FCC Test Report
(Part 22)

Report No.:	RFBBQZ-WTW-P20090593
Contain module FCC ID:	PY320300503
Test Model:	LM1200
Received Date:	Sep. 25, 2020
Test Date:	Oct. 19 ~ Oct. 24, 2020
Issued Date:	Nov. 02, 2020
Applicant:	NETGEAR INC.
Address:	350 East Plumeria Drive, San Jose, CA 95134, USA
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:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBBQZ-WTW-P20090593	Original release	Nov. 02, 2020

1 Certificate of Conformity

Product:	LTE modem
Brand:	Netgear
Test Model:	LM1200
Sample Status:	Engineering Sample
Applicant:	NETGEAR INC.
Test Date:	Oct. 19 ~ Oct. 24, 2020
Standards:	FCC Part 22, Subpart 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:** Nov. 02, 2020

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Nov. 02, 2020

Bruce Chen / Senior Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective radiated power	Pass	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -25.0dB at 50.37MHz.

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	3.04 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 16, 2020	Apr. 15, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 12, 2020	Jun. 11, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 08, 2020	Jun. 07, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 18, 2020	Feb. 17, 2021
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 18, 2020	Jan. 17, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 18, 2020	Jan. 17, 2021
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 08, 2020	Jun. 07, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
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
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 01, 2020	May 31, 2021
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 06, 2020	Jun. 05, 2021
DC power supply	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 HwaYa Chamber 9.

3 General Information

3.1 General Description of EUT

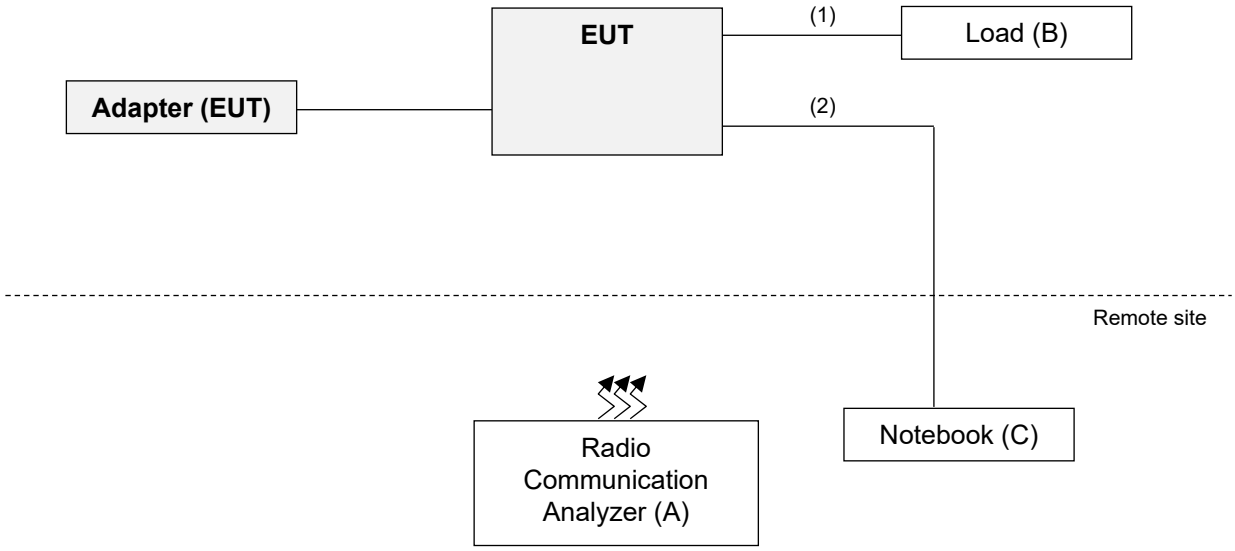
Product	LTE modem		
Brand	Netgear		
Test Model	LM1200		
Sample Status	Engineering Sample		
Power Supply Rating	5 Vdc (Adapter)		
Modulation Type	WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM		
Operating Frequency	WCDMA Band 5	826.4~846.6MHz	
	LTE Band 5 (Channel Bandwidth 1.4MHz)	824.7~848.3MHz	
	LTE Band 5 (Channel Bandwidth 3MHz)	825.5~847.5MHz	
	LTE Band 5 (Channel Bandwidth 5MHz)	826.5~846.5MHz	
	LTE Band 5 (Channel Bandwidth 10MHz)	829.0~844.0MHz	
Max. ERP Power	WCDMA Band 5	162.181mW (22.1dBm)	
		QPSK	16QAM
	LTE Band 5 (Channel Bandwidth 1.4MHz)	169.824mW (22.3dBm)	147.911mW (21.7dBm)
	LTE Band 5 (Channel Bandwidth 3MHz)	186.209mW (22.7dBm)	158.489mW (22.0dBm)
	LTE Band 5 (Channel Bandwidth 5MHz)	190.546mW (22.8dBm)	158.489mW (22.0dBm)
	LTE Band 5 (Channel Bandwidth 10MHz)	208.930mW (23.2dBm)	169.824mW (22.3dBm)
Antenna Type	Ant. 1: PIFA antenna with -1.69dBi gain Ant. 2: PIFA antenna with -3.08dBi gain		
Antenna Connector	Ant. 1: switch Ant. 2: I-pex		
Accessory Device	Refer to Note		
Cable Supplied	Refer to Note		

