



FCC RF Test Report

APPLICANT : Getac Technology Corporation.
EQUIPMENT : WWAN module
BRAND NAME : Getac
MODEL NAME : EM7455
FCC ID : QYLEM7455RC
STANDARD : 47 CFR Part 2, 22(H), 24(E), 27
CLASSIFICATION : PCS Licensed Transmitter (PCB)

This is a partial report. The product was received on Jun. 06, 2017 and completely tested on Jan. 26, 2018. We, SPORTON INTERNATIONAL Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and the testing has shown the tested sample to be in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG391803-39B	Rev. 01	Initial issue of report	Feb. 06, 2018



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(f) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 25) (Band 26)	< 43+10log10(P[Watts])	
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7) (Band 41)	< 55+10log ₁₀ (P[Watts])	
Remark: Except radiated spurious emission is carrying out, FG391803-39B report reuses conducted output power test data from the FG391803-20B report. For other test data please refer to Sierra Report No.: B15W50341-FCC-RF_Rev1 for WWAN module (Model: EM7455).				

1 General Description

1.1 Applicant

Getac Technology Corporation.

5F., Building A, No. 209, Sec.1, Nangang Rd., Nangang Dist., Taipei City 11568, Taiwan, R.O.C.

1.2 Product Feature of Equipment Under Test

WCDMA/LTE

Product Specification subjective to this standard	
Antenna Type	WWAN: PIFA Antenna

The product was installed into Tablet (Brand Name: Getac, Model Name: RC11) during test, and all tests were performed with Sample 2.

Sample 1	Tablet with SKU A
Sample 2	Tablet with SKU B

SKU Table		
RC11 SKU		
	SKU A	SKU B
CPU	i3-7100U	i3-7100U
DDR	8G	8G
SSD	64GB	256GB
Panel	AUO HD B116XAN05.0	AUO HD B116XAN05.0
Digitizer	Getac	Not Support
Option Bay	BCR	NA(MSR)
Expansion Bay	RFID	NA
WLAN/BT	Support	Support
WWAN	Support	Support
GPS	Support	Support
Webcam FHD	Support	Support
IR Webcam	Support	Support
RFID	Support	Not Support

1.3 Modification of EUT

No modifications are made to the EUT during all test items.

1.4 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No.
	TH03-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No.
	03CH11-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22(H), 24(E), 27
- ANSI / TIA-603-E
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

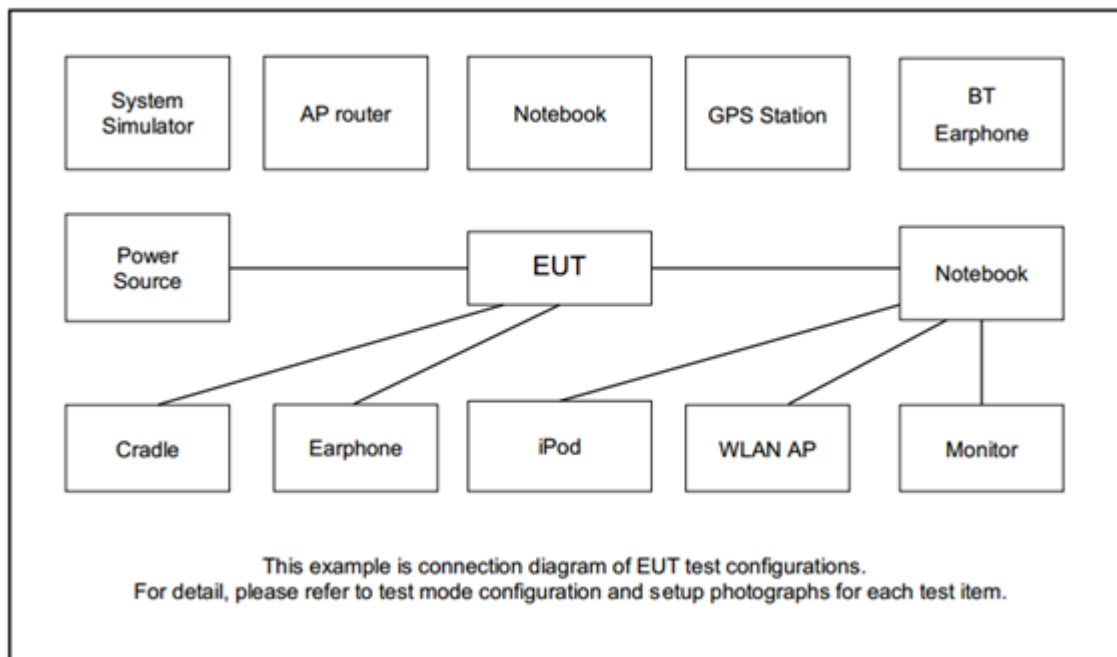
Antenna port conducted and radiated test items listed below are performed according to KDB 971168

D01 Power Meas. License Digital Systems v03 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v	-	-	v	v	v	v	v	v	v	v
	7	-	-	v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v	v	v	v
	25	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	26	v	v	v	v	v	-	v	v	v	v	v	v	v	v
	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	12	Worse Case												v	
Note	1. The mark “v” means that this configuration is chosen for testing 2. The mark “-” means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.														

