Partial FCC Test Report
(Part 22)

Report No.: RF190925C38-6

FCC ID: WIYQSC20A

Original FCC ID: XMR201706SC20A

Test Model: SC20-A

Received Date: Sep. 25, 2019

Test Date: Oct. 03 ~ Oct. 12, 2019

Issued Date: Oct. 30, 2019

Applicant: CASTLES TECHNOLOGY CO., LTD.

Address: 6F, NO. 207-5, SEC. 3, BEIXIN RD., XINDIAN DISTRICT, NEW TAIPEI CITY 23143, 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: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN

FCC Registration / Designation Number: 788550 / TW0003

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

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Release Control Record

Issue No.	Description	Date Issued
RF190925C38-6	Original release	Oct. 30, 2019

1 Certificate of Conformity

Product: LTE module

Brand: Quectel

Test Model: SC20-A

Sample Status: Identical Prototype

Applicant: CASTLES TECHNOLOGY CO., LTD.

Test Date: Oct. 03 ~ Oct. 12, 2019

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 : _____ , **Date:** Oct. 30, 2019

Polly Chien / Specialist

Approved by : _____ , **Date:** Oct. 30, 2019

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.
2.1046 22.913 (a)	Conducted Output Power	N/A	Refer to Note 1
2.1047	Modulation Characteristics	N/A	Refer to Note 1
---	Peak To Average Ratio	N/A	Refer to Note 1
2.1055 22.355	Frequency Stability	N/A	Refer to Note 1
2.1049	Occupied Bandwidth	N/A	Refer to Note 1
22.917	Band Edge Measurements	N/A	Refer to Note 1
2.1051 22.917	Conducted Spurious Emissions	N/A	Refer to Note 1
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -26.2dB at 441.28MHz.

Note:

1. This report is a partial report. Therefore, only test item of Effective Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to Sporton International (KunShan) INC. report no.: FR741007A & FR741007B for module (Brand: Quectel, Model: SC20-A).
2. 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. 15, 2019	Apr. 14, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 04, 2019	Jun. 03, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 21, 2018	Nov. 20, 2019
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Loop Antenna TESEQ	HLA 6121	45745	Jul. 01, 2019	Jun. 30, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jul. 11, 2019	Jul. 10, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 19, 2019	Feb. 18, 2020
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 19, 2019	Jan. 18, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jul. 11, 2019	Jul. 10, 2020
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 30, 2019	Jul. 29, 2020
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
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Nov. 14, 2018	Nov. 13, 2019

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 module	
Brand	Quectel	
Test Model	SC20-A	
Sample Status	Identical Prototype	
Power Supply Rating	9Vdc~48Vdc, 1.5A~0.5A 3Vdc (Battery)	
Modulation Type	GSM, GPRS: GMSK EDGE: GMSK, 8PSK WCDMA: QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM	
Operating Frequency	GSM/GPRS/EDGE	824.2 ~ 848.8 MHz
	WCDMA	826.4 ~ 846.6 MHz
	LTE 5 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 5 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 5 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 5 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
	LTE 26 (Channel Bandwidth: 1.4 MHz)	824.7 ~ 848.3 MHz
	LTE 26 (Channel Bandwidth: 3 MHz)	825.5 ~ 847.5 MHz
	LTE 26 (Channel Bandwidth: 5 MHz)	826.5 ~ 846.5 MHz
	LTE 26 (Channel Bandwidth: 10 MHz)	829 ~ 844 MHz
	LTE 26 (Channel Bandwidth: 15 MHz)	831.5 ~ 841.5 MHz
Max. ERP Power	GSM/GPRS/EDGE	1023.293mW (30.1dBm)
	WCDMA Band 5	102.329mW (20.1dBm)
		QPSK
	LTE Band 5 (Channel Bandwidth 1.4MHz)	123.027mW (20.9dBm)
	LTE Band 5 (Channel Bandwidth 3MHz)	117.490mW (20.7dBm)
	LTE Band 5 (Channel Bandwidth 5MHz)	120.226mW (20.8dBm)
	LTE Band 5 (Channel Bandwidth 10MHz)	128.825mW (21.1dBm)
	LTE Band 26 (Channel Bandwidth 1.4MHz)	123.027mW (20.9dBm)
	LTE Band 26 (Channel Bandwidth 3MHz)	125.893mW (21.0dBm)
	LTE Band 26 (Channel Bandwidth 5MHz)	125.893mW (21.0dBm)
	LTE Band 26 (Channel Bandwidth 10MHz)	120.226mW (20.8dBm)
	LTE Band 26 (Channel Bandwidth 15MHz)	134.896mW (21.3dBm)
Antenna Type	Refer to Note	
Antenna Connector	Refer to Note	
Accessory Device	Refer to note	
Cable Supplied	NA	

Note:

1. This report is a partial report. Therefore, only test item of Effective Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to Sporton International (KunShan) INC. report no.: FR741007A & FR741007B for module (Brand: Quectel, Model: SC20-A).
2. The EUT uses following antennas.

Antenna Type	Antenna Connector	Frequency	Antenna Gain (dBi)
Dipole	SMA PLUG	824-960MHz	-0.68

