



Recommendation ITU-R M.1580-3
(10/2009)

**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.

Electronic Publication
Geneva, 2009

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RECOMMENDATION ITU-R M.1580-3*

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

(Question ITU-R 229/5)

(2002-2005-2007-2009)

Scope

This Recommendation provides the generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT-2000.

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 Regulation (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 additional work is needed in order to define unwanted emission limits for equipment operating in the other bands identified for IMT-2000 at the World Radiocommunication Conference (Istanbul, 2000) (WRC-2000);

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

l) 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,

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,

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 referred to 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 1 427.9-1 452.9 MHz, FDD downlink in the band 1 475.9-1 500.9 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.

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) 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
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 39 in E-UTRA.
- TDD in the band 2 300-2 400 MHz referred to as 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:

- TDD in the band 2 300-2 400 MHz;
- TDD in the band 2 500-2 690 MHz;
- TDD in the band 3 400-3 600 MHz.

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).

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 4A 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 4A 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
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	-12.5 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$-12.5 - 15$ $(f_{\text{offset}} - 2.715) \text{ dBm}$	30 kHz
	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	-24.5 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-11.5 dBm	1 MHz

TABLE 2A

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
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	-12.5 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$-12.5 - 15$ $(f_{\text{offset}} - 2.715) \text{ dBm}$	30 kHz
	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	-24.5 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f < 7.5 \text{ MHz}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < 8.0 \text{ MHz}$	-11.5 dBm	1 MHz
$7.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}} \text{ MHz}$	$8.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 54.5 \text{ dBm}$	1 MHz

TABLE 3A

Spectrum emission mask values, BS maximum output power $31 \leq P < 39$ dBm

Frequency offset of measurement filter -3 dB point, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Requirement	Measurement bandwidth
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	$P - 51.5 \text{ dBm}$	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$P - 51.5 - 15$ $(f_{\text{offset}} - 2.715) \text{ dBm}$	30 kHz
	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	$P - 63.5 \text{ dBm}$	30 kHz
$3.5 \text{ MHz} \leq \Delta f < 7.5 \text{ MHz}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < 8.0 \text{ MHz}$	$P - 50.5 \text{ dBm}$	1 MHz
$7.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}} \text{ MHz}$	$8.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 54.5 \text{ dBm}$	1 MHz

TABLE 4A

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
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	–20.5 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	–20.5 – 15 ($f_{\text{offset}} - 2.715$) dBm	30 kHz
	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	–32.5 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f < 7.5 \text{ MHz}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < 8.0 \text{ MHz}$	–19.5 dBm	1 MHz
$7.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}} \text{ MHz}$	$8.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–23.5 dBm	1 MHz

For operation in Bands II, IV, V, X, XII, XIII and XIV, the applicable additional requirement in Tables 1AA, 2AA or 3AA apply in addition to the minimum requirements in Tables 1A to 4A.

TABLE 1AA

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
$2.5 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	–15 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	1 MHz

TABLE 2AA

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
$2.5 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	–15 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$3.55 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	100 kHz

TABLE 3AA

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
$2.5 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	–13 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$3.55 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	100 kHz

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.

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.
- $f_{\text{offset}_{\text{max}}}$ is the offset to the frequency 10 MHz outside the BS transmitter operating band.
- Δf_{max} is equal to $f_{\text{offset}_{\text{max}}}$ 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 (Category A)

For E-UTRA BS operating in Bands 5, 6, 8, 12, 13 and 14, emissions shall not exceed the maximum levels specified in Tables 1Ba) to 1Bc).

TABLE 1B

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)
$0 \text{ MHz} \leq \Delta f < 1.4 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 1.45 \text{ MHz}$	$+0.5 \text{ dBm} - \frac{10}{1.4} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$1.4 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.45 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	–9.5 dBm	100 kHz
$2.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.85 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	100 kHz

TABLE 1B (continued)

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)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$-3 \text{ dBm} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-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)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$-5.5 \text{ dBm} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$5.05 \text{ MHz} \leq f_{\text{offset}} < 10.05 \text{ MHz}$	-12.5 dBm	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 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 Table 1Bd) to 1Bf):

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)
$0 \text{ MHz} \leq \Delta f < 1.4 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 1.45 \text{ MHz}$	$+0.5 \text{ dBm} - \frac{10}{1.4} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$1.4 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.45 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	-9.5 dBm	100 kHz
$2.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$3.3 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 dBm	1 MHz

TABLE 1B (*end*)

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)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$-3.5 \text{ dBm} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	-13.5 dBm	100 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-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)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$-5.5 \text{ dBm} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$5.05 \text{ MHz} \leq f_{\text{offset}} < 10.05 \text{ MHz}$	-12.5 dBm	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 dBm	1 MHz

2.2.2 E-UTRA spectrum mask (Category B)

For E-UTRA BS operating in Bands 5, 6, 8, 12, 13 and 14, emissions shall not exceed the maximum levels specified in Tables 2Ba) to 2Bc):

TABLE 2B

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)
$0 \text{ MHz} \leq \Delta f < 1.4 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 1.45 \text{ MHz}$	$-0.5 \text{ dBm} - \frac{10}{1.4} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$1.4 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.45 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	-9.5 dBm	100 kHz
$2.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.85 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-16 dBm	100 kHz

TABLE 2B (continued)

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)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$-3.5 \text{ dBm} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	–13.5 dBm	100 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–16 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 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)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$-5.5 \text{ dBm} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$5.05 \text{ MHz} \leq f_{\text{offset}} < 10.05 \text{ MHz}$	–12.5 dBm	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–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 2Bd) to 2Bf):

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

TABLE 2B (end)

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, Δf	Frequency offset of measurement filter centre frequency, f_{offset}	Minimum requirement	Measurement bandwidth (Note 1)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$-3.5 \text{ dBm} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	-13.5 dBm	100 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-15 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 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)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$-5.5 \text{ dBm} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$5.05 \text{ MHz} \leq f_{\text{offset}} < 10.05 \text{ MHz}$	-12.5 dBm	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-15 dBm	1 MHz

2.2.2.1 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 3B.

