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Recommendation ITU-R M.1580-4

(03/2012)

Generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT-2000

M Series

Mobile, radiodetermination, amateur and related satellite services

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Note: *This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.*

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RECOMMENDATION ITU-R M.1580-4*

Generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT-2000

(Question ITU-R 229-2/5)

(2002-2005-2007-2009-2012)

Scope

This Recommendation provides the generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT-2000. Implementation of characteristics of base stations using the terrestrial radio interfaces of IMT-2000 in any of the bands included in this Recommendation is subject to compliance with the Radio Regulations.

The ITU Radiocommunication Assembly,

considering

a) that unwanted emissions consist of both spurious and out-of-band (OoB) emissions according to No. 1.146 of the Radio Regulations (RR) and that spurious and OoB emissions are defined in RR Nos. 1.145 and 1.144, respectively;

b) that limitation of the maximum permitted levels of unwanted emissions of IMT-2000 base stations (BS) is necessary to protect other radio systems and services from interference and to enable coexistence between different technologies;

c) that too stringent limits may lead to an increase in complexity of IMT-2000 BS;

d) that every effort should be made to keep limits for unwanted emissions at the lowest possible values taking account of economic factors and technological limitations;

e) that Recommendation ITU-R SM.329 relates to the effects, measurements and limits to be applied to spurious domain emissions;

f) that the same spurious emission limits apply equally to BS of all radio interfaces;

g) that Recommendation ITU-R SM.1541 relating to OoB emission specifies generic limits in the OoB domain which generally constitute the least restrictive OoB emission limits and encourages the development of more specific limits for each system;

h) that the levels of spurious emissions of IMT-2000 BS shall comply with the limits specified in RR Appendix 3;

j) that the harmonization of unwanted emission limits will facilitate global use and access to a global market; however national/regional variations in unwanted emission limits may exist;

k) that unwanted emission limits are dependent on the transmitter emission characteristics, ITU spurious emission limits and national standards and regulations in addition to depending on services operating in other bands;

l) that the technology used by a system and its conformance with the recommended specifications and standards in Recommendation ITU-R M.1457 defines that system as IMT-2000 regardless of the frequency band of operation;

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* This Recommendation should be brought to the attention of Radiocommunication Study Group 1.

m) that harmonized frequency arrangements for the bands identified for IMT are addressed in Recommendation ITU-R M.1036, which also indicates that some administrations may deploy IMT-2000 systems in bands other than those identified in the RR,

noting

a) the work carried out by standardization bodies to define limits to protect other radio systems and services from interference and to enable coexistence between different technologies;

b) that IMT-2000 base stations must comply with local, regional, and international regulations for out-of-band and spurious emissions relevant to their operations, wherever such regulations apply;

c) that the notes and annexes of this Recommendation – being based on the ongoing work in standardization bodies – in order to reflect the wide applicability of IMT-2000 technologies and to maintain consistency with the technology specifications, may contain material which reflects information related to the technology applications in bands other than those identified for IMT,

recommends

1 that the unwanted emission characteristics of IMT-2000 base stations should be based on the limits contained in the technology specific Annexes 1 to 6 which correspond to the radio interface specifications described in §§ 5.1 to 5.6 of Recommendation ITU-R M.1457.

NOTE 1 – Except the cases stated in Notes 2, 3, 4 and 5, the unwanted emission limits are defined for BS operating according to the following arrangement: frequency division duplex (FDD) uplink in the band 1 920-1 980 MHz, FDD downlink in the band 2 110-2 170 MHz and time division duplex (TDD) in the band 1 885-1 980 MHz and 2 010-2 025 MHz. Future versions of this Recommendation will include limits applicable to other frequency bands. Subject to further study, it is anticipated that such limits would be similar to those already contained in this Recommendation.

NOTE 2 – The unwanted emission limits defined in Annex 1 are for BS operating one of, or a combination of, the following arrangements:

– FDD uplink in the band 1 920-1 980 MHz, FDD downlink in the band 2 110-2 170 MHz, in Annex 1 referred to as FDD Band I in UTRA or Band 1 in E-UTRA.
– FDD uplink in the band 1 850-1 910 MHz, FDD downlink in the band 1 930-1 990 MHz, in Annex 1 referred to as FDD Band II in UTRA or Band 2 in E-UTRA.
– FDD uplink in the band 1 710-1 785 MHz, FDD downlink in the band 1 805-1 880 MHz, in Annex 1 referred to as FDD Band III in UTRA or Band 3 in E-UTRA.
– FDD uplink in the band 1 710-1 755 MHz, FDD downlink in the band 2 110-2 155 MHz, in Annex 1 referred to as FDD Band IV in UTRA or Band 4 in E-UTRA.
– FDD uplink in the band 824- 849 MHz, FDD downlink in the band 869-894 MHz, in Annex 1 referred to as FDD Band V in UTRA or Band 5 in E-UTRA.
– FDD uplink in the band 830- 840 MHz, FDD downlink in the band 875-885 MHz, in Annex 1 referred to as FDD Band VI in UTRA or Band 6 in E-UTRA.
– FDD uplink in the band 2 500-2 570 MHz, FDD downlink in the band 2 620-2 690 MHz, in Annex 1 referred to as FDD Band VII in UTRA or Band 7 in E-UTRA.
– FDD uplink in the band 880-915 MHz, FDD downlink in the band 925-960 MHz, in Annex 1 referred to as FDD Band VIII in UTRA or Band 8 in E-UTRA.
– FDD uplink in the band 1 749.9-1 784.9 MHz, FDD downlink in the band 1 844.9-1 879.9 MHz, in Annex 1 to referred as FDD Band IX in UTRA or Band 9 in E-UTRA.

– FDD uplink in the band 1 710-1 770 MHz, FDD downlink in the band 2 110-2 170 MHz, in Annex 1 referred to as FDD Band X in UTRA or Band 10 in E-UTRA.

– FDD uplink in the band 1 427.9-1 447.9 MHz#, FDD downlink in the band 1 475.9-1 495.9 MHz#, in Annex 1 referred to as FDD Band XI in UTRA or Band 11 in E-UTRA.

– FDD uplink in the band 698-716 MHz, FDD downlink in the band 728-746 MHz, in Annex 1 referred to as FDD Band XII in UTRA or Band 12 in E-UTRA.

– FDD uplink in the band 777-787 MHz, FDD downlink in the band 746-756 MHz, in Annex 1 referred to as FDD Band XIII in UTRA or Band 13 in E-UTRA.

– FDD uplink in the band 788-798 MHz, FDD downlink in the band 758-768 MHz, in Annex 1 referred to as FDD Band XIV in UTRA or Band 14 in E-UTRA.

– FDD uplink in the band 704-716 MHz, FDD downlink in the band 734-746 MHz, in Annex 1 referred to as FDD Band 17 in E-UTRA.

– FDD uplink in the band 815-830 MHz, FDD downlink in the band 860-875 MHz, in Annex 1 referred to as FDD Band 18 in E-UTRA.

– FDD uplink in the band 830-845 MHz, FDD downlink in the band 875-890 MHz, in Annex 1 referred to as FDD Band XIX in UTRA or Band 19 in E-UTRA.

– FDD uplink in the band 832-862 MHz, FDD downlink in the band 791-821 MHz, in Annex 1 referred to as FDD Band XX in UTRA or Band 20 in E-UTRA.

– FDD uplink in the band 1 447.9-1 462.9 MHz#, FDD downlink in the band 1 495.9-1 510.9 MHz#, in Annex 1 referred to as FDD Band XXI in UTRA or Band 21 in E-UTRA.

Future versions of this Recommendation will include limits applicable to other frequency bands. Subject to further study, it is anticipated that such limits would be similar to those already contained in this Recommendation.

NOTE 3 – The unwanted emission limits defined in Annex 2 are for BS operating in the following arrangements (as named by 3GPP2) for either the FDD or TDD components and apply to both cdma2000 and HRPD operating modes except as noted:

Band class	Name	MS transmit frequency (MHz)	BS transmit frequency (MHz)
0	800 MHz band	824-849	869-894
1	1 900 MHz band	1 850-1 910	1 930-1 990
2	TACS band	872-915	917-960
3	JTACS band	887-925	832-870
4	Korean PCS band	1 750-1 780	1 840-1 870
5	450 MHz band	411-484	421-494
6	2 GHz band	1 920-1 980	2 110-2 170
7	Upper 700 MHz band	776-788	746-758
8	1 800 MHz band	1 710-1 785	1 805-1 880
9	900 MHz band	880-915	925-960

All frequency bands or parts of the bands referenced in this Recommendation which are not identified for IMT in the ITU Radio Regulations have been marked with "#".

Band class	Name	MS transmit frequency (MHz)	BS transmit frequency (MHz)
10	Secondary 800 MHz band	806-901	851-940
11	400 MHz European PAMR band	411-484 #	421-494 #
12	800 MHz PAMR band	870-876	915-921
13	2.5 GHz IMT-2000 extension band	2 500-2 570	2 620-2 690
14	US PCS 1.9 GHz band	1 850-1 915	1 930-1 995
15	AWS band	1 710-1 755	2 110-2 155
16(1)	US 2.5 GHz band	2 502-2 568	2 624-2 690
17(1)	US 2.5 GHz forward link only band	N/A	2 624-2 690
18(1)	700 MHz public safety band	787-799	757-769
19(1)	Lower 700 MHz band	698-716	728-746

(1) No emissions specifications at this time.

NOTE 4 – The unwanted emission limits defined in Annex 3 are for BS operating one of or a combination of the following arrangements:

– TDD in the band 1 900-1 920 MHz and 2 010-2 025 MHz referred to as Band a) in UTRA or Band 33 and 34, respectively, in E-UTRA.

– TDD in the band 1 850-1 910 MHz and 1 930-1 990 MHz referred to as Band b) in UTRA or Band 35 and 36, respectively, in E-UTRA.

– TDD in the band 1 910-1 930 MHz referred to as Band c) in UTRA or Band 37 in E-UTRA.

– TDD in the band 2 570-2 620 MHz referred to as Band d) in UTRA or Band 38 in E-UTRA.

– TDD in the band 1 880-1 920 MHz referred to as Band f) in UTRA or Band 39 in E-UTRA.

– TDD in the band 2 300-2 400 MHz referred to as Band e) in UTRA or Band 40 in E-UTRA.

Future versions of this Recommendation will include limits applicable to other frequency bands. Subject to further study, it is anticipated that such limits would be similar to those already contained in this Recommendation.

NOTE 5 – The unwanted emission limits defined in Annex 6 are for BS operating in the following arrangement:

Band class group	Uplink MS transmit frequency (MHz)	Downlink MS receive frequency (MHz)	Channel bandwidth (MHz)	Duplex mode
1.A	2 300-2 400	2 300-2 400	8.75	TDD
1.B	2 300-2 400	2 300-2 400	5 and 10	TDD
2.D	2 305-2 320, 2 345-2 360	2 305-2 320, 2 345-2 360	3.5, 5 and 10	TDD
2.E	2 345-2 360	2 305-2 320	2×3.5, 2×5 and 2×10	FDD
2.F	2 345-2 360	2 305-2 320	5 (Uplink), 10 (Downlink)	FDD

Band class group	Uplink MS transmit frequency (MHz)	Downlink MS receive frequency (MHz)	Channel bandwidth (MHz)	Duplex mode
3.A	2 500-2 690	2 500-2 690	5 and 10	TDD
3.B	2 496-2 572 #	2 614-2 690 #	2×5 and 2×10	FDD
4.A	3 300-3 400 #	3 300-3 400 #	5	TDD
4.B	3 300-3 400 #	3 300-3 400 #	7	TDD
4.C	3 300-3 400 #	3 300-3 400 #	10	TDD
5L.A	3 400-3 600	3 400-3 600	5	TDD
5L.B	3 400-3 600	3 400-3 600	7	TDD
5L.C	3 400-3 600	3 400-3 600	10	TDD
5.D	3 400-3 500	3 500-3 600	2×5, 2×7 and 2×10	FDD
5H.A	3 600-3 800 #	3 600-3 800 #	5	TDD
5H.B	3 600-3 800 #	3 600-3 800 #	7	TDD
5H.C	3 600-3 800 #	3 600-3 800 #	10	TDD
6.A	1 710-1 770	2 110-2 170	2×5 and 2×10	FDD
6.B	1 920-1 980	2 110-2 170	2×5 and 2×10	FDD
6.C	1 710-1 785	1 805-1 880	2×5 and 2×10	FDD
7.A	698-862	698-862	5, 7 and 10	TDD
7.B	776-787	746-757	2×5 and 2×10	FDD
7.C	788-793, 793-798	758-763, 763-768	2×5	FDD
7.D	788-798	758-768	2×10	FDD
7.E	698-862	698-862	5, 7 and 10 (TDD) 2×5, 2×7 and 2×10 (FDD)	TDD/FDD
7.G	880-915	925-960	2×5 and 2×10	FDD
8.A	1 785-1 805, 1 880-1 920, 1 910-1 930, 2 010-2 025, 1 900-1 920	1 785-1 805, 1 880-1 920, 1 910-1 930, 2 010-2 025, 1 900-1 920	5 and 10	TDD

NOTE 6 – It should be noted that significant differences can exist between adjacent channel leakage power ratio (ACLR) information calculated from the integration of the envelope of the absolute spectrum masks compared to the specified values. This is because some or all of the spectrum masks are absolute (rather than relative to in-band power level) masks. Indeed, different margins exist between the guaranteed masks (used for compliance tests) and the shape of the actual emissions. If it represented a realistic transmit scenario, the specified ACLR values could not be met.

However, both the specified mask and the specified ACLR figures are to be met in accordance with, and compliance to, local/regional regulations wherever applicable. Caution is therefore advised when considering the emissions envelope mask for frequency sharing studies and when considering the emissions envelope mask for the actual transmission schemes, as the ACLR values would not be met if the transmissions were to fill the mask envelope. Where spectrum emission information is

needed for adjacent band sharing studies the relevant specified ACLR data should preferably be used if it is available for the relevant frequency offset and bandwidth.

When the ACLR values are specified but are not applicable (e.g. studying the compatibility involving a system with a bandwidth for which the ACLR values are not applicable, e.g. 8 MHz) or when the ACLR values are not specified in this Recommendation, then ACLR values may be calculated from the spectrum mask and receiver filter characteristics if needed. An estimate derived from this calculation can be seen as a worst case. For the particular case of Europe, the mask used for deriving the ACLR value is the relevant ETSI mask (e.g. EN 302 544 for OFDMA TDD WMAN in the 2 500-2 690 MHz band).

NOTE 7 – Frequency bands or parts of the bands referenced in this Recommendation which are marked with "#" are not identified for IMT in the ITU Radio Regulations.

Annex 1 – IMT-2000 code division multiple access (CDMA) direct spread (universal terrestrial radio access (UTRA) FDD) base stations

Annex 2 – IMT-2000 CDMA multi-carrier (cdma-2000) base stations

Annex 3 – IMT-2000 CDMA TDD (UTRA TDD) base stations

Annex 4 – IMT-2000 time division multiple access (TDMA) single-carrier (UWC-136) base stations

Annex 5 – IMT-2000 frequency division multiple access (FDMA)/TDMA (digital enhanced cordless telecommunications (DECT)) base stations

Annex 6 – IMT-2000 OFDMA TDD WMAN base stations

Appendix 1 – Definition of test tolerance.

Annex 1

IMT-2000 code division multiple access (CDMA) direct spread (universal terrestrial radio access (UTRA) FDD) base stations

1 Measurement uncertainty

Values specified in this Annex differ from those specified in Recommendation ITU-R M.1457 since values in this Annex incorporate test tolerances defined in Recommendation ITU-R M.1545.

2 Spectrum mask

2.1 UTRA spectrum mask

The mask defined in Tables 1A to 1D may be mandatory in certain regions. In other regions this mask may not be applied.

For regions where this clause applies, the requirement should be met by a BS transmitting on a single radio frequency (RF) carrier configured in accordance with the manufacturer's specification. Emissions should not exceed the maximum level specified in Tables 1A to 1D for the appropriate BS maximum output power, in the frequency range from $\Delta f = 2.5$ MHz to Δf_{max} from the carrier frequency, where:

– Δf is the separation between the carrier frequency and the nominal –3 dB point of the measuring filter closest to the carrier frequency.

– f_offset is the separation between the carrier frequency and the centre of the measurement filter:

  – f_offset$_{max}$ is either 12.5 MHz or the offset to the BS transmit band edge, whichever is the greater.

– Δf_{max} is equal to f_offset$_{max}$ minus half of the bandwidth of the measuring filter.

TABLE 1A

Spectrum emission mask values, BS maximum output power $P \geq 43$ dBm

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Requirement	Measurement bandwidth
2.5 MHz ≤ Δf < 2.7 MHz	2.515 MHz ≤ f_offset < 2.715 MHz	–12.5 dBm	30 kHz
2.7 MHz ≤ Δf < 3.5 MHz	2.715 MHz ≤ f_offset < 3.515 MHz	–12.5 – 15 (f_offset – 2.715) dBm	30 kHz
	3.515 MHz ≤ f_offset < 4.0 MHz	–24.5 dBm	30 kHz
3.5 MHz ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0 MHz	–11.5 dBm	1 MHz
37.5 MHz ≤ Δf < Δf_{max}	48.0 MHz ≤ f_offset < f_offset$_{max}$	–11.5 dBm	1 MHz

TABLE 1B

Spectrum emission mask values, BS maximum output power $39 \leq P < 43$ dBm

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Requirement	Measurement bandwidth
2.5 MHz ≤ Δf < 2.7 MHz	2.515 MHz ≤ f_offset < 2.715 MHz	–12.5 dBm	30 kHz
2.7 MHz ≤ Δf < 3.5 MHz	2.715 MHz ≤ f_offset < 3.515 MHz	–12.5 – 15 (f_offset – 2.715) dBm	30 kHz
	3.515 MHz ≤ f_offset < 4.0 MHz	–24.5 dBm	30 kHz
3.5 MHz ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0 MHz	–11.5 dBm	1 MHz
7.5 MHz ≤ Δf ≤ Δf_{max} MHz	8.0 MHz ≤ f_offset < f_offset$_{max}$	P – 54.5 dBm	1 MHz

TABLE 1C

Spectrum emission mask values, BS maximum output power 31 ≤ *P* < 39 dBm

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Requirement	Measurement bandwidth
2.5 MHz ≤ Δf < 2.7 MHz	2.515 MHz ≤ f_offset < 2.715 MHz	*P* – 51.5 dBm	30 kHz
2.7 MHz ≤ Δf < 3.5 MHz	2.715 MHz ≤ f_offset < 3.515 MHz	*P* – 51.5 – 15 (f_offset – 2.715) dBm	30 kHz
	3.515 MHz ≤ f_offset < 4.0 MHz	*P* – 63.5 dBm	30 kHz
3.5 MHz ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0 MHz	*P* – 50.5 dBm	1 MHz
7.5 MHz ≤ Δf ≤ Δf_{max} MHz	8.0 MHz ≤ f_offset < f_offset$_{max}$	*P* – 54.5 dBm	1 MHz

TABLE 1D

Spectrum emission mask values, BS maximum output power *P* < 31 dBm

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Requirement	Measurement bandwidth
2.5 MHz ≤ Δf < 2.7 MHz	2.515 MHz ≤ f_offset < 2.715 MHz	–20.5 dBm	30 kHz
2.7 MHz ≤ Δf < 3.5 MHz	2.715 MHz ≤ f_offset < 3.515 MHz	–20.5 – 15 (f_offset – 2.715) dBm	30 kHz
	3.515 MHz ≤ f_offset < 4.0 MHz	–32.5 dBm	30 kHz
3.5 MHz ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0 MHz	–19.5 dBm	1 MHz
7.5 MHz ≤ Δf ≤ Δf_{max} MHz	8.0 MHz ≤ f_offset < f_ f_offset$_{max}$	–23.5 dBm	1 MHz

For operation in Bands II, IV, V, X, XII, XIII and XIV, the applicable additional requirement in Tables 2A, 2B or 2C apply in addition to the minimum requirements in Tables 1A to 1D.

TABLE 2A

Additional spectrum emission limits for Bands II, IV, X

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Additional requirement	Measurement bandwidth
2.5 MHz ≤ Δf < 3.5 MHz	2.515 MHz ≤ f_offset < 3.515 MHz	–15 dBm	30 kHz
3.5 MHz ≤ Δf ≤ Δf_{max}	4.0 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	1 MHz

TABLE 2B

Additional spectrum emission limits for Band V

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Additional requirement	Measurement bandwidth
2.5 MHz ≤ Δf < 3.5 MHz	2.515 MHz ≤ f_offset < 3.515 MHz	–15 dBm	30 kHz
3.5 MHz ≤ $\Delta f \leq \Delta f_{max}$	3.55 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	100 kHz

TABLE 2C

Additional spectrum emission limits for Bands XII, XIII, XIV

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Additional requirement	Measurement bandwidth
2.5 MHz ≤ Δf < 3.5 MHz	2.515 MHz ≤ f_offset < 3.515 MHz	–13 dBm	30 kHz
3.5 MHz ≤ $\Delta f \leq \Delta_{fmax}$	3.55 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	100 kHz

For Home BS, the applicable additional requirements in Table 2D or 2E apply in addition to the minimum requirements in Tables 1A to 1D.

TABLE 2D

Additional spectrum emission limit for Home BS, BS maximum output power $6 \leq P \leq 20$ dBm

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Additional requirement	Measurement bandwidth
12.5 MHz ≤ $\Delta f \leq \Delta f_{max}$	13 MHz ≤ f_offset < f_offset$_{max}$	P – 54.5 dBm	1 MHz

TABLE 2E

Additional spectrum emission limit for Home BS, BS maximum output power $P < 6$ dBm

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Additional requirement	Measurement bandwidth
12.5 MHz ≤ $\Delta f \leq \Delta f_{max}$	13 MHz ≤ f_offset < f_offset$_{max}$	–48.5 dBm	1 MHz

In certain regions, the following requirement may apply for protection of digital terrestrial television. For UTRA BS operating in Band XX, the level of emissions in the band 470-790 MHz, measured in an 8 MHz filter bandwidth on centre frequencies F_{filter} according to Table 2F, shall not exceed the maximum emission level $P_{EM,N}$ declared by the manufacturer.

TABLE 2F

Declared emissions levels for protection of digital terrestrial television

Centre frequency, F_{filter}	Measurement bandwidth	Declared emission level (dBm)
$F_{filter} = 8 \times N + 306$ (MHz); $21 \leq N \leq 60$	8 MHz	$P_{EM,N}$

NOTE – The regional requirement is defined in terms of e.i.r.p. (equivalent isotropically 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.

2.2 E-UTRA (LTE) spectrum mask

The operating band unwanted emission limits are defined from 10 MHz below the lowest frequency of the BS transmitter operating band up to 10 MHz above the highest frequency of the BS transmitter 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.

The unwanted emission limits in the part of the operating band that falls in the spurious domain are consistent with Recommendation ITU-R SM.329 – Unwanted emissions in the spurious domain.

For wide area BS, the requirements of either § 2.2.1 (Category A limits) or § 2.2.2 (Category B limits) shall apply.

For local area BS, the requirements of § 2.2.3 shall apply (Category A and B).

For home BS, the requirements of § 2.2.4 shall apply (Category A and B).

For Category B operating band unwanted emissions, there are two options for the limits that may be applied regionally. Either the limits in § 2.2.2.1 or § 2.2.2.2 shall be applied.

Emissions should not exceed the maximum level specified in tables below, where:

– Δf is the separation between the channel edge frequency and the nominal –3 dB 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_offset_{max} is the offset to the frequency 10 MHz outside the BS transmitter operating band.

– Δf_{max} is equal to f_offset_{max} minus half of the bandwidth of the measuring filter.

For a multi-carrier E-UTRA BS, the definitions above apply to the lower edge of the carrier transmitted at the lowest carrier frequency and the higher edge of the carrier transmitted at the highest carrier frequency.

The requirements of either § 2.2.1 or § 2.2.2 shall apply.

The additional operating band unwanted emission limits defined in § 2.2.2.1 may be mandatory in certain regions. In other regions it may not apply.

2.2.1 E-UTRA spectrum mask for wide area BS (Category A)

For E-UTRA BS operating in Bands 5, 6, 8, 12, 13, 14, 17, 18 and 19, emissions shall not exceed the maximum levels specified in Tables 3Aa) to 3Ac).

TABLE 3A

a) General operating band unwanted emission limits for 1.4 MHz channel bandwidth (E-UTRA bands < 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$+0.5\ \text{dBm} - \frac{10}{1.4}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)$ dB	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–9.5 dBm	100 kHz
2.8 MHz ≤ Δf ≤ Δf_{max}	2.85 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	100 kHz

b) General operating band unwanted emission limits for 3 MHz channel bandwidth (E-UTRA bands < 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-3\ \text{dBm} - \frac{10}{3}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)$ dB	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–13.5 dBm	100 kHz
6 MHz ≤ Δf ≤ Δf_{max}	6.05 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	100 kHz

c) General operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (E-UTRA bands < 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.5\ \text{dBm} - \frac{7}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)$ dB	100 kHz
5 MHz ≤ Δf < 10 MHz	5.05 MHz ≤ f_offset < 10.05 MHz	–12.5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	100 kHz

For E-UTRA BS operating in Bands 1, 2, 3, 4, 7, 9, 10, 11 and 21, emissions shall not exceed the maximum levels specified in Table 3Ad) to 3Af):

TABLE 3A (*end*)

d) General operating band unwanted emission limits for 1.4 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Minimum requirement**	**Measurement bandwidth (Note 1)**
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$+0.5\ \text{dBm} - \frac{10}{1.4}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–9.5 dBm	100 kHz
2.8 MHz ≤ Δf ≤ Δf_{max}	3.3 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	1 MHz

e) General operating band unwanted emission limits for 3 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Minimum requirement**	**Measurement bandwidth (Note 1)**
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-3.5\ \text{dBm} - \frac{10}{3}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–13.5 dBm	100 kHz
6 MHz ≤ Δf ≤ Δf_{max}	6.5 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	1 MHz

f) General operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Minimum requirement**	**Measurement bandwidth (Note 1)**
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.5\ \text{dBm} - \frac{7}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
5 MHz ≤ Δf < 10 MHz	5.05 MHz ≤ f_offset < 10.05 MHz	–12.5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	1 MHz

2.2.2 E-UTRA spectrum mask for wide area BS (Category B)

For Category B operating band unwanted emissions, there are two options for the limits that may be applied regionally. Either the limits in § 2.2.2.1 or § 2.2.2.2 shall be applied.

2.2.2.1 E-UTRA spectrum mask for wide area BS (Category B, Option 1)

For E-UTRA BS operating in Bands 5, 6, 8, 12, 13, 14, 17 and 20, emissions shall not exceed the maximum levels specified in Tables 3Ba) to 3Bc):

TABLE 3B

a) General operating band unwanted emission limits for 1.4 MHz channel bandwidth (E-UTRA bands < 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$+0.5\ \text{dBm} - \frac{10}{1.4}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–9.5 dBm	100 kHz
2.8 MHz ≤ Δf ≤ Δf_{max}	2.85 MHz ≤ f_offset < f_offset_{max}	–16 dBm	100 kHz

b) General operating band unwanted emission limits for 3 MHz channel bandwidth (E-UTRA bands < 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-3.5\ \text{dBm} - \frac{10}{3}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–13.5 dBm	100 kHz
6 MHz ≤ Δf ≤ Δf_{max}	6.05 MHz ≤ f_offset < f_offset_{max}	–16 dBm	100 kHz

TABLE 3B (*continued*)

c) General operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (E-UTRA bands < 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δ*f*	**Frequency offset of measurement filter centre frequency, f_offset**	**Minimum requirement**	**Measurement bandwidth (Note 1)**
0 MHz ≤ Δ*f* < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.5\ \text{dBm} - \frac{7}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
5 MHz ≤ Δ*f* < 10 MHz	5.05 MHz ≤ f_offset < 10.05 MHz	–12.5 dBm	100 kHz
10 MHz ≤ Δ*f* ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	–16 dBm	100 kHz

For E-UTRA BS operating in Bands 1, 2, 3, 4, 7, 9, 10 and 11, emissions shall not exceed the maximum levels specified in Tables 3Bd) to 3Bf):

d) General operating band unwanted emission limits for 1.4 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δ*f*	**Frequency offset of measurement filter centre frequency, f_offset**	**Minimum requirement**	**Measurement bandwidth (Note 1)**
0 MHz ≤ Δ*f* < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$+0.5\ \text{dBm} - \frac{10}{1.4}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
1.4 MHz ≤ Δ*f* < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–9.5 dBm	100 kHz
2.8 MHz ≤ Δ*f* ≤ Δf_{max}	3.3 MHz ≤ f_offset < f_offset_{max}	–15 dBm	1 MHz

e) General operating band unwanted emission limits for 3 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δ*f*	**Frequency offset of measurement filter centre frequency, f_offset**	**Minimum requirement**	**Measurement bandwidth (Note 1)**
0 MHz ≤ Δ*f* < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-3.5\ \text{dBm} - \frac{10}{3}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
3 MHz ≤ Δ*f* < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–13.5 dBm	100 kHz
6 MHz ≤ Δ*f* ≤ Δf_{max}	6.5 MHz ≤ f_offset < f_offset_{max}	–15 dBm	1 MHz

TABLE 3B (*end*)

f) General operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.5\ \text{dBm} - \frac{7}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
5 MHz ≤ Δf < min (10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min (10.05 MHz, f_offset_{max})	–12.5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset_{max}	–15 dBm	1 MHz

2.2.2.2 E-UTRA spectrum mask for Wide Area BS (Category B, Option 2)

The limits in this subclause are intended for Europe and may be applied regionally for BS operating in Bands 3 and 8.

For an E-UTRA BS operating in Band 3 or 8, emissions shall not exceed the maximum levels specified in Tables 3Ca) to 3Cd).

