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**Mobile Radio Specifications**  
**Release 2**

**DRAFT-T23-005-R020v01-H**

**Working Draft**

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## TABLE OF CONTENTS

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<b>1</b>	<b>INTRODUCTION</b>	<b>7</b>
1.1	SCOPE	7
1.2	REFERENCES	7
1.3	DEFINITIONS, SYMBOLS AND ACRONYMS	7
1.3.1	<i>Definitions</i>	7
1.3.2	<i>Symbols</i>	7
1.3.3	<i>Acronyms</i>	8
<b>2</b>	<b>BAND CLASSES</b>	<b>9</b>
<b>3</b>	<b>RADIO FREQUENCY CHANNEL ARRANGEMENT</b>	<b>12</b>
3.1	CENTER FREQUENCY STEP SIZE	12
3.2	RF CHANNEL CENTER FREQUENCIES	12
<b>4</b>	<b>POWER CLASSES</b>	<b>16</b>
4.1	MOBILE STATION	16
<b>5</b>	<b>RADIO SPECIFICATIONS</b>	<b>17</b>
5.1	OUT OF BAND AND SPURIOUS EMISSION REGIONS	17
5.2	MOBILE STATION	17
5.2.1	<i>Default Specifications</i>	17
5.2.2	<i>Band Class 1</i>	18
5.2.3	<i>Band Class 3</i>	20
5.2.4	<i>Band Class 5</i>	23
5.2.5	<i>Band Class 6</i>	25
5.2.6	<i>Band Class 7</i>	30
5.2.7	<i>Band Class 8</i>	32
5.3	BASE STATION	34
5.3.1	<i>Default Specifications</i>	34
5.3.2	<i>Band Class 1</i>	36
5.3.3	<i>Band Class 3</i>	37
5.3.4	<i>Band Class 5</i>	41
5.3.5	<i>Band Class 6</i>	42
5.3.6	<i>Band Class 7</i>	48

## LIST OF TABLES

---

Table 1. List of Band Classes	9
Table 2. RF Channel Center Frequency Numbers	13
Table 3. Mobile Station Power Classes	16
Table 4. Channel Mask for 5 MHz Bandwidth	17
Table 5. Channel Mask for 10 MHz Bandwidth	17
Table 6. Channel Mask for 20 MHz Bandwidth	18
Table 7. Default Spurious Emissions; Relevant to $F_{UL-le} + ChBW/2 \leq f_c \leq F_{UL-ue} - ChBW/2$	18
Table 8. Channel Mask for 5 MHz Bandwidth (BCG 1.C)	19
Table 9. Channel Mask for 10 MHz Bandwidth (BCG 1.C)	19
Table 10. Additional Spurious Emissions for 5 MHz Channel Size (BCG 1.C)	19
Table 11. Channel Mask for 5 MHz Bandwidth (BCG 3.C)	20
Table 12. Channel Mask for 10 MHz Bandwidth (BCG 3.C)	20
Table 13. Additional Spurious Emissions for 5 MHz Channel Size (BCG 3.C)	21
Table 14. Additional Spurious Emissions for 5 MHz Channel Size (BCG 3.C)	21
Table 15. Additional Spurious Emissions for 10 MHz Channel Size (BCG 3.C)	21
Table 16. Spurious Emissions for 10 MHz Channel Size (BCG 3.C)	22
Table 17. Channel Mask for 10 MHz Bandwidth (BCG 3.D)	22
Table 18. Channel Mask for 5 MHz Bandwidth (BCG 3.D)	22
Table 19. Additional Spurious Emissions (BCG 3.D)	23
Table 20. Channel Mask for 5 MHz Channel Bandwidth (BCG 5L.E)	23
Table 21. Channel Mask for 10 MHz Channel Bandwidth (BCG 5L.E)	24
Table 22. Channel Mask for 5 MHz Bandwidth (BCG 6.D)	25
Table 23. Channel Mask for 10 MHz Bandwidth (BCG 6.D)	26
Table 24. Spurious Emissions (BCG 6.D)	26
Table 25. Spurious Emissions (BCG 6.E)	26
Table 26. Additional Spurious Emissions (BCG 6.E)	27
Table 27. Additional Spurious Emission (BCG 6.F)	27
Table 28. Channel Mask for 5 MHz Bandwidth (BCG 6.G)	28
Table 29. Channel Mask for 10 MHz Bandwidth (BCG 6.G)	28
Table 30. Spurious Emissions (BCG 6.G)	28
Table 31. Channel Mask for 5 MHz Bandwidth (BCG 6.H)	28
Table 32. Channel Mask for 10 MHz Bandwidth (BCG 6.H)	29
Table 33. Spurious Emissions (BCG 6.G)	29
Table 34. Channel Mask for 5 MHz Bandwidth (BCG 6.J)	29
Table 35. Channel Mask for 10 MHz Bandwidth (BCG 6.J)	29
Table 36. Spurious Emissions (BCG 6.J)	29
Table 37. Channel Mask for 5 MHz Bandwidth: $700.5 \leq f_c \leq 795.5$ (BCG 7.H)	30
Table 38. Channel Mask for 5 MHz Bandwidth: $799.5 \leq f_c \leq 859.5$ (BCG 7.H)	30
Table 39. Channel Mask for 10 MHz Bandwidth: $703 \leq f_c \leq 793$ (BCG 7.H)	31
Table 40. Channel Mask for 10 MHz Bandwidth: $802 \leq f_c \leq 857$ (BCG 7.H)	31
Table 41. Spurious Emissions (BCG 7.H)	31
Table 42. Additional Spurious Emissions (BCG 8.C)	32
Table 43. Additional Spurious Emissions (BCG 8.E)	32
Table 44. Additional Spurious Emissions (BCG 8.F)	32
Table 45. Channel Mask for 5 MHz Bandwidth	34
Table 46. Channel Mask for 10 MHz Bandwidth	34
Table 47. Channel Mask for 20 MHz Bandwidth	35
Table 48. Default Spurious Emissions; Relevant to $F_{DL-le} + ChBW/2 \leq f_c \leq F_{DL-ue} - ChBW/2$	35
Table 49. Channel Mask for 5 MHz (BCG 1.C)	36
Table 50. Channel Mask for 10 MHz (BCG 1.C)	36

Table 51. Base station spurious emission limit, Category A (BCG 1.C)	36
Table 52. Base station spurious emissions limit, Category B (BCG 1.C)	36
Table 53. Additional Spurious Emissions (BCG 1.C)	37
Table 54. Channel Mask for 5 MHz Bandwidth (BCG 3.C)	37
Table 55. Channel Mask for 5 MHz Bandwidth– Japan (BCG 3.C)	37
Table 56. Channel Mask for 10 MHz Bandwidth (BCG 3.C)	38
Table 57. Channel Mask for 10 MHz Bandwidth– Japan (BCG 3.C)	38
Table 58. Base station spurious emission limit, Category A (BCG 3.C)	38
Table 59. Base station spurious emissions limit, Category B (BCG 3.C)	38
Table 60. Base station spurious emission limit, Japan (BCG 3.A)	38
Table 61. Channel Mask for 5 MHz Bandwidth -US (BCG 3.D)	39
Table 62. Channel Mask for 10 MHz Bandwidth -US (BCG 3.D)	39
Table 63. Channel Mask for 5 MHz Bandwidth-Europe (BCG 3.D)	40
Table 64. Channel Mask for 10 MHz Bandwidth-Europe (BCG 3.D)	40
Table 65. Spurious Emissions -US (BCG 3.D)	40
Table 66. Spurious Emissions for 5 MHz Bandwidth-Europe (BCG 3.D)	41
Table 67. Spurious Emissions for 10 MHz Bandwidth-Europe (BCG 3.D)	41
Table 68. BS Spurious Emissions Limits for protection of the BS receiver (BCG 3.D)	41
Table 69. Relative Transmit Spectral Power Density Channel Mask (BCG 5L.E)	41
Table 70. Absolute Spectral Emission Channel Mask (BCG 5L.E)	42
Table 71. Channel Mask for 5 MHz Bandwidth (BCG 6.D)	42
Table 72. Channel Mask for 10 MHz Bandwidth (BCG 6.D)	42
Table 73. Spurious Emissions (BCG 6.D)	43
Table 74. Channel Mask for 5 MHz Bandwidth (BCG 6.E)	43
Table 75. Channel Mask for 10 MHz Bandwidth (BCG 6.E)	43
Table 76. Channel Mask for 20 MHz Bandwidth (BCG 6.E)	44
Table 77. Spurious Emissions (BCG 6.E)	44
Table 78. Additional Spurious Emissions (BCG 6.E)	45
Table 79. Channel Mask - Europe: 5 MHz (BCG 6.F)	46
Table 80. Channel Mask - Europe: 10 MHz (BCG 6.F)	46
Table 81. Spurious Emission for 5 MHz Channel Bandwidth Size(BCG 6.F)	46
Table 82. Spurious Emission for 10 MHz Channel Bandwidth Size(BCG 6.F)	47
Table 83. Spurious Emissions Limits for protection of the BS receiver (BCG 6.F)	47
Table 84. Additional Spurious Emission (BCG 6.F)	47
Table 85. Channel Mask for 5 MHz Bandwidth -US (BCG 7.A-7.E)	48
Table 86. Channel Mask for 10 MHz Bandwidth -US (BCG 7.A-7.E)	48
Table 87. Channel Mask for 5 MHz Bandwidth -Europe (BCG 7.A-7.E)	49
Table 88. Channel Mask for 10 MHz Bandwidth -Europe (BCG 7.A-7.E)	49

# 1 Introduction

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The purpose of this document is to provide WiMAX Forum® mobile radio specifications for Release 2.

## 1.1 Scope

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This document specifies the WiMAX Forum® mobile radio specifications for Mobile Stations and Base Stations for various Mobile WiMAX™ band classes as specified in the band class list of Section 2.

## 1.2 References

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The following documents contain provisions that, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply.