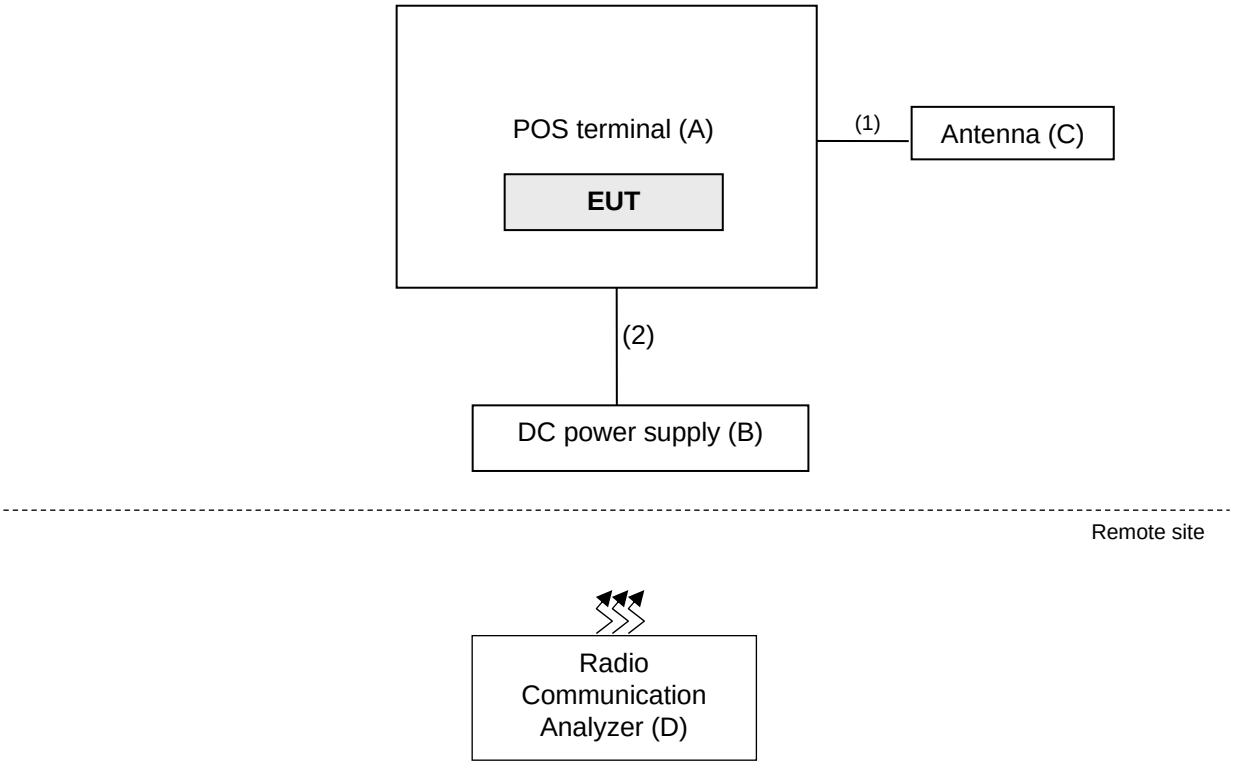
3. The EUT was installed in a specific End-product.

Product	Brand	Model
POS Terminal	CASTLES TECHNOLOGY	SATURN1000-E UPT

4. The End-product contains following accessory device.

Product	Brand	Model	Description
Battery	MITSUBISHI Lithium Manganese Dioxide Battery	CR2032	3Vdc, 210mAh

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.	POS terminal	CASTLES TECHNOLOGY	SATURN1000-E UPT	NA	FCC DoC Approved	Provided by client.
B.	DC power supply	Keysight	U8002A	MY56330015	NA	-
C.	Antenna	ARISTOTLE ENTERPRISES INC.	RFA-LTE-T100-41-3M	NA	NA	Provided by client.
D.	Radio Communication Analyzer	Anritsu	MT8860C	1702001	NA	-

Note:

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

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Antenna cable	1	3	N	0	Provided by client.
2.	Power cable	1	1	N	0	Provided by client.

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

GSM Mode

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	ERP	128 to 251	128(824.2MHz), 189(836.4MHz), 251(848.8MHz)	GPRS
-	Radiated Emission Below 1GHz	128 to 251	128(824.2MHz)	GPRS
-	Radiated Emission Above 1GHz	128 to 251	128(824.2MHz), 189(836.4MHz), 251(848.8MHz)	GPRS

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	4132 (826.4MHz)	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	20525(836.5MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		20415 to 20635	20525(836.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20525(836.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20450 to 20600	20525(836.5MHz)	10MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	20407 to 20643	20525(836.5MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20525(836.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20525(836.5MHz)	10MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	20407 to 20643	20525(836.5MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		20415 to 20635	20525(836.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20525(836.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20450 to 20600	20525(836.5MHz)	10MHz	QPSK	1 RB / 0 RB Offset

LTE Band 26

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	26797 to 27033	26915 (836.5MHz)	1.4MHz	QPSK	1 RB / 5 RB Offset
		26805 to 27025	26915 (836.5MHz)	3MHz	QPSK	1 RB / 14 RB Offset
		26815 to 27015	26915 (836.5MHz)	5MHz	QPSK	1 RB / 24 RB Offset
		26840 to 26990	26915 (836.5MHz)	10MHz	QPSK	1 RB / 49 RB Offset
		26865 to 26965	26915 (836.5MHz)	15MHz	QPSK	1 RB / 74 RB Offset
-	Radiated Emission Below 1GHz	26797 to 27033	26915 (836.5MHz)	1.4MHz	QPSK	1 RB / 5 RB Offset
		26815 to 27015	26915 (836.5MHz)	5MHz	QPSK	1 RB / 24 RB Offset
		26815 to 27015	26915 (836.5MHz)	15MHz	QPSK	1 RB / 74 RB Offset
-	Radiated Emission Above 1GHz	26797 to 27033	26915 (836.5MHz)	1.4MHz	QPSK	1 RB / 5 RB Offset
		26805 to 27025	26915 (836.5MHz)	3MHz	QPSK	1 RB / 14 RB Offset
		26815 to 27015	26915 (836.5MHz)	5MHz	QPSK	1 RB / 24 RB Offset
		26840 to 26990	26915 (836.5MHz)	10MHz	QPSK	1 RB / 49 RB Offset
		26865 to 26965	26915 (836.5MHz)	15MHz	QPSK	1 RB / 74 RB Offset

Note:

1. For radiated emission below 1GHz, low, mid and high channels were pre-tested in chamber. Low channel for GSM and WCDMA Mode were the worst case for all final tests.mid channel for LTE mode was the worst case for all final tests
2. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

Test Condition:

Test Item	Environmental Conditions	Input Power (System)	Tested By
ERP	22deg. C, 66%RH	12Vdc	Han Wu
Radiated Emission	22deg. C, 66%RH	12Vdc	Han 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

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

FCC 47 CFR Part 2
FCC 47 CFR Part 22
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-E 2016
ANSI 63.26-2015

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

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

4.1.2 Test Procedures

EIRP / ERP Measurement:

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, 5MHz for CDMA and WCDMA mode, 10MHz for LTE mode.

b. 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.

c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G

d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

Where:

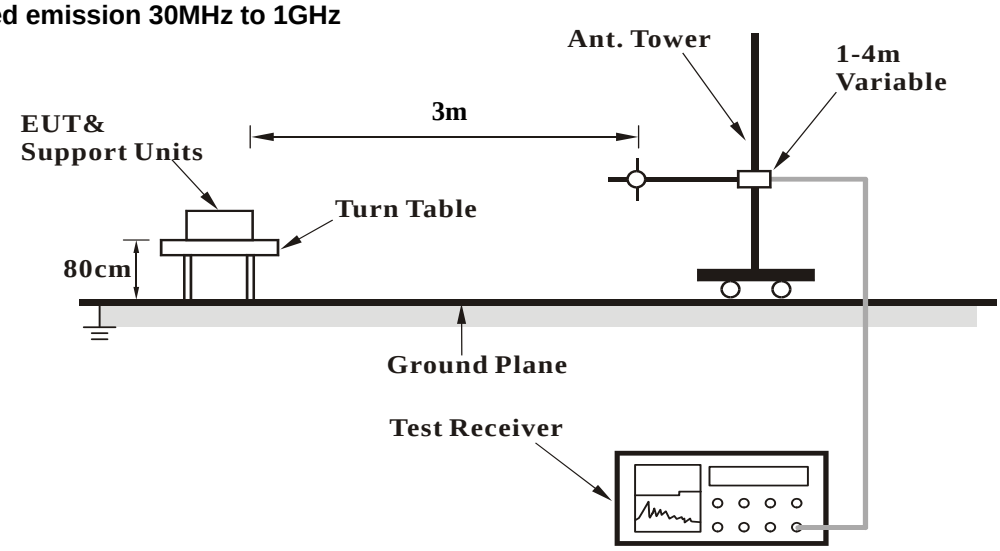
$ERP/EIRP = P_{Meas} + G_T - L_C$

P_{Meas} : Measure transmitter output power.
G_T : Gain of the transmitting antenna.
L_C : signal attenuation in the connecting cable between the transmitter and antenna.

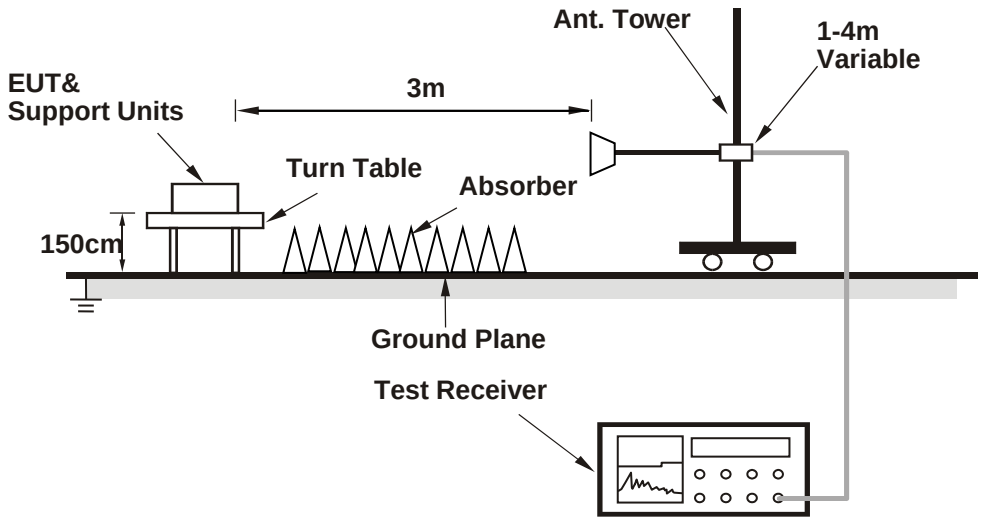
4.1.3 Test Setup

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

GPRS Mode

MODE		TX channel 128					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.20	-6.1	21.5	3.9	25.4	38.5	-13.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.20	-2.1	26.2	3.9	**30.1**	38.5	-8.4

MODE		TX channel 189					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-6.2	21.2	3.8	25.0	38.5	-13.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-2.2	25.8	3.8	29.6	38.5	-8.9

MODE		TX channel 251					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	848.80	-5.9	21.8	3.4	25.2	38.5	-13.3
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	848.80	-1.7	26.4	3.4	29.8	38.5	-8.7

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

WCDMA Band 5

MODE		TX channel 4132					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	826.40	-14.9	12.7	3.9	16.6	38.5	-21.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	826.40	-12.1	16.2	3.9	**20.1**	38.5	-18.4

MODE		TX channel 4182					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-15.1	12.3	3.8	16.1	38.5	-22.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.40	-12.2	15.8	3.8	19.6	38.5	-18.9

MODE		TX channel 4233					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	846.60	-14.7	12.9	3.4	16.3	38.5	-22.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	846.60	-11.7	16.5	3.4	19.9	38.5	-18.6

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Modulation Type: QPSK

LTE Band 5, Channel Bandwidth: 1.4MHz

MODE		TX channel 20525					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.6	7.9	3.8	11.7	38.5	-26.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-11.0	17.1	3.8	**20.9**	38.5	-17.6

LTE Band 5, Channel Bandwidth: 3MHz

MODE		TX channel 20525					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.6	7.9	3.8	11.7	38.5	-26.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-11.2	16.9	3.8	**20.7**	38.5	-17.8

LTE Band 5, Channel Bandwidth: 5MHz

MODE		TX channel 20525					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.9	7.6	3.8	11.4	38.5	-27.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-11.1	17.0	3.8	**20.8**	38.5	-17.7

LTE Band 5, Channel Bandwidth: 10MHz

MODE		TX channel 20525					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.4	8.0	3.8	11.8	38.5	-26.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-10.8	17.3	3.8	**21.1**	38.5	-17.4

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 26, Channel Bandwidth 1.4MHz

MODE		TX channel 26915					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.8	7.7	3.8	11.5	38.5	-27.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-11.0	17.1	3.8	**20.9**	38.5	-17.6

LTE Band 26, Channel Bandwidth 3MHz

MODE		TX channel 26915					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.9	7.5	3.8	11.3	38.5	-27.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-10.9	17.2	3.8	**21.0**	38.5	-17.5

LTE Band 26, Channel Bandwidth 5MHz

MODE		TX channel 26915					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.6	7.8	3.8	11.6	38.5	-26.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-10.9	17.2	3.8	**21.0**	38.5	-17.5

LTE Band 26, Channel Bandwidth 10MHz

MODE		TX channel 26915					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.8	7.7	3.8	11.5	38.5	-27.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-11.1	17.0	3.8	**20.8**	38.5	-17.7

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 26, Channel Bandwidth 15MHz

MODE		TX channel 26915					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-19.4	8.0	3.8	11.8	38.5	-26.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	836.50	-10.6	17.5	3.8	**21.3**	38.5	-17.2

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

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 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 substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