TABLE 3C

a) Regional operating band unwanted emission limits in Bands 3 and 8 for 5, 10, 15 and 20 MHz channel bandwidth for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 0.2 MHz	0.015 MHz ≤ f_offset < 0.215 MHz	–12.5 dBm	30 kHz
0.2 MHz ≤ Δf < 1 MHz	0.215 MHz ≤ f_offset < 1.015 MHz	$-12.5\ \text{dBm} - 15 \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.215\right)\text{dB}$	30 kHz
(Note 4)	1.015 MHz ≤ f_offset < 1.5 MHz	–24.5 dBm	30 kHz
1 MHz ≤ Δf ≤ min (10 MHz, Δf_{max})	1.5 MHz ≤ f_offset < min (10.5 MHz, f_offset_{max})	–11.5 dBm	1 MHz
10 MHz ≤ $\Delta f \le \Delta f_{max}$	10.5 MHz ≤ f_offset < f_offset_{max}	–15 dBm	1 MHz

TABLE 3C (*end*)

b) Regional operating band unwanted emission limits in Bands 3 and 8 for 3 MHz channel bandwidth for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 0.05 MHz	0.015 MHz ≤ f_offset < 0.065 MHz	$6.5\ \text{dBm} - 60 \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.015 \right)$ dB	30 kHz
0.05 MHz ≤ Δf < 0.15 MHz	0. 065 MHz ≤ f_offset < 0.165 MHz	$3.5\ \text{dBm} - 160 \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.065 \right)$ dB	30 kHz
0.15 MHz ≤ Δf < 0.2 MHz	0.165 MHz ≤ f_offset < 0.215 MHz	–12.5 dBm	30 kHz
0.2 MHz ≤ Δf < 1 MHz	0.215 MHz ≤ f_offset < 1.015 MHz	$-12.5\ \text{dBm} - 15 \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.215 \right)$ dB	30 kHz
(Note 4)	1.015 MHz ≤ f_offset < 1.5 MHz	–24.5 dBm	30 kHz
1 MHz ≤ Δf ≤ 6 MHz	1.5 MHz ≤ f_offset < 6.5 MHz	–11.5 dBm	1 MHz
6 MHz ≤ $\Delta f \le \Delta f_{max}$	6.5 MHz ≤ f_offset < f_offset_{max}	–15 dBm	1 MHz

c) Regional operating band unwanted emission limits in Bands 3 and 8 for 1.4 MHz channel bandwidth for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 0.05 MHz	0.015 MHz ≤ f_offset < 0.065 MHz	$6.5\,\text{dBm} - 60 \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.015 \right)$ dB	30 kHz
0.05 MHz ≤ Δf < 0.15 MHz	0. 065 MHz ≤ f_offset < 0.165 MHz	$3.5\ \text{dBm} - 160 \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.065 \right)$ dB	30 kHz
0.15 MHz ≤ Δf < 0.2 MHz	0.165 MHz ≤ f_offset < 0.215 MHz	–12.5 dBm	30 kHz
0.2 MHz ≤ Δf < 1 MHz	0.215 MHz ≤ f_offset < 1.015 MHz	$-12.5\ \text{dBm} - 15 \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.215 \right)$ dB	30 kHz
(Note 4)	1.015 MHz ≤ f_offset < 1.5 MHz	–24.5 dBm	30 kHz
1 MHz ≤ Δf ≤ 2.8 MHz	1.5 MHz ≤ f_offset < 3.3 MHz	–11.5 dBm	1 MHz
2.8 MHz ≤ Δf ≤ Δf_{max}	3.3 MHz ≤ f_offset < f_offset_{max}	–15 dBm	1 MHz

2.2.3 E-UTRA spectrum mask for local area BS (Category A and B)

For local area E-UTRA BS, emissions shall not exceed the maximum levels specified in Tables 4a) to 4b).

TABLE 4

a) Local Area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$-19.5\ \text{dBm} - \frac{10}{1.4} \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)$ dB	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–29.5 dBm	100 kHz
2.8 MHz ≤ $\Delta f \leq \Delta f_{max}$	2.85 MHz ≤ f_offset < f_offset_{max}	–31 dBm	100 kHz

b) Local Area BS operating band unwanted emission limits for 3 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-23.5\ \text{dBm} - \frac{10}{3} \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)$ dB	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–33.5 dBm	100 kHz
6 MHz ≤ $\Delta f \leq \Delta f_{max}$	6.05 MHz ≤ f_offset < f_offset_{max}	–35 dBm	100 kHz

c) Local Area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-28.5\ \text{dBm} - \frac{7}{5} \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)$ dB	100 kHz
5 MHz ≤ Δf < min (10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min (10.05 MHz, f_offset_{max})	–35.5 dBm	100 kHz
10 MHz ≤ $\Delta f \leq \Delta f_{max}$	10.05 MHz ≤ f_offset < f_offset_{max}	–37 dBm	100 kHz

2.2.4 E-UTRA spectrum mask for home BS (Category A and B)

For home E-UTRA BS, emissions shall not exceed the maximum levels specified in Tables 5a) to 5c).

TABLE 5

a) Home BS operating band unwanted emission limits for 1.4 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$-28.5\ \text{dBm} - \frac{6}{1.4} \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)$ dB	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–34.5 dBm	100 kHz
2.8 MHz ≤ Δf ≤ Δf_{max}	3.3 MHz ≤ f_offset < f_offset$_{max}$	$\begin{cases} P - 52\,\text{dB}, & 2\,\text{dBm} \le P \le 20\ \text{dBm} \\ -50\ \text{dBm}, & P < 2\,\text{dBm} \end{cases}$	1 MHz

b) Home BS operating band unwanted emission limits for 3 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-32.5\ \text{dBm} - 2\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)$ dB	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–38.5 dBm	100 kHz
6 MHz ≤ Δf ≤ Δf_{max}	6.5 MHz ≤ f_offset < f_offset$_{max}$	$\begin{cases} P - 52\,\text{dB}, & 2\,\text{dBm} \le P \le 20\ \text{dBm} \\ -50\ \text{dBm}, & P < 2\,\text{dBm} \end{cases}$	1MHz

c) Home BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-34.5\ \text{dBm} - \frac{6}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)$ dB	100 kHz
5 MHz ≤ Δf < min (10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min (10.05 MHz, f_offset$_{max}$)	–40.5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset$_{max}$	$\begin{cases} P - 52\,\text{dB}, & 2\,\text{dBm} \le P \le 20\ \text{dBm} \\ -50\ \text{dBm}, & P < 2\ \text{dBm} \end{cases}$	1 MHz

2.2.5 E-UTRA spectrum mask (additional limits)

The following requirements may apply in certain regions. For E-UTRA BS operating in Band 5, emissions shall not exceed the maximum levels specified in Table 6A.

TABLE 6A

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

Channel bandwidth	Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth (Note 1)
1.4 MHz	0 MHz ≤ Δf < 1 MHz	0.005 MHz ≤ f_offset < 0.995 MHz	–14 dBm	10 kHz
3 MHz	0 MHz ≤ Δf < 1 MHz	0.015 MHz ≤ f_offset < 0.985 MHz	–13 dBm	30 kHz
5 MHz	0 MHz ≤ Δf < 1 MHz	0.015 MHz ≤ f_offset < 0.985 MHz	–15 dBm	30 kHz
10 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–13 dBm	100 kHz
15 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–13 dBm	100 kHz
20 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–13 dBm	100 kHz
All	1 MHz ≤ Δf < Δf_{max}	1.05 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	100 kHz

The following requirements may apply in certain regions. For E-UTRA BS operating in Bands 2, 4 and 10, emissions shall not exceed the maximum levels specified in Table 6B.

TABLE 6B

Additional operating band unwanted emission limits for E-UTRA bands > 1 GHz

Channel bandwidth	Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth (Note 1)
1.4 MHz	0 MHz ≤ Δf < 1 MHz	0.005 MHz ≤ f_offset < 0.995 MHz	–14 dBm	10 kHz
3 MHz	0 MHz ≤ Δf < 1 MHz	0.015 MHz ≤ f_offset < 0.985 MHz	–13 dBm	30 kHz
5 MHz	0 MHz ≤ Δf < 1 MHz	0.015 MHz ≤ f_offset < 0.985 MHz	–15 dBm	30 kHz
10 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–13 dBm	100 kHz
15 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–15 dBm	100 kHz
20 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–16 dBm	100 kHz
All	1 MHz ≤ Δf < Δf_{max}	1.5 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	1 MHz

The following requirements may apply in certain regions. For E-UTRA BS operating in Bands 12, 13, 14 and 17, emissions shall not exceed the maximum levels specified in Table 6C.

TABLE 6C

Additional operating band unwanted emission limits for E-UTRA (Bands 12, 13, 14 and 17)

Channel bandwidth	Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth (Note 1)
All	0 MHz ≤ Δf < 100 kHz	0.015 MHz ≤ f_offset < 0.085 MHz	–13 dBm	30 kHz
All	100 kHz ≤ Δf < Δf_{max}	150 kHz ≤ f_offset < f_offset$_{max}$	–13 dBm	100 kHz

In certain regions the following requirement may apply for protection of digital terrestrial television. For E-UTRA BS operating in Band 20, the level of emissions in the band 470-790 MHz, measured in an 8 MHz filter bandwidth on centre frequencies F_{filter} according to Table 6D, 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 6D

Declared emissions levels for protection of digital terrestrial television

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

NOTE − The regional requirement is defined in terms of e.i.r.p. (equivalent isotropically 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.

The following notes are common to all subclauses in § 2.2:

NOTE 1 – As a general rule for the requirements in § 2.2, 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 can 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 2 – This frequency range ensures that the range of values of f_offset is continuous.

NOTE 3 – The requirement is not applicable when Δf_{max} < 10 MHz.

NOTE 4 – For Home BS, the parameter P is defined as the aggregated maximum power of all transmit antenna ports of Home BS.

3 Adjacent channel leakage power ratio

ACLR is the ratio of the transmitted power to the power measured after a receiver filter in the adjacent channel(s).

3.1 ACLR for UTRA

For UTRA, both the transmitted power and the received power are measured through a matched filter (root raised cosine and roll-off 0.22) with a noise power bandwidth equal to the chip rate.

The requirements should apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

The limit for ACLR should be as specified in Table 7A.

TABLE 7A

BS ACLR limits for UTRA

BS channel offset below the first or above the last carrier frequency used (MHz)	ACLR limit (dB)
5	44.2
10	49.2

NOTE 1 – In certain regions, the adjacent channel power (the root raised cosine (RRC) filtered mean power centred on an adjacent channel frequency) should be less than or equal to −7.2 dBm/3.84 MHz (for Band I, Band IX, Band XI and Band XXI) or +2.8 dBm/3.84 MHz (for Band VI and Band XIX) or as specified by the ACLR limit, whichever is the higher. This Note is not applicable for Home BS.

NOTE 2 – For Home BS, the adjacent channel power (the RRC filtered mean power centred on an adjacent channel frequency) shall be less than or equal to –42.7 dBm/3.84 MHz or as specified by the ACLR limit, whichever is the higher.

3.2 ACLR for E-UTRA (LTE)

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. The transmission bandwidth configuration is as specified in Table 7B.

TABLE 7B

Downlink transmission bandwidth configuration BW_{config}

Channel bandwidth $BW_{Channel}$ (MHz)	1.4	3	5	10	15	20
Transmission bandwidth configuration (BW_{config}) (MHz)	1.095	2.715	4.515	9.015	13.515	18.015

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 –13 dBm/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 –15 dBm/MHz apply, whichever is less stringent.

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

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

For operation in paired spectrum, the ACLR shall be higher than the value specified in Table 7C.

TABLE 7C

BS ACLR limits for E-UTRA (LTE) in paired spectrum

E-UTRA transmitted signal channel bandwidth $BW_{Channel}$ (MHz)	**BS adjacent channel centre frequency offset below the first or above the last carrier centre frequency used**	**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})	44.2 dB
	2 x $BW_{channel}$	E-UTRA of same BW	Square (BW_{config})	44.2 dB
	$BW_{channel}/2$ + 2.5 MHz	3.84 Mchip/s UTRA	RRC (3.84 Mchip/s)	44.2 dB
	$BW_{channel}/2$ + 7.5 MHz	3.84 Mchip/s UTRA	RRC (3.84 Mchip/s)	44.2 dB

NOTE 1 – $BW_{channel}$ 1 and BWconfig are the channel bandwidth and transmission bandwidth configuration of the E-UTRA transmitted signal on the assigned channel frequency.

NOTE 2 – The RRC filter shall be equivalent to the transmit pulse shape filter of root raised cosine and roll-off 0.22, with a chip rate as defined in this Table.

4 Transmitter spurious emission (conducted)

The spurious emission is measured at the BS RF output port.

For UTRA, the requirement applies at frequencies within the specified frequency ranges, which are more than 12.5 MHz under the first carrier frequency used or more than 12.5 MHz above the last carrier frequency used.

For E-UTRA (LTE), the requirement applies at frequencies within the specified frequency ranges, excluding the frequency range from 10 MHz below the lowest frequency of the BS transmitter operating band up to 10 MHz above the highest frequency of the BS transmitter operating band.

The requirement below should 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 (r.m.s.).

4.1 Mandatory requirements

The requirements of either § 4.1.1 or § 4.1.2 applies.

4.1.1 Category A for UTRA and E-UTRA

The following requirements should be met in areas where Category A limits for spurious emissions, as defined in Recommendation ITU-R SM.329, are applied.

The power of any spurious emission should not exceed the limits specified in Table 8A.

TABLE 8A

BS spurious emission limit, Category A

Band	Maximum level	Measurement bandwidth	Note
9 kHz-150 kHz	–13 dBm	1 kHz	Bandwidth as in Recommendation ITU-R SM.329, § 4.1
150 kHz-30 MHz		10 kHz	Bandwidth as in Recommendation ITU-R SM.329, § 4.1
30 MHz-1 GHz		100 kHz	Bandwidth as in Recommendation ITU-R SM.329, § 4.1
1 GHz-12.75 GHz		1 MHz	Upper frequency as in Recommendation ITU-R SM.329, § 2.5 Table 1

4.1.2 Category B

4.1.2.1 Category B for UTRA

The following requirements should be met in areas where Category B limits for spurious emissions, as defined in Recommendation ITU-R SM.329, are applied.

The power of any spurious emission should not exceed the limits specified in Tables 8Ba) and 8Bb).

TABLE 8B

a) BS mandatory spurious emission limits, operating Bands I, II, III, IV, VII, X (Category B)

Band	Maximum level	Measurement bandwidth	Note
9 ↔ 150 kHz	–36 dBm	1 kHz	(1)
150 kHz ↔ 30 MHz	–36 dBm	10 kHz	(1)
30 MHz ↔ 1 GHz	–36 dBm	100 kHz	(1)
1 GHz ↔ F_{low} – 10 MHz	–30 dBm	1 MHz	(1)
F_{low} – 10 MHz ↔ F_{high} + 10 MHz	–15 dBm	1 MHz	(2)
F_{high} + 10 MHz ↔ 12.75 GHz	–30 dBm	1 MHz	(3)

TABLE 8B (*end*)

b) BS mandatory spurious emission limits, operating Bands V, VIII, XII, XIII, XIV, XX (Category B)

Band	Maximum level	Measurement bandwidth	Note
9 ↔ 150 kHz	–36 dBm	1 kHz	(1)
150 kHz ↔ 30 MHz	–36 dBm	10 kHz	(1)
30 MHz ↔ F_{low} – 10 MHz	–36 dBm	100 kHz	(1)
F_{low} – 10 MHz ↔ F_{high} + 10 MHz	–16 dBm	100 kHz	(2)
F_{high} + 10 MHz ↔ 1 GHz	–36 dBm	100 kHz	(1)
1 GHz ↔ 12.75 GHz	–30 dBm	1 MHz	(3)

(1) Bandwidth as in Recommendation ITU-R SM.329, § 4.1.

(2) Limit based on Recommendation ITU-R SM.329, § 4.3 and Annex 7.

(3) Bandwidth as in Recommendation ITU-R SM.329, § 4.1. Upper frequency as in Recommendation ITU-R SM.329, § 2.5 Table 1.

F_{low}: The lowest downlink frequency of the operating band.

F_{high}: The highest downlink frequency of the operating band.

4.1.2.2 Category B for E-UTRA

The following requirements should be met in areas where Category B limits for spurious emissions, as defined in Recommendation ITU-R SM.329, are applied.

The power of any spurious emission should not exceed the limit specified in Table 8C.

TABLE 8C

Band	Maximum level	Measurement bandwidth	Note
9 kHz ↔ 150 kHz	–36 dBm	1 kHz	(1)
150 kHz ↔ 30 MHz	–36 dBm	10 kHz	(1)
30 MHz ↔ 1 GHz	–36 dBm	100 kHz	(1)
1 GHz ↔ 12.75 GHz	–30 dBm	1 MHz	(2)

(1) Bandwidth as in Recommendation ITU-R SM.329, § 4.1.

(2) Bandwidth as in Recommendation ITU-R SM.329, § 4.1. Upper frequency as in Recommendation ITU-R SM.329, § 2.5 Table 1.

4.2 Coexistence with other systems in the same geographical area

4.2.1 Coexistence with other systems in the same geographical area for UTRA

These requirements may be applied for the protection of UE,MS and/or BS operating in other frequency bands in the same geographical area. The requirements may apply in geographic areas in which both UTRA FDD and a system operating in another frequency band than the FDD operating band are deployed. The system operating in the other frequency band may be GSM900, DCS1800, PCS1900, GSM850, E-UTRA FDD and/or UTRA FDD.

The power of any spurious emission should not exceed the limits of Table 9A for a BS where requirements for coexistence with the system listed in the first column apply.

TABLE 9A

BS spurious emission limits for UTRA BS in geographic coverage area of systems operating in other frequency bands

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
GSM900	921-960 MHz	−57 dBm	100 kHz	This requirement does not apply to UTRA FDD operating in Band VIII
	876-915 MHz	−61 dBm	100 kHz	For the frequency range 880-915 MHz, this requirement does not apply to UTRA FDD operating in Band VIII
DCS1800	1 805-1 880 MHz	−47 dBm	100 kHz	This requirement does not apply to UTRA FDD operating in Band III
	1 710-1 785 MHz	−61 dBm	100 kHz	This requirement does not apply to UTRA FDD operating in Band III
PCS1900	1 930-1 990 MHz	−47 dBm	100 kHz	This requirement does not apply to UTRA FDD BS operating in frequency Band II
	1 850-1 910 MHz	−61 dBm	100 kHz	This requirement does not apply to UTRA FDD BS operating in frequency Band II
GSM850 or CDMA850	869-894 MHz	−57 dBm	100 kHz	This requirement does not apply to UTRA FDD BS operating in frequency Band V
	824-849 MHz	−61 dBm	100 kHz	This requirement does not apply to UTRA FDD BS operating in frequency Band V
UTRA FDD Band I or E-UTRA Band 1	2 110-2 170 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band I
	1 920-1 980 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in band I
UTRA FDD Band II or E-UTRA Band 2	1 930-1 990 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band II
	1 850-1 910 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band II

TABLE 9A (*continued*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
UTRA FDD Band III or E-UTRA Band 3	1 805-1 880 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band III
	1 710-1 785 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band III
UTRA FDD Band IV or E-UTRA Band 4	2 110-2 155 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band IV
	1 710-1 755 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band IV
UTRA FDD Band V or E-UTRA Band 5	869-894 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band V
	824-849 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band V
UTRA FDD Band VI or E-UTRA Band 6	860-895 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band VI
	815-850 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band VI
UTRA FDD Band VII or E-UTRA Band 7	2 620-2 690 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band VII
	2 500-2 570 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band VII
UTRA FDD Band VIII or E-UTRA Band 8	925-960 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band VIII
	880-915 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band VIII
UTRA FDD Band IX or E-UTRA Band 9	1 844.9-1 879.9 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band IX
	1 749.9-1 784.9 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band IX

TABLE 9A (*continued*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
UTRA FDD Band X or E-UTRA Band 10	2 110-2 170 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band X
	1 710-1 770 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band X
UTRA FDD Band XI or XXI or E-UTRA Band 11 or 21	1 475.9-1 510.9 MHz	−52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XI or XXI
	1 427.9-1 447.9 MHz	−49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XI
	1 447.9-1 462.9 MHz	–49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XXI
UTRA FDD Band XII or E-UTRA Band 12	728-746 MHz	–52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XII
	698-716 MHz	–49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XII
UTRA FDD Band XIII or E-UTRA Band 13	746-756 MHz	–52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XIII
	777-787 MHz	–49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XIII
UTRA FDD Band XIV or E-UTRA Band 14	758-768 MHz	–52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XIV
	788-798 MHz	–49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XIV

TABLE 9A (*end*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
E-UTRA Band 17	734-746 MHz	–52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XII
	704-716 MHz	–49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XII
UTRA FDD Band XX or E-UTRA Band 20	791-821 MHz	–52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XX
	832-862 MHz	–49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XX

4.2.2 Coexistence with other systems in the same geographical area for E-UTRA

These requirements may be applied for the protection of UE, MS and/or BS operating in other frequency bands in the same geographical area. The requirements may apply in geographic areas in which both E-UTRA BS and a system operating in another frequency band than the E-UTRA operating band are deployed. The system operating in the other frequency band may be GSM900, DCS1800, PCS1900, GSM850, UTRA FDD/TDD and/or E-UTRA.

The power of any spurious emission shall not exceed the limits of Table 9B for a BS where requirements for co-existence with the system listed in the first column apply.

TABLE 9B

BS spurious emission limits for E-UTRA BS in geographic coverage area of systems operating in other frequency bands

System type operating in the same geographical area	Band for coexistence 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
DCS1800	1 805-1 880 MHz	–47 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in Band 3
	1 710-1 785 MHz	–61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in Band 3

TABLE 9B (*continued*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
PCS1900	1 930-1 990 MHz	–47 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in frequency Band 2 or Band 36
	1 850-1 910 MHz	–61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in frequency Band 2. This requirement does not apply to E-UTRA BS operating in frequency Band 35
GSM850	869-894 MHz	–57 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in frequency Band 5
	824-849 MHz	–61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in frequency Band 5
UTRA FDD Band I or E-UTRA Band 1	2 110-2 170 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 1
	1 920-1 980 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 1
UTRA FDD Band II or E-UTRA Band 2	1 930-1 990 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 2
	1 850-1 910 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 2
UTRA FDD Band III or E-UTRA Band 3	1 805-1 880 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 3
	1 710-1 785 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 3
UTRA FDD Band IV or E-UTRA Band 4	2 110-2 155 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 4 or 10
	1 710-1 755 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 4 or 10
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
	824-849 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 5
UTRA FDD Band VI or XIX or E-UTRA Bands 6, 18, 19	860-895 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 6
	815-850 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 6
	830-850 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Bands 6, 19

TABLE 9B (*continued*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
UTRA FDD Band VII or E-UTRA Band 7	2 620-2 690 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 7
	2 500-2 570 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 7
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
UTRA FDD Band IX or E-UTRA Band 9	1 844.9-1 879.9 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 9
	1 749.9-1 784.9 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 9
UTRA FDD Band X or E-UTRA Band 10	2 110-2 170 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 10
	1 710-1 770 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 10
UTRA FDD Band XI or XXI or E-UTRA Band 11 or 21	1 475.9-1 510.9 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 11 or 21
	1 427.9-1 447.9 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 11
	1 447.9-1 462.9 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 21
UTRA FDD Band XII or E-UTRA Band 12	728-746 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 12
	698-716 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 12
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
UTRA FDD Band XIV or E-UTRA Band 14	758-768 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 14
	788-798 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 14
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

TABLE 9B (*end*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
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
UTRA TDD in Band a) or E-UTRA Band 33	1 900-1 920 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 33
UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 34
UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 35
UTRA TDD in Band b) or E-UTRA Band 36	1 930-1 990 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Bands 2 and 36
UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in Recommendation ITU-R M.1036, but is pending any future deployment
UTRA TDD in Band d) or E-UTRA Band 38	2 570-2 620 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 38
E-UTRA Band 39	1 880-1 920 MHz	–52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 39
E-UTRA Band 40	2 300-2 400 MHz	–52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 40

NOTE 1 – As defined in the scope for spurious emissions in this clause (§ 4), the co-existence requirements in Table 9B do not apply for the 10 MHz frequency range immediately outside the BS transmit frequency range of an operating band (see Notes 2 and 3 for the scope). This is also the case when the transmit frequency range is adjacent to the band for the co-existence requirement in the table. Emission limits for this excluded frequency range may also be covered by local or regional requirements.

NOTE 2 – The table above assumes that two operating bands, where the frequency ranges defined either in Note 2 or 3 in the scope 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 this Recommendation.

The power of any spurious emission shall not exceed the limits of Table 9C for a Home BS where requirements for co-existence with a Home BS type listed in the first column apply.

TABLE 9C

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	1 920-1 980 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 1
UTRA FDD Band II or E-UTRA Band 2	1 850-1 910 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 2
UTRA FDD Band III or E-UTRA Band 3	1 710-1 785 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 3
UTRA FDD Band IV or E-UTRA Band 4	1 710-1 755 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 4
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
UTRA FDD Bands VI, XIX or E-UTRA Bands 6, 18, 19	815-830 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 18. Requirement in subclause 6.6.4.5.3
	830-850 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Bands 6, 19
UTRA FDD Band VII or E-UTRA Band 7	2 500-2 570 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 7
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
UTRA FDD Band IX or E-UTRA Band 9	1 749.9-1 784.9 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 9
UTRA FDD Band X or E-UTRA Band 10	1 710-1 770 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 10

TABLE 9C (*continued*)

Type of coexistence BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
UTRA FDD Band XI, XXI or E-UTRA Bands 11, 21	1 427.9-1 447.9 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 11
	1 447.9-1 462.9 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 21
UTRA FDD Band XII or E-UTRA Band 12	698-716 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 12
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
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
E-UTRA Band 17	704-716 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 17
E-UTRA Band 20	832-862 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 20
UTRA TDD in Band a) or E-UTRA Band 33	1 900-1 920 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 33
UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 34
UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 35
UTRA TDD in Band b) or E-UTRA Band 36	1 930-1 990 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Bands 2 and 36
UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 37. This unpaired band is defined in Rec. ITU-R M.1036, but is pending any future deployment

TABLE 9C (*end*)

Type of coexistence BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
UTRA TDD in Band d) or E-UTRA Band 38	2 570-2 620 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 38
E-UTRA Band 39	1 880-1 920 MHz	–71 dBm	100 kHz	This is not applicable to Home BS operating in Band 39
E-UTRA Band 40	2 300-2 400 MHz	–71 dBm	100 kHz	This is not applicable to Home BS operating in Band 40

NOTE 1 – The coexistence requirements in Table 9C do not apply for the 10 MHz frequency range immediately outside the Home BS transmit frequency range of a downlink operating band.

4.3 Co-location with other base stations

4.3.1 Co-existence with co-located and co-sited base stations for UTRA

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

The power of any spurious emission shall not exceed the limits of Table 10A for a Wide Area (WA) BS where requirements for co-location with a BS type listed in the first column apply.

TABLE 10A

BS spurious emissions limits for Wide Area BS co-located with another BS

Type of co-located BS	Band for co-location requirement	Maximum Level	Measurement Bandwidth	Note
Macro GSM900	876-915 MHz	–98 dBm	100 kHz	
Macro DCS1800	1 710-1 785 MHz	–98 dBm	100 kHz	
Macro PCS1900	1 850-1 910 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	1 920-1 980 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band II or E-UTRA Band 2	1 850-1 910 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band III or E-UTRA Band 3	1 710-1 785 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band IV or E-UTRA Band 4	1 710-1 755 MHz	–96 dBm	100 kHz	

TABLE 10A (*end*)

Type of co-located BS	Band for co-location requirement	Maximum Level	Measurement Bandwidth	Note
WA UTRA FDD Band V or E-UTRA Band 5	824-849 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band VI or XIX or E-UTRA Bands 6, 18 or 19	815-850 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band VII or E-UTRA Band 7	2 500-2 570 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	1 749.9-1 784.9 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band X or E-UTRA Band 10	1 710-1 770 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band XI or E-UTRA Band 11	1 427.9-1 447.9 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band XII or E-UTRA Band 12	698-716 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	
E-UTRA Band 17	704-716 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	1 447.9-1 462.9 MHz	–96 dBm	100 kHz	

The power of any spurious emission shall not exceed the limits of Table 10B for a medium range (MR) BS where requirements for co-location with a BS type listed in the first column apply.

TABLE 10B

BS spurious emissions limits for medium range BS co-located with another BS

Type of co-located BS	Band for co-location requirement	Maximum level	Measurement bandwidth	Note
Micro GSM900	876-915 MHz	–91 dBm	100 kHz	
Micro DCS1800	1 710-1 785 MHz	–96 dBm	100 kHz	
Micro PCS1900	1 850-1 910 MHz	–96 dBm	100 kHz	
Micro GSM850	824-849 MHz	–91 dBm	100 kHz	
MR UTRA FDD Band I	1 920-1 980 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band II	1 850-1 910 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band III	1 710-1 785 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band IV	1 710-1 755 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band V	824-849 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band VI or XIX	815-850 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band VII	2 500-2 570 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band VIII	880-915 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band IX	1 749.9-1 784.9 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band X	1 710-1 770 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band XI	1 427.9-1 447.9 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band XII	698-716 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band XIII	777-787 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band XIV	788-798 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band XX	832-862 MHz	–86 dBm	100 kHz	
MR UTRA FDD Band XXI	1 447.9-1 462.9 MHz	–86 dBm	100 kHz	

The power of any spurious emission shall not exceed the limits of Table 10C for a Local Area (LA) BS where requirements for co-location with a BS type listed in the first column apply.

TABLE 10C

BS spurious emissions limits for Local Area BS co-located with another BS

Type of co-located BS	Band for co-location requirement	Maximum level	Measurement bandwidth	Note
Pico GSM900	876-915 MHz	–70 dBm	100 kHz	
Pico DCS1800	1 710-1 785 MHz	–80 dBm	100 kHz	
Pico PCS1900	1 850-1 910 MHz	–80 dBm	100 kHz	
Pico GSM850	824-849 MHz	–70 dBm	100 kHz	
LA UTRA FDD Band I	1 920-1 980 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band II	1 850-1 910 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band III	1 710-1 785 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band IV	1 710-1 755 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band V	824-849 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band VI or XIX	815-850 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band VII	2 500-2 570 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band VIII	880-915 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band IX	1 749.9-1 784.9 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band X	1 710-1 770 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band XI	1 427.9-1 447.9 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band XII	698-716 MHz	–82 dBm	100 KHz	
LA UTRA FDD Band XIII	777-787 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band XIV	788-798 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band XX	832-862 MHz	–82 dBm	100 kHz	
LA UTRA FDD Band XXI	1 447.9-1 462.9 MHz	–82 dBm	100 kHz	

4.3.2 Co-location with other base stations for E-UTRA

These requirements may be applied for the protection of other BS receivers when GSM900, DCS1800, PCS1900, GSM850, 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.

The power of any spurious emission shall not exceed the limits of Table 10D for a Wide Area BS where requirements for co-location with a BS type listed in the first column apply.

