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| **Radiocommunication Study Groups** |  |
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| Received: 1 June 2010 | **Document 5D/744-E** |
| **2 June 2010** |
| **English only**  **TECHNOLOGY ASPECTS** |
| WiMAX Forum | |
| revisions of Recommendations itu-r m.1580-3 and itu-r m.1581-3 | |
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# **1 Introduction**

At the seventh meeting of WP 5D, the detailed work plan on Recommendations ITU-R M.1580 and ITU-R M.1581 has been reviewed and the proposed alignment of the deadline of revisions of Recommendations ITU-R M.1580-3 and ITU-R M.1581-3 with the planned deadline of revision of Recommendation ITU-R M.1457-9 for the eighth meeting of WP 5D was confirmed.

At the seventh meeting of WP 5D, Document [5D/636](http://www.itu.int/md/R07-WP5D-C-0636/en) was also agreed to incorporate the proposed changes in the initial version of the working document towards revisions of Recommendations ITU‑R M.1580-3 and ITU-R M.1581-3. Note that the WiMAX Forum proposed in Document 5D/636 that WP 5D incorporate the material provided in Documents [5D/452](http://www.itu.int/md/R07-WP5D-C-0452/en) and [5D/556](http://www.itu.int/md/R07-WP5D-C-0556/en) in the development of the working document towards revisions of Recommendations ITU-R M.1580-3 and ITU-R M.1581-3.

This contribution, which includes the changes proposed in Documents 5D/452 and 5D/556, is provided to the eighth meeting of WP 5D covering unwanted emissions information for all frequency bands included in its latest version of the WiMAX Forum Mobile Radio Specifications with the aim of aligning Recommendations ITU-R M.1580 and ITU-R M.1581 with the contents of Recommendation ITU-R M.1457.

# **2 Emission characteristics**

The WiMAX Forum has updated the draft revisions of Recommendations ITU-R M.1580 and ITU‑R M.1581 Annexes 6 with information for all frequency bands included in its latest version of the WiMAX Forum Mobile Radio Specifications.

The relevant material is provided in Attachments 1 and 2.

# **3 Changes to the bodies of Recommendations ITU-R M.1580 and ITU-R M.1581**

The WiMAX Forum proposes that the bullet points of Note 5 in each Recommendation be replaced with the table shown in Attachment 3.

Attachment 1

Proposed modifications to Recommendation ITU-R M.1580-3

Annex 6  
  
IMT‑2000 OFDMA TDD WMAN base stations

# 1 Introduction

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

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

# 2 Spectrum emission mask

## 2.1 Default spectrum emission mask

The spectrum masks of Table X1 and Table X2 are applicable to all bands and all regions unless specific mask for a band or a region is specified in a relevant sub section of Section 2.

TABLE X1

**Spectrum emission mask for 5 MHz carrier**

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to <7.5 | 100 | -7-7(*∆f*-2.55)/5 |
| 7.5 to ≤12.5 | 100 | -14 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 100 kHz filter is at *Δf* equals to 2.550 MHz; the last is at *Δf* equals to 12.450 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

TABLE X2

**Spectrum emission mask for 10 MHz carrier**

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to <10 | 100 | -7-7*(∆f-*5.05)/5 |
| 10 to <15 | 100 | -14 |
| 15 to ≤25 | 1000 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 100 kHz filter is at Δf equals to 5.05 MHz; the last is at *Δf* equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at *Δf* equals to 15.5 MHz; the last is at *Δf* equals to 24.5 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

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

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

TABLE 1

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission level | Measurement bandwidth |
| 2.5 ≤ Δ*f*  3.5 MHz | −13 dBm | 50 kHz |
| 3.5 ≤ Δ*f* < 12.5 MHz | −13 dBm | 1 MHz |

TABLE 2

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission level | Measurement bandwidth |
| 5 ≤ Δ*f*  6 MHz | −13 dBm | 100 kHz |
| 6 ≤ Δ*f* < 25 MHz | −13 dBm | 1 MHz |

TABLE 3

Spectrum emission mask for 8.75 MHz carrier

(a) Ptx ≥ 40 dBm

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission | Measurement bandwidth |
| 4.77 ≤ Δ*f*  22.5 MHz | –56.9 dBc | 100 kHz |
| Δ*f*  > 22.5 MHz | −13 dBm | 1 MHz |

(b) 29 dBm ≤Ptx < 40 dBm

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission | Measurement bandwidth |
| 4.77 ≤ Δ*f*  22.5 MHz | –53.9 dBc | 100 kHz |
| Δ*f*  > 22.5 MHz | −13 dBm | 1 MHz |

(c) Ptx < 29 dBm

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission | Measurement bandwidth |
| 4.77 ≤ Δ*f*  22.5 MHz | –14.5 dBm | 1MHz |
| Δ*f*  > 22.5 MHz | −13 dBm | 1 MHz |

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

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

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

TABLE 4

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission level | Measurement bandwidth |
| 2.5 ≤ Δ*f*  3.5 MHz | −13 dBm | 50 kHz |
| 3.5 ≤ Δ*f* < 12.5 MHz | −13 dBm | 1 MHz |

TABLE 5

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission level | Measurement bandwidth |
| 5 ≤ Δ*f*  6 MHz | −13 dBm | 100 kHz |
| 6 ≤ Δ*f* < 25 MHz | −13 dBm | 1 MHz |

TABLE 6

Adjacent channel leakage power – Japan

|  |  |  |
| --- | --- | --- |
| **Channel size** | **Measurement frequency range   (MHz)** | **Allowed adjacent channel leakage power (dBm)** |
| 5 MHz | 2.6 < Δ*f* < 7.4 | 7 |
| 10 MHz | 5.25 < Δ*f* < 14.75 | 3 |

TABLE 7

Spectrum emission mask for 5 MHz carrier – Japan

|  |  |  |
| --- | --- | --- |
| **Frequency offset from centre** | **Allowed emission level** | **Measurement bandwidth** |
| 7.5 MHz ≤ Δf < 12.25 | −15−1.4 × (Δ*f* −7.5) dBm | 1 MHz |
| 12.25 ≤ Δf < 22.5 MHz | −22 dBm | 1 MHz |
| NOTE – The adjacent channel leakage power for the 5 MHz channel from 2.6 MHz to 7.4 MHz is shown in Table 6. | | |

TABLE 8

Spectrum emission mask for 10 MHz carrier – Japan

|  |  |  |
| --- | --- | --- |
| **Frequency offset from centre** | **Allowed emission level** | **Measurement bandwidth** |
| 15 ≤ Δf < 25 MHz | −22 dBm | 1 MHz |
| NOTE – The adjacent channel leakage power for the 10 MHz channel from 5.25 MHz to 14.75 MHz is shown in Table 6. | | |

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

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

TABLE X1

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| Offset Δf from channel center (MHz) | Integration Bandwidth (kHz) | Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port |
| 2.5 to < 3.5 | 50 | −13 |
| 3.5 to ≤ 12.5 | 1000 | −13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 50 kHz filter is at Δf equals to 2.525 MHz; the last is at *Δf* equals to 3.475 MHz. The first measurement position with a 1 MHz filter is at *Δf* equals to 4.0 MHz; the last is at *Δf* equals to 12.0 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

TABLE X2

**Spectrum emission mask for 10 MHz carrier**

|  |  |  |
| --- | --- | --- |
| Offset Δf from channel center (MHz) | Integration Bandwidth (kHz) | Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port |
| 5 to < 6 | 100 | −13 |
| 6 to ≤ 25 | 1000 | −13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 100 kHz filter is at Δf equals to 5.050 MHz; the last is at *Δf* equals to 5.950 MHz. The first measurement position with a 1 MHz filter is at *Δf* equals to 6.5 MHz; the last is at *Δf* equals to 24.5 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

TABLE X3

**Spectrum emission mask for 5 MHz carrier - Europe**

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to <7.5 | 100 | -7-7(*∆f*-2.55)/5 |
| 7.5 to ≤12.5 | 100 | -14 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 100 kHz filter is at *Δf* equals to 2.550 MHz; the last is at *Δf* equals to 12.450 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

TABLE X4

**Spectrum emission mask for 10 MHz carrier – Europe**

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to <10 | 100 | -7-7*(∆f-*5.05)/5 |
| 10 to <15 | 100 | -14 |
| 15 to ≤25 | 1000 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 100 kHz filter is at Δf equals to 5.05 MHz; the last is at *Δf* equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at *Δf* equals to 15.5 MHz; the last is at *Δf* equals to 24.5 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

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

The Spectrum Emission Mask for 5, 7 and 10 MHz bandwidth sizes are specified in **Error! Reference source not found.** and. **Error! Reference source not found.** specifies breakpoints of the underlying piecewise linear power spectral density mask, as shown in Figure x1. This mask is a relative mask and conditionally applicable depending on the base station *Pnom* power level. specifies the emission levels of an underlying piecewise step function appliable conditionally only to some of *Pnom* power levels.



Figure x1

Transmit spectral power density mask

Table x1

Relative Transmit Spectral Power Density Mask

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Power** | **Frequency Offset** | | | | |
| **0.5\*BW** | **0.71\*BW** | **1.06\*BW** | **2.0\*BW** | **2.5\*BW** |
| 39 dBm < Pnom | -20 dB | -27 dB | -32 dB | -50dB | -50dB |
| 33 dBm < Pnom ≤****39 dBm | -20 dB | -27 dB | -32 dB | -50 dB + (39 dBm - Pnom) | Refer to **Error! Reference source not found.** |

Table x2

Absolute Spectral Emission Mask

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Power** | **Frequency Offset** | | | |
| **0.50 BW ≤ Δ*f*  0.71 BW** | **0.71 BW ≤ Δ*f*  1.06 BW** | **1.06 BW ≤ Δ*f*  2.00 BW** | **2.00 BW ≤ Δ*f* ≤ 2.50 BW** |
| 33 dBm **** Pnom  ≤ 39 dBm | Refer to **Error! Reference source not found.** | Refer to **Error! Reference source not found.** | Refer to **Error! Reference source not found.** | -21 + *x* dBm/MHz |
| Pnom  ≤ 33 dBm | -5.5 dBm/MHz | -5.5 dBm/MHz | -23.5 dBm/MHz | -23.5 dBm/MHz |

Notes:

1. In, *x* = -10 log(BW/10)
2. BW: Channel bandwidth in MHz
3. Pnom: Transmitter nominal maximum output power

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

The Spectrum Emission Mask for 5, 7 and 10 MHz bandwidth sizes are specified in **Error! Reference source not found.**. Table X2 specifies breakpoints of the underlying piecewise linear power spectral density mask, as shown in Figure X1. This mask is a relative mask and conditionally applicable depending on the base station *Pnom* power level. specifies the emission levels of an underlying piecewise step function appliable conditionally only to some of *Pnom* power levels.

TableX1

Relative spectrum emission mask

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Power** | **Frequency Offset** | | | | |
| **0.5\*BW** | **0.71\*BW** | **1.06\*BW** | **2.0\*BW** | **2.5\*BW** |
| 39 dBm **** Pnom | -20 dB | -27 dB | -32 dB | -50dB | -50dB |
| 33 dBm **** Pnom ≤****39 dBm | -20 dB | -27 dB | -32 dB | -50 dB + (39 dBm - Pnom) | Refer to **Error! Reference source not found.** |

Table X3

Absolute Spectral Emission

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Power** | **Frequency Offset** | | | |
| **0.50 BW ≤ Δ*f*  0.71 BW** | **0.71 BW ≤ Δ*f*  1.06 BW** | **1.06 BW ≤ Δ*f*  2.00 BW** | **2.00 BW ≤ Δ*f* ≤ 2.50 BW** |
| 33 dBm **** Pnom  ≤ 39 dBm | Refer to **Error! Reference source not found.** | Refer to **Error! Reference source not found.** | Refer to **Error! Reference source not found.** | -21 + *x* dBm/MHz |
| Pnom  ≤ 33 dBm | -5.5 dBm/MHz | -5.5 dBm/MHz | -23.5 dBm/MHz | -23.5 dBm/MHz |

Notes:

1. In, *x* = -10 log(BW/10)
2. BW: Channel bandwidth in MHz
3. Pnom: Transmitter nominal maximum output power

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

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

Table X1 and Table X2 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission level | Measurement bandwidth |
| 2.5 ≤ Δ*f*  3.5 MHz | −13 dBm | 50 kHz |
| 3.5 ≤ Δ*f* < 12.5 MHz | −13 dBm | 1 MHz |

TABLE X2

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission level | Measurement bandwidth |
| 5 ≤ Δ*f*  6 MHz | −13 dBm | 100 kHz |
| 6 ≤ Δ*f* < 25 MHz | −13 dBm | 1 MHz |

NOTES:

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

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

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

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

Table X3 and Table X4 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE X3

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission level | Measurement bandwidth |
| 2.5 ≤ Δ*f*  7.5 MHz | –7.0-7/5×(∆f-2.55) dBm | 100 kHz |
| 7.5 ≤ Δ*f* < 12.5 MHz | −14 dBm | 100 kHz |

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

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

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

TABLE X4

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| Frequency offset from centre | Allowed emission level | Measurement bandwidth |
| 5 ≤ Δ*f*  6 MHz | –7.0-7/5×(∆f-5.05) dBm | 100 kHz |
| 10 ≤ Δ*f* < 15 MHz | −14 dBm | 100 kHz |
| 15 ≤ Δ*f* < 25 MHz | −13 dBm | 1 MHz |

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

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

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

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

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

Table X1 and Table X2 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset** Δ**f from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.515 to <2.715 | 30 | -14 |
| 2.715 to <3.515 | 30 | -14-15(*∆f*-2.715) |
| 3.515 to <4.0 | 30 | -26 |
| 4.0 to ≤12.5 | 1000 | -13 |

TABLE X2

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset** Δ**f from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.015 to <5.215 | 30 | -14 |
| 5.215 to <6.015 | 30 | -14-15(*∆f*-52.2715) |
| 6.015 to <6.5 | 30 | -26 |
| 6.5 to <15.50 | 1000 | -13 |
| 15.50 to ≤25.0 | 1000 | -15 |

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

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

Table X1, Table X2, Table X3, Table Y1, Table Y2 and Table Y3 specify the spectrum emissions for TDD base stations with 5, 7 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to < 2.6 | 30 | -13 |
| 2.6 to ≤12.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE X2

Spectrum emission mask for 7 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 3.5 to < 3.6 | 30 | -13 |
| 3.6 to ≤17.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE X3

Spectrum emission mask for 10 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to < 5.1 | 30 | -13 |
| 5.1 to ≤ 25.0 | 100 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

TABLE Y1

Spectrum emission mask for 5 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to <7.5 | 100 | -7-7(*∆f*-2.55)/5 |
| 7.5 to ≤12.5 | 100 | -14 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE Y2

Spectrum emission mask for 7 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 3.5 to <7 | 100 | -7-7*(∆f-*5.05)/5 |
| 7 to <10.5 | 100 | -14 |
| 10.5 to ≤17.5 | 1000 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE Y3

Spectrum emission mask for 10 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to <10 | 100 | -7-7*(∆f-*5.05)/5 |
| 10 to <15 | 100 | -14 |
| 15 to ≤25 | 1000 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

## 2.11 Spectrum emission mask for FDD equipment operating in the band 776-787 / 746-757 MHz (BCG 7.B)

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

Table X1, Table X2, Table Y1 and Table Y2 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to < 2.6 | 30 | -13 |
| 2.6 to ≤12.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE X2

Spectrum emission mask for 10 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to < 5.1 | 30 | -13 |
| 5.1 to ≤ 25.0 | 100 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

TABLE Y1

Spectrum emission mask for 5 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to <7.5 | 100 | -7-7(*∆f*-2.55)/5 |
| 7.5 to ≤12.5 | 100 | -14 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE Y2

Spectrum emission mask for 10 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to <10 | 100 | -7-7*(∆f-*5.05)/5 |
| 10 to <15 | 100 | -14 |
| 15 to ≤25 | 1000 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

## 2.12 Spectrum emission mask for FDD equipment operating in the band 788-793 / 758-763 and 793-798 / 763-768 MHz (BCG 7.C)

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

Table X1and Table Y1 specify the spectrum emissions for FDD base stations with 5 channel bandwidth.