Note:
1. This report is a partial report. Only Effective radiated power and Radiated Spurious Emissions were verified and recorded in this report. Other testing data please refer to the original TA Technology (Shanghai) Co., Ltd. report no.: R1806A0301-R1V1 (LTE Module, Brand: Quectel, Model: EC25-AF, FCC ID: XMR201808EC25AF).
2. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
3. The EUT contains following accessory devices.

Adapter	
Brand	Netgear
Model	AD2037320
Input Power	100-240Vac~50/60Hz, 0.3A
Output Power	5.0Vdc, 2.0A

Cable	Brand	Model	Information
USB cable	HOTRON PRECISION	D0017100R20HR	1.0m shielded cable without core
RJ45 Cable 1	EKSON	HS01-C442	1.5m non-shielded cable without core
RJ45 Cable 2	EKSON	HS01-C445	1.5m non-shielded cable without core

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.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-
B.	Load	NA	NA	NA	NA	-
C.	Notebook	DELL	E5410	1HC2XM1	FCC Doc Approved	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1.5	N	0	RJ45, Accessory
2.	LAN cable	1	10	N	0	RJ45, Provided by lab

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 on X-plane. Following channel(s) was (were) selected for the final test as listed below.

WCDMA Band 5

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	4132 to 4233	4132 (826.4MHz), 4182 (836.4MHz), 4233 (846.6MHz)	WCDMA
-	Radiated Emission Below 1GHz	4132 to 4233	4233 (846.6MHz)	WCDMA
-	Radiated Emission Above 1GHz	4132 to 4233	4132 (826.4MHz), 4182 (836.4MHz), 4233 (846.6MHz)	WCDMA

LTE Band 5

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK / 16QAM	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
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK / 16QAM	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
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK / 16QAM	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
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK / 16QAM	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	20407 to 20643	20643(848.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

Test Condition:

Test Item	Environmental Conditions	Input Power (system)	Tested By
ERP	24deg. C, 66%RH	120Vac, 60Hz	Tank Wu
Radiated Emission	24deg. C, 66%RH	120Vac, 60Hz	Tank Wu

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 and References:

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

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

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 Test Procedures

EIRP / ERP Measurement:

a. Substitution method is used for E.I.R.P measurement. 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 5.2.7

