



FCC RADIO TEST REPORT

FCC ID : QYLEM9190B
Equipment : Wireless Module
Brand Name : Getac
Model Name : EM9190
Applicant : Getac Technology Corporation.
5F., Building A, No. 209, Sec.1, Nangang Rd.,
Nangang Dist., Taipei City 11568, Taiwan, R.O.C.
Standard : FCC 47 CFR Part 2, 90(R)

The product was received on Dec. 21, 2020 and testing was started from Jan. 27, 2021 and completed on Mar. 05, 2021. 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 test results in this partial 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 333, Taiwan (R.O.C.)



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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§90.542 (a)(7)	Effective Radiated Power	Pass	-
-	-	Peak-to-Average Ratio	-	See Note
-	§2.1049	Occupied Bandwidth	-	See Note
-	§2.1053 §90.543 (e)(2)	Conducted Band Edge Measurement	-	See Note
-	§2.1051 §90.210 (n)	Emission Mask	-	See Note
-	§2.1053 §90.543 (e)(3)	Conducted Spurious Emission	-	See Note
-	§2.1055 §90.539 (e)	Frequency Stability Temperature & Voltage	-	See Note
4.2	§2.1053 §90.543 (e)(3) §90.543 (f)	Radiated Spurious Emission	Pass	Under limit 16.78 dB at 1577.000 MHz

Note: The module (Model: EM9190) makes no difference after verifying output power, this report reuses test data from the module report.

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: Amy Chen



1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE/5G NR, and GNSS.

Product Feature	
Sample 1	EUT with Host 1
Sample 2	EUT with Host 2
Antenna Type	WWAN: PIFA Antenna GPS/Glonass/BDS/Galileo/SBAS : PATCH Antenna
Antenna Gain	LTE Band 14: 0.91 dBi

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

The product was installed into Notebook (Brand Name: Getac, Model Name: B360, B360 Pro) during test, and the host information was recorded in the following table.

Host Information	
Host 1	Host with SKU A
Host 2	Host with SKU B

Host Sample Information		
B360	SKUA	SKUB
CPU	i7-10610U	i7-10710U
Memory(DDR4)	8G	8G
Storage(OPAL SSD)	Main:256GB	Main:256GB
	Second:256GB	Second:256GB
WLAN	AX200NGW	AX200NGW
WWAN	EM9190	EM9190
Camera FN20FF-679H (RGB)	N/A	v
Camera FN23FF-678H (RGB+IR)	v	N/A
FINGERPRINT	v	v
VGA	v	N/A
HDMI	v	v
RS232	v	v
LAN	v	v
USB	v	v
USB3.1 Type C	N/A	v
Smart Card	v	v
SD Card Reader	N/A	N/A
ODD(Expansion)	N/A	v
RS232(Expansion)	N/A	v
Touch Screen	v	v
PCMCIA	v	v
GPS	v	v



1.2 Modification of EUT

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

1.3 Testing Site

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. TH05-HY
Test Engineer	Hao Syu and Howard Lin
Temperature	20.3~23.6°C
Relative Humidity	43.3~54.3%

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. 03CH12-HY (TAF Code: 3786)
Test Engineer	Jack Cheng, Lance Chiang, and Chuan Chu
Temperature	24.3~26.4°C
Relative Humidity	58~66%
Remark	The Radiated test item subcontracted to Sporton International Inc. Wensan Laboratory.

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

FCC Designation No.: TW1190 and TW0007



1.4 Applied Standards

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

- ♦ ANSI C63.26-2015
- ♦ FCC 47 CFR Part 2, Part 90(R)
- ♦ ANSI / TIA-603-E
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 414788 D01 Radiated Test Site 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.
3. The TAF code is not including all the FCC KDB listed without accreditation.

