalled value "NS_16") when lower channel edge is at 807 MHz

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	27					23	+2.7 / -2.7
2	27					23	+2.7 / -3.7
3	27					23	+2.7 / -4.7
4	27					23	+2.7 / -2.7
5	27					23	+2.7 / -4.7
6	27					23	+2.7 / -6.2
7	27					23	+2.7 / -8.2
8	27					23	+2.7 / -9.7
9	27					23	+2.7 / -4.7
10	27					23	+2.7 / -6.2
11	27					23	+2.7 / -11.7
12	27					23	+2.7 / -8.2
13	27					23	+2.7 / -11.7
14	27					23	+2.7 / -12.7
15	27					23	+2.7 / -9.7
16	27					23	+2.7 / -2.7
17	27					23	+2.7 / -8.2
18	27					23	+2.7 / -4.7
19	27					23	+2.7 / -8.2
20	27					23	+2.7 / -13.7
21	27					23	+2.7 / -13.7
22	27					23	+2.7 / -14.7
23	27					23	+2.7 / -13.7
24	27					23	+2.7 / -13.7

Table 6.2.4B.5-15B: UE Power Class test requirements (network signalled value "NS_16") when lower channel edge is at 808.5 MHz

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	27					23	+2.7 / -2.7
2	27					23	+2.7 / -3.7
3	27					23	+2.7 / -5.2
4	27					23	+2.7 / -2.7
5	27					23	+2.7 / -3.7
6	27					23	+2.7 / -3.7
7	27					23	+2.7 / -4.7
8	27					23	+2.7 / -2.7
9	27					23	+2.7 / -3.7
10	27					23	+2.7 / -4.7
11	27					23	+2.7 / -6.2
12	27					23	+2.7 / -6.2
13	27					23	+2.7 / -8.2
14	27					23	+2.7 / -9.7
15	27					23	+2.7 / -9.7
16	27					23	+2.7 / -2.7
17	27					23	+2.7 / -6.2
18	27					23	+2.7 / -4.7
19	27					23	+2.7 / -4.7
20	27					23	+2.7 / -9.7
21	27					23	+2.7 / -11.7
22	27					23	+2.7 / -12.7
23	27					23	+2.7 / -11.7
24	27					23	+2.7 / -11.7

Table 6.2.4B.5-15C: UE Power Class test requirements (network signalled value "NS_16") when lower channel edge is at 812 MHz

Configuration ID	EUTRA band	Class 1 (dBm)	Tol. (dB)	Class 2 (dBm)	Tol. (dB)	Class 3 (dBm)	Tol. (dB)
1	27					23	+2.7 / - 2.7
2	27					23	+2.7 / - 3.7
3	27					23	+2.7 / - 4.7
4	27					23	+2.7 / - 2.7
5	27					23	+2.7 / -3.7
6	27					23	+2.7 / -3.7
7	27					23	+2.7 / -4.7
8	27					23	+2.7 / -2.7
9	27					23	+2.7 / -3.7
10	27					23	+2.7 / -3.7
11	27					23	+2.7 / -3.7
12	27					23	+2.7 / -3.7
13	27					23	+2.7 / -3.7
14	27					23	+2.7 / -4.7
15	27					23	+2.7 / -2.7
16	27					23	+2.7 / -2.7
17	27					23	+2.7 / -3.7
18	27					23	+2.7 / -3.7
19	27					23	+2.7 / -3.7
20	27					23	+2.7 / -4.7
21	27					23	+2.7 / -8.2
22	27					23	+2.7 / -9.7
23	27					23	+2.7 / -6.2
24	27					23	+2.7 / -4.7

Table 6.2.4B.5-16: UE Power Class test requirements (network signalled value "NS_20 for Band 23")

TBD

6.2.5 Configured UE transmitted Output Power

6.2.5.1 Test purpose

To verify the UE does not exceed the minimum between the P_{EMAX} maximum allowed UL TX Power signalled by the E-UTRAN and the P_{UMAX} maximum UE power for the UE power class.

6.2.5.2 Test applicability

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

6.2.5.3 Minimum conformance requirements

The UE is allowed to set its configured maximum output power P_{CMAX}. The configured maximum output power P_{CMAX} is set within the following bounds:

$$P_{CMAX\_L} \leq PCMAX \leq P_{CMAX\_H}$$

Where

- $P_{CMAX\_L} = MIN \{PEMAX - \Delta T_C, P_{PowerClass} - MAX(MPR + A\text{-}MPR + \Delta T_{IB,c}, P\text{-}MPR) - \Delta T_C\}$
- $P_{CMAX\_H} = MIN \{P_{EMAX}, P_{PowerClass}\}$
- P_{EMAX} is the value given to IE *P-Max*, defined in [5]
- $P_{PowerClass}$ is the maximum UE power specified in Table 6.2.2.3-1 without taking into account the tolerance specified in the Table 6.2.2.3-1

- MRP and A-MPR are specified in Section 6.2.3 and Section 6.2.4, respectively
- $\Delta T_{IB,c}$ is the additional tolerance for serving cell *c* as specified in Table 6.2.5A.1.3-3.
- P-MPR is the allowed maximum output power reduction for;
  a) Ensuring compliance with applicable electromagnetic energy absorption requirements and addressing unwanted emissions / self defence requirements in case of simultaneous transmissions on multiple RAT(s) for scenarios not in scope of 3GPP RAN specifications.

  b) Ensuring compliance with applicable electromagnetic energy absorption requirements in case of proximity detection is used to address such requirements that require a lower maximum output power.

  The UE shall apply P-MPR only for the above cases. For UE conducted conformance testing P-MPR shall be 0 dB

NOTE 1: P-MPR was introduced in the P_{CMAX} equation such that the UE can report to the eNB the available maximum output transmit power. This information can be used by the eNB for scheduling decisions.

NOTE 2: P-MPR may impact the maximum uplink performance for the selected UL transmission path.

- ΔT_C = 1.5 dB when Note 2 in Table 6.2.2.3-1 applies
- ΔT_C = 0 dB when Note 2 in Table 6.2.2.3-1 does not apply

The measured maximum output power P_{CMAX} shall be within the following bounds:

$$P_{CMAX\_L} - MAX\{T_L, T(P_{CMAX\_L})\} \leq P_{CMAX} \leq P_{CMAX\_H} + T(P_{CMAX\_H})$$

Where$T(P_{CMAX})$ is defined by the tolerance table below and applies to P_{CMAX_L} and P_{CMAX_H} separately, while T_L is the absolute value of the lower tolerance in Table 6.2.2.3-1 for the applicable operating band.

Table 6.2.5.3-1: P_{CMAX} tolerance

P_{CMAX} (dBm)	Tolerance $T(P_{CMAX})$ (dB)
$21 \leq P_{CMAX} \leq 23$	2.0
$20 \leq P_{CMAX} < 21$	2.5
$19 \leq P_{CMAX} < 20$	3.5
$18 \leq P_{CMAX} < 19$	4.0
$13 \leq P_{CMAX} < 18$	5.0
$8 \leq P_{CMAX} < 13$	6.0
$-40 \leq P_{CMAX} < 8$	7.0

The normative reference for this requirement is TS 36.101 [2] clause 6.2.5.

6.2.5.4 Test description

6.2.5.4.1 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 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 6.2.5.4.1-1. 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 6.2.5.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH			
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	N/A for Configured UE transmitted Output Power test case	Mod'n	RB allocation	
			FDD	TDD
1.4MHz		QPSK	5	5
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, the applicable channel bandwidths are specified in Table 5.4.2.1-1.				
Note 2: For the uplink RB allocation the RB_{start} shall be RB #0.				

1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, in 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 6.2.5.4.1-1
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 6.2.5.4.3.

6.2.5.4.2 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 6.2.5.4.1-1. 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 transmit uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms for the UE to reach the Pumax level of the test point.
3. Measure the mean power of the UE in the channel bandwidth for each test point in table 6.2.5.5-1 according to the test configuration from Table 6.2.5.4.1-1. The period of measurement shall be at least continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.5.4.3 Message contents

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

Table 6.2.5.4.3-1: SystemInformationBlockType1: Test point 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	-10		

Table 6.2.5.4.3-2: SystemInformationBlockType1: Test point 2

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	10		

Table 6.2.5.4.3-3: SystemInformationBlockType1: Test point 3

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	15		

6.2.5.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2.5.5-1.

Table 6.2.5.5-1: P_{CMAX} configured UE output power

	Channel bandwidth / maximum output power					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Measured UE output power test point 1	For carrier frequency f ≤ 3.0GHz: -10 dBm ± 7.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: -10 dBm ± 8.0					
Measured UE output power test point 2	For carrier frequency f ≤ 3.0GHz: 10 dBm ± 6.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: 10 dBm ± 7.0					
Measured UE output power test point 3	For carrier frequency f ≤ 3.0GHz: 15 dBm ± 5.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: 15 dBm ± 6.0					
Note: In addition note 2 in Table 6.2.2.3-1 shall apply to the tolerances.						

6.2.5_1 Configured UE transmitted Output Power for HPUE

6.2.5_1.1 Test purpose

Same test purpose as in clause 6.2.5.1

6.2.5_1.2 Test applicability

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

6.2.5_1.3 Minimum conformance requirements

Same minimum conformance requirements as in clause 6.2.5.3 with the following exceptions:

- stead of Table 6.2.2.3-1 → use Table 6.2.2_1.3-1
- stead of Section 6.2.3 → use Section 6.2.3_1
- stead of Section 6.2.4 → use Section 6.2.4_1
- stead of Table 6.2.5.3-1 → use Table 6.2.5_1.3-1

Table 6.2.5_1.3-1: P_{CMAX} tolerance

P_{CMAX} (dBm)	Tolerance T(P_{CMAX}) (dB)
23 < PCMAX ≤ 33	2.0
21 ≤ P_{CMAX} ≤ 23	2.0
20 ≤ P_{CMAX} < 21	2.5
19 ≤ P_{CMAX} < 20	3.5
18 ≤ P_{CMAX} < 19	4.0
13 ≤ P_{CMAX} < 18	5.0
8 ≤ P_{CMAX} < 13	6.0
-40 ≤ P_{CMAX} < 8	7.0

The normative reference for this requirement is TS 36.101 [2] clause 6.2.5.

6.2.5_1.4 Test description

6.2.5_1.4.1 Initial conditions

Same initial conditions as in clause 6.2.5.4.1 with the following exceptions

- stead of clause 6.2.5.4.3 → use clause 6.2.5_1.4.3

6.2.5_1.4.2 Test procedure

Same test procedure as in clause 6.2.5.4.2 with the following exceptions:

- stead of Table 6.2.5.5-1 → use Table 6.2.5_1.5-1

6.2.5_1.4.3 Message contents

Same message contents as in clause 6.2.5.4.3 with the following additional test point:

Table 6.2.5_1.4.3-1: SystemInformationBlockType1: Test point 4

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		

6.2.5_1.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2.5_1.5-1.

Table 6.2.5_1.5-1: P_{CMAX} configured HPUE output power

	Channel bandwidth / maximum output power	
	5MHz	10MHz
Measured UE output power test point 1	-10 dBm ± 7.7	
Measured UE output power test point 2	10 dBm ± 6.7	
Measured UE output power test point 3	15 dBm ± 5.7	
Measured UE output power test point 4	20dBm ± 5.7	
Note: In addition note 2 in Table 6.2.2_1.3-1 shall apply to the tolerances.		

6.2.5A Configured transmitted power for CA

6.2.5A.1 Configured UE transmitted Output Power for CA (intra-band contiguous DL CA and UL CA)

6.2.5A.1.1 Test purpose

To verify the UE does not exceed the minimum between the $P_{EMAX,c}$ maximum allowed UL TX Power signalled by the E-UTRA N and the P_{UMAX} maximum UE power for the UE power class.

6.2.5A.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.

6.2.5A.1.3 Minimum conformance requirements

For carrier aggregation the UE is allowed to set its configured maximum output power $P_{CMAX,c}$ on serving cell c and its total configured maximum output power P_{CMAX}.

The configured maximum output power on serving cell c shall be set within the following bounds:

$$P_{CMAX\_L,c} \leq P_{CMAX,c} \leq P_{CMAX\_H,c}$$

For intra-band contiguous carrier aggregation:

- $P_{CMAX\_L,c} = MIN \{ P_{EMAX,c} - \Delta T_{C,c}, P_{PowerClass} - MAX(MPR_c + A\text{-}MPR_c + \Delta T_{IB,c,} P\text{-}MPR_c) - \Delta T_{C,c} \}$

For inter-band carrier aggregation:

- $P_{CMAX\_L,c} = MIN \{ P_{EMAX,c} - \Delta T_{C,c}, P_{PowerClass} - MAX(MPR_c + A\text{-}MPR_c + \Delta T_{IB,c}, P\text{-}MPR_c) - \Delta T_{C,c} \}$
- $P_{CMAX\_H,c} = MIN \{P_{EMAX,c}, P_{PowerClass}\}$
- $P_{EMAX,c}$ is the value given by IE *P-Max* for serving cell c in [5].
- $P_{PowerClass}$ is the maximum UE power specified in Table 6.2.2.3-1 without taking into account the tolerance specified in the Table 6.2.2.3-1.
- $\Delta T_{IB,c}$ is the additional tolerance for serving cell *c* as specified in Table 6.2.5A.1.3-3.

For inter-band carrier aggregation, MPR_c and $A\text{-}MPR_c$ apply per serving cell c and are specified in clause 6.2.3 and clause 6.2.4, respectively. For intra-band contiguous carrier aggregation, MPR_c = MPR and $A\text{-}MPR_c$ = A-MPR with MPR and A-MPR specified in clause 6.2.3A and clause 6.2.4A respectively.

- $P\text{-}MPR_c$ accounts for power management for serving cell *c*. For intra-band contiguous carrier aggregation, there is one power management term for the UE, P-MPR, and $P\text{-}MPR_c$ = P-MPR.
- $\Delta T_{C,c}$ = 1.5 dB when Note 2 in Table 6.2.2.3-1 applies to the serving cell *c*.
- $\Delta T_{C,c}$ = 0 dB when Note 2 in Table 6.2.2.3-1 does not apply to the serving cell *c*.

For inter-band carrier aggregation with one UL serving cell the total configured maximum output power PCMAX shall be set within the following bounds:

$$P_{CMAX\_L} \leq P_{CMAX} \leq P_{CMAX\_H}$$

where

- $P_{CMAX\_L} = P_{CMAX\_L,c}$
- $P_{CMAX\_H} = P_{CMAX\_H,c}$

For intra-band contiguous carrier aggregation, $P_{CMAX,c}$ is calculated under the assumption that the transmit power is increased by the same amount in dB on all component carriers.

For inter-band carrier aggregation, $P_{CMAX,c}$ is calculated under the assumption that the transmit power is increased independently on all component carriers.

The measured maximum output power P_{UMAX} shall be within the following bounds:

- $P_{CMAX\_L} - MAX\{T_L, T(P_{CMAX\_L})\} \leq P_{UMAX} \leq P_{CMAX\_H} + T(P_{CMAX\_H})$

Where $T(P_{CMAX})$ is defined by the table below and applies to P_{CMAX_L} and P_{CMAX_H} separately, while T_L is the absolute value of the lower tolerance in Table 6.2.2.3-1 for the applicable operating band.

Table 6.2.5A.1.3-1: P_{CMAX} tolerance

P_{CMAX} (dBm)	Tolerance $T(P_{CMAX})$ (dB)
$21 \leq P_{CMAX} \leq 23$	2.0
$20 \leq P_{CMAX} < 21$	2.5
$19 \leq P_{CMAX} < 20$	3.5
$18 \leq P_{CMAX} < 19$	4.0
$13 \leq P_{CMAX} < 18$	5.0
$8 \leq P_{CMAX} < 13$	6.0
$-40 \leq P_{CMAX} < 8$	7.0

For carrier aggregation with two UL serving cells, the total configured maximum output power P_{CMAX} shall be set within the following bounds:

$$P_{CMAX\_L\_CA} \leq P_{CMAX} \leq P_{CMAX\_H\_CA}$$

For intra-band contiguous carrier aggregation,

- $P_{CMAX\_L\_CA} = MIN\{10 \log10 \sum P_{EMAX,c} - \Delta T_C , P_{PowerClass} - MAX(MPR + A\text{-}MPR + \Delta T_{IB,c}, P\text{-}MPR) - \Delta T_C\}$

- $P_{CMAX\_H\_CA} = MIN\{10 \log10 \sum P_{EMAX,c} , P_{PowerClass}\}$

where

- $P_{EMAX,c}$ is the linear value of $P_{EMAX,c}$ which is given by IE *P-Max* for serving cell *c* in [5].

- $P_{PowerClass}$ is the maximum UE power specified in Table 6.2.2A.1.3-1 without taking into account the tolerance specified in the Table 6.2.2A.1.3-1.

- MPR and A-MPR specified in clause 6.2.3A and clause 6.2.4A respectively.

- $\Delta T_{IB,c}$ is the additional tolerance for serving cell *c* as specified in Table 6.2.5A.1.3-3.

- P-MPR is the power management term for the UE.

- ΔT_C is the highest value $\Delta T_{C,c}$ among all serving cells *c* in the subframe over both timeslots. $\Delta T_{C,c}$ = 1.5 dB when Note 2 in Table 6.2.2A.3-1 applies to the serving cell *c*. $\Delta T_{C,c}$ = 0 dB when Note 2 in Table 6.2.2A.1.3-1 does not apply to the serving cell *c*.

For inter-band carrier aggregation with up to one serving cell c per operating band:

$$P_{CMAX\_L\_CA} = MIN\{10log10 \sum MIN[P_{EMAX,c}/(\Delta t_{C,c}), P_{PowerClass}/(mpr_c\text{-}a\text{-}mpr_c\text{-}\Delta t_{C,c}\text{-}\Delta t_{IB,c}) ,$$

$$P_{PowerClass}/(pmpr_c\text{-}\Delta t_{C,c})], P_{PowerClass}\}$$

$$P_{CMAX\_H\_CA} = MIN\{10 \log10 \sum P_{EMAX,c} , P_{PowerClass}\}$$

where

- $P_{EMAX,c}$ is the linear value of $P_{EMAX,c}$ which is given by IE *P-Max* for serving cell *c* in [5].

- $P_{PowerClass}$ is the maximum UE power specified in Table 6.2.2A.1.3-1 without taking into account the tolerance specified in the Table 6.2.2A.1.3-1. $P_{PowerClass}$ is the linear value of $P_{PowerClass}$.
- MPR_c and A-MPR_c apply per serving cell c and are specified in clause 6.2.3 and clause 6.2.4, respectively. mpr_c is the linear value of MPR_c. a-mpr_c is the linear value of A-MPR_c.
- P-MPR_c accounts for power management for serving cell *c*. $pmpr_c$ is the linear value of P-MPR_c.
- $\Delta t_{C,c} = 1.41$ when Note 2 in Table 6.2.2.3-1 applies for a serving cell *c*
- $\Delta t_{C,c} = 1$ when Note 2 in Table 6.2.2.3-1 does not apply for a serving cell *c*
- $\Delta t_{IB,c}$ is the linear value of the inter-band relaxation term of the serving cell *c* $\Delta T_{IB,c}$. $\Delta t_{IB,c} = 1$ when no inter-band relaxation is allowed..

The measured maximum output power PUMAX over all serving cells shall be within the following range:

$$P_{CMAX\_L\_CA} - T(P_{CMAX\_L\_CA}) \leq P_{UMAX} \leq P_{CMAX\_H\_CA} + T(P_{CMAX\_H\_CA})$$

$$P_{UMAX} = 10 \log10 \sum P_{UMAX,c}$$

where

- $P_{UMAX,c}$ denotes the measured maximum output power for serving cell *c* expressed in linear scale.

The tolerance $T(P_{CMAX})$ is defined by the table below and applies to $P_{CMAX\_L\_CA}$ and $P_{CMAX\_H\_CA}$ separately.

Table 6.2.5A.1.3-2: P_{CMAX} tolerance

P_{CMAX} (dBm)	Tolerance $T(P_{CMAX})$ Intra-band with two active UL serving cells (dB)	Tolerance $T(P_{CMAX})$ Inter-band with two active UL serving cells (dB)
$21 \leq P_{CMAX} \leq 23$	2.0	2.0
$20 \leq P_{CMAX} < 21$	[2.5]	TBD
$19 \leq P_{CMAX} < 20$	[3.5]	TBD
$18 \leq P_{CMAX} < 19$	[4.0]	TBD
$13 \leq P_{CMAX} < 18$	[5.0]	TBD
$8 \leq P_{CMAX} < 13$	[6.0]	TBD
$-40 \leq P_{CMAX} < 8$	[7.0]	TBD

For the UE which supports inter-band carrier aggregation configurations with uplink assigned to one E-UTRA band the $\Delta T_{IB,c}$ is defined for applicable bands in Table 6.2.5A.1.3-3.

Table 6.2.5A.1.3-3: $\Delta T_{IB,c}$

Inter-band CA Configuration	E-UTRA Band	$\Delta T_{IB,c}$ [dB]
CA_1A-5A	1	0.3
	5	0.3
CA_1A-18A	1	0.3
	18	0.3
CA_1A-19A	1	0.3
	19	0.3
CA_1A-21A	1	0.3
	21	0.3
CA_2A-17A	2	0.3
	17	0.8
CA_2A-29A	2	0.3
CA_3A-7A	3	0.5
	7	0.5
CA_3A-8A	3	0.3
	8	0.3

CA_4A-12A	4	0.3
	12	0.8
CA_4A-17A	4	0.3
	17	0.8
CA_4A-5A	4	0.3
	5	0.3
CA_4A-13A	4	0.3
	13	0.3
CA_5A-12A	5	0.8
	12	0.4
CA_7A-20A	7	0.3
	20	0.3
CA_11A-18A	11	0.3
	18	0.3

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 6.2.5A-3, truncated to one decimal place 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 6.2.5A-3 that applies for that operating band among the supported CA configurations.

NOTE 1: 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.

NOTE 2: To meet the $\Delta T_{IB,c}$ requirements for CA_3A-7A with state-of-the-art technology, an increase in power consumption of the UE may be required. It is also expected that as the state-of-the-art technology evolves in the future, this possible power consumption increase can be reduced or eliminated.

The normative reference for this requirement is TS 36.101 [2] clause 6.2.5A.

6.2.5A.1.4 Test description

6.2.5A.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 6.2.5A.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 6.2.5A.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: 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**	**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	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.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 6.2.5A.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 6.2.5A.1.4.3.

6.2.5A.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 6.2.5A.1.4.3.
3. SS activates SCC by sending the MAC-CE according to TS 36.321 [13] clauses 5.13 and 6.1.3.8. Wait for at least 2 seconds as per TS 36.133 [4] clause 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 6.2.5A.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.
5. Send transmit uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms for the UE to reach the P_{UMAX} level of the test point.

6. Measure the mean power over all component carriers in the CA configuration for each test point in table 6.2.5A.1.5-1 according to the test configuration from Table 6.2.5A.1.4.1-1. The period of measurement shall be at least continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.5A.1.4.3 Message contents

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

Table 6.2.5A.1.4.3-1: SystemInformationBlockType1: Test point 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	-10		

Table 6.2.5A.1.4.3-2: SystemInformationBlockType1: Test point 2

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	10		

Table 6.2.5A.1.4.3-3: SystemInformationBlockType1: Test point 3

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	15		

6.2.5A.1.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2.5A.1.5-1.

