Technical Specifications for Mobile Broadband Base Station Radio Frequency Equipment

(Unofficial Translation*)

National Communications Commission (NCC)

April 26 ,2023

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Technical Specifications for Mobile Broadband Base Station Radio Frequency Equipment

1. Legal Basis

The Specifications are established on Paragraph 2, Article 66 of the Telecommunications Management Act.

2. Definitions and Abbreviations:

2.1 Definitions:

$N_{TXU,countedpercell}$:Number of active transmission units in a single cell.

$P_{rated,c,AC}$:Rated carrier output power per antenna connector

$P_{rated,c,TABC}$:Rated carrier output power per TAB connector

$P_{rated,c,cell}$:Rated carrier output power per TAB connector TX min cell group

$P_{rated,c,sys}$:The sum of $P_{rated,c,TABC}$ for all TAB connectors for a single carrier

$P_{max,c,AC}$:Maximum carrier output power measured per antenna connector

$P_{max,c,TABC}$:Maximum carrier output power per TAB connector

$P_{rated,c,TRP}$:Rated carrier TRP declared per RIB, which refers to the total radiated power of carrier at every transceiver radiated interface boundary.

OBUE:Abbreviation for Operating Band Unwanted Emission, which means the unwanted emission in the operating band.

2.2 Abbreviations:

ACLR: Adjacent Channel Leakage Ratio
BS: Base Station
FDD:Frequency Division Duplex
IS: Infrastructure Station
LTE: Long Term Evolution
NR:New Radio
OBUE: Operating Band Unwanted Emission
OTA:Over the Air
RIB:Radiated Interface Boundary
TAB: Transceiver Array Boundary
TABC:TAB Connector
TDD:Time Division Duplex
TRP:Total Radiated Power
TT:Test Tolerance
WCDMA:Wideband Code Division Multiple Access

3. Scope of Application

3.1 NR BS (IS2051)

The Specifications apply to the type approval of radio frequency equipment for the wide area base stations, medium range base stations and local area base stations in the new radio (NR) frequency bands of mobile broadband services, mobile broadband dedicated telecommunications networks. Depending on terminal duplexing, the frequency division duplex (FDD) and time division duplex (TDD) are available depending on and operate on the following frequency bands:

3.1.1 Frequency Division Duplex (FDD):

FR1 (Frequency Range 1):

700 megahertz (MHz hereafter) band (703 MHz～748 MHz for uplink; 758 MHz～803 MHz for downlink),

900 MHz band (885 MHz～915 MHz for uplink; 930 MHz～960 MHz for downlink),

1800 MHz band (1710 MHz ～ 1785 MHz for uplink;1805 MHz ～ 1880 MHz for downlink),

2100 MHz band (1920 MHz ～ 1980 MHz for uplink; 2110 MHz ～ 2170 MHz for

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downlink),
2500 MHz and 2600 MHz bands (2500 MHz～2570 MHz for uplink; 2620 MHz～2690MHz for downlink).

3.1.2 Time Division Duplex (TDD):

3.1.2.1 FR1 (Frequency Range 1):
2500 MHz and 2600 MHz bands (2500 MHz～2690 MHz),
3500 MHz band (3300 MHz～3570 MHz),
4800 MHz band (4800 MHz ~ 4900 MHz apply to the radio frequency equipment for the base station of mobile broadband dedicated telecommunication network).

3.1.2.2 FR2 (Frequency Range 2):
28000 MHz band (27000 MHz～29500MHz).

3.1.3 Types of Base Station (BS):

3.1.3.1 BS Type 1-C:
An NR base station that operates on FR1 and is provided with a separate antenna port. The requirements are applied at the BS antenna connector.

3.1.3.2 BS Type 1-H:
An NR base station that operates on FR1 with the requirements defined for two points of reference, signified by radiated requirements and conducted requirements. Conducted characteristics are defined at individual or groups of TAB connectors at the transceiver array boundary (TAB), which is the conducted interface between the transceiver unit array and the composite antenna. Radiated characteristics are defined over the air (OTA), where the operating band specific radiated interface is referred to as the Radiated Interface Boundary (RIB). Radiated requirements are also referred to as OTA requirements.

3.1.3.3 BS Type 1-O:
An NR base station that operates on FR1 and are composed of only the OTA interface that meets the RIB definition.

3.1.3.4 BS Type 2-O:
An NR base station that operates on FR2 and are composed of only the OTA interface that meets the RIB definition.

3.1.4 Class of Base Station:

3.1.4.1 Wide area base station: meets the operating environment of macro cells:

3.1.4.1.1 BS Type 1-C / BS Type 1-H: the minimum coupling loss from base station to user is 70dB.

3.1.4.1.2 BS Type 1-O / BS Type 2-O: the shortest distance on the ground from base station to user is 35m.

3.1.4.2 Medium range base station: meets the operating environment of micro cells:

3.1.4.2.1 BS Type 1-C / BS Type 1-H: the minimum coupling loss from base station to user is 53dB.

3.1.4.2.2 BS Type 1-O / BS Type 2-O: the shortest distance on the ground from base station to user is 5m.

3.1.4.3 Local area base station: meets the operating environment of pico cells:

3.1.4.3.1 BS Type 1-C / BS Type 1-H: the minimum coupling loss from base station to user is 45dB.

3.1.4.3.2 BS Type 1-O / BS Type 2-O: the shortest distance on the ground from base station to user is 2m.

3.2 LTE BS (IS2050)：

This specifications are applicable to the certification of the frequency bands for mobile broadband services such as the frequency equipment of Base Stations, Repeaters, Micro Base Stations, Pico Cells and Femto Cells. Based on multiplexing properties, they can be

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classified as frequency division duplex (FDD) and time division duplex (TDD) with relevant frequency sections are identified as below:

3.2.1 Frequency Division Duplex (FDD):

700 MHz (uplink 703 MHz-748 MHz; downlink 758 MHz-803 MHz),
900 MHz (uplink 885 MHz-915 MHz; downlink 930 MHz-960 MHz),
1800 MHz (uplink 1710 MHz-1785 MHz; downlink 1805 MHz-1880 MHz),
2100 MHz (uplink 1920 MHz-1980 MHz\downlink 2110 MHz-2170 MHz),
2500 MHz and 2600 MHz (uplink 2500 MHz-2570 MHz;downlink 2620 MHz-2690 MHz) bands.

3.2.2 Time Division Duplex (TDD):

2500 MHz and 2600 MHz bands (2500 MHz-2690 MHz).

3.3 WCDMA BS (IS2038)：

This specifications apply to the type approval of the radio frequency equipment of base stations, femtocell access points and repeaters, which are WCDMA FDD stated in IMT-2000. The relevant frequency bands are as follows:

Band 1 (1920 MHz～1980 MHz; 2110 MHz～2170 MHz),
Band 3 (1710 MHz～1785 MHz; 1805 MHz～1880 MHz),
Band 7 (2500 MHz～2570 MHz; 2620 MHz～2690 MHz) ,
Band 8 (885 MHz～915 MHz; 930 MHz～960 MHz).

4. Technical Standards

The Specifications are established by referencing the National Standards, including CNS14336-1, CNS13438, 3GPP, and other applicable international technical standards.

5. Test Conditions

5.1 The applicant for NR BS radio frequency equipment type approval shall declare the class and type of base station and normal voltage; the applicant for LTE BS or WCDMA BS radio frequency equipment type approval shall declare the class of base station and normal voltage

5.2 Temperature and relative humidity conditions

The test environment conditions in Item 6 shall meet: Temperature range: +15℃ to +30℃, Relative humidity range: 20% to 85%.

6. Tests to Be Performed and Criteria

6.1 NR BS：

6.1.1 Frequency Error

6.1.1.1 Conducted test

6.1.1.1.1 Limits:

6.1.1.1.1.1 The modulated carrier frequency error of every NR carrier in the base station shall meet Table 1. The observation shall last more than 1 millisecond (ms).

6.1.1.1.2 Test Method:

6.1.1.1.2.1 A BS Type 1-C base station shall be tested at the emission end of antenna port according to its operating frequency band. A BS Type 1-H base station shall be tested at the emission end of every TAB antenna port according to its operating frequency band.

6.1.1.1.2.2 The channel bandwidth and subcarrier spacing shall be defined in normal environment and voltage according to Table 35. The maximum scales of modulation supported shall be used to test the low, medium and high channels of single carrier mode.

6.1.1.2 Radiated test

6.1.1.2.1 Limits:

6.1.1.2.1.1 BS Type 1-O and BS Type 2-O:

The modulated carrier frequency error of every NR carrier in the base station

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shall meet Table 2. The observation shall last more than 1 ms.

6.1.1.2.2 Test method:

The low and high channels of single carrier mode shall be tested in normal environment and voltage. For BS Type 1-O, the channel bandwidth and subcarrier spacing shall be defined according to Table 35 and the test is performed with the maximum scales of modulation supported up to 256QAM; for BS Type 2-O, the channel bandwidth and subcarrier spacing shall be defined according to Table 38 and the test is performed with the maximum scales of modulation supported up to 64QAM.