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	iPod Earphone	Apple	N/A	Verification	N/A	N/A

2.4 Frequency List of Low/Middle/High Channels

LTE Band 12 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	23095	-
	Frequency	-	707.5	-

3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 Conducted Output Power



3.3 Test Result of Conducted Test

Please refer to Appendix A.



3.4 Conducted Output Power

3.4.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.4.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
 2. Set EUT at maximum power through the system simulator.
 3. Select lowest, middle, and highest channels for each band and different modulation.
- Measure and record the power level from the system simulator.

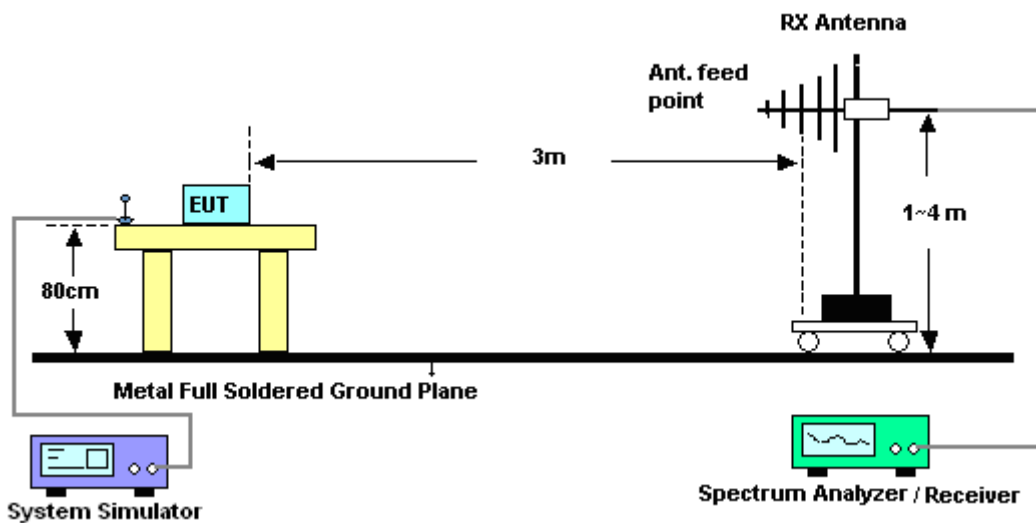
4 Radiated Test Items

4.1 Measuring Instruments

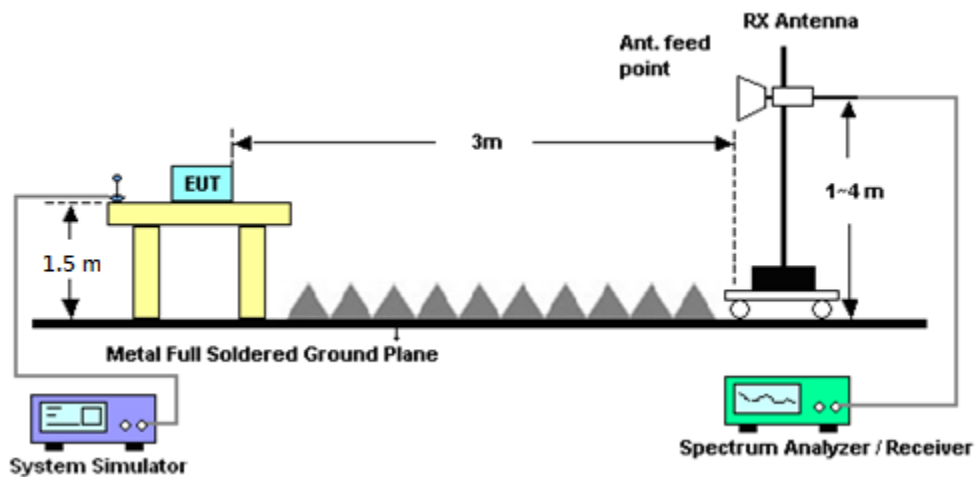
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.



