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TABLE OF CONTENTS
C:\Users\hyaghoob\Documents\Broadband Wireless\Standards\WiMAX\TWG>Main Documents\Feb 2012\DRAT-T23-005-R015v06-A_RSP.docx - _Toc318038650

1.	INTRODUCTION.....	8
1.1	<i>Scope</i>	8
1.2	<i>References.....</i>	9
1.3	<i>Definitions, Symbols and Acronyms</i>	9
1.3.1	<i>Definitions</i>	9
1.3.2	<i>Symbols.....</i>	10
1.3.3	<i>Acronyms.....</i>	10
2.	RADIO SPECIFICATIONS.....	12
2.1	<i>Mobile Station</i>	12
2.1.1	<i>Center frequency step size.....</i>	12
2.1.2	<i>RF Profile.....</i>	12
2.1.3	<i>Power Class Profile.....</i>	15
2.1.4	<i>Default Specifications.....</i>	15
2.1.4.1	<i>Default Channel Spectral Mask.....</i>	15
2.1.4.2	<i>Default Spurious Emission.....</i>	16
2.1.4.3	<i>Default Receiver Adjacent Channel Selectivity.....</i>	16
2.1.4.4	<i>Default Receiver Blocking Specification.....</i>	17
2.1.4.5	<i>Default Receiver Out of Band Blocking Specification</i>	18
2.1.4.6	<i>Default receiver Intermodulation specification</i>	19
2.1.4.7	<i>Default receiver spurious response specification</i>	20
2.1.5	<i>Band Class 1.....</i>	20
2.1.5.1	<i>Band Class Group 1.A</i>	20
2.1.5.2	<i>Band Class Group 1.B</i>	22
2.1.6	<i>Band Class 3.....</i>	24
2.1.6.1	<i>Band Class Group 3.A</i>	24
2.1.6.2	<i>Band Class Group 3.B</i>	30
2.1.7	<i>Band Class 5.....</i>	33
2.1.7.1	<i>Band Class Group 5.A</i>	33
2.1.7.2	<i>Band Class Group 5.B</i>	34
2.1.7.3	<i>Band Class Group 5.C</i>	36
2.1.8	<i>Band Class 6.....</i>	37
2.1.8.1	<i>Band Class Group 6.A</i>	37
2.1.8.2	<i>Band Class Group 6.B</i>	38
2.1.8.3	<i>Band Class Group 6.C</i>	43
2.1.9	<i>Band Class 7.....</i>	46
2.1.9.1	<i>Band Class Group 7.A</i>	46
2.1.9.2	<i>Band Class Group 7.B</i>	50
2.1.9.3	<i>Band Class Group 7.C</i>	51
2.1.9.4	<i>Band Class Group 7.D</i>	52

2.1.9.5 <i>Band Class Group 7.E</i>	54
2.1.9.6 <i>Band Class Group 7.G</i>	57
2.1.10 <i>Band Class 8</i>	60
2.1.10.1 <i>Band Class Group 8.A</i>	60
2.1.10.2 <i>Spurious Emission Specifications</i>	64
2.1.11 <i>Band Class 9</i>	64
2.1.11.1 <i>Band Class Group 9.D</i>	64
2.1.12 <i>Band Class 10</i>	66
2.1.12.1 <i>Band Class Group 10.A</i>	66
2.1.12.2 <i>Band Class Group 10.B</i>	68
2.2 <i>Base Station</i>	70
2.2.1 <i>Default Specifications</i>	70
2.2.1.1 <i>Default Channel Spectral Mask</i>	70
2.2.1.2 <i>Default Spurious Emission</i>	71
2.2.1.3 <i>Default Receiver Adjacent Channel Selectivity</i>	71
2.2.1.4 <i>Default receiver blocking specification</i>	72
2.2.1.5 <i>Default receiver Intermodulation specification</i>	73
2.2.1.6 <i>Default transmmiter Intermodulation specification</i>	74
2.2.2 <i>Band Class 1</i>	75
2.2.2.1 <i>Band Class Group 1.A</i>	75
2.2.2.2 <i>Band Class Group 1.B</i>	76
2.2.3 <i>Band Class 3</i>	78
2.2.3.1 <i>Band Class Group 3.A</i>	78
2.2.3.2 <i>Band Class Group 3.B</i>	81
2.2.4 <i>Band Class 5</i>	85
2.2.4.1 <i>Channel Spectral Mask: BCG 5.A, 5.B and 5.C</i>	85
2.2.4.2 <i>Adjacent Channel Leakage Ratio (ACLR): BCG 5.A, 5.B and 5.C</i>	85
2.2.5 <i>Band Class 6</i>	86
2.2.5.1 <i>Band Class Group 6.A</i>	86
2.2.5.2 <i>Band Class Group 6.B</i>	87
2.2.5.3 <i>Band Class Group 6.C</i>	95
2.2.6 <i>Band Class 7</i>	97
2.2.6.1 <i>Band Class Group 7.A to 7.E</i>	97
2.2.6.2 <i>Band Class Group 7.G</i>	99
2.2.7 <i>Band Class 8</i>	101
2.2.7.1 <i>Band Class Group 8.G</i>	101
2.2.8 <i>Band Class 9</i>	103
2.2.8.1 <i>Band Class Group 9.D</i>	103

List of Tables

TABLE 1. LIST OF BAND CLASS GROUPS.....	8
TABLE 2. RF CHANNEL CENTER FREQUENCY NUMBERS	12
TABLE 3. POWER CLASSES.....	15
TABLE 4. CHANNEL MASK FOR 5 MHZ BANDWIDTH.....	15
TABLE 5. CHANNEL MASK FOR 10 MHZ BANDWIDTH.....	15
TABLE 6. DEFAULT SPURIOUS EMISSIONS; RELEVANT TO $F_{UL-LE} + CHBW/2 \leq F_C \leq F_{UL-UE} - CHBW/2$	16
TABLE 7. LIMITS AND TEST PARAMETERS FOR RECEIVER ADJACENT CHANNEL SELECTIVITY.....	16
TABLE 8. BLOCKING FOR 5 MHZ CHANNEL BANDWIDTH	17
TABLE 9. BLOCKING FOR 10 MHZ CHANNEL BANDWIDTH	18
TABLE 10. PARAMETERS FOR OUT OF BAND BLOCKING FOR 5 AND 10 MHZ CHANNELS	18
TABLE 10. RECEIVER INTERMODULATION CHARACTERISTICS FOR 5 MHZ CHANNEL BANDWIDTH.....	19
TABLE 11. RECEIVER INTERMODULATION CHARACTERISTICS FOR 10 MHZ CHANNEL BANDWIDTH.....	19
TABLE 12. RECEIVER SPURIOUS RESPONSE FOR 5 MHZ CHANNEL BANDWIDTH.....	20
TABLE 13. RECEIVER SPURIOUS RESPONSE FOR 10 MHZ CHANNEL BANDWIDTH	20
TABLE 14. CHANNEL MASK FOR MS WITH $PTX \leq 23$ DBM (BCG 1.A)	20
TABLE 15. CHANNEL MASK FOR MS WITH $PTX > 23$ DBM (BCG 1.A)	21
TABLE 16. SPURIOUS EMISSIONS FOR 8.75 MHZ CHANNEL BANDWIDTH (BCG 1.A)	21
TABLE 17. ADDITIONAL SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2302.5 \leq F_C \leq 2397.5$ (BCG 1.B)	21
TABLE 18. ADDITIONAL SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2305 \leq F_C \leq 2395$ (BCG 1.B)	22
TABLE 19. CHANNEL MASK FOR 10 MHZ CHANNEL BANDWIDTH (BCG 1.B)	22
TABLE 20. CHANNEL MASK FOR 5 MHZ CHANNEL BANDWIDTH (BCG 1.B)	22
TABLE 21. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2302.5 \leq F_C \leq 2397.5$ (BCG 1.B)	23
TABLE 22. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2305 \leq F_C \leq 2395$ (BCG 1.B)	23
TABLE 23. ACLR SPECIFICATION FOR 5 MHZ CHANNEL BW MS (BCG 1.B).....	24
TABLE 24. ACLR SPECIFICATIONS FOR 10 MHZ CHANNEL BW MS (BCG 1.B)	24
TABLE 25. CHANNEL MASK FOR 10 MHZ CHANNEL BANDWIDTH (BCG 3.A)	24
TABLE 26. CHANNEL MASK FOR 5 MHZ CHANNEL BANDWIDTH (BCG 3.A)	25
TABLE 27. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2498.5 \leq F_C \leq 2687.5$ (BCG 3.A)	26
TABLE 28. ADDITIONAL SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2547.5 \leq F_C \leq 2622.5$ (BCG 3.A)	26
TABLE 29. ADDITIONAL SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2498.5 \leq F_C \leq 2687.5$ (BCG 3.A)	26
TABLE 30. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2501 \leq F_C \leq 2685$ (BCG 3.A)	27
TABLE 31. ADDITIONAL SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE, RELEVANT TO $2550 \leq F_C \leq 2620$ (BCG 3.A)	27
TABLE 32. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2501 \leq F_C \leq 2685$ (BCG 3.A)	27
TABLE 33. RECEIVER SPURIOUS EMISSION LIMITS (BCG 3.A)	28
TABLE 34. ACLR SPECIFICATION FOR 5 MHZ CHANNEL BW MS (BCG 3.A).....	29
TABLE 35. ACLR SPECIFICATIONS FOR 10 MHZ CHANNEL BW MS (BCG 3.A)	29
TABLE 36. RECEIVER SENSITIVITY LEVELS (BCG 3.A).....	30
TABLE 37. FIRST AND SECOND ADJACENT CHANNEL REJECTION (BCG 3.A).....	30

TABLE 38. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 3.B)	30
TABLE 39. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 3.B)	31
TABLE 40. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2498.5 \leq F_C \leq 2687.5$ (BCG 3.B)	31
TABLE 41. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2501 \leq F_C \leq 2685$ (BCG 3.B)	32
TABLE 42. ADDITIONAL SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2498.5 \leq F_C \leq 2687.5$ (BCG 3.B)	32
TABLE 43. ADDITIONAL SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2498.5 \leq F_C \leq 2687.5$ (BCG 3.B)	32
TABLE 44. CHANNEL MASK FOR 5 MHZ CHANNEL BANDWIDTH (BCG 5.A)	33
TABLE 45. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $3402.5 \leq F_C \leq 3797.5$ (BCG 5.A)	34
TABLE 46. CHANNEL MASK FOR 7 MHZ CHANNEL BANDWIDTH (BCG 5.B)	35
TABLE 47. SPURIOUS EMISSIONS FOR 7 MHZ CHANNEL SIZE; RELEVANT TO $3403.5 \leq F_C \leq 3796.5$ (BCG 5.B)	35
TABLE 48. CHANNEL MASK FOR 10 MHZ CHANNEL BANDWIDTH (BCG 5.C)	36
TABLE 49. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $3405 \leq F_C \leq 3795$ (BCG 5.C)	37
TABLE 50. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 6.A)	37
TABLE 51. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 6.A)	37
TABLE 52. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $1712.5 \leq F_C \leq 1767.5$ (BCG 6.A)	38
TABLE 53. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $1715 \leq F_C \leq 1765$ (BCG 6.A)	38
TABLE 54. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 6.B)	39
TABLE 55. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 6.B)	39
TABLE 56. CHANNEL MASK FOR 20 MHZ (BCG 6.B)	40
TABLE 57. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $1922.5 \leq F_C \leq 1977.5$ (BCG 6.B)	41
TABLE 58. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $1925 \leq F_C \leq 1975$ (BCG 6.B)	41
TABLE 59. ADDITIONAL SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $1922.5 \leq F_C \leq 1977.5$ (BCG 6.B)	41
TABLE 60. ADDITIONAL SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $1925 \leq F_C \leq 1975$ (BCG 6.B)	42
TABLE 61. SPURIOUS EMISSIONS FOR 20 MHZ CHANNEL SIZE; RELEVANT TO $1930 \leq F_C \leq 1970$ (BCG 6.B)	42
TABLE 62. ADDITIONAL SPURIOUS EMISSIONS FOR 20 MHZ CHANNEL SIZE; RELEVANT TO $1930 \leq F_C \leq 1970$ (BCG 6.B)	43
TABLE 63. CHANNEL MASK FOR 5 MHZ (BCG 6.C)	43
TABLE 64. CHANNEL MASK FOR 10 MHZ (BCG 6.C)	43
TABLE 65. SPURIOUS EMISSION (BCG 6.C)	44
TABLE 66. ADDITIONAL SPURIOUS EMISSION (BCG 6.C)	44
TABLE 67. ACLR SPECIFICATION FOR 5 MHZ CHANNEL BW MS (BCG 6.C)	45
TABLE 68. ACLR SPECIFICATIONS FOR 10 MHZ CHANNEL BW MS (BCG 6.C)	45
TABLE 69. CHANNEL MASK FOR 5 MHZ BANDWIDTH: $700.5 \leq F_C \leq 795.5$ (BCG 7.A)	46
TABLE 70. CHANNEL MASK FOR 5 MHZ BANDWIDTH: $799.5 \leq F_C \leq 859.5$ (BCG 7.A)	46
TABLE 71. CHANNEL MASK FOR 7 MHZ BANDWIDTH: $701.5 \leq F_C \leq 7944.5$ (BCG 7.A)	47
TABLE 72. CHANNEL MASK FOR 7 MHZ BANDWIDTH: $800.5 \leq F_C \leq 858.5$ (BCG 7.A)	47
TABLE 73. CHANNEL MASK FOR 10 MHZ BANDWIDTH: $703 \leq F_C \leq 793$ (BCG 7.A)	48
TABLE 74. CHANNEL MASK FOR 10 MHZ BANDWIDTH: $802 \leq F_C \leq 857$ (BCG 7.A)	48
TABLE 75. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE (BCG 7.A)	49
TABLE 76. SPURIOUS EMISSIONS FOR 7 MHZ CHANNEL SIZE (BCG 7.A)	49

TABLE 77. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE (BCG 7.A)	49
TABLE 78. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 7.B)	50
TABLE 79. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 7.B)	50
TABLE 80. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE (BCG 7.B)	51
TABLE 81. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE (BCG 7.B)	51
TABLE 82. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 7.C)	51
TABLE 83. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 7.C)	51
TABLE 84. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE (BCG 7.C)	52
TABLE 85. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 7.D)	52
TABLE 86. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 7.D)	53
TABLE 87. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE (BCG 7.D)	53
TABLE 88. CHANNEL MASK FOR 5 MHZ BANDWIDTH: $700.5 \leq F_C \leq 795.5$ (BCG 7.E)	54
TABLE 89. CHANNEL MASK FOR 5 MHZ BANDWIDTH: $799.5 \leq F_C \leq 859.5$ (BCG 7.E)	54
TABLE 90. CHANNEL MASK FOR 7 MHZ BANDWIDTH: $701.5 \leq F_C \leq 7944.5$ (BCG 7.E)	54
TABLE 91. CHANNEL MASK FOR 7 MHZ BANDWIDTH: $800.5 \leq F_C \leq 858.5$ (BCG 7.E)	55
TABLE 92. CHANNEL MASK FOR 10 MHZ BANDWIDTH: $703 \leq F_C \leq 793$ (BCG 7.E)	55
TABLE 93. CHANNEL MASK FOR 10 MHZ BANDWIDTH: $802 \leq F_C \leq 857$ (BCG 7.E)	56
TABLE 94. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE (BCG 7.E)	56
TABLE 95. SPURIOUS EMISSIONS FOR 7 MHZ CHANNEL SIZE (BCG 7.E)	57
TABLE 96. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE (BCG 7.E)	57
TABLE 97. CHANNEL MASK FOR 5 MHZ (BCG 7.G)	57
TABLE 98. CHANNEL MASK FOR 10 MHZ (BCG 7.G)	58
TABLE 99. SPURIOUS EMISSION (BCG 7.G)	58
TABLE 100. ADDITIONAL SPURIOUS EMISSION (BCG 7.G)	58
TABLE 101. ACLR SPECIFICATION FOR 5 MHZ CHANNEL BW MS (BCG 7.G)	59
TABLE 102. ACLR SPECIFICATIONS FOR 10 MHZ CHANNEL BW MS (BCG 7.G)	60
TABLE 103. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 8.A)	60
TABLE 104. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 8.A)	61
TABLE 105. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE (BCG 8.A)	61
TABLE 106. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE (BCG 8.A)	62
TABLE 107. ADDITIONAL SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE (BCG 8.A)	62
TABLE 108. ADDITIONAL SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE (BCG 8.A)	63
TABLE 109. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $1802.5 \leq F_C \leq 1827.5$ (BCG 8.G)	64
TABLE 110. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $1805 \leq F_C \leq 1825$ (BCG 8.G)	64
TABLE 111. SPURIOUS EMISSION FOR 5MHZ CHANNEL SIZE MOBILE STATION; RELEVANT TO $170.0 < F_C < 202.5$ (BCG 9.D)	65
TABLE 112. RECEIVER SPURIOUS EMISSION FOR MOBILE STATION (BCG 9.D)	65
TABLE 113. ACLR SPECIFICATION FOR 5MHZ CHANNEL BW MOBILE STATION (BCG 9.D)	65
TABLE 114. CHANNEL MASK FOR 5 MHZ CHANNEL BANDWIDTH (BCG 10.A)	67
TABLE 115. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL BANDWIDTH (BCG 10.A)	67
TABLE 116. CHANNEL MASK FOR 10 MHZ CHANNEL BANDWIDTH (BCG 10.B)	68
TABLE 117. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL BANDWIDTH (BCG 10.B)	69
TABLE 118. CHANNEL MASK FOR 5 MHZ BANDWIDTH	70
TABLE 119. CHANNEL MASK FOR 10 MHZ BANDWIDTH	70
TABLE 120. DEFAULT SPURIOUS EMISSIONS; RELEVANT TO $F_{DL-LE} + CHBW/2 \leq F_C \leq F_{DL-UE} - CHBW/2$	71
TABLE 121. LIMITS AND TEST PARAMETERS FOR RECEIVER ADJACENT CHANNEL SELECTIVITY	72
TABLE 122. BLOCKING FOR 5 MHZ CHANNEL BANDWIDTH	72
TABLE 123. BLOCKING FOR 10 MHZ CHANNEL BANDWIDTH	73
TABLE 124. RECEIVER INTERMODULATION CHARACTERISTICS FOR 5 MHZ CHANNEL BANDWIDTH	74