Table 6.2.5A.1.5-1: P_{CMAX} configured UE output power

	Channel bandwidth / maximum output power		
	50RB+100RB (10 MHz + 20 MHz)	**75RB + 75RB (15 MHz + 15 MHz)**	**100RB + 100RB 20 MHz + 20 MHz)**
Measured UE output power test point 1	For carrier frequency f ≤ 3.0GHz: -10 dBm ± 7.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: -10 dBm ± 8.0		
Measured UE output power test point 2	For carrier frequency f ≤ 3.0GHz: 10 dBm ± 6.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: 10 dBm ± 7.0		
Measured UE output power test point 3	For carrier frequency f ≤ 3.0GHz: 15 dBm ± 5.7 For carrier frequency 3.0GHz < f ≤ 4.2GHz: 15 dBm ± 6.0		
Note: In addition Note 2 in Table 6.2.2A.1.3-1 shall apply to the tolerances.			

6.2.5A.2 Configured UE transmitted Output Power for CA (inter-band DL CA without UL CA)

6.2.5A.2.1 Test purpose

Same as in clause 6.2.5A.1.1.

6.2.5A.2.2 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.

6.2.5A.2.3 Minimum conformance requirements

Same as in clause 6.2.5A.1.3.

6.2.5A.2.4 Test description

6.2.5A.2.4.1 Initial conditions

Same as in clause 6.2.5A.1.4.1 with the following exceptions:

- Instead of Table 6.2.5A.1.4.1-1→ use Table 6.2.5A.2.4.1-1.

Table 6.2.5A.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.			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.			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 RB allocations (L_{CRB} @ RB_{start})**	
6	25	N/A for this test	QPSK	5	P_5@0	-
15	25		QPSK	4	P_4@0	-
25	25		QPSK	8	P_8@0	
25	50		QPSK	8	P_8@0	-
50	50		QPSK	12	P_12@0	
50	75		QPSK	12	P_12@0	-
75	100		QPSK	16	P_16@0	-
100	75		QPSK	18	P_18@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.						

6.2.5A.2.4.2 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 6.2.5A.2.4.3.

3. SS activates SCC by sending the MAC-CE according to TS 36.321 [13] clauses 5.13 and 6.1.3.8. Wait for at least 2 seconds as per TS 36.133 [4] clause 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 6.2.5A.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.

5. Send transmit uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms for the UE to reach the P_{UMAX} level of the test point.

6. Measure the mean power over all component carriers in the CA configuration for each test point in table 6.2.5A.2.5-1 according to the test configuration from Table 6.2.5A.2.4.1-1. The period of measurement shall be at least continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.5A.2.4.3 Message contents

Same as in clause 6.2.5A.1.1.

6.2.5A.2.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2.5A.2.5-1.

Table 6.2.5A.2.5-1: P_{CMAX} configured UE output power

	Channel bandwidth / maximum output power					
	6RB 1.4 MHz	**15 RB 3.0 MHz**	**25RB 5 MHz**	**50 RB 10 MHz**	**75 RB 15 MHz**	**100 RB 20 MHz**
Measured UE output power test point 1	-10 dBm					
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 7.7dB ± 8.0dB					
Measured UE output power test point 2	10 dBm					
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 6.7dB ± 7.0dB					
Measured UE output power test point 3	15 dBm					
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 5.7dB ± 6.0dB					
Note 1: In addition note 2 in Table 6.2.2.3-1 shall apply to the tolerances. Note 2: $\Delta T_{IB,c}$ in Table 6.2.5A.1.3-3 shall be applied.						

6.2.5B Configured UE transmitted Output Power for UL-MIMO

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

- Test Tolerance

6.2.5B.1 Test purpose

To verify the UE does not exceed the minimum between the P_{EMAX} maximum allowed UL TX Power for UL-MIMO signalled by the E-UTRAN and the P_{UMAX} maximum UE power for the UE power class.

6.2.5B.2 Test applicability

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

6.2.5B.3 Minimum conformance requirements

For UE with multiple transmit antenna connectors, the transmitted power is configured per each UE.

The definitions of configured maximum output power P_{CMAX}, the lower bound P_{CMAX_L}, and the higher bound P_{CMAX_H} specified in Section 6.2.5 shall apply to UE with multiple transmit antenna connectors, where

- $P_{PowerClass}$ and ΔT_C are specified in Section 6.2.2B
- MPR is specified in Section 6.2.3B
- A-MPR is specified in Section 6.2.4B

The measured configured maximum output power P_{UMAX} shall be within the following bounds:

$$P_{CMAX\_L} - MAX\{T_L, T_{LOW}(P_{CMAX\_L})\} \leq P_{UMAX} \leq P_{CMAX\_H} + T_{HIGH}(P_{CMAX\_H})$$

where $T_{LOW}(P_{CMAX\_L})$ and $T_{HIGH}(P_{CMAX\_H})$ are defined as the tolerance and applies to P_{CMAX_L} and P_{CMAX_H} separately, while T_L is the absolute value of the lower tolerance in Table 6.2.2B.3-1 for the applicable operating band.

For UE with two transmit antenna connectors, the tolerance is specified in Table 6.2.5B.3-1 with UL-MIMO configurations specified in Table 6.2.2B.3-2.

Table 6.2.5B.3-1: P_{CMAX} tolerance in closed-loop spatial multiplexing scheme

P_{CMAX} (dBm)	Tolerance $T_{LOW}(P_{CMAX\_L})$ (dB)	Tolerance $T_{HIGH}(P_{CMAX\_H})$ (dB)
P_{CMAX}=23	3.0	2.0
[22] ≤ P_{CMAX} < [23]	[5.0]	[2.0]
[21] ≤ P_{CMAX} < [22]	[5.0]	[3.0]
[20] ≤ P_{CMAX} < [21]	[6.0]	[4.0]
[16] ≤ P_{CMAX} < [20]	[5.0]	
[11] ≤ P_{CMAX} < [16]	[6.0]	
[-40] ≤ P_{CMAX} < [11]	[7.0]	

The normative reference for this requirement is TS 36.101 [2] clause 6.2.5B.

6.2.5B.4 Test description

6.2.5B.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 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 6.2.5B.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 6.2.5B.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH			
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	N/A for Configured UE transmitted Output Power test case	Mod'n	RB allocation	
			FDD	TDD
1.4MHz		QPSK	5	5
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, the applicable channel bandwidths are specified in Table 5.4.2.1-1.				
Note 2: For the uplink RB allocation the RB_{start} shall be RB #0.				

1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, in 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 channel is set according to Table 6.2.5B.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 6.2.5B.4.3.

6.2.5B.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 6.2.5B.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 transmit uplink power control "up" commands in every uplink scheduling information to the UE; allow at least 200ms for the UE to reach the P_{umax} level of the test point.
3. Measure the sum mean power of the UE at each UE antenna connector in the associated measurement bandwidth for each test point in table 6.2.5B.5-1 according to the test configuration from Table 6.2.5B.4.1-1. The period of measurement shall be at least continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.2.5B.4.3 Message contents

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

Table 6.2.5B.4.3-1: SystemInformationBlockType1: Test point 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	-10		

Table 6.2.5B.4.3-2: SystemInformationBlockType1: Test point 2

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	13		

Table 6.2.5B.4.3-3: SystemInformationBlockType1: Test point 3

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	18		

6.2.5B.5 Test requirement

The maximum output power measured shall not exceed the values specified in Table 6.2.5B.5-1.

Table 6.2.5B.5-1: P_{CMAX} configured UE output power

	Channel bandwidth / maximum output power					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Measured UE output power test point 1	For carrier frequency f ≤ 3.0GHz: -10 dBm ± [7.7] For carrier frequency 3.0GHz < f ≤ 4.2GHz: -10 dBm ± [8]					
Measured UE output power test point 2	For carrier frequency f ≤ 3.0GHz: 13 dBm ± [6.7] For carrier frequency 3.0GHz < f ≤ 4.2GHz: 13 dBm ± [7]					
Measured UE output power test point 3	For carrier frequency f ≤ 3.0GHz: 18 dBm ± [5.7] For carrier frequency 3.0GHz < f ≤ 4.2GHz: 18 dBm ± [6]					
Note: In addition note 2 in Table 6.2.2B.3-1 shall apply to the tolerances.						

6.3 Output Power Dynamics

6.3.1 Void

6.3.2 Minimum Output Power

6.3.2.1 Test purpose

To verify the UE's ability to transmit with a broadband output power below the value specified in the test requirement when the power is set to a minimum value.

6.3.2.2 Test applicability

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

6.3.2.3 Minimum conformance requirements

The minimum output power is defined as the mean power in one sub-frame (1ms). The minimum output power shall not exceed the values specified in Table 6.3.2.3-1.

Table 6.3.2.3-1: Minimum output power

	Channel bandwidth / minimum output power / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**

Minimum output power	-40 dBm					
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] clause 6.3.2.1.

Minimum output power test verifies the UE's ability to transmit with a broadband output power below the specified limit when the power is set to a minimum value. The broadband output power is defined as the power in the channel bandwidth, for all transmit bandwidth configurations (resource blocks).

An excess minimum output power potentially increases the Rise Over Thermal (RoT) and therefore reduces the cell coverage area for other UEs.

6.3.2.4 Test description

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 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 6.3.2.4.1-1. 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 6.3.2.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, 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	N/A for min output power test	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, in 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 6.3.2.4.1-1.
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 6.3.2.4.3.

6.3.2.4.2 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 6.3.2.1.4.1-1. 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 continuous uplink power control "down" commands in the uplink scheduling information to the UE to ensure that the UE transmits at its minimum output power.

3. Measure the mean power of the UE in the associated measurement bandwidth specified in Table 6.3.2.5-1 for the specific channel bandwidth under test. The period of measurement shall be the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.3.2.4.3 Message contents

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

6.3.2.5 Test requirement

The minimum output power measured shall not exceed the values specified in Table 6.3.2.5-1.

Table 6.3.2.5-1: Minimum output power

	Channel bandwidth / minimum output power / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Minimum output power	For carrier frequency f ≤ 3.0GHz: ≤ -39 dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -38.7 dBm					
Measurement bandwidth (Note 1)	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
Note 1: Different implementations such as FFT or spectrum analyzer approach are allowed. For spectrum analyzer approach the measurement bandwidth is defined as an equivalent noise bandwidth.						

6.3.2A Minimum Output Power for CA

6.3.2A.1 Minimum Output Power for CA (intra-band contiguous DL CA and UL CA)

6.3.2A.1.1 Test purpose

To verify the UE's ability to transmit with a broadband output power below the value specified in the test requirement when the power on each component carrier is set to a minimum value.

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.

6.3.2A.1.3 Minimum conformance requirements

For intra-band contiguous carrier aggregation, the minimum controlled output power of the UE is defined as the transmit power of the UE per component carrier, i.e., the power in the channel bandwidth of each component carrier for all transmit bandwidth configurations (resource blocks), when the power on both component carriers are set to a minimum value.

For intra-band contiguous carrier aggregation the minimum output power is defined as the mean power in one sub-frame (1ms). The minimum output power shall not exceed the values specified in Table 6.3.2A.1.3-1.

Table 6.3.2A.1.3-1: Minimum output power for intra-band contiguous CA UE

	CC Channel bandwidth / Minimum output power / Measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Minimum output power	-40 dBm					
Measurement bandwidth				9.0 MHz	13.5 MHz	18 MHz

The normative reference for this requirement is TS 36.101 [2] clause 6.3.2A.

6.3.2A.1.4 Test description

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 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 6.3.2A.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 6.3.2A.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 and 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**	**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	150	P_75@0	S_75@0	-	-
100	50		QPSK	150	P_100@0	S_50@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 6.3.2A.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 6.3.2A.1.4.3.

6.3.2A.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 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 6.3.2A.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 "down" commands in every uplink scheduling information to the UE to ensure that the UE transmits at its minimum output power.
6. Measure the mean transmitted power of each component carrier in the CA configuration of the radio access mode. The period of measurement shall be at least the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.3.2A.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.

6.3.2A.1.5 Test requirements

For each component carrier, the minimum output power measured shall not exceed the values specified in Table 6.3.2A.1.5-1.

Table 6.3.2A.1.5-1: Minimum output power for intra-band contiguous CA UE

	CC Channel bandwidth / Minimum output power / Measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Minimum output power	For carrier frequency f ≤ 3.0GHz: ≤ -39 dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -38.7 dBm					
Measurement bandwidth				9.0 MHz	13.5 MHz	18 MHz
Note 1: Different implementations such as FFT or spectrum analyzer approach are allowed. For spectrum analyzer approach the measurement bandwidth is defined as an equivalent noise bandwidth.						

6.3.2B Minimum Output Power for UL-MIMO

6.3.2B.1 Test purpose

To verify the UE's ability to transmit with a UL-MIMO broadband output power below the value specified in the test requirement when the power is set to a minimum value.

6.3.2B.2 Test applicability

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

6.3.2B.3 Minimum conformance requirements

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the minimum output power is defined as the sum of the mean power at each UE antenna connector in one sub-frame (1ms). The minimum output power shall not exceed the values specified in Table 6.3.2B.3-1.

Table 6.3.2B.3-1: Minimum output power

	Channel bandwidth / Minimum output power / Measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Minimum output power	-40 dBm					
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] clause 6.3.2B.1.

6.3.2B.4 Test description

6.3.2B.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 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 6.3.2B.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 6.3.2B.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, 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	N/A for min output power test	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, in 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 channel is set according to Table 6.3.2B.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 6.3.2B.4.3.

6.3.2B.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 6.3.2B.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 continuous uplink power control "down" commands in the uplink scheduling information to the UE to ensure that the UE transmits at its minimum output power.

3. Measure the sum of mean power of the UE at each UE antenna connector in the associated measurement bandwidth specified in Table 6.3.2B.5-1 for the specific channel bandwidth under test. The period of measurement shall be the continuous duration of one sub-frame (1ms). For TDD slots with transient periods are not under test.

6.3.2B.4.3 Message contents

Message contents are according to TS 36.508 [7] clause 4.6.6.3.2B.5 Test requirement

The minimum sum of mean output power of the UE at each antenna connector measured shall not exceed the values specified in Table 6.3.2B.5-1.

Table 6.3.2B.5-1: Minimum output power

	Channel bandwidth / minimum output power / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Minimum output power	For carrier frequency f ≤ 3.0GHz: ≤ -40 +TT dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -40 +TT dBm					
Measurement bandwidth (Note 1)	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
Note 1: Different implementations such as FFT or spectrum analyzer approach are allowed. For spectrum analyzer approach the measurement bandwidth is defined as an equivalent noise bandwidth.						

6.3.3 Transmit OFF power

6.3.3.1 Test purpose

To verify that the UE transmit OFF power is lower than the value specified in the test requirement.

6.3.3.2 Test applicability

The requirements of this test apply in test cases 6.3.4.1 General ON/OFF time mask and 6.3.4.2 PRACH and SRS time mask to all types of E-UTRA UE release 8 and forward.

6.3.3.3 Minimum conformance requirement

The transmit OFF power is defined as the mean power in a duration of at least one sub-frame (1ms) excluding any transient periods. The requirement for the transmit OFF power shall not exceed the values specified in Table 6.3.3.3-1.

Table 6.3.3.3-1: Transmit OFF power

	Channel bandwidth / Transmit OFF power / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**

Transmit OFF power	-50 dBm					
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] clause 6.3.3.

Transmit OFF power is defined as the mean power when the transmitter is OFF. The transmitter is considered to be OFF when the UE is not allowed to transmit or during periods when the UE is not transmitting a sub-frame. During DTX and measurements gaps, the UE is not considered to be OFF.

An excess transmit OFF power potentially increases the Rise Over Thermal (RoT) and therefore reduces the cell coverage area for other UEs

6.3.3.4 Test description

This test is covered by clause 6.3.4.1 General ON/OFF time mask and 6.3.4.2 PRACH and SRS time mask.

6.3.3.5 Test requirement

The requirement for the transmit OFF power shall not exceed the values specified in Table 6.3.3.5-1.

Table 6.3.3.5-1: Transmit OFF power

	Channel bandwidth / Transmit OFF power / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Transmit OFF power	For carrier frequency f ≤ 3.0GHz: ≤ -48.5 dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -48.2 dBm					
Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz

6.3.3A UE Transmit OFF power for CA

6.3.3A.1 UE Transmit OFF power for CA (intra-band contiguous DL CA and UL CA)

6.3.3A.1.1 Test purpose

For intra-band contiguous carrier aggregation the transmit OFF power is defined as the mean power per component carrier when the transmitter is OFF on both component carriers. The transmitter is considered to be OFF when the UE is not allowed to transmit or during periods when the UE is not transmitting a sub-frame. During measurements gaps, the UE is not considered to be OFF.

To verify that the UE transmit OFF power for CA is lower than the value specified in the test requirement.

6.3.3A.1.2 Test applicability

The requirements of this test case apply in test cases 6.3.4A.1 General ON/OFF time mask for CA and 6.3.4.2 PRACH and SRS time mask to all types of E-UTRA UE release 10 and forward that support intra-band contiguous DL CA and UL CA.

6.3.3A.1.3 Minimum conformance requirements

For intra-band contiguous carrier aggregation the transmit OFF power is defined as the mean power in a duration of at least one sub-frame (1ms) excluding any transient periods. The transmit OFF power shall not exceed the values specified in Table 6.3.3A.1.3-1.

Table 6.3.3A.1.3-1: Transmit OFF power for intra-band contiguous CA UE

	Channel bandwidth / Minimum output power / measurement

	bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Transmit OFF power	-50 dBm					
Measurement bandwidth				9.0 MHz	13.5 MHz	18 MHz

The normative reference for this requirement is TS 36.101[2] clause 6.3.3A

6.3.3A.1.4 Test description

This test is covered by clause 6.3.4A.1.1 General ON/OFF time mask for CA and 6.3.4.2 PRACH and SRS time mask.

6.3.3A.1.5 Test Requirements

Table 6.3.3A.1.5-1: Transmit OFF power for intra-band contiguous CA UE

	Channel bandwidth / Minimum output power / Measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Transmit OFF power	-48.5 dBm					
Measurement bandwidth				9.0 MHz	13.5 MHz	18 MHz

6.3.3B UE Transmit OFF power for UL-MIMO

6.3.3B.1 Test purpose

To verify that the UE transmit OFF power for UL-MIMO is lower than the value specified in the test requirement.

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.3B.2 Test applicability

The requirements of this test apply in test cases 6.3.4B.1 General ON/OFF time mask to all types of E-UTRA UE release 10 and forward that support UL-MIMO

6.3.3B.3 Minimum conformance requirement

The transmit OFF power is defined as the mean power at each transmit connector in a duration of at least one sub-frame (1ms) excluding any transient periods. The transmit OFF power at each transmit connector shall not exceed the values specified in Table 6.3.3B.3-1.

Table 6.3.3B.3-1: Transmit OFF power per antenna port

	Channel bandwidth / Minimum output power / Measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Transmit OFF power	-50 dBm					
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] clause 6.3.3B.1.

6.3.3B.4 Test description

This test is covered by clause 6.3.4B.1 General ON/OFF time mask.

6.3.3B.5 Test requirement

The requirement for the transmit OFF power at each transmit antenna connector shall not exceed the values specified in Table 6.3.3B.5-1.

Table 6.3.3B.5-1: Transmit OFF power

	Channel bandwidth / Transmit OFF power / measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Transmit OFF power	For carrier frequency f ≤ 3.0GHz: ≤ -48.5 dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -48.2 dBm					
Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz

6.3.4 ON/OFF time mask

6.3.4.1 General ON/OFF time mask

Editor's note: The measurement period in the minimum requirement is defined to be 1 subframe (14 symbols). Due to practical reasons the TDD measurement period for off power prior the PUSCH is 10 symbols. It is FFS, if this deviation is acceptable.

6.3.4.1.1 Test purpose

To verify that the general ON/OFF time mask meets the requirements given in 6.3.4.1.5.

The time mask for transmit ON/OFF defines the ramping time allowed for the UE between transmit OFF power and transmit ON power.

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.4.1.2 Test applicability

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

6.3.4.1.3 Minimum conformance requirement

The General ON/OFF time mask defines the observation period between Transmit OFF and ON power and between Transmit ON and OFF power. ON/OFF scenarios include; the beginning or end of DTX, measurement gap, contiguous, and non contiguous transmission

The OFF power measurement period is defined in a duration of at least one sub-frame excluding any transient periods. The ON power is defined as the mean power over one sub-frame excluding any transient period.

There are no additional requirements on UE transmit power beyond that which is required in clause 6.2.2 and clause 6.6.2.3.

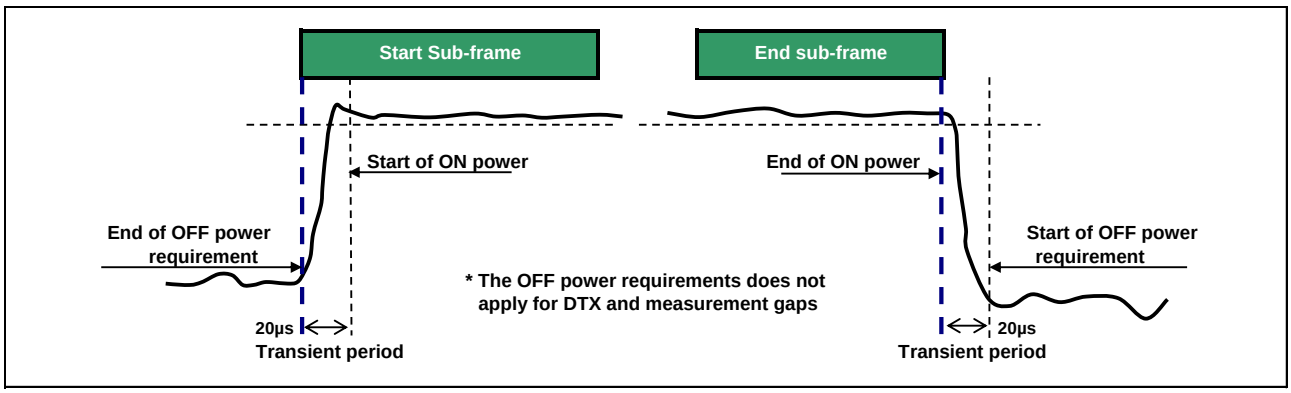

Figure 6.3.4.1.3-1: General ON/OFF time mask

The normative reference for this requirement is TS 36.101 [2] clause 6.3.4.1.

6.3.4.1.4 Test description

6.3.4.1.4.1 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 6.3.4.1.4.1-1. 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 6.3.4.1.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, 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	N/A for General On/Off Time Mask test case	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 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 6.3.4.1.4.1-1.

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 6.3.4.1.4.3. Note that PDCCH DCI format 0 sent after resetting uplink power with RRC Connection Reconfiguration, should have TPC command 0dB.

6.3.4.1.4.2 Test procedure

1. SS sends uplink scheduling information via PDCCH DCI format 0 with TPC command 0dB for C_RNTI to schedule the UL RMC according to Table 6.3.4.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. The UL assignment is such that the UE transmits on UL sub-frame 2 of every radio frame.

2. For FDD: Measure the UE transmission OFF power during the sub-frame prior to the PUSCH subframe. For TDD: Measure the UE transmission OFF power during the 10 SCFDMA symbols prior to the PUSCH subframe.

3. Measure the output power of the UE PUSCH transmission during one sub-frame, excluding a transient period of 20 µs at the beginning of the subframe.

4. Measure the UE transmission OFF power during one sub-frame following the PUSCH subframe, excluding a transient period of 20 µs at the beginning of the subframe.