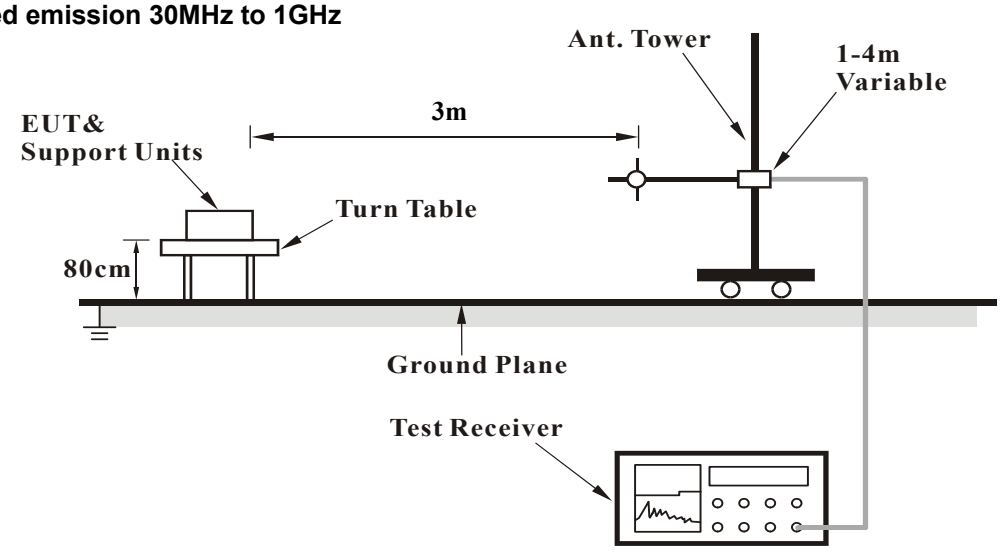
EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

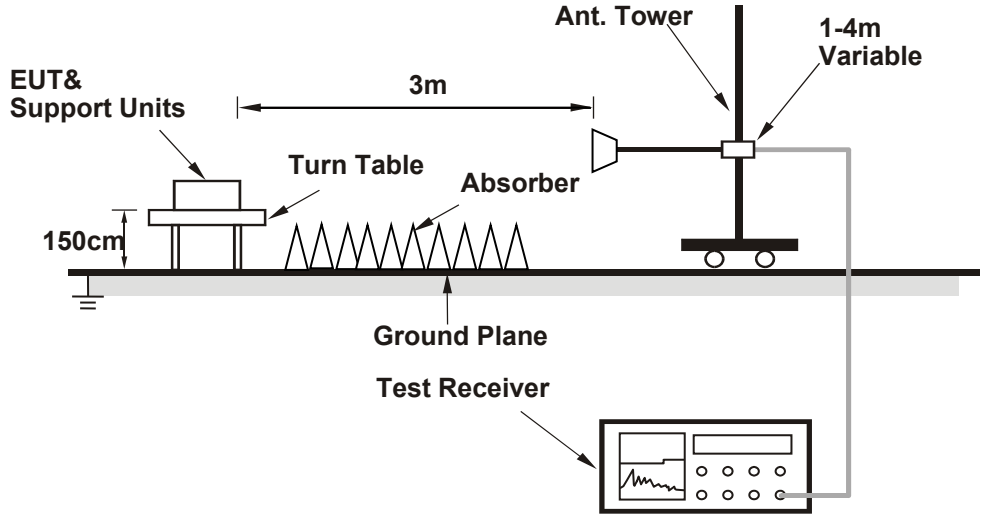
4.1.3 Test Setup

EIRP / ERP Measurement:

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).

4.1.4 Test Results

ERP Power (dBm)

WCDMA Band V

Mode	TX channel 4132, 4182, 4233							
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	826.40	-66.0	87.9	21.9	38.5	-16.6	100	185
2	836.40	-66.0	88.2	22.1	38.5	-16.4	100	182
3	846.60	-66.0	87.8	21.8	38.5	-16.7	100	179
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	826.4	-66.0	83.9	17.9	38.5	-20.6	109	226
2	836.4	-66.0	83.8	17.8	38.5	-20.7	111	224
3	846.6	-66.0	84.0	18.0	38.5	-20.5	110	219

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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