TABLE 10D

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	1 710-1 785 MHz	–98 dBm	100 kHz	
Macro PCS1900	1 850-1 910 MHz	–98 dBm	100 kHz	
Macro GSM850	824-849 MHz	–98 dBm	100 kHz	
WA UTRA FDD Band I or E-UTRA Band 1	1 920-1 980 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band II or E-UTRA Band 2	1 850-1 910 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band III or E-UTRA Band 3	1 710-1 785 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band IV or E-UTRA Band 4	1 710-1 755 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 Bands 6, 19	830-850 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band VII or E-UTRA Band 7	2 500-2 570 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	1 749.9-1 784.9 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band X or E-UTRA Band 10	1 710-1 770 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band XI or E-UTRA Band 11	1 427.9-1 447.9 MHz	–96 dBm	100 kHz	

TABLE 10D (*continued*)

Type of co-located BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
WA UTRA FDD Band XII or E-UTRA Band 12	698-716 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 E-UTRA Band 20	832-862 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band XXI or E-UTRA Band 21	1 447.9-1 462.9 MHz	–96 dBm	100 kHz	
WA UTRA TDD in Band a) or E-UTRA Band 33	1 900-1 920 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33
WA UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 34
WA UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 35
WA UTRA TDD in Band b) or E-UTRA Band 36	1930-1990 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Bands 2 and 36

TABLE 10D (*end*)

Type of co-located BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
WA UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in Recommendation ITU-R M.1036, but is pending any future deployment
WA UTRA TDD in Band d) or E-UTRA Band 38	2 570-2 620 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 38
WA E-UTRA Band 39	1 880-1 920 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Bands 33 and 39
WA E-UTRA Band 40	2 300-2 400 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 40

The power of any spurious emission shall not exceed the limits of Table 10E for a Local Area BS where requirements for co-location with a BS type listed in the first column apply.

TABLE 10E

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	1 710-1 785 MHz	–80 dBm	100 kHz	
Pico PCS1900	1 850-1 910 MHz	–80 dBm	100 kHz	
Pico GSM850	824-849 MHz	–70 dBm	100 kHz	
LA UTRA FDD Band I or E-UTRA Band 1	1 920-1 980 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band II or E-UTRA Band 2	1 850-1 910 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band III or E-UTRA Band 3	1 710-1 785 MHz	–88 dBm	100 kHz	

TABLE 10E (*continued*)

Type of co-located BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
LA UTRA FDD Band IV or E-UTRA Band 4	1 710-1 755 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 Bands VI, XIX or E-UTRA Bands 6, 19	830-850 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band VII or E-UTRA Band 7	2 500-2 570 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	1 749.9-1 784.9 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band X or E-UTRA Band 10	1 710-1 770 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band XI or E-UTRA Band 11	1 427.9-1 447.9 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band XII or E-UTRA Band 12	698-716 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 E-UTRA Band 20	832-862 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band XXI or E-UTRA Band 21	1 447.9-1 462.9 MHz	–88 dBm	100 kHz	
LA UTRA TDD in Band a) or E-UTRA Band 33	1 900-1 920 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33
LA UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 34

TABLE 10E (*end*)

Type of co-located BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
LA UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 35
LA UTRA TDD in Band b) or E-UTRA Band 36	1 930-1 990 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Bands 2 and 36
LA UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in Recommendation ITU-R M.1036, but is pending any future deployment.
LA UTRA TDD in Band d) or E-UTRA Band 38	2 570-2 620 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 38
LA E-UTRA Band 39	1 880-1 920 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Bands 33 and 39
LA E-UTRA Band 40	2 300-2 400 MHz	88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 40

NOTE 1 – The co-location requirements in Tables 10D and 10E do not apply for the 10 MHz frequency range immediately outside the BS transmit frequency range of a downlink operating band. The current state-of-the-art technology does not allow a single generic solution for co-location with other system on adjacent frequencies for 30 dB BS-BS minimum coupling loss. However, there are certain site-engineering solutions that can be used.

NOTE 2 – The table above assumes that two operating bands, where the corresponding eNode B transmit and receive frequency ranges 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.

NOTE 3 – Co-located TDD base stations that are synchronized and using the same operating band can transmit without special co-locations requirements. For unsynchronized base stations, special co-location requirements may apply.

4.4 Coexistence with PHS

This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA FDD or E-UTRA FDD are deployed. For UTRA FDD, this requirement is also applicable at specified frequencies falling between 12.5 MHz below the first carrier frequency used and 12.5 MHz above the last carrier frequency used. For E-UTRA FDD, this requirement is also applicable at specified frequencies falling between 10 MHz below the lowest BS transmitter frequency of the operating band and 10 MHz above the highest BS transmitter frequency of the operating band.

The power of any spurious emission should not exceed:

TABLE 11A

BS spurious emission limits for BS in geographic coverage area of PHS for UTRA

Band	Measurement bandwidth	Maximum level	Note
1 884.5 to 1 919.6 MHz	300 kHz	–41 dBm	

TABLE 11B

BS spurious emission limits for BS in geographic coverage area of PHS for E-UTRA

Band	Measurement bandwidth	Maximum level	Note
1 884.5-1 919.6 MHz	300 kHz	–41 dBm	Applicable when co-existence with PHS system operating in 1 884.5-1 919.6 MHz
1 884.5-1 915.7 MHz	300 kHz	–41 dBm	Applicable when co-existence with PHS system operating in 1 884.5-1 915.7 MHz

4.5 Co-existence with services in adjacent frequency bands

This requirement may be applied for the protection in bands adjacent to Bands I, II, III or VII, in geographic areas in which both an adjacent band service and UTRA FDD are deployed.

TABLE 12

BS spurious emissions limits for protection of adjacent band services

Operating band	Band	Maximum level	Measurement bandwidth	Note
I	2 100-2 105 MHz	–30 + 3.4 · (f – 2 100 MHz) dBm	1 MHz	
	2 175-2 180 MHz	–30 + 3.4 · (2 180 MHz – f) dBm	1 MHz	
II	1 920-1 925 MHz	–30 + 3.4 · (f – 1 920 MHz) dBm	1 MHz	
	1 995-2 000 MHz	–30 +3.4 · (2 000 MHz – f) dBm	1 MHz	
III	1 795-1 800 MHz	–30 + 3.4 · (f – 1 795 MHz) dBm	1 MHz	
	1 885-1 890 MHz	–30 +3.4 · (1 890 MHz – f) dBm	1 MHz	
VII	2 610-2 615 MHz	–30 + 3.4 · (f – 2 610 MHz) dBm	1 MHz	
	2 695-2 700 MHz	–30 +3.4 · (2 700 MHz – f) dBm	1 MHz	

NOTE − This requirement for the frequency range 2 610-2 615 MHz may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.

4.6 Protection of public safety operations

This requirement shall be applied to UTRA BS operating in Bands XIII and XIV to ensure that appropriate interference protection is provided to 700 MHz public safety operations. This requirement is also applicable at specified frequencies falling between 12.5 MHz below the first carrier frequency used and 12.5 MHz above the last carrier frequency used.

TABLE 13A

BS spurious emissions limits

Operating band	Band	Maximum level	Measurement bandwidth	Note
XIII	763-775 MHz	–46 dBm	6.25 kHz	
XIII	793-805 MHz	–46 dBm	6.25 kHz	
XIV	769-775 MHz	–46 dBm	6.25 kHz	
XIV	799-805 MHz	–46 dBm	6.25 kHz	

The following requirement shall be applied to E-UTRA 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 transmitter operating band up to 10 MHz above the highest frequency of the BS transmitter operating band. The power of any spurious emission shall not exceed:

TABLE 13B

BS spurious emissions limits for protection of public safety operations

Operating band	Band	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	

4.7 Co-existence with Home UTRA BS operating in other bands

These requirements may be applied for the protection of Home UTRA BS receivers operating in other bands. These requirements are only applicable to Home UTRA BS.

The power of any spurious emission shall not exceed the limits of Table 14 for a Home UTRA BS where requirements for co-existence with a Home BS type listed in the first column apply.

TABLE 14

Home UTRA BS spurious emissions limits for co-existence with Home BS operating in other bands

Type of Home BS	Band for co-existence requirement	Maximum level	Measurement bandwidth	Note
UTRA FDD Band I	1 920-1 980 MHz	–82 dBm	100 kHz	
UTRA FDD Band II	1 850-1 910 MHz	–82 dBm	100 kHz	
UTRA FDD Band III	1 710-1 785 MHz	–82 dBm	100 kHz	
UTRA FDD Band IV	1 710-1 755 MHz	–82 dBm	100 kHz	
UTRA FDD Band V	824-849 MHz	–82 dBm	100 kHz	
UTRA FDD Band VI or XIX	815-850 MHz	–82 dBm	100 kHz	
UTRA FDD Band VII	2 500-2 570 MHz	–82 dBm	100 kHz	
UTRA FDD Band VIII	880-915 MHz	–82 dBm	100 kHz	
UTRA FDD Band IX	1 749.9-1 784.9 MHz	–82 dBm	100 kHz	
UTRA FDD Band X	1 710-1 770 MHz	–82 dBm	100 kHz	
UTRA FDD Band XI	1 427.9-1 447.9 MHz	–82 dBm	100 kHz	
UTRA FDD Band XII	698-716 MHz	–82 dBm	100 kHz	
UTRA FDD Band XIII	777-787 MHz	–82 dBm	100 kHz	
UTRA FDD Band XIV	788-798 MHz	–82 dBm	100 kHz	
UTRA FDD Band XX	832-862 MHz	–82 dBm	100 kHz	
UTRA FDD Band XXI	1 447.9-1 462.9 MHz	–82 dBm	100 kHz	

4.8 Coexistence with UTRA-TDD

This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.

The power of any spurious emission should not exceed:

TABLE 15

BS spurious emission limits for UTRA BS in geographic coverage area of UTRA-TDD

Band	Measurement bandwidth	Maximum level	Note
1 880-1 920 MHz	1 MHz	–52 dBm	Applicable in China
1 900 to 1 920 MHz	1 MHz	–52 dBm	
2 010 to 2 025 MHz	1 MHz	–52 dBm	
2 300-2 400 MHz	1 MHz	–52 dBm	
2 570 to 2 610 MHz	1 MHz	–52 dBm	

4.9 Protection of the E-UTRA FDD BS receiver of own or different BS

This requirement shall be applied for E-UTRA FDD operation in order to prevent the receivers of the BSs being desensitised by emissions from a BS transmitter. It is measured at the transmit antenna port for any type of BS which has common or separate Tx/Rx antenna ports.

The power of any spurious emission shall not exceed the limits in Table 16.

TABLE 16

E-UTRA FDD BS spurious emissions limits for protection of the BS receiver

	Frequency range	Maximum level	Measurement bandwidth	Note
Wide Area BS	FUL_low – FUL_high	–96 dBm	100 kHz	
Local Area BS	FUL_low – FUL_high	–88 dBm	100 kHz	
Home BS	FUL_low – FUL_high	–88 dBm	100 kHz	

5 Receiver spurious emission

The requirements apply to all BS with separate receiver and transmitter antenna port. The requirements should be applied under the condition of both transmitter and receiver are on with the transmitter port terminated.

For all BS with common receiver and transmitter antenna ports the transmitter spurious emission as specified above is valid.

The power of any spurious emission should not exceed the limit specified in Tables 17a) and 17b).

For E-UTRA, in addition to the requirements in Table 17, the power of any spurious emission should not exceed the levels specified for protection of the E-UTRA FDD BS receiver of own or different BS in § 4.9 and for co-existence with other systems in the same geographical area in § 4.2.2. In addition, the co-existence requirements for co-located base stations specified in § 4.3.2 may also be applied.

TABLE 17

a) Receiver spurious emission limits

Band	Maximum level	Measurement bandwidth	Note
30 MHz-1 GHz	–57 dBm	100 kHz	
1-12.75 GHz	–47 dBm	1 MHz	

NOTE 1 – For UTRA, frequencies between 12.5 MHz below the first carrier frequency and 12.5 MHz above the last carrier frequency used by the BS transmitter are excluded.

NOTE 2 – For E-UTRA, the frequency range between 2.5 * $BW_{channel}$ below the first carrier frequency and 2.5 * $BW_{channel}$ above the last carrier frequency transmitted by the BS, where $BW_{channel}$ is the channel bandwidth, may be excluded from the requirement. However, frequencies that are more than 10 MHz below the lowest frequency of the BS transmitter operating band or more than 10 MHz above the highest frequency of the BS transmitter operating band shall not be excluded from the requirement.

b) Additional spurious emission requirements for UTRA

Operating band	Band	Maximum level	Measurement bandwidth	Note
I	1 920-1 980 MHz	−78 dBm	3.84 MHz	
II	1 850-1 910 MHz	−78 dBm	3.84 MHz	
III	1 710-1 785 MHz	−78 dBm	3.84 MHz	
IV	1 710-1 755 MHz	−78 dBm	3.84 MHz	
V	824-849 MHz	−78 dBm	3.84 MHz	
VI	815-850 MHz	−78 dBm	3.84 MHz	
VII	2 500-2 570 MHz	−78 dBm	3.84 MHz	
VIII	880-915 MHz	−78 dBm	3.84 MHz	
IX	1 749.9-1 784.9 MHz	−78 dBm	3.84 MHz	
X	1 710-1 770 MHz	−78 dBm	3.84 MHz	
XI	1 427.9-1 447.9 MHz	−78 dBm	3.84 MHz	
XII	698-716 MHz	–78 dBm	3.84 MHz	
XIII	777-787 MHz	–78 dBm	3.84 MHz	
XIV	788-798 MHz	–78 dBm	3.84 MHz	
XX	832-862 MHz	–78 dBm	3.84 MHz	
XXI	1 447.9-1 462.9 MHz	–78 dBm	3.84 MHz	

In addition, the requirements in Table 17c) may be applied to geographic areas in which both IMT-2000 CDMA TDD and IMT-2000 CDMA DS are deployed.

TABLE 17 (*end*)

c) Additional spurious emission requirements for the TDD bands for UTRA

Operating band	Band	Maximum level	Measurement bandwidth	Note
I	1 900-1 920 MHz 2 010-2 025 MHz	–78 dBm	3.84 MHz	Not applicable in Japan
	2 010-2 025 MHz	–52 dBm	1MHz	Applicable in Japan
	1 880-1 920 MHz	–84 dBm	1 MHz	Applicable in China
	2 300-2 400 MHz	–84 dBm	1 MHz	
VI, IX, XI, XIX, XXI	2 010-2 025 MHz	–52 dBm	1 MHz	VI, IX, XI, XIX, XXI
VII	2 570-2 620 MHz	–84 dBm	1 MHz	VII
	2 300-2 400 MHz	–84 dBm	1 MHz	

Annex 2

IMT-2000 CDMA multi-carrier (cdma-2000) Base Stations

1 CDMA2000 and CDMA2000 high rate packet data (HRPD)

1.1 Spectrum mask

The emissions when transmitting on a single or all RF carriers supported by the BS and configured in accordance with the manufacturer's specification shall be less than the limits specified below. The spectrum emission mask values in Table 18A apply to Band Classes 0, 2, 5, 7, 9 and 10 and shall be met when transmitting on a single or all RF carriers supported by the BS as indicated by the entries in the column Active carriers.

TABLE 18A

Band Classes 0, 2, 5, 7, 9 and 10 spectrum emission mask values

For $\|\Delta f\|$ within the range	Active carriers	Emission limit
750 kHz to 1.98 MHz	Single	–45 dBc/30 kHz
1.98 to 4.00 MHz	Single	–60 dBc/30 kHz, HRPD –60 dBc/30 kHz; Pout ≥ 33 dBm, cdma2000 –27 dBm/30 kHz; 28 dBm ≤ Pout < 33 dBm, cdma2000 –55 dBc/30 kHz; Pout < 28 dBm, cdma2000
3.25 to 4.00 MHz (Band Class 7 only)	All	–46 dBm/6.25 kHz

NOTE 1 – All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$ where Δf = centre frequency – closer edge frequency (f) of the measurement filter. For multiple-carrier testing, Δf is defined for positive Δf as the centre frequency of the highest carrier – closer measurement edge frequency (f) and for negative Δf as the centre frequency of the lowest carrier – closer measurement edge frequency (f).

The spectrum emission mask values in Table 18B apply to Band Classes 1, 4, 6, 8, 13, 14 and 15 and shall be met when transmitting on a single or all RF carriers supported by the BS as indicated by the entries in the column Active carriers.

TABLE 18B

Band Classes 1, 4, 6, 8, 13, 14 and 15 spectrum emission mask values

For $\|\Delta f\|$ within the range	Active carriers	Emission limit
885 kHz to 1.25 MHz	Single	–45 dBc/30 kHz
1.25 to 1.98 MHz	Single	More stringent of –45 dBc/30 kHz or –9 dBm/30 kHz
1.25 to 2.25 MHz (MC tests only)	All	–9 dBm/30 kHz
1.25 to 1.45 MHz (Band Classes 6, 8 and 13)	All	–13 dBm/30 kHz
1.45 to 2.25 MHz (Band Classes 6, 8 and 13)	All	$\{13 + 17 \times (\Delta f - 1.45 \text{ MHz})\}$ dBm/30 kHz
1.98 MHz to 2.25 MHz	Single	–55 dBc/30 kHz, HPRD –55 dBc/30 kHz; Pout ≥ 33 dBm, cdma2000 –22 dBm/30 kHz; 28 dBm ≤ Pout < 33 dBm, cdma2000– 50 dBc/30 kHz; Pout < 28 dBm, cdma2000
2.25 MHz to 4.00 MHz	All	–13 dBm/1 MHz

NOTE 1 – All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$. The emissions requirements shall apply for all values of Δf regardless of whether the measurement frequency falls inside or outside of the band or block edge. For single-carrier testing, Δf = centre frequency – closer measurement edge frequency (f). For multiple-carrier testing, Δf is defined for positive Δf as the closer measurement edge frequency (f) – centre frequency of the highest carrier and for negative Δf as the closer measurement edge frequency (f) – centre frequency of the lowest carrier.

The spectrum emission mask values in Table 18C apply to Band Classes 11 and 12 and shall be met when transmitting on a single or all RF carriers supported by the BS as indicated by the entries in the column Active carriers.

TABLE 18C

Band Classes 11 and 12 spectrum emission mask values

For $\|\Delta f\|$ within the range	Active carriers	Emission limit
750 to 885 kHz	Single	$-45-15(\|\Delta f\|-750)/135$ dBc in 30 kHz
885 to 1125 kHz	Single	$-60-5(\|\Delta f\|-885)/240$ dBc in 30 kHz
1.125 to 1.98 MHz	Single	–65 dBc/30 kHz
1.98 to 4.00 MHz	Single	–75 dBc/30 kHz

NOTE 1 – All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$ where Δf = centre frequency – closer measurement edge frequency (f). Δf is positive offset from the highest valid CDMA channel in the band subclass or negative offset from the lowest valid CDMA channel in the band subclass. The emission limits for Band Classes 11 and 12 (European PAMR bands) are designed to allow co-existence with incumbent services in Europe and are tighter than ITU Category B requirements.

The spectrum emission mask values in Table 18D apply to Band Class 3 and shall be met when transmitting on a single or all RF carriers supported by the BS as indicated by the entries in the column Active carriers.

TABLE 18D

Band Class 3 spectrum emission mask values

Measurement frequency	Active carriers	For $\|\Delta f\|$ within the range	Emission limit
> 832 MHz and ≤ 834 MHz, > 838 MHz and ≤ 846 MHz, > 860 MHz and ≤ 895 MHz	Single	≥ 750 kHz and < 1.98 MHz	–45 dBc/30 kHz
	Single	≥ 1.98 MHz	25 µW (–16 dBm)/100 kHz; Pout ≤ 30 dBm –60 dBc/100 kHz; 30 dBm < Pout ≤ 47 dBm Less stringent of 50 µW (–13 dBm)/100 kHz or –70 dBc/100 kHz; Pout > 47 dBm
> 810 MHz and ≤ 860 MHz, except > 832 MHz and ≤ 834 MHz, > 838 MHz and ≤ 846 MHz	Single	< 1.98 MHz	25 µW (–16 dBm)/30 kHz; Pout ≤ 30 dBm More stringent of –60 dBc / 30 kHz and 25 µW (–16 dBm)/30 kHz; Pout > 30 dBm
	Single	≥ 1.98 MHz	25 µW (–16 dBm)/100 kHz; Pout ≤ 30 dBm More stringent of –60 dBc/100 kHz and 25 µW (–16 dBm)/100 kHz; Pout > 30 dBm
≤ 810 MHz and > 895 MHz	All	N/A	25 µW (–16 dBm)/1 MHz; Pout ≤ 44 dBm –60 dBc/1 MHz; 44 dBm < Pout ≤ 47 dBm Less stringent of 50 µW (–13 dBm)/1 MHz or –70 dBc/1 MHz; Pout > 47 dBm

NOTE 1 – All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$. The emissions requirements shall apply for all values of Δf regardless of whether the measurement frequency falls inside or outside of the band or block edge. For single-carrier testing, Δf = centre frequency – closer measurement edge frequency (f). For multiple-carrier testing, Δf is defined for positive Δf as the closer measurement edge frequency (f) – centre frequency of the highest carrier and for negative Δf as the closer measurement edge frequency (f) – centre frequency of the lowest carrier. The upper and lower limits of the frequency measurement are currently 10 MHz and 3 GHz in Japan radio measurement documents.

1.2 Transmitter spurious emission

In areas where Category A limits for spurious emissions, as defined in Recommendation ITU-R SM.329, are applied, the spurious emissions when transmitting on all RF carriers supported by the BS and configured in accordance with the manufacturer's specification shall be less than the limits specified in Tables 19A and 19B.

TABLE 19A

BS spurious emission limits, Category A

For $\|\Delta f\|$ within the range	Emission limit	
> 4.00 MHz	9 kHz < f < 150 kHz 150 kHz < f < 30 MHz 30 MHz < f < 1 GHz 1 GHz < f < 12.75 GHz	–13 dBm/1 kHz –13 dBm/10 kHz –13 dBm/100 kHz –13 dBm/1 MHz

NOTE 1 – All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$ where Δf = centre frequency – closer edge frequency (f) of the measurement filter. For multiple-carrier testing, Δf is defined for positive Δf as the centre frequency of the highest carrier – closer measurement edge frequency (f) and for negative Δf as the centre frequency of the lowest carrier – closer measurement edge frequency (f).

TABLE 19B

Additional transmitter spurious emission limits in addition to Category A limits in areas where PHS is deployed

Measurement frequency	Measurement bandwidth	Emission limit	For protection of
1 884.5 to 1 919.6 MHz	300 kHz	–41 dBm	PHS

In areas where Category B limits for spurious emissions, as defined in Recommendation ITU-R SM.329, are applied, the spurious emissions when transmitting on a single or all RF carriers supported by the BS and configured in accordance with the manufacturer's specification shall be less than the limits specified in Tables 20A and 20B. The emission limits in Table 20A shall be met when transmitting on all RF carriers supported by the BS. The emission limits in Table 20B shall be met when transmitting on a single or all RF carriers supported by the BS as indicated by the entries in the column Active carriers.

TABLE 20A

Spurious emission limits, Category B

For $\|\Delta f\|$ within the range	Emission limit	
> 4.00 MHz	9 kHz < f < 150 kHz 150 kHz < f < 30 MHz 30 MHz < f < 1 GHz 1 GHz < f < 12.75 GHz	–36 dBm/1 kHz –36 dBm/10 kHz –36 dBm/100 kHz –30 dBm/1 MHz

NOTE 1 – All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$ where Δf = centre frequency – closer edge frequency (f) of the measurement filter. For multiple-carrier testing, Δf is defined for positive Δf as the centre frequency of the highest carrier – closer measurement edge frequency (f) and for negative Δf as the centre frequency of the lowest carrier – closer measurement edge frequency (f).

TABLE 20B

Additional transmitter spurious emission limits in addition to Category B limits

Measurement frequency	Active carriers	Emission limit	For protection of
921 to 960 MHz	All	–57 dBm/100 kHz	GSM 900 MS receive band
1 805 to 1 880 MHz	All	–47 dBm/100 kHz	DCS 1800 MS receive band
1 900 to 1 920 MHz 2 010 to 2 025 MHz	All	–52 dBm/1 MHz	IMT-2000 CDMA TDD
1 920 to 1 980 MHz	Single	–86 dBm/1 MHz	FDD BS receive band

When transmitting in Band Classes 0, 7, 9 and 10, the spurious emissions shall be less than the limits specified in Tables 21A and 21B when transmitting on a single or all RF carriers supported by the BS as indicated by the entries in the column Active carriers.

TABLE 21A

Additional Band Classes 0, 7, 9 and 10 spurious emission limits for ITU Category B only

For $\|\Delta f\|$ within the range	Active carriers	Emission limit	
> 4.00 MHz {Band Classes 0, 7, 9, and 10} (ITU Category B only)	All	–36 dBm/1 kHz; –36 dBm/10 kHz; –36 dBm/100 kHz; –30 dBm/1 MHz;	9 kHz < f < 150 kHz 150 kHz < f < 30 MHz 30 MHz < f < 1 GHz 1 GHz < f < 12.5 GHz

TABLE 21B

Additional Band Classes 0, 7, 9 and 10 spurious emission limits for ITU Category B only

Frequency range	Active carriers	Emission limit
30 MHz < f < f_{low} – 4.0 MHz	All	–36 dBm/100 kHz
f_{low} – 4.0 MHz ≤ f ≤ f_c – 4.0 MHz	All	–16 dBm/100 kHz
f_c + 4.0 MHz ≤ f ≤ f_{high} + 4.0 MHz	All	–16 dBm/100 kHz
f_{high} + 4.0 MHz < f < 1.0 GHz	All	–36 dBm/100 kHz

fl_{ow}: Centre frequency of the lowest valid carrier in the band.

f_{high}: Centre frequency of the highest valid carrier in the band.

When transmitting in Band Classes 2 and 5, the spurious emissions shall be less than the limits specified in Table 22 when transmitting on a single or all RF carriers supported by the BS as indicated by the entries in the column Active carriers.

TABLE 22

Additional Band Classes 2 and 5 spurious emission limits for ITU Category B only

For $\|\Delta f\|$ within the range	Active carriers	Emission limit	
> 4.00 MHz {Band Classes 2 and 5} (ITU Category B only)	All	–36 dBm/1 kHz; –36 dBm/10 kHz; –30 dBm/1 MHz;	9 kHz < f < 150 kHz 150 kHz < f < 30 MHz 1 GHz < f < 12.5 GHz
4.00 to 6.40 MHz (Band Classes 2 and 5) (ITU Category B only)	All	–36 dBm/1 kHz	30 MHz < f < 1 GHz
6.40 to 16 MHz (Band Classes 2 and 5) (ITU Category B only)	All	–36 dBm/10 kHz	30 MHz < f < 1 GHz
> 16 MHz (Band Classes 2 and 5) (ITU Category B only)	All	–36 dBm/100 kHz	30 MHz < f < 1 GHz

When transmitting in Band Classes 11 and 12, the spurious emissions shall be less than the limits specified in Tables 23A and 23B.

TABLE 23A

Additional Band Classes 11 and 12 spurious emission limits for ITU Category B only

For $\|\Delta f\|$ within the range	Active carriers	Emission limit	
> 6.00 MHz	All	–36 dBm/1 kHz; –36 dBm/10 kHz; –45 dBm/100 kHz; –30 dBm/1 MHz;	9 kHz < f < 150 kHz 150 kHz < f < 30 MHz 30 MHz < f < 1 GHz 1 GHz < f < 12.75 GHz

TABLE 23B

Additional Band Classes 11 and 12 spurious emission limits

For $\|\Delta f\|$ within the range	Active carriers	Emission limit
4.00 to 6.00 MHz	All	–36 dBm/100 kHz
> 6.00 MHz	All	–45 dBm/100 kHz

The emission limits for Band Classes 11 and 12 (European PAMR bands) are designed to allow co-existence with incumbent services in Europe and are tighter than ITU Category B requirements.

When transmitting in Band Classes 1, 4, 6, 8, 13, 14 and 15, the spurious emissions shall be less than the limits specified in Table 24A. When transmitting in Band Class 6, the spurious emissions shall be less than the limits specified in Table 24B.

TABLE 24A

Additional Band Classes 1, 4, 6, 8, 13, 14 and 15 spurious emission limits for ITU Category B only

Frequency range	Active carriers	Emission limit
$f_{low} - 4.0$ MHz < f < $f_c - 4.0$ MHz	All	–30 dBm/30 kHz
$f_c + 4.0$ MHz < f < $f_{high} + 4.0$ MHz	All	–30 dBm/30 kHz
1 GHz < f < $f_{low} - 4.0$ MHz	All	–30 dBm/1 MHz
$f_{high} + 4.0$ MHz < f < 12.5 GHz	All	–30 dBm/1 MHz

f_{low} : Centre frequency of the lowest valid carrier in the band.

f_{high}: Centre frequency of the highest valid carrier in the band.

TABLE 24B

Additional Band Class 6 spurious emission limits

Measurement frequency	Active carriers	Emission limit	When coverage overlaps with
1 884.5 to 1 919.6 MHz	Single	–41 dBm/300 kHz	PHS
824 to 849 MHz	No	–98 dBm/100 kHz (co-located only) –61 dBm/100 kHz (non-co-located)	GSM 850 CDMA 850
869 to 894 MHz	Yes	–57 dBm/100 kHz	GSM 850 CDMA 850
876 to 915 MHz	Single	–98 dBm/100 kHz (co-located only) –61 dBm/100 kHz (non-co-located)	GSM 900
921 to 960 MHz	All	–57 dBm/100 kHz	GSM 900
1 710 to 1 785 MHz	Single	–98 dBm/100 kHz (co-located only) –61 dBm/100 kHz (non-co-located)	DCS 1800
1 805 to 1 880 MHz	All	–47 dBm/100 kHz	DCS 1800
1 900 to 1 920 MHz and 2 010 to 2 025 MHz	Single	–86 dBm/1 MHz (co-located only)	UTRA-TDD
1 900 to 1 920 MHz and 2 010 to 2 025 MHz	All	–52 dBm/1 MHz	UTRA-TDD
1 920 to 1 980 MHz	Single	–86 dBm/1 MHz	Always

When transmitting in Band Class 10 in North America the spurious emissions shall be less than the limits specified in Table 25.

TABLE 25

Additional Band Class 10 spurious emission limits for the North American operation

Measurement frequency	Emission limit
854.75 to 861 MHz	–40 dBm/30 kHz
866 to 869 MHz	–40 dBm/30 kHz

NOTE 1 – The Band Class 10 spurious emissions limit is designed to allow marginal co-existence with North American PMRS 800 MHz Public Safety services and is far tighter than the CFR 47 Part 90.691(a)(2) requirement.

When transmitting in Band Class 7, the spurious emissions shall also be less than the limits specified in Table 26.

TABLE 26

Additional Band Class 7 spurious emission limits

Transmission frequency (MHz)	Measurement frequency (MHz)	Emission limit	Victim band
746-758	763-775 and 793-805	–46 dBm/6.25 kHz	Public safety
758-768	769-775 and 799-805	–46 dBm/6.25 kHz	Public safety

1.3 Adjacent channel leakage power ratio

For a cdma2000 ACLR calculation, both the transmitted power and received power are measured with a rectangular filter. For a cdma2000 system, the first adjacent channel offset is 2.5 MHz and the second adjacent channel offset is 3.75 MHz for band classes in 1 900 MHz. For cellular band in 800 or 450 MHz, the first adjacent channel offset is 1.5 MHz (1.515 MHz for Band Class 3 because of the emission mask) and the second adjacent channel offset is 2.73 MHz (2.745 MHz for Band Class 3). The receiver bandwidth is 1.23 MHz.

The ACLR calculated from the masks are as given in Table 27 (assuming 43 dBm as transmit power).