TABLE 125. RECEIVER INTERMODULATION CHARACTERISTICS FOR 10 MHZ CHANNEL BANDWIDTH.....	74
TABLE 126. CHANNEL MASK FOR 8.75 MHZ CARRIER (BCG 1.A).....	75
TABLE 127. BASE STATION SPURIOUS EMISSION LIMIT, CATEGORY A (BCG 1.A).....	75
TABLE 128. CHANNEL MASK FOR 5 MHZ (BCG 1.B)	76
TABLE 129. CHANNEL MASK FOR 10 MHZ (BCG 1.B)	76
TABLE 130. BASE STATION SPURIOUS EMISSION LIMIT, CATEGORY A (BCG 1.B)	76
TABLE 131. BASE STATION SPURIOUS EMISSIONS LIMIT, CATEGORY B (BCG 1.B).....	76
TABLE 132. ADDITIONAL SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2302.5 \leq F_C \leq 2397.5$ (BCG 1.B).....	77
TABLE 133. ADDITIONAL SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO 2305 $\leq F_C \leq 2395$ (BCG 1.B).....	77
TABLE 134. ACLR SPECIFICATION FOR 5 MHZ CHANNEL BW BS (BCG 1.B)	78
TABLE 135. ACLR SPECIFICATIONS FOR 10 MHZ CHANNEL BW BS (BCG 1.B).....	78
TABLE 136. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 3.A)	78
TABLE 137. CHANNEL MASK FOR 5 MHZ BANDWIDTH- JAPAN (BCG 3.A)	78
TABLE 138. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 3.A)	79
TABLE 139. CHANNEL MASK FOR 10 MHZ BANDWIDTH- JAPAN (BCG 3.A)	79
TABLE 140. BASE STATION SPURIOUS EMISSION LIMIT, CATEGORY A (BCG 3.A)	79
TABLE 141. BASE STATION SPURIOUS EMISSIONS LIMIT, CATEGORY B (BCG 3.A).....	79
TABLE 142. BASE STATION SPURIOUS EMISSION LIMIT, JAPAN (BCG 3.A)	79
TABLE 143. RECEIVER SENSITIVITY LEVELS (BCG 3.A)	80
TABLE 144. FIRST AND SECOND ADJACENT CHANNEL REJECTION (BCG 3.A).....	80
TABLE 145. CHANNEL MASK FOR 5 MHZ BANDWIDTH -US (BCG 3.B).....	81
TABLE 146. CHANNEL MASK FOR 10 MHZ BANDWIDTH -US (BCG 3.B).....	81
TABLE 147. CHANNEL MASK FOR 5 MHZ BANDWIDTH-EUROPE (BCG 3.B).....	82
TABLE 148. CHANNEL MASK FOR 10 MHZ BANDWIDTH-EUROPE (BCG 3.B).....	82
TABLE 149. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE-US; RELEVANT TO $2616.5 \leq F_C \leq 2687.5$ (BCG 3.B).....	83
TABLE 150. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE-US; RELEVANT TO $2619 \leq F_C \leq 2685$ (BCG 3.B).....	83
TABLE 151. SPURIOUS EMISSIONS FOR 5 MHZ BANDWIDTH-EUROPE; RELEVANT TO $2616.5 \leq F_C \leq 2687.5$ (BCG 3.B).....	83
TABLE 152. SPURIOUS EMISSIONS FOR 10 MHZ BANDWIDTH-EUROPE; RELEVANT TO $2619 \leq F_C \leq 2685$ (BCG 3.B).....	83
TABLE 153. BS SPURIOUS EMISSIONS LIMITS FOR PROTECTION OF THE BS RECEIVER FOR 5 MHZ-EUROPE; RELEVANT TO $2616.5 \leq F_C \leq 2687.5$ (BCG 3.B)	84
TABLE 154. BS SPURIOUS EMISSIONS LIMITS FOR PROTECTION OF THE BS RECEIVER FOR 10 MHZ-EUROPE; RELEVANT TO $2619 \leq F_C \leq 2685$ (BCG 3.B)	84
TABLE 155. RELATIVE TRANSMIT SPECTRAL POWER DENSITY CHANNEL MASK (BCG 5.A/5.B/5.C)	85
TABLE 156. ABSOLUTE SPECTRAL EMISSION CHANNEL MASK (BCG 5.A/5.B/5.C)	85
TABLE 157. BS ACLR LIMITS (BCG 5.A).....	85
TABLE 158. BS ACLR LIMITS (BCG 5.B).....	86
TABLE 159. BS ACLR LIMITS (BCG 5.C).....	86
TABLE 160. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 6.A)	86
TABLE 161. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 6.A)	86
TABLE 162. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2112.5 \leq F_C \leq 2167.5$ (BCG 6.A)	87
TABLE 163. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2115 \leq F_C \leq 2165$ (BCG 6.A)	87
TABLE 164. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 6.B)	87
TABLE 165. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 6.B)	88
TABLE 166. CHANNEL MASK FOR 20 MHZ BANDWIDTH (BCG 6.B)	88

TABLE 167. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2112.5 \leq F_C \leq 2167.5$ (BCG 6.B)	89
TABLE 168. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2115 \leq F_C \leq 2165$ (BCG 6.B)	89
TABLE 169. ADDITIONAL SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $2112.5 \leq F_C \leq 2152.5$ (BCG 6.B)	90
TABLE 170. ADDITIONAL SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $2115 \leq F_C \leq 2150$ (BCG 6.B)	92
TABLE 171. SPURIOUS EMISSIONS FOR 20 MHZ CHANNEL SIZE; RELEVANT TO $2120 \leq F_C \leq 2160$ (BCG 6.B)	93
TABLE 172. ADDITIONAL SPURIOUS EMISSIONS FOR 20 MHZ CHANNEL SIZE; RELEVANT TO $2120 \leq F_C \leq 2160$ (BCG 6.B)	94
TABLE 173. CHANNEL MASK - EUROPE: 5 MHZ (BCG 6.C)	95
TABLE 174. CHANNEL MASK - EUROPE: 10 MHZ (BCG 6.C)	95
TABLE 175. SPURIOUS EMISSION (BCG 6.C)	96
TABLE 176. SPURIOUS EMISSIONS LIMITS FOR PROTECTION OF THE BS RECEIVER (BCG 6.C)	96
TABLE 177. ADDITIONAL SPURIOUS EMISSION (BCG 6.C)	96
TABLE 178. ACLR SPECIFICATION FOR 5 MHZ CHANNEL BW BS (BCG 6.C)	97
TABLE 179. ACLR SPECIFICATIONS FOR 10 MHZ CHANNEL BW BS (BCG 6.C)	97
TABLE 180. CHANNEL MASK FOR 5 MHZ BANDWIDTH -US (BCG 7.A-7.E)	97
TABLE 181. CHANNEL MASK FOR 10 MHZ BANDWIDTH -US (BCG 7.A-7.E)	98
TABLE 182. CHANNEL MASK FOR 5 MHZ BANDWIDTH -EUROPE (BCG 7.A-7.E)	98
TABLE 183. CHANNEL MASK FOR 10 MHZ BANDWIDTH -EUROPE (BCG 7.A-7.E)	98
TABLE 184. CHANNEL MASK - EUROPE: 5 MHZ (BCG 7.G)	99
TABLE 185. SPECTRUM EMISSION MASK - EUROPE: 10 MHZ (BCG 7.G)	99
TABLE 186. SPURIOUS EMISSION (BCG 7.G)	100
TABLE 187. BS SPURIOUS EMISSIONS LIMITS FOR PROTECTION OF THE BS RECEIVER (BCG 7.G)	100
TABLE 188. ADDITIONAL SPURIOUS EMISSION (BCG 7.G)	100
TABLE 189. ACLR SPECIFICATION FOR 5 MHZ CHANNEL BW BS (BCG 7.G)	101
TABLE 190. ACLR SPECIFICATIONS FOR 10 MHZ CHANNEL BW BS (BCG 7.G)	101
TABLE 191. CHANNEL MASK FOR 5 MHZ BANDWIDTH (BCG 8.G)	101
TABLE 192. CHANNEL MASK FOR 10 MHZ BANDWIDTH (BCG 8.G)	102
TABLE 193. SPURIOUS EMISSIONS FOR 5 MHZ CHANNEL SIZE; RELEVANT TO $1802.5 \leq F_C \leq 1827.5$ (BCG 8.G)	102
TABLE 194. SPURIOUS EMISSIONS FOR 10 MHZ CHANNEL SIZE; RELEVANT TO $1805 \leq F_C \leq 1825$ (BCG 8.G)	102
TABLE 195. SPURIOUS EMISSION FOR 5MHZ CHANNEL SIZE FIXED BASE STATION; RELEVANT TO $170.0 < FC < 202.5$ (BCG 9.D)	103
TABLE 196. SPURIOUS EMISSION FOR 5MHZ CHANNEL SIZE TRANSPORTABLE BASE STATION; RELEVANT TO $170.0 < FC < 202.5$ (BCG 9.D)	104
TABLE 197. RECEIVER SPURIOUS EMISSION FOR FIXED BASE STATION (BCG 9.D)	104
TABLE 198. RECEIVER SPURIOUS EMISSION FOR TRANSPORTABLE BASE STATION (BCG 9.D)	104
TABLE 199. ACLR SPECIFICATION FOR 5MHZ CHANNEL BW FIXED BASE STATION (BCG 9.D)	105
TABLE 200. ACLR SPECIFICATION FOR 5MHZ CHANNEL BW TRANSPORTABLE BASE STATION (BCG 9.D)	105
TABLE 201. PREFERRED CHANNEL SET FOR BCG 10	106

1. Introduction

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

1.1 Scope

The present document specifies the WiMAX Forum® Mobile Radio specifications for Mobile Stations and Base Stations for Mobile WiMAX® Release 1.0 and 1.5 Band Classes Groups as listed in **Table 1**.

Table 1. List of Band Class Groups

Band Class Group	Uplink MS Transmit Frequency (MHz)	Downlink MS Receive Frequency (MHz)	Channel Bandwidth (MHz)	Duplex Mode	Air Interface Release
1.A	2300-2400	2300-2400	8.75	TDD	1.0
1.B	2300-2400	2300-2400	5 , 10, or both	TDD	1.0
2.D	2305-2320, 2345-2360	2305-2320, 2345-2360	3.5 and 5 and10	TDD	1.0
2.E	2345-2360	2305-2320	2x3.5 and 2x5 and 2x10	FDD	1.5
2.F	2345-2360	2305-2320	5 Uplink, 10 Downlink	FDD	1.5
3.A	2496-2690	2496-2690	5 , 10, or both	TDD	1.0
3.B	2496-2572	2614-2690	2x5 and 2x10	FDD	1.5
4.A	3300-3400	3300-3400	5	TDD	1.0
4.B	3300-3400	3300-3400	7	TDD	1.0
4.C	3300-3400	3300-3400	10	TDD	1.0
5L.A	3400-3600	3400-3600	5	TDD	1.0
5L.B	3400-3600	3400-3600	7	TDD	1.0
5L.C	3400-3600	3400-3600	10	TDD	1.0
5L.D	3400-3500	3500-3600	2x5 and 2x7 and 2x10	FDD	1.5
5H.A	3600-3800	3600-3800	5	TDD	1.0
5H.B	3600-3800	3600-3800	7	TDD	1.0
5H.C	3600-3800	3600-3800	10	TDD	1.0
6.A	1710-1770	2110-2170	2x5 and 2x10	FDD	1.5
6.B	1920-1980	2110-2170	2x5 and 2x10 (20 MHz optional)	FDD	1.5
6.C	1710-1785	1805-1880	2x5 and 2x10	FDD	1.5
7.A	698-862	698-862	5 and 7 and 10	TDD	1.0
7.B	776-787	746-757	2x5 and 2x10	FDD	1.5

7.C	788-793, 793-798	758-763, 763-768	2x5	FDD	1.5
7.D	788-798	758-768	2x10	FDD	1.5
7.E	698-862	698-862	5 and 7 and 10 (TDD) 2x5 and 2x7 and 2x10 (FDD)	TDD/FDD	1.5
7.F	698-862	698-862	8	TDD	1.0
7.G	880-915	925-960	2x5 and 2x10	FDD	1.5
7.x*	730-770, 890-903, 915-950	730-770, 890-903, 915-950	5 and 10	TDD	1.5
8.A	1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920	1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920	5 and 10	TDD	1.5
8.G	1800-1830	1800-1830	5 AND 10	TDD	1.0
9.D	170 -202.5	170-202.5	5	TDD	1.0
10.A	5000-5150	5000-5150	5	TDD	1.0
10.B	5000-5150	5000-5150	10	TDD	1.0

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

1.2 References

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] WMF-T23-001-R010v09, WiMAX Forum® Mobile System Profile, Release 1
- [2] WMF-T23-007-R010v02, WiMAX Forum® Mobile System Profile, Release 1 – IMT-2000 Edition
- [3] WMF-T23-001-R015v01, WiMAX Forum® Mobile System Profile, Release 1.5 Common Part
- [4] WMF-T23-003-R015v01, WiMAX Forum® Mobile System Profile Specification, Release 1.5 FDD Specific Part
- [5] WMF-T23-002-R015v01, WiMAX Forum® Mobile System Profile Specification, Release 1.5 TDD Specific Part

1.3 Definitions, Symbols and Acronyms

1.3.1 Definitions

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

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
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

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	Channel bandwidth in MHz
ChBW	Channel Bandwidth
MS	Mobile Station
RF	Radio Frequency
Pnom	transmitter nominal maximum output power

oi qualified option – for mutually exclusive or selectable options from a set. One or more of the options from the set shall be supported

2. Radio Specifications

2.1 Mobile Station

The purpose of this section is to provide radio specification for Mobile Station. The receiver characterization specified in this section is optional and not required for WiMAX certification of Mobile Stations. The receiver specifications may need to be met to conform with regulatory requirements in some territories.

2.1.1 Center frequency step size

The center frequency step size is 250 KHz for Release 1.0 BCGs and 100 KHz for Release 1.5 BCGs.

2.1.2 RF Profile

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.

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

Here the RF channel center frequency (f_c) is in MHz. The RF channel center frequency number (f_{cN}) is a number between 3450 and 102950 corresponding to 172.5 MHz and 5147.5 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	Channel BW (MHz)	Frequency Range (MHz)		RF Channel Center Frequency Number Set	
		Uplink	Downlink	Uplink	Downlink
1.A	8.75	2300-2400	2300-2400	(46090, 47910, 5)	(46090, 47910, 5)
1.B	5	2300-2400	2300-2400	(46050, 47950, 5)	(46050, 47950, 5)
	10	2300-2400	2300-2400	(46100, 47900, 5)	(46100, 47900, 5)

2.D	3.5	2305-2320, 2345-2360	2305-2320, 2345-2360	(46135, 46365, 5), (46935, 47165, 5)	(46135, 46365, 5), (46935, 47165, 5)
	5	2305-2320, 2345-2360	2305-2320, 2345-2360	(46150, 46350, 5), (46950, 47150, 5)	(46150, 46350, 5), (46950, 47150, 5)
	10	2305-2320, 2345-2360	2305-2320, 2345-2360	(46200, 46300, 5), (47000, 47100, 5)	(46200, 46300, 5), (47000, 47100, 5)
2.E	2x3.5	2345-2360	2305-2320	(46935, 47165, 2)	(46135, 46365, 2)
	2x5	2345-2360	2305-2320	(46950, 47150, 2)	(46150, 46350, 2)
	2x10	2345-2360	2305-2320	(47000, 47100, 2)	(46200, 46300, 2)
2.F	5UL/10DL	2345-2360	2305-2320	(46950, 47150, 2)	(46200, 46300, 2)
3.A	5	2496-2690	2496-2690	(49970, 53750, 5)	(49970, 53750, 5)
	10	2496-2690	2496-2690	(50020, 53700, 5)	(50020, 53700, 5)
3.B	2x5	2496-2572	2614-2690	(49970, 51390, 2)	(52330, 53750, 2)
	2x10	2496-2572	2614-2690	(50020, 51340, 2)	(52380, 53700, 2)
4.A	5	3300-3400	3300-3400	(66050, 67950, 5)	(66050, 67950, 5)
4.B	7	3300-3400	3300-3400	(66070, 67930, 5)	(66070, 67930, 5)
4.C	10	3300-3400	3300-3400	(66100, 67900, 5)	(66100, 67900, 5)
5L.A	5	3400-3600	3400-3600	(68050, 71950, 5)	(68050, 71950, 5)
5L.B	7	3400-3600	3400-3600	(68070, 71930, 5)	(68070, 71930, 5)
5L.C	10	3400-3600	3400-3600	(68100, 71900, 5)	(68100, 71900, 5)
5L.D	2x5	3400-3500	3500-3600	(68050, 69950, 2)	(70050, 71950, 2)
	2x7	3400-3500	3500-3600	(68070, 69930, 2)	(70070, 71930, 2)
	2x10	3400-3500	3500-3600	(68100, 69900, 2)	(70100, 71900, 2)
5H.A	5	3600-3800	3600-3800	(72050, 75950, 5)	(72050, 75950, 5)
5H.B	7	3600-3800	3600-3800	(72070, 75930, 5)	(72070, 75930, 5)
5H.C	10	3600-3800	3600-3800	(72100, 75900, 5)	(72100, 75900, 5)
6.A	2x5	1710-1770	2110-2170	(34250, 35350, 2)	(42250, 43350, 2)
	2x10	1710-1770	2110-2170	(34300, 35300, 2)	(42300, 43300, 2)
6.B	2x5	1920-1980	2110-2170	(38450, 39550, 2)	(42250, 43350, 2)
	2x10	1920-1980	2110-2170	(38500, 39500, 2)	(42300, 43300, 2)
6.C	2x5	1710-1785	1805-1880	(34250, 35650, 2)	(36150, 37550, 2)
	2x10	1710-1785	1805-1880	(34300, 35600, 2)	(36200, 37500, 2)
7.A	5	698-862	698-862	(14010, 17190, 5)	(14010, 17190, 5)
	7	698-862	698-862	(14030, 17170, 5)	(14030, 17170, 5)
	10	698-862	698-862	(14060, 17140, 5)	(14060, 17140, 5)