6.1.2 Output Power limits

6.1.2.1 Conducted test

6.1.2.1.1 Limits:

6.1.2.1.1.1 The rated carrier power output of BS Type 1-C base station shall meet Table 3.

6.1.2.1.1.2 The rated carrier power output of BS Type 1-H base station shall meet Table 4.

6.1.2.1.1.3 The difference between the maximum carrier power output ($P_{max,c,AC}$ or $P_{max,c,TABC}$) of base station and the rated carrier power output ($P_{rated,c,AC}$, $P_{rated,c,TABC}$ or $P_{rated,c,sys}$) in normal environment and voltage shall meet Table 5.

6.1.2.1.2 Test method:

6.1.2.1.2.1 The emission power shall be measured conductively at the emission of antenna port of single frequency band.

6.1.2.1.2.2 The channel bandwidth shall be set at the highest, and subcarrier spacing shall be set according to Table 35 in normal environment and voltage. The QPSK modulation is used to test the low, medium and high channels of single carrier mode.

6.1.2.2 Radiated test

6.1.2.2.1 Limits:

6.1.2.2.1.1 BS Type 1-O and BS Type 2-O:

6.1.2.2.1.1.1 The limits for total radiated power (TPR) of BS Type 1-O base station shall meet Table 6.

6.1.2.2.1.1.2 The applicant for BS Type 2-O base station radio frequency equipment type approval shall declare the rated carrier power output ($P_{rated,c,TRP}$) of base station.

6.1.2.2.1.1.3 The difference between the maximum carrier power output of base station and the rated carrier power output ($P_{rated,c,TRP}$) in normal environment and voltage shall be smaller than 3.4dB for BS Type 1-O (f≤3GHz) or 3.5dB for BS Type 1-O (3 GHz<f≤6 GHz), where the limits may be relaxed according to Table 42; or smaller than 5.1dB for BS Type 2-O, where the limits may be relaxed according to Table 43.

6.1.2.2.2 Test method:

The channel bandwidth shall be set at the highest in normal environment and voltage. The test shall be performed on the low, medium and high channels of single carrier mode in normal environment and voltage using the QPSK modulation. The subcarrier spacing of BS Type 1-O and BS Type 2-O shall be defined according to Table 35 and Table 38, respectively.

6.1.3 Adjacent channel leakage power ratio (ACLR)

6.1.3.1 Conducted test

6.1.3.1.1 Limits:

6.1.3.1.1.1 For BS Type1-C base station, the ACLR of every antenna port shall meet Table 7 or Table 8, whichever is more relaxed.

6.1.3.1.1.2 For BS Type1-H base station, the ACLR of every TAB antenna port

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shall meet the limit in Table 8 + X, where X = $10\log_{10}(N_{TXU,countedpercell})$ or the limit in Table 7, whichever is more relaxed.

6.1.3.1.2 Test method:

The channel bandwidth shall be set at the highest, and subcarrier spacing shall be set according to Table 35 in normal environment and voltage. The QPSK modulation is used to test the low, medium and high channel of single carrier mode.

6.1.3.2 Radiated test

6.1.3.2.1 Limits:

6.1.3.2.1.1 For BS Type 1-O base station, the OTA ACLR shall meet the limit for OTA ACLR in Table 9 or the absolute limit for OTA ACLR in Table 10, whichever is more relaxed.

6.1.3.2.1.2 For BS Type 2-O base station, the OTA ACLR shall meet the limit for OTA ACLR in Table 11 or the absolute limit for OTA ACLR in Table 12, whichever is more relaxed.

6.1.3.2.2 Test method:

The channel bandwidth shall be set at the highest, and subcarrier spacing shall be set according to Table 38 in normal environment and voltage. The QPSK modulation is used to test the low and high channels of single carrier mode.

6.1.4 Operating band unwanted emissions

6.1.4.1 Conducted test

6.1.4.1.1 Limits:

6.1.4.1.1.1 BS Type 1-C and BS Type 1-H

6.1.4.1.1.1.1 Wide area base station:

6.1.4.1.1.1.1.1 Table 13 shall be met for operating frequency band lower than 1 GHz.

6.1.4.1.1.1.1.2 Table 14 shall be met for operating frequency band between 1 GHz and 3 GHz.

6.1.4.1.1.1.1.3 Table 15 shall be met for operating frequency band between 3 GHz and 6 GHz.

6.1.4.1.1.1.2 Medium range base station (31 dBm < $P_{rated,x} \leq 38$ dBm):

6.1.4.1.1.1.2.1 Table 16 shall be met for operating frequency band lower than 3 GHz.

6.1.4.1.1.1.2.2 Table 17 shall be met for operating frequency band between 3 GHz and 6 GHz.

6.1.4.1.1.1.3 Medium range base station ($P_{rated,x} \leq 31$ dBm):

6.1.4.1.1.1.3.1 Table 18 shall be met for operating frequency band lower than 3 GHz.

6.1.4.1.1.1.3.2 Table 19 shall be met for operating frequency band between 3 GHz and 6 GHz.

6.1.4.1.1.1.4 Local area base station:

6.1.4.1.1.1.4.1 Table 20 shall be met for operating frequency band lower than 3 GHz.

6.1.4.1.1.1.4.2 Table 21 shall be met for operating frequency band between 3 GHz and 6 GHz.

6.1.4.1.2 Test method:

6.1.4.1.2.1 The highest channel bandwidth and highest subcarrier spacing shall be defined in normal environment and voltage. The QPSK modulation is used to test the low, medium and high channels of single carrier mode.

6.1.4.1.2.2 Test frequency range: (lowest operating band - Δf_{OBUE}) to (highest operating band + Δf_{OBUE}); Δf_{OBUE} is defined in Table 22.

6.1.4.1.2.3 BS Type 1-C:

6.1.4.1.2.3.1 All physical antenna ports shall be tested.

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6.1.4.1.2.3.2 $P_{rated,x} = P_{rated,c,AC}$

6.1.4.1.2.4 BS Type 1-H:

6.1.4.1.2.4.1 All TAB ports shall be tested.

6.1.4.1.2.4.2 All unused TAB ports shall be connected to dummy load during the test.

6.1.4.1.2.4.3 $P_{rated,x} = P_{rated,c,cell} - 10\times\log_{10}(N_{TXU,countedpercell})$

6.1.4.2 Radiated test

6.1.4.2.1 BS Type 1-O:

6.1.4.2.1.1 The unwanted emission of operating frequency band shall be tested based on the type and class of base station and meet Table 23 through Table 31.

6.1.4.2.1.2 Test method:

6.1.4.2.1.2.1 The highest channel bandwidth and highest subcarrier spacing shall be defined in normal environment and voltage. The QPSK modulation is used to test the low, medium and high channels of single carrier mode.

6.1.4.2.1.2.2 The test shall be performed based on the class and type of base station:

6.1.4.2.1.2.2.1 Wide area base station:

6.1.4.2.1.2.2.1.1 Table 23shall be met for operating frequency band lower than 1 GHz.

6.1.4.2.1.2.2.1.2 Table 24 shall be met for operating frequency band between 1 GHz and 3 GHz.

6.1.4.2.1.2.2.1.3 Table 25 shall be met for operating frequency band between 3 GHz and 6 GHz.

6.1.4.2.1.2.2.2 Medium range base station (40 dBm < $P_{rated,c,TRP} \leq$ 47 dBm):

6.1.4.2.1.2.2.2.1 Table 26 shall be met for operating frequency band lower than 3 GHz.

6.1.4.2.1.2.2.2.2 Table 27 shall be met for operating frequency band between 3 GHz and 6 GHz.

6.1.4.2.1.2.2.3 Medium range base station ($P_{rated,c,TRP} \leq$ 40 dBm):

6.1.4.2.1.2.2.3.1 Table 28 shall be met for operating frequency band lower than 3 GHz.

6.1.4.2.1.2.2.3.2 Table 29 shall be met for operating frequency band between 3 GHz and 6 GHz.

6.1.4.2.1.2.2.4 Local area base station:

6.1.4.2.1.2.2.4.1 Table 30 shall be met for operating frequency band lower than 3 GHz.

6.1.4.2.1.2.2.4.2 Table 31 shall be met for operating frequency band between 3 GHz and 6 GHz.

6.1.4.2.2 BS Type 2-O:

6.1.4.2.2.1 Table 32 shall be met for the unwanted emission of operating frequency band.

6.1.4.2.2.2 Test method:

The highest channel bandwidth and highest subcarrier spacing shall be defined in normal environment and voltage. The QPSK modulation is used to test the low, medium and high channels of single carrier mode.

6.1.5 Transmitter spurious emissions

6.1.5.1 Conducted test

6.1.5.1.1 Limits:

6.1.5.1.1.1 BS Type 1-C and BS Type 1-H

6.1.5.1.1.1.1 The general limits shall meet Table 33.

6.1.5.1.1.1.2 The additional limits shall meet Table 34.

6.1.5.1.2 Test method:

6.1.5.1.2.1 The channel bandwidth shall be set at the highest, and subcarrier spacing shall be set according to Table 35 in normal environment and voltage. The QPSK modulation is used to test the low and high channels of single carrier

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mode.