TABLE 3B

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}	Minimum requirement	Measurement bandwidth (Note 1)
1.4 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.005 \text{ MHz} \leq f_{\text{offset}} < 0.995 \text{ MHz}$	-12.5 dBm	10 kHz
	$1 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.05 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	-11.5 dBm	100 kHz
	$2.8 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$2.85 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-13 dBm	

TABLE 3B (end)

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)
3 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	–11.5 dBm	30 kHz
	$1 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$1.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	–11.5 dBm	100 kHz
	$6 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$6.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
5 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	–13.5 dBm	30 kHz
	$1 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$1.05 \text{ MHz} \leq f_{\text{offset}} < 10.05 \text{ MHz}$	–11.5 dBm	100 kHz
	$10 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$10.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
10 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–11.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 20 \text{ MHz}$	$1.05 \text{ MHz} \leq f_{\text{offset}} < 20.05 \text{ MHz}$	–11.5 dBm	
	$20 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$20.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
15 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–11.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 30 \text{ MHz}$	$1.05 \text{ MHz} \leq f_{\text{offset}} < 30.05 \text{ MHz}$	–11.5 dBm	
	$30 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$30.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
20 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–11.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 40 \text{ MHz}$	$1.05 \text{ MHz} \leq f_{\text{offset}} < 40.05 \text{ MHz}$	–11.5 dBm	
	$40 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$40.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	

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 4B.

TABLE 4B

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}	Minimum requirement	Measurement bandwidth (Note 1)
1.4 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.005 \text{ MHz} \leq f_{\text{offset}} < 0.995 \text{ MHz}$	–12.5 dBm	10 kHz
	$1 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 3.3 \text{ MHz}$	–11.5 dBm	1 MHz
	$2.8 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$3.3 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
3 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	–11.5 dBm	30 kHz
	$1 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 6.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$6 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
5 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	–13.5 dBm	30 kHz
	$1 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 10.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$10 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$10.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
10 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–11.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 20 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 20.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$20 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$20.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
15 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–13.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 30 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 30.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$30 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$30.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
20 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–14.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 40 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 40.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$40 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$40.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	

The following requirements may apply in certain regions. For E-UTRA BS operating in Bands 12, 13 and 14, emissions shall not exceed the maximum levels specified in Table 4C.

TABLE 4C

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

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)
1.4 MHz 3 MHz 5 MHz 10 MHz 15 MHz 20 MHz	$0 \text{ MHz} \leq \Delta f < 100 \text{ kHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.085 \text{ MHz}$	–11.5 dBm	30 kHz
1.4 MHz	$100 \text{ kHz} \leq \Delta f < 2.8 \text{ MHz}$	$150 \text{ kHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	–11.5 dBm	100 kHz
	$2.8 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$2.85 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
3 MHz	$100 \text{ kHz} \leq \Delta f < 6 \text{ MHz}$	$150 \text{ kHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	–11.5 dBm	100 kHz
	$6 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$6.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
5 MHz	$100 \text{ kHz} \leq \Delta f < 10 \text{ MHz}$	$150 \text{ kHz} \leq f_{\text{offset}} < 10.05 \text{ MHz}$	–11.5 dBm	100 kHz
	$10 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$10.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
10 MHz	$100 \text{ kHz} \leq \Delta f < 20 \text{ MHz}$	$150 \text{ kHz} \leq f_{\text{offset}} < 20.05 \text{ MHz}$	–11.5 dBm	100 kHz
	$20 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$20.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
15 MHz	$100 \text{ kHz} \leq \Delta f < 30 \text{ MHz}$	$150 \text{ kHz} \leq f_{\text{offset}} < 30.05 \text{ MHz}$	–11.5 dBm	100 kHz
	$30 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$30.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
20 MHz	$100 \text{ kHz} \leq \Delta f < 40 \text{ MHz}$	$150 \text{ kHz} \leq f_{\text{offset}} < 40.05 \text{ MHz}$	–11.5 dBm	100 kHz
	$40 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$40.05 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	

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.

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 5A.

TABLE 5A

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 and Band XI) or $+2.8$ dBm/3.84 MHz (for Band VI) 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 5B.

TABLE 5B

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, either the ACLR limits in the tables below or the absolute limit of -13 dBm/MHz apply, whichever is less stringent.

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

For operation in paired spectrum, the ACLR shall be higher than the value specified in Table 5C.

TABLE 5C

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
	$2 \times BW_{channel}$	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 – $BW_{channel}$ and BW_{config} are the channel bandwidth and transmission bandwidth configuration of the E-UTRA transmitted signal on the assigned channel frequency.

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

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 limit specified in Table 6.

TABLE 6
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 limit specified in Tables 7a) and 7b).

TABLE 7
a) BS mandatory spurious emission limits, operating Band 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)

**b) BS mandatory spurious emission limits, operating Band V, VIII, XII, XIII, XIV
(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 Tables 7A.

TABLE 7A

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 ITU-R SM.329, § 4.1.

(2) Bandwidth as in ITU-R SM.329, § 4.1. Upper frequency as in 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 operating in frequency Bands I to XIV 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 and/or FDD operating in Bands I to XIV.

The power of any spurious emission should not exceed the limits of Table 8A for a BS where requirements for coexistence with the system listed in the first column apply.

