



FCC TEST REPORT (PART 22)

REPORT NO.: RF121023C07A

MODEL NO.: P530

FCC ID: UZI-30P58

RECEIVED: Oct. 23, 2012

TESTED: Jul. 03 ~ Jul. 10, 2013

ISSUED: Jul. 17, 2013

APPLICANT: BandRich Inc.

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ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New
Taipei City, Taiwan (R.O.C.)

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF121023C07A	Original release.	Jul. 17, 2013



1 CERTIFICATION

PRODUCT: LTE/EVDO Mobile Router
MODEL: P530
BRAND: BandLuxe
APPLICANT: BandRich Inc.
TESTED: Jul. 03 ~ Jul. 10, 2013
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: FCC PART 22, Subpart H

The above equipment (model: P530) 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 EMC characteristics under the conditions specified in this report.

PREPARED BY : Suntee Liu , **DATE :** Jul. 17, 2013
Suntee Liu / Specialist

APPROVED BY : Anderson Chiu , **DATE :** Jul. 17, 2013
Anderson Chiu / Senior Engineer

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
2.1046 22.913 (a)	Effective radiated power	PASS	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	PASS	Meet the requirement of limit.
2.1049	Occupied Bandwidth	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -25.06dB at 1653.00MHz.

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	UNCERTAINTY
Conducted emissions	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.2 TEST SITE AND INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Aug. 21, 2012	Aug. 20, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Oct. 25, 2012	Oct. 24, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Dec. 22, 2012	Dec. 21, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8447D	2944A10738	Oct. 23, 2012	Oct. 22, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 28, 2012	Aug. 27, 2013
Software BV ADT	ADT_Radiated_ V7.6.15.9.3	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
Mini-Circuits Power Splitter	ZN2PD-9G	NA	Mar. 22, 2013	Mar. 21, 2014
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
Communications Tester-Wireless	E5515C	MY50266653	Oct. 08, 2012	Oct. 09, 2013

- 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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. The test was performed in HwaYa Chamber 4.
 4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 5. The FCC Site Registration No. is 460141.
 6. The IC Site Registration No. is IC7450F-4.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	LTE/EVDO Mobile Router	
MODEL NO.	P530	
POWER SUPPLY	5Vdc (adapter / host equipment) 3.7Vdc (battery)	
HW VERSION	V01	
SW VERSION	QC_2_00012644_2_001_0032	
MODULATION TYPE	EVDO	QPSK, OQPSK, HPSK
	LTE	QPSK, 16QAM
FREQUENCY RANGE	EVDO	824.7MHz ~ 848.31MHz
	LTE Band 5 (Channel Bandwidth 5MHz)	826.5MHz ~ 846.5MHz
	LTE Band 5 (Channel Bandwidth 10MHz)	829MHz ~ 844MHz
MAX. ERP POWER	EVDO	36.64mW
	LTE Band 5 (Channel Bandwidth 5MHz)	22.18mW
	LTE Band 5 (Channel Bandwidth 10MHz)	23.82mW
EMISSION DESIGNATOR	EVDO	1M27F9W
	LTE Band 5 (Channel Bandwidth 5MHz)	QPSK: 4M50G7D
		16QAM: 4M50W7D
	LTE Band 5 (Channel Bandwidth 10MHz)	QPSK: 8M97G7D
16QAM: 8M97W7D		
CATEGORY	LTE: 3	
ANTENNA TYPE	Fixed Internal antenna with -4.5dBi gain	
I/O PORTS	Refer to users' manual	
DATA CABLE	1m non-shielded USB cable without core	
ACCESSORY DEVICES	Adapter, Battery	



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NOTE:

1. The EUT consumes power from the following battery and adapter.

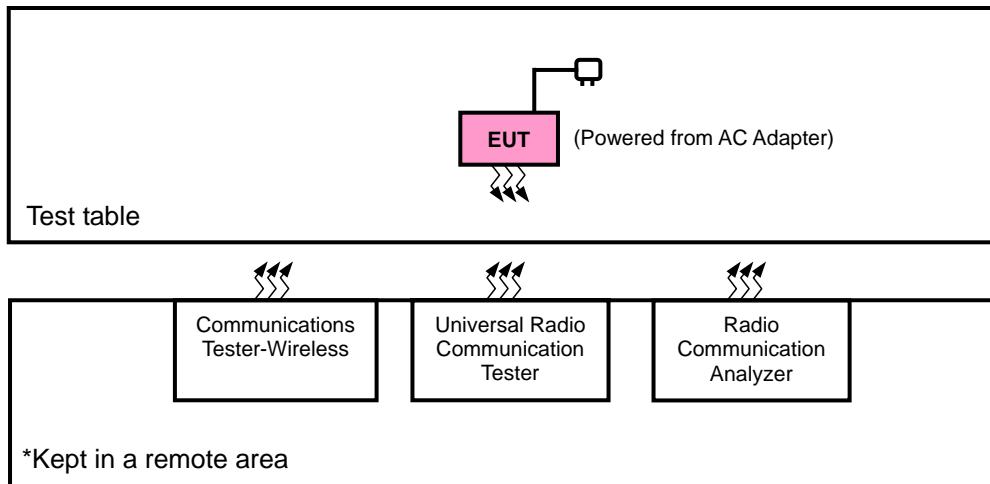
Battery	
MODEL:	GT-2200
RATING:	3.7Vdc, 8.14WH

ADAPTER	
BRAND:	PHIHONG
MODEL:	PSA05A-050Q
INPUT:	100-240Vac, 0.2A, 50-60Hz
OUTPUT:	5Vdc, 1A

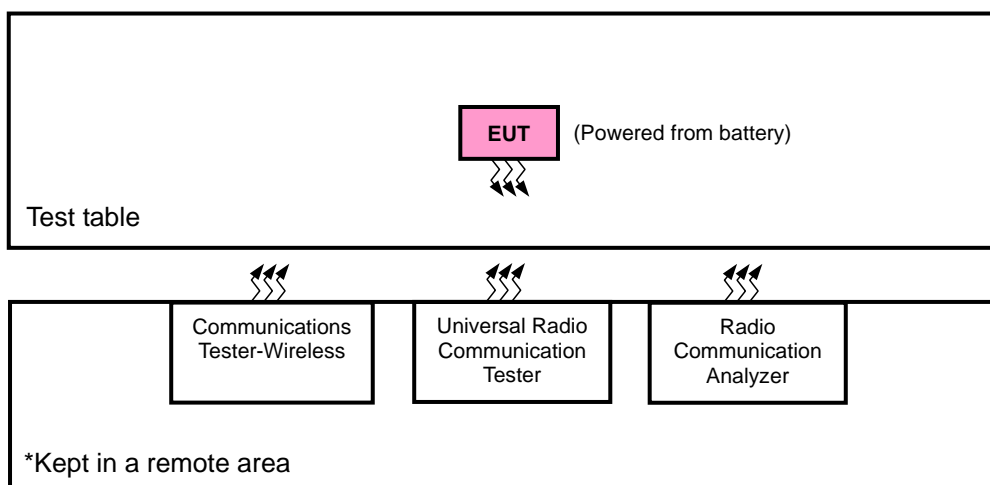
2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR E.R.P. TEST



3.3 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Universal Radio Communication Tester	R&S	CMU200	104958	NA
2	Communications Tester-Wireless	Agilent	8960 Series 10	MY50260642	NA
3	Radio Communication Analyzer	Anritsu	MT8820C	6201010284	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items 1-3 act as communication partners to transfer data.