6.1.5.1.2.2 The test is performed on the lowest channel when the frequency of spurious emission zone to be tested is lower than F_{DL_low} - Δf_{OBUE}; and on the highest channel when the frequency of spurious emission zone to be tested is higher than F_{DL_high} + Δf_{OBUE}. See Table 22 for the definition of Δf_{OBUE}.

6.1.5.1.2.3 BS Type 1-C:

All physical antenna ports shall be tested.

6.1.5.1.2.4 BS Type 1-H:

6.1.5.1.2.4.1 All TAB ports shall be tested.

6.1.5.1.2.4.2 All unused TAB ports shall be connected to dummy load during the test.

6.1.5.2 Radiated test

6.1.5.2.1 BS Type 1-O:

6.1.5.2.1.1 The unwanted emission limits shall meet Table 36. The measurement frequency band does not include the maximum offset frequency Δf_{OBUE} beyond the downlink operating frequency band in Table 40.

6.1.5.2.1.2 Test method:

6.1.5.2.1.2.1 The channel bandwidth and subcarrier spacing shall be defined in normal environment and voltage according to Table 35. The QPSK modulation is used to test the low and high channels of single carrier mode.

6.1.5.2.1.2.2 The additional limits shall meet Table 37.

6.1.5.2.2 BS Type 2-O:

6.1.5.2.2.1 The unwanted emission limits shall meet Table 39. The measurement frequency band does not include the maximum offset frequency Δf_{OBUE} beyond the downlink operating frequency band in Table 40.

6.1.5.2.2.2 Test method:

The channel bandwidth shall be set at the highest, and subcarrier spacing shall be set according to Table 38 in normal environment and voltage. The QPSK modulation is used to test the low and high channels of single carrier mode.

6.2 LTE BS：

6.2.1 Power limit:

6.2.1.1 Emission power limit:

6.2.1.1.1 The conducted emission power shall conform to regulations stated in Table 44 and the deviation of rated output power value shall be within±2.7dB.

6.2.1.2 Testing methods:

6.2.1.2.1 During the measurement of emission power, one must use devices with RMS (root mean square) equivalent voltage to measure any continuous transmission time. The measurement results shall be used to adjust the correct emission power based on the responding time, resolution bandwidth capability and sensitivity of the device.

6.2.1.2.2 Testing channels include three channels (low, medium and high) that test emission patterns with the maximum modulation level of different operating bandwidths.

6.2.2 Radiation emission limit outside the conduction band:

6.2.2.1 Any free radiation emission outside the operating band shall be lower than the

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carrier emission power (P) and the measurement is calculated in Watt. The edge attenuation outside the operating channel shall be higher than 43 + 10 log (P) dB.

6.2.2.2 Testing methods:

6.2.2.2.1 Devices with an operating frequency lower than 1GHz.

6.2.2.2.1.1 Within a range that is outside the edge of measurement channel and within 1 GHz out-of-band, the measurement shall be conducted by using spectrum measurement apparatuses with a resolution bandwidth above 100 kHz; as for an out-of-band range that is over 1 GHz, the measurement shall be conducted by using spectrum measurement apparatuses with a resolution bandwidth above 1 MHz.

6.2.2.2.1.2 Within a range of 100 kHz that is outside the channel edge, a smaller resolution bandwidth shall be used to measure the radiation outside the accurate channel. At this moment, the minimum resolution bandwidth must be higher than 30 kHz.

6.2.2.2.1.3 Testing channels include three channels (low, medium and high) that test emission patterns with the maximum modulation level of different operating bandwidths.

6.2.2.2.2 Devices with an operating frequency higher than 1 GHz.

6.2.2.2.2.1 Within a range that is outside the edge of measurement channel and within 1 GHz out-of-band, the measurement shall be conducted by using spectrum measurement apparatuses with a resolution bandwidth above 100 kHz; as for an out-of-band range that is over 1 GHz, the measurement shall be conducted by using spectrum measurement apparatuses with a resolution bandwidth higher than 1 MHz.

6.2.2.2.2.2 Within a range of 1 MHz that is outside the channel edge, a smaller resolution bandwidth shall be used to measure the radiation outside the accurate channel. At this moment, the minimum resolution bandwidth must be higher than 1% of the carrier emission bandwidth (26 dB bandwidth). However, the maximum shall not be over 100 kHz.

6.2.2.2.2.3 Testing channels include three channels (low, medium and high) that test emission patterns with the maximum modulation level of different operating bandwidths.

6.3 WCDMA BS：

6.3.1 General testing items and eligibility criteria

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6.3.1.1 Channel spacing: 5 MHz.

6.3.2 Testing items and eligibility criteria for base station radio frequency equipment

6.3.2.2 This section applies to Base Stations radio frequency equipment.

6.3.2.2 Occupied bandwidth: Shall be less than or equal to 5 MHz.

6.3.2.3 Maximum output power: In normal conditions, the maximum output power shall remain within +2dB and -2dB of the rated output power.

6.3.2.4 Frequency error: Shall remain within ±0.05 ppm of the main frequency.

6.3.2.5 Spectrum emission mask: Shall comply with the spectrum emission mask shown in Figure 1 and the spectrum emission mask limit values prescribed in Table 45.

6.3.2.6 Spurious emissions: Shall comply with the spurious emissions limit values prescribed in Table 46.

6.3.2.7 Adjacent Channel Leakage power Ratio (ACLR):

If the adjacent channel offset is 5 MHz, the ACLR limit is 45 dB. If the adjacent channel offset is 10 MHz, the ACLR limit is 50 dB.

6.3.2.8 Transmit intermodulation:

6.3.2.8.1 The transmit intermodulation level shall not exceed the spurious emissions limit values prescribed in Table 46.

6.3.2.8.2 Testing methods: Inject modulated interference signal into the antenna connector at a power level of 30 dB lower than main signal. The interference frequency shall be offset ±5MHz, ±10MHz and ±15MHz from the main signal. The interference frequency that are outside of any downlink application band are excluded.

6.3.3 Testing items and eligibility criteria for femtocell access point radio frequency equipment

6.3.3.1 Occupied bandwidth: Shall be less than or equal to 5 MHz.

6.3.3.2 Maximum output power: In normal conditions, the rated output power limit is 20 dBm, and the maximum output power shall remain within +2.7dB and -2.7dB of the rated output power.

6.3.3.3 Frequency error: Shall remain within ±0.25 ppm of the main frequency.

6.3.3.4 Spectrum emission mask: Shall comply with the spectrum emission mask shown in Figure 1, the spectrum emission mask limit values prescribed in Table 45 and the extra spectrum emission mask limit values prescribed in Table 47.

6.3.3.5 Spurious emissions: Shall comply with the spurious emissions limit values prescribed in Table 46

6.3.3.6 Adjacent Channel Leakage power Ratio (ACLR):

6.3.3.6.1 Adjacent channel leakage power shall comply with 6.3.3.6.2 or 6.3.3.6.3, whichever is the higher.

6.3.3.6.2 ACLR limit: If the adjacent channel offset is 5 MHz, the ACLR limit is 45 dB. If the adjacent channel offset is 10 MHz, the ACLR limit is 50 dB.

6.3.3.6.3 Adjacent channel leakage power limit: the RRC filtered mean power centered on an adjacent channel frequency shall be less than or equal to -44.2dBm/3.84MHz.

6.3.3.7 Transmit intermodulation:

6.3.3.7.1 The transmit intermodulation level shall not exceed the spurious emissions limit values prescribed in Table 46.

6.3.3.7.2 Testing methods: Inject modulated interference signal into the antenna connector at a power level of 30 dB lower than main signal. The interference frequency shall be offset ±5MHz, ±10MHz and ±15MHz from the main signal. The interference frequency that are outside of any downlink application band are excluded.

6.3.3.8 Output power for adjacent channel protection: According to the setting of Table 48, shall comply with the limit values prescribed in Table 49. The output power shall remain within±2.7 dB of the limit values in Table 49.

6.3.4 Testing items and eligibility criteria for repeater radio frequency equipment

6.3.4.1 Maximum output power: In normal conditions, if the rated output power is more than or equal to 31dBm, the maximum output power shall remain within +2dB and -2dB of the rated output power. If the rated output power is less than 31dBm, the maximum output power shall remain within +3dB and -3dB of the rated output power.

6.3.4.2 Frequency error: Shall remain within ±0.01 ppm of the main frequency.

6.3.4.3 Spectrum emission mask: Shall comply with the spectrum emission mask shown in

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Figure 1 and the spectrum emission mask limit values prescribed in Table 45.

6.3.4.4 Spurious emissions: Shall comply with the spurious emissions limit values prescribed in Table 50.

6.3.4.5 Input intermodulation: The input intermodulation limit values are prescribed in Table 51, and the input intermodulation requirement for interfering signals in other systems are in Table 52.

6.3.4.6 Out of band gain: Shall comply with limit values of out of band gain prescribed in Table 53.

6.4 Electrical safety:

CNS14336-1, CNS15598-1 or any other applicable standards established by the competent authority shall be met. As from January 1, 2024, CNS15598-1 or any other applicable standards established by the competent authority shall be met.

6.5 Electromagnetic compatibility (EMC):

CNS13438, CNS15936 or any other applicable standards established by the competent authority shall be met. As from January 1, 2024, CNS15936 or any other applicable standards established by the competent authority shall be met.