TABLE X1

Spectrum emission mask for 5 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to < 2.6 | 30 | -13 |
| 2.6 to ≤12.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE Y1

Spectrum emission mask for 5 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to <7.5 | 100 | -7-7(*∆f*-2.55)/5 |
| 7.5 to ≤12.5 | 100 | -14 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

## 2.13 Spectrum emission mask for FDD equipment operating in the band 788-798 / 758-768 MHz (BCG 7.D)

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

Table X1and Table Y1 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 10 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to < 5.1 | 30 | -13 |
| 5.1 to ≤ 25.0 | 100 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

TABLE Y1

Spectrum emission mask for 10 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to <10 | 100 | -7-7*(∆f-*5.05)/5 |
| 10 to <15 | 100 | -14 |
| 15 to ≤25 | 1000 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

## 2.14 Spectrum emission mask for TDDand FDD equipment operating in the band 698-862 MHz (BCG 7.E)

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

Table X1, Table X2, Table X3, Table Y1, Table Y2 and Table Y3 specify the spectrum emissions for TDD base stations with 5, 7 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to < 2.6 | 30 | -13 |
| 2.6 to ≤12.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE X2

Spectrum emission mask for 7 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 3.5 to < 3.6 | 30 | -13 |
| 3.6 to ≤17.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE X3

Spectrum emission mask for 10 MHz carrier-US

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to < 5.1 | 30 | -13 |
| 5.1 to ≤ 25.0 | 100 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

TABLE Y1

Spectrum emission mask for 5 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to <7.5 | 100 | -7-7(*∆f*-2.55)/5 |
| 7.5 to ≤12.5 | 100 | -14 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE Y2

Spectrum emission mask for 7 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 3.5 to <7 | 100 | -7-7*(∆f-*5.05)/5 |
| 7 to <10.5 | 100 | -14 |
| 10.5 to ≤17.5 | 1000 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE Y3

Spectrum emission mask for 10 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to <10 | 100 | -7-7*(∆f-*5.05)/5 |
| 10 to <15 | 100 | -14 |
| 15 to ≤25 | 1000 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

## 2.15 Spectrum emission mask for FDD equipment operating in the band 880-915 / 925-960MHz (BCG 7.G)

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

Table X1 and Table X2 specify the spectrum emissions for FDD base stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset f from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.515 to <2.715 | 30 | -14 |
| 2.715 to <3.515 | 30 | -14-15(*∆f*-2.715) |
| 3.515 to <4.0 | 30 | -26 |
| 4.0 to 12.5 | 1000 | -13 |

TABLE X2

Spectrum emission mask for 10 MHz carrier-Europe

|  |  |  |
| --- | --- | --- |
| **Offset f from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.015 to <5.215 | 30 | -14 |
| 5.215 to <6.015 | 30 | -14-15(*∆f*-52.2715) |
| 6.015 to <6.5 | 30 | -26 |
| 6.5 to <15.50 | 1000 | -13 |
| 15.50 to 25.0 | 1000 | -15 |

# 3 Transmitter spurious emissions (conducted)

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

## 3.1 Default spurious emissions

Unless otherwise specified in sub sections of Section 3 for specific bands, the default spurious emission specifications of Table X1 are applicable.

Table X1

Default spurious emission

|  |  |  |
| --- | --- | --- |
| Spurious frequency (*f*) range | Measurement bandwidth | Maximum Emission Level (dBm) |
| 9 kHz ≤ *f* < 150 kHz | 1 kHz | -36 |
| 150 kHz ≤ *f* < 30 MHz | 10 kHz | -36 |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | -36 |
| 1 GHz ≤ *f* < 5 x Fue | 30 kHz If 2.5xChBW <= ∆*f* < 10xChBW  300 kHz If 10xChBW <= ∆*f* < 12xChBW  1 MHz If 12xChBW <= ∆*f* | -30 |

### 3.2 Spurious emission for TDD equipment operating in the band 2 300-2 400 MHz (BCG 1.A/1.B)

The limits shown in Tables 9 and 10 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and greater than 25 MHz for the 10 MHz carrier. *f* is the frequency of the spurious domain emissions. *fc* is the base station centre frequency.

TABLE 9

Base station spurious emission limit, Category A

|  |  |  |  |
| --- | --- | --- | --- |
| Band | Allowed emission level | Measurement bandwidth | Note |
| 30 MHz – 1 GHz | −13 dBm | 100 kHz | Bandwidth as in Recommendation ITU‑R SM.329-10, § 4.1 |
| 1-13.45 GHz | 1 MHz | Upper frequency as in Recommendation ITU‑R SM.329-10, § 2.5, Table 1 |

TABLE 10

Base station spurious emissions limit, Category B

|  |  |  |
| --- | --- | --- |
| Band | Measurement bandwidth | Allowed emission level |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | –36 dBm |
| 1 GHz ≤ *f* < 13.45 GHz | 30 kHz If 2.5 × *BW* <= | *fc* − *f* | < 10 × *BW*  300 kHz If 10 × *BW* <= | *fc* − *f* | < 12 × *BW*  1 MHz If 12 × BW <= | *fc* − *f* | | –30 dBm |

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

For a channel bandwidth of 8.75 MHz, Table 9 applies.

### 3.3 Spurious emission for TDD equipment operating in the band 2 500-2 690 MHz (BCG 3.A)

The limits shown in Tables 11 and 12 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and greater than 25 MHz for the 10 MHz carrier. f is the frequency of the spurious domain emissions. fc is the base station centre frequency.

The emission levels in Table 11 should be met in areas where Category A limits for spurious emissions, as defined in Recommendation ITU-R SM.329-10, are applicable. The emission levels in Table 12 should be met in areas where Category B limits for spurious emissions, as defined in Recommendation ITU-R SM.329-10, are applicable.

TABLE 11

Base station spurious emission limit, Category A

|  |  |  |  |
| --- | --- | --- | --- |
| **Band** | **Allowed emission level** | **Measurement bandwidth** | **Note** |
| 30 MHz – 1 GHz | −13 dBm | 100 kHz | Bandwidth as in Recommendation ITU‑R SM.329-10, § 4.1 |
| 1-13.45 GHz | 1 MHz | Upper frequency as in Recommendation ITU‑R SM.329-10, § 2.5, Table 1 |

TABLE 12

Base station spurious emissions limit, Category B

|  |  |  |
| --- | --- | --- |
| **Band** | **Measurement bandwidth** | **Allowed emission level** |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | –36 dBm |
| 1 GHz ≤ *f* < 13.45 GHz | 30 kHz If 2.5 × BW <= | *fc − f* | < 10 × BW  300 kHz If 10 × BW <= | *fc − f* |  < 12 × BW  1 MHz If 12 × BW <= | *fc − f* | | –30 dBm |

NOTE – In Table 12, BW is the signal channel bandwidth of 5 or 10 MHz.

TABLE 13

Base station spurious emission limit, Japan

|  |  |  |
| --- | --- | --- |
| **Frequency bandwidth** | **Measurement bandwidth** | **Allowed emission level (dBm)** |
| 9 kHz ≤ *f* < 150 kHz | 1 kHz | −13 |
| 150 kHz ≤ *f* < 30 MHz | 10 kHz | −13 |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | −13 |
| 1 000 MHz ≤ *f* < 2 505 MHz | 1 MHz | −13 |
| 2 505 MHz ≤ *f* < 2 535 MHz | 1 MHz | −42 |
| 2 535 MHz ≤ *f* < 2 630 MHz | 1 MHz | −13(1) |
| 2 630 MHz ≤ *f* < 2 634.75 MHz | 1 MHz | −15 − 7/5 × (*f* −2 629.75) |
| 2 634.75 MHz ≤ *f* < 2 655 MHz | 1 MHz | −22 |
| 2 655 MHz ≤ *f* | 1 MHz | −13 |
| (1) The allowed emission level for the frequency band between 2 535 MHz and 2 630 MHz shall be applied for the frequency range greater than 2.5 times the channel size from the centre frequency. | | |

### 3.4 Spurious emission for FDD equipment operating in the band 2 496-2 572 / 2 614-2 690 MHz (BCG 3.B)

Spurious emission limits are applicable to frequency offset which are greater than 250% of the channel bandwidth. Therefore the limits shown in Tables X1 to Table X6 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier, greater than 17.5 MHz away from the base station centre frequency for the 7 MHz carrier, and greater than 25 MHz for the 10 MHz carrier. *f* is the frequency of the spurious domain emissions. *fc* is the base station centre frequency.

In all of the following tables, measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included here.

TABLE X1

Base station spurious emission limit for 5 MHz carrier- US; Relevant to 2616.5 ≤ *fc* ≤ 2687.5

|  |  |  |
| --- | --- | --- |
| Measurement frequency range | Measurement bandwidth (MHz) | Maximum Emission Level (dBm) |
| 30 MHz < *f* < 13.450 GHz, 12.5 MHz ≤ *∆f* | 1 | -13 |

TABLE X2

Base station spurious emission limit for 10 MHz carrier- US; Relevant to 2619 ≤ *fc* ≤ 2685

|  |  |  |
| --- | --- | --- |
| Measurement frequency range | Measurement bandwidth (MHz) | Maximum Emission Level (dBm) |
| 30 MHz < *f* < 13.450 GHz, 25 MHz ≤ *∆f* | 1 | -13 |

TABLE X3

Base station spurious emission limit for 5 MHz carrier- Europe; Relevant to 2616.5 ≤ *fc* ≤ 2687.5

|  |  |  |
| --- | --- | --- |
| Spurious frequency (*f*) range | Measurement bandwidth | Maximum Emission Level (dBm) |
| 9 kHz ≤ *f* < 150 kHz | 1 kHz | -36 |
| 150 kHz ≤ *f* < 30 MHz | 10 kHz | -36 |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | -36 |
| 1 GHz ≤ *f* < 13450 MHz | 30 kHz If 12.5 MHz<= *∆f* < 50 MHz  300 kHz If 50 MHz<= *∆f* < 60 Mhz  1 MHz If 60 MHz <= *∆f* | -30 |

TABLE X4

Base station spurious emission limit for 10 MHz carrier- Europe; Relevant to 2619 ≤ *fc* ≤ 2685

|  |  |  |
| --- | --- | --- |
| Spurious frequency (*f*) range | Measurement bandwidth | Maximum Emission Level (dBm) |
| 9 kHz ≤ *f* < 150 kHz | 1 kHz | -36 |
| 150 kHz ≤ *f* < 30 MHz | 10 kHz | -36 |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | -36 |
| 1 GHz ≤ *f* < 13450 MHz | 30 kHz If 25 MHz<= *∆f* < 100 MHz  300 kHz If 100 MHz<= *∆f* < 120 Mhz  1 MHz If 120 MHz <= *∆f* | -30 |

TABLE X5

Base station spurious emission limit for 5 MHz carrier- Europe; Relevant to 2616.5 ≤ *fc* ≤ 2687.5

|  |  |  |
| --- | --- | --- |
| Spurious Frequency (*f*) Range (MHz) | Measurement Bandwidth | Maximum Level |
| 2496-2572 | 100 kHz | -96 dBm |

TABLE X6

Base station spurious emission limit for 10 MHz carrier- Europe; Relevant to 2619 ≤ *fc* ≤ 2685

|  |  |  |
| --- | --- | --- |
| Spurious Frequency (*f*) Range (MHz) | Measurement Bandwidth | Maximum Level |
| 2496-2572 | 100 kHz | -96 dBm |

### 3.5 Spurious emission for TDD equipment operating in the band 3 400-3 600 MHz (BCG 5L.A/5L.B/5L.C)

Spurious emission limits are applicable to frequency offset which are greater than 250% of the channel bandwidth. Therefore the limits shown in Tables 14 and 15 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier, greater than 17.5 MHz away from the base station centre frequency for the 7 MHz carrier, and greater than 25 MHz for the 10 MHz carrier. *f* is the frequency of the spurious domain emissions. *fc* is the base station centre frequency.

TABLE 14

Base station spurious emission limit, Category A

|  |  |  |  |
| --- | --- | --- | --- |
| Band | Allowed emission level | Measurement bandwidth | Note |
| 30 MHz – 1 GHz | −13 dBm | 100 kHz | Bandwidth as in Recommendation ITU‑R SM.329-10, § 4.1 |
| 1-13.45 GHz | 1 MHz | Upper frequency as in Recommendation ITU‑R SM.329-10, § 2.5, Table 1 |

TABLE 15

Base station spurious emissions limit, Category B

|  |  |  |
| --- | --- | --- |
| Band | Measurement bandwidth | Allowed emission level |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | –36 dBm |
| 1 GHz ≤ *f* < 13.45 GHz | 30 kHz If 2.5 × *BW* <= | *fc* − *f* | < 10 × *BW*  300 kHz If 10 × *BW* <= | *fc* − *f* | < 12 × *BW*  1 MHz If 12 × BW <= | *fc* − *f* | | –30 dBm |

NOTE – In Table 15, BW is the signal channel bandwidth of 5, 7 or 10 MHz.

## 3.6 Spurious emission for TDD equipment operating in the band 3 600-3 800 MHz (BCG 5H.A/5H.B/5H.C)

Spurious emission limits are applicable to frequency offset which are greater than 250% of the channel bandwidth. Therefore the limits shown in Tables X1 and Table X2 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier, greater than 17.5 MHz away from the base station centre frequency for the 7 MHz carrier, and greater than 25 MHz for the 10 MHz carrier. *f* is the frequency of the spurious domain emissions. *fc* is the base station centre frequency.

TABLE X1

Base station spurious emission limit, Category A

|  |  |  |  |
| --- | --- | --- | --- |
| Band | Allowed emission level | Measurement bandwidth | Note |
| 30 MHz – 1 GHz | −13 dBm | 100 kHz | Bandwidth as in Recommendation ITU‑R SM.329-10, § 4.1 |
| 1-13.45 GHz | 1 MHz | Upper frequency as in Recommendation ITU‑R SM.329-10, § 2.5, Table 1 |

TABLE X2

Base station spurious emissions limit, Category B

|  |  |  |
| --- | --- | --- |
| Band | Measurement bandwidth | Allowed emission level |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | –36 dBm |
| 1 GHz ≤ *f* < 13.45 GHz | 30 kHz If 2.5 × *BW* <= | *fc* − *f* | < 10 × *BW*  300 kHz If 10 × *BW* <= | *fc* − *f* | < 12 × *BW*  1 MHz If 12 × BW <= | *fc* − *f* | | –30 dBm |

NOTE – In Table X2, BW is the signal channel bandwidth of 5, 7 or 10 MHz.

## 3.7 Spurious emission for FDD equipment operating in the band 1 710-1 770 / 2 110-2 170 MHz (BCG 6.A)

The limits shown in Tables Y1 and Y2 are only applicable for frequency offsets which are greater than 12.5 MHz away from the base station centre frequency for the 5 MHz carrier and greater than 25 MHz for the 10 MHz carrier. *f* is the frequency of the spurious domain emissions. *fc* is the base station centre frequency.

In Table Y1 and Table Y2, measurement uncertainty (as defined in Recommendation   
ITU-R M.1545) values corresponding to spurious emission limits have not been included.

