



WiMAX Forum[®]

WirelessMAN- Advanced

T28-001-R020v01

WiMAX Forum Specification

(2011-09-20)

WiMAX Forum Proprietary

Copyright © 2011 WiMAX Forum. All Rights Reserved.

Note: This Document has been created according to the ITU-R transposition process in document IMT/ADV-24 and the authorization given by IEEE to WiMAX Forum as a “Transposing Organization” in “Certification B.”

Copyright Notice, Use Restrictions, Disclaimer, and Limitation of Liability

Copyright 2011 WiMAX Forum. All rights reserved.

Except as otherwise provided herein the WiMAX Forum® owns the copyright in this document and reserves all rights herein. This document is available for download from the WiMAX Forum and may be duplicated for internal use by the WiMAX Forum members, provided that all copies contain all proprietary notices and disclaimers included herein. Except for the foregoing, this document may not be duplicated, in whole or in part, or distributed without the express written authorization of the WiMAX Forum. By making this document available for a wide variety of uses, the WiMAX Forum does not waive any rights in copyright to this document.

Certain information and materials in this document (as identified below) belong to IEEE which owns the copyright in them. The use of such information and materials of IEEE shall be in accordance with the notices, disclaimers and other standards or requirements of use as determined by IEEE.

Use of this document is subject to the disclaimers and limitations described below. Use of this document constitutes acceptance of the following terms and conditions:

THIS DOCUMENT IS PROVIDED “AS IS” AND WITHOUT WARRANTY OF ANY KIND. TO THE GREATEST EXTENT PERMITTED BY LAW, THE WiMAX FORUM DISCLAIMS ALL EXPRESS, IMPLIED AND STATUTORY WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF TITLE, NONINFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WiMAX FORUM DOES NOT WARRANT THAT THIS DOCUMENT IS COMPLETE OR WITHOUT ERROR AND DISCLAIMS ANY WARRANTIES TO THE CONTRARY.

Any products or services provided using technology described in or implemented in connection with this document may be subject to various regulatory controls under the laws and regulations of various governments worldwide. The user is solely responsible for the compliance of its products and/or services with any such laws and regulations and for obtaining any and all required authorizations, permits, or licenses for its products and/or services as a result of such regulations within the applicable jurisdiction.

NOTHING IN THIS DOCUMENT CREATES ANY WARRANTIES WHATSOEVER REGARDING THE APPLICABILITY OR NON-APPLICABILITY OF ANY SUCH LAWS OR REGULATIONS OR THE SUITABILITY OR NON-SUITABILITY OF ANY SUCH PRODUCT OR SERVICE FOR USE IN ANY JURISDICTION.

NOTHING IN THIS DOCUMENT CREATES ANY WARRANTIES WHATSOEVER REGARDING THE SUITABILITY OR NON-SUITABILITY OF A PRODUCT OR A SERVICE FOR CERTIFICATION UNDER ANY CERTIFICATION PROGRAM OF THE WiMAX FORUM OR ANY THIRD PARTY.

The WiMAX Forum has not investigated or made an independent determination regarding title or noninfringement of any technologies that may be incorporated, described or referenced in this document. Use of this document or implementation of any technologies described or referenced herein may therefore infringe undisclosed third-party patent rights or other intellectual property rights. The user is solely responsible for making all assessments relating to title and noninfringement of any technology, standard, or specification referenced in this document and for obtaining appropriate authorization to use such technologies, technologies, standards, and specifications, including through the payment of any required license fees.

NOTHING IN THIS DOCUMENT CREATES ANY WARRANTIES OF TITLE OR NONINFRINGEMENT WITH RESPECT TO ANY TECHNOLOGIES, STANDARDS OR SPECIFICATIONS REFERENCED OR INCORPORATED INTO THIS DOCUMENT.

IN NO EVENT SHALL THE WiMAX FORUM OR ANY MEMBER BE LIABLE TO THE USER OR TO A THIRD PARTY FOR ANY CLAIM ARISING FROM OR RELATING TO THE USE OF THIS DOCUMENT, INCLUDING, WITHOUT LIMITATION, A CLAIM THAT SUCH USE INFRINGES A THIRD PARTY’S INTELLECTUAL PROPERTY RIGHTS OR THAT IT FAILS TO COMPLY WITH APPLICABLE LAWS OR REGULATIONS. BY USE OF THIS DOCUMENT, THE USER WAIVES ANY SUCH CLAIM AGAINST THE WiMAX FORUM AND ITS MEMBERS RELATING TO THE USE OF THIS DOCUMENT.

The WiMAX Forum reserves the right to modify or amend this document without notice and in its sole discretion.

“WiMAX,” “Mobile WiMAX,” “Fixed WiMAX,” “WiMAX Forum,” “WiMAX Certified,” “WiMAX Forum Certified,” the WiMAX Forum logo and the WiMAX Forum Certified logo are trademarks or registered trademarks of the WiMAX Forum. All other trademarks are the property of their respective owners.

Table of Contents

1.	Introduction	8
2.	General Description.....	8
2.1	Overview	8
2.2	Scope	8
3.	Specifications	8
3.1	Outline	8
3.1.1.	IEEE Std 802.16-2009	9
3.1.2.	IEEE Std 802.16j-2009	9
3.1.3.	IEEE Std 802.16h-2010.....	9
3.1.4.	IEEE Std 802.16m-2011	9
3.2	Detailed specification	9
3.2.1.	Reference models	9
3.2.2.	Normative references	10
3.2.3.	Definitions.....	10
3.2.4.	Abbreviations and acronyms	10
3.2.5.	Packet Convergence Sublayer	10
3.2.6.	WirelessMAN-Advanced Interface.....	10
3.2.7.	MAC Control messages	10
3.2.8.	Test Vectors	10
3.2.9.	Supported Frequency Bands.....	10
3.2.9.1.	Radio Frequency (RF) channel arrangement	12
3.2.9.1.1.	Center frequency step size	12
3.2.9.1.2.	RF channel center frequencies.....	13
3.2.10.	Radio Specifications	15
3.2.10.1.	Definitions, Symbols and Acronyms	15
3.2.10.1.1.	Definitions.....	15
3.2.10.1.2.	Symbols.....	15
3.2.10.1.3.	Acronyms and abbreviations	16
3.2.10.2.	Power Classes	16
3.2.10.2.1.	Mobile Station	16
3.2.10.3.	Radio specifications	17
3.2.10.3.1.	Out of Band and Spurious Emission Regions.....	17
3.2.10.3.2.	Mobile Station	17
3.2.10.3.2.1	Default Specifications	17
3.2.10.3.2.1.1	Default Channel Spectral Mask	17
3.2.10.3.2.1.2	Default Spurious Emission	18
3.2.10.3.2.2	Band Class 1	18
3.2.10.3.2.2.1	Band Class Group 1.C	18
3.2.10.3.2.2.1.1.	Channel Spectral Mask	18
3.2.10.3.2.2.1.2	Spurious Emission Specification.....	19
3.2.10.3.2.3	Band Class 3	19
3.2.10.3.2.3.1	Band Class Group 3.C	19
3.2.10.3.2.3.1.1.	Channel Spectral Mask	19
3.2.10.3.2.3.1.2	Transmitter Spurious Emission	20
3.2.10.3.2.3.2	Band Class Group 3.D	21
3.2.10.3.2.3.2.1.	Channel Spectral Mask	21
3.2.10.3.2.3.2.2	Transmitter Spurious Emission	22
3.2.10.3.2.4	Band Class 5	22
3.2.10.3.2.4.1	Band Class Group 5L.E.....	22
3.2.10.3.2.4.1.1.	Channel Spectral Mask	22