7. Test requirements

7.1 NR BS:

Unless otherwise specified in the Specifications, the latest version of 3GPP TS 38.104, 3GPP TS 38.141-1 and 3GPP TS 38.141-2 shall apply to the test procedures.

7.2 LTE BS:

Except as otherwise provided in these technical specifications, testing methods for examining emission power and out-of-band radiation emission shall all be processed based on the inspection requirements stated in Point 6 of the Low-power Radio-frequency Devices Technical Specifications (LPRFD Technical Requirements). The inspection procedures shall be processed in accordance of the Appendix 1 "Referential Procedures of Inspecting Transmitters" of the Low-power Radio-frequency Devices Technical Specifications (LPRFD Technical Requirements).

7.3 WCDMA BS:

Except as otherwise provided in these technical specifications, testing methods for testing items shall be processed based on the inspection requirements stated in Point 6 of the Low-power Radio-frequency Devices Technical Specifications (LPRFD Technical Requirements). The inspection procedures shall be processed in accordance of the Appendix 1 “Referential Procedures of Inspecting Transmitters” of the Low-power Radio-frequency Devices Technical Specifications.

Table 1 Frequency error test requirement for BS Type 1-C and BS Type 1-H (see 3GPP 38.141-1 Table 6.5.2.5-1)

Base station class	Frequency stability
Wide area base station	±(f × 0.05 ppm + 12 Hz)
Medium range base station	±(f × 0.1 ppm + 12 Hz)
Local area base station	±(f × 0.1 ppm + 12 Hz)
Note: f is the central frequency of channel.	

Table 2 OTA frequency error test requirement for BS Type 1-O and BS Type 2-O (see 3GPP TS 38.141-2 Table 6.6.2.5-1)

Base station class	Frequency stability limit
Wide area base station	±(f × 0.05 ppm + 12 Hz)

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Medium range base station	±(f × 0.1 ppm + 12 Hz)
Local area base station	±(f × 0.1 ppm + 12 Hz)
Note: f is the central frequency of channel.	

Table 3 Rated carrier output power limits for BS Type 1-C (see 3GPP TS 38.141-1 Table 6.2.1-1 and Table C.1-1)

Base station class	$P_{rated,c,AC}$
Wide area base station	(note 1)
Medium range base station	≤ 38 dBm (note 2)
Local area base station	≤ 24 dBm (note 2)
Note 1: no upper limit for the rated power output, $P_{rated,c,AC}$, for wide area base station. Note 2: the limits may be relaxed according to Table 41.	

Table 4 Rated power output limits for BS Type 1-H (see 3GPP TS 38.141-1 Table 6.2.1-2 and Table C.1-1)

Base station class	$P_{rated,c,sys}$ (note 2)	$P_{rated,c,TABC}$ (note 2)
Wide area base station	(note 1)	(note 1)
Medium range base station	≤ 38 dBm +10log($N_{TXU,counted}$)	≤ 38 dBm
Local area base station	≤ 24 dBm +10log($N_{TXU,counted}$)	≤ 24 dBm
Note 1: no upper limit for $P_{rated,c,sys}$ or $P_{rated,c,TABC}$ for Wide area base station. Note 2: the limits may be relaxed according to Table 41.		

Table 5 Difference between maximum carrier power output of base station and rated carrier power output (see 3GPP TS 38.141-1 Table 6.2.5-1 and Table C.1-1)

Base station type	Normal environment + normal voltage
BS Type 1-C BS Type 1-H	f ≤ 3 GHz: ±2.7 dB (note)
	3GHz < f ≤ 6 GHz: ±3.0dB (note)
Note: the limits may be relaxed according to Table 41.	

Table 6 Rated carrier TRP output power limits for BS Type 1-O (see 3GPP TS 38.104 **Table 9.3.1-1 and TS 38.141-2 Table C.1-1**)

Base station class	$P_{rated,c,TRP}$
Wide area base station	(note 1)
Medium range base station	≤ + 47 dBm (note 2)
Local area base station	≤ + 33 dBm (note 2)

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Note 1: no upper limit for $P_{rated,c,TRP}$ for wide area base station.
Note 2: the limits may be relaxed according to Table 42.

Table 7 Adjacent channel leakage ratio (ACLR) limits for BS Type 1-C and BS Type 1-H base stations (see 3GPP TS 38.141-1 Table 6.6.3.5.2-1 and Table C.1-1)

BS channel bandwidth of lowest/highest NR carrier transmitted $BW_{Channel}$ (MHz)	BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted (MHz)	Assumed adjacent channel carrier (informative)	Filter on the adjacent channel frequency and corresponding filter bandwidth	ACLR limit (note 4)
5, 10, 15, 20	$BW_{Channel}$	NR of same BW (note 2)	Square (BW_{Config})	44.2 dB
	$2 \times BW_{Channel}$	NR of same BW (note 2)	Square (BW_{Config})	44.2 dB
	$BW_{Channel}/2 + 2.5$ MHz	5 MHz E-UTRA	Square (4.5 MHz)	44.2 dB (note 3)
	$BW_{Channel}/2 + 7.5$ MHz	5 MHz E-UTRA	Square (4.5 MHz)	44.2 dB (note 3)
25, 30, 40, 50, 60, 70, 80, 90, 100	$BW_{Channel}$	NR of same BW (note 2)	Square (BW_{Config})	43.8 dB
	$2 \times BW_{Channel}$	NR of same BW (note 2)	Square (BW_{Config})	43.8 dB
	$BW_{Channel}/2 + 2.5$ MHz	5 MHz E-UTRA	Square (4.5 MHz)	43.8 dB (note 3)
	$BW_{Channel}/2 + 7.5$ MHz	5 MHz E-UTRA	Square (4.5 MHz)	43.8 dB (note 3)

Note 1: $BW_{Channel}$ and BW_{Config} are the lowest/highest channel bandwidth and emission bandwidth configuration, respectively, when a base station is emitting NR carrier on the specified channel.
Note 2: the subcarrier spacing (SCS) provides the maximum emission bandwidth configuration (BW_{Config}).
Note 3: this limit applies to E-UTRA or UTRA on this frequency band.
Note 4: the limits may be relaxed according to Table 41.

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Table 8 Base station ACLR absolute basic limit for BS Type 1-C and BS Type 1-H (see 3GPP TS 38.141-1 Table 6.6.3.5.2-2 and Table C.1-1)

Base station class	ACLR absolute basic limit
Wide area base station	-13 dBm/MHz
Medium range base station	-25 dBm/MHz
Local area base station	-32 dBm/MHz
Note: the limits may be relaxed according to Table 41.	

Table 9 Adjacent channel leakage ratio (ALCR) limits for BS Type 1-O (see 3GPP TS 38.141-2 Table 6.7.3.5.1-1 and Table C.1-1)

BS channel bandwidth of lowest/highest NR carrier transmitted $BW_{Channel}$(MHz)	BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted (MHz)	Assumed adjacent channel carrier (informative)	Filter on the adjacent channel frequency and corresponding filter bandwidth	OTA ACLR limit (0 – 3 GHz) (note 4)	OTA ACLR limit (3 – 6 GHz) (note 4)
5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90,100	$BW_{Channel}$	NR of same BW (note 2)	Square (BW_{Config})	44dB	43.8dB
	2 × $BW_{Channel}$	NR of same BW (note 2)	Square (BW_{Config})	44dB	43.8dB
	$BW_{Channel}$/2 + 2.5 MHz	5 MHz E-UTRA	Square (4.5 MHz)	44dB (note 3)	43.8dB (note 3)
	$BW_{Channel}$/2 + 7.5 MHz	5 MHz E-UTRA	Square (4.5 MHz)	44dB (note 3)	43.8dB (note 3)

Note 1: $BW_{Channel}$ and BW_{Config} are the BS channel bandwidth and transmission bandwidth configuration of the lowest/highest NR carrier transmitted on the assigned channel frequency.
Note 2: With subcarrier spacing (SCS) that provides largest transmission bandwidth configuration (BW_{Config}).
Note 3: The requirements are applicable when the band is also defined for E-UTRA or UTRA.
Note 4: the limits may be relaxed according to Table 42.

Table 10 Absolute adjacent channel leakage ratio (ALCR) limits for BS Type 1-O (see 3GPP TS 38.141-2 Table 6.7.3.5.1-2 and Table C.1-1)

Base station class	Absolute ACLR limit (Note 1, 2)
Wide area base station	-4dBm/MHz
Medium range base station	-16dBm/MHz

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Local area base station	-23dBm/MHz
Note 1: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 2: the limits may be relaxed according to Table 42.	

Table 11 Adjacent channel leakage ratio (ALCR) limits for BS Type 2-O (see 3GPP TS 38.141-2 Table 6.7.3.5.2-1 and Table C.1-2)

BS channel bandwidth of lowest/highest NR carrier transmitted $BW_{Channel}$ (MHz)	BS adjacent channel center 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	OTA ACLR limit (dB)
50, 100, 200, 400	$BW_{Channel}$	NR of same BW (note 2)	Square (BW_{Config})	25.7 (note 3)
Note 1: $BW_{Channel}$ and BW_{Config} are the BS channel bandwidth and transmission bandwidth configuration of the lowest/highest NR carrier transmitted on the assigned channel frequency Note 2: With subcarrier spacing (SCS) that provides largest transmission bandwidth configuration (BWConfig). Note 3: the limits may be relaxed according to Table 43.				