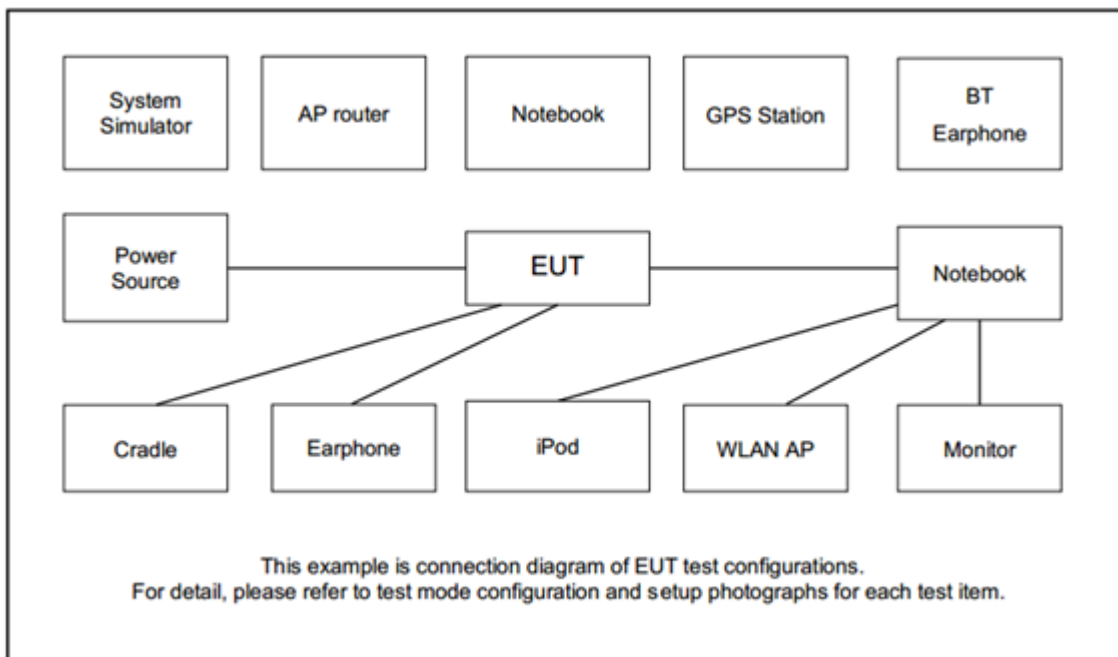
2 Test Configuration of Equipment Under Test

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.

Conducted Test Cases	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	14	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
E.R.P.	14			v	v			v	v	v	Max. Power					
Radiated Spurious Emission	14	-	-	v		-	-	v			v			v	v	v
Remark	<ol style="list-style-type: none"> The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. 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. All the radiated test cases were performed with Sample 2. 															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
2.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A



2.4 Frequency List of Low/Middle/High Channels

LTE Band 14 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	23330	-
	Frequency	-	793	-
5	Channel	23305	23330	23355
	Frequency	790.5	793	795.5

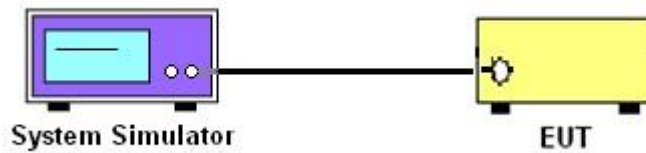
3 Conducted Test Items

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 Measurement and ERP

3.2.1 Description of the Conducted Output Power Measurement and ERP Measurement

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

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 14.

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 base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

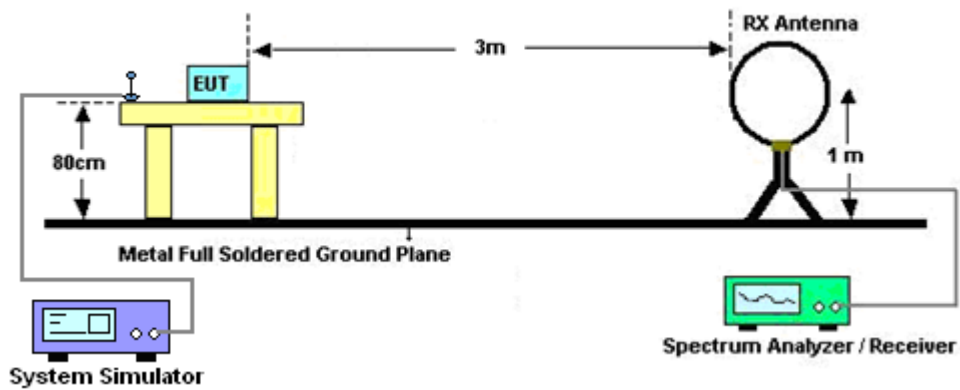
4 Radiated Test Items

4.1 Measuring Instruments

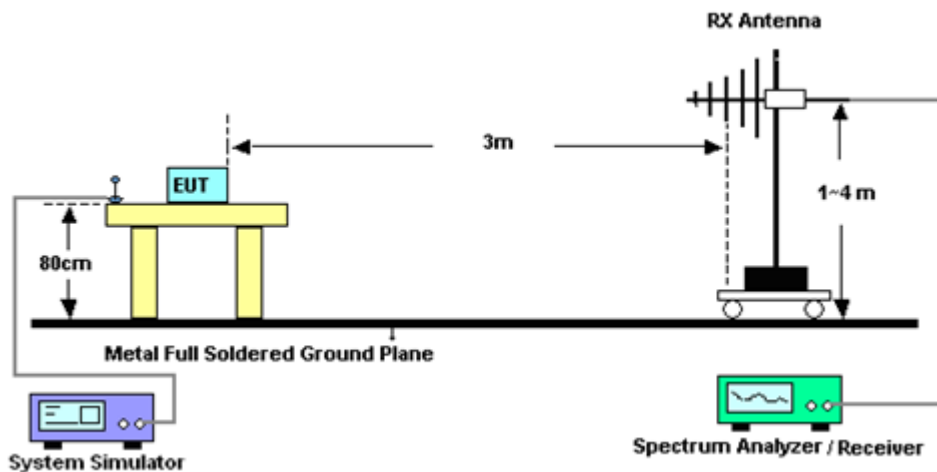
See list of measuring instruments of this test report.