TABLE 27

Base station ACLR limits

Band Class	ACLR1 (dB)	ACLR2 (dB)
0	29.36	43.87
1	42.96	55.56
2	29.36	43.87
3	29.43	49.10
4	42.96	55.56
5	29.36	43.87
6	52.89	55.56
7	29.36	44.22
8	52.89	55.56
9	29.36	43.87
10	29.36	43.87
11	48.57	58.87
12	48.57	58.87
13	52.89	55.56
14	42.96	55.56
15	42.96	55.56

For a cdma2000 system, the first adjacent channel offset is 2.5 MHz (ACLR1) and the second adjacent channel offset is 3.75 MHz for band classes in 1 900 MHz (ACLR2). For a cellular band in 800 or 450 MHz, the first adjacent channel offset is 1.5 MHz (1.515 MHz for Band Class 3 because of the emission mask) (ACLR1) and the second adjacent channel offset is 2.73 MHz (2.745 MHz for Band Class 3) (ACLR2).

1.4 Receiver spurious emission

This requirement only applies if the BS is equipped with a separate RF input port. The conducted spurious emissions at the BS RF input ports shall be not greater than the limits in Tables 28 and 29.

TABLE 28

General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level	Note
30 MHz ≤ f < 1 GHz	100 kHz	–57 dBm	
1 GHz ≤ f ≤ 12.75 GHz	1 MHz	–47 dBm	With the exception of the frequencies covered by Table 29, for which additional receiver spurious emission requirements apply

For all frequencies within the mobile station receive and transmit bands, the conducted emissions shall be below the limits in Table 29.

TABLE 29

Additional receiver spurious emission requirements

Measurement bandwidth (kHz)	Maximum level (dBm)	Note
30	–80	Base receive band
30	–60	Base transmit band

2 Ultra Mobile Broadband (UMB)

2.1 Spectrum mask

TABLE 30

Transmitter spurious emission limits for carrier frequencies less than 1 GHz

Frequency offset, Δf, MHz	Emission limit			Comments	
	–	Unit	RBW, kHz	Restrictions	Applicable range
0 to 5	$-7 - 7/5 \times \Delta f$	dBm	100	all CBW ≥ 5 MHz	f_c < 1 GHz
5 to 10	–14	dBm	100	all CBW ≥ 5 MHz	f_c < 1 GHz
10 to 20	–16	dBm	100	all CBW ≥ 5 MHz	f_c < 1 GHz

TABLE 31

Band Class 0 additional transmitter spurious emission limits

Frequency offset, Δf, MHz	Emission limit			Comments	
	–	Unit	RBW, kHz	Restrictions	Applicable range
0 to 1	–10	dBm	100	CBW = 5 MHz	f_c < 1 GHz
0 to 1	–13	dBm	100	CBW = 10 MHz	f_c < 1 GHz
0 to 1	–16	dBm	100	CBW = 20 MHz	f_c < 1 GHz
1 to 5	–13	dBm	100	all CBW ≥ 5 MHz	f_c < 1 GHz
5 to 10	–14	dBm	100	all CBW ≥ 5 MHz	f_c < 1 GHz
10-Δf_{max}	–16	dBm	100	all CBW ≥ 5 MHz	f_c < 1 GHz

TABLE 32

Transmitter spurious emission limits for carrier frequencies higher than 1 GHz

Frequency offset, Δf, MHz	Emission limit			Comments	
	–	Unit	RBW, kHz	Restrictions	Applicable range
0 to 5	$-7 - 7/5 \times \Delta f$	dBm	100	all CBW ≥ 5 MHz	f_c > 1 GHz
5 to 10	–14	dBm	100	all CBW ≥ 5 MHz	f_c > 1 GHz
10 to Δf_{max}	–15	dBm	1 000	all CBW ≥ 5 MHz	f_c > 1 GHz

TABLE 33

Additional Band Classes 1 and 15 transmitter spurious emission limits

Frequency offset, Δf, MHz	Emission limit			Comments	
	–	Unit	RBW, kHz	Restrictions	Applicable range
0 to 1	–10	dBm	100	CBW=5 MHz	f_c > 1 GHz
0 to 1	–13	dBm	100	CBW=10 MHz	f_c > 1 GHz
0 to 1	–16	dBm	100	CBW=20 MHz	f_c > 1 GHz
1 to 10	–13	dBm	1 000	all CBW ≥ 5 MHz	f_c > 1 GHz
10 to Δf_{max}	–15	dBm	1 000	all CBW ≥ 5 MHz	f_c > 1 GHz

2.2 Transmitter spurious emission

TABLE 34

Out-of-band spurious emission limits for Category A

Band	Maximum level	Measurement bandwidth	Note
9 kHz-150 kHz	–13 dBm	1 kHz	Note 1
150 kHz-30 MHz		10 kHz	Note 1
30 MHz-1 GHz		100 kHz	Note 1
1 GHz-12.75 GHz		1 MHz	Note 2

NOTE 1 – Bandwidth as in Recommendation ITU-R SM.329 [2], § 4.1.

NOTE 2 – Bandwidth as in Recommendation ITU-R SM.329 [2], § 4.1. Upper frequency as in Recommendation ITU-R SM.329 [2], § 2.5 Table 1.

TABLE 35

Out of band spurious emission limits for Category B

Band	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

NOTE 1 – Bandwidth as in Recommendation ITU-R SM.329 [2], § 4.1.

NOTE 2 – Bandwidth as in Recommendation ITU-R SM.329 [2], § 4.1. Upper frequency as in Recommendation ITU-R SM.329 [4], § 2.5 Table 1.

TABLE 36

Wide area access network spurious emission limits for protection of access network receiver

Operating bands	Access network class	Maximum level	Measurement bandwidth
All	Wide Area	–96 dBm	100 kHz

TABLE 37

Access network spurious emissions limits for UMB FDD access networks in geographic coverage area of systems operating in other frequency bands

System type operating in the same geographical area	Band for co-existence requirement	Maximum level	Measurement bandwidth	Note
GSM900	921-960 MHz	–57 dBm	100 kHz	This requirement does not apply to UMB AN operating in BC9
	876-915 MHz	–61 dBm	100 kHz	For the frequency range 880-915 MHz, this requirement does not apply to UMB AN operating in BC9, since it is already covered by the requirement in Table 36
DCS1800	1 805-1 880 MHz	–47 dBm	100 kHz	This requirement does not apply to UMB AN operating in BC8
	1 710-1 785 MHz	–61 dBm	100 kHz	This requirement does not apply to UMB AN operating in BC8, since it is already covered by the requirement in Table 36

TABLE 37 (*end*)

System type operating in the same geographical area	Band for co-existence requirement	Maximum level	Measurement bandwidth	Note
PCS1900	1 930-1 990 MHz	–47 dBm	100 kHz	This requirement does not apply to UMB AN operating in frequency BC1
	1 850-1 910 MHz	–61 dBm	100 kHz	This requirement does not apply to UMB AN operating in frequency BC1, since it is already covered by the requirement in Table 36
GSM850	869-894 MHz	–57 dBm	100 kHz	This requirement does not apply to UMB AN operating in frequency BC0
	824-849 MHz	–61 dBm	100 kHz	This requirement does not apply to UMB AN operating in frequency BC0, since it is already covered by the requirement in Table 36
UMB FDD BC6	2 110-2 170 MHz	–52 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC6
	1 920-1 980 MHz	–49 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC6, since it is already covered by the requirement in Table 36
UMB FDD BC1	1 930-1 990 MHz	–52 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC1
	1 850-1 910 MHz	–49 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC1, since it is already covered by the requirement in Table 36
MB FDD BC8	1 805-1 880 MHz	–52 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC8
	1 710-1 785 MHz	–49 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC8, since it is already covered by the requirement in Table 36
UMB FDD BC15	2 110-2 155 MHz	–52 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC15
	1 710-1 755 MHz	–49 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC15, since it is already covered by the requirement in Table 36
UMB FDD BC0	869-894 MHz	–52 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC0
	824-849 MHz	–49 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC0, since it is already covered by the requirement in Table 36
UMB FDD BC13	2 620-2 690 MHz	–52 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC13
	2 500-2 570 MHz	–49 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC13, since it is already covered by the requirement in Table 36
UMB FDD BC9	925-960 MHz	–52 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC9
	880-915 MHz	–49 dBm	1 MHz	This requirement does not apply to UMB AN operating in BC9, since it is already covered by the requirement in Table 36

TABLE 38

Access network spurious emissions limits for wide area FDD AN co-located with another access network

Type of co-located AN	Band for co-location requirement	Maximum level	Measurement bandwidth
Macro GSM900	876-915 MHz	–98 dBm	100 kHz
Macro DCS1800	1 710-1 785 MHz	–98 dBm	100 kHz
Macro PCS1900	1 850-1 910 MHz	–98 dBm	100 kHz
Macro GSM850	824-849 MHz	–98 dBm	100 kHz
WA UMB FDD BC6	1 920-1 980 MHz	–96 dBm	100 kHz
WA UMB FDD BC1	1 850-1 910 MHz	–96 dBm	100 kHz
WA UMB FDD BC8	1 710-1 785 MHz	–96 dBm	100 kHz
WA UMB FDD BC15	1 710-1 755 MHz	–96 dBm	100 kHz
WA UMB FDD BC0	824-849 MHz	–96 dBm	100 kHz
WA UMB FDD BC13	2 500-2 570 MHz	–96 dBm	100 kHz
WA UMB FDD BC9	880-915 MHz	–96 dBm	100 kHz

TABLE 39

FDD AN Spurious emissions limits for access network in geographic coverage area of PHS

Band	Maximum level	Measurement bandwidth
1 884.5-1 919.6 MHz	–41 dBm	300 kHz

Current region-specific radio regulation rules shall also apply.

2.3 Adjacent channel leakage power ratio

TABLE 40

ACLR limits

UMB	ACLR limit for 1st and 2nd adjacent channel relative to assigned channel frequency [dB]				
Channel BW (MHz)		UMB[1]	UMB[1]	UMB[1]	UMB[1]
		< 5.0 MHz	5.0 MHz	10 MHz	20 MHz
< 5	ACLR 1	45	–	–	–
	ACLR 2	45	–	–	–
5	ACLR 1	45	45	–	–
	ACLR 2	45	45	–	–
10	ACLR 1	45	–	45	–
	ACLR 2	45	–	45	–
20	ACLR 1	45	–	–	45
	ACLR 2	45	–	–	45

NOTE 1 – Measured with a rectangular filter with a bandwidth equal to the channel bandwidth on the first or second adjacent channel.

Annex 3

IMT-2000 CDMA TDD (UTRA TDD) base stations

1 Measurement uncertainty

Values specified in this Annex differ from those specified in Recommendation ITU-R M.1457 since values in this Annex incorporate test tolerances defined in Recommendation ITU-R M.1545.

2 Spectrum mask

2.1 UTRA 3.84 Mchip/s TDD option

The spectrum emission mask specifies the limit of the transmitter OoB emissions at frequency offsets from the assigned channel frequency of the wanted signal between 2.5 MHz and 12.5 MHz.

The requirement should be met by a BS transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions should not exceed the maximum level specified in Tables 41A to 41C in the frequency range of f_offset from 2.515 MHz to Δf_{max} from the carrier frequency, where:

– f_offset is the separation between the carrier frequency and the centre of the measurement filter:

– f_offset_{max} is either 12.5 MHz or the offset to the universal mobile telecommunications system (UMTS) transmit band edge, whichever is the greater.

– Δf_{max} is equal to f_offset_{max} minus half of the bandwidth of the measuring filter.

The spectrum emissions measured should not exceed the maximum level specified in Tables 41A to 41A for the appropriate BS rated output power.

TABLE 41A

Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter −3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Maximum level**	**Measurement bandwidth**
2.5 MHz ≤ Δf < 2.7 MHz	2.515 MHz ≤ f_offset < 2.715 MHz	−12.5 dBm	30 kHz
2.7 MHz ≤ Δf < 3.5 MHz	2.715 MHz ≤ f_offset < 3.515 MHz	$-12.5\ \text{dBm} - 15\left(\frac{\text{f\_offset}}{\text{MHz}} - 2.715\right)\ \text{dB}$	30 kHz
(See Note 1)	3.515 MHz ≤ f_offset < 4.0 MHz	−24.5 dBm	30 kHz
3.5 MHz ≤ Δf ≤ Δf_{max}	4.0 MHz ≤ f_offset < f_offset_{max}	−11.5 dBm	1 MHz

TABLE 41B

Spectrum emission mask values, BS maximum output power 39 ≤ *P* < 43 dBm

Frequency offset of measurement filter −3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Maximum level**	**Measurement bandwidth**
2.5 MHz ≤ Δf < 2.7 MHz	2.515 MHz ≤ f_offset < 2.715 MHz	−12.5 dBm	30 kHz
2.7 MHz ≤ Δf < 3.5 MHz	2.715 MHz ≤ f_offset < 3.515 MHz	$-12.5\ \text{dBm} - 15\left(\frac{\text{f\_offset}}{\text{MHz}} - 2.715\right)\ \text{dB}$	30 kHz
(See Note 1)	3.515 MHz ≤ f_offset < 4.0 MHz	−24.5 dBm	30 kHz
3.5 MHz ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0 MHz	−11.5 dBm	1 MHz
7.5 MHz ≤ Δf ≤ Δf_{max}	8.0 MHz ≤ f_offset < f_offset_{max}	P – 54.5 dB	1 MHz

TABLE 41C

Spectrum emission mask values, BS maximum output power 31 ≤ *P* < 39 dBm

Frequency offset of measurement filter −3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 MHz ≤ Δf < 2.7 MHz	2.515 MHz ≤ f_offset < 2.715 MHz	P – 51.5 dB	30 kHz
2.7 MHz ≤ Δf < 3.5 MHz	2.715 MHz ≤ f_offset < 3.515 MHz	$P - 51.5\ \text{dBm} - 15\left(\frac{\text{f\_offset}}{\text{MHz}} - 2.715\right)\ \text{dB}$	30 kHz
(See Note 1)	3.515 MHz ≤ f_offset < 4.0 MHz	P – 63.5 dB	30 kHz
3.5 MHz ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0 MHz	P – 50.5 dB	1 MHz
7.5 MHz ≤ Δf ≤ Δf_{max}	8.0 MHz ≤ f_offset < f_offset$_{max}$	P – 54.5 dB	1 MHz

TABLE 41D

Spectrum emission mask values, BS maximum output power *P* < 31 dBm

Frequency offset of measurement filter −3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
2.5 MHz ≤ Δf < 2.7 MHz	2.515 MHz ≤ f_offset < 2.715 MHz	−20.5 dBm	30 kHz
2.7 MHz ≤ Δf < 3.5 MHz	2.715 MHz ≤ f_offset < 3.515 MHz	$-20.5\ \text{dBm} - 15\left(\frac{\text{f\_offset}}{\text{MHz}} - 2.715\right)\ \text{dB}$	30 kHz
(See Note 1)	3.515 MHz ≤ f_offset < 4.0 MHz	−32.5 dBm	30 kHz
3.5 MHz ≤ Δf < 7.5 MHz	4.0 MHz ≤ f_offset < 8.0 MHz	−19.5 dBm	1 MHz
7.5 MHz ≤ Δf ≤ Δf_{max}	8.0 MHz ≤ f_offset < f_offset$_{max}$	−23.5 dBm	1 MHz

NOTE 1 – This frequency range ensures that the range of values of f_offset is continuous.

2.2 UTRA 1.28 Mchip/s TDD option

The spectrum emission mask specifies the limit of the transmitter OoB emissions at frequency offsets from the assigned channel frequency of the wanted signal between 0.8 MHz and 4.0 MHz.

The requirement should be met by a BS transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions should not exceed the maximum level

specified in Tables 42A to 42C in the frequency range of f_offset from 0.815 MHz to Δf_{max} from the carrier frequency, where:

– f_offset is the separation between the carrier frequency and the centre of the measurement filter:

– f_offset_{max} is either 4.0 MHz or the offset to the universal mobile telecommunication system (UMTS) transmit band edge, whichever is the greater.

– Δf_{max} is equal to f_offset_{max} minus half of the bandwidth of the measuring filter.

The spectrum emissions measured should not exceed the maximum level specified in Tables 42A to 42C for the appropriate BS rated output power.

TABLE 42A

Spectrum emission mask values, BS maximum output power $P \geq 34$ dBm

Frequency offset of measurement filter −3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Maximum level**	**Measurement bandwidth**
0.8 MHz ≤ Δf < 1.0 MHz	0.815 MHz ≤ f_offset < 1.015 MHz	−18.5 dBm	30 kHz
1.0 MHz ≤ Δf < 1.8 MHz	1.015 MHz ≤ f_offset < 1.815 MHz	$-18.5\ \text{dBm} - 10\left(\frac{\text{f\_offset}}{\text{MHz}} - 1.015\right)\ \text{dB}$	30 kHz
(See Note 1)	1.815 MHz ≤ f_offset < 2.3 MHz	−26.5 dBm	30 kHz
1.8 MHz ≤ Δf ≤ Δf_{max}	2.3 MHz ≤ f_offset < f_offset_{max}	−11.5 dBm	1 MHz

TABLE 42B

Spectrum emission mask values, BS maximum output power $26 \leq P < 34$ dBm

Frequency offset of measurement filter −3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Maximum level**	**Measurement bandwidth**
0.8 MHz ≤ Δf < 1.0 MHz	0.815 MHz ≤ f_offset < 1.015 MHz	P − 52.5 dB	30 kHz
1.0 MHz ≤ Δf < 1.8 MHz	1.015 MHz ≤ f_offset < 1.815 MHz	$P - 52.5\ \text{dBm} - 10\left(\frac{\text{f\_offset}}{\text{MHz}} - 1.015\right)\ \text{dB}$	30 kHz
(See Note 1)	1.815 MHz ≤ f_offset < 2.3 MHz	P − 60.5 dB	30 kHz
1.8 MHz ≤ Δf ≤ Δf_{max}	2.3 MHz ≤ f_offset < f_offset_{max}	P – 45.5 dB	1 MHz

TABLE 42C

Spectrum emission mask values, BS maximum output power $P < 26$ dBm

Frequency offset of measurement filter −3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Maximum level**	**Measurement bandwidth**
0.8 MHz ≤ Δf < 1.0 MHz	0.815 MHz ≤ f_offset < 1.015 MHz	−26.5 dBm	30 kHz
1.0 MHz ≤ Δf < 1.8 MHz	1.015 MHz ≤ f_offset < 1.815 MHz	$-26.5\ \text{dBm} - 10\left(\frac{\text{f\_offset}}{\text{MHz}} - 1.015\right)\ \text{dB}$	30 kHz
(See Note 1)	1.815 MHz ≤ f_offset < 2.3 MHz	−34.5 dBm	30 kHz
1.8 MHz ≤ Δf ≤ Δf_{max}	2.3 MHz ≤ f_offset < f_offset$_{max}$	−19.5 dBm	1 MHz

NOTE 1 – This frequency range ensures that the range of values of f_offset is continuous.

2.3 UTRA 7.68 Mchip/s TDD option

The spectrum emission mask specifies the limit of the transmitter OoB emissions at frequency offsets from the assigned channel frequency of the wanted signal between 5 MHz and 25 MHz.

The requirement should be met by a BS transmitting on a single RF carrier configured in accordance with the manufacturer's specification. Emissions should not exceed the maximum level specified in Tables 43D to 45C in the frequency range of f_offset from 5.015 MHz to Δf_{max} from the carrier frequency, where:

– f_offset is the separation between the carrier frequency and the centre of the measurement filter:

– f_offset$_{max}$ is either 25 MHz or the offset to the universal mobile telecommunications system (UMTS) transmit band edge, whichever is the greater.

– Δf_{max} is equal to f_offset$_{max}$ minus half of the bandwidth of the measuring filter.

The spectrum emissions measured should not exceed the maximum level specified in Tables 43A to 43C for the appropriate BS rated output power.

TABLE 43A

Spectrum emission mask values, BS maximum output power $P \geq 43$ dBm

Frequency offset of measurement filter −3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Maximum level**	**Measurement bandwidth**
5 MHz ≤ Δf < 5.2 MHz	5.015 MHz ≤ f_offset < 5.215 MHz	−15.5 dBm	30 kHz
5.2 MHz ≤ Δf < 6 MHz	5.215 MHz ≤ f_offset < 6.015 MHz	$-15.5\ \text{dBm} - 15\left(\frac{\text{f\_offset}}{\text{MHz}} - 5.215\right)\ \text{dB}$	30 kHz
(See Note 1)	6.015 MHz ≤ f_offset < 6.5 MHz	−27.5 dBm	30 kHz
6 MHz ≤ Δf ≤ Δf_{max}	6.5 MHz ≤ f_offset < f_offset_{max}	−14.5 dBm	1 MHz

TABLE 43B

Spectrum emission mask values, BS maximum output power $39 \leq P < 43$ dBm

Frequency offset of measurement filter −3 dB point, Δf	**Frequency offset of measurement filter centre frequency, f_offset**	**Maximum level**	**Measurement bandwidth**
5 MHz ≤ Δf < 5.2 MHz	5.015 MHz ≤ f_offset < 5.215 MHz	−15.5 dBm	30 kHz
5.2 MHz ≤ Δf < 6 MHz	5.215 MHz ≤ f_offset < 6.015 MHz	$-15.5\ \text{dBm} - 15\left(\frac{\text{f\_offset}}{\text{MHz}} - 5.215\right)\ \text{dB}$	30 kHz
(See Note 1)	6.015 MHz ≤ f_offset < 6.5 MHz	−27.5 dBm	30 kHz
6 MHz ≤ Δf < 15 MHz	6.5 MHz ≤ f_offset < 15.5 MHz	−14.5 dBm	1 MHz
15 MHz ≤ Δf ≤ Δf_{max}	15.5 MHz ≤ f_offset < f_offset_{max}	P – 57.5 dB	1 MHz

TABLE 43C

Spectrum emission mask values, BS maximum output power 31 ≤ *P* < 39 dBm

Frequency offset of measurement filter −3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
5 MHz ≤ Δf < 5.2 MHz	5.015 MHz ≤ f_offset < 5.215 MHz	P – 54.5 dB	30 kHz
5.2 MHz ≤ Δf < 6 MHz	5.215 MHz ≤ f_offset < 6.015 MHz	$P - 54.5\ \text{dBm} - 15\left(\frac{\text{f\_offset}}{\text{MHz}} - 5.215\right)\ \text{dB}$	30 kHz
(See Note 1)	6.015 MHz ≤ f_offset < 6.5 MHz	P – 66.5 dB	30 kHz
6 MHz ≤ Δf < 15 MHz	6.5 MHz ≤ f_offset < 15.5 MHz	P – 53.5 dB	1 MHz
15 MHz ≤ Δf ≤ Δf_{max}	15.5 MHz ≤ f_offset < f_offset$_{max}$	P – 57.5 dB	1 MHz

TABLE 43D

Spectrum emission mask values, BS maximum output power *P* < 31 dBm

Frequency offset of measurement filter −3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
5 MHz ≤ Δf < 5.2 MHz	5.015 MHz ≤ f_offset < 5.215 MHz	−23.5 dBm	30 kHz
5.2 MHz ≤ Δf < 6 MHz	5.215 MHz ≤ f_offset < 6.015 MHz	$-23.5\ \text{dBm} - 15\left(\frac{\text{f\_offset}}{\text{MHz}} - 5.215\right)\ \text{dB}$	30 kHz
(See Note 1)	6.015 MHz ≤ f_offset < 6.5 MHz	−35.5 dBm	30 kHz
6 MHz ≤ Δf < 15 MHz	6.5 MHz ≤ f_offset < 15.5 MHz	−22.5 dBm	1 MHz
15 MHz ≤ Δf ≤ Δf_{max}	15.5 MHz ≤ f_offset < f_offset$_{max}$	−26.5 dBm	1 MHz

NOTE 1 – This frequency range ensures that the range of values of f_offset is continuous.

2.4 E-UTRA (LTE) spectrum mask

The operating band unwanted emission limits are defined from 10 MHz below the lowest frequency of the BS transmitter operating band up to 10 MHz above the highest frequency of the BS transmitter 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.

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

For Wide Area BS, the requirements of either § 2.4.1 (Category A limits) or § 2.4.2 (Category B limits) shall apply.

For Local Area BS, the requirements of § 2.4.3 shall apply (Category A and B).

For Home BS, the requirements of § 2.4.4 shall apply (Category A and B).

Emissions should not exceed the maximum level specified in tables below, where:

– Δf is the separation between the channel edge frequency and the nominal –3 dB 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_offset_{max} is the offset to the frequency 10 MHz outside the BS transmitter operating band.

– Δf_{max} is equal to f_offset_{max} minus half of the bandwidth of the measuring filter.

For a multi-carrier E-UTRA BS, the definitions above apply to the lower edge of the carrier transmitted at the lowest carrier frequency and the higher edge of the carrier transmitted at the highest carrier frequency.

The requirements of either § 2.4.1 or § 2.4.2 shall apply.

The additional operating band unwanted emission limits defined in § 2.4.2.1 may be mandatory in certain regions. In other regions it may not apply.

2.4.1 E-UTRA spectrum mask (Category A)

For E-UTRA BS operating in TDD bands, emissions shall not exceed the maximum levels specified in Table 44A:

TABLE 44A

a) General operating band unwanted emission limits for 1.4 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$+0.5\ \text{dBm} - \frac{10}{1.4}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–9.5 dBm	100 kHz
2.8 MHz ≤ Δf ≤ Δf_{max}	2.85 MHz ≤ f_offset < f_offset	–13 dBm	1 MHz

TABLE 44A (*end*)

b) General operating band unwanted emission limits for 3 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-3.5\ \text{dBm} - \frac{10}{3}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–13.5 dBm	100 kHz
6 MHz ≤ Δf ≤ Δf_{max}	6.05 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	1 MHz

c) General operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category A

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.5\ \text{dBm} - \frac{7}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
5 MHz ≤ Δf < 10 MHz	5.05 MHz ≤ f_offset < 10.05 MHz	–12.5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset$_{max}$	–13 dBm	1 MHz

2.4.2 E-UTRA spectrum mask (Category B)

For E-UTRA BS operating in Bands 33, 34, 35, 36, 37, 38, 39 and 40, emissions shall not exceed the maximum levels specified in Table 44B:

TABLE 44B

a) General operating band unwanted emission limits for 1.4 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$+0.5\ \text{dBm} - \frac{10}{1.4}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–9.5 dBm	100 kHz
2.8 MHz ≤ Δf ≤ Δf_{max}	3.3 MHz ≤ f_offset < f_offset$_{max}$	–15 dBm	1 MHz

b) General operating band unwanted emission limits for 3 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-3.5\ \text{dBm} - \frac{10}{3}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–13.5 dBm	100 kHz
6 MHz ≤ Δf ≤ Δf_{max}	6.5 MHz ≤ f_offset < f_offset$_{max}$	–15 dBm	1 MHz

c) General operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (E-UTRA bands > 1 GHz) for Category B

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.5\ \text{dBm} - \frac{7}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\ \text{dB}$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset$_{max}$)	–12.5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset$_{max}$	–15 dBm	1 MHz

2.4.3 E-UTRA spectrum mask for local area BS (Category A and B)

For local area E-UTRA BS, emissions shall not exceed the maximum levels specified in Tables 44Ca) to 44Cc).

TABLE 44C

a) Local area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$-19.5\ \text{dBm} - \frac{10}{1.4} \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)\ \text{dB}$	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–29.5 dBm	100 kHz
2.8 MHz ≤ $\Delta f \leq \Delta f_{max}$	2.85 MHz ≤ f_offset < f_offset_{max}	–31 dBm	100 kHz

b) Local area BS operating band unwanted emission limits for 3 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-23.5\ \text{dBm} - \frac{10}{3} \cdot \left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)\ \text{dB}$	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–33.5 dBm	100 kHz
6 MHz ≤ $\Delta f \leq \Delta f_{max}$	6.05 MHz ≤ f_offset < f_offset_{max}	–35 dBm	100 kHz

c) Local area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-28.5\ \text{dBm} - \frac{7}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05 \right)\ \text{dB}$	100 kHz
5 MHz ≤ Δf < min (10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min (10.05 MHz, f_offset_{max})	–35.5 dBm	100 kHz
10 MHz ≤ $\Delta f \leq \Delta f_{max}$	10.05 MHz ≤ f_offset < f_offset_{max}	–37 dBm	100 kHz

2.4.4 E-UTRA spectrum mask for Home BS (Category A and B)

For Home E-UTRA BS, emissions shall not exceed the maximum levels specified in Tables 44Da) to 44Dc).

TABLE 44D

a) Home BS operating band unwanted emission limits for 1.4 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 1.4 MHz	0.05 MHz ≤ f_offset < 1.45 MHz	$-28.5\ \text{dBm} - \frac{6}{1.4}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\text{dB}$	100 kHz
1.4 MHz ≤ Δf < 2.8 MHz	1.45 MHz ≤ f_offset < 2.85 MHz	–34.5 dBm	100 kHz
2.8 MHz ≤ Δf ≤ Δf_{max}	3.3 MHz ≤ f_offset < f_offset_{max}	$\begin{cases} P - 52\ \text{dB}, & 2\ \text{dBm} \le P \le 20\ \text{dBm} \\ -50\ \text{dBm}, & P < 2\ \text{dBm} \end{cases}$	1 MHz

b) Home BS operating band unwanted emission limits for 3 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 3 MHz	0.05 MHz ≤ f_offset < 3.05 MHz	$-32.5\ \text{dBm} - 2\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\text{dB}$	100 kHz
3 MHz ≤ Δf < 6 MHz	3.05 MHz ≤ f_offset < 6.05 MHz	–38.5 dBm	100 kHz
6 MHz ≤ Δf ≤ Δf_{max}	6.5 MHz ≤ f_offset < f_offset_{max}	$\begin{cases} P - 52\ \text{dB}, & 2\ \text{dBm} \le P \le 20\ \text{dBm} \\ -50\ \text{dBm}, & P < 2\ \text{dBm} \end{cases}$	1 MHz

c) Home BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth

Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Minimum requirement	Measurement bandwidth (Note 1)
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-34.5\ \text{dBm} - \frac{6}{5}\left(\frac{\text{f\_offset}}{\text{MHz}} - 0.05\right)\text{dB}$	100 kHz
5 MHz ≤ Δf < min (10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min (10.05 MHz, f_offset_{max})	–40.5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset_{max}	$\begin{cases} P - 52\ \text{dB}, & 2\ \text{dBm} \le P \le 20\ \text{dBm} \\ -50\ \text{dBm}, & P < 2\ \text{dBm} \end{cases}$	1 MHz

2.4.5 E-UTRA spectrum mask (additional limits)

The following requirements may apply in certain regions. For E-UTRA BS operating Bands 35 and 36, emissions shall not exceed the maximum levels specified in Table 44E.