Modulation Type: QPSK

LTE Band 5, Channel Bandwidth: 1.4MHz

Mode		TX channel 20407, 20525, 20643						
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	824.70	-66.0	87.8	21.8	38.5	-16.7	103	199
2	836.50	-66.0	88.3	22.3	38.5	-16.2	100	195
3	848.30	-66.0	88.2	22.2	38.5	-16.3	106	186
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	824.70	-66.0	83.9	17.9	38.5	-20.6	109	77
2	836.50	-66.0	84.2	18.2	38.5	-20.3	114	73
3	848.30	-66.0	84.0	18.0	38.5	-20.5	115	79

LTE Band 5, Channel Bandwidth: 3MHz

Mode		TX channel 20415, 20525, 20635						
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	825.50	-66.0	88.8	22.7	38.5	-15.8	100	197
2	836.50	-66.0	88.5	22.5	38.5	-16.0	100	199
3	847.50	-66.0	88.6	22.6	38.5	-15.9	103	189
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	825.50	-66.0	84.9	18.9	38.5	-19.6	103	72
2	836.50	-66.0	84.8	18.7	38.5	-19.8	108	82
3	847.50	-66.0	84.8	18.8	38.5	-19.7	109	79

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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

LTE Band 5, Channel Bandwidth: 5MHz

Mode		TX channel 20425, 20525, 20625						
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	826.50	-66.0	88.8	22.7	38.5	-15.8	103	196
2	836.50	-66.0	88.7	22.6	38.5	-15.9	103	191
3	846.50	-66.0	88.8	22.8	38.5	-15.7	100	199
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	826.50	-66.0	84.9	18.9	38.5	-19.6	109	81
2	836.50	-66.0	85.0	19.0	38.5	-19.5	103	75
3	846.50	-66.0	84.8	18.9	38.5	-19.6	105	77

LTE Band 5, Channel Bandwidth: 10MHz

Mode		TX channel 20450, 20525, 20600						
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	829.00	-66.2	89.1	22.9	38.5	-15.6	103	197
2	836.50	-66.0	89.2	23.2	38.5	-15.3	100	193
3	844.00	-66.0	89.0	23.0	38.5	-15.5	100	199
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	829.00	-66.2	85.0	18.8	38.5	-19.7	106	80
2	836.50	-66.0	85.0	19.0	38.5	-19.5	108	77
3	844.00	-66.0	85.2	19.2	38.5	-19.3	108	79

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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

Modulation Type: 16QAM

LTE Band 5, Channel Bandwidth: 1.4MHz

Mode		TX channel 20407, 20525, 20643						
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	824.70	-66.0	87.5	21.5	38.5	-17.0	100	190
2	836.50	-66.0	87.8	21.7	38.5	-16.8	103	196
3	848.30	-66.0	87.6	21.6	38.5	-16.9	100	196
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	824.70	-66.0	82.5	16.5	38.5	-22.0	108	172
2	836.50	-66.0	82.7	16.6	38.5	-21.9	103	72
3	848.30	-66.0	82.8	16.8	38.5	-21.7	100	79

LTE Band 5, Channel Bandwidth: 3MHz

Mode		TX channel 20415, 20525, 20635						
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	825.50	-66.0	87.8	21.7	38.5	-16.8	102	198
2	836.50	-66.0	87.8	21.7	38.5	-16.8	104	199
3	847.50	-66.0	88.0	22.0	38.5	-16.5	100	196
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	825.50	-66.0	83.8	17.7	38.5	-20.8	102	77
2	836.50	-66.0	83.9	17.9	38.5	-20.6	106	80
3	847.50	-66.0	84.1	18.1	38.5	-20.4	100	77

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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