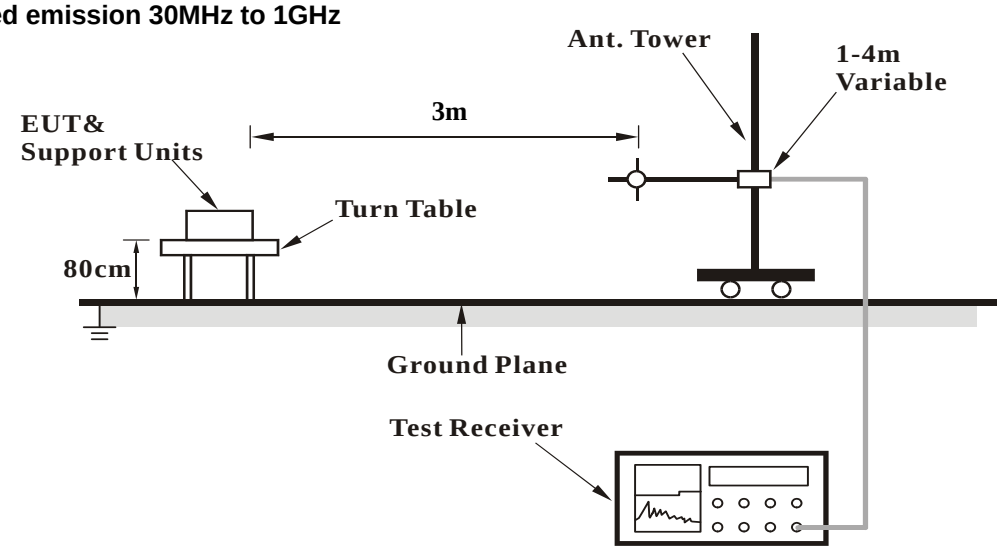
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.2.3 Deviation from Test Standard

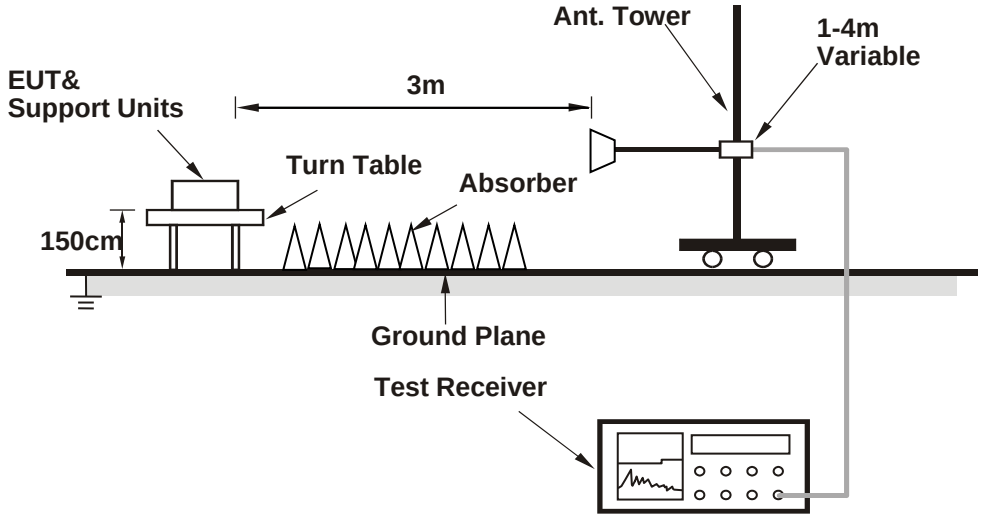
No deviation.

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).

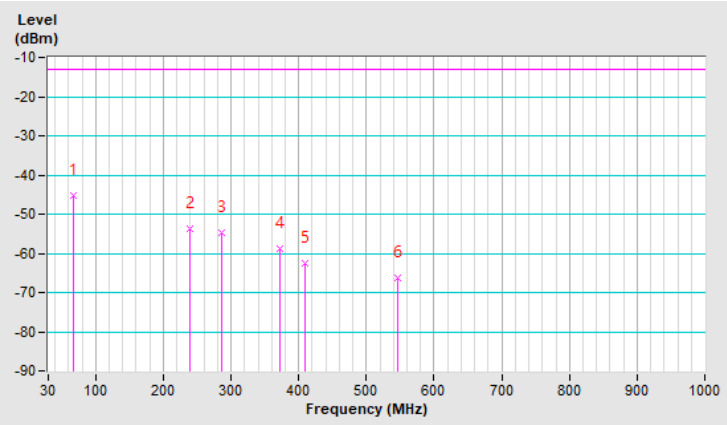
4.2.5 Test Results

Below 1GHz
GPRS Mode

Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	66.86	-36.0	-43.6	-1.5	-45.1	-13.0	-32.1
2	239.52	-44.7	-52.2	-1.5	-53.7	-13.0	-40.7
3	286.08	-48.8	-53.1	-1.7	-54.8	-13.0	-41.8
4	371.44	-54.5	-62.6	3.9	-58.7	-13.0	-45.7
5	410.24	-60.1	-65.8	3.3	-62.5	-13.0	-49.5
6	546.04	-64.6	-70.2	3.9	-66.3	-13.0	-53.3

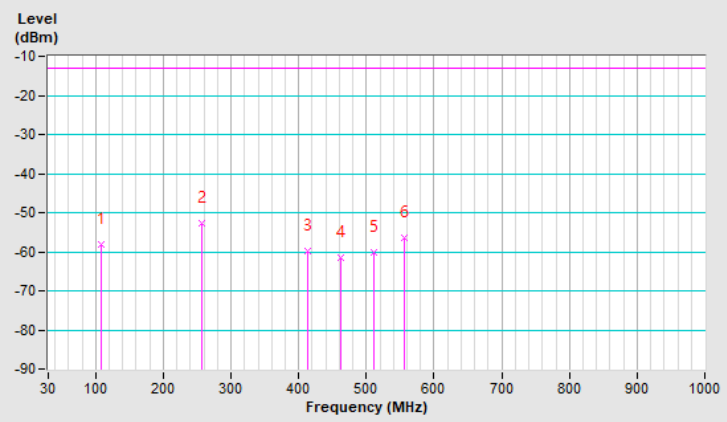
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 128 (824.2MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	107.60	-47.6	-55.8	-2.3	-58.1	-13.0	-45.1
2	256.98	-51.1	-51.3	-1.5	-52.8	-13.0	-39.8
3	414.12	-57.4	-63.3	3.4	-59.9	-13.0	-46.9
4	462.62	-59.1	-64.8	3.4	-61.4	-13.0	-48.4
5	511.12	-58.3	-64.1	3.8	-60.3	-13.0	-47.3
6	555.74	-56.0	-60.2	3.7	-56.5	-13.0	-43.5