Table 12 Adjacent channel leakage ratio (ALCR) absolute limit for BS Type 2-O (see 3GPP TS 38.141-2 Table 6.7.3.5.2-2 and Table C.1-2)

Base station class	Absolute ACLR limit
Wide area base station	-10.3dBm/MHz
Medium range base station	-17.3 dBm/MHz
Local area base station	-17.3 dBm/MHz
Note 1: the limits may be relaxed according to Table 43.	

Table 13 Limits for unwanted emission of operating frequency band for wide area base station (NR bands ≤ 1GHz, BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.4.5.2-1 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Basic limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.5dBm-\frac{7}{5}\cdot\left(\frac{f_offset}{MHz}-0.05\right)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-12.5 dBm	100 kHz

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-13 dBm (note 1)	100 kHz
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 14 Limits for unwanted emission of operating frequency band for wide area base station (1GHz < NR bands ≤ 3GHz, BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.4.5.2-2 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Basic limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.5dBm-\frac{7}{5}\cdot\left(\frac{f_offset}{MHz}-0.05\right)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-12.5 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset_{max}	-13 dBm (note 1)	1MHz
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 15 Limits for unwanted emission of operating frequency band for wide area base station (NR bands >3GHz, BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.4.5.2-3 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Basic limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-5.2dBm-\frac{7}{5}\cdot\left(\frac{f_offset}{MHz}-0.05\right)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-12.2 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset_{max}	-13 dBm (note 1)	1MHz
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 16 Limits for unwanted emission of operating frequency band for medium range base station (NR bands ≤ 3GHz, Type 1-C, BS Type 1-H) (31 dBm < $P_{rated,x}$ ≤ 38 dBm) (see 3GPP TS 38.141-1 Table 6.6.4.5.4-1 and Table C.1-1)

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Offset frequency at -3dB frequency point of measurement filter, Δf	Frequency offset of measurement filter centre frequency, f_offset	Basic limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$P_{rated,x} - 51.5dB - \frac{7}{5}\left(\frac{f_offset}{MHz} - 0.05\right) dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	$P_{rated,x}$ - 58.5dB	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	Min($P_{rated,x}$ - 60dB, -25dBm) (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 17 Limits for unwanted emission of operating frequency band for medium range base station (NR bands >3GHz, Type 1-C, BS Type 1-H) (31 dBm < $P_{rated,x}$ ≤ 38 dBm) (see 3GPP TS 38.141-1 Table 6.6.4.5.4-3 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Basic limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$P_{rated,x} - 51.2dB - \frac{7}{5}\left(\frac{f_offset}{MHz} - 0.05\right) dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	$P_{rated,x}$ - 58.2dB	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	Min($P_{rated,x}$ - 60dB, -25dBm) (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 18 Limits for unwanted emission of operating frequency band for medium range base station (NR bands ≤ 3GHz, BS Type 1-C, BS Type 1-H) ($P_{rated,x}$ ≤ 31 dBm) (see 3GPP TS 38.141-1 Table 6.6.4.5.4-2 and Table C.1-1)

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Basic limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-20.5\text{ dBm} - \frac{7}{5}\left(\frac{f_offset}{MHz} - 0.05\right) dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-27.5 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-29 dBm (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 19 Limits for unwanted emission of operating frequency band for medium range base station (NR bands >3GHz, BS Type 1-C, BS Type 1-H) ($P_{rated,x}$ ≤31 dBm) (see 3GPP TS 38.141-1 Table 6.6.4.5.4-4 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Basic limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-20.2\text{ dBm} - \frac{7}{5}\left(\frac{f_offset}{MHz} - 0.05\right) dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-27.2 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-29 dBm (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 20 Limits for unwanted emission of operating frequency band for local area base station (NR bands ≤ 3GHz, BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.4.5.5-1 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Basic limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-28.5dBm - \frac{7}{5}\left(\frac{f_offset}{MHz} - 0.05\right) dB$	100 kHz

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-35.5 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-37 dBm (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 21 Limits for unwanted emission of operating frequency band for local area base station (NR bands >3GHz,BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.4.5.5-2 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Limit (note 2)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-28.2dBm-\frac{7}{5}\cdot\left(\frac{f_offset}{MHz}-0.05\right)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤f_offset < min(10.05 MHz, f_offset_{max})	-35.2 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤f_offset < f_offset_{max}	-37 dBm (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: the limits may be relaxed according to Table 41.			

Table 22 Maximum offset of OBUE outside the downlink operating band (see 3GPP TS 38.141-1 Table 6.6.1-1)

Base station type	Operating band characteristics	Δf_{OBUE} (MHz)
BS Type 1-C	$F_{DL_high} - F_{DL_low} \leq 200$ MHz	10
	200 MHz < $F_{DL_high} - F_{DL_low} \leq 900$ MHz	40
BS Type 1-H	$F_{DL_high} - F_{DL_low} < 100$ MHz	10
	100 MHz ≤ $F_{DL_high} - F_{DL_low} \leq 900$ MHz	40

Table 23 Limits for unwanted emission of operating frequency band for wide area base station (NR bands ≤ 1GHz, BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.1-1 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement (note 2, 3)	Measurement bandwidth

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	3.8 dBm - 7/5(f_offset/MHz - 0.05) dB	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-3.2 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-4 dBm (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10 MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 24 Operating band unwanted emission limits for wide area base station (1GHz < NR bands ≤ 3GHz, BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.1-2 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Emission limit (note 2, 3)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	3.8 dBm-7/5(f_offset/MHz-0.05)dB	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-3.2 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset_{max}	-4 dBm (note 1)	1MHz
Note 1: The requirement is not applicable when Δf_{max} < 10MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 25 Operating band unwanted emission limits for wide area base station (3 GHz < NR bands ≤ 6 GHz, BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.1-3, Table 6.7.4.5.1.1-4 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Emission limit (note 2, 3)	Resolution bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	4 dBm-7/5(f_offset/MHz-0.05)dB	100 kHz

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-3 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.5 MHz ≤ f_offset < f_offset_{max}	-4 dBm (note 1)	1MHz
Note 1: The requirement is not applicable when Δf_{max} < 10MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 26 Operating band unwanted emission limits for medium range base station (NR bands ≤ 3GHz, BS Type 1-O) (40 dBm < $P_{rated,c,TRP}$ ≤ 47 dBm) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.4-1 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement (note 2, 3)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$P_{rated,c,TRP} - 51.2dB - \frac{7}{5}(\frac{f_offset}{MHz} - 0.05)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	$P_{rated,c,TRP}$ – 58.2 dB	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	Min($P_{rated,c,TRP}$ - 60 dB, -16 dBm) (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 27 Operating band unwanted emission limits for medium range base station (3 GHz < NR bands ≤ 6 GHz, BS Type 1-O) (40 dBm < $P_{rated,c,TRP}$ ≤ 47 dBm) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.4-2, Table 6.7.4.5.1.4-3 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement (note 2, 3)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$P_{rated,c,TRP} - 51dB - \frac{7}{5}(\frac{f_offset}{MHz} - 0.05)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	$P_{rated,c,TRP}$ - 58 dB	

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	Min($P_{rated,c,TRP}$ – 60 dB, -16 dBm) (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 28 Operating band unwanted emission limits for medium range base station (NR bands ≤ 3 GHz, BS Type 1-O) ($P_{rated,c,TRP}$ ≤ 40 dBm) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.4-4 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement (note 2, 3)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-11.2dB-\frac{7}{5}(\frac{f_offset}{MHz}-0.05)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-18.2 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-20 dBm (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 29 Operating band unwanted emission limits for medium range base station (3 GHz < NR bands ≤ 6 GHz, BS Type 1-O) ($P_{rated,c,TRP}$ ≤ 40 dBm) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.4-5, Table 6.7.4.5.1.4-6 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement (note 2, 3)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-11dB-\frac{7}{5}(\frac{f_offset}{MHz}-0.05)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-18 dBm	

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-20 dBm (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 30 Operating band unwanted emission limits for local area base station (NR bands ≤ 3 GHz, BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.5-1 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement (note 2, 3)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤f_offset < 5.05 MHz	$-19.2dB-\frac{7}{5}(\frac{f_offset}{MHz}-0.05)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-26.2 dBm	100 kHz
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-28 dBm (note 1)	100 kHz
Note 1: The requirement is not applicable when Δfmax < 10MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 31 Operating band unwanted emission limits for local area base station (3 GHz < NR bands ≤ 6 GHz, BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.4.5.1.5-2, Table 6.7.4.5.1.5-3 and Table C.1-1)

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Test requirement (note 2, 3)	Measurement bandwidth
0 MHz ≤ Δf < 5 MHz	0.05 MHz ≤ f_offset < 5.05 MHz	$-19dB-\frac{7}{5}(\frac{f_offset}{MHz}-0.05)dB$	100 kHz
5 MHz ≤ Δf < min(10 MHz, Δf_{max})	5.05 MHz ≤ f_offset < min(10.05 MHz, f_offset_{max})	-26 dBm	
10 MHz ≤ Δf ≤ Δf_{max}	10.05 MHz ≤ f_offset < f_offset_{max}	-28 dBm (note 1)	
Note 1: The requirement is not applicable when Δf_{max} < 10MHz. Note 2: The test requirements are originated from the basic limits. The proportional factor (difference between conducted & radiation), which is 9 dB, has be incorporated and applies to any test tolerance. Note 3: the limits may be relaxed according to Table 42.			