TABLE 8A
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
FDD Band I	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
FDD Band II	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
FDD Band III	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
FDD Band IV	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

TABLE 8A (end)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
FDD Band V	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
FDD Band VI	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
FDD Band VII	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
FDD Band VIII	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
FDD Band IX	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
FDD Band X	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
FDD Band XI	1 475.9-1 500.9 MHz	-52 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XI
	1 427.9-1 452.9 MHz	-49 dBm	1 MHz	This requirement does not apply to UTRA FDD BS operating in Band XI
FDD Band XII	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
FDD Band XIII	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
FDD Band XIV	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

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 8B for a BS where requirements for co-existence with the system listed in the first column apply.

TABLE 8B
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
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

TABLE 8B (continued)

**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
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
	1 710-1 755 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 4
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 E-UTRA Band 6	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
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 E-UTRA Band 11	1 475.9-1 500.9 MHz	-52 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 11
	1 427.9-1 452.9 MHz	-49 dBm	1 MHz	This requirement does not apply to E-UTRA BS operating in Band 11
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

TABLE 8B (*end*)

**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
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 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 8B 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.

4.3 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 9

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

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

4.4 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 10

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

Band	Measurement bandwidth	Maximum level	Note
1 900 to 1 920 MHz	1 MHz	-52 dBm	
2 010 to 2 025 MHz	1 MHz	-52 dBm	
2 570 to 2 610 MHz	1 MHz	-52 dBm	

5 Receiver spurious emission

The requirements apply to all BS with separate receiver and transmitter antenna port. The test should be performed when 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 11a) and 11b).

For E-UTRA, in addition to the requirements in Table 11, the power of any spurious emission should not exceed the levels specified for co-existence with other systems in the same geographical area in § 4.2.2 and § 4.3.

TABLE 11

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	1 427.9-1 452.9 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	

In addition, the requirements in Table 11c) may be applied to geographic areas in which both IMT-2000 CDMA TDD and IMT-2000 CDMA DS are deployed.

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	1 MHz	Applicable in Japan
VI, IX, XI	2 010-2 025 MHz	-52 dBm	1 MHz	

Annex 2

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

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 12 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 12

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; $P_{out} \geq 33$ dBm, cdma2000 -27 dBm/30 kHz; 28 dBm $\leq P_{out} < 33$ dBm, cdma2000 -55 dBc/30 kHz; $P_{out} < 28$ 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 13 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 13

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

TABLE 13 (*end*)

For $ \Delta f $ within the range	Active carriers	Emission limit
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; $P_{\text{out}} \geq 33$ dBm, cdma2000 –22 dBm/30 kHz; $28 \text{ dBm} \leq P_{\text{out}} < 33$ dBm, cdma2000–50 dBc/30 kHz; $P_{\text{out}} < 28$ 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 14 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 14

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 15 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 15

Band Class 3 spectrum emission mask values

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

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 16A and 16B.

TABLE 16A

BS spurious emission limits, Category A

For $ \Delta f $ within the range	Emission limit	
$>$ 4.00 MHz	$9 \text{ kHz} < f < 150 \text{ kHz}$	-13 dBm/1 kHz
	$150 \text{ kHz} < f < 30 \text{ MHz}$	-13 dBm/10 kHz
	$30 \text{ MHz} < f < 1 \text{ GHz}$	-13 dBm/100 kHz
	$1 \text{ GHz} < f < 12.75 \text{ GHz}$	-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 16B

**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 17A and 17B. The emission limits in Table 17A shall be met when transmitting on all RF carriers supported by the BS. The emission limits in Table 17B 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 17A

Spurious emission limits, Category B

For $ \Delta f $ within the range	Emission limit	
> 4.00 MHz	$9 \text{ kHz} < f < 150 \text{ kHz}$	−36 dBm/1 kHz
	$150 \text{ kHz} < f < 30 \text{ MHz}$	−36 dBm/10 kHz
	$30 \text{ MHz} < f < 1 \text{ GHz}$	−36 dBm/100 kHz
	$1 \text{ GHz} < f < 12.75 \text{ GHz}$	−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 17B

**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 18A and 18B 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

**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 18B

**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 $\leq f \leq f_c - 4.0$ MHz	All	-16 dBm/100 kHz
$f_c + 4.0$ MHz $\leq f \leq f_{high} + 4.0$ MHz	All	-16 dBm/100 kHz
$f_{high} + 4.0$ MHz < f < 1.0 GHz	All	-36 dBm/100 kHz

f_{low} : 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 19 when transmitting on a single or all RF carriers supported by the BS as indicated by the entries in the column Active carriers.

TABLE 19

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 20A and 20B.

TABLE 20A

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; 9 kHz < f < 150 kHz -36 dBm/10 kHz; 150 kHz < f < 30 MHz -45 dBm/100 kHz; 30 MHz < f < 1 GHz -30 dBm/1 MHz; 1 GHz < f < 12.75 GHz

TABLE 20B

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 21A. When transmitting in Band Class 6, the spurious emissions shall be less than the limits specified in Table 21B.

TABLE 21A

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
$f_{low} - 4.0 \text{ MHz} < f < f_c - 4.0 \text{ MHz}$	All	-30 dBm/30 kHz
$f_c + 4.0 \text{ MHz} < f < f_{high} + 4.0 \text{ MHz}$	All	-30 dBm/30 kHz
$1 \text{ GHz} < f < f_{low} - 4.0 \text{ MHz}$	All	-30 dBm/1 MHz
$f_{high} + 4.0 \text{ MHz} < f < 12.5 \text{ GHz}$	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 21B

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 22.

TABLE 22

**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 23.

TABLE 23

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

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 24 (assuming 43 dBm as transmit power).

TABLE 24

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).

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 25 and 26.