3.2.10.3.2.5	Band Class 6	24
3.2.10.3.2.5.1	Band Class Group 6.D	24
3.2.10.3.2.5.1.1	Channel Spectral Mask	24
3.2.10.3.2.5.1.2	Spurious Emission Specifications	25
3.2.10.3.2.5.2	Band Class Group 6.E	25
3.2.10.3.2.5.2.1	Transmitter Spurious Emission Specification	25
3.2.10.3.2.5.3	Band Class Group 6.F	25
3.2.10.3.2.5.3.1	Transmitter Spurious Emission Specification	25
3.2.10.3.2.5.4	Band Class Group 6.G	26
3.2.10.3.2.5.4.1	Channel Spectral Mask	26
3.2.10.3.2.5.4.2	Spurious Emission Specifications	26
3.2.10.3.2.5.5	Band Class Group 6.H	27
3.2.10.3.2.5.5.1	Channel Spectral Mask	27
3.2.10.3.2.5.5.2	Spurious Emission Specifications	27
3.2.10.3.2.5.6	Band Class Group 6.J	27
3.2.10.3.2.5.6.1	Channel Spectral Mask	27
3.2.10.3.2.5.6.2	Spurious Emission Specifications	28
3.2.10.3.2.6	Band Class 7	28
3.2.10.3.2.6.1	Band Class Group 7.H	28
3.2.10.3.2.6.1.1	Channel Spectral Mask	28
3.2.10.3.2.6.1.2	Transmitter Spurious Emission Specification	29
3.2.10.3.2.7	Band Class 8	30
3.2.10.3.2.7.1	Band Class Group 8.C	30
3.2.10.3.2.7.1.1	Transmitter Spurious Emission Specification	30
3.2.10.3.2.7.2	Band Class Group 8.E	30
3.2.10.3.2.7.2.1	Transmitter Spurious Emission Specification	30
3.2.10.3.2.7.3	Band Class Group 8.F	30
3.2.10.3.2.7.3.1	Transmitter Spurious Emission Specification	30
3.2.10.3.3	Base Station	30
3.2.10.3.3.1	Default Specifications	30
3.2.10.3.3.1.1	Default Channel Spectral Mask	31
3.2.10.3.3.1.2	Default Spurious Emission	32
3.2.10.3.3.2	Band Class 1	32
3.2.10.3.3.2.1	Band Class Group 1.C	32
3.2.10.3.3.2.1.1	Channel Spectral Mask	32
3.2.10.3.3.2.1.2	Transmitter Spurious Emission specification	33
3.2.10.3.3.3	Band Class 3	33
3.2.10.3.3.3.1	Band Class Group 3.C	33
3.2.10.3.3.3.1.1	Channel Spectral Mask	33
3.2.10.3.3.3.1.2	Transmitter Spurious Emission specification	34
3.2.10.3.3.3.2	Band Class Group 3.D	35
3.2.10.3.3.3.2.1	Channel Spectral Mask	35
3.2.10.3.3.3.2.2	Transmitter Spurious Emission specification	36
3.2.10.3.3.4	Band Class 5	37
3.2.10.3.3.4.1	Channel Spectral Mask: BCG 5LE	37
3.2.10.3.3.5	Band Class 6	37
3.2.10.3.3.5.1	Band Class Group 6.D	37
3.2.10.3.3.5.1.1	Channel Spectral Mask	37
3.2.10.3.3.5.1.2	Transmitter Spurious Emission specification	38
3.2.10.3.3.5.2	Band Class Group 6.E	38
3.2.10.3.3.5.2.1	Channel Spectral Mask	38
3.2.10.3.3.5.2.2	Transmitter Spurious Emission specification	39
3.2.10.3.3.5.3	Band Class Group 6.F	41
3.2.10.3.3.5.3.1	Channel Spectral Mask	41
3.2.10.3.3.5.3.2	Transmitter Spurious Emission specification	41
3.2.10.3.3.6	Band Class 7	42

3.2.10.3.3.6.1	Band Class Group 7.A to 7.E	42
3.2.10.3.3.6.1.1	Channel Spectral Mask	42
3.2.11.	Default capability class and parameters	44
4.	Annex 1	44
5.	Annex 2	44
6.	Annex 3	44
7.	Annex 4	44

