

LTE-U Forum:

Alcatel-Lucent, Ericsson, Qualcomm Technologies Inc., Samsung Electronics & Verizon

eNB Minimum Requirements for LTE-U SDL V1.0 (2015-02)

(Modifications to 3GPP TS 36.104)

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Contents

Foreword.....	4
1 Scope.....	5
2 References.....	5
3 Definitions, symbols and abbreviations.....	5
3.1 Definitions.....	5
3.2 Symbols.....	5
3.3 Abbreviations.....	5
4 General.....	6
4.1 Relationship between minimum requirements and test requirements.....	6
4.2 Base station classes.....	6
4.3 Regional requirements.....	6
4.4 Applicability of requirements.....	6
4.5 Requirements for BS capable of multi-band operation.....	7
5 Operating bands and channel arrangement.....	7
5.1 General.....	7
5.2 Void.....	7
5.3 Void.....	7
5.4 Void.....	7
5.5 Operating bands.....	7
5.6 Channel bandwidth.....	14
5.7 Channel arrangement.....	14
5.7.1 Channel spacing.....	14
5.7.1A CA Channel spacing.....	14
5.7.2 Channel raster.....	14
5.7.3 Carrier frequency and EARFCN.....	14
5.8 Requirements for contiguous and non-contiguous spectrum.....	17
6 Transmitter characteristics.....	17
6.1 General.....	17
6.2 Base station output power.....	17
6.2.1 Minimum requirement.....	17
6.2.2 Additional requirement (regional).....	18
6.2.3 Home BS output power for adjacent UTRA channel protection.....	19
6.2.4 Home BS output power for adjacent E-UTRA channel protection.....	19
6.2.5 Home BS Output Power for co-channel E-UTRA protection.....	19
6.3 Output power dynamics.....	19
6.4 Transmit ON/OFF power.....	19
6.5 Transmitted signal quality.....	19
6.6 Unwanted emissions.....	19
6.6.1 Occupied bandwidth.....	19
6.6.2 Adjacent Channel Leakage power Ratio (ACLR).....	20
6.6.2.1 Minimum requirement.....	20
6.6.2.2 Cumulative ACLR requirement in non-contiguous spectrum.....	22
6.6.3 Operating band unwanted emissions.....	22
6.6.3.1 Minimum requirements for Wide Area BS (Category A).....	23
6.6.3.2 Minimum requirements for Wide Area BS (Category B).....	23
6.6.3.2A Minimum requirements for Local Area BS (Category A and B).....	23
6.6.3.2B Minimum requirements for Home BS (Category A and B).....	25
6.6.3.2C Minimum requirements for Medium Range BS (Category A and B).....	26
6.6.3.3 Additional requirements.....	29
6.6.4 Transmitter spurious emissions.....	33
6.6.4.1 Mandatory Requirements.....	33
6.6.4.1.1 Spurious emissions (Category A).....	33
6.6.4.1.2 Spurious emissions (Category B).....	34
6.6.4.1.3 Spurious emissions (LTE-U).....	34
6.6.4.2 Protection of the BS receiver of own or different BS.....	34

6.6.4.3	Additional spurious emissions requirements	35
6.6.4.3.1	Minimum Requirement	36
6.6.4.4	Co-location with other base stations	45
6.6.4.4.1	Minimum Requirement	46
6.7	Transmitter intermodulation	52
7	Receiver characteristics	52
7.1	General	52
7.2	Reference sensitivity level	52
7.3	Dynamic range	52
7.4	In-channel selectivity	52
7.5	Adjacent Channel Selectivity (ACS) and narrow-band blocking	52
7.6	Blocking	52
7.6.1	General blocking requirement	52
7.6.2	Co-location with other base stations	53
7.6.2.1	Minimum requirement	54
7.7	Receiver spurious emissions	59
7.8	Receiver intermodulation	59
8	Performance requirement	59
Annex A (normative): Reference measurement channels		59
Annex B (normative): Propagation conditions		60
Annex C (normative): Characteristics of the interfering signals		61
Annex D (normative): Environmental requirements for the BS equipment		62
Annex E (normative): Error Vector Magnitude		63
Annex F (Informative): Unwanted emission requirements for multi-carrier BS		64
Annex G (Informative): Regional requirement for protection of DTT		65
Annex H (Informative): Calculation of EIRP based on manufacturer declarations and site specific conditions		66
H.1	Calculation of EIRP based on manufacturer declarations and site specific conditions	66
H.2 (Informative):	Regional emission requirement for Bands 252 and 255	67
H.3 (Informative):	FCC CFR 47 Part 15.205 Restricted Bands	68
Annex I (Informative): Change history		69

Foreword

This Technical Specification has been produced within the LTE-U Forum. The specification is based on 3GPP TS 36.104 v12.6.0. The changes are shown in red.

1 Scope

See this clause and all its sub-clauses in TS 36.104 V12.6.0

2 References

See this clause and all its sub-clauses in TS 36.104 V12.6.0

3 Definitions, symbols and abbreviations

3.1 Definitions

See this clause and all its sub-clauses in TS 36.104 V12.6.0

3.2 Symbols

See this clause and all its sub-clauses in TS 36.104 V12.6.0

3.3 Abbreviations

See this clause and all its sub-clauses in TS 36.104 V12.6.0

4 General

4.1 Relationship between minimum requirements and test requirements

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

4.2 Base station classes

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

4.3 Regional requirements

Some requirements in the present document may only apply in certain regions either as optional requirements or set by local and regional regulation as mandatory requirements. It is normally not stated in the 3GPP specifications under what exact circumstances that the requirements apply, since this is defined by local or regional regulation.

Table 4.3-1 lists all requirements that may be applied differently in different regions.

Table 4.3-1: List of regional requirements

Clause number	Requirement	Comments
5.5	Operating bands	Some bands may be applied regionally.
5.6	Channel bandwidth	Some channel bandwidths may be applied regionally.
5.7	Channel arrangement	The requirement is applied according to what operating bands in clause 5.5 that are supported by the BS.
6.2	Base station maximum output power	In certain regions, the minimum requirement for normal conditions may apply also for some conditions outside the range of conditions defined as normal.
6.2.2	Additional requirement (regional)	For Band 34 and Band 41 operation in certain regions, the rated output power declared by the manufacturer shall be less than or equal to the values specified in Table 6.2.2-1 and 6.2.2-2, respectively. <i>For Band 252 and Band 255 operation in US, the additional requirements in Tables 6.2.2-3 and 6.2.2-4 shall apply.</i>
6.6.3.1	Operating band unwanted emissions (Category A)	This requirement is mandatory for regions where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329 [2] apply.
6.6.3.2	Operating band unwanted emissions (Category B)	This requirement is mandatory for regions where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329 [2], apply.
6.6.3.3	Additional requirements	These requirements may apply in certain regions as additional Operating band unwanted emission limits.
6.6.4.1.1	Spurious emissions (Category A)	This requirement is mandatory for regions where Category A limits for spurious emissions, as defined in ITU-R Recommendation SM.329 [2] apply.
6.6.4.1.2	Spurious emissions (Category B)	This requirement is mandatory for regions where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329 [2], apply.
6.6.4.3	Additional spurious emission requirements	These requirements may be applied for the protection of system operating in frequency ranges other than the E-UTRA BS operating band.
6.6.4.4	Co-location with other base stations	These requirements may be applied for the protection of other BS receivers when a BS operating in another frequency band is co-located with an E-UTRA BS.
6.7.2	Additional requirements	These requirements may apply in certain regions.
7.6.2	Co-location with other base stations	These requirements may be applied for the protection of the BS receiver when a BS operating in another frequency band is co-located with an E-UTRA BS.

4.4 Applicability of requirements

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

4.5 Requirements for BS capable of multi-band operation

See this clause and all its sub-clauses in TS 36.104 V12.6.0

5 Operating bands and channel arrangement

5.1 General

The channel arrangements presented in this clause are based on the operating bands and channel bandwidths defined in the present release of specifications.

NOTE: Other operating bands and channel bandwidths may be considered in future releases.

5.2 Void

5.3 Void

5.4 Void

5.5 Operating bands

E-UTRA is designed to operate in the operating bands defined in Table 5.5-1.

Table 5.5-1 E-UTRA frequency bands

E-UTRA Operating Band	Uplink (UL) operating band BS receive UE transmit	Downlink (DL) operating band BS transmit UE receive	Duplex Mode
	F _{UL_low} – F _{UL_high}	F _{DL_low} – F _{DL_high}	
1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	FDD
2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	FDD
3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	FDD
4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	FDD
5	824 MHz – 849 MHz	869 MHz – 894MHz	FDD
6 (NOTE 1)	830 MHz – 840 MHz	875 MHz – 885 MHz	FDD
7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	FDD
8	880 MHz – 915 MHz	925 MHz – 960 MHz	FDD
9	1749.9 MHz – 1784.9 MHz	1844.9 MHz – 1879.9 MHz	FDD
10	1710 MHz – 1770 MHz	2110 MHz – 2170 MHz	FDD
11	1427.9 MHz – 1447.9 MHz	1475.9 MHz – 1495.9 MHz	FDD
12	699 MHz – 716 MHz	729 MHz – 746 MHz	FDD
13	777 MHz – 787 MHz	746 MHz – 756 MHz	FDD
14	788 MHz – 798 MHz	758 MHz – 768 MHz	FDD
15	Reserved	Reserved	FDD
16	Reserved	Reserved	FDD
17	704 MHz – 716 MHz	734 MHz – 746 MHz	FDD
18	815 MHz – 830 MHz	860 MHz – 875 MHz	FDD
19	830 MHz – 845 MHz	875 MHz – 890 MHz	FDD
20	832 MHz – 862 MHz	791 MHz – 821 MHz	
21	1447.9 MHz – 1462.9 MHz	1495.9 MHz – 1510.9 MHz	FDD
22	3410 MHz – 3490 MHz	3510 MHz – 3590 MHz	FDD
23	2000 MHz – 2020 MHz	2180 MHz – 2200 MHz	FDD
24	1626.5 MHz – 1660.5 MHz	1525 MHz – 1559 MHz	FDD
25	1850 MHz – 1915 MHz	1930 MHz – 1995 MHz	FDD
26	814 MHz – 849 MHz	859 MHz – 894 MHz	FDD
27	807 MHz – 824 MHz	852 MHz – 869 MHz	FDD
28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD
29	N/A	717 MHz – 728 MHz	FDD (NOTE 2)
30	2305 MHz – 2315 MHz	2350 MHz – 2360 MHz	FDD
31	452.5 MHz – 457.5 MHz	462.5 MHz – 467.5 MHz	FDD
32	N/A	1452 MHz – 1496 MHz	FDD (NOTE 2)
33	1900 MHz – 1920 MHz	1900 MHz – 1920 MHz	TDD
34	2010 MHz – 2025 MHz	2010 MHz – 2025 MHz	TDD
35	1850 MHz – 1910 MHz	1850 MHz – 1910 MHz	TDD
36	1930 MHz – 1990 MHz	1930 MHz – 1990 MHz	TDD
37	1910 MHz – 1930 MHz	1910 MHz – 1930 MHz	TDD
38	2570 MHz – 2620 MHz	2570 MHz – 2620 MHz	TDD
39	1880 MHz – 1920 MHz	1880 MHz – 1920 MHz	TDD
40	2300 MHz – 2400 MHz	2300 MHz – 2400 MHz	TDD
41	2496 MHz – 2690 MHz	2496 MHz – 2690 MHz	TDD
42	3400 MHz – 3600 MHz	3400 MHz – 3600 MHz	TDD
43	3600 MHz – 3800 MHz	3600 MHz – 3800 MHz	TDD
44	703 MHz – 803 MHz	703 MHz – 803 MHz	TDD
⋮			
<u>252</u>	N/A	<u>5150 MHz – 5250 MHz</u>	<u>FDD</u> <u>(NOTE 2)</u>
<u>253</u>	<u>Reserved</u>	<u>Reserved</u>	<u>FDD</u>
<u>254</u>	<u>Reserved</u>	<u>Reserved</u>	<u>FDD</u>
<u>255</u>	N/A	<u>5725 MHz – 5850 MHz</u>	<u>FDD</u>

			(NOTE 2)
NOTE 1: Band 6 is not applicable.			
NOTE 2: Restricted to E-UTRA operation when carrier aggregation is configured. The downlink operating band is paired with the uplink operating band (external) of the carrier aggregation configuration that is supporting the configured Pcell.			

E-UTRA is designed to operate for the carrier aggregation bands defined in Tables 5.5-2 to 5.5-4.

Table 5.5-2 Intra-band contiguous carrier aggregation bands

CA Band	E-UTRA operating band
CA_1	1
CA_2	2
CA_3	3
CA_7	7
CA_12	12
CA_23	23
CA_27	27
CA_38	38
CA_39	39
CA_40	40
CA_41	41
CA_42	42

Table 5.5-3. Inter-band carrier aggregation bands(two bands)

CA Band	E-UTRA operating bands
CA_1-3	1
	3
CA_1-5	1
	5
CA_1-7	1
	7
CA_1-8	1
	8
CA_1-11	1
	11
CA_1-18	1
	18
CA_1-19	1
	19
CA_1-20	1
	20
CA_1-21	1
	21
CA_1-26	1
	26
CA_1-28	1
	28
CA_1-41	1
	41
CA_1-42	1
	42
CA_2-4	2
	4
CA_2-4-4	2
	4
CA_2-5	2
	5
CA_2-2-5	2
	5
CA_2-12	2
	12
CA_2-13	2
	13
CA_2-2-13	2
	13
CA_2-17	2
	17
CA_2-29	2
	29
CA_2-30	2
	30
<u>CA_2-252</u>	<u>2</u>
	<u>252</u>
<u>CA_2-255</u>	<u>2</u>
	<u>255</u>
CA_3-5	3
	5
CA_3-7	3
	7
CA_3-8	3
	8
CA_3-19	3
	19
CA_3-20	3
	20
CA_3-26	3

	26
CA_3-27	3
	27
CA_3-28	3
	28
CA_4-5	4
	5
CA_4-4-5	4
	5
CA_4-7	4
	7
CA_4-4-7	4
	7
CA_4-12	4
	12
CA_4-4-12	4
	12
CA_4-13	4
	13
CA_4-4-13	4
	13
CA_4-17	4
	17
CA_4-27	4
	27
CA_4-29	4
	29
CA_4-30	4
	30
<u>CA_4-252</u>	<u>4</u>
	<u>252</u>
<u>CA_4-255</u>	<u>4</u>
	<u>255</u>
CA_5-7	5
	7
CA_5-12	5
	12
CA_5-13	5
	13
CA_5-17	5
	17
CA_5-25	5
	25
CA_5-30	5
	30
CA_7-8	7
	8
CA_7-12	7
	12
CA_7-20	7
	20
CA_7-28	7
	28
CA_8-11	8
	11
CA_8-20	8
	20
CA_8-40	8
	40
CA_11-18	11
	18

CA_12-25	12
	25
CA_12-30	12
	30
<u>CA_13-252</u>	<u>13</u>
	<u>252</u>
<u>CA_13-255</u>	<u>13</u>
	<u>255</u>
CA_18-28	18
	28
CA_19-21	19
	21
CA_19-42	19
	42
CA_20-32	20
	32
CA_23-29	23
	29
CA_25-41	25
	41
CA_26-41	26
	41
CA_29-30	29
	30
CA_39-41	39
	41
CA_41-42	41
	42

Table 5.5-3A. Inter-band carrier aggregation bands (three bands)

CA Band	E-UTRA operating bands
CA_1-3-5	1
	3
	5
CA_1-3-8	1
	3
	8
CA_1-3-19	1
	3
	19
CA_1-3-20	1
	3
	20
CA_1-3-26	1
	3
	26
CA_1-5-7	1
	5
	7
CA_1-7-20	1
	7
	20
CA_1-18-28	1
	18
	28
CA_1-19-21	1
	19
	21
CA_2-4-5	2
	4
	5
CA_2-4-12	2
	4
	12
CA_2-4-13	2
	4
	13
CA_2-4-29	2
	4
	29
CA_2-5-12	2
	5
	12
CA_2-5-13	2
	5
	13
CA_2-5-30	2
	5
	30
CA_2-12-30	2
	12
	30
CA_2-29-30	2
	29
	30
CA_3-7-20	3
	7
	20
CA_4-5-12	4
	5
	12
CA_4-5-13	4

	5
	13
CA_4-5-30	4
	5
	30
CA_4-7-12	4
	7
	12
CA_4-12-30	4
	12
	30
CA_4-29-30	4
	29
	30
CA_7-8-20	7
	8
	20

Table 5.5-4. Intra-band non-contiguous carrier aggregation bands (with two sub-blocks)

CA Band	E-UTRA operating band
CA_2-2	2
CA_3-3	3
CA_4-4	4
CA_7-7	7
CA_23-23	23
CA_25-25	25
CA_41-41	41
CA_42-42	42

5.6 Channel bandwidth

See this clause and all its sub-clauses in TS 36.104 V12.6.0

5.7 Channel arrangement

5.7.1 Channel spacing

See this clause and all its sub-clauses in TS 36.104 V12.6.0

5.7.1A CA Channel spacing

See this clause and all its sub-clauses in TS 36.104 V12.6.0

5.7.2 Channel raster

See this clause and all its sub-clauses in TS 36.104 V12.6.0

5.7.3 Carrier frequency and EARFCN

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535 and 65536 - 262143. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where F_{DL_low} and $N_{Offs-DL}$ are given in table 5.7.3-1 and N_{DL} is the downlink EARFCN.

$$F_{DL} = F_{DL_low} + 0.1(N_{DL} - N_{Offs-DL})$$

For operations in Band 252, only the following set of DL EARFCNs is allowed.

