Annex 1

LTE-Advanced

The present Annex includes unwanted emission requirements from E-UTRA carriers for E-UTRA and multi standard radio (MSR) base stations.

An E-UTRA base station is characterized by the ability of its receiver and transmitter to process only E-UTRA carriers.

An MSR base station is characterized by the ability of its receiver and transmitter to process two or more carriers in common active RF components simultaneously in a declared RF bandwidth, where at least one carrier is of a different Radio Access Technology (RAT) than the other carrier(s).

This Annex is divided into three parts:

– Chapter 1 specifies the operating bands for which the requirements in the present Annex apply.

– Chapter 2.1 and Chapter 2.2 specifies definitions, symbols and abbreviations.

– Chapter 2.3 ff. includes the E-UTRA BS unwanted emission requirements.

– Chapter 3 includes the MSR BS unwanted emission requirements.

Values specified in the present Annex incorporate test tolerances defined in Recommendation ITU‑R M.1545.

# 1 Operating bands

The unwanted emission limits defined in the present Annex are for MSR or E-UTRA BS operating at least one of the bands in Table 1-1 or Table 1-2:

TABLE 1-1

Paired bands in E-UTRA, NR, UTRA and GSM/EDGE

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MSR and E‑UTRA band number(Note 1) | NR band number | UTRAband number | GSM/EDGEband designation | Uplink (UL) BS receiveUE transmit | Downlink (DL) BS transmit UE receive | Band category (Note 2) |
| 1 | n1 | I | – | 1920 MHz | – | 1980 MHz | 2110 MHz | – | 2170 MHz | 1 |
| 2 | n2 | II | PCS 1900 | 1850 MHz | – | 1910 MHz | 1930 MHz | – | 1990 MHz | 2 |
| 3 | n3 | III | DCS 1800 | 1710 MHz | – | 1785 MHz | 1805 MHz | – | 1880 MHz | 2 |
| 4 | n4 | IV | – | 1710 MHz | – | 1755 MHz | 2110 MHz | – | 2155 MHz | 1 |
| 5 | n5 | V | GSM 850 | 824 MHz | – | 849 MHz | 869 MHz | – | 894 MHz | 2 |
| 6(1) | – | VI | – | 830 MHz | – | 840 MHz | 875 MHz | – | 885 MHz | 1(1) |
| 7 | n7 | VII | – | 2500 MHz | – | 2570 MHz | 2620 MHz | – | 2690 MHz | 1 |
| 8 | n8 | VIII | E-GSM | 880 MHz | – | 915 MHz | 925 MHz | – | 960 MHz | 2 |
| 9 | – | IX | – | 1749.9 MHz | – | 1784.9 MHz | 1844.9 MHz | – | 1879.9 MHz | 1(12) |
| 10 | – | X | – | 1710 MHz | – | 1770 MHz | 2110 MHz | – | 2170 MHz | 1(12) |
| 11 | – | XI | – | 1427.9 MHz | – | 1447.9 MHz | 1475.9 MHz | – | 1495.9 MHz | 1 |
| 12 | n12 | XII | – | 699 MHz | – | 716 MHz | 729 MHz | – | 746 MHz | 1 |
| 13 | – | XIII | – | 777 MHz | – | 787 MHz | 746 MHz | – | 756 MHz | 1 |
| 14 | n14 | XIV | – | 788 MHz | – | 798 MHz | 758 MHz | – | 768 MHz | 1 |
| 15 | – | XV | – | Reserved |  |  | Reserved |  |  |  |
| 16 | – | XVI | – | Reserved |  |  | Reserved |  |  |  |
| 17 | – | – | – | 704 MHz | – | 716 MHz | 734 MHz | – | 746 MHz | 1(13) |
| 18 | n18 | – | – | 815 MHz | – | 830 MHz | 860 MHz | – | 875 MHz | 1(4) |
| 19 | – | XIX | – | 830 MHz | – | 845 MHz | 875 MHz | – | 890 MHz | 1 |
| 20 | n20 | XX | – | 832 MHz | – | 862 MHz | 791 MHz | – | 821 MHz | 1 |
| 21 | – | XXI | – | 1447.9 MHz | – | 1462.9 MHz | 1495.9 MHz | – | 1510.9 MHz | 1 |
| 22 | – | XXII | – | 3410 MHz | – | 3490 MHz | 3510 MHz | – | 3590 MHz | 1(12) |
| 23 | – | – | – | 2000 MHz | – | 2020 MHz | 2180 MHz | – | 2200 MHz | 1(8) |
| 24# | – | – | – | 1626.5 MHz | – | 1660.5 MHz | 1525 MHz | – | 1559 MHz | 1(11) |
| 25 | n25 | XXV | – | 1850 MHz | – | 1915 MHz | 1930 MHz | – | 1995 MHz | 1 |
| 26 | n26 | XXVI | – | 814 MHz | – | 849 MHz | 859 MHz | – | 894 MHz | 1 |
| 27 | – | – | – | 807 MHz | – | 824 MHz | 852 MHz | – | 869 MHz | 1(11) |

TABLE 1-1 (*end*)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MSR and E‑UTRA band number(Note 1) | NR band number | UTRAband number | GSM/EDGEband designation | Uplink (UL) BS receiveUE transmit | Downlink (DL) BS transmit UE receive | Band category (Note 2) |
| 28 | n28 | – | – | 703 MHz | – | 748 MHz | 758 MHz | – | 803 MHz | 1(4) |
| 29 | n29 | – | – | N/A | 717 MHz | – | 728 MHz | 1(2, 5) |
| 30 | n30 | – | – | 2305 MHz | – | 2315 MHz | 2350 MHz  | – | 2360 MHz | 1(2) |
| 31 | – | – | – | 452.5 MHz | – | 457.5 MHz | 462.5 MHz | – | 467.5 MHz | 1(13) |
| 32 | – | XXXII | – | N/A | 1452 MHz  | – | 1496 MHz | 1(5, 12)  |
| 64 | – | – | – |  |  | Reserved |
| 65 | n65 | – | – | 1920 MHz | – | 2010 MHz | 2110 MHz | – | 2200 MHz | 1(4) |
| 66 | n66 | – | – | 1710 MHz | – | 1780 MHz | 2110 MHz | – | 2200 MHz | 1(4, 7) |
| 67 | – | – | – | N/A | 738 MHz | – | 758 MHz | 1(5, 11) |
| 68 | – | – | – | 698 MHz | – | 728 MHz | 753 MHz | – | 783 MHz | 1(11) |
| 69 | – | – | – | N/A | 2570 MHz | – | 2620 MHz | 1(5, 11) |
| 70 | n70 | – | – | 1695 MHz | – | 1710 MHz | 1995 MHz | – | 2020 MHz | 1(4, 9) |
| 71 | n71 | – | – | 663 MHz | – | 698 MHz | 617 MHz | – | 652 MHz | 1(4) |
| 72 | – | – | – | 451 MHz | – | 456 MHz | 461 MHz | – | 466 MHz | 1(13) |
| 73 | – | – | – | 450 MHz | – | 455 MHz | 460 MHz | – | 465 MHz | 1(13) |
| 74 | n74 | – | – | 1427 MHz | – | 1470 MHz | 1475 MHz | – | 1518 MHz | 1(4) |
| 75 | n75 | – | – | N/A | 1432 MHz | – | 1517 MHz | 1(2, 5) |
| 76 | n76 | – | – | N/A | 1427 MHz | – | 1432 MHz | 1(2, 5) |
| 85 | – | – | – | 698 MHz | – | 716 MHz | 728 MHz | – | 746 MHz | 1(13) |
| 87 | – | – | – | 410 MHz | – | 415 MHz | 420 MHz | – | 425 MHz | 1(13) |
| 88 | – | – | – | 412 MHz | – | 417 MHz | 422 MHz | – | 427 MHz | 1(13) |
|  | (1) The band is for UTRA only.(2) The band is for E-UTRA and/or NR only. (3) The band is for NR, E-UTRA and/or UTRA only.(4) The band is for NR, E-UTRA and/or NB-IoT only.(5) Restricted to NR and/or E-UTRA operation when carrier aggregation is configured. The downlink operating band is paired with the uplink operating band (external) of the carrier aggregation configuration that is supporting the configured Primary Cell (Pcell): the cell, operating on the primary frequency, in which the UE either performs the initial connection establishment procedure or initiates the connection re-establishment procedure, or the cell indicated as the primary cell in the handover procedure.(6) Restricted to UTRA operation when dual band is configured (e.g., DB-DC-HSDPA or dual band 4C-HSDPA). The down link frequency(ies) of this band are paired with the uplink frequency(ies) of the other FDD band (external) of the dual band configuration.(7) In E-UTRA operation, the range 2180 – 2200 MHz of the DL operating band is restricted to operation when carrier aggregation is configured.(8) Band 23 is not applicable.(9) In E-UTRA operation, the range 2010-2020 MHz of the DL operating band is restricted to operation when carrier aggregation is configured and TX-RX separation is 300 MHz. In E-UTRA operation, the range 2005 – 2020 MHz of the DL operating band is restricted to operation when carrier aggregation is configured and TX-RX separation is 295 MHz.(10) DL operation is restricted to 1526-1536 MHz frequency range. UL operation is restricted to 1627.5 – 1637.5 MHz and 1646.5 – 1656.5 MHz per FCC Order DA 20-48.(11) The band is for E-UTRA only.(12) The band is for E-UTRA and/or UTRA only.(13) The band is for E-UTRA and/or NB-IoT onlyNOTE 1 – All frequency bands or parts of the bands referenced in this Recommendation which are not identified for IMT in the ITU Radio Regulations have been marked with “#”.NOTE 2 – Band Category 1 (BC1): Bands for E-UTRA FDD, NR FDD and UTRA FDD operation. Bands in this category are also used for NB-IoT operation (all modes). – Band Category 2 (BC2): Bands for E-UTRA FDD, NR FDD, UTRA FDD and GSM/EDGE operation. Bands in this category are also used for NB-IoT operation (all modes). – Band Category 3 (BC3): Bands for E-UTRA TDD, NR TDD and UTRA TDD operation. Bands in this category are also used for NB-IoT operation (all modes). |