- [1] DRAFT-T21-TBD-R020, Requirements for WiMAX Air Interface System Profile Release 2
- [2] WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT REVISION, Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RRs)
- [3] WMF-T23-001-R020, WiMAX Forum® Air Interface Specifications, WiMAX Forum® Mobile System Profile

## 1.3 Definitions, Symbols and Acronyms

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### 1.3.1 Definitions

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This section provides the list of definitions used throughout the document.

**Integration Bandwidth:** Integration Bandwidth refers to the frequency range over which the emission power is integrated.

### 1.3.2 Symbols

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This section provides the list of symbols used throughout the document along with their descriptions.

$f$	frequency in MHz unless specified otherwise.
$f_c$	center frequency in MHz unless specified otherwise.
$f_{cN}$	RF channel center frequency number
$\Delta f$	absolute value of frequency offset of frequency $f$ from the center frequency of the channel ( $ f_c - f $ ). The offset is in MHz unless specified otherwise.
$\Delta F_c$	center frequency step
$F_{start}$	start frequency for a specific band,
$N_{range}$	range values for the $n$ parameter
$PTx$	measured transmit power into antenna in dBm
$PTx,max$	measured maximum transmit power into antenna in dBm
$RFChannel_n$	center frequency of RF Channel $n$
$F_{UL-le}$	Lower edge of uplink portion of the band
$F_{UL-ue}$	Upper edge of uplink portion of the band
$F_{ue}$	Upper edge of the band (either uplink or downlink whichever larger)
$F_{DL-le}$	Lower edge of downlink portion of the band
$F_{DL-ue}$	Upper edge of downlink portion of the band

### 1.3.3 Acronyms

---

This section provides the list of acronyms and abbreviations used throughout the document.

ACLR	adjacent channel leakage ratio
ACR	adjacent channel rejection
BCG	band class group
BS	base station
BW	bandwidth
ChBW	channel bandwidth
MS	mobile station
RF	radio frequency
Pnom	nominal max output power measured at antenna port(s); total for multiple antennas

## 2 Band Classes

The purpose of this section is to provide the list of Mobile WiMAX Release 2 Band Class Groups along with the supported channel bandwidths.

Table 1 lists R 2 BCGs along with R1.0/1.5 BCGs. Unlike in R 1.0/1.5 where specific channel bandwidth sizes are specified for various BCGs and two BCGs may differ only on supported channel bandwidth sizes, all R 2 BCGs, by default, support 5, 10 and 20 MHz channel bandwidth sizes unless the band allocation size is too small to allocate certain channel bandwidth size. Supports of other channel bandwidth sizes for R 2 BCGs are considered in a case by case basis.

**Table 1. List of Band Classes**

Band Class Group	Frequency Range (MHz)		Duplex Mode	Release	Channel Bandwidth Size (MHz)						
	Uplink	Downlink			3.5	5	7	8	8.75	10	20
1.A <sup>1</sup>	2300-2400	2300-2400	TDD	1.0					Y		
1.B <sup>1</sup>	2300-2400	2300-2400	TDD	1.0		Y				Y	
1.C	2300-2400	2300-2400	TDD	2.0		Y				Y	Y
2.D <sup>1</sup>	2305-2320, 2345-2360	2305-2320, 2345-2360	TDD	1.0	Y	Y				Y	
2.E <sup>1</sup>	2345-2360	2305-2320	FDD	1.5	Y	Y				Y	
2.F <sup>1,2</sup>	2345-2360	2305-2320	FDD	1.5		AUL				ADL	
3.A <sup>1</sup>	2496-2690	2496-2690	TDD	1.0		Y				Y	
3.B <sup>1</sup>	2496-2572	2614-2690	FDD	1.5		Y				Y	
3.C	2496-2690	2496-2690	TDD	2.0		Y				Y	Y
3.D	2496-2572	2614-2690	FDD	2.0		Y				Y	Y
4.A <sup>1</sup>	3300-3400	3300-3400	TDD	1.0		Y					
4.B <sup>1</sup>	3300-3400	3300-3400	TDD	1.0			Y				
4.C <sup>1</sup>	3300-3400	3300-3400	TDD	1.0						Y	
4.D	3300-3400	3300-3400	TDD	2.0		Y				Y	Y
5L.A <sup>1</sup>	3400-3600	3400-3600	TDD	1.0		Y					
5L.B <sup>1</sup>	3400-3600	3400-3600	TDD	1.0			Y				
5L.C <sup>1</sup>	3400-3600	3400-3600	TDD	1.0						Y	
5L.D <sup>1</sup>	3400-3500	3500-3600	FDD	1.5		Y	Y			Y	
5L.E	3400-3600	3400-3600	TDD	2.0		Y				Y	Y
5L.F	3400-3500	3500-3600	FDD	2.0		Y				Y	Y
5H.A <sup>1</sup>	3600-3800	3600-3800	TDD	1.0		Y					
5H.B <sup>1</sup>	3600-3800	3600-3800	TDD	1.0			Y				
5H.C <sup>1</sup>	3600-3800	3600-3800	TDD	1.0						Y	
5H.D	3600-3800	3600-3800	TDD	2.0		Y				Y	Y
6.A <sup>1</sup>	1710-1770	2110-2170	FDD	1.5		Y				Y	

<sup>1</sup> Release 1.0 and 1.5 legacy Band Class Groups are listed for reference. [Editor Note: Legacy BCGs may be removed later.]

<sup>2</sup> BCG 2.F is defined by Asymmetric channel bandwidths in UL (AUL) and DL (ADL).

6.B <sup>1</sup>	1920-1980	2110-2170	FDD	1.5		Y			Y	Y
6.C <sup>1</sup>	1710-1785	1805-1880	FDD	1.5		Y			Y	
6.D	1710-1770	2110-2170	FDD	2.0		Y			Y	Y
6.E	1920-1980	2110-2170	FDD	2.0		Y			Y	Y
6.F	1710-1785	1805-1880	FDD	2.0		Y			Y	Y
6.G	1710-1755	2110-2155	FDD	2.0		Y			Y	Y
6.H	1850-1910	1930-1990	FDD	2.0		Y			Y	Y
6.I	1710-1785, 1920-1980	1805-1880, 2110-2170	FDD	2.0		Y			Y	Y
6.J	1850-1910, 1710-1770	1930-1990, 2110-2170	FDD	2.0		Y			Y	Y
7.A <sup>1</sup>	698-862	698-862	TDD	1.0		Y	Y		Y	
7.B <sup>1</sup>	776-787	746-757	FDD	1.5		Y			Y	
7.C <sup>1</sup>	788-793, 793-798	758-763, 763-768	FDD	1.5					Y	
7.D <sup>1</sup>	788-798	758-768	FDD	1.5		Y				
7.E <sup>1</sup>	698-862	698-862	TDD/ FDD	1.5		Y	Y		Y	
7.F <sup>1</sup>	698-862	698-862	TDD	1.0				Y		
7.G <sup>1</sup>	880-915	925-960	FDD	1.5		Y			Y	
7.H	698-862	698-862	TDD	2.0		Y			Y	Y
7.I	824-849	869-894	FDD	2.0		Y			Y	Y
7.J	698-716, 776-793	728-746, 746-763	FDD	2.0		Y			Y	
7.K	791-821	832-862	FDD	2.0		Y			Y	Y
7.L	797-862	797-862	TDD	2.0		Y			Y	Y
7.M	756-806	698-748	FDD	2.0		Y			Y	Y
7.X[*]	730-770, 890-903, 915-950	730-770, 890-903, 915-950	TDD	1.5		Y			Y	
8.A <sup>1</sup>	1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920	1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920	TDD	1.5		Y			Y	
8.B	1785-1805	1785-1805	TDD	2.0		Y			Y	Y
8.C	1880-1920	1880-1920	TDD	2.0		Y			Y	Y
8.D	1910-1930	1910-1930	TDD	2.0		Y			Y	Y
8.E	2010-2025	2010-2025	TDD	2.0		Y			Y	
8.F	1900-1920	1900-1920	TDD	2.0		Y			Y	Y
8.G	1800-1830	1800-1830	TDD	1.0		Y			Y	
9.A	450-470	450-470	TDD	2.0		Y			Y	Y
9.B	450.0-457.5	462.5-470.0	FDD	2.0		Y				
9.C	450-455	465-470	FDD	2.0		Y				
9.D	170-202.5	170-202.5	TDD	1.0		Y				
10.A	5000-5150	5000-5150	TDD	1.0		Y			Y	

[\*Note: The details of Band Class Group 7.X including ACLR specifications are under development pending finalization of Japanese regulations.]

In Table 1, in the case of FDD channel bandwidth sizes are for uplink or downlink segments in a symmetric allocation.

For each Band Class Group, Mobile Stations are required to support operation over entire band as specified by Mobile WiMAX channel center frequency lists of Section 3.2. Base Stations are required to support at least three consecutive channels and only one channel bandwidth size.

## 3 Radio Frequency channel arrangement

---

### 3.1 Center frequency step size

---

The center frequency step size for Release 2 is 100 KHz.

For all Release 2 devices operating in legacy Release 1 mode (including mixed mode) for Release1 BCGs, the center frequency step size of 250 KHz is also supported for backward compatibility purposes. Table 2 also lists the 250 KHz center frequencies related to the relevant BCGs.

From the perspective of the Release 2 BS, it is to the discretion of Base Station vendors to choose the center frequency based on the 100 KHz or 250 KHz step size. More specifically, if the BS supports mixed 16e/16m mode through mixed frame structure, the BS needs to operate in center frequencies based on 250 KHz step size to be able to serve Release 1 devices. If the BS operates only in Release 2 TDD mode, the center frequencies can be chosen based on 100 KHz or 250 KHz step size.

### 3.2 RF channel center frequencies

---

Table 2 provides the set of RF channel center frequency numbers for various Band Class Groups. From Table 2, the RF channel center frequencies can be derived as a function of RF channel center frequency numbers using the following equation.

$$f_c = 0.05 \times f_{cN}$$

In here the RF channel center frequency ( $f_c$ ) is in MHz. The RF channel center frequency number ( $f_{cN}$ ) is a number between 9050 and 75950 corresponding to 452.5 MHz and 3797.5 MHz RF channel center frequencies respectively.

