



FCC RADIO TEST REPORT

FCC ID : APYHRO00277
Equipment : Smart phone
Brand Name : SHARP
Applicant : SHARP CORPORATION
2-13-1, Hachihonmatsu-lida,
Higashi-hiroshima-shi, Hiroshima pref. 739-0192, Japan
Manufacturer : SHARP CORPORATION
1 Takumi-Cho, Sakai-Ku, Sakai-Shi, Osaka 590-8522, Japan
Standard : 47 CFR Part 2, 22(H), 27

The product was received on Sep. 02, 2019 and testing was started from Sep. 15, 2019 and completed on Sep. 16, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FG990231B	01	Initial issue of report	Oct. 04, 2019
FG990231B	02	Add the description of Sample difference	Oct. 09, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	§2.1046	Conducted Output Power	Reporting only	-
	§22.913 (a)(2)	Effective Radiated Power (Band 5)	Pass	
	§27.50 (c)(10)	Effective Radiated Power (Band 12) (Band 17)		
-	-	Peak-to-Average Ratio	Not Required	-
-	§2.1049	Occupied Bandwidth	Not Required	-
-	§2.1051 §22.917 (a) §27.53 (g)	Conducted Band Edge Measurement (Band 5) (Band 12) (Band 17)	Not Required	-
-	§2.1051 §22.917 (a) §27.53 (g)	Conducted Spurious Emission (Band 5) (Band 12) (Band 17)	Not Required	-
-	§2.1055 §22.355 §27.54	Frequency Stability Temperature & Voltage	Not Required	-
4.2	§2.1053 §22.917 (a) §27.53 (g)	Radiated Spurious Emission (Band 5) (Band 12) (Band 17)	Pass	Under limit 39.82 dB at 1680.000 MHz

Remark:

- Not required means after assessing, test items are not necessary to carry out.
- This is a variant report which can be referred Product Equality Declaration. All the test cases were performed on original report which can be referred to Sporton Report Number FG971613B. Based on the original report, the test case was verified.

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang
Report Producer: Ann Lee

1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac and GNSS.

Product Specification subjective to this standard	
Sample 1	1st vender parts
Sample 2	2nd vender parts
Antenna Type	WWAN: ILA & IFA Antenna WLAN: IFA Antenna Bluetooth: IFA Antenna GPS/Glonass/BDS/Galileo : ILA Antenna

Remark:

1. All test items were performed with Sample 1.
2. The difference between Sample 1 & Sample 2 is their suppliers of memory, battery, vibe motor components.

1.2 Modification of EUT

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



1.3 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
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
Test Engineer	Ryan Lin, JC Liang, Fu Chen
Temperature	22.6~25.6°C
Relative Humidity	53.4~62.2%

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

FCC Designation No.: TW0007

1.4 Applicable Standards

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

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ 47 CFR Part 2, 22(H), 27
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

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

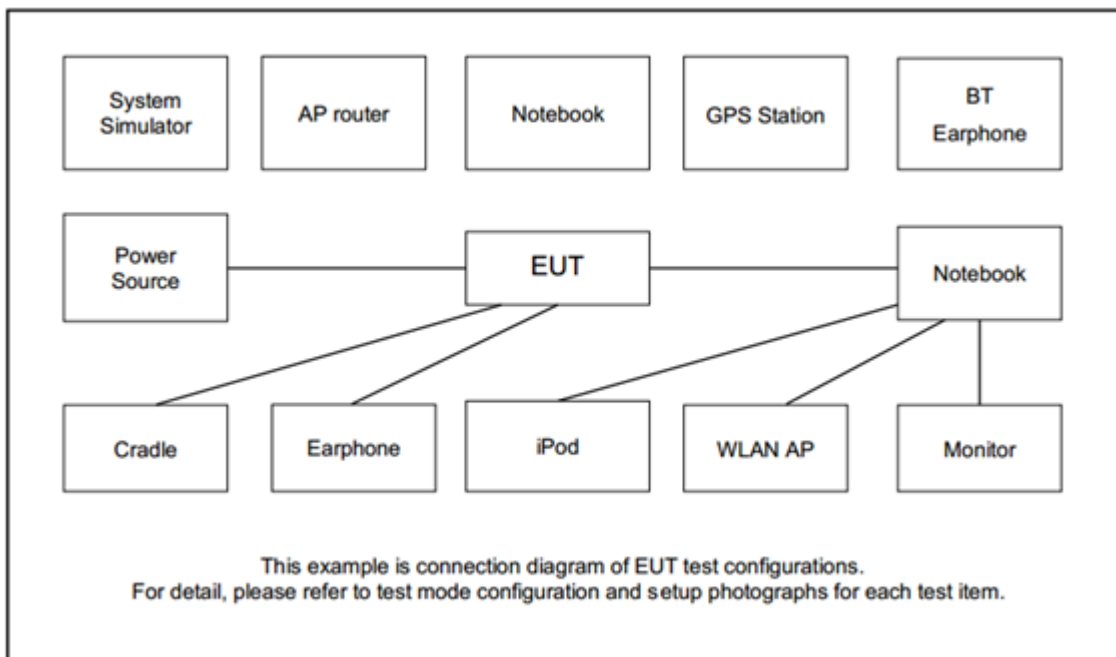
Antenna port conducted and radiated test items listed below are performed according to KDB 971168