List of Tables

Table 1 WirelessMAN-Advanced Clauses	8
Table 2. List of Band Classes	11
Table 3. RF Channel Center Frequency Numbers	13
Table 4. Mobile Station Power Classes	16
Table 5. Channel Mask for 5 MHz Bandwidth	17
Table 6. Channel Mask for 10 MHz Bandwidth	17
Table 7. Channel Mask for 20 MHz Bandwidth	18
Table 8. Default Spurious Emissions; Relevant to $F_{UL-le} + ChBW/2 \leq f_c \leq F_{UL-ue} - ChBW/2$	18
Table 9. Channel Mask for 5 MHz Bandwidth (BCG 1.C)	18
Table 10. Channel Mask for 10 MHz Bandwidth (BCG 1.C)	19
Table 11. Additional Spurious Emissions for 5 MHz Channel Size (BCG 1.C)	19
Table 12. Channel Mask for 5 MHz Bandwidth (BCG 3.C)	19
Table 13. Channel Mask for 10 MHz Bandwidth (BCG 3.C)	20
Table 14. Additional Spurious Emissions for 5 MHz Channel Size (BCG 3.C)	20
Table 15. Additional Spurious Emissions for 5 MHz Channel Size (BCG 3.C)	21
Table 16. Additional Spurious Emissions for 10 MHz Channel Size (BCG 3.C)	21
Table 17. Spurious Emissions for 10 MHz Channel Size (BCG 3.C)	21
Table 18. Channel Mask for 10 MHz Bandwidth (BCG 3.D)	22
Table 19. Channel Mask for 5 MHz Bandwidth (BCG 3.D)	22
Table 20. Additional Spurious Emissions (BCG 3.D)	22
Table 21. Channel Mask for 5 MHz Channel Bandwidth (BCG 5L.E)	23
Table 22. Channel Mask for 10 MHz Channel Bandwidth (BCG 5L.E)	23
Table 23. Channel Mask for 5 MHz Bandwidth (BCG 6.D)	24
Table 24. Channel Mask for 10 MHz Bandwidth (BCG 6.D)	24
Table 25. Spurious Emissions (BCG 6.D)	25
Table 26. Spurious Emissions (BCG 6.E)	25
Table 27. Additional Spurious Emissions (BCG 6.E)	25
Table 28. Additional Spurious Emission (BCG 6.F)	25
Table 29. Channel Mask for 5 MHz Bandwidth (BCG 6.G)	26
Table 30. Channel Mask for 10 MHz Bandwidth (BCG 6.G)	26
Table 31. Spurious Emissions (BCG 6.G)	26
Table 32. Channel Mask for 5 MHz Bandwidth (BCG 6.H)	27
Table 33. Channel Mask for 10 MHz Bandwidth (BCG 6.H)	27
Table 34. Spurious Emissions (BCG 6.G)	27
Table 35. Channel Mask for 5 MHz Bandwidth (BCG 6.J)	27
Table 36. Channel Mask for 10 MHz Bandwidth (BCG 6.J)	27
Table 37. Spurious Emissions (BCG 6.J)	28
Table 38. Channel Mask for 5 MHz Bandwidth: $700.5 \leq f_c \leq 795.5$ (BCG 7.H)	28
Table 39. Channel Mask for 5 MHz Bandwidth: $799.5 \leq f_c \leq 859.5$ (BCG 7.H)	28
Table 40. Channel Mask for 10 MHz Bandwidth: $703 \leq f_c \leq 793$ (BCG 7.H)	29
Table 41. Channel Mask for 10 MHz Bandwidth: $802 \leq f_c \leq 857$ (BCG 7.H)	29
Table 42. Spurious Emissions (BCG 7.H)	29
Table 43. Additional Spurious Emissions (BCG 8.C)	30
Table 44. Additional Spurious Emissions (BCG 8.E)	30
Table 45. Additional Spurious Emissions (BCG 8.F)	30
Table 46. Channel Mask for 5 MHz Bandwidth	31
Table 47. Channel Mask for 10 MHz Bandwidth	31
Table 48. Channel Mask for 20 MHz Bandwidth	31
Table 49. Default Spurious Emissions; Relevant to $F_{DL-le} + ChBW/2 \leq f_c \leq F_{DL-ue} - ChBW/2$	32
Table 50. Channel Mask for 5 MHz (BCG 1.C)	32
Table 51. Channel Mask for 10 MHz (BCG 1.C)	32
Table 52. Base station spurious emission limit, Category A (BCG 1.C)	33

Table 53. Base station spurious emissions limit, Category B (BCG 1.C)	33
Table 54. Additional Spurious Emissions (BCG 1.C)	33
Table 55. Channel Mask for 5 MHz Bandwidth (BCG 3.C)	34
Table 56. Channel Mask for 5 MHz Bandwidth– Japan (BCG 3.C)	34
Table 57. Channel Mask for 10 MHz Bandwidth (BCG 3.C)	34
Table 58. Channel Mask for 10 MHz Bandwidth– Japan (BCG 3.C)	34
Table 59. Base station spurious emission limit, Category A (BCG 3.C)	34
Table 60. Base station spurious emissions limit, Category B (BCG 3.C)	34
Table 61. Base station spurious emission limit, Japan (BCG 3.A)	34
Table 62. Channel Mask for 5 MHz Bandwidth -US (BCG 3.D)	35
Table 63. Channel Mask for 10 MHz Bandwidth -US (BCG 3.D)	35
Table 64. Channel Mask for 5 MHz Bandwidth-Europe (BCG 3.D)	36
Table 65. Channel Mask for 10 MHz Bandwidth-Europe (BCG 3.D)	36
Table 66. Spurious Emissions -US (BCG 3.D)	36
Table 67. Spurious Emissions for 5 MHz Bandwidth-Europe (BCG 3.D)	36
Table 68. Spurious Emissions for 10 MHz Bandwidth-Europe (BCG 3.D)	36
Table 69. BS Spurious Emissions Limits for protection of the BS receiver (BCG 3.D)	37
Table 70. Relative Transmit Spectral Power Density Channel Mask (BCG 5L.E)	37
Table 71. Absolute Spectral Emission Channel Mask (BCG 5L.E)	37
Table 72. Channel Mask for 5 MHz Bandwidth (BCG 6.D)	37
Table 73. Channel Mask for 10 MHz Bandwidth (BCG 6.D)	38
Table 74. Spurious Emissions (BCG 6.D)	38
Table 75. Channel Mask for 5 MHz Bandwidth (BCG 6.E)	38
Table 76. Channel Mask for 10 MHz Bandwidth (BCG 6.E)	38
Table 77. Channel Mask for 20 MHz Bandwidth (BCG 6.E)	39
Table 78. Spurious Emissions (BCG 6.E)	39
Table 79. Additional Spurious Emissions (BCG 6.E)	40
Table 80. Channel Mask - Europe: 5 MHz (BCG 6.F)	41
Table 81. Channel Mask - Europe: 10 MHz (BCG 6.F)	41
Table 82. Spurious Emission for 5 MHz Channel Bandwidth Size(BCG 6.F)	41
Table 83. Spurious Emission for 10 MHz Channel Bandwidth Size(BCG 6.F)	42
Table 84. Spurious Emissions Limits for protection of the BS receiver (BCG 6.F)	42
Table 85. Additional Spurious Emission (BCG 6.F)	42
Table 86. Channel Mask for 5 MHz Bandwidth -US (BCG 7.A-7.E)	42
Table 87. Channel Mask for 10 MHz Bandwidth -US (BCG 7.A-7.E)	43
Table 88. Channel Mask for 5 MHz Bandwidth -Europe (BCG 7.A-7.E)	43
Table 89. Channel Mask for 10 MHz Bandwidth -Europe (BCG 7.A-7.E)	43