TABLE 25

General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level	Note
$30 \text{ MHz} \leq f < 1 \text{ GHz}$	100 kHz	-57 dBm	
$1 \text{ GHz} \leq f \leq 12.75 \text{ GHz}$	1 MHz	-47 dBm	With the exception of the frequencies covered by Table 26, 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 26.

TABLE 26

Additional receiver spurious emission requirements

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

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 27A to 30A 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:
- $f_{\text{offset}_{\text{max}}}$ 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 $f_{\text{offset}_{\text{max}}}$ minus half of the bandwidth of the measuring filter.

The spectrum emissions measured should not exceed the maximum level specified in Tables 27A to 30A for the appropriate BS rated output power.

TABLE 27A

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
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	–12.5 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$-12.5 \text{ dBm} - 15 \left(\frac{f_{\text{offset}}}{\text{MHz}} - 2.715 \right) \text{ dB}$	30 kHz
(See Note 1)	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	–24.5 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–11.5 dBm	1 MHz

TABLE 28A

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
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	–12.5 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$-12.5 \text{ dBm} - 15 \left(\frac{f_{\text{offset}}}{\text{MHz}} - 2.715 \right) \text{ dB}$	30 kHz
(See Note 1)	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	–24.5 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f < 7.5 \text{ MHz}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < 8.0 \text{ MHz}$	–11.5 dBm	1 MHz
$7.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$8.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 54.5 \text{ dB}$	1 MHz

TABLE 29A

Spectrum emission mask values, BS maximum output power $31 \leq P < 39$ dBm

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

TABLE 30A

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
$2.5 \text{ MHz} \leq \Delta f < 2.7 \text{ MHz}$	$2.515 \text{ MHz} \leq f_{\text{offset}} < 2.715 \text{ MHz}$	-20.5 dBm	30 kHz
$2.7 \text{ MHz} \leq \Delta f < 3.5 \text{ MHz}$	$2.715 \text{ MHz} \leq f_{\text{offset}} < 3.515 \text{ MHz}$	$-20.5 \text{ dBm} - 15 \left(\frac{f_{\text{offset}}}{\text{MHz}} - 2.715 \right) \text{ dB}$	30 kHz
(See Note 1)	$3.515 \text{ MHz} \leq f_{\text{offset}} < 4.0 \text{ MHz}$	-32.5 dBm	30 kHz
$3.5 \text{ MHz} \leq \Delta f < 7.5 \text{ MHz}$	$4.0 \text{ MHz} \leq f_{\text{offset}} < 8.0 \text{ MHz}$	-19.5 dBm	1 MHz
$7.5 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$8.0 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-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 27B to 29B 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:
- $f_{\text{offset}_{\text{max}}}$ 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 27B to 29B for the appropriate BS rated output power.

TABLE 27B

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
$0.8 \text{ MHz} \leq \Delta f < 1.0 \text{ MHz}$	$0.815 \text{ MHz} \leq f_{offset} < 1.015 \text{ MHz}$	–18.5 dBm	30 kHz
$1.0 \text{ MHz} \leq \Delta f < 1.8 \text{ MHz}$	$1.015 \text{ MHz} \leq f_{offset} < 1.815 \text{ MHz}$	$-18.5 \text{ dBm} - 15 \left(\frac{f_{offset}}{\text{MHz}} - 1.015 \right) \text{ dB}$	30 kHz
(See Note 1)	$1.815 \text{ MHz} \leq f_{offset} < 2.3 \text{ MHz}$	–26.5 dBm	30 kHz
$1.8 \text{ MHz} \leq \Delta f \leq \Delta f_{max}$	$2.3 \text{ MHz} \leq f_{offset} < f_{offset_{max}}$	–11.5 dBm	1 MHz

TABLE 28B

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
$0.8 \text{ MHz} \leq \Delta f < 1.0 \text{ MHz}$	$0.815 \text{ MHz} \leq f_{offset} < 1.015 \text{ MHz}$	$P - 52.5 \text{ dB}$	30 kHz
$1.0 \text{ MHz} \leq \Delta f < 1.8 \text{ MHz}$	$1.015 \text{ MHz} \leq f_{offset} < 1.815 \text{ MHz}$	$P - 52.5 \text{ dBm} - 10 \left(\frac{f_{offset}}{\text{MHz}} - 1.015 \right) \text{ dB}$	30 kHz
(See Note 1)	$1.815 \text{ MHz} \leq f_{offset} < 2.3 \text{ MHz}$	$P - 60.5 \text{ dB}$	30 kHz
$1.8 \text{ MHz} \leq \Delta f \leq \Delta f_{max}$	$2.3 \text{ MHz} \leq f_{offset} < f_{offset_{max}}$	$P - 45.5 \text{ dB}$	1 MHz

TABLE 29B

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
$0.8 \text{ MHz} \leq \Delta f < 1.0 \text{ MHz}$	$0.815 \text{ MHz} \leq f_{\text{offset}} < 1.015 \text{ MHz}$	–26.5 dBm	30 kHz
$1.0 \text{ MHz} \leq \Delta f < 1.8 \text{ MHz}$	$1.015 \text{ MHz} \leq f_{\text{offset}} < 1.815 \text{ MHz}$	$-26.5 \text{ dBm} - 10 \left(\frac{f_{\text{offset}}}{\text{MHz}} - 1.015 \right) \text{ dB}$	30 kHz
(See Note 1)	$1.815 \text{ MHz} \leq f_{\text{offset}} < 2.3 \text{ MHz}$	–34.5 dBm	30 kHz
$1.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.3 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–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 30C to 31C 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;
- $f_{\text{offset}_{\text{max}}}$ 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 $f_{\text{offset}_{\text{max}}}$ minus half of the bandwidth of the measuring filter.