TABLE Y1

Spurious emissions for 5 MHz channel size; relevant to 2 112.5 MHz <= fc <= 2 152.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 30 MHz ≤ f  10.775 GHz, 12.5 MHz <= | f | | 1 MHz | −13 |

TABLE Y2

Spurious emissions for 5 MHz channel size; relevant to 2 115 MHz <= fc <= 2 150 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 30 MHz ≤ f  10.775 GHz, 25 MHz <= | f | | 1 MHz | −13 |

## 3.8 Spurious emissions for FDD equipment operating in the band 1 920-1 980 / 2 110-2 170 MHz (BCG 6.B)

The limits shown in Tables Y3 to Y6 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Tables | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables Y3 to Y4 specify the spurious emission for FDD mobile stations with 5 and 10 MHz channel bandwidths, while Table Y5 and Table Y6 specified the additional spurious emission limits for   
5 and 10 MHz channel bandwidths.

TABLE Y3

Spurious emissions for 5 MHz channel size; relevant to 2 112.5 MHz <= fc <= 2 167.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  9.9 GHz, 12.5 <= | f | | 1 MHz | −30 |

TABLE Y4

Spurious emissions for 10 MHz channel size; relevant to 2 115 MHz <= fc <= 2 165 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f 1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz, 25 <= | f | | 1 MHz | −30 |

TABLE Y5

Additional spurious emissions for 5 MHz channel size; relevant to   
2 112.5 MHz <= fc <= 2 167.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | 921-960 MHz | 100 kHz | –57 dBm |
| 2 | 876-915 MHz | 100 kHz | –61 dBm |
| 3 | 1 805-1 880 MHz | 100 kHz | –47 dBm |
| 4 | 1 710-1 785 MHz | 100 kHz | –61 dBm |
| 5 | 1 930-1 990 MHz | 100 kHz | –47 dBm |
| 6 | 1 850-1 910 MHz | 100 kHz | –61 dBm |
| 7 | 869-894 MHz | 100 kHz | –57 dBm |
| 8 | 824-849 MHz | 100 kHz | –61 dBm |
| 9 | 1 930-1 990 MHz | 1 MHz | –52 dBm |
| 11 | 1 850-1 910 MHz | 1 MHz | –49 dBm |
| 12 | 1 805-1 880 MHz | 1 MHz | –52 dBm |
| 13 | 1 710-1 785 MHz | 1 MHz | –49 dBm |
| 14 | 2 110-2 155 MHz | 1 MHz | –52 dBm |
| 15 | 1 710-1 755 MHz | 1 MHz | –49 dBm |
| 16 | 869-894 MHz | 1 MHz | –52 dBm |
| 17 | 824-849 MHz | 1 MHz | –49 dBm |
| 18 | 860-895 MHz | 1 MHz | –52 dBm |
| 19 | 815-850 MHz | 1 MHz | –49 dBm |
| 20 | 2 620-2 690 MHz | 1 MHz | –52 dBm |
| 21 | 2 500-2 570 MHz | 1 MHz | –49 dBm |
| 22 | 925-960 MHz | 1 MHz | –52 dBm |
| 23 | 880-915 MHz | 1 MHz | –49 dBm |
| 24 | 1 844.9-1 879.9 MHz | 1 MHz | –52 dBm |
| 25 | 1 749.9-1 784.9 MHz | 1 MHz | –49 dBm |
| 26 | 2 110-2 170 MHz | 1 MHz | –52 dBm |
| 27 | 1 710-1 770 MHz | 1 MHz | –49 dBm |
| 28 | 1 475.9-1 500.9 MHz | 1 MHz | –52 dBm |
| 29 | 1 427.9-1 452.9 MHz | 1 MHz | –49 dBm |
| 30 | 728-746 MHz | 1 MHz | –52 dBm |
| 31 | 698-716 MHz | 1 MHz | –49 dBm |
| 32 | 746-756 MHz | 1 MHz | –52 dBm |
| 33 | 777-787 MHz | 1 MHz | –49 dBm |
| 34 | 758-768 MHz | 1 MHz | –52 dBm |
| 35 | 788-798 MHz | 1 MHz | –49 dBm |
| 36 | 1 900-1 920 MHz | 1 MHz | –52 dBm |
| 37 | 2 010-2 025 MHz | 1 MHz | –52 dBm |
| 38 | 1 850-1 910 MHz | 1 MHz | –52 dBm |
| 39 | 1 930-1 990 MHz | 1 MHz | –52 dBm |
| 40 | 1 910-1 930 MHz | 1 MHz | –52 dBm |
| 41 | 2 570-2 620 MHz | 1 MHz | –52 dBm |
| 42 | 1 880-1 920 MHz | 1 MHz | –52 dBm |

TABLE Y6

Additional spurious emissions for 10 MHz channel size; relevant to   
2 115 MHz <= fc <= 2 165 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | 921-960 MHz | 100 kHz | –57 dBm |
| 2 | 876-915 MHz | 100 kHz | –61 dBm |
| 3 | 1 805-1 880 MHz | 100 kHz | –47 dBm |
| 4 | 1 710-1 785 MHz | 100 kHz | –61 dBm |
| 5 | 1 930-1 990 MHz | 100 kHz | –47 dBm |
| 6 | 1 850-1 910 MHz | 100 kHz | –61 dBm |
| 7 | 869-894 MHz | 100 kHz | –57 dBm |
| 8 | 824-849 MHz | 100 kHz | –61 dBm |
| 9 | 1 930-1 990 MHz | 1 MHz | –52 dBm |
| 11 | 1 850-1 910 MHz | 1 MHz | –49 dBm |
| 12 | 1 805-1 880 MHz | 1 MHz | –52 dBm |
| 13 | 1 710-1 785 MHz | 1 MHz | –49 dBm |
| 14 | 2 110-2 155 MHz | 1 MHz | –52 dBm |
| 15 | 1 710-1 755 MHz | 1 MHz | –49 dBm |
| 16 | 869-894 MHz | 1 MHz | –52 dBm |
| 17 | 824-849 MHz | 1 MHz | –49 dBm |
| 18 | 860-895 MHz | 1 MHz | –52 dBm |
| 19 | 815-850 MHz | 1 MHz | –49 dBm |
| 20 | 2 620-2 690 MHz | 1 MHz | –52 dBm |
| 21 | 2 500-2 570 MHz | 1 MHz | –49 dBm |
| 22 | 925-960 MHz | 1 MHz | –52 dBm |
| 23 | 880-915 MHz | 1 MHz | –49 dBm |
| 24 | 1 844.9-1 879.9 MHz | 1 MHz | –52 dBm |
| 25 | 1 749.9-1 784.9 MHz | 1 MHz | –49 dBm |
| 26 | 2 110-2 170 MHz | 1 MHz | –52 dBm |
| 27 | 1 710-1 770 MHz | 1 MHz | –49 dBm |
| 28 | 1 475.9-1 500.9 MHz | 1 MHz | –52 dBm |
| 29 | 1 427.9-1 452.9 MHz | 1 MHz | –49 dBm |
| 30 | 728-746 MHz | 1 MHz | –52 dBm |
| 31 | 698-716 MHz | 1 MHz | –49 dBm |
| 32 | 746-756 MHz | 1 MHz | –52 dBm |
| 33 | 777-787 MHz | 1 MHz | –49 dBm |
| 34 | 758-768 MHz | 1 MHz | –52 dBm |
| 35 | 788-798 MHz | 1 MHz | –49 dBm |
| 36 | 1 900-1 920 MHz | 1 MHz | –52 dBm |
| 37 | 2 010-2 025 MHz | 1 MHz | –52 dBm |
| 38 | 1 850-1 910 MHz | 1 MHz | –52 dBm |
| 39 | 1 930-1 990 MHz | 1 MHz | –52 dBm |
| 40 | 1 910-1 930 MHz | 1 MHz | –52 dBm |
| 41 | 2 570-2 620 MHz | 1 MHz | –52 dBm |
| 42 | 1 880-1 920 MHz | 1 MHz | –52 dBm |

### 3.9 Spurious emissions for FDD equipment operating in the band 1 710-1 785 / 1 805-1 880 MHz (BCG 6.C)

The limits shown in Tables X1 to Table X3 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Tables | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables X1 to Table X2 specify the spurious emission for FDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spurious emissions

|  |  |  |  |
| --- | --- | --- | --- |
| Transmitter Center Frequency (fc) (MHz) | Spurious Frequency (*f*) Range | Integration Bandwidth | Maximum Emission Level (dBm) |
| 1805-1880 | 9 kHz ≤ *f*  150 kHz | 1 kHz | -36 |
| 1805-1880 | 150 kHz ≤ *f*  30 MHz | 10 kHz | -36 |
| 1805-1880 | 30 MHz ≤ *f*  1000 MHz | 100 kHz | -36 |
| 1805-1880 | 1 GHz ≤ *f*  12.75 GHz | 30 kHz, If 12.5 MHz <=*f* < 50 MHz  300 kHz, If 50 MHz<=*f* < 60 MHz  1 MHz, If 60 MHz<=*f* | -30 |

TABLE X2

Spurious emissions limits for protection of the BS receiver

|  |  |  |  |
| --- | --- | --- | --- |
| Transmitter Center Frequency (fc) (MHz) | Spurious Frequency (*f*) Range (MHz) | Measurement Bandwidth | Maximum Level |
| 1805-1880 | 1710 - 1785 | 100 kHz | -96 dBm |

TABLE X3

Additional spurious emission limits

|  |  |  |  |
| --- | --- | --- | --- |
| **Transmitter Center Frequency (fc) (MHz)** | **Spurious Frequency (*f*) Range (MHz)** | **Measurement Bandwidth** | **Maximum Emission Level (dBm)** |
| 1850-1880 | 1850–1910  1930–1990 | 100 KHz | -61 |
| 1850-1880 | 1850–1910  1930–1990 | 1 MHz | -49 |
| 1850-1880 | 1850–1910 | 1 MHz | -52 |
| 1844.9 - 1879.9 | 1749.9 –1784.9  1844.9–1879.9 | 1 MHz | -52 |

### 3.10 Spurious emissions for FDD equipment operating in the band 880-915 / 925-960 MHz (BCG 7.G)

The limits shown in Tables X1 to Table X3 are for frequency offsets which are greater than   
2.5 times the channel bandwidth from the mobile station center frequency. In the Tables | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables X1 to Table X3 specify the spurious emission for FDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spurious emissions

|  |  |  |  |
| --- | --- | --- | --- |
| Transmitter Center Frequency (fc) (MHz) | Spurious Frequency (f) Range | Integration Bandwidth | Maximum Emission Level (dBm) |
| 925 -960 | 9 kHz ≤ *f*  150 kHz | 1 kHz | -36 |
| 925 -960 | 150 kHz ≤ *f*  30 MHz | 10 kHz | -36 |
| 925 -960 | 30 MHz ≤ *f*  1000 MHz | 100 kHz | -36 |
| 925 -960 | 1 GHz ≤ *f*  12.75 GHz | 30 kHz, If 12.5 MHz <=*f* < 50 MHz  300 kHz, If 50 MHz<=*f* < 60 MHz  1 MHz, If 60 MHz<=*f* | -30 |

Table X1 specifies limits to protect BS receivers against its intra-system BS transmit emissions.

TABLE X2

BS spurious emission limits for protection of the BS receiver

|  |  |  |  |
| --- | --- | --- | --- |
| Transmitter Center Frequency (fc) (MHz) | Spurious Frequency (*f*) Range (MHz) | Measurement Bandwidth | Maximum Level |
| 925 -960 | 880-915 | 100 kHz | -96 dBm |

The spurious emission limits specified in Table X2 may be required by local or regional regulations.

## 3.11 Coexistence with other systems in the same geographical/service area

These requirements may be applied for the protection of UE, MS and/or BS operating in other frequency bands in the same geographical area. The requirements may apply in geographical/service areas as applicable in which both OFDMA-TDD-WMAN and a system operating in another frequency band than the OFDMA-TDD-WMAN operating band are deployed. The systems operating in the other frequency band may be GSM900, DCS1800, PCS1900, GSM850, PHS, UTRA-TDD (3.84 Mchip/s, 7.68 Mchip/s, 1.28 Mchip/s options) and UTRA‑FDD.

The power of any spurious emission should not exceed the limits of Table 16 for a BS where requirements for coexistence with the system listed in the first column apply.

TABLE 16

BS spurious emission limits for OFDMA-TDD-WMAN BS in geographic coverage   
area of systems operating in other frequency bands

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| System type operating in the same geographical area | Band for coexistence requirement | Maximum level | Measurement bandwidth | Note |
| GSM900 | 921-960 MHz | −57 dBm | 100 kHz |  |
| 876-915 MHz | −61 dBm | 100 kHz |  |
| DCS1800 | 1 805-1 880 MHz | −47 dBm | 100 kHz |  |
| 1 710-1 785 MHz | −61 dBm | 100 kHz |  |
| PCS1900 | 1 930-1 990 MHz | −47 dBm | 100 kHz |  |
| 1 850-1 910 MHz | −61 dBm | 100 kHz |  |
| GSM850 | 869-894 MHz | −57 dBm | 100 kHz |  |
| 824-849 MHz | −61 dBm | 100 kHz |  |
| PHS | 1 884.5-1 919.6 MHz | −41 dBm | 300 kHz |  |
| FDD Band I | 2 110-2 170 MHz | −52 dBm | 1 MHz |  |
| 1 920-1 980 MHz | −49 dBm | 1 MHz |  |
| FDD Band II | 1 930-1 990 MHz | −52 dBm | 1 MHz |  |
| 1 850-1 910 MHz | −49 dBm | 1 MHz |  |
| FDD Band III | 1 805-1 880 MHz | −52 dBm | 1 MHz |  |
| 1 710-1 785 MHz | −49 dBm | 1 MHz |  |
| FDD Band IV | 2 110-2 155 MHz | −52 dBm | 1 MHz |  |
| 1 710-1 755 MHz | −49 dBm | 1 MHz |  |
| FDD Band V | 869-894 MHz | −52 dBm | 1 MHz |  |
| 824-849 MHz | −49 dBm | 1 MHz |  |
| FDD Band VI | 860-895 MHz | −52 dBm | 1 MHz |  |
| 815-850 MHz | −49 dBm | 1 MHz |  |
| FDD Band VII | 2 620-2 690 MHz | −52 dBm | 1 MHz | This requirement does not apply to OFDMA TDD WMAN operating in Band VII |
| 2 500-2 570 MHz | −49 dBm | 1 MHz | This requirement does not apply to OFDMA TDD WMAN operating in Band VII |
| FDD Band VIII | 925-960 MHz | −52 dBm | 1 MHz |  |
| 880-915 MHz | −49 dBm | 1 MHz |  |
| FDD Band IX | 1 844.9-1 879.9 MHz | −52 dBm | 1 MHz |  |
| 1 749.9-1 784.9 MHz | −49 dBm | 1 MHz |  |
| FDD Band X | 2 110-2 170 MHz | −52 dBm | 1 MHz |  |
| 1 710-1 770 MHz | −49 dBm | 1 MHz |  |
| UTRA-TDD | 1 900-1 920 MHz | −52 dBm | 1 MHz |  |
| 2 010-2 025 MHz | −52 dBm | 1 MHz |  |
| 2 300-2 400 MHz | −52 dBm | 1 MHz | This requirement does not apply to OFDMA TDD WMAN operating in the band 2 300‑2 400 MHz |
| 2 570-2 610 MHz | −52 dBm | 1 MHz | This requirement does not apply to OFDMA TDD WMAN operating in the band 2 500‑2 690 MHz |
| NOTE 1 – The values in this table are considered as preliminary values only, and are subject to further study that could lead to a revision of this Recommendation. | | | | |

# 4 Receiver spurious emissions (conducted)

The receiver spurious emissions in Table 17 are applied in Japan.