TABLE 1-2

Unpaired bands in E-UTRA and UTRA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MSR and E‑UTRA band number | NRband number | UTRA band number | Uplink (UL) BS receiveUE transmit | Downlink (DL) BS transmit UE receive | Band category (NOTE) |
| 33 | – | a) | 1900 MHz | – | 1920 MHz | 1900 MHz | – | 1920 MHz | 3 |
| 34 | n34 | a) | 2010 MHz | – | 2025 MHz | 2010 MHz | – | 2025 MHz | 3 |
| 35 | – | b) | 1850 MHz | – | 1910 MHz | 1850 MHz | – | 1910 MHz | 3 |
| 36 | – | b) | 1930 MHz | – | 1990 MHz | 1930 MHz | – | 1990 MHz | 3 |
| 37 | – | c) | 1910 MHz | – | 1930 MHz | 1910 MHz | – | 1930 MHz | 3 |
| 38 | n38 | d) | 2570 MHz | – | 2620 MHz | 2570 MHz | – | 2620 MHz | 3 |
| 39 | n39 | f) | 1880 MHz | – | 1920 MHz | 1880 MHz | – | 1920 MHz | 3 |
| 40 | n40 | e) | 2300 MHz | – | 2400 MHz | 2300 MHz | – | 2400 MHz | 3 |
| 41 | n41 | – | 2496 MHz | – | 2690 MHz | 2496 MHz | – | 2690 MHz | 3(1) |
| 42 | – | – | 3400 MHz | – | 3600 MHz | 3400 MHz | – | 3600 MHz | 3(1) |
| 43# | – | – | 3600 MHz | – | 3800 MHz | 3600 MHz | – | 3800 MHz | 3(1) |
| 44 | – | – | 703 MHz | – | 803 MHz | 703 MHz | – | 803 MHz | 3 |
| 45 | – | – | 1447 MHz | – | 1467 MHz | 1447 MHz | – | 1467 MHz | 3 |
| 48 | n48 | – | 3550 MHz | – | 3700 MHz | 3550 MHz | – | 3700 MHz | 3 |
| 50 | n50 | – | 1432 MHz | – | 1517 MHz | 1432 MHz | – | 1517 MHz | 3 |
| 51 | n51 | – | 1427 MHz | – | 1432 MHz | 1427 MHz | – | 1432 MHz | 3 |
| 52 | n52 | – | 3300 MHz | – | 3400 MHz | 3300 MHz | – | 3400 MHz | 3 |
| 53 | n53 | – | 2483.5 MHz | – | 2495 MHz | 2483.5 MHz | – | 2495 MHz | 3 |
| 77 | n77 | – | 3300 MHz | – | 4200 MHz | 3300 MHz | – | 4200 MHz | 3(2) |
| 78 | n78 | – | 3300 MHz | – | 3800 MHz | 3300 MHz | – | 3800 MHz | 3(2) |
|  | (1) The band 41 supports NB-IoT (in certain regions). The band 42 and 43 support NB-IoT.(2) The band is for NR only. NOTE – Band Category 1 (BC1): Bands for E-UTRA FDD, NR FDD and UTRA FDD operation. Bands in this category are also used for NB-IoT operation (all modes). – Band Category 2 (BC2): Bands for E-UTRA FDD, NR FDDUTRA FDD and GSM/EDGE operation. Bands in this category are also used for NB-IoT operation (all modes). – Band Category 3 (BC3): Bands for E-UTRA TDD, NR TDD and UTRA TDD operation. Bands in this category are also used for NB-IoT operation (all modes). |

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# 2 E-UTRA generic unwanted emission characteristics

## 2.1 Definitions

**Aggregated channel bandwidth**: RF bandwidth in which a BS transmits and/or receives multiple contiguously aggregated carriers.

NOTE – The aggregated channel bandwidth is measured in MHz.

**Base station RF bandwidth edge**: frequency of one of the edges of the base station RF bandwidth.

**Base station RF bandwidth**: RF bandwidth in which a BS transmits and/or receives single or multiple carrier(s) within a supported operating band.

NOTE – In single E-UTRA carrier operation, the Base Station RF Bandwidth is equal to the channel bandwidth.

**Carrier**: modulated waveform conveying the E-UTRA or UTRA (WCDMA) physical channels.

**Carrier aggregation**: aggregation of two or more E-UTRA component carriers in order to support wider transmission bandwidths.

**Carrier aggregation band**: a set of one or more operating bands across which multiple carriers are aggregated with a specific set of technical requirements.

NOTE – Carrier aggregation band(s) for an E-UTRA BS is declared by the manufacturer.

**Channel bandwidth**: the RF bandwidth supporting a single E-UTRA RF carrier with the transmission bandwidth configured in the uplink or downlink of a cell.

NOTE – The channel bandwidth is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

**Channel edge**: lowest or highest frequency of the E-UTRA carrier.

NOTE – Channel edges are separated by the channel bandwidth.

**Contiguous spectrum**: spectrum consisting of a contiguous block of spectrum with no sub-block gaps.

**Contiguous carriers**: a set of two or more carriers configured in a spectrum block where there are no RF requirements based on co-existence for un-coordinated operation within the spectrum block.

**Downlink operating band**: part of the operating band designated for downlink.

**Highest carrier**: carrier with the highest carrier centre frequency transmitted/received in a specified operating band.

**Inter RF BandwidthBandwidth gap**: frequency gap between two consecutive Base station RF bandwidths that are placed within two supported operating bands.

**Inter-band carrier aggregation**: carrier aggregation of component carriers in different operating bands.

NOTE – Carriers aggregated in each band can be contiguous or non-contiguous.

**Intra-band contiguous carrier aggregation**: contiguous carriers aggregated in the same operating band.

**Intra-band non-contiguous carrier aggregation**: non-contiguous carriers aggregated in the same operating band.

**Lower sub-block edge**: the frequency at the lower edge of one sub-block.

NOTE – It is used as a frequency reference point for both transmitter and receiver requirements.

**Lowest carrier**: carrier with the lowest carrier centre frequency transmitted/received in a specified operating band.

**Maximum Base Station RF bandwidth**: maximum Base station bandwidth supported by a BS within each supported operating band.

**Maximum output power**: mean power level per carrier of the base station measured at the antenna connector in a specified reference condition.

**Maximum radio bandwidth**: maximum frequency difference between the upper edge of the highest used carrier and the lower edge of the lowest used carrier.

**Mean power**: power measured in the channel bandwidth of the carrier.

NOTE – The period of measurement shall be at least one subframe (1ms), unless otherwise stated.

**Multi-band Base Station**: Base Station characterized by the ability of its transmitter and/or receiver to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different non-overlapping operating band than the other carrier(s).

**Multi-band transmitter**: transmitter characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different operating band (which is not a sub-band or superseding-band of another supported operating band) than the other carrier(s).

**Multi-band receiver**: receiver characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different non operating band (which is not a sub-band or superseding-band of another supported operating band) than the other carrier(s).

**Non-contiguous spectrum**: spectrum consisting of two or more sub-blocks separated by sub-block gap(s).

**Occupied bandwidth**: width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage β/2 of the total mean power of a given emission.

**Operating band**: frequency range (paired or unpaired) that is defined with a specific set of technical requirements, in which E-UTRA operates.

NOTE – The operating band(s) for an E-UTRA BS is declared by the manufacturer according to the designations in Tables 1-1 and 1-2.

**Output power**: mean power of one carrier of the base station, delivered to a load with resistance equal to the nominal load impedance of the transmitter.

**Rated output power**: mean power level per carrier that the manufacturer has declared to be available at the antenna connector.

**Reference bandwidth**: RF bandwidth in which an emission level is specified.

**RRC filtered mean power**: mean power as measured through a root raised cosine filter with roll-off factor  and a bandwidth equal to the chip rate of the radio access mode.

NOTE – The RRC filtered mean power of a perfectly modulated W-CDMA signal is 0.246 dB lower than the mean power of the same signal.

**Sub-block**: one contiguous allocated block of spectrum for use by the same base station. There may be multiple instances of sub-blocks within an RF bandwidth.

**Sub-block bandwidth**: RF bandwidth of one sub-block.

**Sub-block gap**: frequency gap between two consecutive sub-blocks within an RF bandwidth, where the RF requirements in the gap are based on co-existence for un-coordinated operation.

**Synchronized operation**: operation of TDD in two different systems, where no simultaneous uplink and downlink occur.

**Total RF bandwidth**: maximum sum of Base station RF bandwidths in all supported operating bands.

**Transmission bandwidth**: bandwidth of an instantaneous transmission from a UE or BS, measured in resource block units.

**Transmission bandwidth configuration**: highest transmission bandwidth allowed for uplink or downlink in a given channel bandwidth, measured in resource block units.

**Unsynchronized operation**: operation of TDD in two different systems, where the conditions for synchronized operation are not met.

**Uplink operating band**: part of the operating band designated for uplink.

**Upper sub-block edge**: frequency at the upper edge of one sub-block.

NOTE – It is used as a frequency reference point for both transmitter and receiver requirements.

## 2.2 Symbols and Abbreviations

### 2.2.1 Symbols

*BWChannel* Channel bandwidth

BWConfig Transmission bandwidth configuration, expressed in MHz, where BWConfig = NRB × 180 kHz in the uplink and BWConfig = 15 kHz + NRB × 180 kHz in the downlink.