The spectrum emissions measured should not exceed the maximum level specified in Tables 27C to 29C for the appropriate BS rated output power.

TABLE 27C

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
$5 \text{ MHz} \leq \Delta f < 5.2 \text{ MHz}$	$5.015 \text{ MHz} \leq f_{\text{offset}} < 5.215 \text{ MHz}$	–15.5 dBm	30 kHz
$5.2 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$5.215 \text{ MHz} \leq f_{\text{offset}} < 6.015 \text{ MHz}$	$-15.5 \text{ dBm} - 15 \left(\frac{f_{\text{offset}}}{\text{MHz}} - 5.215 \right) \text{ dB}$	30 kHz
(See Note 1)	$6.015 \text{ MHz} \leq f_{\text{offset}} < 6.5 \text{ MHz}$	–27.5 dBm	30 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–14.5 dBm	1 MHz

TABLE 28C

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
$5 \text{ MHz} \leq \Delta f < 5.2 \text{ MHz}$	$5.015 \text{ MHz} \leq f_{\text{offset}} < 5.215 \text{ MHz}$	-15.5 dBm	30 kHz
$5.2 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$5.215 \text{ MHz} \leq f_{\text{offset}} < 6.015 \text{ MHz}$	$-15.5 \text{ dBm} - 15 \left(\frac{f_{\text{offset}}}{\text{MHz}} - 5.215 \right) \text{ dB}$	30 kHz
(See Note 1)	$6.015 \text{ MHz} \leq f_{\text{offset}} < 6.5 \text{ MHz}$	-27.5 dBm	30 kHz
$6 \text{ MHz} \leq \Delta f < 15 \text{ MHz}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < 15.5 \text{ MHz}$	-14.5 dBm	1 MHz
$15 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$15.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	$P - 57.5 \text{ dB}$	1 MHz

TABLE 29C

Spectrum emission mask values, BS maximum output power $31 \leq P < 39$ dBm

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

TABLE 30C

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
$5 \text{ MHz} \leq \Delta f < 5.2 \text{ MHz}$	$5.015 \text{ MHz} \leq f_{\text{offset}} < 5.215 \text{ MHz}$	–23.5 dBm	30 kHz
$5.2 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$5.215 \text{ MHz} \leq f_{\text{offset}} < 6.015 \text{ MHz}$	$-23.5 \text{ dBm} - 15 \left(\frac{f_{\text{offset}}}{\text{MHz}} - 5.215 \right) \text{ dB}$	30 kHz
(See Note 1)	$6.015 \text{ MHz} \leq f_{\text{offset}} < 6.5 \text{ MHz}$	–35.5 dBm	30 kHz
$6 \text{ MHz} \leq \Delta f < 15 \text{ MHz}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < 15.5 \text{ MHz}$	–22.5 dBm	1 MHz
$15 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$15.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–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.

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.
- $f_{\text{offset}_{\text{max}}}$ is the offset to the frequency 10 MHz outside the BS transmitter operating band.
- Δf_{max} is equal to $f_{\text{offset}_{\text{max}}}$ 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 27D:

TABLE 27D

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)
$0 \text{ MHz} \leq \Delta f < 1.4 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 1.45 \text{ MHz}$	$+0.5 \text{ dBm} - \frac{10}{1.4} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$1.4 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.45 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	–9.5 dBm	100 kHz
$2.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$2.85 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}}$	–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)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$-3.5 \text{ dBm} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	–13.5 dBm	100 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–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)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$-5.5 \text{ dBm} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$5.05 \text{ MHz} \leq f_{\text{offset}} < 10.05 \text{ MHz}$	–12.5 dBm	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–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 28D:

TABLE 28D

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)
$0 \text{ MHz} \leq \Delta f < 1.4 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 1.45 \text{ MHz}$	$+0.5 \text{ dBm} - \frac{10}{1.4} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$1.4 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.45 \text{ MHz} \leq f_{\text{offset}} < 2.85 \text{ MHz}$	–9.5 dBm	100 kHz
$2.8 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$3.3 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–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)
$0 \text{ MHz} \leq \Delta f < 3 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 3.05 \text{ MHz}$	$-3.5 \text{ dBm} - \frac{10}{3} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$3 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$3.05 \text{ MHz} \leq f_{\text{offset}} < 6.05 \text{ MHz}$	–13.5 dBm	100 kHz
$6 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–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)
$0 \text{ MHz} \leq \Delta f < 5 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 5.05 \text{ MHz}$	$-5.5 \text{ dBm} - \frac{7}{5} \left(\frac{f_{\text{offset}}}{\text{MHz}} - 0.05 \right) \text{ dB}$	100 kHz
$5 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$5.05 \text{ MHz} \leq f_{\text{offset}} < 10.05 \text{ MHz}$	–12.5 dBm	100 kHz
$10 \text{ MHz} \leq \Delta f \leq \Delta f_{\text{max}}$	$10.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–15 dBm	1 MHz

2.4.2.1 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 29D.