D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	5	v	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	v
	17	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
E.R.P	5	v	v	v	v	-	-	v	v	v	v			v	v	v
	12	v	v	v	v	-	-	v	v	v	v			v	v	v
	17	-	-	v	v	-	-	v	v	v	v			v	v	v
Radiated Spurious Emission	5	Worst Case														v
	12	Worst Case														v
	17	Worst Case														v
Remark	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.	Earphone	SHARP	RPHOEA007AFZZ	N/A	Unshielded, 1.2 m	N/A
3.	Adapter	SHARP	SH-AC05	N/A	N/A	Unshielded, 1.5 m

2.4 Frequency List of Low/Middle/High Channels

LTE Band 5 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	20450	20525	20600
	Frequency	829	836.5	844
5	Channel	20425	20525	20625
	Frequency	826.5	836.5	846.5
3	Channel	20415	20525	20635
	Frequency	825.5	836.5	847.5
1.4	Channel	20407	20525	20643
	Frequency	824.7	836.5	848.3

LTE Band 12 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23060	23095	23130
	Frequency	704	707.5	711
5	Channel	23035	23095	23155
	Frequency	701.5	707.5	713.5
3	Channel	23025	23095	23165
	Frequency	700.5	707.5	714.5
1.4	Channel	23017	23095	23173
	Frequency	699.7	707.5	715.3

LTE Band 17 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23780	23790	23800
	Frequency	709	710	711
5	Channel	23755	23790	23825
	Frequency	706.5	710	713.5

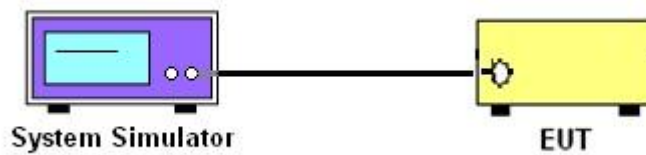
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.



3.2 Conducted Output Power and ERP

3.2.1 Description of the Conducted Output Power Measurement and ERP 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.

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 5.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 12 and Band 17.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 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.
4. Measure and record the power level from the system simulator.