CA\_X Intra-band contiguous CA of component carriers in one sub-block within band X where X is the applicable E-UTRA operating band

CA\_X-X Intra-band non-contiguous CA of component carriers in two sub-blocks withinband X where X is the applicable E-UTRA operating band

CA\_X-Y Inter-band CA of component carrier(s) in one sub-blocks within band X and component carrier(s) in one sub-block withinband Y where X and Y are the applicable E-UTRA operating bands

CA\_X-X-Y CA of component carriers in two sub-blocks within Band X and component carrier(s) in one sub-block within Band Y where X and Y are the applicable E‑UTRA operating bands

*f* Frequency

Δ*f* Separation between the channel edge frequency and the nominal −3 dB point of the measuring filter closest to the carrier frequency

Δ*fmax* The largest value of Δ*f* used for defining the requirement

*Ffilter* Filter centre frequency

*f\_offset* Separation between the channel edge frequency and the centre of the measuring filter

*f\_offsetmax* The maximum value of f\_offset used for defining the requirement

*FDL\_low*The lowest frequency of the downlink operating band

*FDL\_high*The highest frequency of the downlink operating band

*FUL\_low*The lowest frequency of the uplink operating band

*FUL\_high*The highest frequency of the uplink operating band

*PEM,N* Declared emission level for channel *N*

*PEM,B32,B75,B76,ind* Declared emission level in Band 32, Band 75 and Band 76, ind=a, b, c

*PEM,B32,ind*Declared emission level in Band 32, ind= d, e

Wgap Sub-block gap or Inter RF Bandwidth gap size

### 2.2.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

ACLR Adjacent channel leakage ratio

ACK Acknowledgement (in HARQ protocols)

ACS Adjacent channel selectivity

AWGN Additive white Gaussian noise

BS Base station

C Contiguous

CA Carrier aggregation

CACLR Cumulative ACLR

CP Cyclic prefix

CRC Cyclic redundancy check

CW Continuous wave

DC Direct current

DFT Discrete Fourier transformation

DTT Digital terrestrial television

DTX Discontinuous transmission

DwPTS Downlink part of the special subframe (for TDD operation)

EARFCN E-UTRA Absolute radio frequency channel number

e.i.r.p. Effective isotropic radiated power

EPA Extended pedestrian A model

ETU Extended typical urban model

E-UTRA Evolved UTRA

EVA Extended vehicular A model

EVM Error vector magnitude

FDD Frequency division duplex

FFT Fast Fourier transformation

FRC Fixed reference channel

GP Guard period (for TDD operation)

HARQ Hybrid automatic repeat request

ICS In-channel selectivity

ITU‑R Radiocommunication Sector of the ITU

LA Local area

LNA Low noise amplifier

MC Multi-carrier

MCS Modulation and coding scheme

MR Medium range

MSR Multi standard radio

NB-IoT Narrowband – Internet of Things

NC Non-contiguous

OFDM Orthogonal Frequency Division Multiplex

OoB Out-of-band

PA Power amplifier

PBCH Physical broadcast channel

PDCCH Physical downlink control channel

PDSCH Physical downlink shared channel

PUSCH Physical uplink shared channel

PUCCH Physical uplink control channel

PRACH Physical random access channel

QAM Quadrature amplitude modulation

QPSK Quadrature phase-shift keying

RAT Radio access technology

RB Resource block

RE Resource element

RF Radio frequency

RMS Root mean square (value)

RS Reference symbol

RRC Root raised cosine

RX Receiver

SNR Signal-to-noise ratio

TA Timing advance

TDD Time division duplex

TX Transmitter

UE User equipment

UEM Unwanted emission mark

WA Wide area

## 2.3 Operating band unwanted emissions

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

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

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

For a BS supporting E-UTRA with guard band NB-IoT operation, the Operating band unwanted emissions requirements apply to E-UTRA carrier with channel bandwidth larger than or equal to 5 MHz.

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

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

For wide area BS, the requirements of either § 2.3.1 (category A limits) or § 2.3.2 (category B limits) shall apply.

For local area BS, the requirements of § 2.3.2A shall apply (category A and B).

For home BS, the requirements of § 2.3.2B shall apply (category A and B).

For medium range BS, the requirements in § 2.3.2C shall apply (category A and B).

The application of either category A or category B limits shall be the same as for transmitter spurious emissions (mandatory requirements) in § 2.6.

For category B operating band unwanted emissions, there are two options for the limits that may be applied regionally. Either the limits in § 2.3.2.1 or § 2.3.2.2 shall be applied.

The requirements of § 2.3.1 and § 2.3.2 apply to Wide Area BS that supports E-UTRA with NB-IoT (in band and/or guard band). The requirements for Wide Area BS that supports standalone NB-IoT are in § 2.3.2E.

The requirements of § 2.3.2A apply to Local Area BS that supports E-UTRA with NB-IoT (in band and/or guard band). The requirements for Local Area BS that supports standalone NB-IoT are in § 2.3.2F.

The requirements of § 2.3.2B apply to Home BS that supports E-UTRA with NB-IoT (in band and/or guard band). The requirements for Home BS that supports standalone NB-IoT are in § 2.3.2G.

The requirements of § 2.3.2C apply to Medium Range BS that supports E-UTRA with NB-IoT (in band and/or guard band). The requirements for Medium Range BS that supports standalone NB-IoT are in § 2.3.2H.

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

– Δ*f* is the separation between the Base Station RF Bandwidth edge frequency and the nominal –3dB point of the measuring filter closest to the carrier frequency.

– *f\_offset* is the separation between the Base Station RF Bandwidth edge frequency and the centre of the measuring filter.

– *f\_offset*max is the offset to the frequency 10 MHz outside the downlink operating band.

– Δ*f*max is equal to *f\_offset*max minus half of the bandwidth of the measuring filter.

For BS operating in multiple bands, inside any Inter RF Bandwidth gaps with *Wgap* < 20 MHz, emissions shall not exceed the cumulative sum of the test requirements specified at the Base Station RF Bandwidth edges on each side of the Inter RF Bandwidth gap. The test requirement for Base Station RF Bandwidth edge is specified in Tables 2.3.1-1 to 2.3.3-3 below, where in this case:

– Δ*f* is the separation between the Base Station RF Bandwidth edge frequency and the nominal –3 dB point of the measuring filter closest to the RF bandwidth edge.

– *f*\_*offset* is the separation between the Base Station RF Bandwidth edge frequency and the centre of the measuring filter.

– *f*\_*offset*max is equal to the Inter RF Bandwidth gap minus half of the bandwidth of the measuring filter.

– *Δf*max is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For BS capable of multi-band operation where multiple bands are mapped on the same antenna connector, the operating band unwanted emission limits apply also in a supported operating band without any carrier transmitted, in the case where there are carrier(s) transmitted in other supported operating band(s). In this case where there is no carrier transmitted in an operating band, the operating band unwanted emission limit, as defined in the tables of the present section for the largest frequency offset (Δfmax), of a band where there is no carrier transmitted shall apply from 10 MHz below the lowest frequency, up to 10 MHz above the highest frequency of the supported downlink operating band without any carrier transmitted. And, no cumulative limit is applied in the inter-band gap between a supported downlink operating band with carrier(s) transmitted and a supported downlink operating band without any carrier transmitted.

In addition inside any sub-block gap for a BS operating in non-contiguous spectrum, measurement results shall not exceed the cumulative sum of the test requirements specified for the adjacent sub blocks on each side of the sub block gap. The test requirement for each sub block is specified in Tables 2.3.1-1 to 2.3.3-3 below, where in this case:

– Δ*f* is the separation between the sub block edge frequency and the nominal –3 dB point of the measuring filter closest to the sub block edge.

– *f\_offset* is the separation between the sub block edge frequency and the centre of the measuring filter.

– *f\_offset*max is equal to the sub block gap bandwidth minus half of the bandwidth of the measuring filter.

– Δ*f*max is equal to *f\_offset*max minus half of the bandwidth of the measuring filter.

### 2.3.1 Operating band unwanted emissions for wide area BS (category A)

For E-UTRA BS operating in Bands 5, 6, 8, 12, 13, 14, 17, 18, 19, 26, 27, 28, 29, 31, 44, 71, 72, 73, 85, 87, 88 emissions shall not exceed the maximum levels specified in Tables 2.3.1‑1 to 2.3.1-3.

TABLE 2.3.1-1

Wide area BS 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, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –9.5 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 2.85 MHz ≤ *f\_offset* < *f\_offset*max  | –13 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –13 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwdith on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.1-2

Wide area BS 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, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –13.5 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.05 MHz ≤ *f\_offset* < *f\_offset*max | –13 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –13 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwdith on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.1-3

Wide area BS 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, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* <min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* <min(10.05 MHz, *f\_offset*max) | –12.5 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.05 MHz ≤ *f\_offset* < *f\_offset*max | –13 dBm (Note 3) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –13 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δ*f*max < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwdith on each side of the Inter RF Bandwidth gap. |

For E-UTRA BS operating in Bands 1, 2, 3, 4, 7, 9, 10, 11, 21, 23, 24, 25, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 45, 48, 50, 65, 66, 69, 70, 74, 75 emissions shall not exceed the maximum levels specified in Tables 2.3.1-4, 2.3.1-5 and 2.3.1‑6:

For E-UTRA BS operating in Bands 22, 42, 43, 52, emissions shall not exceed the maximum levels specified in Tables 2.3.1-4a, 2.3.1-5a and 2.3.1-6a:

TABLE 2.3.1-4

Wide area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth
(1 GHz < E‑UTRA bands ≤ 3 GHz) for category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter‑3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –9.5 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 3.3 MHz ≤ *f\_offset* < *f\_offset*max | –13 dBm | 1 MHz |

|  |
| --- |
| *Note to Table 2.3.1-4:*NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block.. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –13 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.1-4a

Wide area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth
(E‑UTRA bands >3 GHz) for category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –9.2 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 3.3 MHz ≤ *f\_offset* < *f\_offset*max | –13 dBm | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –13 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.1-5

Wide area BS operating band unwanted emission limits for 3 MHz channel bandwidth
(1 GHz < E‑UTRA bands ≤ 3 GHz) for category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –13.5 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.5 MHz ≤ *f\_offset* < *f\_offset*max | –13 dBm | 1 MHz |
| *Note to Table 2.3.1-5:*NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –13 dBm/1 MHz where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.1-5a

Wide area BS operating band unwanted emission limits for 3 MHz channel bandwidth
(E‑UTRA bands >3 GHz) for category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –13.2 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.5 MHz ≤ *f\_offset* < *f\_offset*max | –13 dBm | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block, where the test requirement within sub-block gaps shall be –13 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.1-6

Wide area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (1 GHz < E-UTRA bands ≤ 3 GHz) for category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* <min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* <min(10.05 MHz, *f\_offset*max) | –12.5 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.5 MHz ≤ *f\_offset* < *f\_offset*max | –13 dBm (Note 3) | 1 MHz |

|  |
| --- |
| *Notes to Table 2.3.1-6:*NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block, where the test requirement within sub-block gaps shall be –13 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δfmax < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.1-6a

Wide area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel
bandwidth (E-UTRA bands >3 GHz) for category A

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* < min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* < min(10.05 MHz, *f\_offset*max) | –12.2 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.5 MHz ≤ *f\_offset* < *f\_offset*max  | –13 dBm (Note 3) | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –13 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δfmax < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

### 2.3.2 Operating band unwanted emissions for wide area BS (category B)

For category B operating band unwanted emissions, there are two options for the limits that may be applied regionally. Either the limits in § 2.3.2.1 or § 2.3.2.2 shall be applied.