Table 32 Operating band unwanted emission limits (BS Type 2-O) (see 3GPP TS 38.141-2 Table 6.7.4.5.2.2-1 and Table C.1-2)

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Frequency offset of measurement filter 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Limit (dBm) (note)	Resolution bandwidth
0 MHz ≤ Δf < 0.1× $BW_{contiguous}$	0.5 MHz ≤ f_offset < 0.1 × $BW_{contiguous}$ +0.5 MHz	Min(-2.3, Max($P_{rated,t,TRP}$ - 32.3, -9.3))	1MHz
0.1 × $BW_{contiguous}$ ≤ Δf < $Δf_{max}$	0.1× $BW_{contiguous}$ +0.5 MHz ≤ f_offset < f_ $offset_{max}$	Min(-13, Max($P_{rated,t,TRP}$ – 43, -20))	1MHz
Note: the limits may be relaxed according to Table 43.			

Table 33 General BS transmitter spurious emission limits in the conducted test (BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.5.5.1.1-1 and Table C.1-1)

Spurious emission frequency range	Basic limit	Measurement bandwidth	Notes
9 kHz – 150 kHz	-13 dBm	1 kHz	Note 1, Note 4
150 kHz – 30 MHz		10 kHz	Note 1, Note 4
30 MHz – 1 GHz		100 kHz	Note 1
1 GHz – 12.75 GHz		1 MHz	Note 1, Note 2
12.75 GHz – 5 x highest harmonics of the maximum DL operating frequency, in GHz		1 MHz	Note 1, Note 2, Note 3
Note 1: Measurement bandwidths as in ITU-R SM.329 , s4.1. Note 2: Upper frequency as in ITU-R SM.329 , s2.5 table 1. Note 3: This spurious frequency range applies only for operating bands for which the 5th harmonic of the upper frequency edge of the DL operating band is reaching beyond 12.75 GHz. Note 4: This spurious frequency range applies only to BS type 1-C and BS type 1-H. Note 5: the limits may be relaxed according to Table 41.			

Table 34 BS spurious emissions limits for BS for co-existence with systems operating in other frequency bands in the conducted test (BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.5.5.1.3-1 and Table C.1-1)

Co-existing system	Frequency range needed for co-existence	Limit	Resolution bandwidth	Note
GSM900	921 – 960 MHz	-57 dBm	100 kHz	Not applicable to n8 base station
	876 – 915 MHz	-61 dBm	100 kHz	Not applicable to n8 base station
DCS1800	1805 – 1880 MHz	-47 dBm	100 kHz	Not applicable to n3 base station
	1710 – 1785 MHz	-61 dBm	100 kHz	Not applicable to n3 base station
UTRA FDD Band I or E-UTRA Band 1 or NR Band n1	2110 – 2170 MHz	-52 dBm	1 MHz	Not applicable to n1 base station
	1920 – 1980 MHz	-49 dBm	1 MHz	Not applicable to n1 base station
UTRA FDD Band VII or E-UTRA Band 7 or NR Band n7	2620 – 2690 MHz	-52 dBm	1 MHz	Not applicable to n7 base station
	2500 – 2570 MHz	-49 dBm	1 MHz	Not applicable to n7 base station

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

E-UTRA Band 28 or NR Band n28	758 – 803 MHz	-52 dBm	1 MHz	Not applicable to n20 or n28 base station
	703 – 748 MHz	-49 dBm	1 MHz	Not applicable to n28 base station
UTRA TDD Band d) or E-UTRA Band 38 or NR Band n38	2570 – 2620 MHz	-52 dBm	1 MHz	Not applicable to n38 base station
E-UTRA Band 41 or NR Band n41	2496 – 2690 MHz	-52 dBm	1 MHz	Not applicable to n41 base station
NR Band n77	3.3 – 4.2 GHz	-52 dBm	1 MHz	Not applicable to n48, n77 or n78 base station
NR Band n79	4.4 – 5.0 GHz	-52 dBm	1 MHz	Not applicable to n79 base station
Note: the limits may be relaxed according to Table 41.				

Table 35 Test signal parameters for unwanted emission of spurious emission zone for FR1 (see 3GPP TS 38.141-1 Table 4.7.2-1)

Operating frequency band parameters		$F_{DL_high} - F_{DL_low} < 100$ MHz	$F_{DL_high} - F_{DL_low} \geq 100$ MHz
Test signal parameters	Frequency bandwidth	5 MHz (note)	20 MHz (note)
	Subcarrier spacing	Smallest subcarrier spacing supported	
Note: If this channel bandwidth is not supported, the narrowest supported channel bandwidth shall be used.			

Table 36 General OTA BS transmitter spurious emission limits (BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.5.2.5.1-1 and Table C.1-1)

Spurious emission frequency zone	Limit (note 5)	Resolution bandwidth	Note
30MHz – 1GHz	-13 + X dBm	100kHz	Note 1, Note 4
1GHz – 12.75GHz	-13 + X dBm	1MHz	Note 1, Note 2, Note 4
12.75GHz –5 x highest harmonics of the maximum DL operating frequency, in GHz	-13 + X dBm	1MHz	Note 1, Note 2, Note 3, Note 4
Note 1: see ITU-R SM.329, s4.1 for resolution bandwidth Note 2: see ITU-R SM.329, s2.5 table 1 for upper limit frequency. Note 3: applicable only for 5 x highest harmonics of the maximum DL operating frequency > 12.75GHz. Note 4: X = 9 dB except for different requirements in different areas. Note 5: the limits may be relaxed according to Table 42.			

Table 37 BS spurious emissions test limits for BS for co-existence with systems operating in other frequency bands (BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.5.4.5-1 and Table C.1-1)

Co-existing system	Frequency range needed for co-existence	Limit	Resolution bandwidth	Note
GSM900	921 – 960 MHz	-45.4 dBm	100 kHz	Not applicable to n8 base station
	876 – 915 MHz	-49.4 dBm	100 kHz	Not applicable to n8 base station
DCS1800	1805 – 1880 MHz	-35.4 dBm	100 kHz	Not applicable to

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

				n3 base station
	1710 – 1785 MHz	-49.4 dBm	100 kHz	Not applicable to n3 base station
UTRA FDD Band I or E-UTRA Band 1 or NR Band n1	2110 – 2170 MHz	-40.4 dBm	1 MHz	Not applicable to n1 base station
	1920 – 1980 MHz	-37.4 dBm	1 MHz	Not applicable to n1 base station
UTRA FDD Band VII or E-UTRA Band 7 or NR Band n7	2620 – 2690 MHz	-40.4 dBm	1 MHz	Not applicable to n7 base station
	2500 – 2570 MHz	-37.4 dBm	1 MHz	Not applicable to n7 base station
E-UTRA Band 28 or NR Band n28	758 – 803 MHz	-40.4 dBm	1 MHz	Not applicable to n20 or n28 base station
	703 – 748 MHz	-37.4 dBm	1 MHz	Not applicable to n28 base station
UTRA TDD Band d) or E-UTRA Band 38 or NR Band n38	2570 – 2620 MHz	-40.4 dBm	1 MHz	Not applicable to n38 base station
E-UTRA Band 41 or NR Band n41	2496 – 2690 MHz	-40.4 dBm	1 MHz	Not applicable to n41 base station
NR Band n77	3.3– 4.2 GHz	-40 dBm	1 MHz	Not applicable to n77 or n78 base station
NR Band n79	4.4 – 5.0 GHz	-39.5 dBm	1 MHz	Not applicable to n79 base station
Note: the limits may be relaxed according to Table 42.				

Table 38 Radiation test signal parameters for unwanted emission of spurious emission zone for FR2 (see 3GPP TS 38.141-2 Table 4.7.2.1-2)

Operating frequency band parameters		$F_{DL_high} - F_{DL_low} \leq 3250$ MHz
Test signal parameters	Frequency bandwidth	100 MHz (Note 1, Note 2)
	Subcarrier spacing	Smallest carrier spacing that is supported and declared for every operating frequency band
Note 1: the applicant for base station radio frequency equipment type approval may decide to test with 50MHz of base station channel bandwidth and the smallest carrier spacing that is supported and declared for every operating frequency band instead of the 100 MHz of base station channel bandwidth. Note 2: the smallest base station channel bandwidth that is supported and declared for every operating frequency band is used if the base station channel bandwidth is not supported.		

Table 39 BS radiated Tx spurious emission limits (BS Type 2-O) (see 3GPP TS 38.104 Table 9.7.5.3.2.2-1 and TS 38.141-2 Table C.1-2)

Spurious emission frequency zone	Limit (note 3)	Measurement Bandwidth	Note
30MHz – 1GHz	-13dBm	100kHz	Note 1

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

1 GHz – 2nd harmonic of the upper frequency edge of the DL operating band		1MHz	Note 1, Note 2
Note 1: Bandwidth as in ITU-R SM.329 , s4.1 Note 2: Upper frequency as in ITU-R SM.329 , s2.5 table 1 Note 3: the limits may be relaxed according to Table 43.			