TABLE 17

Receiver spurious emission requirements

|  |  |
| --- | --- |
| **Frequency band** | **Total allowed emission level (dBm)** |
| *f* < 1 GHz | –54 |
| 1 GHz ≤ *f* | –47 |

# 5 Adjacent channel leakage ratio (ACLR)

## 5.1 ACLR values for TDD equipment operating in the band 2 500-2 690 MHz (BCG 3.A)

Within this Annex, and in a similar manner to other annexes, the ACLR is defined as the ratio of the on-channel transmitted power to the power transmitted in adjacent channels as measured at the output of the receiver filter. In order to measure ACLR it is necessary to consider a measurement filter for the transmitted signal as well as a receiver measurement bandwidth for the adjacent channel (victim) system.

## Inter-system and intra-system scenarios

There are two specific coexistence requirements that must be considered; the intra-system and inter‑system. In this section only the following scenarios are considered:

– OFDMA TDD WMAN adjacent to OFDMA TDD WMAN within the same network;

– OFDMA TDD WMAN adjacent to UTRA technologies, which might operate using FDD or unsynchronized TDD techniques. The ACLR in this case also takes into account the boundary coexistence conditions between an OFDMA TDD WMAN system and a UTRA system, which could happen in the case of deployments in adjacently assigned spectrum blocks.

In this text, only one inter-system scenario is discussed, that pertaining to UTRA. Two classes of ACLR figures are defined in this Annex to describe the two relevant scenarios as follows.

Intra-system scenario: A classification that identifies a level of minimum required ACLR performance generally appropriate for intra-system operation in contiguous channel assignments within the same network, i.e. OFDMA TDD WMAN adjacent to OFDMA TDD WMAN. In this Annex, intra-system ACLR is based on the following receiver bandwidths with the OFDMA TDD WMAN system operated on-channel and adjacent channel:

– 4.75 MHz for a 5 MHz channelized system, and

– 9.5 MHz for a 10 MHz channelized system.

UTRA scenario: A classification that identifies a level of minimum required ACLR performance appropriate for more demanding interoperator/coexistence scenarios at adjacent frequency block boundaries.

The following receiver bandwidths are assumed for the UTRA system:

– 3.84 MHz for a 5 MHz channelized system, and

– 7.68 MHz for a 10 MHz channelized system.

In each scenario, the passband of the receiver filter is centred on the first or second adjacent channel centre frequency. In the case where the adjacent system is OFDMA TDD WAN, both the transmitted power and the received power are measured with a rectangular filter. For adjacent UTRA systems the transmitted power is measured using a rectangular filter and the received power using a RRC filter with a roll-off factor of 0.22.

The ACLR values for the two relevant scenarios are provided in the following tables.

TABLE 18

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

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 5 MHz | 45 |
| BS channel centre frequency ± 10 MHz | 55 |

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

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 5 MHz | 53.5 |
| BS channel centre frequency ± 10 MHz | 66 |

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

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 10.0 MHz | 45 |
| BS channel centre frequency ± 20.0 MHz | 55 |

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

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 10.0 MHz | 53.5 |
| BS channel centre frequency ± 20.0 MHz | 66 |

## 5.2 ACLR values for TDD equipment operating in the band 3 400-3 600 MHz (BCG 5L.A/5L.B/5L.C)

The ACLR is the ratio of the transmitted mean power measured through a filter pass band centered on the assigned channel frequency to the transmitted mean power measured through a bandpass filter centered on a first or second adjacent channel. The first adjacent and second adjacent channel centre offsets relative to the assigned channel centre frequency respectively equal the channel bandwidth and twice the channel bandwidth.

The ACLR limits for systems with 5, 7 and 10 MHz channel bandwidths operating in the band 3 400-3 600 MHz are specified in Table 19.

TABLE 19

a)  BS ACLR for 5 MHz channel bandwidth

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 5 MHz | 37 |
| BS channel centre frequency ± 10 MHz | 48 |

b)  BS ACLR for 7 MHz channel bandwidth

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 7 MHz | 37 |
| BS channel centre frequency ± 14 MHz | 48 |

c)  BS ACLR for 10 MHz channel bandwidth

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 10.0 MHz | 37 |
| BS channel centre frequency ± 20.0 MHz | 48 |

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

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

## 5.3 ACLR values for TDD equipment operating in the band 3 600-3 800 MHz (BCG 5H.A/5H.B/5H.C)

The ACLR is the ratio of the transmitted mean power measured through a filter pass band centered on the assigned channel frequency to the transmitted mean power measured through a bandpass filter centered on a first or second adjacent channel. The first adjacent and second adjacent channel centre offsets relative to the assigned channel centre frequency respectively equal the channel bandwidth and twice the channel bandwidth.

The ACLR limits for systems with 5, 7 and 10 MHz channel bandwidths operating in the band 3 600-3 800 MHz are specified in Table X1.

TABLE X1

a)  BS ACLR for 5 MHz channel bandwidth

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 5 MHz | 37 |
| BS channel centre frequency ± 10 MHz | 48 |

b)  BS ACLR for 7 MHz channel bandwidth

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 7 MHz | 37 |
| BS channel centre frequency ± 14 MHz | 48 |

c)  BS ACLR for 10 MHz channel bandwidth

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **Minimum required ACLR (dB)** |
| BS channel centre frequency ± 10.0 MHz | 37 |
| BS channel centre frequency ± 20.0 MHz | 48 |

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

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

# 6 Test tolerance

In this Annex, the test tolerances (as defined in Recommendation ITU-R M.1545) corresponding to various specifications are 0 dB unless stated otherwise in the corresponding section.

Appendix 1  
  
Definition of test tolerance

Test tolerance

With reference to Recommendation ITU-R M.1545, “test tolerance” is the relaxation value referred to in *recommends* 2 of Recommendation ITU-R M.1545, i.e., the difference between the core specification value and the test limit, evaluated applying the shared risk principle as per Figures 2 and 3 of Annex 1 of Recommendation ITU-R M.1545. In case the core specification value is equal to the test limit (Figure 3 of Annex 1 of Recommendation ITU-R M.1545) the “test tolerances” are equal to 0.

Attachment 2

Proposed modifications to Recommendation ITU-R M.1581-3

Annex 6  
  
IMT-2000 OFDMA TDD WMAN mobile stations

This Annex defines the unwanted emission limits for IMT‑2000 OFDMA TDD WMAN mobile stations.

# 1Spectrum emission mask

**1.1 Default spectrum emission mask**

Unless otherwise specified in sub sections of Section 1 for specific bands, the spectrum masks of **Error! Reference source not found.** X1 and Table X2 are applicable.

Table X1

Default spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| ***∆f* offset from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to < 3.5 | 50 | -13 |
| 3.5 to ≤ 12.5 | 1000 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 50 kHz filter is at Δf equals to 2.525 MHz; the last is at *Δf* equals to 3.475 MHz. The first measurement position with a 1 MHz filter is at *Δf* equals to 4.0 MHz; the last is at *Δf* equals to 12.0 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

Table X2

Default spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to < 6 | 100 | -13 |
| 6 to ≤ 25 | 1000 | -13 |

Notes:

1. *Δf* is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 100 kHz filter is at Δf equals to 2.550 MHz; the last is at *Δf* equals to 5.950 MHz. The first measurement position with a 1 MHz filter is at *Δf* equals to 6.5 MHz; the last is at *Δf* equals to 24.5 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

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

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the user equipment centre frequency for the 10 MHz carrier. For user equipment with 8.75 MHz channel bandwidth, the spectrum emissions mask applies to frequencies between 4.77 MHz and 21.875 MHz away from the centre frequency.

Tables 1 to 4 specify the spectrum emission for TDD mobile stations with 10, 5 and 8.75 MHz channel bandwidths.

TABLE 1

Spectrum emission mask for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth)** |
| 1 | 5 to < 6 | 100 | −13.00 |
| 2 | 6 to < 10 | 1 000 | −13.00 |
| 3 | 10 to < 11 | 1 000 | −13 − 12(f − 10) |
| 4 | 11 to < 15 | 1 000 | −25.00 |
| 5 | 15 to < 20 | 1 000 | −25.00 |
| 6 | 20 to < 25 | 1 000 | −25.00 |

In Table 1:

Channel bandwidth is 10 MHz.

Integration bandwidth refers to the frequency range over which the emission power is integrated. ∆f is defined as the frequency offset in MHz from the channel centre frequency.

TABLE 2

Spectrum emission mask for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth)** |
| 1 | 2.5 to < 3.5 | 50 | −13.00 |
| 2 | 3.5 to < 7.5 | 1 000 | −13.00 |
| 3 | 7.5 to < 8 | 1 000 | −13.00 |
| 4 | 8 to < 10.4 | 1 000 | −25.00 |
| 5 | 10.4 to < 12.5 | 1 000 | −25.00 |

In Table 2:

Channel bandwidth is 5 MHz.

Integration bandwidth refers to the frequency range over which the emission power is integrated. For all combination of transmit power and center frequencies, the spectral mask measurements shall not exceed the limits specified in Tables 1 and 2 for 10 and 5 MHz channel bandwidth sizes respectively.

The specification of Tables 3 and 4 are attenuations of out of band emission per integration bandwidth relative to the transmit power calculated over the same frequency interval as integration bandwidth.

TABLE 3

Spectrum emission mask for 8.75 MHz carrier for PTx < 23 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Specification** |
| 1 | 4.77 to < 9.27 | 100 | −(26+7×(|Δf|−4.77)/4.5) dB |
| 2 | 9.27 to < 13.23 | 100 | −(33+4×(|Δf|−9.27)/3.96) dB |
| 3 | 13.23 to < 17.73 | 100 | −(37+2×(|Δf|−13.23)/4.5) dB |
| 4 | 17.73 to < 21.875 | 100 | −39 dB |

TABLE 4

Spectrum emission mask for 8.75 MHz carrier for PTx ≥ 23 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Specification** |
| 1 | 4.77 to < 9.27 | 100 | −((PTx-23)+26+7×(|Δf|−4.77)/4.5) dB |
| 2 | 9.27 to < 13.23 | 100 | −((PTx-23)+33+4×(|Δf|−9.27)/3.96) dB |
| 3 | 13.23 to < 17.73 | 100 | −((PTx-23)+37+2×(|Δf|−13.23)/4.5) dB |
| 4 | 17.73 to < 21.875 | 100 | −(PTx-23)+39 dB |

In Tables 3 and 4, PTx is the measured power in dBm into the antenna and ∆f is defined as the frequency offset in MHz from the channel centre frequency.

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

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the user equipment centre frequency for the 10 MHz carrier.

Tables 5 and 6 specify the spectrum emission for TDD mobile stations with 10 and 5 MHz channel bandwidths.

TABLE 5

Spectrum emission mask for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth)** |
| 1 | 5 to < 6 | 100 | −13.00 |
| 2 | 6 to < 10 | 1 000 | −13.00 |
| 3 | 10 to < 11 | 1 000 | −13 − 12(f − 10) |
| 4 | 11 to < 15 | 1 000 | −25.00 |
| 5 | 15 to < 20 | 1 000 | If PTx ≤ +23 dBm and   2 550 ≤ fc≤  2 620 MHz then   −21 − 32/19 × (f −10.5) else −25 |
| 6 | 20 to < 25 | 1 000 | If PTx ≤ +23 dBm and   2 550 ≤ fc≤  2 620 MHz then  − 37 else −25 |
| NOTE 1 – Maximum transmitter output power of user equipment is 23 dBm or smaller in Japan, and the frequency band of operation is limited to 2 545-2 625 MHz. | | | |

In Table 5:

Channel bandwidth is 10 MHz.

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

∆f is defined as the frequency offset in MHz from the channel centre frequency.

PTx is the measured power in dBm into the antenna

fc is the channel centre frequency in MHz.

TABLE 6

Spectrum emission mask for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth)** |
| 1 | 2.5 to < 3.5 | 50 | −13.00 |
| 2 | 3.5 to < 7.5 | 1 000 | −13.00 |
| 3 | 7.5 to < 8 | 1 000 | If PTx ≤ +23 dBm and   2 547.5 ≤ fc ≤  2 622.5 MHz then   −20 − 2.28 × (f − 7.5) else −13.00 |
| 4 | 8 to < 10.4 | 1 000 | −25.00 |
| 5 | 10.4 to < 12.5 | 1 000 | If PTx ≤ +23 dBm and   2 547.5 ≤ fc ≤  2 622.5 MHz then   −21 − 1.68 × (f − 8) else −25 |
| NOTE 1 – Maximum transmitter output power of user equipment is 23 dBm or smaller in Japan, and the frequency band of operation is limited to 2 545-2 625 MHz. | | | |

In Table 6:

Channel bandwidth is 5 MHz.

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

PTx is the measured power in dBm into the antenna

∆f is defined as the frequency offset in MHz from the channel centre frequency

fc is the channel centre frequency in MHz.

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

### 1.4.1 5 MHz channel bandwidth

The spectrum emission mask of the mobile station applies to frequency offsets between 2.5 MHz and 12.5 MHz on both sides of the mobile station centre carrier frequency. The out-of-channel emission is specified as power level measured over the specified measurement bandwidth relative to the total mean power of the mobile station carrier measured in the 5 MHz channel.

Table 7 specifies the spectrum emission for TDD mobile stations with 5 MHz channel bandwidth. The mobile station emission shall not exceed the levels specified in Table 7. Assuming specific power classes, relative requirements of Table 7 can be converted to absolute values for testing purposes. A test tolerance value of 1.5 dB is included here.

TABLE 7

Spectrum emission mask requirement for 5 MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
| Frequency offset Δf | Minimum requirement | Measurement bandwidth |
| 2.5 MHz to 3.5 MHz |  | 30 kHz |
| 3.5 to 7.5 MHz |  | 1 MHz |
| 7.5 to 8.5 MHz |  | 1 MHz |
| 8.5 to 12.5 MHz | –47.5 dBc | 1 MHz |
| NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.  NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 3.485 MHz.  NOTE 3 – The first measurement position with a 1 MHz filter is at Δf equals to 4 MHz; the last is at Δf equals to 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from 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 – Note that equivalent PSD type mask can be derived by applying 10\*log ((5 MHz)/ (30 kHz))= 22.2 dB and 10\*log((5 MHz)/(1 MHz))= 7 dB scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively. | | |

### 1.4.2 7 MHz channel bandwidth

The spectrum emission mask of the mobile station applies to frequency offsets between 3.5 MHz and 17.5 MHz on both sides of the mobile station center carrier frequency. The out-of-channel emission is specified as power level measured over the specified measurement bandwidth relative to the total mean power of the mobile station carrier measured in the 7 MHz channel.

Table 8 specifies the spectrum emission for TDD mobile stations with 7 MHz channel bandwidth. The mobile station emission shall not exceed the levels specified in Table 8. Assuming specific power classes, relative requirements of Table 8 can be converted to absolute values. A test tolerance value of 1.5 dB is included here.

TABLE 8

Spectrum emission mask requirement for 7 MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
| Frequency offset Δf | Minimum requirement | Measurement bandwidth |
| 3.5 MHz to 4.75 MHz |  | 30 kHz |
| 4.75 to 10.5 MHz |  | 1 MHz |
| 10.5 to 11.9 MHz |  | 1 MHz |
| 11.9 to 17.5 MHz | –49.0 dBc | 1 MHz |
| NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.  NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 4.735 MHz.  NOTE 3 – The first measurement position with a 1 MHz filter is at Δf equals to 5.25 MHz; the last is at Δf equals to 17 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from 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 – Note that equivalent PSD type mask can be derived by applying 10\*log ((7 MHz)/ (30 kHz))= 23.7 dB and 10\*log((7 MHz)/(1 MHz))= 8.5 dB scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively. | | |

### 1.4.3 10 MHz channel bandwidth

The spectrum emission mask of the mobile station applies to frequency offsets between 5.0 MHz and 25.0 MHz on both sides of the mobile station centre carrier frequency. The out-of-channel emission is specified as power level measured over the specified measurement bandwidth relative to the total mean power of the mobile station carrier measured in the 10 MHz channel.