7.B	2x5	776-787	746-757	(15570, 15690, 2)	(14970, 15090, 2)
	2x0	776-787	746-757	(15620, 15640, 2)	(15020, 15040, 2)
7.C	2x5	788-793, 793-798	758-763, 763-768	(15810, 15810, 2)	(15210, 15210, 2)
7.D	2x10	788-798	758-768	(15910, 15910, 2)	(15310, 15310, 2)
7.E	5	698-862	698-862	(15860, 15860, 2)	(15260, 15260, 2)
	7	698-862	698-862	(14010, 17190, 2)	(14010, 17190, 2)
	10	698-862	698-862	(14030, 17170, 2)	(14030, 17170, 2)
	2x5	698-862	698-862	(14060, 17140, 2)	(14060, 17140, 2)
	2x7	698-862	698-862	(14010, 17190, 2)	(14010, 17190, 2)
	2x10	698-862	698-862	(14030, 17170, 2)	(14030, 17170, 2)
7.F	8	698-862	698-862	(14040, 17160, 5)	(14040, 17160, 5)
7.G	2x5	880-915	925-960	(17650, 18250, 2)	(18550, 19150, 2)
	2x10	880-915	925-960	(17700, 18200, 2)	(18600, 19100, 2)
8.A	5	1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920	1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920	(35750, 36050, 2), (37650, 38350, 2), (38250, 38550, 2), (40250, 40450, 2), (38050, 38350, 2)	(35750, 36050, 2), (37650, 38350, 2), (38250, 38550, 2), (40250, 40450, 2), (38050, 38350, 2)
	10	1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920	1785-1805, 1880-1920, 1910-1930, 2010-2025, 1900-1920	(35800, 36000, 2), (37700, 38300, 2), (38300, 38500, 2), (40300, 40400, 2), (38100, 38300, 2)	(35800, 36000, 2), (37700, 38300, 2), (38300, 38500, 2), (40300, 40400, 2), (38100, 38300, 2)
8.G	5	1800-1830	1800-1830	(36050, 36550, 5)	(36050, 36550, 5)
	10	1800-1830	1800-1830	(36100, 36500, 5)	(36100, 36500, 5)
9.D	5	170-202.5	170-202.5	(3450, 4000, 5)	(3450, 4000, 5)
10.A	5	5000-5150	5000-5150	(100050, 102950, 5)	(100050, 102950, 5)
10.B	10	5000-5150	5000-5150	(100200, 102900, 5)	(100200, 102900, 5)

Note: that comprehensive RF raster of Table 3 is only for interoperability purposes and not a basis for any performance testing on RF channel scanning and synchronization to network. RF preferred sets need to be developed to be considered as basis for scanning time performance specifications.

2.1.3 Power Class Profile

The Power Classes listed in following table are developed to cover the complete target range of power levels while different interpretation of applicable modulation levels are addressed through a dual range specification for QPSK and 16-QAM per Power Class.

Table 3. Power Classes

Class Identifier	Transmit Power (dBm) for 16-QAM	Transmit Power (dBm) for QPSK	MS Required
Power Class 1	$18 \leq PTx,max < 21$	$20 \leq PTx,max < 23$	Oioi
Power Class 2	$21 \leq PTx,max < 25$	$23 \leq PTx,max < 27$	Oioi
Power Class 3	$25 \leq PTx,max < 30$	$27 \leq PTx,max < 30$	Oioi
Power Class 4	$30 \leq PTx,max$	$30 \leq PTx,max$	Oioi

Note: The maximum MS output power may be limited by the value included in a MS Maximum Transmission Power Limitation Control TLV that may be included in the UCD.

2.1.4 Default Specifications

2.1.4.1 Default Channel Spectral Mask

Unless otherwise specified in sub sections of Section 2.1 for specific bands, the spectrum masks of Table 4 and Table 5 are applicable.

Table 4. 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	$3.5 \leq \Delta f \leq 12.5$	1000	-13

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 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	$6 \leq \Delta f \leq 25$	1000	-13

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.

2.1.4.2 Default Spurious Emission

Unless otherwise specified in sub sections of Section 2.1 for specific bands, the default spurious emission specifications of Table 6 are applicable.

Table 6. 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 $2.5xChBW \leq \Delta f < 10xChBW$ 300 kHz If $10xChBW \text{ MHz} \leq \Delta f < 12xChBW$ 1 MHz If $12xChBW \leq \Delta f$	-30

2.1.4.3 Default Receiver Adjacent Channel Selectivity

The receiver adjacent and alternate channel selectivity (ACS) is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the interferer power level (in dB) relative to thermal noise (Nth)

To reference the receiver adjacent and alternate channel selectivity values properly, a sensitivity level is defined as the signal level for Bit Error Ratio (BER) $\leq 10^{-6}$ (or equivalent PER) performance for AWGN channel, over the channel bandwidth (5 MHz or 10 MHz), corresponding to the most robust modulation and coding rate supported by the technology.

Nth is the receiver thermal noise of the equipment as declared by the manufacturer and is equal to $kTBwF$ with Bw is the bandwidth of the equipment and F is the receiver noise figure.

Table 7 specifies the limits and the test parameters for the receiver ACS in the first adjacent channel and 2nd adjacent channels. For an assigned channel bandwidth BW, the interferer channel bandwidth of the same size is used. All the measurements are done over 95 % of the channel. The compliant systems meet a Bit Error Ratio (BER) $< 10^{-6}$ (or equivalent PER) with the interference levels specified in the tables. Please note that depending on some assumed packet sizes, equivalent Packet Error Ratio (PER) criteria can be used alternatively.

Specific numbers for specific band supersedes these default numbers.

Table 7. Limits and test parameters for receiver adjacent channel selectivity

ACS limits (dB)		33	47
Power (dBm)	$P_{SENS} + 3$	Nth +33	Nth +47
Centre frequency (MHz)	f_c	$f_c \pm BW$	$f_c \pm 2xBW$

2.1.4.4 Default Receiver Blocking Specification

Unless otherwise specified in sub sections of Section 2.1 for specific bands, the receiver blocking specifications of this clause are applicable.

The blocking characteristic is a performance measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interfering signal on frequencies other than those of the adjacent channels. The blocking performance specification applies to interfering signals with center frequencies within the ranges specified in the tables below, using a 1MHz step size. The blocking performance shall apply to all frequencies except those at which a spurious response occurs.

PSENS5 and PSENS10 are the sensitivity levels at $BER \leq 10^{-6}$, for 5 MHz and 10 MHz channels respectively, corresponding to the most robust modulation and coding rate supported by the user equipment. The wanted signal with the most robust modulation and coding supported by the Mobile Station shall be used.

For blocking performance specification, the wanted signal with the most robust modulation and coding supported by the Mobile Station shall be used.

BER performance requirement at $BER \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to Mobile Station antenna input:

- A wanted signal at the assigned channel frequency, with mean power 6 dB above PSENS5.
- Interfering signal needs to use the parameters of Table 8.

Table 8. Blocking for 5 MHz channel bandwidth

According to Table 2 Uplink Channel Center Frequencies	According to Table 2 Uplink Channel Center Frequencies excluding first and second adjacent channels and spurious response frequencies	-49	12.5	Modulation and coding equal to those of the wanted signal

BER performance requirement at $BER \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to Mobile Station antenna input:

- A wanted signal at the assigned channel frequency, with mean power 6 dB above PSENS10.

- Interfering signal needs to use the parameters of Table 9.

Table 9. Blocking for 10 MHz channel bandwidth

According to Table 2 Uplink Channel Center Frequencies	According to Table 2 Uplink Channel Center Frequencies excluding first and second adjacent channels and spurious response frequencies	-49	25	Modulation and coding equal to those of the wanted signal

2.1.4.5 Default Receiver Out of Band Blocking Specification

The blocking characteristic is a performance measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted Continuous Wave (CW) interfering signal. The Interfering Signal is applied at frequencies other than those of the adjacent channels (first and second), in accordance with the table below, using a 1MHz step size. The blocking specifications are in conducted mode through Mobile Station antenna port. The blocking performance shall apply at all frequencies except those at which a spurious response occurs.

P_{SENS5} and P_{SENS10} are the sensitivity levels at $BER \leq 10^{-6}$, for 5 MHz and 10 MHz channels respectively, corresponding to the most robust modulation and coding rate supported by the user equipment. The wanted signal with the most robust modulation and coding supported by the Mobile Station shall be used.

BER performance requirement at $BER \leq 10^{-6}$ (or equivalent PER) shall be met when the parameters of Table 10 are used.

Table 10. Parameters for Out of Band Blocking for 5 and 10 MHz Channels

Parameter	Out of Band Interference Range 1	Out of Band Interference Range 2	Out of Band Interference Range 3
Center Frequency of Wanted Signal	According to Uplink Frequency range and RF Channel Center Frequency of Table 2		
Wanted Signal Mean Power (dBm)	$P_{SENS5}+6$ for 5MHz $P_{SENS10}+6$ for 10MHz	$P_{SENS5}+6$ for 5MHz $P_{SENS10}+6$ for 10MHz	$P_{SENS5}+6$ for 5MHz $P_{SENS10}+6$ for 10MHz
Centre Frequency of CW Interfering Signal (MHz)	$F_{DL-ue} + 2xChBW$ to $F_{DL-ue} + 60$, $F_{DL-le} - 2xChBW$ to $F_{DL-le} - 60$	$F_{DL-ue} + 60$ to $F_{DL-ue} + 85$, $F_{DL-le} - 60$ to $F_{DL-le} - 85$	$F_{DL-ue} + 85$ to 13450, $F_{DL-le} - 85$ to 1
Interfering Signal Mean Power (dBm)	-44	-30	-15

For Table 10, for any out of band region, excluding the corresponding UL frequency range (i.e. FUL-le - FUL-ue) of the operating BCG, up to [24] exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size. For UL frequency range (i.e.

FUL-le - FUL-ue), up to 8 exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1 MHz step size. For these exceptions the requirements of clause 2.1.4.7 Default Receiver Spurious response specification are applicable.

2.1.4.6 Default receiver Intermodulation specification

Unless otherwise specified in sub sections of Section 2.1 for specific bands, the receiver Intermodulation specification of this clause are applicable.

Nonlinear mixing of the third and higher order of two interfering signals can produce an interfering signal in the band of the wanted signal. Intermodulation response rejection characteristic is a measure of the capability of the receiver to receive a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

BER performance requirement at $\text{BER} \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to Mobile Station antenna input.

- A wanted signal at the assigned channel frequency,
with mean power 6 dB above PSENS5.
- Two interfering signals need to use the parameters
of Table 11.

Table 11. Receiver intermodulation characteristics for 5 MHz channel bandwidth

-55	7.5	Carrier Wave
-55	17.5	Modulation and coding equal to those of the wanted signal

BER performance requirement at $\text{BER} \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to Mobile Station antenna input.

- A wanted signal at the assigned channel frequency,
with mean power 6 dB above PSENS10.
- Two interfering signals need to use the parameters
of Table 12.

Table 12. Receiver intermodulation characteristics for 10 MHz channel bandwidth

-55	15	Carrier Wave
-55	35	Modulation and coding equal to those of the wanted signal

2.1.4.7 Default receiver spurious response specification

Spurious response is a performance measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted Carrier Wave interfering signal at any other frequency at which a response is obtained (i.e. for which the blocking limits as specified in Table 8, Table 9 and Table 10 are not met).

BER performance requirement at $\text{BER} \leq 10^{-6}$ (or equivalent PER) shall be met when a wanted signal at the assigned channel frequency, with mean power 6 dB above PSENS5, coupled to Mobile Station antenna input.

Table 13. Receiver spurious response for 5 MHz channel bandwidth

According to Table 2 Downlink Channel Center Frequencies	Spurious response frequencies within the Interfering signal frequency range of Table 8, Table 9 and Table 10	-49	Carrier Wave

BER performance requirement at $\text{BER} \leq 10^{-6}$ (or equivalent PER) shall be met when a wanted signal at the assigned channel frequency, with mean power 6 dB above PSENS10, coupled to Mobile Station antenna input.

Table 14. Receiver spurious response for 10 MHz channel bandwidth

Center Frequency of Wanted Signal	Centre Frequency of Interfering Signal	Interfering Signal Mean Power (dBm)	Type of Interfering Signal
According to Table 2 Downlink Channel Center Frequencies	Spurious response frequencies within the range of Table 8, Table 9 and Table 10	-49	Carrier Wave

2.1.5 Band Class 1

2.1.5.1 Band Class Group 1.A

2.1.5.1.1 Channel Spectral Mask

The channel mask for 8.75 MHz bandwidth is specified in Table 15 and Table 16 depending the transmit power level.

Table 15. Channel Mask for MS with PTx ≤ 23 dBm (BCG 1.A)

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1	$4.77 \leq \Delta f < 9.27$	$-[26+7\{(\Delta f-4.77)/4.5\}]$	100
2	$9.27 \leq \Delta f < 13.23$	$-[33+4\{(\Delta f-9.27)/3.96\}]$	100
3	$13.23 \leq \Delta f < 17.73$	$-[37+2\{(\Delta f-13.23)/4.5\}]$	100
4	$17.73 \leq \Delta f$	-39	100

Table 16. Channel Mask for MS with PTx > 23 dBm (BCG 1.A)

No	Frequency offset (Δf) in MHz	Maximum Emission Level (dB)	Integration Bandwidth (KHz)
1	$4.77 \leq \Delta f < 9.27$	$-[(PTx-23)+26]+7\{(\Delta f-4.77)/4.5\}]$	100
2	$9.27 \leq \Delta f < 13.23$	$-[(PTx-23)+33]+4\{(\Delta f-9.27)/3.96\}]$	100
3	$13.23 \leq \Delta f < 17.73$	$-[(PTx-23)+37]+2\{(\Delta f-13.23)/4.5\}]$	100
4	$17.73 \leq \Delta f$	$-(PTx-23)+39]$	100

Note: Protection specification beyond 17.73 MHz is specified in the spurious emissions specification.

2.1.5.1.2 Spurious Emission Specification

Minimum required conducted transmit Spurious Emissions are specified in Table 17. The limits shown in Table 17 are for frequency offsets, (Δf), that are greater than 17.73 MHz. Here, f is the frequency of the spurious domain emissions.

Table 17. Spurious Emissions for 8.75 MHz Channel Bandwidth (BCG 1.A)

No	Spurious frequency (f) range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-13
2	$1 \text{ GHz} \leq f \leq 12 \text{ GHz}$	1 MHz	-13

Table 18. Additional Spurious Emissions for 5 MHz Channel Size; Relevant to $2302.5 \leq f_c \leq 2397.5$ (BCG 1.B)

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
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Table 19. Additional Spurious Emissions for 10 MHz Channel Size; Relevant to $2305 \leq f_c \leq 2395$ (BCG 1.B)

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

2.1.5.2 Band Class Group 1.B

2.1.5.2.1 Channel Spectral Mask

The channel mask for 10 MHz bandwidth is specified in Table 20.

Table 20. Channel Mask for 10 MHz Bandwidth (BCG 1.B)

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

The channel mask for 5 MHz bandwidth is specified in Table 21.

Table 21. Channel Mask for 5 MHz Bandwidth (BCG 1.B)

No	Δf offset from channel center (MHz)	Integration Bandwidth (kHz)	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	$3.5 \leq \Delta f < 7.5$	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

For all combination of transmit power and center frequencies, the spectral mask measurements shall not exceed the limits specified in Table 20 and Table 21 for 10 and 5 MHz channel bandwidth sizes respectively.

2.1.5.2.2 Spurious Emission Specification

The limits shown in Table 22 and Table 23 are for frequency offsets which are greater than 2.5 times the channel bandwidth (5 and 10 MHz respectively). In the tables, f is the frequency of the spurious domain emissions. All spurious emission specifications are of conducted type.

Table 22. Spurious Emissions for 5 MHz Channel Size; Relevant to $2302.5 \leq f_c \leq 2397.5$ (BCG 1.B)

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	$1 \text{ GHz} \leq f < 12 \text{ GHz}$	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 23. Spurious Emissions for 10 MHz Channel Size; Relevant to $2305 \leq f_c \leq 2395$ (BCG 1.B)

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

2.1.5.2.3 Adjacent Channel Leakage Ratio (ACLR)

For 5 and 10 MHz BW Band Class Group 1.B, the ACLR shall be equal to or greater than the limits specified in Table 35 below.

Table 24. ACLR Specification for 5 MHz Channel BW MS (BCG 1.B)

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	MS channel centre frequency ± 5 MHz	30
2	MS channel centre frequency ± 10 MHz	44

Table 25. ACLR Specifications for 10 MHz Channel BW MS (BCG 1.B)

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	MS channel centre frequency ± 10 MHz	30
2	MS channel centre frequency ± 20 MHz	44

Note: In Table 24 and Table 25, the measurement filter bandwidth on the adjacent channel centre frequency is 4.75 MHz for a 5 MHz channelized system and 9.5 MHz for a 10 MHz channelized system.

2.1.6 Band Class 3

2.1.6.1 Band Class Group 3.A

2.1.6.1.1 Additional Transmit Power Level Specifications

The operational maximum power level ($P_{Tx,max}$) for mobile equipment is in the range of 18 to 24 dBm in the band. Exceptionally, non-handheld equipment with higher operational maximum power levels of up to 33 dBm is also supported by the system, subject to relevant regulation.