TABLE 44E

Additional operating band unwanted emission limits for E-UTRA bands > 1 GHz

Channel bandwidth	Frequency offset of measurement filter –3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement	Measurement bandwidth (Note 1)
1.4 MHz	0 MHz ≤ Δf < 1 MHz	0.005 MHz ≤ f_offset < 0.995 MHz	–14 dBm	10 kHz
3 MHz	0 MHz ≤ Δf < 1 MHz	0.015 MHz ≤ f_offset < 0.985 MHz	–13 dBm	30 kHz
5 MHz	0 MHz ≤ Δf < 1 MHz	0.015 MHz ≤ f_offset < 0.985 MHz	–15 dBm	30 kHz
10 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–13 dBm	100 kHz
15 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–15 dBm	100 kHz
20 MHz	0 MHz ≤ Δf < 1 MHz	0.05 MHz ≤ f_offset < 0.95 MHz	–16 dBm	100 kHz
All	1 MHz ≤ Δf < Δf_{max}	1.5 MHz ≤ f_offset < f_offset_{max}	–13 dBm	1 MHz

NOTE 1 – As a general rule for the requirements in § 2.4, 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 can 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.

3 ACLR

ACLR is the ratio of the transmitted power to the power measured after a receiver filter in the adjacent channel(s).

3.1 ACLR for UTRA

For UTRA, both the transmitted power and the received power are measured through a matched filter (root raised cosine and roll-off 0.22) with a noise power bandwidth equal to the chip rate. The requirements should apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

The ACLR of a single carrier BS or a multi-carrier BS with contiguous carrier frequencies should be higher than the value specified in Tables 45Aa) to 45Ac).

TABLE 45A

a) BS ACLR limits for 3.84 Mchip/s TDD option

BS adjacent channel offset below the first or above the last carrier frequency used (MHz)	ACLR limit (dB)
5	44.2
10	54.2

TABLE 45A (*end*)

b) BS ACLR limits for 1.28 Mchip/s TDD option

BS adjacent channel offset below the first or above the last carrier frequency used (MHz)	ACLR limit (dB)
1.6	39.2
3.2	44.2

c) BS ACLR limits for 7.68 Mchip/s TDD option

BS adjacent channel offset below the first or above the last carrier frequency used (MHz)	ACLR limit (dB)
10.0	44.2
20.0	54.2

If a BS provides multiple non-contiguous single carriers or multiple non-contiguous groups of contiguous single carriers, the above requirements should be applied individually to the single carriers or group of single carriers.

3.2 ACLR for E-UTRA (LTE)

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. The transmission bandwidth configuration is as specified in Table 45B.

TABLE 45B

Downlink transmission bandwidth configuration BW_{config}

Channel bandwidth $BW_{channel}$ (MHz)	1.4	3	5	10	15	20
Transmission bandwidth configuration (BW_{config}) (MHz)	1.095	2.715	4.515	9.015	13.515	18.015

For Category A Wide Area BS, limits in the tables below or the absolute limit of –13 dBm/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 –15 dBm/MHz apply, whichever is less stringent.

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

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

For operation in unpaired spectrum, the ACLR shall be higher than the value specified in Table 45C.

TABLE 45C

Base station ACLR in unpaired spectrum with synchronized operation

E-UTRA transmitted signal channel bandwidth $BW_{channel}$ (MHz)	**BS adjacent channel centre frequency offset below the first or above the last 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	$BW_{channel}$	E-UTRA of same BW	Square (BW_{config})	44.2 dB
	$2 \times BW_{channel}$	E-UTRA of same BW	Square (BW_{config})	44.2 dB
	$BW_{channel}$/ 2 + 0.8 MHz	1.28 Mchip/s UTRA	RRC (1.28 Mchip/s)	44.2 dB
	$BW_{channel}$/ 2 + 2.4 MHz	1.28 Mchip/s UTRA	RRC (1.28 Mchip/s)	44.2 dB
5, 10, 15, 20	$BW_{channel}$	E-UTRA of same BW	Square (BW_{config})	44.2 dB
	$2 \times BW_{channel}$	E-UTRA of same BW	Square (BW_{config})	44.2 dB
	$BW_{channel}$/ 2 + 0.8 MHz	1.28 Mchip/s UTRA	RRC (1.28 Mchip/s)	44.2 dB
	$BW_{channel}$/ 2 + 2.4 MHz	1.28 Mchip/s UTRA	RRC (1.28 Mchip/s)	44.2 dB
	$BW_{channel}$/ 2 + 2.5 MHz	3.84 Mchip/s UTRA	RRC (3.84 Mchip/s)	44.2 dB
	$BW_{channel}$/ 2 + 7.5 MHz	3.84 Mchip/s UTRA	RRC (3.84 Mchip/s)	44.2 dB
	$BW_{channel}$/ 2 + 5 MHz	7.68 Mchip/s UTRA	RRC (7.68 Mchip/s)	44.2 dB
	$BW_{channel}$/ 2 + 15 MHz	7.68 Mchip/s UTRA	RRC (7.68 Mchip/s)	44.2 dB

NOTE 1 – BWchannel and BWconfig are the channel bandwidth and transmission bandwidth configuration of the E-UTRA transmitted signal on the assigned channel frequency.

NOTE 2 – The RRC filter shall be equivalent to the transmit pulse shape filter defined in a 3GPP specification, with a chip rate as defined in Table 45C.

4 Transmitter spurious emission (conducted)

The conducted spurious emissions are measured at the BS RF output port.

Unless otherwise stated, all requirements are measured as mean power.

The requirements should apply to BS intended for general-purpose applications.

The requirements should apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer.

For the 3.84 Mchip/s UTRA TDD option, either requirement (except the case of coexistence with PHS) applies at frequencies within the specified frequency ranges which are more than 12.5 MHz under the first carrier frequency used or more than 12.5 MHz above the last carrier frequency used.

For the 1.28 Mchip/s UTRA TDD option, either requirement applies at frequencies within the specified frequency ranges which are more than 4 MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.

For the 7.68 Mchip/s UTRA TDD option, either requirement (except the case of coexistence with PHS) applies at frequencies within the specified frequency ranges which are more than 25 MHz under the first carrier frequency used or more than 25 MHz above the last carrier frequency used.

For E-UTRA (LTE), the requirement applies at frequencies within the specified frequency ranges, excluding the frequency range from 10 MHz below the lowest frequency of the BS transmitter operating band up to 10 MHz above the highest frequency of the BS transmitter operating band.

In areas where Category A limits for spurious emissions, as defined in Recommendation ITU-R SM.329, are applied, the power of any spurious emission should not exceed the maximum levels given in Table 46A.

TABLE 46A

BS Mandatory spurious emissions limits, Category A

Band	Maximum level	Measurement bandwidth	Note
9-150 kHz	–13 dBm	1 kHz	Bandwidth as in Recommendation ITU-R SM.329, § 4.1
150 kHz-30 MHz		10 kHz	Bandwidth as in Recommendation ITU-R SM.329, § 4.1
30 MHz-1 GHz		100 kHz	Bandwidth as in Recommendation ITU-R SM.329, § 4.1
1-12.75 GHz		1 MHz	Upper frequency as in Recommendation ITU-R SM.329, § 2.5 Table 1

NOTE 1 – The requirements reported in the present table are applicable for the 3.84 Mchip/s, 1.28 Mchip/s, 7.68 Mchip/s and E-UTRA(LTE) TDD options.

In areas where Category B limits for spurious emissions, as defined in Recommendation ITU-R SM.329, are applied, the power of any spurious emission should not exceed the maximum levels given in Tables 46B to 46E.

TABLE 46B

BS spurious emission limits for UTRA 3.84 Mchip/s option, Category B

Band	Maximum level	Measurement bandwidth	Notes
9 ↔ 150 kHz	–36 dBm	1 kHz	(1)
150 kHz ↔ 30 MHz	–36 dBm	10 kHz	(1)
30 MHz ↔ 1 GHz	–36 dBm	100 kHz	(1)
1 GHz ↔ Fl – 10 MHz	–30 dBm	1 MHz	(1)
Fl – 10 MHz ↔ Fu + 10 MHz	–15 dBm	1 MHz	(2)
Fu + 10 MHz ↔ 12.5 GHz	–30 dBm	1 MHz	(3)

TABLE 46C

BS spurious emission limits for UTRA 1.28 Mchip/s option, Category B

Band	Maximum level	Measurement bandwidth	Notes
9 ↔ 150 kHz	–36 dBm	1 kHz	(1)
150 kHz ↔ 30 MHz	–36 dBm	10 kHz	(1)
30 MHz ↔ 1 GHz	–36 dBm	100 kHz	(1)
1 GHz ↔ Flow – 10 MHz	–30 dBm	1 MHz	(1)
F_{low} – 10 MHz ↔ F_{high} + 10 MHz	–15 dBm	1 MHz	(2)
F_{high} + 10 MHz ↔ 12.75 GHz	–30 dBm	1 MHz	(3)

TABLE 46D

BS spurious emission limits for UTRA 7.68 Mchip/s option, Category B

Band	Maximum level	Measurement bandwidth	Notes
9 ↔ 150 kHz	–36 dBm	1 kHz	(1)
150 kHz ↔ 30 MHz	–36 dBm	10 kHz	(1)
30 MHz ↔ 1 GHz	–36 dBm	100 kHz	(1)
1 GHz ↔ F_{low} – 10 MHz	–30 dBm	1 MHz	(1)
F_{low} – 10 MHz ↔ F_{high} + 10 MHz	–15 dBm	1 MHz	(2)
F_{high} + 10 MHz ↔ 12.75 GHz	–30 dBm	1 MHz	(3)

(1) Bandwidth as in Recommendation ITU-R SM.329, § 4.1.

(2) Specification in accordance with Recommendation ITU-R SM.329, § 4.3 and Annex 7.

(3) Bandwidth as in Recommendation ITU-R SM.329, § 4.3 and Annex 7. Upper frequency as in Recommendation ITU-R SM.329, § 2.5, Table 1.

F_{low}: Lowest downlink frequency of the operating band.

F_{high}: Highest downlink frequency of the operating band.

TABLE 46E

BS spurious emission limits for E-UTRA, Category B

Band	Maximum level	Measurement bandwidth	Note
9 ↔ 150 kHz	–36 dBm	1 kHz	(1)
150 kHz ↔ 30 MHz	–36 dBm	10 kHz	(1)
30 MHz ↔ 1 GHz	–36 dBm	100 kHz	(1)
1 GHz ↔ 12.75 GHz	–30 dBm	1 MHz	(2)

(1) Bandwidth as in Recommendation ITU-R SM.329, § 4.1.

(2) Bandwidth as in Recommendation ITU-R SM.329, § 4.1. Upper frequency as in Recommendation ITU-R SM.329, § 2.5 Table 1.

4.1 Coexistence with GSM 900

This requirement may be applied for the protection of GSM 900 MS and GSM 900 BTS receivers in geographic areas in which both GSM 900 and UTRA are deployed.

TABLE 47A

BS spurious emissions limits for UTRA BS in geographic coverage area of GSM 900 MS and GSM 900 BTS receivers

Band	Maximum level	Measurement bandwidth	Note
876-915 MHz	−61 dBm	100 kHz	
921-960 MHz	−57 dBm	100 kHz	

This requirement may be applied for the protection of GSM 900 BTS receivers when GSM 900 BTS and UTRA BS are co-located.

The power of any spurious emission shall not exceed the maximum level given in Table 47B.

TABLE 47B

BS Spurious emissions limits for protection of the GSM 900 BTS receiver

Band	Maximum level	Measurement bandwidth	Note
876 MHz-915 MHz	–98 dBm	100 kHz	

4.2 Coexistence with DCS 1800

This requirement may be applied for the protection of DCS 1800 MS and DCS 1800 BTS receivers in geographic areas in which both DCS 1800 and UTRA are deployed.

TABLE 47C

a) BS spurious emissions limits for UTRA BS in the band a), d) and e) when operating in geographic coverage area of DCS 1800 MS and DCS 1800 BTS receivers

Band	Maximum level	Measurement bandwidth	Note
1 710-1 785 MHz	−61 dBm	100 kHz	
1 805-1 880 MHz	−47 dBm	100 kHz	

b) BS spurious emissions limits for UTRA BS in the Band f) when operating in geographic coverage area of DCS 1800 MS and DCS 1800 BTS receiver operating in 1 710-1 755 MHz/1 805-1 850 MHz

Band	Maximum level	Measurement bandwidth	Note
1 710-1 755 MHz	–61 dBm	100 kHz	
1 805-1 850 MHz	–47 dBm	100 kHz	

This requirement may be applied for the protection of DCS 1800 BTS receivers when DCS 1800 BTS and UTRA BS are co-located.

The power of any spurious emission shall not exceed the maximum level given in Table 47D.

TABLE 47D

a) BS spurious emissions limits for UTRA BS in the Bands a), d) and e) when co-located with DCS 1800 BTS

Band	Maximum level	Measurement bandwidth	Note
1 710 MHz-1 785 MHz	–98 dBm	100 kHz	

b) BS spurious emissions limits for BS in the band f) when co-located with DCS1800 BTS

Band	Maximum level	Measurement bandwidth	Note
1 710 MHz-1 755 MHz	–98 dBm	100 kHz	

4.3 Coexistence with UTRA-FDD

4.3.1 Operation in the same geographic area

This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD operating in bands specified in Table 47E are deployed.

For TDD base stations which use carrier frequencies within the band 2 010-2 025 MHz the requirements apply at all frequencies within the specified frequency bands in Table 47E. For the 3.84 Mchip/s TDD option base stations which use a carrier frequency within the band 1 900-1 920 MHz, the requirement apply at frequencies within the specified frequency range which are more than 12.5 MHz above the last carrier used in the frequency band 1 900-1 920 MHz. For the 1.28 Mchip/s TDD option base stations which use carrier frequencies within the band 1 900-1 920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 4 MHz above the last carrier used in the frequency band 1 900-1 920 MHz. For the 7.68 Mchip/s TDD option base stations which use a carrier frequency within the band

1 900-1 920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 25 MHz above the last carrier used in the frequency band 1 900-1 920 MHz.

The power of any spurious emission should not exceed values reported in Table 47E.

TABLE 47E

BS spurious emissions limits for UTRA BS in geographic coverage area of UTRA-FDD

BS class	Band	Maximum level	Measurement bandwidth	Note
Wide area BS	1 920-1 980 MHz	−43 dBm[(1)]	3.84 MHz	
Wide area BS	2 110-2 170 MHz	−52 dBm	1 MHz	
Wide area BS	2 500-2 570 MHz	−43 dBm[(2)]	3.84 MHz	
Wide area BS	2 620-2 690 MHz	−52 dBm	1 MHz	
Wide area BS	815-850 MHz	−43 dBm[(3)]	3.84 MHz	Applicable in Japan
Wide area BS	860-895 MHz	−52 dBm[(3)]	1 MHz	Applicable in Japan
Wide area BS	1 427.9 MHz-1 452.9 MHz	−43 dBm[(3)]	3.84 MHz	Applicable in Japan
Wide area BS	1 475.9 MHz-1 500.9 MHz	−52 dBm[(4)]	1 MHz	Applicable in Japan
Wide area BS	1 749.9-1 784.9 MHz	−43 dBm[(3)]	3.84 MHz	Applicable in Japan
Wide area BS	1 844.9-1 879.9 MHz	−52 dBm[(3)]	1 MHz	Applicable in Japan
Local area BS	1 920-1 980 MHz	−40 dBm[(1)]	3.84 MHz	
Local area BS	2 110-2 170 MHz	−52 dBm	1 MHz	
Local area BS	2 500-2 570 MHz	−40 dBm[(2)]	3.84 MHz	
Local area BS	2 620-2 690 MHz	−52 dBm	1 MHz	

(1) For the 3.84 Mchip/s TDD option base stations which use carrier frequencies within the band 1 900-1 920 MHz, the requirement should be measured RRC filtered mean power with the lowest centre frequency of measurement at 1 922.6 MHz or 15 MHz above the highest TDD carrier used, whichever is higher. For the 1.28 Mchip/s TDD option base stations which use carrier frequencies within the band 1 900-1 920 MHz, the requirement should be measured RRC filtered mean power with the lowest centre frequency of measurement at 1 922.6 MHz or 6.6 MHz above the highest TDD carrier used, whichever is higher. For the 7.68 Mchip/s TDD option base stations which use carrier frequencies within the band 1 900-1 920 MHz, the requirement should be measured RRC filtered mean power with the lowest centre frequency of measurement at 1 922.6 MHz or 30 MHz above the highest TDD carrier used, whichever is higher.

(2) For the 3.84 Mchip/s TDD option base stations which use carrier frequencies within the band 2 570-2 620 MHz, the requirement should be measured RRC filtered mean power with the highest centre frequency of measurement at 2 567.5 MHz or 15 MHz below the lowest TDD carrier used, whichever is lower. For the 1.28 Mchip/s TDD option base stations which use carrier frequencies within the band 2 570-2 620 MHz, the requirement should be measured RRC filtered mean power with the highest centre frequency of measurement at 2 567.5 MHz or 6.6 MHz below the lowest TDD carrier used, whichever is lower. For the 7.68 Mchip/s TDD option base stations which use carrier frequencies within the band 2 570-2 620 MHz, the requirement should be measured RRC filtered mean power with the highest centre frequency of measurement at 2 567.5 MHz or 30 MHz below the lowest TDD carrier used, whichever is lower.

(3) This is applicable only in Japan for the 3.84 Mchip/s and 7.68 Mchip/s TDD options operating in 2 010-2 025 MHz.

(4) This is applicable only to the 7.68 Mchip/s TDD option operating in 2 010-2 025 MHz.

The requirements for wide area BS in Table 47E are based on a coupling loss of 67 dB between the TDD and FDD base stations. The requirements for local area BS in Table 47E are based on a coupling loss of 70 dB between TDD and FDD wide area base stations.

4.3.2 Co-located base stations

This requirement may be applied for the protection of UTRA FDD BS receivers when UTRA TDD BS and UTRA FDD BS are co-located.

For TDD base stations which use carrier frequencies within the band 2 010-2 025 MHz the requirements applies at all frequencies within the specified frequency bands in Table 47F. For 3.84 Mcps TDD option base stations which use a carrier frequency within the band 1 900-1 920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 12.5 MHz above the last carrier used in the frequency band 1 900-1 920 MHz. For 1.28 Mcps TDD option base stations which use carrier frequencies within the band 1 900-1 920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 4 MHz above the last carrier used in the frequency band 1 900-1 920 MHz. For 7.68 Mcps TDD option base stations which use a carrier frequency within the band 1 900-1 920 MHz, the requirement applies at frequencies within the specified frequency range which are more than 25 MHz above the last carrier used in the frequency band 1 900-1 920 MHz.

The power of any spurious emission shall not exceed the maximum level given in Table 47F.

TABLE 47F

BS spurious emissions limits for BS co-located with UTRA FDD

BS class	Band	Maximum level	Measurement bandwidth	Note
Wide Area BS	1 920-1 980 MHz	–80 dBm[1]	3.84 MHz	
Wide Area BS	2 110-2 170 MHz	–52 dBm	1 MHz	
Wide Area BS	2 500-2 570 MHz	–80 dBm[2]	3.84 MHz	
Wide Area BS	2 620-2 690 MHz	–52 dBm	1 MHz	

[1] For 3.84 Mcps TDD option base stations which use a carrier frequency within the band 1 900-1 920 MHz or 1 880-1 920 MHz, the requirement shall be measured RRC filtered mean power with the lowest centre frequency of measurement at 1 922.6 MHz or 15 MHz above the highest TDD carrier used, whichever is higher. For 1.28 Mcps TDD option base stations which use a carrier frequency within the band 1 900-1 920 MHz, the requirement shall be measured RRC filtered mean power with the lowest centre frequency of measurement at 1 922.6 MHz or 6.6 MHz above the highest TDD carrier used, whichever is higher. For 7.68 Mcps TDD option base stations which use carrier frequencies within the band 1 900-1 920 MHz, the requirement shall be measured RRC filtered mean power with the lowest centre frequency of measurement at 1 922.6 MHz or 30 MHz above the highest TDD carrier used, whichever is higher.

[2] For 3.84 Mcps TDD option base stations which use carrier frequencies within the band 2 570-2 620 MHz, the requirement shall be measured RRC filtered mean power with the highest centre frequency of measurement at 2 567.5 MHz or 15 MHz below the lowest TDD carrier used, whichever is lower.

For 1.28 Mcps TDD option base stations which use carrier frequencies within the band 2 570-2 620 MHz, the requirement shall be measured RRC filtered mean power with the highest centre frequency of measurement at 2 567.5 MHz or 6.6 MHz below the lowest TDD carrier used, whichever is lower.

For 7.68 Mcps TDD option base stations which use carrier frequencies within the band 2 570-2 620 MHz, the requirement shall be measured RRC filtered mean power with the highest centre frequency of measurement at 2 567.5 MHz or 30 MHz below the lowest TDD carrier used, whichever is lower.

The requirements in Table 47F are based on a minimum coupling loss of 30 dB between base stations. The co-location of different base station classes is not considered. A co-location requirement for the Local Area TDD BS is intended to be part of a later release.

4.4 Co-existence of UTRA TDD with unsynchronized UTRA TDD and/or E-UTRA TDD

4.4.1 Operation in the same geographic area

This requirement may be applied for the protection of TDD BS receivers in geographic areas in which unsynchronized UTRA TDD and/or E-UTRA TDD is deployed.

4.4.1.1 UTRA 3,84 Mcps TDD option

The RRC filtered mean power of any spurious emission shall not exceed the maximum level given in Table 47G.

TABLE 47G

BS spurious emissions limits for operation in same geographic area with unsynchronized UTRA TDD and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–39 dBm	3.84 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–39 dBm	3.84 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–39 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–36 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–36 dBm	3.84 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–36 dBm	3.84 MHz

The requirements in Table 47G for the Wide Area BS are based on a minimum coupling loss of 67 dB between unsynchronized TDD base stations. The requirements in Table 47G for the Local Area BS are based on a coupling loss of 70 dB between unsynchronized Wide Area and Local Area TDD base stations.

4.4.1.2 1.28 Mcps TDD option

In geographic areas where only 1.28 Mcps TDD is deployed, the RRC filtered mean power of any spurious emission shall not exceed the maximum level given in Table 47H, otherwise the limits in Table 47I shall apply.

TABLE 47H

BS spurious emissions limits for operation in same geographic area with unsynchronized 1.28 Mcps UTRA TDD and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–39 dBm	1.28 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–39 dBm	1.28 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–39 dBm	1.28 MHz
WA UTRA TDD Band e) or E-UTRA Band 40 Wide Area BS	2 300-2 400 MHz	–39 dBm	1.28 MHz
WA UTRA TDD Band f) or E-UTRA Band 39 Wide Area BS	1 880-1 920 MHz	–39 dBm	1.28 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–36 dBm	1.28 MHz
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–36 dBm	1.28 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–36 dBm	1.28 MHz
LA UTRA TDD Band e) or E-UTRA Band 40 Local Area BS	2 300-2 400 MHz	–36 dBm	1.28 MHz
LA UTRA TDD Band f) or E-UTRA Band 39 Local Area BS	1 880-1 920 MHz	–36 dBm	1.28 MHz

TABLE 47I

BS spurious emissions limits for operation in same geographic area with unsynchronized UTRA TDD and E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–39 dBm	3.84 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–39 dBm	3.84 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–39 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–36 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–36 dBm	3.84 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–36 dBm	3.84 MHz

The requirements in Tables 47H and 47I for the Wide Area BS are based on a minimum coupling loss of 67 dB between unsynchronized TDD base stations. The requirements in Tables 47H and 47I for the Local Area BS are based on a coupling loss of 70 dB between unsynchronized Wide Area and Local Area TDD base stations.

4.4.1.3 UTRA 7.68 Mcps TDD option

The RRC filtered mean power of any spurious emission shall not exceed the maximum level given in Tables 47J and 47K.

TABLE 47J

BS spurious emissions limits for operation in same geographic area with unsynchronized UTRA TDD (7.68 Mcps TDD and 3.84 Mcps TDD) and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–39 dBm	3.84 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–39 dBm	3.84 MHz

TABLE 47J (*end*)

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–39 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–36 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–36 dBm	3.84 MHz
LA UTRA TDD Band d)or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–36 dBm	3.84 MHz

TABLE 47K

BS spurious emissions limits for operation in same geographic area with unsynchronized 1.28 Mcps UTRA TDD and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–39 dBm	1.28 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–39 dBm	1.28 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–39 dBm	1.28 MHz
WA UTRA TDD Band e) or E-UTRA Band 40 Wide Area BS	2 300-2 400 MHz	–39 dBm	1.28 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–36 dBm	1.28 MHz
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–36 dBm	1.28 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–36 dBm	1.28 MHz
LA UTRA TDD Band e) or E-UTRA Band 40 Local Area BS	2 300-2 400 MHz	–36 dBm	1.28 MHz

The requirements in Tables 47J and 47K for the Wide Area BS are based on a minimum coupling loss of 67 dB between unsynchronized TDD base stations. The requirements in Tables 47J and 47K for the Local Area BS are based on a coupling loss of 70 dB between unsynchronized Wide Area and Local Area TDD base stations.

4.4.2 Co-located base stations

This requirement may be applied for the protection of TDD BS receivers when unsynchronized UTRA TDD and/or E-UTRA TDD BS are co-located.

4.4.2.1 3.84 Mcps TDD option

The RRC filtered mean power of any spurious emission shall not exceed the maximum level given in Table 47M.

TABLE 47L

BS spurious emissions limits for co-location with unsynchronized UTRA TDD and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–76 dBm	3.84 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–76 dBm	3.84 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–76 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–66 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 3 Local Area BS	2 010-2 025 MHz	–66 dBm	384 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–66 dBm	3.84 MHz

The requirements in Table 47L for the Wide Area BS are based on a minimum coupling loss of 30 dB between unsynchronized TDD base stations. The requirements in Table 47L for the Local Area BS are based on a minimum coupling loss of 30 dB between unsynchronized Local Area base stations. The co-location of different base station classes is not considered.

4.4.2.2 1.28 Mcps TDD option

In geographic areas where only 1.28 Mcps TDD is deployed, the RRC filtered mean power of any spurious emission in case of co-location shall not exceed the maximum level given in Table 47M, otherwise the limits in Table 47N shall apply.

TABLE 47M

BS spurious emissions limits for co-location with unsynchronized 1.28 Mcps UTRA TDD and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–76 dBm	1.28 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–76 dBm	1.28 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–76 dBm	1.28 MHz
WA UTRA TDD Band e) or E-UTRA Band 40 Wide Area BS	2 300-2 400 MHz	–76 dBm	1.28 MHz
WA UTRA TDD Band f) or E-UTRA Band 39 Wide Area BS	1 880-1 920 MHz	–76 dBm	1.28 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–71 dBm	1.28 MHz
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–71 dBm	1.28 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–71 dBm	1.28 MHz
LA UTRA TDD Band e) or E-UTRA Band 40 Local Area BS	2 300-2 400 MHz	–71 dBm	1.28 MHz
LA UTRA TDD Band f) or E-UTRA Band 39 Local Area BS	1 880-1 920 MHz	–71 dBm	1.28 MHz

NOTE − The requirement applies for frequencies more than 10 MHz below or above the supported frequency range declared by the vendor.

TABLE 47N

BS spurious emissions limits for co-location with unsynchronized UTRA TDD and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–76 dBm	384 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–76 dBm	3.84 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–76 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–66 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–66 dBm	3.84 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–66 dBm	3.84 MHz

The requirements in Tables 47M and 47N for the Wide Area BS are based on a minimum coupling loss of 30 dB between unsynchronized TDD base stations. The requirements in Tables 47M and 47N for the Local Area BS are based on a minimum coupling loss of 30 dB between unsynchronized Local Area base stations. The co-location of different base station classes is not considered.

4.4.2.3 7.68 Mcps TDD option

The RRC filtered mean power of any spurious emission shall not exceed the maximum level given in Tables 47O and 47P.

TABLE 47O

BS spurious emissions limits for co-location with unsynchronized UTRA TDD (7.68 Mcps TDD and 3.84 Mcps TDD) and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–76 dBm	3.84 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–76 dBm	3.84 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–76 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–66 dBm	3.84 MHz
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–66 dBm	3.84 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–66 dBm	3.84 MHz

TABLE 47P

BS spurious emissions limits for co-location with unsynchronized 1.28 Mcps UTRA TDD and/or E-UTRA TDD

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
WA UTRA TDD Band a) or E-UTRA Band 33 Wide Area BS	1 900-1 920 MHz	–76 dBm	1.28 MHz
WA UTRA TDD Band a) or E-UTRA Band 34 Wide Area BS	2 010-2 025 MHz	–76 dBm	1.28 MHz
WA UTRA TDD Band d) or E-UTRA Band 38 Wide Area BS	2 570-2 620 MHz	–76 dBm	1.28 MHz
WA UTRA TDD Band e) or E-UTRA Band 40 Wide Area BS	2 300-2 400 MHz	–76 dBm	1.28 MHz
LA UTRA TDD Band a) or E-UTRA Band 33 Local Area BS	1 900-1 920 MHz	–71 dBm	1.28 MHz

TABLE 47P (*end*)

System type operating in the same geographic area BS Class	Frequency range band	Maximum level	Measurement bandwidth
LA UTRA TDD Band a) or E-UTRA Band 34 Local Area BS	2 010-2 025 MHz	–71 dBm	1.28 MHz
LA UTRA TDD Band d) or E-UTRA Band 38 Local Area BS	2 570-2 620 MHz	–71 dBm	1.28 MHz
LA UTRA TDD Band e) or E-UTRA Band 40 Local Area BS	2 300-2 400 MHz	–71 dBm	1.28 MHz

The requirements in Tables 47O and 47P for the Wide Area BS are based on a minimum coupling loss of 30 dB between unsynchronized TDD base stations. The requirements in Tables 47O and 47P for the Local Area BS are based on a minimum coupling loss of 30 dB between unsynchronized Local Area base stations. The co-location of different base station classes is not considered.

4.5 Coexistence with other systems in the same geographical area for E-UTRA

These requirements may be applied for the protection of UE, MS and/or BS operating in other frequency bands in the same geographical area. The requirements may apply in geographic areas in which both E-UTRA BS and a system operating in another frequency band than the E-UTRA operating band are deployed. The system operating in the other frequency band may be GSM900, DCS1800, PCS1900, GSM850, UTRA FDD/TDD and/or E-UTRA.

The power of any spurious emission shall not exceed the limits of Table 47Q for a BS where requirements for co-existence with the system listed in the first column apply.