4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For LTE Band 12

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

The testing follows ANSI C63.26 Section 5.8 Measurement of spurious emissions using substitution method.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Base Station	Anritsu	MT8820C	6201381760	-	May 17, 2017	Jun. 06, 2017	May 16, 2018	Conducted (TH03-HY)
Base Station	Anritsu	E5515C	MY50266977	-	May 30, 2017	Jun. 06, 2017	May 29, 2018	Conducted (TH03-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Jan. 25, 2018~Jan. 26, 2018	Jul. 17, 2018	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 10, 2016	Jan. 25, 2018~Jan. 26, 2018	Nov. 09, 2018	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-06	35414&AT-N0602	30MHz~1GHz	Oct. 14, 2017	Jan. 25, 2018~Jan. 26, 2018	Oct. 13, 2018	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Oct. 16, 2017	Jan. 25, 2018~Jan. 26, 2018	Oct. 15, 2018	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1GHz ~ 18GHz	Mar. 17, 2017	Jan. 25, 2018~Jan. 26, 2018	Mar. 16, 2018	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Jan. 25, 2018~Jan. 26, 2018	Nov. 22, 2019	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY53270080	1GHz~26.5GHz	Nov. 10, 2016	Jan. 25, 2018~Jan. 26, 2018	Nov. 09, 2018	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz ~ 44GHz	Oct. 19, 2017	Jan. 25, 2018~Jan. 26, 2018	Oct. 18, 2018	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-1080-1200-1500-60SS	SN2	1.2G High Pass	Sep. 18, 2017	Jan. 25, 2018~Jan. 26, 2018	Sep. 17, 2018	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jan. 25, 2018~Jan. 26, 2018	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Jan. 25, 2018~Jan. 26, 2018	N/A	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY57290111	3Hz~26.5GHz	Nov. 02, 2017	Jan. 25, 2018~Jan. 26, 2018	Nov. 01, 2018	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz- 40GHz	Apr. 27, 2017	Jan. 25, 2018~Jan. 26, 2018	Apr. 26, 2018	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Jan. 25, 2018~Jan. 26, 2018	Nov. 26, 2018	Radiation (03CH11-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	1GHz~18GHz	May 22, 2017	Jan. 25, 2018~Jan. 26, 2018	May 21, 2018	Radiation (03CH11-HY)



6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.37
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.67
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.03
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.97	22.84	22.91
20	1	49		22.61	22.72	22.63
20	1	99		22.64	22.57	22.48
20	50	0		21.79	21.77	21.73
20	50	24		21.67	21.78	21.73
20	50	50		21.68	21.71	21.60
20	100	0		21.73	21.70	21.65
20	1	0	16-QAM	22.13	22.06	22.10
20	1	49		21.93	21.91	21.81
20	1	99		21.86	21.74	21.80
20	50	0		20.63	20.72	20.75
20	50	24		20.66	20.82	20.71
20	50	50		20.61	20.69	20.60
20	100	0		20.72	20.76	20.70
15	1	0	QPSK	22.85	22.78	22.69
15	1	37		22.54	22.72	22.46
15	1	74		22.65	22.75	22.58
15	36	0		21.77	21.75	21.68
15	36	20		21.72	21.83	21.73
15	36	39		21.63	21.77	21.69
15	75	0		21.77	21.78	21.71
15	1	0	16-QAM	22.02	22.11	21.91
15	1	37		21.98	22.06	21.87
15	1	74		21.84	21.99	21.87
15	36	0		20.74	20.70	20.60
15	36	20		20.60	20.77	20.66
15	36	39		20.57	20.75	20.65
15	75	0		20.73	20.78	20.71



LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.89	22.94	22.86
10	1	25		22.91	22.93	22.63
10	1	49		22.92	22.80	22.71
10	25	0		21.76	21.87	21.71
10	25	12		21.80	21.86	21.74
10	25	25		21.73	21.88	21.58
10	50	0		21.80	21.81	21.65
10	1	0	16-QAM	22.25	22.09	22.08
10	1	25		22.12	22.12	21.84
10	1	49		21.98	22.13	21.94
10	25	0		20.76	20.83	20.69
10	25	12		20.75	20.87	20.73
10	25	25		20.73	20.83	20.56
10	50	0		20.79	20.82	20.61
5	1	0	QPSK	22.88	22.94	22.71
5	1	12		22.85	22.85	22.93
5	1	24		22.81	22.81	22.73
5	12	0		21.80	21.82	21.63
5	12	7		21.85	21.91	21.68
5	12	13		21.85	21.78	21.66
5	25	0		21.81	21.91	21.55
5	1	0	16-QAM	22.22	22.26	22.07
5	1	12		22.42	22.42	21.99
5	1	24		22.02	22.03	21.95
5	12	0		20.82	20.84	20.48
5	12	7		20.78	20.91	20.58
5	12	13		20.81	20.77	20.52
5	25	0		20.81	20.85	20.53



LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.87	22.93	22.52
3	1	8		22.81	22.86	22.64
3	1	14		22.78	22.77	22.69
3	8	0		21.78	21.86	21.57
3	8	4		21.81	21.82	21.64
3	8	7		21.77	21.79	21.62
3	15	0		21.81	21.81	21.61
3	1	0	16-QAM	21.89	22.06	21.78
3	1	8		22.05	22.21	21.92
3	1	14		22.09	21.97	21.97
3	8	0		20.78	20.89	20.58
3	8	4		20.84	20.86	20.64
3	8	7		20.84	20.84	20.65
3	15	0		20.78	20.80	20.55
1.4	1	0	QPSK	22.85	22.91	22.61
1.4	1	3		22.91	22.96	22.73
1.4	1	5		22.88	22.82	22.67
1.4	3	0		22.74	22.76	22.54
1.4	3	1		22.79	22.92	22.70
1.4	3	3		22.73	22.80	22.60
1.4	6	0		21.78	21.80	21.60
1.4	1	0	16-QAM	22.16	22.18	21.99
1.4	1	3		22.13	22.21	22.06
1.4	1	5		22.16	22.09	21.93
1.4	3	0		21.74	21.74	21.55
1.4	3	1		21.75	21.78	21.59
1.4	3	3		21.91	21.86	21.61
1.4	6	0		20.82	20.86	20.65



LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	23.11	23.02	22.92
20	1	49		22.76	22.78	22.61
20	1	99		22.74	22.66	22.65
20	50	0		21.88	21.80	21.70
20	50	24		21.78	21.83	21.69
20	50	50		21.70	21.72	21.62
20	100	0		21.82	21.80	21.68
20	1	0	16-QAM	22.10	22.21	21.99
20	1	49		22.18	22.20	21.91
20	1	99		22.09	21.89	21.77
20	50	0		20.72	20.78	20.64
20	50	24		20.71	20.77	20.65
20	50	50		20.67	20.69	20.63
20	100	0		20.80	20.79	20.70
15	1	0	QPSK	22.81	22.83	22.72
15	1	37		22.57	23.04	22.82
15	1	74		22.70	22.67	22.70
15	36	0		21.77	21.78	21.62
15	36	20		21.82	21.86	21.63
15	36	39		21.73	21.82	21.62
15	75	0		21.76	21.85	21.73
15	1	0	16-QAM	22.11	22.02	22.18
15	1	37		22.01	22.30	21.94
15	1	74		22.01	22.01	21.87
15	36	0		20.76	20.70	20.68
15	36	20		20.79	20.81	20.59
15	36	39		20.69	20.79	20.57
15	75	0		20.81	20.77	20.75



LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.99	22.88	22.82
10	1	25		23.02	23.03	22.81
10	1	49		22.79	22.79	22.63
10	25	0		21.77	21.81	21.61
10	25	12		21.74	21.79	21.69
10	25	25		21.79	21.83	21.68
10	50	0		21.77	21.84	21.69
10	1	0	16-QAM	22.29	22.24	22.11
10	1	25		22.09	22.10	21.89
10	1	49		22.02	22.02	21.85
10	25	0		20.78	20.78	20.57
10	25	12		20.75	20.78	20.68
10	25	25		20.80	20.83	20.65
10	50	0		20.72	20.80	20.69
5	1	0	QPSK	22.90	22.97	22.76
5	1	12		22.95	22.86	22.84
5	1	24		22.83	22.96	22.64
5	12	0		21.78	21.71	21.72
5	12	7		21.87	21.89	21.79
5	12	13		21.71	21.80	21.72
5	25	0		21.82	21.85	21.70
5	1	0	16-QAM	22.15	22.11	21.97
5	1	12		22.07	22.05	22.10
5	1	24		22.18	22.31	21.96
5	12	0		20.89	20.78	20.76
5	12	7		20.90	20.92	20.80
5	12	13		20.79	20.88	20.75
5	25	0		20.85	20.83	20.71



LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.72	22.90	22.67
3	1	8		22.68	23.06	22.65
3	1	14		22.73	22.87	22.58
3	8	0		21.77	21.86	21.67
3	8	4		21.83	21.85	21.64
3	8	7		21.70	21.91	21.63
3	15	0		21.74	21.83	21.64
3	1	0	16-QAM	21.91	22.19	21.97
3	1	8		22.05	22.34	21.92
3	1	14		22.20	22.16	21.94
3	8	0		20.78	20.89	20.66
3	8	4		20.94	20.96	20.66
3	8	7		20.71	20.89	20.70
3	15	0		20.74	20.79	20.63
1.4	1	0	QPSK	22.91	22.78	22.71
1.4	1	3		22.71	22.85	22.68
1.4	1	5		22.82	22.80	22.55
1.4	3	0		22.73	22.99	22.60
1.4	3	1		22.80	22.77	22.59
1.4	3	3		22.72	22.95	22.61
1.4	6	0		21.74	21.74	21.55
1.4	1	0	16-QAM	22.12	22.34	22.02
1.4	1	3		21.97	22.13	22.11
1.4	1	5		22.04	22.09	22.00
1.4	3	0		21.71	21.91	21.60
1.4	3	1		21.86	21.83	21.56
1.4	3	3		21.70	21.80	21.53
1.4	6	0		20.87	20.81	20.70