#### 2.3.2.1 Operating band unwanted emissions for wide area BS, category B (Option 1)

For E-UTRA BS operating in Bands 5, 8, 12, 13, 14, 17, 20, 26, 27, 28, 29, 31, 44, 67, 68, 71, 72, 73, 85, 87, 88 emissions shall not exceed the maximum levels specified in Tables 2.3.2.1-1 to 2.3.2.1-3:

TABLE 2.3.2.1-1

Wide area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth
(E‑UTRA bands <1 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –9.5 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 2.85 MHz ≤ *f\_offset* < *f\_offset*max | –16 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –16 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2.1-2

Wide area BS operating band unwanted emission limits for 3 MHz channel bandwidth
(E‑UTRA bands <1 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –13.5 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.05 MHz ≤ *f\_offset* < *f\_offset*max | –16 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –16 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2.1-3

Wide area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel
bandwidth (E-UTRA bands <1 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* <min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* <min(10.05 MHz, *f\_offset*max) | –12.5 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.05 MHz ≤ *f\_offset* < *f\_offset*max | –16 dBm (Note 3) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –16 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δ*f*max < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap |

For E-UTRA BS operating in Bands 1, 2, 3, 4, 7, 10, 25, 30, 33, 34, 35, 36, 37, 38, 39, 40, 41, 45, 48, 50, 65, 66, 69, 70, 75 emissions shall not exceed the maximum levels specified in Tables 2.3.2.1-4, 2.3.22.3.2.1-5 and 2.3.2.1-6:

For E-UTRA BS operating in Bands 22, 42, 43, 52, emissions shall not exceed the maximum levels specified in Tables 2.3.2.1-4a, 2.3.2.1-5a and 2.3.2.1-6a:

TABLE 2.3.2.1-4

Wide area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth
(1 GHz < E‑UTRA bands ≤ 3 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –9.5 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 3.3 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm | 1 MHz |

|  |
| --- |
| *Notes to Table 2.3.2.1-4:*NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.2.1-4a

Wide area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth
(E‑UTRA bands >3 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –9.2 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 3.3 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.2.1-5

Wide area BS operating band unwanted emission limits for 3 MHz channel bandwidth
(1 GHz < E‑UTRA bands ≤ 3 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –13.5 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.5 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm | 1 MHz |

|  |
| --- |
| *Notes to Table 2.3.2.1-5:*NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.2.1-5a

Wide area BS operating band unwanted emission limits for 3 MHz channel bandwidth
(E‑UTRA bands >3 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –13.2 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.5 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions fromadjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.2.1-6

Wide area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel
bandwidth (1 GHz < E-UTRA bands ≤ 3 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* <min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* <min(10.05 MHz, *f\_offset*max) | –12.5 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.5 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm (Note 3) | 1 MHz |

|  |
| --- |
| *Notes to Table 2.3.2.1-6:*NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δfmax < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

TABLE 2.3.2.1-6a

Wide area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (E-UTRA bands >3 GHz) for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* <min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* <min(10.05 MHz, *f\_offset*max) | –12.2 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.5 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm (Note 3) | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δfmax < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

#### 2.3.2.2 Operating band unwanted emissions for wide area BS, category B (Option 2)

The limits in this section are intended for Europe and may be applied regionally for BS operating in band 1, 3, 7, 8, 32, 33, 34, 38, 65 or 69.

For a BS operating in bands 1, 3, 7, 8, 32, 33, 34, 38, 65 or 69, emissions shall not exceed the maximum levels specified in Table 2.3.2.2-1 below for 5, 10, 15 and 20 MHz channel bandwidth:

TABLE 2.3.2.2-1

Regional wide area BS operating band unwanted emission limits in bands 1, 3, 7, 8, 32, 33, 34, 38, 65 or 69 for 5, 10, 15 and 20 MHz channel bandwidth for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 5) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 0.2 MHz | 0.015 MHz ≤ *f\_offset* < 0.215 MHz | –12.5dBm | 30 kHz |
| 0.2 MHz ≤ Δ*f* < 1 MHz | 0.215 MHz ≤ *f\_offset* < 1.015MHz |  | 30 kHz |
| (Note 4) | 1.015 MHz ≤ *f\_offset* < 1.5 MHz | –24.5dBm | 30 kHz |
| 1 MHz ≤ Δ*f* ≤min( 10 MHz, Δ*f*max) | 1.5 MHz ≤ *f\_offset* <min(10.5 MHz, *f\_offset*max) | –11.5dBm | 1 MHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.5 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm (Note 3) | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δfmax < 10 MHz.NOTE 4 – This frequency range ensures that the range of values of f\_offset is continuous.NOTE 5 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

For a BS operating in bands 3, 8 or 65, emissions shall not exceed the maximum levels specified in Table 2.3.2.2‑2 below for 3 MHz channel bandwidth:

TABLE 2.3.2.2-2

Regional wide area BS operating band unwanted emission limits in bands 3, 8 or 65 for 3 MHz channel bandwidth for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 0.05 MHz | 0.015 MHz ≤ *f\_offset* < 0.065 MHz |  | 30 kHz |
| 0.05 MHz ≤ Δ*f* < 0.15 MHz | 0. 065 MHz ≤ *f\_offset* < 0.165 MHz |  | 30 kHz |
| 0.15 MHz ≤ Δ*f* < 0.2 MHz | 0.165 MHz ≤ *f\_offset* < 0.215MHz | –12.5dBm | 30 kHz |
| 0.2 MHz ≤ Δ*f* < 1 MHz | 0.215 MHz ≤ *f\_offset* < 1.015MHz |  | 30 kHz |
| (Note 3) | 1.015 MHz ≤ *f\_offset* < 1.5 MHz | –24.5dBm | 30 kHz |
| 1 MHz ≤ Δ*f* ≤ 6 MHz | 1.5 MHz ≤ *f\_offset* < 6.5 MHz, | –11.5dBm | 1 MHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.5 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – This frequency range ensures that the range of values of f\_offset is continuous.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

For a BS operating in bands3, 8 or 65, emissions shall not exceed the maximum levels specified in Table 2.3.2.2‑3 below for 1.4 MHz channel bandwidth:

TABLE 2.3.2.2-3

Regional wide area BS operating band unwanted emission limits in bands 3, 8 or 65 for 1.4 MHz channel bandwidth for category B

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 0.05 MHz | 0.015 MHz ≤ *f\_offset* < 0.065 MHz |  | 30 kHz |
| 0.05 MHz ≤ Δ*f* < 0.15 MHz | 0. 065 MHz ≤ *f\_offset* < 0.165 MHz |  | 30 kHz |
| 0.15 MHz ≤ Δ*f* < 0.2 MHz | 0.165 MHz ≤ *f\_offset* < 0.215MHz | –12.5 dBm | 30 kHz |
| 0.2 MHz ≤ Δ*f* < 1 MHz | 0.215 MHz ≤ *f\_offset* < 1.015MHz |  | 30 kHz |
| (Note 3) | 1.015 MHz ≤ *f\_offset* < 1.5 MHz | –24.5 dBm | 30 kHz |
| 1 MHz ≤ Δ*f* ≤ 2.8 MHz | 1.5 MHz ≤ *f\_offset* < 3.3 MHz | –11.5 dBm | 1 MHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 3.3 MHz ≤ *f\_offset* < *f\_offset*max | –15 dBm | 1 MHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –15 dBm/1 MHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – This frequency range ensures that the range of values of f\_offset is continuous.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. |

### 2.3.2A Operating band unwanted emissions for local area BS (category A and B)

For Local Area BS in E-UTRA bands ≤3 GHz, emissions shall not exceed the maximum levels specified in Tables 2.3.2A-1, 2.3.2A-2 and 2.3.2A-3.

For Local Area BS in E-UTRA bands >3 GHz, emissions shall not exceed the maximum levels specified in Tables 2.3.2A-1a, 2.3.2A-2a and 2.3.2A-3a.

TABLE 2.3.2A-1

Local area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth
(E-UTRA bands ≤3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –29.5 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 2.85 MHz ≤ *f\_offset* < *f\_offset*max | –31 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –31 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2A-1a

Local area BS operating band unwanted emission limits for 1.4 MHz channel bandwidth
(E-UTRA bands >3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –29.2 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 2.85 MHz ≤ *f\_offset* < *f\_offset*max  | –31 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –31 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2A-2

Local area BS operating band unwanted emission limits for 3 MHz channel bandwidth
(E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –33.5 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.05 MHz ≤ *f\_offset* < *f\_offset*max  | –35 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –35 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2A-2a

Local area BS operating band unwanted emission limits for 3 MHz channel bandwidth
(E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –33.2 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.05 MHz ≤ *f\_offset* < *f\_offset*max  | –35 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –35 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2A-3

Local area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel
bandwidth (E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* <min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* <min(10.05 MHz, *f\_offset*max) | –35.5 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.05 MHz ≤ *f\_offset* < *f\_offset*max | –37 dBm (Note 3) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –37 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δ*f*max < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2A-3a

Local area BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel
 bandwidth (E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* <min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* <min(10.05 MHz, *f\_offset*max) | –35.2 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.05 MHz ≤ *f\_offset* < *f\_offset*max | –37 dBm (Note 3) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –37 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δ*f*max < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

### 2.3.2B Operating band unwanted emissions for home BS (category A and B)

For home BS in E-UTRA bands ≤ 3 GHz, emissions shall not exceed the maximum levels specified in Tables 2.3.2B-1, 2.3.2B-2 and 2.3.2B-3.

For home BS in E-UTRA bands > 3 GHz, emissions shall not exceed the maximum levels specified in Tables 2.3.2B-1a, 2.3.2B-2a and 2.3.2B-3a.