$N_{DL,allowed} = \{n-2, n-1, n, n+1, n+2 \mid n = 255244, 255444, 255644, 255844, 256044\}$

For operations in Band 255, only the following set of DL EARFCNs is allowed.

$N_{DL,allowed} = \{n-2, n-1, n, n+1, n+2 \mid n = 261094, 261294, 261494, 261694, 261894\}$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where $F_{UL,low}$ and $N_{Offs-UL}$ are given in table 5.7.3-1 and N_{UL} is the uplink EARFCN.

$$F_{UL} = F_{UL,low} + 0.1(N_{UL} - N_{Offs-UL})$$

Table 5.7.3-1: E-UTRA channel numbers

E-UTRA Operating Band	Downlink			Uplink		
	F _{DL_low} [MHz]	N _{Offs-DL}	Range of N _{DL}	F _{UL_low} [MHz]	N _{Offs-UL}	Range of N _{UL}
1	2110	0	0 – 599	1920	18000	18000 – 18599
2	1930	600	600 – 1199	1850	18600	18600 – 19199
3	1805	1200	1200 – 1949	1710	19200	19200 – 19949
4	2110	1950	1950 – 2399	1710	19950	19950 – 20399
5	869	2400	2400 – 2649	824	20400	20400 – 20649
6	875	2650	2650 – 2749	830	20650	20650 – 20749
7	2620	2750	2750 – 3449	2500	20750	20750 – 21449
8	925	3450	3450 – 3799	880	21450	21450 – 21799
9	1844.9	3800	3800 – 4149	1749.9	21800	21800 – 22149
10	2110	4150	4150 – 4749	1710	22150	22150 – 22749
11	1475.9	4750	4750 – 4949	1427.9	22750	22750 – 22949
12	729	5010	5010 – 5179	699	23010	23010 – 23179
13	746	5180	5180 – 5279	777	23180	23180 – 23279
14	758	5280	5280 – 5379	788	23280	23280 – 23379
...						
17	734	5730	5730 – 5849	704	23730	23730 – 23849
18	860	5850	5850 – 5999	815	23850	23850 – 23999
19	875	6000	6000 – 6149	830	24000	24000 – 24149
20	791	6150	6150 - 6449	832	24150	24150 - 24449
21	1495.9	6450	6450 – 6599	1447.9	24450	24450 - 24599
22	3510	6600	6600-7399	3410	24600	24600-25399
23	2180	7500	7500 – 7699	2000	25500	25500 – 25699
24	1525	7700	7700 – 8039	1626.5	25700	25700 – 26039
25	1930	8040	8040 - 8689	1850	26040	26040 - 26689
26	859	8690	8690 – 9039	814	26690	26690 - 27039
27	852	9040	9040 – 9209	807	27040	27040 – 27209
28	758	9210	9210 – 9659	703	27210	27210 – 27659
29 (NOTE 2)	717	9660	9660 – 9769	N/A		
30	2350	9770	9770 – 9869	2305	27660	27660 – 27759
31	462.5	9870	9870 – 9919	452.5	27760	27760 – 27809
32 (NOTE 2)	1452	9920	9920 – 10359	N/A		
33	1900	36000	36000 – 36199	1900	36000	36000 – 36199
34	2010	36200	36200 – 36349	2010	36200	36200 – 36349
35	1850	36350	36350 – 36949	1850	36350	36350 – 36949
36	1930	36950	36950 – 37549	1930	36950	36950 – 37549
37	1910	37550	37550 – 37749	1910	37550	37550 – 37749
38	2570	37750	37750 – 38249	2570	37750	37750 – 38249
39	1880	38250	38250 – 38649	1880	38250	38250 – 38649
40	2300	38650	38650 – 39649	2300	38650	38650 – 39649
41	2496	39650	39650 – 41589	2496	39650	39650 – 41589
42	3400	41590	41590 – 43589	3400	41590	41590 – 43589
43	3600	43590	43590 – 45589	3600	43590	43590 – 45589
44	703	45590	45590 – 46589	703	45590	45590 – 46589
...						
<u>252</u> (NOTE 2)	<u>5150</u>	<u>255144</u>	<u>255144-256143</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
...						
<u>255</u> (NOTE 2)	<u>5725</u>	<u>260894</u>	<u>260894-262143</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

NOTE 1: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

NOTE 2: Restricted to E-UTRA operation when carrier aggregation is configured.

5.8 Requirements for contiguous and non-contiguous spectrum

See this clause and all its sub-clauses in TS 36.104 V12.6.0

6 Transmitter characteristics

6.1 General

See this clause and all its sub-clauses in TS 36.104 V12.6.0

6.2 Base station output power

Output power, P_{out} , of the base station is the mean power of one carrier delivered to a load with resistance equal to the nominal load impedance of the transmitter.

The maximum total output power (P_{max}), of the base station is the mean power level measured at the antenna connector during the transmitter ON period in a specified reference condition.

Rated total output power of the base station is the mean power for BS operating in single carrier, multi-carrier, or carrier aggregation configurations that the manufacturer has declared to be available at the antenna connector during the transmitter ON period.

Maximum output power ($P_{max,c}$) of the base station is the mean power level per carrier measured at the antenna connector during the transmitter ON period in a specified reference condition.

Rated output power, PRAT, of the base station is the mean power level per carrier for BS operating in single carrier, multi-carrier, or carrier aggregation configurations that the manufacturer has declared to be available at the antenna connector during the transmitter ON period.

NOTE: Different PRATs may be declared for different configurations

The rated output power, PRAT, of the BS shall be as specified in Table 6.2-1.

Table 6.2-1: Base Station rated output power

BS class	PRAT
Wide Area BS	- (note)
Medium Range BS	$\leq + 38$ dBm
Local Area BS	$\leq + 24$ dBm
Home BS	$\leq + 20$ dBm (for one transmit antenna port) $\leq + 17$ dBm (for two transmit antenna ports) $\leq + 14$ dBm (for four transmit antenna ports) $< + 11$ dBm (for eight transmit antenna ports)
NOTE:	There is no upper limit for the rated output power of the Wide Area Base Station.

6.2.1 Minimum requirement

See this clause and all its sub-clauses in TS 36.104 V12.6.0

6.2.2 Additional requirement (regional)

For Band 34 operation in Japan, the rated output power declared by the manufacturer shall be less than or equal to the values specified in Table 6.2.2-1.

Table 6.2.2-1: Regional requirements for Band 34 for rated output power declared by the manufacturer.

Channel bandwidth BW _{Channel} [MHz]	1.4	3	5	10	15	20
Maximum output power [W]	N/A	N/A	20	40	60	N/A

For Band 41 operation in Japan, the rated output power per BS declared by the manufacturer shall be less than or equal to the values specified in Table 6.2.2-2.

Table 6.2.2-2: Regional requirements for Band 41 for rated output power declared by the manufacturer.

Channel bandwidth BW _{Channel} [MHz]	1.4	3	5	10	15	20
Maximum output power [W]	N/A	N/A	N/A	20	N/A	40

For Band 252 and Band 255 operation in US, the rated output power per BS declared by the manufacturer shall be less than or equal to the values specified in Table 6.2.2-3.

Table 6.2.2-3: Regional requirements for Band 252 and Band 255 for rated output power declared by the manufacturer.

<u>Channel bandwidth</u> <u>BW_{Channel} [MHz]</u>	<u>1.4</u>	<u>3</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>
<u>Maximum output power</u> <u>[W]</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>1^{1,2}</u>
<p><u>NOTE 1: Maximum conducted output power limit is defined for a single transmitting antenna with a gain equal to or less than 6dBi. If the antenna gain is greater than 6 dBi, the maximum conducted output power limit shall be reduced by the amount in dB that antenna gain exceeds 6 dBi. If multiple antennas are used for transmission, the maximum conducted power limit shall be reduced by the amount equal to 10*log (the number of transmitting antennas).</u></p> <p><u>NOTE 2: Regional regulatory requirements may further limit the maximum transmit power and antenna radiation characteristics, such as those defined in FCC Subpart E that limit EIRP versus elevation angle for an outdoor Band 252 BS.</u></p>						

For Band 252 and Band 255 operation in US, the BS shall comply with regional power density requirements in Table 6.2.2-4.

Table 6.2.2-4 Regional maximum power spectral density requirements

<u>E-UTRA Operating Band</u>	<u>Power Spectral Density</u>	<u>Note</u>
<u>252</u>	<u>17 dBm/MHz</u>	<u>1</u>
<u>255</u>	<u>30 dBm/500kHz</u>	<u>1</u>
<u>NOTE 1: Requirements are sourced from FCC CFR47 Part 15.407(a).</u>		

6.2.3 Home BS output power for adjacent UTRA channel protection

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

6.2.4 Home BS output power for adjacent E-UTRA channel protection

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

6.2.5 Home BS Output Power for co-channel E-UTRA protection

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

6.3 Output power dynamics

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

6.4 Transmit ON/OFF power

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

6.5 Transmitted signal quality

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

6.6 Unwanted emissions

Unwanted emissions consist of out-of-band emissions and spurious emissions [2]. Out of band emissions are unwanted emissions immediately outside the channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

The out-of-band emissions requirement for the BS transmitter is specified both in terms of Adjacent Channel Leakage power Ratio (ACLR) and Operating band unwanted emissions. The Operating band unwanted emissions define all unwanted emissions in each supported downlink operating band plus the frequency ranges 10 MHz above and 10 MHz below each band. Unwanted emissions outside of this frequency range are limited by a spurious emissions requirement.

For a BS supporting multi-carrier or intra-band contiguous CA, the unwanted emissions requirements apply to channel bandwidths of the outermost carrier larger than or equal to 5 MHz.

There is in addition a requirement for occupied bandwidth.

6.6.1 Occupied bandwidth

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

6.6.2 Adjacent Channel Leakage power Ratio (ACLR)

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency.

The requirements shall apply outside the Base Station RF bandwidth edges or radio bandwidth edges whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

For a BS operating in non-contiguous spectrum, the ACLR also applies for the first adjacent channel inside any sub-block gap with a gap size $W_{\text{gap}} \geq 15\text{MHz}$. The ACLR requirement for the second adjacent channel applies inside any sub-block gap with a gap size $W_{\text{gap}} \geq 20\text{MHz}$. The CACLR requirement in subclause 6.6.2.2 applies in sub block gaps for the frequency ranges defined in Table 6.6.2.2-1.

For a BS operating in multiple bands, where multiple bands are mapped onto the same antenna connector, the ACLR also applies for the first adjacent channel inside any inter RF bandwidth gap with a gap size $W_{\text{gap}} \geq 15\text{MHz}$. The ACLR requirement for the second adjacent channel applies inside any inter RF bandwidth gap with a gap size $W_{\text{gap}} \geq 20\text{MHz}$. The CACLR requirement in subclause 6.6.2.2 applies in inter RF bandwidth gaps for the frequency ranges defined in Table 6.6.2.2-1.

The requirement applies during the transmitter ON period.

6.6.2.1 Minimum requirement

The ACLR is defined with a square filter of bandwidth equal to the transmission bandwidth configuration of the transmitted signal (BW_{Config}) centred on the assigned channel frequency and a filter centred on the adjacent channel frequency according to the tables below.

For Category A Wide Area BS, either the ACLR limits in the tables below or the absolute limit of -13dBm/MHz apply, whichever is less stringent.

For Category B Wide Area BS, either the ACLR limits in the tables below or the absolute limit of -15dBm/MHz apply, whichever is less stringent.

For Medium Range BS, either the ACLR limits in the tables below or the absolute limit of -25 dBm/MHz shall apply, whichever is less stringent.

For Local Area BS, either the ACLR limits in the tables below or the absolute limit of -32dBm/MHz shall apply, whichever is less stringent.

For Home BS, either the ACLR limits in the tables below or the absolute limit of -50dBm/MHz apply, whichever is less stringent.

For operation in paired spectrum, the ACLR shall be higher than the value specified in Table 6.6.2.1-1.

Table 6.6.2.1-1: Base Station ACLR in paired spectrum

Channel bandwidth of E-UTRA lowest (highest) carrier transmitted BW_{Channel} [MHz]	BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted	Assumed adjacent channel carrier (informative)	Filter on the adjacent channel frequency and corresponding filter bandwidth	ACLR limit
1.4, 3.0, 5, 10, 15, 20	BW_{Channel}	E-UTRA of same BW	Square (BW_{Config})	45 dB
	$2 \times BW_{\text{Channel}}$	E-UTRA of same BW	Square (BW_{Config})	45 dB
	$BW_{\text{Channel}}/2 + 2.5\text{MHz}$	3.84 Mcps UTRA	RRC (3.84 Mcps)	45 dB
	$BW_{\text{Channel}}/2 + 7.5\text{MHz}$	3.84 Mcps UTRA	RRC (3.84 Mcps)	45 dB
NOTE 1: BW_{Channel} and BW_{Config} are the channel bandwidth and transmission bandwidth configuration of the E-UTRA lowest (highest) carrier transmitted on the assigned channel frequency.				
NOTE 2: The RRC filter shall be equivalent to the transmit pulse shape filter defined in TS 25.104 [6], with a chip rate as defined in this table.				

For operation in Band 252 and Band 255, the ACLR for the Medium range and Local area base station shall be higher than the value specified in Table 6.6.2.1-1b.

Table 6.6.2.1-1b: Medium Range and Local Area BS ACLR in band 252 and band 255

<u>Channel bandwidth of E-UTRA lowest (highest) carrier transmitted $BW_{Channel}$ [MHz]</u>	<u>BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted</u>	<u>Assumed adjacent channel carrier (informative)</u>	<u>Filter on the adjacent channel frequency and corresponding filter bandwidth</u>	<u>ACLR limit</u>
20	$BW_{Channel}$	E-UTRA of same BW	Square (BW_{Config})	30 dB
	$2 \times BW_{Channel}$	E-UTRA of same BW	Square (BW_{Config})	30 dB
NOTE 1: $BW_{Channel}$ and BW_{Config} are the channel bandwidth and transmission bandwidth configuration of the E-UTRA lowest (highest) carrier transmitted on the assigned channel frequency.				

For operation in unpaired spectrum, the ACLR shall be higher than the value specified in Table 6.6.2.1-2.