Table 40 Maximum offset Δf_{OBUE} outside the downlink operating band (see 3GPP TS 38.141-2 Table 6.7.1-1)

Base station type	Operating frequency band characteristics	Δf_{OBUE} (MHz)
BS Type 1-O	$F_{DL_high} - F_{DL_low} < 100$ MHz	10
	100 MHz $\leq F_{DL_high} - F_{DL_low} \leq$ 900 MHz	40
BS Type 2-O	$F_{DL_high} - F_{DL_low} \leq 3250$ MHz	1500

Table **41 Test tolerance for conducted tests to be performed (see 3GPP TS 38.141-1** Table C.1-1)

Tests to be performed	Minimum test requirements in TS 38.104	Test tolerance (TT)	Test requirements
Table 3 Rated carrier output power limits for BS Type 1-C (see 3GPP TS 38.141-1 Table 6.2.1-1 and Table C.1-1) or Table 4 Rated power output limits for BS Type 1-H (see 3GPP TS 38.141-1 Table 6.2.1-2 and Table C.1-1) or Table 5 Difference between maximum carrier power output of base station and rated carrier power output (see 3GPP TS 38.141-1 Table 6.2.5-1 and Table C.1-1)	Per 6.2, TS 38.104	Normal environment (f is the operating frequency): 0.7 dB, f ≤ 3.0 GHz 1.0 dB, 3.0 GHz < f ≤ 6GHz	Formula: Upper limit +TT, Lower limit -TT
Table 7 Adjacent channel leakage ratio (ACLR) limits for BS Type 1-C and BS Type 1-H base stations (see 3GPP TS 38.141-1 Table 6.6.3.5.2-1 and Table C.1-1) or	Per 6.6.3, TS 38.104	ACLR: BW ≤ 20MHz: 0.8dB BW > 20MHz: 1.2 dB Absolute basic ACLR: 0 dB	Formula: (1) ACLR limit - TT (2) Absolute basic ACLR limit +TT

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Table 8 Base station ACLR absolute basic limit for BS Type 1-C and BS Type 1-H (see 3GPP TS 38.141-1 Table 6.6.3.5.2-2 and Table C.1-1)			
Unwanted emission of operating frequency band (Conducted test) Table 13, Table 14, Table 15, Table 16, Table 17, Table 18, Table 19, Table 20, Table 21	Per 6.6.4, TS 38.104	Offset frequency Δf < 10MHz 1.5 dB, f ≤ 3.0GHz 1.8 dB, 3.0GHz < f ≤ 6GHz (note) Offset frequency Δf ≥ 10MHz 0dB	Formula: Limit + TT
Table 33 General BS transmitter spurious emission limits in the conducted test (BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.5.5.1.1-1 and Table C.1-1)	Per 6.6.5.1, TS 38.104	0 dB	Formula: Limit + TT
Table 34 BS spurious emissions limits for BS for co-existence with systems operating in other frequency bands in the conducted test (BS Type 1-C, BS Type 1-H) (see 3GPP TS 38.141-1 Table 6.6.5.5.1.3-1 and Table C.1-1)	Per 6.6.5.2.3, TS 38.104	0 dB	Formula: Limit + TT
Note: TT is applicable only for base station operating frequency, f, within 4.2 GHz < f ≤ 6.0 GHz.			

Table 42 FR1 radiation test tolerance (see 3GPP TS 38.141-2 Table C.1-1)

Tests to be performed	Minimum test requirements in TS 38.104	Test tolerance (TT_{OTA})	Test requirements
Table 6 Rated carrier TRP output power limits for BS Type 1-O (see 3GPP TS 38.104 Table 9.3.1-1 and TS 38.141-2 Table C.1-1) or	Per 9.3m TS 38.104	1.4 dB, f ≤ 3.0 GHz 1.5 dB, 3.0 GHz < f ≤ 4.2 GHz 1.5 dB, 4.2 GHz < f ≤ 6.0 GHz	Formula: Upper limit + TT, Lower limit – TT

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

6.2.2.1.1.3 (TRP test for Type 1-O base station)			
Table 9 Adjacent channel leakage ratio (ALCR) limits for BS Type 1-O (see 3GPP TS 38.141-2 Table 6.7.3.5.1-1 and Table C.1-1) or Table 10 Absolute adjacent channel leakage ratio (ALCR) limits for BS Type 1-O (see 3GPP TS 38.141-2 Table 6.7.3.5.1-2 and Table C.1-1)	Per 9.7.3, TS 38.104	ACLR: 1.0 dB, f ≤ 3.0GHz 1.2 dB, 3.0GHz < f ≤ 4.2GHz 1.2 dB, 4.2GHz < f ≤ 6.0GHz Absolute ACLR: 0 dB	Formula: (1) ACLR limit - TT (2) Absolute ACLR limit +TT
Unwanted emission of operating frequency band (radiation test) Table 23, Table 24, Table 25, Table 26, Table 27, Table 28, Table 29Table 30, Table 31	Per 9.7.4, TS 38.104	Offset frequency Δf < 10MHz 1.8 dB, f ≤ 3.0GHz 2 dB, 3.0GHz < f ≤ 4.2GHz 2 dB, 4.2GHz < f ≤ 6.0GHz Offset frequency Δf ≥ 10MHz 0 dB	Formula: Limit + TT
Table 36 General OTA BS transmitter spurious emission limits (BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.5.2.5.1-1 and Table C.1-1)	Per 9.7.5.2.2, TS 38.104	0 dB	Formula: Limit + TT
Table 37 BS spurious emissions test limits for BS for co-existence with systems operating in other frequency bands (BS Type 1-O) (see 3GPP TS 38.141-2 Table 6.7.5.4.5-1 and Table C.1-1)	Per 9.7.5.2.4, TS 38.104	2.6 dB, f ≤ 3 GHz 3.0 dB, 3 GHz < f ≤ 4.2 GHz 3.5 dB, 4.2 GHz < f ≤ 6 GHz	Formula: Limit + TT

Table **43 FR2 radiation test tolerance (see 3GPP TS 38.141-2** Table C.1-2)

Tests to be performed	Minimum test requirements in TS 38.104	Test tolerance (TT_{OTA})	Test requirements
6.2.2.1.1.3 (TRP test for Type 2-O base	Per 9.3, TS 38.104	2.1 dB, 24.25GHz < f ≤ 29.5GHz	Formula: Upper limit + TT,

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

station)			Lower limit – TT
Table 11 Adjacent channel leakage ratio (ALCR) limits for BS Type 2-O (see 3GPP TS 38.141-2 Table 6.7.3.5.2-1 and Table C.1-2) or Table 12 Adjacent channel leakage ratio (ALCR) absolute limit for BS Type 2-O (see 3GPP TS 38.141-2 Table 6.7.3.5.2-2 and Table C.1-2)	Per 9.7.3, TS 38.104	ACLR: 2.3 dB, 24.25GHz < f ≤ 29.5GHz Absolute ACLR: 2.7 dB, 24.25GHz < f ≤ 29.5GHz	Formula: (1) ACLR limit - TT (2) Absolute ACLR limit +TT
Table 32 Operating band unwanted emission limits (BS Type 2-O) (see 3GPP TS 38.141-2 Table 6.7.4.5.2.2-1 and Table C.1-2)	Per 9.7.4, TS 38.104	0 MHz ≦ $\Delta f < 0.1 \times BW_{contiguous}$ 2.7 dB, 24.25GHz < f ≦ 29.5GHz 2.7 dB, 37GHz < f ≦ 40GHz $0.1 \times BW_{contiguous} \leqq \Delta f < \Delta f_{max}$ 0 dB	Formula: Limit + TT
Table 39 BS radiated Tx spurious emission limits (BS Type 2-O) (see 3GPP TS 38.104 Table 9.7.5.3.2.2-1 and TS 38.141-2 Table C.1-2)	Per 9.7.5.3.2, TS 38.104	0 dB	Formula: Limit + TT

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Table 44 Limit of Transmission Output Power

Equipment	Limit Value
Base Station	Rated output power of equipment
Repeater	Downlink(DL): Rated output power of equipment (Emission power transfer to cellular phone) Uplink(UL): ≤ 31 dBm(Emission power transfer to base station)
Micro Base Station	≤ 39 dBm
Pico Cell	≤ 31 dBm
Femto Cell	≤ 20 dBm