TABLE 2.3.2B-1

Home BS operating band unwanted emission limits for 1.4 MHz channel bandwidth
(E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –34.5 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 3.3 MHz ≤ *f\_offset* < *f\_offset*max  |  | 1 MHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

TABLE 2.3.2B-1a

Home BS operating band unwanted emission limits for 1.4 MHz channel
and width (E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –34.2 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 3.3 MHz ≤ *f\_offset* < *f\_offset*max  |  | 1 MHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

TABLE 2.3.2B-2

Home BS operating band unwanted emission limits for 3 MHz channel bandwidth
(E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –38.5 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.5 MHz ≤ *f\_offset* < *f\_offset*max |  | 1 MHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

TABLE 2.3.2B-2a

Home BS operating band unwanted emission limits for 3 MHz channel bandwidth
(E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –38.2 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.5 MHz ≤ *f\_offset* < *f\_offset*max |  | 1 MHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

TABLE 2.3.2B-3

Home BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel
bandwidth (E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* < min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* < min(10.05 MHz, *f\_offset*max) | –40.5 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.5 MHz ≤ *f\_offset* < *f\_offset*max | (Note 2) | 1 MHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 2 – The requirement is not applicable when Δ*f*max < 10 MHz. |

TABLE 2.3.2B-3a

Home BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth
(E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* < min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* < min(10.05 MHz, *f\_offset*max) | –40.2 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.5 MHz ≤ *f\_offset* < *f\_offset*max | (Note 2) | 1 MHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 2 – The requirement is not applicable when Δ*f*max < 10 MHz. |

### 2.3.2C Operating band unwanted emissions for medium range BS (category A and B)

For Medium Range BS in E-UTRA bands ≤ 3GHz, emissions shall not exceed the maximum levels specified in Tables 2.3.2C-1, 2.3.2C-2, 2.3.2C-3, 2.3.2C-4, 2.3.2C-5 and 2.3.2C-6.

For Medium Range BS in E-UTRA bands >3GHz, emissions shall not exceed the maximum levels specified in Tables 2.3.2C-1a, 2.3.2C-2a, 2.3.2C-3a, 2.3.2C-4a, 2.3.2C-5a and 2.3.2C-6a.

TABLE 2.3.2C-1

Medium range BS operating band unwanted emission limits for 1.4 MHz channel bandwidth, 31 < *P*rated,c ≤ 38 dBm (E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz |  *Prated,c*– 53.5 dB | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 2.85 MHz ≤ *f\_offset* < *f\_offset*max | –25 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –25 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-1a

Medium range BS operating band unwanted emission limits for 1.4 MHz channel bandwidth,
31 < *P*rated,c ≤ 38 dBm (E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz |  *Prated,c* – 53.2 dB | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 2.85 MHz ≤ *f\_offset* < *f\_offset*max | –25 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –25 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-2

Medium range BS operating band unwanted emission limits for 1.4 MHz channel bandwidth,
*P*rated,c ≤ 31 dBm (E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –22.5 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 2.85 MHz ≤ *f\_offset* < *f\_offset*max | –25 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –25 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-2a

Medium range BS operating band unwanted emission limits for 1.4 MHz channel bandwidth, *P*rated,c ≤ 31 dBm (E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 1.4 MHz | 0.05 MHz ≤ *f\_offset* < 1.45 MHz |  | 100 kHz |
| 1.4 MHz ≤ Δ*f* < 2.8 MHz | 1.45 MHz ≤ *f\_offset* < 2.85 MHz | –22.2 dBm | 100 kHz |
| 2.8 MHz ≤ Δ*f* ≤ Δ*f*max | 2.85 MHz ≤ *f\_offset* < *f\_offset*max | –25 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –25 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-3

Medium range BS operating band unwanted emission limits for 3 MHz channel bandwidth,
31 < *P*rated,c ≤ 38 dBm (E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz |  *Prated,c*– 57.5 dB | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.05 MHz ≤ *f\_offset* < *f\_offset*max | Min( *Prated,c*– 59 dB, –25 dBm) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be Min( *Prated,c*– 59 dB, –25 dBm)/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-3a

Medium range BS operating band unwanted emission limits for 3 MHz channel bandwidth,
31 < *P*rated,c ≤ 38 dBm (E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz |  *Prated,c*– 57.2 dB | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.05 MHz ≤ *f\_offset* < *f\_offset*max | Min( *Prated,c*– 59 dB, –25 dBm) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be Min(*Prated,c* – 59 dB, –25 dBm)/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-4

Medium range BS operating band unwanted emission limits for 3 MHz channel bandwidth,
*P*rated,c ≤ 31 dBm (E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –26.5 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.05 MHz ≤ *f\_offset* < *f\_offset*max | –28 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –28 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-4a

Medium range BS operating band unwanted emission limits for 3 MHz channel bandwidth,
*P*rated,c ≤ 31 dBm (E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 3) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 3 MHz | 0.05 MHz ≤ *f\_offset* < 3.05 MHz |  | 100 kHz |
| 3 MHz ≤ Δ*f* < 6 MHz | 3.05 MHz ≤ *f\_offset* < 6.05 MHz | –26.2 dBm | 100 kHz |
| 6 MHz ≤ Δ*f* ≤ Δ*f*max | 6.05 MHz ≤ *f\_offset* < *f\_offset*max  | –28 dBm | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –28 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-5

Medium range BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth, 31< *P*rated,c ≤ 38 dBm (E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* < min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* < min(10.05 MHz, *f\_offset*max) |  *Prated,c*– 58.5 dB | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.05 MHz ≤ *f\_offset* < *f\_offset*max | Min( *Prated,c*– 60dB, –25 dBm) (Note 3) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be Min( *Prated,c*– 60 dB, –25 dBm)/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δ*f*max < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-5a

Medium range BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth, 31< *P*rated,c ≤ 38 dBm (E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* < min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* < min(10.05 MHz, *f\_offset*max) |  *Prated,c*– 58.2 dB | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.05 MHz ≤ *f\_offset* < *f\_offset*max | Min( *Prated,c*– 60dB, –25 dBm) (Note 3) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be Min( *Prated,c*– 60 dB, –25 dBm)/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δ*f*max < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-6

Medium range BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth, *P*rated,c ≤ 31 dBm (E-UTRA bands ≤ 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* < min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* < min(10.05 MHz, *f\_offset*max) | –27.5 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.05 MHz ≤ *f\_offset* < *f\_offset*max | –29 dBm (Note 3) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –29 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δ*f*max < 10 MHz.NOTE 4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

TABLE 2.3.2C-6a

Medium range BS operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth, *P*rated,c ≤ 31 dBm (E-UTRA bands > 3 GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 4) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δ*f* < 5 MHz | 0.05 MHz ≤ *f\_offset* < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δ*f* < min(10 MHz, Δ*f*max) | 5.05 MHz ≤ *f\_offset* < min(10.05 MHz, *f\_offset*max) | –27.2 dBm | 100 kHz |
| 10 MHz ≤ Δ*f* ≤ Δ*f*max | 10.05 MHz ≤ *f\_offset* < *f\_offset*max | –29 dBm (Note 3) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band the test requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δ*f* ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be –29 dBm/100 kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.NOTE 3 – The requirement is not applicable when Δ*f*max < 10 MHz.NOTE4 – For BS supporting multi-band operation with Inter RF Bandwidth gap < 20 MHz the test requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap. |

### 2.3.2D Minimum requirements for Local Area and Medium Range BS in Band 46 (Category A and B)

For Local Area and Medium Range BS operating in Band 46, emissions shall not exceed the maximum levels specified in Tables 2.3.2D-1 and 2.3.2D-2.

TABLE 2.3.2D-1

Local Area and Medium Range BS operating band unwanted emission limits in Band 46 for 20MHz channel bandwidth

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δf < 1 MHz | 0.05 MHz ≤ f\_offset < 1.05 MHz |  | 100 kHz |
| 1 MHz ≤ Δf < min(10 MHz, Δfmax) | 1.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) |  | 100 kHz |
| 10 MHz ≤ Δf < min(20 MHz, Δfmax) | 10.05 MHz ≤ f\_offset < min(20.05 MHz, f\_offsetmax) |  | 100 kHz |
| 20 MHz ≤ Δf < min(170 MHz, Δfmax) | 20.05 MHz ≤ f\_offset < min(170.05 MHz, f\_offsetmax) | Max(*Prated,c* - 62.6dB, -40dBm) | 100 kHz |
| 170 MHz ≤ Δf < min(206 MHz, Δfmax) | 170.05 MHz ≤ f\_offset < min(206.05 MHz, f\_offsetmax) | Max(*Prated,c* - 64.6dB, -40dBm) | 100 kHz |
| 206 MHz ≤ Δf ≤ Δfmax | 206.05 MHz ≤ f\_offset < f\_offsetmax | Max(*Prated,c* - 69.6dB, -40dBm) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band, the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δf ≥ 20 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be Max (Prated,c - 62.6dB, -40 dBm)/100kHz..NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

TABLE 2.3.2D-2

Local Area and Medium Range BS operating band unwanted emission limits in Band 46 for 20MHz channel bandwidth

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1) | Measurement bandwidth (Note 2) |
| 0 MHz ≤ Δf < 0.5 MHz | 0.05 MHz ≤ f\_offset < 0.55 MHz |  | 100 kHz  |
| 0.5 MHz ≤ Δf < 5 MHz | 0.55 MHz ≤ f\_offset < min(5.05 MHz, f\_offsetmax) |  | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) |  | 100 kHz  |
| 10 MHz ≤ Δf < min(85 MHz, Δfmax) | 10.05 MHz ≤ f\_offset < min(85.05 MHz, f\_offsetmax) | Max(Prated,c – 57.3dB, -40dBm) | 100 kHz |
| 85 MHz ≤ Δf < min(103 MHz, Δfmax) | 85.05 MHz ≤ f\_offset < min(103.05 MHz, f\_offsetmax) | Max(Prated,c – 59.3dB, -40dBm) | 100 kHz  |
| 103 MHz ≤ Δf ≤ Δfmax | 103.05 MHz ≤ f\_offset < f\_offsetmax | Max(Prated,c – 64.3dB, -40dBm) | 100 kHz |
| NOTE 1 – For a BS supporting non-contiguous spectrum operation within any operating band, the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is Δf ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be Max (Prated,c – 57.3dB, -40 dBm)/100kHz.NOTE 2 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

### 2.3.2E Minimum requirements for stand-alone NB-IoT Wide Area BS

For stand-alone NB-IoT BS in E-UTRA bands ≤3GHz, emissions shall not exceed the maximum levels specified in Tables 2.3.2E-1.