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

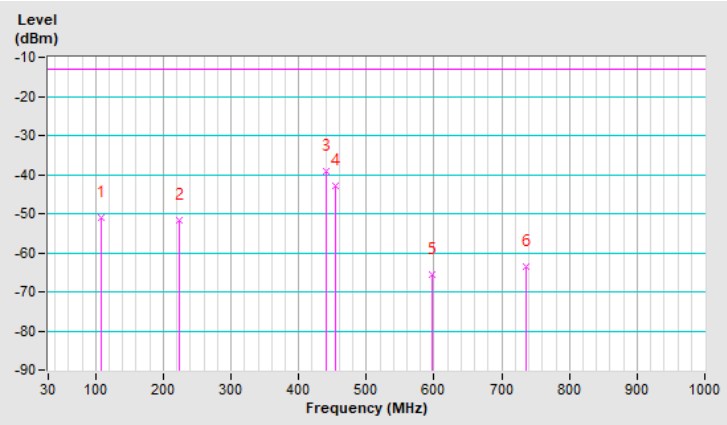


WCDMA Band 5

Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	107.60	-41.0	-48.8	-2.3	-51.1	-13.0	-38.1
2	224.00	-41.4	-49.6	-2.1	-51.7	-13.0	-38.7
3	**441.28**	**-36.9**	**-42.7**	**3.5**	**-39.2**	**-13.0**	**-26.2**
4	454.86	-40.8	-46.4	3.5	-42.9	-13.0	-29.9
5	596.48	-64.9	-69.4	3.8	-65.6	-13.0	-52.6
6	736.16	-65.3	-67.1	3.7	-63.4	-13.0	-50.4

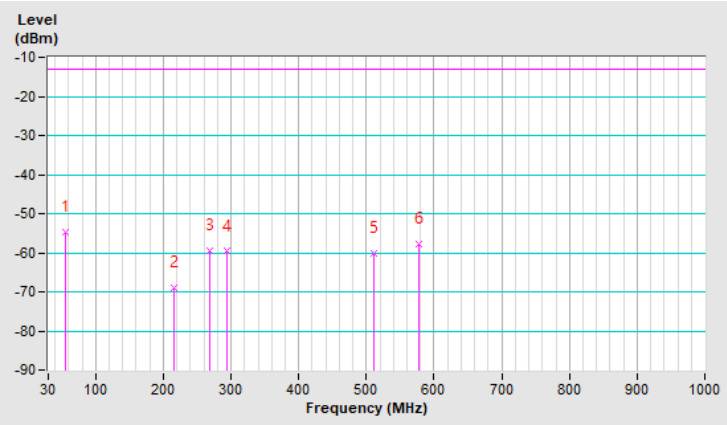
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 4132 (826.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	55.22	-45.7	-49.3	-5.4	-54.7	-13.0	-41.7
2	216.24	-63.0	-67.0	-2.0	-69.0	-13.0	-56.0
3	268.62	-58.9	-57.9	-1.5	-59.4	-13.0	-46.4
4	293.84	-57.8	-57.9	-1.8	-59.7	-13.0	-46.7
5	511.12	-58.1	-63.9	3.8	-60.1	-13.0	-47.1
6	577.08	-57.6	-61.5	3.7	-57.8	-13.0	-44.8

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

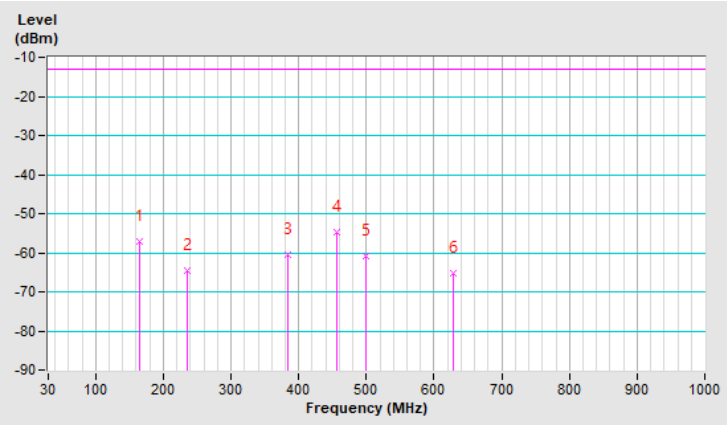


LTE Band 5, Channel Bandwidth: 1.4MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	165.80	-48.2	-54.0	-3.0	-57.0	-13.0	-44.0
2	235.64	-55.4	-63.2	-1.5	-64.7	-13.0	-51.7
3	383.08	-57.2	-64.0	3.5	-60.5	-13.0	-47.5
4	456.80	-52.5	-58.3	3.5	-54.8	-13.0	-41.8
5	499.48	-58.6	-64.7	3.8	-60.9	-13.0	-47.9
6	627.52	-65.1	-68.9	3.6	-65.3	-13.0	-52.3

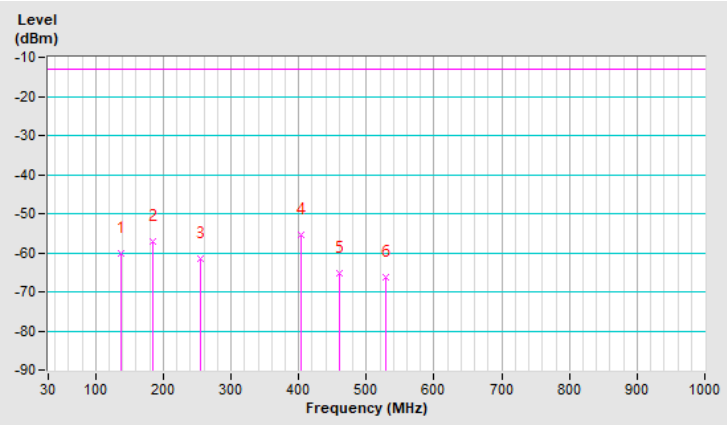
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 20525 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	136.70	-54.9	-57.1	-3.2	-60.3	-13.0	-47.3
2	185.20	-52.2	-54.4	-2.8	-57.2	-13.0	-44.2
3	255.04	-59.8	-60.1	-1.4	-61.5	-13.0	-48.5
4	404.42	-52.8	-58.8	3.3	-55.5	-13.0	-42.5
5	460.68	-63.1	-68.7	3.4	-65.3	-13.0	-52.3
6	528.58	-65.0	-70.1	3.9	-66.2	-13.0	-53.2

