

Report Number: F690501/RF-RTL010985-1 Page: 163 of 261

5. Peak-Average Ratio

5.1. Limit

FCC

- §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

- §27.50(d)(5), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

IC

- RSS-130 Issue 1

4.4, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 $\,\mathrm{dB}$ for more than 0.1 % of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

- RSS-132 Issue 3

5.4, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1 % of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

- RSS-133 Issue 6

6.4, the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1 % of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

- RSS-139 Issue 3

6.5, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1 % of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

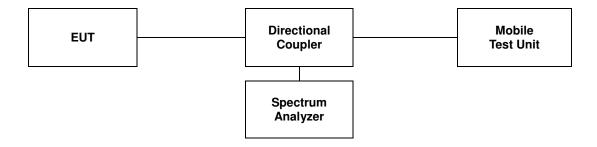


Report Number: F690501/RF-RTL010985-1 Page: 164 of 261

5.2. Test Procedure

The test follows section 5.7.1 of FCC KDB 971168 D01 v02r02.

- 1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function.
- 2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth.
- 3. Set the number of counts to a value that stabilizes the measured CCDF curve.
- 4. Set the measurement interval as follows:
 - a) for continuous transmissions, set to 1 ms.
 - b) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
- 5. Record the maximum PAPR level associated with a probability of 0.1 %.





Report Number: F690501/RF-RTL010985-1 Page: 165 of 261

5.3 Test Results

Ambient temperature : (23 \pm 1) $^{\circ}$ C Relative humidity : 47 $^{\circ}$ R.H.

- LTE

Band	Mode	Frequency (Mb)	PAR (dB)
2 (5 MHz)	QPSK	1 852.5	4.58
		1 880.0	4.87
		1 907.5	5.13
2 (10 吨)	QPSK	1 855.0	4.72
		1 880.0	4.75
		1 905.0	4.93
2 (15 Mb)	QPSK	1 857.5	5.10
		1 880.0	5.04
		1 902.5	4.99
2 (20 Mb)	QPSK	1 860.0	4.99
		1 880.0	4.75
		1 900.0	4.61

- LTE

Band	Mode	Frequency (脈)	PAR (dB)
4 (5 吨)	QPSK	1 712.5	4.96
		1 732.5	4.52
		1 752.5	4.99
4 (10 MHz)	QPSK	1 715.0	4.87
		1 732.5	4.61
		1 750.0	4.90
4 (15 MHz)	QPSK	1 717.5	5.01
		1 732.5	4.78
		1 747.5	5.16
4 (20 Mlz)	QPSK	1 720.0	4.70
		1 732.5	4.61
		1 745.0	4.75



Report Number: F690501/RF-RTL010985-1 Page: 166 of 261

- LTE

Band	Mode	Frequency (쌘)	PAR (dB)
5 (1.4 MHz)	QPSK	824.7	4.29
		836.5	4.32
		848.3	4.78
5 (3 Mb)	QPSK	825.5	4.55
		836.5	4.32
		847.5	4.78
5 (5 Mb)	QPSK	826.5	4.70
		836.5	4.29
		846.5	4.87
5 (10 吨)	QPSK	829.0	4.72
		836.5	4.38
		844.0	4.72

- LTE

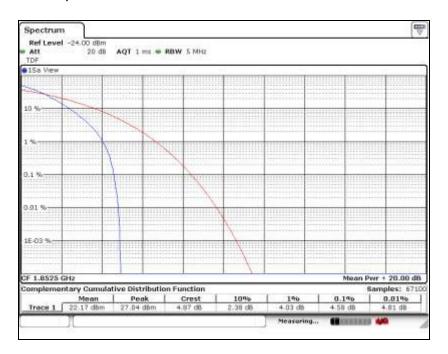
Band	Mode	Frequency (Mb)	PAR (dB)
17 (5 Mb)	QPSK	706.5	4.64
		710.0	4.90
		713.5	4.26
17 (10 Mb)	QPSK	709.0	4.81
		710.0	4.72
		711.0	4.72



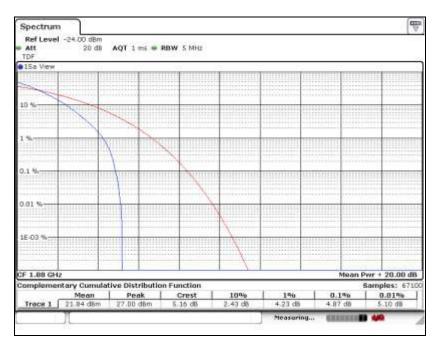
Report Number: F690501/RF-RTL010985-1 Page: 167 of 261

LTE Band 2 (5 M拉 - QPSK)

Low Channel

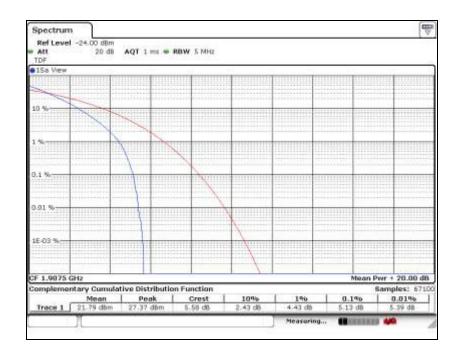


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 168 of 261

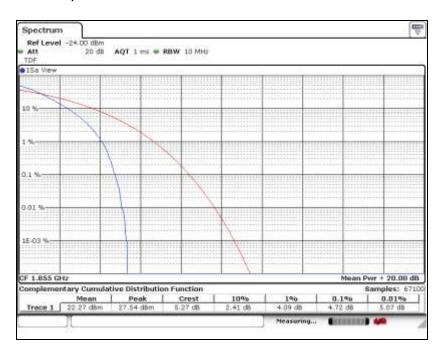




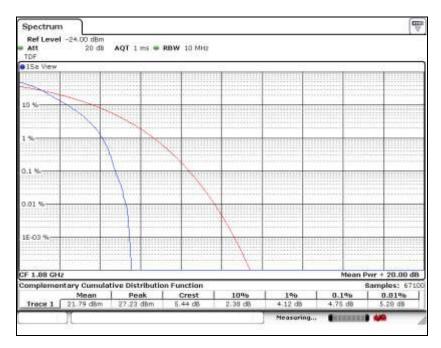
Report Number: F690501/RF-RTL010985-1 Page: 169 of 261

LTE Band 2 (10 M拉 - QPSK)

Low Channel

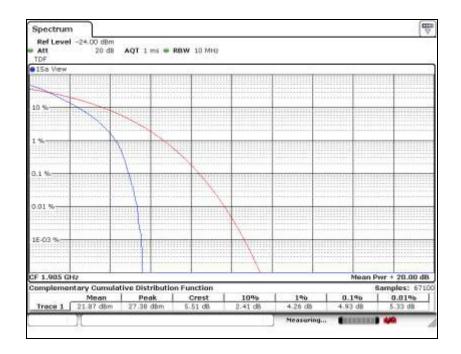


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 170 of 261

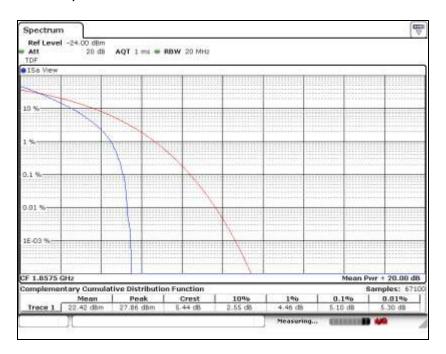




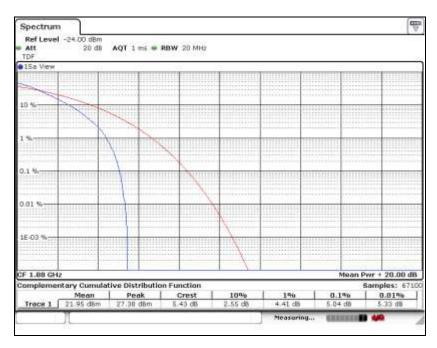
Report Number: F690501/RF-RTL010985-1 Page: 171 261 of

LTE Band 2 (15 M拉 - QPSK)

Low Channel

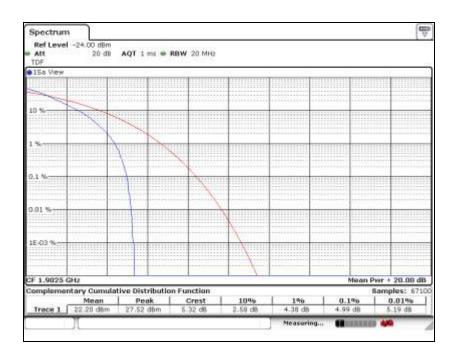


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 172 of 261

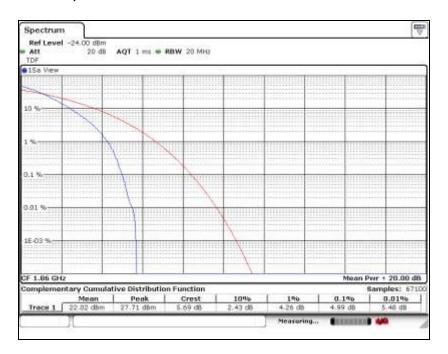




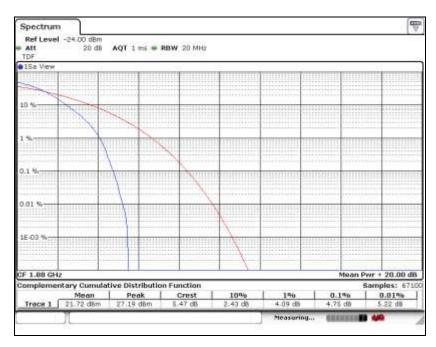
Report Number: F690501/RF-RTL010985-1 Page: 173 261 of

LTE Band 2 (20 M拉 - QPSK)

Low Channel

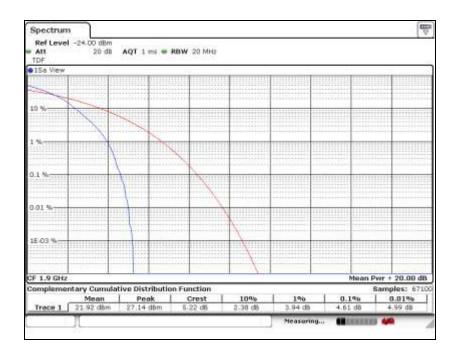


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 174 of 261

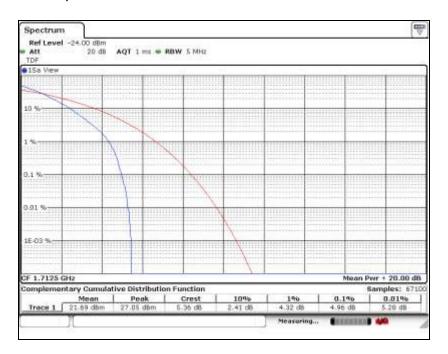




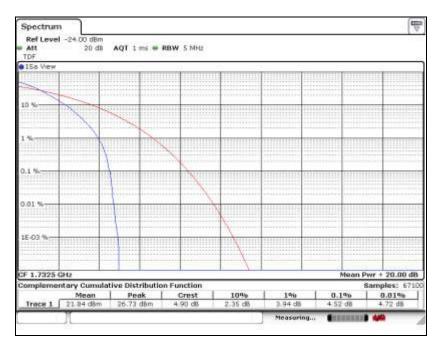
Report Number: F690501/RF-RTL010985-1 Page: 175 of 261

LTE Band 4 (5 M拉 - QPSK)