LTE Band 5, Channel Bandwidth: 5MHz

Mode		TX channel 20425, 20525, 20625						
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	826.50	-66.0	88.0	22.0	38.5	-16.5	104	193
2	836.50	-66.0	87.9	21.9	38.5	-16.6	102	192
3	846.50	-66.0	88.1	22.1	38.5	-16.4	100	193
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	826.50	-66.0	84.0	18.0	38.5	-20.5	105	76
2	836.50	-66.0	84.2	18.2	38.5	-20.3	104	77
3	846.50	-66.0	84.0	18.0	38.5	-20.5	103	71

LTE Band 5, Channel Bandwidth: 10MHz

Mode		TX channel 20450, 20525, 20600						
Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	829.00	-66.2	88.4	22.2	38.5	-16.3	100	197
2	836.50	-66.0	88.3	22.3	38.5	-16.2	103	196
3	844.00	-66.0	88.2	22.2	38.5	-16.3	100	191
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	829.00	-66.2	84.2	18.0	38.5	-20.5	105	79
2	836.50	-66.0	83.9	17.9	38.5	-20.6	108	79
3	844.00	-66.0	84.2	18.2	38.5	-20.3	107	75

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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

4.2 Radiated Emission Measurement

4.2.1 Limits of Radiated Emission Measurement

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.

4.2.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. 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

   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.

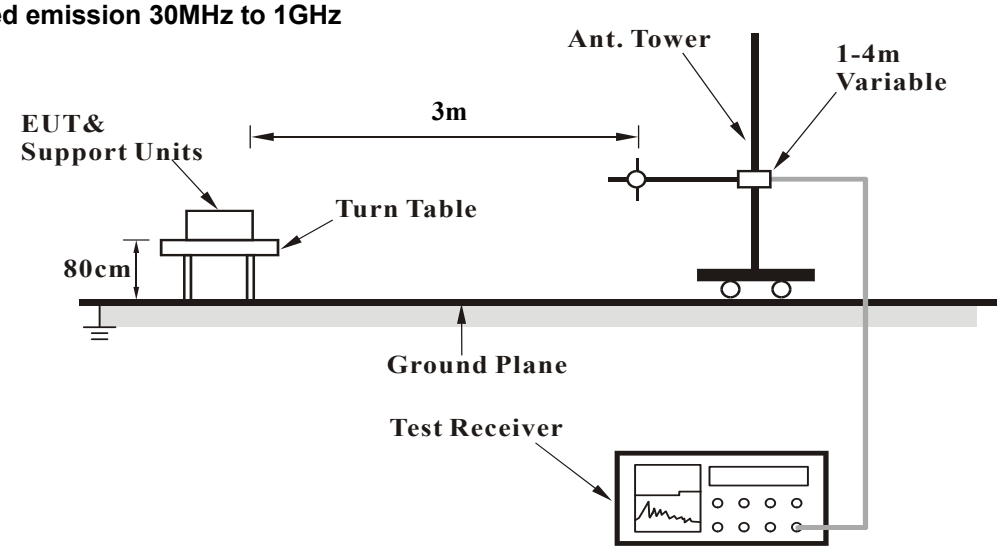
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.2.3 Deviation from Test Standard

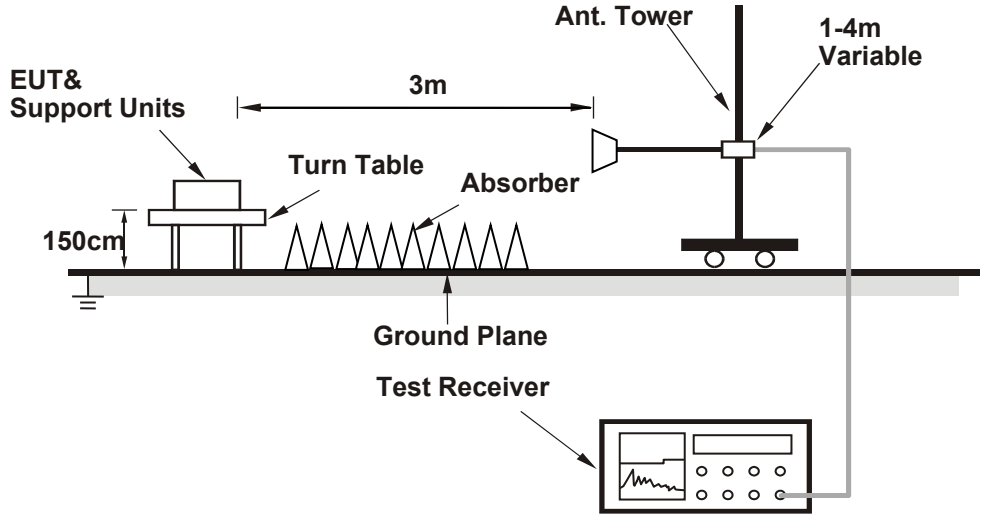
No deviation.

