FCC Test Report

(Spot Check: ENDC: n25 + LTE Band 12)

Report No.:	RFBHQC-WTW-P21030610C
FCC ID:	2AQ68T99W175M
Original FCC ID:	2AQ68T99W175
Test Model:	T99W175M
Received Date:	Sep. 06, 2021
Test Date:	Oct. 21 ~ Oct. 31, 2021
Issued Date:	Dec. 30, 2021
Applicant:	Hon Lin Technology Co., Ltd.
Address:	11F, No. 32, Jihu Rd., Neihu Dist., Taipei City 114, Taiwan R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location(1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number(1):	788550 / TW0003
Test Location(2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration / Designation Number(2):	281270 / TW0032

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Release Control Record

Issue No.	Description	Date Issued
RFBHQC-WTW-P21030610C	Original release	Dec. 30, 2021

1 Certificate of Conformity

Product:	5G WWAN Module
Brand:	Foxconn
Test Model:	T99W175M
Sample Status:	Engineering Sample
Applicant:	Hon Lin Technology Co., Ltd.
Test Date:	Oct. 21 ~ Oct. 31, 2021
Standards:	FCC Part 24, Subpart E FCC Part 27, Subpart C, H

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Pettie Chen , **Date:** Dec. 30, 2021

Pettie Chen / Senior Specialist

Approved by : Jeremy Lin , **Date:** Dec. 30, 2021

Jeremy Lin / Project Engineer

2 Summary of Test Results

For n25

Applied Standard: FCC Part 24 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 24.232	Effective Isotropically Radiated Power	Pass	Meet the requirement of limit.
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -36.03dB at 3825.00MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For LTE Band 12

FCC Clause	Applied Standard: FCC Part 27 & Part 2		
LTE B12	Test Item	Result	Remarks
2.1046 27.50(c)	Equivalent radiated power	Pass	Meet the requirement of limit.
2.1053 27.53(g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -39.17dB at 1403.00MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Rohde & Schwarz	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer KEYSIGHT	N9020B	MY60110440	Dec. 18, 2020	Dec. 17, 2021
BILOG Antenna SCHWARZBECK	VULB9168	1213	Nov. 04, 2020	Nov. 03, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	995	Nov. 22, 2020	Nov. 21, 2021
Preamplifier EMCI	EMC330N	980782	Jan. 12, 2021	Jan. 11, 2022
Preamplifier EMCI	EMC118A45SE	980808	Jan. 12, 2021	Jan. 11, 2022
Preamplifier EMCI	EMC184045SE	980788	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMC104-SM-SM-(9000+2000+1000)	201243+ 201231+ 210102	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMCCFD400-NM-NM-(9000+300+500)	201236+ 201235+ 201233	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMC101G-KM-KM-(5000+3000+2000)	201260+201257+201254	Jan. 12, 2021	Jan. 11, 2022
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Max-Full	MF-7802BS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208674	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/ MY55190007/MY55210005	Jul. 12, 2021	Jul. 11, 2022
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Standard Temperature And Humidity Chamber GIANT FORCE	GTH-120-40-CP-AR	MAA1306-019	Sep. 10, 2021	Sep. 09, 2022
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 02, 2021	Jun. 01, 2022
DC power supply Keysight	U8002A	MY56330015	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in WM Chamber 8.

3 General Information

3.1 General Description of EUT

Product	5G WWAN Module
Brand	Foxconn
Test Model	T99W175M
Sample Status	Engineering Sample
Power Supply Rating	5 Vdc (Host equipment) 3.135Vdc~3.63Vdc (Module)

n25

Modulation Type	$\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM					
Waveform Type	CP-OFDM, DFT-s-OFDM					
Operating Frequency	n25 (Channel Bandwidth 5MHz)	1852.5MHz ~ 1912.5MHz				
	n25 (Channel Bandwidth 10MHz)	1855.0MHz ~ 1910.0MHz				
	n25 (Channel Bandwidth 15MHz)	1857.5MHz ~ 1907.5MHz				
	n25 (Channel Bandwidth 20MHz)	1860.0MHz ~ 1905.0MHz				
Max. EIRP Power		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
	n25 (Channel Bandwidth 5MHz)	855.067mW (29.32dBm)	810.961mW (29.09dBm)	590.201mW (27.71dBm)	486.407mW (26.87dBm)	298.538mW (24.75dBm)
	n25 (Channel Bandwidth 10MHz)	829.851mW (29.19dBm)	807.235mW (29.07dBm)	608.135mW (27.84dBm)	483.059mW (26.84dBm)	313.329mW (24.96dBm)
	n25 (Channel Bandwidth 15MHz)	841.395mW (29.25dBm)	799.834mW (29.03dBm)	576.766mW (27.61dBm)	460.257mW (26.63dBm)	305.492mW (24.85dBm)
	n25 (Channel Bandwidth 20MHz)	827.942mW (29.18dBm)	769.130mW (28.86dBm)	571.479mW (27.57dBm)	479.733mW (26.81dBm)	310.456mW (24.92dBm)
Emission Designator		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
	n25 (Channel Bandwidth 5MHz)	4M48G7D	4M47G7D	4M47D7W	4M47D7W	4M47D7W
	n25 (Channel Bandwidth 10MHz)	9M21G7D	9M29G7D	9M29D7W	9M29D7W	9M29D7W
	n25 (Channel Bandwidth 15MHz)	14M0G7D	14M1G7D	14M1D7W	14M1D7W	14M1D7W
	n25 (Channel Bandwidth 20MHz)	18M8G7D	18M9G7D	18M9D7W	18M9D7W	18M9D7W

LTE Band

Modulation Type	QPSK, 16QAM, 64QAM, 256QAM				
Operating Frequency	LTE Band 12 (Channel Bandwidth 1.4MHz)	699.7MHz ~ 715.3MHz			
	LTE Band 12 (Channel Bandwidth 3MHz)	700.5MHz ~ 714.5MHz			
	LTE Band 12 (Channel Bandwidth 5MHz)	701.5MHz ~ 713.5MHz			
	LTE Band 12 (Channel Bandwidth 10MHz)	704.0MHz ~ 711.0MHz			
Max. ERP Power		QPSK	16QAM	64QAM	256QAM
	LTE Band 12 (Channel Bandwidth 1.4MHz)	515.229mW (27.12dBm)	426.580mW (26.30dBm)	345.939mW (25.39dBm)	222.331mW (23.47dBm)
	LTE Band 12 (Channel Bandwidth 3MHz)	518.800mW (27.15dBm)	437.522mW (26.41dBm)	347.536mW (25.41dBm)	242.103mW (23.84dBm)
	LTE Band 12 (Channel Bandwidth 5MHz)	521.195mW (27.17dBm)	444.631mW (26.48dBm)	344.350mW (25.37dBm)	226.986mW (23.56dBm)
	LTE Band 12 (Channel Bandwidth 10MHz)	501.187mW (27.00dBm)	454.988mW (26.58dBm)	350.752mW (25.45dBm)	228.034mW (23.58dBm)
Emission Designator		QPSK	16QAM	64QAM	256QAM
	LTE Band 12 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W	1M09D7W	1M09D7W
	LTE Band 12 (Channel Bandwidth 3MHz)	2M70G7D	2M70D7W	2M70D7W	2M70D7W
	LTE Band 12 (Channel Bandwidth 5MHz)	4M49G7D	4M49D7W	4M49D7W	4M49D7W
	LTE Band 12 (Channel Bandwidth 10MHz)	8M97G7D	8M96D7W	8M96D7W	8M96D7W
Antenna Type	Refer to Note as below				
Antenna Connector	Refer to Note as below				