Table 9 specify the spectrum emission for TDD mobile stations with 10 MHz channel bandwidth. The mobile station emission shall not exceed the levels specified in Table 9. Assuming specific power classes, relative requirements of Table 9 can be converted to absolute values. A test tolerance value of 1.5 dB is included here.

TABLE 9

Spectrum emission mask requirement for 10 MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
| Frequency offset Δf | Minimum requirement | Measurement bandwidth |
| 5.0 MHz to 7.0 MHz |  | 30 kHz |
| 7.0 to 15.0 MHz |  | 1 MHz |
| 15.0 to 17.0 MHz |  | 1 MHz |
| 17.0 to 25.0 MHz | −50.5 dBc | 1 MHz |
| NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.  NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 6.985 MHz.  NOTE 3 – The first measurement position with a 1 MHz filter is at Δf equals to 7.5 MHz; the last is at Δf equals to 24.5 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from 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 – Equivalent PSD type mask can be derived by applying 10\*log ((10 MHz)/(30 kHz))= 25.2 dB and 10\*log((10 MHz)/(1 MHz))= 10 dB scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively. | | |

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

### 1.5.1 5 MHz channel bandwidth

The spectrum emission mask of the mobile station applies to frequency offsets between 2.5 MHz and 12.5 MHz on both sides of the mobile station centre carrier frequency. The out-of-channel emission is specified as power level measured over the specified measurement bandwidth relative to the total mean power of the mobile station carrier measured in the 5 MHz channel.

Table X1 specifies the spectrum emission for TDD mobile stations with 5 MHz channel bandwidth. The mobile station emission shall not exceed the levels specified in Table X1. Assuming specific power classes, relative requirements of Table X1 can be converted to absolute values for testing purposes. A test tolerance value of 1.5 dB is included here.

TABLE X1

Spectrum emission mask requirement for 5 MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
| Frequency offset Δf | Minimum requirement | Measurement bandwidth |
| 2.5 MHz to 3.5 MHz |  | 30 kHz |
| 3.5 to 7.5 MHz |  | 1 MHz |
| 7.5 to 8.5 MHz |  | 1 MHz |
| 8.5 to 12.5 MHz | –47.5 dBc | 1 MHz |
| NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.  NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 3.485 MHz.  NOTE 3 – The first measurement position with a 1 MHz filter is at Δf equals to 4 MHz; the last is at Δf equals to 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from 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 – Note that equivalent PSD type mask can be derived by applying 10\*log ((5 MHz)/ (30 kHz))= 22.2 dB and 10\*log((5 MHz)/(1 MHz))= 7 dB scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively. | | |

### 1.5.2 7 MHz channel bandwidth

The spectrum emission mask of the mobile station applies to frequency offsets between 3.5 MHz and 17.5 MHz on both sides of the mobile station center carrier frequency. The out-of-channel emission is specified as power level measured over the specified measurement bandwidth relative to the total mean power of the mobile station carrier measured in the 7 MHz channel.

Table X1 specifies the spectrum emission for TDD mobile stations with 7 MHz channel bandwidth. The mobile station emission shall not exceed the levels specified in Table X1. Assuming specific power classes, relative requirements of Table X1 can be converted to absolute values. A test tolerance value of 1.5 dB is included here.

TABLE X1

Spectrum emission mask requirement for 7 MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
| Frequency offset Δf | Minimum requirement | Measurement bandwidth |
| 3.5 MHz to 4.75 MHz |  | 30 kHz |
| 4.75 to 10.5 MHz |  | 1 MHz |
| 10.5 to 11.9 MHz |  | 1 MHz |
| 11.9 to 17.5 MHz | –49.0 dBc | 1 MHz |
| NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.  NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 4.735 MHz.  NOTE 3 – The first measurement position with a 1 MHz filter is at Δf equals to 5.25 MHz; the last is at Δf equals to 17 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from 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 – Note that equivalent PSD type mask can be derived by applying 10\*log ((7 MHz)/ (30 kHz))= 23.7 dB and 10\*log((7 MHz)/(1 MHz))= 8.5 dB scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively. | | |

### 1.5.3 10 MHz channel bandwidth

The spectrum emission mask of the mobile station applies to frequency offsets between 5.0 MHz and 25.0 MHz on both sides of the mobile station centre carrier frequency. The out-of-channel emission is specified as power level measured over the specified measurement bandwidth relative to the total mean power of the mobile station carrier measured in the 10 MHz channel.

Table X1 specify the spectrum emission for TDD mobile stations with 10 MHz channel bandwidth. The mobile station emission shall not exceed the levels specified in Table X1. Assuming specific power classes, relative requirements of Table X1 can be converted to absolute values. A test tolerance value of 1.5 dB is included here.

TABLE X1

Spectrum emission mask requirement for 10 MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
| Frequency offset Δf | Minimum requirement | Measurement bandwidth |
| 5.0 MHz to 7.0 MHz |  | 30 kHz |
| 7.0 to 15.0 MHz |  | 1 MHz |
| 15.0 to 17.0 MHz |  | 1 MHz |
| 17.0 to 25.0 MHz | −50.5 dBc | 1 MHz |
| NOTE 1 – Δf is the separation between the carrier frequency and the centre of the measuring filter.  NOTE 2 – The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 6.985 MHz.  NOTE 3 – The first measurement position with a 1 MHz filter is at Δf equals to 7.5 MHz; the last is at Δf equals to 24.5 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from 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 – Equivalent PSD type mask can be derived by applying 10\*log ((10 MHz)/(30 kHz))= 25.2 dB and 10\*log((10 MHz)/(1 MHz))= 10 dB scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively. | | |

## 1.6 Spectrum emission mask for FDD equipment operating in the bands 1 710-1 770 / 2 110-2 170 MHz (BCG 6A)

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the user equipment centre frequency for the 10 MHz carrier.

Tables Y1 and Y2 specify the spectrum emission for FDD mobile stations with 10 and 5 MHz channel bandwidths.

TABLE Y1

Spectrum emission mask requirement for 10 MHz channel bandwidth

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel center (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth) as measured at the antenna port** |
| 1 | 5 to < 6 | 100 | –13.00 |
| 2 | 6 to ≤ 25 | 1 000 | –13.00 |

T

TABLE Y2

Spectrum emission mask requirement for 5 MHz channel bandwidth

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel center (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration BW) at the antenna port** |
| 1 | 2.5 to < 3.5 | 50 | –13 |
| 2 | 3.5 to ≤ 12.5 | 1 000 | –13 |

NOTES:

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

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

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

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the user equipment centre frequency for the 10 MHz carrier.

Table Y3 and Table Y4 specify the spectrum emission for FDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE Y3

Spectrum emission mask for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth)** |
| 1 | 2.5 to < 3.5 | 30 | −15.00 |
| 2 | 3.5 to < 5.0 | 1 000 | −10.00 |
| 3 | 5.0 to < 7.5 | 1 000 | −10.00 |
| 4 | 7.5 to < 8.5 | 1 000 | −13.00 |
| 5 | 8.5 to < 12.5 | 1 000 | −25.00 |
| NOTE 1 – ∆f is the separation between the carrier frequency and the centre of the measuring filter.  NOTE 2 – The first measurement position with a 30 kHz filter is at ∆f equals to 2.515 MHz; the last is at  ∆f equals to 3.485 MHz. The first measurement position with a 1 MHz filter is at ∆f equals to 4.0 MHz; the last is at ∆f equals to 12.0 MHz.  NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated. | | | |

TABLE Y4

Spectrum emission mask for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth)** |
| 1 | 5.0 to < 6.0 | 30 | −18.00 |
| 2 | 6.0 to < 7.5 | 1 000 | −10.00 |
| 3 | 7.5 to < 10.0 | 1 000 | −10.00 |
| 4 | 10.0 to < 11.0 | 1 000 | −13.00 |
| 5 | 11.0 to < 15.0 | 1 000 | −13.00 |
| 6 | 15.0 to < 25.0 | 1 000 | −25.00 |
| NOTE 1 – ∆f is the separation between the carrier frequency and the centre of the measuring filter.  NOTE 2 – The first measurement position with a 30 kHz filter is at ∆f equals to 5.015 MHz; the last is at ∆f equals to 5.985 MHz. The first measurement position with a 1 MHz filter is at ∆f equals to 6.5 MHz; the last is at ∆f equals to 24.5 MHz.  NOTE 3 – Integration bandwidth refers to the frequency range over which the emission power is integrated. | | | |

## 1.8 Spectrum emission mask for FDD equipment operating in the band 2 496-2 690 MHz (BCG 3.B)

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the user equipment centre frequency for the 10 MHz carrier.

Tables Y5 and Y6 specify the spectrum emission for FDD mobile stations with 10 and 5 MHz channel bandwidths.

TABLE Y5

Spectrum emission mask for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth)** |
| 1 | 5 to < 6 | 100 | −13.00 |
| 2 | 6 to < 10 | 1 000 | −13.00 |
| 3 | 10 to < 11 | 1 000 | −13 − 12(f − 10) |
| 4 | 11 to < 15 | 1 000 | −25.00 |
| 5 | 15 to < 20 | 1 000 | −25.00 |
| 6 | 20 to < 25 | 1 000 | −25.00 |

In Table Y5:

Channel bandwidth is 10 MHz.

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

∆f is defined as the frequency offset in MHz from the channel centre frequency.

PTx is the measured power in dBm into the antenna

fc is the channel centre frequency in MHz.

TABLE Y6

Spectrum emission mask for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Segment number** | **Offset from channel centre frequency  (MHz)** | **Integration bandwidth (kHz)** | **Allowed emission level (dBm/integration bandwidth)** |
| 1 | 2.5 to < 3.5 | 50 | −13.00 |
| 2 | 3.5 to < 7.5 | 1 000 | −13.00 |
| 3 | 7.5 to < 8 | 1 000 | −16.00 |
| 4 | 8 to < 10.4 | 1 000 | −25.00 |
| 5 | 10.4 to < 12.5 | 1 000 | −25.00 |

In Table Y6:

Channel bandwidth is 5 MHz.

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

PTx is the measured power in dBm into the antenna

∆f is defined as the frequency offset in MHz from the channel centre frequency

fc is the channel centre frequency in MHz.

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

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the user equipment centre frequency for the 10 MHz carrier.

Table Y3 and Table Y4 specify the spectrum emission for FDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to <3.5 | 50 | -13 |
| 3.5 to < 7.5 | 1000 | -10 |
| 7.5 to <8.5 | 1000 | -13 |
| 8.5 to 12.5 | 1000 | -25 |

TABLE X2

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to < 6.0 | 50 | -13 |
| 6.0 to < 10.0 | 1000 | -10 |
| 10.0 to < 11.0 | 1000 | -13 |
| 11.0 to 25.0 | 1000 | -25 |

## 1.10 Spectrum emission mask for TDD equipment operating in the bands 698-862 MHz (BCG 7.A)

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier, between 3.5 MHz and 17.5 MHz for the 7 MHz carrier and between 5 MHz and 25 MHz for the 10 MHz carrier.

Table X1 to Table X6 specify the spectrum emission for FDD mobile stations with 5, 7 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier - 700.5 ≤*fc* ≤ 795.5

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to 2.6 | 30 | -13 |
| 2.6 to 12.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE X2

Spectrum emission mask for 5 MHz carrier - 799.5 ≤*fc* ≤ 859.5

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (MHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to 7.5 | 5 | 1.6 |
| 7.5 to 12.5 | 2 | -10 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The measurement position with a 5 MHz filter is at Δf equals to 5 MHz. The first measurement position with a 2 MHz filter is at Δf equals to 8.5 MHz; the last is at Δf equals to 11.5 MHz.

TABLE X3

Spectrum emission mask for 7 MHz carrier - 701.5 ≤*fc* ≤ 794.5

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 3.5 to 3.6 | 30 | -13 |
| 3.6 to 17.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE X4

Spectrum emission mask for 7 MHz carrier - 800.5 ≤*fc* ≤ 858.5

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (MHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 3.5 to 8.5 | 5 | 1.6 |
| 8.5 to 17.5 | 2 | -10 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The measurement position with a 5 MHz filter is at Δf equals to 6 MHz. The first measurement position with a 2 MHz filter is at Δf equals to 9.5 MHz; the last is at Δf equals to 16.5 MHz.

TABLE X5

Spectrum emission mask for 10 MHz carrier - 703 ≤*fc* ≤ 793

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to 5.1 | 30 | -13 |
| 5.1 to 25.0 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

TABLE X6

Spectrum emission mask for 10 MHz carrier - 802 ≤*fc* ≤ 857

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (MHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to 10 | 5 | 1.6 |
| 10 to 25 | 2 | -10 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The measurement position with a 5 MHz filter is at Δf equals to 7.5 MHz. The first measurement position with a 2 MHz filter is at Δf equals to 11 MHz; the last is at Δf equals to 24 MHz.

## 1.11 Spectrum emission mask for FDD equipment operating in the bands 776-787 / 746-757 MHz (BCG 7.B)

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz away from the user equipment centre frequency for the 10 MHz carrier.

Table X1 and Table X2 specify the spectrum emission for FDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE X1

**Spectrum emission mask for 5 MHz carrier**

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to 2.6 | 30 | -13 |
| 2.6 to 12.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE X2

**Spectrum emission mask for 10 MHz carrier**

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to 5.1 | 30 | -13 |
| 5.1 to 25.0 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

## 1.12 Spectrum emission mask for FDD equipment operating in the bands 788-793 / 758-763 and 793-798 / 763-768 MHz (BCG 7.C)

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz.

Table X1 specifies the spectrum emission for FDD mobile stations with 5 MHz channel bandwidth.

TABLE X1

**Spectrum emission mask for 5 MHz carrier**

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to 2.6 | 30 | -13 |
| 2.6 to 12.5 | 100 | -13 |

Notes:

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

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

## 1.13 Spectrum emission mask for FDD equipment operating in the bands 788-798 / 758-768 MHz (BCG 7.D)

The spectrum emission mask of user equipment applies to frequencies between 5 MHz and 25 MHz away from the user equipment centre frequency for the 10 MHz channel bandwidth.

Table X1 specifies the spectrum emission for FDD mobile stations with 10 MHz channel bandwidth.

TABLE X1

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to 5.1 | 30 | -13 |
| 5.1 to 25.0 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

## 1.14 Spectrum emission mask for FDD and TDD equipment operating in the bands 698-862 MHz (BCG 7.E)

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 3.5 MHz and 17.5 MHz for the 10 MHz carrier, and between 5 MHz and 25 MHz for the 10 MHz carrier.

Table X1 to Table X6 specify the spectrum emission for FDD and TDD mobile stations with 5, 7 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier - 700.5 ≤*fc* ≤ 795.5

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to 2.6 | 30 | -13 |
| 2.6 to 12.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 2.650 MHz; the last is at Δf equals to 12.450 MHz.

TABLE X2

Spectrum emission mask for 5 MHz carrier - 799.5 ≤*fc* ≤ 859.5

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (MHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to 7.5 | 5 | 1.6 |
| 7.5 to 12.5 | 2 | -10 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The measurement position with a 5 MHz filter is at Δf equals to 5 MHz. The first measurement position with a 2 MHz filter is at Δf equals to 8.5 MHz; the last is at Δf equals to 11.5 MHz.

TABLE X3

Spectrum emission mask for 7 MHz carrier - 701.5 ≤*fc* ≤ 794.5

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 3.5 to 3.6 | 30 | -13 |
| 3.6 to 17.5 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 3.585 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 3.650 MHz; the last is at Δf equals to 17.450 MHz.