4.1.1 Test Setup

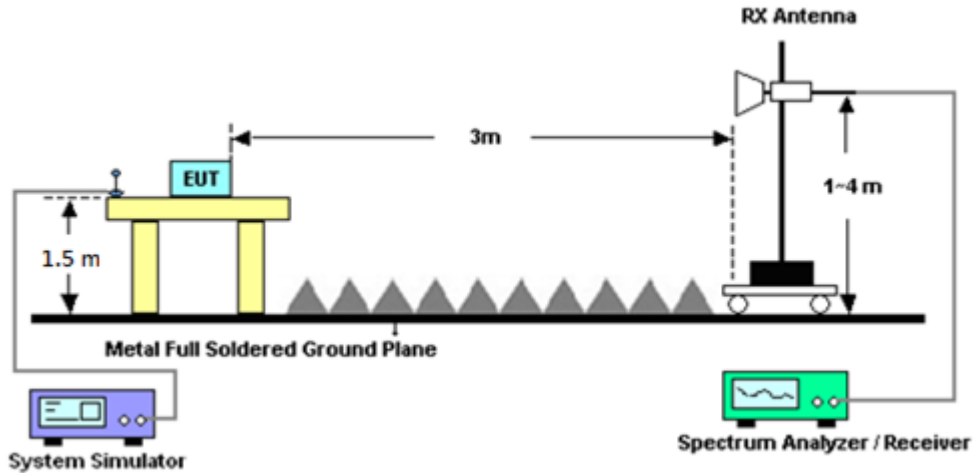
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix A

Note:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



4.2 Radiated Spurious Emission

4.2.1 Description of Radiated Spurious Emission

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.

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics 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. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

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, Sweep = 500ms, 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.
11. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)



5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jul. 14, 2020	Jan. 27, 2021~ Feb. 02, 2021	Jul. 13, 2021	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N- 06	40103 & 07	30MHz~1GHz	Apr. 29, 2020	Jan. 27, 2021~ Feb. 02, 2021	Apr. 28, 2021	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1328	1GHz~18GHz	Nov. 23, 2020	Jan. 27, 2021~ Feb. 02, 2021	Nov. 22, 2021	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-1241	1GHz ~ 18GHz	Jul. 15, 2020	Jan. 27, 2021~ Feb. 02, 2021	Jul. 14, 2021	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2020	Jan. 27, 2021~ Feb. 02, 2021	Mar. 24, 2021	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY57280120	1GHz~26.5GHz	Jul. 20, 2020	Jan. 27, 2021~ Feb. 02, 2021	Jul. 19, 2021	Radiation (03CH12-HY)
Preamplifier	E-INSTRUME NT TECH LTD.	ERA-100M-18 G-56-01-A70	EC1900249	1GHz~18GHz	Dec. 05, 2020	Jan. 27, 2021~ Feb. 02, 2021	Dec. 04, 2021	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY54200485	10Hz~44GHz	Feb. 10, 2020	Jan. 27, 2021~ Feb. 02, 2021	Feb. 09, 2021	Radiation (03CH12-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Feb. 15, 2020	Jan. 27, 2021~ Feb. 02, 2021	Feb. 14, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 12, 2020	Jan. 27, 2021~ Feb. 02, 2021	Mar. 11, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 11, 2020	Jan. 27, 2021~ Feb. 02, 2021	Dec. 10, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 25, 2020	Jan. 27, 2021~ Feb. 02, 2021	Feb. 24, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 25, 2020	Jan. 27, 2021~ Feb. 02, 2021	Feb. 24, 2021	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP140349	N/A	Oct. 02, 2020	Jan. 27, 2021~ Feb. 02, 2021	Oct. 01, 2021	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Jan. 27, 2021~ Feb. 02, 2021	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Jan. 27, 2021~ Feb. 02, 2021	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jan. 27, 2021~ Feb. 02, 2021	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Jan. 27, 2021~ Feb. 02, 2021	N/A	Radiation (03CH12-HY)
Radio Communicatio n Analyzer	Anritsu	MT8821C	6261849015	LTE	Sep. 18, 2020	Mar. 05, 2021	Sep. 17, 2021	Conducted (TH05-HY)
5G Wireless Test Platform	Anritsu	MT8000A	6261940327	FR1 (+MT8821C SN:6261849015)	Sep. 23, 2020	Mar. 05, 2021	Sep. 22, 2021	Conducted (TH05-HY)
Base Station (Measure)	Anritsu	MT8821C	62620025341	N/A	Oct. 06, 2020	Mar. 05, 2021	Oct. 05, 2021	Conducted (TH05-HY)