Low Channel

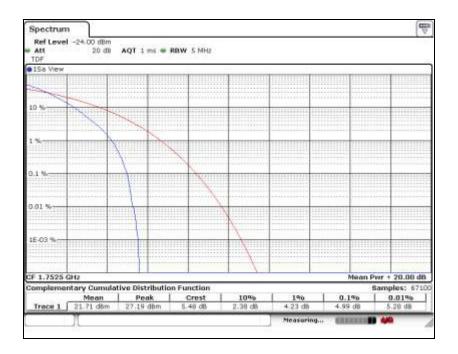


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 176 of 261

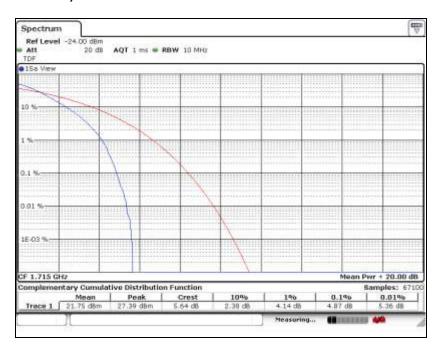




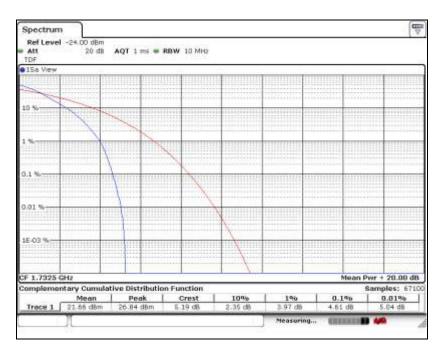
Report Number: F690501/RF-RTL010985-1 Page: 177 of 261

LTE Band 4 (10 版 - QPSK)

Low Channel

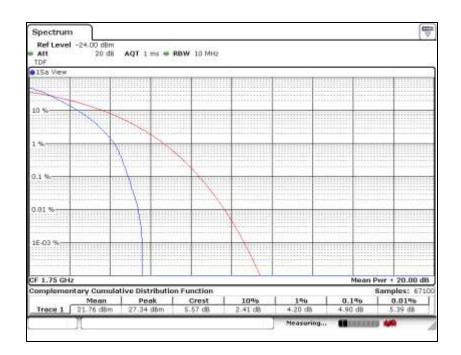


Middle Channel





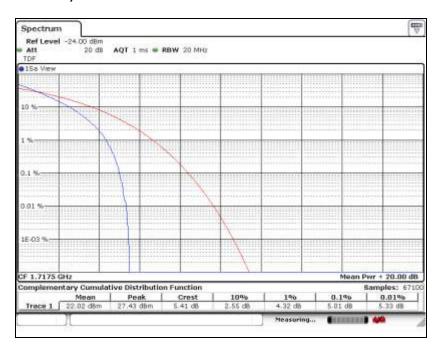
Report Number: F690501/RF-RTL010985-1 Page: 178 of 261



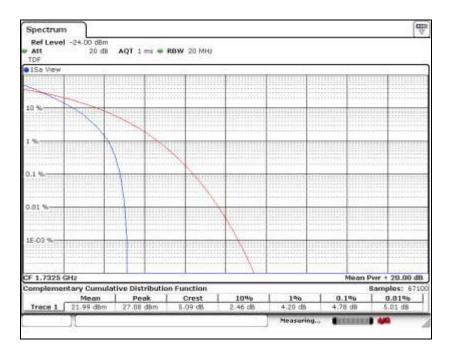


Report Number: F690501/RF-RTL010985-1 Page: 179 of 261

Low Channel

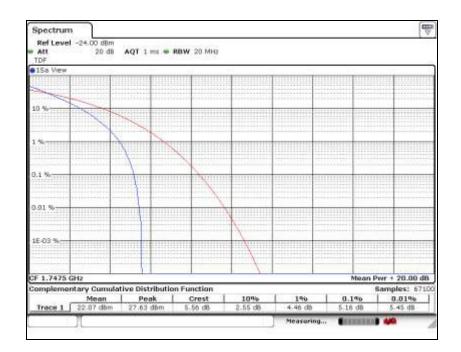


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 180 of 261

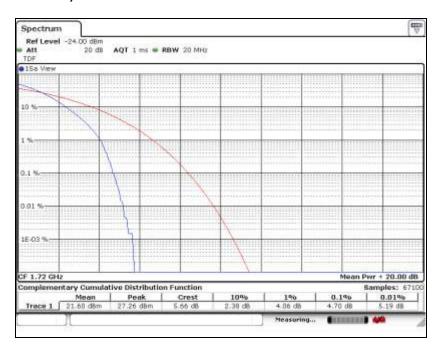




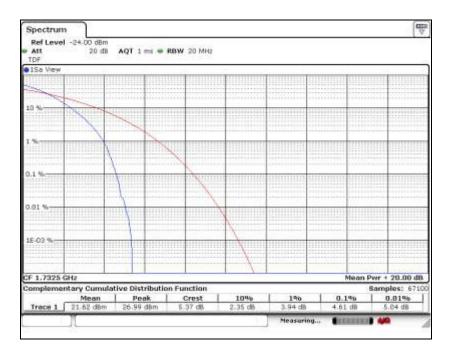
Report Number: F690501/RF-RTL010985-1 Page: 181 of 261

LTE Band 4 (20 版 - QPSK)

Low Channel

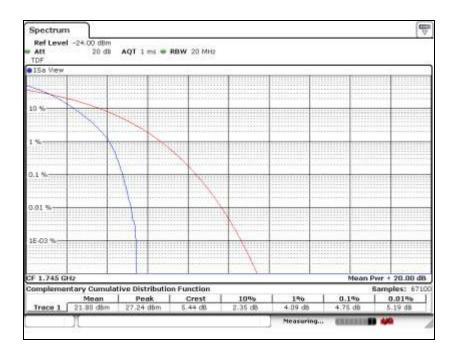


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 182 of 261

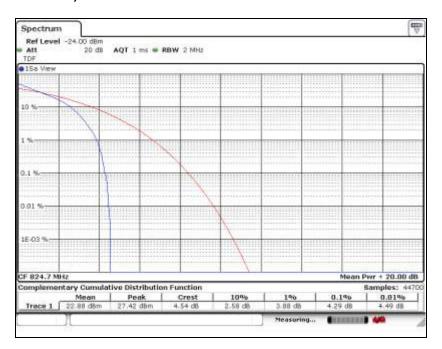




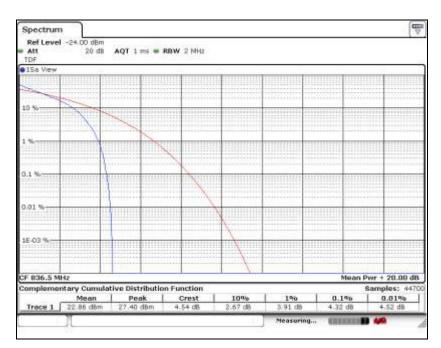
Report Number: F690501/RF-RTL010985-1 Page: 183 of 261

LTE Band 5 (1.4 胍 - QPSK)

Low Channel

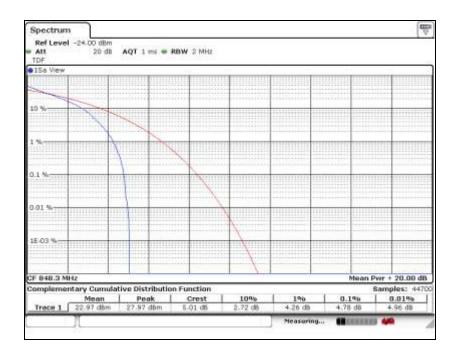


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 184 of 261

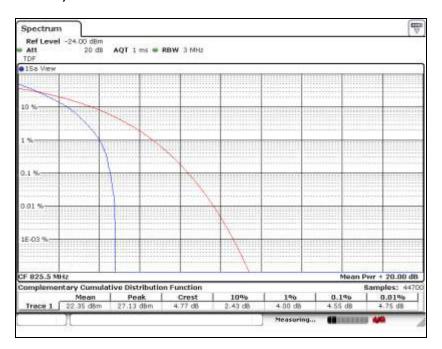




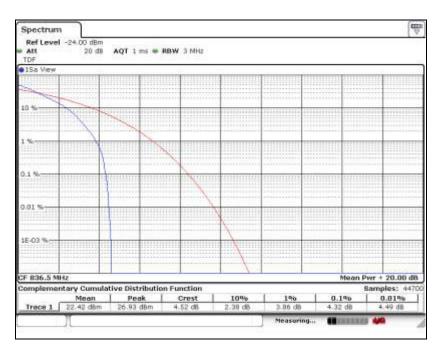
Report Number: F690501/RF-RTL010985-1 Page: 185 of 261

LTE Band 5 (3 Mb - QPSK)

Low Channel

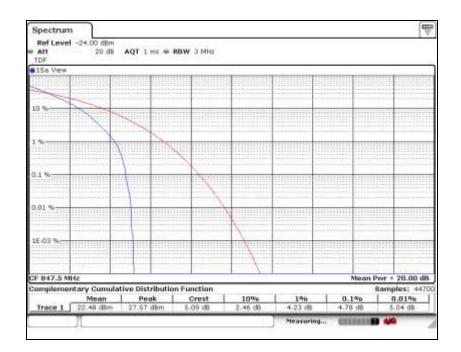


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 186 of 261

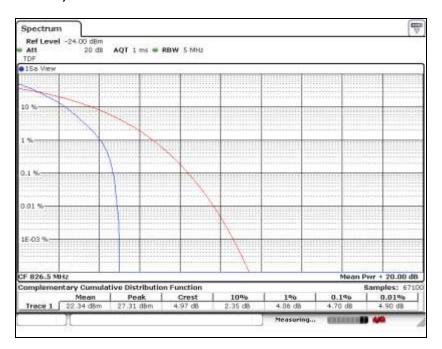




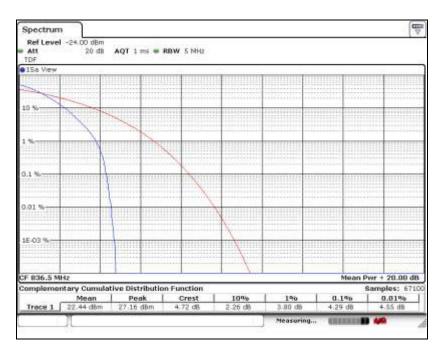
Report Number: F690501/RF-RTL010985-1 Page: 187 261 of

LTE Band 5 (5 Mb - QPSK)

Low Channel

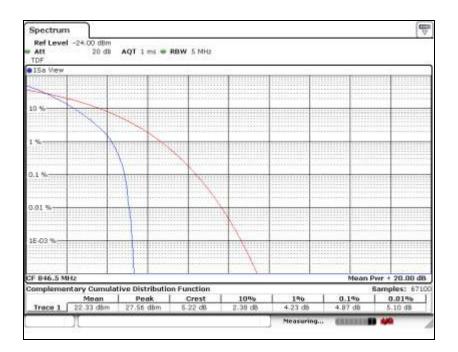


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 188 of 261

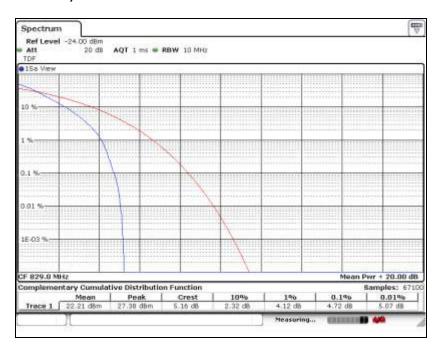




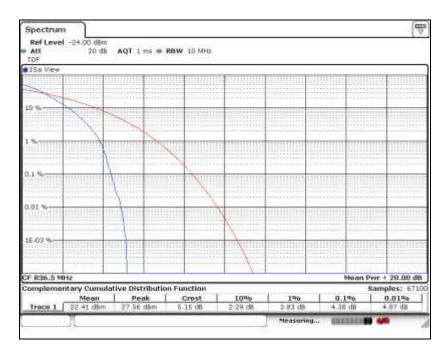
Report Number: F690501/RF-RTL010985-1 Page: 189 of 261

LTE Band 5 (10 版 - QPSK)