TABLE X4

Spectrum emission mask for 7 MHz carrier - 800.5 ≤*fc* ≤ 858.5

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (MHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 3.5 to 8.5 | 5 | 1.6 |
| 8.5 to 13.5 | 2 | -10 |
| 13.5 to 17.5 | 1 | -25 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The measurement position with a 5 MHz filter is at Δf equals to 6 MHz. The first measurement position with a 2 MHz filter is at Δf equals to 9.5 MHz; the last is at Δf equals to 12.5 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 14 MHz; the last is at Δf equals to 17 MHz.
3. The emission level of Segment 3 is only applicable when 835.5 ≤*fc* ≤ 858.5

TABLE X5

Spectrum emission mask for 10 MHz carrier - 703 ≤*fc* ≤ 793

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to 5.1 | 30 | -13 |
| 5.1 to 25.0 | 100 | -13 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at Δf equals to 5.150 MHz; the last is at Δf equals to 24.950 MHz.

TABLE X6

Spectrum emission mask for 10 MHz carrier - 802 ≤*fc* ≤ 857

|  |  |  |
| --- | --- | --- |
| **Frequency offset Δf from channel center (MHz)** | **Integration Bandwidth (MHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to 10 | 5 | 1.6 |
| 10 to 15 | 2 | -10 |
| 15 to 25 | 1 | -25 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The measurement position with a 5 MHz filter is at Δf equals to 7.5 MHz. The first measurement position with a 2 MHz filter is at Δf equals to 11 MHz; the last is at Δf equals to 14 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 15.5 MHz; the last is at Δf equals to 24.5 MHz.
3. The emission level of Segment 3 is only applicable when 837 ≤*fc* ≤ 857

## 1.15 Spectrum emission mask for FDD equipment operating in the bands 880-915 / 925-960 MHz (BCG 7.F)

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz for the 10 MHz carrier.

Table X1 and Table X2 specify the spectrum emission for FDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 2.5 to <3.5 | 50 | -13 |
| 3.5 to < 7.5 | 1000 | -10 |
| 7.5 to <8.5 | 1000 | -13 |
| 8.5 to ≤12.5 | 1000 | -25 |

TABLE X2

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5.0 to < 6.0 | 50 | -13 |
| 6.0 to < 10.0 | 1000 | -10 |
| 10.0 to < 11.0 | 1000 | -13 |
| 11.0 to ≤25.0 | 1000 | -25 |

## 1.16 Spectrum emission mask for TDD equipment operating in the bands 1 785-1 805, 1 880-1 920, 1 910-1 930, 2 010-2 025, and 1 900-1 920 MHz (BCG 8.A)

The spectrum emission mask of user equipment applies to frequencies between 2.5 MHz and 12.5 MHz away from the user equipment centre frequency for the 5 MHz carrier and between 5 MHz and 25 MHz for the 10 MHz carrier.

Table X1 and Table X2 specify the spectrum emission for TDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spectrum emission mask for 5 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/integration BW) at the antenna port** |
| 2.5 to < 3.5 | 50 | -13 |
| 3.5 to < 7.5 | 1000 | -10 |
| 73.5 to ≤ 8.5 | 1000 | -13 |
| 8.5 to ≤ 12.5 | 1000 | -25 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 50 KHz filter is at Δf equals to 2.525 MHz; the last is at Δf equals to 3.475 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 4.0 MHz; the last is at Δf equals to 12 MHz.

TABLE X2

Spectrum emission mask for 10 MHz carrier

|  |  |  |
| --- | --- | --- |
| **Offset from channel center (MHz)** | **Integration Bandwidth (kHz)** | **Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port** |
| 5 to < 6 | 100 | -13 |
| 6 to < 10 | 1000 | -10 |
| 106 to ≤ 15 | 1000 | -13 |
| 15 to ≤ 25 | 1000 | -25 |

Notes:

1. Δf is the separation between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 100 KHz filter is at Δf equals to 5.050 MHz; the last is at Δf equals to 5.950 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 6.5 MHz; the last is at Δf equals to 24.5 MHz.

# 2 Transmitter spurious emissions (conducted)

**2.1 Default spurious emissions**

Unless otherwise specified in sub sections of Section 2 for specific bands, the default spurious emission specifications of Table X1 are applicable.

Table X1

Default spurious emissions- Relevant to FUL-le +ChBW/2 ≤ *fc* ≤ FUL-ue- ChBW/2

|  |  |  |
| --- | --- | --- |
| Spurious frequency (*f*) range | Measurement bandwidth | Maximum Emission Level (dBm) |
| 9 kHz ≤ *f* < 150 kHz | 1 kHz | -36 |
| 150 kHz ≤ *f* < 30 MHz | 10 kHz | -36 |
| 30 MHz ≤ *f* < 1 000 MHz | 100 kHz | -36 |
| 1 GHz ≤ *f* < 5 x Fue | 30 kHz If 2.5xChBW <= *∆f* < 10xChBW  300 kHz If 10xChBW MHz<= *∆f* < 12xChBW  1 MHz If 12xChBW <= *∆f* | -30 |

## 2.2 Spurious emissions for TDD equipment operating in the band 2 300-2 400 MHz (BCG 1.A/1.B)

The limits shown in Tables 10 to 12 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables 10 to 12 specify the spurious emission for TDD mobile stations with 5, 8.75 and 10 MHz channel bandwidths.

TABLE 10

Spurious emissions for 5 MHz channel size; relevant to 2 302.5 MHz <= fc <= 2 397.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz | 30 kHz If 12.5 <= | f | < 50  300 kHz If 50 <= | f | < 60  1 MHz If 60 <= |f | | −30 |

TABLE 11

Spurious emissions for 8.75 MHz channel bandwidth

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −13 dBm |
| 2 | 1 GHz ≤ f ≤12 GHz | 1 MHz | −13 dBm |

TABLE 12

Spurious emissions for 10 MHz channel size; relevant to 2 305 MHz <= fc <= 2 395 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f 1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz | 30 kHz If 25 <= | f | < 100  300 kHz If 100 <= | f | < 120  1 MHz If 120 <= |f | | −30 |

## 2.3 Spurious emissions for TDD equipment operating in the band 2 500-2 690 MHz (BCG 3.A)

IMT‑2000 OFDMA TDD WMAN user equipment complies with the limits recommended in Recommendation ITU‑R SM.329‑10. The limits for the 5 MHz carrier, shown in Tables 13, 14 and 15 are only applicable for frequency offsets which are greater than 12.5 MHz away from the user equipment centre frequency, while the limits for the 10 MHz carrier shown in Tables 16, 17 and 18 apply only for frequency offsets greater than 25 MHz. f is the frequency of the spurious domain emissions. fc is the user equipment center frequency.

Tables 13, 14, 15, 16, 17 and 18 specify the general and additional spurious emission for TDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE 13

General user equipment spurious emissions limit for 5 MHz channel size;   
relevant to 2 502.5 MHz <= fc <= 2 687.5 MHz

|  |  |  |
| --- | --- | --- |
| **Band** | **Measurement bandwidth** | **Allowed emission level (dBm)** |
| 9 kHz ≤ f < 150 kHz | 1 kHz | −13 |
| 150 kHz ≤ f < 30 MHz | 10 kHz | −13 |
| 30 MHz ≤ f < 1 000 MHz | 100 kHz | –36 |
| 1 GHz ≤ f < 13.45 GHz | 30 kHz If 12.5 MHz ≤ | fc − f | < 50 MHz  300 kHz If 50 MHz ≤ | fc − f | < 60 MHz  1 MHz If 60 MHz ≤ | fc − f | | –30 |

TABLE 14

Additional user equipment spurious emission limit for 5 MHz channel size; the requirements of table are relevant to 2 547.5 MHz <= fc <= 2 622.5 MHz

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Frequency bandwidth** | **Measurement bandwidth** | **Minimum requirement (dBm)** | **Note** | |
| 1 000 MHz ≤ f  2 505 MHz | 1 MHz | −13 |  | |
| 2 505 MHz ≤ f  2 530 MHz | 1 MHz | −37 |  | |
| 2 530 MHz ≤ f  2 535 MHz | 1 MHz | 1.7f − 4 338 |  | |
| 2 535 MHz ≤ f  2 630 MHz | 1 MHz | −21 − 1.68\*(f − 8) 12.5 MHz < f < 17.5 MHz  −37 17.5 MHz < f < 22.5 MHz  −18 22.5 MHz < f |  | |
| 2 630 MHz ≤ f  2 630.5 MHz | 1 MHz | −13 − 8/3.5 × (f − 2 627) |  | |
| 2 630.5 MHz ≤ f  2 640 MHz | 1 MHz | −21 − 16/9.5× (f − 2 630.5) |  | |
| 2 640 MHz ≤ f  2 655 MHz | 1 MHz | −37 |  | |
| 2 655 MHz ≤ f | 1 MHz | −13 |  | |
| NOTE 1 – The allowed emission level shall be applied for the frequency range greater than 2.5 times the channel size from the centre frequency. f is the offset from channel centre frequency.  NOTE 2 – This additional requirement provides for the protection of satellite systems in the bands  2 500-2 535 MHz and 2 630-2 690 MHz in Japan, and applies only to terminals operating in the frequency band 2 545-2 625 MHz with powers of 23 dBm or smaller. | | | | |

TABLE 15

Additional user equipment spurious emissions for 5 MHz channel size;   
relevant to 2 502.5 MHz <= fc <= 2 687.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | 2 620 MHz ≤ f   2 690 MHz | 1 MHz | −40 |
| NOTE 1 – This additional requirement is for the purpose of compliance to ETSI EN 302-544-2. | | | |

TABLE 16

General user equipment spurious emissions limit for 10 MHz channel size;   
relevant to 2 505 MHz <= fc <= 2 685 MHz

|  |  |  |
| --- | --- | --- |
| Spurious frequency (f) range | Measurement bandwidth | Allowed emission level (dBm) |
| 9 kHz ≤ f <150 kHz | 1 kHz | −36 |
| 150 kHz ≤ f < 30 MHz | 10 kHz | −36 |
| 30 MHz ≤ f < 1 000 MHz | 100 kHz | –36 |
| 1 GHz ≤ f <13.45 GHz | 30 kHz If 25 ≤ | fc − f | < 100  300 kHz If 100 ≤ | fc − f | < 120  1 MHz If 120 ≤ | fc − f | | –30 |

TABLE 17

Additional user equipment spurious emission limit for 10 MHz channel size, the requirements of table are relevant to 2 550 MHz <= fc <= 2 620 MHz

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) | Note | |
| 1 000 MHz ≤ f  2 505 MHz | 1 MHz | −13 |  | |
| 2 505 MHz ≤ f  2 530 MHz | 1 MHz | −37 |  | |
| 2 530 MHz ≤ f  2 535 MHz | 1 MHz | 1.7f − 4 338 |  | |
| 2 535 MHz ≤ f  2 630 MHz | 1 MHz | −18 25 MHz < f |  | |
| 2 630 MHz ≤ f  2 630.5 MHz | 1 MHz | −13 − 8/3.5 × (f − 2 627) |  | |
| 2 630.5 MHz ≤ f  2 640 MHz | 1 MHz | −21 − 16/9.5 × (f − 2 630.5) |  | |
| 2 640 MHz ≤ f  2 655 MHz | 1 MHz | −37 |  | |
| 2 655 MHz ≤ f | 1 MHz | −13 |  | |
| NOTE 1 – The allowed emission level shall be applied for the frequency range greater than 2.5 times the channel size from the centre frequency. f is the offset from channel centre frequency.  NOTE 2 – This additional requirement provides for the protection of satellite systems in the bands  2 500-2 535 MHz and 2 630-2 690 MHz in Japan, and applies only to terminals operating in the frequency band 2 545-2 625 MHz with powers of 23 dBm or smaller. | | | |

TABLE 18

Additional user equipment spurious emissions for 10 MHz channel size;   
relevant to 2 505 MHz <= fc <= 2 685 MHz

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Row | | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | | 2 620 MHz ≤ f   2 690 MHz | 1 MHz | -40 |
| NOTE 1 – This additional requirement is for the purpose of compliance to ETSI EN 302-544-2. | | | |

## 2.4 Spurious emission for TDD equipment operating in the band 3 400-3 600 MHz (BCG 5L.A/5L.B/5L.C)

The limits shown in Tables 19 to 21 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the table | f | is fc−f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables 19 to 21 specify the spurious emission for TDD mobile stations with 5, 7 and 10 MHz channel bandwidths.

Table 19

Spurious emissions for 5 MHz channel size; relevant to 3 402.5 MHz <= fc <= 3 797.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f 30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz | 30 kHz If 12.5 MHz <= | f | < 50 MHz  300 kHz If 50 MHz <= | f | < 60 MHz  1 MHz If 60 MHz <= |f | | −30 |

Table 20

Spurious emissions for 7 MHz channel size; relevant to 3 403.5 MHz <= fc <= 3 796.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| **Row** | **Spurious frequency (f) range** | **Measurement bandwidth** | **Minimum specification (dBm)** |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz | 30 kHz If 17.5 MHz <= | f | < 70 MHz  300 kHz If 70 MHz <= | f | < 84 MHz  1 MHz If 84 MHz <= |f | | −30 |

Table 21

Spurious emissions for 10 MHz channel size; relevant to 3 405 MHz <= fc <= 3 795 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| **Row** | **Spurious frequency (f) range** | **Measurement bandwidth** | **Minimum specification (dBm)** |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz | 30 kHz If 25 MHz <= | f | < 100 MHz  300 kHz If 100 MHz <= | f | < 120 MHz  1 MHz If 120 MHz <= |f | | −30 |

## 2.5 Spurious emissions for TDD equipment operating in the band 3 600-3 800 MHz (BCG 5H.A/5H.B/5H.C)

The limits shown in Tables X1 to X3 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the table | f | is fc−f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables X1 to X3 specify the spurious emission for TDD mobile stations with 5, 7 and 10 MHz channel bandwidths.

Table X1

Spurious emissions for 5 MHz channel size; relevant to 3 402.5 MHz <= fc <= 3 797.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f 30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz | 30 kHz If 12.5 MHz <= | f | < 50 MHz  300 kHz If 50 MHz <= | f | < 60 MHz  1 MHz If 60 MHz <= |f | | −30 |

Table X2

Spurious emissions for 7 MHz channel size; relevant to 3 403.5 MHz <= fc <= 3 796.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| **Row** | **Spurious frequency (f) range** | **Measurement bandwidth** | **Minimum specification (dBm)** |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz | 30 kHz If 17.5 MHz <= | f | < 70 MHz  300 kHz If 70 MHz <= | f | < 84 MHz  1 MHz If 84 MHz <= |f | | −30 |

Table X3

Spurious emissions for 10 MHz channel size; relevant to 3 405 MHz <= fc <= 3 795 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| **Row** | **Spurious frequency (f) range** | **Measurement bandwidth** | **Minimum specification (dBm)** |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz | 30 kHz If 25 MHz <= | f | < 100 MHz  300 kHz If 100 MHz <= | f | < 120 MHz  1 MHz If 120 MHz <= |f | | −30 |

## 2.6 Spurious emissions for FDD equipment operating in the band 1 710-1 770 / 2 110-2 170 MHz (BCG 6.A)

The limits shown in Tables 10 to 12 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables X1 and X2 specify the spurious emission for FDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE X1

Spurious emissions for 5 MHz channel size; relevant to 1 712.5 MHz <= fc <= 1 752.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 30 MHz ≤ f  8.775 GHz, 12.5 MHz <= | f | | 1 MHz | −13 |

TABLE X2

Spurious emissions for 5 MHz channel size; relevant to 1 715 MHz <= fc <= 1 750 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 30 MHz ≤ f  8.775 GHz, 25 MHz <= | f | | 1 MHz | −13 |

## 2.7 Spurious emissions for FDD equipment operating in the band 1 920-1 980 / 2 110-2 170 MHz (BCG 6.B)

The limits shown in Tables X3 to X6 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Tables | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables X3 to X4 specify the spurious emission for FDD mobile stations with 5 and 10 MHz channel bandwidths, while Table X5 and Table X6 specified the additional spurious emission limits for   
5 and 10 MHz channel bandwidths.