TABLE 29D

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}	Minimum requirement	Measurement bandwidth (Note 1)
1.4 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.005 \text{ MHz} \leq f_{\text{offset}} < 0.995 \text{ MHz}$	–12.5 dBm	10 kHz
	$1 \text{ MHz} \leq \Delta f < 2.8 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 3.3 \text{ MHz}$	–11.5 dBm	1 MHz
	$2.8 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$3.3 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
3 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	–11.5 dBm	30 kHz
	$1 \text{ MHz} \leq \Delta f < 6 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 6.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$6 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$6.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
5 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.015 \text{ MHz} \leq f_{\text{offset}} < 0.985 \text{ MHz}$	–13.5 dBm	30 kHz
	$1 \text{ MHz} \leq \Delta f < 10 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 10.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$10 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$10.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
10 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–11.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 20 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 20.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$20 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$20.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
15 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–13.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 30 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 30.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$30 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$30.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	
20 MHz	$0 \text{ MHz} \leq \Delta f < 1 \text{ MHz}$	$0.05 \text{ MHz} \leq f_{\text{offset}} < 0.95 \text{ MHz}$	–14.5 dBm	100 kHz
	$1 \text{ MHz} \leq \Delta f < 40 \text{ MHz}$	$1.5 \text{ MHz} \leq f_{\text{offset}} < 40.5 \text{ MHz}$	–11.5 dBm	1 MHz
	$40 \text{ MHz} \leq \Delta f < \Delta f_{\text{max}}$	$40.5 \text{ MHz} \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	–13 dBm	

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 31Aa) to 31Ac).

TABLE 31A

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

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)	Chip rate for RRC measurement filter (Mchip/s)	ACLR limit (dB)
7.5	3.84	44.2
12.5	3.84	54.2
10.0	7.68	44.2
20.0	7.68	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 31B.

TABLE 31B
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 limits in the tables below or the absolute limit of -13 dBm/MHz apply, whichever is less stringent.

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

For operation in unpaired spectrum, the ACLR shall be higher than the value specified in Table 31C.

TABLE 31C
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
	$\frac{BW_{channel}}{2} + 0.8$ MHz	1.28 Mchip/s UTRA	RRC (1.28 Mchip/s)	44.2 dB
	$\frac{BW_{channel}}{2} + 2.4$ 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
	$\frac{BW_{channel}}{2} + 0.8$ MHz	1.28 Mchip/s UTRA	RRC (1.28 Mchip/s)	44.2 dB
	$\frac{BW_{channel}}{2} + 2.4$ MHz	1.28 Mchip/s UTRA	RRC (1.28 Mchip/s)	44.2 dB
	$\frac{BW_{channel}}{2} + 2.5$ MHz	3.84 Mchip/s UTRA	RRC (3.84 Mchip/s)	44.2 dB

TABLE 31C (*end*)

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
5, 10, 15, 20	$BW_{channel}/2 + 7.5$ 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 – $BW_{channel}$ and BW_{config} 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 31C.

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 32A.

TABLE 32A

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 32B to 32E.

TABLE 32B

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 ↔ $F_l - 10$ MHz	-30 dBm	1 MHz	(1)
$F_l - 10$ MHz ↔ $F_u + 10$ MHz	-15 dBm	1 MHz	(2)
$F_u + 10$ MHz ↔ 12.5 GHz	-30 dBm	1 MHz	(3)

TABLE 32C

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 ↔ $F_{low} - 10$ 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 32D

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 32E

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 33A

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	

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 33B

BS spurious emissions limits for UTRA BS 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	

4.3 Coexistence with UTRA-FDD

This requirement may be applied to geographic areas in which both UTRA-TDD and UTRA-FDD operating in bands specified in Table 33C 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 33C. 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 33C.

TABLE 33C

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

TABLE 33C (*end*)

BS class	Band	Maximum level	Measurement bandwidth	Note
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 33C are based on a coupling loss of 67 dB between the TDD and FDD base stations. The requirements for local area BS in Table 33C are based on a coupling loss of 70 dB between TDD and FDD wide area base stations.

4.4 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 33D.

TABLE 33D

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 34F, 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 34A

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 and 2.025 GHz-2.5 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
1.9 GHz-1.98 GHz, 2.01 GHz-2.025 GHz and 2.5 GHz-2.62 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
2.62 GHz-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 34B

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 34C

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 and 2.025 GHz-2.3 GHz 2.4 GHz-2.50 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
1.9 GHz-1.98 GHz, 2.01 GHz-2.025 GHz 2.3 GHz to 2.4 GHz and 2.5 GHz-2.62 GHz	-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
2.62 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

5.3 7.68 Mchip/s UTRA TDD option

TABLE 34D

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

TABLE 34D (end)

Band	Maximum level	Measurement bandwidth	Note
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 34E

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 34F

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) mobile 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 35.

TABLE 35

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 36.

TABLE 36

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 37.

TABLE 37
MS spurious emission limits

Band (f) ⁽¹⁾	Maximum level (dBm)	Measurement bandwidth	Note
$9 \text{ kHz} \leq f \leq 150 \text{ kHz}$	-36	1 kHz	(2)
$150 \text{ kHz} < f \leq 30 \text{ MHz}$	-36	10 kHz	(2)
$30 \text{ MHz} < f \leq 1\,000 \text{ MHz}$	-36	100 kHz	(2)
$1\,000 \text{ MHz} < f < 1\,920 \text{ MHz}$	-30	1 MHz	(2)
$1\,920 \text{ MHz} \leq f \leq 1\,980 \text{ MHz}$	-30	30 kHz	(3)
$1\,980 \text{ MHz} < f < 2\,110 \text{ MHz}$	-30	1 MHz	(2)
$2\,110 \text{ MHz} \leq f \leq 2\,170 \text{ MHz}$	-70	30 kHz	(4)
$2\,170 \text{ MHz} < f \leq 12.75 \text{ GHz}$	-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 38.

TABLE 38
Additional spurious emissions requirements

Service	Frequency band	Measurement bandwidth (kHz)	Limit (dBm)
R-GSM	$921 \leq f \leq 925 \text{ MHz}$	100	-60
R-GSM	$925 < f \leq 935 \text{ MHz}$	100	-67
GSM 900/R-GSM	$935 < f \leq 960 \text{ MHz}$	100	-79
DCS 1800	$1\,805 \leq f \leq 1\,880 \text{ MHz}$	100	-71
UTRA TDD	$1\,900 \leq f \leq 1\,920 \text{ MHz}$	100	-62
UTRA TDD	$2\,010 \leq f \leq 2\,025 \text{ MHz}$	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 39.