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

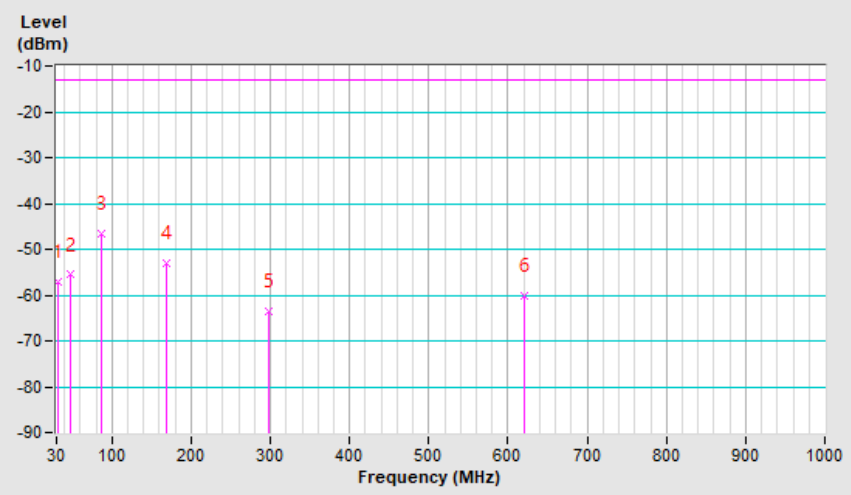
Below 1GHz
WCDMA Band 5

Mode	TX channel 4233 (846.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	31.94	-108.2	51.2	-57.0	-13.0	-44.0	100	233
2	48.43	-106.7	51.1	-55.6	-13.0	-42.6	149	321
3	86.26	-111.9	65.2	-46.7	-13.0	-33.7	100	140
4	168.71	-106.3	53.2	-53.1	-13.0	-40.1	149	274
5	298.69	-104.6	41.0	-63.6	-13.0	-50.6	200	81
6	620.73	-97.9	37.9	-60.0	-13.0	-47.0	125	241

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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.