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

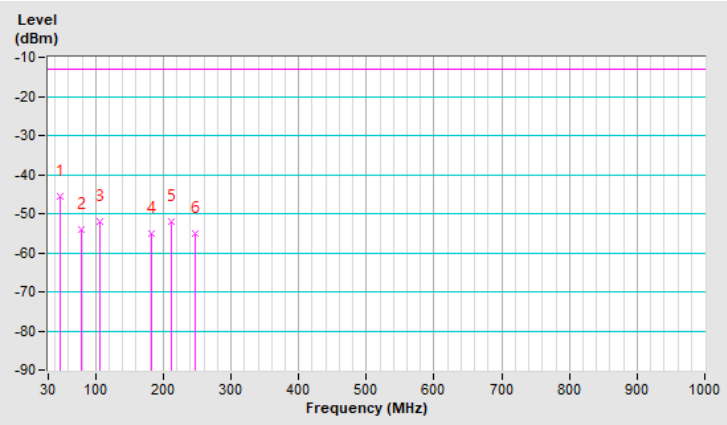


LTE Band 5, Channel Bandwidth: 5MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	47.46	-43.6	-36.4	-9.2	-45.6	-13.0	-32.6
2	78.50	-46.8	-54.6	0.6	-54.0	-13.0	-41.0
3	105.66	-41.9	-49.9	-2.2	-52.1	-13.0	-39.1
4	183.26	-44.7	-52.2	-3.0	-55.2	-13.0	-42.2
5	212.36	-41.4	-49.9	-2.1	-52.0	-13.0	-39.0
6	247.28	-46.2	-53.6	-1.5	-55.1	-13.0	-42.1

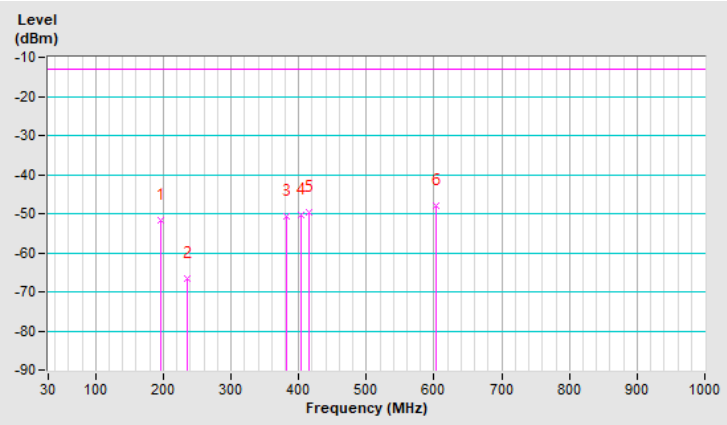
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 20525 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	196.84	-48.7	-49.2	-2.5	-51.7	-13.0	-38.7
2	235.64	-62.4	-65.2	-1.5	-66.7	-13.0	-53.7
3	381.14	-47.9	-54.2	3.6	-50.6	-13.0	-37.6
4	404.42	-47.5	-53.5	3.3	-50.2	-13.0	-37.2
5	416.06	-47.2	-53.2	3.4	-49.8	-13.0	-36.8
6	602.30	-49.4	-51.5	3.7	-47.8	-13.0	-34.8

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

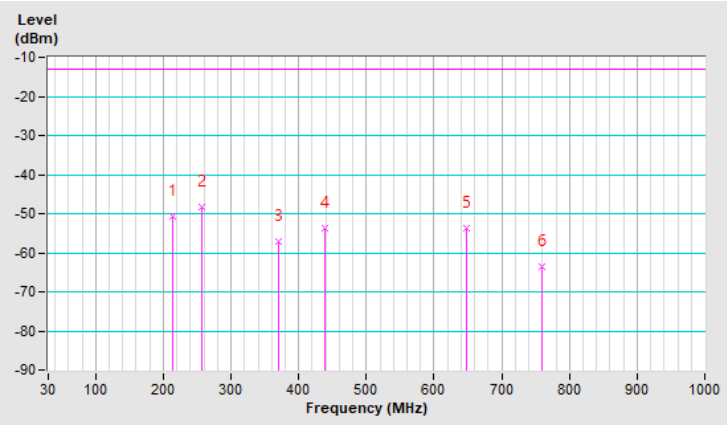


LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	214.30	-40.2	-48.8	-2.0	-50.8	-13.0	-37.8
2	256.98	-40.9	-46.7	-1.5	-48.2	-13.0	-35.2
3	369.50	-52.5	-60.9	3.9	-57.0	-13.0	-44.0
4	439.34	-51.4	-57.2	3.5	-53.7	-13.0	-40.7
5	648.86	-53.6	-57.3	3.7	-53.6	-13.0	-40.6
6	759.44	-65.5	-67.5	3.8	-63.7	-13.0	-50.7

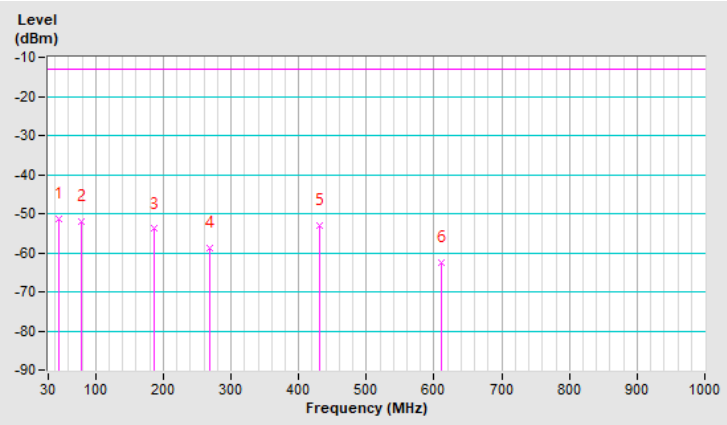
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 20525 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	45.52	-40.9	-41.0	-10.4	-51.4	-13.0	-38.4
2	78.50	-44.8	-52.7	0.6	-52.1	-13.0	-39.1
3	187.14	-49.4	-51.2	-2.7	-53.9	-13.0	-40.9
4	268.62	-58.2	-57.2	-1.5	-58.7	-13.0	-45.7
5	431.58	-50.6	-56.6	3.5	-53.1	-13.0	-40.1
6	610.06	-65.2	-66.4	3.7	-62.7	-13.0	-49.7