Table 6.6.2.1-2: Base Station ACLR in unpaired spectrum with synchronized operation

Channel bandwidth of E-UTRA lowest (highest) carrier transmitted $BW_{Channel}$ [MHz]	BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted	Assumed adjacent channel carrier (informative)	Filter on the adjacent channel frequency and corresponding filter bandwidth	ACLR limit
1.4, 3	$BW_{Channel}$	E-UTRA of same BW	Square (BW_{Config})	45 dB
	$2 \times BW_{Channel}$	E-UTRA of same BW	Square (BW_{Config})	45 dB
	$BW_{Channel}/2 + 0.8$ MHz	1.28 Mcps UTRA	RRC (1.28 Mcps)	45 dB
	$BW_{Channel}/2 + 2.4$ MHz	1.28 Mcps UTRA	RRC (1.28 Mcps)	45 dB
5, 10, 15, 20	$BW_{Channel}$	E-UTRA of same BW	Square (BW_{Config})	45 dB
	$2 \times BW_{Channel}$	E-UTRA of same BW	Square (BW_{Config})	45 dB
	$BW_{Channel}/2 + 0.8$ MHz	1.28 Mcps UTRA	RRC (1.28 Mcps)	45 dB
	$BW_{Channel}/2 + 2.4$ MHz	1.28 Mcps UTRA	RRC (1.28 Mcps)	45 dB
	$BW_{Channel}/2 + 2.5$ MHz	3.84 Mcps UTRA	RRC (3.84 Mcps)	45 dB
	$BW_{Channel}/2 + 7.5$ MHz	3.84 Mcps UTRA	RRC (3.84 Mcps)	45 dB
	$BW_{Channel}/2 + 5$ MHz	7.68 Mcps UTRA	RRC (7.68 Mcps)	45 dB
	$BW_{Channel}/2 + 15$ MHz	7.68 Mcps UTRA	RRC (7.68 Mcps)	45 dB
NOTE 1: $BW_{Channel}$ and BW_{Config} are the channel bandwidth and transmission bandwidth configuration of the E-UTRA lowest (highest) carrier transmitted on the assigned channel frequency.				
NOTE 2: The RRC filter shall be equivalent to the transmit pulse shape filter defined in TS 25.105 [7], with a chip rate as defined in this table.				

For operation in non-contiguous paired spectrum or multiple bands, the ACLR shall be higher than the value specified in Table 6.6.2.1-3.

Table 6.6.2.1-3: Base Station ACLR in non-contiguous paired spectrum or multiple bands

Sub-block or inter RF bandwidth gap size (W_{gap}) where the limit applies	BS adjacent channel centre frequency offset below or above the sub-block edge or the RF bandwidth edge (inside the gap)	Assumed adjacent channel carrier (informative)	Filter on the adjacent channel frequency and corresponding filter bandwidth	ACLR limit
$W_{gap} \geq 15$ MHz	2.5 MHz	3.84 Mcps UTRA	RRC (3.84 Mcps)	45 dB
$W_{gap} \geq 20$ MHz	7.5 MHz	3.84 Mcps UTRA	RRC (3.84 Mcps)	45 dB
NOTE: The RRC filter shall be equivalent to the transmit pulse shape filter defined in TS 25.104 [6], with a chip rate as defined in this table.				

For operation in non-contiguous unpaired spectrum or multiple bands, the ACLR shall be higher than the value specified in Table 6.6.2.1-4.

Table 6.6.2.1-4: Base Station ACLR in non-contiguous unpaired spectrum or multiple bands

Sub-block or inter RF bandwidth gap size (W_{gap}) where the limit applies	BS adjacent channel centre frequency offset below or above the sub-block edge or the RF bandwidth edge (inside the gap)	Assumed adjacent channel carrier (informative)	Filter on the adjacent channel frequency and corresponding filter bandwidth	ACLR limit
$W_{\text{gap}} \geq 15$ MHz	2.5 MHz	5MHz E-UTRA carrier	Square (BW_{Config})	45 dB
$W_{\text{gap}} \geq 20$ MHz	7.5 MHz	5MHz E-UTRA carrier	Square (BW_{Config})	45 dB

6.6.2.2 Cumulative ACLR requirement in non-contiguous spectrum

See this clause and all its sub-clauses in TS 36.104 V12.6.0

6.6.3 Operating band unwanted emissions

Unless otherwise stated, the Operating band unwanted emission limits are defined from 10 MHz below the lowest frequency of each supported downlink operating band up to 10 MHz above the highest frequency of each supported downlink operating band.

The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier) and for all transmission modes foreseen by the manufacturer's specification. In addition, for a BS operating in non-contiguous spectrum, the requirements apply inside any sub-block gap. In addition, for a BS operating in multiple bands, the requirements apply inside any inter RF bandwidth gap.

For BS capable of multi-band operation where multiple bands are mapped on separate antenna connectors, the single-band requirements apply and the cumulative evaluation of the emission limit in the inter-RF bandwidth gap are not applicable.

The unwanted emission limits in the part of the downlink operating band that falls in the spurious domain are consistent with ITU-R Recommendation SM.329 [2].

Emissions shall not exceed the maximum levels specified in the tables below, where:

- Δf is the separation between the channel edge frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.
- f_{offset} is the separation between the channel edge frequency and the centre of the measuring filter.
- $f_{\text{offset}_{\text{max}}}$ is the offset to the frequency 10 MHz outside the downlink operating band.
- Δf_{max} is equal to $f_{\text{offset}_{\text{max}}}$ minus half of the bandwidth of the measuring filter.

For BS operating in multiple bands, inside any inter RF bandwidth gaps with $W_{\text{gap}} < 20$ MHz, emissions shall not exceed the cumulative sum of the minimum requirements specified at the RF bandwidth edges on each side of the inter RF bandwidth gap. The minimum requirement for RF bandwidth edge is specified in Tables 6.6.3.1-1 to 6.6.3.3-3 below, where in this case:

- Δf is the separation between the RF bandwidth edge frequency and the nominal -3 dB point of the measuring filter closest to the RF bandwidth edge.
- f_{offset} is the separation between the RF bandwidth edge frequency and the centre of the measuring filter.
- $f_{\text{offset}_{\text{max}}}$ is equal to the inter RF bandwidth gap divided by two.
- Δf_{max} is equal to $f_{\text{offset}_{\text{max}}}$ minus half of the bandwidth of the measuring filter.

For a multicarrier E-UTRA BS or BS configured for intra-band contiguous or non-contiguous carrier aggregation the definitions above apply to the lower edge of the carrier transmitted at the lowest carrier frequency and the upper edge of the carrier transmitted at the highest carrier frequency within a specified frequency band.

In addition inside any sub-block gap for a BS operating in non-contiguous spectrum, emissions shall not exceed the cumulative sum of the minimum requirements specified for the adjacent sub blocks on each side of the sub block gap. The minimum requirement for each sub block is specified in Tables 6.6.3.1-1 to 6.6.3.3-3 below, where in this case:

- Δf is the separation between the sub block edge frequency and the nominal -3 dB point of the measuring filter closest to the sub block edge.
- f_{offset} is the separation between the sub block edge frequency and the centre of the measuring filter.
- $f_{\text{offset}_{\text{max}}}$ is equal to the sub block gap bandwidth divided by two.
- Δf_{max} is equal to $f_{\text{offset}_{\text{max}}}$ minus half of the bandwidth of the measuring filter.

For Wide Area BS, the requirements of either subclause 6.6.3.1 (Category A limits) or subclause 6.6.3.2 (Category B limits) shall apply.

For Local Area BS, the requirements of subclause 6.6.3.2A shall apply (Category A and B).

For Home BS, the requirements of subclause 6.6.3.2B shall apply (Category A and B).

For Medium Range BS, the requirements in subclause 6.6.3.2C shall apply (Category A and B).

The application of either Category A or Category B limits shall be the same as for Transmitter spurious emissions (Mandatory Requirements) in subclause 6.6.4.1.

6.6.3.1 Minimum requirements for Wide Area BS (Category A)

See this clause and all its sub-clauses in TS 36.104 V12.6.0

6.6.3.2 Minimum requirements for Wide Area BS (Category B)

See this clause and all its sub-clauses in TS 36.104 V12.6.0

6.6.3.2A Minimum requirements for Local Area BS (Category A and B)

For Local Area BS, emissions shall not exceed the maximum levels specified in Tables 6.6.3.2A-1 to 6.6.3.2A-35.

Table 6.6.3.2A-1: Local Area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2)	Measurement bandwidth (Note 5)
$0 \text{ MHz} \leq \Delta f < 1.4 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 1.45 \text{ MHz}$	$-21\text{dBm} - \frac{10}{1.4} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$1.4 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.45 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	-31 dBm	100 kHz
$2.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.85 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-31 dBm	100 kHz
NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -31dBm/100kHz. NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.			

Table 6.6.3.2A-2: Local Area BS operating band unwanted emission limits for 3 MHz channel bandwidth

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2)	Measurement bandwidth (Note 5)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$-25\text{dBm} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	-35 dBm	100 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-35 dBm	100 kHz
<p>NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -35dBm/100kHz.</p> <p>NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.</p>			

Table 6.6.3.2A-3: Local Area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2))	Measurement bandwidth (Note 54)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$-30\text{dBm} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < \min(10 \text{ MHz}, \Delta f_{\text{max}})$	$5.05 \text{ MHz} \leq f_{\text{offset}} < \min(10.05 \text{ MHz}, f_{\text{offset}_{\text{max}}})$	-37 dBm	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-37 dBm (Note 7)	100 kHz
<p>NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -37dBm/100kHz.</p> <p>NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.</p>			

For Local Area BS operating in Bands 252 and 255, emissions shall not exceed the maximum BS emissions at the antenna connector, specified in Table 6.6.3.2A-4 below for 20 MHz channel bandwidth, where P(dBm) is the maximum output power at the antenna connector for the 20 MHz channel.

Table 6.6.3.2A-4: Local Area BS operating band unwanted emission limits for 20 MHz channel bandwidth when operating in Bands 252 and 255

<u>Frequency offset of measurement filter -3dB point, Δf</u>	<u>Frequency offset of measurement filter centre frequency, f_{offset}</u>	<u>Minimum requirement (Note 1, 2)</u>	<u>Measurement bandwidth (Note 5)</u>
<u>$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$</u>	<u>$0.05 \text{ MHz} \leq f_{offset} < 1.05 \text{ MHz}$</u>	<u>$P - 32.6 - 10 \left(\frac{f_{offset}}{\text{MHz}} - 0.05 \right)$</u>	<u>100 kHz</u>
<u>$1 \text{ MHz} \leq \Delta f < \min(10 \text{ MHz}, \Delta f_{max})$</u>	<u>$1.05 \text{ MHz} \leq f_{offset} < \min(10.05 \text{ MHz}, f_{offset_{max}})$</u>	<u>$P - 42.6 - \frac{8}{9} \left(\frac{f_{offset}}{\text{MHz}} - 1.05 \right)$</u>	<u>100 kHz</u>
<u>$10 \text{ MHz} \leq \Delta f < \min(20 \text{ MHz}, \Delta f_{max})$</u>	<u>$10.05 \text{ MHz} \leq f_{offset} < \min(20.05 \text{ MHz}, f_{offset_{max}})$</u>	<u>$P - 50.6 - \frac{12}{10} \left(\frac{f_{offset}}{\text{MHz}} - 10.05 \right)$</u>	<u>100kHz</u>
<u>$20 \text{ MHz} \leq \Delta f \leq \Delta f_{max}$</u>	<u>$20.05 \text{ MHz} \leq f_{offset} < f_{offset_{max}}$</u>	<u>$P - 62.6$</u>	<u>100 kHz</u>

NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -37dBm/100kHz.

NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.

For Local Area BS operating in Bands 252 and 255, emissions shall not exceed the maximum BS emissions at the antenna connector, specified below in Table 6.6.3.2A-5 for 20+20 MHz channel bandwidth, where P(dBm) is the maximum output power (per carrier) at the antenna connector for the 20+20 MHz channels.

Table 6.6.3.2A-5: Local Area BS operating band unwanted emission limits for 20+20 MHz channel bandwidth when operating in Bands 252 and 255

<u>Frequency offset of measurement filter -3dB point, Δf</u>	<u>Frequency offset of measurement filter centre frequency, f_{offset}</u>	<u>Minimum requirement (Note 1, 2)</u>	<u>Measurement bandwidth (Note 5)</u>
<u>$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$</u>	<u>$0.05 \text{ MHz} \leq f_{offset} < 1.05 \text{ MHz}$</u>	<u>$P - 32.6 - 10 \left(\frac{f_{offset}}{\text{MHz}} - 0.05 \right)$</u>	<u>100 kHz</u>
<u>$1 \text{ MHz} \leq \Delta f < \min(20 \text{ MHz}, \Delta f_{max})$</u>	<u>$1.05 \text{ MHz} \leq f_{offset} < \min(20.05 \text{ MHz}, f_{offset_{max}})$</u>	<u>$P - 42.6 - \frac{8}{19} \left(\frac{f_{offset}}{\text{MHz}} - 1.05 \right)$</u>	<u>100 kHz</u>
<u>$20 \text{ MHz} \leq \Delta f < \min(40 \text{ MHz}, \Delta f_{max})$</u>	<u>$20.05 \text{ MHz} \leq f_{offset} < \min(40.05 \text{ MHz}, f_{offset_{max}})$</u>	<u>$P - 50.6 - \frac{12}{20} \left(\frac{f_{offset}}{\text{MHz}} - 20.05 \right)$</u>	<u>100kHz</u>
<u>$40 \text{ MHz} \leq \Delta f \leq \Delta f_{max}$</u>	<u>$40.05 \text{ MHz} \leq f_{offset} < f_{offset_{max}}$</u>	<u>$P - 62.6$</u>	<u>100 kHz</u>

NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -37dBm/100kHz.

NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.

6.6.3.2B Minimum requirements for Home BS (Category A and B)

See this clause and all its sub-clauses in TS 36.104 V12.6.0

6.6.3.2C Minimum requirements for Medium Range BS (Category A and B)

For Medium Range BS, emissions shall not exceed the maximum levels specified in Tables 6.6.3.2C-1 to 6.6.3.2C-68.

Table 6.6.3.2C-1: Medium Range BS operating band unwanted emission limits for 1.4 MHz channel bandwidth, $31 < P \leq 38$ dBm

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2)	Measurement bandwidth (Note 5)
$0 \text{ MHz} \leq \Delta f < 1.4 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 1.45 \text{ MHz}$	$P - 45\text{dB} - \frac{10}{1.4} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$1.4 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.45 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	P-55dB	100 kHz
$2.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.85 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-25dBm	100 kHz
NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -25dBm/100kHz.			
NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.			

Table 6.6.3.2C-2: Medium Range BS operating band unwanted emission limits for 1.4 MHz channel bandwidth, $P \leq 31$ dBm

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2)	Measurement bandwidth (Note 5)
$0 \text{ MHz} \leq \Delta f < 1.4 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 1.45 \text{ MHz}$	$-14\text{dBm} - \frac{10}{1.4} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$1.4 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.45 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	-24 dBm	100 kHz
$2.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.85 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-25dBm	100 kHz
NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -25dBm/100kHz.			
NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.			

Table 6.6.3.2C-3: Medium Range BS operating band unwanted emission limits for 3 MHz channel bandwidth, $31 < P \leq 38$ dBm

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2)	Measurement bandwidth (Note 5)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$P - 49\text{dB} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	P-59dB	100 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	Min(P-59dB, -25dBm)	100 kHz
NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be Min(P-59dB, -25dBm)/100kHz.			
NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.			

Table 6.6.3.2C-4: Medium Range BS operating band unwanted emission limits for 3 MHz channel bandwidth, $P \leq 31$ dBm

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2)	Measurement bandwidth (Note 5)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$-18\text{dBm} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	-28 dBm	100 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-28 dBm	100 kHz
<p>NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -28dBm/100kHz.</p> <p>NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.</p>			

Table 6.6.3.2C-5: Medium Range BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth, $31 < P \leq 38$ dBm

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2)	Measurement bandwidth (Note 5)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$P - 53\text{dB} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < \min(10 \text{ MHz}, \Delta f_{\text{max}})$	$5.05 \text{ MHz} \leq f_{\text{offset}} < \min(10.05 \text{ MHz}, f_{\text{offset}_{\text{max}}})$	P-60dB	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	Min(P-60dB, -25dBm) (Note 6)	100 kHz
<p>NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be Min(P-60dB, -25dBm)/100kHz.</p> <p>NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.</p>			

Table 6.6.3.2C-6: Medium Range BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth, $P \leq 31$ dBm

Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement (Note 1, 2)	Measurement bandwidth (Note 5)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$-22 \text{ dBm} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < \min(10 \text{ MHz}, \Delta f_{\text{max}})$	$5.05 \text{ MHz} \leq f_{\text{offset}} < \min(10.05 \text{ MHz}, f_{\text{offset}_{\text{max}}})$	-29 dBm	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-29 dBm (Note 6)	100 kHz
<p>NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -29dBm/100kHz.</p> <p>NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.</p>			

For Medium Range BS operating in Bands 252 and 255, emissions shall not exceed the maximum BS emissions at the antenna connector, specified below in Table 6.6.3.2C-7 for 20 MHz channel bandwidth, Where P(dBm) is the maximum output power at the antenna connector for the 20 MHz channel.