In Table 2, for each combination of Band Class Group and channel bandwidth size, the RF Channel Center Frequency Number Sets are specified using the following triple

$$(f_{cNstart}, f_{cNstop}, step)$$

where  $f_{cNstart}$  is the starting RF channel center frequency number assigned to the first RF channel center frequency in the BCG,  $f_{cNstop}$  is the ending RF channel center frequency number assigned to the last RF channel center frequency in the BCG and  $step$  is the RF channel center frequency number step size between  $f_{cNstart}$  and  $f_{cNstop}$ .

**Table 2. RF Channel Center Frequency Numbers**

Band Class Group	Frequency Range (MHz)		Duplex Mode	Channel BW	RF Channel Center Frequency Number Set	
	Uplink	Downlink			Uplink	Downlink
1.C	2300-2400	2300-2400	TDD	5	(46050, 47950, 2), (46050, 47950, 5)	(46050, 47950, 2), (46050, 47950, 5)
				10	(46100, 47900, 2), (46100, 47900, 5)	(46100, 47900, 2), (46100, 47900, 5)
				20	(46200, 47800, 2), (46200, 47800, 5)	(46200, 47800, 2), (46200, 47800, 5)
3.C	2496-2690	2496-2690	TDD	5	(49970, 53750, 2), (49970, 53750, 5)	(49970, 53750, 2), (49970, 53750, 5)
				10	(50020, 53700, 2), (50020, 53700, 5)	(50020, 53700, 2), (50020, 53700, 5)
				20	(50120, 53600, 2), (50120, 53600, 5)	(50120, 53600, 2), (50120, 53600, 5)
3.D	2496-2572	2614-2690	FDD	2x5	(49970, 51390, 2)	(52330, 53750, 2)
				2x10	(50020, 51340, 2)	(52380, 53700, 2)
				2x20	(50120, 51240, 2)	(52480, 53600, 2)
4.D	3300-3400	3300-3400	TDD	5	(66050, 67950, 2), (66050, 67950, 5)	(66050, 67950, 2), (66050, 67950, 5)
				10	(66100, 67900, 2), (66100, 67900, 5)	(66100, 67900, 2), (66100, 67900, 5)
				20	(66200, 67800, 2), (66200, 67800, 5)	(66200, 67800, 2), (66200, 67800, 5)
5L.E	3400-3600	3400-3600	TDD	5	(68050, 71950, 2), (68050, 71950, 5)	(68050, 71950, 2), (68050, 71950, 5)
				10	(68100, 71900, 2), (68100, 71900, 5)	(68100, 71900, 2), (68100, 71900, 5)
				20	(68200, 71800, 2), (68200, 71800, 5)	(68200, 71800, 2), (68200, 71800, 5)
5L.F	3400-3500	3500-3600	FDD	2x5	(68050, 69950, 2)	(70050, 71950, 2)
				2x10	(68100, 69900, 2)	(70100, 71900, 2)
				2x20	(68200, 69800, 2)	(70200, 71800, 2)
5H.D	3600-3800	3600-3800	TDD	5	(72050, 75950, 2), (72050, 75950, 5)	(72050, 75950, 2), (72050, 75950, 5)
				10	(72100, 75900, 2), (72100, 75900, 5)	(72100, 75900, 2), (72100, 75900, 5)
				20	(72200, 75800, 2), (72200, 75800, 5)	(72200, 75800, 2), (72200, 75800, 5)
6.D	1710-1770	2110-2170	FDD	2x5	(34250, 35350, 2)	(42250, 43350, 2)
				2x10	(34300, 35300, 2)	(42300, 43300, 2)
				2x20	(34400, 35200, 2)	(42400, 43200, 2)
6.E	1920-1980	2110-2170	FDD	2x5	(38450, 39550, 2)	(42250, 43350, 2)
				2x10	(38500, 39500, 2)	(42300, 43300, 2)
				2x20	(38600, 39400, 2)	(42400, 43200, 2)
6.F	1710-1785	1805-1880	FDD	2x5	(34250, 35650, 2)	(36150, 37550, 2)
				2x10	(34300, 35600, 2)	(36200, 37500, 2)
				2x20	(34200, 35500, 2)	(36300, 37400, 2)
6.G	1710-1755	2110-2155	FDD	2x5	(34250, 35050, 2)	(42250, 43050, 2)

				2x10	(34300, 35000, 2)	(42300, 43000, 2)
				2x20	(34400, 34900, 2)	(42400, 42900, 2)
6.H	1850-1910	1930-1990	FDD	2x5	(37050, 38150, 2)	(38650, 39750, 2)
				2x10	(37100, 38100, 2)	(38700, 39700, 2)
				2x20	(37200, 38000, 2)	(38800, 39600, 2)
6.I	1710-1785, 1920-1980	1805-1880, 2110-2170	FDD	2x5	(34250, 35650, 2), (38450, 39550, 2)	(36150, 37550, 2), (42250, 43350, 2)
				2x10	(34300, 35600, 2), (38500, 39500, 2)	(36200, 37500, 2), (42300, 43300, 2)
				2x20	(34200, 35500, 2), (38600, 39400, 2)	(36300, 37400, 2), (42400, 43200, 2)
6.J	1850-1910, 1710-1770	1930-1990, 2110-2170	FDD	2x5	(37050, 38150, 2), (34250, 35350, 2)	(38650, 39750, 2), (42250, 43350, 2)
				2x10	(37100, 38100, 2), (34300, 35300, 2)	(38700, 39700, 2), (42300, 43300, 2)
				2x20	(37200, 38000, 2), (34400, 35200, 2)	(38800, 39600, 2), (42400, 43200, 2)
7.H	698-862	698-862	TDD	5	(14010, 17190, 2), (14010, 17190, 5)	(14010, 17190, 2), (14010, 17190, 5)
				10	(14060, 17140, 2), (14060, 17140, 5)	(14060, 17140, 2), (14060, 17140, 5)
				20	(14160, 17040, 2), (14160, 17040, 5)	(14160, 17040, 2), (14160, 17040, 5)
7.I	824-849	869-894	FDD	2x5	(16530, 16930, 2)	(17430, 17830, 2)
				2x10	(16620, 16880, 2)	(17480, 17780, 2)
				2x20	(16720, 16780, 2)	(17580, 17680, 2)
7.J	698-716, 776-793	728-746, 746-763	FDD	2x5	(14010, 14270, 2), (15570, 15810, 2)	(14610, 14870, 2), (14970, 15210, 2)
				2x10	(14060, 14220, 2), (15620, 15760, 2)	(14610, 14870, 2), (15020, 15160, 2)
7.K	791-821	832-862	FDD	2x5	(15870, 16370, 2)	(16690, 17190, 2)
				2x10	(15920, 16320, 2)	(16740, 17140, 2)
				2x20	(16020, 16220, 2)	(16840, 17040, 2)
7.L	797-862	797-862	TDD	5	(15990, 17190, 2)	(15990, 17190, 2)
				10	(16040, 17140, 2)	(16040, 17140, 2)
				20	(16140, 17040, 2)	(15990, 17040, 2)
7.M	756-806	698-748	FDD	2x5	(15190, 16070, 2)	(14010, 14910, 2)
				2x10	(15250, 16020, 2)	(14060, 14860, 2)
				2x20	(15350, 15920, 2)	(14160, 14760, 2)
8.B	1785-1805	1785-1805	TDD	5	(35750, 36050, 2), (35750, 36050, 5)	(35750, 36050, 2), (35750, 36050, 5)
				10	(35800, 36000, 2), (35800, 36000, 5)	(35800, 36000, 2), (35800, 36000, 5)
				20	(35900, 35900, 2), (35900, 35900, 5)	(35900, 35900, 2), (35900, 35900, 5)
8.C	1880-1920	1880-1920	TDD	5	(37650, 38350, 2), (37650, 38350, 5)	(37650, 38350, 2), (37650, 38350, 5)
				10	(37700, 38300, 2), (37700, 38300, 5)	(37700, 38300, 2), (37700, 38300, 5)
				20	(38700, 38200, 2), (38700, 38200, 5)	(38700, 38200, 2), (38700, 38200, 5)

8.D	1910-1930	1910-1930	TDD	5	(38250, 38550, 2), (38250, 38550, 5)	(38250, 38550, 2), (38250, 38550, 5)
				10	(38300, 38500, 2), (38300, 38500, 5)	(38300, 38500, 2), (38300, 38500, 5)
				20	(38400, 38400, 2), (38400, 38400, 5)	(38400, 38400, 2), (38400, 38400, 5)
8.E	2010-2025	2010-2025	TDD	5	(40250, 40450, 2), (40250, 40450, 5)	(37650, 38350, 2), (40250, 40450, 2)
				10	(40300, 40400, 2), (40300, 40400, 5)	(40300, 40400, 2), (40300, 40400, 5)
8.F	1900-1920	1900-1920	TDD	5	(38050, 38350, 2), (38050, 38350, 5)	(38050, 38350, 2), (38050, 38350, 5)
				10	(38100, 38300, 2), (38100, 38300, 5)	(38100, 38300, 2), (38100, 38300, 5)
				20	(38200, 38200, 2), (38200, 38200, 5)	(38200, 38200, 2), (38200, 38200, 5)
9.A	450-470	450-470	TDD	5	(9050, 9350, 2)	(9050, 9350, 2)
				10	(9100, 9300, 2)	(9100, 9300, 2)
				20	(9200, 9250, 2)	(9200, 9250, 2)
9.B	450.0-457.5	462.5-470.0	FDD	2x5	(9050, 9100, 2)	(9300, 9350, 2)
9.C	450-455	465-470	FDD	2x5	(9050, 905, 2)	(9350, 9350, 2)

## 4 Power Classes

The purpose of this section is to specify the Power Class options for Mobile WiMAX Release 2.

### 4.1 Mobile Station

Table 3 provides the list of Mobile Station Power Classes per Band Class Groups.

[Per BCG power reduction capability is TBD for consideration.]