TABLE 47Q

BS spurious emission limits for E-UTRA BS in geographic coverage area of systems operating in other frequency bands

System type operating in the same geographical area	Band for coexistence 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

TABLE 47Q (*continued*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
DCS1800	1 805-1 880 MHz	–47 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in Band 3
	1 710-1 785 MHz	–61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in Band 3
PCS1900	1 930-1 990 MHz	–47 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in frequency Band 2 or Band 36
	1 850-1 910 MHz	–61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in frequency Band 2. This requirement does not apply to E-UTRA BS operating in frequency Band 35
GSM850	869-894 MHz	–57 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in frequency Band 5
	824-849 MHz	–61 dBm	100 kHz	This requirement does not apply to E-UTRA BS operating in frequency Band 5
UTRA FDD Band I or E-UTRA Band 1	2 110-2 170 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 1
	1 920-1 980 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 1
UTRA FDD Band II or E-UTRA Band 2	1 930-1 990 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 2
	1 850-1 910 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 2
UTRA FDD Band III or E-UTRA Band 3	1 805-1 880 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 3
	1 710-1 785 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 3

TABLE 47Q (*continued*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
UTRA FDD Band IV or E-UTRA Band 4	2 110-2 155 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 4 or 10
	1 710-1 755 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 4 or 10
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
	824-849 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 5
UTRA FDD Band VI or XIX or E-UTRA Bands 6, 18, 19	860-895 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 6
	815-850 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 6
	830-850 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Bands 6, 19
UTRA FDD Band VII or E-UTRA Band 7	2 620-2 690 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 7
	2 500-2 570 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 7
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
UTRA FDD Band IX or E-UTRA Band 9	1 844.9-1 879.9 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 9
	1 749.9-1 784.9 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 9

TABLE 47Q (*continued*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
UTRA FDD Band X or E-UTRA Band 10	2 110-2 170 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 10
	1 710-1 770 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 10
UTRA FDD Band XI or XXI or E-UTRA Band 11 or 21	1 475.9-1 510.9 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 11 or 21
	1 427.9-1 447.9 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 11
	1 447.9-1 462.9 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 21
UTRA FDD Band XII or E-UTRA Band 12	728-746 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 12
	698-716 MHz	–49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 12
UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 34
UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 35
UTRA TDD in Band b) or E-UTRA Band 36	1 930-1 990 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 2 and Band 36
UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in Recommendation ITU-R M.1036, but is pending any future deployment
UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 34

TABLE 47Q (*end*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 35
UTRA TDD in Band b) or E-UTRA Band 36	1 930-1 990 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 2 and Band 36
UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in Recommendation ITU-R M.1036, but is pending any future deployment
UTRA TDD in Band d) or E-UTRA Band 38	2 570-2 620 MHz	–52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 38
E-UTRA Band 39	1 880-1 920 MHz	–52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 39
E-UTRA Band 40	2 300-2 400 MHz	–52 dBm	1 MHz	This is not applicable to E-UTRA BS operating in Band 40

NOTE 1 – As defined in the scope for spurious emissions in this clause (§ 4), the co-existence requirements in Table 47Q do not apply for the 10 MHz frequency range immediately outside the BS transmit frequency range of an operating band (see Notes 2 and 3 for the scope). This is also the case when the transmit frequency range is adjacent to the band for the co-existence requirement in the table. Emission limits for this excluded frequency range may also be covered by local or regional requirements.

NOTE 2 – The table above assumes that two operating bands, where the frequency ranges defined either in Note 2 or 3 in the scope 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 this Recommendation.

The power of any spurious emission shall not exceed the limits of Table 47R for a Home BS where requirements for co-existence with a Home BS type listed in the first column apply.

TABLE 47R

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	1 920-1 980 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 1
UTRA FDD Band II or E-UTRA Band 2	1 850-1 910 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 2
UTRA FDD Band III or E-UTRA Band 3	1 710-1 785 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 3
UTRA FDD Band IV or E-UTRA Band 4	1 710-1 755 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 4
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
UTRA FDD Band VI, XIX or E-UTRA Bands 6, 18, 19	815-830 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 18. Requirement in subclause 6.6.4.5.3
	830-850 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Bands 6, 19
UTRA FDD Band VII or E-UTRA Band 7	2 500-2 570 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 7
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
UTRA FDD Band IX or E-UTRA Band 9	1 749.9-1 784.9 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 9
UTRA FDD Band X or E-UTRA Band 10	1 710-1 770 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 10

TABLE 47R (*end*)

Type of coexistence BS	Frequency range for co-location requirement	Maximum Level	Measurement Bandwidth	Note
UTRA FDD Band XI, XXI or E-UTRA Bands 11, 21	1 427.9-1 447.9 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 11
	1 447.9-1 462.9 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 21
UTRA FDD Band XII or E-UTRA Band 12	698-716 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 12
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
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
E-UTRA Band 17	704-716 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 17
E-UTRA Band 20	832-862 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 20
UTRA TDD in Band a) or E-UTRA Band 33	1 900-1 920 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 33
UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 34
UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 35
UTRA TDD in Band b) or E-UTRA Band 36	1 930-1 990 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Bands 2 and 36
UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 37. This unpaired band is defined in Rec. ITU-R M.1036, but is pending any future deployment
UTRA TDD in Band d) or E-UTRA Band 38	2 570-2 620 MHz	–71 dBm	100 kHz	This requirement does not apply to Home BS operating in Band 38
E-UTRA Band 39	1 880-1 920 MHz	–71 dBm	100 kHz	This is not applicable to Home BS operating in Band 39
E-UTRA Band 40	2 300-2 400 MHz	–71 dBm	100 kHz	This is not applicable to Home BS operating in Band 40

NOTE 1 – The coexistence requirements in Table 47R do not apply for the 10 MHz frequency range immediately outside the Home BS transmit frequency range of a downlink operating band.

4.6 Co-location with other base stations for E-UTRA

These requirements may be applied for the protection of other BS receivers when 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.

The power of any spurious emission shall not exceed the limits of Table 47S for a Wide Area BS where requirements for co-location with a BS type listed in the first column apply.

TABLE 47S

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	1 710-1 785 MHz	–98 dBm	100 kHz	
Macro PCS1900	1 850-1 910 MHz	–98 dBm	100 kHz	
Macro GSM850	824-849 MHz	–98 dBm	100 kHz	
WA UTRA FDD Band I or E-UTRA Band 1	1 920-1 980 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band II or E-UTRA Band 2	1 850-1 910 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band III or E-UTRA Band 3	1 710-1 785 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band IV or E-UTRA Band 4	1 710-1 755 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 Bands 6, 19	830-850 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band VII or E-UTRA Band 7	2 500-2 570 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	1 749.9-1 784.9 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band X or E-UTRA Band 10	1 710-1 770 MHz	–96 dBm	100 kHz	

TABLE 47S (*continued*)

Type of co-located BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
WA UTRA FDD Band XI or E-UTRA Band 11	1 427.9-1 447.9 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band XII or E-UTRA Band 12	698-716 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 E-UTRA Band 20	832-862 MHz	–96 dBm	100 kHz	
WA UTRA FDD Band XXI or E-UTRA Band 21	1 447.9-1 462.9 MHz	–96 dBm	100 kHz	
WA UTRA TDD in Band a) or E-UTRA Band 33	1 900-1 920 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33
WA UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 34
WA UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 35
WA UTRA TDD in Band b) or E-UTRA Band 36	1 930-1 990 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Bands 2 and 36
WA UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in Recommendation ITU-R M.1036, but is pending any future deployment.

TABLE 47S (*end*)

Type of co-located BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
WA UTRA TDD in Band d) or E-UTRA Band 38	2 570–2 620 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 38.
WA E-UTRA Band 39	1 880–1 920 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Bands 33 and 39
WA E-UTRA Band 40	2 300-2 400 MHz	–96 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 40

The power of any spurious emission shall not exceed the limits of Table 47T for a Local Area BS where requirements for co-location with a BS type listed in the first column apply.

TABLE 47T

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	1 710-1 785 MHz	–80 dBm	100 kHz	
Pico PCS1900	1 850-1 910 MHz	–80 dBm	100 kHz	
Pico GSM850	824-849 MHz	–70 dBm	100 kHz	
LA UTRA FDD Band I or E-UTRA Band 1	1 920-1 980 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band II or E-UTRA Band 2	1 850-1 910 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band III or E-UTRA Band 3	1 710-1 785 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band IV or E-UTRA Band 4	1 710-1 755 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	830-850 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band VII or E-UTRA Band 7	2 500-2 570 MHz	–88 dBm	100 kHz	

TABLE 47T (*continued*)

Type of co-located BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
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	1 749.9-1 784.9 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band X or E-UTRA Band 10	1 710-1 770 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band XI or E-UTRA Band 11	1 427.9-1 447.9 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band XII or E-UTRA Band 12	698-716 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 E-UTRA Band 20	832-862 MHz	–88 dBm	100 kHz	
LA UTRA FDD Band XXI or E-UTRA Band 21	1 447.9-1 462.9 MHz	–88 dBm	100 kHz	
LA UTRA TDD in Band a) or E-UTRA Band 33	1 900-1 920 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 33
LA UTRA TDD in Band a) or E-UTRA Band 34	2 010-2 025 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 34
LA UTRA TDD in Band b) or E-UTRA Band 35	1 850-1 910 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 35
LA UTRA TDD in Band b) or E-UTRA Band 36	1 930-1 990 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Bands 2 and 36

TABLE 47T (*end*)

Type of co-located BS	Frequency range for co-location requirement	Maximum level	Measurement bandwidth	Note
LA UTRA TDD in Band c) or E-UTRA Band 37	1 910-1 930 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 37. This unpaired band is defined in Recommendation ITU-R M.1036, but is pending any future deployment.
LA UTRA TDD in Band d) or E-UTRA Band 38	2 570-2 620 MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 38.
LA E-UTRA Band 39	1 880–1 920MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Bands 33 and 39
LA E-UTRA Band 40	2 300-2 400MHz	–88 dBm	100 kHz	This is not applicable to E-UTRA BS operating in Band 40

NOTE 1 – The co-location requirements in Table 47S and Table 47T do not apply for the 10 MHz frequency range immediately outside the BS transmit frequency range of a downlink operating band. The current state-of-the-art technology does not allow a single generic solution for co-location with other system on adjacent frequencies for 30 dB BS-BS minimum coupling loss. However, there are certain site-engineering solutions that can be used.

NOTE 2 – The table above assumes that two operating bands, where the corresponding eNode B transmit and receive frequency ranges 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.

NOTE 3 – Co-located TDD base stations that are synchronized and using the same operating band can transmit without special co-locations requirements. For unsynchronized base stations, special co-location requirements may apply.

4.7 Coexistence with PHS

This requirement may be applied for the protection of PHS in geographic areas in which both PHS and UTRA TDD or E-UTRA TDD are deployed. For the 3.84 Mchip/s TDD option, this requirement is also applicable at specified frequencies falling between 12.5 MHz below the first carrier frequency used and 12.5 MHz above the last carrier frequency used. For the 7.68 Mchip/s TDD option, this requirement is also applicable at specified frequencies falling between 25 MHz below the first carrier frequency used and 25 MHz above the last carrier frequency used. For E-UTRA TDD, this requirement is also applicable at specified frequencies falling between 10 MHz

below the lowest BS transmitter frequency of the operating band and 10 MHz above the highest BS transmitter frequency of the operating band.

The power of any spurious emission should not exceed values reported in Table 47U.

TABLE 47U

BS spurious emissions limits for UTRA BS (3.84 Mchip/s and 7.68 Mchip/s TDD options) and E-UTRA BS in geographic coverage area of PHS

Band	Maximum level	Measurement bandwidth	Note
1 884.5-1 919.6 MHz	−41 dBm	300 kHz	Applicable for transmission in 2 010-2 025 MHz

5 Receiver spurious emission

The requirements apply to all BS with separate receive and transmit antenna ports. The test should be performed when both transmitter and receiver are on with the transmitter port terminated.

For BS equipped with only a single antenna connector for both transmitter and receiver, the requirements of transmitter spurious emissions should apply to this port, and this test need not be performed.

The requirements in this subclause should apply to BS intended for general-purpose applications.

The power of any spurious emission should not exceed the values given in the Tables below.

For E-UTRA, in addition to the requirements in Table 48F, the power of any spurious emission should not exceed the levels specified for co-existence with other systems in the same geographical area in § 4.4.

5.1 3.84 Mchip/s UTRA TDD option

TABLE 48A

Receiver spurious emission requirements

Band	Maximum level	Measurement bandwidth	Note
30 MHz-1 GHz	−57 dBm	100 kHz	
1 GHz-1.9 GHz	−47 dBm	1 MHz	With the exception of frequencies between 12.5 MHz below the first carrier frequency and 12.5 MHz above the last carrier frequency used by the BS
1.900-1.980 GHz	−78 dBm	3.84 MHz	With the exception of frequencies between 12.5 MHz below the first carrier frequency and 12.5 MHz above the last carrier frequency used by the BS

TABLE 48A (*end*)

Band	Maximum level	Measurement bandwidth	Note
1.980-2.010 GHz	−47 dBm	1 MHz	With the exception of frequencies between 12.5 MHz below the first carrier frequency and 12.5 MHz above the last carrier frequency used by the BS
2.010-2.025 GHz	–78 dBm	3.84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2.025-2.500 GHz	–47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2.500-2.620 GHz	–78 dBm	3,84 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS
2.620-12.75 GHz	–47 dBm	1 MHz	With the exception of frequencies between 12,5 MHz below the first carrier frequency and 12,5 MHz above the last carrier frequency used by the BS

TABLE 48B

Additional receiver spurious emission requirements

Band	Maximum level	Measurement bandwidth	Note
815 MHz-850 MHz 1 749.9 MHz-1 784.9 MHz	−78 dBm	3.84 MHz	Applicable in Japan. With the exception of frequencies between 12.5 MHz below the first carrier frequency and 12.5 MHz above the last carrier frequency used by the BS

5.2 1.28 Mchip/s UTRA TDD option

TABLE 48C

Receiver spurious emission requirements

Band	Maximum level	Measurement bandwidth	Note
30 MHz-1 GHz	−57 dBm	100 kHz	
1 GHz-12.75 GHz	−47 dBm	1 MHz	With the exception of frequencies between 4 MHz below the first carrier frequency and 4 MHz above the last carrier frequency used by the BS

TABLE 48D

Additional spurious emission requirements

Operating band	Band	Maximum level	Measurement bandwidth	Note
a	1 900-1 920 MHz	–83 dBm	1.28 MHz	With the exception of frequencies between 4 MHz below the first carrier frequency and 4 MHz above the last carrier frequency used by the BS.
	2 010-2 025 MHz	–83 dBm	1.28 MHz	
b	1 850-1 910 MHz	–83 dBm	1.28 MHz	
	1 930-1 990 MHz	–83 dBm	1.28 MHz	
c	1 910-1 930 MHz	–83 dBm	1.28 MHz	
d	2 570-2 620 MHz	–83 dBm	1.28 MHz	
e	2 300-2 400 MHz	–83 dBm	1.28 MHz	
f	1 880-1 920 MHz	–83 dBm	1.28 MHz	

In addition, the requirement in Table 48E may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD are deployed.

TABLE 48E

Additional spurious emission requirements for the FDD bands

Operating band	Protected band	Maximum level	Measurement bandwidth	Note
a, e, f	1 920-1 980 MHz	–78 dBm	3.84 MHz	With the exception of frequencies between 4 MHz below the first carrier frequency and 4 MHz above the last carrier frequency used by the BS.
d, e	2 500-2 570 MHz	–78 dBm	3.84 MHz	

5.3 7.68 Mchip/s UTRA TDD option

TABLE 48F

Receiver spurious emission requirements

Band	Maximum level	Measurement bandwidth	Note
30 MHz-1 GHz	−57 dBm	100 kHz	
1 GHz-1.9 GHz, 1.98 GHz-2.01 GHz 2.025 GHz-2.5 GHz	−47 dBm	1 MHz	With the exception of frequencies between 25 MHz below the first carrier frequency and 25 MHz above the last carrier frequency used by the BS
1.9 GHz-1.98 GHz, 2.01 GHz-2.025 GHz 2.5 GHz-2.62 GHz	−75 dBm	7.68 MHz	With the exception of frequencies between 25 MHz below the first carrier frequency and 25 MHz above the last carrier frequency used by the BS
2.62 GHz-12.75 GHz	−47 dBm	1 MHz	With the exception of frequencies between 25 MHz below the first carrier frequency and 25 MHz above the last carrier frequency used by the BS

TABLE 48G

Additional receiver spurious emission requirements

Band	Maximum level	Measurement bandwidth	Note
815 MHz-850 MHz 1 427.9 MHz-1 452.9 MHz 1 749.9 MHz-1 784.9 MHz	−78 dBm	3.84 MHz	Applicable in Japan With the exception of frequencies between 25 MHz below the first carrier frequency and 25 MHz above the last carrier frequency used by the BS

5.4 E-UTRA TDD option

TABLE 48H

Receiver spurious emission limits

Band	Maximum level	Measurement bandwidth	Note
30 MHz-1 GHz	–57 dBm	100 kHz	
1 GHz-12.75 GHz	–47 dBm	1 MHz	

NOTE 1 – For E-UTRA, the frequency range between 2.5 * $BW_{channel}$ below the first carrier frequency and 2.5 * $BW_{channel}$ above the last carrier frequency transmitted by the BS, where $BW_{channel}$ is the channel bandwidth, may be excluded from the requirement. However, frequencies that are more than 10 MHz below the lowest frequency of the BS transmitter operating band or more than 10 MHz above the highest frequency of the BS transmitter operating band shall not be excluded from the requirement.

Annex 4

TDMA Single-Carrier (UWC-136) base stations

PART A

Conformance requirements (30 kHz)

1 Spectrum mask

Spectrum noise suppression is the restraint of sideband energy outside the active transmit channel. This RF spectrum is the result of power ramping, modulation and all sources of noise. The spectrum is primarily the result of events that do not occur at the same time: digital modulation and power ramping (switching transients). The RF spectrum from these two events are specified separately.

Adjacent and first or second alternate channel power is that part of the mean power output of the transmitter resulting from the modulation and noise which falls within a specified passband centred on either of the adjacent or first or second alternate channels.

The emission power should not exceed the limits specified in Table 49.

TABLE 49

Adjacent and alternate channel power requirements

Channel	Maximum level
In either adjacent channel, centred ±30 kHz from the centre frequency	26 dB below the mean output power
In either alternate channel, centred ±60 kHz from the centre frequency	45 dB below the mean output power
In either second alternate channel centred ±90 kHz from the centre frequency	45 dB below the mean output power or –13 dBm measured in 30 kHz bandwidth, whichever is the lower power

OoB power arising from switching transients is the peak power of the spectrum, arising from the ramping-on and ramping-off of the transmitter, that fall within defined frequency bands outside the active transmit channel.

The peak emission power should not exceed the limits specified in Table 50.

TABLE 50

Switching transients requirements

Channel	Maximum level
In either adjacent channel, centred ±30 kHz from the centre frequency	26 dB below the peak output power reference
In either alternate channel, centred ±60 kHz from the centre frequency	45 dB below the peak output power reference
In either second alternate channel centred ±90 kHz from the centre frequency	45 dB below the peak output power reference or –13 dBm measured in 30 kHz bandwidth, whichever is the lower power

2 Transmitter spurious emissions (conducted)

The power of any spurious emission should not exceed the limits specified in Table 51.

TABLE 51

MS spurious emission limits

Band (f)(1)	Maximum level (dBm)	Measurement bandwidth	Note
9 kHz ≤ f ≤ 150 kHz	–36	1 kHz	(2)
150 kHz < f ≤ 30 MHz	–36	10 kHz	(2)
30 MHz < f ≤ 1 000 MHz	–36	100 kHz	(2)
1 000 MHz < f < 1 920 MHz	–30	1 MHz	(2)
1 920 MHz ≤ f ≤ 1 980 MHz	–30	30 kHz	(3)
1 980 MHz < f < 2 110 MHz	–30	1 MHz	(2)
2 110 MHz ≤ f ≤ 2 170 MHz	–70	30 kHz	(4)
2 170 MHz < f ≤ 12.75 GHz	–30	1 MHz	(2)

(1) f is the frequency of the spurious emission.

(2) In accordance with the applicable clauses of Recommendation ITU-R SM.329.

(3) MS transmit band.

(4) MS receive band.

2.1 Coexistence with services in adjacent frequency bands

This requirement provides for the protection of receivers operating in bands adjacent to the MS transmit frequency band of 1 920 to 1 980 MHz: GSM 900, R-GSM and UTRA TDD.

NOTE 1 – UTRA FDD operates in the same frequency band as UWC-136.

The power of any spurious emission should not exceed the limits specified in Table 52.

TABLE 52

Additional spurious emissions requirements

Service	Frequency band	Measurement bandwidth (kHz)	Limit (dBm)
R-GSM	921 ≤ f ≤ 925 MHz	100	–60
R-GSM	925 < f ≤ 935 MHz	100	–67
GSM 900/R-GSM	935 < f ≤ 960 MHz	100	–79
DCS 1800	1 805 ≤ f ≤ 1 880 MHz	100	–71
UTRA TDD	1 900 ≤ f ≤ 1 920 MHz	100	–62
UTRA TDD	2 010 ≤ f ≤ 2 025 MHz	100	–62

NOTE 1 – The measurements are made on frequencies which are integer multiples of 200 kHz. Up to five exceptions of up to –36 dBm are permitted in the GSM 900, DCS 1800 and UTRA bands, and up to three exceptions of up to –36 dBm are permitted in the GSM 400 bands.

3 Receiver spurious emissions (idle mode)

The power of any spurious emissions should not exceed the limits given in Table 53.

TABLE 53

General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level (dBm)	Note
30 MHz ≤ f < 1 GHz	100 kHz	–57	
1 GHz ≤ f ≤ 12.75 GHz	1 MHz	–47	With the exception of the frequencies covered by the table below, for which additional receiver spurious emission requirements apply(1)

(1) *Editorial Note* – In TFES Harmonized Standard v1.0.2, no additional receiver spurious emission is specified; yet, it is expected that there will be a table added, in the same form as for the other technologies (see Annexes 1, 2 and 3).

PART B

Conformance requirements (200 kHz)

The 200 kHz channel provides packet data service and employs both 8-level phase shift keying (8-PSK) and Gaussian minimum shift keying (GMSK) modulations.

1 Spectrum mask

Output RF spectrum is the relationship between the frequency offset from the carrier and the power, measured in a specified bandwidth and time, produced by the MS due to the effects of modulation and power ramping.

The specifications contained in this subclause apply in frequency hopping as well as in non-frequency hopping modes.

Due to the bursty nature of the signal, the output RF spectrum results from two effects: the modulation process, and the power ramping up and down (switching transients).

– The level of the output RF spectrum due to GMSK and 8-PSK modulations should be no more than that given in Tables 54 and 55.

– The level of the output RF spectrum due to switching transients should be no more than that given in Table 56.

– The power emitted should not exceed –71 dBm in frequency band 2 110-2 170 MHz.

2 Spectrum due to the modulation and wideband noise

The output RF modulation spectrum is specified in Tables 54 and 55. This specification applies for all RF channels supported by the equipment.

The specification applies to the entire relevant transmit band and up to 2 MHz either side.

The limits should be met under the following measurement conditions:

– Zero frequency scan, filter bandwidth and video bandwidth of 30 kHz up to 1 800 kHz from the carrier and 100 kHz at 1 800 kHz and above from the carrier, with averaging done over 50% to 90% of the useful part of the transmitted bursts, excluding the midamble, and then averaged over at least 200 such burst measurements. Above 1 800 kHz from the carrier, only measurements centred on 200 kHz multiples are taken with averaging over 50 bursts.

– When tests are done in frequency hopping mode, the averaging should include only bursts transmitted when the hopping carrier corresponds to the nominal carrier of the measurement. The limits then apply to the measurement results for any of the hopping frequencies.

The figures in Table 54, at the vertically listed power level (dBm) and at the horizontally listed frequency offset from the carrier (kHz), are then the maximum allowed level (dB) relative to a measurement in 30 kHz on the carrier.

NOTE 1 – This approach of specification has been chosen for convenience and speed of testing. It does however require careful interpretation if there is a need to convert figures in the following tables into spectral density values, in that only part of the power of the carrier is used as the relative reference, and in addition different measurement bandwidths are applied at different offsets from the carrier.

TABLE 54

Relative maximum level due to modulation

Carrier power (dBm)	**Frequency offset (kHz)**							
	100	200	250	400	≥ 600 < 1 200	≥ 1 200 <1 800	≥ 1 800 < 6 000	≥ 6 000
≥ 33	+0.5	–30	–33	–60	–60	–60	–68	–76
32	+0.5	–30	–33	–60	–60	–60	–67	–75
30	+0.5	–30	–33	–60	–60(1)	–60	–65	–73
28	+0.5	–30	–33	–60	–60(1)	–60	–63	–71
26	+0.5	–30	–33	–60	–60(1)	–60	–61	–69
≤ 24	+0.5	–30	–33	–60	–60(1)	–60	–59	–67

(1) For equipment supporting 8-PSK, the requirement for 8-PSK modulation is –54 dB.

The following exceptions should apply, using the same measurement conditions as specified above:

– In the combined range of 600 kHz to 6 MHz above and below the carrier, in up to three bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz, exception levels of up to –36 dBm are allowed.

– Above 6 MHz offset from the carrier in up to 12 bands of 200 kHz width centred on a frequency which is an integer multiple of 200 kHz, exception levels of up to –36 dBm are allowed.

Using the same measurement conditions as specified above, if a requirement in Table 54 results in lower than the power limit given in Table 55, then the latter should be applied instead.

TABLE 55

Absolute maximum level due to modulation

Frequency offset from the carrier (kHz)	Level (dBm)
< 600	–36
≥ 600, < 1 800	–56
≥ 1 800	–51

3 Spectrum due to switching transients

These effects are also measured in the time domain and the specifications assume the following measurement conditions: zero frequency scan, filter bandwidth 30 kHz, peak hold, and video bandwidth 100 kHz. Table 56 specifies the limits.

TABLE 56

Maximum levels due to switching transients

Carrier power level (dBm)	Maximum level measured at various frequency offsets			
	400 kHz	600 kHz	1 200 kHz	1 800 kHz
39	–21 dBm	–26 dBm	–32 dBm	–36 dBm
≤ 37	–23 dBm	–26 dBm	–32 dBm	–36 dBm

NOTE 1 – The relaxation for carrier power level 39 dBm is in line with the modulated spectra and thus causes negligible additional interference to an analogue system by an UWC-136 200 kHz signal.

NOTE 2 – The near-far dynamics with this specification has been estimated to be approximately 58 dB for MS operating at a power level of 8 W or 49 dB for MSs operating at a power level of 1 W. The near-far dynamics then gradually decreases by 2 dB per power level down to 32 dB for MSs operating in cells with a maximum allowed output power of 20 mW or 29 dB for MS operating at 10 mW.

NOTE 3 – The possible performance degradation due to switching transient leaking into the beginning or the end of a burst, was estimated and found to be acceptable with respect to the BER due to co-channel interference, *C*/*I*.

4 Transmitter spurious emissions (conducted)

The power of any spurious emission should not exceed the limits specified in Table 57.

TABLE 57

MS spurious emission limits

Band (f)[1]	Measurement bandwidth	Maximum level (dBm)	Note
9 kHz ≤ f ≤ 150 kHz	1 kHz	–36	(2)
150 kHz < f ≤ 30 MHz	10 kHz	–36	(2)
30 MHz < f ≤ 1 000 MHz	100 kHz	–36	(2)
1 000 MHz < f < 1 920 MHz	1 MHz	–30	(2)
1 920 MHz ≤ f ≤ 1 980 MHz	100 kHz	–36	(3)
1 980 MHz < f < 2 110 MHz	1 MHz	–30	(2)
2 110 MHz ≤ f ≤ 2 170 MHz	100 kHz	–66	(4)
2 170 MHz < f ≤ 12.75 GHz	1 MHz	–30	(2)

(1) f is the frequency of the spurious emission.

(2) In accordance with the applicable clauses of Recommendation ITU-R SM.329.

(3) MS transmit band.

(4) MS receive band.

5 Coexistence with services in adjacent frequency bands

This requirement provides for the protection of receivers operating in bands adjacent to the MS transmit frequency band of 1 920 MHz to 1 980 MHz: GSM 900, R-GSM, UTRA TDD.

The power of any spurious emission should not exceed the limits specified in Table 58.

TABLE 58

Additional spurious emissions requirements

Service	Frequency band	Measurement bandwidth (kHz)	Minimum requirement (dBm)
R-GSM	921 ≤ f ≤ 925 MHz	100	–60
R-GSM	925 < f ≤ 935 MHz	100	–67
GSM 900/R-GSM	935 < f ≤ 960 MHz	100	–79
DCS 1800	1 805 ≤ f ≤ 1 880 MHz	100	–71
UTRA TDD	1 900 ≤ f ≤ 1 920 MHz	100	–62
UTRA TDD	2 010 ≤ f ≤ 2 025 MHz	100	–62

NOTE 1 – The measurements are made on frequencies which are integer multiples of 200 kHz. Up to five exceptions of up to –36 dBm are permitted in the GSM 900, DCS 1800 and UTRA bands, and up to three exceptions of up to –36 dBm are permitted in the GSM 400 bands.

6 Receiver spurious emissions (idle mode)

The power of any spurious emissions should not exceed the limits given in Table 59.

TABLE 59

General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level (dBm)	Note
30 MHz ≤ f < 1 GHz	100 kHz	–57	
1 GHz ≤ f ≤ 12.75 GHz	1 MHz	–47	With the exception of the frequencies covered by the Table 46, for which additional receiver spurious emission requirements apply(1)

(1) *Editorial Note* – In TFES Harmonized Standard v1.0.2, no additional receiver spurious emission is specified; yet, it is expected that there will be a table added, in the same form as for the other technologies (see Annexes 1, 2 and 3).

Annex 5

FDMA/TDMA (Digital enhanced cordless telecommunications (DECT)) base stations

1 Spectrum mask

If the equipment under test (EUT) is equipped with antenna diversity, the EUT should have the diversity operation defeated for the following tests.

2 Emissions due to modulation

The unwanted emission(s) due to modulation is the power measured in any DECT RF channel other than the one in which the EUT is transmitting, integrated over a bandwidth of 1 MHz.

With transmissions on physical channel Ra (K, L, M, N) in successive frames, the power in physical channel Ra (K, L, Y, N) should be less than the values given in Table 60.

TABLE 60

Emissions modulation

Emissions on RF channel "*Y*"	Measurement bandwidth	Maximum power level
$Y = M \pm 1$	(1)	160 µW (–8 dBm)
$Y = M \pm 2$	(1)	1 µW (–30 dBm)
$Y = M \pm 3$	(1)	80 nW (–41 dBm)
Y = any other DECT channel	(1)	40 nW (–44 dBm)(2)

(1) The power in RF channel Y is defined by integration over a bandwidth of 1 MHz centred on the nominal centre frequency, F_Y, averaged over at least 60% but less than 80% of the physical packet, and starting before 25% of the physical packet has been transmitted but after the synchronization word.

(2) For Y = "any other DECT channel", the maximum power level should be less than 40 nW (–44 dBm) except for one instance of a 500 nW (–33 dBm) signal.

3 Emissions due to transmitter transients

The power level of all modulation products (including AM components due to the switching on or off of the modulated RF carrier) in a DECT RF channel as a result of a transmission on another DECT RF channel.