Table 6.6.3.2C-7: Medium Range BS operating band unwanted emission limits for 20 MHz channel bandwidth when operating in Bands 252 and 255

<u>Frequency offset of measurement filter -3dB point, Δf</u>	<u>Frequency offset of measurement filter centre frequency, f_{offset}</u>	<u>Minimum requirement (Note 1, 2)</u>	<u>Measurement bandwidth (Note 5)</u>
$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{offset} < 1.05 \text{ MHz}$	$P - 32.6 - 10 \left(\frac{f_{offset}}{\text{MHz}} - 0.05 \right)$	100 kHz
$1 \text{ MHz} \leq \Delta f < \min(10 \text{ MHz}, \Delta f_{max})$	$1.05 \text{ MHz} \leq f_{offset} < \min(10.05 \text{ MHz}, f_{offset_{max}})$	$P - 42.6 - \frac{8}{9} \left(\frac{f_{offset}}{\text{MHz}} - 1.05 \right)$	100 kHz
$10 \text{ MHz} \leq \Delta f < \min(20 \text{ MHz}, \Delta f_{max})$	$10.05 \text{ MHz} \leq f_{offset} < \min(20.05 \text{ MHz}, f_{offset_{max}})$	$P - 50.6 - \frac{12}{10} \left(\frac{f_{offset}}{\text{MHz}} - 10.05 \right)$	100kHz
$20 \text{ MHz} \leq \Delta f \leq \Delta f_{max}$	$20.05 \text{ MHz} \leq f_{offset} < f_{offset_{max}}$	$P - 62.6 \text{ (dB)}$	100 kHz

NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -37dBm/100kHz.

NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.

For Medium Range BS operating in Bands 252 and 255, emissions shall not exceed the maximum BS emissions at the antenna connector, specified in Table 6.6.3.2C-8 for 20+20 MHz channel bandwidth, where P (dBm) is the maximum output power (per carrier) at the antenna connector for the 20+20 MHz channels.

Table 6.6.3.2C-8: Medium Range BS operating band unwanted emission limits for 20+20 MHz channel bandwidth when operating in Bands 252 and 255

<u>Frequency offset of measurement filter -3dB point, Δf</u>	<u>Frequency offset of measurement filter centre frequency, f_{offset}</u>	<u>Minimum requirement (Note 1, 2)</u>	<u>Measurement bandwidth (Note 5)</u>
$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{offset} < 1.05 \text{ MHz}$	$P - 32.6 - 10 \left(\frac{f_{offset}}{\text{MHz}} - 0.05 \right)$	100 kHz
$1 \text{ MHz} \leq \Delta f < \min(20 \text{ MHz}, \Delta f_{max})$	$1.05 \text{ MHz} \leq f_{offset} < \min(20.05 \text{ MHz}, f_{offset_{max}})$	$P - 42.6 - \frac{8}{19} \left(\frac{f_{offset}}{\text{MHz}} - 1.05 \right)$	100 kHz
$20 \text{ MHz} \leq \Delta f < \min(40 \text{ MHz}, \Delta f_{max})$	$20.05 \text{ MHz} \leq f_{offset} < \min(40.05 \text{ MHz}, f_{offset_{max}})$	$P - 50.6 - \frac{12}{20} \left(\frac{f_{offset}}{\text{MHz}} - 20.05 \right)$	100kHz
$40 \text{ MHz} \leq \Delta f \leq \Delta f_{max}$	$40.05 \text{ MHz} \leq f_{offset} < f_{offset_{max}}$	$P - 62.6$	100 kHz

NOTE 1: For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is $\Delta f \geq 10\text{MHz}$ from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -37dBm/100kHz.

NOTE 2: For BS supporting multi-band operation with inter RF bandwidth gap < 20MHz the minimum requirement within the inter RF bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the inter RF bandwidth gap.

6.6.3.3 Additional requirements

These requirements may be applied for the protection of other systems operating inside or near each supported E-UTRA BS downlink operating band. The limits may apply as an optional protection of such systems that are deployed in the same geographical area as the E-UTRA BS, or they may be set by local or regional regulation as a mandatory requirement for an E-UTRA operating band. It is in some cases not stated in the present document whether a requirement is mandatory or under what exact circumstances that a limit applies, since this is set by local or regional regulation. An overview of regional requirements in the present document is given in subclause 4.3.

In certain regions the following requirement may apply. For E-UTRA BS operating in Bands 5, 26, 27 or 28, emissions shall not exceed the maximum levels specified in Tables 6.6.3.3-1.

Table 6.6.3.3-1: Additional operating band unwanted emission limits for E-UTRA bands <1GHz

Channel bandwidth	Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement	Measurement bandwidth (Note 5)
1.4 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.005 \text{ MHz} \leq f_{\text{offset}} < 0.995 \text{ MHz}$	-14 dBm	10 kHz
3 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	-13 dBm	30 kHz
5 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	-15 dBm	30 kHz
10 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	-13 dBm	100 kHz
15 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	-13 dBm	100 kHz
20 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	-13 dBm	100 kHz
All	$1 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$1.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 dBm	100 kHz

In certain regions the following requirement may apply. For E-UTRA BS operating in Bands 2, 4, 10, 23, 25, 30, 35, 36, 41, emissions shall not exceed the maximum levels specified in Table 6.6.3.3-2.

Table 6.6.3.3-2: Additional operating band unwanted emission limits for E-UTRA bands >1GHz

Channel bandwidth	Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement	Measurement bandwidth (Note 5)
1.4 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.005 \text{ MHz} \leq f_{\text{offset}} < 0.995 \text{ MHz}$	-14 dBm	10 kHz
3 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	-13 dBm	30 kHz
5 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	-15 dBm	30 kHz
10 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	-13 dBm	100 kHz
15 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	-15 dBm	100 kHz
20 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	-16 dBm	100 kHz
All	$1 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 dBm	1 MHz

In certain regions the following requirement may apply. For E-UTRA BS operating in Bands 12, 13, 14, 17, 29 emissions shall not exceed the maximum levels specified in Table 6.6.3.3-3.

Table 6.6.3.3-3: Additional operating band unwanted emission limits for E-UTRA (bands 12, 13, 14, 17 and 29)

Channel bandwidth	Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement	Measurement bandwidth (Note 5)
All	$0 \text{ MHz} \leq \Delta f < 100 \text{ kHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.085 \text{ MHz}$	-13 dBm	30 kHz
All	$100 \text{ kHz} \leq \Delta f < \Delta f_{\text{max}}$	$150 \text{ kHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 dBm	100 kHz

In certain regions, the following requirements may apply to an E-UTRA TDD BS operating in the same geographic area and in the same operating band as another E-UTRA TDD system without synchronisation. For this case the emissions shall not exceed -52 dBm/MHz in each supported downlink operating band except in:

- The frequency range from 10 MHz below the lower channel edge to the frequency 10 MHz above the upper channel edge of each supported band.

In certain regions the following requirement may apply for protection of DTT. For E-UTRA BS operating in Band 20, the level of emissions in the band 470-790 MHz, measured in an 8MHz filter bandwidth on centre frequencies F_{filter}

according to Table 6.6.3.3-4, shall not exceed the maximum emission level $P_{EM,N}$ declared by the manufacturer. This requirement applies in the frequency range 470-790 MHz even though part of the range falls in the spurious domain.

Table 6.6.3.3-4: Declared emissions levels for protection of DTT

Filter centre frequency, F_{filter}	Measurement bandwidth	Declared emission level [dBm]
$F_{\text{filter}} = 8 \cdot N + 306$ (MHz); $21 \leq N \leq 60$	8 MHz	$P_{EM,N}$

Note: The regional requirement is defined in terms of EIRP (effective isotropic radiated power), which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement. Compliance with the regional requirement can be determined using the method outlined in Annex G.

In certain regions the following requirement may apply for the protection of systems operating in frequency bands adjacent to band 1 as defined in clause 5.5, in geographic areas in which both an adjacent band service E-UTRA are deployed.

The power of any spurious emission shall not exceed:

Table 6.6.3.3-5: Emissions limits for protection of adjacent band services

Operating Band	Frequency range	Maximum Level	Measurement Bandwidth
1	2100-2105 MHz	$-30 + 3.4 \cdot (f - 2100 \text{ MHz})$ dBm	1 MHz
	2175-2180 MHz	$-30 + 3.4 \cdot (2180 \text{ MHz} - f)$ dBm	1 MHz

In regions where FCC regulation applies, requirements for protection of GPS according to FCC Order DA 10-534 applies for operation in Band 24. The following normative requirement covers the base station, to be used together with other information about the site installation to verify compliance with the requirement in FCC Order DA 10-534. The requirement applies to BS operating in Band 24 to ensure that appropriate interference protection is provided to the 1559 – 1610 MHz band. This requirement applies to the frequency range 1559-1610 MHz, even though part of this range falls within the spurious domain.

The level of emissions in the 1559 – 1610 MHz band, measured in measurement bandwidth according to Table 6.6.3.3-6 shall not exceed the maximum emission levels $P_{E_1\text{MHz}}$ and $P_{E_1\text{kHz}}$ declared by the manufacturer.

Table 6.6.3.3-6: Declared emissions levels for protection of the 1559-1610 MHz band

Operating Band	Frequency range	Declared emission level [dBW] (Measurement bandwidth = 1 MHz)	Declared emission level [dBW] of discrete emissions of less than 700 Hz bandwidth (Measurement bandwidth = 1 kHz)
24	1559 - 1610 MHz	$P_{E_1\text{MHz}}$	$P_{E_1\text{kHz}}$

Note: The regional requirement in FCC Order DA 10-534 is defined in terms of EIRP (effective isotropic radiated power), which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The EIRP level is calculated using: $P_{EIRP} = P_E + G_{\text{ant}}$ where P_E denotes the BS unwanted emission level at the antenna connector, G_{ant} equals the BS antenna gain minus feeder loss. The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement.

The following requirement may apply to E-UTRA BS operating in Band 41 in certain regions. Emissions shall not exceed the maximum levels specified in Table 6.6.3.3-7.

Table 6.6.3.3-7: Additional operating band unwanted emission limits for Band 41

Channel bandwidth	Frequency offset of measurement filter -3dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement	Measurement bandwidth (Note 5)
10 MHz	$10 \text{ MHz} \leq \Delta f < 20 \text{ MHz}$	$10.5 \text{ MHz} \leq f_{\text{offset}} < 19.5 \text{ MHz}$	-22 dBm	1 MHz
20 MHz	$20 \text{ MHz} \leq \Delta f < 40 \text{ MHz}$	$20.5 \text{ MHz} \leq f_{\text{offset}} < 39.5 \text{ MHz}$	-22 dBm	1 MHz
NOTE: This requirement applies for carriers allocated within 2545-2575MHz or 2595-2645MHz.				

In certain regions, the following requirements may apply to E-UTRA BS operating in Band 32 within 1452-1492 MHz. The level of operating band unwanted emissions, measured on centre frequencies f_{offset} with filter bandwidth, according to Table 6.6.3.3-8, shall neither exceed the maximum emission level $P_{\text{EM},\text{B}32,\text{a}}$, $P_{\text{EM},\text{B}32,\text{b}}$ nor $P_{\text{EM},\text{B}32,\text{c}}$ declared by the manufacturer.

Table 6.6.3.3-8: Declared operating band 32 unwanted emission within 1452-1492 MHz

Frequency offset of measurement filter centre frequency, f_{offset}	Declared emission level [dBm]	Measurement bandwidth
2.5 MHz	$P_{\text{EM},\text{B}32,\text{a}}$	5 MHz
7.5 MHz	$P_{\text{EM},\text{B}32,\text{b}}$	5 MHz
$12.5 \text{ MHz} \leq f_{\text{offset}} \leq f_{\text{offset,max},\text{B}32}$	$P_{\text{EM},\text{B}32,\text{c}}$	5 MHz
NOTE: $f_{\text{offset,max},\text{B}32}$ denotes the frequency difference between the lower channel edge and 1454.5 MHz, and the frequency difference between the upper channel edge and 1489.5 MHz for the set channel position.		

NOTE: The regional requirement, included in [16], is defined in terms of EIRP per antenna, which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement. The assessment of the EIRP level is described in Annex H.

In certain regions, the following requirement may apply to E-UTRA BS operating in Band 32 within 1452-1492 MHz for the protection of services in spectrum adjacent to the frequency range 1452-1492 MHz. The level of emissions, measured on centre frequencies F_{filter} with filter bandwidth according to Table 6.6.3.3-9, shall neither exceed the maximum emission level $P_{\text{EM},\text{B}32,\text{d}}$ nor $P_{\text{EM},\text{B}32,\text{e}}$ declared by the manufacturer. This requirement applies in the frequency range 1429-1518MHz even though part of the range falls in the spurious domain.

Table 6.6.3.3-9: Operating band 32 declared emission outside 1452-1492 MHz

Filter centre frequency, F_{filter}	Declared emission level [dBm]	Measurement bandwidth
$1429.5 \text{ MHz} \leq F_{\text{filter}} \leq 1448.5 \text{ MHz}$	$P_{\text{EM},\text{B}32,\text{d}}$	1 MHz
$F_{\text{filter}} = 1450.5 \text{ MHz}$	$P_{\text{EM},\text{B}32,\text{e}}$	3 MHz
$F_{\text{filter}} = 1493.5 \text{ MHz}$	$P_{\text{EM},\text{B}32,\text{e}}$	3 MHz
$1495.5 \text{ MHz} \leq F_{\text{filter}} \leq 1517.5 \text{ MHz}$	$P_{\text{EM},\text{B}32,\text{d}}$	1 MHz

NOTE: The regional requirement, included in [16], is defined in terms of EIRP, which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement. The assessment of the EIRP level is described in Annex H.

The following notes are common to all subclauses in 6.6.3:

NOTE 3: Local or regional regulations may specify another excluded frequency range, which may include frequencies where synchronised E-UTRA TDD systems operate.

NOTE 4: E-UTRA TDD base stations that are synchronized can transmit without these additional co-existence requirements.

NOTE 5: As a general rule for the requirements in subclause 6.6.3, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

NOTE 6: This frequency range ensures that the range of values of f_{offset} is continuous.

NOTE 7: The requirement is not applicable when $\Delta f_{\text{max}} < 10$ MHz.

NOTE 8: For Home BS, the parameter P is defined as the aggregated maximum power of all transmit antenna ports of Home BS.

In certain regions the following requirement may apply. For E-UTRA BS operating in Band 252, the level of emissions outside 5.15-5.35 GHz, measured in 1MHz filter bandwidth on centre frequencies F_{filter} according to Table 6.6.3.3-10, shall not exceed the maximum emission level P_{E_B252} specified by the manufacturer.

Table 6.6.3.3-10: Declared emissions levels for E-UTRA Band 252

Operating Band	Measurement Filter centre frequency, F_{filter}	Measurement bandwidth	Declared emission level [dBm]
<u>252</u>	<u>$F_{\text{filter}} \leq 5149.5\text{MHz}$ and $\geq 5350.5\text{MHz}$</u>	<u>1 MHz</u>	<u>P_{E_B252}</u>

NOTE: The regional requirement, included in FCC Code of Federal Regulations 47 Part 15.407(b), is defined in terms of EIRP, which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain, feeder loss and the number of transmitting antennas). The requirement defined above provides the characteristics of the BS needed to verify compliance with the regional requirement. The assessment of the EIRP level is described in Annex H.2.

In certain regions the following requirement may apply. For E-UTRA BS operating in Band 255, the level of emissions measured in 1MHz filter bandwidth on centre frequencies F_{filter} according to Table 6.6.3.3-11, shall not exceed the maximum emission levels $P_{E_B255_a}$ and $P_{E_B255_b}$ specified by the manufacturer.