6.3.4.1.4.3 Message contents

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

Table 6.3.4.1.4.3-1: UplinkPowerControlCommon: Test point 1

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE { p0-NominalPUSCH	-105	Test point 1 to verify a UE relative low initial power transmission	

Table 6.3.4.1.4.3-2: PhysicalConfigDedicated

Derivation Path: TS 36.508 [7] clause 5.5.1.2, Table 5.5.1.2.1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
UplinkPowerControlDedicated	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	SRB1
	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	RBC

Table 6.3.4.1.4.3-3: UplinkPowerControlDedicated

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-26 UplinkPowerControlDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {			
p0-UE-PUSCH	1		SRB1
	0		RBC
}			

Table 6.3.4.1.3-4: TDD-Config-DEFAULT: On/OFF time mask measurement

Derivation Path: 36.508 clause 5.3.1 Table 5.3.1-1 (*SystemInformationBlockType1*)			
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.	
}			

6.3.4.1.5 Test requirement

The requirement for the power measured in steps (2), (3) and (4) of the test procedure shall not exceed the values specified in Table 6.3.4.1.5-1.

Table 6.3.4.1.5-1: General ON/OFF time mask

	Channel bandwidth / minimum output power / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Transmit OFF power	For carrier frequency f ≤ 3.0GHz: ≤ -48.5 dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -48.2 dBm					
Transmission OFF Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
Expected Transmission ON Measured power	-14.8 dBm	-10.8 dBm	-8.6 dBm	-5.6 dBm	-3.9 dBm	-2.6 dBm
ON power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB

6.3.4.2 PRACH and SRS time mask

6.3.4.2.1 PRACH time mask

6.3.4.2.1.1 Test purpose

To verify that the PRACH time mask meets the requirements given in 6.3.4.2.1.5.

The time mask for PRACH time mask defines the ramping time allowed for the UE between transmit OFF power and transmit ON power when transmitting the PRACH.

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.4.2.1.2 Test applicability

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

6.3.4.2.1.3 Minimum conformance requirement

For the PRACH Power / Time mask defines the observation period for PRACH transmissions. The PRACH ON power is specified as the mean power over the PRACH measurement period excluding any transient periods. The measurement period for different PRACH preamble format is specified in Table 6.3.4.2.1.3-1.

There are no additional requirements on UE transmit power beyond that which is required in clause 6.2.2 and clause 6.6.2.3

Table 6.3.4.2.1.3-1: PRACH ON power measurement period

PRACH preamble format	Measurement period (ms)
0	0.9031
1	1.4844
2	1.8031
3	2.2844
4	0.1479

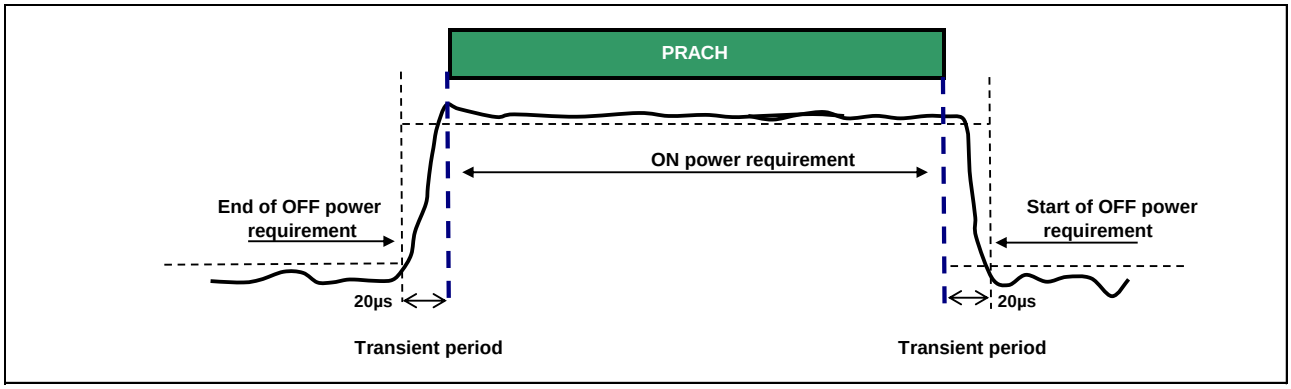

Figure 6.3.4.2.1.3-1: PRACH ON/OFF time mask

The normative reference for this requirement is TS 36.101 [2] clause 6.3.4.2.1.

6.3.4.2.1.4 Test description

6.3.4.2.1.4.1 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 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 6.3.4.2.1.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3.

Table 6.3.4.2.1.4.1-1: Test Configuration Table

Initial Conditions		
Test Environment (as specified in TS 36.508 [7] subclause 4.1)	Normal, TL/VL, TL/VH, TH/VL, TH/VH	
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	
PRACH preamble format		
	FDD	TDD
PRACH Configuration Index	3	51

1. Connect the SS to the UE antenna connectors as shown in TS 36.508 [7] Annex A, Figure A3.
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. 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 6.3.4.2.1.4.3.

6.3.4.2.1.4.2 Test procedure

1. 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.
2. The UE shall send the signalled preamble to the SS.
3. For FDD UE, the SS measure the UE transmission OFF power during the sub-frame preceding the PRACH preamble excluding a transient period of 20 µs according to Figure 6.3.4.2.1.3-1. For TDD UE, the SS measure the UE transmission OFF power starting (20us+the duration of 8 OFDM symbols) before the PRACH starts, and ending 20us before PRACH starts. Note, the nominal PRACH timing for TDD is not aligned with the sub frame and symbol raster.
4. Measure the output power of the transmitted PRACH preamble according to Figure 6.3.4.2.1.3-1.
5. Measure the UE transmission OFF power, starting 20 µs after the PRACH preamble ends for a measurement period of 980 µs..

6.3.4.2.1.4.3 Message contents

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

Table 6.3.4.2.1.4.3-1: *RACH-ConfigCommon-DEFAULT:* PRACH 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 {			
powerRampingParameters SEQUENCE {			
powerRampingStep	dB0		
preambleInitialReceivedTargetPower	dBm-104		PRACH Format 0
	dBm-112		PRACH Format 4
}			
)			

Table 6.3.4.2.1.4.3-2: *PRACH-Config-DEFAULT:* PRACH measurement for TDD

Derivation Path: TS 36.508 [7] clause 5.3.1, Table 5.3.1-3: PRACH-Config-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PRACH-Config-DEFAULT ::= SEQUENCE {			
prach-ConfigIndex	51		TDD
}			

Table 6.3.4.2.1.4.3-3: *TDD-Config-DEFAULT:* PRACH 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.	
}			

6.3.4.2.1.5 Test requirement

The requirement for the power measured in steps (3), (4) and (5) of the test procedure shall not exceed the values specified in Table 6.3.4.2.1.5-1.

Table 6.3.4.2.1.5-1: PRACH time mask

	Channel bandwidth / Output Power [dBm] / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Transmit OFF power	For carrier frequency f ≤ 3.0GHz: ≤ -48.5 dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -48.2 dBm					
Transmission OFF Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
Expected PRACH Transmission ON Measured power	-1 dBm	-1 dBm	-1 dBm	-1 dBm	-1 dBm	-1 dBm
ON power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB

6.3.4.2.2 SRS time mask

6.3.4.2.2.1 Test purpose

To verify that the SRS time mask meets the requirements given in 6.3.4.2.2.5.

The time mask for SRS time mask defines the ramping time allowed for the UE between transmit OFF power and transmit ON power when transmitting the SRS.

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.4.2.2.2 Test applicability

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

6.3.4.2.2.3 Minimum conformance requirement

In the case a single SRS transmission, the ON power is defined as the mean power for each symbol duration excluding any transient period. Figure 6.3.4.2.2.3-1.

In the case a dual SRS transmission, the ON power is defined as the mean power for each symbol duration excluding any transient period. Figure 6.3.4.2.2.3-2.

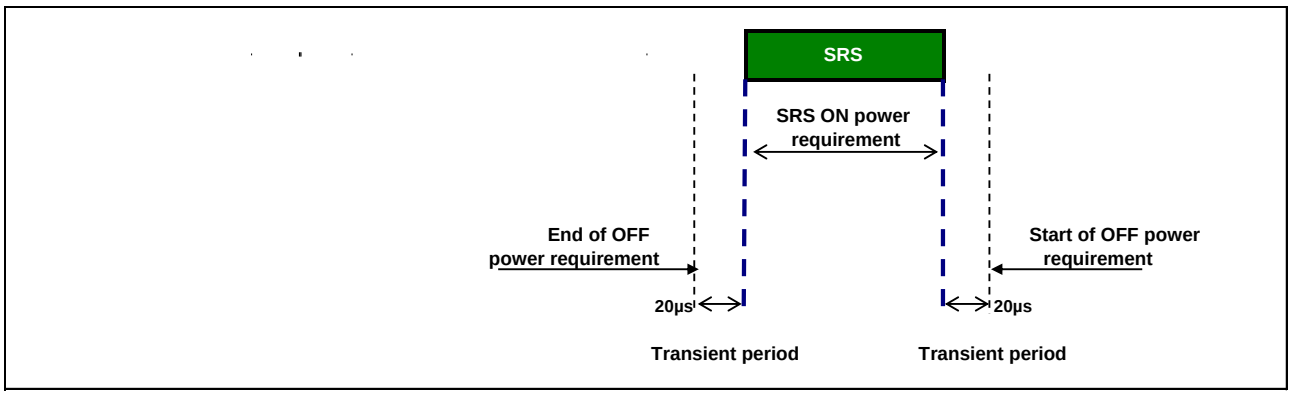

Figure 6.3.4.2.2.3-1: Single SRS time mask

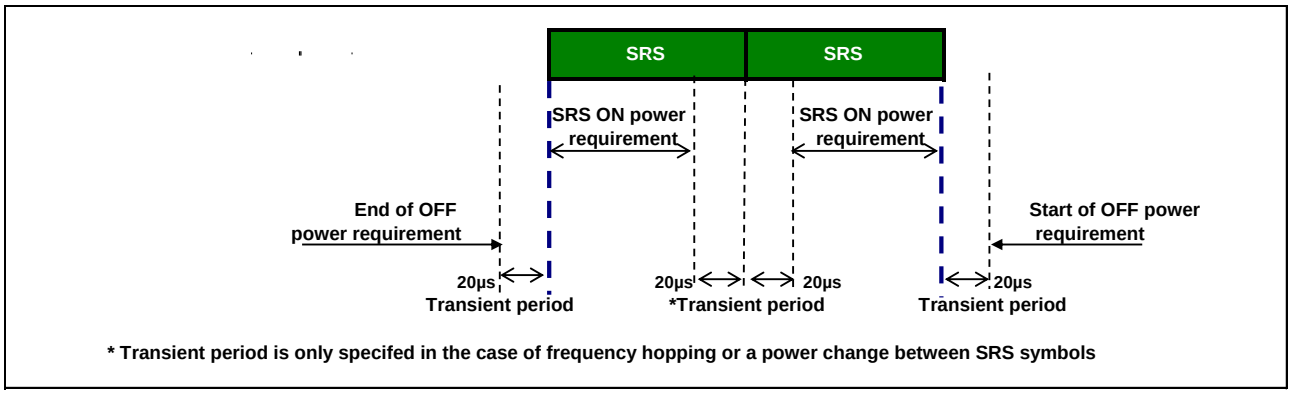

Figure 6.3.4.2.2.3-2: Dual SRS time mask for the case of UpPTS transmissions

6.3.4.2.2.4 Test description

6.3.4.2.2.4.1 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 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 6.3.4.2.2.4.1-1. The details of the uplink and downlink reference measurement channels (RMCs) are specified in Annexes A.2 and A.3.

Table 6.3.4.2.2.4.1-1: Test Configuration Table

Initial Conditions		
Test Environment (as specified in TS 36.508 [7] subclause 4.1)	Normal, TL/VL, TL/VH, TH/VL, TH/VH	
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	
SRS configuration		
	FDD	TDD
srs-BandwidthConfig	bw7	bw7 (for BW 1.4 MHz) bw5 (for BW 3 MHz) bw2 (for BW 5 MHz) bw0 (for BW 10, 15, 20 MHz)
srs-SubframeConfig	sc3	sc0
ackNackSRS-SimultaneousTransmission	FALSE	FALSE
srsMaxUpPts	N/A	N/A
srs-Bandwidth	bw3	bw3
srs-HoppingBandwidth	hbw3	hbw0
freqDomainPosition	0	0
Duration	TRUE	TRUE
srs-ConfigIndex	7	0
transmissionComb	0	0
cyclicShift	cs0	cs0

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. 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 6.3.4.2.2.4.3. Note that PDCCH DCI format 0 sent after resetting uplink power with RRC Connection Reconfiguration, should have TPC command 0dB.

6.3.4.2.2.4.2 Test procedure

1. For FDD UE, the SS measure the UE transmission OFF power during the 13 symbols preceding the SRS symbol excluding a transient period of 20 µs according to Figure 6.3.4.2.2.3-1. For TDD UE, the SS measure the UE transmission OFF power during the 8 symbols preceding the two SRS symbols excluding a transient period of 20µs according to Figure 6.3.4.2.2.3-2.
2. Measure the output power of the transmitted SRS according to Figure 6.3.4.2.2.3-1 for FDD UE and according to Figure 6.3.4.2.2.3-2 for TDD UE, The transient periods are excluded from measurement accordingly.
3. Measure the UE transmission OFF power during the sub-frame following the SRS under test, excluding a transient period of 20 µs according to Figure 6.3.4.2.2.3-1 for FDD UE and according to Figure 6.3.4.2.2.3-2 for TDD UE.

6.3.4.2.2.4.3 Message contents

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

Table 6.3.4.2.2.4.3-1: *RadioResourceConfigCommonSIB-DEFAULT*: SRS measurement

Derivation Path: 36.508 clause 5.3.1 Table 5.3.1-2 RadioResourceConfigCommonSIB-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
RadioResourceConfigCommon-DEFAULT ::= SEQUENCE {			
rach-ConfigCommon	RACH-ConfigCommon-DEFAULT		
bcch-Config	BCCH-Config-DEFAULT		
pcch-Config	PCCH-Config-DEFAULT		
prach-Config	PRACH-ConfigSIB-DEFAULT		
pdsch-ConfigCommon	PDSCH-ConfigCommon-DEFAULT		
pusch-ConfigCommon	PUSCH-ConfigCommon-DEFAULT		
pucch-ConfigCommon	PUCCH-ConfigCommon-DEFAULT		
soundingRSUL-ConfigCommon	*SoundingRS-UL-ConfigCommon-DEFAULT*		
uplinkPowerControlCommon	UplinkPowerControlCommon-DEFAULT		
ul-CyclicPrefixLength	len1		
}			

Table 6.3.4.2.2.4.3-2: *SoundingRS-UL-ConfigCommon-DEFAULT*: SRS time mask measurement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-21 SoundingRS-UL-ConfigCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRS-UL-ConfigCommon-DEFAULT ::= SEQUENCE {			
setup SEQUENCE {			
srs-BandwidthConfig	bw7		FDD
	bw7		TDD (BW 1.4 MHz)
	bw5		TDD (BW 3 MHz)
	bw2		TDD (BW 5 MHz)
	bw0		TDD (BW 10, 15, 20 MHz)
srs-SubframeConfig	sc3	Periodicity of 5ms, with offset of 0.	FDD
	sc0	Periodicity of 5ms, with offset of 1.	TDD
ackNackSRS-SimultaneousTransmission	FALSE		
srsMaxUpPts	Not present		
}			
}			

Table 6.3.4.2.2.4.3-3: PhysicalConfigDedicated-DEFAULT: SRS time mask measurement

Derivation Path: 36.508 clause 5.5.1 Table 5.5.1.2-1: PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
cqi-ReportConfig	Not present		
soundingRS-UL-ConfigDedicated	*SoundingRSUL-ConfigDedicated-DEFAULT*		
}			

Table 6.3.4.2.2.4.3-4: *SoundingRSUL-ConfigDedicated-DEFAULT*: SRS time mask measurement

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-22 SoundingRS-UL-ConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
SoundingRS-UL-ConfigDedicated-DEFAULT ::= CHOICE {			
setup SEQUENCE {			
srs-Bandwidth	bw3	bw3 used to ensure that the bandwidth is constantly 4 RBs irrespective of channel bandwidth.	
srs-HoppingBandwidth	hbw3	This is selected so that hopping is disabled	FDD
	hbw0	This is selected so that hopping is enabled	TDD
freqDomainPosition	0		
Duration	TRUE	Indefinite duration	
srs-ConfigIndex	7	SRS periodicity of 10ms, Toffset=0.	FDD
	0	SRS periodicity of 2ms, Ksrs=0,1, this is two symbols UpPTS in first half subframe.	TDD
transmissionComb	0		
cyclicShift	cs0	No cyclic shift	
}			
}			

Table 6.3.4.2.2.4.3-5: TDD-Config-DEFAULT: SRS time mask measurement

Derivation Path: 36.508 331 clause 65.3.21 Table 5.3.1-1 (*SystemInformationBlockType1*)			
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.	
}			

Table 6.3.4.2.2.4.3-6: PhysicalConfigDedicated

Derivation Path: TS 36.508 [7] clause 5.5.1.2, Table 5.5.1.2.1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
uplinkPowerControlDedicated	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	SRB1
	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	RBC

Table 6.3.4.2.2.4.3-7: UplinkPowerControlDedicated

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-26 UplinkPowerControlDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {			
p0-UE-PUSCH	1		SRB1
	0		RBC
}			

Condition	Explanation
FDD	FDD cell environment
TDD	TDD cell environment

6.3.4.2.2.5 Test requirement

The requirement for the power measured in steps (1), (2) and (3) of the test procedure shall not exceed the values specified in Table 6.3.4.2.2.5-1.

Table 6.3.4.2.2.5-1: SRS time mask

	Channel bandwidth / Output Power [dBm] / measurement bandwidth					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Transmit OFF power	For carrier frequency f ≤ 3.0GHz: ≤ -48.5 dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -48.2 dBm					
Transmission OFF Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
Expected SRS Transmission ON Measured power	-2.6 dBm	-2.6 dBm	-2.6 dBm	-2.6 dBm	-2.6 dBm	-2.6 dBm
ON power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB	± 7.5dB ± 7.8dB

6.3.4A ON/OFF time mask for CA

6.3.4A.1 General ON/OFF time mask for CA

6.3.4A.1.1 General ON/OFF time mask for CA (intra-band contiguous DL CA and UL CA)

6.3.4A.1.1.1 Test purpose

To verify that the general ON/OFF time mask for CA meets the requirements given in 6.3.4A.1.1.5.

The time mask for transmit ON/OFF for CA defines the ramping time allowed for the UE between transmit OFF power and transmit ON power for CA.

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.4A.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.

6.3.4A.1.1.3 Minimum conformance requirements

For intra-band contiguous carrier aggregation, the general output power ON/OFF time mask specified in subclause 6.3.4.1.3 is applicable for each component carrier during the ON power period and transient period. The OFF period as specified in subclause 6.3.4.1.3 shall only be applicable for each component carrier when all the component carriers are OFF.

The normative reference for this requirement is TS 36.101[2] clause 6.3.4A.

6.3.4A.1.1.4 Test description

6.3.4A.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 6.3.4A.1.1.4.1-1. 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 6.3.4A.1.1.4.1-1: 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 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}**	**PCC & SCC RB allocation**	**CC MOD**	**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	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] 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 Reference Measurement channel is set according to Table 6.3.4A.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 6.3.4A.1.1.4.3.

6.3.4A.1.1.4.2 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 6.5.1A 3.4A.1.1.4.3

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. The each UL assignment is such that the UE transmits on UL sub-frame 2 of every radio frame.

5. For FDD: Measure the UE transmission OFF power for each component carrier during the sub-frame prior to the PUSCH subframe. For TDD: Measure the UE transmission OFF power during the 10 SCFDMA symbols prior to the PUSCH subframe.

6. Measure the output power of the UE PUSCH transmission for each component carrier during one sub-frame, excluding a transient period of 20 µs at the beginning of the subframe.

7. Measure the UE transmission OFF power for each component carrier during one sub-frame following the PUSCH subframe, excluding a transient period of 20 µs at the beginning of the subframe.

6.3.4A.1.1.4.3 Message contents

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

Table 6.3.4A.1.1.4.3-1: UplinkPowerControlCommon: Test point 1

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE {			
p0-NominalPUSCH	-105	Test point 1 to verify a UE relative low initial power transmission for PCC	

Table 6.3.4A.1.1.4.3-2: PhysicalConfigDedicated

Derivation Path: TS 36.508 [7] clause 5.5.1.2, Table 5.5.1.2.1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
UplinkPowerControlDedicated	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	RBC
	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	UL CA

Table 6.3.4A.1.1.4.3-3: UplinkPowerControlDedicated

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-26 UplinkPowerControlDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {			
p0-UE-PUSCH	1		RBC
	0		UL CA
}			

Table 6.3.4A.1.1.4.3-4: UplinkPowerControlCommonSCell-r10: Test point 1

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25A UplinkPowerControlCommonSCell-r10-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommonSCell-r10 ::= SEQUENCE {			
p0-NominalPUSCH-r10	-105	Test point 1 to verify a UE relative low initial power transmission for SCC	

6.3.4A.1.5 Test requirement

The requirement for the power measured in steps 5, 6 and 7 of the test procedure shall not exceed the values specified in Table 6.3.4.1.5-1.6.3.4B ON/OFF time mask for UL-MIMO

6.3.4B ON/OFF time mask for UL-MIMO

6.3.4B.1 General ON/OFF time mask for UL-MIMO

Editor's note: The measurement period in the minimum requirement is defined to be 1 subframe (14 symbols). Due to practical reasons the TDD measurement period for off power prior the PUSCH is 10 symbols. It is FFS, if this deviation is acceptable.

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

- The initial conditions and test procedure are subject to further investigation

6.3.4B.1.1 Test purpose

To verify that the general ON/OFF time mask for UL-MIMO meets the requirements given in 6.3.4B.1.5.

The time mask for transmit ON/OFF defines the ramping time allowed for each transmit antenna of UE between transmit OFF power and transmit ON power.

Transmission of the wrong power increases interference to other channels, or increases transmission errors in the uplink channel.

6.3.4B.1.2 Test applicability

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

6.3.4B.1.3 Minimum conformance requirement

For UE with multiple transmit antenna connectors, the ON/OFF time mask requirements in subclause 6.3.4.1.3 apply to each transmit antenna connector.

For UE with two transmit antenna connectors in closed-loop spatial multiplexing scheme, the general ON/OFF time mask requirements specified in subclause 6.3.4.1.3 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 6.3.4B

6.3.4B.1.4 Test description

6.3.4B.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 6.3.4B.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 6.3.4B.1.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, 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	N/A for General On/Off Time Mask test case	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 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 6.3.4B.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 6.3.4B.1.4.3. Note that PDCCH DCI format 4 sent after resetting uplink power with RRC Connection Reconfiguration, should have TPC command 0dB.

6.3.4B.1.4.2 Test procedure

1. SS sends uplink scheduling information via PDCCH with DCI format 4 and TPC command 0dB for C_RNTI to schedule the UL RMC according to Table 6.3.4B.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. The UL assignment is such that the UE transmits on UL sub-frame 2 of every radio frame.
2. For FDD: Measure the UE transmission OFF power during the sub-frame prior to the PUSCH subframe. For TDD: Measure the UE transmission OFF power during the 10 SCFDMA symbols prior to the PUSCH subframe.
3. Measure the output power of the UE PUSCH transmission during one sub-frame, excluding a transient period of 20 µs at the beginning of the subframe.
4. Measure the UE transmission OFF power during one sub-frame following the PUSCH subframe, excluding a transient period of 20 µs at the beginning of the subframe.
5. Repeat step 2) until 4) for each of transmit antenna of the UE.