TABLE 2.3.2E-1

Stand-alone NB-IoT BS operating band unwanted emission limits (E-UTRA bands ≤3GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement(Notes 1, 2, 3, 4) | Measurement bandwidth (Note 8) |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz  |  | 30 kHz  |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz  |  | 30 kHz  |
| 0.15 MHz ≤ Δf < 0.2 MHz | 0.165 MHz ≤ f\_offset < 0.215 MHz  | -12.5 dBm | 30 kHz  |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 6) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | -24.5 dBm | 30 kHz  |
| 1 MHz ≤ Δf ≤min(Δfmax, 10 MHz)  | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -11.5 dBm | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax  | -15 dBm (Note 7) | 1 MHz  |
| NOTE 1 – The limits in this table only apply for operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.NOTE 2 – For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.NOTE 3 – For a BS supporting multi-band operation with Inter RF Bandwidth gap < 20MHz the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap.NOTE 4 – In case the carrier adjacent to the RF bandwidth edge is a standalone NB-IoT carrier, the value of X = PNB-IoTcarrier – 43, where PNB-IoTcarrier is the power level of the standalone NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0.NOTE 5 – For BS that only support E-UTRA and NB-IoT multi-carrier operation, the requirements in this table do not apply to an E-UTRA BS from Release 8, which is upgraded to support E-UTRA and NB-IoT multi-carrier operation, where the upgrade does not affect existing RF parts of the radio unit related to the requirements in this table. In this case, the requirements in § 2.3.1 and § 2.3.2 shall apply.NOTE 6 – This frequency range ensures that the range of values of f\_offset is continuous.NOTE 7 – The requirement is not applicable when Δfmax < 10 MHz.NOTE 8 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

##### 2.3.2F Minimum requirements for stand-alone NB-IoT Local Area BS

For stand-alone NB-IoT BS in E-UTRA bands ≤3GHz, emissions shall not exceed the maximum levels specified in Table 2.3.2F-1.

Table 2.3.2F-1

Stand-alone NB-IoT BS operating band unwanted emission limits (E-UTRA bands ≤3GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2, 3, 4) | Measurement bandwidth (Note 5) |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz |  | 30 kHz |
| 0.05 MHz ≤ Δf < 0.16 MHz | 0.065 MHz ≤ f\_offset < 0.175 MHz |  | 30 kHz |
| 0.16 MHz ≤ Δf < 5 MHz(Note 6) | 0.175 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -35.5 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -37 dBm (Note 7) | 100 kHz |

NOTE 1 – The limits in this table only apply for operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.

NOTE 2 – For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.

NOTE 3 – For a BS supporting multi-band operation with Inter RF Bandwidth gap < 20MHz the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap.

NOTE 4 – In case the carrier adjacent to the RF bandwidth edge is a standalone NB-IoT carrier, the value of X = PNB-IoTcarrier – 24, where PNB-IoTcarrier is the power level of the standalone NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0.

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

NOTE 6 – This frequency range ensures that the range of values of f\_offset is continuous.

NOTE 7 – The requirement is not applicable when Δfmax < 10 MHz.

##### 2.3.2G Minimum requirements for stand-alone NB-IoT Home BS

For stand-alone NB-IoT BS in E-UTRA bands ≤3GHz, emissions shall not exceed the maximum levels specified in Table 2.3.2G-1.

TABLE 2.3.2G-1

Stand-alone NB-IoT BS operating band unwanted emission limits (E-UTRA bands ≤3GHz)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 3) |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz |  | 30 kHz |
| 0.05 MHz ≤ Δf < 0.16 MHz | 0.065 MHz ≤ f\_offset < 0.175 MHz |  | 30 kHz |
| 0.16 MHz ≤ Δf < 5 MHz(Note 4) | 0.175 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -39.5 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -41 dBm (Note 5) | 100 kHz |

NOTE 1 – The limits in this table only apply for operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.

NOTE 2 – In case the carrier adjacent to the RF bandwidth edge is a standalone NB-IoT carrier, the value of X = PNB-IoTcarrier – 20, where PNB-IoTcarrier is the power level of the standalone NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0.

NOTE 3 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

NOTE 4 – This frequency range ensures that the range of values of f\_offset is continuous.

NOTE 5 – The requirement is not applicable when Δfmax < 10 MHz.

##### 2.3.2H Minimum requirements for stand-alone NB-IoT Medium Range BS

For stand-alone NB-IoT BS in E-UTRA bands ≤3GHz, emissions shall not exceed the maximum levels specified in Tables 2.3.2H-1 and 2.3.2H-2.

TABLE 2.3.2H-1

Stand-alone NB-IoT BS operating band unwanted emission limits (E-UTRA bands ≤3GHz), BS maximum output power 31 < Prated,c ≤ 38 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2, 3, 4) | Measurement bandwidth (Note 4) |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz |  | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz |  | 30 kHz |
| 0.15 MHz ≤ Δf < 0.6 MHz (Note 1) | 0.165MHz ≤ f\_offset < 0.615MHz |  | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615MHz ≤ f\_offset < 1.015MHz |  | 30 kHz |
| (Note 5) | 1.015MHz ≤ f\_offset < 1.5 MHz | Prated,c – 63.5 dB | 30 kHz |
| 1 MHz ≤ Δf ≤ 2.8 MHz | 1.5 MHz ≤ f\_offset < 3.3 MHz | Prated,c – 50.5 dB | 1 MHz |
| 2.8 MHz ≤ Δf ≤ 5 MHz | 3.3 MHz ≤ f\_offset < 5.5 MHz | min(Prated,c – 50.5 dB, -13.5dBm) | 1 MHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.5 MHz ≤ f\_offset < min(10.5 MHz, f\_offsetmax) | Prated,c – 54.5 dB | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | Prated,c -56dB (Note 6) | 1 MHz |

NOTE 1 – The limits in this table only apply for operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.

NOTE 2 – For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.

NOTE 3 – For a BS supporting multi-band operation with Inter RF Bandwidth gap < 20MHz the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap.

NOTE 4 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

NOTE 5 – This frequency range ensures that the range of values of f\_offset is continuous.

NOTE 6 – The requirement is not applicable when Δfmax < 10 MHz.

TABLE 2.3.2H-2

Stand-alone NB-IoT BS operating band unwanted emission limits (E-UTRA bands ≤3GHz), BS maximum output power Prated,c ≤ 31 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency offset of measurement filter ‑3dB point, Δf** | **Frequency offset of measurement filter centre frequency, f\_offset** | **Minimum requirement (Note 1, 2, 3, 4)** | **Measurement bandwidth (Note 5)** |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz |  | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz |  | 30 kHz |
| 0.15 MHz ≤ Δf < 0.6 MHz (Note 1) | 0.165MHz ≤ f\_offset < 0.615MHz |  | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615MHz ≤ f\_offset < 1.015MHz |  | 30 kHz |
| (Note 6) | 1.015MHz ≤ f\_offset < 1.5 MHz | -32.5 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤ 5 MHz | 1.5 MHz ≤ f\_offset < 5.5 MHz | -19.5 dBm | 1 MHz |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.5 MHz ≤ f\_offset < min(10.5 MHz, f\_offsetmax) | -23.5 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -25 dBm (Note 7) | 1 MHz |

NOTE 1 – The limits in this table only apply for operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.

NOTE 2 – For a BS supporting non-contiguous spectrum operation within any operating band the minimum requirement within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.

NOTE 3 – For a BS supporting multi-band operation with Inter RF Bandwidth gap < 20MHz the minimum requirement within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap.

NOTE 4 – In case the carrier adjacent to the RF bandwidth edge is a standalone NB-IoT carrier, the value of X = PNB-IoTcarrier – 31, where PNB-IoTcarrier is the power level of the standalone NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0.

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

NOTE 6 – This frequency range ensures that the range of values of f\_offset is continuous.

NOTE 7 – The requirement is not applicable when Δfmax < 10 MHz.

### 2.3.3 Additional requirements

In certain regions the following requirement may apply. For E-UTRA, E-UTRA with NB-IoT and NB-IoT BS operating in Bands 5, 26, 27 or 28, emissions shall not exceed the maximum levels specified in Tables 2.3.3-1.

TABLE 2.3.3-1

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth | Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| 200 kHz | 0 MHz ≤ Δf < 1 MHz | 0.005 MHz ≤ f\_offset < 0.995 MHz | -6 dBm | 10 kHz |
| 1.4 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.005 MHz ≤ *f\_offset* < 0.995 MHz | –14 dBm | 10 kHz |
| 3 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.015 MHz ≤ *f\_offset* < 0.985 MHz | –13 dBm | 30 kHz |
| 5 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.015 MHz ≤ *f\_offset* < 0.985 MHz | –15 dBm | 30 kHz |
| 10 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.05 MHz ≤ *f\_offset* < 0.95 MHz | –13 dBm | 100 kHz |
| 15 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.05 MHz ≤ *f\_offset* < 0.95 MHz | –13 dBm | 100 kHz |
| 20 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.05 MHz ≤ *f\_offset* < 0.95 MHz | –13 dBm | 100 kHz |
| All | 1 MHz ≤ Δ*f* < Δ*f*max  | 1.05 MHz ≤ *f\_offset* < *f\_offset*max  | –13 dBm | 100 kHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

In certain regions the following requirement may apply. For E-UTRA, E-UTRA with NB-IoT and NB-IoT BS operating in Bands 2, 4, 10, 23, 25, 30, 35, 36, 41, 66, 70, emissions shall not exceed the maximum levels specified in
Table 2.3.3-2.

TABLE 2.3.3-2

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth | Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| 200 kHz | 0 MHz ≤ Δf < 1 MHz | 0.005 MHz ≤ f\_offset < 0.995 MHz | -6 dBm | 10 kHz |
| 1.4 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.005 MHz ≤ *f\_offset* < 0.995 MHz | –14 dBm | 10 kHz |
| 3 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.015 MHz ≤ *f\_offset* < 0.985 MHz | –13 dBm | 30 kHz |
| 5 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.015 MHz ≤ *f\_offset* < 0.985 MHz | –15 dBm | 30 kHz |
| 10 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.05 MHz ≤ *f\_offset* < 0.95 MHz | –13 dBm | 100 kHz |
| 15 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.05 MHz ≤ *f\_offset* < 0.95 MHz | –15 dBm | 100 kHz |
| 20 MHz | 0 MHz ≤ Δ*f* < 1 MHz | 0.05 MHz ≤ *f\_offset* < 0.95 MHz | –16 dBm | 100 kHz |
| All | 1 MHz ≤ Δ*f* < Δ*f*max  | 1.5 MHz ≤ *f\_offset* < *f\_offset*max  | –13 dBm | 1 MHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

In certain regions the following requirement may apply. For E-UTRA, E-UTRA with NB-IoT and NB-IoT BS operating in Bands 12, 13, 14, 17, 29, 71, 85 emissions shall not exceed the maximum levels specified in Table 2.3.3-3.