3.4 TEST ITEM AND TEST CONFIGURATION

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 cases were found when positioned on **X-plane** for EVDO/ LTE mode in ERP and **X-axis** for EVDO/ LTE mode in radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EVDO

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
-	ERP	1013 to 777	1013, 384, 777	EVDO
-	FREQUENCY STABILITY	1013 to 777	384	EVDO
-	OCCUPIED BANDWIDTH	1013 to 777	1013, 384, 777	EVDO
-	BAND EDGE	1013 to 777	1013, 777	EVDO
-	CONDCUDED EMISSION	1013 to 777	384	EVDO
-	RADIATED EMISSION Below 1GHz	1013 to 777	1013	EVDO
-	RADIATED EMISSION Above 1GHz	1013 to 777	1013	EVDO

LTE Band 5

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	20425 to 20625	20425, 20525, 20625	5MHz	QPSK	1RB / 0RB offset
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK	1RB / 0RB offset
FREQUENCY STABILITY	20425 to 20625	20525	5MHz	QPSK	1RB / 0RB offset
	20450 to 20600	20525	10MHz	QPSK	1RB / 0RB offset
OCCUPIED BANDWIDTH	20425 to 20625	20425, 20525, 20625	5MHz	QPSK/16QAM	1RB / 0RB offset
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK/16QAM	1RB / 0RB offset
BAND EDGE	20425 to 20625	20425, 20625	5MHz	QPSK	1RB / 0RB offset
					1RB / 24RB offset
	20450 to 20600	20450, 20600	10MHz	QPSK	1RB / 0RB offset
					1RB / 49RB offset
CONDCUDED EMISSION	20425 to 20625	20425	5MHz	QPSK	1RB / 0RB offset
	20450 to 20600	20525	10MHz	QPSK	1RB / 0RB offset
RADIATED EMISSION Below 1GHz	20425 to 20625	20425	5MHz	QPSK	1RB / 0RB offset
	20450 to 20600	20525	10MHz	QPSK	1RB / 0RB offset
RADIATED EMISSION Above 1GHz	20425 to 20625	20425	5MHz	QPSK	1RB / 0RB offset
	20450 to 20600	20525	10MHz	QPSK	1RB / 0RB offset



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TEST CONDITION:

EVDO/ LTE Band 5

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	25deg. C, 65%RH	3.7Vdc	Chris Lin
FREQUENCY STABILITY	24deg. C, 64%RH	3.7Vdc	Match Tsui
OCCUPIED BANDWIDTH	24deg. C, 64%RH	3.7Vdc	Match Tsui
BAND EDGE	24deg. C, 64%RH	3.7Vdc	Match Tsui
CONDCUDED EMISSION	24deg. C, 64%RH	3.7Vdc	Match Tsui
RADIATED EMISSION Below 1GHz	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin
RADIATED EMISSION Above 1GHz	25deg. C, 65%RH	120Vac, 60Hz	Chris Lin



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3.5 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

3.6 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

ANSI/TIA/EIA-603-C 2004

NOTE: 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:

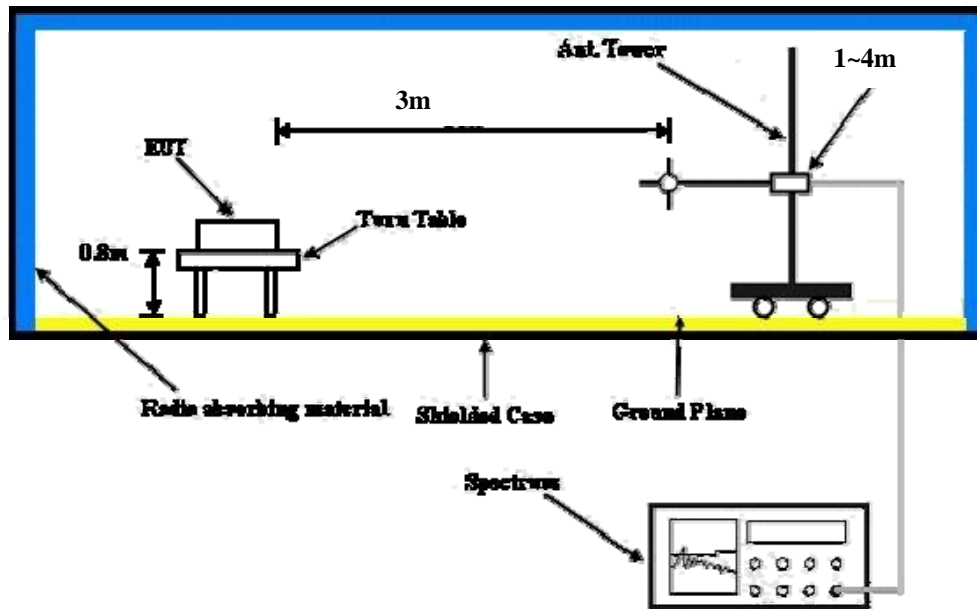
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for 5MHz for EVDO mode and 10MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table 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. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$
 $E.R.P \text{ power can be calculated form E.I.R.P power by subtracting the gain of dipole, } E.R.P \text{ power} = E.I.R.P \text{ power} - 2.15\text{dBi.}$

CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with EVDO/ 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.

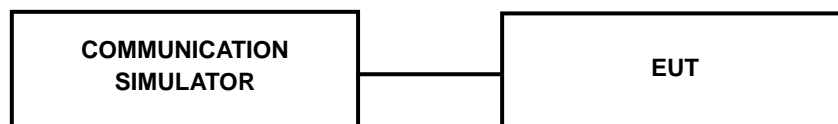
4.1.3 TEST SETUP

EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



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



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4.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	EVDO BC0		
Channel	1013	384	777
Frequency (MHz)	824.7	836.52	848.31
RC1+SO55	24.36	24.21	24.05
RC3+SO55	24.35	24.20	24.04
RC3+SO32(+ F-SCH)	24.37	24.22	24.06
RC3+SO32(+SCH)	24.22	24.07	23.91
RTAP 153.6	24.79	24.64	24.48
RETAP 4096	24.65	24.50	24.34



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LTE Band 5								
BW	Modulation	CH	Frequency	RB	RB Offset	MPR	Target	Measured
			(MHz)				Power	Power
5 MHz	QPSK	20425	826.5	1	0	0	22.6	22.35
		20525	836.5	1	0	0	22.6	22.14
		20625	846.5	1	0	0	22.6	22.2
		20425	826.5	1	12	0	22.6	22.5
		20525	836.5	1	12	0	22.6	22.12
		20625	846.5	1	12	0	22.6	22.33
		20425	826.5	1	24	0	22.6	22.14
		20525	836.5	1	24	0	22.6	22.06
		20625	846.5	1	24	0	22.6	22.09
		20425	826.5	12	0	1	22.6	21.3
		20525	836.5	12	0	1	22.6	21.02
		20625	846.5	12	0	1	22.6	21.17
		20425	826.5	12	6	1	22.6	21.33
		20525	836.5	12	6	1	22.6	21.02
		20625	846.5	12	6	1	22.6	21.2
		20425	826.5	12	13	1	22.6	21.16
		20525	836.5	12	13	1	22.6	21.11
		20625	846.5	12	13	1	22.6	21.13
	20425	826.5	25	0	1	22.6	21.32	
	20525	836.5	25	0	1	22.6	21.03	
	20625	846.5	25	0	1	22.6	21.22	
	20425	826.5	1	0	1	22.6	21.35	
	20525	836.5	1	0	1	22.6	21.14	
	20625	846.5	1	0	1	22.6	21.2	
	20425	826.5	1	12	1	22.6	21.5	
	20525	836.5	1	12	1	22.6	21.12	
	20625	846.5	1	12	1	22.6	21.33	
	20425	826.5	1	24	1	22.6	21.14	
	20525	836.5	1	24	1	22.6	21.06	
	20625	846.5	1	24	1	22.6	21.09	
20425	826.5	12	0	2	22.6	20.3		
20525	836.5	12	0	2	22.6	20.02		
20625	846.5	12	0	2	22.6	20.17		
20425	826.5	12	6	2	22.6	20.33		
20525	836.5	12	6	2	22.6	20.02		
20625	846.5	12	6	2	22.6	20.2		
20425	826.5	12	13	2	22.6	20.16		
20525	836.5	12	13	2	22.6	20.11		
20625	846.5	12	13	2	22.6	20.13		
20425	826.5	25	0	2	22.6	20.32		
20525	836.5	25	0	2	22.6	20.03		
20625	846.5	25	0	2	22.6	20.22		