Low Channel

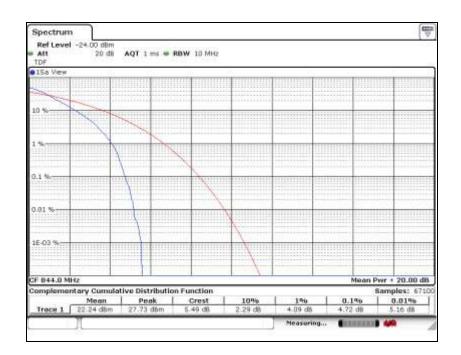


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 190 of 261

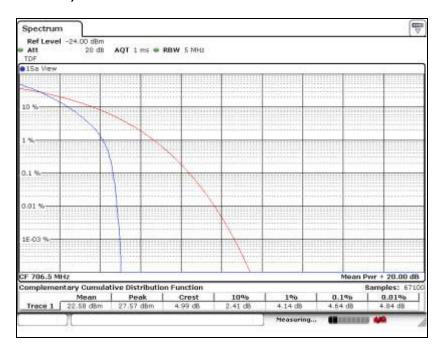




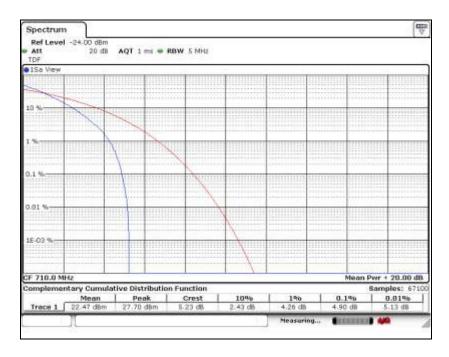
Report Number: F690501/RF-RTL010985-1 Page: 191 of 261

LTE Band 17 (5 版 - QPSK)

Low Channel

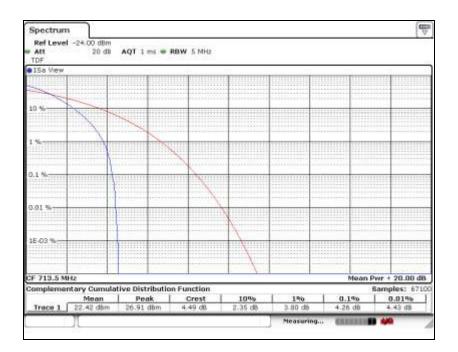


Middle Channel





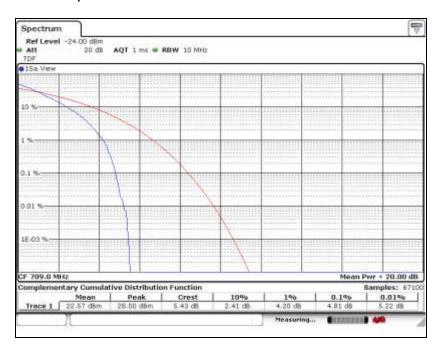
Report Number: F690501/RF-RTL010985-1 Page: 192 of 261



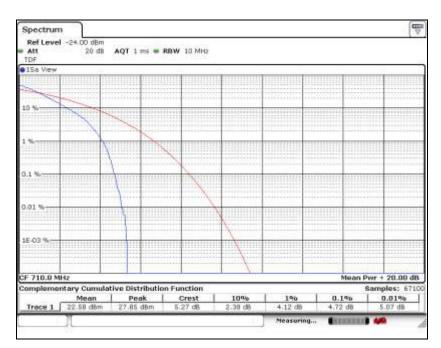


Report Number: F690501/RF-RTL010985-1 Page: 193 of 261

Low Channel

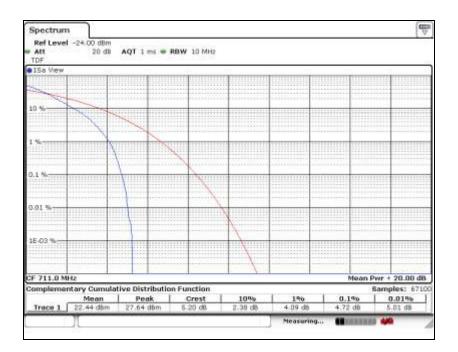


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 194 of 261





Report Number: F690501/RF-RTL010985-1 Page: 195 of 261

6. Spurious Emissions at Antenna Terminal

6.1. Limit

FCC

- \$22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
- §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
- §27.53(g), the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.
- §27.53(h)(1), for operations in the 1 695-1 710 Mb, 1 710-1 755 Mb, 1 755-1 780 Mb, 1 915-1 920 Mb, 1 995-2 000 Mb, 2 000-2 020 Mb, 2 110-2 155 Mb, 2 155-2 180 Mb, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 \log_{10} (P) dB.

IC

- RSS-130 Issue 1

4.6.1, the power of any unwanted emissions in any 100 klb bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log₁₀ p (watts), dB. However, in the 100 klb band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 klb may be employed.

- RSS-132 Issue 3

- 5.5, Mobile and base station equipment shall comply with the limits in (i) and (ii) below.
- (i) In the first 1.0 Mb band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log₁₀ p (watts).
- (ii) After the first 1.0 Mb immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least 43 + 10 log₁₀ p (watts). If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 klb is required.

- RSS-133 Issue 6

- 6.5, Equipment shall comply with the limits in (i) and (ii) below.
- (i) In the 1.0 Mb bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1 % of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 \log_{10} p(watts).
- (ii) After the first 1.0 Mb, the emission power in any 1 Mb bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log₁₀ p(watts). If the measurement is performed using 1 % of the emission bandwidth, power integration over 1.0 Mb is required.



Report Number: F690501/RF-RTL010985-1 Page: 196 of 261

- RSS-139 Issue 3

6.6, (i) In the first 1.0 Mb bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1 % of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + $10 \log_{10} p$ (watts) dB.

(ii) After the first 1.0 $\, \text{Mb} \,$ outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 $\, \text{Mb} \,$ bandwidth shall be attenuated below the transmitter output power P (in $\, \text{dB W}$) by at least 43 + 10 \log_{10} p (watts) $\, \text{dB}$.

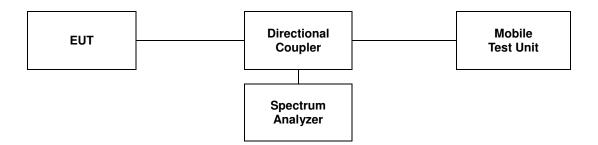


Report Number: F690501/RF-RTL010985-1 Page: 197 of 261

6.2. Test Procedure

The test follows section 6.0 of FCC KDB 971168 D01 v02r02.

- 1. Start frequency was set to 30 Mb and stop frequency was set to at least 10* the fundamental frequency.
- 2. Detector = Peak.
- 3. Trace mode = Max hold.
- 4. Sweep time = Auto couple.
- 5. The trace was allowed to stabilize.
- 6. Please see notes below for RBW and VBW settings.
- 7. For plots showing conducted spurious emissions from 30 Mb to 20 GHz, all path loss of wide frequency range was investigated and compensated to spectrum analyzer as correction factor.



Notes;

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 km or greater for frequencies less than 1 Gm and frequencies greater than 1 Gm. However, in the 1 Mb bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two point, one below the carrier center frequency, and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.



Report Number: F690501/RF-RTL010985-1 Page: 198 of 261

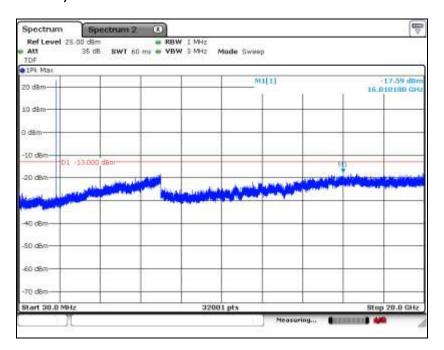
6.3. Test Results

Ambient temperature : (23 \pm 1) $^{\circ}$ C Relative humidity : 47 $^{\circ}$ R.H.

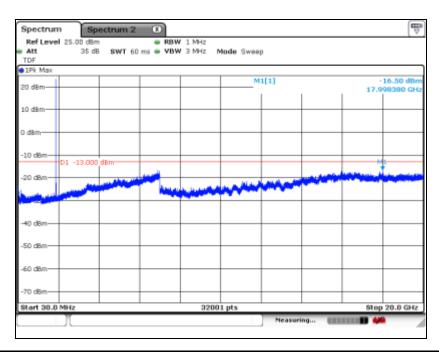
Please refer to the following plots.

LTE Band 2 (5 Mb - QPSK)

Low Channel

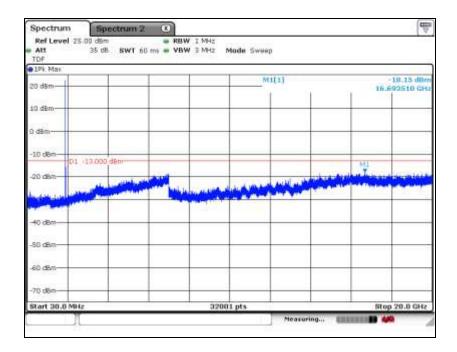


Middle Channel





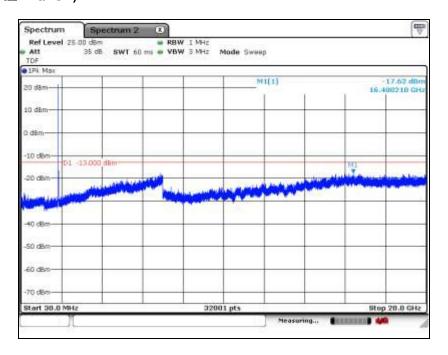
Report Number: F690501/RF-RTL010985-1 Page: 199 of 261



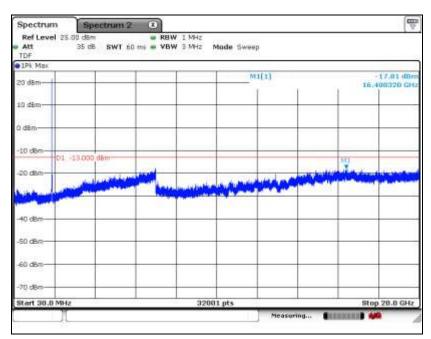


Report Number: F690501/RF-RTL010985-1 Page: 200 261 of

Low Channel

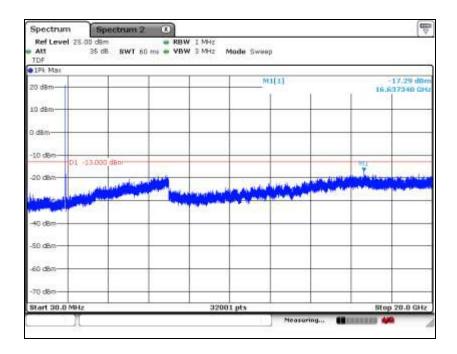


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 201 of 261

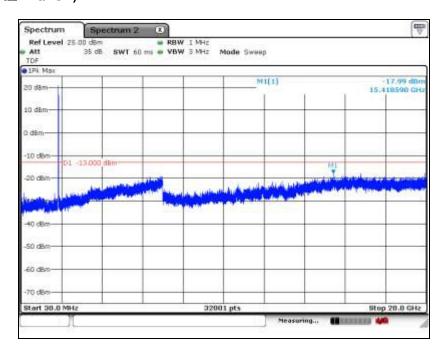




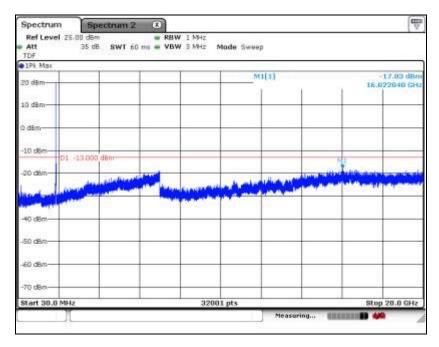
Report Number: F690501/RF-RTL010985-1 Page: 202 261 of