Accessory Device	NA
Cable Supplied	NA

Output Power / Emission Designator	n25+LTE Band 12		Maximum EIRP	Sum Bandwidth
		n25	855.067mW (29.32dBm)	8M9D7W
		LTE Band 12 (ERP)	521.195mW (27.17dBm)	
			EIRP	MAX Sum Bandwidth
		n25	654.636mW (28.16dBm)	27M8D7W
		LTE Band 12 (ERP)	426.58mW (26.30dBm)	

Note:

1. This report is a supplementary report to the original BV CPS report no.: RFBHQC-WTW-P21030610B. Difference compared with the original report is adding ENDC mode (n25+LTE B12) through software enable. Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Radiated emission and output power verification worst test refer to original report.
2. There are four Difference HW of T99W175M.

Brand	Model	HW
Foxconn	T99W175M	1. 3G+LTE+Sub6+mmWave+eSIM
		2. 3G+LTE+Sub6+mmWave+w/o eSIM
		3. 3G+LTE+Sub6+mmWave+eSIM+GNSS connector
		4. 3G+LTE+Sub6+mmWave+w/o eSIM+GNSS connector

*After pre-testing, “HW: 1. 3G+LTE+Sub6+mmWave+eSIM” is the worst for the final tests.

3. The EUT supports non-STA (ENDC) mode only, not support STA mode.

4. The following antennas were provided to the EUT.

Antenna No.	RF Chain No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connector Type
1		WHA YU	C107-511720-A	4.41	660~803	PCB	I-PEX
2		WHA YU	C107-511721-A	3.81 4.03	791~960 1447.9~1606	PCB	I-PEX
3		WHA YU	C107-511722-A	4.27 5.31	1710~2170 2500~2690	PCB	I-PEX
4		WHA YU	C107-511723-A	2.99 0.92	2300~2400 3500~3700	PCB	I-PEX
5		WHA YU	C107-511724-A	6.45	5150~5925	PCB	I-PEX
6		WHA YU	C107-511725-A	4.89	3400~3700	PCB	I-PEX
7		AVX	5000106-R1-X01	2.91	699~803	Monopole	I-PEX
8		AVX	5000107-R1-X01	2.59	791~960	Monopole	I-PEX
9		AVX	5000108-R1-X01	2.85	1427~1610	Monopole	I-PEX
10		AVX	5000109-R1-X01	2.23 2.94	1710~2200 5150~5925	Monopole	I-PEX
11		AVX	5000110-R1-X01	0.9	2300~2690	Monopole	I-PEX
12		AVX	5000111-R1-X01	0.87	3300~5000	Monopole	I-PEX
13	Tx1/ Rx1	Ethertronics	5003806	0.4 -1.61 0.39 2.95 1.98 0.38 0.83 2.31	698-821 824-960 1425-1515 1710-2200 2300-2690 3300-4200 4400-5000 5150-5925	PIFA	I-PEX
	Rx2	Ethertronics	5003807	-2.24 -4.52 2.87 2.99 2.93 2.91 2.23 -0.85 -3.04	716-821 824-960 1425-1515 1557-1610 1805-2200 2300-2690 3300-4200 4400-5000 5150-5925	PIFA	I-PEX
	Tx2/ Rx3	Ethertronics	5003806	2.21 2.25 -0.45 2.6	1710-2200 2300-2690 3300-4200 4400-5000	PIFA	I-PEX
	Rx4	Ethertronics	5003700	1.38 2.87 0.6 -2.09	1805-2200 2300-2690 3300-4200 4400-5000	PIFA	I-PEX

Antenna No.	RF Chain No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connector Type
14	Ant. 0 (TX/RX)	Master Wave	NA	2.4 2.2 2.9 2.9 2.9 NA	880~960 1020~2170 2545~2595 3565~3600 3900~4000 GPS	PCB	I-PEX
	Ant. 2 (TX/RX)	Master Wave	NA	NA 2.2 2.8 2.9 2.8 NA	880~960 1020~2170 2545~2595 3565~3600 3900~4000 GPS	PCB	I-PEX
	Ant. 1 (RX)	Master Wave	NA	NA 5.3 5.1 4.3 4.5 NA	880~960 1020~2170 2545~2595 3565~3600 3900~4000 GPS	PCB	I-PEX
	Ant. 3 (RX)	Master Wave	NA	1.3 6.8 3.7 6.4 6.2 3.7	880~960 1020~2170 2545~2595 3565~3600 3900~4000 GPS	PCB	I-PEX

*The antenna for the final tests as following table.

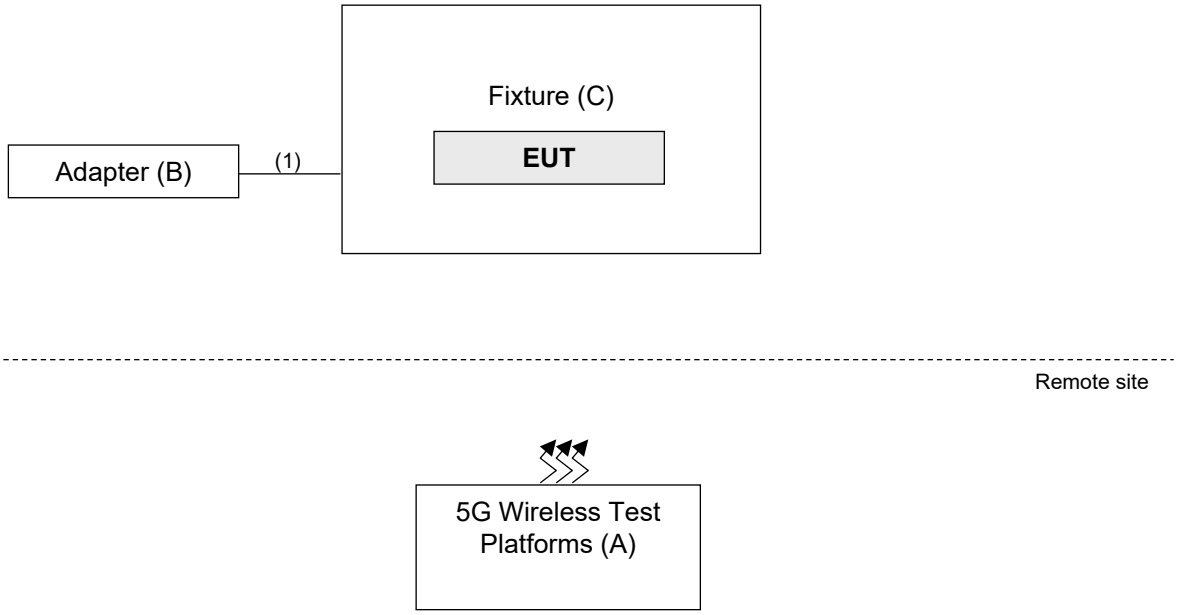
	Band	Antenna
5GNR	25 (15kHz) /5/10/15/20	Antenna 3