Table 6.6.3.3-11: Declared emissions levels for E-UTRA Band 255

Operating Band	Measurement Filter centre frequency, F_{filter}	Measurement bandwidth	Declared emission level [dBm]
<u>255</u>	<u>$5715.5\text{MHz} \leq F_{\text{filter}} \leq 5724.5\text{MHz}$ and $5850.5\text{MHz} \leq F_{\text{filter}} \leq 5859.5\text{MHz}$</u>	<u>1 MHz</u>	<u>$P_{E_B255_a}$</u>
<u>255</u>	<u>$F_{\text{filter}} \leq 5714.5\text{MHz}$ and $\geq 5860.5\text{MHz}$</u>	<u>1 MHz</u>	<u>$P_{E_B255_b}$</u>

NOTE: The regional requirement, included in FCC Code of Federal Regulations 47 Part 15.407(b), is defined in terms of EIRP, which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain, feeder loss and the number of transmitting antennas). The requirement defined above provides the characteristics of the BS needed to verify compliance with the regional requirement. The assessment of the EIRP level is described in Annex H.2.

6.6.4 Transmitter spurious emissions

The transmitter spurious emission limits apply from 9 kHz to 12.75 GHz, excluding the frequency range from 10 MHz below the lowest frequency of the downlink operating band up to 10 MHz above the highest frequency of the downlink operating band. For BS capable of multi-band operation where multiple bands are mapped on the same antenna connector, this exclusion applies for each supported operating band. For BS capable of multi-band operation where multiple bands are mapped on separate antenna connectors, the single-band requirements apply and the multi-band exclusions and provisions are not applicable. Exceptions are the requirements in Table 6.6.4.3.1-2, Table 6.6.4.3.1-3, and specifically stated exceptions in Table 6.6.4.3.1-1 that apply also closer than 10 MHz from the downlink operating band. For some operating bands the upper frequency limit is higher than 12.75 GHz.

The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification. Unless otherwise stated, all requirements are measured as mean power (RMS).

6.6.4.1 Mandatory Requirements

The requirements of either subclause 6.6.4.1.1 (Category A limits) or subclause 6.6.4.1.2 (Category B limits) shall apply. The application of either Category A or Category B limits shall be the same as for Operating band unwanted emissions in subclause 6.6.3.

6.6.4.1.1 Spurious emissions (Category A)

6.6.4.1.1.1 Minimum Requirement

The power of any spurious emission shall not exceed the limits in Table 6.6.4.1.1.1-1

Table 6.6.4.1.1.1-1: BS Spurious emission limits, Category A

Frequency range	Maximum level	Measurement Bandwidth	Note
9kHz - 150kHz	-13 dBm	1 kHz	Note 1
150kHz - 30MHz		10 kHz	Note 1
30MHz - 1GHz		100 kHz	Note 1
1GHz - 12.75 GHz		1 MHz	Note 2
12.75 GHz - 5 th harmonic of the upper frequency edge of the DL operating band in GHz		1 MHz	Note 2, Note 3
NOTE 1: Bandwidth as in ITU-R SM.329 [2] , s4.1			
NOTE 2: Bandwidth as in ITU-R SM.329 [2] , s4.1. Upper frequency as in ITU-R SM.329 [2] , s2.5 table 1			
NOTE 3: Applies only for Bands 22, 42 and 43.			

6.6.4.1.2 Spurious emissions (Category B)

6.6.4.1.2.1 Minimum Requirement

The power of any spurious emission shall not exceed the limits in Table 6.6.4.1.2.1-1

Table 6.6.4.1.2.1-1: BS Spurious emissions limits, Category B

Frequency range	Maximum Level	Measurement Bandwidth	Note
9 kHz ↔ 150 kHz	-36 dBm	1 kHz	Note 1
150 kHz ↔ 30 MHz	-36 dBm	10 kHz	Note 1
30 MHz ↔ 1 GHz	-36 dBm	100 kHz	Note 1
1 GHz ↔ 12.75 GHz	-30 dBm	1 MHz	Note 2
12.75 GHz ↔ 5 th harmonic of the upper frequency edge of the DL operating band in GHz	-30 dBm	1 MHz	Note 2, Note 3
NOTE 1: Bandwidth as in ITU-R SM.329 [2] , s4.1			
NOTE 2: Bandwidth as in ITU-R SM.329 [2] , s4.1. Upper frequency as in ITU-R SM.329 [2] , s2.5 table 1			
NOTE 3: Applies only for Bands 22, 42 and 43.			

6.6.4.1.3 Spurious emissions (LTE-U)

6.6.4.1.3.1 Minimum Requirement

The power of any spurious emission shall not exceed the limits in Table 6.6.4.1.3.1-1

Table 6.6.4.1.3.1-1: BS Spurious emissions limits, LTE-U

Frequency range	Maximum Level	Measurement Bandwidth	Note
9 kHz ↔ 150 kHz	-46 dBm	0.2kHz	Note 1, 2, 5
150 kHz ↔ 30 MHz	-46 dBm	9 kHz	Note 1, 2, 5
30 MHz ↔ 88 MHz	-55 dBm	120 kHz	Note 1, 2, 5
88 MHz ↔ 216 MHz	-52 dBm	120 kHz	Note 1, 2, 5
216 MHz ↔ 960 MHz	-49 dBm	120 kHz	Note 1, 2, 5
960 MHz ↔ 1000 MHz	-41 dBm	120 kHz	Note 1, 2, 5
1 GHz ↔ 12.75 GHz	NOTE 3	1 MHz	Note 1, 2, 5
12.75 GHz ↔ 40 GHz	NOTE 3	1 MHz	Note 1, 2, 5
FCC 15.205 Restricted Bands above 1000 MHz	-41 dBm	1 MHz	Note 1, 2, 3, 4, 5, 6
NOTE 1: Limits are sourced from US FCC CFR 47 Part 15.209			
NOTE 2: Applicable regional regulatory requirements, such as FCC CFR 47 Subpart E, define radiated emissions from the BS in terms of field strength with units of microvolts/meter using a CISPR 16 quasi-peak detector function on frequencies <1000MHz and an average detector for frequencies >1000 MHz. The field strength limits may be converted to isotropic radiated power (EIRP) and then conducted emissions limits based on an assumed antenna gain. The limits have been converted from FCC Part 15.209 electric field strength limits to conducted RF emissions limits assuming an antenna gain of 0 dBi.			
NOTE 3: See section 6.6.3.3 for emissions limits > 1GHz			
NOTE 4: Restricted bands are defined in US FCC CFR 47 Part 15.205			
NOTE 5: If multiple antennas are used for transmission, the maximum conducted spurious emissions limit shall be reduced by the amount equal to 10*log(the number of transmitting antennas).			
NOTE 6: FCC CFR 47 Part 15.209 restricted band emissions limits < 1000 MHz are addressed in this table by the limits in the range of 9 kHz to 1000 MHz			

6.6.4.2 Protection of the BS receiver of own or different BS

See this clause and all its sub-clauses in TS 36.104 V12.6.0

6.6.4.3 Additional spurious emissions requirements

These requirements may be applied for the protection of system operating in frequency ranges other than the E-UTRA BS downlink operating band. The limits may apply as an optional protection of such systems that are deployed in the same geographical area as the E-UTRA BS, or they may be set by local or regional regulation as a mandatory requirement for an E-UTRA operating band. It is in some cases not stated in the present document whether a requirement is mandatory or under what exact circumstances that a limit applies, since this is set by local or regional regulation. An overview of regional requirements in the present document is given in subclause 4.3.

Some requirements may apply for the protection of specific equipment (UE, MS and/or BS) or equipment operating in specific systems (GSM, CDMA, UTRA, E-UTRA, etc.) as listed below.

6.6.4.3.1 Minimum Requirement

The power of any spurious emission shall not exceed the limits of Table 6.6.4.3.1-1 for a BS where requirements for co-existence with the system listed in the first column apply. For BS capable of multi-band operation, the exclusions and conditions in the Note column of Table 6.6.4.3.1-1 apply for each supported operating band. For BS capable of multi-band operation where multiple bands are mapped on separate antenna connectors, the exclusions and conditions in the Note column of Table 6.6.4.3.1-1 apply for the operating band supported at that antenna connector.

Table 6.6.4.3.1-1: BS Spurious emissions limits for E-UTRA BS for co-existence with systems operating in other frequency bands

System type for E-UTRA to co-exist with	Frequency range for co-existence requirement	Maximum Level	Measurement Bandwidth	Note
GSM900	921 - 960 MHz	-57 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in band 8
	876 - 915 MHz	-61 dBm	100 kHz	For the frequency range 880-915 MHz, this requirement does not apply to E-UTRA BS operating in band 8, since it is already covered by the requirement in sub-clause 6.6.4.2.
DCS1800	1805 - 1880 MHz	-47 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in band 3.
	1710 - 1785 MHz	-61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in band 3, since it is already covered by the requirement in sub-clause 6.6.4.2.
PCS1900	1930 - 1990 MHz	-47 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in band 2, band 25 or band 36.
	1850 - 1910 MHz	-61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in band 2 or 25, since it is already covered by the requirement in sub-clause 6.6.4.2. This requirement does not apply to E-UTRA BS operating in band 35.
GSM850 or CDMA850	869 - 894 MHz	-57 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in band 5 or 26. This requirement applies to E-UTRA BS operating in Band 27 for the frequency range 879-894 MHz.
	824 - 849 MHz	-61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in band 5 or 26, since it is already covered by the requirement in sub-clause 6.6.4.2. For E-UTRA BS operating in Band 27, it applies 3 MHz below the Band 27 downlink operating band.
UTRA FDD Band I or E-UTRA Band 1	2110 - 2170 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 1,
	1920 - 1980 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 1, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band II or E-UTRA Band 2	1930 - 1990 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 2 or 25.
	1850 - 1910 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 2 or 25, since it is already covered by the requirement in sub-clause 6.6.4.2
UTRA FDD Band III or E-UTRA Band 3	1805 - 1880 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 3 or 9.
	1710 - 1785 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 3, since it is already covered by the requirement in sub-clause 6.6.4.2. For E-UTRA BS operating in band 9, it applies for 1710 MHz to 1749.9 MHz and 1784.9 MHz to 1785 MHz, while the rest is covered in sub-clause 6.6.4.2.
UTRA FDD Band IV or E-UTRA Band 4	2110 - 2155 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 4 or 10
	1710 - 1755 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 4 or 10, since it is already covered by the requirement in sub-clause 6.6.4.2.

UTRA FDD Band V or E-UTRA Band 5	869 - 894 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 5 or 26. This requirement applies to E-UTRA BS operating in Band 27 for the frequency range 879-894 MHz.
	824 - 849 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 5 or 26, since it is already covered by the requirement in sub-clause 6.6.4.2. For E-UTRA BS operating in Band 27, it applies 3 MHz below the Band 27 downlink operating band.
UTRA FDD Band VI, XIX or E-UTRA Band 6, 18, 19	860 - 890 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 6, 18, 19.
	815 - 830 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 18, since it is already covered by the requirement in sub-clause 6.6.4.2.
	830 - 845 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 6, 19, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band VII or E-UTRA Band 7	2620 - 2690 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 7.
	2500 - 2570 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 7, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band VIII or E-UTRA Band 8	925 - 960 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 8.
	880 - 915 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 8, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band IX or E-UTRA Band 9	1844.9 - 1879.9 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 3 or 9.
	1749.9 - 1784.9 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 3 or 9, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band X or E-UTRA Band 10	2110 - 2170 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 4 or 10
	1710 - 1770 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 10, since it is already covered by the requirement in sub-clause 6.6.4.2. For E-UTRA BS operating in Band 4, it applies for 1755 MHz to 1770 MHz, while the rest is covered in sub-clause 6.6.4.2.
UTRA FDD Band XI or XXI or E-UTRA Band 11 or 21	1475.9 - 1510.9 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 11, 21 or 32,
	1427.9 - 1447.9 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 11, since it is already covered by the requirement in sub-clause 6.6.4.2. For E-UTRA BS operating in band 32, this requirement applies for carriers allocated within 1475.9MHz and 1495.9MHz.
	1447.9 - 1462.9 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 21, since it is already covered by the requirement in sub-clause 6.6.4.2. For E-UTRA BS operating in band 32, this requirement applies for carriers allocated within 1475.9MHz and 1495.9MHz.
UTRA FDD Band XII or E-UTRA Band 12	729 - 746 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 12.
	699 - 716 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 12, since it is already covered by the requirement in sub-clause 6.6.4.2. For E-UTRA BS operating in Band 29, it applies 1 MHz below the Band 29 downlink operating band (Note 6).
UTRA FDD Band XIII or E-UTRA Band 13	746 - 756 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 13.
	777 - 787 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 13, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band XIV or	758 - 768 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 14.

E-UTRA Band 14	788 - 798 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 14, since it is already covered by the requirement in sub-clause 6.6.4.2.
E-UTRA Band 17	734 - 746 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 17.
	704 - 716 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 17, since it is already covered by the requirement in subclause 6.6.4.2. For E-UTRA BS operating in Band 29, it applies 1 MHz below the Band 29 downlink operating band (Note 6).
UTRA FDD Band XX or E-UTRA Band 20	791 - 821 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 20.
	832 - 862 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 20, since it is already covered by the requirement in subclause 6.6.4.2.
UTRA FDD Band XXII or E-UTRA Band 22	3510 – 3590 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 22 or 42.
	3410 – 3490 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 22, since it is already covered by the requirement in subclause 6.6.4.2. This requirement does not apply to E-UTRA BS operating in Band 42
E-UTRA Band 23	2180 - 2200 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 23.
	2000 - 2020 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 23, since it is already covered by the requirement in subclause 6.6.4.2. This requirement does not apply to BS operating in Bands 2 or 25, where the limits are defined separately.
	2000 – 2010 MHz	-30 dBm	1 MHz	This requirement only applies to E-UTRA BS operating in Band 2 or Band 25. This requirement applies starting 5 MHz above the Band 25 downlink operating band. (Note 4)
	2010 – 2020 MHz	-49 dBm	1 MHz	
E-UTRA Band 24	1525 – 1559 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 24.
	1626.5 – 1660.5 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 24, since it is already covered by the requirement in subclause 6.6.4.2.
UTRA FDD Band XXV or E-UTRA Band 25	1930 – 1995 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 2 or 25
	1850 – 1915 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 25, since it is already covered by the requirement in subclause 6.6.4.2. For E-UTRA BS operating in Band 2, it applies for 1910 MHz to 1915 MHz, while the rest is covered in sub-clause 6.6.4.2
UTRA FDD Band XXVI or E-UTRA Band 26	859 – 894 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 5 or 26. This requirement applies to E-UTRA BS operating in Band 27 for the frequency range 879-894 MHz.
	814 – 849 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 26, since it is already covered by the requirement in subclause 6.6.4.2. For E-UTRA BS operating in Band 5, it applies for 814 MHz to 824 MHz, while the rest is covered in sub-clause 6.6.4.2. For E-UTRA BS operating in Band 27, it applies 3 MHz below the Band 27 downlink operating band.
E-UTRA Band 27	852 – 869 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 5, 26 or 27.
	807 – 824 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 27, since it is already covered by the requirement in subclause 6.6.4.2. For E-UTRA BS operating in Band 26, it applies for 807 MHz to 814 MHz, while the rest is covered in sub-clause 6.6.4.2. This requirement also applies to E-UTRA BS operating in Band 28, starting 4 MHz above the Band 28 downlink operating band (Note 5).

E-UTRA Band 28	758 - 803 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 28 or 44.
	703 - 748 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 28, since it is already covered by the requirement in subclause 6.6.4.2. This requirement does not apply to E-UTRA BS operating in Band 44.
E-UTRA Band 29	717 – 728 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 29.
E-UTRA Band 30	2350 – 2360 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 30 or 40.
	2305 – 2315 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 30, since it is already covered by the requirement in subclause 6.6.4.2. This requirement does not apply to E-UTRA BS operating in Band 40.
E-UTRA Band 31	462.5 -467.5 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 31.
	452.5 -457.5 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 31, since it is already covered by the requirement in subclause 6.6.4.2.
UTRA FDD band XXXII or E-UTRA band 32	1452 – 1496 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in band 11, 21 or 32.
UTRA TDD Band a) or E-UTRA Band 33	1900 - 1920 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 33.
UTRA TDD Band a) or E-UTRA Band 34	2010 - 2025 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 34.
UTRA TDD Band b) or E-UTRA Band 35	1850 - 1910 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 35.
UTRA TDD Band b) or E-UTRA Band 36	1930 - 1990 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 2 and 36.
UTRA TDD Band c) or E-UTRA Band 37	1910 - 1930 MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in ITU-R M.1036, but is pending any future deployment.
UTRA TDD Band d) or E-UTRA Band 38	2570 - 2620 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 38.
UTRA TDD Band f) or E-UTRA Band 39	1880 - 1920MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 39.
UTRA TDD Band e) or E-UTRA Band 40	2300 - 2400MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 30 or 40.
E-UTRA Band 41	2496 - 2690 MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 41.
E-UTRA Band 42	3400 - 3600 MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 42 or 43.
E-UTRA Band 43	3600 - 3800 MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 42 or 43.
E-UTRA Band 44	703 - 803 MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 28 or 44.
E-UTRA Band 252	5150 – 5250 MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 252 or 255
E-UTRA Band 255	5725 – 5850 MHz	-52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 252 or 255
NOTE 4: This requirement does not apply to a Band 2 E-UTRA BS of an earlier release. In addition, it does not apply to an E-UTRA Band 2 BS from an earlier release manufactured before 31 December, 2012, which is upgraded to support Rel-10 features, where the upgrade does not affect existing RF parts of the radio unit related to this requirement.				