2.1.6.1.2 Channel Spectral Mask

The minimum specifications mask for WiMAX® systems is considered to be the minimum necessary required to meet the regulatory conditions for the majority of the addressable market for WiMAX® products and the mask that devices shall comply with to obtain WiMAX® certification. The channel mask for 10 and 5 MHz channel bandwidths are specified in Table 26 and Table 27.

Table 26. Channel Mask for 10 MHz Bandwidth (BCG 3.A)

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 $PTx \leq +23 \text{ dBm}$ 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 $PTx \leq +23 \text{ dBm}$ and $(2550 \leq f_c \leq 2620)$ then -37 else -25

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

Table 27. Channel Mask for 5 MHz Bandwidth (BCG 3.A)

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

2.1.6.1.3 Transmitter Spurious Emission (conducted)

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

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

Table 28. Spurious Emissions for 5 MHz Channel Size; Relevant to $2498.5 \leq f_c \leq 2687.5$ (BCG 3.A)

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	$1 \text{ GHz} \leq f < 14.34 \text{ GHz}$	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 29. Additional Spurious Emissions for 5 MHz Channel Size; Relevant to $2547.5 \leq f_c \leq 2622.5$ (BCG 3.A)

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) $12.5 \text{ MHz} < \Delta f < 17.5 \text{ MHz}$ -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 30. Additional Spurious Emissions for 5 MHz Channel size; Relevant to $2498.5 \leq f_c \leq 2687.5$ (BCG 3.A)

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

Notes:

1. In Table 28, Table 29 and Table 30 the allowed emission level shall be applied for the frequency range greater than 2.5 times the channel size from the centre frequency.
2. With respect to Table 30, 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 28 is applicable.

Table 31. Spurious Emissions for 10 MHz Channel Size; Relevant to $2501 \leq f_c \leq 2685$ (BCG 3.A)

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	$1 \text{ GHz} \leq f < 13.45 \text{ GHz}$	30 kHz	If $25 \text{ MHz} \leq \Delta f < 100 \text{ MHz}$	-30
		300 kHz	If $100 \text{ MHz} \leq \Delta f < 120 \text{ MHz}$	
		1 MHz	If $120 \text{ MHz} \leq \Delta f$	

Table 32. Additional Spurious Emissions for 10 MHz Channel Size, Relevant to $2550 \leq f_c \leq 2620$ (BCG 3.A)

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 $25 \text{ MHz} < \Delta f$
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 33. Spurious Emissions for 10 MHz Channel Size; Relevant to $2501 \leq f_c \leq 2685$ (BCG 3.A)

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

Notes:

1. In Table 31, Table 32 and Table 33 the allowed emission level shall be applied for the frequency range greater than 2.5 times the channel size from the centre frequency.
2. With respect to Table 33, 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 31 is applicable.

2.1.6.1.4 Receiver Spurious Emission (conducted)

The power of any narrow-band spurious emission should not exceed the maximum level specified in the following table.

Table 34 specifies Receiver spurious emissions specifications applicable to 5 and 10 MHz channel bandwidth sizes.

Table 34. Receiver Spurious Emission Limits (BCG 3.A)

No	Frequency Band	Measurement Bandwidth	Maximum Emission Level (dBm)
1	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 KHz	-57
2	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 KHz	-57
3	$30 \text{ MHz} \leq f < 1 \text{ GHz}$	100 KHz	-57
4	$1000 \text{ MHz} \leq f < 2500 \text{ MHz}$	30 KHz If $2.5 \cdot \text{ChBW} \leq \Delta f < 10 \cdot \text{ChBW}$	-47
		300 KHz If $10 \cdot \text{ChBW} \leq \Delta f < 12 \cdot \text{ChBW}$	
		1 MHz If $12 \cdot \text{ChBW} \leq \Delta f$	
5	$2500 \text{ MHz} \leq f < 2690 \text{ MHz}$	5 MHz	-59
6	$2690 \text{ MHz} \leq f < 13.45 \text{ GHz}$	30 KHz If $2.5 \cdot \text{ChBW} \leq \Delta f < 10 \cdot \text{ChBW}$	-47
		300 KHz If $10 \cdot \text{ChBW} \leq \Delta f < 12 \cdot \text{ChBW}$	
		1 MHz If $12 \cdot \text{ChBW} \leq \Delta f$	

2.1.6.1.5 Adjacent Channel Leakage Ratio (ACLR)

This annex contains the ACLR specifications for mobile station and user device operating in Band Class Group 3.A. The ACLR is defined as the ratio of the on-channel transmitted power to the out of channel power leaking into adjacent channels and as measured at the output of the receiver filter. The first-adjacent and second-adjacent channel-centre frequency offsets relative to the assigned channel's centre frequency are 5 MHz and 10 MHz, when the nominal occupied channel bandwidth is 5 MHz. These offsets are 10 MHz and 20 MHz respectively when the nominal occupied channel bandwidth is 10 MHz. ACLR is specified for two configurations.

In Configuration I the receiver channel bandwidth on the adjacent channel is:

- 4.75 MHz for a 5 MHz channelized system;
- 9.5 MHz for a 10 MHz channelized system.

In Configuration II the receiver channel bandwidth on the adjacent channel is:

- 3.84 MHz for a 5 MHz channelized system;
- 7.68 MHz for a 10 MHz channelized system.

The measurement bandwidth for the measurement of on-channel power of the Mobile WiMAX® carrier is:

- 4.75 MHz for a 5 MHz channelized system, and
- 9.5 MHz for a 10 MHz channelized system.

In Configuration I both the transmitted power and the received power are measured with a rectangular filter. For Configuration II the transmitted power is measured using a rectangular filter and the received power using a RRC filter with a roll-off factor of 0.22.

In Table 21 and Table 22, the ACLR specifications are shown. Measurement uncertainty (as defined in ITU-R M.1545) values corresponding to the ACLR limits have not been included.

2.1.6.1.5.1 ACLR specifications for 5 MHz Bandwidth

For 5 MHz BW Band Class Group 3.A, the ACLR shall be equal to or greater than the limits specified in Table 35 below and as specified in ITU-R M.1581-2.

Table 35. ACLR Specification for 5 MHz Channel BW MS (BCG 3.A)

No	Description	Minimum required ACLR relative to assigned channel frequency (dB)	
1	Adjacent channel centre frequency	Configuration I	Configuration II
2	MS channel centre frequency \pm 5 MHz	30	33
3	MS channel centre frequency \pm 10 MHz	44	43

2.1.6.1.5.2 ACLR specifications for 10 MHz Bandwidth

For 10 MHz BW Band Class Group 3.A, the ACLR shall be equal to or greater than the limits specified in Table 36 below and as specified in ITU-R M.1581-2.

Table 36. ACLR Specifications for 10 MHz Channel BW MS (BCG 3.A)

No	Description	Minimum required ACLR relative to assigned channel frequency (dB)	
1	Adjacent channel centre frequency	Configuration I	Configuration II
2	MS channel centre frequency \pm 10 MHz	30	33
3	MS channel centre frequency \pm 20 MHz	44	43

2.1.6.1.6 First and Second Adjacent Channel Rejection

The first and second adjacent channel rejection shall be measured by setting the desired signal's strength 3 dB above the rate dependent receiver sensitivity (Table 37) and raising the power level of the interfering signal (at first or second adjacent channel) until the specified error rate is obtained. The power difference between the interfering signal and the desired channel is the corresponding adjacent channel rejection.

Table 37. Receiver Sensitivity Levels (BCG 3.A)

No	Channel Bandwidth	Sub-carrier Allocation Mode	Modulation and Coding Level	Sensitivity Level (dBm)
1	5 MHz	PUSC	CTC-QPSK 1/2	-91.0
		FUSC	CTC-QPSK 1/2	-91.1
		AMC	CTC-QPSK 1/2	-91.0
2	10 MHz	PUSC	CTC-QPSK 1/2	-88.0
		FUSC	CTC-QPSK 1/2	-88.1
		AMC	CTC-QPSK 1/2	-88.0

The first and second adjacent channel rejection specifications are listed in Table 38.

Table 38. First and Second Adjacent Channel Rejection (BCG 3.A)

No	Description	Modulation and Coding Level	Sub-carrier Allocation Mode	Value (dB)
1	Min first adjacent channel rejection at BER=10 ⁻⁶ for 3 dB degradation C/I	CTC-QPSK 1/2	PUSC	21.6
			FUSC	21.8
			AMC	21.7
2	Min second adjacent rejection at BER=10 ⁻⁶ for 3 dB degradation C/I	CTC-QPSK 1/2	PUSC	35.6
			FUSC	35.8
			AMC	35.7

2.1.6.2 Band Class Group 3.B

2.1.6.2.1 Channel Spectral Mask

The WiMAX® minimum specifications mask is considered to be the minimum necessary required to meet the regulatory conditions for the majority of the addressable market for WiMAX products and the mask that devices shall comply with to obtain WiMAX certification.

The channel mask for 10 MHz bandwidth is specified in Table 39.

Table 39. Channel Mask for 10 MHz Bandwidth (BCG 3.B)

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 < 10	1000	-13
3	10 ≤ Δf < 11	1000	-13-12(Δf-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

Note: Protection specification beyond 25 MHz (250% of the bandwidth) is specified in the spurious emissions specification.

The channel mask for 5 MHz bandwidth is specified in Table 40.

Table 40. Channel Mask for 5 MHz Bandwidth (BCG 3.B)

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

2.1.6.2.2 Transmitter Spurious Emission (conducted)

The limits shown in the Table 41, Table 42, Table 43 and Table 44 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency. In the table, f is the frequency of the spurious domain emissions.

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

Table 41. Spurious Emissions for 5 MHz Channel Size; Relevant to $2498.5 \leq f_c \leq 2687.5$ (BCG 3.B)

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	$1 \text{ GHz} \leq f < 13.45 \text{ GHz}$	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 42. Spurious Emissions for 10 MHz Channel Size; Relevant to $2501 \leq f_c \leq 2685$ (BCG 3.B)

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	$1 \text{ GHz} \leq f < 13.45 \text{ GHz}$	30 kHz	If $25 \text{ MHz} \leq \Delta f < 100 \text{ MHz}$	-30
		300 kHz	If $100 \text{ MHz} \leq \Delta f < 120 \text{ MHz}$	
		1 MHz	If $120 \text{ MHz} \leq \Delta f$	

Table 43. Additional Spurious Emissions for 5 MHz Channel Size; Relevant to $2498.5 \leq f_c \leq 2687.5$ (BCG 3.B)

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

Table 44. Additional Spurious Emissions for 10 MHz Channel Size; Relevant to $2498.5 \leq f_c \leq 2687.5$ (BCG 3.B)

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

2.1.7 Band Class 5

2.1.7.1 Band Class Group 5.A

2.1.7.1.1 Channel Spectral Mask

The spectrum emission mask of the MS applies to frequency offsets between 2.5 MHz and 12.5 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 5 MHz channel.

The MS emission shall not exceed the levels specified in Table 45. Assuming specific power classes, relative specifications of Table 45 can be converted to absolute values for testing purposes.

In addition, for center carrier frequencies within 3650-3700 MHz range, all emission levels shall not exceed -13 dBm/MHz.

Table 45. Channel Mask for 5 MHz Channel Bandwidth (BCG 5.A)

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. Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz; the last is at Δf equals to 3.485 MHz.
3. The first measurement position with a 1 MHz filter is at Δf equals to 4 MHz; the last is at Δf equals to 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.
4. 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.

2.1.7.1.2 Spurious Emission Specification

The limits shown in Table 46 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency (i.e. 12.5 MHz). In the table, f is the frequency of the spurious domain emissions. All spurious emission specifications are of conducted type.

Table 46. Spurious Emissions for 5 MHz Channel Size; Relevant to $3402.5 \leq f_c \leq 3797.5$ (BCG 5.A)

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	$1 \text{ GHz} \leq f < 19 \text{ GHz}$	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

2.1.7.2 Band Class Group 5.B

2.1.7.2.1 Channel Spectral Mask

The spectrum emission mask of the MS applies to frequency offsets between 3.5 MHz and 17.5 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 7 MHz channel.

The MS emission shall not exceed the levels specified in Table 41. Assuming specific power classes, relative specifications of Table 41 can be converted to absolute values for testing purposes.

In addition, for center carrier frequencies within 3650-3700 MHz range, all emission levels shall not exceed -13 dBm/MHz.

Table 47. Channel Mask for 7 MHz Channel Bandwidth (BCG 5.B)

No	Frequency offset Δf (MHz)	Maximum Emission Level (dBc)	Measurement bandwidth
1	$3.5 \leq \Delta f < 4.75$	-33.5-13.5(Δf -3.5)	30 kHz
2	$4.75 \leq \Delta f < 10.5$	-35.5-0.7(Δf -4.75)	1 MHz
3	$10.5 \leq \Delta f < 11.9$	-39.0-7(Δf -10.5)	1 MHz
4	$11.9 \leq \Delta f \leq 17.5$	-49.0	1 MHz

Notes:

1. Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 3.515 MHz; the last is at Δf equals to 4.735 MHz.
3. The first measurement position with a 1 MHz filter is at Δf equals to 5.25 MHz; the last is at Δf equals to 17 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.
4. Note that equivalent PSD type mask can be derived by applying $10 * \log((7 \text{ MHz})/(30 \text{ kHz})) = 23.7 \text{ dB}$ and $10 * \log((7 \text{ MHz})/(1 \text{ MHz})) = 8.5 \text{ dB}$ scaling factor for 30 kHz and 1 MHz measurement bandwidth respectively.

2.1.7.2.2 Spurious Emission Specification

The limits shown in Table 48 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency (i.e. 17.5 MHz). In the table, f is the frequency of the spurious domain emissions. All spurious emission specifications are of conducted type.

Table 48. Spurious Emissions for 7 MHz Channel Size; Relevant to $3403.5 \leq f_c \leq 3796.5$ (BCG 5.B)

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	$1 \text{ GHz} \leq f < 19 \text{ GHz}$	30 kHz If $17.5 \text{ MHz} \leq \Delta f < 70 \text{ MHz}$ 300 kHz If $70 \text{ MHz} \leq \Delta f < 84 \text{ MHz}$ 1 MHz If $84 \text{ MHz} \leq \Delta f$	-30

2.1.7.3 Band Class Group 5.C

2.1.7.3.1 Channel Spectral Mask

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.

The MS emission shall not exceed the levels specified in

Table 49. Assuming specific power classes, relative specifications of

Table 49 can be converted to absolute values for testing purposes.

In additions, for center carrier frequencies within 3650-3700 MHz range, all emission levels shall not exceed -13 dBm/MHz.

Table 49. Channel Mask for 10 MHz Channel Bandwidth (BCG 5.C)

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. Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 510.015 MHz; the last is at Δf equals to 6.985 MHz.
3. The first measurement position with a 1 MHz filter is at Δf equals to 7.5 MHz; the last is at Δf equals to 24.5 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth.
When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.
4. 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.

2.1.7.3.2 Spurious Emission Specification

The limits shown in Table 30 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency (i.e. 25.0 MHz). In the table, f is the frequency of the spurious domain emissions. All spurious emission specifications are of conducted type.

Table 50. Spurious Emissions for 10 MHz Channel Size; Relevant to $3405 \leq f_c \leq 3795$ (BCG 5.C)

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	$1 \text{ GHz} \leq f < 19 \text{ GHz}$	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

2.1.8 Band Class 6

2.1.8.1 Band Class Group 6.A

2.1.8.1.1 Channel Spectral Mask

Table 51 and Table 52 specify the spectrum emission for FDD Mobile Stations with 10 and 5 MHz channel bandwidths.

Table 51. Channel Mask for 10 MHz Bandwidth (BCG 6.A)

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

Table 52. Channel Mask for 5 MHz Bandwidth (BCG 6.A)

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

Note:

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

2.1.8.1.2 Spurious Emission Specifications

Table 53 and Table 54 specify the spurious emission limits for 5 and 10 MHz channel bandwidth respectively. The limits shown in the tables are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency. In the table, f is the frequency of the spurious domain emissions.

In Table 53 and Table 54, measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included.

Table 53. Spurious Emissions for 5 MHz Channel Size; Relevant to $1712.5 \leq f_c \leq 1767.5$ (BCG 6.A)

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 8.850 \text{ GHz}$, $12.5 \text{ MHz} \leq \Delta f$	1	-13

Table 54. Spurious Emissions for 10 MHz Channel Size; Relevant to $1715 \leq f_c \leq 1765$ (BCG 6.A)

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 8.850 \text{ GHz}$, $25 \text{ MHz} \leq \Delta f$	1	-13

2.1.8.2 Band Class Group 6.B

2.1.8.2.1 Channel Spectral Mask

Table 55 and Table 56 specify the spectrum emission for FDD Mobile Stations with 5 and 10 MHz channel bandwidths.

Table 55. Channel Mask for 5 MHz Bandwidth (BCG 6.B)

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	$2.5 \leq \Delta f < 3.5$	30	-15
2	$3.5 \leq \Delta f < 5.0$	1000	-10
3	$5.0 \leq \Delta f < 7.5$	1000	-10
4	$7.5 \leq \Delta f < 8.5$	1000	-13
5	$8.5 \leq \Delta f \leq 12.5$	1000	-25

Notes:

1. 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. 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 56. Channel Mask for 10 MHz Bandwidth (BCG 6.B)

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	$5.0 \leq \Delta f < 6.0$	30	-18
2	$6.0 \leq \Delta f < 7.5$	1000	-10
3	$7.5.0 \leq \Delta f < 10.0$	1000	-10
4	$10.0 \leq \Delta f \leq 11.0$	1000	-13
5	$11.0 \leq \Delta f < 15.0$	1000	-13
6	$15.0 \leq \Delta f \leq 25.0$	1000	-25

Notes:

1. Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 30 kHz filter is at Δf equals to 5.015 MHz; the last is at Δf equals to 5.985 MHz. The first measurement position with a 1 MHz filter is at Δf equals to 6.5 MHz; the last is at Δf equals to 24.5 MHz.
3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.