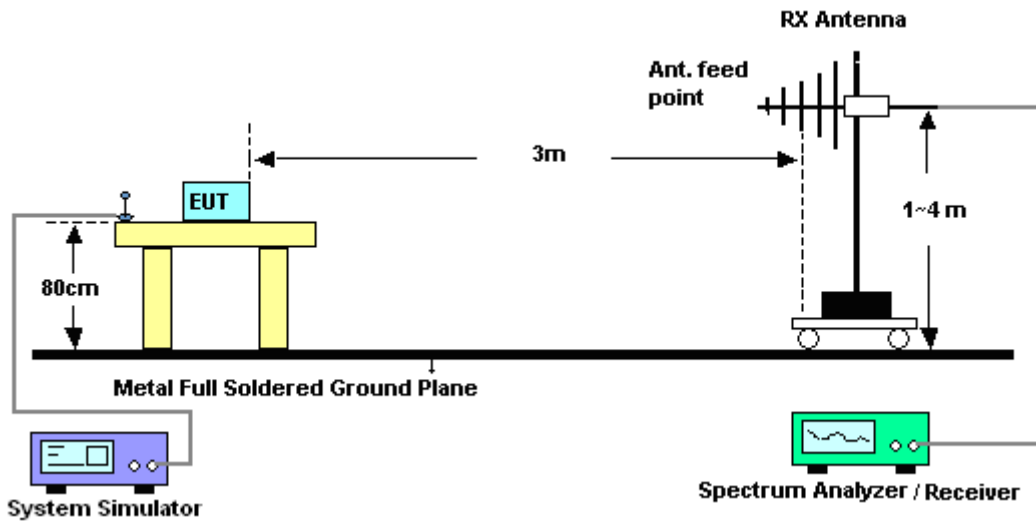
4 Radiated Test Items

4.1 Measuring Instruments

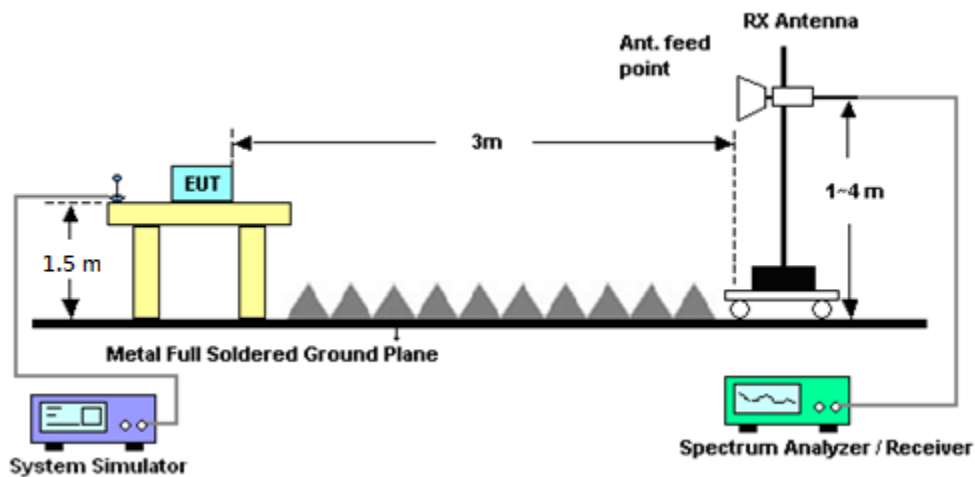
See list of measuring instruments of this test report.

4.1.1 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

4.2 Radiated Spurious Emission Measurement

4.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. 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.

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

4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

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
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 06, 2018	Sep. 15, 2019~ Sep. 16, 2019	Dec. 05, 2019	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 04, 2018	Sep. 15, 2019~ Sep. 16, 2019	Dec. 03, 2019	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-0 6	35414&AT- N0602	30MHz~1GHz	Oct. 13, 2018	Sep. 15, 2019~ Sep. 16, 2019	Oct. 12, 2019	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-132 6	1GHz ~ 18GHz	Oct. 15, 2018	Sep. 15, 2019~ Sep. 16, 2019	Oct. 14, 2019	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-132 8	1GHz ~ 18GHz	Nov. 09, 2018	Sep. 15, 2019~ Sep. 16, 2019	Nov. 08, 2019	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Sep. 15, 2019~ Sep. 16, 2019	Nov. 22, 2019	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY532701 48	1GHz~26.5GHz	Nov. 14, 2018	Sep. 15, 2019~ Sep. 16, 2019	Nov. 13, 2019	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004 86	10Hz ~ 44GHz	Oct. 18, 2018	Sep. 15, 2019~ Sep. 16, 2019	Oct. 17, 2019	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-108 0-1200-15000 -60ST	SN1	1.2GHz High Pass Filter	Mar. 19, 2019	Sep. 15, 2019~ Sep. 16, 2019	Mar. 18, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60ST	SN2	3GHz High Pass Filter	Jul. 15, 2019	Sep. 15, 2019~ Sep. 16, 2019	Jul. 14, 2020	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1~4m	N/A	Sep. 15, 2019~ Sep. 16, 2019	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Sep. 15, 2019~ Sep. 16, 2019	N/A	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY532900 45	20MHz~8.4GHz	Jan. 19, 2019	Sep. 15, 2019~ Sep. 16, 2019	Jan. 18, 2020	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170 584	18GHz- 40GHz	Dec. 05, 2018	Sep. 15, 2019~ Sep. 16, 2019	Dec. 04, 2019	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-00104 2	N/A	N/A	Sep. 15, 2019~ Sep. 16, 2019	N/A	Radiation (03CH11-HY)
Hygrometer	TECEPEL	DTN-303B	TP140325	N/A	Nov. 05, 2018	Sep. 15, 2019~ Sep. 16, 2019	Nov. 04, 2019	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	9kHz-30MHz	Mar. 13, 2019	Sep. 15, 2019~ Sep. 16, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 13, 2019	Sep. 15, 2019~ Sep. 16, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	30M-18G	Mar. 13, 2019	Sep. 15, 2019~ Sep. 16, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 13, 2019	Sep. 15, 2019~ Sep. 16, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	Nov. 12, 2018	Sep. 15, 2019~ Sep. 16, 2019	Nov. 10, 2020	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% ($U = 2U_c(y)$)	3.37
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