**Table 3. Mobile Station Power Classes**

Band Class Group	Power Class 1 Pnom (dBm)	Power Class 2 Pnom (dBm)	Power Class 3 Pnom (dBm)	Power Class 4 Pnom (dBm)	Power Class 5 Pnom (dBm)
1.C	Rsvd	20	23	26	Rsvd
3.C	Rsvd	20	23	26	Rsvd
3.D	Rsvd	20	23	26	Rsvd
4.D	Rsvd	20	23	26	Rsvd
5.EL	Rsvd	20	23	26	Rsvd
5.FL	Rsvd	20	23	26	Rsvd
5.DH	Rsvd	20	23	26	Rsvd
6.D	Rsvd	20	23	26	Rsvd
6.E	Rsvd	20	23	26	Rsvd
6.F	Rsvd	20	23	26	Rsvd
6.G	Rsvd	20	23	26	Rsvd
6.H	Rsvd	20	23	26	Rsvd
6.I	Rsvd	20	23	26	Rsvd
6.J	Rsvd	20	23	26	Rsvd
7.H	Rsvd	20	23	26	Rsvd
7.I	Rsvd	20	23	26	Rsvd
7.J	Rsvd	20	23	26	Rsvd
7.K	Rsvd	20	23	26	Rsvd
7.L	Rsvd	20	23	26	Rsvd
7.M	Rsvd	20	23	26	Rsvd
8.B	Rsvd	20	23	26	Rsvd
8.C	Rsvd	20	23	26	Rsvd
8.D	Rsvd	20	23	26	Rsvd
8.E	Rsvd	20	23	26	Rsvd
8.F	Rsvd	20	23	26	Rsvd
9.A	Rsvd	20	23	26	Rsvd
9.B	Rsvd	20	23	26	Rsvd
9C	Rsvd	20	23	26	Rsvd

## 5 Radio specifications

### 5.1 Out of Band and Spurious Emission Regions

The default out of band emission, where Channel Spectral Mask specifications is applicable, is the absolute value of  $\pm 250\%$  of channel bandwidth size from channel center frequency or lower and upper bound of the target band whichever is smaller. For frequencies beyond out of band region, the Spurious Emission specifications are applicable.

### 5.2 Mobile Station

The purpose of this section is to provide radio specification for Mobile Station.

#### 5.2.1 Default Specifications

##### 5.2.1.1 Default Channel Spectral Mask

Unless otherwise specified in other sub sections of Section 5 for specific bands, the spectrum masks of Table 4 and Table 5 are applicable.

**Table 4. Channel Mask for 5 MHz Bandwidth**

No	$\Delta f$ , offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f < 7.5$	1000	-10
3	$7.5 \leq \Delta f < 8.5$	1000	-13
4	$8.5 \leq \Delta f < 12.5$	1000	-25

Note: The first measurement position with a 50 kHz filter is at  $\Delta f$  equals to 2.525 MHz; the last is at  $\Delta f$  equals to 3.475 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 4.0 MHz; the last is at  $\Delta f$  equals to 12.0 MHz.

**Table 5. Channel Mask for 10 MHz Bandwidth**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 6$	100	-13
2	$6 \leq \Delta f < 10$	1000	-10
3	$10 \leq \Delta f < 15$	1000	-13
4	$15 \leq \Delta f < 25$	1000	-25

Note: The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 5.050 MHz; the last is at  $\Delta f$  equals to 5.950 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 6.5 MHz; the last is at  $\Delta f$  equals to 24.5 MHz.

**Table 6. Channel Mask for 20 MHz Bandwidth**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$10 \leq \Delta f < 11$	200	-13
2	$11 \leq \Delta f < 15$	1000	-10
3	$15 \leq \Delta f < 30$	1000	-13
4	$30 \leq \Delta f < 50$	1000	-25

Note: The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 10.050 MHz; the last is at  $\Delta f$  equals to 10.950 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 11.5 MHz; the last is at  $\Delta f$  equals to 49.5 MHz.

### 5.2.1.2 Default Spurious Emission

Unless otherwise specified in sub sections of Section 5 for specific bands, the default spurious emission specifications of Table 7 are applicable.

**Table 7. Default Spurious Emissions; Relevant to  $F_{UL-le} + ChBW/2 \leq f_c \leq F_{UL-ue} - ChBW/2$**

No	Spurious frequency (f) range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4	$1 \text{ GHz} \leq f < 5 \times F_{ue}$	30 kHz If $2.5 \times ChBW \leq \Delta f < 10 \times ChBW$ 300 kHz If $10 \times ChBW \leq \Delta f < 12 \times ChBW$ 1 MHz If $12 \times ChBW \leq \Delta f$	-30

## 5.2.2 Band Class 1

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### 5.2.2.1 Band Class Group 1.C

#### 5.2.2.1.1 Channel Spectral Mask

The channel mask for 5 MHz bandwidth is specified in Table 8.

**Table 8. Channel Mask for 5 MHz Bandwidth (BCG 1.C)**

No	$\Delta f$ offset from channel center (MHz)	Integration Bandwidth (kHz)	Allowed Emission Level (dBm/integration BW) at the antenna port.
1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f < 7.5$	1000	-13
3	$7.5 \leq \Delta f < 8$	500	-16
4	$8 \leq \Delta f < 10.4$	1000	-25
5	$10.4 \leq \Delta f < 12.5$	1000	-25

The channel mask for 10 MHz bandwidth is specified in Table 9.

**Table 9. Channel Mask for 10 MHz Bandwidth (BCG 1.C)**

No	$\Delta f$ offset from channel center (MHz)	Integration Bandwidth (kHz)	Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 6$	100	-13
2	$6 \leq \Delta f < 10$	1000	-13
3	$10 \leq \Delta f < 11$	1000	$-13-12(\Delta f - 10)$
4	$11 \leq \Delta f < 15$	1000	-25
5	$15 \leq \Delta f < 20$	1000	-25
6	$20 \leq \Delta f \leq 25$	1000	-25

#### 5.2.2.1.2 Spurious Emission Specification

**Table 10. Additional Spurious Emissions for 5 MHz Channel Size (BCG 1.C)**

No	Spurious frequency ( $f$ ) range (MHz)	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$2110 \leq f < 2170$	1	-50
2	$1805 \leq f < 1880$	1	-50
3	$2496 \leq f < 2690$	1	-50
4	$925 \leq f < 960$	1	-50
5	$1900 \leq f < 1920$	1	-50
6	$2010 \leq f < 2025$	1	-50
7	$2570 \leq f < 2620$	1	-50
8	$791 \leq f < 821$	1	-50

### 5.2.3 Band Class 3

#### 5.2.3.1 Band Class Group 3.C

##### 5.2.3.1.1 Channel Spectral Mask

The channel mask for 5 and 10 MHz channel bandwidths are specified in Table 11 and Table 12.

**Table 11. Channel Mask for 5 MHz Bandwidth (BCG 3.C)**

No	Offset from channel centre (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/integration BW) at the antenna port.
1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f < 7.5$	1000	-13
3	$7.5 \leq \Delta f < 8$	500	If $PTx \leq +23$ and $(2547.5 \leq f_c \leq 2622.5)$ then $-23 - 2.28(\Delta f - 7.5)$ else -16.00
4	$8 \leq \Delta f < 10.4$	1000	-25
5	$10.4 \leq \Delta f < 12.5$	1000	If $PTx \leq +23$ and $(2547.5 \leq f_c \leq 2622.5)$ then $-21 - 1.68(\Delta f - 8)$ else -25

**Table 12. Channel Mask for 10 MHz Bandwidth (BCG 3.C)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 6$	100	-13
2	$6 \leq \Delta f < 10$	1000	-13
3	$10 \leq \Delta f < 11$	1000	$-13 - 12(\Delta f - 10)$
4	$11 \leq \Delta f < 15$	1000	-25
5	$15 \leq \Delta f < 20$	1000	If $PTx \leq +23$ dBm and $(2550 \leq f_c \leq 2620)$ then $-21 - 32(\Delta f - 10.5)/19$ else

			-25
6	$20 \leq \Delta f \leq -25$	1000	If $PTx \leq +23$ dBm and $(2550 \leq f_c \leq 2620)$ then -37 else -25

### 5.2.3.1.2 Transmitter Spurious Emission

In addition to the default Spurious Emission specifications, the requirements of Table 13, Table 14, Table 15 and Table 16 are applicable.

**Table 13. Additional Spurious Emissions for 5 MHz Channel Size (BCG 3.C)**

No	Spurious frequency ( <i>f</i> ) range (MHz)	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$2505 \leq f < 2530$	1	-37
2	$2530 \leq f < 2535$	1	$1.7f - 4338$
3	$2535 \leq f < 2630$	1	$-21 - 1.68(\Delta f - 8)$ $12.5 \text{ MHz} < \Delta f < 17.5 \text{ MHz}$ -37 $17.5 \text{ MHz} < \Delta f < 22.5 \text{ MHz}$ -18 $22.5 \text{ MHz} < \Delta f$
4	$2630 \leq f < 2630$	1	$-13 - 8(f - 2627)/3.5$
5	$2630.5 \leq f < 2640$	1	$-21 - 16(f - 2630.5)/9.5$
6	$2640 \leq f < 2655$	1	-37

**Table 14. Additional Spurious Emissions for 5 MHz Channel Size (BCG 3.C)**

No	Spurious frequency ( <i>f</i> ) range (MHz)	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$2620 \leq f < 2690$	1	-40

Note: With respect to Table 14, for each RF channel used, up to five measurements in 2620-2635.84 and 2655-2690 MHz are exempt from the -40 dBm specification of Row 1 where a relaxed level of -30 dBm of Row 4 of Table 7 is applicable.