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.95	22.81	22.84
20	1	49		22.65	22.71	22.73
20	1	99		22.56	22.57	22.67
20	50	0		21.77	21.68	21.72
20	50	24		21.76	21.75	21.74
20	50	50		21.68	21.64	21.69
20	100	0		21.72	21.70	21.68
20	1	0	16-QAM	22.06	21.98	21.98
20	1	49		22.04	22.12	22.00
20	1	99		21.74	21.84	22.03
20	50	0		20.70	20.69	20.66
20	50	24		20.74	20.76	20.85
20	50	50		20.68	20.63	20.79
20	100	0		20.70	20.69	20.74
15	1	0	QPSK	22.91	22.78	22.77
15	1	37		22.74	22.67	22.76
15	1	74		22.62	22.70	22.73
15	36	0		21.71	21.78	21.81
15	36	20		21.71	21.77	21.85
15	36	39		21.67	21.68	21.75
15	75	0		21.63	21.77	21.78
15	1	0	16-QAM	22.14	22.03	22.06
15	1	37		22.02	21.87	22.04
15	1	74		21.93	22.01	22.12
15	36	0		20.73	20.69	20.75
15	36	20		20.72	20.72	20.77
15	36	39		20.66	20.71	20.73
15	75	0		20.72	20.76	20.75



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.93	22.84	22.85
10	1	25		22.94	22.90	22.88
10	1	49		22.86	22.80	22.85
10	25	0		21.83	21.81	21.64
10	25	12		21.81	21.83	21.72
10	25	25		21.75	21.73	21.75
10	50	0		21.81	21.83	21.77
10	1	0	16-QAM	22.18	22.22	22.18
10	1	25		22.27	21.94	21.91
10	1	49		22.17	21.98	22.14
10	25	0		20.90	20.80	20.67
10	25	12		20.82	20.82	20.79
10	25	25		20.82	20.71	20.77
10	50	0		20.85	20.79	20.79
5	1	0	QPSK	22.93	22.91	22.80
5	1	12		22.90	22.79	22.78
5	1	24		22.94	22.80	22.92
5	12	0		21.72	21.75	21.73
5	12	7		21.85	21.84	21.82
5	12	13		21.74	21.89	21.89
5	25	0		21.84	21.78	21.80
5	1	0	16-QAM	22.14	22.12	22.01
5	1	12		22.13	22.40	22.38
5	1	24		22.31	22.01	22.02
5	12	0		20.79	20.76	20.72
5	12	7		20.86	20.81	20.81
5	12	13		20.74	20.92	20.88
5	25	0		20.83	20.83	20.81



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.73	22.93	22.92
3	1	8		22.87	22.80	22.83
3	1	14		22.88	22.81	22.77
3	8	0		21.82	21.84	21.75
3	8	4		21.87	21.76	21.83
3	8	7		21.78	21.77	21.79
3	15	0		21.86	21.74	21.80
3	1	0	16-QAM	21.96	22.03	21.89
3	1	8		22.02	22.06	22.14
3	1	14		21.95	22.05	22.10
3	8	0		20.87	20.89	20.79
3	8	4		20.92	20.81	20.84
3	8	7		20.83	20.78	20.88
3	15	0		20.90	20.71	20.83
1.4	1	0	QPSK	22.91	22.72	22.80
1.4	1	3		22.94	22.93	22.93
1.4	1	5		22.83	22.81	22.91
1.4	3	0		22.72	22.68	22.76
1.4	3	1		22.91	22.76	22.82
1.4	3	3		22.81	22.72	22.75
1.4	6	0		21.78	21.67	21.74
1.4	1	0	16-QAM	22.06	22.08	22.19
1.4	1	3		22.09	22.15	22.21
1.4	1	5		22.09	22.19	22.14
1.4	3	0		21.82	21.77	21.84
1.4	3	1		21.83	21.84	21.72
1.4	3	3		21.81	21.81	21.75
1.4	6	0		20.92	20.77	20.85



LTE Band 5 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.53	22.48	22.42
10	1	25		22.44	22.46	22.41
10	1	49		22.27	22.18	22.14
10	25	0		21.41	21.36	21.30
10	25	12		21.37	21.39	21.40
10	25	25		21.36	21.23	21.37
10	50	0		21.35	21.30	21.33
10	1	0	16-QAM	21.67	21.95	21.71
10	1	25		21.79	21.78	21.89
10	1	49		21.50	21.53	21.46
10	25	0		20.42	20.40	20.34
10	25	12		20.33	20.43	20.42
10	25	25		20.27	20.31	20.40
10	50	0		20.26	20.40	20.41
5	1	0	QPSK	22.52	22.33	22.39
5	1	12		22.25	22.34	22.29
5	1	24		22.26	22.27	22.11
5	12	0		21.43	21.24	21.39
5	12	7		21.37	21.27	21.39
5	12	13		21.32	21.21	21.24
5	25	0		21.40	21.30	21.39
5	1	0	16-QAM	21.91	21.58	21.81
5	1	12		21.89	21.53	21.80
5	1	24		21.70	21.44	21.43
5	12	0		20.47	20.27	20.42
5	12	7		20.41	20.30	20.42
5	12	13		20.32	20.32	20.38
5	25	0		20.41	20.29	20.39