6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.07
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.21
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power & ERP)

LTE Band 14 Maximum Average Power [dBm] (GT - LC = 0.91 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	ERP (dBm)	ERP (W)
10	1	0	QPSK		22.73		21.49	0.1409
10	1	25			22.69			
10	1	49			22.67			
10	25	0			21.73			
10	25	12			21.85			
10	25	25			21.73			
10	50	0			21.84			
10	1	0	16-QAM	-	22.17	-	20.93	0.1239
10	1	25			21.80			
10	1	49			22.07			
10	25	0			20.59			
10	25	12			20.64			
10	25	25			20.88			
10	50	0			20.71			
10	1	0	64-QAM		20.93		19.69	0.0931
10	1	25			20.83			
10	1	49			20.50			
10	25	0			19.66			
10	25	12			19.86			
10	25	25			19.69			
10	50	0			19.86			
Limit	ERP < 3W			Result			Pass	



LTE Band 14 Maximum Average Power [dBm] (GT - LC = 0.91 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	ERP (dBm)	ERP (W)
5	1	0	QPSK	22.59	22.65	22.64	21.42	0.1387
5	1	12		22.62	22.62	22.61		
5	1	24		22.59	22.66	22.53		
5	12	0		21.56	21.69	21.64		
5	12	7		21.78	21.81	21.77		
5	12	13		21.55	21.72	21.67		
5	25	0		21.79	21.77	21.79		
5	1	0	16-QAM	22.06	22.08	22.06	20.84	0.1213
5	1	12		21.69	21.74	21.68		
5	1	24		21.92	22.03	21.96		
5	12	0		20.42	20.57	20.43		
5	12	7		20.55	20.54	20.58		
5	12	13		20.76	20.84	20.69		
5	25	0		20.56	20.63	20.57		
5	1	0	64-QAM	20.91	20.86	20.78	19.67	0.0927
5	1	12		20.73	20.75	20.66		
5	1	24		20.34	20.50	20.41		
5	12	0		19.66	19.61	19.57		
5	12	7		19.73	19.78	19.72		
5	12	13		19.55	19.63	19.61		
5	25	0		19.82	19.85	19.72		
Limit	ERP < 3W			Result			Pass	



Appendix B. Test Results of Radiated Test

LTE Band 14

LTE Band 14 / 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)
Lowest	1577	-58.93	-42.15	-16.78	-67.43	-64.28	0.90	8.39	H
	2365	-53.08	-13	-40.08	-66.67	-60.32	1.12	10.51	H
	3153	-57.21	-13	-44.21	-72.73	-65.43	1.30	11.67	H
									H
									H
	1577	-59.20	-42.15	-17.05	-67.18	-64.55	0.90	8.39	V
	2365	-54.81	-13	-41.81	-68.15	-62.05	1.12	10.51	V
	3153	-56.62	-13	-43.62	-72.56	-64.84	1.30	11.67	V
									V
									V
Middle	1582	-59.32	-42.15	-17.17	-67.78	-64.68	0.90	8.41	H
	2373	-54.52	-13	-41.52	-68.06	-61.77	1.12	10.52	H
	3163	-56.93	-13	-43.93	-72.47	-65.17	1.30	11.69	H
									H
									H
	1582	-59.81	-42.15	-17.66	-67.79	-65.17	0.90	8.41	V
	2373	-54.24	-13	-41.24	-67.58	-61.49	1.12	10.52	V
	3163	-55.91	-13	-42.91	-71.88	-64.15	1.30	11.69	V
									V
									V



Highest	1587	-59.12	-42.15	-16.97	-67.55	-64.50	0.90	8.43	H
	2380	-56.73	-13	-43.73	-70.24	-63.99	1.12	10.53	H
	3173	-56.61	-13	-43.61	-72.16	-64.87	1.30	11.72	H
									H
									H
	1587	-59.57	-42.15	-17.42	-67.55	-64.95	0.90	8.43	V
	2380	-56.21	-13	-43.21	-69.57	-63.47	1.12	10.53	V
	3173	-56.36	-13	-43.36	-72.37	-64.62	1.30	11.72	V
									V
									V

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