- NOTE 1: As defined in the scope for spurious emissions in this clause, except for the cases where the noted requirements apply to a BS operating in Band 25, Band 27, Band 28 or Band 29, the co-existence requirements in Table 6.6.4.3.1-1 do not apply for the 10 MHz frequency range immediately outside the downlink operating band (see Table 5.5-1). Emission limits for this excluded frequency range may be covered by local or regional requirements.
- NOTE 2: Table 6.6.4.3.1-1 assumes that two operating bands, where the frequency ranges in Table 5.5-1 would be overlapping, are not deployed in the same geographical area. For such a case of operation with overlapping frequency arrangements in the same geographical area, special co-existence requirements may apply that are not covered by the 3GPP specifications.
- NOTE 3: TDD base stations deployed in the same geographical area, that are synchronized and use the same or adjacent operating bands can transmit without additional co-existence requirements. For unsynchronized base stations, special co-existence requirements may apply that are not covered by the 3GPP specifications.
- NOTE 5: For E-UTRA Band 28 BS, specific solutions may be required to fulfil the spurious emissions limits for E-UTRA BS for co-existence with E-UTRA Band 27 UL operating band.
- NOTE 6: For E-UTRA Band 29 BS, specific solutions may be required to fulfil the spurious emissions limits for E-UTRA BS for co-existence with UTRA Band XII or E-UTRA Band 12 UL operating band or E-UTRA Band 17 UL operating band.

The power of any spurious emission shall not exceed the limits of Table 6.6.4.3.1-1A for a Home BS where requirements for co-existence with a Home BS type listed in the first column apply.

Table 6.6.4.3.1-1A: Home BS Spurious emissions limits for co-existence with Home BS operating in other frequency bands

Type of coexistence BS	Frequency range for co-location requirement	Maximum Level	Measurement Bandwidth	Note
UTRA FDD Band I or E-UTRA Band 1	1920 - 1980 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 1, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band II or E-UTRA Band 2	1850 - 1910 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 2 or 25, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band III or E-UTRA Band 3	1710 - 1785 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 3, since it is already covered by the requirement in sub-clause 6.6.4.2. For Home BS operating in band 9, it applies for 1710 MHz to 1749.9 MHz and 1784.9 MHz to 1785 MHz, while the rest is covered in sub-clause 6.6.4.2.
UTRA FDD Band IV or E-UTRA Band 4	1710 - 1755 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 4 or 10, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band V or E-UTRA Band 5	824 - 849 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 5 or 26, since it is already covered by the requirement in sub-clause 6.6.4.2. For E-UTRA BS operating in Band 27, it applies 3 MHz below the Band 27 downlink operating band.
UTRA FDD Band VI, XIX or E-UTRA Band 6, 18, 19	815 - 830 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 18, since it is already covered by the requirement in sub-clause 6.6.4.2.
	830 - 845 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 6, 19, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band VII or E-UTRA Band 7	2500 - 2570 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 7, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band VIII or E-UTRA Band 8	880 - 915 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 8, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band IX or E-UTRA Band 9	1749.9 - 1784.9 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 3 or 9, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band X or E-UTRA Band 10	1710 - 1770 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 10, since it is already covered by the requirement in sub-clause 6.6.4.2. For Home BS operating in Band 4, it applies for 1755 MHz to 1770 MHz, while the rest is covered in sub-clause 6.6.4.2.

UTRA FDD Band XI, XXI or E-UTRA Band 11, 21	1427.9 - 1447.9 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 11, since it is already covered by the requirement in sub-clause 6.6.4.2. For Home BS operating in band 32, this requirement applies for carriers allocated within 1475.9MHz and 1495.9MHz.
	1447.9 - 1462.9 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 21, since it is already covered by the requirement in sub-clause 6.6.4.2. For Home BS operating in band 32, this requirement applies for carriers allocated within 1475.9MHz and 1495.9MHz.
UTRA FDD Band XII or E-UTRA Band 12	699 - 716 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 12, since it is already covered by the requirement in sub-clause 6.6.4.2. For Home BS operating in Band 29, it applies 1 MHz below the Band 29 downlink operating band (Note 5)
UTRA FDD Band XIII or E-UTRA Band 13	777 - 787 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 13, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band XIV or E-UTRA Band 14	788 - 798 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 14, since it is already covered by the requirement in sub-clause 6.6.4.2.
E-UTRA Band 17	704 - 716 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 17, since it is already covered by the requirement in sub-clause 6.6.4.2. For Home BS operating in Band 29, it applies 1 MHz below the Band 29 downlink operating band (Note 5)
UTRA FDD Band XX or E-UTRA Band 20	832 - 862 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 20, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band XXII or E-UTRA Band 22	3410 - 3490 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 22, since it is already covered by the requirement in sub-clause 6.6.4.2. This requirement does not apply to Home BS operating in Band 42
E-UTRA Band 23	2000 - 2020 MHz	TBD	TBD	This requirement does not apply to Home BS operating in band 23, since it is already covered by the requirement in sub-clause 6.6.4.2.
E-UTRA Band 24	1626.5 – 1660.5 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 24, since it is already covered by the requirement in sub-clause 6.6.4.2.
UTRA FDD Band XXV or E-UTRA Band 25	1850 - 1915 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 25, since it is already covered by the requirement in sub-clause 6.6.4.2

UTRA FDD Band XXVI or E-UTRA Band 26	814 - 849 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 26, since it is already covered by the requirement in sub-clause 6.6.4.2. For Home BS operating in Band 5, it applies for 814 MHz to 824 MHz, while the rest is covered in sub-clause 6.6.4.2. For E-UTRA BS operating in Band 27, it applies 3 MHz below the Band 27 downlink operating band.
E-UTRA Band 27	807 - 824 MHz	-71 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in Band 27, since it is already covered by the requirement in subclause 6.6.4.2. For E-UTRA BS operating in Band 26, it applies for 807 MHz to 814 MHz, while the rest is covered in sub-clause 6.6.4.2. This requirement also applies to E-UTRA BS operating in Band 28, starting 4 MHz above the Band 28 downlink operating band (Note 4).
E-UTRA Band 28	703 – 748 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 28, since it is already covered by the requirement in sub-clause 6.6.4.2. This requirement does not apply to Home BS operating in Band 44.
E-UTRA Band 30	2305 – 2315 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in band 30, since it is already covered by the requirement in sub-clause 6.6.4.2. This requirement does not apply to Home BS operating in Band 40.
UTRA TDD Band a) or E-UTRA Band 33	1900 - 1920 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 33
UTRA TDD Band a) or E-UTRA Band 34	2010 - 2025 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 34
UTRA TDD Band b) or E-UTRA Band 35	1850 – 1910 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 35
UTRA TDD Band b) or E-UTRA Band 36	1930 - 1990 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 2 and 36
UTRA TDD Band c) or E-UTRA Band 37	1910 - 1930 MHz	-71 dBm	100 kHz	This is not applicable to Home BS operating in Band 37. This unpaired band is defined in ITU-R M.1036, but is pending any future deployment.
UTRA TDD Band d) or E-UTRA Band 38	2570 - 2620 MHz	-71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 38.
UTRA TDD Band f) or E-UTRA Band 39	1880 - 1920MHz	-71 dBm	100 kHz	This is not applicable to Home BS operating in Band 39
UTRA TDD Band e) or E-UTRA Band 40	2300 - 2400MHz	-71 dBm	100 kHz	This is not applicable to Home BS operating in Band 30 or 40
E-UTRA Band 41	2496 – 2690 MHz	-71 dBm	100 kHz	This is not applicable to Home BS operating in Band 41
E-UTRA Band 42	3400 - 3600 MHz	-71 dBm	100 kHz	This is not applicable to Home BS operating in Band 42 or 43
E-UTRA Band 43	3600 - 3800 MHz	-71 dBm	100 kHz	This is not applicable to Home BS operating in Band 42 or 43
E-UTRA Band 44	703 - 803 MHz	-71 dBm	100 kHz	This is not applicable to Home BS operating in Band 28 or 44

NOTE 1: As defined in the scope for spurious emissions in this clause, except for the cases where the noted requirements apply to a BS operating in Band 27, Band 28 or Band 29, the coexistence requirements in Table 6.6.4.3.1-1A do not apply for the 10 MHz frequency range immediately outside the Home BS transmit frequency range of a downlink operating band (see Table 5.5-1). Emission limits for this excluded frequency range may be covered by local or regional requirements.

NOTE 2: Table 6.6.4.3.1-1A assumes that two operating bands, where the frequency ranges in Table 5.5-1 would be overlapping, are not deployed in the same geographical area. For such a case of operation with overlapping frequency arrangements in the same geographical area, special co-existence requirements may apply that are not covered by the 3GPP specifications.

NOTE 3: TDD base stations deployed in the same geographical area, that are synchronized and use the same or adjacent operating bands can transmit without additional co-existence requirements. For unsynchronized base stations, special co-existence requirements may apply that are not covered by the 3GPP specifications.

NOTE 4: For E-UTRA Band 28 BS, specific solutions may be required to fulfil the spurious emissions limits for E-UTRA BS for co-existence with E-UTRA Band 27 UL operating band.

NOTE 5: For E-UTRA Band 29 BS, specific solutions may be required to fulfil the spurious emissions limits for E-UTRA BS for co-existence with UTRA Band XII or E-UTRA Band 12 UL operating band or E-UTRA Band 17 UL operating band.

The following requirement may be applied for the protection of PHS. This requirement is also applicable at specified frequencies falling between 10 MHz below the lowest BS transmitter frequency of the downlink operating band and 10 MHz above the highest BS transmitter frequency of the downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.4.3.1-2: E-UTRA BS Spurious emissions limits for BS for co-existence with PHS

Frequency range	Maximum Level	Measurement Bandwidth	Note
1884.5 - 1915.7 MHz	-41 dBm	300 kHz	Applicable when co-existence with PHS system operating in 1884.5-1915.7MHz

The following requirement shall be applied to BS operating in Bands 13 and 14 to ensure that appropriate interference protection is provided to 700 MHz public safety operations. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.4.3.1-3: BS Spurious emissions limits for protection of 700 MHz public safety operations

Operating Band	Frequency range	Maximum Level	Measurement Bandwidth	Note
13	763 - 775 MHz	-46 dBm	6.25 kHz	
13	793 - 805 MHz	-46 dBm	6.25 kHz	
14	769 - 775 MHz	-46 dBm	6.25 kHz	
14	799 - 805 MHz	-46 dBm	6.25 kHz	

Table 6.6.4.3.1-4: Void

The following requirement shall be applied to BS operating in Band 26 to ensure that appropriate interference protection is provided to 800 MHz public safety operations. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.4.3.1-5: BS Spurious emissions limits for protection of 800 MHz public safety operations

Operating Band	Frequency range	Maximum Level	Measurement Bandwidth	Note
26	851 - 859 MHz	-13 dBm	100 kHz	Applicable for offsets > 37.5kHz from the channel edge

The following requirement may apply to E-UTRA BS operating in Band 41 in certain regions. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.4.3.1-6: Additional E-UTRA BS Spurious emissions limits for Band 41

Frequency range	Maximum Level	Measurement Bandwidth	Note
2505MHz – 2535MHz	-42dBm	1 MHz	
2535MHz – 2655MHz	-22dBm	1 MHz	Applicable at offsets \geq 250% of channel bandwidth from carrier frequency.
NOTE: This requirement applies for 10 or 20 MHz E-UTRA carriers allocated within 2545-2575MHz or 2595-2645MHz.			

The following requirement may apply to E-UTRA BS operating in Band 30 in certain regions. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

The power of any spurious emission shall not exceed:

Table 6.6.4.3.1-7: Additional E-UTRA BS Spurious emissions limits for Band 30

Frequency range	Maximum Level	Measurement Bandwidth	Note
2200MHz – 2345MHz	-45dBm	1 MHz	
2362.5MHz – 2365MHz	-25dBm	1 MHz	
2365MHz – 2367.5MHz	-40dBm	1 MHz	
2367.5MHz – 2370MHz	-42dBm	1 MHz	
2370MHz – 2395MHz	-45dBm	1 MHz	

6.6.4.4 Co-location with other base stations

These requirements may be applied for the protection of other BS receivers when GSM900, DCS1800, PCS1900, GSM850, CDMA850, UTRA FDD, UTRA TDD and/or E-UTRA BS are co-located with an E-UTRA BS.

The requirements assume a 30 dB coupling loss between transmitter and receiver and are based on co-location with base stations of the same class.

6.6.4.4.1 Minimum Requirement

The power of any spurious emission shall not exceed the limits of Table 6.6.4.4.1-1 for a Wide Area BS where requirements for co-location with a BS type listed in the first column apply. For BS capable of multi-band operation, the exclusions and conditions in the Note column of Table 6.6.4.4.1-1 apply for each supported operating band. For BS capable of multi-band operation where multiple bands are mapped on separate antenna connectors, the exclusions and conditions in the Note column of Table 6.6.4.4.1-1 apply for the operating band supported at that antenna connector.

Table 6.6.4.4.1-1: BS Spurious emissions limits for Wide Area BS co-located with another BS

Type of co-located BS	Frequency range for co-location requirement	Maximum Level	Measurement Bandwidth	Note
Macro GSM900	876-915 MHz	-98 dBm	100 kHz	
Macro DCS1800	1710 - 1785 MHz	-98 dBm	100 kHz	
Macro PCS1900	1850 - 1910 MHz	-98 dBm	100 kHz	
Macro GSM850 or CDMA850	824 - 849 MHz	-98 dBm	100 kHz	
WA UTRA FDD Band I or E-UTRA Band 1	1920 - 1980 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band II or E-UTRA Band 2	1850 - 1910 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band III or E-UTRA Band 3	1710 - 1785 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band IV or E-UTRA Band 4	1710 - 1755 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band V or E-UTRA Band 5	824 - 849 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band VI, XIX or E-UTRA Band 6, 19	830 - 845 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band VII or E-UTRA Band 7	2500 - 2570 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band VIII or E-UTRA Band 8	880 - 915 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band IX or E-UTRA Band 9	1749.9 - 1784.9 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band X or E-UTRA Band 10	1710 - 1770 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XI or E-UTRA Band 11	1427.9 – 1447.9 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XII or E-UTRA Band 12	699 - 716 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XIII or E-UTRA Band 13	777 - 787 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XIV or E-UTRA Band 14	788 - 798 MHz	-96 dBm	100 kHz	
WA E-UTRA Band 17	704 - 716 MHz	-96 dBm	100 kHz	
WA E-UTRA Band 18	815 - 830 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XX or E-UTRA Band 20	832 - 862 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XXI or E-UTRA Band 21	1447.9 – 1462.9 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XXII or E-UTRA Band 22	3410 – 3490 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42
WA E-UTRA Band 23	2000 - 2020 MHz	-96 dBm	100 kHz	
WA E-UTRA Band 24	1626.5 – 1660.5 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XXV or E-UTRA Band 25	1850 – 1915 MHz	-96 dBm	100 kHz	
WA UTRA FDD Band XXVI or E-UTRA Band 26	814 – 849 MHz	-96 dBm	100 kHz	

WA E-UTRA Band 27	807 - 824 MHz	-96 dBm	100 kHz	
WA E-UTRA Band 28	703 – 748 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 44
WA E-UTRA Band 30	2305 – 2315 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 40
WA E-UTRA Band 31	452.5 -457.5 MHz	-96 dBm	100 kHz	
WA UTRA TDD Band a) or E-UTRA Band 33	1900 - 1920 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33
WA UTRA TDD Band a) or E-UTRA Band 34	2010 - 2025 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 34
WA UTRA TDD Band b) or E-UTRA Band 35	1850 – 1910 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 35
WA UTRA TDD Band b) or E-UTRA Band 36	1930 - 1990 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 2 and 36
WA UTRA TDD Band c) or E-UTRA Band 37	1910 - 1930 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in ITU-R M.1036, but is pending any future deployment.
WA UTRA TDD Band d) or E-UTRA Band 38	2570 – 2620 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 38.
WA UTRA TDD Band f) or E-UTRA Band 39	1880 – 1920MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33 and 39
WA UTRA TDD Band e) or E-UTRA Band 40	2300 – 2400MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 30 or 40
WA E-UTRA Band 41	2496 – 2690 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 41
WA E-UTRA Band 42	3400 – 3600 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42 or 43
WA E-UTRA Band 43	3600 – 3800 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42 or 43
WA E-UTRA Band 44	703 – 803 MHz	-96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 28 or 44

The power of any spurious emission shall not exceed the limits of Table 6.6.4.4.1-2 for a Local Area BS where requirements for co-location with a BS type listed in the first column apply. For BS capable of multi-band operation, the

exclusions and conditions in the Note column of Table 6.6.4.4.1-2 apply for each supported operating band. For BS capable of multi-band operation where multiple bands are mapped on separate antenna connectors, the exclusions and conditions in the Note column of Table 6.6.4.4.1-2 apply for the operating band supported at that antenna connector.