LTE Band 2 (15 Mb - QPSK)

Low Channel

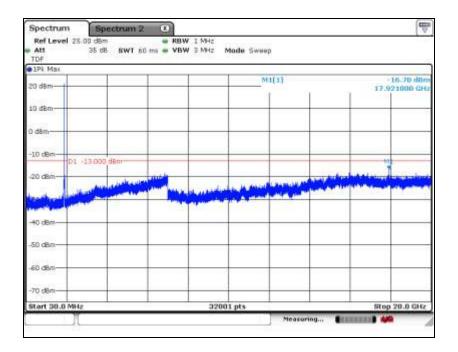


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 203 of 261

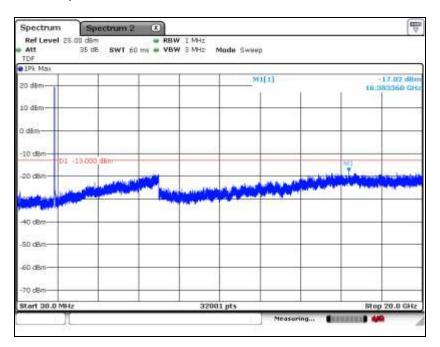




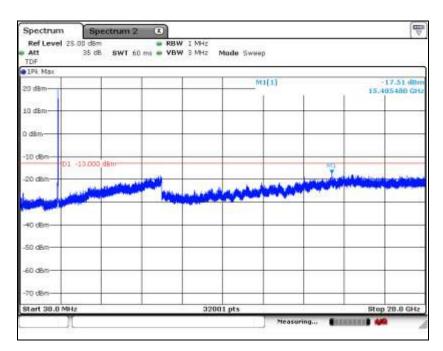
Report Number: F690501/RF-RTL010985-1 Page: 204 261 of

LTE Band 2 (20 版 - QPSK)

Low Channel

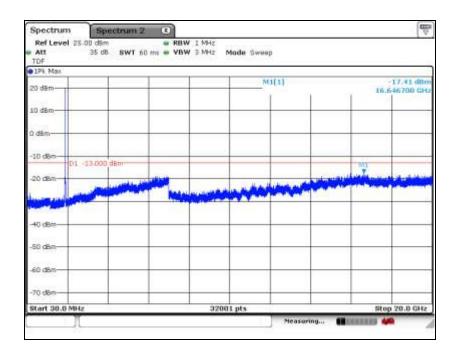


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 205 of 261

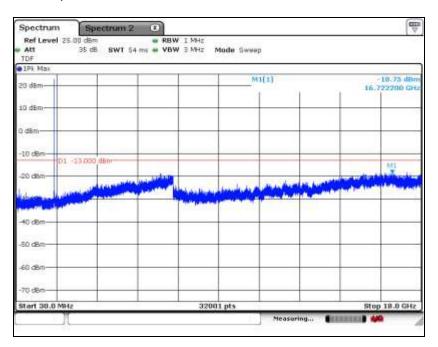




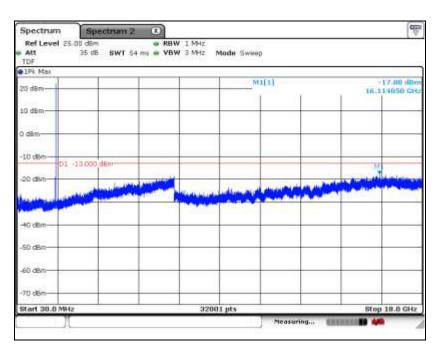
Report Number: F690501/RF-RTL010985-1 Page: 206 261 of

LTE Band 4 (5 Mb - QPSK)

Low Channel



Middle Channel

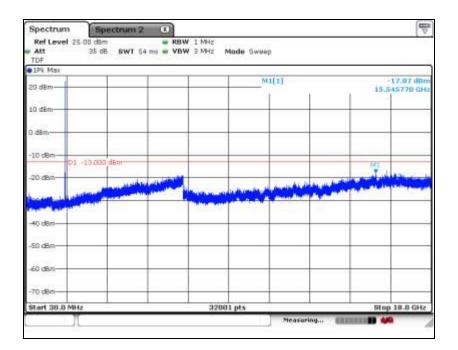


The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

RTT5041-20(2015.10.01)(3)



Report Number: F690501/RF-RTL010985-1 Page: 207 of 261

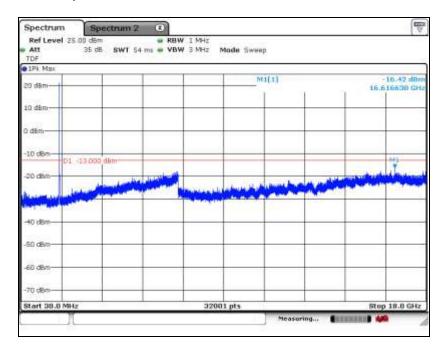




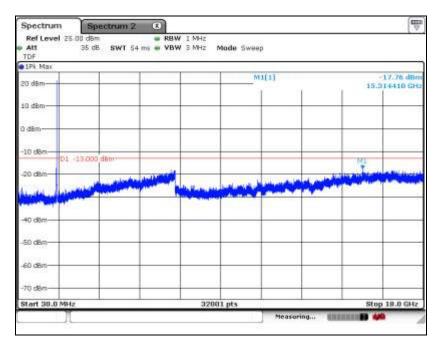
Report Number: F690501/RF-RTL010985-1 Page: 208 261 of

LTE Band 4 (10 版 - QPSK)

Low Channel

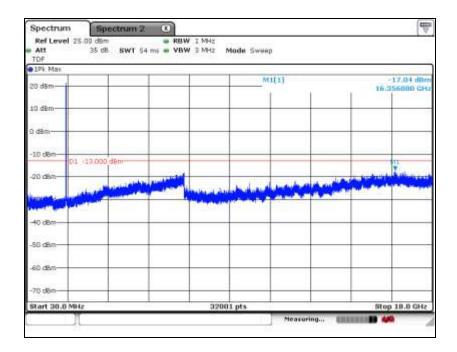


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 209 of 261

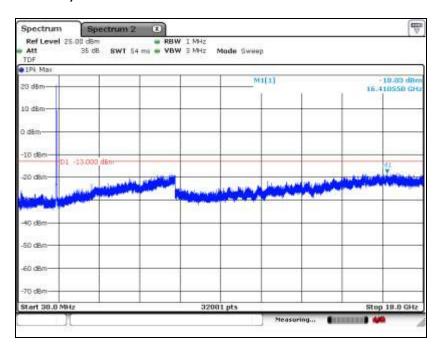




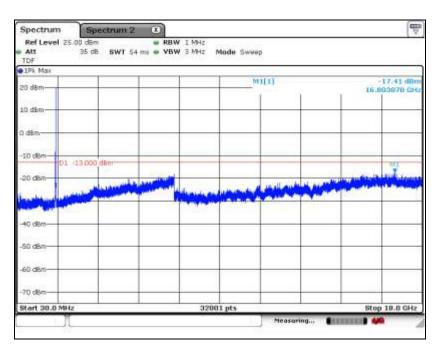
Report Number: F690501/RF-RTL010985-1 Page: 210 261 of

LTE Band 4 (15 上 QPSK)

Low Channel

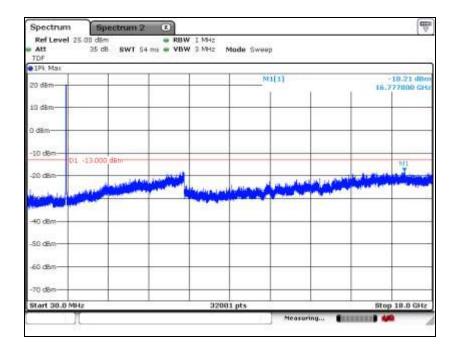


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 211 of 261

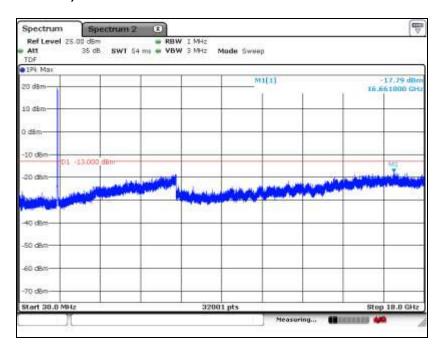




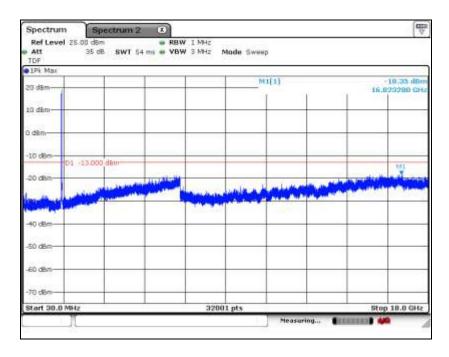
Report Number: F690501/RF-RTL010985-1 Page: 212 261 of

LTE Band 4 (20 版 - QPSK)

Low Channel

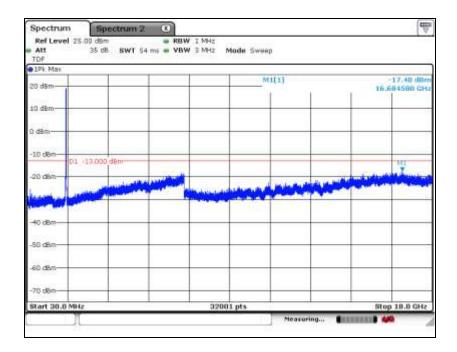


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 213 of 261

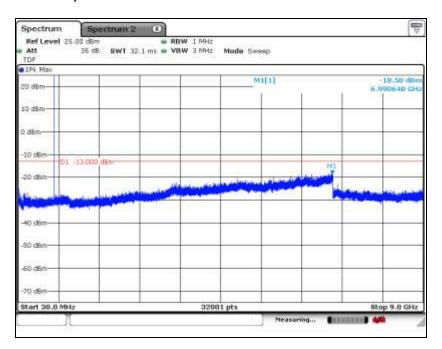




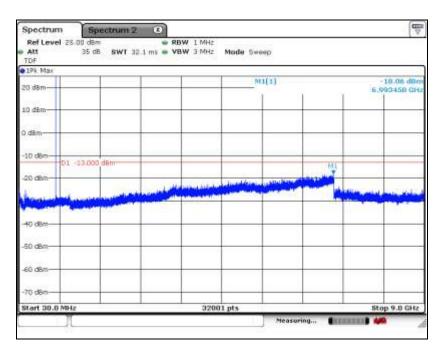
Report Number: F690501/RF-RTL010985-1 Page: 214 261 of

LTE Band 5 (1.4 胍 - QPSK)

Low Channel

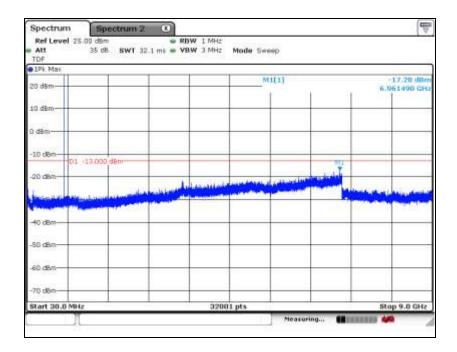


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 215 of 261

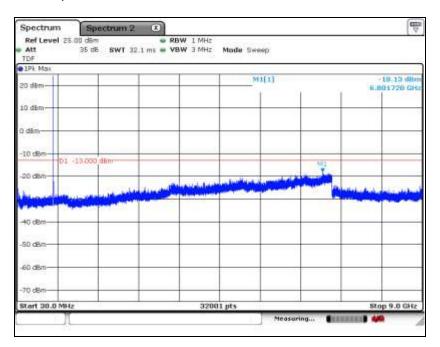




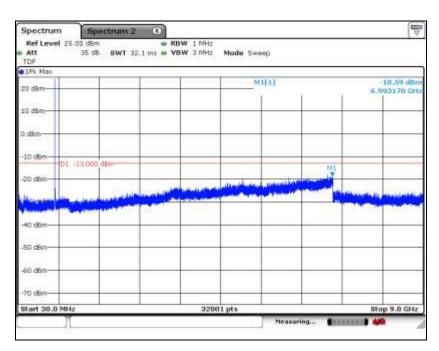
Report Number: F690501/RF-RTL010985-1 Page: 216 261 of