6.3.4B.1.4.3 Message contents

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

Table 6.3.4B.1.4.3-1: UplinkPowerControlCommon: Test point 1

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE { p0-NominalPUSCH	-105	Test point 1 to verify a UE relative low initial power transmission	

Table 6.3.4B.1.4.3-2: PhysicalConfigDedicated

Derivation Path: TS 36.508 [7] clause 5.5.1.2, Table 5.5.1.2.1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
UplinkPowerControlDedicated	UplinkPowerControlDedicated-DEFAULT	See clause 4.6.3	SRB1
	UplinkPowerControlDedicated-DEFAULT	See clause 4.6.3	RBC

Table 6.3.4B.1.4.3-3: UplinkPowerControlDedicated

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-26 UplinkPowerControlDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {			
p0-UE-PUSCH	1		SRB1
	0		RBC
}			

Table 6.3.4B.1.3-4: TDD-Config-DEFAULT: On/OFF time mask measurement

Derivation Path: 36.508 clause 5.3.1 Table 5.3.1-1 (*SystemInfomationBlockType1*)			
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.	
}			

6.3.4B.1.5 Test requirement

The requirement for the power measured in steps (2), (3) and (4) of the test procedure shall not exceed the values specified in Table 6.3.4B.1.5-1.

Table 6.3.4B.1.5-1: General ON/OFF time mask

	Channel bandwidth / minimum output power / measurement bandwidth					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Transmit OFF power	For carrier frequency f ≤ 3.0GHz: ≤ -48.5 dBm For carrier frequency 3.0GHz < f ≤ 4.2GHz: ≤ -48.2 dBm					
Transmission OFF Measurement bandwidth	1.08 MHz	2.7 MHz	4.5 MHz	9.0 MHz	13.5 MHz	18 MHz
Expected Transmission ON Measured power	-14.8 dBm	-10.8 dBm	-8.6 dBm	-5.6 dBm	-3.9 dBm	-2.6 dBm
ON power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	7.5 dB ±7.8dB	7.5 dB ±7.8dB	7.5dB ±7.8dB	7.5dB ±7.8dB	7.5dB ±7.8dB	7.5dB ±7.8dB

6.3.5 Power Control

Power control is used to limit the interference level and compensate the channel fading. The UE power is defined as the mean power in a subframe or ON power duration, whichever is available.

The UE transmission can be in two contiguity modes, i.e. contiguous transmission and non-contiguous transmission. The former has a transmission gap of 0 and the later has a transmission gap larger than 0. The transmission gap is the time interval between the end of the last UE transmission subframe and the beginning of the next UE transmission subframe or the UpPTS (for TDD).

6.3.5.1 Power Control Absolute power tolerance

6.3.5.1.1 Test purpose

To verify the ability of the UE transmitter to set its initial output power to a specific value at the start of a contiguous transmission or non-contiguous transmission with a long transmission gap, i.e. transmission gap is larger than 20 ms.

6.3.5.1.2 Minimum conformance requirement

Absolute power tolerance is the ability of the UE transmitter to set its initial output power to a specific value for the first sub-frame at the start of a contiguous transmission or non-contiguous transmission with a transmission gap larger than 20ms.

The minimum requirement on absolute power tolerance is given in Table 6.3.5.1.2-1 over the power range bounded by the Maximum output power as defined in sub-clause 6.2.2 and the Minimum output power as defined in sub clause 6.3.2.

For operating bands under Note 2 in Table 6.2.2.3-1, the absolute power tolerance as specified in Table 6.3.5.1.2-1 is relaxed by reducing the lower limit by 1.5 dB when the transmission bandwidth is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high}.

Table 6.3.5.1.2-1: Absolute power tolerance

Conditions	Tolerance
Normal conditions	± 9.0 dB
Extreme conditions	± 12.0 dB

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5.1.1.

6.3.5.1.3 Test applicability

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

6.3.5.1.4 Test description

6.3.5.1.4.1 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 6.3.5.1.4.1-1. The details of the uplink reference measurement channel (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.5.1.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH			
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	N/A for Power Control Absolute power tolerance test case	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 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 6.3.5.1.4.1-1.

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 6.3.5.1.4.3. Note that PDCCH DCI format 0 sent after resetting uplink power with RRC Connection Reconfiguration, should have TPC command 0dB.

6.3.5.1.4.2 Test procedure

1. SS sends uplink scheduling information via PDCCH DCI format 0 with TPC command 0dB for C_RNTI to schedule the UL RMC according to Table 6.3.5.1.4.1-1. Since the UE has no payload and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC.

2. Measure the initial output power of the first subframe of UE PUSCH first transmission. The transient periods of 20us are excluded.

3. Repeat for the two test points as indicated in section 6.3.5.1.4.3. The timing of the execution between the two test points shall be larger than 20ms.

6.3.5.1.4.3 Message contents

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

Table 6.3.5.1.4.3-1: UplinkPowerControlCommon: Test point 1

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE { p0-NominalPUSCH	-105	Test point 1 to verify a UE relative low initial power transmission	

Table 6.3.5.1.4.3-2: UplinkPowerControlCommon: Test point 2

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE { p0-NominalPUSCH	-93	Test point 2 to verify a UE relative high initial power transmission	

Table 6.3.5.1.4.3-3: PhysicalConfigDedicated

Derivation Path: TS 36.508 [7] clause 5.5.1.2, Table 5.5.1.2.1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
uplinkPowerControlDedicated	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	SRB1
	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	RBC

Table 6.3.5.1.4.3-4: UplinkPowerControlDedicated

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-26 UplinkPowerControlDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {			
p0-UE-PUSCH	1		SRB1
	0		RBC
}			

6.3.5.1.5 Test requirement

The requirement for the power measured in step (2) of the test procedure is not to exceed the values specified in Table 6.3.5.1.5-1 and 6.3.5.1.5-2.

Table 6.3.5.1.5-1: Absolute power tolerance: test point 1

	Channel bandwidth / expected output power (dBm)					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**

Expected Measured power Normal conditions	-14.8 dBm	-10.8 dBm	-8.6 dBm	-5.6 dBm	-3.9 dBm	-2.6 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB
Expected Measured power Extreme conditions	-14.8 dBm	-10.8 dBm	-8.6 dBm	-5.6 dBm	-3.9 dBm	-2.6 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB
Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3						

Table 6.3.5.1.5-2: Absolute power tolerance: test point 2

	Channel bandwidth / expected output power (dBm)					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Expected Measured power Normal conditions	-2.8 dBm	1.2 dBm	3.4 dBm	6.4 dBm	8.2 dBm	9.4 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB
Expected Measured power Extreme conditions	-2.8 dBm	1.2 dBm	3.4 dBm	6.4 dBm	8.2 dBm	9.4 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB
Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3						

6.3.5.2 Power Control Relative power tolerance

6.3.5.2.1 Test purpose

To verify the ability of the UE transmitter to set its output power relatively to the power in a target sub-frame relatively to the power of the most recently transmitted reference sub-frame if the transmission gap between these sub-frames is ≤ 20 ms.

6.3.5.2.2 Test applicability

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

6.3.5.2.3 Minimum conformance requirement

The UE shall meet the requirements specified in Table 6.3.5.2.3-1.

To account for RF Power amplifier mode changes 2 exceptions are allowed for each of two test patterns. The test patterns are a monotonically increasing power sweep and a monotonically decreasing power sweep over a range bounded by the requirements of minimum power and maximum power specified in clauses 6.3.2.3 and 6.2.2.3. For these exceptions the power tolerance limit is a maximum of ±6.0 dB in Table 6.3.5.2.3-1.

Table 6.3.5.2.3-1 Relative Power Tolerance for Transmission (normal conditions)

Power step ΔP (Up or down) [dB]	All combinations of PUSCH and PUCCH transitions [dB]	All combinations of PUSCH/PUCCH and SRS transitions between sub-frames [dB]	PRACH [dB]
ΔP < 2	±2.5 (Note 3)	±3.0	±2.5
2 ≤ ΔP < 3	±3.0	±4.0	±3.0
3 ≤ ΔP < 4	±3.5	±5.0	±3.5
4 ≤ ΔP ≤ 10	±4.0	±6.0	±4.0
10 ≤ ΔP < 15	±5.0	±8.0	±5.0
15 ≤ ΔP	±6.0	±9.0	±6.0

Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed

Note 2: For operating bands under Note 2 in Table 6.2.2.3-1, the relative power tolerance is relaxed by increasing the upper limit by 1.5 dB if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges; if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges, then the tolerance is relaxed by reducing the lower limit by 1.5 dB.

Note 3: For PUSCH to PUSCH transitions with the allocated resource blocks fixed in frequency and no transmission gaps other than those generated by downlink subframes, DwPTS fields or Guard Periods for TDD: for a power step ΔP ≤ 1 dB, the relative power tolerance for transmission is ±1.0 dB.

The power step (ΔP) is defined as the difference in the calculated setting of the UE Transmit power between the target and reference sub-frames with the power setting according to Clause 5.1 of TS 36.213. The error is the difference between ΔP and the power change measured at the UE antenna port with the power of the cell-specific reference signals kept constant. The error shall be less than the relative power tolerance specified in Table 6.3.5.2.3-1.

The normative reference for this requirement is TS 36.101 clause 6.3.5.2.

6.3.5.2.4 Test description

6.3.5.2.4.1 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 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 6.3.5.2.4.1-1. 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 6.3.5.2.4.1-1: Test Configuration Table

Initial Conditions		
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH	
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	Lowest, 5MHz, Highest	
Test Parameters for Channel Bandwidths		
	Downlink Configuration	**Uplink Configuration**

Ch BW	N/A for Power Control Relative power tolerance test case	Mod'n	RB allocation	
			FDD	TDD
1.4MHz		QPSK	See table 6.3.5.2.5-1 6.3.5.2.5-2 6.3.5.2.5-13	See table 6.3.5.2.5-1 6.3.5.2.5-2 6.3.5.2.5-13
3MHz		QPSK	See table 6.3.5.2.5-3 6.3.5.2.5-4 6.3.5.2.5-13	See table 6.3.5.2.5-3 6.3.5.2.5-4 6.3.5.2.5-13
5MHz		QPSK	See table 6.3.5.2.5-5 6.3.5.2.5-6 6.3.5.2.5-13	See table 6.3.5.2.5-5 6.3.5.2.5-6 6.3.5.2.5-13
10MHz		QPSK	See table 6.3.5.2.5-7 6.3.5.2.5-8 6.3.5.2.5-13	See table 6.3.5.2.5-7 6.3.5.2.5-8 6.3.5.2.5-13
15MHz		QPSK	See table 6.3.5.2.5-9 6.3.5.2.5-10 6.3.5.2.5-13	See table 6.3.5.2.5-9 6.3.5.2.5-10 6.3.5.2.5-13
20MHz		QPSK	See table 6.3.5.2.5-11 6.3.5.2.5-12 6.3.5.2.5-13	See table 6.3.5.2.5-11 6.3.5.2.5-12 6.3.5.2.5-13
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 starting resource block shall be RB# 0.				

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 6.3.5.2.4.1-1

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 6.3.5.2.4.3.

6.3.5.2.4.2 Test procedure

The procedure is separated in various subtests to verify different aspects of relative power control. The power patterns of the subtests are described in figure 6.3.5.2.4.2-1.

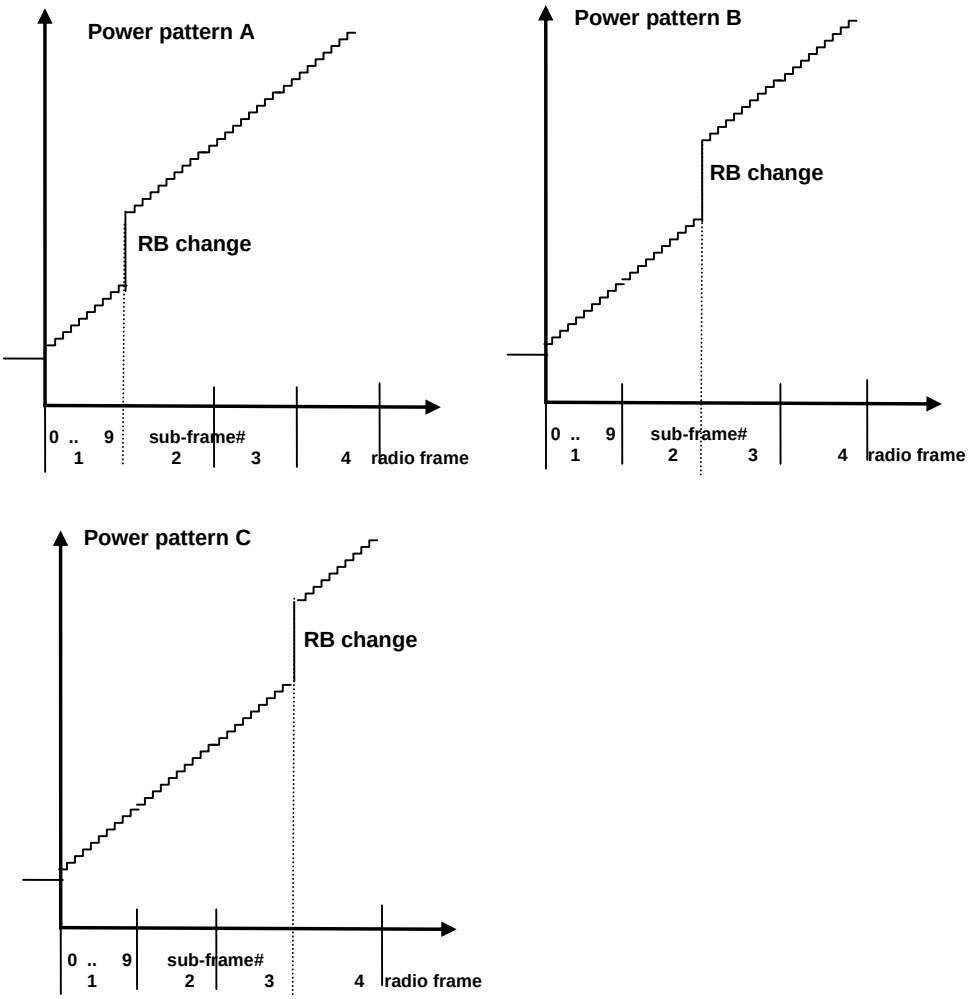

Figure 6.3.5.2.4.2-1: FDD ramping up test power patterns

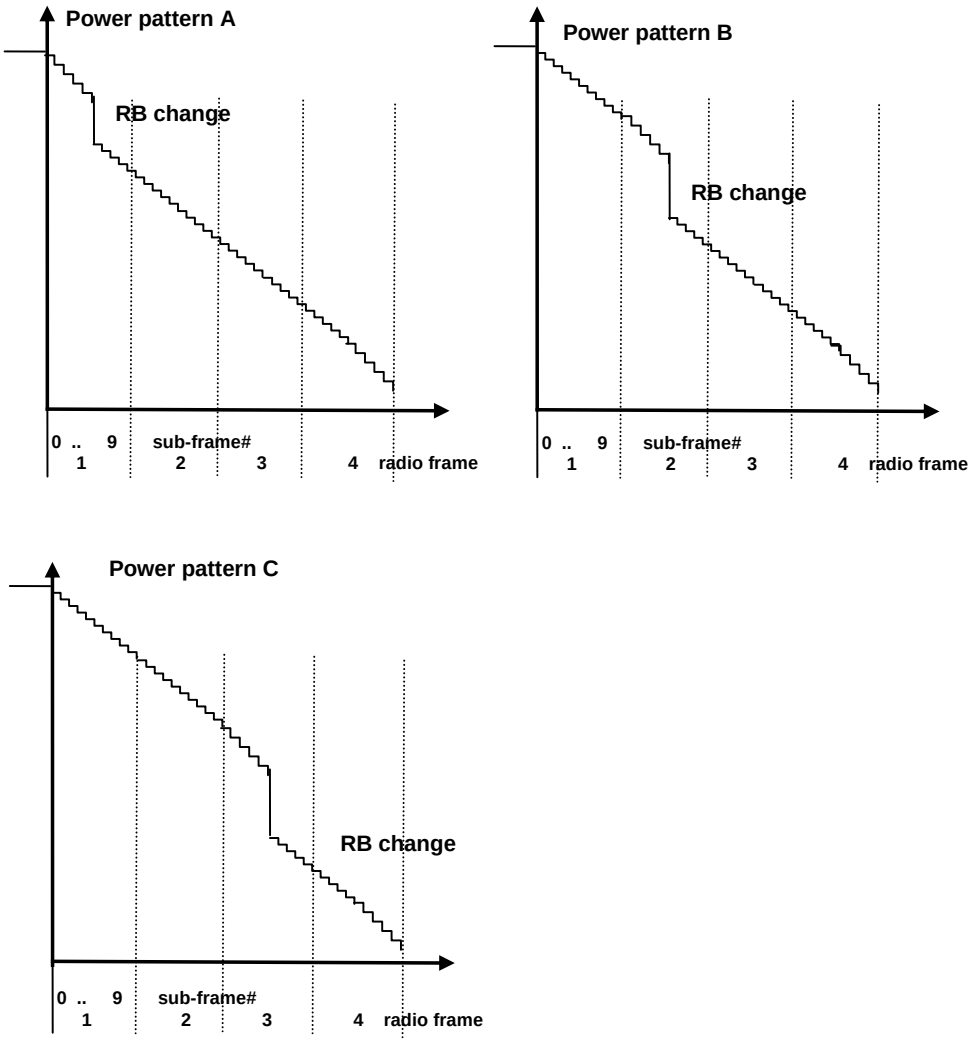

Figure 6.3.5.2.4.2-2: FDD ramping down test power patterns

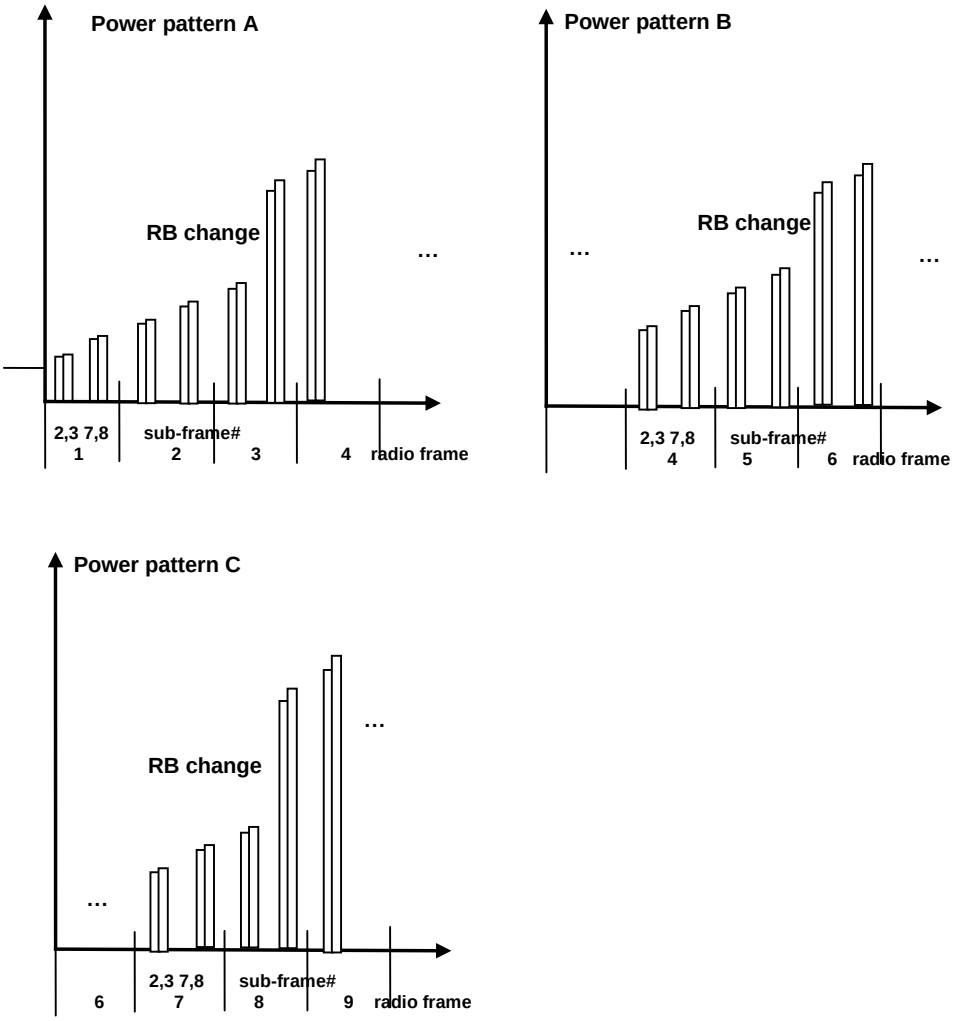

Figure 6.3.5.2.4.2-3: TDD ramping up test power patterns

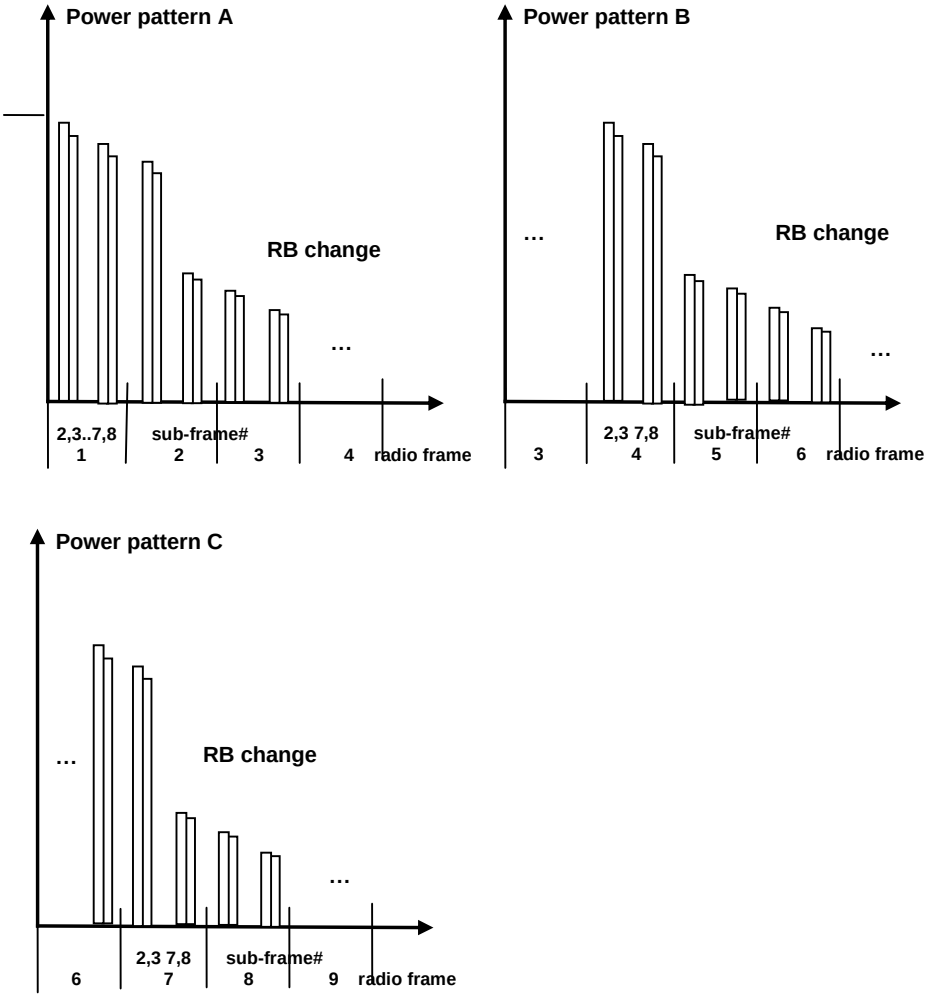

Figure 6.3.5.2.4.2-4: TDD ramping down test power patterns

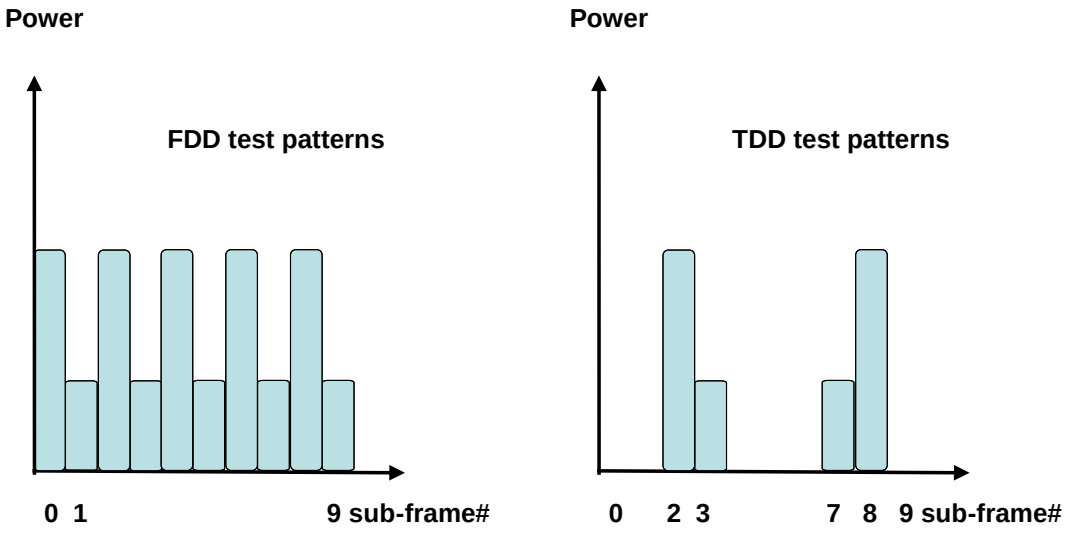

Figure 6.3.5.2.4.2-5: Alternating Test Power patterns

1. Sub test: ramping up pattern

   1.1. 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 and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. Send the appropriate TPC commands for PUSCH to the UE to ensure that the UE transmits PUSCH at -36.8dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at -36.5dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

   1.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.5.2.4.2-1 (FDD pattern A: sub-test is divided in 4 arbitrary radio frames with 10 active uplink sub-frames per radio frame) and Figure 6.3.5.2.4.2-3 (TDD pattern A: sub-test is divided in 10 arbitrary radio frames with 4 active uplink sub-frames per radio frame) with an uplink RB allocation as defined in tables 6.3.5.2.5-1 thru 6.3.5.2.5-12 depending on channel bandwidth. On the PDCCH format 0 for the scheduling of the PUSCH the SS will transmit a +1dB TPC command. Note that the measurement need not be done continuously, provided that interruptions are whole numbers of frames, and TPC commands of 0dB are sent during the interruption.