Table 6.6.4.4.1-2: BS Spurious emissions limits for Local Area BS co-located with another BS

Type of co-located BS	Frequency range for co-location requirement	Maximum Level	Measurement Bandwidth	Note
Pico GSM900	876-915 MHz	-70 dBm	100 kHz	
Pico DCS1800	1710 - 1785 MHz	-80 dBm	100 kHz	
Pico PCS1900	1850 - 1910 MHz	-80 dBm	100 kHz	
Pico GSM850	824 - 849 MHz	-70 dBm	100 kHz	
LA UTRA FDD Band I or E-UTRA Band 1	1920 - 1980 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band II or E-UTRA Band 2	1850 - 1910 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band III or E-UTRA Band 3	1710 - 1785 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band IV or E-UTRA Band 4	1710 - 1755 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band V or E-UTRA Band 5	824 - 849 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band VI, XIX or E-UTRA Band 6, 19	830 - 845 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band VII or E-UTRA Band 7	2500 - 2570 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band VIII or E-UTRA Band 8	880 - 915 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band IX or E-UTRA Band 9	1749.9 - 1784.9 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band X or E-UTRA Band 10	1710 - 1770 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XI or E-UTRA Band 11	1427.9 - 1447.9 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XII or E-UTRA Band 12	699 - 716 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XIII or E-UTRA Band 13	777 - 787 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XIV or E-UTRA Band 14	788 - 798 MHz	-88 dBm	100 kHz	
LA E-UTRA Band 17	704 - 716 MHz	-88 dBm	100 kHz	
LA E-UTRA Band 18	815 - 830 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XX or E-UTRA Band 20	832 - 862 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XXI or E-UTRA Band 21	1447.9 - 1462.9 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XXII or E-UTRA Band 22	3410 – 3490 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42
LA E-UTRA Band 23	2000 - 2020 MHz	-88 dBm	100 kHz	
LA E-UTRA Band 24	1626.5 – 1660.5 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XXV or E-UTRA Band 25	1850 – 1915 MHz	-88 dBm	100 kHz	
LA UTRA FDD Band XXVI or E-UTRA Band 26	814 – 849 MHz	-88 dBm	100 kHz	
LA E-UTRA Band 27	807 - 824 MHz	-88 dBm	100 kHz	
LA E-UTRA Band 28	703 – 748 MHz	-88 dBm	100 KHz	This is not applicable to E-UTRA BS operating in Band 44
LA E-UTRA Band 30	2305 – 2315 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 40

LA E-UTRA Band 31	452.5 – 457.5 MHz	-88 dBm	100 KHz	
LA UTRA TDD Band a) or E-UTRA Band 33	1900 - 1920 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33
LA UTRA TDD Band a) or E-UTRA Band 34	2010 - 2025 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 34
LA UTRA TDD Band b) or E-UTRA Band 35	1850 – 1910 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 35
LA UTRA TDD Band b) or E-UTRA Band 36	1930 - 1990 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 2 and 36
LA UTRA TDD Band c) or E-UTRA Band 37	1910 - 1930 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in ITU-R M.1036, but is pending any future deployment.
LA UTRA TDD Band d) or E-UTRA Band 38	2570 – 2620 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 38.
LA LUTRA TDD Band f) or E-UTRA Band 39	1880 – 1920MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33 and 39
LA UTRA TDD Band e) or E-UTRA Band 40	2300 – 2400MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 30 or 40
LA E-UTRA Band 41	2496 – 2690 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 41
LA E-UTRA Band 42	3400 – 3600 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42 or 43
LA E-UTRA Band 43	3600 – 3800 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42 or 43
LA E-UTRA Band 44	703 – 803 MHz	-88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 28 or 44
<u>LA E-UTRA Band 252</u>	<u>5150 – 5250 MHz</u>	<u>-88 dBm</u>	<u>100 kHz</u>	<u>This is not applicable to E-UTRA BS operating in Band 252 or 255</u>
<u>LA E-UTRA Band 255</u>	<u>5725 – 5850 MHz</u>	<u>-88 dBm</u>	<u>100 kHz</u>	<u>This is not applicable to E-UTRA BS operating in Band 252 or 255</u>

The power of any spurious emission shall not exceed the limits of Table 6.6.4.4.1-3 for a Medium Range BS where requirements for co-location with a BS type listed in the first column apply. For BS capable of multi-band operation, the exclusions and conditions in the Note column of Table 6.6.4.4.1-3 apply for each supported operating band. For BS

capable of multi-band operation where multiple bands are mapped on separate antenna connectors, the exclusions and conditions in the Note column of Table 6.6.4.4.1-3 apply for the operating band supported at that antenna connector.

Table 6.6.4.4.1-3: BS Spurious emissions limits for Medium range BS co-located with another BS

Type of co-located BS	Frequency range for co-location requirement	Maximum Level	Measurement Bandwidth	Note
Micro/MR GSM900	876-915 MHz	-91 dBm	100 kHz	
Micro/MR DCS1800	1710 - 1785 MHz	-91 dBm	100 kHz	
Micro/MR PCS1900	1850 - 1910 MHz	-91 dBm	100 kHz	
Micro/MR GSM850	824 - 849 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band I or E-UTRA Band 1	1920 - 1980 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band II or E-UTRA Band 2	1850 - 1910 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band III or E-UTRA Band 3	1710 - 1785 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band IV or E-UTRA Band 4	1710 - 1755 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band V or E-UTRA Band 5	824 - 849 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band VI, XIX or E-UTRA Band 6, 19	830 - 850 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band VII or E-UTRA Band 7	2500 - 2570 MHz	-91 dBm	100 KHz	
MR UTRA FDD Band VIII or E-UTRA Band 8	880 - 915 MHz	-91 dBm	100 KHz	
MR UTRA FDD Band IX or E-UTRA Band 9	1749.9 - 1784.9 MHz	-91 dBm	100 KHz	
MR UTRA FDD Band X or E-UTRA Band 10	1710 - 1770 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band XI or E-UTRA Band 11	1427.9 - 1447.9 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band XII or E-UTRA Band 12	699 - 716 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band XIII or E-UTRA Band 13	777 - 787 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band XIV or E-UTRA Band 14	788 - 798 MHz	-91 dBm	100 kHz	
MR E-UTRA Band 17	704 - 716 MHz	-91 dBm	100 kHz	
MR E-UTRA Band 18	815 - 830 MHz	-91 dBm	100 KHz	
MR UTRA FDD Band XX or E-UTRA Band 20	832 - 862 MHz	-91 dBm	100 KHz	
MR UTRA FDD Band XXI or E-UTRA Band 21	1447.9 - 1462.9 MHz	-91 dBm	100 KHz	
MR UTRA FDD Band XXII or E-UTRA Band 22	3410 – 3490 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42
MR E-UTRA Band 23	2000 - 2020 MHz	-91 dBm	100 kHz	
MR E-UTRA Band 24	1626.5 – 1660.5 MHz	-91 dBm	100 KHz	
MR UTRA FDD Band XXV or E-UTRA Band 25	1850 – 1915 MHz	-91 dBm	100 kHz	
MR UTRA FDD Band XXVI or E-UTRA Band 26	814 – 849 MHz	-91 dBm	100 kHz	
MR E-UTRA Band 27	807 - 824 MHz	-91 dBm	100 kHz	
MR E-UTRA Band 28	703 – 748 MHz	-91 dBm	100 KHz	This is not applicable to E-UTRA BS operating in Band 44
MR E-UTRA Band 30	2305 – 2315 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 40
MR E-UTRA Band 31	452.5 – 457.5 MHz	-91 dBm	100 KHz	

MR E-UTRA Band 33	1900 - 1920 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33
MR E-UTRA Band 34	2010 - 2025 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 34
MR E-UTRA Band 35	1850 – 1910 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 35
MR E-UTRA Band 36	1930 - 1990 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 2 and 36
MR E-UTRA Band 37	1910 - 1930 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in ITU-R M.1036, but is pending any future deployment.
MR E-UTRA Band 38	2570 – 2620 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 38.
MR E-UTRA Band 39	1880 – 1920MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33 and 39
MR E-UTRA Band 40	2300 – 2400MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 30 or 40
MR E-UTRA Band 41	2496 – 2690 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 41
MR E-UTRA Band 42	3400 – 3600 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42 or 43
MR E-UTRA Band 43	3600 – 3800 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 42 or 43
MR E-UTRA Band 44	703 – 803 MHz	-91 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 28 or 44
<u>MR E-UTRA Band 252</u>	<u>5150 – 5250 MHz</u>	<u>-91 dBm</u>	<u>100 kHz</u>	<u>This is not applicable to E-UTRA BS operating in Band 252 or 255</u>
<u>MR E-UTRA Band 255</u>	<u>5725 – 5850 MHz</u>	<u>-91 dBm</u>	<u>100 kHz</u>	<u>This is not applicable to E-UTRA BS operating in Band 252 or 255</u>

NOTE 1: As defined in the scope for spurious emissions in this clause, the co-location requirements in Table 6.6.4.4.1-1 to Table 6.6.4.4.1-3 do not apply for the 10 MHz frequency range immediately outside the BS transmit frequency range of a downlink operating band (see Table 5.5-1). The current state-of-the-art technology does not allow a single generic solution for co-location with other system on adjacent frequencies for 30dB BS-BS minimum coupling loss. However, there are certain site-engineering solutions that can be used. These techniques are addressed in TR 25.942 [8].

NOTE 2: Table 6.6.4.4.1-1 to Table 6.6.4.4.1-3 assume that two operating bands, where the corresponding BS transmit and receive frequency ranges in Table 5.5-1 would be overlapping, are not deployed in the same geographical area. For such a case of operation with overlapping frequency arrangements in the same geographical area, special co-location requirements may apply that are not covered by the 3GPP specifications.

NOTE 3: Co-located TDD base stations that are synchronized and using the same or adjacent operating band can transmit without special co-locations requirements. For unsynchronized base stations, special co-location requirements may apply that are not covered by the 3GPP specifications.

6.7 Transmitter intermodulation

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

7 Receiver characteristics

7.1 General

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

7.2 Reference sensitivity level

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

7.3 Dynamic range

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

7.4 In-channel selectivity

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

7.5 Adjacent Channel Selectivity (ACS) and narrow-band blocking

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

7.6 Blocking

7.6.1 General blocking requirement

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

7.6.2 Co-location with other base stations

This additional blocking requirement may be applied for the protection of E-UTRA BS receivers when GSM, CDMA, UTRA or E-UTRA BS operating in a different frequency band are co-located with an E-UTRA BS. The requirement is applicable to all channel bandwidths supported by the E-UTRA BS.

The requirements in this clause assume a 30 dB coupling loss between interfering transmitter and E-UTRA BS receiver and are based on co-location with base stations of the same class.

7.6.2.1 Minimum requirement

The throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channel, with a wanted and an interfering signal coupled to BS antenna input using the parameters in Table 7.6.2.1-1 for Wide Area BS, in Table 7.6.2.1-2 for Local Area BS and in Table 7.6.2.1-3 for Medium Range BS. The reference measurement channel for the wanted signal is identified in Tables 7.2.1-1, 7.2.1-2 and 7.2.1-4 for each channel bandwidth and further specified in Annex A.

Table 7.6.2.1-1: Blocking performance requirement for E-UTRA Wide Area BS when co-located with BS in other frequency bands.

Co-located BS type	Centre Frequency of Interfering Signal (MHz)	Interfering Signal mean power (dBm)	Wanted Signal mean power (dBm)	Type of Interfering Signal
Macro GSM850 or CDMA850	869 – 894	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Macro GSM900	921 – 960	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Macro DCS1800	1805 – 1880	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Macro PCS1900	1930 – 1990	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band I or E-UTRA Band 1	2110 – 2170	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band II or E-UTRA Band 2	1930 – 1990	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band III or E-UTRA Band 3	1805 – 1880	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band IV or E-UTRA Band 4	2110 – 2155	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band V or E-UTRA Band 5	869 – 894	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band VI or E-UTRA Band 6	875 – 885	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band VII or E-UTRA Band 7	2620 – 2690	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band VIII or E-UTRA Band 8	925 – 960	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band IX or E-UTRA Band 9	1844.9 – 1879.9	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band X or E-UTRA Band 10	2110 – 2170	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XI or E-UTRA Band 11	1475.9 – 1495.9	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XII or E-UTRA Band 12	729 - 746	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XIII or E-UTRA Band 13	746 - 756	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XIV or E-UTRA Band 14	758 - 768	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 17	734 - 746	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 18	860 - 875	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XIX or E-UTRA Band 19	875 - 890	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XX or E-UTRA Band 20	791 - 821	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XXI or E-UTRA Band 21	1495.9 – 1510.9	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XXII or E-UTRA Band 22	3510 – 3590	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 23	2180 - 2200	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 24	1525 – 1559	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XXV or E-UTRA Band 25	1930 – 1995	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XXVI or E-UTRA Band 26	859 – 894	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 27	852 - 869	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 28	758 – 803	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier

WA E-UTRA Band 29	717-728	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 30	2350 – 2360	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 31	462.5-467.5	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA FDD Band XXXII or E-UTRA Band 32	1452-1496 (NOTE 3)	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA TDD Band a) or E-UTRA Band 33	1900-1920	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA TDD Band a) or E-UTRA Band 34	2010-2025	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA TDD Band b) or E-UTRA Band 35	1850-1910	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA TDD Band b) or E-UTRA Band 36	1930-1990	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA TDD Band c) or E-UTRA Band 37	1910-1930	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA TDD Band d) or E-UTRA Band 38	2570-2620	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA TDD Band f) or E-UTRA Band 39	1880-1920	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA UTRA TDD Band e) or E-UTRA Band 40	2300-2400	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 41	2496 - 2690	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 42	3400-3600	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 43	3600-3800	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
WA E-UTRA Band 44	703-803	+16	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Note*: P_{REFSENS} depends on the channel bandwidth as specified in Table 7.2.1-1.				
NOTE 1: Except for a BS operating in Band 13, these requirements do not apply when the interfering signal falls within any of the supported uplink operating band or in the 10 MHz immediately outside any of the supported uplink operating band. For a BS operating in band 13 the requirements do not apply when the interfering signal falls within the frequency range 768-797 MHz. For BS operating in Band 42 or 43, the requirements do not apply when the interfering signal falls within the Band 42 or 43 uplink operating bands and the Base Stations are synchronized.				
NOTE 2: Some combinations of bands may not be possible to co-site based on the requirements above. The current state-of-the-art technology does not allow a single generic solution for co-location of UTRA TDD or E-UTRA TDD with E-UTRA FDD on adjacent frequencies for 30dB BS-BS minimum coupling loss. However, there are certain site-engineering solutions that can be used. These techniques are addressed in TR 25.942 [8].				
NOTE 3: For a BS operating in band 11 or 21, this requirement applies for interfering signal within the frequency range 1475.9-1495.9 MHz.				