	Band	Antenna
LTE	12	Antenna 1

5. The EUT supports the following ENDC configuration.

5GNR	FCC 5G FR1			ENDC
	Band	SCS	Bandwidth (MHz)	
	n25	15kHz	5/10/15/20	Band 12
	n77	30kHz	20/40/50/60/80/90/100	Band 2/5/7/12/13/14/30/41/66

3.2 Configuration of System under Test



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	5G Wireless Test Platforms	Keysight	E7515B	MY60102114	NA	-
B.	Adapter	LITEON	PA-1050-39	NA	NA	-
C.	Fixture	NA	NA	NA	NA	Provided by client.

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	1.5	Y	0	-

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	Radiated Emission
n25	Z-plane
LTE Band 12	Z-plane

n25

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	EIRP	370500 to 382500	370500 (1852.5MHz), 376500 (1882.5MHz), 382500 (1912.5MHz)	5MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 13 RB Offset 1 RB / 23 RB Offset 12 RB / 0 RB Offset 12 RB / 7 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		371000 to 382000	371000 (1855.0MHz), 376500 (1882.5MHz), 382000 (1910.0MHz)	10MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 26 RB Offset 1 RB / 50 RB Offset 25 RB / 0 RB Offset 25 RB / 14 RB Offset 25 RB / 27 RB Offset 50 RB / 0 RB Offset
		371500 to 381500	371500 (1857.5MHz), 376500 (1882.5MHz), 381500 (1907.5MHz)	15MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 40 RB Offset 1 RB / 77 RB Offset 36 RB / 0 RB Offset 36 RB / 22 RB Offset 36 RB / 43 RB Offset 75 RB / 0 RB Offset
		372000 to 381000	372000 (1860.0MHz), 376500 (1882.5MHz), 381000 (1905.0MHz)	20MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 53 RB Offset 1 RB / 104 RB Offset 50RB / 0 RB Offset 50 RB / 28 RB Offset 50 RB / 56 RB Offset 100 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	370500 to 382500	382500 (1912.5MHz)	5MHz	$\pi/2$ BPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	370500 to 382500	370500 (1852.5MHz), 376500 (1882.5MHz), 382500 (1912.5MHz)	5MHz	$\pi/2$ BPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. Only output power, modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under $\pi/2$ BPSK, QPSK, 16QAM, 64QAM and 256QAM modes, the other test items were performed under worse mode according to the maximum output power.

LTE Band 12

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 2 RB Offset 1 RB / 5 RB Offset 3 RB / 0 RB Offset 3 RB / 1 RB Offset 3 RB / 3 RB Offset 6 RB / 0 RB Offset
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset 1 RB / 14 RB Offset 8 RB / 0 RB Offset 8 RB / 3 RB Offset 8 RB / 7 RB Offset 15 RB / 0 RB Offset
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0 MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	23035 to 23155	23035 (701.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. The output power for QPSK, 16QAM, 64QAM and 256QAM, measured value of QPSK is higher than 16QAM, 64QAM and 256QAM mode. Therefore the radiated emission test items was performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP / ERP	25deg. C, 70%RH	5Vdc	James Yang
Radiated Emission	23deg. C, 67%RH	120Vac, 60Hz	Greg Lin

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 24

FCC 47 CFR Part 27

ANSI/TIA/EIA-603-D-2010

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 971168 D02 Misc Rev Approv License Devices v02r01

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

For n25:
Mobile / Portable station are limited to 2 watts e.i.r.p.

For LTE Band 12:
Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.
Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

4.1.2 Test Procedures

Conducted Power Measurement:

The EUT was set up for the maximum power with 5GNR and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$EIRP = P_{Meas} + G_T$

$ERP = P_{Meas} + G_T - 2.15$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

Conducted Power Measurement:

4.1.4 Test Results

Conducted Output Power (dBm)

5GNR n25						
BW	MCS Index	Channel		372000	376500	381000
		Frequency (MHz)		1860	1882.5	1905
20M	$\pi/2$ BPSK	1	0	24.70	24.60	24.78
		1	53	24.91	24.74	24.69
		1	105	24.79	24.59	24.65
		54	0	24.25	24.16	24.48
		54	26	24.51	24.42	24.25
		54	52	24.45	24.31	24.22
		100	0	24.33	24.40	24.33
	QPSK	1	0	24.28	24.36	24.35
		1	53	24.59	24.41	24.39
		1	105	24.59	24.57	24.41
		53	0	23.86	23.94	24.15
		53	53	23.94	23.91	24.14
		53	50	23.92	23.95	23.96
		106	0	23.89	23.98	24.29
	16QAM	1	0	23.12	23.15	23.16
		1	53	23.20	23.22	23.22
		1	105	23.09	23.30	23.17
		53	0	22.89	22.74	22.75
		53	53	23.19	23.11	22.95
		53	50	23.05	22.81	22.83
		106	0	23.13	22.93	23.14
	64QAM	1	0	22.23	22.07	22.43
		1	53	22.40	22.30	22.54
		1	105	22.14	22.05	22.38
		53	0	21.86	21.94	22.05
		53	53	21.81	21.64	22.06
		53	50	22.03	21.88	21.88
		106	0	21.73	22.06	21.98
	256QAM	1	0	20.26	20.52	20.62
		1	53	20.25	20.53	20.65
		1	105	20.41	20.23	20.56
		53	0	19.74	20.19	20.07
		53	53	20.19	20.02	20.06
		53	50	20.03	20.15	20.15
		106	0	19.88	20.04	20.20