   1.3. Measure the power of PUSCH transmissions to verify the UE relative power control meet test requirements 6.3.5.2.5. For power transients between subframes, transient periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

   1.4. Repeat the subtest different pattern B, C to move the RB allocation change at different points in the pattern as described in Table 6.3.5.2.5-1 thru Table 6.3.5.2.5-12 to force bigger UE power steps at various points in the power range.

2. Sub test: ramping down pattern

   2.1. 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 and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. Send the appropriate TPC commands for PUSCH to the UE to ensure that the UE transmits PUSCH at +18.0dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at +17.7dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

   2.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.5.2.4.2-2 (FDD pattern A: sub-test is divided in 4 arbitrary radio frames with 10 active uplink sub-frames per radio frame) and Figure 6.3.5.2.4.2-4 (TDD pattern A: sub-test is divided in 10 arbitrary radio frames with 4 active uplink sub-frames per radio frame) with an uplink RB allocation as defined in tables 6.3.5.2.5-1 thru 6.3.5.2.5-12 depending on channel bandwidth. On the PDCCH format 0 for the scheduling of the PUSCH the SS will transmit a -1dB TPC command. Note that the measurement need not be done continuously, provided that interruptions are whole numbers of frames, and TPC commands of 0dB are sent during the interruption.

2.3. Measure the power of PUSCH transmissions to verify the UE relative power control meet test requirements 6.3.5.2.5. For power transients between subframes, transient periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

2.4. Repeat the subtest different pattern B, C to move the RB allocation change at different points in the pattern as described in Table 6.3.5.2.5-1 thru Table 6.3.5.2.5-12 to force bigger UE power steps at various points in the power range.

3. Sub test: alternating pattern

3.1 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 and no loopback data to send the UE sends uplink MAC padding bits on the UL RMC. Send the appropriate TPC commands for PUSCH to the UE to ensure that the UE transmits PUSCH at -10dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at -10dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz. The initial uplink RB allocation is defined as the smaller uplink RB allocation value specified in tables 6.3.5.2.5-13. The power level and RB allocation are reset for each sub-test.

3.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.5.2.4.2-5for 10 sub-frames with an uplink RB allocation alternating pattern as defined in table 6.3.5.2.5-13 while transmitting 0dB TPC command for PUSCH via the PDCCH.

3.3. Measure the power of PUSCH transmissions to verify the UE relative power control meet test requirements specified in clause 6.3.5.2.5. For power transients between subframes, transient periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

6.3.5.2.4.3 Message contents

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

6.3.5.2.5 Test requirement

Each UE power step measured in the test procedure 6.3.5.2.4.2 should satisfy the test requirements specified in Table 6.3.5.2.5-1, thru 6.3.5.2.5-13 for normal conditions; for extreme conditions an additional ± 2.0 dB relaxation is allowed.

To account for RF Power amplifier mode changes 2 exceptions are allowed for each of ramping up and ramping down test patterns. For these exceptions the power tolerance limit is a maximum of ±6.7 dB. If there is an exception in the power step caused by the RB change for all test patterns (A, B, C) then fail the UE.

Table 6.3.5.2.5-1: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 1.4MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]

Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 6 RBs	TPC=+1dB	8.78	4 ≤ ΔP < 10	8.78 ± (4.7) Note 2 8.78 +6.2/-4.7 Note 3
Subframes after RB change	Fixed = 6	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-2: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 1.4MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 5	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 5 to 1 RBs	TPC=-1dB	7.99	4 ≤ ΔP < 1	7.99 ± (4.7) Note 2 7.99 +4.7/-6.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-3: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 3MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 4 RBs	TPC=+1dB	7.02	4 ≤ ΔP < 10	7.02 ± (4.7) Note 2 7.02 +6.2/-4.7 Note 3
Subframes after RB change	Fixed =4	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-4: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 3MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]

Subframes before RB change	Fixed = 15	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 15 to 1 RBs	TPC=-1dB	12.76	10 ≤ ΔP < 15	12.76 ± (5.7) Note 2 12.76 +5.7/-7.2 Note 4
Subframes after RB change	Fixed =1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern **A** the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-5: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 5MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 20	TPC=+1dB	14.01	10 ≤ ΔP < 15	14.01 ± (5.7) Note 2 14.01 +7.2/-5.7 Note 3
Subframes after RB change	Fixed = 20	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-6: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 5MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 25	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 25 to 1	TPC=-1dB	14.98	10 ≤ ΔP < 15	14.98 ± (5.7) Note 2 14.98 +5.7/-7.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-7: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 10MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]

Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 25	TPC=+1dB	14.98	10 ≤ ΔP < 15	14.98 ± (5.7) Note 2 14.98 +7.2/-5.7 Note 3
Subframes after RB change	Fixed = 25	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-8: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 10MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down)	Power step size range (down)	PUSCH
			ΔP [dB]	ΔP [dB]	[dB]

Subframes before RB change	Fixed = 50 (UE-Categories ≥2) Fixed = 48 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 50 to 1 (UE-Categories ≥2) Change from 48 to 1 (UE cat 1)	TPC=-1dB	17.99 17.81	15 ≤ Δ	17.99 ± (6.7) Note 2 17.99 +6.7/-8.2 Note 4 17.81 ± (6.7) Note 2 17.81 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-9: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 15MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up)	Power step size range (Up)	PUSCH
			ΔP [dB]	ΔP [dB]	[dB]

Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 50	TPC=+1dB	17.99	15 ≤ ΔP	17.99±(6.7) Note 2 17.99 +8.2/-6.7 Note 3
Subframes after RB change	Fixed = 50	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-10: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 15MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down)	Power step size range (down)	PUSCH
			ΔP [dB]	ΔP [dB]	[dB]

Subframes before RB change	Fixed = 75 (UE-Categories ≥2) Fixed = 50 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 75 to 1 (UE-Categories ≥2) Change from 50 to 1 (UE Cat 1)	TPC=-1dB	19.75 17.99	15 ≤ ΔP	19.75 ± (6.7) Note 2 19.75 +6.7/-8.2 Note 4 17.99 ± (6.7) Note 2 17.99 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-11: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 20MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]

Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 75	TPC=+1dB	19.75	15 ≤ ΔP	19.75 ± (6.7) Note 2 19.75 +8.2/-6.7 Note 3
Subframes after RB change	Fixed = 75	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-12: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 20MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down)	Power step size range (down)	PUSCH
			ΔP [dB]	ΔP [dB]	[dB]

Subframes before RB change	Fixed = 100 (UE-Categories ≥2) Fixed = 75 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 100 to 1 (UE-Categories ≥2) Change from 75 to 1 (UE Cat 1)	TPC=-1dB	21.0 19.75	15 ≤ ΔP	21.0 ± (6.7) Note 2 21.0 +6.7/-8.2 Note 4 19.75 ± (6.7) Note 2 19.75 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5.2.5-13: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) (Alternating pattern)

Sub-test	Uplink RB allocation	TPC command	Expected power step size (Up or down) ΔP [dB]	Power step size range (Up or down) ΔP [dB]	PUSCH [dB]

1.4 MHz	Alternating 1 and 6	TPC=0dB	7.78	4 ≤ ΔP < 10	7.78 ± (6.7) Note 1,2 7.78 +8.2/-6.7 Note 3 7.78 +6.7/-8.2 Note 4
3 MHz	Alternating 1 and 15	TPC=0dB	11.76	10 ≤ ΔP < 15	11.76 ± (6.7) Note 1,2 11.76 +8.2/-6.7 Note 3 11.76 +6.7/-8.2 Note 4
5 MHZ	Alternating 1 and 25	TPC=0dB	13.98	10 ≤ ΔP < 15	13.98 ± (6.7) Note 1,2 13.98 +8.2/-6.7 Note 3 13.98 +6.7/-8.2 Note 4
10 MHZ	Alternating 1 and 50 (UE-Categories ≥2) Alternating 1 and 48 (UE Cat 1)	TPC=0dB	16.99 16,81	15 ≤ ΔP	16.99 ± (6.7) Note 1,2 16.99 +8.2/-6.7 Note 3 16.99 +6.7/-8.2 Note 4 16.81 ± (6.7) Note 1,2 16.81 +8.2/-6.7 Note 3 16.81 +6.7/-8.2 Note 4
15 MHZ	Alternating 1 and 75 (UE-Categories ≥2) Alternating 1 and 50 (UE Cat 1)	TPC=0dB	18.75 16.99	15 ≤ ΔP	18.75 ± (6.7) Note 1,2 18.75 +8.2/-6.7 Note 3 18.75 +6.7/-8.2 Note 4 16.99 ± (6.7) Note 1,2 16.99 +8.2/-6.7 Note 3 16.99 +6.7/-8.2 Note 4
20 MHZ	Alternating 1 and 100 (UE-Categories ≥2) Alternating 1 and 75 (UE Cat 1)	TPC=0dB	20.00 18.75	15 ≤ ΔP	20.00 ± (6.7) Note 1,2 20.00 +8.2/-6.7 Note 3 20.00 +6.7/-8.2 Note 4 18.75 ± (6.7) Note 1,2 18.75 +8.2/-6.7 Note 3 18.75 +6.7/-8.2 Note 4

Note 1: Test tolerance +/- 6.7 dB was selected to allow PA switch possible exceptions to occur.
Note 2: When neither Note 3 nor Note 4 applies.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

6.3.5.3 Aggregate power control tolerance

6.3.5.3.1 Test purpose

To verify the ability of the UE to maintain its power level in non-contiguous transmission within 21 ms in response to 0 dB TPC commands with respect to the first UE transmission, when the power control parameters specified in TS 36.213 are constant.

6.3.5.3.2 Test applicability

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

6.3.5.3.3 Minimum conformance requirement

The UE shall meet the requirements specified in Table 6.3.5.3.3-1 for relative power control over the power range bounded by the minimum output power as defined in sub clause 6.3.2 and the maximum output power in sub-clause 6.2.2.

Table 6.3.5.3.3-1: Power control tolerance

TPC command	UL channel	Aggregate power tolerance within 21 ms
0 dB	PUCCH	±2.5 dB
0 dB	PUSCH	±3.5 dB
Note 1: The UE transmission gap is 4 ms. TPC command is transmitted via PDCCH 4 subframes preceding each PUCCH/PUSCH transmission.		

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5.3.1.

6.3.5.3.4 Test description

6.3.5.3.4.1 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 table 6.3.5.3.4.1-1. 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 6.3.5.3.4.1-1: Test Configuration Table: PUCCH sub-test

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**				Lowest, 5MHz, Highest
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 6.3.5.3.4.1-2: Test Configuration Table: PUSCH sub-test

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**	Lowest, 5MHz, Highest			
Test Parameters for Channel Bandwidths				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for PUSCH sub-test	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, 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 and DL Reference Measurement channels are set according to Table 6.3.5.3.4.1-1 (PUCCH sub-test) and Table 6.3.5.3.4.1-2 (PUSCH sub-test).

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 6.3.5.3.4.3.

6.3.5.3.4.2 Test procedure

The procedure is separated in two subtests to verify PUCCH and PUSCH aggregate power control tolerance respectively. The uplink transmission patterns are described in figure 6.3.5.3.4.2-1.

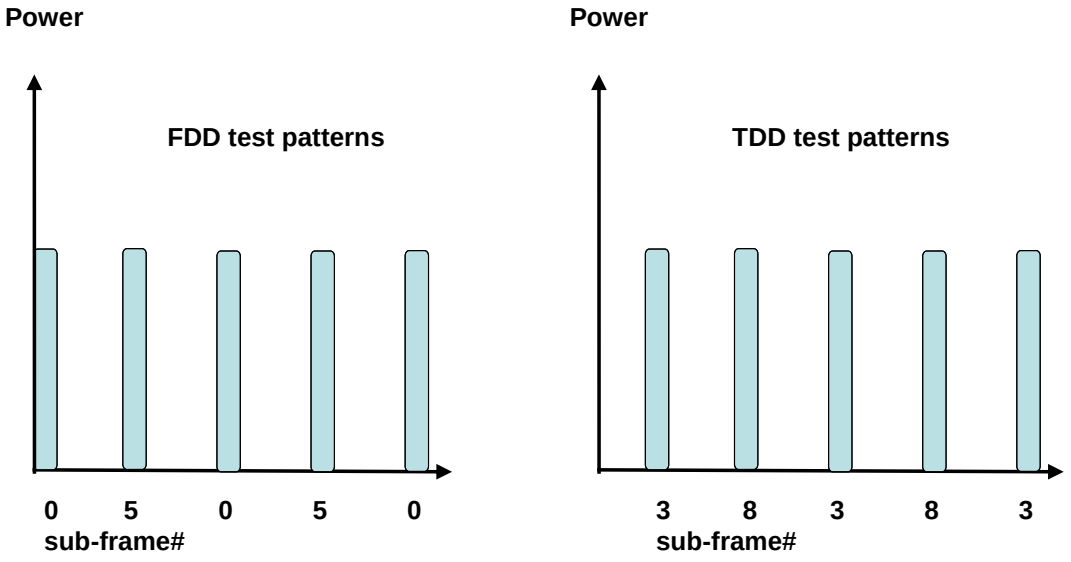

Figure 6.3.5.3.4.2-1 Test uplink transmission

1. PUCCH sub test:

1.1 The SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to Table 6.3.5.3.4.1-1. 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. Send the appropriate TPC commands for PUCCH to the UE to ensure that the UE transmits PUCCH at 0dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at 0dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

1.2. Every 5 subframes transmit to the UE downlink PDSCH MAC padding bits as well as 0 dB TPC command for PUCCH via the PDCCH to make the UE transmit ACK/NACK on the PUCCH with transmission gap of 4 subframes. The downlink transmission is scheduled in the appropriate sub-frames to make the UE transmit PUCCH as described in figure 6.3.5.3.4.2-1.

1.3. Measure the power of 5 consecutive PUCCH transmissions to verify the UE transmitted PUCCH power is maintained within 21 ms. The transient periods of 20us are excluded from the power measurement.

2. PUSCH sub test:

2.1. The SS sends uplink scheduling information via PDCCH DCI format 0 for C_RNTI to schedule the PUSCH. 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 for PUSCH to the UE to ensure that the UE transmits PUSCH at 0dBm +/- 3.2.dB for carrier frequency f ≤ 3.0GHz or at 0dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

2.2. Every 5 subframes schedule the UE's PUSCH data transmission and transmit 0 dB TPC command for PUSCH via the PDCCH to make the UE transmit PUSCH with 4 subframes gap. The uplink transmission patterns are described in figure 6.3.5.3.4.2-1.

2.3. Measure the power of 5 consecutive PUSCH transmissions to verify the UE transmitted PUSCH power is maintained within 21 ms. The transient periods of 20us are excluded from the power measurement.

6.3.5.3.4.3 Message contents

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

6.3.5.3.5 Test requirement

The requirement for the power measurements made in step (1.3) and (2.3) of the test procedure shall not exceed the values specified in Table 6.3.5.3.5-1. The power measurement period shall be 1 sub-frame excluding transient periods.

Table 6.3.5.3.5-1: Power control tolerance

TPC command	UL channel	Test requirement measured power
0 dB	PUCCH	Given 5 power measurements in the pattern, the 2nd, 3rd, 4th, and 5th measurements shall be within ± 3.2 dB of the 1st measurement.
0 dB	PUSCH	Given 5 power measurements in the pattern, the 2nd, 3rd, 4th, and 5th measurements shall be within ± 4.2 dB of the 1st measurement.
Note 1: The UE transmission gap is 4 ms. TPC command is transmitted via PDCCH 4 subframes preceding each PUCCH/PUSCH transmission.		

6.3.5_1 Power Control for HPUE

Same text as in clause 6.3.5.

6.3.5_1.1 Power Control Absolute power tolerance for HPUE

6.3.5_1.1.1 Test purpose

Same test purpose as in clause 6.3.5.1.1.

6.3.5_1.1.2 Test applicability

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

6.3.5_1.1.3 Minimum conformance requirement

Same minimum conformance requirement as in clause 6.3.5.1.2 with the following exceptions:

- of sub-clause 6.2.2 → use sub-clause 6.2.2_1

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5.1.1.

6.3.5_1.1.4 Test description

Same test description as in clause 6.3.5.1.4 with the following exceptions:

- For test point 2, instead of Table 6.3.5.1.4.3-2 → use Table 6.3.5_1.1.4.3-1

Table 6.3.5_1.1.4.3-1: UplinkPowerControlCommon: Test point 2

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE {			
p0-NominalPUSCH	-85	Test point 2 to verify a UE relative high initial power transmission	

6.3.5_1.1.5 Test requirement

The requirement for the power measured in step (2) of the test procedure is not to exceed the values specified in Table 6.3.5_1.1.5-1 and 6.3.5_1.1.5-2.

Table 6.3.5_1.1.5-1: Absolute power tolerance: test point 1

	Channel bandwidth / expected output power (dBm)	
	5 MHz	**10 MHz**
Expected Measured power Normal conditions	-8.6 dBm	-5.6 dBm
Power tolerance	± 10.0dB	± 10.0dB
Expected Measured power Extreme conditions	-8.6 dBm	-5.6 dBm
Power tolerance	± 13.0dB	± 13.0dB
Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3		

Table 6.3.5_1.1.5-2: Absolute power tolerance: test point 2

	Channel bandwidth / expected output power (dBm)	
	5 MHz	**10 MHz**
Expected Measured power Normal conditions	11.4 dBm	14.4 dBm
Power tolerance	± 10.0dB	± 10.0dB
Expected Measured power Extreme conditions	11.4 dBm	14.4 dBm
Power tolerance	± 13.0dB	± 13.0dB
Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3		

6.3.5_1.2 Power Control Relative power tolerance for HPUE

6.3.5_1.2.1 Test purpose

Same test purpose as in clause 6.3.5.2.1.

6.3.5_1.2.2 Test applicability

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

6.3.5_1.2.3 Minimum conformance requirement

Same minimum conformance requirement as in clause 6.3.5.2.3 with the following exceptions

- stead of clause 6.2.2.3 → use sub-clause 6.2.2_1.3

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5.2.

6.3.5_1.2.4 Test description

Same test description as in clause 6.3.5.2.4 with the following exceptions:

- clause 6.3.5.2.4.2, test step 2.1, setting the UE PUSCH power at +26dBm +/-3.2dB instead of +18.0dBm +/-3.2dB

6.3.5_1.2.5 Test requirement

Same test requirement as in clause 6.3.5.2.5.

6.3.5_1.3 Aggregate power control tolerance for HPUE

6.3.5_1.3.1 Test purpose

Same test purpose as in clause 6.3.5.3.1.

6.3.5_1.3.2 Test applicability

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

6.3.5_1.3.3 Minimum conformance requirement

Same minimum conformance requirement as in clause 6.3.5.3.3 with the following exception:

- Instead of sub-clause 6.2.2 → use sub-clause 6.2.2_1

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5.3.1.

6.3.5_1.3.4 Test description

Same test description as in clause 6.3.5.3.4.

6.3.5_1.3.5 Test requirement

Same test requirement as in clause 6.3.5.3.5.

6.3.5A Power Control for CA

6.3.5A.1 Power Control Absolute power tolerance for CA

6.3.5A.1.1 Power Control Absolute power tolerance for CA (intra-band contiguous DL CA and UL CA)

6.3.5A.1.1.1 Test purpose

To verify the ability of the UE transmitter to set its initial output power to a specific value for the first sub-frame at the start of a contiguous transmission or non-contiguous transmission with a transmission gap on each active component carriers larger than 20ms.

6.3.5A.1.1.2 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.

6.3.5A.1.1.3 Minimum conformance requirements

The absolute power tolerance is the ability of the UE transmitter to set its initial output power to a specific value for the first sub-frame at the start of a contiguous transmission or non-contiguous transmission with a transmission gap on each active component carriers larger than 20ms. The requirement can be tested by time aligning any transmission gaps on the component carriers.

For intra-band contiguous carrier aggregation bandwidth class C the absolute power control tolerance per component carrier is given in Table 6.3.5A.1.1.3-1.

The requirements apply for one single PUCCH, PUSCH or SRS transmission of contiguous PRB allocation per component carrier.

Table 6.3.5A.1.1.3-1: Absolute power tolerance for intra-band contiguous CA

Conditions	Tolerance
Normal conditions	± 9.0 dB
Extreme conditions	± 12.0 dB

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5A.1.1.

6.3.5A.1.1.4 Test description

6.3.5A.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 6.3.5A.1.1.4.1-1. The details of the uplink reference measurement channel (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.5A.1.1.4.1-1: Test Configuration Table

Initial Conditions								
Test Environment as specified in TS 36.508[7] clause 4.1		Normal, TL/VL, TL/VH, TH/VL, TH/VH						
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**	**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	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 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 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 6.3.5A.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 6.3.5A.1.1.4.3. Any PDCCH DCI format 0 sent to the UE during the configuration should have TPC command 0dB.