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LTE Band 5									
BW	Modulation	CH	Frequency	RB	RB Offset	MPR	Target	Measured	
			(MHz)				Power	Power	
10MHz	QPSK	20450	829	1	0	0	22.6	22.37	
		20525	836.5	1	0	0	22.6	22.16	
		20600	844	1	0	0	22.6	22.22	
		20450	829	1	24	0	22.6	22.52	
		20525	836.5	1	24	0	22.6	22.14	
		20600	844	1	24	0	22.6	22.35	
		20450	829	1	49	0	22.6	22.16	
		20525	836.5	1	49	0	22.6	22.08	
		20600	844	1	49	0	22.6	22.11	
		20450	829	25	0	1	22.6	21.32	
		20525	836.5	25	0	1	22.6	21.04	
		20600	844	25	0	1	22.6	21.19	
		20450	829	25	12	1	22.6	21.35	
		20525	836.5	25	12	1	22.6	21.04	
		20600	844	25	12	1	22.6	21.22	
		20450	829	25	25	1	22.6	21.18	
		20525	836.5	25	25	1	22.6	21.13	
		20600	844	25	25	1	22.6	21.15	
	20450	829	50	0	1	22.6	21.31		
	20525	836.5	50	0	1	22.6	21.02		
	20600	844	50	0	1	22.6	21.21		
	20450	16QAM	20450	829	1	0	1	22.6	21.37
	20525		836.5	1	0	1	22.6	21.16	
	20600		844	1	0	1	22.6	21.22	
	20450		829	1	24	1	22.6	21.52	
	20525		836.5	1	24	1	22.6	21.14	
	20600		844	1	24	1	22.6	21.35	
	20450		829	1	49	1	22.6	21.16	
	20525		836.5	1	49	1	22.6	21.08	
	20600		844	1	49	1	22.6	21.11	
20450	829		25	0	2	22.6	20.32		
20525	836.5		25	0	2	22.6	20.04		
20600	844		25	0	2	22.6	20.19		
20450	829	25	12	2	22.6	20.35			
20525	836.5	25	12	2	22.6	20.04			
20600	844	25	12	2	22.6	20.22			
20450	829	25	25	2	22.6	20.18			
20525	836.5	25	25	2	22.6	20.13			
20600	844	25	25	2	22.6	20.15			
20450	829	50	0	2	22.6	20.31			
20525	836.5	50	0	2	22.6	20.02			
20600	844	50	0	2	22.6	20.21			



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ERP POWER (dBm)

EVDO

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
X	1013	824.7	-14.74	0.02	15.64	36.64	H
	384	836.52	-14.43	0.29	15.17	32.89	H
	777	848.31	-14.06	0.50	15.59	36.22	H
	1013	824.7	-20.96	0.02	8.10	6.46	V
	384	836.52	-2.57	0.29	8.17	6.56	V
	777	848.31	-21.38	0.50	8.54	7.14	V

LTE Band 5 (Channel Bandwidth 5MHz)

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
X	20425	826.5	-16.80	0.06	13.46	22.18	H
	20525	836.5	-16.35	0.29	13.25	21.13	H
	20625	846.5	-16.41	0.47	13.23	21.04	H
	20425	826.5	-22.03	0.06	7.13	5.16	V
	20425	836.5	-22.44	0.29	7.30	5.37	V
	20425	846.5	-22.75	0.47	7.14	5.18	V



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LTE Band 5 (Channel Bandwidth 10MHz)