Table 57 specifies the spectrum emission mask for FDD Mobile Stations with 20 MHz channel bandwidth.

Table 57. Channel Mask for 20 MHz (BCG 6.B)

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	$30 \leq \Delta f \leq 50$	1000	-25

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

2.1.8.2.2 Transmitter Spurious Emission Specification (conducted)

Table 58 and Table 59 specify the spurious emission limits for 5 and 10 MHz channel bandwidth respectively while Table 60 and Table 61 specify the additional spurious emission limits for 5 and 10 MHz channel bandwidth. The limits shown in the tables are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency. In the table, f is the frequency of the spurious domain emissions.

In Table 58, Table 59, Table 60 and Table 61 measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included.

Table 58. Spurious Emissions for 5 MHz Channel Size; Relevant to $1922.5 \leq f_c \leq 1977.5$ (BCG 6.B)

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	$1 \text{ GHz} \leq f < 9.900 \text{ GHz}, 12.5 \text{ MHz} \leq \Delta f$	1 MHz	-30

Table 59. Spurious Emissions for 10 MHz Channel Size; Relevant to $1925 \leq f_c \leq 1975$ (BCG 6.B)

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	$1 \text{ GHz} \leq f < 9.900 \text{ GHz}, 25 \text{ MHz} \leq \Delta f$	1 MHz	-30

Table 60. Additional Spurious Emissions for 5 MHz Channel Size; Relevant to $1922.5 \leq f_c \leq 1977.5$ (BCG 6.B)

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

Table 61. Additional Spurious Emissions for 10 MHz Channel Size; Relevant to $1925 \leq f_c \leq 1975$ (BCG 6.B)

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

Table 59 and Table 61 specify the basic and additional spurious emission specifications for FDD Mobile Stations with 20 MHz channel bandwidth.

Table 62. Spurious Emissions for 20 MHz Channel Size; Relevant to $1930 \leq f_c \leq 1970$ (BCG 6.B)

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	$1 \text{ GHz} \leq f < 9.900 \text{ GHz}, 25 \text{ MHz} \leq \Delta f$	1 MHz	-30

Table 63. Additional Spurious Emissions for 20 MHz Channel Size; Relevant to $1930 \leq f_c \leq 1970$ (BCG 6.B)

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

2.1.8.3 Band Class Group 6.C

2.1.8.3.1 Channel Spectral Mask

Table 64 specifies MS Spectrum Emission Mask for 5 MHz channel bandwidth while Table 65 specifies MS Spectrum Emission Mask for 10 MHz channel bandwidth.

Table 64. Channel Mask for 5 MHz (BCG 6.C)

No	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	$8.5 \leq \Delta f \leq 12.5$	1000	-25

Table 65. Channel Mask for 10 MHz (BCG 6.C)

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5.0 \leq \Delta f < 6.0$	50	-13

2	$6.0 \leq \Delta f < 10.0$	1000	-10
3	$10.0 \leq \Delta f < 11.0$	1000	-13
4	$11.0 \leq \Delta f \leq 25.0$	1000	-25

2.1.8.3.2 Transmitter Spurious Emission Specification (conducted)

The spurious emission limits specified in Table 66 and Table 67 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency.

Table 66. Spurious Emission (BCG 6.C)

No	Transmitter Center Frequency (f_c) (MHz)	Spurious Frequency (f) Range	Integration Bandwidth	Maximum Emission Level (dBm)
1.	1710-1785	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2.	1710-1785	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3.	1710-1785	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4.	1710-1785	$1 \text{ GHz} \leq f < 12.75 \text{ GHz}$	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 67. Additional Spurious Emission (BCG 6.C)

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

2.1.8.3.3 Adjacent Channel Leakage Ratio (ACLR)

For 5 and 10 MHz BW Band Class Group 6.C, the ACLR shall be equal to or greater than the limits specified in Table 68 and Table 69 below. ACLR is specified for two configurations.

In Configuration I the receiver channel bandwidth on the adjacent channel is:

- 4.75 MHz for a 5 MHz channelized system;
- 9.5 MHz for a 10 MHz channelized system.

In Configuration II the receiver channel bandwidth on the adjacent channel is:

- 3.84 MHz for a 5 MHz channelized system;
- 7.68 MHz for a 10 MHz channelized system.

The measurement bandwidth for the measurement of on-channel power of the Mobile WiMAX carrier is:

- 4.75 MHz for a 5 MHz channelized system, and
- 9.5 MHz for a 10 MHz channelized system.

In Configuration I both the transmitted power and the received power are measured with a rectangular filter. For Configuration II the transmitted power is measured using a rectangular filter and the received power using a RRC filter with a roll-off factor of 0.22.

In Table 68 and Table 69, the ACLR specifications are shown. Measurement uncertainty (as defined in ITU-R M.1545) values corresponding to the ACLR limits have not been included.

Table 68. ACLR Specification for 5 MHz Channel BW MS (BCG 6.C)

No	Description	Minimum required ACLR relative to assigned channel frequency (dB)	
		Configuration I	Configuration II
1	Adjacent channel centre frequency		
2	MS channel centre frequency \pm 5 MHz	30	33
3	MS channel centre frequency \pm 10 MHz	44	43

Table 69. ACLR Specifications for 10 MHz Channel BW MS (BCG 6.C)

No	Description	Minimum required ACLR relative to assigned channel frequency (dB)	
		Configuration I	Configuration II
1	Adjacent channel centre frequency		
2	MS channel centre frequency \pm 10 MHz	30	33
3	MS channel centre frequency \pm 20 MHz	44	43

2.1.9 Band Class 7

2.1.9.1 Band Class Group 7.A

2.1.9.1.1 Channel Spectral Mask

Table 70 and Table 71 specify the spectrum emission mask with 5 MHz channel bandwidths.

Table 70. Channel Mask for 5 MHz Bandwidth: $700.5 \leq f_c \leq 795.5$ (BCG 7.A)

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	$2.5 \leq \Delta f \leq 2.6$	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 71. Channel Mask for 5 MHz Bandwidth: $799.5 \leq f_c \leq 859.5$ (BCG 7.A)

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	$2.5 \leq \Delta f \leq 7.5$	5	1.6
2	$7.5 \leq \Delta f \leq 12.5$	2	-10

Notes:

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

Table 72 and Table 73 specify the spectrum emission mask with 7 MHz channel bandwidths.

Table 72. Channel Mask for 7 MHz Bandwidth: $701.5 \leq f_c \leq 7944.5$ (BCG 7.A)

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	$3.5 \leq \Delta f < 3.6$	30	-13
2	$3.6 \leq \Delta f < 17.5$	100	-13

Notes:

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

Table 73. Channel Mask for 7 MHz Bandwidth: $800.5 \leq f_c \leq 858.5$ (BCG 7.A)

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	$3.5 \leq \Delta f < 8.5$	5	1.6
2	$8.5 \leq \Delta f < 17.5$	2	-10

Notes:

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

Table 74 and Table 75 specify the spectrum emission mask with 10 MHz channel bandwidths.

Table 74. Channel Mask for 10 MHz Bandwidth: $703 \leq f_c \leq 793$ (BCG 7.A)

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:

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

Table 75. Channel Mask for 10 MHz Bandwidth: $802 \leq f_c \leq 857$ (BCG 7.A)

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:

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

2.1.9.1.2 Transmitter Spurious Emission Specification (conducted)

Table 76, Table 77 and Table 78 specify the spurious emission limits for 5, 7 and 10 MHz channel bandwidth sizes respectively.

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

Table 76. Spurious Emissions for 5 MHz Channel Size (BCG 7.A)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	698-798	$30 \leq f < 4310$ (12.5 MHz $\leq \Delta f$)	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	$797 \leq f \leq 862$ (12.5 MHz $\leq \Delta f$)	5000	-37
5	797-862	$790 \leq f \leq 791$	1000	-44
6	797-862	$470 \leq f \leq 790$	8000	-65

Table 77. Spurious Emissions for 7 MHz Channel Size (BCG 7.A)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	698-798	$30 \leq f < 4310$ (17.5 MHz $\leq \Delta f$)	100	-13
2	746-758, 776-788	$763 \leq f \leq 775$, $793 \leq f \leq 805$	6.25	-35
3	758-768, 788-798	$769 \leq f \leq 775$, $799 \leq f \leq 805$	6.25	-35
4	797-862	$797 \leq f \leq 862$ (17.5 MHz $\leq \Delta f$)	5000	-37
5	797-862	$790 \leq f \leq 791$	1000	-44
6	797-862	$470 \leq f \leq 790$	8000	-65

Table 78. Spurious Emissions for 10 MHz Channel Size (BCG 7.A)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	698-798	$30 \leq f < 4310$ (25 MHz $\leq \Delta f$)	100	-13
2	746-758, 776-788	$763 \leq f \leq 775$, $793 \leq f \leq 805$	6.25	-35
3	758-768, 788-798	$769 \leq f \leq 775$, $799 \leq f \leq 805$	6.25	-35
4	797-862	$797 \leq f \leq 862$ (25 MHz $\leq \Delta f$)	5000	-37
5	797-862	$790 \leq f \leq 791$	1000	-44
6	797-862	$470 \leq f \leq 790$	8000	-65

2.1.9.2 Band Class Group 7.B

2.1.9.2.1 Channel Spectral Mask

Table 79 and Table 80 specify the spectrum emission mask with 5 and 10 MHz channel bandwidths.

Table 79. Channel Mask for 5 MHz Bandwidth (BCG 7.B)

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	$2.5 \leq \Delta f <$ to 2.6	30	-13
2	$2.6 \leq \Delta f \leq$ to 12.5	100	-13

Notes:

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

Table 80. Channel Mask for 10 MHz Bandwidth (BCG 7.B)

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	$5.0 \leq \Delta f <$ to 5.1	30	-13
2	$5.1 \leq \Delta f \leq$ to 25.0	100	-13

Notes:

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

2.1.9.2.2 Transmitter Spurious Emission Specification (conducted)

Table 81 and Table 82 specify the spurious emission limits for 5 and 10 MHz channel bandwidth sizes respectively.

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

Table 81. Spurious Emissions for 5 MHz Channel Size (BCG 7.B)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	776-787	$30 \leq f < 4310$ ($12.5 \text{ MHz} \leq \Delta f$)	100	-13
2	776-787	$763 \leq f \leq 775, 793 \leq f \leq 805$	6.25	-35

Table 82. Spurious Emissions for 10 MHz Channel Size (BCG 7.B)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	776-787	$30 \leq f < 4310$ ($25 \text{ MHz} \leq \Delta f$)	100	-13
2	776-787	$763 \leq f \leq 775, 793 \leq f \leq 805$	6.25	-35

2.1.9.3 Band Class Group 7.C

2.1.9.3.1 Channel Spectral Mask

Table 83 and Table 84 specify the spectrum emission mask with 5 and 10 MHz channel bandwidths.

Table 83. Channel Mask for 5 MHz Bandwidth (BCG 7.C)

No	Frequency offset Δf from channel center (MHz)	Integration Bandwidth (kHz)	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 84. Channel Mask for 10 MHz Bandwidth (BCG 7.C)

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:

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.

2.1.9.3.2 Transmitter Spurious Emission Specification (conducted)

Table 85 specifies the spurious emission limits for 5 MHz channel bandwidth size. In this section, measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included.

Table 85. Spurious Emissions for 5 MHz Channel Size (BCG 7.C)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	788-793, 793-798	$30 \leq f < 4310$ ($12.5 \text{ MHz} \leq \Delta f$)	100	-13
2	788-793, 793-798	$769 \leq f \leq 775, 799 \leq f \leq 805$	6.25	-35

2.1.9.4 Band Class Group 7.D

2.1.9.4.1 Channel Spectral Mask

Table 86 and Table 87 specify the spectrum emission mask with 5 and 10 MHz channel bandwidths.

Table 86. Channel Mask for 5 MHz Bandwidth (BCG 7.D)

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	$2.6 \leq \Delta f \leq 12.5$	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 (BCG 7.D)

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:

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.

2.1.9.4.2 Transmitter Spurious Emission Specification (conducted)

Table 88 specifies the spurious emission limits for 10 MHz channel bandwidth size.

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

Table 88. Spurious Emissions for 10 MHz Channel Size (BCG 7.D)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	788-798	$30 \leq f < 4310$ (25 MHz $\leq \Delta f$)	100	-13
2	788-798	$769 \leq f \leq 775, 799 \leq f \leq 805$	6.25	-35

2.1.9.5 Band Class Group 7.E

2.1.9.5.1 Channel Spectral Mask

Table 89 and Table 90 specify the spectrum emission mask with 5 MHz channel bandwidths.

Table 89. Channel Mask for 5 MHz Bandwidth: $700.5 \leq f_c \leq 795.5$ (BCG 7.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	$2.5 \leq \Delta f < 2.6$	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 90. Channel Mask for 5 MHz Bandwidth: $799.5 \leq f_c \leq 859.5$ (BCG 7.E)

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	$7.5 \leq \Delta f \leq 12.5$	2	-10

Notes:

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

Table 91 and Table 92 specify the spectrum emission mask with 7 MHz channel bandwidths.

Table 91. Channel Mask for 7 MHz Bandwidth: $701.5 \leq f_c \leq 7944.5$ (BCG 7.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	$3.5 \leq \Delta f < 3.6$	30	-13

2	$3.6 \leq \Delta f \leq 17.5$	100	-13
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Notes:

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

Table 92. Channel Mask for 7 MHz Bandwidth: $800.5 \leq f_c \leq 858.5$ (BCG 7.E)

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	$3.5 \leq \Delta f < 8.5$	5	1.6
2	$8.5 \leq \Delta f < 13.5$	2	-10
3	$13.5 \leq \Delta f \leq 17.5$	1	-25

Notes:

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

Table 93 and Table 94 specify the spectrum emission mask with 10 MHz channel bandwidths.

Table 93. Channel Mask for 10 MHz Bandwidth: $703 \leq f_c \leq 793$ (BCG 7.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	$5.0 \leq \Delta f < 5.1$	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.

Table 94. Channel Mask for 10 MHz Bandwidth: $802 \leq f_c \leq 857$ (BCG 7.E)

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	$5 \leq \Delta f < 10$	5	1.6
2	$10 \leq \Delta f \leq 15$	2	-10
3	$15 \leq \Delta f < 25$	1	-25

Notes:

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

2.1.9.5.2 Transmitter Spurious Emission Specification (conducted)

Table 95, Table 96 and Table 97 specify the spurious emission limits for 5, 7 and 10 MHz channel bandwidth sizes respectively.

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

Table 95. Spurious Emissions for 5 MHz Channel Size (BCG 7.E)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	698-798	$30 \leq f < 4310$ ($12.5 \text{ MHz} \leq \Delta f$)	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	791-862	$797 \leq f \leq 862$	5000	-37

		(12.5 MHz $\leq \Delta f$)		
5	797-862	$790 \leq f \leq 791$	1000	-44
6	832-862	$821 \leq f \leq 862$ (12.5 MHz $\leq \Delta f$)	1000	-25
7	832-862	$470 \leq f \leq 790$	8000	-65

Table 96. Spurious Emissions for 7 MHz Channel Size (BCG 7.E)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	698-798	$30 \leq f < 4310$ (17.5 MHz $\leq \Delta f$)	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	$797 \leq f \leq 862$ (17.5 MHz $\leq \Delta f$)	5000	-37
5	797-862	$790 \leq f \leq 791$	1000	-44
6	832-862	$821 \leq f \leq 862$ (17.5 MHz $\leq \Delta f$)	1000	-25
7	832-862	$470 \leq f \leq 790$	8000	-65

Table 97. Spurious Emissions for 10 MHz Channel Size (BCG 7.E)

No	Transmit frequency range (MHz)	Measurement frequency range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	698-798	$30 \leq f < 4310$ (25 MHz $\leq \Delta f$)	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	$797 \leq f \leq 862$ (25 MHz $\leq \Delta f$)	5000	-37
5	797-862	$790 \leq f \leq 791$	1000	-44
6	832-862	$821 \leq f \leq 862$ (25 MHz $\leq \Delta f$)	1000	-25
7	832-862	$470 \leq f \leq 790$	8000	-65

2.1.9.6 Band Class Group 7.G

2.1.9.6.1 Channel Spectral Mask

Table 98 specifies MS Spectrum Emission Mask for 5 MHz channel bandwidth while Table 99 specifies MS Spectrum Emission Mask for 10 MHz channel bandwidth.

Table 98. Channel Mask for 5 MHz (BCG 7.G)

No	Offset from channel center	Integration Bandwidth	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured
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	(MHz)	(kHz)	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	$8.5 \leq \Delta f \leq 12.5$	1000	-25

Table 99. Channel Mask for 10 MHz (BCG 7.G)

No	Offset from channel center (MHz)	Integration Bandwidth (kHz)	Maximum Allowed Emission Level (dBm/Integration Bandwidth) as measured at the antenna port
1	$5.0 \leq \Delta f < 6.0$	50	-13
2	$6.0 \leq \Delta f < 10.0$	1000	-10
3	$10.0 \leq \Delta f < 11.0$	1000	-13
4	$11.0 \leq \Delta f \leq 25.0$	1000	-25

2.1.9.6.2 Transmitter Spurious Emission Specification (conducted)

The spurious emission limits specified in Table 100 and Table 101 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency.