LTE Band 5 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.51	22.30	22.49
3	1	8		22.52	22.40	22.24
3	1	14		22.36	22.39	22.12
3	8	0		21.43	21.38	21.29
3	8	4		21.53	21.31	21.26
3	8	7		21.36	21.29	21.22
3	15	0		21.39	21.30	21.17
3	1	0	16-QAM	21.69	21.53	21.53
3	1	8		21.73	21.72	21.55
3	1	14		21.44	21.54	21.24
3	8	0		20.46	20.47	20.34
3	8	4		20.49	20.35	20.25
3	8	7		20.46	20.39	20.32
3	15	0		20.39	20.36	20.18
1.4	1	0	QPSK	22.45	22.44	22.18
1.4	1	3		22.50	22.35	22.11
1.4	1	5		22.42	22.26	22.08
1.4	3	0		22.48	22.29	22.09
1.4	3	1		22.43	22.27	22.03
1.4	3	3		22.48	22.24	22.12
1.4	6	0		21.37	21.19	21.09
1.4	1	0	16-QAM	21.73	21.61	21.45
1.4	1	3		21.80	21.51	21.33
1.4	1	5		21.59	21.69	21.32
1.4	3	0		21.39	21.26	21.20
1.4	3	1		21.57	21.25	21.08
1.4	3	3		21.47	21.31	21.14
1.4	6	0		20.52	20.32	20.25



LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	21.26	21.45	21.54
20	1	49		21.11	21.46	21.31
20	1	99		21.13	21.21	21.04
20	50	0		20.14	20.33	20.35
20	50	24		20.15	20.32	20.23
20	50	50		20.11	20.31	20.18
20	100	0		20.16	20.33	20.31
20	1	0	16-QAM	20.43	20.59	20.62
20	1	49		20.36	20.77	20.49
20	1	99		20.27	20.48	20.29
20	50	0		19.13	19.43	19.30
20	50	24		19.13	19.50	19.31
20	50	50		19.10	19.44	19.24
20	100	0		19.15	19.46	19.25
15	1	0	QPSK	21.06	21.40	21.27
15	1	37		21.23	21.51	21.37
15	1	74		21.01	21.35	21.11
15	36	0		20.15	20.45	20.28
15	36	20		20.28	20.54	20.32
15	36	39		20.14	20.35	20.18
15	75	0		20.06	20.48	20.27
15	1	0	16-QAM	20.29	20.62	20.62
15	1	37		20.47	20.73	20.54
15	1	74		20.26	20.52	20.34
15	36	0		19.14	19.45	19.27
15	36	20		19.25	19.52	19.35
15	36	39		19.03	19.39	19.21
15	75	0		19.07	19.44	19.27



LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	21.28	21.48	21.14
10	1	25		21.15	21.50	21.11
10	1	49		21.07	21.39	21.04
10	25	0		20.09	20.32	20.02
10	25	12		20.08	20.25	20.08
10	25	25		20.16	20.29	20.01
10	50	0		20.01	20.28	20.02
10	1	0	16-QAM	20.56	20.98	20.51
10	1	25		20.57	20.71	20.54
10	1	49		20.54	20.50	20.48
10	25	0		19.08	19.39	19.10
10	25	12		19.06	19.35	19.09
10	25	25		19.07	19.29	19.01
10	50	0		19.02	19.28	19.08
5	1	0	QPSK	21.21	21.40	21.08
5	1	12		21.16	21.34	21.15
5	1	24		21.11	21.39	21.08
5	12	0		20.17	20.26	20.05
5	12	7		20.09	20.30	20.10
5	12	13		20.07	20.29	20.02
5	25	0		20.05	20.29	20.02
5	1	0	16-QAM	20.51	20.62	20.38
5	1	12		20.43	20.56	20.53
5	1	24		20.42	20.68	20.22
5	12	0		19.18	19.33	19.08
5	12	7		19.16	19.42	19.13
5	12	13		19.09	19.34	19.07
5	25	0		19.07	19.33	19.05



LTE Band 12 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	23.41	23.33	23.25
10	1	25		23.08	23.34	23.23
10	1	49		23.07	23.02	22.91
10	25	0		22.11	22.08	22.00
10	25	12		22.04	22.08	21.93
10	25	25		22.04	21.91	21.87
10	50	0		22.09	22.02	22.02
10	1	0	16-QAM	22.52	22.31	22.55
10	1	25		22.35	22.49	22.28
10	1	49		22.31	22.24	22.05
10	25	0		21.11	21.10	21.07
10	25	12		21.05	21.07	20.94
10	25	25		21.05	20.91	20.86
10	50	0		21.07	21.01	21.03
5	1	0	QPSK	23.17	23.14	23.06
5	1	12		23.10	23.06	22.85
5	1	24		23.07	23.07	22.76
5	12	0		22.06	22.02	21.90
5	12	7		21.99	22.10	21.93
5	12	13		22.06	22.01	21.78
5	25	0		22.12	22.06	21.95
5	1	0	16-QAM	22.36	22.36	22.31
5	1	12		22.63	22.60	22.37
5	1	24		22.22	22.32	22.19
5	12	0		21.02	21.01	20.89
5	12	7		20.98	21.15	20.96
5	12	13		21.00	21.00	20.90
5	25	0		21.08	21.06	20.91