The power level of all modulation products (including AM products due to the switching on or off of a modulated RF carrier) arising from a transmission on RF channel M should, when measured using a peak hold technique, be less than the values given in Table 61.

TABLE 61

Emissions due to transmitter transients

Emissions on RF channel "*Y*"	Measurement bandwidth	Maximum power level
$Y = M \pm 1$	(1)	250 µW (–6 dBm)
$Y = M \pm 2$	(1)	40 µW (–14 dBm)
$Y = M \pm 3$	(1)	4 µW (–24 dBm)
Y = any other DECT channel	(1)	1 µW (–30 dBm)

(1) The measurement bandwidth should be 100 kHz and the power should be integrated over a 1 MHz bandwidth centred on the DECT frequency, F_Y.

4 Transmitter spurious emissions (conducted)

4.1 Spurious emissions when allocated a transmit channel

The spurious emissions, when a radio end point has an allocated physical channel, should meet the requirements of Table 62. The requirements of Table 62 are only applicable for frequencies which are greater than 12.5 MHz away from the centre frequency, f_c, of a carrier.

TABLE 62

Spurious emissions requirements

Frequency	Minimum requirement/ Reference bandwidth
30 MHz ≤ f < 1 000 MHz	–36 dBm/100 kHz
1 GHz ≤ f < 12.75 GHz	–30 dBm/1 MHz
f_c – 12.5 MHz < f < f_c + 12.5 MHz	Not defined

Measurements should not be made for transmissions on the RF channel closest to the nearest band edge for frequency offsets of up to 2 MHz.

5 Receiver spurious emissions (idle mode)

5.1 Spurious emissions when the EUT has no allocated transmit channel

The power level of any spurious emissions when the radio end point has no allocated transmit channel should not exceed the limits specified in Table 63.

TABLE 63

Receiver spurious emissions

Frequency band	Measurement bandwidth	Maximum level (dBm)	Note
30 MHz ≤ f < 1 GHz	100 kHz(1)	–57	
1 GHz ≤ f ≤ 12.75 GHz	1 MHz(1)	–47	With the exception of the frequencies within the DECT band, covered by Table 50

(1) The power should be measured using a peak hold technique.

5.2 In the DECT band

The power level of any receiver spurious emissions within the DECT band should not exceed the limit in Table 64.

TABLE 64

Receiver spurious emissions within DECT band

Frequency band (MHz)	Measurement bandwidth (MHz)	Maximum level (dBm)
1 900-1 920 2 010-2 025	1	–57(1)

(1) The following exceptions are allowed:

- in one 1 MHz band, the maximum allowable e.r.p. should be less than 20 nW;
- in up to two bands of 30 kHz, the maximum e.r.p. should be less than 250 nW.

Annex 6

IMT-2000 OFDMA TDD WMAN base stations

1 Introduction

This Annex identifies unwanted emission limits for IMT-2000 OFDMA TDD WMAN base stations.

OFDMA TDD WMAN base stations comply with all local and/or regional rules and regulations applicable to them. All such regulations take precedence over the limits expressed in this Annex.

2 Spectrum emission mask

2.1 Default spectrum emission mask

The spectrum masks of Tables 65 and 66 are applicable to all bands and all regions unless specific mask for a band or a region is specified in a relevant subsection of Section 2.

TABLE 65

Spectrum emission mask for 5 MHz carrier

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 7.5	100	–7-7(Δf-2.55)/5
7.5 to ≤12.5	100	–14

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 100 kHz filter is at Δf equals to 2.550 MHz; the last is at Δf equals to 12.450 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 66

Spectrum emission mask for 10 MHz carrier

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5 to < 10	100	–7-7(Δf-5.05)/5
10 to < 15	100	–14
15 to ≤ 25	1 000	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 100 kHz filter is at Δf equals to 5.05 MHz; the last is at Δf equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 15.5 MHz; the last is at Δf equals to 24.5 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

2.2 Spectrum emission mask for TDD equipment operating in the band 2 300-2 400 MHz (BCG 1.A/1.B)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

TABLE 67

Spectrum emission mask for 5 MHz carrier

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$2.5 \leq \Delta f < 3.5$ MHz	–13 dBm	50 kHz
$3.5 \leq \Delta f < 12.5$ MHz	–13 dBm	1 MHz

TABLE 68

Spectrum emission mask for 10 MHz carrier

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$5 \leq \Delta f < 6$ MHz	–13 dBm	100 kHz
$6 \leq \Delta f < 25$ MHz	–13 dBm	1 MHz

TABLE 69

Spectrum emission mask for 8.75 MHz carrier

(a) Ptx ≥ 40 dBm

Frequency offset from centre	Allowed emission	Measurement bandwidth
$4.77 \leq \Delta f < 22.5$ MHz	–56.9 dBc	100 kHz
$\Delta f > 22.5$ MHz	–13 dBm	1 MHz

(b) 29 dBm ≤ Ptx < 40 dBm

Frequency offset from centre	Allowed emission	Measurement bandwidth
$4.77 \leq \Delta f < 22.5$ MHz	–53.9 dBc	100 kHz
$\Delta f > 22.5$ MHz	–13 dBm	1 MHz

TABLE 69 (*end*)

(c) Ptx < 29 dBm

Frequency offset from centre	Allowed emission	Measurement bandwidth
$4.77 \leq \Delta f < 22.5$ MHz	–14.5 dBm	1MHz
$\Delta f > 22.5$ MHz	–13 dBm	1 MHz

NOTE 1 – Definition of dBc from Recommendation ITU-R SM.329-10: Decibels relative to the unmodulated carrier power of the emission. In the cases which do not have a carrier, for example in some digital modulation schemes where the carrier is not accessible for measurement, the reference level equivalent to dBc is decibels relative to the mean power P.

2.3 Spectrum emission mask for TDD equipment operating in the band 2 500-2 690 MHz (BCG 3.A)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

TABLE 70

Spectrum emission mask for 5 MHz carrier

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$2.5 \leq \Delta f < 3.5$ MHz	–13 dBm	50 kHz
$3.5 \leq \Delta f < 12.5$ MHz	–13 dBm	1 MHz

TABLE 71

Spectrum emission mask for 10 MHz carrier

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$5 \leq \Delta f < 6$ MHz	–13 dBm	100 kHz
$6 \leq \Delta f < 25$ MHz	–13 dBm	1 MHz

TABLE 72

Adjacent channel leakage power – Japan

Channel size	Measurement frequency range (MHz)	Allowed adjacent channel leakage power (dBm)
5 MHz	$2.6 < \Delta f < 7.4$	7
10 MHz	$5.25 < \Delta f < 14.75$	3

TABLE 73

Spectrum emission mask for 5 MHz carrier – Japan

Frequency offset from centre	Allowed emission level	Measurement bandwidth
7.5 MHz ≤ Δf < 12.25	–15–1.4 × (Δf –7.5) dBm	1 MHz
12.25 ≤ Δf < 22.5 MHz	–22 dBm	1 MHz

NOTE 1 – The adjacent channel leakage power for the 5 MHz channel from 2.6 MHz to 7.4 MHz is shown in Table 72.

TABLE 74

Spectrum emission mask for 10 MHz carrier – Japan

Frequency offset from centre	Allowed emission level	Measurement bandwidth
15 ≤ Δf < 25 MHz	–22 dBm	1 MHz

NOTE 1 – The adjacent channel leakage power for the 10 MHz channel from 5.25 MHz to 14.75 MHz is shown in Table 72.

2.4 Spectrum emission mask for FDD equipment operating in the band 2 496-2 572/ 2 614-2 690 MHz (BCG 3.B)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

TABLE 75

Spectrum emission mask for 5 MHz carrier

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 3.5	50	–13
3.5 to ≤ 12.5	1 000	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 50 kHz filter is at Δf equals to 2.525 MHz; the last is at Δf equals to 3.475 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 4.0 MHz; the last is at Δf equals to 12.0 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 76

Spectrum emission mask for 10 MHz carrier

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5 to < 6	100	–13
6 to ≤ 25	1 000	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 100 kHz filter is at Δf equals to 5.050 MHz; the last is at Δf equals to 5.950 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 6.5 MHz; the last is at Δf equals to 24.5 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 77

Spectrum emission mask for 5 MHz carrier – Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 7.5	100	–7-7(Δf-2.55)/5
7.5 to ≤ 12.5	100	–14

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 100 kHz filter is at Δf equals to 2.550 MHz; the last is at Δf equals to 12.450 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 78

Spectrum emission mask for 10 MHz carrier – Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5 to < 10	100	–7-7(Δf-5.05)/5
10 to < 15	100	–14
15 to ≤ 25	1 000	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 100 kHz filter is at Δf equals to 5.05 MHz; the last is at Δf equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 15.5 MHz; the last is at Δf equals to 24.5 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

2.5 Spectrum emission mask for TDD equipment operating in the band 3 400-3 600 MHz (BCG 5L.A/5L.B/5L.C)

The spectrum emission mask for 5, 7 and 10 MHz bandwidth sizes are specified in Table 75. This mask is a relative mask with breakpoints of the underlying piecewise linear power density mask. This mask is conditionally applicable depending on the base station P_{nom} power level.

FIGURE 1

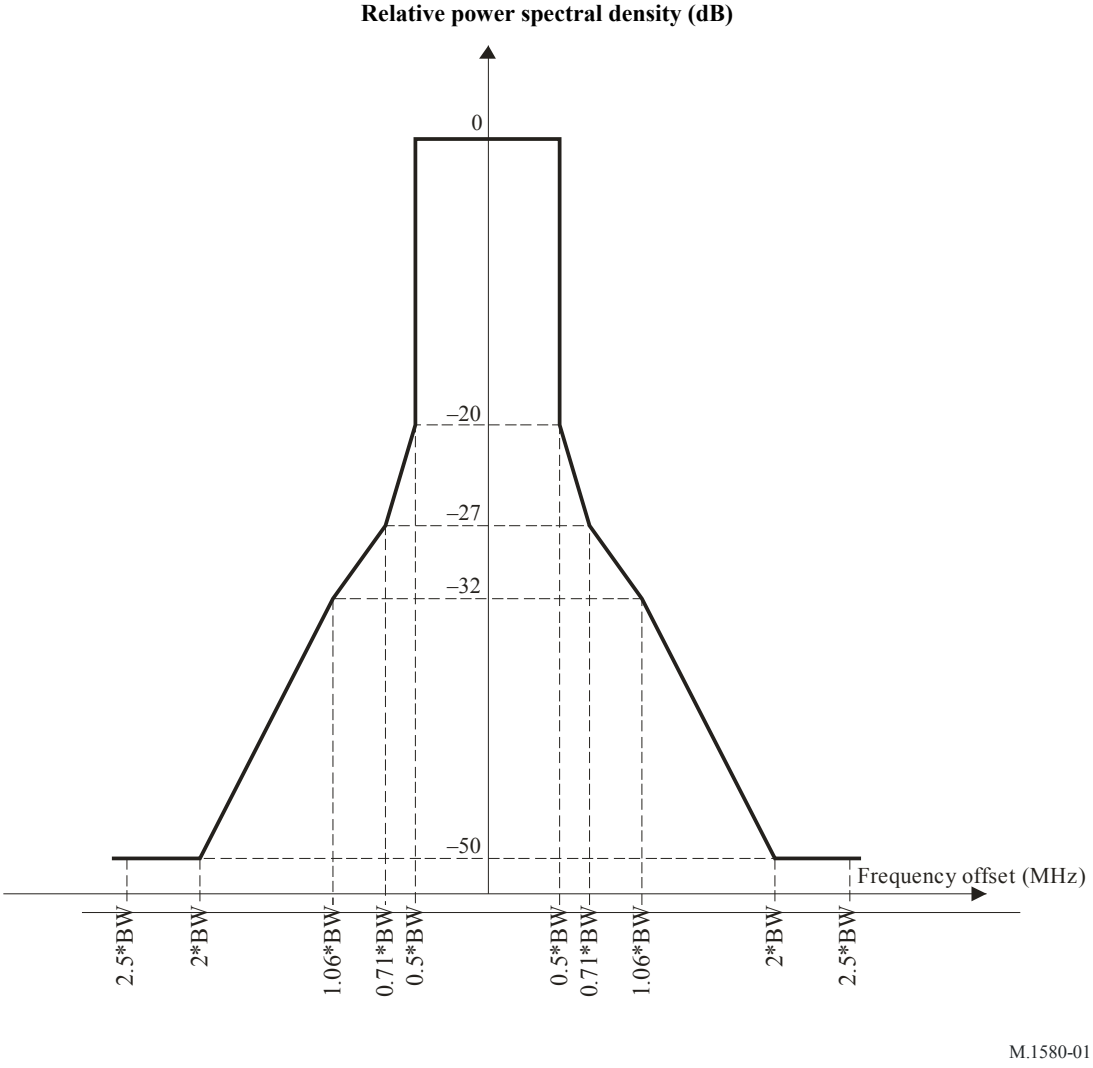

TABLE 79

Relative transmit spectral power density mask

Power	Frequency offset				
	0.5*BW	**0.71*BW**	**1.06*BW**	**2.0*BW**	**2.5*BW**
39 dBm < P_{nom}	–20 dB	–27 dB	–32 dB	–50dB	–50 dB
33 dBm < P_{nom} ≤39 dBm	–20 dB	–27 dB	–32 dB	–50 dB + (39 dBm – P_{nom})	Refer to Table 80

TABLE 80

Absolute spectral emission mask

Power	Frequency offset			
	0.50 BW ≤ Δ*f* < 0.71 BW	**0.71 BW ≤ Δ*f* < 1.06 BW**	**1.06 BW ≤ Δ*f* < 2.00 BW**	**2.00 BW ≤ Δ*f* ≤ 2.50 BW**
33 dBm < P_{nom} ≤ 39 dBm	Refer to Table 79	Refer to Table 79	Refer to Table 79	–21 + x dBm/ MHz
P_{nom} ≤ 33 dBm	–5.5 dBm/MHz	–5.5 dBm/MHz	–23.5 dBm/MHz	–23.5 dBm/MHz

NOTE 1 – x = –10 log(BW/10).

NOTE 2 – BW: Channel bandwidth in MHz.

NOTE 3 – P_{nom}: Transmitter nominal maximum output power.

2.6 Spectrum emission mask for TDD equipment operating in the band 3 600-3 800 MHz (BCG 5H.A/5H.B/5H.C)

The spectrum emission mask for 5, 7 and 10 MHz bandwidth sizes are specified in Table 79. Table 80 specifies breakpoints of the underlying piecewise linear power spectral density mask. This mask is a relative mask and conditionally applicable depending on the base station P_{nom} power level.

TABLE 81

Relative spectrum emission mask

Power	Frequency offset				
	0.5*BW	**0.71*BW**	**1.06*BW**	**2.0*BW**	**2.5*BW**
39 dBm < P_{nom}	–20 dB	–27 dB	–32 dB	–50 dB	–50 dB
33 dBm < P_{nom} ≤39 dBm	–20 dB	–27 dB	–32 dB	–50 dB + (39 dBm – P_{nom})	Refer to Table 82

TABLE 82

Absolute spectral emission

Power	Frequency offset			
	0.50 BW ≤ Δ*f* < 0.71 BW	**0.71 BW ≤ Δ*f* < 1.06 BW**	**1.06 BW ≤ Δ*f* < 2.00 BW**	**2.00 BW ≤ Δ*f* ≤ 2.50 BW**
33 dBm < P_{nom} ≤ 39 dBm	Refer to Table 81	Refer to Table 81	Refer to Table 81	–21 + x dBm/MHz
P_{nom} ≤ 33 dBm	–5.5 dBm/MHz	–5.5 dBm/MHz	–23.5 dBm/MHz	–23.5 dBm/MHz

NOTE 1 – x = –10 log(BW/10)

NOTE 2 – BW: Channel bandwidth in MHz

NOTE 3 – P_{nom}: Transmitter nominal maximum output power

2.7 Spectrum emission mask for FDD equipment operating in the band 1 710-1 770/2 110-2 170 MHz (BCG 6.A)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 83 and 84 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE 83

Spectrum emission mask for 5 MHz carrier

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$2.5 \leq \Delta f < 3.5$ MHz	–13 dBm	50 kHz
$3.5 \leq \Delta f < 12.5$ MHz	–13 dBm	1 MHz

TABLE 84

Spectrum emission mask for 10 MHz carrier

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$5 \leq \Delta f < 6$ MHz	–13 dBm	100 kHz
$6 \leq \Delta f < 25$ MHz	–13 dBm	1 MHz

NOTE 1 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

NOTE 2 – Protection requirement beyond 25 MHz (250% of the bandwidth) is specified in the spurious emissions requirement.

2.8 Spectrum emission mask for FDD equipment operating in the band 1 920-1 980/2 110-2 170 MHz (BCG 6.B)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 85 and 86 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE 85

Spectrum emission mask for 5 MHz carrier

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$2.5 \leq \Delta f < 7.5$ MHz	$-7.0\text{-}7/5 \times (\Delta f\text{-}2.55)$ dBm	100 kHz
$7.5 \leq \Delta f < 12.5$ MHz	–14 dBm	100 kHz

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 100 kHz filter is at Δf equals to 2.55 MHz; the last is at Δf equals to 12.45 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 86

Spectrum emission mask for 10 MHz carrier

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$5 \leq \Delta f < 6$ MHz	$-7.0-7/5\times(\Delta f-5.05)$ dBm	100 kHz
$10 \leq \Delta f < 15$ MHz	–14 dBm	100 kHz
$15 \leq \Delta f < 25$ MHz	–13 dBm	1 MHz

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 100 kHz filter is at Δf equals to 5.05 MHz; the last is at Δf equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 15.5 MHz; the last is at Δf equals to 24.5 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

2.9 Spectrum emission mask for FDD equipment operating in the band 1 710-1 785/1 805-1 880 MHz (BCG 6.C)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 87 and 88 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE 87

Spectrum emission mask for 5 MHz carrier

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.515 to < 2.715	30	–14
2.715 to < 3.515	30	$-14-15(\Delta f-2.715)$
3.515 to < 4.0	30	–26
4.0 to ≤ 12.5	1 000	–13

TABLE 88

Spectrum emission mask for 10 MHz carrier

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5.015 to < 5.215	30	–14
5.215 to < 6.015	30	–14-15(Δf-52.2715)
6.015 to < 6.5	30	–26
6.5 to < 15.50	1 000	–13
15.50 to ≤ 25.0	1 000	–15

2.10 Spectrum emission mask for TDD equipment operating in the band 698-862 MHz (BCG 7.A)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier, between 3.5 MHz and 17.5 MHz away for the 7 MHz carrier, and between 5 MHz and 25 MHz away for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 89, 90, 91, 92, 93 and 94 specify the spectrum emissions for TDD base stations with 5, 7 and 10 MHz channel bandwidths.

TABLE 89

Spectrum emission mask for 5 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 2.6	30	–13
2.6 to ≤ 12.5	100	–13

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE 90

Spectrum emission mask for 7 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
3.5 to < 3.6	30	–13
3.6 to ≤ 17.5	100	–13

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE 91

Spectrum emission mask for 10 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5.0 to < 5.1	30	–13
5.1 to ≤ 25.0	100	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 92

Spectrum emission mask for 5 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 7.5	100	$-7-7(\Delta f-2.55)/5$
7.5 to ≤ 12.5	100	–14

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE 93

Spectrum emission mask for 7 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
3.5 to < 7	100	$-7-7(\Delta f-5.05)/5$
7 to < 10.5	100	–14
10.5 to ≤ 17.5	1 000	–13

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE 94

Spectrum emission mask for 10 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5 to < 10	100	–7-7(Δf-5.05)/5
10 to < 15	100	–14
15 to ≤ 25	1 000	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

2.11 Spectrum emission mask for FDD equipment operating in the band 776-787/746-757 MHz (BCG 7.B)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 95, 96, 97 and 98 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE 95

Spectrum emission mask for 5 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 2.6	30	–13
2.6 to ≤ 12.5	100	–13

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE 96

Spectrum emission mask for 10 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5.0 to < 5.1	30	–13
5.1 to ≤ 25.0	100	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 97

Spectrum emission mask for 5 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 7.5	100	$-7-7(\Delta f-2.55)/5$
7.5 to ≤ 12.5	100	–14

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE 98

Spectrum emission mask for 10 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5 to < 10	100	$-7-7(\Delta f-5.05)/5$
10 to < 15	100	–14
15 to ≤ 25	1 000	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

2.12 Spectrum emission mask for FDD equipment operating in the band 788-793/758-763 and 793-798/763-768 MHz (BCG 7.C)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 99 and 100 specify the spectrum emissions for FDD base stations with 5 channel bandwidth.

TABLE 99

Spectrum emission mask for 5 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 2.6	30	–13
2.6 to ≤ 12.5	100	–13

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE 100

Spectrum emission mask for 5 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 7.5	100	–7-7(Δf-2.55)/5
7.5 to ≤ 12.5	100	–14

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

2.13 Spectrum emission mask for FDD equipment operating in the band 788-798/758-768 MHz (BCG 7.D)

The spectrum emission mask of base stations applies to frequency offsets between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 101 and 102 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE 101

Spectrum emission mask for 10 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5.0 to < 5.1	30	–13
5.1 to ≤ 25.0	100	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 –The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 102

Spectrum emission mask for 10 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5 to < 10	100	$-7-7(\Delta f-5.05)/5$
10 to < 15	100	–14
15 to ≤ 25	1 000	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

2.14 Spectrum emission mask for TDD and FDD equipment operating in the band 698-862 MHz (BCG 7.E)

The spectrum emission mask of base stations applies to frequency offsets between 2.5 MHz and 12.5 MHz away from the base station centre frequency for the 5 MHz carrier, between 3.5 MHz and 17.5 MHz for the 7 MHz carrier, and between 5 MHz and 25 MHz away for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 103 to 109 specify the spectrum emissions for TDD base stations with 5, 7 and 10 MHz channel bandwidths.

TABLE 103

Spectrum emission mask for 5 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 2.6	30	–13
2.6 to ≤ 12.5	100	–13

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE 104

Spectrum emission mask for 7 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
3.5 to < 3.6	30	–13
3.6 to ≤ 17.5	100	–13

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE 105

Spectrum emission mask for 10 MHz carrier-US

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5.0 to < 5.1	30	–13
5.1 to ≤ 25.0	100	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

TABLE 106

Spectrum emission mask for 5 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
2.5 to < 7.5	100	–7-7(Δf-2.55)/5
7.5 to ≤ 12.5	100	–14

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE 107

Spectrum emission mask for 7 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
3.5 to < 7	100	–7-7(Δf-5.05)/5
7 to < 10.5	100	–14
10.5 to ≤ 17.5	1 000	–13

NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE 108

Spectrum emission mask for 10 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/Integration bandwidth) as measured at the antenna port
5 to < 10	100	–7-7(Δf-5.05)/5
10 to < 15	100	–14
15 to ≤ 25	1 000	–13

NOTE 1 – Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.

NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated.

2.15 Spectrum emission mask for FDD equipment operating in the band 880-915/925-960 MHz (BCG 7.G)

The spectrum emission mask of base stations applies to frequency offsets between 5 MHz and 25 MHz away from the base station centre frequency for the 10 MHz carrier. Δf is defined as the frequency offset in MHz from the channel centre frequency.

Tables 109 and 110 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE 109

Spectrum emission mask for 5 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/integration bandwidth) as measured at the antenna port
2.515 to < 2.715	30	–14
2.715 to < 3.515	30	–14-15(Δf-2.715)
3.515 to < 4.0	30	–26
4.0 to ≤ 12.5	1 000	–13

TABLE 110

Spectrum emission mask for 10 MHz carrier-Europe

Offset Δf from channel centre (MHz)	Integration bandwidth (kHz)	Allowed emission level (dBm/integration bandwidth) as measured at the antenna port
5.015 to < 5.215	30	–14
5.215 to < 6.015	30	–14-15(Δf-52.2715)
6.015 to < 6.5	30	–26
6.5 to < 15.50	1 000	–13
15.50 to ≤ 25.0	1 000	–15

3 Transmitter spurious emissions (conducted)

IMT-2000 OFDMA TDD WMAN base stations comply with the limits recommended in Recommendation ITU-R SM.329-10.

3.1 Default spurious emissions

Unless otherwise specified in subsections of § 3 for specific bands, the default spurious emission specifications of Table 111 are applicable.

TABLE 111

Default spurious emission

Spurious frequency (f) range	Measurement bandwidth	Maximum emission level (dBm)
9 kHz ≤ f < 150 kHz	1 kHz	–36
150 kHz ≤ f < 30 MHz	10 kHz	–36
30 MHz ≤ f < 1 000 MHz	100 kHz	–36
1 GHz ≤ f < 5 × F_{ue}	30 kHz If 2.5 × ChBW <= Δf < 10 × ChBW 300 kHz If 10 × ChBW <= Δf < 12 × ChBW 1 MHz If 12 × ChBW <= Δf	–30

3.2 Spurious emissions for TDD equipment operating in the band 2 300-2 400 MHz (BCG 1.A/1.B)

The limits shown in Tables 112 and 113 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and greater than 25 MHz for the 10 MHz carrier. f is the frequency of the spurious domain emissions. f_c is the base station centre frequency.

TABLE 112

Spurious emission limit, Category A

Band	Allowed emission level	Measurement bandwidth	Note
30 MHz-1 GHz	–13 dBm	100 kHz	Bandwidth as in Recommendation ITU-R SM.329-10, § 4.1
1 GHz-13.45 GHz		1 MHz	Upper frequency as in Recommendation ITU-R SM.329-10, § 2.5, Table 1

TABLE 113

Spurious emissions limit, Category B

Band	Measurement bandwidth	Allowed emission level
9 kHz ≤ f < 150 kHz	1 kHz	–36 dBm
150 kHz ≤ 5f < 30 MHz	10 kHz	–36 dBm
30 MHz ≤ f < 1 000 MHz	100 kHz	–36 dBm
1 GHz ≤ f < 13.45 GHz	30 kHz If 2.5 × BW ≤ | $f_c - f$ | < 10 × BW 300 kHz If 10 × BW ≤ | $f_c - f$ | < 12 × BW 1 MHz If 12 × BW ≤ | $f_c - f$ |	–30 dBm

NOTE 1 – In Table 113, BW is the signal channel bandwidth of 5 or 10 MHz.

For a channel bandwidth of 8.75 MHz, Table 112 applies.

TABLE 114

Additional spurious emissions for 5 MHz channel size; relevant to 2 302.5 ≤ f_c ≤ 2 397.5 (BCG 1.B)

No	Spurious frequency (f) range (MHz)	Measurement bandwidth (MHz)	Maximum emission level (dBm)
1	876 ≤ f < 915	1	–51
2	921 ≤ f < 925	1	–47
3	925 ≤ f < 960	1	–52
4	1 710 ≤ f < 1 785	1	–51
5	1 805 ≤ f < 1 880	1	–52
6	1 920 ≤ f < 1 980	1	–49
7	2 110 ≤ f < 2 170	1	–52
8	1 900 ≤ f < 1 920	1	–52
9	2 010 ≤ f < 2 025	1	–52
10	2 500 ≤ f < 2 570	1	–49
11	2 570 ≤ f < 2 620	1	–52
12	2 620 ≤ f < 2 690	1	–52

TABLE 115

Additional spurious emissions for 10 MHz channel size; relevant to 2 305 ≤ f_c ≤ 2 395 (BCG 1.B)

No	Spurious frequency (f) range (MHz)	Measurement bandwidth (MHz)	Maximum emission level (dBm)
1	876 ≤ f < 915	1	–51
2	921 ≤ f < 960	1	–47
3	925 ≤ f < 960	1	–52
4	1 710 ≤ f < 1 785	1	–51
5	1 805 ≤ f < 1 880	1	–52
6	1 920 ≤ f < 1 980	1	–49
7	2 110 ≤ f < 2 170	1	–52
8	1 900 ≤ f < 1 920	1	–52
9	2 010 ≤ f < 2 025	1	–52
10	2 500 ≤ f < 2 570	1	–49
11	2 570 ≤ f < 2 620	1	–52
12	2 620 ≤ f < 2 690	1	–52

3.3 Spurious emissions for TDD equipment operating in the band 2 500-2 690 MHz (BCG 3.A)

The limits shown in Tables 116 and 117 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and greater than 25 MHz for the 10 MHz carrier. f is the frequency of the spurious domain emissions. f_c is the base station centre frequency.

The emission levels in Table 116 should be met in areas where Category A limits for spurious emissions, as defined in Recommendation ITU-R SM.329-10, are applicable. The emission levels in Table 12 should be met in areas where Category B limits for spurious emissions, as defined in Recommendation ITU-R SM.329-10, are applicable.

TABLE 116

Spurious emission limit, Category A

Band	Allowed emission level	Measurement bandwidth	Note
30 MHz – 1 GHz	–13 dBm	100 kHz	Bandwidth as in Recommendation ITU-R SM.329-10, § 4.1
1-13.45 GHz		1 MHz	Upper frequency as in Recommendation ITU-R SM.329-10, § 2.5, Table 1

TABLE 117

Spurious emissions limit, Category B

Band	Measurement bandwidth	Allowed emission level
30 MHz ≤ f < 1 000 MHz	100 kHz	–36 dBm
1 GHz ≤ f < 13.45 GHz	30 kHz If 2.5 × BW <= $\lvert f_c - f \rvert$ < 10 × BW 300 kHz If 10 × BW <= $\lvert f_c - f \rvert$ < 12 × BW 1 MHz If 12 × BW <= $\lvert f_c - f \rvert$	–30 dBm

NOTE – In Table 117, BW is the signal channel bandwidth of 5 or 10 MHz.

TABLE 118

Spurious emission limit, Japan

Frequency bandwidth	Measurement bandwidth	Allowed emission level (dBm)
9 kHz ≤ f < 150 kHz	1 kHz	−13
150 kHz ≤ f < 30 MHz	10 kHz	−13
30 MHz ≤ f < 1 000 MHz	100 kHz	−13
1 000 MHz ≤ f < 2 505 MHz	1 MHz	−13
2 505 MHz ≤ f < 2 535 MHz	1 MHz	−42
2 535 MHz ≤ f < 2 630 MHz	1 MHz	−13(1)
2 630 MHz ≤ f < 2 634.75 MHz	1 MHz	−15 − 7/5 × (f −2 629.75)
2 634.75 MHz ≤ f < 2 655 MHz	1 MHz	−22
2 655 MHz ≤ f	1 MHz	−13

(1) The allowed emission level for the frequency band between 2 535 MHz and 2 630 MHz shall be applied for the frequency range greater than 2.5 times the channel size from the centre frequency.

3.4 Spurious emission for FDD equipment operating in the band 2 496-2 572/2 614-2 690 MHz (BCG 3.B)

Spurious emission limits are applicable to frequency offset which are greater than 250% of the channel bandwidth. Therefore the limits shown in Tables 119 to 124 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier, greater than 17.5 MHz away from the base station centre frequency for the 7 MHz carrier, and greater than 25 MHz for the 10 MHz carrier. f is the frequency of the spurious domain emissions. f_c is the base station centre frequency.