Table 100. Spurious Emission (BCG 7.G)

No	Transmitter Center Frequency (f_c) (MHz)	Spurious Frequency (f) Range	Integration Bandwidth	Maximum Emission Level (dBm)
1.	880-915	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2.	880-915	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3.	880-915	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4.	880-915	$1 \text{ GHz} \leq f < 12.75 \text{ GHz}$	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 101. Additional Spurious Emission (BCG 7.G)

No	Transmitter Center Frequency (f_c) (MHz)	Spurious Frequency (f) Range (MHz)	Measurement Bandwidth (MHz)	Maximum Emission Level (dBm)
1.	880-915	925-960	1	-50
2.		1805-1880	1	-50

3.	1880–1920	1	-50
4.	1900–1920	1	-50
5.	2010–2025	1	-50
6.	2110–2170	1	-50
7.	2300–2400	1	-50
8.	2570–2620	1	-50
9.	2620–2690	1	-50
10.	791–821	1	-50

With respect to the spurious frequencies of Item 2 (entire range) and 9 (2640–2690 sub range) (entire range) of Table 101 exceptions in measurements are allowed for harmonic spurious emissions where the harmonics are 2nd or 3rd harmonics of in channel transmissions. In these exception cases, the maximum emission level (-36 dBm/100KHz) of Item 3 Table 100 is applicable.

2.1.9.6.3 Adjacent Channel Leakage Ratio (ACLR)

For 5 and 10 MHz BW Band Class Group 7.G, the ACLR shall be equal to or greater than the limits specified in Table 102 and Table 103 below. ACLR is specified for two configurations.

In Configuration I the receiver channel bandwidth on the adjacent channel is:

- 4.75 MHz for a 5 MHz channelized system;
- 9.5 MHz for a 10 MHz channelized system.

In Configuration II the receiver channel bandwidth on the adjacent channel is:

- 3.84 MHz for a 5 MHz channelized system;
- 7.68 MHz for a 10 MHz channelized system.

The measurement bandwidth for the measurement of on-channel power of the Mobile WiMAX carrier is:

- 4.75 MHz for a 5 MHz channelized system, and
- 9.5 MHz for a 10 MHz channelized system.

In Configuration I both the transmitted power and the received power are measured with a rectangular filter. For Configuration II the transmitted power is measured using a rectangular filter and the received power using a RRC filter with a roll-off factor of 0.22.

In Table 94 and Table 95, the ACLR specifications are shown. Measurement uncertainty (as defined in ITU-R M.1545) values corresponding to the ACLR limits have not been included.

Table 102. ACLR Specification for for 5 MHz Channel BW MS (BCG 7.G)

1	Adjacent channel centre frequency	Configuration I	Configuration II
2	MS channel centre frequency ± 5 MHz	30	33
3	MS channel centre frequency ± 10 MHz	44	43

Table 103. ACLR Specifications for 10 MHz Channel BW MS (BCG 7.G)

1	Adjacent channel centre frequency	Configuration I	Configuration II
2	MS channel centre frequency ± 10 MHz	30	33
3	MS channel centre frequency ± 20 MHz	44	43

2.1.10 Band Class 8

2.1.10.1 Band Class Group 8.A

2.1.10.1.1 Channel Spectral Mask

The Spectrum Emission Mask for 5 MHz bandwidth is specified in Table 104.

Table 104. Channel Mask for 5 MHz Bandwidth (BCG 8.A)

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	-10
3	$7.5 \leq \Delta f \leq 8.5$	1000	-13
4	$8.5 \leq \Delta f \leq 12.5$	1000	-25

Notes:

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

The Spectrum Emission Mask for 10 MHz bandwidth is specified in Table 105.

Table 105. Channel Mask for 10 MHz Bandwidth (BCG 8.A)

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	$106 \leq \Delta f \leq 15$	1000	-13
4	$15 \leq \Delta f \leq 25$	1000	-25

Notes:

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

2.1.10.1.2 Transmitter Spurious Emission Specification (conducted)

The limits shown in the Table 106, Table 42, Table 43, Table 44 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency. In the table, f is the frequency of the spurious domain emissions.

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

Table 106. Spurious Emissions for 5 MHz Channel Size (BCG 8.A)

No	Transmitter Center Frequency (f_c) (MHz)	Spurious Frequency (f) Range	Integration Bandwidth	Maximum Emission Level (dBm)
1.	1787.5-1802.5 1882.5-1917.5 1912.5-1927.5 2012.5-2022.5 1902.5-1917.5	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2.	1787.5-1802.5 1882.5-1917.5 1912.5-1927.5 2012.5-2022.5 1902.5-1917.5	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3.	1787.5-1802.5 1882.5-1917.5 1912.5-1927.5 2012.5-2022.5 1902.5-1917.5	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36

4.	1787.5-1802.5 1882.5-1917.5 1912.5-1927.5 2012.5-2022.5 1902.5-1917.5	1 GHz $\leq f < 12.75$ GHz	30 kHz, If 12.5 MHz $\leq \Delta f < 50$ MHz 300 kHz, If 50 MHz $\leq \Delta f < 60$ MHz 1 MHz, If 60 MHz $\leq \Delta f$	-30
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Table 107. Spurious Emissions for 10 MHz Channel Size (BCG 8.A)

No	Transmitter Center Frequency (f_c) (MHz)	Spurious Frequency (f) Range	Integration Bandwidth	Maximum Emission Level (dBm)
1.	1790-1800 1885-1915 1915-1925 2015-2020 1905-1915	9 kHz $\leq f < 150$ kHz	1 kHz	-36
2.	1790-1800 1885-1915 1915-1925 2015-2020 1905-1915	150 kHz $\leq f < 30$ MHz	10 kHz	-36
3.	1790-1800 1885-1915 1915-1925 2015-2020 1905-1915	30 MHz $\leq f < 1000$ MHz	100 kHz	-36
4.	1790-1800 1885-1915 1915-1925 2015-2020 1905-1915	1 GHz $\leq f < 12.75$ GHz	30 kHz, If 25 MHz $\leq \Delta f < 100$ MHz 300 kHz, If 100 MHz $\leq \Delta f < 120$ MHz 1 MHz, If 120 MHz $\leq \Delta f$	-30

Table 108. Additional Spurious Emissions for 5 MHz Channel Size (BCG 8.A)

No	Transmitter Center Frequency (f_c) (MHz)	Spurious frequency (f) range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	1882.5-1917.5	2010–2025 2300-2400	1000	-50
2	1902.5-1917.5	925-960 1880-1920 1930-1990 2010-2025 2110-2170 2300-2400 2570-2620	1000	-50
3	2012.5-2022.5	2110-2170	1000	-50

		1805-1880 2620-2690 925-960 1844.9-1879.9 1475.9-1500.9 1900-1920 2570-2620 1880-1920 2300-2400		
		860-895	1000	-50
		1884.5-1919.6	300	-41

Table 109. Additional Spurious Emissions for 10 MHz Channel Size (BCG 8.A)

No	Transmitter Center Frequency (f_c) (MHz)	Spurious frequency (f) range (MHz)	Measurement bandwidth (KHz)	Maximum Emission Level (dBm)
1	1885-1915	2010-2025 2300-2400	1000	-50
2	1905-1915	925-960 1880-1920 1930-1990 2010-2025 2110-2170 2300-2400 2570-2620	1000	-50
3	2015-2020	2110-2170 1805-1880 2620-2690 925-960 1844.9-1879.9 1475.9-1500.9 1900-1920 2570-2620 1880-1920 2300-2400	1000	-50
		860-895	1000	-50
		1884.5-1919.6	300	-41

2.1.10.2 Spurious Emission Specifications

Table 110 and Table 111 specify the spurious emission limits for 5 and 10 MHz channel bandwidth respectively. The limits shown in the tables are for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency. In the table, f is the frequency of the spurious domain emissions.

In Table 110 and Table 111, measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included.

Table 110. Spurious Emissions for 5 MHz Channel Size; Relevant to $1802.5 \leq f_c \leq 1827.5$ (BCG 8.G)

1	$30 \text{ MHz} \leq f < 9.150 \text{ GHz}$, $12.5 \text{ MHz} \leq \Delta f$	1	-13

Table 111. Spurious Emissions for 10 MHz Channel Size; Relevant to $1805 \leq f_c \leq 1825$ (BCG 8.G)

1	$30 \text{ MHz} \leq f < 9.150 \text{ GHz}$, $25 \text{ MHz} \leq \Delta f$	1	-13

2.1.11 Band Class 9

2.1.11.1 Band Class Group 9.D

This section treats specification for Mobile Station of the BGC 9.D radio system configuration.

2.1.11.1.1 Channel Spectral Mask

The channel spectral mask for BGC 9.D Mobile Station is effectively specified by the ACLR, which is provided in the Section 2.1.11.1.4.

In the BCG BGC 9.D application, the maximum transmission output power of Mobile Station is as large as +37dBm (5W), and the transmission filter may have to cover the bandwidth as wide as 30MHz to meet the system operation requirement. Considering these matters, the spectral masking level is specified equivalently by ACLR measurement relative to the carrier power of the 5MHz channel.

Note:

- Since the Japan radio ordinance of this VHF Public Safety band does not have article regulating channel spectral masking, it is specified with the ACLR number hereby.
- Protection specification outside the range of 160M - 215MHz (beyond 250% offset from the carrier frequency of the lowest and highest channels with the 5MHz bandwidth) is specified in the spurious emissions requirement.

2.1.11.1.2 Transmitter Spurious Emission (conducted)

The limits shown in Table 112 is for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center frequency. In the table, f is the frequency of the spurious domain emissions.

Table 112. Spurious Emission for 5MHz Channel Size Mobile station; Relevant to $170.0 < f_c < 202.5$ (BCG 9.D)

No.	Spurious frequency (f) range	Measurement bandwidth	Maximum Emission Level
1	$9\text{kHz} < f \leq 150\text{kHz}$	1kHz	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
2	$150\text{kHz} < f \leq 30\text{MHz}$	10k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
3	$30\text{MHz} < f \leq 160\text{MHz}$	100k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
3	$160\text{MHz} < f \leq 170\text{MHz}$	100k	-30dBm (1uW)
4	$207.5\text{MHz} < f \leq 215\text{MHz}$	100k	-30dBm (1uW)
5	$215\text{MHz} < f \leq 1\text{GHz}$	100k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
6	$1\text{GHz} < f$	1M	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm

2.1.11.1.3 Receiver Spurious Emission (conducted)

The power of any narrow-band spurious emission should not exceed the maximum level specified in Table 113.

Table 113. Receiver Spurious Emission for Mobile station (BCG 9.D)

1	$9\text{kHz} \leq f < 150\text{kHz}$	1kHz	-54
2	$150\text{kHz} \leq f < 30\text{MHz}$	10kHz	-54
3	$30\text{MHz} \leq f < 1000\text{MHz}$	100kHz	-54
4	$1000\text{MHz} \leq f < 2505\text{MHz}$	1MHz	-47
5	$2505\text{MHz} \leq f < 2535\text{MHz}$	1MHz	-70
6	$2535\text{MHz} \leq f$	1MHz	-47

2.1.11.1.4 Adjacent Channel Leakage Ratio (ACLR)

The ACLR is defined as the ratio of the on-channel transmitted power to the out of channel power leaking into adjacent channels and as measured at the output of the receiver filter. The first-adjacent and second-adjacent channel-centre frequency offsets relative to the assigned channel's centre frequency are 5 MHz and 10 MHz for the 5 MHz system.

Table 114. ACLR Specification for 5MHz Channel BW Mobile station (BCG 9.D)

1	+/- 5MHz offset from MS channel center frequency	4.8M (=+/-2.4M)Hz	21
2	+/- 10MHz offset from MS channel center frequency	4.8M (=+/-2.4M)Hz	41

2.1.12 Band Class 10

2.1.12.1 Band Class Group 10.A

2.1.12.1.1 Channel Spectral Mask

The spectrum emission mask of the MS applies to frequency offsets between 2.25 MHz and 12.5 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 5 MHz channel.

The MS emission shall not exceed the levels specified in Table 115. Assuming specific power classes, relative specifications of Table 115 can be converted to absolute values for testing purposes.

Table 115. Channel Mask for 5 MHz Channel Bandwidth (BCG 10.A)

No	Frequency offset Δf (MHz)	Maximum Emission Level (dBc)	Measurement bandwidth
1	$2.25 \leq \Delta f < 2.5$	-184($\Delta f - 2.25$)	50 kHz
2	$2.5 \leq \Delta f < 2.75$	-46-24($\Delta f - 2.5$)	50 kHz
3	$2.75 \leq \Delta f < 5.0$	-39-3.556($\Delta f - 2.75$)	1 MHz
4	$5.0 \leq \Delta f < 7.5$	-47-4($\Delta f - 5.0$)	1 MHz
5	$7.5 \leq \Delta f \leq 12.5$	-57	1 MHz

Notes:

1. Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
2. The first measurement position with a 50 kHz filter is at Δf equals to 2.275 MHz; the last is at Δf equals to 2.725 MHz.
3. The first measurement position with a 1 MHz filter is at Δf equals to 3.25 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.
4. Note that equivalent PSD type mask can be derived by applying $10 * \log((5 \text{ MHz})/(50 \text{ kHz})) = 20 \text{ dB}$ and $10 * \log((5 \text{ MHz})/(1 \text{ MHz})) = 7 \text{ dB}$ scaling factors for 50 kHz and 1 MHz measurement bandwidth respectively.

2.1.12.1.2 Transmitter Spurious Emission (conducted)

The limit shown in Table 116 is for frequency offsets which are greater than 2.5 times the channel bandwidth. In the tables, f is the frequency of the spurious domain emissions. All spurious emission specifications are of conducted type.

Table 116. Spurious Emissions for 5 MHz Channel Bandwidth (BCG 10.A)

No	Spurious frequency (f) range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-45 if $PTx,max < 25 \text{ dBm}$ -70+ PTx,max if $PTx,max \geq 25 \text{ dBm}$
2	$1 \text{ GHz} \leq f \leq 25.750 \text{ GHz}$	1 MHz	-35 if $PTx,max < 25 \text{ dBm}$ -60+ PTx,max if $PTx,max \geq 25 \text{ dBm}$

2.1.12.2 Band Class Group 10.B

2.1.12.2.1 Channel Spectral Mask

The spectrum emission mask of the MS applies to frequency offsets between 4.5 MHz and 25 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.

The MS emission shall not exceed the levels specified in Table 117. Assuming specific power classes, relative specifications of Table 117 can be converted to absolute values for testing purposes.

Table 117. Channel Mask for 10 MHz Channel Bandwidth (BCG 10.B)

No	Frequency offset Δf (MHz)	Maximum Emission Level (dBc)	Measurement bandwidth
1	$4.5 \leq \Delta f < 5$	-92($\Delta f - 4.5$)	100 kHz
2	$5 \leq \Delta f < 5.5$	-46-12($\Delta f - 5.0$)	100 kHz
3	$5.5 \leq \Delta f < 10$	-42-1.778($\Delta f - 5.5$)	1 MHz
4	$10 \leq \Delta f < 15$	-50-2($\Delta f - 10$)	1 MHz
5	$15 \leq \Delta f \leq 25$	-60	1 MHz

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 4.55 MHz; the last is at Δf equals to 5.450 MHz.
3. The first measurement position with a 1 MHz filter is at Δf equals to 6.0 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.
4. Note that equivalent PSD type mask can be derived by applying $10 * \log((10 \text{ MHz})/(100 \text{ kHz})) = 20 \text{ dB}$ and $10 * \log((10 \text{ MHz})/(1 \text{ MHz})) = 10 \text{ dB}$ scaling factors for 100 kHz and 1 MHz measurement bandwidth respectively.

2.1.12.2.2 Transmitter Spurious Emission (conducted)

The limit shown in Table 118 is for frequency offsets which are greater than 2.5 times the channel bandwidth. In the tables, f is the frequency of the spurious domain emissions. All spurious emission specifications are of conducted type.

Table 118. Spurious Emissions for 10 MHz Channel Bandwidth (BCG 10.B)

No	Spurious frequency (f) range	Measurement bandwidth	Maximum Emission Level (dBm)
1	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-45 if $PTx,max < 25 \text{ dBm}$ -70+ PTx,max if $PTx,max \geq 25 \text{ dBm}$
2	$1 \text{ GHz} \leq f \leq 25.750 \text{ GHz}$	1 MHz	-35 if $PTx,max < 25 \text{ dBm}$ -60+ PTx,max if $PTx,max \geq 25 \text{ dBm}$

2.2 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.

2.2.1 Default Specifications

2.2.1.1 Default Channel Spectral Mask

The spectrum masks of Table 119 and Table 120 are applicable to all bands and all regions unless specific mask for a band or a region is specified in a relevant sub section of Section 2.2.

Table 119. 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 120. 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.
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.

2.2.1.2 Default Spurious Emission

Unless otherwise specified in sub sections of Section 2.2 for specific bands, the default spurious emission specifications of Table 121 are applicable.

Table 121. Default Spurious Emissions; Relevant to $F_{DL-ue} + ChBW/2 \leq f_c \leq F_{DL-ue} - ChBW/2$

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

2.2.1.3 Default Receiver Adjacent Channel Selectivity

The receiver adjacent and alternate channel selectivity (ACS) is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the interferer power level (in dB) relative to thermal noise (Nth)

To reference the receiver adjacent and alternate channel selectivity values properly, a sensitivity level is defined as the signal level for Bit Error Ratio (BER) $\leq 10^{-6}$ (or equivalent PER) performance for AWGN channel, over the channel bandwidth (5 MHz or 10 MHz), corresponding to the most robust modulation and coding rate supported by the technology.

Nth is the receiver thermal noise of the equipment as declared by the manufacturer and is equal to $kTBwF$ with Bw is the bandwidth of the equipment and F is the receiver noise figure.

Table 122 specifies the limits and the test parameters for the receiver ACS in the first adjacent channel and 2nd adjacent channels. For an assigned channel bandwidth BW, the interferer channel bandwidth of the same size is used. All the measurements are done over 95 % of the channel. The compliant systems meet a Bit Error Ratio (BER) $< 10^{-6}$ (or equivalent PER) with the interference levels specified in the

tables. Please note that depending on some assumed packet sizes, equivalent Packet Error Ratio (PER) criteria can be used alternatively.

Specific numbers for specific band supersedes these default numbers.

Table 122. Limits and test parameters for receiver adjacent channel selectivity

ACS limits (dB)		40	50
Power (dBm)	$P_{SENS} + 3$	Nth +40	Nth +50
Centre frequency (MHz)	f_c	$f_c \pm BW$	$f_c \pm 2xBW$

2.2.1.4 Default receiver blocking specification

Unless otherwise specified in sub sections of Section 2.2 for specific bands, the receiver blocking specifications of this clause are applicable.