Table 45 : Limit Values of Spectrum Emission Mask

Maximum Output Power, P	Frequency offset of measurement filter-3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
P ≧43 dBm	2.5≦Δf < 2.7 MHz	2.515 MHz≦f_offset < 2.715 MHz	-14 dBm	30 kHz
	2.7≦Δf < 3.5 MHz	2.715 MHz≦f_offset < 3.515 MHz	- 14-15·（f_offset-2.715）dBm	30 kHz
		3.515 MHz ≦f_offset < 4.0 MHz	-26 dBm	30 kHz
	3.5≦Δf≦Δf_{max} MHz	4.0 MHz≦f_offset < f_offset_{max}	-13 dBm	1 MHz
39 ≦P < 43 dBm	2.5≦Δf < 2.7 MHz	2.515 MHz≦f_offset < 2.715 MHz	-14 dBm	30 kHz
	2.7≦Δf < 3.5 MHz	2.715 MHz≦f_offset < 3.515 MHz	- 14-15·（f_offset-2.715）dBm	30 kHz
		3.515 MHz≦f_offset < 4.0 MHz	-26 dBm	30 kHz
	3.5≦Δf < 7.5 MHz	4.0 MHz≦f_offset < 8.0 MHz	-13 dBm	1 MHz
	7.5≦Δf≦Δf_{max} MHz	8.0MHz≦f_offset < f_offset_{max}	P - 56 dBm	1 MHz
31 ≦P < 39 dBm	2.5≦Δf < 2.7 MHz	2.515 MHz≦f_offset < 2.715 MHz	P - 53 dBm	30 kHz
	2.7≦Δf < 3.5 MHz	2.715 MHz≦f_offset < 3.515 MHz	P - 53-15·（f_offset- 2.715）dBm	30 kHz
		3.515 MHz≦f_offset < 4.0 MHz	P - 65 dBm	30 kHz
	3.5≦Δf < 7.5 MHz	4.0 MHz≦f_offset < 8.0 MHz	P - 52 dBm	1 MHz
	7.5≦Δf≦Δf_{max} MHz	8.0MHz≦f_offset < f_offset_{max}	P - 56 dBm	1 MHz
P < 31 dBm	2.5≦Δf < 2.7 MHz	2.515 MHz≦f_offset < 2.715 MHz	-22 dBm	30 kHz
	2.7≦Δf < 3.5 MHz	2.715 MHz≦f_offset < 3.515 MHz	-22 -15·（ f_offset - 2.715）dBm	30 kHz
		3.515 MHz≦f_offset < 4.0 MHz	-34 dBm	30 kHz
	3.5≦Δf < 7.5 MHz	4.0 MHz≦f_offset < 8.0 MHz	-21 dBm	1 MHz
	7.5≦Δf≦Δf_{max} MHz	8.0MHz≦f_offset < f_offset_{max}	-25 dBm	1 MHz

Table 46 : Spurious Emissions Limit Values of Base station and Femtocell Access Point Radio Frequency Equipment

Category	Band	Maximum level	Measurement bandwidth
Category A	9kHz – 150kHz	-13 dBm	1 kHz
	150kHz – 30MHz		10 kHz

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

		30MHz – 1GHz		100 kHz
		1GHz – 12.75 GHz		1 MHz
Category B	Band 1 Band 3 Band 7	9kHz ↔ 150kHz	- 36 dBm	1 kHz
		150kHz ↔ 30MHz	- 36 dBm	10 kHz
		30MHz ↔ 1GHz	-36 dBm	100 kHz
		1GHz ↔F_{low}-10MHz	-30 dBm	1 MHz
		F_{low}-10MHz ↔ F_{high}+10MHz	-15 dBm	1 MHz
		F_{high}+10MHz ↔12.75GHz	-30 dBm	1 MHz
	Band 8	9kHz ↔ 150kHz	-36 dBm	1 kHz
		150kHz ↔ 30MHz	-36 dBm	10 kHz
		30MHz ↔F_{low}-10MHz	-36 dBm	100 kHz
		F_{low}-10MHz ↔ F_{high}+10MHz	-16 dBm	100 kHz
		F_{high}+10MHz ↔1GHz	-36 dBm	100 kHz
		1GHz ↔12.75GHz	-30 dBm	1 MHz

Note: F_{low} is the lowest downlink frequency of the operating band ; F_{high} is the highest downlink frequency of operating band.

Table 47 : Extra Spurious Emissions Limit Values of Femtocell Access Point Radio Frequency Equipment

Maximum Output Power, P	Frequency offset of measurement filter-3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
6≦P≦20 dBm	12.5≦Δf≦Δfmax MHz	13MHz ≤ f_offset < f_offset_{max}	P – 56dBm	1 MHz
P<6 dBm	12.5≦Δf≦Δfmax MHz	13MHz ≤ f_offset < f_offset_{max}	-50 dBm	1 MHz

Table 48 : Test Parameters for Output Power for Adjacent Channel Protection of Femtocell Access Point Radio Frequency Equipment

Testing Environment	CPICH $\hat{E}c$（dBm）	Ioh（dBm）
1	-80	-50
2	-90	-60
3	-100	-70
4	-100	-50

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Note：CPICH $\hat{E}c$ 及 Ioh are according to ETSI EN 301 908-3. CPICH $\hat{E}c$: the code power of adjacent channel's common pilot channel. Ioh : received power density including the signal and interferences; however, the signal of the object to be measured is excluded

Table 49 : Limit Values for Output Power for Adjacent Channel Protection of Femtocell Access Point Radio Frequency Equipment

Input Conditions	Output Power
Ioh > CPICH $\hat{E}c$ +43dB and CPICH $\hat{E}c$ ≧-105dBm	≦+10dBm
Ioh ≦ CPICH $\hat{E}c$ +43dB and CPICH $\hat{E}c$ ≧-105dBm	≦ max（8 dBm, min（20dBm, CPICH $\hat{E}c$ +100dB））

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Table 50 : Spurious Emissions Limit Values of Repeater Radio Frequency Equipment

Category	Band	Maximum level	Measurement bandwidth
Category A	9kHz – 150kHz	-13 dBm	1 kHz
	150kHz – 30MHz		10 kHz
	30MHz – 1GHz		100 kHz
	1GHz – 12.75 GHz		1 MHz
Category B	9kHz – 150kHz	-36 dBm	1 kHz
	150kHz – 30MHz	-36 dBm	10 kHz
	30MHz – 1GHz	-36 dBm	100 kHz
	1GHz – 12.75 GHz	-30 dBm	1 MHz

Table 51 : Input Intermodulation Limit Values of Repeater Radio Frequency Equipment

f_offset	Interfering signal levels	Type of signals	Measurement bandwidth
3.5 MHz	-40 dBm	2 CW carriers	1 MHz

Note: f_offset is the distance between the centre frequency of first or last channel in the pass band and the interfering signals.

Table 52 : Input Intermodulation Requirement for Interfering Signals in Other Systems of Repeater Radio Frequency Equipment

Co-located other systems	Frequency of interfering signals	Interfering signal levels	Type of signals	Measurement bandwidth
GSM900	921 - 960 MHz	16 dBm	2 CW carriers	1 MHz
DCS1800	1805 - 1880 MHz	16 dBm	2 CW carriers	1 MHz
UTRA-FDD or E-UTRA FDD	2110 - 2170 MHz	16 dBm	2 CW carriers	1 MHz
UTRA-FDD or E-UTRA FDD	1805 - 1880 MHz	16 dBm	2 CW carriers	1 MHz
UTRA-FDD or E-UTRA FDD	2620 - 2690 MHz	16 dBm	2 CW carriers	1 MHz
UTRA-FDD or E-UTRA FDD	925 - 960 MHz	16 dBm	2 CW carriers	1 MHz
E-UTRA	758 - 803 MHz	16 dBm	2 CW carriers	1 MHz

Table 53 : Out of band gain limit values of Repeater Radio Frequency Equipment

f_offset	Out of band gain

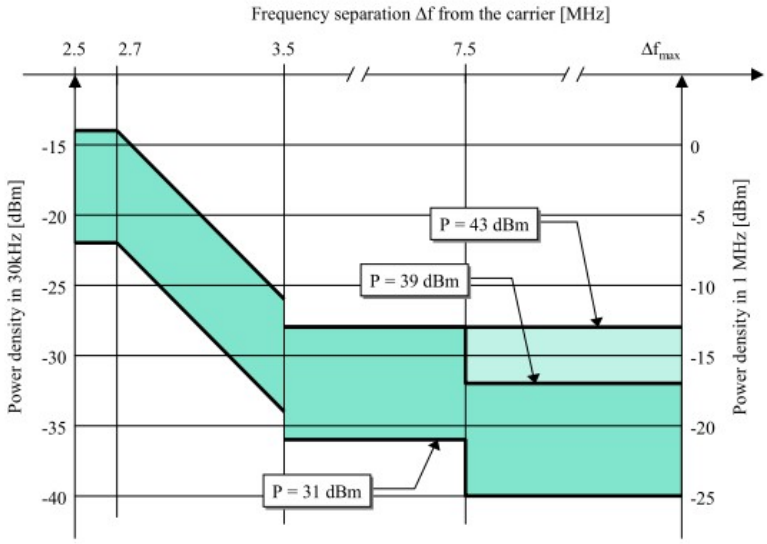
*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

	limit value
2.7 ≦ f_offset < 3.5 MHz	60 dB
3.5 ≦ f_offset < 7.5 MHz	45 dB
7.5 ≦ f_offset < 12.5 MHz	45 dB
12.5 MHz ≦ f_offset	35 dB

Note: f_offset is the distance between the centre frequency of first or last channel in the pass band and the interfering signals.

*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.

Figure 1 : Spectrum Emission Mask



*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.