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

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

Conducted Output Power(Average power)

LTE Band 5 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.77	22.84	22.85
10	1	25		22.84	22.95	22.74
10	1	49		22.90	22.80	22.73
10	25	0		21.91	21.95	21.87
10	25	12		21.99	21.95	21.79
10	25	25		21.95	21.89	21.84
10	50	0		21.98	21.92	21.89
10	1	0	16-QAM	22.10	22.10	22.17
10	1	25		22.09	22.21	22.11
10	1	49		22.20	22.16	22.11
10	25	0		20.97	21.03	20.96
10	25	12		21.07	21.04	20.87
10	25	25		20.99	20.97	20.88
10	50	0		21.05	21.01	20.97
10	1	0	64-QAM	21.02	21.05	21.11
10	1	25		21.05	21.13	21.02
10	1	49		21.17	21.10	21.05
10	25	0		20.02	20.07	20.00
10	25	12		20.07	20.06	19.91
10	25	25		20.04	20.00	19.91
10	50	0		20.07	20.04	20.03
5	1	0	QPSK	22.80	22.93	22.72
5	1	12		22.84	22.87	22.76
5	1	24		22.82	22.87	22.77
5	12	0		21.93	21.94	21.79
5	12	7		21.92	21.96	21.80
5	12	13		21.88	21.90	21.82
5	25	0		21.92	21.94	21.80
5	1	0	16-QAM	22.12	22.23	22.08
5	1	12		22.12	22.19	22.12
5	1	24		22.09	22.17	22.12
5	12	0		21.01	21.01	20.90
5	12	7		21.00	21.06	20.93
5	12	13		20.97	20.98	20.91
5	25	0		21.01	21.03	20.89
5	1	0	64-QAM	21.04	21.18	21.03
5	1	12		21.08	21.14	21.06
5	1	24		21.06	21.12	21.04
5	12	0		20.09	20.11	19.96
5	12	7		20.07	20.11	20.00
5	12	13		20.05	20.07	19.97
5	25	0		20.01	20.04	19.91