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

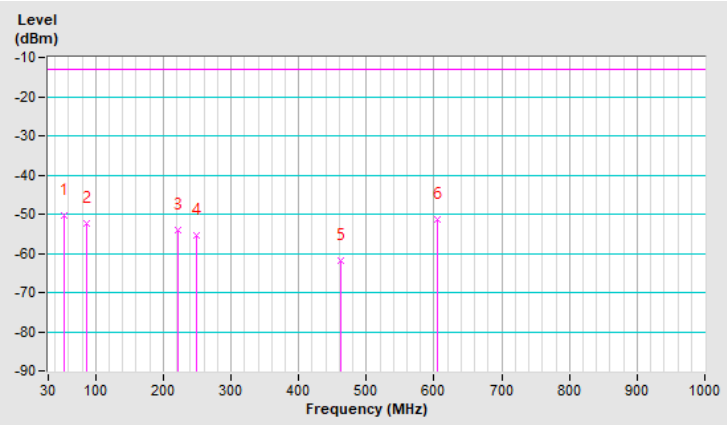


LTE Band 26, Channel Bandwidth 1.4MHz

Mode	TX channel 26915 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	53.28	-46.4	-44.0	-6.2	-50.2	-13.0	-37.2
2	86.26	-43.5	-52.5	0.1	-52.4	-13.0	-39.4
3	222.06	-43.9	-52.2	-1.9	-54.1	-13.0	-41.1
4	249.22	-46.9	-54.1	-1.4	-55.5	-13.0	-42.5
5	462.62	-59.5	-65.2	3.4	-61.8	-13.0	-48.8
6	604.24	-51.0	-55.1	3.6	-51.5	-13.0	-38.5

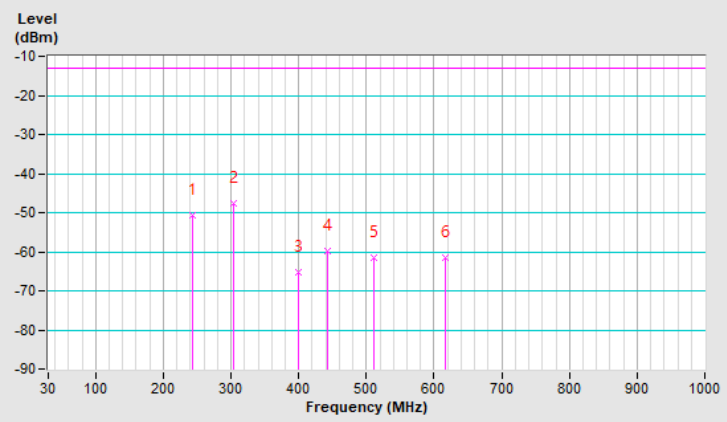
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 26915 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	243.40	-47.2	-49.4	-1.4	-50.8	-13.0	-37.8
2	303.54	-45.5	-51.2	3.7	-47.5	-13.0	-34.5
3	400.54	-62.3	-68.6	3.3	-65.3	-13.0	-52.3
4	443.22	-57.4	-63.2	3.5	-59.7	-13.0	-46.7
5	511.12	-59.4	-65.2	3.8	-61.4	-13.0	-48.4
6	615.88	-64.2	-65.2	3.7	-61.5	-13.0	-48.5

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

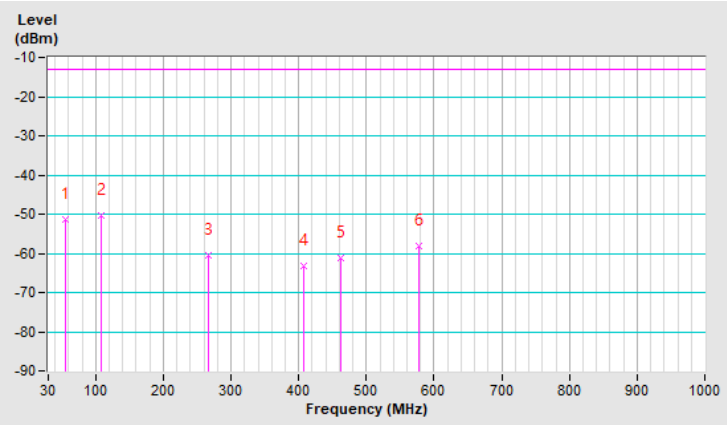


LTE Band 26, Channel Bandwidth 5MHz

Mode	TX channel 26915 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	55.22	-46.5	-45.9	-5.4	-51.3	-13.0	-38.3
2	107.60	-40.2	-47.9	-2.3	-50.2	-13.0	-37.2
3	266.68	-54.2	-59.0	-1.6	-60.6	-13.0	-47.6
4	408.30	-60.6	-66.3	3.2	-63.1	-13.0	-50.1
5	462.62	-59.0	-64.7	3.4	-61.3	-13.0	-48.3
6	577.08	-56.9	-61.7	3.7	-58.0	-13.0	-45.0

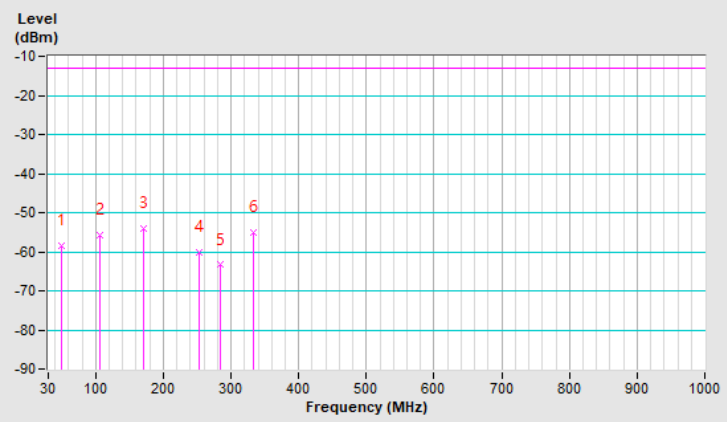
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 26915 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	49.40	-48.8	-50.2	-8.3	-58.5	-13.0	-45.5
2	105.66	-45.1	-53.6	-2.2	-55.8	-13.0	-42.8
3	171.62	-48.4	-51.1	-2.9	-54.0	-13.0	-41.0
4	253.10	-58.2	-58.8	-1.4	-60.2	-13.0	-47.2
5	284.14	-63.8	-61.8	-1.6	-63.4	-13.0	-50.4
6	332.64	-52.2	-59.0	4.0	-55.0	-13.0	-42.0