5GNR n25						
BW	MCS Index	Channel		371500	376500	381500
		Frequency (MHz)		1857.5	1882.5	1907.5
15M	$\pi/2$ BPSK	1	0	24.45	24.90	24.85
		1	39	24.61	24.46	24.62
		1	78	24.85	24.98	24.24
		39	0	24.29	24.29	24.19
		39	19	24.60	24.53	24.01
		39	40	24.63	24.69	24.49
		75	0	24.74	24.56	24.24
	QPSK	1	0	24.45	24.36	24.42
		1	39	24.63	24.76	24.54
		1	78	24.64	24.67	24.63
		39	0	24.37	24.03	24.34
		39	19	24.01	23.88	23.99
		39	40	24.16	23.96	24.13
		79	0	24.19	24.02	23.96
	16QAM	1	0	22.99	23.27	23.22
		1	39	23.09	23.04	22.87
		1	78	23.07	23.26	23.25
		39	0	22.78	23.01	23.19
		39	19	23.05	22.66	23.29
		39	40	22.66	23.34	22.85
		79	0	22.69	22.71	23.03
	64QAM	1	0	22.33	21.90	22.23
		1	39	22.19	22.01	22.26
		1	78	22.23	22.36	22.22
		39	0	22.06	21.81	22.12
		39	19	22.15	21.96	22.10
		39	40	21.63	21.86	21.96
		79	0	21.98	21.73	22.30
	256QAM	1	0	20.42	20.47	20.28
		1	39	20.58	20.40	20.27
		1	78	20.57	20.29	20.57
		39	0	20.12	19.74	19.95
		39	19	20.05	20.27	19.91
		39	40	19.81	19.94	20.30
		79	0	20.06	20.16	19.70

5GNR n25						
BW	MCS Index	Channel		371000	376500	382000
		Frequency (MHz)		1855	1882.5	1910
10M	$\pi/2$ BPSK	1	0	24.92	24.68	24.61
		1	26	24.80	24.64	24.87
		1	51	24.85	24.66	24.65
		26	0	24.12	24.75	24.23
		26	13	24.40	24.76	24.19
		26	26	24.26	24.18	24.64
		51	0	24.18	24.47	24.27
	QPSK	1	0	24.60	24.38	24.32
		1	26	24.43	24.49	24.57
		1	51	24.80	24.26	24.36
		26	0	24.09	24.02	24.12
		26	13	24.42	24.23	24.32
		26	26	24.27	24.44	24.03
		52	0	23.93	24.18	24.09
	16QAM	1	0	22.99	23.26	23.28
		1	26	23.34	23.33	23.23
		1	51	23.14	23.20	23.57
		26	0	22.88	23.01	22.71
		26	13	23.08	22.81	23.17
		26	26	23.28	22.89	22.67
		52	0	22.80	23.18	22.98
	64QAM	1	0	22.20	22.57	22.21
		1	26	22.47	22.32	22.06
		1	51	22.26	22.13	22.43
		26	0	21.87	21.99	22.29
		26	13	21.77	22.13	22.28
		26	26	21.94	21.71	22.27
		52	0	21.86	21.97	21.70
	256QAM	1	0	20.34	20.20	20.09
		1	26	20.47	20.46	20.12
		1	51	20.69	20.23	20.25
		26	0	20.19	20.25	20.33
		26	13	20.24	20.11	19.91
		26	26	19.83	20.24	20.44
		52	0	19.91	19.96	20.00

5GNR n25						
BW	MCS Index	Channel		370500	376500	382500
		Frequency (MHz)		1852.5	1882.5	1912.5
5M	$\pi/2$ BPSK	1	0	25.05	24.55	24.84
		1	12	24.76	24.70	24.55
		1	24	24.76	24.92	24.57
		12	0	24.30	24.62	24.11
		12	6	24.47	24.14	24.49
		12	13	24.59	24.54	24.18
		24	0	24.68	24.12	24.39
	QPSK	1	0	24.39	24.62	24.82
		1	12	24.38	24.62	24.34
		1	24	24.58	24.62	24.52
		12	0	23.97	24.37	24.47
		12	6	24.04	24.10	24.24
		12	13	23.98	24.34	24.03
		25	0	24.21	23.79	23.94
	16QAM	1	0	23.40	23.22	23.28
		1	12	23.01	23.44	23.18
		1	24	23.07	23.30	23.28
		12	0	22.84	23.21	23.23
		12	6	22.71	22.54	23.40
		12	13	23.05	23.25	23.32
		25	0	22.66	23.18	23.32
	64QAM	1	0	22.60	22.46	22.23
		1	12	22.44	22.54	22.33
		1	24	22.19	22.48	22.10
		12	0	22.12	21.56	21.93
		12	6	21.69	21.62	22.31
		12	13	21.59	22.15	22.29
		25	0	21.97	21.84	21.68
	256QAM	1	0	20.12	20.21	20.35
		1	12	20.48	20.34	20.48
		1	24	20.44	20.26	20.46
		12	0	20.03	20.26	20.11
		12	6	19.82	20.22	19.79
		12	13	20.23	20.30	20.08
		25	0	20.13	20.18	20.18

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	24.58	24.45	24.73
		1	24	24.51	24.74	24.63
		1	49	24.74	24.67	24.41
		25	0	23.53	23.52	23.59
		25	12	23.78	23.64	23.52
		25	25	23.84	23.89	23.80
		50	0	24.04	23.79	23.98
	16QAM	1	0	24.32	23.89	23.53
		1	24	24.20	24.00	23.99
		1	49	24.25	23.80	23.77
		25	0	22.99	22.83	22.73
		25	12	22.75	22.67	22.86
		25	25	22.81	22.47	22.77
		50	0	23.00	22.82	22.79
	64QAM	1	0	23.03	23.19	22.51
		1	24	23.01	22.88	22.93
		1	49	22.70	23.04	22.88
		25	0	22.03	21.42	21.42
		25	12	22.06	21.56	21.48
		25	25	21.87	21.30	21.82
		50	0	21.30	21.22	22.01
	256QAM	1	0	20.65	21.07	20.44
		1	24	20.84	20.87	21.32
		1	49	20.58	21.07	20.71
		25	0	20.06	19.43	19.51
		25	12	19.81	19.82	19.05
		25	25	19.75	19.42	19.37
		50	0	19.46	19.81	19.46

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	24.59	24.75	24.79
		1	12	24.60	24.44	24.35
		1	24	24.88	24.91	24.64
		12	0	23.74	23.48	23.73
		12	6	23.55	23.65	23.83
		12	13	23.70	23.64	23.71
		25	0	23.75	23.72	23.60
	16QAM	1	0	24.14	23.62	23.30
		1	12	24.05	23.79	23.87
		1	24	23.83	23.74	24.22
		12	0	22.80	22.58	22.35
		12	6	22.85	22.53	22.70
		12	13	22.83	22.71	22.58
		25	0	22.55	22.79	22.86
	64QAM	1	0	22.86	23.02	22.84
		1	12	23.11	22.77	22.92
		1	24	22.85	23.02	22.72
		12	0	21.63	21.88	21.43
		12	6	21.62	21.66	21.77
		12	13	21.74	21.71	21.47
		25	0	21.73	21.73	21.73
	256QAM	1	0	20.37	21.30	21.11
		1	12	20.88	20.74	20.85
		1	24	20.93	21.01	20.70
		12	0	19.74	20.09	19.27
		12	6	19.68	19.50	19.66
		12	13	19.11	19.26	19.55
		25	0	20.11	20.08	20.00