1. Introduction

The WiMAX Forum® is an industry-led, not-for-profit organization that certifies and promotes the compatibility and interoperability of broadband wireless products based upon IEEE Standard 802.16. The WiMAX Forum’s primary goal is to accelerate the adoption, deployment and expansion of WiMAX® technologies across the globe while facilitating roaming agreements, sharing best practices within our membership and certifying products. WiMAX Forum Certified® products are interoperable and support broadband fixed, nomadic, portable and mobile services. The WiMAX Forum works closely with service providers and regulators to ensure that WiMAX Forum Certified systems meet customer and government requirements.

This specification can be utilized by radio equipment manufacturers and telecommunications operators for the development of WirelessMAN-Advanced systems.

2. General Description

2.1 Overview

The WirelessMAN-Advanced GCS is developed by the Institute of Electrical and Electronics Engineers, Inc.

2.2 Scope

This specifies the WiMAX Forum® transposition of WirelessMAN-Advanced GCS.

3. Specifications

3.1 Outline

“WirelessMAN-Advanced System” Global Core Specification is comprised of IEEE 802.16-2009, as amended by IEEE 802.16j-2009, IEEE Std 802.16h-2010, and IEEE Std 802.16m-2011. The clauses in the specification are summarized in the following Table 1.

Table 1 WirelessMAN-Advanced Clauses

IEEE Std 802.16 Clause: Subject	IEEE Std 802.16-2009	IEEE Std 802.16j- 2009	IEEE Std 802.16h- 2010	IEEE Std 802.16m-2011
Clause 1.4: Reference models	Base Specification		Amended	Amended
Clause 2: Normative references	Base Specification		Amended	Amended
Clause 3: Definitions	Base Specification	Amended	Amended	Amended
Clause 4: Abbreviations and acronyms	Base Specification	Amended	Amended	Amended
Clause 5.2: Packet Convergence Sublayer	Base Specification			Amended
Clause 16: WirelessMAN-Advanced Air Interface				Base Specification
Annex R: MAC Control Messages				Base Specification
Annex S: Test Vectors				Base Specification
Annex T: Supported Frequency Bands				Base Specification
Annex U: Radio Specifications				Base Specification
Annex V: Default Capability Class and parameters				Base Specification

IEEE Std 802.16: Standard for local and metropolitan area networks – Air interface for broadband wireless access systems.

This standard specifies the air interface, including the medium access control layer (MAC) and physical layer (PHY), of combined fixed and mobile point-to-multipoint broadband wireless access (BWA) systems. The MAC is structured to support multiple PHY specifications, each of which is suited to a particular operational environment.

IEEE Std 802.16 is composed of IEEE Std 802.16-2009, as amended, consecutively, by IEEE Std 802.16j-2009, IEEE Std 802.16h-2010, and IEEE Std 802.16m-2011.

3.1.1. IEEE Std 802.16-2009

This standard specifies the air interface, including the medium access control layer (MAC) and physical layer (PHY), of combined fixed and mobile point-to-multipoint broadband wireless access (BWA) systems. The MAC is structured to support multiple PHY specifications, each of which is suited to a particular operational environment.

3.1.2. IEEE Std 802.16j-2009

This amendment updates and expands IEEE Std 802.16-2009 for licensed bands to enable the operation of relay stations by specifying physical layer and medium access control layer enhancements to IEEE Std 802.16. Subscriber station specifications are unchanged.

3.1.3. IEEE Std 802.16h-2010

This amendment updates and expands IEEE Std 802.16 to enable coexistence among license-exempt systems and to facilitate the coexistence of these systems with primary users.

3.1.4. IEEE Std 802.16m-2011

This amendment specifies the *WirelessMAN-Advanced* air interface, with enhancements designed to meet the requirements of the IMT-Advanced standardization activity. Based upon the WirelessMAN-OFDMA specification of IEEE Std 802.16, this amendment provides continuing support for WirelessMAN-OFDMA subscriber stations.

3.2 Detailed specification

Normative Reference:

The detailed specification text for the WirelessMAN-Advanced radio interface is provided in Annexes 1, 2, 3, and 4 as referred to in the following subsections. As the text referred to below within the Clauses of Annexes 1, 2, 3 or 4 is unchanged, the reader can download a copy of the GCS text using the hyperlinks. Specifically with respect to Annex 4 (i.e. IEEE Std 802.16m-2011), text provided in sections 4.2.9 and 4.2.10 below replaces the contents of Annexes T and U within the WirelessMAN-Advanced GCS respectively.

3.2.1. Reference models

Normative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 1: IEEE Std 802.16-2009, Clause 1.4

Annex 3: IEEE Std 802.16h-2010, Clause 1.4

Annex 4: IEEE Std 802.16m-2011, Clause 1.4

3.2.2. Normative references

Normative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 1: IEEE Std 802.16-2009, Clause 2

Annex 3: IEEE Std 802.16h-2010, Clause 2

Annex 4: IEEE Std 802.16m-2011, Clause 2

3.2.3. Definitions

Normative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 1: IEEE Std 802.16-2009, Clause 3

Annex 2: IEEE Std 802.16j-2009, Clause 3

Annex 3: IEEE Std 802.16h-2010, Clause 3

Annex 4: IEEE Std 802.16m-2011, Clause 3

3.2.4. Abbreviations and acronyms

Normative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 1: IEEE Std 802.16-2009, Clause 4

Annex 2: IEEE Std 802.16j-2009, Clause 4

Annex 3: IEEE Std 802.16h-2010, Clause 4

Annex 4: IEEE Std 802.16m-2011, Clause 4

3.2.5. Packet Convergence Sublayer

Normative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 1: IEEE Std 802.16-2009, Clause 5.2

Annex 4: IEEE Std 802.16m-2011, Clause 5.2

3.2.6. WirelessMAN-Advanced Interface

Normative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 4: IEEE Std 802.16m-2011, Clause 5.2

3.2.7. MAC Control messages

Normative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 4: IEEE Std 802.16m-2011, Annex R

3.2.8. Test Vectors

Informative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 4: IEEE Std 802.16m-2011, Annex S

3.2.9. Supported Frequency Bands

The text in this section is a transposition of Annex T in the WirelessMAN-Advanced GCS that provides additional detailed information on supported frequency bands of “*WirelessMAN-Advanced*” to reflect regional differences.