TABLE 39

General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level (dBm)	Note
$30 \text{ MHz} \leq f < 1 \text{ GHz}$	100 kHz	-57	
$1 \text{ GHz} \leq f \leq 12.75 \text{ GHz}$	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 40 and 41.
- The level of the output RF spectrum due to switching transients should be no more than that given in Table 42.
- 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 40 and 41. 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 40, 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 40
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 40 results in lower than the power limit given in Table 41, then the latter should be applied instead.

TABLE 41

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 42 specifies the limits.

TABLE 42

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 43.

TABLE 43

MS spurious emission limits

Band (f)(1)	Measurement bandwidth	Maximum level (dBm)	Note
$9 \text{ kHz} \leq f \leq 150 \text{ kHz}$	1 kHz	-36	(2)
$150 \text{ kHz} < f \leq 30 \text{ MHz}$	10 kHz	-36	(2)
$30 \text{ MHz} < f \leq 1\,000 \text{ MHz}$	100 kHz	-36	(2)

TABLE 43 (*end*)

Band (f)(1)	Measurement bandwidth	Maximum level (dBm)	Note
1 000 MHz < f < 1 920 MHz	1 MHz	-30	(2)
1 920 MHz $\leq f \leq$ 1 980 MHz	100 kHz	-36	(3)
1 980 MHz < f < 2 110 MHz	1 MHz	-30	(2)
2 110 MHz $\leq f \leq$ 2 170 MHz	100 kHz	-66	(4)
2 170 MHz < $f \leq$ 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 44.

TABLE 44

Additional spurious emissions requirements

Service	Frequency band	Measurement bandwidth (kHz)	Minimum requirement (dBm)
R-GSM	$921 \leq f \leq 925$ MHz	100	-60
R-GSM	$925 < f \leq 935$ MHz	100	-67
GSM 900/R-GSM	$935 < f \leq 960$ MHz	100	-79
DCS 1800	$1\ 805 \leq f \leq 1\ 880$ MHz	100	-71
UTRA TDD	$1\ 900 \leq f \leq 1\ 920$ MHz	100	-62
UTRA TDD	$2\ 010 \leq f \leq 2\ 025$ 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 45.

TABLE 45

General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level (dBm)	Note
$30 \text{ MHz} \leq f < 1 \text{ GHz}$	100 kHz	-57	
$1 \text{ GHz} \leq f \leq 12.75 \text{ GHz}$	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)) mobile 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 46.

TABLE 46

Emissions modulation

Emissions on RF channel “Y”	Measurement bandwidth	Maximum power level
$Y = M \pm 1$	⁽¹⁾	160 μ W (-8 dBm)
$Y = M \pm 2$	⁽¹⁾	1 μ W (-30 dBm)
$Y = M \pm 3$	⁽¹⁾	80 nW (-41 dBm)
$Y = \text{any other DECT channel}$	⁽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 $Y = \text{“any other DECT channel”}$, 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 47.

TABLE 47

Emissions due to transmitter transients

Emissions on RF channel "Y"	Measurement bandwidth	Maximum power level
$Y = M \pm 1$	(1)	250 μ W (-6 dBm)
$Y = M \pm 2$	(1)	40 μ W (-14 dBm)
$Y = M \pm 3$	(1)	4 μ W (-24 dBm)
Y = any other DECT channel	(1)	1 μ W (-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 48. The requirements of Table 48 are only applicable for frequencies which are greater than 12.5 MHz away from the centre frequency, f_c , of a carrier.

TABLE 48

Spurious emissions requirements

Frequency	Minimum requirement/ Reference bandwidth
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	-36 dBm/100 kHz
$1 \text{ GHz} \leq f < 12.75 \text{ GHz}$	-30 dBm/1 MHz
$f_c - 12.5 \text{ MHz} < f < f_c + 12.5 \text{ MHz}$	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 49.

TABLE 49

Receiver spurious emissions

Frequency band	Measurement bandwidth	Maximum level (dBm)	Note
$30 \text{ MHz} \leq f < 1 \text{ GHz}$	100 kHz ⁽¹⁾	-57	
$1 \text{ GHz} \leq f \leq 12.75 \text{ GHz}$	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 50.

TABLE 50

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 Annex 6.

2 Spectrum emission mask

2.1 Spectrum emission mask for equipment operating in the band 2 300-2 400 MHz

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 51

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 52

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 53

Spectrum emission mask for 8.75 MHz carrier

a) $P_{tx} \geq 40$ 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) $29 \text{ dBm} \leq P_{tx} < 40 \text{ dBm}$

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 53 (*end*)**c) $P_{tx} < 29$ dBm**

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

2.2 Spectrum emission mask for equipment operating in the band 2 500-2 690 MHz

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 54

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 55

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 56

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 57

Spectrum emission mask for 5 MHz carrier – Japan

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$7.5 \text{ MHz} \leq \Delta f < 12.25$	$-15 - 1.4 \times (\Delta f - 7.5) \text{ dBm}$	1 MHz
$12.25 \leq \Delta f < 22.5 \text{ MHz}$	-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 56.

TABLE 58

Spectrum emission mask for 10 MHz carrier – Japan

Frequency offset from centre	Allowed emission level	Measurement bandwidth
$15 \leq \Delta f < 25 \text{ MHz}$	-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 56.

2.3 Spectrum emission mask for equipment operating in the band 3 400-3 600 MHz

OFDMA TDD WMAN base stations follow local/regional regulations in force on out-of-band emissions. In this regard, in the CEPT regulatory domain, the unwanted emissions of OFDMA TDD WMAN base stations as a minimum meet the requirements of ETSI harmonized standard EN 302 326 currently in force for this band and any other applicable ETSI harmonized standards. The same requirements have been chosen by a number of administrations of countries which are not CEPT members.