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	24.73	24.80	24.36
		1	7	24.33	24.89	24.41
		1	14	24.40	24.44	24.70
		8	0	23.90	23.42	23.51
		8	3	23.58	23.81	23.36
		8	7	23.64	23.84	23.74
		15	0	23.94	23.89	23.73
	16QAM	1	0	23.96	23.87	24.01
		1	7	23.90	23.66	24.06
		1	14	23.78	24.15	23.69
		8	0	22.50	22.74	22.51
		8	3	22.82	22.67	22.72
		8	7	22.94	22.89	22.81
		15	0	22.89	22.72	22.72
	64QAM	1	0	22.92	22.59	22.74
		1	7	22.90	23.01	23.01
		1	14	22.44	23.15	22.72
		8	0	21.78	21.99	21.24
		8	3	21.92	22.15	21.30
		8	7	21.50	21.67	21.78
		15	0	21.69	21.80	21.86
	256QAM	1	0	20.96	20.99	20.79
		1	7	21.07	20.86	21.58
		1	14	20.80	21.08	20.46
		8	0	19.68	19.86	19.74
		8	3	19.83	19.52	19.49
		8	7	19.93	19.79	19.61
		15	0	20.25	19.90	19.94

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	24.76	24.53	24.31
		1	2	24.86	24.67	24.46
		1	5	24.37	24.43	24.29
		3	0	24.67	24.52	24.34
		3	1	24.77	24.54	24.24
		3	3	24.78	24.68	24.51
		6	0	23.59	23.45	23.28
	16QAM	1	0	24.04	23.88	23.59
		1	2	23.85	23.72	23.89
		1	5	23.81	23.82	23.31
		3	0	23.90	23.41	23.37
		3	1	23.81	23.51	23.24
		3	3	23.84	23.70	23.51
		6	0	22.79	22.87	22.71
	64QAM	1	0	22.92	22.82	22.23
		1	2	23.13	22.74	22.74
		1	5	22.59	23.04	22.34
		3	0	22.77	22.54	22.64
		3	1	23.13	22.73	22.06
		3	3	22.24	22.69	22.35
		6	0	22.10	21.73	21.75
	256QAM	1	0	20.78	21.03	20.07
		1	2	21.21	20.89	20.71
		1	5	21.02	21.12	19.91
		3	0	20.65	20.23	20.60
		3	1	21.13	20.61	20.20
		3	3	20.67	20.35	20.13
		6	0	19.91	20.13	19.76

EIRP / ERP Power (dBm)

5GNR n25						
BW	MCS Index	Channel		372000	376500	381000
		Frequency (MHz)		1860	1882.5	1905
20M	$\pi/2$ BPSK	1	0	28.97	28.87	29.05
		1	53	**29.18**	29.01	28.96
		1	105	29.06	28.86	28.92
		54	0	28.52	28.43	28.75
		54	26	28.78	28.69	28.52
		54	52	28.72	28.58	28.49
		100	0	28.60	28.67	28.60
	QPSK	1	0	28.55	28.63	28.62
		1	53	**28.86**	28.68	28.66
		1	105	**28.86**	28.84	28.68
		53	0	28.13	28.21	28.42
		53	53	28.21	28.18	28.41
		53	50	28.19	28.22	28.23
		106	0	28.16	28.25	28.56
	16QAM	1	0	27.39	27.42	27.43
		1	53	27.47	27.49	27.49
		1	105	27.36	**27.57**	27.44
		53	0	27.16	27.01	27.02
		53	53	27.46	27.38	27.22
		53	50	27.32	27.08	27.10
		106	0	27.40	27.20	27.41
	64QAM	1	0	26.50	26.34	26.70
		1	53	26.67	26.57	**26.81**
		1	105	26.41	26.32	26.65
		53	0	26.13	26.21	26.32
		53	53	26.08	25.91	26.33
		53	50	26.30	26.15	26.15
		106	0	26.00	26.33	26.25
	256QAM	1	0	24.53	24.79	24.89
		1	53	24.52	24.80	**24.92**
		1	105	24.68	24.50	24.83
		53	0	24.01	24.46	24.34
		53	53	24.46	24.29	24.33
		53	50	24.30	24.42	24.42
		106	0	24.15	24.31	24.47

*EIRP = Conducted + antenna gain (4.27dBi)

5GNR n25						
BW	MCS Index	Channel		371500	376500	381500
		Frequency (MHz)		1857.5	1882.5	1907.5
15M	$\pi/2$ BPSK	1	0	28.72	29.17	29.12
		1	39	28.88	28.73	28.89
		1	78	29.12	**29.25**	28.51
		39	0	28.56	28.56	28.46
		39	19	28.87	28.80	28.28
		39	40	28.90	28.96	28.76
		75	0	29.01	28.83	28.51
	QPSK	1	0	28.72	28.63	28.69
		1	39	28.90	**29.03**	28.81
		1	78	28.91	28.94	28.90
		39	0	28.64	28.30	28.61
		39	19	28.28	28.15	28.26
		39	40	28.43	28.23	28.40
		79	0	28.46	28.29	28.23
	16QAM	1	0	27.26	27.54	27.49
		1	39	27.36	27.31	27.14
		1	78	27.34	27.53	27.52
		39	0	27.05	27.28	27.46
		39	19	27.32	26.93	27.56
		39	40	26.93	**27.61**	27.12
		79	0	26.96	26.98	27.30
	64QAM	1	0	26.60	26.17	26.50
		1	39	26.46	26.28	26.53
		1	78	26.50	**26.63**	26.49
		39	0	26.33	26.08	26.39
		39	19	26.42	26.23	26.37
		39	40	25.90	26.13	26.23
		79	0	26.25	26.00	26.57
	256QAM	1	0	24.69	24.74	24.55
		1	39	**24.85**	24.67	24.54
		1	78	24.84	24.56	24.84
		39	0	24.39	24.01	24.22
		39	19	24.32	24.54	24.18
		39	40	24.08	24.21	24.57
		79	0	24.33	24.43	23.97

*EIRP = Conducted + antenna gain (4.27dBi)