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

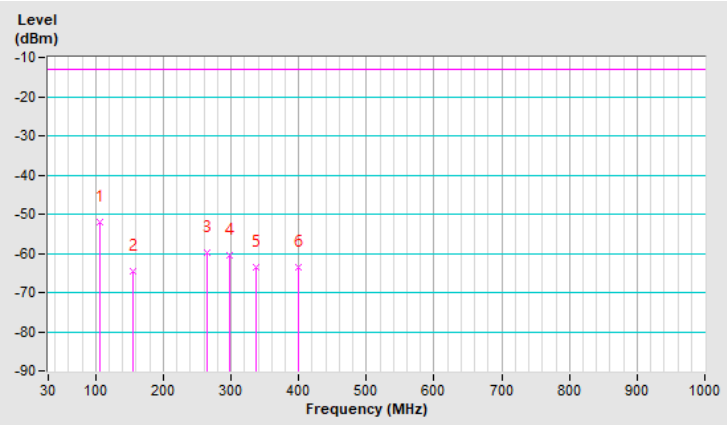


LTE Band 26, Channel Bandwidth 15MHz

Mode	TX channel 26915 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	105.66	-41.9	-49.9	-2.2	-52.1	-13.0	-39.1
2	156.10	-57.7	-61.7	-2.9	-64.6	-13.0	-51.6
3	264.74	-53.1	-58.1	-1.6	-59.7	-13.0	-46.7
4	297.72	-55.8	-58.9	-1.7	-60.6	-13.0	-47.6
5	336.52	-57.6	-67.5	4.0	-63.5	-13.0	-50.5
6	400.54	-60.5	-66.8	3.3	-63.5	-13.0	-50.5

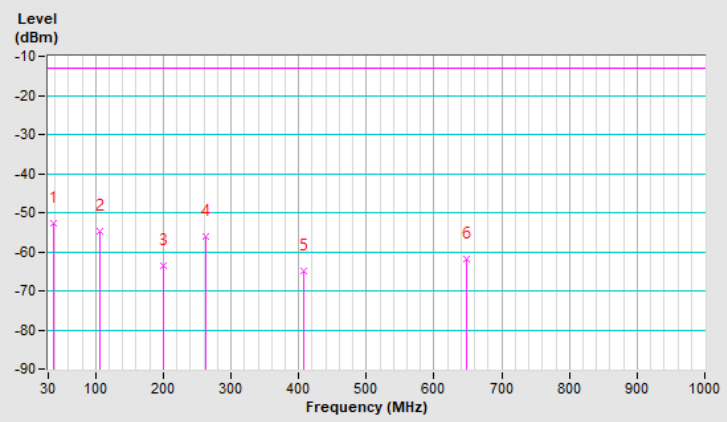
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Mode	TX channel 26915 (836.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	37.76	-41.0	-37.9	-14.7	-52.6	-13.0	-39.6
2	105.66	-44.2	-52.7	-2.2	-54.9	-13.0	-41.9
3	200.72	-60.2	-61.3	-2.3	-63.6	-13.0	-50.6
4	262.80	-55.0	-54.5	-1.6	-56.1	-13.0	-43.1
5	408.30	-62.0	-68.0	3.2	-64.8	-13.0	-51.8
6	648.86	-65.5	-65.7	3.7	-62.0	-13.0	-49.0

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).



Above 1GHz
GPRS Mode

Mode	TX channel 128 (824.2MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.40	-47.9	-40.2	0.9	-39.3	-13.0	-26.3
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.40	-50.0	-42.6	0.9	-41.7	-13.0	-28.7

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 189 (836.4MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-48.2	-40.6	0.8	-39.8	-13.0	-26.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-49.9	-42.6	0.8	-41.8	-13.0	-28.8

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 251 (848.8MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1697.60	-48.1	-40.6	0.7	-39.9	-13.0	-26.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1697.60	-49.8	-42.5	0.7	-41.8	-13.0	-28.8

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

WCDMA Band 5

Mode	TX channel 4132 (826.4MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1652.80	-57.8	-50.0	0.9	-49.1	-13.0	-36.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1652.80	-60.4	-53.2	0.9	-52.3	-13.0	-39.3

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4182 (836.4MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-57.8	-50.1	0.8	-49.3	-13.0	-36.3
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1672.80	-60.1	-52.8	0.8	-52.0	-13.0	-39.0

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

Mode	TX channel 4233 (846.6MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1693.20	-58.1	-50.6	0.7	-49.9	-13.0	-36.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1693.20	-60.0	-52.7	0.7	-52.0	-13.0	-39.0

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 1.4MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-58.2	-50.6	0.8	-49.8	-13.0	-36.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-59.4	-52.1	0.8	-51.3	-13.0	-38.3

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 3MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-58.2	-50.6	0.8	-49.8	-13.0	-36.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-59.4	-52.1	0.8	-51.3	-13.0	-38.3

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 5MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-58.2	-50.5	0.8	-49.7	-13.0	-36.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-59.2	-51.9	0.8	-51.1	-13.0	-38.1

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-58.0	-50.4	0.8	-49.6	-13.0	-36.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-59.1	-51.8	0.8	-51.0	-13.0	-38.0

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 26, Channel Bandwidth 1.4MHz

Mode	TX channel 26915 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-55.3	-47.7	0.8	-46.9	-13.0	-33.9
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-57.6	-50.3	0.8	-49.5	-13.0	-36.5

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 26, Channel Bandwidth 3MHz

Mode	TX channel 26915 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-55.5	-47.8	0.8	-47.0	-13.0	-34.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-57.9	-50.6	0.8	-49.8	-13.0	-36.8

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 26, Channel Bandwidth 5MHz

Mode	TX channel 26915 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-55.7	-48.0	0.8	-47.2	-13.0	-34.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-58.1	-50.8	0.8	-50.0	-13.0	-37.0

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 26, Channel Bandwidth 10MHz

Mode	TX channel 26915 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-55.2	-47.6	0.8	-46.8	-13.0	-33.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-57.5	-50.2	0.8	-49.4	-13.0	-36.4

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

LTE Band 26, Channel Bandwidth 15MHz

Mode	TX channel 26915 (836.5MHz)	Frequency Range	1GH~10GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	12Vdc
Tested By	Han Wu		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-55.8	-48.1	0.8	-47.3	-13.0	-34.3
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1673.00	-58.4	-51.0	0.8	-50.2	-13.0	-37.2

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB).

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:

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
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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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