6.3.5A.1.1.4.2 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 for UplinkPowerControlCommonSCell-r10 are defined in tables 6.3.5A.1.1.4.3-2, 6.3.5A.1.1.4.3-4 and 6.3.5A.1.1.4.3-7. Any PDCCH DCI format 0 sent to the UE during the configuration should have TPC command 0dB.
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 with TPC command 0dB for C_RNTI to schedule the UL RMC according to Table 6.3.5A.1.1.4.1-1 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. Measure the initial output power of the first subframe of the UE PUSH first transmission for each component carrier. The transient periods of 20us are excluded.
6. Repeat for the two test points as indicated in section 6.3.5A.1.1.4.3. The timing of the execution between the two test points shall be larger than 20ms.

6.3.5A.1.1.4.3 Message contents

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

Table 6.3.5A.1.1.4.3-1: UplinkPowerControlCommon: Test point 1

Derivation Path: TS 36.508 [7] clause 6.3.2, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE {			
p0-NominalPUSCH	-105	Test point 1 to verify a UE relative low initial power transmission	

Table 6.3.5A.1.1.4.3-2: UplinkPowerControlCommonSCell-r10: Test point 1

Derivation Path: TS 36.508 [7] clause 6.3.2, Table 4.6.3-25A UplinkPowerControlCommonSCell-r10-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommonSCell-r10 ::= SEQUENCE {			
p0-NominalPUSCH	-105	Test point 1 to verify a UE relative low initial power transmission	

Table 6.3.5A.1.1.4.3-3: UplinkPowerControlCommon: Test point 2

Derivation Path: TS 36.508 [7] clause 6.3.2, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE {			
p0-NominalPUSCH	-93	Test point 2 to verify a UE relative high initial power transmission	

Table 6.3.5A.1.1.4.3-4: UplinkPowerControlCommonSCell-r10: Test point 2

Derivation Path: TS 36.508 [7] clause 6.3.2, Table 4.6.3-25A UplinkPowerControlCommonSCell-r10-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommonSCell-r10 ::= SEQUENCE {			
p0-NominalPUSCH	-93	Test point 2 to verify a UE relative high initial power transmission	

Table 6.3.5A.1.1.4.3-5: PhysicalConfigDedicated

Derivation Path: TS 36.508 [7] clause 6.3.2, Table 5.5.1.2.1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {			
uplinkPowerControlDedicated	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	SRB1
	UplinkPowerControlDedicated-DEFAULT	See subclause 4.6.3	RBC

Table 6.3.5A.1.1.4.3-6: UplinkPowerControlDedicated

Derivation Path: TS 36.508 [7] clause 6.3.2, Table 4.6.3-26 UplinkPowerControlDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {			
p0-UE-PUSCH	1		SRB1
	0		RBC
}			

Table 6.3.5A.1.1.4.3-7: UplinkPowerControlDedicatedSCell-r10

Derivation Path: TS 36.508 [7] clause 6.3.2, Table 4.6.3-26B UplinkPowerControlDedicatedSCell-r10-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlDedicatedSCell-r10 ::= SEQUENCE {			
p0-UE-PUSCH	1		SRB1
	0		RBC
}			

6.3.5A.1.1.5 Test requirement

For intra-band contiguous carrier aggregation bandwidth class C, the absolute power control tolerance per component carrier measured in step (5) of the test procedure is not to exceed the values specified in Table 6.3.5A.1.1.5-1 and 6.3.5A.1.1.5-2. The test requirement tables are originated from tables 6.3.5.1.5-1 and 6.3.5.1.5-2.

Table 6.3.5A.1.1.5-1: Absolute power tolerance for intra-band contiguous CA: test point 1

	Channel bandwidth / expected output power (dBm)					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Expected Measured power Normal conditions	-14.8 dBm	-10.8 dBm	-8.6 dBm	-5.6 dBm	-3.9 dBm	-2.6 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB
Expected Measured power Extreme conditions	-14.8 dBm	-10.8 dBm	-8.6 dBm	-5.6 dBm	-3.9 dBm	-2.6 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB
Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3						

Table 6.3.5A.1.1.5-2: Absolute power tolerance for intra-band contiguous CA: test point 2

	Channel bandwidth / expected output power (dBm)					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Expected Measured power Normal conditions	-2.8 dBm	1.2 dBm	3.4 dBm	6.4 dBm	8.2 dBm	9.4 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB
Expected Measured power Extreme conditions	-2.8 dBm	1.2 dBm	3.4 dBm	6.4 dBm	8.2 dBm	9.4 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB
Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3						

6.3.5A.2 Power Control Relative power tolerance for CA

6.3.5A.2.1 Power Control Relative power tolerance for CA (intra-band contiguous DL CA and UL CA)

In the minimum conformance paragraph and in the test procedure the alignment (±[2]) of the two component carriers needs to be confirmed.

6.3.5A.2.1.1 Test purpose

To verify the ability of the UE transmitter to change the output power in both assigned component carrier in the uplink with a defined power step sizes between sub-frames on the two respective component carrier.

6.3.5A.2.1.2 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.

6.3.5A.2.1.3 Minimum conformance requirement

The requirements apply when the power of the target and reference sub-frames on each component carrier exceed the minimum output power as defined in subclause 6.3.2A and the total power is limited by P_{UMAX} as defined in subclause 6.2.5A.

For intra-band contiguous carrier aggregation bandwidth class C, the UE transmitter shall have the capability of changing the output power in both assigned component carrier in the uplink with a step sizes of ΔP between subframes on the two respective component carrier as follows

a) The requirements for all combinations of PUSCH and PUCCH transitions per component carrier is given in Table 6.3.5A.2.1.3-1, when the average transmit power per PRB for the transmission on the assigned carriers are aligned to within ±[2] dB in the reference sub-frame and the target subframe after the transition.

b) For SRS the requirements for combinations of PUSCH/PUCCH and SRS transitions between sub-frames given in Table 6.3.5A.2.1.3-1 apply per component carrier when the target and reference subframes are configured for either simultaneous SRS or simultaneous PUSCH and with the average transmit power per PRB for the transmissions on the assigned carrier aligned to within ±[2] dB in the reference sub-frame and the target subframe after the transition.

c) For RACH the requirements apply for the primary cell and are given in Table 6.3.5A.2.1.3-1.

Table 6.3.5A.2.1.3-1 Relative Power Tolerance for Transmission (normal conditions)

Power step ΔP (Up or down) [dB]	All combinations of PUSCH and PUCCH transitions [dB]	All combinations of PUSCH/PUCCH and SRS transitions between sub-frames [dB]	PRACH [dB]
ΔP < 2	±2.5 (Note 3)	±3.0	±2.5
2 ≤ ΔP < 3	±3.0	±4.0	±3.0
3 ≤ ΔP < 4	±3.5	±5.0	±3.5
4 ≤ ΔP ≤ 10	±4.0	±6.0	±4.0
10 ≤ ΔP < 15	±5.0	±8.0	±5.0
15 ≤ ΔP	±6.0	±9.0	±6.0

Note 1: For extreme conditions an additional ± 2.0 dB relaxation is allowed

Note 2: For operating bands under Note 2 in Table 6.2.2.3-1, the relative power tolerance is relaxed by increasing the upper limit by 1.5 dB if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges; if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or FUL_high - 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges, then the tolerance is relaxed by reducing the lower limit by 1.5 dB.

Note 3: For PUSCH to PUSCH transitions with the allocated resource blocks fixed in frequency and no transmission gaps other than those generated by downlink subframes, DwPTS fields or Guard Periods for TDD: for a power step ΔP ≤ 1 dB, the relative power tolerance for transmission is ±1.0 dB.

The power step (ΔP) is defined as the difference in the calculated setting of the UE Transmit power between the target and reference sub-frames with the power setting according to Clause 5.1 of TS 36.213. The error is the difference between ΔP and the power change measured at the UE antenna port with the power of the cell-specific reference signals kept constant. The error shall be less than the relative power tolerance specified in Table 6.3.5A.2.1.3-1.

The normative reference for this requirement is TS 36.101 clause 6.3.5A.2.

6.3.5A.2.1.4 Test description

6.3.5A.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 6.3.5A.2.1.4.1-1. 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 6.3.5A.2.1.4.1-1: Test Configuration Table

Initial Conditions									
Test Environment as specified in TS 36.508[7] clause 4.1			Normal, TL/VL, TL/VH, TH/VL, TH/VH						
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**	**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	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] 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 Reference Measurement channel is set according to table 6.3.5A.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 6.3.5A.2.1.4.3.

6.3.5A.2.1.4.2 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.
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. The procedure is separated in various subtests to verify different aspects of relative power control. The power patterns of the subtests are described in figure 6.3.5.2.4.2-1, 6.3.5.2.4.2-2, 6.3.5.2.4.2-3, 6.3.5.2.4.2-4 and 6.3.5.2.4.2-5.
5. Sub test: ramping up pattern

5.1. 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 6.3.5A.1.1.4.1-1 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. Send the appropriate TPC commands for PUSCH on each component carrier to the UE to ensure that the UE transmits PUSCH at -36.8dBm +/- 3.2 dB for carrier frequency f $\leq$ 3.0GHz or at -36.5dBm +/- 3.5 dB for carrier frequency 3.0GHz < f $\leq$ 4.2GHz. In addition, considering that PCC and SCC uplink RB allocations are both active, the average transmit power per PRB for the transmission on the assigned carriers shall aligned within ±[2] dB in the reference sub-frame and the target subframe after the transition. In case they are not aligned, SS shall send appropriate TPC commands for PUSCH on the relevant component in order to be aligned before continuing the test.

5.2. Schedule the UE's PUSCH data transmission on each component carrier as described in Figure 6.3.5.2.4.2-1 (FDD pattern A: sub-test is divided in 4 arbitrary radio frames with 10 active uplink sub-frames per radio frame)

and Figure 6.3.5.2.4.2-3 (TDD pattern A: sub-test is divided in 10 arbitrary radio frames with 4 active uplink sub-frames per radio frame) with an uplink RB allocation as defined in tables 6.3.5.2.5-1 thru 6.3.5.2.5-12 depending on channel bandwidth. On the PDCCH format 0 for the scheduling of the PUSCH of each component carrier the SS will transmit a +1dB TPC command. Note that the measurement need not be done continuously, provided that interruptions are whole numbers of frames, and TPC commands of 0dB are sent during the interruption.

5.3. Measure the power of PUSCH transmissions on each component carrier to verify the UE relative power control meet test requirements 6.3.5.2.5. For power transients between subframes, transient periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

5.4. Repeat the subtest different pattern B, C to move the RB allocation change at different points in the pattern as described in Table 6.3.5.2.5-1 thru Table 6.3.5.2.5-12 to force bigger UE power steps at various points in the power range on each component carrier.

6. Sub test: ramping down pattern

6.1. 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 6.3.5A.1.1.4.1-1 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. Send the appropriate TPC commands for PUSCH on each component carrier to the UE to ensure that the UE transmits PUSCH at +18.0dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at +17.7dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz. In addition, considering that PCC and SCC uplink RB allocations are both active, the average transmit power per PRB for the transmission on the assigned carriers shall aligned within ±[2] dB in the reference sub-frame and the target subframe after the transition. In case they are not aligned, SS shall send appropriate TPC commands for PUSCH on the relevant component in order to be aligned before continuing the test.

6.2. Schedule the UE's PUSCH data transmission on each component carrier as described in Figure 6.3.5.2.4.2-2 (FDD pattern A: sub-test is divided in 4 arbitrary radio frames with 10 active uplink sub-frames per radio frame) and Figure 6.3.5.2.4.2-4 (TDD pattern A: sub-test is divided in 10 arbitrary radio frames with 4 active uplink sub-frames per radio frame) with an uplink RB allocation as defined in tables 6.3.5.2.5-1 thru 6.3.5.2.5-12 depending on channel bandwidth. On the PDCCH format 0 for the scheduling of the PUSCH of each component carrier the SS will transmit a -1dB TPC command. Note that the measurement need not be done continuously, provided that interruptions are whole numbers of frames, and TPC commands of 0dB are sent during the interruption.

6.3. Measure the power of PUSCH transmissions on each component carrier to verify the UE relative power control meet test requirements 6.3.5.2.5. For power transients between subframes, transient periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

6.4. Repeat the subtest different pattern B, C to move the RB allocation change at different points in the pattern as described in Table 6.3.5.2.5-1 thru Table 6.3.5.2.5-12 to force bigger UE power steps at various points in the power range on each component carrier.

7. Sub test: alternating pattern

7.1. 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 6.3.5A.1.1.4.1-1 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. Send the appropriate TPC commands for PUSCH on each component carrier to the UE to ensure that the UE transmits PUSCH at -10dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at -10dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz. The initial uplink RB allocation is defined as the smaller uplink RB allocation value specified in tables 6.3.5.2.5-13. The power level and RB allocation are reset for each sub-test.

7.2. Schedule the UE's PUSCH data transmission on each component carrier as described in Figure 6.3.5.2.4.2-5for 10 sub-frames with an uplink RB allocation alternating pattern as defined in table 6.3.5.2.5-13 while transmitting 0dB TPC command for PUSCH via the PDCCH.

7.3. Measure the power of PUSCH transmissions on each component carrier to verify the UE relative power control meet test requirements specified in clause 6.3.5.2.5. For power transients between subframes, transient

periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

6.3.5A.2.1.4.3 Message contents

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

6.3.5A.2.1.5 Test requirement

For intra-band contiguous carrier aggregation bandwidth class C, the relative power control tolerance per component carrier measured in steps (5), (6) and (7) of the test procedure should satisfy the test requirements specified in Tables 6.3.5A.2.1.5-1, thru 6.3.5A.2.1.5-13 for normal conditions; for extreme conditions an additional ± 2.0 dB relaxation is allowed. The test requirement tables are originated from tables 6.3.5.2.5-1, thru 6.3.5.2.5-13.

To account for RF Power amplifier mode changes 2 exceptions are allowed for each of ramping up and ramping down test patterns. For these exceptions the power tolerance limit is a maximum of ±6.7 dB. If there is an exception in the power step caused by the RB change for all test patterns (A, B, C) then fail the UE.

Table 6.3.5A.2.1.5-1: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 1.4MHz (ramping up) for intra-band contiguous DL CA and UL CA

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 6 RBs	TPC=+1dB	8.78	4 ≤ ΔP < 10	8.78 ± (4.7) Note 2 8.78 +6.2/-4.7 Note 3
Subframes after RB change	Fixed = 6	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-2: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 1.4MHz (ramping down) for intra-band contiguous DL CA and UL CA

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]

Subframes before RB change	Fixed = 5	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 5 to 1 RBs	TPC=-1dB	7.99	4 ≤ ΔP < 1	7.99 ± (4.7) Note 2 7.99 +4.7/-6.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-3: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 3MHz (ramping up) for intra-band contiguous DL CA and UL CA

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 4 RBs	TPC=+1dB	7.02	4 ≤ ΔP < 10	7.02 ± (4.7) Note 2 7.02 +6.2/-4.7 Note 3
Subframes after RB change	Fixed =4	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-4: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 3MHz (ramping down) for intra-band contiguous DL CA and UL CA

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 15	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 15 to 1 RBs	TPC=-1dB	12.76	10 ≤ ΔP < 15	12.76 ± (5.7) Note 2 12.76 +5.7/-7.2 Note 4
Subframes after RB change	Fixed =1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern **A** the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-5: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 5MHz (ramping up) for intra-band contiguous DL CA and UL CA

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]

Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 20	TPC=+1dB	14.01	10 ≤ ΔP < 15	14.01 ± (5.7) Note 2 14.01 +7.2/-5.7 Note 3
Subframes after RB change	Fixed = 20	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-6: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 5MHz (ramping down) for intra-band contiguous DL CA and UL CA

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 25	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 25 to 1	TPC=-1dB	14.98	10 ≤ ΔP < 15	14.98 ± (5.7) Note 2 14.98 +5.7/-7.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-7: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 10MHz (ramping up) for intra-band contiguous DL CA and UL CA

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 25	TPC=+1dB	14.98	10 ≤ ΔP < 15	14.98 ± (5.7) Note 2 14.98 +7.2/-5.7 Note 3
Subframes after RB change	Fixed = 25	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-8: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 10MHz (ramping down) for intra-band contiguous DL CA and UL CA

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]

Subframes before RB change	Fixed = 50 (UE-Categories ≥2) Fixed = 48 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 50 to 1 (UE-Categories ≥2) Change from 48 to 1 (UE cat 1)	TPC=-1dB	17.99 17.81	15 ≤ Δ	17.99 ± (6.7) Note 2 17.99 +6.7/-8.2 Note 4 17.81 ± (6.7) Note 2 17.81 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-9: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 15MHz (ramping up) for intra-band contiguous DL CA and UL CA

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up)	Power step size range (Up)	PUSCH
			ΔP [dB]	ΔP [dB]	[dB]

Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 50	TPC=+1dB	17.99	15 ≤ ΔP	17.99±(6.7) Note 2 17.99 +8.2/-6.7 Note 3
Subframes after RB change	Fixed = 50	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-10: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 15MHz (ramping down) for intra-band contiguous DL CA and UL CA

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down)	Power step size range (down)	PUSCH
			ΔP [dB]	ΔP [dB]	[dB]

Subframes before RB change	Fixed = 75 (UE-Categories ≥2) Fixed = 50 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 75 to 1 (UE-Categories ≥2) Change from 50 to 1 (UE Cat 1)	TPC=-1dB	19.75 17.99	15 ≤ ΔP	19.75 ± (6.7) Note 2 19.75 +6.7/-8.2 Note 4 17.99 ± (6.7) Note 2 17.99 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-11: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 20MHz (ramping up) for intra-band contiguous DL CA and UL CA

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]

Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 1 to 75	TPC=+1dB	19.75	15 ≤ ΔP	19.75 ± (6.7) Note 2 19.75 +8.2/-6.7 Note 3
Subframes after RB change	Fixed = 75	TPC=+1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-12: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 20MHz (ramping down) for intra-band contiguous DL CA and UL CA

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down)	Power step size range (down)	PUSCH
			ΔP [dB]	ΔP [dB]	[dB]

Subframes before RB change	Fixed = 100 (UE-Categories ≥2) Fixed = 75 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± (1.7)
RB change	Change from 100 to 1 (UE-Categories ≥2) Change from 75 to 1 (UE Cat 1)	TPC=-1dB	21.0 19.75	15 ≤ ΔP	21.0 ± (6.7) Note 2 21.0 +6.7/-8.2 Note 4 19.75 ± (6.7) Note 2 19.75 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± (1.7)

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes
Note 2: When Note 4 does not apply.
Note 3: N/A
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5A.2.1.5-13: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) (Alternating pattern) for intra-band contiguous DL CA and UL CA

Sub-test	Uplink RB allocation	TPC command	Expected power step size (Up or down) ΔP [dB]	Power step size range (Up or down) ΔP [dB]	PUSCH [dB]

1.4 MHz	Alternating 1 and 6	TPC=0dB	7.78	4 ≤ ΔP < 10	7.78 ± (6.7) Note 1,2 7.78 +8.2/-6.7 Note 3 7.78 +6.7/-8.2 Note 4
3 MHz	Alternating 1 and 15	TPC=0dB	11.76	10 ≤ ΔP < 15	11.76 ± (6.7) Note 1,2 11.76 +8.2/-6.7 Note 3 11.76 +6.7/-8.2 Note 4
5 MHZ	Alternating 1 and 25	TPC=0dB	13.98	10 ≤ ΔP < 15	13.98 ± (6.7) Note 1,2 13.98 +8.2/-6.7 Note 3 13.98 +6.7/-8.2 Note 4
10 MHZ	Alternating 1 and 50 (UE-Categories ≥2) Alternating 1 and 48 (UE Cat 1)	TPC=0dB	16.99 16,81	15 ≤ ΔP	16.99 ± (6.7) Note 1,2 16.99 +8.2/-6.7 Note 3 16.99 +6.7/-8.2 Note 4 16.81 ± (6.7) Note 1,2 16.81 +8.2/-6.7 Note 3 16.81 +6.7/-8.2 Note 4
15 MHZ	Alternating 1 and 75 (UE-Categories ≥2) Alternating 1 and 50 (UE Cat 1)	TPC=0dB	18.75 16.99	15 ≤ ΔP	18.75 ± (6.7) Note 1,2 18.75 +8.2/-6.7 Note 3 18.75 +6.7/-8.2 Note 4 16.99 ± (6.7) Note 1,2 16.99 +8.2/-6.7 Note 3 16.99 +6.7/-8.2 Note 4
20 MHZ	Alternating 1 and 100 (UE Cat 2-5) Alternating 1 and 75 (UE Cat 1)	TPC=0dB	20.00 18.75	15 ≤ ΔP	20.00 ± (6.7) Note 1,2 20.00 +8.2/-6.7 Note 3 20.00 +6.7/-8.2 Note 4 18.75 ± (6.7) Note 1,2 18.75 +8.2/-6.7 Note 3 18.75 +6.7/-8.2 Note 4

Note 1: Test tolerance +/- 6.7 dB was selected to allow PA switch possible exceptions to occur.
Note 2: When neither Note 3 nor Note 4 applies.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

6.3.5A.3 Aggregate power control tolerance for CA

6.3.5A.3.1 Aggregate power control tolerance for CA (intra-band contiguous DL CA and UL CA)

6.3.5A.3.1.1 Test purpose

To verify the ability of a UE to maintain its power in non-contiguous transmission within 21 ms in response to 0 dB TPC commands with respect to the first UE transmission, when the power control parameters specified in [TS 36.213] are constant on all active component carriers.

6.3.5A.3.1.2 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.

6.3.5A.3.1.3 Minimum conformance requirements

For intra-band contiguous carrier aggregation bandwidth class C, the aggregate power tolerance per component carrier is given in Table 6.3.5A.3.1.3-1 with simultaneous PUCCH and PUSCH configured if supported. The requirement can be tested with the transmission gaps time aligned between component carriers.

Table 6.3.5A.3.1.3-1: Aggregate power control tolerance for intra-band contiguous CA

TPC command	UL channel	Aggregate power tolerance within 21 ms
0 dB	PUCCH	±2.5 dB
0 dB	PUSCH	±3.5 dB
NOTE: The UE transmission gap is 4 ms. TPC command is transmitted via PDCCH 4 subframes preceding each PUCCH/PUSCH transmission.		

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5A.3.1.

6.3.5A.3.1.4 Test description

6.3.5A.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 6.3.5A.3.1.4.1-1and table 6.3.5A.3.1.4.1-2. The details of the uplink reference measurement channel (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.5A.3.1.4.1-1: Test Configuration Table: PUCCH sub-test

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**		**Uplink Configuration**
PCC N_{RB}	**SCCs N_{RB}**	**CC Mod**	**PCC & SCC RB allocation**	FDD: PUCCH format = Format 1b with channel selection/Format 3 TDD: PUCCH format = Format 1b with channel selection/Format 3
75	75	QPSK	75+75	
100	50	QPSK	100+50	
100	100	QPSK	100+100	
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 6.3.5A.3.1.4.1-2: Test Configuration Table: PUSCH sub-test

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 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			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	150	P_75@0	S_75@0			
100	50		QPSK	150	P_100@0	S_50@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] clause 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 and DL Reference Measurement channel is set according to Table 6.3.5A.3.1.4.1-1 (PUCCH sub-test) and Table 6.3.5A.3.1.4.1-2 (PUSCH sub-test).
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 6.3.5A.3.1.4.3.