5GNR n25						
BW	MCS Index	Channel		371000	376500	382000
		Frequency (MHz)		1855	1882.5	1910
10M	$\pi/2$ BPSK	1	0	**29.19**	28.95	28.88
		1	26	29.07	28.91	29.14
		1	51	29.12	28.93	28.92
		26	0	28.39	29.02	28.50
		26	13	28.67	29.03	28.46
		26	26	28.53	28.45	28.91
		51	0	28.45	28.74	28.54
	QPSK	1	0	28.87	28.65	28.59
		1	26	28.70	28.76	28.84
		1	51	**29.07**	28.53	28.63
		26	0	28.36	28.29	28.39
		26	13	28.69	28.50	28.59
		26	26	28.54	28.71	28.30
		52	0	28.20	28.45	28.36
	16QAM	1	0	27.26	27.53	27.55
		1	26	27.61	27.60	27.50
		1	51	27.41	27.47	**27.84**
		26	0	27.15	27.28	26.98
		26	13	27.35	27.08	27.44
		26	26	27.55	27.16	26.94
		52	0	27.07	27.45	27.25
	64QAM	1	0	26.47	**26.84**	26.48
		1	26	26.74	26.59	26.33
		1	51	26.53	26.40	26.70
		26	0	26.14	26.26	26.56
		26	13	26.04	26.40	26.55
		26	26	26.21	25.98	26.54
		52	0	26.13	26.24	25.97
	256QAM	1	0	24.61	24.47	24.36
		1	26	24.74	24.73	24.39
		1	51	**24.96**	24.50	24.52
		26	0	24.46	24.52	24.60
		26	13	24.51	24.38	24.18
		26	26	24.10	24.51	24.71
		52	0	24.18	24.23	24.27

*EIRP = Conducted + antenna gain (4.27dBi)

5GNR n25						
BW	MCS Index	Channel		370500	376500	382500
		Frequency (MHz)		1852.5	1882.5	1912.5
5M	$\pi/2$ BPSK	1	0	**29.32**	28.82	29.11
		1	12	29.03	28.97	28.82
		1	24	29.03	29.19	28.84
		12	0	28.57	28.89	28.38
		12	6	28.74	28.41	28.76
		12	13	28.86	28.81	28.45
		24	0	28.95	28.39	28.66
	QPSK	1	0	28.66	28.89	**29.09**
		1	12	28.65	28.89	28.61
		1	24	28.85	28.89	28.79
		12	0	28.24	28.64	28.74
		12	6	28.31	28.37	28.51
		12	13	28.25	28.61	28.30
		25	0	28.48	28.06	28.21
	16QAM	1	0	27.67	27.49	27.55
		1	12	27.28	**27.71**	27.45
		1	24	27.34	27.57	27.55
		12	0	27.11	27.48	27.50
		12	6	26.98	26.81	27.67
		12	13	27.32	27.52	27.59
		25	0	26.93	27.45	27.59
	64QAM	1	0	**26.87**	26.73	26.50
		1	12	26.71	26.81	26.60
		1	24	26.46	26.75	26.37
		12	0	26.39	25.83	26.20
		12	6	25.96	25.89	26.58
		12	13	25.86	26.42	26.56
		25	0	26.24	26.11	25.95
	256QAM	1	0	24.39	24.48	24.62
		1	12	**24.75**	24.61	**24.75**
		1	24	24.71	24.53	24.73
		12	0	24.30	24.53	24.38
		12	6	24.09	24.49	24.06
		12	13	24.50	24.57	24.35
		25	0	24.40	24.45	24.45

*EIRP = Conducted + antenna gain (4.27dBi)

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	26.84	26.71	26.99
		1	24	26.77	**27.00**	26.89
		1	49	**27.00**	26.93	26.67
		25	0	25.79	25.78	25.85
		25	12	26.04	25.90	25.78
		25	25	26.10	26.15	26.06
		50	0	26.30	26.05	26.24
	16QAM	1	0	**26.58**	26.15	25.79
		1	24	26.46	26.26	26.25
		1	49	26.51	26.06	26.03
		25	0	25.25	25.09	24.99
		25	12	25.01	24.93	25.12
		25	25	25.07	24.73	25.03
		50	0	25.26	25.08	25.05
	64QAM	1	0	25.29	**25.45**	24.77
		1	24	25.27	25.14	25.19
		1	49	24.96	25.30	25.14
		25	0	24.29	23.68	23.68
		25	12	24.32	23.82	23.74
		25	25	24.13	23.56	24.08
		50	0	23.56	23.48	24.27
	256QAM	1	0	22.91	23.33	22.70
		1	24	23.10	23.13	**23.58**
		1	49	22.84	23.33	22.97
		25	0	22.32	21.69	21.77
		25	12	22.07	22.08	21.31
		25	25	22.01	21.68	21.63
		50	0	21.72	22.07	21.72

*ERP = Conducted + antenna gain (4.41dBi)-2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	26.85	27.01	27.05
		1	12	26.86	26.70	26.61
		1	24	27.14	**27.17**	26.90
		12	0	26.00	25.74	25.99
		12	6	25.81	25.91	26.09
		12	13	25.96	25.90	25.97
		25	0	26.01	25.98	25.86
	16QAM	1	0	26.40	25.88	25.56
		1	12	26.31	26.05	26.13
		1	24	26.09	26.00	**26.48**
		12	0	25.06	24.84	24.61
		12	6	25.11	24.79	24.96
		12	13	25.09	24.97	24.84
		25	0	24.81	25.05	25.12
	64QAM	1	0	25.12	25.28	25.10
		1	12	**25.37**	25.03	25.18
		1	24	25.11	25.28	24.98
		12	0	23.89	24.14	23.69
		12	6	23.88	23.92	24.03
		12	13	24.00	23.97	23.73
		25	0	23.99	23.99	23.99
	256QAM	1	0	22.63	**23.56**	23.37
		1	12	23.14	23.00	23.11
		1	24	23.19	23.27	22.96
		12	0	22.00	22.35	21.53
		12	6	21.94	21.76	21.92
		12	13	21.37	21.52	21.81
		25	0	22.37	22.34	22.26

*ERP = Conducted + antenna gain (4.41dBi)-2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	26.99	27.06	26.62
		1	7	26.59	**27.15**	26.67
		1	14	26.66	26.70	26.96
		8	0	26.16	25.68	25.77
		8	3	25.84	26.07	25.62
		8	7	25.90	26.10	26.00
		15	0	26.20	26.15	25.99
	16QAM	1	0	26.22	26.13	26.27
		1	7	26.16	25.92	26.32
		1	14	26.04	**26.41**	25.95
		8	0	24.76	25.00	24.77
		8	3	25.08	24.93	24.98
		8	7	25.20	25.15	25.07
		15	0	25.15	24.98	24.98
	64QAM	1	0	25.18	24.85	25.00
		1	7	25.16	25.27	25.27
		1	14	24.70	**25.41**	24.98
		8	0	24.04	24.25	23.50
		8	3	24.18	24.41	23.56
		8	7	23.76	23.93	24.04
		15	0	23.95	24.06	24.12
	256QAM	1	0	23.22	23.25	23.05
		1	7	23.33	23.12	**23.84**
		1	14	23.06	23.34	22.72
		8	0	21.94	22.12	22.00
		8	3	22.09	21.78	21.75
		8	7	22.19	22.05	21.87
		15	0	22.51	22.16	22.20