In cases where local/regional regulations specify out of block emissions for the purpose of facilitating coexistence between licensees, the operators may ensure compliance with the BEM (Block-Edge Mask). In CEPT the levels are in ECC REC (04) 05.

3 Transmitter spurious emissions (conducted)

3.1 Transmitter spurious emissions

IMT-2000 OFDMA TDD WMAN base stations comply with the limits recommended in Recommendation ITU-R SM.329-10.

3.1.1 Spurious emissions for equipment operating in the band 2 300-2 400 MHz

The limits shown in Tables 59 and 60 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 59

Base station 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 60

Base station spurious emissions limit, Category B

Band	Measurement bandwidth	Allowed emission level
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	100 kHz	-36 dBm
$1 \text{ GHz} \leq f < 13.45 \text{ GHz}$	30 kHz If $2.5 \times \text{BW} \leq f_c - f < 10 \times \text{BW}$	-30 dBm
	300 kHz If $10 \times \text{BW} \leq f_c - f < 12 \times \text{BW}$	
	1 MHz If $12 \times \text{BW} \leq f_c - f $	

NOTE 1 – In Table 60, BW is the signal channel bandwidth of 5 or 10 MHz.

For a channel bandwidth of 8.75 MHz, Table 59 applies.

3.1.2 Spurious emissions for equipment operating in the band 2 500-2 690 MHz

The limits shown in Tables 61 and 62 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 61 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 62 should be met in areas where Category B limits for spurious emissions, as defined in Recommendation ITU-R SM.329-10, are applicable.

TABLE 61

Base station 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 62

Base station spurious emissions limit, Category B

Band	Measurement bandwidth	Allowed emission level
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	100 kHz	-36 dBm
$1 \text{ GHz} \leq f < 13.45 \text{ GHz}$	30 kHz If $2.5 \times \text{BW} \leq f_c - f < 10 \times \text{BW}$	-30 dBm
	300 kHz If $10 \times \text{BW} \leq f_c - f < 12 \times \text{BW}$	
	1 MHz If $12 \times \text{BW} \leq f_c - f $	

NOTE 1 – In Table 62, BW is the signal channel bandwidth of 5 or 10 MHz.

TABLE 63

Base station spurious emission limit, Japan

Frequency bandwidth	Measurement bandwidth	Allowed emission level (dBm)
$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-13
$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-13
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	100 kHz	-13
$1\,000 \text{ MHz} \leq f < 2\,505 \text{ MHz}$	1 MHz	-13
$2\,505 \text{ MHz} \leq f < 2\,535 \text{ MHz}$	1 MHz	-42
$2\,535 \text{ MHz} \leq f < 2\,630 \text{ MHz}$	1 MHz	-13 ⁽¹⁾
$2\,630 \text{ MHz} \leq f < 2\,634.75 \text{ MHz}$	1 MHz	$-15 - 7/5 \times (f - 2\,629.75)$
$2\,634.75 \text{ MHz} \leq f < 2\,655 \text{ MHz}$	1 MHz	-22
$2\,655 \text{ MHz} \leq f$	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.

3.1.3 Spurious emissions for equipment operating in the band 3 400-3 600 MHz

Spurious emission limits are applicable to frequency offset which are greater than 250% of the channel bandwidth. Therefore the limits shown in Tables 64 and 65 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 64

Base station 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 65

Base station spurious emissions limits, Category B

Band	Measurement bandwidth	Allowed emission level
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	100 kHz	-36 dBm
$1 \text{ GHz} \leq f < 13.45 \text{ GHz}$	30 kHz If $2.5 \times \text{BW} \leq f_c - f < 10 \times \text{BW}$	-30 dBm
	300 kHz If $10 \times \text{BW} \leq f_c - f < 12 \times \text{BW}$	
	1 MHz If $12 \times \text{BW} \leq f_c - f $	

NOTE 1 – In Table 65, BW is the signal channel bandwidth of 5, 7 or 10 MHz.

3.2 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 68 for a BS where requirements for coexistence with the system listed in the first column apply.

TABLE 66

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	

TABLE 66 (end)

System type operating in the same geographical area	Band for coexistence requirement	Maximum level	Measurement bandwidth	Note
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	
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 67 are applied in Japan.

TABLE 67

Receiver spurious emission requirements

Frequency band	Total allowed emission level (dBm)
$f < 1 \text{ GHz}$	-54
$1 \text{ GHz} \leq f$	-47

5 Adjacent channel leakage ratio (ACLR)

5.1 ACLR values for equipment operating in the band 2 500-2 690 MHz

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.

5.2 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 68

a) BS ACLR for 5 MHz channel bandwidth – intra-system scenario

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency \pm 5 MHz	45
BS channel centre frequency \pm 10 MHz	55

b) BS ACLR for 5 MHz channel bandwidth – UTRA scenario

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency \pm 5 MHz	53.5
BS channel centre frequency \pm 10 MHz	66

c) BS ACLR for 10 MHz channel bandwidth – intra-system scenario

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency \pm 10.0 MHz	45
BS channel centre frequency \pm 20.0 MHz	55

d) BS ACLR for 10 MHz channel bandwidth –UTRA scenario

Adjacent channel centre frequency	Minimum required ACLR (dB)
BS channel centre frequency \pm 10.0 MHz	53.5
BS channel centre frequency \pm 20.0 MHz	66

Additional information may be provided in future revisions of this Recommendation.

NOTE 1 – Further study is necessary for other systems wherever applicable.

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

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.