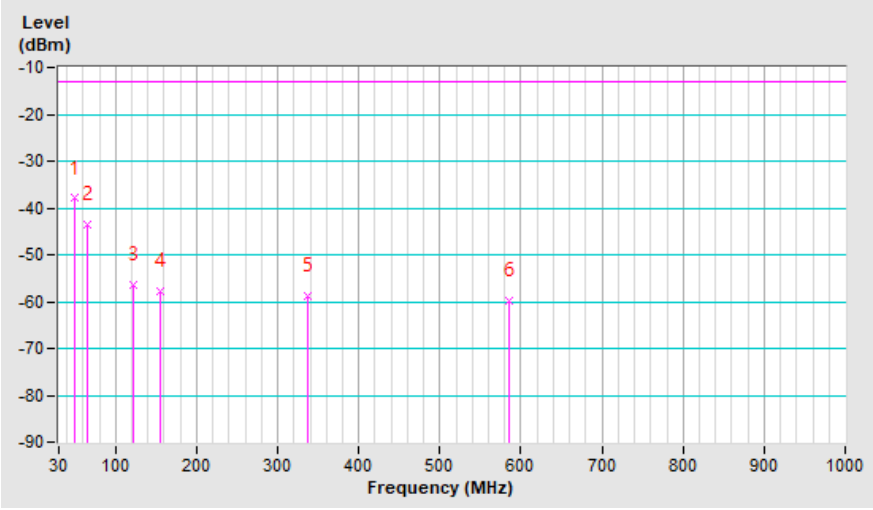


Mode	TX channel 4233 (846.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	**50.37**	**-106.7**	**68.7**	**-38.0**	**-13.0**	**-25.0**	**101**	**318**
2	64.92	-107.8	64.3	-43.5	-13.0	-30.5	125	123
3	122.15	-108.3	52.0	-56.3	-13.0	-43.3	101	123
4	156.10	-105.9	48.2	-57.7	-13.0	-44.7	200	181
5	336.52	-103.5	44.8	-58.8	-13.0	-45.8	101	13
6	585.81	-98.7	38.8	-59.9	-13.0	-46.9	150	33

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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.



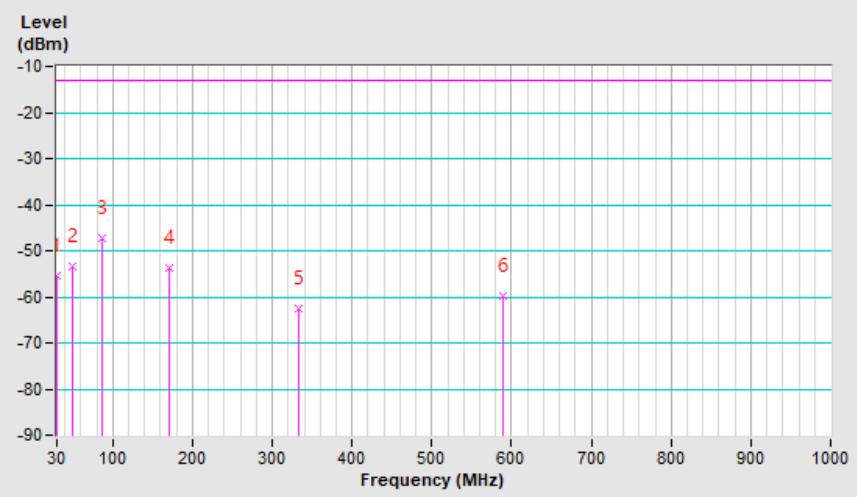
LTE Band 5, Channel Bandwidth: 1.4MHz

Mode	TX channel 20643 (848.3MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	30.00	-108.0	52.5	-55.5	-13.0	-42.5	100	32
2	49.40	-106.7	53.2	-53.5	-13.0	-40.5	150	161
3	86.26	-111.9	64.6	-47.3	-13.0	-34.3	125	56
4	171.62	-106.5	52.8	-53.7	-13.0	-40.7	200	96
5	333.61	-103.8	41.2	-62.6	-13.0	-49.6	150	52
6	589.69	-98.6	38.8	-59.8	-13.0	-46.8	150	109

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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.