LTE Band 5 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.78	22.89	22.72
3	1	8		22.73	22.85	22.73
3	1	14		22.82	22.84	22.73
3	8	0		21.80	21.90	21.76
3	8	4		21.92	21.94	21.79
3	8	7		21.87	21.91	21.81
3	15	0		21.91	21.91	21.78
3	1	0	16-QAM	22.04	22.16	22.12
3	1	8		22.06	22.18	22.12
3	1	14		22.10	22.14	22.12
3	8	0		20.96	21.00	20.92
3	8	4		21.03	21.05	20.97
3	8	7		20.99	21.03	20.95
3	15	0		20.98	21.02	20.88
3	1	0	64-QAM	21.06	21.13	21.05
3	1	8		20.96	21.13	21.03
3	1	14		21.07	21.10	21.03
3	8	0		19.98	20.06	19.94
3	8	4		20.06	20.06	19.97
3	8	7		20.00	20.04	19.97
3	15	0		20.03	20.03	19.90
1.4	1	0	QPSK	22.73	22.79	22.64
1.4	1	3		22.80	22.85	22.73
1.4	1	5		22.71	22.76	22.66
1.4	3	0		22.77	22.84	22.72
1.4	3	1		22.79	22.88	22.72
1.4	3	3		22.74	22.84	22.69
1.4	6	0		21.79	21.85	21.71
1.4	1	0	16-QAM	22.00	22.07	22.04
1.4	1	3		22.05	22.14	22.06
1.4	1	5		21.98	22.05	22.01
1.4	3	0		21.83	21.89	21.81
1.4	3	1		21.86	21.95	21.83
1.4	3	3		21.79	21.88	21.80
1.4	6	0		20.92	20.98	20.88
1.4	1	0	64-QAM	20.97	21.05	20.98
1.4	1	3		21.01	21.08	21.03
1.4	1	5		20.95	21.03	20.97
1.4	3	0		20.95	21.03	20.95
1.4	3	1		21.02	21.10	21.00
1.4	3	3		20.97	21.02	20.98
1.4	6	0		19.86	19.92	19.81



LTE Band 12 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.96	22.92	22.90
10	1	25		22.98	22.99	22.91
10	1	49		22.93	22.90	22.96
10	25	0		21.98	21.94	21.91
10	25	12		22.00	22.01	21.96
10	25	25		21.97	21.94	21.94
10	50	0		21.99	21.98	21.96
10	1	0	16-QAM	22.30	22.30	22.29
10	1	25		22.33	22.31	22.30
10	1	49		22.29	22.27	22.24
10	25	0		21.09	21.10	21.05
10	25	12		21.13	21.09	21.06
10	25	25		21.09	21.07	21.04
10	50	0		21.09	21.09	21.07
10	1	0	64-QAM	21.27	21.21	21.22
10	1	25		21.30	21.26	21.23
10	1	49		21.25	21.24	21.22
10	25	0		20.15	20.12	20.07
10	25	12		20.16	20.12	20.09
10	25	25		20.12	20.11	20.05
10	50	0		20.13	20.10	20.08
5	1	0	QPSK	22.86	22.95	22.77
5	1	12		22.87	22.93	22.86
5	1	24		22.85	22.91	22.84
5	12	0		21.90	21.95	21.81
5	12	7		21.95	22.01	21.93
5	12	13		21.92	21.95	21.93
5	25	0		21.94	21.96	21.82
5	1	0	16-QAM	22.21	22.27	22.15
5	1	12		22.24	22.30	22.26
5	1	24		22.22	22.28	22.14
5	12	0		21.07	21.12	20.95
5	12	7		21.07	21.13	21.08
5	12	13		21.05	21.09	21.02
5	25	0		21.04	21.08	20.92
5	1	0	64-QAM	21.16	21.23	21.08
5	1	12		21.21	21.24	21.18
5	1	24		21.18	21.20	21.12
5	12	0		20.11	20.16	20.00
5	12	7		20.16	20.18	20.13
5	12	13		20.12	20.16	20.10
5	25	0		20.06	20.09	19.92



LTE Band 12 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	22.96	22.91	22.87
3	1	8		22.98	22.93	22.85
3	1	14		22.96	22.89	22.84
3	8	0		22.03	21.93	21.88
3	8	4		22.05	21.98	21.91
3	8	7		22.03	21.94	21.88
3	15	0		22.02	21.95	21.89
3	1	0	16-QAM	22.24	22.27	22.22
3	1	8		22.30	22.29	22.19
3	1	14		22.34	22.26	22.12
3	8	0		21.18	21.12	21.07
3	8	4		21.21	21.13	21.08
3	8	7		21.18	21.09	21.02
3	15	0		21.15	21.08	21.02
3	1	0	64-QAM	21.21	21.18	21.16
3	1	8		21.17	21.20	21.13
3	1	14		21.17	21.24	21.12
3	8	0		20.18	20.14	20.06
3	8	4		20.11	20.15	20.09
3	8	7		20.14	20.12	20.07
3	15	0		20.12	20.08	20.04
1.4	1	0	QPSK	22.82	22.83	22.77
1.4	1	3		22.89	22.90	22.85
1.4	1	5		22.83	22.83	22.78
1.4	3	0		22.87	22.87	22.85
1.4	3	1		22.90	22.91	22.86
1.4	3	3		22.89	22.89	22.83
1.4	6	0		21.89	21.90	21.82
1.4	1	0	16-QAM	22.15	22.21	22.09
1.4	1	3		22.24	22.31	22.13
1.4	1	5		22.16	22.21	22.04
1.4	3	0		21.96	21.99	21.93
1.4	3	1		21.99	22.03	21.94
1.4	3	3		21.94	22.00	21.86
1.4	6	0		21.04	21.07	20.99
1.4	1	0	64-QAM	21.10	21.16	21.07
1.4	1	3		21.19	21.22	21.14
1.4	1	5		21.10	21.14	21.03
1.4	3	0		21.11	21.14	21.06
1.4	3	1		21.15	21.19	21.10
1.4	3	3		21.11	21.15	21.04
1.4	6	0		20.01	20.02	19.97