**Table 15. Additional Spurious Emissions for 10 MHz Channel Size (BCG 3.C)**

No	Spurious frequency ( <i>f</i> ) range (MHz)	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$2505 \leq f < 2530$	1	-37

2	$2530 \leq f < 2535$	1	1.7f-4338
3	$2535 \leq f < 2630$	1	-18 $25 \text{ MHz} < \Delta f$
4	$2630 \leq f < 2630.5$	1	$-13 - 8(f - 2627)/3.5$
5	$2630.5 \leq f < 2640$	1	$-21 - 16(f - 2630.5)/9.5$
6	$2640 \leq f < 2655$	1	-37

**Table 16. Spurious Emissions for 10 MHz Channel Size (BCG 3.C)**

No	Spurious frequency (f) range (MHz)	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$2620 \leq f < 2690$	1	-40

Note: With respect to Table 15, for each RF channel used, up to five measurements in 2620-2635.84 and 2655-2690 MHz are exempt from the -40 dBm specification of Row 1 where a relaxed level of -30 dBm of Row 4 of Table 7 is applicable.

### 5.2.3.2 Band Class Group 3.D

#### 5.2.3.2.1 Channel Spectral Mask

The channel mask for 10 MHz bandwidth is specified in Table 17.

**Table 17. Channel Mask for 10 MHz Bandwidth (BCG 3.D)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 6$	100	-13
2	$6 \leq \Delta f < 10$	1000	-13
3	$10 \leq \Delta f < 11$	1000	$-13 - 12(\Delta f - 10)$
4	$11 \leq \Delta f < 15$	1000	-25
5	$15 \leq \Delta f < 20$	1000	-25
6	$20 \leq \Delta f \leq 25$	1000	-25

The channel mask for 5 MHz bandwidth is specified in Table 18.

**Table 18. Channel Mask for 5 MHz Bandwidth (BCG 3.D)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/integration BW) at the antenna port.
1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f < 7.5$	1000	-13
3	$7.5 \leq \Delta f < 8$	500	-16

4	$8 \leq \Delta f < 10.4$	1000	-25
5	$10.4 \leq \Delta f < 12.5$	1000	-25

### 5.2.3.2.2 Transmitter Spurious Emission

In addition to the default Spurious Emission specifications, the requirements of Table 19 are applicable.

**Table 19. Additional Spurious Emissions (BCG 3.D)**

No	Spurious frequency (f) range (MHz)	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	2110-2170	1	-50
2	1805-1880	1	-50
3	2620-2690	1	-50
4	925-960	1	-50
5	1900-1920	1	-50
6	2010-2025	1	-50
7	2570-2620	1	-50

## 5.2.4 Band Class 5

### 5.2.4.1 Band Class Group 5L.E

#### 5.2.4.1.1 Channel Spectral Mask

**Table 20. Channel Mask for 5 MHz Channel Bandwidth (BCG 5L.E)**

No	Frequency offset $\Delta f$ (MHz)	Maximum Emission Level (dBc)	Measurement bandwidth
1	$2.5 \leq \Delta f < 3.5$	$-33.5-15(\Delta f-2.5)$	30 kHz
2	$3.5 \leq \Delta f < 7.5$	$-33.5-1(\Delta f-3.5)$	1 MHz
3	$7.5 \leq \Delta f < 8.5$	$-37.5-10(\Delta f-7.5)$	1 MHz
4	$8.5 \leq \Delta f \leq 12.5$	-47.5	1 MHz

Notes:

1. The out-of-channel emission is specified as power level measured over the specified measurement bandwidth relative to the total mean power of the MS carrier measured in the 5 MHz channel.
2. The MS emission shall not exceed the levels specified in Table 20. Assuming specific power classes, relative specifications of Table 20 can be converted to absolute values for testing purposes.
3. In additions, for center carrier frequencies within 3650-3700 MHz range, all emission levels shall not exceed -13 dBm/MHz.
4. The first measurement position with a 30 kHz filter is at  $\Delta f$  equals to 2.515 MHz; the last is at  $\Delta f$  equals to 3.485 MHz.

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5. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 4 MHz; the last is at  $\Delta f$  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.
  6. Note that equivalent PSD type mask can be derived by applying  $10 \cdot \log((5 \text{ MHz})/(30 \text{ kHz})) = 22.2 \text{ dB}$  and  $10 \cdot \log((5 \text{ MHz})/(1 \text{ MHz})) = 7 \text{ dB}$  scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively.

**Table 21. Channel Mask for 10 MHz Channel Bandwidth (BCG 5L.E)**

No	Frequency offset $\Delta f$ (MHz)	Maximum Emission Level (dBc)	Measurement bandwidth
1	$5.0 \leq \Delta f < 7.0$	$-33.5-9(\Delta f-5.0)$	30 kHz
2	$7.0 \leq \Delta f < 15.0$	$-36.5-0.5(\Delta f-7.0)$	1 MHz
3	$15.0 \leq \Delta f < 17.0$	$-40.5-5(\Delta f-15.0)$	1 MHz
4	$17.0 \leq \Delta f \leq 25.0$	-50.5	1 MHz

Notes:

1. The spectrum emission mask of the MS applies to frequency offsets between 5.0 MHz and 25.0 MHz on both sides of the MS 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 MS carrier measured in the 10 MHz channel.
2. The MS emission shall not exceed the levels specified in Table 21. Assuming specific power classes, relative specifications of Table 21 can be converted to absolute values for testing purposes.
3. In additions, for center carrier frequencies within 3650-3700 MHz range, all emission levels shall not exceed -13 dBm/MHz.
4. The first measurement position with a 30 kHz filter is at  $\Delta f$  equals to 510.015 MHz; the last is at  $\Delta f$  equals to 6.985 MHz.
5. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 7.5 MHz; the last is at  $\Delta f$  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.
6. Equivalent PSD type mask can be derived by applying  $10 \cdot \log((10 \text{ MHz})/(30 \text{ kHz})) = 25.2 \text{ dB}$  and  $10 \cdot \log((10 \text{ MHz})/(1 \text{ MHz})) = 10 \text{ dB}$  scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively.

## 5.2.5 Band Class 6

### 5.2.5.1 Band Class Group 6.D

#### 5.2.5.1.1 Channel Spectral Mask

Table 22 and Table 23 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

**Table 22. Channel Mask for 5 MHz Bandwidth (BCG 6.D)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/integration BW) at the antenna port
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1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f \leq 12.5$	1000	-13

**Table 23. Channel Mask for 10 MHz Bandwidth (BCG 6.D)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 6$	100	-13
2	$6 \leq \Delta f \leq 25$	1000	-13

### 5.2.5.1.2 Spurious Emission Specifications

In addition to the default Spurious Emission specifications, the requirements of Table 24 are applicable.

**Table 24. Spurious Emissions (BCG 6.D)**

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 8.850 \text{ GHz}$	1	-13

### 5.2.5.2 Band Class Group 6.E

#### 5.2.5.2.1 Transmitter Spurious Emission Specification

Table 25 and Table 26 specify the additional spurious emission limits.

**Table 25. Spurious Emissions (BCG 6.E)**

No	Measurement frequency range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3	$30 \text{ MHz} \leq f < 1000 \text{ GHz}$	100 kHz	-36
4	$1 \text{ GHz} \leq f < 9.900 \text{ GHz}$	1 MHz	-30

**Table 26. Additional Spurious Emissions (BCG 6.E)**

No	Spurious frequency (f) range (MHz)	Measurement bandwidth	Maximum Emission Level (dBm)
1	2110-2170	1 MHz	-50
2	1805-1880	1 MHz	-50
3	2620-2690	1 MHz	-50
4	925-960	1 MHz	-50
5	1844.9-1879.9	1 MHz	-50
6	1475.9-1500.9	1 MHz	-50
7	1900-1920	1 MHz	-50
8	2010-2025	1 MHz	-50
9	2570-2620	1 MHz	-50
11	1880-1920	1 MHz	-50
12	2300-2400	1 MHz	-50
13	860-895	1 MHz	-50
14	1884.5-1919.6	300 KHz	-41

### 5.2.5.3 Band Class Group 6.F

#### 5.2.5.3.1 Transmitter Spurious Emission Specification

Table 27 specifies the additional spurious emission limits.

**Table 27. Additional Spurious Emission (BCG 6.F)**

No	Transmitter Center Frequency (f <sub>c</sub> ) (MHz)	Spurious Frequency (f) Range (MHz)	Measurement Bandwidth (MHz)	Maximum Emission Level (dBm)
1.	1710-1785	925-960	1	-50
2.	1710-1785	1475.9–1500.9	1	-50
3.	1710-1785	1805-1880	1	-50
4.	1710-1785	1844.9–1879.9	1	-50
5.	1710-1785	1900–1920	1	-50
6.	1710-1785	2010–2025	1	-50
7.	1710-1785	2110-2170	1	-50
8.	1710-1785	2570–2620	1	-50
9.	1710-1785	2620-2690	1	-50
10.	1710-1785	2300–2400	1	-50
11.	1710-1785	791-821	1	-50

### 5.2.5.4 Band Class Group 6.G

#### 5.2.5.4.1 Channel Spectral Mask

Table 28 and Table 29 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

**Table 28. Channel Mask for 5 MHz Bandwidth (BCG 6.G)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/integration BW) at the antenna port
1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f \leq 12.5$	1000	-13

**Table 29. Channel Mask for 10 MHz Bandwidth (BCG 6.G)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 6$	100	-13
2	$6 \leq \Delta f \leq 25$	1000	-13

#### 5.2.5.4.2 Spurious Emission Specifications

In addition to the default Spurious Emission specifications, the requirements of Table 30 are applicable.

**Table 30. Spurious Emissions (BCG 6.G)**

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 8.775 \text{ GHz}$	1	-13

### 5.2.5.5 Band Class Group 6.H

#### 5.2.5.5.1 Channel Spectral Mask

Table 31 and Table 32 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

**Table 31. Channel Mask for 5 MHz Bandwidth (BCG 6.H)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/integration BW) at the antenna port
1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f \leq 12.5$	1000	-13

**Table 32. Channel Mask for 10 MHz Bandwidth (BCG 6.H)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 6$	100	-13
2	$6 \leq \Delta f \leq 25$	1000	-13

**5.2.5.5.2 Spurious Emission Specifications**

In addition to the default Spurious Emission specifications, the requirements of Table 33 are applicable.