LTE Band 12 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	23.23	23.22	22.98
3	1	8		23.24	23.14	22.86
3	1	14		22.99	22.96	22.85
3	8	0		22.10	22.12	21.96
3	8	4		22.12	22.12	21.92
3	8	7		22.02	22.03	21.89
3	15	0		22.12	22.11	21.93
3	1	0	16-QAM	22.40	22.35	22.23
3	1	8		22.34	22.42	22.06
3	1	14		22.28	22.40	22.13
3	8	0		21.17	21.15	20.97
3	8	4		21.26	21.18	20.95
3	8	7		21.04	21.07	20.92
3	15	0		21.15	21.13	20.91
1.4	1	0	QPSK	23.32	23.27	23.07
1.4	1	3		23.35	23.37	22.97
1.4	1	5		23.21	23.05	22.90
1.4	3	0		23.12	23.07	22.95
1.4	3	1		23.25	23.04	23.11
1.4	3	3		23.08	23.10	22.88
1.4	6	0		22.00	21.96	21.79
1.4	1	0	16-QAM	22.68	22.49	22.29
1.4	1	3		22.51	22.57	22.22
1.4	1	5		22.43	22.46	22.18
1.4	3	0		22.27	22.12	21.91
1.4	3	1		22.22	22.04	21.85
1.4	3	3		22.20	22.16	21.78
1.4	6	0		21.12	21.05	21.01



LTE Band 13 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK		22.55	
10	1	25			22.54	
10	1	49			22.48	
10	25	0			21.49	
10	25	12			21.47	
10	25	25			21.36	
10	50	0			21.48	
10	1	0	16-QAM		21.46	
10	1	25			21.93	
10	1	49			21.69	
10	25	0			20.48	
10	25	12			20.57	
10	25	25			20.36	
10	50	0			20.46	
5	1	0	QPSK	22.14	22.45	22.47
5	1	12		22.45	22.48	22.20
5	1	24		22.46	22.22	22.44
5	12	0		21.49	21.52	21.44
5	12	7		21.49	21.56	21.45
5	12	13		21.59	21.38	21.56
5	25	0		21.61	21.45	21.51
5	1	0	16-QAM	21.76	21.72	21.94
5	1	12		21.89	21.87	22.11
5	1	24		21.85	21.62	21.94
5	12	0		20.46	20.49	20.48
5	12	7		20.46	20.55	20.52
5	12	13		20.60	20.42	20.61
5	25	0		20.66	20.49	20.53



LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	23.03	22.74	22.63
15	1	37		22.54	22.56	22.55
15	1	74		22.53	22.54	22.53
15	36	0		21.87	21.55	21.50
15	36	20		21.79	21.54	21.58
15	36	39		21.59	21.42	21.47
15	75	0		21.73	21.52	21.48
15	1	0	16-QAM	22.16	21.87	21.87
15	1	37		22.12	21.69	21.69
15	1	74		21.72	21.66	21.68
15	36	0		20.82	20.57	20.48
15	36	20		20.77	20.56	20.54
15	36	39		20.61	20.42	20.41
15	75	0		20.74	20.49	20.50
10	1	0	QPSK	22.98	22.75	22.68
10	1	25		22.77	22.70	22.50
10	1	49		22.62	22.51	22.53
10	25	0		21.83	21.68	21.47
10	25	12		21.75	21.56	21.44
10	25	25		21.68	21.44	21.38
10	50	0		21.79	21.57	21.44
10	1	0	16-QAM	22.12	22.08	21.88
10	1	25		22.17	21.91	21.72
10	1	49		21.97	21.75	21.74
10	25	0		20.79	20.72	20.47
10	25	12		20.70	20.57	20.48
10	25	25		20.68	20.50	20.39
10	50	0		20.79	20.53	20.43



LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	22.91	22.56	22.57
5	1	12		22.79	22.44	22.74
5	1	24		22.72	22.43	22.51
5	12	0		21.91	21.52	21.51
5	12	7		21.90	21.48	21.53
5	12	13		21.81	21.46	21.52
5	25	0		21.87	21.47	21.56
5	1	0	16-QAM	22.33	21.89	22.08
5	1	12		22.31	21.84	22.09
5	1	24		22.00	21.83	21.85
5	12	0		20.95	20.50	20.51
5	12	7		20.94	20.45	20.54
5	12	13		20.75	20.46	20.62
5	25	0		20.86	20.48	20.56
3	1	0	QPSK	22.98	22.58	22.60
3	1	8		22.94	22.52	22.56
3	1	14		22.96	22.51	22.54
3	8	0		22.04	21.69	21.54
3	8	4		21.99	21.64	21.62
3	8	7		21.90	21.63	21.58
3	15	0		21.93	21.62	21.56
3	1	0	16-QAM	22.36	21.89	21.90
3	1	8		22.31	21.87	21.86
3	1	14		22.06	21.86	21.87
3	8	0		21.06	20.65	20.63
3	8	4		21.06	20.63	20.62
3	8	7		21.03	20.62	20.61
3	15	0		20.92	20.57	20.56



LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	22.96	22.61	22.65
1.4	1	3		22.99	22.61	22.62
1.4	1	5		23.00	22.55	22.51
1.4	3	0		22.97	22.51	22.51
1.4	3	1		22.95	22.50	22.62
1.4	3	3		22.96	22.62	22.55
1.4	6	0		21.90	21.47	21.53
1.4	1	0	16-QAM	22.24	21.98	21.98
1.4	1	3		22.40	21.98	21.92
1.4	1	5		22.29	22.03	21.90
1.4	3	0		22.08	21.64	21.60
1.4	3	1		22.09	21.62	21.61
1.4	3	3		22.00	21.61	21.62
1.4	6	0		21.00	20.51	20.56



LTE Band 41 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	21.53	21.65	21.59
20	1	49		21.43	21.54	21.53
20	1	99		21.40	21.43	21.48
20	50	0		20.65	20.73	20.72
20	50	24		20.68	20.69	20.71
20	50	50		20.64	20.64	20.66
20	100	0		20.62	20.67	20.66
20	1	0	16-QAM	20.62	20.42	20.85
20	1	49		20.73	20.62	20.76
20	1	99		20.55	20.53	20.82
20	50	0		19.64	19.42	19.73
20	50	24		19.76	19.68	19.80
20	50	50		19.70	19.62	19.75
20	100	0		19.75	19.62	19.73
15	1	0	QPSK	21.54	21.38	21.58
15	1	37		21.53	21.38	21.60
15	1	74		21.27	21.25	21.25
15	36	0		20.49	20.21	20.56
15	36	20		20.47	20.17	20.43
15	36	39		20.35	20.07	20.34
15	75	0		20.38	20.15	20.47
15	1	0	16-QAM	20.39	20.42	20.50
15	1	37		20.49	20.34	20.51
15	1	74		20.11	20.02	20.39
15	36	0		19.53	19.17	19.44
15	36	20		19.42	19.21	19.48
15	36	39		19.25	19.06	19.27
15	75	0		19.32	19.14	19.35



LTE Band 41 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	21.55	21.26	21.29
10	1	25		21.64	21.29	21.23
10	1	49		21.46	21.24	21.22
10	25	0		20.53	20.15	20.26
10	25	12		20.62	20.19	20.25
10	25	25		20.39	20.19	20.23
10	50	0		20.53	20.12	20.26
10	1	0	16-QAM	20.71	20.27	20.39
10	1	25		20.65	20.33	20.48
10	1	49		20.54	20.24	20.26
10	25	0		19.60	19.14	19.31
10	25	12		19.62	19.22	19.35
10	25	25		19.39	19.27	19.20
10	50	0		19.54	19.08	19.35
5	1	0	QPSK	21.36	21.16	21.13
5	1	12		21.38	21.14	21.13
5	1	24		21.33	21.08	21.02
5	12	0		20.56	20.17	20.34
5	12	7		20.62	20.17	20.34
5	12	13		20.53	20.13	20.26
5	25	0		20.54	20.15	20.27
5	1	0	16-QAM	20.66	20.27	20.45
5	1	12		20.74	20.27	20.60
5	1	24		20.64	20.32	20.49
5	12	0		19.50	19.16	19.30
5	12	7		19.55	19.19	19.34
5	12	13		19.53	19.08	19.27
5	25	0		19.54	19.18	19.28



Appendix B. Test Results of Radiated Test

LTE Band 12

LTE Band 12 / 10MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1408	-58.40	-13.00	-45.40	-69.23	-64.50	0.50	8.75	H
	2112	-50.45	-13.00	-37.45	-64.00	-58.20	0.59	10.49	H
	2810	-59.57	-13.00	-46.57	-73.94	-67.70	0.70	10.99	H
									H
									H
									H
									H
	1408	-59.80	-13.00	-46.80	-70.35	-65.90	0.50	8.75	V
	2112	-56.35	-13.00	-43.35	-69.32	-64.10	0.59	10.49	V
	2810	-59.87	-13.00	-46.87	-74.09	-68.00	0.70	10.99	V
									V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.