LTE Band 17 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.86	22.85	22.86
10	1	25		22.93	22.94	22.84
10	1	49		22.92	22.92	22.81
10	25	0		21.97	21.99	21.91
10	25	12		22.03	22.01	21.89
10	25	25		21.96	21.98	21.89
10	50	0		21.98	21.97	21.88
10	1	0	16-QAM	22.20	22.19	22.15
10	1	25		22.26	22.25	22.16
10	1	49		22.25	22.23	22.12
10	25	0		21.09	21.07	21.00
10	25	12		21.13	21.10	21.01
10	25	25		21.08	21.08	20.98
10	50	0		21.11	21.08	20.99
10	1	0	64-QAM	21.15	21.15	21.09
10	1	25		21.21	21.22	21.13
10	1	49		21.20	21.18	21.06
10	25	0		20.13	20.11	20.01
10	25	12		20.13	20.14	20.02
10	25	25		20.10	20.09	19.99
10	50	0		20.12	20.10	20.02
5	1	0	QPSK	22.88	22.90	22.87
5	1	12		22.93	22.87	22.85
5	1	24		22.92	22.89	22.87
5	12	0		21.92	21.97	21.94
5	12	7		22.05	21.98	21.98
5	12	13		22.02	21.99	21.96
5	25	0		22.02	21.95	21.92
5	1	0	16-QAM	22.22	22.26	22.26
5	1	12		22.27	22.25	22.22
5	1	24		22.27	22.25	22.14
5	12	0		21.05	21.09	21.07
5	12	7		21.14	21.10	21.07
5	12	13		21.14	21.08	21.06
5	25	0		21.11	21.06	21.07
5	1	0	64-QAM	21.15	21.19	21.11
5	1	12		21.23	21.18	21.09
5	1	24		21.22	21.20	21.04
5	12	0		20.10	20.16	20.11
5	12	7		20.21	20.15	20.15
5	12	13		20.19	20.14	20.03
5	25	0		20.14	20.10	19.96



Appendix B. Test Results of ERP/EIRP and Radiated Test

ERP/EIRP

LTE Band 5 / 1.4MHz (Average) (GT - LC = -6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	3	1	22.79	0.1901	14.64	0.0291
Middle		3	1	22.88	0.1941	14.73	0.0297
Highest		3	1	22.72	0.1871	14.57	0.0286
Lowest	16QAM	1	3	22.05	0.1603	13.90	0.0245
Middle		1	3	22.14	0.1637	13.99	0.0251
Highest		1	3	22.06	0.1607	13.91	0.0246
Lowest	64QAM	3	1	21.02	0.1265	12.87	0.0194
Middle		3	1	21.10	0.1288	12.95	0.0197
Highest		3	1	21.00	0.1259	12.85	0.0193
Limit	ERP < 7W			Result		PASS	

LTE Band 5 / 3MHz (Average) (GT - LC = -6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	0	22.78	0.1897	14.63	0.0290
Middle		1	0	22.89	0.1945	14.74	0.0298
Highest		1	0	22.72	0.1871	14.57	0.0286
Lowest	16QAM	1	8	22.06	0.1607	13.91	0.0246
Middle		1	8	22.18	0.1652	14.03	0.0253
Highest		1	8	22.12	0.1629	13.97	0.0249
Lowest	64QAM	1	0	21.06	0.1276	12.91	0.0195
Middle		1	0	21.13	0.1297	12.98	0.0199
Highest		1	0	21.05	0.1274	12.90	0.0195
Limit	ERP < 7W			Result		PASS	