TABLE X3

Spurious emissions for 5 MHz channel size; relevant to 1 922.5 MHz <= fc <= 1 977.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  9.9 GHz, 12.5 <= | f | | 1 MHz | −30 |

TABLE X4

Spurious emissions for 10 MHz channel size; relevant to 1 925 MHz <= fc <= 1 975 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f 1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  19 GHz, 25 <= | f | | 1 MHz | −30 |

TABLE X5

Additional spurious emissions for 5 MHz channel size; relevant to   
1 922.5 MHz <= fc <= 1 977.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | 2 110-2 170 MHz | 1 MHz | –50 |
| 2 | 1 805-1 880 MHz | 1 MHz | –50 |
| 3 | 2 620-2 690 MHz | 1 MHz | –50 |
| 4 | 925-960 MHz | 1 MHz | –50 |
| 5 | 1 844.9-1 879.9 MHz | 1 MHz | –50 |
| 6 | 1 475.9-1 500.9 MHz | 1MHz | –50 |
| 7 | 1 900-1 920 MHz | 1 MHz | –50 |
| 8 | 2 010-2 025 MHz | 1 MHz | –50 |
| 9 | 2 570-2 620 MHz | 1 MHz | –50 |
| 11 | 1 880-1 920 MHz | 1 MHz | –50 |
| 12 | 2 300-2 400 MHz | 1 MHz | –50 |
| 13 | 860-895 MHz | 1 MHz | –50 |
| 14 | 1 884.5-1 919.6 MHz | 300 kHz | –41 |

TABLE X6

Additional spurious emissions for 10 MHz channel size; relevant to  
1 925 MHz <= fc <= 1 975 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | 2 110-2 170 MHz | 1 MHz | –50 |
| 2 | 1 805-1 880 MHz | 1 MHz | –50 |
| 3 | 2 620-2 690 MHz | 1 MHz | –50 |
| 4 | 925-960 MHz | 1 MHz | –50 |
| 5 | 1 844.9-1 879.9 MHz | 1 MHz | –50 |
| 6 | 1 475.9-1 500.9 MHz | 1MHz | –50 |
| 7 | 1 900-1 920 MHz | 1 MHz | –50 |
| 8 | 2 010-2 025 MHz | 1 MHz | –50 |
| 9 | 2 570-2 620 MHz | 1 MHz | –50 |
| 11 | 1 880-1 920 MHz | 1 MHz | –50 |
| 12 | 2 300-2 400 MHz | 1 MHz | –50 |
| 13 | 860-895 MHz | 1 MHz | –50 |
| 14 | 1 884.5-1 919.6 MHz | 300 kHz | –41 |

## 2.8 Spurious emissions for FDD equipment operating in the band 2 496-2 690 MHz (BCG 3.B)

The limits shown in Tables X7 to X10 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

Tables X7 to X10 specify the spurious emission for FDD mobile stations with 5 and 10 MHz channel bandwidths.

TABLE X7

Spurious emissions for 5 MHz channel size; relevant to 2 498.5 MHz <= fc <= 2 687.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f  1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  13.45 GHz | 30 kHz If 12.5 <= | f | < 50  300 kHz If 50 <= | f | < 60  1 MHz If 60 <= |f | | −30 |

TABLE X8

Spurious emissions for 10 MHz channel size; relevant to 2 501 MHz <= fc <= 2 685 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum specification (dBm) |
| 1 | 9 kHz ≤ f  150 kHz | 1 kHz | −36 |
| 2 | 150 kHz ≤ f  30 MHz | 10 kHz | −36 |
| 3 | 30 MHz ≤ f 1 000 MHz | 100 kHz | −36 |
| 4 | 1 GHz ≤ f  13.45 GHz | 30 kHz If 25 <= | f | < 100  300 kHz If 100 <= | f | < 120  1 MHz If 120 <= |f | | −30 |

TABLE X9

Additional spurious emissions for 5 MHz channel size; relevant to   
2 498.5 MHz <= fc <= 2 687.5 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | 2 110-2 170 MHz | 1 MHz | –50 |
| 2 | 1 805-1 880 MHz | 1 MHz | –50 |
| 3 | 2 620-2 690 MHz | 1 MHz | –50 |
| 4 | 925-960 MHz | 1 MHz | –50 |
| 5 | 1 900-1 920 MHz | 1 MHz | –50 |
| 6 | 2 010-2 025 MHz | 1 MHz | –50 |
| 7 | 2 570-2 620 MHz | 1 MHz | –50 |

TABLE X6

Additional spurious emissions for 10 MHz channel size; relevant to   
2 501 MHz <= fc <= 2 685 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| Row | Spurious frequency (f) range | Measurement bandwidth | Minimum requirement (dBm) |
| 1 | 2 110-2 170 MHz | 1 MHz | –50 |
| 2 | 1 805-1 880 MHz | 1 MHz | –50 |
| 3 | 2 620-2 690 MHz | 1 MHz | –50 |
| 4 | 925-960 MHz | 1 MHz | –50 |
| 5 | 1 900-1 920 MHz | 1 MHz | –50 |
| 6 | 2 010-2 025 MHz | 1 MHz | –50 |
| 7 | 2 570-2 620 MHz | 1 MHz | –50 |

## 2.9 Spurious emissions for FDD equipment operating in the band 1 710-1 785 / 1 805-1 880 MHz (BCG 6.C)

The limits shown in Tables X1 and X2 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

TABLE X1

Spurious emissions

|  |  |  |  |
| --- | --- | --- | --- |
| Transmitter Center Frequency (fc) (MHz) | Spurious Frequency (*f*) Range | Integration Bandwidth | Maximum Emission Level (dBm) |
| 1710-1785 | 9 kHz ≤ *f*  150 kHz | 1 kHz | -36 |
| 1710-1785 | 150 kHz ≤ *f*  30 MHz | 10 kHz | -36 |
| 1710-1785 | 30 MHz ≤ *f*  1000 MHz | 100 kHz | -36 |
| 1710-1785 | 1 GHz ≤ *f*  12.75 GHz | 30 kHz, If 12.5 MHz <=*f* < 50 MHz  300 kHz, If 50 MHz<=*f* < 60 MHz  1 MHz, If 60 MHz<=*f* | -30 |

TABLE X2

Additioinal spurious emissions

|  |  |  |  |
| --- | --- | --- | --- |
| **Transmitter Center Frequency (fc) (MHz)** | **Spurious Frequency (*f*) Range (MHz)** | **Measurement Bandwidth (MHz)** | **Maximum Emission Level (dBm)** |
| 1710-1785 | 925-960 | 1 | -50 |
| 1710-1785 | 1475.9–1500.9 | 1 | -50 |
| 1710-1785 | 1805-1880 | 1 | -50 |
| 1710-1785 | 1844.9–1879.9 | 1 | -50 |
| 1710-1785 | 1900–1920 | 1 | -50 |
| 1710-1785 | 2010–2025 | 1 | -50 |
| 1710-1785 | 2110-2170 | 1 | -50 |
| 1710-1785 | 2570–2620 | 1 | -50 |
| 1710-1785 | 2620-2690 | 1 | -50 |

## 2.10 Spurious emissions for TDD equipment operating in the band 698-862 MHz (BCG 7.A)

The limits shown in Tables X1 and X2 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

TABLE X1

Spurious emissions for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 698-798 | 30 ≤ *f* < 4310  (12.5 MHz ≤ ∆f) | 100 | -13 |
| 746-758, 776-788 | 763≤*f*≤ 775, 793≤*f*≤ 805 | 6.25 | -35 |
| 758-763, 763-768, 788-793, 793-798 | 769≤*f*≤ 775, 799≤*f*≤ 805 | 6.25 | -35 |
| 797-862 | 797 ≤ *f* ≤ 862  (12.5 MHz ≤ ∆f) | 5000 | -37 |
| 797-862 | 790 ≤ *f* ≤ 791 | 1000 | -44 |
| 797-862 | 470 ≤ *f* ≤ 790 | 8000 | -65 |

TABLE X2

Spurious emissions for 7 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 698-798 | 30 ≤ *f* < 4310  (17.5 MHz ≤ ∆f) | 100 | -13 |
| 746-758, 776-788 | 763≤*f*≤ 775, 793≤*f*≤ 805 | 6.25 | -35 |
| 758-768, 788-798 | 769≤*f*≤ 775, 799≤*f*≤ 805 | 6.25 | -35 |
| 797-862 | 797 ≤ *f* ≤ 862  (17.5 MHz ≤ ∆f) | 5000 | -37 |
| 797-862 | 790 ≤ *f* ≤ 791 | 1000 | -44 |
| 797-862 | 470 ≤ *f* ≤ 790 | 8000 | -65 |

TABLE X3

Spurious emissions for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 698-798 | 30 ≤ *f* < 4310  (25 MHz ≤ ∆f) | 100 | -13 |
| 746-758, 776-788 | 763≤*f*≤ 775, 793≤*f*≤ 805 | 6.25 | -35 |
| 758-768, 788-798 | 769≤*f*≤ 775, 799≤*f*≤ 805 | 6.25 | -35 |
| 797-862 | 797 ≤ *f* ≤ 862  (25 MHz ≤ ∆f) | 5000 | -37 |
| 797-862 | 790 ≤ *f* ≤ 791 | 1000 | -44 |
| 797-862 | 470 ≤ *f* ≤ 790 | 8000 | -65 |

## 2.11 Spurious emissions for FDD equipment operating in the band 776-787 / 746-757 MHz (BCG 7.B)

The limits shown in Tables X1 and X2 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

TABLE X1

Spurious emissions for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 776-787 | 30 ≤ *f* < 4310  (12.5 MHz ≤ ∆f) | 100 | -13 |
| 776-787 | 763≤*f*≤ 775, 793≤*f*≤ 805 | 6.25 | -35 |

TABLE X2

Spurious emissions for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 776-787 | 30 ≤ *f* < 4310  (25 MHz ≤ ∆f) | 100 | -13 |
| 776-787 | 763≤*f*≤ 775, 793≤*f*≤ 805 | 6.25 | -35 |

## 2.12 Spurious emissions for FDD equipment operating in the band 788-793 / 758-763 and 793-798 / 763-768 MHz (BCG 7.C)

The limits shown in Table X1 is for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

TABLE X1

Spurious emissions for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 788-793, 793-798 | 30 ≤ *f* < 4310  (12.5 MHz ≤ ∆f) | 100 | -13 |
| 788-793, 793-798 | 769≤*f*≤ 775, 799≤*f*≤ 805 | 6.25 | -35 |

## 2.13 Spurious emission for FDD equipment operating in the bands 788-798 / 758-768 MHz (BCG 7.D)

The limits shown in Tables X1 and X2 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

In this section, measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included.

TABLE X1

Spurious emissions for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 788-798 | 30 ≤ *f* < 4310  (25 MHz ≤ ∆f) | 100 | -13 |
| 788-798 | 769≤*f*≤ 775, 799≤*f*≤ 805 | 6.25 | -35 |

## 2.14 Spurious emission for FDD and TDD equipment operating in the bands 698-862 MHz (BCG 7.E)

The limits shown in Tables X1 and X2 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

In this section, measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included.

TABLE X1

Spurious emissions for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 698-798 | 30 ≤ *f* < 4310  (12.5 MHz ≤ ∆f) | 100 | -13 |
| 746-758, 776-788 | 763≤*f*≤ 775, 793≤*f*≤ 805 | 6.25 | -35 |
| 758-763, 763-768, 788-793, 793-798 | 769≤*f*≤ 775, 799≤*f*≤ 805 | 6.25 | -35 |
| 791-862 | 797 ≤ *f* ≤ 862  (12.5 MHz ≤ ∆f) | 5000 | -37 |
| 797-862 | 790 ≤ *f* ≤ 791 | 1000 | -44 |
| 832-862 | 821 ≤ *f* ≤ 862  (12.5 MHz ≤ ∆f) | 1000 | -25 |
| 832-862 | 470 ≤ *f* ≤ 790 | 8000 | -65 |

TABLE X2

Spurious emissions for 7 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 698-798 | 30 ≤ *f* < 4310  (17.5 MHz ≤ ∆f) | 100 | -13 |
| 746-758, 776-788 | 763≤*f*≤ 775, 793≤*f*≤ 805 | 6.25 | -35 |
| 758-763, 763-768, 788-793, 793-798 | 769≤*f*≤ 775, 799≤*f*≤ 805 | 6.25 | -35 |
| 797-862 | 797 ≤ *f* ≤ 862  (17.5 MHz ≤ ∆f) | 5000 | -37 |
| 797-862 | 790 ≤ *f* ≤ 791 | 1000 | -44 |
| 832-862 | 821 ≤ *f* ≤ 862  (17.5 MHz ≤ ∆f) | 1000 | -25 |
| 832-862 | 470 ≤ *f* ≤ 790 | 8000 | -65 |

TABLE X3

Spurious emissions for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmit frequency range (MHz) | Measurement frequency range (MHz) | Measurement bandwidth (KHz) | Maximum Emission Level (dBm) |
| 698-798 | 30 ≤ *f* < 4310  (25 MHz ≤ ∆f) | 100 | -13 |
| 746-758, 776-788 | 763≤*f*≤ 775, 793≤*f*≤ 805 | 6.25 | -35 |
| 758-763, 763-768, 788-793, 793-798 | 769≤*f*≤ 775, 799≤*f*≤ 805 | 6.25 | -35 |
| 797-862 | 797 ≤ *f* ≤ 862  (25 MHz ≤ ∆f) | 5000 | -37 |
| 797-862 | 790 ≤ *f* ≤ 791 | 1000 | -44 |
| 832-862 | 821 ≤ *f* ≤ 862  (25 MHz ≤ ∆f) | 1000 | -25 |
| 832-862 | 470 ≤ *f* ≤ 790 | 8000 | -65 |

## 2.15 Spurious emission for FDD equipment operating in the bands 880-915 / 925-960 MHz (BCG 7.G)

The limits shown in Tables X1 and X2 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the mobile station center frequency. In the Table | Δf | is fc-f, where f is the frequency of the spurious domain emissions and fc is the mobile station transmit center frequency. All spurious emission specifications are of conducted type.

TABLE X1

Spurious emissions

|  |  |  |  |
| --- | --- | --- | --- |
| Transmitter Center Frequency (fc) (MHz) | Spurious Frequency (*f*) Range | Integration Bandwidth | Maximum Emission Level (dBm) |
| 880-915 | 9 kHz ≤ *f* < 150 kHz | 1 kHz | -36 |
| 880-915 | 150 kHz ≤ *f* < 30 MHz | 10 kHz | -36 |
| 880-915 | 30 MHz ≤ *f* < 1000 MHz | 100 kHz | -36 (1) |
| 880-915 | 1 GHz ≤ *f* < 12.75 GHz | 30 kHz, If 12.5 MHz <=∆*f* < 50 MHz  300 kHz, If 50 MHz<=∆*f* < 60 MHz  1 MHz, If 60 MHz<=∆*f* | -30 |

TABLE X2

Additional spurious emission

|  |  |  |  |
| --- | --- | --- | --- |
| **Transmitter Center Frequency (fc) (MHz)** | **Spurious Frequency (*f*) Range (MHz)** | **Measurement Bandwidth (MHz)** | **Maximum Emission Level (dBm)** |
| 880-915 | 925-960 | 1 | -50 |
| 1805-1880 (1) | 1 | -50 |
| 1880–1920 | 1 | -50 |
| 1900–1920 | 1 | -50 |
| 2010–2025 | 1 | -50 |
| 2110-2170 | 1 | -50 |
| 2300–2400 | 1 | -50 |
| 2570–2620 | 1 | -50 |
| 2620-2690 (2) | 1 | -50 |

With respect to the spurious frequencies of the range indicated by (1) and (2) in Table X1, exceptions in measurements are allowed for harmonic spurious emissions where the harmonics are 2nd or 3rd harmonics of in-channel transmissions. In these exception cases, the maximum emission level (-36 dBm/100KHz) shown at (1) in Table X1 is applicable.