The blocking characteristic is a performance measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interfering signal on frequencies other than those of the adjacent channels. The blocking performance requirement applies to interfering signals using a 1 MHz step size.

PSENS5 and PSENS10 are the sensitivity levels at $BER \leq 10^{-6}$, for 5 MHz and 10 MHz channels respectively, corresponding to the most robust modulation and coding rate supported by the base station. The wanted signal with the most robust modulation and coding supported by the base station shall be used. BER performance requirement at $BER \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to the BS antenna input.

BER performance requirement at $BER \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to the Base Station antenna input:

- A wanted signal at the assigned channel frequency,
with mean power 6 dB above PSENS5.
- Interfering signal needs to use the parameters of
Table 123.

Table 123. Blocking for 5 MHz channel bandwidth

According to Table 2 Uplink Channel Center Frequencies excluding first and second adjacent channels in the uplink frequency block (F_{UL} lower edge to F_{UL} upper edge)	-40	12.5	Modulation and coding equal to those of the wanted signal

F_{UL} lower edge - 20MHz to F_{UL} lower edge.	-40	12.5	Modulation and coding equal to those of the wanted signal
F_{UL} upper edge to F_{UL} upper edge + 20MHz.			
1 MHz to F_{UL} lower edge - 20MHz, F_{UL} upper edge + 20MHz to 12 750 MHz	-15	—	Carrier Wave

BER performance requirement at $BER \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to Mobile Station antenna input:

- A wanted signal at the assigned channel frequency, with mean power 6 dB above PSENS10.
- Interfering signal needs to use the parameters of Table 124.

Table 124. Blocking for 10 MHz channel bandwidth

According to Table 2 Uplink Channel Center Frequencies excluding first and second adjacent channels in the uplink frequency block (F_{UL} lower edge to F_{UL} upper edge)	-40	25	Modulation and coding equal to those of the wanted signal
F_{UL} lower edge - 20MHz to F_{UL} lower edge. F_{UL} upper edge to F_{UL} upper edge + 20MHz.	-40	25	Modulation and coding equal to those of the wanted signal
1 MHz to F_{UL} lower edge - 20MHz, F_{UL} upper edge + 20MHz to 12 750 MHz	-15	—	Carrier Wave

2.2.1.5 Default receiver Intermodulation specification

Unless otherwise specified in sub sections of Section 2.2 for specific bands, the receiver Intermodulation specification of this clause are applicable.

Nonlinear mixing of the third and higher order of two interfering signals can produce an interfering signal in the band of the wanted signal. Intermodulation response rejection characteristic is a measure of the capability of the receiver to receive a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

BER performance requirement at $\text{BER} \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to the Base Station antenna input.

- A wanted signal at the assigned channel frequency,
with mean power 6 dB above PSENS5.
- Two interfering signals needs to use the parameters
of Table 125.

Table 125. Receiver intermodulation characteristics for 5 MHz channel bandwidth

-48	7.5	Carrier Wave
-48	17.5	Modulation and coding equal to those of the wanted signal

BER performance requirement at $\text{BER} \leq 10^{-6}$ (or equivalent PER) shall be met when the following signals are coupled to Mobile Station antenna input.

- A wanted signal at the assigned channel frequency,
with mean power 6 dB above PSENS10.
- Two interfering signals needs to use the parameters
of Table 126.

Table 126. Receiver intermodulation characteristics for 10 MHz channel bandwidth

Interfering Signal Mean Power (dBm)	Offset of Interfering Signal center frequency from the channel edge (MHz)	Type of Interfering Signal
-48	15	Carrier Wave
-48	35	Modulation and coding equal to those of the wanted signal

2.2.1.6 Default transmitter Intermodulation specification

Unless otherwise specified in sub sections of Section 2.2 for specific bands, the transmitter Intermodulation specification of this clause are applicable.

The transmit intermodulation characteristic is a measure of the capability of the transmitter to mitigate the development of an impairing signal at non linear elements as a result of intermodulation between the wanted signal and an interfering signal reaching the transmitter via the antenna.

The transmit intermodulation level is defined as the power of the intermodulation products when a modulated interference signal is injected into the antenna connector at a mean power level of 30 dB lower than that of the mean power of the wanted signal. The wanted signal bandwidth shall be 5 MHz and 10 MHz depending on the channel bandwidth size of the base station. The interference signal has the same channel bandwidth size as the wanted signal.

For 5 MHz channel bandwidth size, the centre frequency of the interference signal offset from the subject signal carrier centre frequency shall be at ± 5 MHz, ± 10 MHz, ± 15 MHz (± 10 MHz, ± 20 MHz, ± 30 MHz for 10 MHz channel bandwidth size) but exclude interference frequencies that are partially or completely outside of the declared operating frequency band of the base station.

The base stations need to meet the relevant spectral mask, adjacent channel leakage ratio and spurious emission specifications at the specific 3rd and 5th order intermodulation product frequencies, (except those overlapping with the interfering signal) when the interference signal is injected.

2.2.2 Band Class 1

2.2.2.1 Band Class Group 1.A

2.2.2.1.1 Channel Spectral Mask

The Spectrum Emission Mask for 8.75 MHz bandwidth is specified in Table 129.

Table 127. Channel Mask for 8.75 MHz carrier (BCG 1.A)

(a) $P_{tx} \geq 40$ dBm

No	Frequency offset from centre	Allowed emission	Measurement bandwidth
1	$4.77 \leq \Delta f < 22.5$ MHz	-56.9 dBc	100 kHz
2	$\Delta f > 22.5$ MHz	-13 dBm	1 MHz

(b) 29 dBm $\leq P_{tx} < 40$ dBm

No	Frequency offset from centre	Allowed emission	Measurement bandwidth
1	$4.77 \leq \Delta f < 22.5$ MHz	-53.9 dBc	100 kHz
2	$\Delta f > 22.5$ MHz	-13 dBm	1 MHz

(c) $P_{tx} < 29$ dBm

No	Frequency offset from centre	Allowed emission	Measurement bandwidth
1	$4.77 \leq \Delta f < 22.5$ MHz	-14.5 dBm	1MHz
2	$\Delta f > 22.5$ MHz	-13 dBm	1 MHz

2.2.2.1.2 Transmitter Spurious Emission specification (conducted)

Table 128. Base station spurious emission limit, Category A (BCG 1.A)

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-		1 MHz	Upper frequency as in Recommendation

	13.45 GHz		ITU-R SM.329-10, § 2.5, Table 1
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2.2.2.2 Band Class Group 1.B

2.2.2.2.1 Channel Spectral Mask

The Spectrum Emission Mask for 5 and 10 MHz bandwidth is specified in Table 129 and Table 130.

Table 129. Channel Mask for 5 MHz (BCG 1.B)

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 130. Channel Mask for 10 MHz (BCG 1.B)

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

2.2.2.2.2 Transmitter Spurious Emission specification (conducted)

Table 131. Base station spurious emission limit, Category A (BCG 1.B)

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 132. Base station spurious emissions limit, Category B (BCG 1.B)

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 133. Additional Spurious Emissions for 5 MHz Channel Size; Relevant to $2302.5 \leq f_c \leq 2397.5$ (BCG 1.B)

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

Table 134. Additional Spurious Emissions for 10 MHz Channel Size; Relevant to $2305 \leq f_c \leq 2395$ (BCG 1.B)

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
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2.2.2.2.3 Adjacent Channel Leakage Ratio (ACLR)

For 5 and 10 MHz BW Band Class Group 1.B, the ACLR shall be equal to or greater than the limits specified in Table 35 below.

Table 135. ACLR Specification for 5 MHz Channel BW BS (BCG 1.B)

1	BS channel centre frequency ± 5 MHz	45
2	BS channel centre frequency ± 10 MHz	50

Table 136. ACLR Specifications for 10 MHz Channel BW BS (BCG 1.B)

1	BS channel centre frequency ± 10 MHz	45
2	BS channel centre frequency ± 20 MHz	50

Note: In Table 135 and Table 136 , the measurement bandwidth centered on the adjacent channel is 4.75 MHz for a 5 MHz channelized system and 9.5 MHz for a 10 MHz channelized system.

2.2.3 Band Class 3

2.2.3.1 Band Class Group 3.A

2.2.3.1.1 Channel Spectral Mask

The Spectrum Emission Mask for 5 MHz bandwidth is specified in Table 137 and Table 138.

Table 137. Channel Mask for 5 MHz Bandwidth (BCG 3.A)

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 138. Channel Mask for 5 MHz Bandwidth– Japan (BCG 3.A)

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 139 and Table 140.

Table 139. Channel Mask for 10 MHz Bandwidth (BCG 3.A)

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 140. Channel Mask for 10 MHz Bandwidth– Japan (BCG 3.A)

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

2.2.3.1.2 Transmitter Spurious Emission specification (conducted)

Table 141. Base station spurious emission limit, Category A (BCG 3.A)

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 142. Base station spurious emissions limit, Category B (BCG 3.A)

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:

1. In Table 142, BW is the signal channel bandwidth of 5 or 10 MHz.

Table 143. 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	$1000 \text{ MHz} \leq f < 2505 \text{ MHz}$	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(1)
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:

1. The allowed emission level for the frequency band between 2 535 MHz and 2 630 MHz shall be applied for the frequency range greater than 2.5 times the channel size from the centre frequency.

2.2.3.1.3 First and Second Adjacent Channel Rejection

The first and second adjacent channel rejection shall be measured by setting the desired signal strength 3 dB above the rate dependent receiver sensitivity (Table 144) and raising the power level of the interfering signal (at first or second adjacent channel) until the specified error rate is obtained. The power difference between the interfering signal and the desired channel is the corresponding adjacent channel rejection.

Table 144. Receiver Sensitivity Levels (BCG 3.A)

No	Channel Bandwidth	Sub-carrier Allocation Mode	Modulation and Coding Level	Sensitivity Level (dBm)
1	5 MHz	PUSC	CTC-QPSK 1/2	-91.6
2		AMC	CTC-QPSK 1/2	-91.3
3	10 MHz	PUSC	CTC-QPSK 1/2	-88.5
4		AMC	CTC-QPSK 1/2	-88.3

The first and second adjacent channel rejection recommended specifications are listed in Table 145.

Table 145. First and Second Adjacent Channel Rejection (BCG 3.A)

No	Description	Modulation and Coding Level	Sub-carrier Allocation Mode	Class 1	Class 2	Class 3
1	Min first adjacent channel rejection at $\text{BER}=10^{-6}$ for 3 dB degradation C/I	CTC-QPSK 1/2	PUSC	22.1 dB	29.1 dB	35.1 dB
2			AMC	22.1 dB	29.1 dB	35.1 dB
3	Min second adjacent rejection at $\text{BER}=10^{-6}$ for 3 dB degradation C/I	CTC-QPSK 1/2	PUSC	36.1 dB	39.1 dB	45.1 dB
4			AMC	36.1 dB	39.1 dB	45.1 dB

Where:

ACR Class 1: This class identifies a level of ACR performance appropriate for Base Stations operating at nominal maximum output power ≤ 25 dBm.

ACR Class 2: This class identifies a level of intra-system ACR performance for Base Stations operating at nominal maximum output power > 25 dBm.

ACR Class 3: This class identifies a level of inter-system ACR performance for Base Stations operating at nominal maximum output power > 25 dBm for the boundary between FDD Downlink and TDD and for the boundaries between blocks with unsynchronized TDD usage.

2.2.3.2 Band Class Group 3.B

2.2.3.2.1 Channel Spectral Mask

The Spectrum Emission Mask of Table 146 and Table 147 apply to US region.

Table 146. Channel Mask for 5 MHz Bandwidth -US (BCG 3.B)

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

Table 147. Channel Mask for 10 MHz Bandwidth -US (BCG 3.B)

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

Table 148. Channel Mask for 5 MHz Bandwidth-Europe (BCG 3.B)

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 149. Channel Mask for 10 MHz Bandwidth-Europe (BCG 3.B)

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.

2.2.3.2.2 Transmitter Spurious Emission specification (conducted)

Table 150. Spurious Emissions for 5 MHz Channel Size-US; Relevant to $2616.5 \leq f_c \leq 2687.5$ (BCG 3.B)

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	30 MHz < f < 13.450 GHz, $12.5 \text{ MHz} \leq \Delta f$	1	-13

Table 151. Spurious Emissions for 10 MHz Channel Size-US; Relevant to $2619 \leq f_c \leq 2685$ (BCG 3.B)

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	30 MHz < f < 13.450 GHz, $25 \text{ MHz} \leq \Delta f$	1	-13

Table 152. Spurious Emissions for 5 MHz Bandwidth-Europe; Relevant to $2616.5 \leq f_c \leq 2687.5$ (BCG 3.B)

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 153. Spurious Emissions for 10 MHz Bandwidth-Europe; Relevant to $2619 \leq f_c \leq 2685$ (BCG 3.B)

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 154 and Table 155 specify limits to protect BS receivers against its intra-system BS transmit emissions.

**Table 154. BS Spurious Emissions Limits for protection of the BS receiver for 5 MHz-Europe;
Relevant to $2616.5 \leq f_c \leq 2687.5$ (BCG 3.B)**

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

**Table 155. BS Spurious Emissions Limits for protection of the BS receiver for 10 MHz-Europe;
Relevant to $2619 \leq f_c \leq 2685$ (BCG 3.B)**

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

2.2.4 Band Class 5

2.2.4.1 Channel Spectral Mask: BCG 5.A, 5.B and 5.C

The Spectrum Emission Mask for 5, 7 and 10 MHz bandwidth sizes are specified in Table 156 and Table 157. Table 156 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 157 specifies the emission levels of an underlying piecewise step function applicable conditionally only to some of P_{nom} power levels.

Table 156. Relative Transmit Spectral Power Density Channel Mask (BCG 5.A/5.B/5.C)

No	Power	Frequency Offset				
		0.5*BW	0.71*BW	1.06*BW	2.0*BW	2.5*BW
1	39 dBm < P_{nom}	-20 dB	-27 dB	-32 dB	-50dB	-50dB
2	33 dBm < $P_{nom} \leq 39$ dBm	-20 dB	-27 dB	-32 dB	-50 dB + (39 dBm - P_{nom})	Refer to Table 157

Table 157. Absolute Spectral Emission Channel Mask (BCG 5.A/5.B/5.C)

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 < $P_{nom} \leq 39$ dBm	Refer to Table 156	Refer to Table 156	Refer to Table 156	-21 + x dBm/MHz
2	$P_{nom} \leq 33$ dBm	-5.5 dBm/MHz	-5.5 dBm/MHz	-23.5 dBm/MHz	-23.5 dBm/MHz

Notes: In Table 157, x = $-10 \log(BW/10)$

2.2.4.2 Adjacent Channel Leakage Ratio (ACLR): BCG 5.A, 5.B and 5.C

This section contains the ACLR specifications for base stations operating in Band Class Group 5.A, 5.B and 5.C.

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

ACLR limits for BCG 5.A are specified in Table 158.

Table 158. BS ACLR limits (BCG 5.A)

No	Adjacent channels	ACLR limit
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1	$F_c \pm 5 \text{ MHz}$	45 dB
2	$F_c \pm 10 \text{ MHz}$	50 dB

1

2 ACLR limits for BCG 5.B are specified in Table 159.

3 **Table 159. BS ACLR limits (BCG 5.B)**

No	Adjacent channels	ACLR limit
1	$F_c \pm 7 \text{ MHz}$	45 dB
2	$F_c \pm 14 \text{ MHz}$	50 dB

4

5

6 ACLR limits for BCG 5.C are specified in Table 160.

7 **Table 160. BS ACLR limits (BCG 5.C)**

No	Adjacent channels	ACLR limit
1	$F_c \pm 10 \text{ MHz}$	45 dB
2	$F_c \pm 20 \text{ MHz}$	50 dB

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10 **2.2.5 Band Class 6**

11 **2.2.5.1 Band Class Group 6.A**

12 **2.2.5.1.1 Channel Spectral Mask**

13 Table 161 and Table 162 specify the spectrum emission for FDD Base Stations with 10 and 5 MHz
14 channel bandwidths.

15 **Table 161. Channel Mask for 10 MHz Bandwidth (BCG 6.A)**

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

16

17 **Table 162. Channel Mask for 5 MHz Bandwidth (BCG 6.A)**

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
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2 Note:

- 3 1. Protection specification beyond 25 MHz (250% of the bandwidth) is specified in the spurious
4 emissions specification.

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6 **2.2.5.1.2 Transmitter Spurious Emission specification (conducted)**

7 Table 163 and Table 164 specified the spurious emission limits for 5 and 10 MHz channel bandwidth
8 respectively. The limits shown in the tables are for frequency offsets which are greater than 2.5 times the
9 channel bandwidth from the BS center frequency. In the table, f is the frequency of the spurious domain
10 emissions.

11 In Table 163 and Table 164, measurement uncertainty (as defined in ITU-R M.1545) values
12 corresponding to spurious emission limits have not been included.

13 **Table 163. Spurious Emissions for 5 MHz Channel Size; Relevant to $2112.5 \leq f_c \leq 2167.5$ (BCG 6.A)**

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	30 MHz < f < 10.775 GHz, $12.5 \text{ MHz} \leq \Delta f$	1	-13

14

15 **Table 164. Spurious Emissions for 10 MHz Channel Size; Relevant to $2115 \leq f_c \leq 2165$ (BCG 6.A)**

No	Measurement frequency range	Measurement bandwidth (MHz)	Maximum Emission Level (dBm)
1	30 MHz < f < 10.775 GHz, $25 \text{ MHz} \leq \Delta f$	1	-13

16

17 **2.2.5.2 Band Class Group 6.B**

18 **2.2.5.2.1 Channel Spectral Mask**

19 Table 165 and Table 166 specify the spectrum emission for FDD Base Stations with 5 and 10 MHz
20 channel bandwidths.

21 **Table 165. Channel Mask for 5 MHz Bandwidth (BCG 6.B)**

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	$2.5 \leq \Delta f \leq 7.5$	100	$-7.0 - 7(\Delta f - 2.55)/5$
2	$7.5 \leq \Delta f \leq 12.5$	100	-14

Notes:

4. Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
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.