TABLE 2.3.3-3

Additional operating band unwanted emission limits for E-UTRA
(bands 12, 13, 14, 17, 29, 71 and 85)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth | Frequency offset of measurement filter –3 dB point, Δ*f* | Frequency offset of measurement filter centre frequency, *f\_offset* | Test requirement | Measurement bandwidth (Note 1) |
| All | 0 MHz ≤ Δ*f* < 100 kHz | 0.015 MHz ≤ *f\_offset* < 0.085 MHz | –13 dBm | 30 kHz |
| All | 100 kHz ≤ Δ*f* < Δ*f*max  | 150 kHz ≤ *f\_offset* < *f\_offset*max  | –13 dBm | 100 kHz |
| NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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. |

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

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

In certain regions the following requirement may apply for protection of DTT. For E-UTRA BS operating in Band 20, the level of emissions in the band 470-790 MHz, measured in an 8 MHz filter bandwidth on centre frequencies *Ffilter* according to Table 2.3.3-4, shall not exceed the maximum emission level *PEM,N* declared by the manufacturer. This requirement applies in the frequency range 470-790 MHz even though part of the range falls in the spurious domain.

TABLE 2.3.3-4

Declared emissions levels for protection of DTT

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, *Ffilter* | Measurement bandwidth | Declared emission level (dBm) |
| *Ffilter* = 8\**N* + 306 (MHz); 21 ≤ *N* ≤ 60 | 8 MHz | *PEM,N* |

NOTE – The regional requirement is defined in terms of effective isotropic radiated power (e.i.r.p.), which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The requirement defined above provides the characteristics of the basestation needed to verify compliance with the regional requirement.

TABLE 2.3.3-5

Void

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |

In regions where Federal Communication Commission (FCC) regulation applies, requirements for protection of GPS according to FCC Order DA 20-48 applies for operation in Band 24. The following normative requirement covers the base station, to be used together with other information about the site installation to verify compliance with the requirement in FCC Order DA 20-48. The requirement applies to BS operating in Band 24 to ensure that appropriate interference protection is provided to the 1541 – 1650 MHz band. This requirement applies to the frequency range 1541 – 1650 MHz, even though part of this range falls within the spurious domain.

The level of emissions in the 1541 – 1650 MHz band, measured in measurement bandwidth according to Table 2.3.3-6 shall not exceed the maximum emission levels PEM,B24,a, PEM,B24,b, PEM,B24,c, PEM,B24,d, PEM,B24,e and PEM,B24,f declared by the manufacturer.

TABLE 2.3.3-6

Declared emissions levels for protection of the 1 559-1 610 MHz band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating Band | Frequency range | Declared emission level (dBW)(Measurement bandwidth = 1 MHz) | Declared emission level (dBW) ) of discrete emissions of less than 700 Hz bandwidth(Measurement bandwidth = 1 kHz) | Declared emission level (dBW) of discrete emissions of less than 2 kHz bandwidth(Measurement bandwidth = 1 kHz) |
| 24 | 1541 - 1559 MHz | PEM,B24,a |  | PEM,B24,f |
|  | 1 559-1 610 MHz | PEM,B24,b | PEM,B24,d |  |
|  | 1610 - 1650 MHz | PEM,B24,c | PEM,B24,e |  |

NOTE – The regional requirements in FCC Order DA 20-48 are defined in terms of e.i.r.p., which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The e.i.r.p. level is calculated using: *Pe.i.r.p.* = *PE* + *Gant* where *PE* denotes the BS unwanted emission level at the antenna connector, *Gant* equals the BS antenna gain minus feeder loss. The requirement defined above provides the characteristics of the base station needed to verify compliance with the regional requirement.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
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|  |

In certain regions, the following requirements may apply to E-UTRA BS operating in Band 32 within 1 452-1 492 MHz, in Band 75 within 1432-1517 MHz and in Band 76 within 1427-1432 MHz. The level of operating band unwanted emissions, measured on centre frequencies f\_offset with filter bandwidth, according to Table 2.3.3-8, shall neither exceed the maximum emission level PEM,B32,B75,B76,a , PEM,B32,B75,B76,b nor PEM,B32,B75,B76,c declared by the manufacturer.

For Band 32, this requirement applies in the frequency range 1452-1492 MHz when non-Mobile/Fixed Communications Network (MFCN) services are deployed in adjacent frequency ranges, while it applies also within 1427-1452 MHz and/or 1492-1517 MHz when MFCN services are deployed in such frequency ranges, even though part of the ranges falls in the spurious domain. For Band 75, this requirement applies in the frequency range 1427-1517 MHz. For Band 76, this requirement applies in the frequency range 1432-1517 MHz even though part of the range falls in the spurious domain.

TABLE 2.3.3-8

Declared operating band 32, 75 and 76 unwanted emission within  1 427 – 1 517 MHz

|  |  |  |
| --- | --- | --- |
| Frequency offset of measurement filter centre frequency, *f\_offset* | Declared emission level (dBm) | Measurement bandwidth |
| 2.5 MHz | PEM,B32,B75, B76,a | 5 MHz |
| 7.5 MHz | PEM,B32,B75, B76,b | 5 MHz |
| 12.5 MHz ≤ f\_offset ≤ f\_offsetmax,B32 | PEM,B32,B75, B76,c | 5 MHz |
| NOTE – For Band 32, when non-MFCN services are deployed in the adjacent bands, *f\_offset*max denotes the frequency difference between the lower channel edge and 1454.5 MHz, and the frequency difference between the upper channel edge and 1489.5 MHz for the set channel position. For Band 32, when MFCN services are deployed in the adjacent frequencies, Band 75 and Band 76, f\_offsetmax denotes the frequency difference between the lower channel edge and 1429.5 MHz, and the frequency difference between the upper channel edge and 1514.5 MHz for the set channel position. |

In certain regions, the following requirement may apply to E-UTRA BS operating in Band 32 within 1452-1492 MHz for the protection of non-MFCN services in spectrum adjacent to the frequency range 1452‑1492 MHz. The level of emissions, measured on centre frequencies *Ffilter* with filter bandwidth according to Table 2.3.3-9, shall neither exceed the maximum emission level PEM,B32,d nor PEM,B32,e declared by the manufacturer. This requirement applies in the frequency range 1429-1518MHz even though part of the range falls in the spurious domain.

TABLE 2.3.3-9

Operating band 32 declared emission outside 1452-1492 MHz

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, *Ffilter* | Declared emission level (dBm) | Measurement bandwidth |
| 1 429.5 MHz ≤ *Ffilter* ≤ 1 448.5 MHz | PEM,B32,d | 1 MHz |
| *Ffilter* = 1 450.5 MHz | PEM,B32,e | 3 MHz |
| *Ffilter* = 1 493.5 MHz | PEM,B32,e | 3 MHz |
| 1 495.5 MHz ≤ *Ffilter* ≤ 1 517.5 MHz | PEM,B32,d | 1 MHz |

In certain regions, the following requirement may apply to BS operating in Band 50 and Band 75 within 1492-1517 MHz and in Band 74 within 1492-1518 MHz. The level of emissions, measured on centre frequencies Ffilter with filter bandwidth according to Table 2.3.3-9A, shall neither exceed the maximum emission level PEM,B50,B74,B75,a nor PEM,B50,B74,B75,b declared by the manufacturer.

TABLE 2.3.3-9A

Operating band 50, 74 and 75 declared emission above 1518 MHz

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | Declared emission level (dBm) | Measurement bandwidth |
| 1518.5 MHz ≤ Ffilter ≤ 1519.5 MHz | PEM,B50,B74,B75,a | 1 MHz |
| 1520.5 MHz ≤ Ffilter ≤ 1558.5 MHz | PEM,B50,B74,B75,b | 1 MHz |

In certain regions, the following requirement may apply to E-UTRA BS operating in Band 50 and Band 75 within 1432-1452 MHz, and in Band 51 and Band 76. Emissions shall not exceed the maximum levels specified in Table 2.3.3-9B.

TABLE 2.3.3-9B

Additional operating band unwanted emission limits for BS operating in Band 50 and 75 within 1432-1452 MHz, and in Band 51 and 76

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | Maximum Level (dBm) | Measurement Bandwidth |
| Ffilter = 1413.5 MHz | -42 | 27 MHz |

In certain regions the following requirement may apply to E-UTRA BS operating in Band 45. Emissions shall not exceed the maximum levels specified in Table 2.3.3-10.

TABLE 2.3.3-10

Emissions limits for protection of adjacent band services

|  |  |  |  |
| --- | --- | --- | --- |
| Operating Band | Filter centre frequency, Ffilter | Maximum Level (dBm) | Measurement Bandwidth |
| 45 | Ffilter = 1467.5 MHz | -20 | 1 MHz |
| Ffilter = 1468.5 MHz | -23 | 1 MHz |
| Ffilter = 1469.5 MHz | -26 | 1 MHz |
| Ffilter = 1470.5 MHz | -33 | 1 MHz |
| Ffilter = 1471.5 MHz | -40 | 1 MHz |
| 1472.5 MHz ≤ Ffilter ≤ 1491.5 MHz | -47 | 1 MHz |

In addition for Band 46 operation, the BS may have to comply with the applicable operating band unwanted emission limits established regionally, when deployed in regions where those limits apply and under the conditions declared by the manufacturer. The regional requirements may be in the form of conducted power, power spectral density, EIRP and other types of limits.

The following requirement may apply to E-UTRA BS operating in Band 48 and Band 49 in certain regions. Emissions shall not exceed the maximum levels specified in Table 2.3.3-11.

TABLE 2.3.3-11

Additional operating band unwanted emission limits for Band 48 and Band 49

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth | Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement | Measurement bandwidth (Note 1) |
| All | 0 MHz ≤ Δf < 10 MHz | 0.5 MHz ≤ f\_offset < 9.5 MHz | -13 dBm | 1 MHz |

NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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.