**Table 33. Spurious Emissions (BCG 6.G)**

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 9.550 \text{ GHz}$	1	-13

**5.2.5.6 Band Class Group 6.J**

**5.2.5.6.1 Channel Spectral Mask**

Table 34 and Table 35 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

**Table 34. Channel Mask for 5 MHz Bandwidth (BCG 6.J)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/integration BW) at the antenna port
1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f \leq 12.5$	1000	-13

**Table 35. Channel Mask for 10 MHz Bandwidth (BCG 6.J)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 6$	100	-13
2	$6 \leq \Delta f \leq 25$	1000	-13

**5.2.5.6.2 Spurious Emission Specifications**

In addition to the default Spurious Emission specifications, the requirements of Table 36 are applicable.

**Table 36. Spurious Emissions (BCG 6.J)**

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 9.550 \text{ GHz}$	1	-13

## 5.2.6 Band Class 7

### 5.2.6.1 Band Class Group 7.H

#### 5.2.6.1.1 Channel Spectral Mask

Table 37 and Table 38 specify the spectrum emission mask with 5 MHz channel bandwidths.

**Table 37. Channel Mask for 5 MHz Bandwidth:  $700.5 \leq f_c \leq 795.5$  (BCG 7.H)**

No	Frequency offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 2.6$	30	-13
2	$2.6 \leq \Delta f < 12.5$	100	-13

Notes: The first measurement position with a 30 kHz filter is at  $\Delta f$  equals to 2.515 MHz; the last is at  $\Delta f$  equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 2.650 MHz; the last is at  $\Delta f$  equals to 12.450 MHz.

**Table 38. Channel Mask for 5 MHz Bandwidth:  $799.5 \leq f_c \leq 859.5$  (BCG 7.H)**

No	Frequency offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (MHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 7.5$	5	1.6
2	$7.5 \leq \Delta f < 12.5$	2	-10

Notes: The measurement position with a 5 MHz filter is at  $\Delta f$  equals to 5 MHz. The first measurement position with a 2 MHz filter is at  $\Delta f$  equals to 8.5 MHz; the last is at  $\Delta f$  equals to 11.5 MHz.

Table 39 and Table 40 specify the spectrum emission mask with 10 MHz channel bandwidths.

**Table 39. Channel Mask for 10 MHz Bandwidth:  $703 \leq f_c \leq 793$  (BCG 7.H)**

No	Frequency offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5.0 \leq \Delta f < 5.1$	30	-13
2	$5.1 \leq \Delta f \leq 25.0$	100	-13

Notes: The first measurement position with a 30 kHz filter is at  $\Delta f$  equals to 5.015 MHz; the last is at  $\Delta f$  equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 5.150 MHz; the last is at  $\Delta f$  equals to 24.950 MHz.

**Table 40. Channel Mask for 10 MHz Bandwidth:  $802 \leq f_c \leq 857$  (BCG 7.H)**

No	Frequency offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (MHz)	Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 10$	5	1.6
2	$10 \leq \Delta f \leq 25$	2	-10

Notes: The measurement position with a 5 MHz filter is at  $\Delta f$  equals to 7.5 MHz. The first measurement position with a 2 MHz filter is at  $\Delta f$  equals to 11 MHz; the last is at  $\Delta f$  equals to 24 MHz.

#### 5.2.6.1.2 Transmitter Spurious Emission Specification

Table 41 specify the additional spurious emission limits.

**Table 41. Spurious Emissions (BCG 7.H)**

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	698-798	$30 \leq f < 4310$	100	-13
2	746-758, 776-788	$763 \leq f \leq 775, 793 \leq f \leq 805$	6.25	-35
3	758-763, 763-768, 788-793, 793-798	$769 \leq f \leq 775, 799 \leq f \leq 805$	6.25	-35
4	797-862	$797 \leq f \leq 862$	5000	-37

5	797-862	$790 \leq f \leq 791$	1000	-44
6	797-862	$470 \leq f \leq 790$	8000	-65

## 5.2.7 Band Class 8

### 5.2.7.1 Band Class Group 8.C

#### 5.2.7.1.1 Transmitter Spurious Emission Specification

Table 42 specify the additional spurious emission limits.

**Table 42. Additional Spurious Emissions (BCG 8.C)**

No	Spurious frequency (f) range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	2010–2025 2300-2400	1000	-50

### 5.2.7.2 Band Class Group 8.E

#### 5.2.7.2.1 Transmitter Spurious Emission Specification

Table 43 specify the additional spurious emission limits.

**Table 43. Additional Spurious Emissions (BCG 8.E)**

No	Spurious frequency (f) range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	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
2	860-895	1000	-50
3	1884.5-1919.6	300	-41

### 5.2.7.3 Band Class Group 8.F

#### 5.2.7.3.1 Transmitter Spurious Emission Specification

Table 44 specify the additional spurious emission limits.

**Table 44. Additional Spurious Emissions (BCG 8.F)**

No	Spurious frequency (f) range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	925-960 1880-1920 1930-1990 2010-2025	1000	-50

	2110-2170 2300-2400 2570-2620		
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## 5.3 Base Station

The purpose of this section is to provide radio specification recommendations for Base Station. The specifications of this section are recommendations only and are not required or intended to be a basis for certification of Base Stations.

### 5.3.1 Default Specifications

#### 5.3.1.1 Default Channel Spectral Mask

The spectrum masks of Table 45 and Table 46 are applicable to all bands and all regions unless specific mask for a band or a region is specified in other relevant sub section of Section 5.3.

**Table 45. Channel Mask for 5 MHz Bandwidth**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 7.5$	100	$-7-7(\Delta f-2.55)/5$
2	$7.5 \leq \Delta f \leq 12.5$	100	-14

Notes:

1.  $\Delta f$  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  $\Delta f$  equals to 2.550 MHz; the last is at  $\Delta f$  equals to 12.450 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

**Table 46. Channel Mask for 10 MHz Bandwidth**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 10$	100	$-7-7(\Delta f-5.05)/5$
2	$10 \leq \Delta f < 15$	100	-14
3	$15 \leq \Delta f \leq 25$	1000	-13

Notes:

1.  $\Delta f$  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  $\Delta f$  equals to 5.05 MHz; the last is at  $\Delta f$  equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 15.5 MHz; the last is at  $\Delta f$  equals to 24.5 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

**Table 47. Channel Mask for 20 MHz Bandwidth**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 10$	100	$-7-7(\Delta f-5.05)/5$
2	$10 \leq \Delta f < 15$	100	-14
3	$15 \leq \Delta f \leq 35$	1000	-13

Notes:

1.  $\Delta f$  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  $\Delta f$  equals to 10.05 MHz; the last is at  $\Delta f$  equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 15.5 MHz; the last is at  $\Delta f$  equals to 34.5 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

### 5.3.1.2 Default Spurious Emission

Unless otherwise specified in other sub sections of Section 5.3 for specific bands, the default spurious emission specifications of Table 48 are applicable.

**Table 48. Default Spurious Emissions; Relevant to  $F_{DL-le} + ChBW/2 \leq f_c \leq F_{DL-ue} - ChBW/2$**

No	Spurious frequency ( $f$ ) range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4	$1 \text{ GHz} \leq f < 5 \times F_{ue}$	30 kHz If $2.5 \times ChBW \leq \Delta f < 10 \times ChBW$ 300 kHz If $10 \times ChBW \leq \Delta f < 12 \times ChBW$	-30

		1 MHz If $12 \times \text{ChBW} \leq \Delta f$	
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### 5.3.2 Band Class 1

#### 5.3.2.1 Band Class Group 1.C

##### 5.3.2.1.1 Channel Spectral Mask

The Spectrum Emission Mask for 5 and 10 MHz bandwidth is specified in Table 49 and Table 50.

**Table 49. Channel Mask for 5 MHz (BCG 1.C)**

No	Frequency offset from centre	Allowed emission level	Measurement bandwidth
1	$2.5 \leq \Delta f < 3.5$ MHz	-13 dBm	50 kHz
2	$3.5 \leq \Delta f < 12.5$ MHz	-13 dBm	1 MHz

**Table 50. Channel Mask for 10 MHz (BCG 1.C)**

No	Frequency offset from centre	Allowed emission level	Measurement bandwidth
1	$5 \leq \Delta f < 6$ MHz	-13 dBm	100 kHz
2	$6 \leq \Delta f < 25$ MHz	-13 dBm	1 MHz

##### 5.3.2.1.2 Transmitter Spurious Emission specification

**Table 51. Base station spurious emission limit, Category A (BCG 1.C)**

No	Band	Allowed emission level	Measurement bandwidth	Note
1	30 MHz-1 GHz	-13 dBm	100 kHz	Bandwidth as in Recommendation ITU-R SM.329-10, § 4.1
2	1 GHz-13.45 GHz		1 MHz	Upper frequency as in Recommendation ITU-R SM.329-10, § 2.5, Table 1

**Table 52. Base station spurious emissions limit, Category B (BCG 1.C)**

No	Band	Measurement bandwidth	Allowed emission level
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36 dBm
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36 dBm
3	$30 \text{ MHz} \leq f < 1 \text{ 000 MHz}$	100 kHz	-36 dBm
4	$1 \text{ GHz} \leq f < 13.45 \text{ GHz}$	30 kHz If $2.5 \times BW \leq  f_c - f  < 10 \times BW$	-30 dBm

		300 kHz If $10 \times BW \leq  f_c - f  < 12 \times BW$	
		1 MHz If $12 \times BW \leq  f_c - f $	

**Table 53. Additional Spurious Emissions (BCG 1.C)**

No	Spurious frequency ( $f$ ) range (MHz)	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$791 \leq f < 821$	1	-52
2	$831 \leq f < 862$	1	-49
3	$876 \leq f < 915$	1	-51
4	$921 \leq f < 925$	1	-47
5	$925 \leq f < 960$	1	-52
6	$1710 \leq f < 1785$	1	-51
7	$1805 \leq f < 1880$	1	-52
8	$1920 \leq f < 1980$	1	-49
9	$2110 \leq f < 2170$	1	-52
10	$1900 \leq f < 1920$	1	-52
11	$2010 \leq f < 2025$	1	-52
12	$2500 \leq f < 2570$	1	-49
13	$2570 \leq f < 2620$	1	-52
14	$2620 \leq f < 2690$	1	-52

### 5.3.3 Band Class 3

#### 5.3.3.1 Band Class Group 3.C

##### 5.3.3.1.1 Channel Spectral Mask

The Spectrum Emission Mask for 5 MHz bandwidth is specified in Table 54 and Table 55.