6.3.5A.3.1.4.2 Test procedure

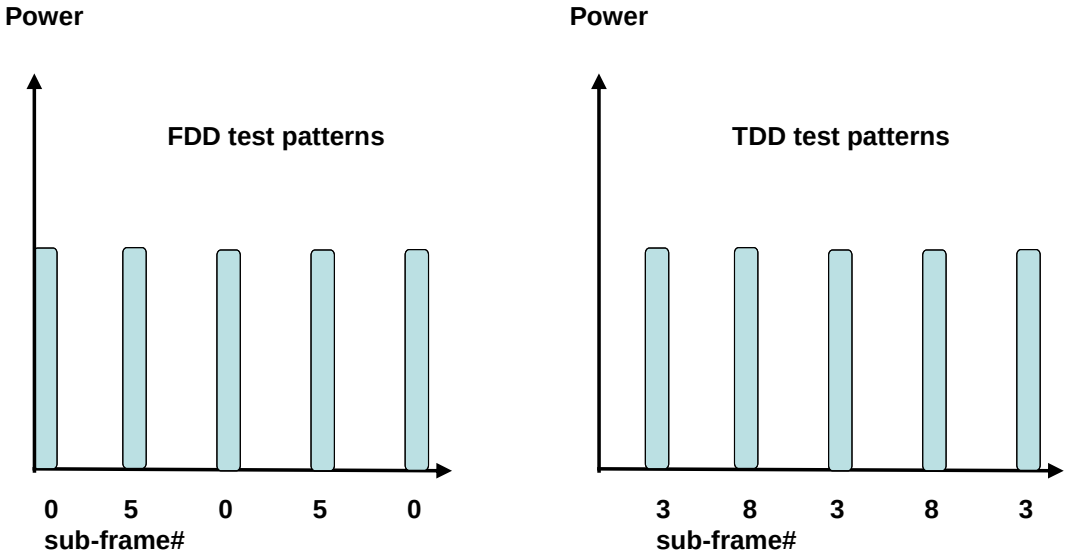

Figure 6.3.5A.3.1.4.2-1: Test uplink transmission

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.

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. The procedure is separated in two subtests to verify PUCCH and PUSCH aggregate power control tolerance respectively. The uplink transmission patterns are described in figure 6.3.5A.3.1.4.2-1.

5. PUCCH sub test:

   5.1 The SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to Table 6.3.5A.3.1.4.1-1 on both PCC and SCC. 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 on PCC. Send the appropriate TPC commands for PUCCH to the UE to ensure that the UE transmits PUCCH at 0dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at 0dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

   5.2 Every 5 subframes transmit to the UE downlink PDSCH MAC padding bits as well as 0 dB TPC command for PUCCH via the PDCCH to make the UE transmit ACK/NACK on the PUCCH with transmission gap of 4 subframes. The downlink transmission is scheduled in the appropriate sub-frames to make the UE transmit PUCCH as described in figure 6.3.5A.3.1.4.2-1.

   5.3 Measure the power of 5 consecutive PUCCH transmissions on PCC to verify the UE transmitted PUCCH power is maintained within 21 ms. The transient periods of 20us are excluded from the power measurement.

6. PUSCH sub test:

   6.1 The 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 6.3.5A.3.1.4.1-2 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. Send the appropriate TPC commands for PUSCH to the UE to ensure that the UE transmits PUSCH at 0dBm +/- 3.2.dB for carrier frequency f ≤ 3.0GHz or at 0dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

   6.2 Every 5 subframes schedule the UE's PUSCH data transmission and transmit 0 dB TPC command for PUSCH via the PDCCH to make the UE transmit PUSCH with 4 subframes gap. The uplink transmission patterns are described in figure 6.3.5A.3.1.4.2-1.

   6.3 Measure the power on both PCC and SCC of 5 consecutive PUSCH transmissions to verify the UE transmitted PUSCH power is maintained within 21 ms on each component carrier. The transient periods of 20us are excluded from the power measurement.

6.3.5A.3.1.4.3 Message contents

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

6.3.5A.3.1.5 Test requirement

For intra-band contiguous carrier aggregation bandwidth class C, the aggregate power control tolerance per component carrier measured in step (2) of the test procedure is not to exceed the values specified in Table 6.3.5A.3.1.5-1.

Table 6.3.5A.3.1.5-1: Aggregate power control tolerance for intra-band contiguous CA

TPC command	UL channel	Aggregate power tolerance within 21 ms
0 dB	PUCCH	±3.2 dB
0 dB	PUSCH	±4.2 dB
NOTE: The UE transmission gap is 4 ms. TPC command is transmitted via PDCCH 4 subframes preceding each PUCCH/PUSCH transmission.		

6.3.5B Power Control for UL- MIMO

6.3.5B.1 Power Control Absolute Power Tolerance for UL- MIMO

6.3.5B.1.1 Test purpose

To verify the ability of the UE transmitter for UL-MIMO to set its initial output power to a specific value at the start of a contiguous transmission or non-contiguous transmission with a long transmission gap, i.e. transmission gap is larger than 20 ms.

6.3.5B.1.2 Minimum conformance requirement

For UE with multiple transmit antenna connectors, the power control tolerance applies to the sum of output power at each transmit antenna connector.

The power control requirements specified in subclause 6.3.5 apply to UE with two transmit antenna connectors with UL-MIMO configurations specified in Table 6.2.2B.3-2 for closed-loop spatial multiplexing scheme, wherein

- The Maximum output power requirements for UL-MIMO are specified in subclause 6.2.2B
- The Minimum output power requirements for UL-MIMO are specified in subclause 6.3.2B

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5B.

6.3.5B.1.3 Test applicability

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

6.3.5B.1.4 Test description

6.3.5B.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 6.3.5B.1.4.1-1. The details of the uplink reference measurement channel (RMCs) are specified in Annexes A.2. Configurations of PDSCH and PDCCH before measurement are specified in Annex C.2.

Table 6.3.5B.1.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508[7] subclause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH			
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	N/A for Power Control Absolute power tolerance test case	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 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 6.3.5B.1.4.1-1.

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 6.3.5B.1.4.3. Note that PDCCH DCI format 4 sent after resetting uplink power with RRC Connection Reconfiguration, should have TPC command 0dB.

6.3.5B.1.4.2 Test procedure

1. SS sends uplink scheduling information via PDCCH DCI format 4 with TPC command 0dB for C_RNTI to schedule the UL RMC according to Table 6.3.5B.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. Measure the initial sum power of the first subframe of UE PUSCH first transmission at each UE antenna connector. The transient periods of 20us are excluded.

3. Repeat for the two test points as indicated in section 6.3.5B.1.4.3. The timing of the execution between the two test points shall be larger than 20ms.

6.3.5B.1.4.3 Message contents

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

Table 6.3.5B.1.4.3-1: UplinkPowerControlCommon: Test point 1

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE { p0-NominalPUSCH	-105	Test point 1 to verify a UE relative low initial power transmission	

Table 6.3.5B.1.4.3-2: UplinkPowerControlCommon: Test point 2

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-25 UplinkPowerControlCommon-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
PhysicalConfigDedicated-DEFAULT ::= SEQUENCE {	-93	Test point 2 to verify a UE relative high initial power transmission	

Table 6.3.5B.1.4.3-3: PhysicalConfigDedicated

Derivation Path: TS 36.508 [7] clause 5.5.1.2, Table 5.5.1.2.1 PhysicalConfigDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE { p0-NominalPUSCH			
uplinkPowerControlDedicated	UplinkPowerControlDedicated-DEFAULT	See clause 4.6.3	SRB1
	UplinkPowerControlDedicated-DEFAULT	See clause 4.6.3	RBC

Table 6.3.5B.1.4.3-4: UplinkPowerControlDedicated

Derivation Path: TS 36.508 [7] clause 4.6.3, Table 4.6.3-26 UplinkPowerControlDedicated-DEFAULT			
Information Element	**Value/remark**	**Comment**	**Condition**
UplinkPowerControlDedicated-DEFAULT ::= SEQUENCE {			
p0-UE-PUSCH	1		SRB1
	0		RBC
}			

6.3.5B.1.5 Test requirement

The requirement for the power measured in step (2) of the test procedure is not to exceed the values specified in Table 6.3.5B.1.5-1 and 6.3.5B.1.5-2.

Table 6.3.5B.1.5-1: Absolute power tolerance: test point 1

	Channel bandwidth / expected output power (dBm)					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**
Expected Measured power Normal conditions	-14.8 dBm	-10.8 dBm	-8.6 dBm	-5.6 dBm	-3.9 dBm	-2.6 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB
Expected Measured power Extreme conditions	-14.8 dBm	-10.8 dBm	-8.6 dBm	-5.6 dBm	-3.9 dBm	-2.6 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB
Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3						

Table 6.3.5B.1.5-2: Absolute power tolerance: test point 2

	Channel bandwidth / expected output power (dBm)					
	1.4 MHz	**3.0 MHz**	**5 MHz**	**10 MHz**	**15 MHz**	**20 MHz**

Expected Measured power Normal conditions	-2.8 dBm	1.2 dBm	3.4 dBm	6.4 dBm	8.2 dBm	9.4 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB	± 10.0dB ± 10.4dB
Expected Measured power Extreme conditions	-2.8 dBm	1.2 dBm	3.4 dBm	6.4 dBm	8.2 dBm	9.4 dBm
Power tolerance f ≤ 3.0GHz 3.0GHz < f ≤ 4.2GHz	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB	± 13.0dB ± 13.4dB
Note 1: The lower power limit shall not exceed the minimum output power requirements defined in sub-clause 6.3.2.3						

6.3.5B.2 Power Control Relative power tolerance for UL-MIMO

6.3.5B.2.1 Test purpose

To verify the ability of the UE transmitter to set its output power relatively to the power in a target sub-frame relatively to the power of the most recently transmitted reference sub-frame if the transmission gap between these sub-frames is ≤ 20 ms.

6.3.5B.2.2 Test applicability

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

6.3.5B.2.3 Minimum conformance requirement

For UE with multiple transmit antenna connectors, the power control tolerance applies to the sum of output power at each transmit antenna connector.

The power control requirements specified in clause 6.3.5 apply to UE with two transmit antenna connectors with UL-MIMO configurations specified in Table 6.2.2B.3-2 for closed-loop spatial multiplexing scheme, wherein:

- The Maximum output power requirements for UL-MIMO are specified in clause 6.2.2B
- The Minimum output power requirements for UL-MIMO are specified in clause 6.3.2B

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5B.

6.3.5B.2.4 Test description

6.3.5B.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 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 6.3.5B.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 6.3.5B.2.4.1-1: Test Configuration Table

Initial Conditions				
Test Environment as specified in TS 36.508 [7] clause 4.1	Normal, TL/VL, TL/VH, TH/VL, TH/VH			
Test Frequencies as specified in TS 36.508 [7] clause 4.3.1	Low 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 for Power Control Relative power tolerance test case	Mod'n	RB allocation	
			FDD	TDD
1.4MHz		QPSK	See table 6.3.5B.2.5-1 6.3.5B.2.5-2 6.3.5B.2.5-13	See table 6.3.5B.2.5-1 6.3.5B.2.5-2 6.3.5B.2.5-13
3MHz		QPSK	See table 6.3.5B.2.5-3 6.3.5B.2.5-4 6.3.5B.2.5-13	See table 6.3.5B.2.5-3 6.3.5B.2.5-4 6.3.5B.2.5-13
5MHz		QPSK	See table 6.3.5B.2.5-5 6.3.5B.2.5-6 6.3.5B.2.5-13	See table 6.3.5B.2.5-5 6.3.5B.2.5-6 6.3.5B.2.5-13
10MHz		QPSK	See table 6.3.5B.2.5-7 6.3.5B.2.5-8 6.3.5B.2.5-13	See table 6.3.5B.2.5-7 6.3.5B.2.5-8 6.3.5B.2.5-13
15MHz		QPSK	See table 6.3.5B.2.5-9 6.3.5B.2.5-10 6.3.5B.2.5-13	See table 6.3.5B.2.5-9 6.3.5B.2.5-10 6.3.5B.2.5-13
20MHz		QPSK	See table 6.3.5B.2.5-11 6.3.5B.2.5-12 6.3.5B.2.5-13	See table 6.3.5B.2.5-11 6.3.5B.2.5-12 6.3.5B.2.5-13
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 starting resource block shall be RB# 0.				

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 6.3.5B.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 6.3.5B.2.4.3.

6.3.5B.2.4.2 Test procedure

The procedure is separated in various subtests to verify different aspects of relative power control. The power patterns of the subtests are described in figure 6.3.5B.2.4.2-1.