LTE Band 5 / 5MHz (Average) (GT - LC = -6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	0	22.80	0.1905	14.65	0.0292
Middle		1	0	22.93	0.1963	14.78	0.0301
Highest		1	0	22.72	0.1871	14.57	0.0286
Lowest	16QAM	1	0	22.12	0.1629	13.97	0.0249
Middle		1	0	22.23	0.1671	14.08	0.0256
Highest		1	0	22.08	0.1614	13.93	0.0247
Lowest	64QAM	1	0	21.04	0.1271	12.89	0.0195
Middle		1	0	21.18	0.1312	13.03	0.0201
Highest		1	0	21.03	0.1268	12.88	0.0194
Limit	ERP < 7W			Result		PASS	



LTE Band 5 / 10MHz (Average) (GT - LC = -6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	25	22.84	0.1923	14.69	0.0294
Middle		1	25	22.95	0.1972	14.80	0.0302
Highest		1	25	22.74	0.1879	14.59	0.0288
Lowest	16QAM	1	25	22.09	0.1618	13.94	0.0248
Middle		1	25	22.21	0.1663	14.06	0.0255
Highest		1	25	22.11	0.1626	13.96	0.0249
Lowest	64QAM	1	49	21.17	0.1309	13.02	0.0200
Middle		1	49	21.10	0.1288	12.95	0.0197
Highest		1	49	21.05	0.1274	12.90	0.0195
Limit	ERP < 7W			Result		PASS	



LTE Band 12 / 1.4MHz (Average) (GT - LC = -4.6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	3	1	22.90	0.1950	16.15	0.0412
Middle		3	1	22.91	0.1954	16.16	0.0413
Highest		3	1	22.86	0.1932	16.11	0.0408
Lowest	16QAM	1	3	22.24	0.1675	15.49	0.0354
Middle		1	3	22.31	0.1702	15.56	0.0360
Highest		1	3	22.13	0.1633	15.38	0.0345
Lowest	64QAM	1	3	21.19	0.1315	14.44	0.0278
Middle		1	3	21.22	0.1324	14.47	0.0280
Highest		1	3	21.14	0.1300	14.39	0.0275
Limit	ERP < 3W			Result		PASS	

LTE Band 12 / 3MHz (Average) (GT - LC = -4.6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	8	22.98	0.1986	16.23	0.0420
Middle		1	8	22.93	0.1963	16.18	0.0415
Highest		1	8	22.85	0.1928	16.10	0.0407
Lowest	16QAM	1	14	22.34	0.1714	15.59	0.0362
Middle		1	14	22.26	0.1683	15.51	0.0356
Highest		1	14	22.12	0.1629	15.37	0.0344
Lowest	64QAM	1	14	21.17	0.1309	14.42	0.0277
Middle		1	14	21.24	0.1330	14.49	0.0281
Highest		1	14	21.12	0.1294	14.37	0.0274
Limit	ERP < 3W			Result		PASS	

LTE Band 12 / 5MHz (Average) (GT - LC = -4.6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	0	22.86	0.1932	16.11	0.0408
Middle		1	0	22.95	0.1972	16.20	0.0417
Highest		1	0	22.77	0.1892	16.02	0.0400
Lowest	16QAM	1	12	22.24	0.1675	15.49	0.0354
Middle		1	12	22.30	0.1698	15.55	0.0359
Highest		1	12	22.26	0.1683	15.51	0.0356
Lowest	64QAM	1	12	21.21	0.1321	14.46	0.0279
Middle		1	12	21.24	0.1330	14.49	0.0281
Highest		1	12	21.18	0.1312	14.43	0.0277
Limit	ERP < 3W			Result		PASS	