**Table 54. Channel Mask for 5 MHz Bandwidth (BCG 3.C)**

No	Frequency offset from centre	Allowed emission level	Measurement bandwidth
1	$2.5 \leq \Delta f < 3.5$ MHz	-13 dBm	50 kHz
2	$3.5 \leq \Delta f < 12.5$ MHz	-13 dBm	1 MHz

**Table 55. Channel Mask for 5 MHz Bandwidth– Japan (BCG 3.C)**

No	Frequency offset from centre	Allowed emission level	Measurement bandwidth
1	$7.5 \text{ MHz} \leq \Delta f < 12.25$	$-15 - 1.4 \times (\Delta f - 7.5)$ dBm	1 MHz
2	$12.25 \leq \Delta f < 22.5$ MHz	-22 dBm	1 MHz

The Spectrum Emission Mask for 10 MHz bandwidth is specified in Table 56 and Table 57.

**Table 56. Channel Mask for 10 MHz Bandwidth (BCG 3.C)**

No	Frequency offset from centre	Allowed emission level	Measurement bandwidth
1	$5 \leq \Delta f < 6$ MHz	-13 dBm	100 kHz
2	$6 \leq \Delta f < 25$ MHz	-13 dBm	1 MHz

**Table 57. Channel Mask for 10 MHz Bandwidth– Japan (BCG 3.C)**

No	Frequency offset from centre	Allowed emission level	Measurement bandwidth
1	$15 \leq \Delta f < 25$ MHz	-22 dBm	1 MHz

### 5.3.3.1.2 Transmitter Spurious Emission specification

**Table 58. Base station spurious emission limit, Category A (BCG 3.C)**

No	Band	Allowed emission level	Measurement bandwidth	Note
1	30 MHz-1 GHz	-13 dBm	100 kHz	Bandwidth as in Recommendation ITU-R SM.329-10, § 4.1
2	1 GHz-13.45 GHz		1 MHz	Upper frequency as in Recommendation ITU-R SM.329-10, § 2.5, Table 1

**Table 59. Base station spurious emissions limit, Category B (BCG 3.C)**

No	Band	Measurement bandwidth	Allowed emission level
1	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36 dBm
2	$1 \text{ GHz} \leq f < 13.45 \text{ GHz}$	30 kHz If $2.5 \times \text{BW} \leq  f_c - f  < 10 \times \text{BW}$ 300 kHz If $10 \times \text{BW} \leq  f_c - f  < 12 \times \text{BW}$ 1 MHz If $12 \times \text{BW} \leq  f_c - f $	-30 dBm

Note: In Table 59, BW is the signal channel bandwidth of 5 or 10 MHz.

**Table 60. Base station spurious emission limit, Japan (BCG 3.A)**

No	Frequency bandwidth	Measurement bandwidth	Allowed emission level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-13
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-13

3	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-13
4	$1\,000 \text{ MHz} \leq f < 2\,505 \text{ MHz}$	1 MHz	-13
5	$2\,505 \text{ MHz} \leq f < 2\,535 \text{ MHz}$	1 MHz	-42
6	$2\,535 \text{ MHz} \leq f < 2\,630 \text{ MHz}$	1 MHz	-13
7	$2\,630 \text{ MHz} \leq f < 2\,634.75 \text{ MHz}$	1 MHz	$-15 - 7/5 \times (f - 2\,629.75)$
8	$2\,634.75 \text{ MHz} \leq f < 2\,655 \text{ MHz}$	1 MHz	-22
9	$2\,655 \text{ MHz} \leq f$	1 MHz	-13

Note: 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.

### 5.3.3.2 Band Class Group 3.D

#### 5.3.3.2.1 Channel Spectral Mask

The Spectrum Emission Mask of Table 61 and Table 62 apply to US region.

**Table 61. Channel Mask for 5 MHz Bandwidth -US (BCG 3.D)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f \leq 12.5$	1000	-13

Notes:

1. The first measurement position with a 50 kHz filter is at  $\Delta f$  equals to 2.525 MHz; the last is at  $\Delta f$  equals to 3.475 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 4.0 MHz; the last is at  $\Delta f$  equals to 12.0 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

**Table 62. Channel Mask for 10 MHz Bandwidth -US (BCG 3.D)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f \leq 6$	100	-13
2	$6 \leq \Delta f \leq 25$	1000	-13

Notes:

1. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 5.050 MHz; the last is at  $\Delta f$  equals to 5.950 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 6.5 MHz; the last is at  $\Delta f$  equals to 24.5 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

The Spectrum Emission Mask of Table 63 and Table 64 apply to Europe region.

**Table 63. Channel Mask for 5 MHz Bandwidth-Europe (BCG 3.D)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 7.5$	100	$-7-7(\Delta f-2.55)/5$
2	$7.5 \leq \Delta f \leq 12.5$	100	-14

Notes:

1. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 2.550 MHz; the last is at  $\Delta f$  equals to 12.450 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

**Table 64. Channel Mask for 10 MHz Bandwidth-Europe (BCG 3.D)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 10$	100	$-7-7(\Delta f-5.05)/5$
2	$10 \leq \Delta f < 15$	100	-14
3	$15 \leq \Delta f \leq 25$	1000	-13

Notes:

1. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 5.05 MHz; the last is at  $\Delta f$  equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 15.5 MHz; the last is at  $\Delta f$  equals to 24.5 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

### 5.3.3.2.2 Transmitter Spurious Emission specification

**Table 65. Spurious Emissions -US (BCG 3.D)**

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$30 \text{ MHz} < f < 13.450 \text{ GHz}$	1	-13

**Table 66. Spurious Emissions for 5 MHz Bandwidth-Europe (BCG 3.D)**

No	Spurious frequency ( $f$ ) range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4	$1 \text{ GHz} \leq f < 13450 \text{ MHz}$	30 kHz If $12.5 \text{ MHz} \leq \Delta f < 50 \text{ MHz}$ 300 kHz If $50 \text{ MHz} \leq \Delta f < 60 \text{ MHz}$ 1 MHz If $60 \text{ MHz} \leq \Delta f$	-30

**Table 67. Spurious Emissions for 10 MHz Bandwidth-Europe (BCG 3.D)**

No	Spurious frequency ( $f$ ) range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4	$1 \text{ GHz} \leq f < 13450 \text{ MHz}$	30 kHz If $25 \text{ MHz} \leq \Delta f < 100 \text{ MHz}$ 300 kHz If $100 \text{ MHz} \leq \Delta f < 120 \text{ MHz}$ 1 MHz If $120 \text{ MHz} \leq \Delta f$	-30

Table 68 specify limits to protect BS receivers against its intra-system BS transmit emissions.

**Table 68. BS Spurious Emissions Limits for protection of the BS receiver (BCG 3.D)**

No	Spurious Frequency ( $f$ ) Range (MHz)	Measurement Bandwidth	Maximum Level
1.	2496-2572	100 kHz	-96 dBm

## 5.3.4 Band Class 5

### 5.3.4.1 Channel Spectral Mask: BCG 5L.E

The Spectrum Emission Mask for 5 and 10 MHz bandwidth sizes are specified in Table 69 and Table 70. Table 69 specifies breakpoints of the underlying piecewise linear power spectral density mask. This mask is a relative mask and conditionally applicable depending on the base station  $P_{nom}$  power level. Table 70 specifies the emission levels of an underlying piecewise step function applicable conditionally only to some of  $P_{nom}$  power levels.

**Table 69. Relative Transmit Spectral Power Density Channel Mask (BCG 5L.E)**

No	Power	Frequency Offset				
		0.5*BW	0.71*BW	1.06*BW	2.0*BW	2.5*BW
1	39 dBm < P <sub>nom</sub>	-20 dB	-27 dB	-32 dB	-50dB	-50dB
2	33 dBm < P <sub>nom</sub> ≤ 39 dBm	-20 dB	-27 dB	-32 dB	-50 dB + (39 dBm - P <sub>nom</sub> )	Refer to Table 70

**Table 70. Absolute Spectral Emission Channel Mask (BCG 5L.E)**

No	Power	Frequency Offset			
		0.50 BW ≤ Δf < 0.71 BW	0.71 BW ≤ Δf < 1.06 BW	1.06 BW ≤ Δf < 2.00 BW	2.00 BW ≤ Δf ≤ 2.50 BW
1	33 dBm < P <sub>nom</sub> ≤ 39 dBm	Refer to Table 69	Refer to Table 69	Refer to Table 69	-21 + x dBm/MHz
2	P <sub>nom</sub> ≤ 33 dBm	-5.5 dBm/MHz	-5.5 dBm/MHz	-23.5 dBm/MHz	-23.5 dBm/MHz

Notes: In Table 70, x = -10 log(BW/10)

### 5.3.5 Band Class 6

#### 5.3.5.1 Band Class Group 6.D

##### 5.3.5.1.1 Channel Spectral Mask

Table 71 and Table 72 specify the spectrum emission for FDD Base Stations with 5 and 10 MHz channel bandwidths.

**Table 71. Channel Mask for 5 MHz Bandwidth (BCG 6.D)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/integration BW) at the antenna port.
1	2.5 ≤ Δf < 3.5	50	-13
2	3.5 ≤ Δf ≤ 12.5	1000	-13

**Table 72. Channel Mask for 10 MHz Bandwidth (BCG 6.D)**

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	5 ≤ Δf < 6	100	-13
2	6 ≤ Δf ≤ 25	1000	-13

**5.3.5.1.2 Transmitter Spurious Emission specification**

**Table 73. Spurious Emissions (BCG 6.D)**

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	30 MHz < $f$ < 10.775 GHz	1	-13

**5.3.5.2 Band Class Group 6.E**

**5.3.5.2.1 Channel Spectral Mask**

Table 74 and Table 75 specify the spectrum emission for FDD Base Stations with 5 and 10 MHz channel bandwidths.