LTE Band 5 (3 Mb - QPSK)

Low Channel

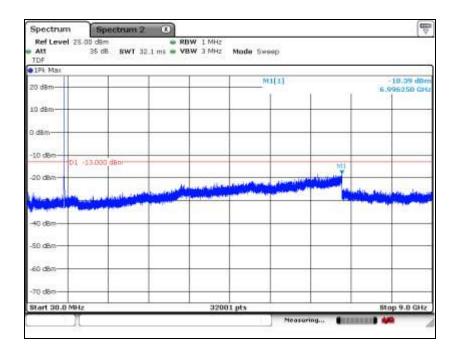


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 217 of 261

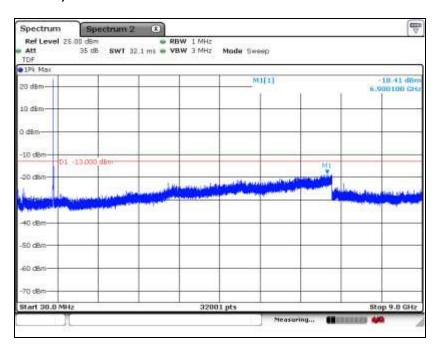




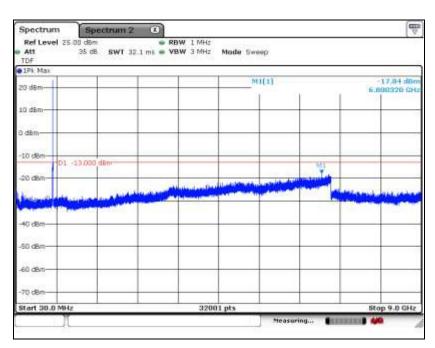
Report Number: F690501/RF-RTL010985-1 Page: 218 261 of

LTE Band 5 (5 Mb - QPSK)

Low Channel

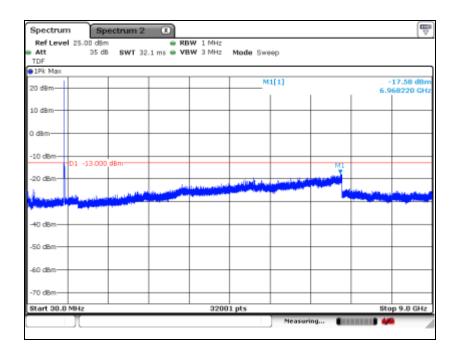


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 219 of 261

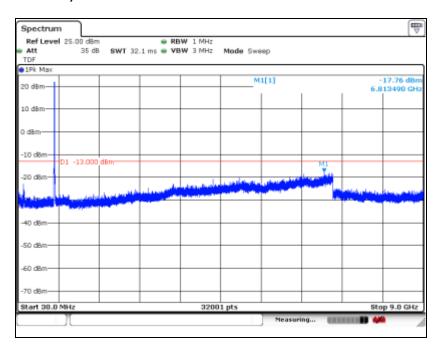




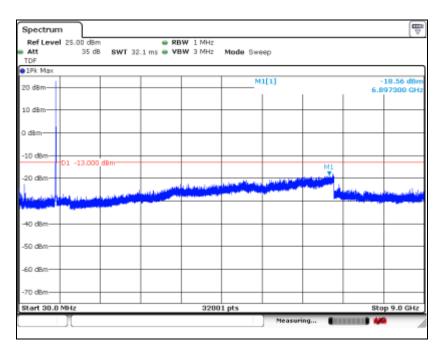
Report Number: F690501/RF-RTL010985-1 Page: 220 261 of

LTE Band 5 (10 版 - QPSK)

Low Channel

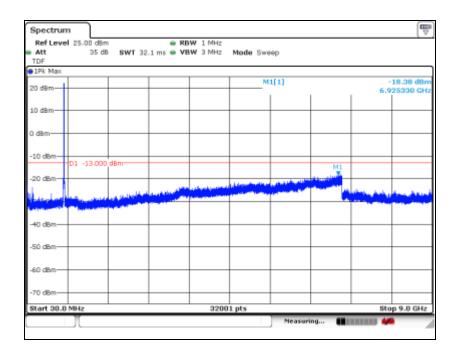


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 221 of 261

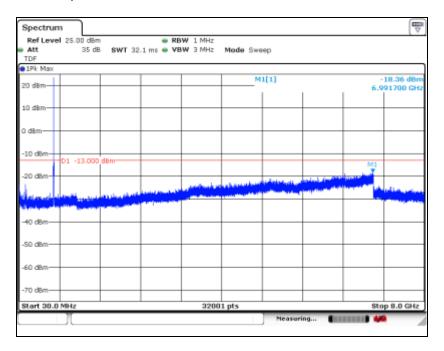




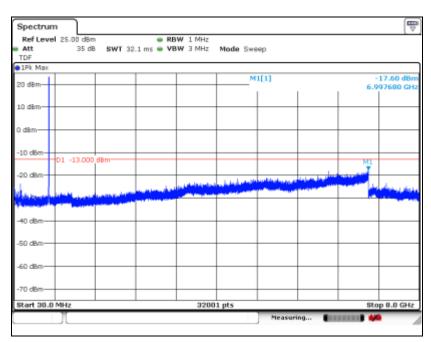
Report Number: F690501/RF-RTL010985-1 Page: 222 261 of

LTE Band 17 (5 版 - QPSK)

Low Channel

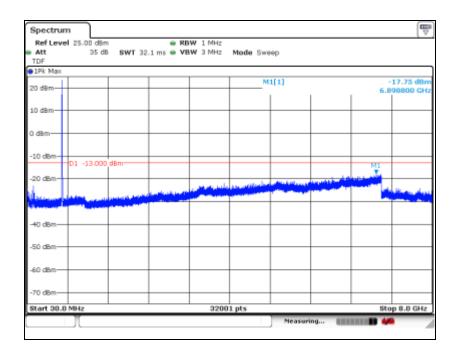


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 223 of 261

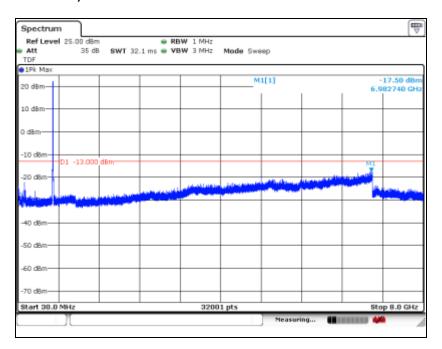




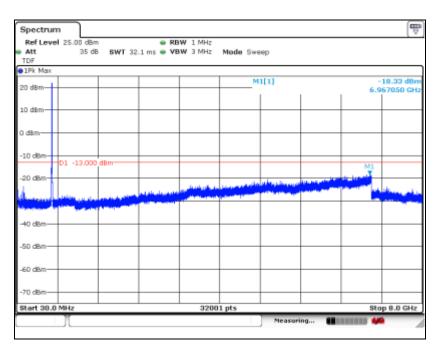
Report Number: F690501/RF-RTL010985-1 Page: 224 261 of

LTE Band 17 (10 Mb - QPSK)

Low Channel

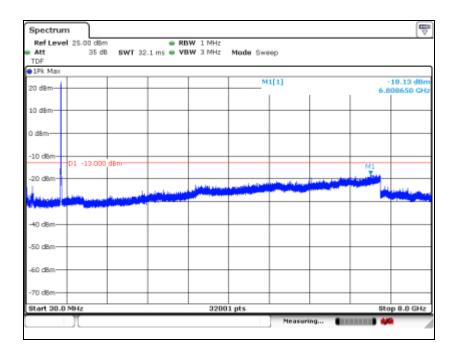


Middle Channel





Report Number: F690501/RF-RTL010985-1 Page: 225 of 261





Report Number: F690501/RF-RTL010985-1 Page: 226 of 261

7. Band Edge

7.1. Limit

FCC

- §22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
- §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
- §27.53(g), the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.
- §27.53(h)(1), for operations in the 1 695-1 710 Mb, 1 710-1 755 Mb, 1 755-1 780 Mb, 1 915-1 920 Mb, 1 995-2 000 Mb, 2 000-2 020 Mb, 2 110-2 155 Mb, 2 155-2 180 Mb, and 2 180-2 200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 \log_{10} (P) dB.

IC

- RSS-130 Issue 1

4.6.1, the power of any unwanted emissions in any 100 klb bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log₁₀ p (watts), dB. However, in the 100 klb band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 klb may be employed.

- RSS-132 Issue 3

- 5.5, Mobile and base station equipment shall comply with the limits in (i) and (ii) below.
- (i) In the first 1.0 Mb band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1 % of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log₁₀ p (watts).
- (ii) After the first 1.0 Mb immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dB W) by at least 43 + 10 log₁₀ p (watts). If the measurement is performed using 1 % of the occupied bandwidth, power integration over 100 klb is required.

- RSS-133 Issue 6

- 6.5, Equipment shall comply with the limits in (i) and (ii) below.
- (i) In the 1.0 Mb bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1 % of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 \log_{10} p(watts).
- (ii) After the first 1.0 Mb, the emission power in any 1 Mb bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log₁₀ p(watts). If the measurement is performed using 1 % of the emission bandwidth, power integration over 1.0 Mb is required.



Report Number: F690501/RF-RTL010985-1 Page: 227 of 261

- RSS-139 Issue 3

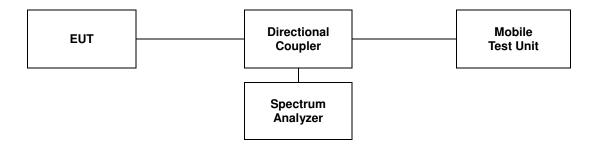
6.6, (i) In the first 1.0 Mb bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1 % of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + $10 \log_{10} p$ (watts) dB.

(ii) After the first 1.0 $\, \text{Mb} \,$ outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 $\, \text{Mb} \,$ bandwidth shall be attenuated below the transmitter output power P (in $\, \text{dB W}$) by at least 43 + 10 \log_{10} p (watts) $\, \text{dB} \,$.

7.2. Test Procedure

The test follows section 6.0 of FCC KDB 971168 D01 v02r02.

- 1. Span was set large enough so as to capture all out of band emissions near the band edge.
- 2. RBW ≥ 1 % of OBW
- 3. VBW \geq 3 x RBW.
- 4. Detector = RMS.
- 5. Trace mode = Trace average.
- 6. Sweep time = Auto.
- 7. The trace was allowed to stabilize.
- 8. All path loss of frequency range was investigated and compensated to spectrum analyzer as correction factor.





Report Number: F690501/RF-RTL010985-1 Page: 228 of 261

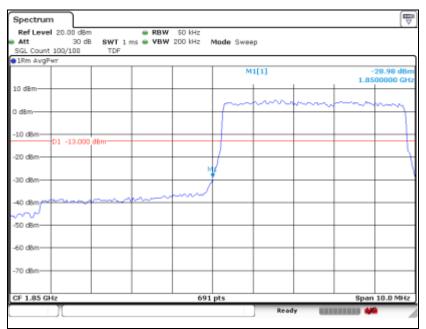
7.3. Test Results

Ambient temperature : (23 \pm 1) $^{\circ}$ C Relative humidity : 47 $^{\circ}$ R.H.

Please refer to the following plots.