In all of the following tables, measurement uncertainty (as defined in Recommendation ITU-R M.1545) values corresponding to spurious emission limits have not been included here.

TABLE 119

Spurious emission limit for 5 MHz carrier – US; relevant to 2 616.5 ≤ f_c ≤ 2 687.5

Measurement frequency range	Measurement bandwidth (MHz)	Maximum emission level (dBm)
30 MHz < f < 13.450 GHz, 12.5 MHz ≤ Δf	1	–13

TABLE 120

Spurious emission limit for 10 MHz carrier – US; relevant to 2 619 ≤ f_c ≤ 2 685

Measurement frequency range	Measurement bandwidth (MHz)	Maximum emission level (dBm)
30 MHz < f < 13.450 GHz, 25 MHz ≤ Δf	1	–13

TABLE 121

Spurious emission limit for 5 MHz carrier – Europe; relevant to 2 616.5 ≤ f_c ≤ 2 687.5

Spurious frequency (f) range	Measurement bandwidth	Maximum emission level (dBm)
9 kHz ≤ f < 150 kHz	1 kHz	–36
150 kHz ≤ f < 30 MHz	10 kHz	–36
30 MHz ≤ f < 1 000 MHz	100 kHz	–36
1 GHz ≤ f < 13450 MHz	30 kHz If 12.5 MHz <= Δf < 50 MHz 300 kHz If 50 MHz <= Δf < 60 MHz 1 MHz If 60 MHz <= Δf	–30

TABLE 122

Spurious emission limit for 10 MHz carrier – Europe; relevant to 2 619 ≤ f_c ≤ 2 685

Spurious frequency (f) range	Measurement bandwidth	Maximum emission level (dBm)
9 kHz ≤ f < 150 kHz	1 kHz	–36
150 kHz ≤ f < 30 MHz	10 kHz	–36
30 MHz ≤ f < 1 000 MHz	100 kHz	–36
1 GHz ≤ f < 13 450 MHz	30 kHz If 25 MHz <= Δf < 100 MHz 300 kHz If 100 MHz <= Δf < 120 MHz 1 MHz If 120 MHz <= Δf	–30

TABLE 123

Spurious emission limit for 5 MHz carrier – Europe; relevant to 2 616.5 ≤ f_c ≤ 2 687.5

Spurious frequency (f) range (MHz)	Measurement bandwidth	Maximum level
2 496-2 572	100 kHz	–96 dBm

TABLE 124

Spurious emission limit for 10 MHz carrier- Europe; relevant to 2 619 ≤ f_c ≤ 2 685

Spurious frequency (f) range (MHz)	Measurement bandwidth	Maximum level
2 496-2 572	100 kHz	–96 dBm

3.5 Spurious emissions for TDD equipment operating in the band 3 400-3 600 MHz (BCG 5L.A/5L.B/5L.C)

Spurious emission limits are applicable to frequency offset which are greater than 250% of the channel bandwidth. Therefore the limits shown in Tables 125 and 126 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier, greater than 17.5 MHz away from the base station centre frequency for the 7 MHz carrier, and greater than 25 MHz for the 10 MHz carrier. f is the frequency of the spurious domain emissions. f_c is the base station centre frequency.

TABLE 125

Spurious emission limit, Category A

Band	Allowed emission level	Measurement bandwidth	Note
30 MHz-1 GHz	–13 dBm	100 kHz	Bandwidth as in Recommendation ITU-R SM.329-10, § 4.1
1 GHz-13.45 GHz		1 MHz	Upper frequency as in Recommendation ITU-R SM.329-10, § 2.5, Table 1

TABLE 126

Spurious emissions limit, Category B

Band	Measurement bandwidth		Allowed emission level
30 MHz ≤ f < 1 000 MHz	100 kHz		–36 dBm
1 GHz ≤ f < 13.45 GHz	30 kHz	If 2.5 × BW ≤ $\lvert f_c - f \rvert$ < 10 × BW	–30 dBm
	300 kHz	If 10 × BW ≤ $\lvert f_c - f \rvert$ < 12 × BW	
	1 MHz	If 12 × BW ≤ $\lvert f_c - f \rvert$	

NOTE 1 – In Table 126, BW is the signal channel bandwidth of 5, 7 or 10 MHz.

3.6 Spurious emission for TDD equipment operating in the band 3 600-3 800 MHz (BCG 5H.A/5H.B/5H.C)

Spurious emission limits are applicable to frequency offset which are greater than 250% of the channel bandwidth. Therefore the limits shown in Tables 127 and 128 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier, greater than 17.5 MHz away from the base station centre frequency for the 7 MHz carrier, and greater than 25 MHz for the 10 MHz carrier. f is the frequency of the spurious domain emissions. f_c is the base station centre frequency.

TABLE 127

Spurious emission limit, Category A

Band	Allowed emission level	Measurement bandwidth	Note
30 MHz–1 GHz	–13 dBm	100 kHz	Bandwidth as in Recommendation ITU-R SM.329-10, § 4.1
1 GHz-13.45 GHz		1 MHz	Upper frequency as in Recommendation ITU-R SM.329-10, § 2.5, Table 1

TABLE 128

Spurious emissions limit, Category B

Band	Measurement bandwidth		Allowed emission level
30 MHz ≤ f < 1 000 MHz	100 kHz		–36 dBm
1 GHz ≤ f < 13.45 GHz	30 kHz 300 kHz 1 MHz	If 2.5 × BW <= $\lvert f_c - f \rvert$ < 10 × BW If 10 × BW <= $\lvert f_c - f \rvert$ < 12 × BW If 12 × BW <= $\lvert f_c - f \rvert$	–30 dBm

NOTE – In Table 128, BW is the signal channel bandwidth of 5, 7 or 10 MHz.

3.7 Spurious emission for FDD equipment operating in the band 1 710-1 770/2 110-2 170 MHz (BCG 6.A)

The limits shown in Tables 129 and 130 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and greater than 25 MHz for the 10 MHz carrier. f is the frequency of the spurious domain emissions. f_c is the base station centre frequency.

In Tables 129 and 130, measurement uncertainty (as defined in Recommendation ITU-R M.1545) values corresponding to spurious emission limits have not been included.

TABLE 129

Spurious emissions for 5 MHz channel size; relevant to 2 112.5 MHz <= f_c <= 2 152.5 MHz

Row	Spurious frequency (f) range	Measurement bandwidth	Minimum specification (dBm)
1	30 MHz ≤ f < 10.775 GHz, 12.5 MHz <= $\lvert \Delta f \rvert$	1 MHz	−13

TABLE 130

Spurious emissions for 5 MHz channel size; relevant to 2 115 MHz <= f_c <= 2 150 MHz

Row	Spurious frequency (f) range	Measurement bandwidth	Minimum specification (dBm)
1	30 MHz ≤ f < 10.775 GHz, 25 MHz <= | Δf |	1 MHz	−13

3.8 Spurious emissions for FDD equipment operating in the band 1 920-1 980/2 110-2 170 MHz (BCG 6.B)

The limits shown in Tables 131 to 134 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station centre frequency. In the Tables | Δf | is f_c–f, where f is the frequency of the spurious domain emissions and f_c is the mobile station transmit centre frequency. All spurious emission specifications are of conducted type.

Tables 131 and 132 specify the spurious emission for FDD base stations with 5 and 10 MHz channel bandwidths, while Tables 133 and 134 specify the additional spurious emission limits for 5 and 10 MHz channel bandwidths.

TABLE 131

Spurious emissions for 5 MHz channel size; relevant to 2 112.5 MHz <= f_c <= 2 167.5 MHz

Row	Spurious frequency (f) range	Measurement bandwidth	Minimum specification (dBm)
1	9 kHz ≤ f < 150 kHz	1 kHz	−36
2	150 kHz ≤ f < 30 MHz	10 kHz	−36
3	30 MHz ≤ f < 1 000 MHz	100 kHz	−36
4	1 GHz ≤ f < 9.9 GHz, 12.5 <= | Δf |	1 MHz	−30

TABLE 132

Spurious emissions for 10 MHz channel size; relevant to 2 115 MHz <= f_c <= 2 165 MHz

Row	Spurious frequency (f) range	Measurement bandwidth	Minimum specification (dBm)
1	9 kHz ≤ f < 150 kHz	1 kHz	−36
2	150 kHz ≤ f < 30 MHz	10 kHz	−36
3	30 MHz ≤ f < 1 000 MHz	100 kHz	−36
4	1 GHz ≤ f < 19 GHz, 25 <= | Δf |	1 MHz	−30

TABLE 133

Additional spurious emissions for 5 MHz channel size; relevant to 2 112.5 MHz <= f_c <= 2 167.5 MHz

Row	Spurious frequency (f) range	Measurement bandwidth	Minimum requirement (dBm)
1	921-960 MHz	100 kHz	–57 dBm
2	876-915 MHz	100 kHz	–61 dBm
3	1 805-1 880 MHz	100 kHz	–47 dBm
4	1 710-1 785 MHz	100 kHz	–61 dBm
5	1 930-1 990 MHz	100 kHz	–47 dBm
6	1 850-1 910 MHz	100 kHz	–61 dBm
7	869-894 MHz	100 kHz	–57 dBm
8	824-849 MHz	100 kHz	–61 dBm
9	1 930-1 990 MHz	1 MHz	–52 dBm
11	1 850-1 910 MHz	1 MHz	–49 dBm
12	1 805-1 880 MHz	1 MHz	–52 dBm
13	1 710-1 785 MHz	1 MHz	–49 dBm
14	2 110-2 155 MHz	1 MHz	–52 dBm
15	1 710-1 755 MHz	1 MHz	–49 dBm
16	869-894 MHz	1 MHz	–52 dBm
17	824-849 MHz	1 MHz	–49 dBm
18	860-895 MHz	1 MHz	–52 dBm
19	815-850 MHz	1 MHz	–49 dBm
20	2 620-2 690 MHz	1 MHz	–52 dBm
21	2 500-2 570 MHz	1 MHz	–49 dBm
22	925-960 MHz	1 MHz	–52 dBm
23	880-915 MHz	1 MHz	–49 dBm
24	1 844.9-1 879.9 MHz	1 MHz	–52 dBm
25	1 749.9-1 784.9 MHz	1 MHz	–49 dBm
26	2 110-2 170 MHz	1 MHz	–52 dBm
27	1 710-1 770 MHz	1 MHz	–49 dBm
28	1 475.9-1 500.9 MHz	1 MHz	–52 dBm
29	1 427.9-1 452.9 MHz	1 MHz	–49 dBm
30	728-746 MHz	1 MHz	–52 dBm
31	698-716 MHz	1 MHz	–49 dBm
32	746-756 MHz	1 MHz	–52 dBm
33	777-787 MHz	1 MHz	–49 dBm
34	758-768 MHz	1 MHz	–52 dBm
35	788-798 MHz	1 MHz	–49 dBm
36	1 900-1 920 MHz	1 MHz	–52 dBm

TABLE 133 (*end*)

Row	Spurious frequency (*f*) range	Measurement bandwidth	Minimum requirement (dBm)
37	2 010-2 025 MHz	1 MHz	–52 dBm
38	1 850-1 910 MHz	1 MHz	–52 dBm
39	1 930-1 990 MHz	1 MHz	–52 dBm
40	1 910-1 930 MHz	1 MHz	–52 dBm
41	2 570-2 620 MHz	1 MHz	–52 dBm
42	1 880-1 920 MHz	1 MHz	–52 dBm

TABLE 134

Additional spurious emissions for 10 MHz channel size; relevant to 2 115 MHz <= f_c <= 2 165 MHz

Row	Spurious frequency (*f*) range	Measurement bandwidth	Minimum requirement (dBm)
1	921-960 MHz	100 kHz	–57 dBm
2	876-915 MHz	100 kHz	–61 dBm
3	1 805-1 880 MHz	100 kHz	–47 dBm
4	1 710-1 785 MHz	100 kHz	–61 dBm
5	1 930-1 990 MHz	100 kHz	–47 dBm
6	1 850-1 910 MHz	100 kHz	–61 dBm
7	869-894 MHz	100 kHz	–57 dBm
8	824-849 MHz	100 kHz	–61 dBm
9	1 930-1 990 MHz	1 MHz	–52 dBm
11	1 850-1 910 MHz	1 MHz	–49 dBm
12	1 805-1 880 MHz	1 MHz	–52 dBm
13	1 710-1 785 MHz	1 MHz	–49 dBm
14	2 110-2 155 MHz	1 MHz	–52 dBm
15	1 710-1 755 MHz	1 MHz	–49 dBm
16	869-894 MHz	1 MHz	–52 dBm
17	824-849 MHz	1 MHz	–49 dBm
18	860-895 MHz	1 MHz	–52 dBm
19	815-850 MHz	1 MHz	–49 dBm
20	2 620-2 690 MHz	1 MHz	–52 dBm
21	2 500-2 570 MHz	1 MHz	–49 dBm
22	925-960 MHz	1 MHz	–52 dBm
23	880-915 MHz	1 MHz	–49 dBm
24	1 844.9-1 879.9 MHz	1 MHz	–52 dBm
25	1 749.9-1 784.9 MHz	1 MHz	–49 dBm

TABLE 134 (*end*)

Row	Spurious frequency (*f*) range	Measurement bandwidth	Minimum requirement (dBm)
26	2 110-2 170 MHz	1 MHz	–52 dBm
27	1 710-1 770 MHz	1 MHz	–49 dBm
28	1 475.9-1 500.9 MHz	1 MHz	–52 dBm
29	1 427.9-1 452.9 MHz	1 MHz	–49 dBm
30	728-746 MHz	1 MHz	–52 dBm
31	698-716 MHz	1 MHz	–49 dBm
32	746-756 MHz	1 MHz	–52 dBm
33	777-787 MHz	1 MHz	–49 dBm
34	758-768 MHz	1 MHz	–52 dBm
35	788-798 MHz	1 MHz	–49 dBm
36	1 900-1 920 MHz	1 MHz	–52 dBm
37	2 010-2 025 MHz	1 MHz	–52 dBm
38	1 850-1 910 MHz	1 MHz	–52 dBm
39	1 930-1 990 MHz	1 MHz	–52 dBm
40	1 910-1 930 MHz	1 MHz	–52 dBm
41	2 570-2 620 MHz	1 MHz	–52 dBm
42	1 880-1 920 MHz	1 MHz	–52 dBm

3.9 Spurious emissions for FDD equipment operating in the band 1 710-1 785/1 805-1 880 MHz (BCG 6.C)

The limits shown in Tables 135 to 137 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the base station centre frequency. In the Tables $|\Delta f|$ is $f_c - f$, where f is the frequency of the spurious domain emissions and f_c is the base station transmit centre frequency. All spurious emission specifications are of conducted type.

Tables 135 and 136 specify the spurious emission for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE 135

Spurious emissions

Transmitter centre frequency (f_c) (MHz)	Spurious frequency (f) range	Integration bandwidth	Maximum emission level (dBm)
1 805-1 880	9 kHz ≤ f < 150 kHz	1 kHz	–36
1 805-1 880	150 kHz ≤ f < 30 MHz	10 kHz	–36
1 805-1 880	30 MHz ≤ f < 1 000 MHz	100 kHz	–36
1 805-1 880	1 GHz ≤ f < 12.75 GHz	30 kHz, If 12.5 MHz <= Δf < 50 MHz 300 kHz, If 50 MHz <= Δf < 60 MHz 1 MHz, If 60 MHz <= Δf	–30

TABLE 136

Spurious emissions limits for protection of the BS receiver

Transmitter centre frequency (f_c) (MHz)	Spurious frequency (f) range (MHz)	Measurement bandwidth	Maximum level
1 805-1 880	1 710-1 785	100 kHz	–96 dBm

TABLE 137

Additional spurious emission limits

No	Transmitter centre frequency (f_c) (MHz)	Spurious frequency (f) range (MHz)	Measurement bandwidth	Maximum emission level (dBm)
1	1 805-1 880	1 805-1 880	100 kHz	47
2		1 710-1 785	100 kHz	–61
		1 805-1 880	1 MHz	–52
		1 710-1 785	1 MHz	–49

3.10 Spurious emissions for FDD equipment operating in the band 880-915/925-960 MHz (BCG 7.G)

The limits shown in Tables 138 to 140 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the base station centre frequency. In the Tables | Δf | is f_c–f, where f is the frequency of the spurious domain emissions and f_c is the base station transmit centre frequency. All spurious emission specifications are of conducted type.

Tables 138 to 140 specify the spurious emission for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE 138

Spurious emissions

Transmitter centre frequency (f_c) (MHz)	Spurious frequency (f) range	Integration bandwidth	Maximum emission level (dBm)
925-960	9 kHz ≤ f < 150 kHz	1 kHz	–36
925-960	150 kHz ≤ f < 30 MHz	10 kHz	–36
925-960	30 MHz ≤ f < 1 000 MHz	100 kHz	–36
925-960	1 GHz ≤ f < 12.75 GHz	30 kHz, If 12.5 MHz <= Δf < 50 MHz 300 kHz, If 50 MHz <= Δf < 60 MHz 1 MHz, If 60 MHz<=Δf	–30

Table 138 specifies limits to protect BS receivers against its intra-system BS transmit emissions.

TABLE 139

Spurious emission limits for protection of the BS receiver

Transmitter centre frequency (f_c) (MHz)	Spurious frequency (f) range (MHz)	Measurement bandwidth	Maximum level
925-960	880-915	100 kHz	–96 dBm

The spurious emission limits specified in Table 139 may be required by local or regional regulations.

TABLE 140

Additional spurious emission (BCG 7.G)

No	Transmitter centre frequency (f_c) (MHz)	Spurious frequency (f) range (MHz)	Measurement bandwidth	Maximum emission level (dBm)
3	925-960	880-915	1 MHz	–52
		925-960	1 MHz	–49

3.11 Coexistence with other systems in the same geographical/service area

These requirements may be applied for the protection of UE, MS and/or BS operating in other frequency bands in the same geographical area. The requirements may apply in geographical/service areas as applicable in which both OFDMA-TDD-WMAN and a system operating in another frequency band than the OFDMA-TDD-WMAN operating band are deployed. The systems operating in the other frequency band may be GSM900, DCS1800, PCS1900, GSM850, PHS, UTRA-TDD (3.84 Mchip/s, 7.68 Mchip/s, 1.28 Mchip/s options) and UTRA-FDD.

The power of any spurious emission should not exceed the limits of Table 141 for a BS where requirements for coexistence with the system listed in the first column apply.

TABLE 141

BS spurious emission limits for OFDMA-TDD-WMAN BS in geographic coverage area of systems operating in other frequency bands

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
GSM900	921-960 MHz	−57 dBm	100 kHz	
	876-915 MHz	−61 dBm	100 kHz	
DCS1800	1 805-1 880 MHz	−47 dBm	100 kHz	
	1 710-1 785 MHz	−61 dBm	100 kHz	
PCS1900	1 930-1 990 MHz	−47 dBm	100 kHz	
	1 850-1 910 MHz	−61 dBm	100 kHz	
GSM850	869-894 MHz	−57 dBm	100 kHz	
	824-849 MHz	−61 dBm	100 kHz	
PHS	1 884.5-1 919.6 MHz	–41 dBm	300 kHz	
FDD Band I	2 110-2 170 MHz	−52 dBm	1 MHz	
	1 920-1 980 MHz	−49 dBm	1 MHz	
FDD Band II	1 930-1 990 MHz	−52 dBm	1 MHz	
	1 850-1 910 MHz	−49 dBm	1 MHz	
FDD Band III	1 805-1 880 MHz	−52 dBm	1 MHz	
	1 710-1 785 MHz	−49 dBm	1 MHz	
FDD Band IV	2 110-2 155 MHz	−52 dBm	1 MHz	
	1 710-1 755 MHz	−49 dBm	1 MHz	
FDD Band V	869-894 MHz	−52 dBm	1 MHz	
	824-849 MHz	−49 dBm	1 MHz	
FDD Band VI	860-895 MHz	−52 dBm	1 MHz	
	815-850 MHz	−49 dBm	1 MHz	
FDD Band VII	2 620-2 690 MHz	−52 dBm	1 MHz	This requirement does not apply to OFDMA TDD WMAN operating in Band VII
	2 500-2 570 MHz	−49 dBm	1 MHz	This requirement does not apply to OFDMA TDD WMAN operating in Band VII
FDD Band VIII	925-960 MHz	−52 dBm	1 MHz	
	880-915 MHz	−49 dBm	1 MHz	
FDD Band IX	1 844.9-1 879.9 MHz	−52 dBm	1 MHz	
	1 749.9-1 784.9 MHz	−49 dBm	1 MHz	

TABLE 141 (*end*)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
FDD Band X	2 110-2 170 MHz	−52 dBm	1 MHz	
	1 710-1 770 MHz	−49 dBm	1 MHz	
UTRA-TDD	1 900-1 920 MHz	–52 dBm	1 MHz	
	2 010-2 025 MHz	–52 dBm	1 MHz	
	2 300-2 400 MHz	–52 dBm	1 MHz	This requirement does not apply to OFDMA TDD WMAN operating in the band 2 300-2 400 MHz
	2 570-2 610 MHz	–52 dBm	1 MHz	This requirement does not apply to OFDMA TDD WMAN operating in the band 2 500-2 690 MHz

NOTE 1 – The values in this Table are considered as preliminary values only, and are subject to further study that could lead to a revision of this Recommendation.

4 Receiver spurious emissions (conducted)

The receiver spurious emissions in Table 142 are applied in Japan.

TABLE 142

Receiver spurious emission requirements

Frequency band	Total allowed emission level (dBm)
$f < 1$ GHz	–54
1 GHz ≤ f	–47

5 Adjacent channel leakage ratio (ACLR)

5.1 ACLR values for TDD equipment operating in the band 2 302.5 ≤ f_c ≤ 2 397.5 (BCG 1.B)

For 5 and 10 MHz BW Band Class Group 1.B, the ACLR shall be equal to or greater than the limits specified in the tables below.

TABLE 143

ACLR specification for 5 MHz channel BW (BCG 1.B)

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	BS channel centre frequency ± 5 MHz	45
2	BS channel centre frequency ± 10 MHz	50

TABLE 144

ACLR specifications for 10 MHz channel BW (BCG 1.B)

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	BS channel centre frequency ± 10 MHz	45
2	BS channel centre frequency ± 20 MHz	50

In Tables 143 and 144, the measurement bandwidth centred on the adjacent channel is 4.75 MHz for a 5 MHz channelized system and 9.5 MHz for a 10 MHz channelized system.

5.2 ACLR values for TDD equipment operating in the band 2 500-2 690 MHz (BCG 3.A)

Within this Annex, and in a similar manner to other annexes, the ACLR is defined as the ratio of the on-channel transmitted power to the power transmitted in adjacent channels as measured at the output of the receiver filter. In order to measure ACLR it is necessary to consider a measurement filter for the transmitted signal as well as a receiver measurement bandwidth for the adjacent channel (victim) system.

5.3 Inter-system and intra-system scenarios

There are two specific coexistence requirements that must be considered; the intra-system and inter-system. In this section only the following scenarios are considered:

– OFDMA TDD WMAN adjacent to OFDMA TDD WMAN within the same network;

– OFDMA TDD WMAN adjacent to UTRA technologies, which might operate using FDD or unsynchronized TDD techniques. The ACLR in this case also takes into account the boundary coexistence conditions between an OFDMA TDD WMAN system and a UTRA system, which could happen in the case of deployments in adjacently assigned spectrum blocks.

In this text, only one inter-system scenario is discussed, that pertaining to UTRA. Two classes of ACLR figures are defined in this Annex to describe the two relevant scenarios as follows.

Intra-system scenario: A classification that identifies a level of minimum required ACLR performance generally appropriate for intra-system operation in contiguous channel assignments within the same network, i.e. OFDMA TDD WMAN adjacent to OFDMA TDD WMAN. In this Annex, intra-system ACLR is based on the following receiver bandwidths with the OFDMA TDD WMAN system operated on-channel and adjacent channel:

– 4.75 MHz for a 5 MHz channelized system, and

– 9.5 MHz for a 10 MHz channelized system.

UTRA scenario: A classification that identifies a level of minimum required ACLR performance appropriate for more demanding interoperator/coexistence scenarios at adjacent frequency block boundaries.

The following receiver bandwidths are assumed for the UTRA system:

– 3.84 MHz for a 5 MHz channelized system, and

– 7.68 MHz for a 10 MHz channelized system.

In each scenario, the passband of the receiver filter is centred on the first or second adjacent channel centre frequency. In the case where the adjacent system is OFDMA TDD WAN, both the transmitted power and the received power are measured with a rectangular filter. For adjacent UTRA systems the transmitted power is measured using a rectangular filter and the received power using a RRC filter with a roll-off factor of 0.22.

The ACLR values for the two relevant scenarios are provided in the following tables.

TABLE 145

a) ACLR for 5 MHz channel bandwidth – intra-system scenario

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 5 MHz	45
BS channel centre frequency ± 10 MHz	55

b) ACLR for 5 MHz channel bandwidth – UTRA scenario

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 5 MHz	53.5
BS channel centre frequency ± 10 MHz	66

c) ACLR for 10 MHz channel bandwidth – intra-system scenario

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 10.0 MHz	45
BS channel centre frequency ± 20.0 MHz	55

d) ACLR for 10 MHz channel bandwidth – UTRA scenario

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 10.0 MHz	53.5
BS channel centre frequency ± 20.0 MHz	66

5.4 ACLR values for TDD equipment operating in the band 3 400-3 600 MHz (BCG 5L.A/5L.B/5L.C)

The ACLR is the ratio of the transmitted mean power measured through a filter pass band centred on the assigned channel frequency to the transmitted mean power measured through a bandpass filter centred on a first or second adjacent channel. The first adjacent and second adjacent channel centre offsets relative to the assigned channel centre frequency respectively equal the channel bandwidth and twice the channel bandwidth.

The ACLR limits for systems with 5, 7 and 10 MHz channel bandwidths operating in the band 3 400-3 600 MHz are specified in Table 146.

TABLE 146

a) ACLR for 5 MHz channel bandwidth

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 5 MHz	37
BS channel centre frequency ± 10 MHz	48

b) ACLR for 7 MHz channel bandwidth

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 7 MHz	37
BS channel centre frequency ± 14 MHz	48

c) ACLR for 10 MHz channel bandwidth

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 10.0 MHz	37
BS channel centre frequency ± 20.0 MHz	48

Additional information may be provided in future revisions of this Recommendation.

NOTE 1 – Further study is necessary for other systems wherever applicable.

5.5 ACLR values for TDD equipment operating in the band 3 600-3 800 MHz (BCG 5H.A/5H.B/5H.C)

The ACLR is the ratio of the transmitted mean power measured through a filter pass band centred on the assigned channel frequency to the transmitted mean power measured through a bandpass filter centred on a first or second adjacent channel. The first adjacent and second adjacent channel centre offsets relative to the assigned channel centre frequency respectively equal the channel bandwidth and twice the channel bandwidth.

The ACLR limits for systems with 5, 7 and 10 MHz channel bandwidths operating in the band 3 600-3 800 MHz are specified in Table 147.

TABLE 147

a) ACLR for 5 MHz channel bandwidth

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 5 MHz	37
BS channel centre frequency ± 10 MHz	48

b) ACLR for 7 MHz channel bandwidth

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 7 MHz	37
BS channel centre frequency ± 14 MHz	48

c) ACLR for 10 MHz channel bandwidth

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency ± 10.0 MHz	37
BS channel centre frequency ± 20.0 MHz	48

Additional information may be provided in future revisions of this Recommendation.

NOTE 1 – Further study is necessary for other systems wherever applicable.

5.6 ACLR values for FDD equipment operating in the band 1 710-1 785/1 805-1 880 MHz (BCG 6.C)

For 5 and 10 MHz BW Band Class Group 6.C, the ACLR shall be equal to or greater than the limits specified in Tables 148 and 149 below.

ACLR is specified when the receiver channel bandwidth on the adjacent channel is:

– 4.75 MHz for a 5 MHz channelized system; and

– 9.5 MHz for a 10 MHz channelized system.

The measurement bandwidth for the measurement of on-channel power of the Mobile WiMAX carrier is:

– 4.75 MHz for a 5 MHz channelized system; and

– 9.5 MHz for a 10 MHz channelized system.

In here, the transmitted power and the received power are measured with a rectangular filter. In Tables 148 and 149, the ACLR specifications are shown. Measurement uncertainty (as defined in Recommendation ITU-R M.1545) values corresponding to the ACLR limits have not been included.

TABLE 148

ACLR specification for 5 MHz channel BW BS (BCG 6.C)

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	BS channel centre frequency ± 5 MHz	45
2	BS channel centre frequency ± 10 MHz	50

TABLE 149

ACLR specifications for 10 MHz channel BW BS (BCG 6.C)

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	BS channel centre frequency ± 10 MHz	45
2	BS channel centre frequency ± 20 MHz	50

5.7 ACLR values for FDD equipment operating in the band 880-915/925-960 MHz (BCG 7.G)

For 5 and 10 MHz BW Band Class Group 6.C, the ACLR shall be equal to or greater than the limits specified in Tables 150 and 151 below.

ACLR is specified when the receiver channel bandwidth on the adjacent channel is:

– 4.75 MHz for a 5 MHz channelized system; and

– 9.5 MHz for a 10 MHz channelized system.

The measurement bandwidth for the measurement of on-channel power of the Mobile WiMAX carrier is:

– 4.75 MHz for a 5 MHz channelized system; and

– 9.5 MHz for a 10 MHz channelized system.

In here, the transmitted power and the received power are measured with a rectangular filter. In Tables 150 and 151, the ACLR specifications are shown. Measurement uncertainty (as defined in Recommendation ITU-R M.1545) values corresponding to the ACLR limits have not been included.

TABLE 150

ACLR specification for 5 MHz channel BW BS (BCG 7.G)

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	BS channel centre frequency ± 5 MHz	45
2	BS channel centre frequency ± 10 MHz	50

TABLE 151

ACLR specifications for 10 MHz channel BW BS (BCG 7.G)

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	BS channel centre frequency ± 10 MHz	45
2	BS channel centre frequency ± 20 MHz	50

6 Test tolerance

In this Annex, the test tolerances (as defined in Recommendation ITU-R M.1545) corresponding to various specifications are 0 dB unless stated otherwise in the corresponding section.

Appendix 1
to Annex 6

Definition of test tolerance

Test tolerance

With reference to Recommendation ITU-R M.1545, "test tolerance" is the relaxation value referred to in *recommends* 2 of Recommendation ITU-R M.1545, i.e. the difference between the core specification value and the test limit, evaluated applying the shared risk principle as per Figs 2 and 3 of Annex 1 of Recommendation ITU-R M.1545. In case the core specification value is equal to the test limit (Fig. 3 of Annex 1 of Recommendation ITU-R M.1545) the "test tolerances" are equal to 0.