**Table 74. Channel Mask for 5 MHz Bandwidth (BCG 6.E)**

No	Frequency offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 7.5$	100	$-7.0-7(\Delta f-2.55)/5$
2	$7.5 \leq \Delta f < 12.5$	100	-14

Notes:

1. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 2.550 MHz; the last is at  $\Delta f$  equals to 12.450 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

**Table 75. Channel Mask for 10 MHz Bandwidth (BCG 6.E)**

No	Frequency offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 10$	100	$-7.0-7(\Delta f-5.05)/5$
2	$10 \leq \Delta f < 15$	100	-14
3	$15 \leq \Delta f < 25$	1000	-13

Notes:

1. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 5.05 MHz; the last is at  $\Delta f$  equals to 14.95 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 15.5 MHz; the last is at  $\Delta f$  equals to 24.5 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

Table 76 specifies the spectrum emission mask for FDD Base Stations with 20 MHz channel bandwidth.

**Table 76. Channel Mask for 20 MHz Bandwidth (BCG 6.E)**

No	Frequency offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$10 \leq \Delta f < 15$	100	$-7-7(\Delta f-10.05)/5$
2	$15 \leq \Delta f < 20$	100	-14
3	$20 \leq \Delta f \leq 50$	1000	-13

Notes:

1. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 10.05 MHz; the last is at  $\Delta f$  equals to 19.95 MHz. The first measurement position with a 1 MHz filter is at  $\Delta f$  equals to 20.5 MHz; the last is at  $\Delta f$  equals to 49.5 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

**5.3.5.2.2 Transmitter Spurious Emission specification**

Table 77 specifies the spurious emission limits while Table 78 specify the additional spurious emission limits.

**Table 77. Spurious Emissions (BCG 6.E)**

No	Measurement frequency range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4	$1 \text{ GHz} \leq f < 10.775 \text{ GHz}$	1 MHz	-30

**Table 78. Additional Spurious Emissions (BCG 6.E)**

No	Measurement frequency range (MHz)	Measurement bandwidth	Maximum Emission Level (dBm)
1.	921 - 960	100 kHz	-57
2.	876 - 915	100 kHz	-61
3.	1805 - 1880	100 kHz	-47
4.	1710 - 1785	100 kHz	-61
5.	1930 - 1990	100 kHz	-47
6.	1850 - 1910	100 kHz	-61
7.	869 - 894	100 kHz	-57
8.	824 - 849	100 kHz	-61
9.	1930 - 1990	1 MHz	-52
10.	1850 - 1910	1 MHz	-49
11.	1805 - 1880	1 MHz	-52
12.	1710 - 1785	1 MHz	-49
13.	2110 - 2155	1 MHz	-52
14.	1710 - 1755	1 MHz	-49
15.	869 - 894	1 MHz	-52
16.	824 - 849	1 MHz	-49
17.	860 - 895	1 MHz	-52
18.	815 - 850	1 MHz	-49
19.	2620 - 2690	1 MHz	-52
20.	2500 - 2570	1 MHz	-49
21.	925 - 960	1 MHz	-52
22.	880 - 915	1 MHz	-49
23.	1844.9 - 1879.9	1 MHz	-52
24.	1749.9 - 1784.9	1 MHz	-49
25.	2110 - 2170	1 MHz	-52
26.	1710 - 1770	1 MHz	-49
27.	1475.9 - 1500.9	1 MHz	-52
28.	1427.9 - 1452.9	1 MHz	-49
29.	728 - 746	1 MHz	-52
30.	698 - 716	1 MHz	-49
31.	746 - 756	1 MHz	-52

32.	777 - 787	1 MHz	-49
33.	758 - 768	1 MHz	-52
34.	788 - 798	1 MHz	-49
35.	1900 - 1920	1 MHz	-52
36.	2010 - 2025	1 MHz	-52
37.	1850 - 1910	1 MHz	-52
38.	1930 - 1990	1 MHz	-52
39.	1910 - 1930	1 MHz	-52
40.	2570 - 2620	1 MHz	-52
41.	1880 - 1920	1 MHz	-52
42.	2300 - 2400	1 MHz	-52

### 5.3.5.3 Band Class Group 6.F

#### 5.3.5.3.1 Channel Spectral Mask

Table 79 specifies BS Spectrum Emission Mask for 5 MHz channel bandwidth while Table 80 specifies BS Spectrum Emission Mask for 10 MHz channel bandwidth.

**Table 79. Channel Mask - Europe: 5 MHz (BCG 6.F)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.515 \leq \Delta f < 2.715$	30	-14
2	$2.715 \leq \Delta f < 3.515$	30	$-14-15(\Delta f-2.715)$
3	$3.515 \leq \Delta f < 4.0$	30	-26
4	$4.0 \leq \Delta f \leq 12.5$	1000	-13

**Table 80. Channel Mask - Europe: 10 MHz (BCG 6.F)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5.015 \leq \Delta f < 5.215$	30	-14
2	$5.215 \leq \Delta f < 6.015$	30	$-14-15(\Delta f-5.215)$
3	$6.015 \leq \Delta f < 6.5$	30	-26
4	$6.5 \leq \Delta f < 15.50$	1000	-13
5	$15.50 \leq \Delta f \leq 25.0$	1000	-15

#### 5.3.5.3.2 Transmitter Spurious Emission specification

**Table 81. Spurious Emission for 5 MHz Channel Bandwidth Size(BCG 6.F)**

No	Transmitter Center Frequency ( $f_c$ ) (MHz)	Spurious Frequency ( $f$ ) Range	Integration Bandwidth	Maximum Emission Level (dBm)
1.	1805-1880	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2.	1805-1880	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3.	1805-1880	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4.	1805-1880	$1 \text{ GHz} \leq f < 12.75 \text{ GHz}$	30 kHz, If $12.5 \text{ MHz} \leq \Delta f < 50 \text{ MHz}$ 300 kHz, If $50 \text{ MHz} \leq \Delta f < 60 \text{ MHz}$ 1 MHz, If $60 \text{ MHz} \leq \Delta f$	-30

**Table 82. Spurious Emission for 10 MHz Channel Bandwidth Size(BCG 6.F)**

No	Spurious frequency ( $f$ ) range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4	$1 \text{ GHz} \leq f < 13450 \text{ MHz}$	30 kHz If $25 \text{ MHz} \leq \Delta f < 100 \text{ MHz}$ 300 kHz If $100 \text{ MHz} \leq \Delta f < 120 \text{ MHz}$ 1 MHz If $120 \text{ MHz} \leq \Delta f$	-30

Table 83 specifies limits to protect BS receivers against its intra-system BS transmit emissions.

**Table 83. Spurious Emissions Limits for protection of the BS receiver (BCG 6.F)**

No	Transmitter Center Frequency ( $f_c$ ) (MHz)	Spurious Frequency ( $f$ ) Range (MHz)	Measurement Bandwidth	Maximum Level
1.	1805-1880	1710 - 1785	100 kHz	-96 dBm

The spurious emission limits specified in Table 84 may be required by local or regional regulations.

**Table 84. Additional Spurious Emission (BCG 6.F)**

No	Transmitter Center Frequency ( $f_c$ ) (MHz)	Spurious Frequency ( $f$ ) Range (MHz)	Measurement Bandwidth	Maximum Emission Level (dBm)
1.	1805-1880	791-821	1 MHz	-52
2.		831-862	1 MHz	-49
3.		1805-1880	100 KHz	-47
4.		1710-1785	100 KHz	-61
5.		1805-1880	1 MHz	-52
6.		1710-1785	1 MHz	-49

### 5.3.6 Band Class 7

#### 5.3.6.1 Band Class Group 7.A to 7.E

##### 5.3.6.1.1 Channel Spectral Mask

The Spectrum Emission Mask of Table 85 and Table 86 apply to US region.

**Table 85. Channel Mask for 5 MHz Bandwidth -US (BCG 7.A-7.E)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 2.6$	30	-13
2	$2.6 \leq \Delta f \leq 12.5$	100	-13

Notes:

- $\Delta f$  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  $\Delta f$  equals to 2.515 MHz; the last is at  $\Delta f$  equals to 2.585 MHz. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 2.650 MHz; the last is at  $\Delta f$  equals to 12.450 MHz.

**Table 86. Channel Mask for 10 MHz Bandwidth -US (BCG 7.A-7.E)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5.0 \leq \Delta f < 5.1$	30	-13
2	$5.1 \leq \Delta f \leq 25.0$	100	-13

Notes:

1.  $\Delta f$  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  $\Delta f$  equals to 5.015 MHz; the last is at  $\Delta f$  equals to 5.085 MHz. The first measurement position with a 100 kHz filter is at  $\Delta f$  equals to 5.150 MHz; the last is at  $\Delta f$  equals to 24.950 MHz.

The Spectrum Emission Mask of Table 87 and Table 88 apply to Europe region.

**Table 87. Channel Mask for 5 MHz Bandwidth -Europe (BCG 7.A-7.E)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$2.5 \leq \Delta f < 7.5$	100	$-7-7(\Delta f-2.55)/5$
2	$7.5 \leq \Delta f \leq 12.5$	100	-14

Notes:

1.  $\Delta f$  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  $\Delta f$  equals to 2.550 MHz; the last is at  $\Delta f$  equals to 12.450 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

**Table 88. Channel Mask for 10 MHz Bandwidth -Europe (BCG 7.A-7.E)**

No	Offset $\Delta f$ from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5 \leq \Delta f < 10$	100	$-7-7(\Delta f-5.05)/5$
2	$10 \leq \Delta f < 15$	100	-14
3	$15 \leq \Delta f \leq 25$	1000	-13

Notes:

1.  $\Delta f$  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  $\Delta f$  equals to 5.05 MHz; the last is at  $\Delta f$  equals to 24.95 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.