Table 7.6.2.1-2: Blocking performance requirement for Local Area BS when co-located with BS in other frequency bands.

Co-located BS type	Centre Frequency of Interfering Signal (MHz)	Interfering Signal mean power (dBm)	Wanted Signal mean power (dBm)	Type of Interfering Signal
Pico GSM850	869 – 894	-7	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Pico GSM900	921 – 960	-7	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Pico DCS1800	1805 – 1880	-4	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Pico PCS1900	1930 – 1990	-4	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band I or E-UTRA Band 1	2110 – 2170	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band II or E-UTRA Band 2	1930 – 1990	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band III or E-UTRA Band 3	1805 – 1880	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band IV or E-UTRA Band 4	2110 – 2155	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band V or E-UTRA Band 5	869 – 894	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band VI or E-UTRA Band 6	875 – 885	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band VII or E-UTRA Band 7	2620 – 2690	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band VIII or E-UTRA Band 8	925 – 960	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band IX or E-UTRA Band 9	1844.9 – 1879.9	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band X or E-UTRA Band 10	2110 – 2170	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XI or E-UTRA Band 11	1475.9 - 1495.9	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XII or E-UTRA Band 12	729 - 746	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XIII or E-UTRA Band 13	746 - 756	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XIV or E-UTRA Band 14	758 - 768	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 17	734 - 746	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 18	860 - 875	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XIX or E-UTRA Band 19	875 - 890	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XX or E-UTRA Band 20	791 - 821	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XXI or E-UTRA Band 21	1495.9 – 1510.9	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XXII or E-UTRA Band 22	3510 – 3590	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 23	2180-2200	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 24	1525 – 1559	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XXV or E-UTRA Band 25	1930 – 1995	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XXVI or E-UTRA Band 26	859 – 894	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 27	852 - 869	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 28	758 – 803	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 29	717-728	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 30	2350 – 2360	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 31	462.5-467.5	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA FDD Band XXXII or E-UTRA Band 32	1452-1496 (NOTE 3)	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA TDD Band a) or E-UTRA Band 33	1900-1920	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA TDD Band a) or E-UTRA Band 34	2010-2025	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA TDD Band b) or	1850-1910	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier

E-UTRA Band 35				
LA UTRA TDD Band b) or E-UTRA Band 36	1930-1990	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA TDD Band c) or E-UTRA Band 37	1910-1930	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA TDD Band d) or E-UTRA Band 38	2570-2620	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA UTRA TDD Band f) or E-UTRA Band 39	1880-1920	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA UTRA TDD Band e) or Band 40	2300-2400	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 41	2496 - 2690	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 42	3400-3600	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 43	3600-3800	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
LA E-UTRA Band 44	703-803	-6	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
<u>LA E-UTRA Band 252</u>	<u>5150-5250</u>	<u>-6</u>	<u>$P_{\text{REFSENS}} + 6\text{dB}^*$</u>	<u>CW carrier</u>
<u>LA E-UTRA Band 255</u>	<u>5725-5850</u>	<u>-6</u>	<u>$P_{\text{REFSENS}} + 6\text{dB}^*$</u>	<u>CW carrier</u>
Note*: P_{REFSENS} depends on the channel bandwidth as specified in Table 7.2.1-2.				
NOTE 1: Except for a BS operating in Band 13, these requirements do not apply when the interfering signal falls within any of the supported uplink operating band or in the 10 MHz immediately outside any of the supported uplink operating band. For a BS operating in band 13 the requirements do not apply when the interfering signal falls within the frequency range 768-797 MHz. For BS operating in Band 42 or 43, the requirements do not apply when the interfering signal falls within the Band 42 or 43 uplink operating bands and the Base Stations are synchronized.				
NOTE 2: Some combinations of bands may not be possible to co-site based on the requirements above. The current state-of-the-art technology does not allow a single generic solution for co-location of UTRA TDD or E-UTRA TDD with E-UTRA FDD on adjacent frequencies for 30dB BS-BS minimum coupling loss. However, there are certain site-engineering solutions that can be used. These techniques are addressed in TR 25.942 [8].				
NOTE 3: For a BS operating in band 11 or 21, this requirement applies for interfering signal within the frequency range 1475.9-1495.9 MHz.				

Table 7.6.2.1-3: Blocking performance requirement for E-UTRA Medium Range BS when co-located with BS in other frequency bands.

Co-located BS type	Centre Frequency of Interfering Signal (MHz)	Interfering Signal mean power (dBm)	Wanted Signal mean power (dBm)	Type of Interfering Signal
Micro/MR GSM850	869 – 894	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Micro/MR GSM900	921 – 960	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Micro/MR DCS1800	1805 – 1880	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
Micro/MR PCS1900	1930 – 1990	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band I or E-UTRA Band 1	2110 – 2170	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band II or E-UTRA Band 2	1930 – 1990	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band III or E-UTRA Band 3	1805 – 1880	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band IV or E-UTRA Band 4	2110 – 2155	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band V or E-UTRA Band 5	869 – 894	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band VI or E-UTRA Band 6	875 – 885	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band VII or E-UTRA Band 7	2620 – 2690	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band VIII or E-UTRA Band 8	925 – 960	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band IX or E-UTRA Band 9	1844.9 – 1879.9	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band X or E-UTRA Band 10	2110 – 2170	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XI or E-UTRA Band 11	1475.9 – 1495.9	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XII or E-UTRA Band 12	729 – 746	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XIII or E-UTRA Band 13	746 – 756	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XIV or E-UTRA Band 14	758 – 768	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 17	734 – 746	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 18	860 – 875	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XIX or E-UTRA Band 19	875 – 890	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XX or E-UTRA Band 20	791 – 821	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XXI or E-UTRA Band 21	1495.9 – 1510.9	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XXII or E-UTRA Band 22	3510 – 3590	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 23	2180 – 2200	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 24	1525 – 1559	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XXV or E-UTRA Band 25	1930 – 1995	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XXVI or E-UTRA Band 26	859 – 894	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 27	852 – 869	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 28	758 – 803	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 29	717 – 728	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 30	2350 – 2360	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 31	462.5 – 467.5	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR UTRA FDD Band XXXII or E-UTRA Band 32	1452-1496 (NOTE 3)	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 33	1900 – 1920	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 34	2010 – 2025	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 35	1850 – 1910	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 36	1930 – 1990	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier

MR E-UTRA Band 37	1910 – 1930	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 38	2570 – 2620	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 39	1880 – 1920	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 40	2300 – 2400	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 41	2496 – 2690	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 42	3400 – 3600	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 43	3600 – 3800	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
MR E-UTRA Band 44	703 – 803	+8	$P_{\text{REFSENS}} + 6\text{dB}^*$	CW carrier
<u>MR E-UTRA Band 252</u>	<u>5150-5250</u>	<u>+8</u>	<u>$P_{\text{REFSENS}} + 6\text{dB}^*$</u>	<u>CW carrier</u>
<u>MR E-UTRA Band 255</u>	<u>5725-5850</u>	<u>+8</u>	<u>$P_{\text{REFSENS}} + 6\text{dB}^*$</u>	<u>CW carrier</u>
Note*:	P_{REFSENS} depends on the channel bandwidth as specified in Table 7.2.1-4.			
NOTE 1:	Except for a BS operating in Band 13, these requirements do not apply when the interfering signal falls within any of the supported uplink operating band or in the 10 MHz immediately outside any of the supported uplink operating band. For a BS operating in band 13 the requirements do not apply when the interfering signal falls within the frequency range 768-797 MHz. For BS operating in Band 42 or 43, the requirements do not apply when the interfering signal falls within the Band 42 or 43 uplink operating bands and the Base Stations are synchronized.			
NOTE 2:	Some combinations of bands may not be possible to co-site based on the requirements above. The current state-of-the-art technology does not allow a single generic solution for co-location of UTRA TDD or E-UTRA TDD with E-UTRA FDD on adjacent frequencies for 30dB BS-BS minimum coupling loss. However, there are certain site-engineering solutions that can be used. These techniques are addressed in TR 25.942 [8].			
NOTE 3:	For a BS operating in band 11 or 21, this requirement applies for interfering signal within the frequency range 1475.9-1495.9 MHz.			

7.7 Receiver spurious emissions

See this clause and all its sub-clauses in TS 36.104 V12.6.0

7.8 Receiver intermodulation

See this clause and all its sub-clauses in TS 36.104 V12.6.0

8 Performance requirement

See this clause and all its sub-clauses in TS 36.104 V12.6.0

Annex A (normative): Reference measurement channels

See this clause and all its sub-clauses in TS 36.104 V12.6.0

Annex B (normative): Propagation conditions

See this clause and all its sub-clauses in TS 36.104 V12.6.0

Annex C (normative): Characteristics of the interfering signals

See this clause and all its sub-clauses in TS 36.104 V12.6.0

Annex D (normative): Environmental requirements for the BS equipment

See this clause and all its sub-clauses in TS 36.104 V12.6.0

Annex E (normative): Error Vector Magnitude

See this clause and all its sub-clauses in TS 36.104 V12.6.0

Annex F (Informative): Unwanted emission requirements for multi-carrier BS

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)

Annex G (Informative): Regional requirement for protection of DTT

See this clause and all its sub-clauses in TS 36.104 V12.6.0

Annex H (Informative): Calculation of EIRP based on manufacturer declarations and site specific conditions

H.1 Calculation of EIRP based on manufacturer declarations and site specific conditions

Some regional requirements are defined per effective isotropic radiated power (EIRP), which is a combination of the transmitted power (or in some cases spectral density) and the effective antenna gain which is a site specific condition. Such requirements may be applied per antenna, per cell, or per base station. It shall be noted that the definition of BS or cell may differ between regulations. Where the regulator prescribes a method for EIRP calculation, that method supersedes the proposed assessment in this annex.

The 3GPP specifications mandate manufacturer declarations of the (conducted) output power or power spectral density per connector for the base station under the reference conditions stated as a way to accommodate the referred regional requirements without putting requirements on the local site conditions.

For the case when the base station manufacturer unwanted emission declarations apply per antenna connector, the maximum EIRP can be estimated using the following formulas:

$$\text{EIRP per antenna: } P_{\text{EIRP}} = P_{\text{Tx}} + G_{\text{Ant}}$$

$$\text{EIRP per cell: } P_{\text{EIRPcell}} = 10 * \log (\sum 10^{P_{\text{EIRPn}}/10})$$

In case the EIRP requirement is set per polarisation, the summation shall be made per polarisation.

" P_{EIRP} " is the resulting effective isotropic radiated power (or radiated power spectral density) resulting from the power (or power spectral density) declared by the manufacturer in dBm (or dBm/measurement BW).

" P_{Tx} " is the conducted power or power spectral density declared by the manufacturer in dBm (or dBm/measurement BW)

" G_{Ant} " is the effective antenna gain, calculated as the antenna gain (dBi) minus the loss of the site infrastructure connecting the BS antenna connector with the antenna (dB) for the applied frequency. The antenna nominal gain is only applicable within a certain frequency range.

"n" is the index number of the co-located antennas illuminating the same cell. P_{EIRPn} is the P_{EIRP} of the n:th antenna.

"Cell" is in this annex used in the sense that it is the limited geographical area covered by the carrier transmitted from one site.

H.2 (Informative): Regional emission requirement for Bands 252 and 255

For bands 252 and 255, compliance with the FCC Out-Of-Band Emission (OOBE) requirements defined in Code of Federal Regulations 47 Part 15.407(b) can be assessed based on the manufacturer's declaration of $P_{E_{B252}}$, $P_{E_{B255,a}}$ and $P_{E_{B255,b}}$ specified in subclause 6.6.3.3, together with the deployment characteristics. The maximum EIRP is calculated by using the formula: $P_{EIRP} = P_E + G_{ant} + 10 \cdot \log(N_{ant})$ where P_E denotes the BS unwanted emission level at the antenna connector, G_{ant} equals the BS antenna gain minus feeder loss, and N_{ant} denotes the number of transmitting antennas. The FCC OOBE requirement limits the EIRP level to the maximum level in Table H.2-1.

Table H.2-1: EIRP limits for E-UTRA Bands 252 and 255

<u>Operating Band</u>	<u>Measurement Filter centre frequency, F_{filter}</u>	<u>Measurement bandwidth</u>	<u>Maximum emission level P_{EIRP} [dBm]</u>
<u>252</u>	<u>$F_{filter} \leq 5149.5\text{MHz}$ and $\geq 5350.5\text{MHz}$</u>	<u>1 MHz</u>	<u>-27</u>
<u>255</u>	<u>$5715.5\text{MHz} \leq F_{filter} \leq 5724.5\text{MHz}$ and $5850.5\text{MHz} \leq F_{filter} \leq 5859.5\text{MHz}$</u>	<u>1 MHz</u>	<u>-17</u>
<u>255</u>	<u>$F_{filter} \leq 5714.5\text{MHz}$ and $\geq 5860.5\text{MHz}$</u>	<u>1 MHz</u>	<u>-27</u>

H.3 (Informative): FCC CFR 47 Part 15.205 Restricted Bands

FCC CFR Title 47 Part 15.205 defines frequency bands where only spurious emissions are permitted at the limits defined by FCC CFR Title 47 Part 15.209. Table H.3-1 lists the FCC restricted band frequencies.

Table H.3-1: FCC Part 15.205 Restricted Bands

<u>Frequency Range</u>	<u>Frequency Range</u>	<u>Frequency Range</u>	<u>Frequency Range</u>
<u>0.090-0.110 MHz</u>	<u>16.42-16.423 MHz</u>	<u>399.9-410 MHz</u>	<u>4.5-5.15 GHz</u>
<u>10.495-0.505 MHz</u>	<u>16.69475-16.69525 MHz</u>	<u>608-614 MHz</u>	<u>5.35-5.46 GHz</u>
<u>2.1735-2.1905 MHz</u>	<u>16.80425-16.80475 MHz</u>	<u>960-1240 MHz</u>	<u>7.25-7.75 GHz</u>
<u>4.125-4.128 MHz</u>	<u>25.5-25.67 MHz</u>	<u>1300-1427 MHz</u>	<u>8.025-8.5 GHz</u>
<u>4.17725-4.17775 MHz</u>	<u>37.5-38.25 MHz</u>	<u>1435-1626.5 MHz</u>	<u>9.0-9.2 GHz</u>
<u>4.20725-4.20775 MHz</u>	<u>73-74.6 MHz</u>	<u>1645.5-1646.5 MHz</u>	<u>9.3-9.5 GHz</u>
<u>6.215-6.218 MHz</u>	<u>74.8-75.2 MHz</u>	<u>1660-1710 MHz</u>	<u>10.6-12.7 GHz</u>
<u>6.26775-6.26825 MHz</u>	<u>108-121.94 MHz</u>	<u>1718.8-1722.2 MHz</u>	<u>13.25-13.4 GHz</u>
<u>6.31175-6.31225 MHz</u>	<u>123-138 MHz</u>	<u>2200-2300 MHz</u>	<u>14.47-14.5 GHz</u>
<u>8.291-8.294 MHz</u>	<u>149.9-150.05 MHz</u>	<u>2310-2390 MHz</u>	<u>15.35-16.2 GHz</u>
<u>8.362-8.366 MHz</u>	<u>156.52475-156.52525 MHz</u>	<u>2483.5-2500 MHz</u>	<u>17.7-21.4 GHz</u>
<u>8.37625-8.38675 MHz</u>	<u>156.7-156.9 MHz</u>	<u>2690-2900 MHz</u>	<u>22.01-23.12 GHz</u>
<u>8.41425-8.41475 MHz</u>	<u>162.0125-167.17 MHz</u>	<u>3260-3267 MHz</u>	<u>23.6-24.0 GHz</u>
<u>12.29-12.293 MHz</u>	<u>167.72-173.2 MHz</u>	<u>3332-3339 MHz</u>	<u>31.2-31.8 GHz</u>
<u>12.51975-12.52025 MHz</u>	<u>240-285 MHz</u>	<u>3345.8-3358 MHz</u>	<u>36.43-36.5 GHz</u>
<u>12.57675-12.57725 MHz</u>	<u>322-335.4 MHz</u>	<u>3600-4400 MHz</u>	
<u>13.36-13.41 MHz</u>			

Annex I (Informative): Change history

[See this clause and all its sub-clauses in TS 36.104 V12.6.0](#)