## 2.16 Spurious emission for TDD equipment operating in the bands 1 785-1 805, 1 880-1 920, 1 910-1 930, 2 010-2 025, and 1 900-1 920 MHz (BCG 8.A)

The limits shown in the Table XI to Table X4 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency. In the table, f is the frequency of the spurious domain emissions.

In all of the following tables, measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included here.

TABLE X1

Spurious emission for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmitter Center Frequency (fc) (MHz) | Spurious Frequency (*f*) Range | Integration Bandwidth | Maximum Emission Level (dBm) |
| 1787.5-1802.5  1882.5-1917.5  1912.5-1927.5  2012.5-2022.5  1902.5-1917.5 | 9 kHz ≤ *f* < 150 kHz | 1 kHz | -36 |
| 1787.5-1802.5  1882.5-1917.5  1912.5-1927.5  2012.5-2022.5  1902.5-1917.5 | 150 kHz ≤ *f* < 30 MHz | 10 kHz | -36 |
| 1787.5-1802.5  1882.5-1917.5  1912.5-1927.5  2012.5-2022.5  1902.5-1917.5 | 30 MHz ≤ *f* < 1000 MHz | 100 kHz | -36 |
| 1787.5-1802.5  1882.5-1917.5  1912.5-1927.5  2012.5-2022.5  1902.5-1917.5 | 1 GHz ≤ *f* < 12.75 GHz | 30 kHz, If 12.5 MHz <=*∆f* < 50 MHz  300 kHz, If 50 MHz<=∆*f* < 60 MHz  1 MHz, If 60 MHz<=*∆f* | -30 |

TABLE X2

Spurious emission for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| Transmitter Center Frequency (fc) (MHz) | Spurious Frequency (*f*) Range | Integration Bandwidth | Maximum Emission Level (dBm) |
| 1790-1800  1885-1915  1915-1925  2015-2020  1905-1915 | 9 kHz ≤ *f* < 150 kHz | 1 kHz | -36 |
| 1790-1800  1885-1915  1915-1925  2015-2020  1905-1915 | 150 kHz ≤ *f* < 30 MHz | 10 kHz | -36 |
| 1790-1800  1885-1915  1915-1925  2015-2020  1905-1915 | 30 MHz ≤ *f* < 1000 MHz | 100 kHz | -36 |
| 1790-1800  1885-1915  1915-1925  2015-2020  1905-1915 | 1 GHz ≤ *f* < 12.75 GHz | 30 kHz, If 12.5 MHz <=*∆f* < 50 MHz  300 kHz, If 50 MHz<=*∆f* < 60 MHz  1 MHz, If 60 MHz<=*∆f* | -30 |

TABLE X3

Additional spurious emission for 5 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Transmitter Center Frequency (fc) (MHz)** | **Spurious frequency (*f*) range (MHz)** | **Measurement bandwidth (KHz)** | **Maximum Emission Level (dBm)** |
| 1882.5-1917.5 | 2010–2025  2300-2400 | 1000 | -50 |
| 1902.5-1917.5 | 925-960  1880-1920  1930-1990  2010-2025  2110-2170  2300-2400  2570-2620 | 1000 | -50 |
| 2012.5-2022.5 | 2110-2170  1805-1880  2620-2690  925-960  1844.9-1879.9  1475.9-1500.9  1900-1920  2570-2620  1880-1920  2300-2400 | 1000 | -50 |
| 860-895 | 1000 | -50 |
| 1884.5-1919.6 | 300 | -41 |

TABLE X4

Additional spurious emission for 10 MHz carrier

|  |  |  |  |
| --- | --- | --- | --- |
| **Transmitter Center Frequency (fc) (MHz)** | **Spurious frequency (*f*) range (MHz)** | **Measurement bandwidth (KHz)** | **Maximum Emission Level (dBm)** |
| 1885-1915 | 2010–2025  2300-2400 | 1000 | -50 |
| 1905-1915 | 925-960  1880-1920  1930-1990  2010-2025  2110-2170  2300-2400  2570-2620 | 1000 | -50 |
| 2015-2020 | 2110-2170  1805-1880  2620-2690  925-960  1844.9-1879.9  1475.9-1500.9  1900-1920  2570-2620  1880-1920  2300-2400 | 1000 | -50 |
| 860-895 | 1000 | -50 |
| 1884.5-1919.6 | 300 | -41 |

# 3 Receiver spurious emissions (conducted)

## 3.1 Spurious emissions for TDD equipment operating in the band 2 500-2 690 MHz (BCG 3.A)

Table 22 specifies the spurious emissions for TDD Mobile Stations with 10 and 5 MHz channel bandwidths. The power of any narrow-band spurious emission should not exceed the maximum level specified in Table 22.

TABLE 22

General receiver spurious emission requirements

|  |  |  |
| --- | --- | --- |
| Band | Measurement bandwidth | Allowed emission level (dBm) |
| 30 MHz ≤ f  1 GHz | 100 kHz | −57 |
| 1 GHz ≤ f ≤ 13.45 GHz | 30 kHz If 2.5 × BW ≤ | fc − f | < 10 × BW  300 kHz If 10 × BW ≤ | fc − f | < 12 × BW  1 MHz If 12 × BW ≤ | fc − f | | −47 |

# 4 Adjacent channel leakage ratio (ACLR)

Within this Annex, and in a similar manner to other annexes, the ACLR is defined as the ratio of the on-channel transmitted power to the power transmitted in adjacent channels as measured at the output of the receiver filter. In order to measure ACLR, it is necessary to consider a measurement filter for the transmitted signal as well as a receiver measurement bandwidth for the adjacent channel (victim) system.

## 4.1 ACLR of TDD equipment operating in the frequency range 2 300-2 400 MHz (BCG 1A/1B)

ACLR is therefore specified considering the following receiver bandwidths:

When the adjacent system is OFDMA TDD WMAN:

– 4.75 MHz for a 5 MHz channelized system,

– 8.3125 MHz for a 8.75 MHz channelized system, and

– 9.5 MHz for a 10 MHz channelized system.

The measurement bandwidth for the measurement of on-channel power of the OFDMA TDD WMAN carrier is:

– 4.75 MHz for a 5 MHz channelized system,

– 8.3125 MHz for a 8.75 MHz channelized system, and

– 9.5 MHz for a 10 MHz channelized system.

The passband of the receiver filter is centered on the first or second adjacent channel centre frequency. In the case where the adjacent system is OFDMA TDD WAN, both the transmitted power and the received power are measured with a rectangular filter. For adjacent UTRA systems the transmitted power is measured using a rectangular filter and the received power using a RRC filter with a roll-off factor of 0.22.

Tables 23 to 25 specify the ACLR for TDD mobile stations with 5, 8.75 and 10 MHz channel bandwidths.

TABLE 23

Mobile station ACLR for 5 MHz channel bandwidth

|  |  |
| --- | --- |
| Adjacent channel centre frequency | Minimum required ACLR relative to assigned channel frequency (dB) |
| Mobile station channel centre frequency ± 5 MHz | 30 |
| Mobile station channel centre frequency ± 10 MHz | 44 |

TABLE 24

Mobile station ACLR for 8.75 MHz channel bandwidth

|  |  |
| --- | --- |
| Adjacent channel centre frequency | Minimum required ACLR relative to assigned channel frequency (dB) |
| Mobile station channel centre frequency ± 8.75 MHz | 30 |
| Mobile station channel centre frequency ± 17.5 MHz | 44 |

TABLE 25

Mobile station ACLR for 10 MHz channel bandwidth

|  |  |
| --- | --- |
| Adjacent channel centre frequency | Minimum required ACLR relative to assigned channel frequency (dB) |
| Mobile station channel centre frequency ± 10 MHz | 30 |
| Mobile station channel centre frequency ± 20 MHz | 44 |

## 4.2 ACLR of TDD equipment operating in the frequency range 2 500-2 690 MHz (BCG 3.A)

In this section, data is provided that is relevant to the case where the adjacent system is OFDMA TDD WMAN (intra-system) or the case where the adjacent system is UTRA (inter‑system).

ACLR is therefore specified considering the following receiver bandwidths:

When the adjacent system is OFDMA TDD WMAN:

– 4.75 MHz for a 5 MHz channelized system, and

– 9.5 MHz for a 10 MHz channelized system.

When the adjacent system is UTRA:

– 3.84 MHz for a 5 MHz channelized system, and

– 7.68 MHz for a 10 MHz channelized system.

The measurement bandwidth for the measurement of on-channel power of the OFDMA TDD WMAN carrier is:

– 4.75 MHz for a 5 MHz channelized system, and

– 9.5 MHz for a 10 MHz channelized system.

The passband of the receiver filter is centred on the first or second adjacent channel centre frequency. In the case where the adjacent system is OFDMA TDD WAN, both the transmitted power and the received power are measured with a rectangular filter. For adjacent UTRA systems the transmitted power is measured using a rectangular filter and the received power using a RRC filter with a roll-off factor of 0.22.

The ACLR values for TDD mobile stations relevant to the two cases are provided in the Tables 26 and 27 for 5 and 10 MHz channel bandwidths respectively.

TABLE 26

MS ACLR for 5 MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
|  | **Minimum required ACLR relative to assigned  channel frequency (dB)** | |
| Adjacent channel centre frequency | OFDMA TDD WMAN case | UTRA(1) case |
| MS channel centre frequency ± 5 MHz | 30 | 33 |
| MS channel centre frequency ± 10 MHz | 44 | 43 |
| (1) These are similar to the minimum requirements for UTRA systems (see Annexes 1 and 3 to this Recommendation) and in practice may be expected to be larger. | | |

TABLE 27

MS ACLR for 10 MHz channel bandwidth

|  |  |  |
| --- | --- | --- |
|  | **Minimum required ACLR relative to assigned  channel frequency (dB)** | |
| Adjacent channel centre frequency | OFDMA TDD WMAN case | UTRA(1) case |
| MS channel centre frequency ± 10 MHz | 30 | 33 |
| MS channel centre frequency ± 20 MHz | 44 | 43 |
| (1) These are similar to the minimum requirements for UTRA systems (see Annexes 1 and 3 to this Recommendation) and in practice may be expected to be larger. | | |

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

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

## 4.3 ACLR of TDD equipment operating in the frequency range 3 400-3 600 MHz (BCG 5L.A/5L.B/5L.C)

In this section, data is provided that is relevant to the case where the adjacent system is OFDMA TDD WMAN (intra-system).

ACLR is therefore specified considering the following receiver bandwidth.

When the adjacent system is OFDMA TDD WMAN:

– 4.75 MHz for a 5 MHz channelized system,

– 6.7 MHz for a 7 MHz channelized system, and

– 9.5 MHz for a 10 MHz channelized system.

The measurement bandwidth for the measurement of on-channel power of the OFDMA TDD WMAN carrier is:

– 4.75 MHz for a 5 MHz channelized system,

– 6.7 MHz for a 7 MHz channelized system, and

– 9.5 MHz for a 10 MHz channelized system.

The passband of the receiver filter is centred on the first or second adjacent channel centre frequency. In the case where the adjacent system is OFDMA TDD WAN, both the transmitted power and the received power are measured with a rectangular filter.

Tables 28 to 30 specify the ACLR for TDD mobile stations with 5 and 10 MHz channel bandwidths. The values listed in the tables are applicable when the adjacent channel mean power is greater than −55 dBm.

TABLE 28

Mobile station ACLR for 5 MHz channel bandwidths

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **ACLR limit relative to assigned channel frequency (dB)** |
| Mobile station channel centre frequency ± 5 MHz | 33 |
| Mobile station channel centre frequency ± 10 MHz | 43 |

TABLE 29

Mobile station ACLR for 7 MHz channel bandwidths

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **ACLR limit relative to assigned channel frequency (dB)** |
| Mobile station channel centre frequency ± 7 MHz | 33 |
| Mobile station channel centre frequency ± 14 MHz | 43 |

TABLE 30

Mobile station ACLR for 10 MHz channel bandwidths

|  |  |
| --- | --- |
| **Adjacent channel centre frequency** | **ACLR limit relative to assigned channel frequency (dB)** |
| Mobile station channel centre frequency ± 10 MHz | 33 |
| Mobile station channel centre frequency ± 20 MHz | 43 |

# 5 Test tolerance

In this Annex, the test tolerances (as defined in Recommendation ITU-R M.1545) corresponding to various specifications are 0 dB unless stated otherwise in the corresponding section.

Appendix 1  
  
Definition of test tolerance

Test tolerance

With reference to Recommendation ITU-R M.1545, “test tolerance” is the relaxation value referred to in *recommends* 2 of Recommendation ITU-R M.1545, i.e. the difference between the core specification value and the test limit, evaluated applying the shared risk principle as per Figures 2 and 3 of Annex 1 of Recommendation ITU-R M.1545. In case the core specification value is equal to the test limit (Figure 3 of Annex 1 of Recommendation ITU-R M.1545) the “test tolerances” are equal to 0.

Attachment 3

Proposed changes to the bodies (note 5) of Recommendations ITU-R M.1580-3 and ITU-R M.1581-3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Band Class Group** | **Uplink MS Transmit Frequency (MHz)** | **Downlink MS Receive Frequency (MHz)** | **Channel Bandwidth (MHz)** | **Duplex Mode** |
| 1.A | 2300-2400 | 2300-2400 | 8.75 | TDD |
| 1.B | 2300-2400 | 2300-2400 | 5 and 10 | TDD |
| 2.D | 2305-2320, 2345-2360 | 2305-2320, 2345-2360 | 3.5, 5 and 10 | TDD |
| 2.E | 2345-2360 | 2305-2320 | 2x3.5, 2x5 and 2x10 | FDD |
| 2.F | 2345-2360 | 2305-2320 | 5 (Uplink), 10 (Downlink) | FDD |
| 3.A | 2496-2690 | 2496-2690 | 5 and 10 | TDD |
| 3.B | 2496-2572 | 2614-2690 | 2x5 and 2x10 | FDD |
| 4.A | 3300-3400 | 3300-3400 | 5 | TDD |
| 4.B | 3300-3400 | 3300-3400 | 7 | TDD |
| 4.C | 3300-3400 | 3300-3400 | 10 | TDD |
| 5L.A | 3400-3600 | 3400-3600 | 5 | TDD |
| 5L.B | 3400-3600 | 3400-3600 | 7 | TDD |
| 5L.C | 3400-3600 | 3400-3600 | 10 | TDD |
| 5.D | 3400-3500 | 3500-3600 | 2x5, 2x7 and 2x10 | FDD |
| 5H.A | 3600-3800 | 3600-3800 | 5 | TDD |
| 5H.B | 3600-3800 | 3600-3800 | 7 | TDD |
| 5H.C | 3600-3800 | 3600-3800 | 10 | TDD |
| 6.A | 1710-1770 | 2110-2170 | 2x5 and 2x10 | FDD |
| 6.B | 1920-1980 | 2110-2170 | 2x5 and 2x10 | FDD |
| 6.C | 1710-1785 | 1805-1880 | 2x5 and 2x10 | FDD |
| 7.A | 698-862 | 698-862 | 5, 7 and 10 | TDD |
| 7.B | 776-787 | 746-757 | 2x5 and 2x10 | FDD |
| 7.C | 788-793, 793-798 | 758-763, 763-768 | 2x5 | FDD |
| 7.D | 788-798 | 758-768 | 2x10 | FDD |
| 7.E | 698-862 | 698-862 | 5, 7 and 10 (TDD)  2x5, 2x7 and 2x10 (FDD) | TDD/FDD |
| 7.G | 880-915 | 925-960 | 2x5 and 2x10 | FDD |
| 8.A | 1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920 | 1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920 | 5 and 10 | TDD |

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