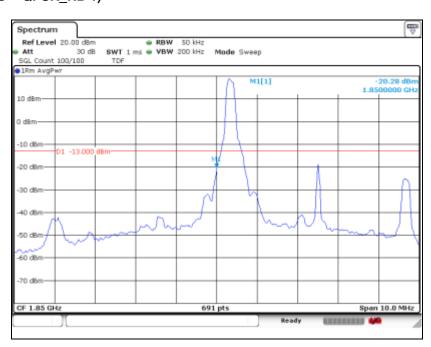
LTE Band 2 (5 Mb - QPSK_RB 25)

Low Channel



LTE Band 2 (5 Mb - QPSK_RB 1)

Low Channel

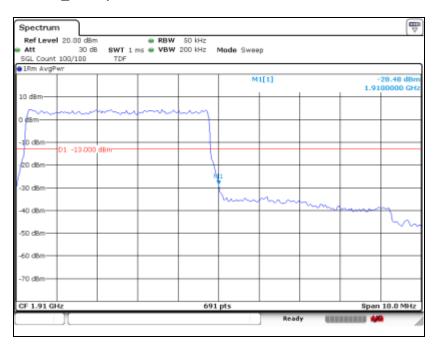




Report Number: F690501/RF-RTL010985-1 Page: 229 of 261

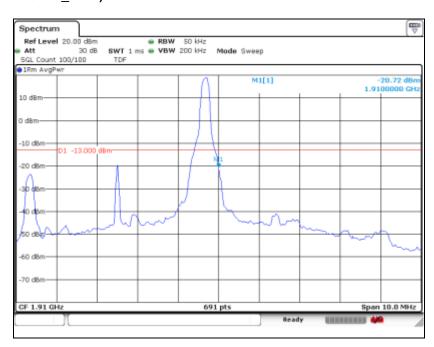
LTE Band 2 (5 版 - QPSK_RB 25)

High Channel



LTE Band 2 (5 Mb - QPSK_RB 1)

High Channel

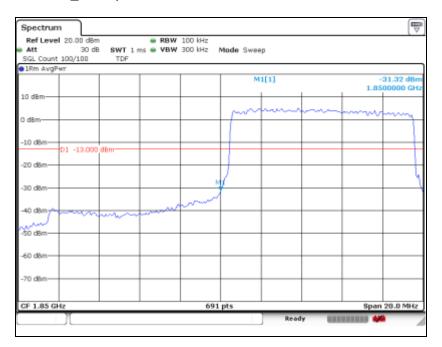




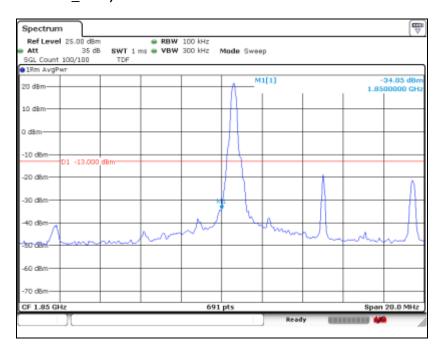
Report Number: F690501/RF-RTL010985-1 Page: 230 of 261

LTE Band 2 (10 Mb - QPSK_RB 50)

Low Channel



Low Channel

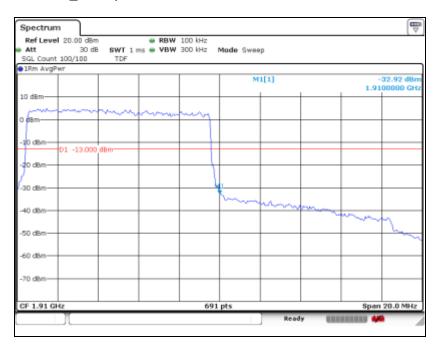




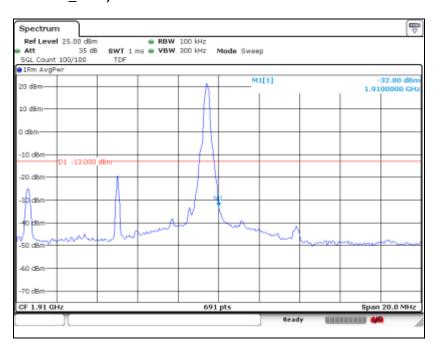
Report Number: F690501/RF-RTL010985-1 Page: 231 of 261

LTE Band 2 (10 № - QPSK_RB 50)

High Channel



High Channel

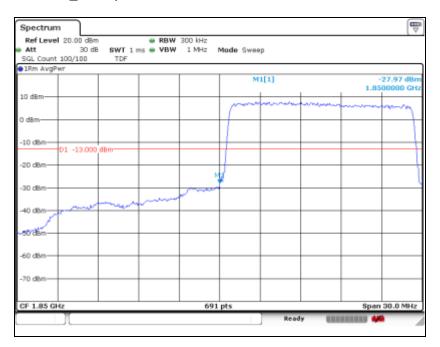




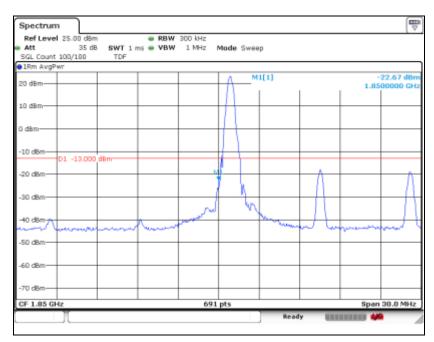
Report Number: F690501/RF-RTL010985-1 Page: 232 of 261

LTE Band 2 (15 № - QPSK_RB 75)

Low Channel



Low Channel





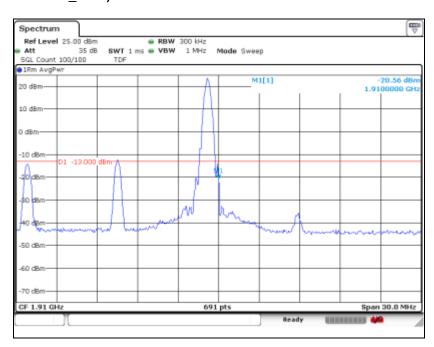
Report Number: F690501/RF-RTL010985-1 Page: 233 of 261

LTE Band 2 (15 № - QPSK_RB 75)

High Channel



High Channel

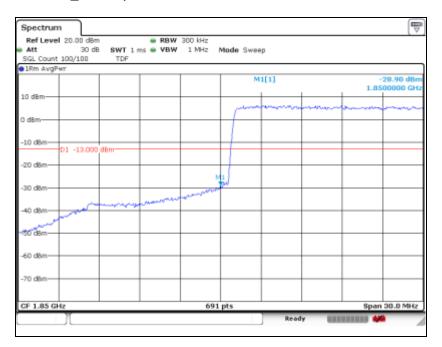




Report Number: F690501/RF-RTL010985-1 Page: 234 of 261

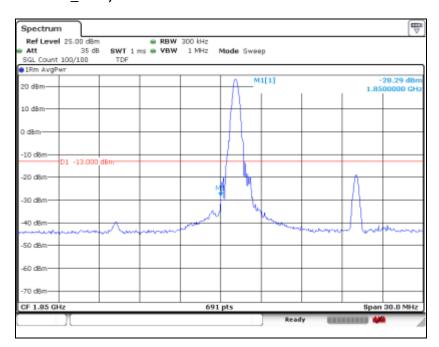
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Low Channel



LTE Band 2 (20 № - QPSK_RB 1)

Low Channel





Report Number: F690501/RF-RTL010985-1 Page: 235 of 261

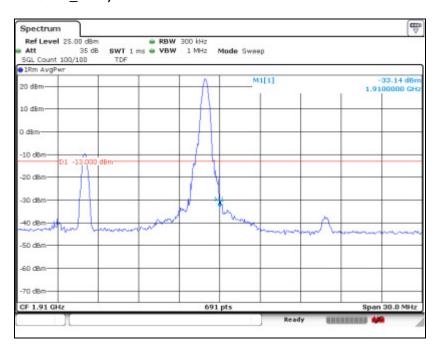
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High Channel



LTE Band 2 (20 № - QPSK_RB 1)

High Channel

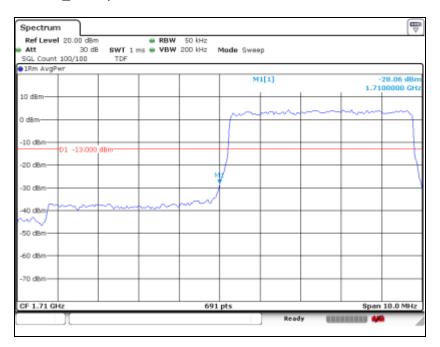




Report Number: F690501/RF-RTL010985-1 Page: 236 of 261

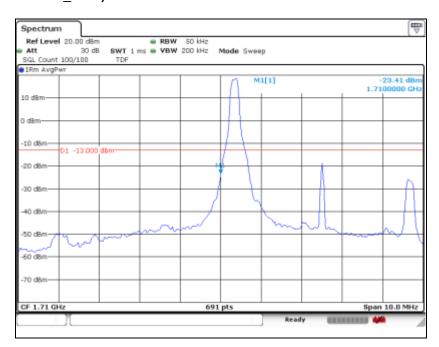
LTE Band 4 (5 Mb - QPSK_RB 25)

Low Channel



LTE Band 4 (5 Mb - QPSK_RB 1)

Low Channel

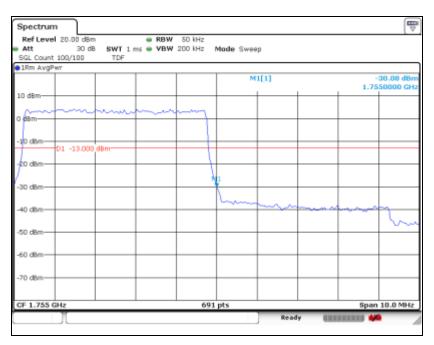




Report Number: F690501/RF-RTL010985-1 Page: 237 of 261

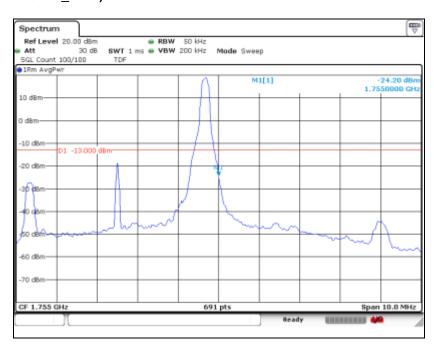
LTE Band 4 (5 Mb - QPSK_RB 25)

High Channel



LTE Band 4 (5 Mb - QPSK_RB 1)

High Channel

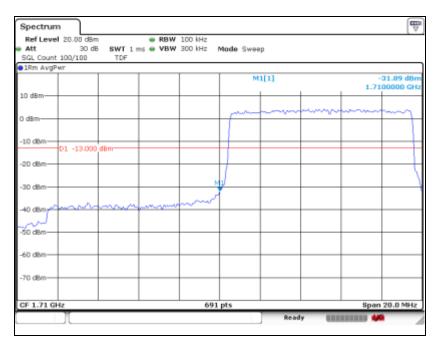




Report Number: F690501/RF-RTL010985-1 Page: 238 of 261

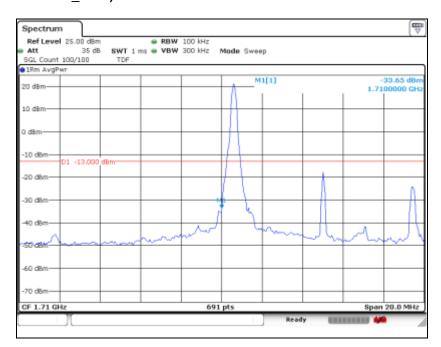
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Low Channel



LTE Band 4 (10 版 - QPSK_RB 1)