*ERP = Conducted + antenna gain (4.41dBi)-2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	27.02	26.79	26.57
		1	2	**27.12**	26.93	26.72
		1	5	26.63	26.69	26.55
		3	0	26.93	26.78	26.60
		3	1	27.03	26.80	26.50
		3	3	27.04	26.94	26.77
		6	0	25.85	25.71	25.54
	16QAM	1	0	**26.30**	26.14	25.85
		1	2	26.11	25.98	26.15
		1	5	26.07	26.08	25.57
		3	0	26.16	25.67	25.63
		3	1	26.07	25.77	25.50
		3	3	26.10	25.96	25.77
		6	0	25.05	25.13	24.97
	64QAM	1	0	25.18	25.08	24.49
		1	2	**25.39**	25.00	25.00
		1	5	24.85	25.30	24.60
		3	0	25.03	24.80	24.90
		3	1	**25.39**	24.99	24.32
		3	3	24.50	24.95	24.61
		6	0	24.36	23.99	24.01
	256QAM	1	0	23.04	23.29	22.33
		1	2	**23.47**	23.15	22.97
		1	5	23.28	23.38	22.17
		3	0	22.91	22.49	22.86
		3	1	23.39	22.87	22.46
		3	3	22.93	22.61	22.39
		6	0	22.17	22.39	22.02

*ERP = Conducted + antenna gain (4.41dBi)-2.15

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

For n25:
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. The emission limit equal to –13dBm.

For LTE Band 12:
According to FCC 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, 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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

4.2.2 Test Procedure

a. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
d. Following C63.26 section 5.5 and 5.2.7
   - EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   - ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

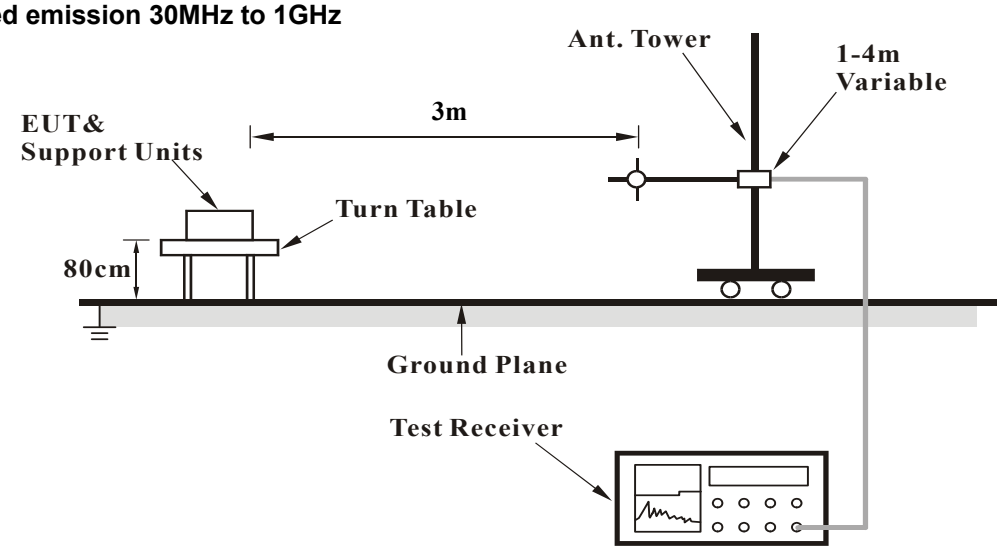
Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.2.3 Deviation from Test Standard

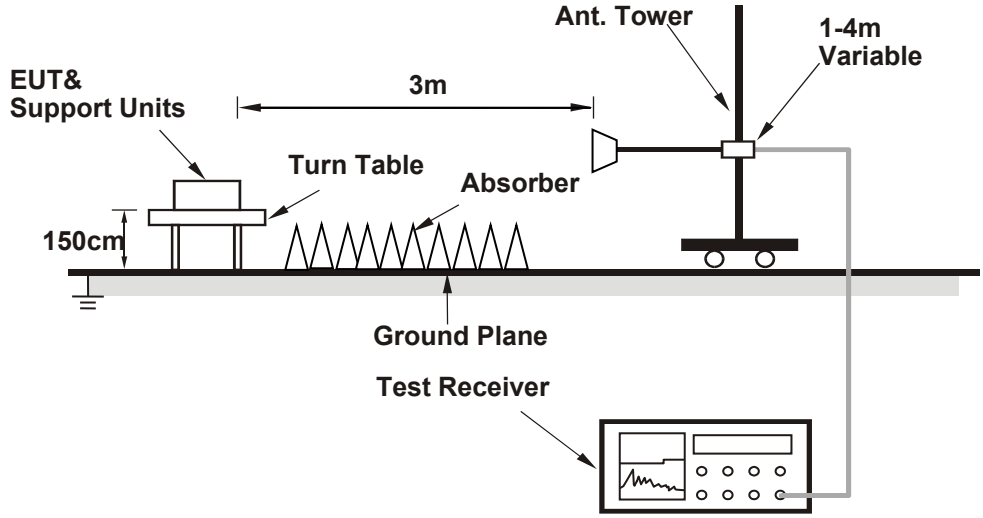
No deviation.

4.2.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.5 Test Results

Below 1GHz

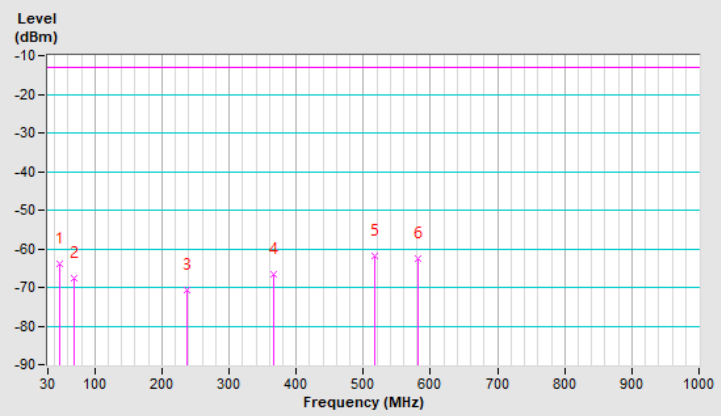
n25, Channel Bandwidth 5MHz

Mode	TX channel 382500 (1912.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	47.46	-63.92	-13.00	-50.92	1.56 H	6	40.30	-104.22
2	69.77	-67.73	-13.00	-54.73	1.78 H	132	38.41	-106.14
3	236.61	-70.55	-13.00	-57.55	2.26 H	353	34.26	-104.81
4	365.62	-66.64	-13.00	-53.64	1.04 H	241	34.03	-100.67
5	516.94	-61.90	-13.00	-48.90	1.52 H	182	35.28	-97.18
6	581.93	-62.39	-13.00	-49.39	2.23 H	22	33.50	-95.89