The purpose of this section is to provide the list of Mobile WiMAX Release 2 (R 2) Band Class Groups (BCGs) along with the supported channel bandwidths. In the WiMAX Forum Release numbering scheme, Mobile WiMAX Release 1.5 (R1.5) reflects the gradual enhancement of the radio performance in comparison to Release 1.0 (R1.0) while Release 2 (R 2) relates to the fulfillment of IMT-Advanced requirements.

Table 2 lists R 2 BCGs along with Release 1.0/1.5 (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. Support of other channel bandwidth sizes for R 2 BCGs are considered in a case by case basis.

Table 2. 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 ¹	2300-2400	2300-2400	TDD	1.0					Y		
1.B ¹	2300-2400	2300-2400	TDD	1.0		Y				Y	
1.C	2300-2400	2300-2400	TDD	2.0		Y				Y	Y
2.D ¹	2305-2320, 2345-2360	2305-2320, 2345-2360	TDD	1.0	Y	Y				Y	
2.E ¹	2345-2360	2305-2320	FDD	1.5	Y	Y				Y	
2.F ^{1,2}	2345-2360	2305-2320	FDD	1.5		AUL				ADL	
3.A ¹	2496-2690	2496-2690	TDD	1.0		Y				Y	
3.B ¹	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 ¹	3300-3400	3300-3400	TDD	1.0		Y					
4.B ¹	3300-3400	3300-3400	TDD	1.0			Y				
4.C ¹	3300-3400	3300-3400	TDD	1.0						Y	
4.D	3300-3400	3300-3400	TDD	2.0		Y				Y	Y
5L.A ¹	3400-3600	3400-3600	TDD	1.0		Y					
5L.B ¹	3400-3600	3400-3600	TDD	1.0			Y				
5L.C ¹	3400-3600	3400-3600	TDD	1.0						Y	
5L.D ¹	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 ¹	3600-3800	3600-3800	TDD	1.0		Y					
5H.B ¹	3600-3800	3600-3800	TDD	1.0			Y				
5H.C ¹	3600-3800	3600-3800	TDD	1.0						Y	
5H.D	3600-3800	3600-3800	TDD	2.0		Y				Y	Y
6.A ¹	1710-1770	2110-2170	FDD	1.5		Y				Y	
6.B ¹	1920-1980	2110-2170	FDD	1.5		Y				Y	Y
6.C ¹	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-	1930-1990,	FDD	2.0		Y				Y	Y

¹ Release 1.0 and 1.5 legacy Band Class Groups are listed for reference.

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

	1770	2110-2170								
7.A ¹	698-862	698-862	TDD	1.0		Y	Y			Y
7.B ¹	776-787	746-757	FDD	1.5		Y				Y
7.C ¹	788-793, 793-798	758-763, 763-768	FDD	1.5						Y
7.D ¹	788-798	758-768	FDD	1.5		Y				
7.E ¹	698-862	698-862	TDD/ FDD	1.5		Y	Y			Y
7.F ¹	698-862	698-862	TDD	1.0				Y		
7.G ¹	880-915	925-960	FDD	1.5		Y				Y
7.H	698-862	698-862	TDD	2.0		Y				Y
7.I	824-849	869-894	FDD	2.0		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
7.L	797-862	797-862	TDD	2.0		Y				Y
7.M	756-806	698-748	FDD	2.0		Y				Y
7.X*	730-770, 890-903, 915-950	730-770, 890-903, 915-950	TDD	1.5		Y				Y
8.A ¹	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
8.C	1880-1920	1880-1920	TDD	2.0		Y				Y
8.D	1910-1930	1910-1930	TDD	2.0		Y				Y
8.E	2010-2025	2010-2025	TDD	2.0		Y				Y
8.F	1900-1920	1900-1920	TDD	2.0		Y				Y
8.G	1800-1830	1800-1830	TDD	1.0		Y				Y
9.A	450-470	450-470	TDD	2.0		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: Details of Band Class Group 7.X including ACLR specifications take into account Japanese regulations.

In Table 2, 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 below. Base Stations are required to support at least three consecutive channels and only one channel bandwidth size.

3.2.9.1. Radio Frequency (RF) channel arrangement

3.2.9.1.1. 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 Release 1 BCGs, the center frequency step size of 250 KHz is also supported for backward compatibility purposes. Table 3 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.

3.2.9.1.2. RF channel center frequencies

Table 3 provides the set of RF channel center frequency numbers for various Band Class Groups. From Table 3, 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 3, 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 3. 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)	(68050, 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)

3.2.10. Radio Specifications

The text in this section is a transposition of Annex U in the WirelessMAN-Advanced GCS that provides additional detailed information on generic unwanted emission characteristics of “*WirelessMAN-Advanced*” base stations and mobile stations to reflect regional differences.

3.2.10.1. Definitions, Symbols and Acronyms

3.2.10.1.1. Definitions

This section uses the following additional definition:

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

3.2.10.1.2. Symbols

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
Δf	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.
ΔF_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

3.2.10.1.3. Acronyms and abbreviations

This section uses the following additional acronyms and abbreviations:

ACR	adjacent channel rejection
BCG	band class group
ChBW	channel bandwidth
RF	radio frequency
Pnom	nominal max output power measured at antenna port(s); total for multiple antennas"

3.2.10.2. Power Classes

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

3.2.10.2.1. Mobile Station

Table 4 provides the list of Mobile Station Power Classes per Band Class Groups.