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

1

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Table 166. Channel Mask for 10 MHz Bandwidth (BCG 6.B)

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	$15 \leq \Delta f \leq 25$	1000	-13

Notes:

2. Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the measuring filter.
3. 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.

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

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Table 166 specifies the spectrum emission mask for FDD Base Stations with 20 MHz channel bandwidth.

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Table 167. Channel Mask for 20 MHz Bandwidth (BCG 6.B)

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

2.2.5.2.2 Transmitter Spurious Emission specification (conducted)

Table 168 and Table 169 specify the spurious emission limits for 5 and 10 MHz channel bandwidth respectively. Table 170 and Table 171 specify the additional spurious emission limits for 5 and 10 MHz channel bandwidth. The limits shown in the tables are for frequency offsets which are greater than 2.5 times the channel bandwidth from the BS center frequency. In the table, f is the frequency of the spurious domain emissions.

In Table 168, Table 169, Table 170 and Table 171, measurement uncertainty (as defined in ITU-R M.1545) values corresponding to spurious emission limits have not been included.

Table 168. Spurious Emissions for 5 MHz Channel Size; Relevant to $2112.5 \leq f_c \leq 2167.5$ (BCG 6.B)

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	$1 \text{ GHz} \leq f < 10.775 \text{ GHz}, 12.5 \text{ MHz} \leq \Delta f$	1 MHz	-30

Table 169. Spurious Emissions for 10 MHz Channel Size; Relevant to $2115 \leq f_c \leq 2165$ (BCG 6.B)

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	$1 \text{ GHz} \leq f < 10.775 \text{ GHz}, 25 \text{ MHz} \leq \Delta f$	1 MHz	-30

1 **Table 170. Additional Spurious Emissions for 5 MHz Channel Size; Relevant to $2112.5 \leq f_c \leq 2152.5$**
2 **(BCG 6.B)**

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

1

2

1 **Table 171. Additional Spurious Emissions for 10 MHz Channel Size; Relevant to $2115 \leq f_c \leq 2150$**
2 **(BCG 6.B)**

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

1

2 Table 169 and Table 171 specify the basic and additional spurious emission specifications for FDD
3 Mobile Stations with 20 MHz channel bandwidth.

4

5 **Table 172. Spurious Emissions for 20 MHz Channel Size; Relevant to $2120 \leq f_c \leq 2160$ (BCG 6.B)**

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	$1 \text{ GHz} \leq f < 10.775 \text{ GHz}, 25 \text{ MHz} \leq \Delta f$	1 MHz	-30

6

1 **Table 173. Additional Spurious Emissions for 20 MHz Channel Size; Relevant to $2120 \leq f_c \leq 2160$**
 2 **(BCG 6.B)**

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

1

2

3 2.2.5.3 Band Class Group 6.C

4 2.2.5.3.1 Channel Spectral Mask

5 Table 174 specifies BS Spectrum Emission Mask for 5 MHz channel bandwidth while Table 175
6 specifies BS Spectrum Emission Mask for 10 MHz channel bandwidth.

7

8 **Table 174. Channel Mask - Europe: 5 MHz (BCG 6.C)**

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	$4.0 \leq \Delta f < 12.5$	1000	-13

9 **Table 175. Channel Mask - Europe: 10 MHz (BCG 6.C)**

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

10

2.2.5.3.2 Transmitter Spurious Emission specification (conducted)

The spurious emission limits specified in Table 176, Table 154 and Table 178 are for frequency offsets which are greater than 2.5 times the channel bandwidth from the BS center frequency.

Table 176. Spurious Emission (BCG 6.C)

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 $12.5 \text{ MHz} \leq f < 50 \text{ MHz}$ 300 kHz, If $50 \text{ MHz} \leq f < 60 \text{ MHz}$ 1 MHz, If $60 \text{ MHz} \leq f$	-30

Table 177 specifies limits to protect BS receivers against its intra-system BS transmit emissions.

Table 177. Spurious Emissions Limits for protection of the BS receiver (BCG 6.C)

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 178 may be required by local or regional regulations.

Table 178. Additional Spurious Emission (BCG 6.C)

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

2.2.5.3.3 Adjacent Channel Leakage Ratio (ACLR)

For 5 and 10 MHz BW Band Class Group 6.C, the ACLR shall be equal to or greater than the limits specified in Table 179 and Table 180 below.

ACLR is specified when the receiver channel bandwidth on the adjacent channel is:

- 1 4.75 MHz for a 5 MHz channelized system;
2 9.5 MHz for a 10 MHz channelized system.

3
4 The measurement bandwidth for the measurement of on-channel power of the Mobile WiMAX carrier is:
5 4.75 MHz for a 5 MHz channelized system, and
6 9.5 MHz for a 10 MHz channelized system.

7
8 In here, the transmitted power and the received power are measured with a rectangular filter. In Table 179
9 and Table 180, the ACLR specifications are shown. Measurement uncertainty (as defined in ITU-R
10 M.1545) values corresponding to the ACLR limits have not been included.

11 **Table 179. ACLR Specification for for 5 MHz Channel BW BS (BCG 6.C)**

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	MS channel centre frequency ± 5 MHz	45
2	MS channel centre frequency ± 10 MHz	50

12 **Table 180. ACLR Specifications for 10 MHz Channel BW BS (BCG 6.C)**

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	MS channel centre frequency ± 10 MHz	45
2	MS channel centre frequency ± 20 MHz	50

15 **2.2.6 Band Class 7**

16 **2.2.6.1 Band Class Group 7.A to 7.E**

17 **2.2.6.1.1 Channel Spectral Mask**

18 The Spectrum Emission Mask of Table 181 and Table 182 apply to US region.

19 **Table 181. 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

20 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 182. 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 183 and Table 184 apply to Europe region.

Table 183. 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 184. 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

1
2 Notes:

- 3 1. Δf is the absolute value of separation in MHz between the carrier frequency and the centre of the
4 measuring filter.
- 5 2. The first measurement position with a 100 kHz filter is at Δf equals to 5.05 MHz; the last is at Δf
6 equals to 24.95 MHz.
- 7 3. Integration Bandwidth refers to the frequency range over which the emission power is integrated.
8

9 **2.2.6.2 Band Class Group 7.G**

10 **2.2.6.2.1 Channel Spectral Mask**

11 Table 185 specifies MS and BS Spectrum Emission Mask for 5 MHz channel bandwidth while Table 186
12 specifies MS and BS Spectrum Emission Mask for 10 MHz channel bandwidth.

13 **Table 185. Channel Mask - Europe: 5 MHz (BCG 7.G)**

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

14 **Table 186. Spectrum Emission Mask - Europe: 10 MHz (BCG 7.G)**

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

15

1 At the upper edge of the downlink block (925-960 MHz), the Channel Spectral Mask Emission
2 specification of Table 186 is only applicable up to $F_{DL-ue} + 10$ (970 MHz). From this point forward (> 970
3 MHz), the Spurious Emission Specifications of Section 2.2.6.2 are applicable.

4 **2.2.6.2.2 Transmitter Spurious Emission specification (conducted)**

5 The spurious emission limits specified in Table 187 and
6 Table 188 for frequency offsets which are greater than 2.5 times the channel bandwidth from the BS
7 center frequency.

8 **Table 187. Spurious Emission (BCG 7.G)**

No	Transmitter Center Frequency (f_c) (MHz)	Spurious Frequency (f) Range	Integration Bandwidth	Maximum Emission Level (dBm)
1.	925 -960	$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	-36
2.	925 -960	$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	-36
3.	925 -960	$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	-36
4.	925 -960	$1 \text{ GHz} \leq f < 12.75 \text{ GHz}$	30 kHz, If $12.5 \text{ MHz} \leq f < 50 \text{ MHz}$ 300 kHz, If $50 \text{ MHz} \leq f < 60 \text{ MHz}$ 1 MHz, If $60 \text{ MHz} \leq f$	-30

9
10 Table 188 specifies limits to protect BS receivers against its intra-system BS transmit emissions.
11
12

13 **Table 188. BS Spurious Emissions Limits for protection of the BS receiver (BCG 7.G)**

No	Transmitter Center Frequency (f_c) (MHz)	Spurious Frequency (f) Range (MHz)	Measurement Bandwidth	Maximum Level
1.	925 -960	880-915	100 kHz	-96 dBm

14
15 The spurious emission limits specified in
16 Table 188 may be required by local or regional regulations.

17 **Table 189. Additional Spurious Emission (BCG 7.G)**

No	Transmitter Center Frequency (f_c) (MHz)	Spurious Frequency (f) Range (MHz)	Measurement Bandwidth	Maximum Emission Level (dBm)
1.	925-960	791-821	1 MHz	-52
2.		831-862	1 MHz	-49
3.		880-915	1 MHz	-52
4.		925-960	1 MHz	-49

1 **2.2.6.2.3 Adjacent Channel Leakage Ratio (ACLR)**

2 For 5 and 10 MHz BW Band Class Group 6.C, the ACLR shall be equal to or greater than the limits
3 specified in Table 190 and Table 191 below.

4

5 ACLR is specified when the receiver channel bandwidth on the adjacent channel is:

6 4.75 MHz for a 5 MHz channelized system;

7 9.5 MHz for a 10 MHz channelized system.

8 The measurement bandwidth for the measurement of on-channel power of the Mobile WiMAX carrier is:

9 4.75 MHz for a 5 MHz channelized system, and

10 9.5 MHz for a 10 MHz channelized system.

11 In here, the transmitted power and the received power are measured with a rectangular filter. In Table 190
12 and Table 191, the ACLR specifications are shown. Measurement uncertainty (as defined in ITU-R
13 M.1545) values corresponding to the ACLR limits have not been included.

14 **Table 190. ACLR Specification for for 5 MHz Channel BW BS (BCG 7.G)**

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	MS channel centre frequency \pm 5 MHz	45
2	MS channel centre frequency \pm 10 MHz	50

15

16 **Table 191. ACLR Specifications for 10 MHz Channel BW BS (BCG 7.G)**

No	Adjacent channel centre frequency	Minimum required ACLR relative to assigned channel frequency (dB)
1	MS channel centre frequency \pm 10 MHz	45
2	MS channel centre frequency \pm 20 MHz	50

17

18 **2.2.7 Band Class 8**

19 **2.2.7.1 Band Class Group 8.G**

20 **2.2.7.1.1 Channel Spectral Mask**

21 Table 192 and Table 193 specify the spectrum emission for FDD Base Stations with 5 and 10 MHz
22 channel bandwidths.

23 **Table 192. Channel Mask for 5 MHz Bandwidth (BCG 8.G)**

1	2.5 to $<$ 3.5	50	-13
2	3.5 to \leq 12.5	1000	-13

1 **Table 193. Channel Mask for 10 MHz Bandwidth (BCG 8.G)**

1	5 to < 6	100	-13
2	6 to \leq 25	1000	-13

2

3 Note:

- 4 1. Protection specification beyond 25 MHz (250% of the bandwidth) is specified in the spurious
5 emissions specification.

6

7 **2.2.7.1.2 Transmitter Spurious Emission Specification (conducted)**

8 **Table 194. Spurious Emissions for 5 MHz Channel Size; Relevant to $1802.5 \leq f_c \leq 1827.5$ (BCG 8.G)**

1	$30 \text{ MHz} \leq f < 9.150 \text{ GHz}$, $12.5 \text{ MHz} \leq \Delta f$	1	-13

9

10 **Table 195. Spurious Emissions for 10 MHz Channel Size; Relevant to $1805 \leq f_c \leq 1825$ (BCG 8.G)**

1	$30 \text{ MHz} \leq f < 9.150 \text{ GHz}$, $25 \text{ MHz} \leq \Delta f$	1	-13

11

1

2 **2.2.8 Band Class 9**

3 **2.2.8.1 Band Class Group 9.D**

4 This section treats specification for Fixed type Base Station and Transportable Base Station of the BGC
5 9.D radio system configuration.

6 **2.2.8.1.1 Channel Spectral Mask**

7 The channel spectral mask for BCG 9.D Mobile station is effectively specified by the ACLR, which is
8 given in the Section 2.2.8.1.4.

9 In the BCG 9.D application, the maximum transmission output powers of Transportable Base Station and
10 Fixed Base Station are as large as +37dBm (5W) and +43dBm (20W) each, and the transmission filter
11 may have to cover the bandwidth as wide as 30MHz to meet the system operation requirement.

12 Considering these matters, the spectral masking level is specified by ACLR measurement relative to the
13 carrier power of the 5MHz channel.

14 Note:

- 15 • Since the Japan radio ordinance of this VHF Public
16 Safety band does not have article regulating channel spectral masking, it is specified with the
17 ACLR number hereby.
- 18 • Protection specification outside the range of 160M -
19 215MHz (beyond 250% offset from the carrier frequency of the lowest and highest channels with
20 the 5MHz bandwidth) is specified in the spurious emissions requirement.

21 **2.2.8.1.2 Transmitter Spurious Emission (conducted)**

22 Table 196 and Table 197 provides the Spurious Emission limitations for Fixed and Transportable Base
23 Station for frequency offsets which are greater than 2.5 times the channel bandwidth from the MS center
24 frequency. In the tables, f is the frequency of the spurious domain emissions.

25 **Table 196. Spurious Emission for 5MHz Channel Size Fixed Base station; Relevant to $170.0 < f_c < 202.5$**
26 **(BCG 9.D)**

1	$9\text{kHz} < f \leq 150\text{kHz}$	1kHz	-16dBm (25uW) , if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
2	$150\text{kHz} < f \leq 30\text{MHz}$	10k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
3	$30\text{MHz} < f \leq 160\text{MHz}$	100k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
4	$160\text{M} < f \leq 170\text{M}$	100k	-54dBm (4nW)
5	$207.5\text{M} < f \leq 215\text{M}$	100k	-25dBm (3.2uW)
6	$215\text{MHz} < f \leq 1\text{GHz}$	100k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm

7	1GHz < f	1M	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
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1

2 **Table 197. Spurious Emission for 5MHz Channel Size Transportable Base station; Relevant to $170.0 < fc < 202.5$ (BCG 9.D)**

3

1	9kHz < f <= 150kHz	1kHz	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
2	150kHz < f <= 30MHz	10k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
3	30MHz < f <= 160MHz	100k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
3	160MHz < f <= 170MHz	100k	-30dBm (1uW)
4	207.5MHz < f <= 215MHz	100k	-30dBm (1uW)
5	215MHz < f <= 1GHz	100k	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm
6	1GHz < f	1M	-16dBm (25uW), if transmission power > 30dBm, -13dBm (50uW), if transmission power <= 30dBm

4

5 **2.2.8.1.3 Receiver Spurious Emission (conducted)**

6 The power of any narrow-band spurious emission should not exceed the maximum level specified in
7 Table 198 and Table 199 for Fixed and Transportable Base Stations respectively.

8 **Table 198. Receiver Spurious Emission for Fixed Base station (BCG 9.D)**

1	9kHz <= f < 150kHz	1kHz	-54
2	150kHz <= f < 30MHz	10kHz	-54
3	30MHz <= f < 1000MHz	100kHz	-54
4	1000MHz <= f < 2505MHz	1MHz	-47
5	2505MHz <= f < 2535MHz	1MHz	-61
6	2535MHz <= f	1MHz	-47

9

10 **Table 199. Receiver Spurious Emission for Transportable Base station (BCG 9.D)**

--	--	--	--

1	$9\text{kHz} \leq f < 150\text{kHz}$	1kHz	-54
2	$150\text{kHz} \leq f < 30\text{MHz}$	10kHz	-54
3	$30\text{MHz} \leq f < 1000\text{MHz}$	100kHz	-54
4	$1000\text{MHz} \leq f < 2505\text{MHz}$	1MHz	-47
5	$2505\text{MHz} \leq f < 2535\text{MHz}$	1MHz	-70
6	$2535\text{MHz} \leq f$	1MHz	-47

1

2 **2.2.8.1.4 Adjacent Channel Leakage Ratio (ACLR)**

3 The ACLR is defined as the ratio of the on-channel transmitted power to the out of channel power leaking
4 into adjacent channels and as measured at the output of the receiver filter. The first-adjacent and second-
5 adjacent channel-centre frequency offsets relative to the assigned channel's centre frequency are 5 MHz
6 and 10 MHz for the 5 MHz system.

7 **Table 200. ACLR Specification for 5MHz Channel BW Fixed Base station (BCG 9.D)**

1	+/- 5MHz offset from F-BS channel center frequency	4.8M (=+/-2.4M)Hz	30
2	+/- 10MHz offset from F-BS channel center frequency	4.8M (=+/-2.4M)Hz	50

8

9 **Table 201. ACLR Specification for 5MHz Channel BW Transportable Base station (BCG 9.D)**

1	+/- 5MHz offset from T-BS channel center frequency	4.8M (=+/-2.4M)Hz	21
2	+/- 10MHz offset from T-BS channel center frequency	4.8M (=+/-2.4M)Hz	41

10

APPENDIX A. Preferred Channel Center Frequencies

Preferred Channel Center Frequencies for Band Class Group 10.A

The channel center frequencies of Table 202 represent preferred channel raster for BCG 10.A. Compliance to this list is not sufficient for conformance. The channel center frequencies listed in **Table 2** are the basis for interoperability and conformance purposes.

Table 202. Preferred Channel Set for BCG 10

Band Class Group	Channel BW (MHz)	Frequency Range (MHz)		RF Channel Center Frequency Number Set	
		Uplink	Downlink	Uplink	Downlink
10.A	5	5000-5150	5000-5150	(100100, 102900, 100)	(100100, 102900, 100)
10.B	10	5000-5150	5000-5150	(100100, 102900, 200)	(100100, 102900, 200)

7
8