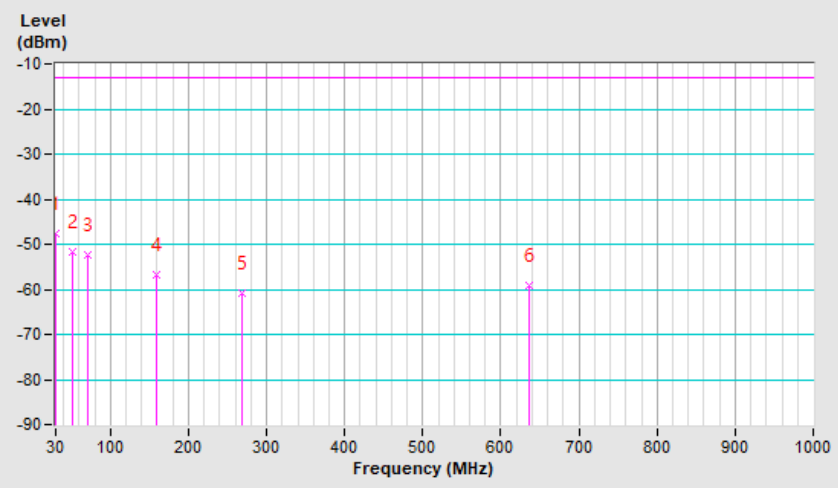


Mode	TX channel 20643 (848.3MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	30.00	-108.0	60.4	-47.6	-13.0	-34.6	100	174
2	52.31	-106.8	55.0	-51.8	-13.0	-38.8	125	77
3	71.71	-108.8	56.2	-52.5	-13.0	-39.5	100	319
4	159.98	-105.8	48.9	-56.9	-13.0	-43.9	100	180
5	268.62	-105.4	44.4	-61.0	-13.0	-48.0	150	10
6	637.22	-97.6	38.5	-59.1	-13.0	-46.1	200	353

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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
WCDMA Band 5

Mode	TX channel 4132 (826.4MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1652.80	-101.1	52.9	-48.2	-13.0	-35.2	216	180
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1652.80	-101.1	51.8	-49.3	-13.0	-36.3	377	157

Mode	TX channel 4182 (836.4MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1672.80	-101.1	53.2	-47.9	-13.0	-34.9	203	171
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1672.80	-101.1	52.1	-49.0	-13.0	-36.0	369	148

Mode	TX channel 4233 (846.6MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1693.20	-101.1	53.5	-47.6	-13.0	-34.6	206	176
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1693.20	-101.1	52.4	-48.7	-13.0	-35.7	371	152

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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.

LTE Band 5, Channel Bandwidth: 1.4MHz

Mode	TX channel 20407 (824.7MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1649.40	-103.3	46.7	-56.6	-13.0	-43.6	154	211
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1649.40	-103.3	46.4	-56.9	-13.0	-43.9	162	103

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1673.00	-103.3	46.8	-56.5	-13.0	-43.5	149	203
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1673.00	-103.3	46.4	-56.9	-13.0	-43.9	159	108

Mode	TX channel 20643 (848.3MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1696.60	-103.3	47.2	-56.1	-13.0	-43.1	159	217
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1696.60	-103.3	46.6	-56.7	-13.0	-43.7	162	112

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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.

LTE Band 5, Channel Bandwidth: 5MHz

Mode	TX channel 20425 (826.5MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1653.00	-103.3	47.1	-56.2	-13.0	-43.2	144	208
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1653.00	-103.3	46.7	-56.6	-13.0	-43.6	159	103

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1673.00	-103.3	47.1	-56.2	-13.0	-43.2	162	215
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1673.00	-103.3	46.6	-56.7	-13.0	-43.7	155	108

Mode	TX channel 20625 (846.5MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1693.00	-103.3	46.9	-56.4	-13.0	-43.4	157	211
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1693.00	-103.3	46.5	-56.8	-13.0	-43.8	162	93

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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.

LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20450 (829.0MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1658.00	-103.3	46.8	-56.5	-13.0	-43.5	162	197
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1658.00	-103.3	46.4	-56.9	-13.0	-43.9	158	99

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1673.00	-103.3	47.0	-56.3	-13.0	-43.3	152	203
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1673.00	-103.3	46.5	-56.8	-13.0	-43.8	163	118

Mode	TX channel 20600 (844.0MHz)	Frequency Range	1GHz ~ 10GHz
Environmental Conditions	24deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Tank Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1688.00	-103.3	47.0	-56.3	-13.0	-43.3	155	187
Antenna Polarity & Test Distance: Vertical at 3 M								
No.	Freq. (MHz)	Correction Factor (dB)	Reading (dBuV/m)	ERP (dBm)	Limit (dBm)	Margin (dB)	Ant. Height (m)	Table Angle (deg)
1	1688.00	-103.3	46.7	-56.6	-13.0	-43.6	162	101

Remarks:

1. ERP(dBm) = Raw Value(dBuV/m) + 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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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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