The following requirement may apply to E-UTRA BS operating in Band 53 in certain regions. Emissions shall not exceed the maximum levels specified in Table 2.3.3-12.

TABLE 2.3.3-12

Additional operating band unwanted emission limits for Band 53

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Channel bandwidth (MHz) | Frequency range (MHz) | Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement | Measurement bandwidth (Note 1) |
| 1.4, 3, 5 | 2400 - 2477.5 | 6 MHz ≤ Δf < 83.5 MHz | 6.5 MHz ≤ f\_offset < 83 MHz | -25 dBm | 1 MHz |
| 10 | 2400 - 2473.5 | 10 MHz ≤ Δf < 83.5 MHz | 10.5 MHz ≤ f\_offset < 83 MHz | -25 dBm | 1 MHz |
| 1.4, 3, 5 | 2477.5 - 2478.5 | 5 MHz ≤ Δf < 6 MHz | 5.5 MHz | -13 dBm | 1 MHz |
| 10 | 2473.5 - 2478.5 | 5 MHz ≤ Δf < 10 MHz | 5.5 MHz ≤ f\_offset < 9.5 MHz | -13 dBm | 1 MHz |
| All | 2478.5 - 2483.5 | 0 MHz ≤ Δf < 5 MHz | 0.5 MHz ≤ f\_offset < 4.5 MHz | -10 dBm | 1 MHz |
| 1.4, 3, 5 | 2495 - 2501 | 0 MHz ≤ Δf < 6 MHz | 0.5 MHz ≤ f\_offset < 5.5 MHz | -13 dBm | 1 MHz |
| 10 | 2495 - 2505 | 0 MHz ≤ Δf < 10 MHz | 0.5 MHz ≤ f\_offset < 9.5 MHz | -13 dBm | 1 MHz |
| 1.4, 3, 5 | 2501 - 2690 | 6 MHz ≤ Δf < 195 MHz | 6.5 MHz ≤ f\_offset < 194.5 MHz | -25 dBm | 1 MHz |
| 10 | 2505 - 2690 | 10 MHz ≤ Δf < 195 MHz | 10.5 MHz ≤ f\_offset < 194.5 MHz | -25 dBm | 1 MHz |

NOTE 1 – As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth 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.

The following note is common to all Tables in § 2.3:

NOTE – If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in Annex G. The explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in Annex G.

## 2.4 Adjacent channel leakage ratio (ACLR)

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

For category A wide area BS, either the ACLR limits in the tables below or the absolute limit of
–13 dBm/MHz shall apply, whichever is less stringent.

For category B wide area BS, either the ACLR limits in the tables below or the absolute limit of
–15 dBm/MHz shall apply, whichever is less stringent.

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

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

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

For operation in paired spectrum, the ACLR shall be higher than the value specified in Table 2.4‑1.

The ACLR requirements in Tables 2.4-1 to 2.4-4 (except Table 2.4-2b) apply to BS that supports E-UTRA or E-UTRA with NB-IoT (in band and/or guard band), in any operating band, except for Band 46. The ACLR requirements for Band 46 are in Table 2.4-2a and 2.4-4a. The ACLR requirements in Table 2.4-2b apply to BS that supports standalone NB-IoT.

TABLE 2.4-1

Base station ACLR in paired spectrum

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth of E-UTRA lowest (highest) carrier transmitted *BWChannel* (MHz) | BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted | Assumed adjacent channel carrier (informative) | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 1.4, 3.0, 5, 10, 15, 20 | *BWChannel* | E-UTRA of same BW | Square (*BWConfig*) | 44.2 dB |
| 2 × *BWChannel* | E-UTRA of same BW | Square (*BWConfig*) | 44.2 dB |
| *BWChannel* /2 + 2.5 MHz | 3.84 Mcps UTRA | RRC (3.84 Mcps) | 44.2 dB |
| *BWChannel* /2 + 7.5 MHz | 3.84 Mcps UTRA | RRC (3.84 Mcps) | 44.2 dB |
| NOTE 1 – *BWChannel* and *BWConfig* are the channel bandwidth and transmission bandwidth configuration of the E‑UTRA lowest (highest) carrier transmitted on the assigned channel frequency.NOTE 2 – The root raised cosine (RRC) filter shall be equivalent to the transmit pulse shape filter defined in 3GPP TS 25.104, with a chip rate as defined in this table. |

For operation in unpaired spectrum, the ACLR shall be higher than the value specified in Table 2.4‑2.

TABLE 2.4-2

Base station ACLR in unpaired spectrum with synchronized operation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth of E-UTRA lowest (highest) carrier transmitted *BWChannel* (MHz) | BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 1.4, 3.0 | *BWChannel* | E-UTRA of same BW | Square (*BWConfig*) | 44.2 dB |
| 2 × *BWChannel* | E-UTRA of same BW | Square (*BWConfig*) | 44.2 dB |
| *BWChannel* /2 + 0.8 MHz | 1.28 Mcps UTRA | RRC (1.28 Mcps) | 44.2 dB |
| *BWChannel* /2 + 2.4 MHz | 1.28 Mcps UTRA | RRC (1.28 Mcps) | 44.2 dB |
| 5, 10, 15, 20 | *BWChannel* | E-UTRA of same BW | Square (*BWConfig*) | 44.2 dB |
| 2 × *BWChannel* | E-UTRA of same BW | Square (*BWConfig*) | 44.2 dB |
| *BWChannel* /2 + 0.8 MHz | 1.28 Mcps UTRA | RRC (1.28 Mcps) | 44.2 dB |
| *BWChannel* /2 + 2.4 MHz | 1.28 Mcps UTRA | RRC (1.28 Mcps) | 44.2 dB |
| *BWChannel* /2 + 2.5 MHz | 3.84 Mcps UTRA | RRC (3.84 Mcps) | 44.2 dB |
| *BWChannel* /2 + 7.5 MHz | 3.84 Mcps UTRA | RRC (3.84 Mcps) | 44.2 dB |
|  *BWChannel* /2 + 5 MHz | 7.68 Mcps UTRA | RRC (7.68 Mcps) | 44.2 dB |
| *BWChannel* /2 + 15 MHz | 7.68 Mcps UTRA | RRC (7.68 Mcps) | 44.2 dB |
| NOTE 1 – *BWChannel* and *BWConfig* are the channel bandwidth and transmission bandwidth configuration of the E‑UTRA lowest (highest) carrier transmitted on the assigned channel frequency.NOTE 2 – The RRC filter shall be equivalent to the transmit pulse shape filter defined in 3GPP TS 25.104, with a chip rate as defined in this table. |

For operation in Band 46, the ACLR shall be higher than the value specified in Table 2.4‑2a.

TABLE 2.4-2a

Base Station ACLR in Band 46

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth of E-UTRA lowest/highest carrier transmitted BWChannel [MHz]  | BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted | Assumed adjacent channel carrier (informative) | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 10 | BWChannel | E-UTRA of same BW | Square (BWConfig) | 34.2 dB |
| 2 x BWChannel | E-UTRA of same BW | Square (BWConfig) | 39.2 dB |
| 20 | BWChannel | E-UTRA of same BW | Square (BWConfig) | 35 dB |
| 2 x BWChannel | E-UTRA of same BW | Square (BWConfig) | 40 dB |

NOTE 1: BWChannel and BWConfig are the channel bandwidth and transmission bandwidth configuration of the E-UTRA lowest/highest carrier transmitted on the assigned channel frequency.

For stand-alone NB-IoT operation in paired spectrum, the ACLR shall be higher than the value specified in Table 2.4‑2b.

TABLE 2.4-2b

Base Station ACLR for stand-alone NB-IoT operation in paired spectrum

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth of NB-IoT lowest/highest carrier transmitted BWChannel [kHz]  | BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted | Assumed adjacent channel carrier (informative) | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 200 | 300 kHz | Stand-alone NB-IoT | Square (180 kHz) | 39.2 dB |
| 500 kHz | Stand-alone NB-IoT | Square (180 kHz) | 49.2 dB |

For operation in non-contiguous paired spectrum or multiple bands, the ACLR shall be higher than the value specified in Table 2.4‑3.

TABLE 2.4-3

Base station ACLR in non-contiguous paired spectrum or multiple bands

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sub-block or Inter RF Bandwidth gap size (*Wgap*) where the limit applies | BS adjacent channel centre frequency offset below or above the sub-block edge or the RF bandwidth edge (inside the gap) | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| *Wgap* ≥ 15 MHz | 2.5 MHz | 3.84 Mcps UTRA | RRC (3.84 Mcps) | 44.2 dB |
| *Wgap* ≥ 20 MHz | 7.5 MHz | 3.84 Mcps UTRA | RRC (3.84 Mcps) | 44.2 dB |
| NOTE – The RRC filter shall be equivalent to the transmit pulse shape filter defined in 3GPP TS 25.104, with a chip rate as defined in this table. |

For operation in non-contiguous unpaired spectrum or multiple bands, the ACLR shall be higher than the value specified in Table 2.4‑4.

TABLE 2.4-4

Base Station ACLR in non-contiguous unpaired spectrum or multiple bands

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sub-block or Inter RF Bandwidth gap size (*Wgap*) where the limit applies | BS adjacent channel centre frequency offset below or above the sub-block edge or the RF bandwidth edge (inside the gap) | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| *Wgap* ≥ 15 MHz | 2.5 MHz | 5 MHz E-UTRA | Square (*BWConfig*) | 44.2 dB |
| *Wgap* ≥ 20 MHz | 7.5 MHz | 5 MHz E-UTRA | Square (*BWConfig*) | 44.2 dB |

For operation in non-contiguous spectrum in Band 46, the ACLR shall be higher than the value specified in Table 2.4‑4a.

Table 2.4-4a

Base Station ACLR in non-contiguous spectrum in Band 46

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sub-block gap size (Wgap) where the limit applies | BS adjacent channel centre frequency offset below or above the sub-block edge (inside the gap) | Assumed adjacent channel carrier (informative) | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| Wgap ≥ 60 MHz | 10 MHz | 20MHz E-UTRA | Square (BWConfig) | 35 dB |
| Wgap ≥ 80 MHz | 30 MHz | 20MHz E-UTRA | Square (BWConfig) | 40 dB |