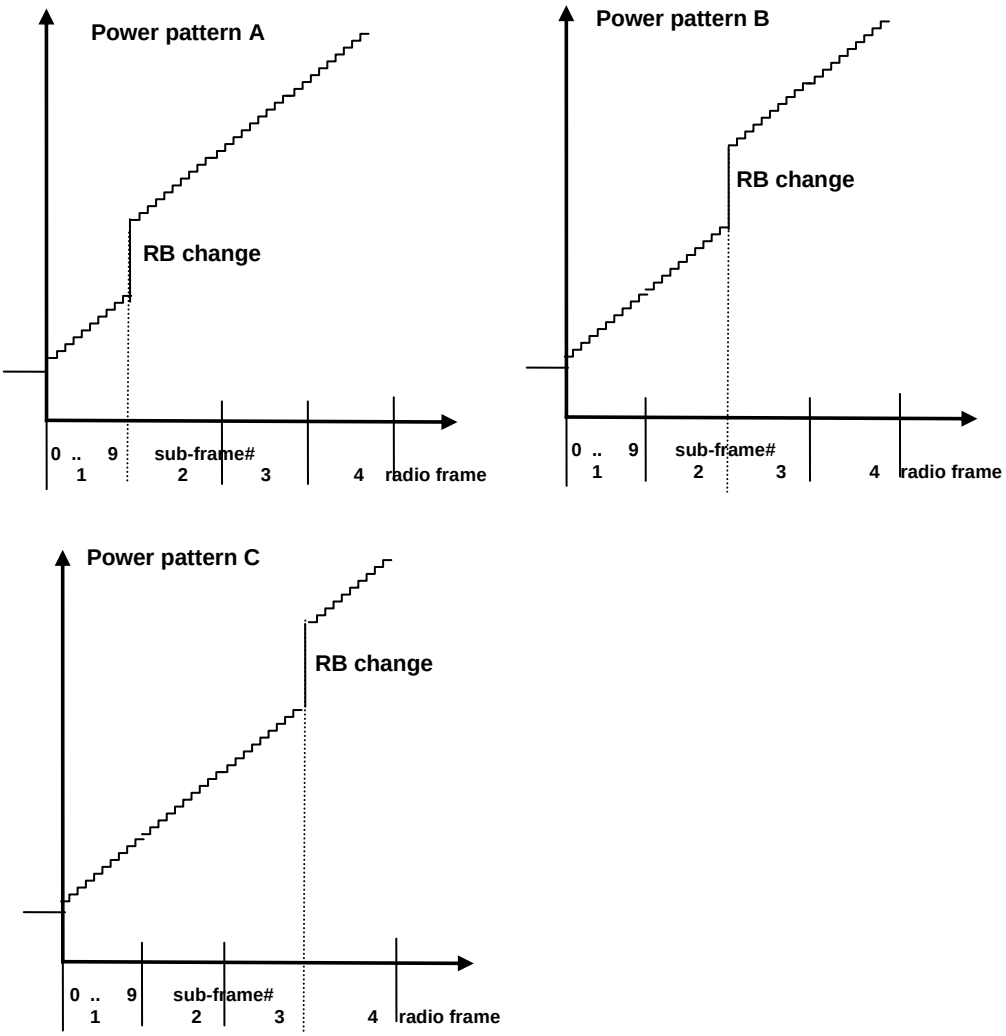

Figure 6.3.5B.2.4.2-1: FDD ramping up test power patterns

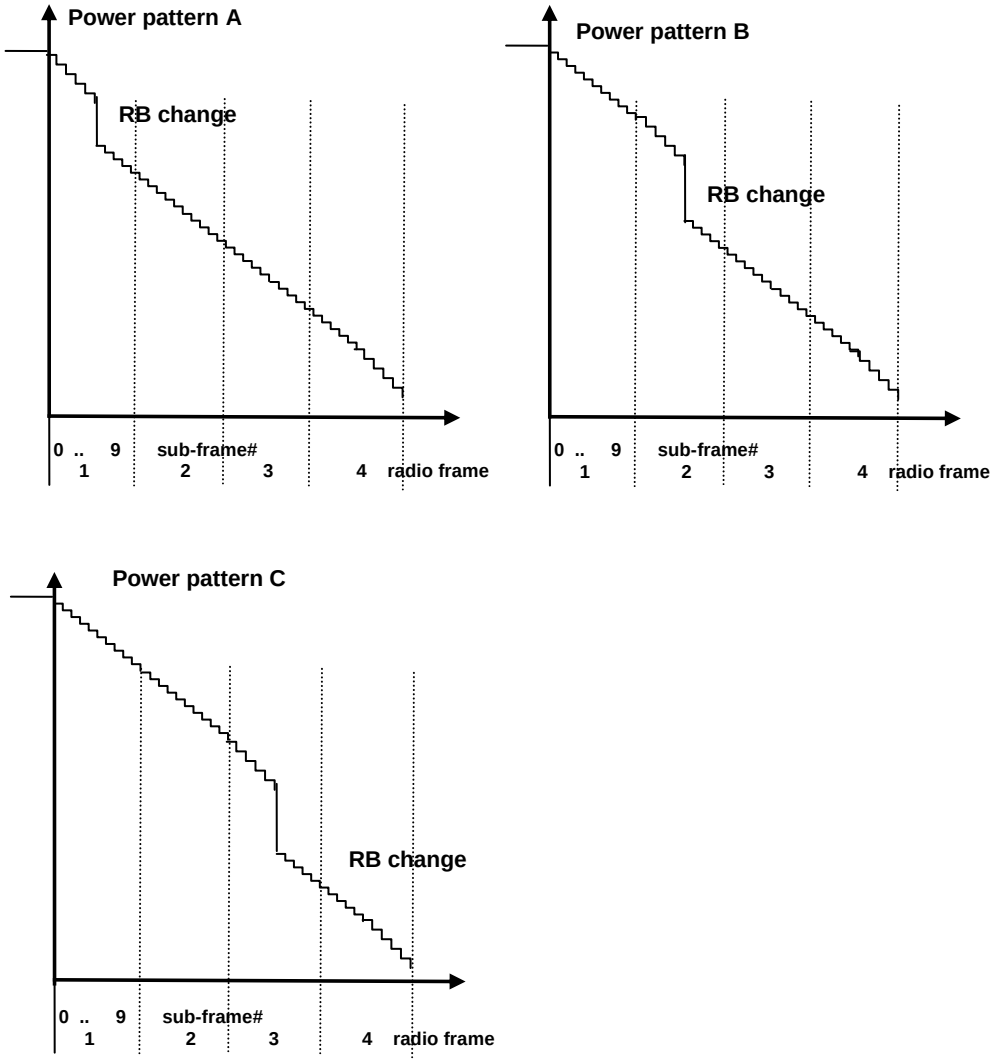

Figure 6.3.5B.2.4.2-2: FDD ramping down test power patterns

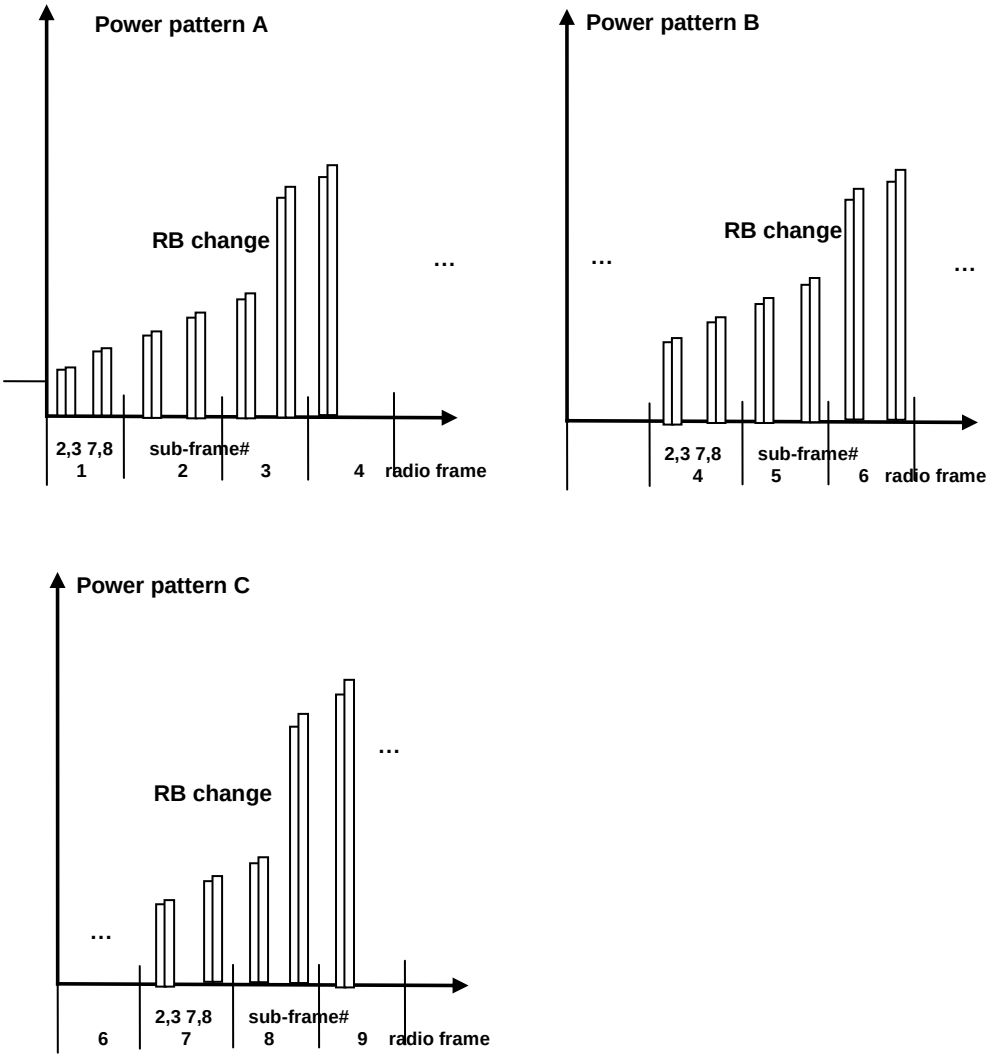

Figure 6.3.5B.2.4.2-3: TDD ramping up test power patterns

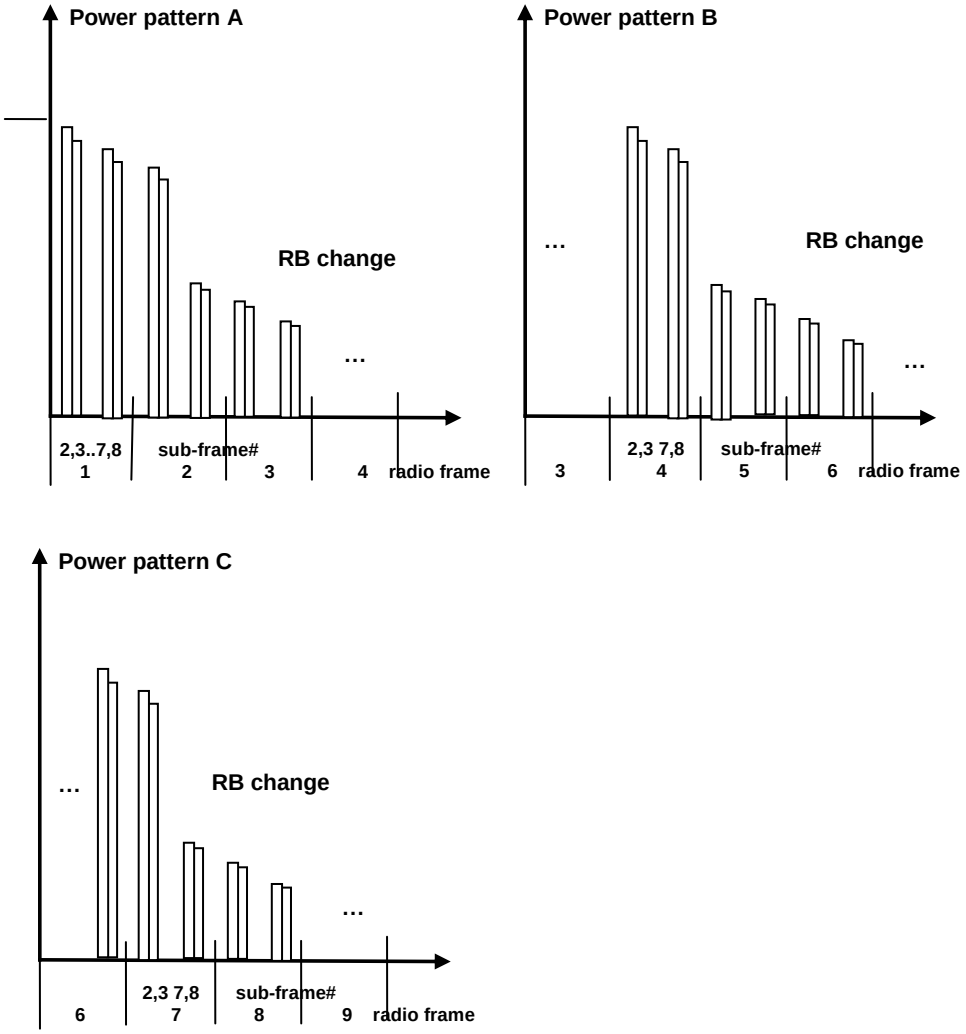

Figure 6.3.5B.2.4.2-4: TDD ramping down test power patterns

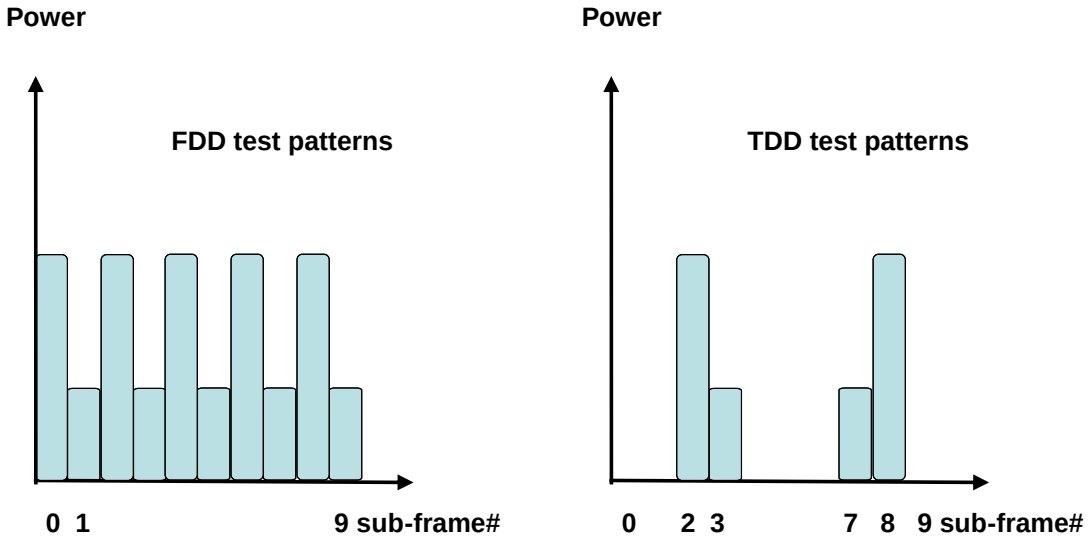

Figure 6.3.5B.2.4.2-5: Alternating Test Power patterns

1. Sub test: ramping up pattern

   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 6.3.5B.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 for PUSCH to the UE to ensure that the UE transmits PUSCH at -36.8dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at -36.5dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

   1.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.5B.2.4.2-1 (FDD pattern A: sub-test is divided in 4 arbitrary radio frames with 10 active uplink sub-frames per radio frame) and Figure 6.3.5B.2.4.2-3 (TDD pattern A: sub-test is divided in 10 arbitrary radio frames with 4 active uplink sub-frames per radio frame) with an uplink RB allocation as defined in tables 6.3.5B.2.5-1 thru 6.3.5B.2.5-12 depending on channel bandwidth. On the PDCCH format 4 for the scheduling of the PUSCH the SS will transmit a +1dB TPC command. Note that the measurement need not be done continuously, provided that interruptions are whole numbers of frames, and TPC commands of 0dB are sent during the interruption.

   1.3. Measure the mean sum power at each antenna connector for PUSCH transmissions to verify the UE relative power control meet test requirements 6.3.5B.2.5. For power transients between subframes, transient periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

   1.4. Repeat the subtest different pattern B, C to move the RB allocation change at different points in the pattern as described in Table 6.3.5B.2.5-1 thru Table 6.3.5B.2.5-12 to force bigger UE power steps at various points in the power range.

2. Sub test: ramping down pattern

   2.1. 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 6.3.5B.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 for PUSCH to the UE to ensure that the UE transmits PUSCH at +18.0dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at +17.7dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

   2.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.5B.2.4.2-2 (FDD pattern A: sub-test is divided in 4 arbitrary radio frames with 10 active uplink sub-frames per radio frame) and Figure 6.3.5B.2.4.2-4 (TDD pattern A: sub-test is divided in 10 arbitrary radio frames with 4 active uplink sub-frames per radio frame) with an uplink RB allocation as defined in tables 6.3.5B.2.5-1 thru 6.3.5B.2.5-12 depending on channel bandwidth. On the PDCCH format 4 for the scheduling of the PUSCH the SS will transmit a -1dB TPC command. Note that the measurement need not be done continuously, provided that interruptions are whole numbers of frames, and TPC commands of 0dB are sent during the interruption.

   2.3. Measure the mean sum power at each antenna connector for PUSCH transmissions to verify the UE relative power control meet test requirements 6.3.5B.2.5. For power transients between subframes, transient periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

   2.4. Repeat the subtest different pattern B, C to move the RB allocation change at different points in the pattern as described in Table 6.3.5B.2.5-1 thru Table 6.3.5B.2.5-12 to force bigger UE power steps at various points in the power range.

3. Sub test: alternating pattern

   3.1. 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 6.3.5B.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 for PUSCH to the UE to ensure that the UE transmits PUSCH at -10dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at -10dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz. The initial uplink RB allocation is defined as the smaller uplink RB allocation value specified in tables 6.3.5B.2.5-13. The power level and RB allocation are reset for each sub-test.

   3.2. Schedule the UE's PUSCH data transmission as described in Figure 6.3.5B.2.4.2-5for 10 sub-frames with an uplink RB allocation alternating pattern as defined in table 6.3.5B.2.5-13 while transmitting 0dB TPC command for PUSCH via the PDCCH.

3.3. Measure the mean sum power of each antenna connector for PUSCH transmissions to verify the UE relative power control meet test requirements specified in clause 6.3.5B.2.5. For power transients between subframes, transient periods of 40us between subframes are excluded. For ON/OFF or OFF/ON transients, transient periods of 20 us at the beginning of the subframe are excluded.

6.3.5B.2.4.3 Message contents

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

6.3.5B.2.5 Test requirement

Each UE power step measured in the test procedure 6.3.5B.2.4.2 should satisfy the test requirements specified in Table 6.3.5B.2.5-1, thru 6.3.5B.2.5-13 for normal conditions; for extreme conditions an additional ± 2.0 dB relaxation is allowed.

To account for RF Power amplifier mode changes 2 exceptions are allowed for each of ramping up and ramping down test patterns. For these exceptions the power tolerance limit is a maximum of ±6.7 dB. If there is an exception in the power step caused by the RB change for all test patterns (A, B, C) then fail the UE.

Table 6.3.5B.2.5-1: Test Requirements Relative Power Tolerance for Transmission (normal conditions - Note 5) channel bandwidth 1.4MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 1 to 6 RBs	TPC=+1dB	8.78	4 ≤ ΔP < 10	8.78 ±4.7 Note 2 8.78 +6.2/-4.7 Note 3
Subframes after RB change	Fixed = 6	TPC=+1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes.
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-2: Test Requirements Relative Power Tolerance for Transmission (normal conditions - Note 5) channel bandwidth 1.4MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 5	TPC=-1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 5 to 1 RBs	TPC=-1dB	7.99	4 ≤ ΔP < 1	7.99 ± 4.7 Note 2 7.99 +4.7/-6.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes.
Note 2: When Note 4 does not apply.
Note 3: N/A.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-3: Test Requirements Relative Power Tolerance for Transmission (normal conditions - Note 5) channel bandwidth 3MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 1 to 4 RBs	TPC=+1dB	7.02	4 ≤ ΔP < 10	7.02 ± 4.7 Note 2 7.02 +6.2/-4.7 Note 3
Subframes after RB change	Fixed =4	TPC=+1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes.
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-4: Test Requirements Relative Power Tolerance for Transmission (normal conditions - Note 5) channel bandwidth 3MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 15	TPC=-1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 15 to 1 RBs	TPC=-1dB	12.76	10 ≤ ΔP < 15	12.76 ± 5.7 Note 2 12.76 +5.7/-7.2 Note 4
Subframes after RB change	Fixed =1	TPC=-1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes.
Pattern A the position of RB uplink allocation change is after 16 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes.
Note 2: When Note 4 does not apply.
Note 3: N/A.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-5: Test Requirements Relative Power Tolerance for Transmission (normal conditions - Note 5) channel bandwidth 5MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 1 to 20	TPC=+1dB	14.01	10 ≤ ΔP < 15	14.01 ± 5.7 Note 2 14.01 +7.2/-5.7 Note 3
Subframes after RB change	Fixed = 20	TPC=+1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes.
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-6: Test Requirements Relative Power Tolerance for Transmission (normal conditions - Note 5) channel bandwidth 5MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 25	TPC=-1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 25 to 1	TPC=-1dB	14.98	10 ≤ ΔP < 15	14.98 ± 5.7 Note 2 14.98 +5.7/-7.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes.
Note 2: When Note 4 does not apply.
Note 3: N/A.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-7: Test Requirements Relative Power Tolerance for Transmission (normal conditions - Note 5) channel bandwidth 10MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 1 to 25	TPC=+1dB	14.98	10 ≤ ΔP < 15	14.98 ± 5.7 Note 2 14.98 +7.2/-5.7 Note 3
Subframes after RB change	Fixed = 25	TPC=+1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes.
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-8: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 10MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 50 (UE-Categories ≥2) Fixed = 48 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 50 to 1 (UE-Categories ≥2) Change from 48 to 1 (UE cat 1)	TPC=-1dB	17.99 17.81	15 ≤ Δ	17.99 ± 6.7 Note 2 17.99 +6.7/-8.2 Note 4 17.81 ± 6.7 Note 2 17.81 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes.
Note 2: When Note 3 does not apply.
Note 3: N/A.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-9: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 15MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 1 to 50	TPC=+1dB	17.99	15 ≤ ΔP	17.99±6.7 Note 2 17.99 +8.2/-6.7 Note 3
Subframes after RB change	Fixed = 50	TPC=+1dB	1	ΔP < 2	1 ±1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes.
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-10: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 15MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 75 (UE-Categories ≥2) Fixed = 50 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 75 to 1 (UE-Categories ≥2) Change from 50 to 1 (UE Cat 1)	TPC=-1dB	19.75 17.99	15 ≤ ΔP	19.75 ± 6.7 Note 2 19.75 +6.7/8.2 ±TT Note 4 17.99 ± 6.7 Note 2 17.99 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes.
Note 2: When Note 4 does not apply.
Note 3: N/A.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-11: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 20MHz (ramping up)

Sub-test (ramp up)	Uplink RB allocation	TPC command	Expected power step size (Up) ΔP [dB]	Power step size range (Up) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 1	TPC=+1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 1 to 75	TPC=+1dB	19.75	15 ≤ ΔP	19.75 ± 6.7 Note 2 19.75 +8.2/-6.7 Note 3
Subframes after RB change	Fixed = 75	TPC=+1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 10 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 20 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 30 active uplink subframes.
Note 2: When Note 3 does not apply.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: N/A.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-12: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) channel bandwidth 20MHz (ramping down)

Sub-test (ramp down)	Uplink RB allocation	TPC command	Expected power step size (down) ΔP [dB]	Power step size range (down) ΔP [dB]	PUSCH [dB]
Subframes before RB change	Fixed = 100 (UE-Categories ≥2) Fixed = 75 (UE Cat 1)	TPC=-1dB	1	ΔP < 2	1 ± 1.7
RB change	Change from 100 to 1 (UE-Categories ≥2) Change from 75 to 1 (UE Cat 1)	TPC=-1dB	21.0 19.75	15 ≤ ΔP	21.0 ± 6.7 Note 2 21.0 +6.7/-8.2 Note 4 19.75 ± 6.7 Note 2 19.75 +6.7/-8.2 Note 4
Subframes after RB change	Fixed = 1	TPC=-1dB	1	ΔP < 2	1 ± 1.7

Note 1: Position of RB change:
Pattern A the position of RB uplink allocation change is after 6 active uplink subframes.
Pattern B the position of RB uplink allocation change is after 16 active uplink subframes.
Pattern C the position of RB uplink allocation change is after 26 active uplink subframes.
Note 2: When Note 4 does not apply.
Note 3: N/A.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

Table 6.3.5B.2.5-13: Test Requirements Relative Power Tolerance for Transmission (normal conditions – Note 5) (Alternating pattern)

Sub-test	Uplink RB allocation	TPC command	Expected power step size (Up or down) ΔP [dB]	Power step size range (Up or down) ΔP [dB]	PUSCH [dB]
1.4 MHz	Alternating 1 and 6	TPC=0dB	7.78	4 ≤ ΔP < 10	7.78 ± 6.7 Note 1,2 7.78 +8.2/-6.7 Note 3 7.78 +6.7/-8.2 Note 4
3 MHz	Alternating 1 and 15	TPC=0dB	11.76	10 ≤ ΔP < 15	11.76 ± 6.76.7 Note 1,2 11.76 +8.2/-6.7 Note 3 11.76 +6.7/-8.2 Note 4
5 MHZ	Alternating 1 and 25	TPC=0dB	13.98	10 ≤ ΔP < 15	13.98 ± 6.7 Note 1 13.98 +8.2/-6.7 Note 2 13.98 +6.7/-8.2 Note 3
10 MHZ	Alternating 1 and 50 (UE-Categories ≥2) Alternating 1 and 48 (UE Cat 1)	TPC=0dB	16.99 16,81	15 ≤ ΔP	16.99 ± 6.7 Note 1,2 16.99 +8.2/-6.7 Note 3 16.99 +6.7/-8.2 Note 4 16.81 ± 6.7 Note 1,2 16.81 +8.2/-6.7 Note 3 16.81 +6.7/-8.2 Note 4
15 MHZ	Alternating 1 and 75 (UE-Categories ≥2) Alternating 1 and 50 (UE Cat 1)	TPC=0dB	18.75 16.99	15 ≤ ΔP	18.75 ± 6.7 Note 1,2 18.75 +8.2/-6.7 Note 3 18.75 +6.7/-8.2 Note 4 16.99 ± 6.7 Note 1,2 16.99 +8.2/-6.7 Note 3 16.99 +6.7/-8.2 Note 4
20 MHZ	Alternating 1 and 100 (UE-Categories ≥2) Alternating 1 and 75 (UE Cat 1)	TPC=0dB	20.00 18.75	15 ≤ ΔP	20.00 ± 6.7 Note 1,2 20.00 +8.2/-6.7 Note 3 20.00 +6.7/-8.2 Note 4 18.75 ± 6.7 Note 1,2 18.75 +8.2/-6.7 Note 3 18.75 +6.7/-8.2 Note 4

Note 1: Test tolerance +/- 6.7 dB was selected to allow PA switch possible exceptions to occur.
Note 2: When neither Note 3 nor Note 4 applies.
Note 3: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the reference sub-frames is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} – 4 MHz and F_{UL_high} and the target sub-frame is not confined within any one of these frequency ranges.
Note 4: For operating bands under Note 2 in Table 6.2.2.3-1, if the transmission bandwidth of the target sub-frame is confined within F_{UL_low} and F_{UL_low} + 4 MHz or F_{UL_high} - 4 MHz and F_{UL_high} and the reference sub-frame is not confined within any one of these frequency ranges.
Note 5: For extreme conditions an additional ± 2.0 dB relaxation is allowed.
Note 6: The starting resource block shall be RB# 0.

6.3.5B.3 Aggregate power control tolerance for UL-MIMO

6.3.5B.3.1 Test purpose

To verify the ability of the UE with UL-MIMO to maintain its power level in non-contiguous transmission within 21 ms in response to 0 dB TPC commands with respect to the first UE transmission, when the power control parameters specified in TS 36.213 are constant.

6.3.5B.3.2 Test applicability

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

6.3.5B.3.3 Minimum conformance requirement

For UE with multiple transmit antenna connectors, the power control tolerance applies to the sum of output power at each transmit antenna connector.

The power control requirements specified in clause 6.3.5 apply to UE with two transmit antenna connectors with UL-MIMO configurations specified in Table 6.2.2B.3-2 for closed-loop spatial multiplexing scheme, wherein:

- The Maximum output power requirements for UL-MIMO are specified in clause 6.2.2B.
- The Minimum output power requirements for UL-MIMO are specified in clause 6.3.2B.

The normative reference for this requirement is TS 36.101 [2] clause 6.3.5B.

6.3.5B.3.4 Test description

6.3.5B.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 table 6.3.5B.3.4.1-1. 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 6.3.5B.3.4.1-1: Test Configuration Table: PUCCH sub-test

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**				Lowest, 5MHz, Highest
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 6.3.5B.3.4.1-2: Test Configuration Table: PUSCH sub-test

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**	Lowest, 5MHz, Highest			
Test Parameters for Channel Bandwidths				
	Downlink Configuration	**Uplink Configuration**		
Ch BW	N/A for PUSCH sub-test	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, 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 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 6.3.5B.3.4.1-1 (PUCCH sub-test) and Table 6.3.5B.3.4.1-2 (PUSCH sub-test).
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 6.3.5B.3.4.3.

6.3.5B.3.4.2 Test procedure

The procedure is separated in two subtests to verify PUCCH and PUSCH aggregate power control tolerance respectively. The uplink transmission patterns are described in figure 6.3.5B.3.4.2-1.

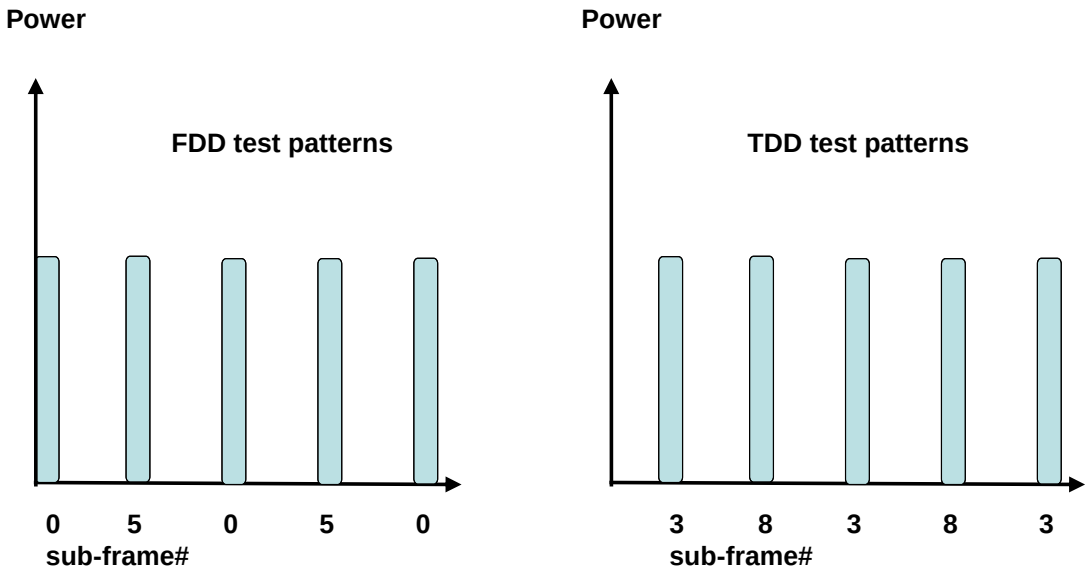

Figure 6.3.5B.3.4.2-1 Test uplink transmission

1. PUCCH sub test:

1.1 The SS transmits PDSCH via PDCCH DCI format 1A for C_RNTI to transmit the DL RMC according to Table 6.3.5B.3.4.1-1. 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. Send the appropriate TPC commands for PUCCH to the UE to ensure that the UE transmits PUCCH at 0dBm +/- 3.2 dB for carrier frequency f ≤ 3.0GHz or at 0dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

1.2. Every 5 subframes transmit to the UE downlink PDSCH MAC padding bits as well as 0 dB TPC command for PUCCH via the PDCCH to make the UE transmit ACK/NACK on the PUCCH with transmission gap of 4 subframes. The downlink transmission is scheduled in the appropriate sub-frames to make the UE transmit PUCCH as described in figure 6.3.5B.3.4.2-1.

1.3. Measure the mean sum power at each antenna connector for UE of 5 consecutive PUCCH transmissions to verify the UE transmitted PUCCH power is maintained within 21 ms. The transient periods of 20us are excluded from the power measurement.

2. PUSCH sub test:

2.1. The SS sends uplink scheduling information via PDCCH DCI format 4 for C_RNTI to schedule the UL RMC according to Table 6.3.5B.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. Send the appropriate TPC commands for PUSCH to the UE to ensure that the UE transmits PUSCH at 0dBm +/- 3.2dB for carrier frequency f ≤ 3.0GHz or at 0dBm +/- 3.5 dB for carrier frequency 3.0GHz < f ≤ 4.2GHz.

2.2. Every 5 subframes schedule the UE's PUSCH data transmission and transmit 0 dB TPC command for PUSCH via the PDCCH to make the UE transmit PUSCH with 4 subframes gap. The uplink transmission patterns are described in figure 6.3.5B.3.4.2-1.

2.3. Measure the mean sum power at each antenna connector for UE of 5 consecutive PUSCH transmissions to verify the UE transmitted PUSCH power is maintained within 21 ms. The transient periods of 20us are excluded from the power measurement.

6.3.5B.3.4.3 Message contents

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

Table 6.3.5B.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		
}			

6.3.5B.3.5 Test requirement

The requirement for the power measurements made in step (1.3) and (2.3) of the test procedure shall not exceed the values specified in Table 6.3.5B.3.5-1. The power measurement period shall be 1 sub-frame excluding transient periods.

Table 6.3.5B.3.5-1: Power control tolerance

TPC command	UL channel	Test requirement measured power
0 dB	PUCCH	Given 5 power measurements in the pattern, the 2nd, 3rd, 4th, and 5th measurements shall be within ± 3.2 dB of the 1st measurement.
0 dB	PUSCH	Given 5 power measurements in the pattern, the 2nd, 3rd, 4th, and 5th measurements shall be within ± 4.2 dB of the 1st measurement.
Note 1: The UE transmission gap is 4 ms. TPC command is transmitted via PDCCH 4 subframes preceding each PUCCH/PUSCH transmission.		

6.4 Void