Low Channel





Report Number: F690501/RF-RTL010985-1 Page: 239 of 261

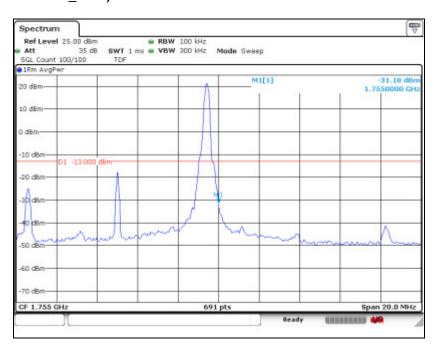
LTE Band 4 (10 № - QPSK_RB 50)

High Channel



LTE Band 4 (10 版 - QPSK_RB 1)

High Channel

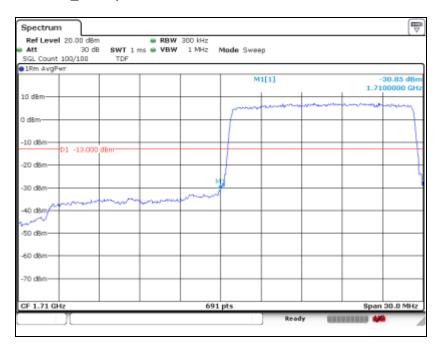




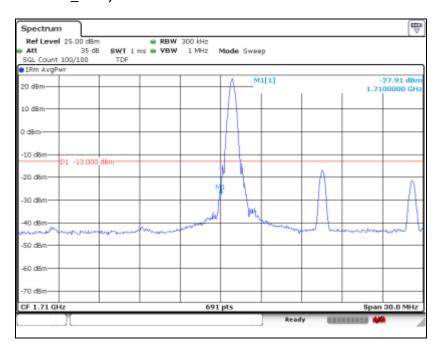
Report Number: F690501/RF-RTL010985-1 Page: 240 of 261

LTE Band 4 (15 Mb - QPSK_RB 75)

Low Channel



Low Channel

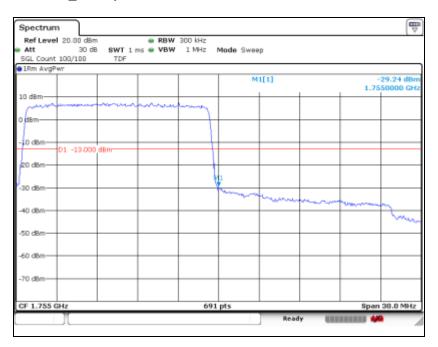




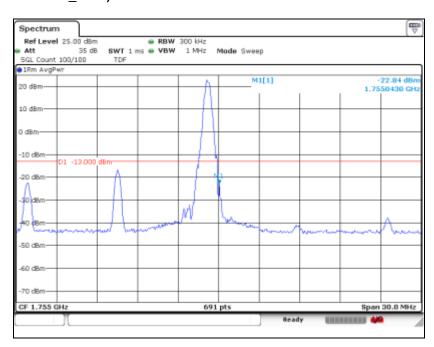
Report Number: F690501/RF-RTL010985-1 Page: 241 of 261

LTE Band 4 (15 № - QPSK_RB 75)

High Channel



High Channel

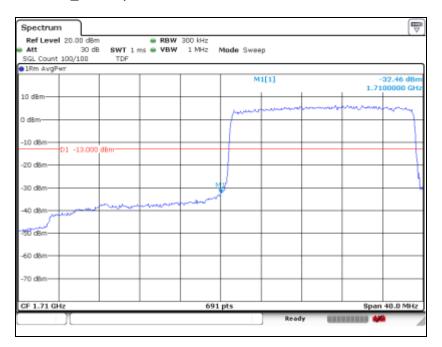




Report Number: F690501/RF-RTL010985-1 Page: 242 of 261

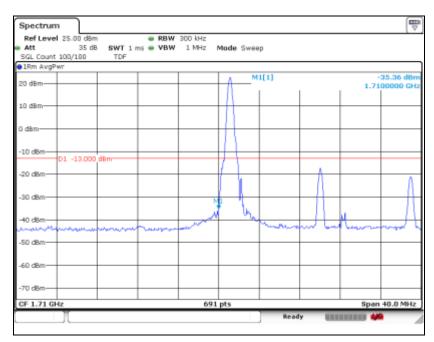
LTE Band 4 (20 № - QPSK_RB 100)

Low Channel



LTE Band 4 (20 № - QPSK_RB 1)

Low Channel

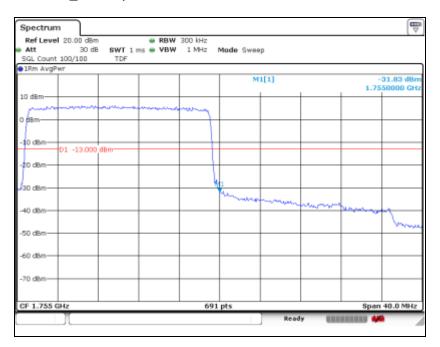




Report Number: F690501/RF-RTL010985-1 Page: 243 of 261

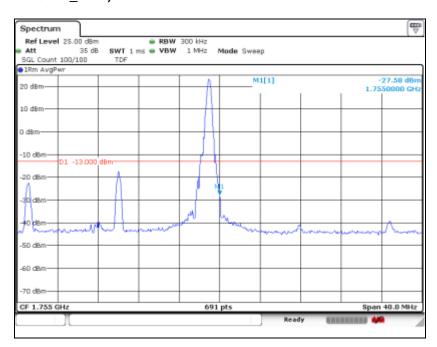
LTE Band 4 (20 № - QPSK_RB 100)

High Channel



LTE Band 4 (20 № - QPSK_RB 1)

High Channel





Report Number: F690501/RF-RTL010985-1 Page: 244 of 261

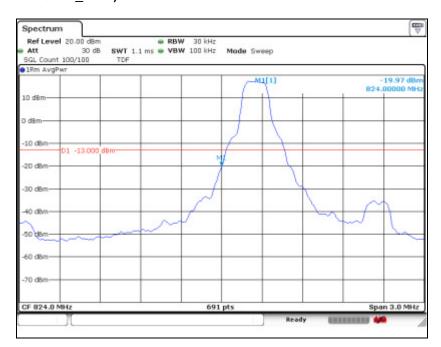
LTE Band 5 (1.4 № - QPSK_RB 6)

Low Channel



LTE Band 5 (1.4 Mb - QPSK_RB 1)

Low Channel

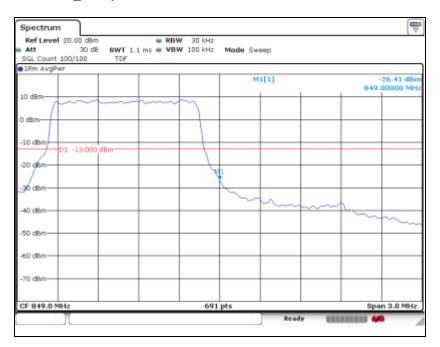




Report Number: F690501/RF-RTL010985-1 Page: 245 of 261

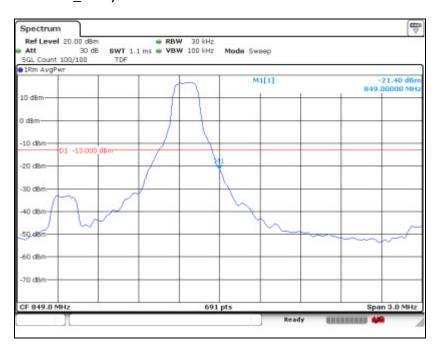
LTE Band 5 (1.4 № - QPSK_RB 6)

High Channel



LTE Band 5 (1.4 Mb - QPSK_RB 1)

High Channel

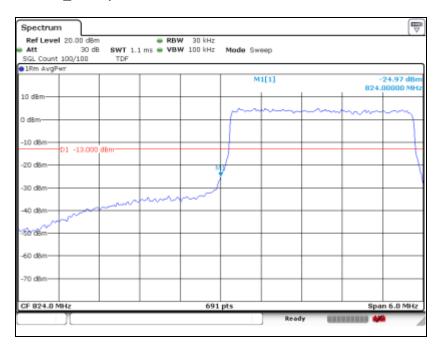




Report Number: F690501/RF-RTL010985-1 Page: 246 of 261

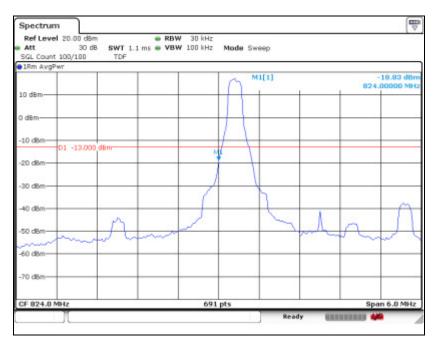
LTE Band 5 (3 Mb - QPSK_RB 15)

Low Channel



LTE Band 5 (3 № - QPSK_RB 1)

Low Channel

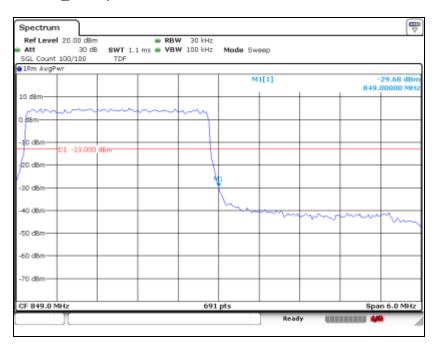




Report Number: F690501/RF-RTL010985-1 Page: 247 of 261

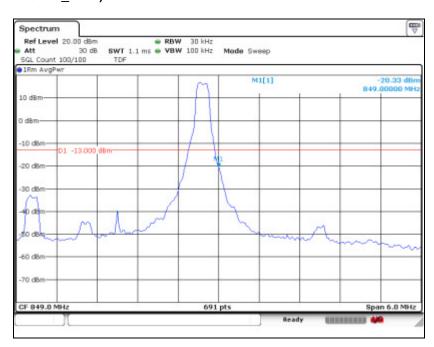
LTE Band 5 (3 Mb - QPSK_RB 15)

High Channel



LTE Band 5 (3 Mb - QPSK_RB 1)

High Channel

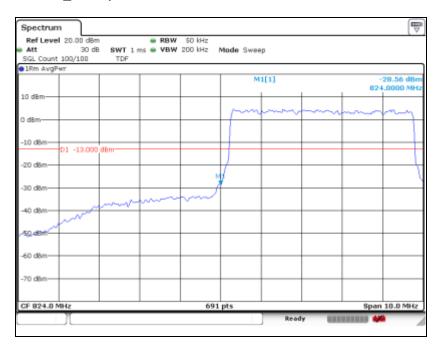




Report Number: F690501/RF-RTL010985-1 Page: 248 of 261

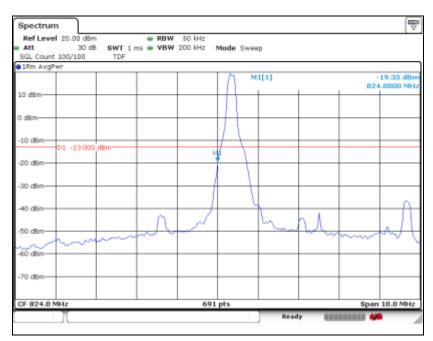
LTE Band 5 (5 Mb - QPSK_RB 25)

Low Channel



LTE Band 5 (5 Mb - QPSK_RB 1)

Low Channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

RTT5041-20(2015.10.01)(3)



Report Number: F690501/RF-RTL010985-1 Page: 249 of 261

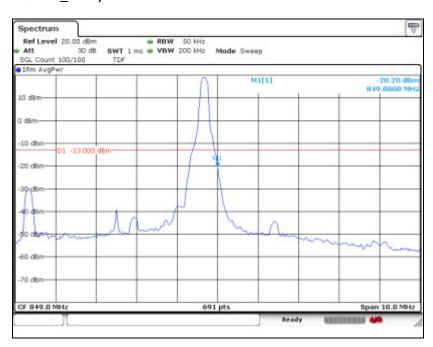
LTE Band 5 (5 Mb - QPSK_RB 25)