Table 4. 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	Reserved	20	23	26	Reserved
3.C	Reserved	20	23	26	Reserved
3.D	Reserved	20	23	26	Reserved
4.D	Reserved	20	23	26	Reserved
5.EL	Reserved	20	23	26	Reserved
5.FL	Reserved	20	23	26	Reserved
5.DH	Reserved	20	23	26	Reserved
6.D	Reserved	20	23	26	Reserved
6.E	Reserved	20	23	26	Reserved
6.F	Reserved	20	23	26	Reserved
6.G	Reserved	20	23	26	Reserved
6.H	Reserved	20	23	26	Reserved
6.I	Reserved	20	23	26	Reserved

6.J	Reserved	20	23	26	Reserved
7.H	Reserved	20	23	26	Reserved
7.I	Reserved	20	23	26	Reserved
7.J	Reserved	20	23	26	Reserved
7.K	Reserved	20	23	26	Reserved
7.L	Reserved	20	23	26	Reserved
7.M	Reserved	20	23	26	Reserved
8.B	Reserved	20	23	26	Reserved
8.C	Reserved	20	23	26	Reserved
8.D	Reserved	20	23	26	Reserved
8.E	Reserved	20	23	26	Reserved
8.F	Reserved	20	23	26	Reserved
9.A	Reserved	20	23	26	Reserved
9.B	Reserved	20	23	26	Reserved
9C	Reserved	20	23	26	Reserved

3.2.10.3. Radio specifications

3.2.10.3.1. 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.

3.2.10.3.2. Mobile Station

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

3.2.10.3.2.1 Default Specifications

3.2.10.3.2.1.1 Default Channel Spectral Mask

Unless otherwise specified in other sub sections of Section 3.2.10.3 for specific bands, the spectrum masks of Table 5, Table 6 and Table 6 are applicable.

Table 5. Channel Mask for 5 MHz Bandwidth

No	Δf , 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 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.

Table 6. 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 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.

Table 7. 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 Δf equals to 10.050 MHz; the last is at Δf equals to 10.950 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 11.5 MHz; the last is at Δf equals to 49.5 MHz.

3.2.10.3.2.1.2 Default Spurious Emission

Unless otherwise specified in sub sections of Section 3.2.10.3 for specific bands, the default spurious emission specifications of Table 8 are applicable.

Table 8. 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 $10 \times ChBW \text{ MHz} \leq \Delta f < 12 \times ChBW$ 1 MHz If $12 \times ChBW \leq \Delta f$	-30

3.2.10.3.2.2 Band Class 1

3.2.10.3.2.2.1 Band Class Group 1.C

3.2.10.3.2.2.1.1. Channel Spectral Mask

The channel mask for 5 MHz bandwidth is specified in Table 9.

Table 9. Channel Mask for 5 MHz Bandwidth (BCG 1.C)

No	Δf 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 10.

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

No	Δf 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

3.2.10.3.2.2.1.2 Spurious Emission Specification

Table 11. 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

3.2.10.3.2.3 Band Class 3

3.2.10.3.2.3.1 Band Class Group 3.C

3.2.10.3.2.3.1.1. Channel Spectral Mask

The channel mask for 5 and 10 MHz channel bandwidths are specified in Table 12 and Table 13.

Table 12. Channel Mask for 5 MHz Bandwidth (BCG 3.C)

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	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 13. 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

3.2.10.3.2.3.1.2 Transmitter Spurious Emission

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

Table 17 are applicable.

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

No	Spurious frequency (f) 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(Δf -8) 12.5 MHz < Δf < 17.5 MHz -37 17.5 MHz < Δf < 22.5 MHz -18 22.5 MHz < Δf
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 15. Additional Spurious Emissions for 5 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 8 is applicable.

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

No	Spurious frequency (f) 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 MHz < Δf
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 17. 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 16, 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 8 is applicable.

3.2.10.3.2.3.2 Band Class Group 3.D

3.2.10.3.2.3.2.1. Channel Spectral Mask

The channel mask for 10 MHz bandwidth is specified in Table 18.

Table 18. 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 19.

Table 19. 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

3.2.10.3.2.3.2.2 Transmitter Spurious Emission

In addition to the default Spurious Emission specifications, the requirements of Table 20 are applicable.

Table 20. 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

3.2.10.3.2.4 Band Class 5

3.2.10.3.2.4.1 Band Class Group 5L.E

3.2.10.3.2.4.1.1. Channel Spectral Mask

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

No	Frequency offset Δf (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 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 Δf equals to 2.515 MHz; the last is at Δf equals to 3.485 MHz.
5. 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.
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 22. Channel Mask for 10 MHz Channel Bandwidth (BCG 5L.E)

No	Frequency offset Δf (MHz)	Maximum Emission Level (dBc)	Measurement bandwidth
1	$5.0 \leq \Delta f < 7.0$	-33.5-9(Δf -5.0)	30 kHz
2	$7.0 \leq \Delta f < 15.0$	-36.5-0.5(Δf -7.0)	1 MHz
3	$15.0 \leq \Delta f < 17.0$	-40.5-5(Δf -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 22. Assuming specific power classes, relative specifications of Table 22 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 Δf equals to 510.015 MHz; the last is at Δf equals to 6.985 MHz.
5. 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.
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.

3.2.10.3.2.5 Band Class 6

3.2.10.3.2.5.1 Band Class Group 6.D

3.2.10.3.2.5.1.1. Channel Spectral Mask

Table 23 and

Table 24 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

Table 23. 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	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f \leq 12.5$	1000	-13

Table 24. 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

3.2.10.3.2.5.1.2. Spurious Emission Specifications

In addition to the default Spurious Emission specifications, the requirements of Table 25 are applicable.

Table 25. 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

3.2.10.3.2.5.2 Band Class Group 6.E

3.2.10.3.2.5.2.1. Transmitter Spurious Emission Specification

Table 26 and Table 27 specify the additional spurious emission limits.

Table 26. 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 27. 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

3.2.10.3.2.5.3 Band Class Group 6.F

3.2.10.3.2.5.3.1. Transmitter Spurious Emission Specification

Table 28 specifies the additional spurious emission limits.

Table 28. Additional Spurious Emission (BCG 6.F)

No	Transmitter Center Frequency (f_c) (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

3.2.10.3.2.5.4 Band Class Group 6.G

3.2.10.3.2.5.4.1. Channel Spectral Mask

Table 29 and

Table 30 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

Table 29. 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 30. 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

3.2.10.3.2.5.4.2. Spurious Emission Specifications

In addition to the default Spurious Emission specifications, the requirements of Table 31 are applicable.