LTE Band 12 / 10MHz (Average) (GT - LC = -4.6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	25	22.98	0.1986	16.23	0.0420
Middle		1	25	22.99	0.1991	16.24	0.0421
Highest		1	25	22.91	0.1954	16.16	0.0413
Lowest	16QAM	1	25	22.33	0.1710	15.58	0.0361
Middle		1	25	22.31	0.1702	15.56	0.0360
Highest		1	25	22.30	0.1698	15.55	0.0359
Lowest	64QAM	1	25	21.30	0.1349	14.55	0.0285
Middle		1	25	21.26	0.1337	14.51	0.0282
Highest		1	25	21.23	0.1327	14.48	0.0281
Limit	ERP < 3W			Result		PASS	



LTE Band 17 / 5MHz (Average) (GT - LC = -4.6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	12	22.93	0.1963	16.18	0.0415
Middle		1	12	22.87	0.1936	16.12	0.0409
Highest		1	12	22.85	0.1928	16.10	0.0407
Lowest	16QAM	1	12	22.27	0.1687	15.52	0.0356
Middle		1	12	22.25	0.1679	15.50	0.0355
Highest		1	12	22.22	0.1667	15.47	0.0352
Lowest	64QAM	1	12	21.23	0.1327	14.48	0.0281
Middle		1	12	21.18	0.1312	14.43	0.0277
Highest		1	12	21.09	0.1285	14.34	0.0272
Limit	ERP < 3W			Result		PASS	

LTE Band 17 / 10MHz (Average) (GT - LC = -4.6 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	25	22.93	0.1963	16.18	0.0415
Middle		1	25	22.94	0.1968	16.19	0.0416
Highest		1	25	22.84	0.1923	16.09	0.0406
Lowest	16QAM	1	25	22.26	0.1683	15.51	0.0356
Middle		1	25	22.25	0.1679	15.50	0.0355
Highest		1	25	22.16	0.1644	15.41	0.0348
Lowest	64QAM	1	25	21.21	0.1321	14.46	0.0279
Middle		1	25	21.22	0.1324	14.47	0.0280
Highest		1	25	21.13	0.1297	14.38	0.0274
Limit	ERP < 3W			Result		PASS	

**Radiated Spurious Emission****Part 22H LTE Band 5**

LTE Band 5 / 5MHz / 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)
Highest	1680	-52.82	-13	-39.82	-63	-59.84	0.53	9.70	H
	2520	-59.49	-13	-46.49	-72.97	-67.49	0.66	10.81	H
	3360	-58.09	-13	-45.09	-74.32	-67.35	0.77	12.18	H
									H
									H
									H
									H
	1680	-55.11	-13	-42.11	-64.79	-62.13	0.53	9.70	V
	2520	-59.72	-13	-46.72	-73.58	-67.72	0.66	10.81	V
	3360	-58.42	-13	-45.42	-74.39	-67.68	0.77	12.18	V
									V
									V
									V
									V

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

**Part 27H LTE Band 12**

LTE Band 12 / 5MHz / 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)
Highest	1432	-60.24	-13.00	-47.24	-71.55	-66.48	0.50	8.89	H
	2148	-57.65	-13.00	-44.65	-71.86	-65.42	0.59	10.52	H
	2864	-59.19	-13.00	-46.19	-73.76	-67.34	0.72	11.02	H
									H
									H
									H
									H
	1432	-60.75	-13.00	-47.75	-71.60	-66.99	0.50	8.89	V
	2148	-59.48	-13.00	-46.48	-73.64	-67.25	0.59	10.52	V
	2864	-59.15	-13.00	-46.15	-73.96	-67.30	0.72	11.02	V
									V
									V
									V
									V

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

**Part 27H LTE Band 17**

LTE Band 17 / 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)
Highest	1432	-60.07	-13	-47.07	-71.38	-66.31	0.50	8.89	H
	2146	-59.41	-13	-46.41	-73.62	-67.18	0.59	10.52	H
	2862	-59.35	-13	-46.35	-73.92	-67.50	0.72	11.02	H
									H
									H
									H
									H
	1432	-60.60	-13	-47.60	-71.45	-66.84	0.50	8.89	V
	2146	-59.49	-13	-46.49	-73.65	-67.26	0.59	10.52	V
	2862	-59.34	-13	-46.34	-74.15	-67.49	0.72	11.02	V
									V
									V
									V
									V

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