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

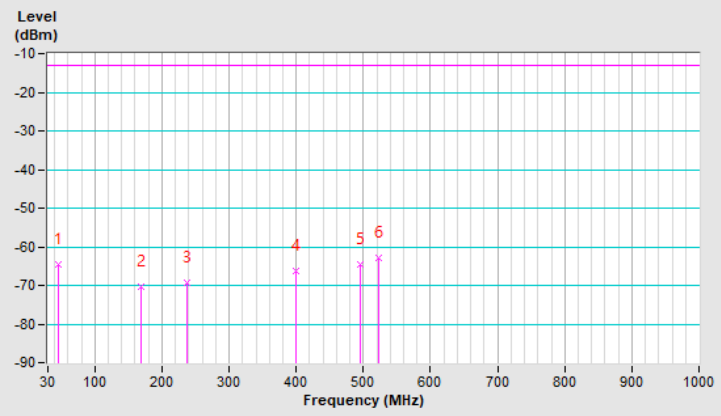


Mode	TX channel 382500 (1912.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	46.49	-64.57	-13.00	-51.57	1.65 V	346	39.66	-104.23
2	169.68	-70.30	-13.00	-57.30	2.23 V	192	33.88	-104.18
3	237.58	-69.26	-13.00	-56.26	1.44 V	331	35.44	-104.70
4	399.57	-66.26	-13.00	-53.26	1.59 V	15	33.74	-100.00
5	494.63	-64.72	-13.00	-51.72	1.92 V	145	32.96	-97.68
6	523.73	-63.01	-13.00	-50.01	1.04 V	15	34.05	-97.06

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



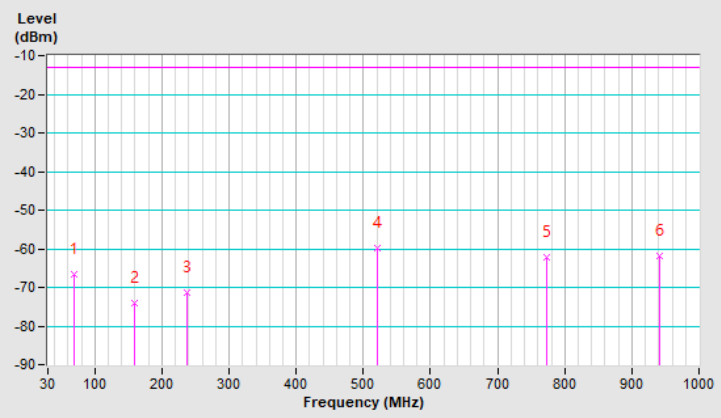
LTE Band 12, Channel Bandwidth 5MHz

Mode	TX channel 23035 (701.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	69.77	-66.52	-13.00	-53.52	1.85 H	5	41.77	-108.29
2	159.98	-74.14	-13.00	-61.14	1.63 H	5	31.80	-105.94
3	237.58	-71.21	-13.00	-58.21	1.04 H	228	35.64	-106.85
4	520.82	-59.81	-13.00	-46.81	1.78 H	171	39.47	-99.28
5	773.99	-62.22	-13.00	-49.22	2.02 H	119	32.22	-94.44
6	941.80	-61.77	-13.00	-48.77	1.11 H	2	29.30	-91.07

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

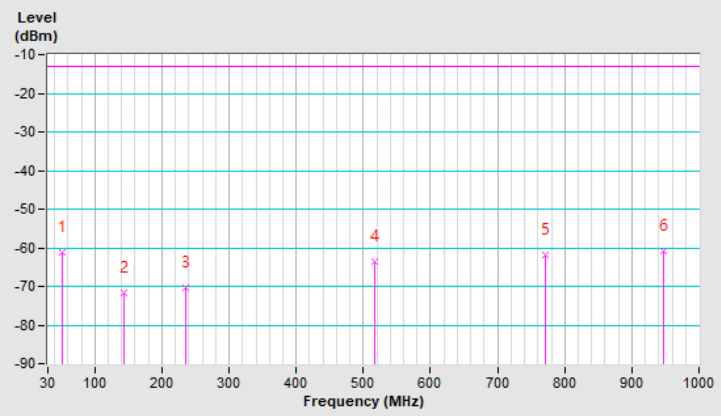


Mode	TX channel 23035 (701.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	51.34	-61.34	-13.00	-48.34	2.13 V	86	44.97	-106.31
2	142.52	-71.69	-13.00	-58.69	2.63 V	159	34.66	-106.35
3	235.64	-70.26	-13.00	-57.26	1.47 V	270	36.79	-107.05
4	516.94	-63.72	-13.00	-50.72	1.59 V	347	35.61	-99.33
5	772.05	-61.89	-13.00	-48.89	1.66 V	75	32.54	-94.43
6	946.65	-61.01	-13.00	-48.01	2.20 V	322	29.94	-90.95

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



Above 1GHz

n25, Channel Bandwidth 5MHz

Mode	TX channel 370500 (1852.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3705.00	-50.07	-13.00	-37.07	1.50 H	155	41.55	-91.62
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3705.00	-49.11	-13.00	-36.11	1.66 V	302	42.51	-91.62

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 376500 (1882.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3765.00	-49.87	-13.00	-36.87	1.51 H	153	41.51	-91.38
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3765.00	-49.13	-13.00	-36.13	1.66 V	300	42.25	-91.38

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 382500 (1912.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3825.00	-49.42	-13.00	-36.42	1.55 H	137	41.65	-91.07
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**3825.00**	**-49.03**	**-13.00**	**-36.03**	**1.66 V**	**315**	**42.04**	**-91.07**

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 12, Channel Bandwidth 5MHz

Mode	TX channel 23035 (701.5MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1403.00	-54.33	-13.00	-41.33	1.71 H	173	47.28	-101.61
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**1403.00**	**-52.17**	**-13.00**	**-39.17**	**2.22 V**	**241**	**49.44**	**-101.61**

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 23095 (707.5MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-54.02	-13.00	-41.02	1.73 H	193	47.61	-101.63
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1415.00	-52.23	-13.00	-39.23	2.21 V	229	49.40	-101.63

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 23155 (713.5MHz)	Frequency Range	1GHz ~ 8GHz
Environmental Conditions	23deg. C, 67%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1427.00	-54.49	-13.00	-41.49	1.77 H	192	47.16	-101.65
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1427.00	-52.66	-13.00	-39.66	2.01 V	232	48.99	-101.65

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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