Table 31. 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

3.2.10.3.2.5.5 Band Class Group 6.H

3.2.10.3.2.5.5.1. Channel Spectral Mask

Table 32 and

Table 33 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

Table 32. 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 33. 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

3.2.10.3.5.5.2. Spurious Emission Specifications

In addition to the default Spurious Emission specifications, the requirements of Table 34 are applicable.

Table 34. 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

3.2.10.3.2.5.6 Band Class Group 6.J

3.2.10.3.2.5.6.1. Channel Spectral Mask

Table 35 and

Table 36 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

Table 35. 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 36. 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

3.2.10.3.2.5.6.2. Spurious Emission Specifications

In addition to the default Spurious Emission specifications, the requirements of Table 37 are applicable.

Table 37. 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

3.2.10.3.2.6 Band Class 7

3.2.10.3.2.6.1 Band Class Group 7.H

3.2.10.3.2.6.1.1. Channel Spectral Mask

Table 38 and Table 39 specify the spectrum emission mask with 5 MHz channel bandwidths.

Table 38. Channel Mask for 5 MHz Bandwidth: $700.5 \leq f_c \leq 795.5$ (BCG 7.H)

No	Frequency offset Δf 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 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 39. Channel Mask for 5 MHz Bandwidth: $799.5 \leq f_c \leq 859.5$ (BCG 7.H)

No	Frequency offset Δf 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 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 40 and Table 41 specify the spectrum emission mask with 10 MHz channel bandwidths.

Table 40. Channel Mask for 10 MHz Bandwidth: $703 \leq f_c \leq 793$ (BCG 7.H)

No	Frequency offset Δf 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 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 41. Channel Mask for 10 MHz Bandwidth: $802 \leq f_c \leq 857$ (BCG 7.H)

No	Frequency offset Δf 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 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.

3.2.10.3.2.6.1.2. Transmitter Spurious Emission Specification

Table 42 specify the additional spurious emission limits.

Table 42. 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

3.2.10.3.2.7 Band Class 8

3.2.10.3.2.7.1 Band Class Group 8.C

3.2.10.3.2.7.1.1. Transmitter Spurious Emission Specification

Table 43 specify the additional spurious emission limits.

Table 43. 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

3.2.10.3.2.7.2 Band Class Group 8.E

3.2.10.3.2.7.2.1. Transmitter Spurious Emission Specification

Table 44 specify the additional spurious emission limits.

Table 44. 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

3.2.10.3.2.7.3 Band Class Group 8.F

3.2.10.3.2.7.3.1. Transmitter Spurious Emission Specification

Table 45 specify the additional spurious emission limits.

Table 45. 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 2110-2170 2300-2400 2570-2620	1000	-50

3.2.10.3.3. 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.

3.2.10.3.3.1 Default Specifications

3.2.10.3.3.1.1 Default Channel Spectral Mask

The spectrum masks of Table 46 and Table 47 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 3.2.10.3.3.

Table 46. Channel Mask for 5 MHz Bandwidth

No	Offset Δf 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. 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 47. Channel Mask for 10 MHz Bandwidth

No	Offset Δf 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. 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.

Table 48. Channel Mask for 20 MHz Bandwidth

No	Offset Δf 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. 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 10.05 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 34.5 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

3.2.10.3.3.1.2 Default Spurious Emission

Unless otherwise specified in other sub sections of Section 3.2.10.3.3 for specific bands, the default spurious emission specifications of Table 49 are applicable.

Table 49. Default Spurious Emissions; Relevant to $F_{DL-lc} + ChBW/2 \leq f_c \leq F_{DL-ue} - ChBW/2$

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 $10 \times ChBW \leq \Delta f < 12 \times ChBW$ 1 MHz If $12 \times ChBW \leq \Delta f$	-30

3.2.10.3.3.2 Band Class 1

3.2.10.3.3.2.1 Band Class Group 1.C

3.2.10.3.3.2.1.1. Channel Spectral Mask

The Spectrum Emission Mask for 5 and 10 MHz bandwidth is specified in Table 50 and Table 51.

Table 50. Channel Mask for 5 MHz (BCG 1.C)

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

Table 51. Channel Mask for 10 MHz (BCG 1.C)

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

3.2.10.3.3.2.1.2. Transmitter Spurious Emission specification

Table 52. 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 53. 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 $2.5 \times BW \leq f_c - f < 10 \times BW$ 300 kHz If $10 \times BW \leq f_c - f < 12 \times BW$ 1 MHz If $12 \times BW \leq f_c - f $	-30 dBm

Table 54. Additional Spurious Emissions (BCG 1.C)

No	Spurious frequency (<i>f</i>) 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

3.2.10.3.3.3 Band Class 3

3.2.10.3.3.3.1 Band Class Group 3.C

3.2.10.3.3.3.1.1. Channel Spectral Mask

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

Table 56.

Table 55. 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 56. 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 57 and Table 58.

Table 57. 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 58. 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

3.2.10.3.3.3.1.2. Transmitter Spurious Emission specification

Table 59. 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 60. Base station spurious emissions limit, Category B (BCG 3.C)

No	Band	Measurement bandwidth	Allowed emission level
1	$30 \text{ MHz} \leq f < 1000$ MHz	100 kHz	-36 dBm
2	$1 \text{ GHz} \leq f < 13.45$ 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 60, BW is the signal channel bandwidth of 5 or 10 MHz.

Table 61. 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	$1 \text{ 000 MHz} \leq f < 2505 \text{ MHz}$	1 MHz	-13
5	$2 \text{ 505 MHz} \leq f < 2 \text{ 535 MHz}$	1 MHz	-42
6	$2 \text{ 535 MHz} \leq f < 2 \text{ 630 MHz}$	1 MHz	-13
7	$2 \text{ 630 MHz} \leq f < 2 \text{ 634.75 MHz}$	1 MHz	$-15 - 7/5 \times (f - 2 \text{ 629.75})$
8	$2 \text{ 634.75 MHz} \leq f < 2 \text{ 655 MHz}$	1 MHz	-22
9	$2 \text{ 655 MHz} \leq f$	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.

3.2.10.3.3.3.2 Band Class Group 3.D

3.2.10.3.3.3.2.1.Channel Spectral Mask

The Spectrum Emission Mask of Table 62 and Table 63 apply to US region.