High Channel



LTE Band 5 (5 Mb - QPSK_RB 1)

High Channel

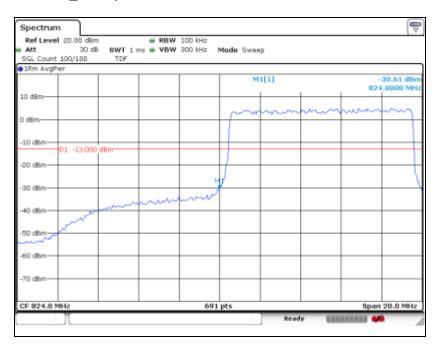




Report Number: F690501/RF-RTL010985-1 Page: 250 of 261

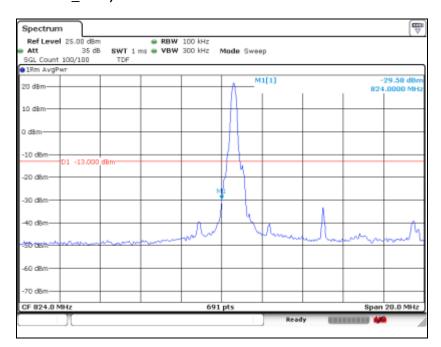
LTE Band 5 (10 Mb - QPSK_RB 50)

Low Channel



LTE Band 5 (10 版 - QPSK_RB 1)

Low Channel

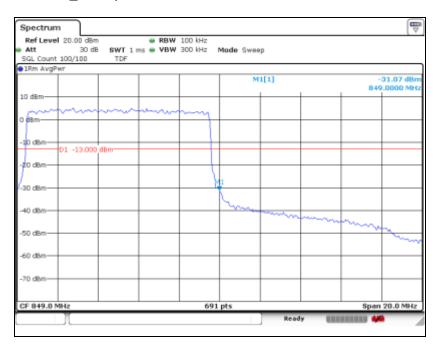




Report Number: F690501/RF-RTL010985-1 Page: 251 of 261

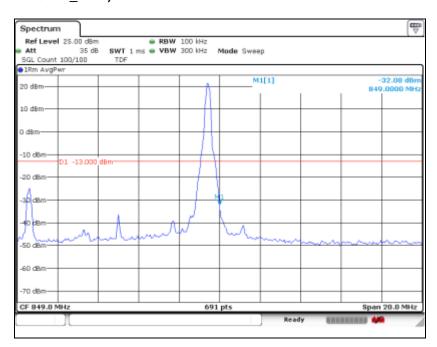
LTE Band 5 (10 № - QPSK_RB 50)

High Channel



LTE Band 5 (10 版 - QPSK_RB 1)

High Channel

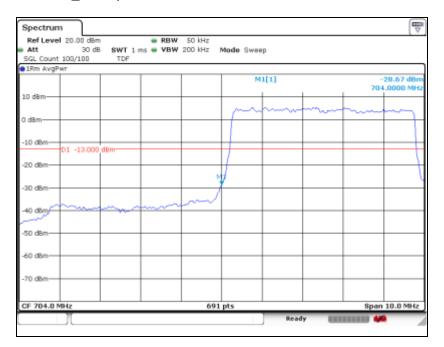




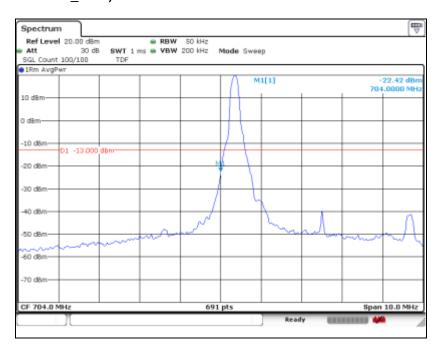
Report Number: F690501/RF-RTL010985-1 Page: 252 of 261

LTE Band 17 (5 № - QPSK_RB 25)

Low Channel



Low Channel

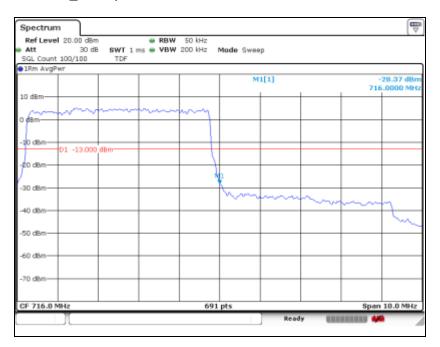




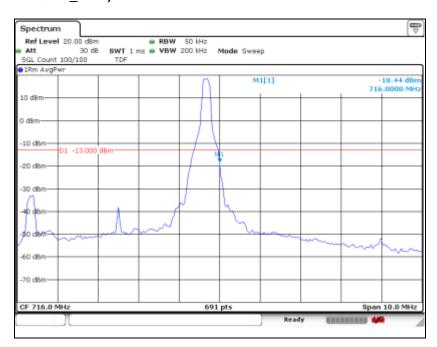
Report Number: F690501/RF-RTL010985-1 Page: 253 of 261

LTE Band 17 (5 № - QPSK_RB 25)

High Channel



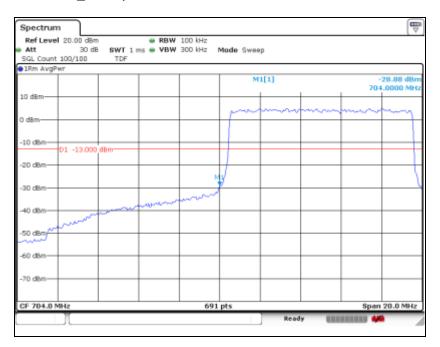
High Channel





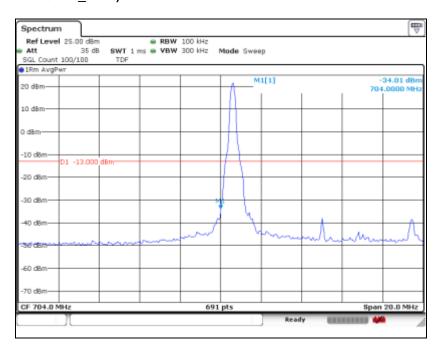
Report Number: F690501/RF-RTL010985-1 Page: 254 of 261

Low Channel



LTE Band 17 (10 版 - QPSK_RB 1)

Low Channel

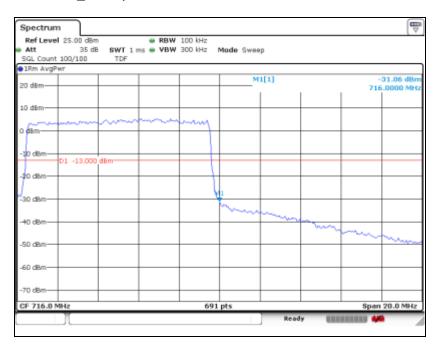




Report Number: F690501/RF-RTL010985-1 Page: 255 of 261

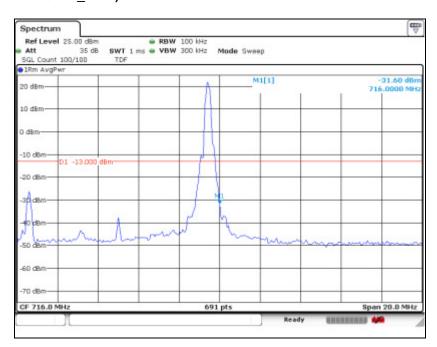
LTE Band 17 (10 Mb - QPSK_RB 50)

High Channel



LTE Band 17 (10 版 - QPSK_RB 1)

High Channel





Report Number: F690501/RF-RTL010985-1 Page: 256 of 261

8. Frequency Stability

8.1. Limit

FCC

- § 2.1055 (a), § 2.1055 (d) & following:
- §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table of this section.

For Mobile devices operating in the 824 to 849 Mb band at a power level less than or equal to 3 Watts, the limit specified in Table C-1 is +/- 2.5 ppm.

- §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
- §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

IC

- RSS-132 Issue 3

- 4.3, the transmitter frequency stability limit shall be determined as follows:
- (a) The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;
- (b) Using a resolution bandwidth of 1 % of the occupied bandwidth, a reference point at the unwanted emission level which complies with the attenuation of 43 + 10 log₁₀ p (watts) on the emission mask of the lowest and highest channel shall be selected, and the frequency at these points shall be recorded as f₁ and f_H respectively.

The applicant shall ensure frequency stability by showing that f₁ minus the frequency offset and f_H plus the frequency offset shall be within the frequency range in which the equipment is designed to operate.

- RSS-132 Issue 3

5.3, The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations and ±1.5 ppm for base stations.

- RSS-133 Issue 6

6.3, the carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.

- RSS-139 Issue 3

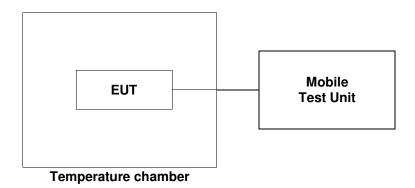
6.4, the frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.



Report Number: F690501/RF-RTL010985-1 Page: 257 of 261

8.2. Test Procedure

- 1. Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Mobile Test Unit via feed-through attenuators.
- 2. The EUT was placed inside the temperature chamber.
- 3. After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from Mobile Test Unit.





Report Number: F690501/RF-RTL010985-1 Page: 258 261 of

8.3. Test Results

Ambient temperature : (23 ± 1) °C Relative humidity % R.H. : 47

LTE Band 2 at middle channel

Reference Frequency: 1 880.0 Mb

Frequency Stability versus Temperature

Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
70		5	0.002 7
60		-1	-0.000 5
50		-2	-0.001 1
40	4	3	0.001 6
30		1	0.000 5
23		-4	-0.002 1
10		-5	-0.002 7
0		-8	-0.004 3
-10		7	0.003 7
-20		4	0.002 1
-30		6	0.003 2

Frequency Stability versus Power Supply

Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	4.6	-3	-0.001 6
	3.4	5	0.002 7



Report Number: F690501/RF-RTL010985-1 Page: 259 of 261

LTE Band 4 at middle channel

Reference Frequency: 1 732.5 №

Frequency Stability versus Temperature

Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
70		2	0.001 2
60		-3	-0.001 7
50		1	0.000 6
40		4	0.002 3
30		5	0.002 9
23	4	6	0.003 5
10		-5	-0.002 9
0		-4	-0.002 3
-10		-3	-0.001 7
-20		5	0.002 9
-30		4	0.002 3

Frequency Stability versus Power Supply

Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	4.6	1	0.000 6
	3.4	7	0.004 0



Report Number: F690501/RF-RTL010985-1 Page: 260 of 261

LTE Band 5 at middle channel

Reference Frequency: 836.5 Mb

Frequency Stability versus Temperature

Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
70		4	0.004 8
60		6	0.007 2
50		-2	-0.002 4
40	4	-4	-0.004 8
30		5	0.006 0
23		-2	-0.002 4
10		-3	-0.003 6
0		4	0.004 8
-10		5	0.006 0
-20		8	0.009 6
-30		-2	-0.002 4

Frequency Stability versus Power Supply

Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	4.6	2	0.002 4
	3.4	-5	-0.006 0



Report Number: F690501/RF-RTL010985-1 Page: 261 of 261

LTE Band 17 at middle channel

Reference	Frequency:	710.0	MHz.
neielelice	rieduelicv.	7 10.0	MILE

Frequency Stability versus Temperature

Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
70		6	0.008 5
60		1	0.001 4
50		-8	-0.011 3
40		-4	-0.005 6
30		-5	-0.007 0
23	4	5	0.007 0
10		6	0.008 5
0		7	0.009 9
-10		2	0.002 8
-20		-4	-0.005 6
-30		-3	-0.004 2

Frequency Stability versus Power Supply

Environment Temperature (℃)	Power Supplied (V _{dc})	Frequency Measure with Time Elapse	
		Frequency Error (Hz)	ppm
23	4.6	-3	-0.004 2
	3.4	-5	-0.007 0

- End of the Test Report -