Table 62. Channel Mask for 5 MHz Bandwidth -US (BCG 3.D)

No	Offset Δf 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 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.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

Table 63. Channel Mask for 10 MHz Bandwidth -US (BCG 3.D)

No	Offset Δf 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 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. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

The Spectrum Emission Mask of Table 64 and Table 65 apply to Europe region.

Table 64. Channel Mask for 5 MHz Bandwidth-Europe (BCG 3.D)

No	Offset Δf 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 Δf equals to 2.550 MHz; the last is at Δf equals to 12.450 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

Table 65. Channel Mask for 10 MHz Bandwidth-Europe (BCG 3.D)

No	Offset Δf 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 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.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

3.2.10.3.3.2.2. Transmitter Spurious Emission specification

Table 66. 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 67. 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 68. 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 69 specify limits to protect BS receivers against its intra-system BS transmit emissions.

Table 69. 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

3.2.10.3.3.4 Band Class 5

3.2.10.3.3.4.1 Channel Spectral Mask: BCG 5L.E

The Spectrum Emission Mask for 5 and 10 MHz bandwidth sizes are specified in Table 70 and Table 71. Table 70 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 71 specifies the emission levels of an underlying piecewise step function applicable conditionally only to some of P_{nom} power levels.

Table 70. 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	$39 \text{ dBm} < P_{nom}$	-20 dB	-27 dB	-32 dB	-50dB	-50dB
2	$33 \text{ dBm} < P_{nom} \leq 39 \text{ dBm}$	-20 dB	-27 dB	-32 dB	$-50 \text{ dB} + (39 \text{ dBm} - P_{nom})$	Refer to Table 71

Table 71. Absolute Spectral Emission Channel Mask (BCG 5L.E)

No	Power	Frequency Offset			
		$0.50 \text{ BW} \leq \Delta f < 0.71 \text{ BW}$	$0.71 \text{ BW} \leq \Delta f < 1.06 \text{ BW}$	$1.06 \text{ BW} \leq \Delta f < 2.00 \text{ BW}$	$2.00 \text{ BW} \leq \Delta f \leq 2.50 \text{ BW}$
1	$33 \text{ dBm} < P_{nom} \leq 39 \text{ dBm}$	Refer to Table 70	Refer to Table 70	Refer to Table 70	$-21 + x \text{ dBm/MHz}$
2	$P_{nom} \leq 33 \text{ dBm}$	-5.5 dBm/MHz	-5.5 dBm/MHz	-23.5 dBm/MHz	-23.5 dBm/MHz

Notes: In Table 71, $x = -10 \log(\text{BW}/10)$

3.2.10.3.3.5 Band Class 6

3.2.10.3.3.5.1 Band Class Group 6.D

3.2.10.3.3.5.1.1. Channel Spectral Mask

Table 72 and Table 73 specify the spectrum emission for FDD Base Stations with 5 and 10 MHz channel bandwidths.

Table 72. 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	$2.5 \leq \Delta f < 3.5$	50	-13
2	$3.5 \leq \Delta f \leq 12.5$	1000	-13

Table 73. 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

3.2.10.3.2.12.1.2. Transmitter Spurious Emission specification

Table 74. Spurious Emissions (BCG 6.D)

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

3.2.10.3.3.5.2 Band Class Group 6.E

3.2.10.3.3.5.2.1. Channel Spectral Mask

Table 75 and

Table 76 specify the spectrum emission for FDD Base Stations with 5 and 10 MHz channel bandwidths.

Table 75. Channel Mask for 5 MHz Bandwidth (BCG 6.E)

No	Frequency offset Δf 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 Δf equals to 2.550 MHz; the last is at Δf equals to 12.450 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

Table 76. Channel Mask for 10 MHz Bandwidth (BCG 6.E)

No	Frequency offset Δf 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 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.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

Table 77 specifies the spectrum emission mask for FDD Base Stations with 20 MHz channel bandwidth.

Table 77. Channel Mask for 20 MHz Bandwidth (BCG 6.E)

No	Frequency offset Δf 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 Δf equals to 10.05 MHz; the last is at Δf equals to 19.95 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 20.5 MHz; the last is at Δf equals to 49.5 MHz.
2. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

3.2.10.3.3.5.2.2. Transmitter Spurious Emission specification

Table 78 specifies the spurious emission limits while Table 79 specify the additional spurious emission limits.

Table 78. 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 79. 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

3.2.10.3.3.5.3 Band Class Group 6.F

3.2.10.3.3.5.3.1. Channel Spectral Mask

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

Table 81 specifies BS Spectrum Emission Mask for 10 MHz channel bandwidth.

Table 80. Channel Mask - Europe: 5 MHz (BCG 6.F)

No	Offset Δf 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 81. Channel Mask - Europe: 10 MHz (BCG 6.F)

No	Offset Δf 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

3.2.10.3.3.5.3.2. Transmitter Spurious Emission specification

Table 82. 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 83. 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 84 specifies limits to protect BS receivers against its intra-system BS transmit emissions.

Table 84. 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 85 may be required by local or regional regulations.

Table 85. 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

3.2.10.3.3.6 Band Class 7

3.2.10.3.3.6.1 Band Class Group 7.A to 7.E

3.2.10.3.3.6.1.1. Channel Spectral Mask

The Spectrum Emission Mask of Table 86 and Table 87 apply to US region.

Table 86. Channel Mask for 5 MHz Bandwidth -US (BCG 7.A-7.E)

No	Offset Δf 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:

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 87. Channel Mask for 10 MHz Bandwidth -US (BCG 7.A-7.E)

No	Offset Δf 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. 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.

The Spectrum Emission Mask of Table 88 and Table 89 apply to Europe region.

Table 88. Channel Mask for 5 MHz Bandwidth -Europe (BCG 7.A-7.E)

No	Offset Δf 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. 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 89. Channel Mask for 10 MHz Bandwidth -Europe (BCG 7.A-7.E)

No	Offset Δf 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. 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 24.95 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

3.2.11. Default capability class and parameters

Normative Reference:

This section is transposed with no change to the GCS as provided by the GCS Proponent.

Annex 4: IEEE Std 802.16m-2011, Annex V

4. Annex 1

[IEEE Std 802.16-2009.](#)

5. Annex 2

[IEEE Std 802.16j-2009.](#)

6. Annex 3

[IEEE Std 802.16h-2010.](#)

7. Annex 4

[IEEE Std 802.16m-2011.](#)