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
X	20450	829	-16.38	0.12	13.71	23.50	H
	20525	836.5	-15.83	0.29	13.77	23.82	H
	20600	844	-16.12	0.42	13.51	22.44	H
	20450	829	-22.02	0.12	7.29	5.36	V
	20525	836.5	-22.61	0.29	7.13	5.16	V
	20600	844	-22.35	0.42	7.51	5.64	V

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

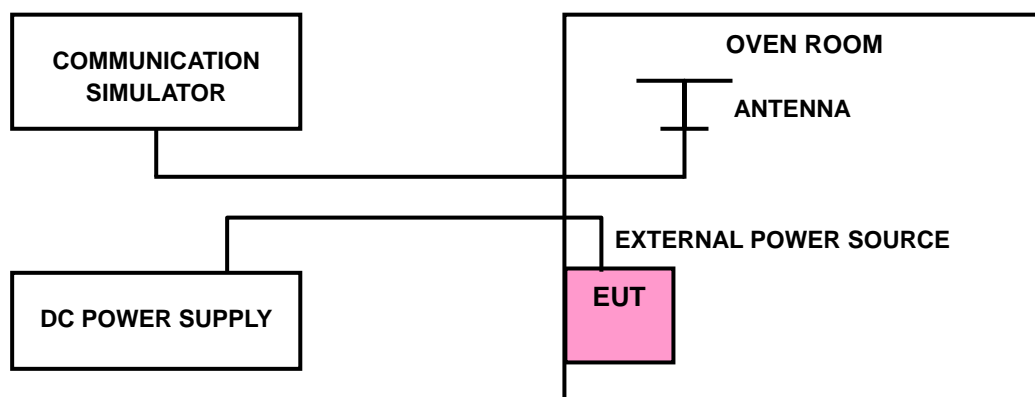
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 TEST PROCEDURE

- a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.2.3 TEST SETUP



4.2.4 TEST RESULTS

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)			LIMIT (ppm)
	EVDO	LTE Band 5		
		5MHz	10MHz	
4.26	-0.025	-0.022	-0.019	2.5
3.7	-0.017	-0.013	-0.014	2.5
3.15	-0.018	-0.016	-0.017	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.15Vdc to 4.26Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

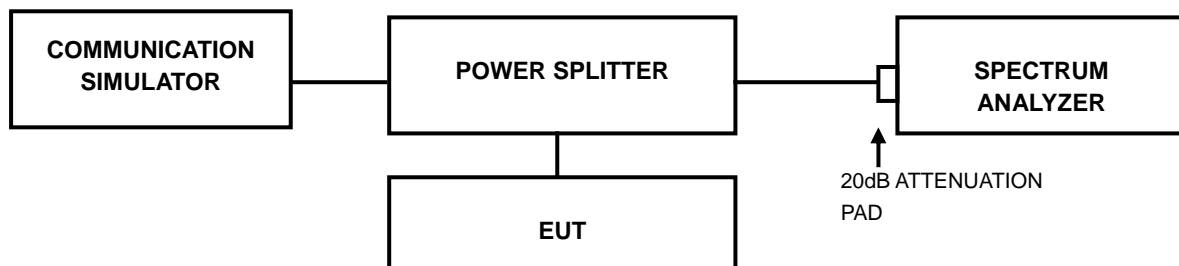
TEMP. (°C)	FREQUENCY ERROR (ppm)			LIMIT (ppm)
	EVDO	LTE Band 5		
		5MHz	10MHz	
50	-0.029	-0.039	-0.041	2.5
40	-0.022	-0.032	-0.029	2.5
30	-0.017	-0.020	-0.018	2.5
20	-0.029	-0.013	-0.014	2.5
10	-0.041	-0.012	-0.023	2.5
0	-0.049	-0.023	-0.029	2.5
-10	-0.059	-0.029	-0.037	2.5
-20	-0.054	-0.041	-0.047	2.5
-30	-0.029	-0.050	-0.053	2.5

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.2 TEST SETUP



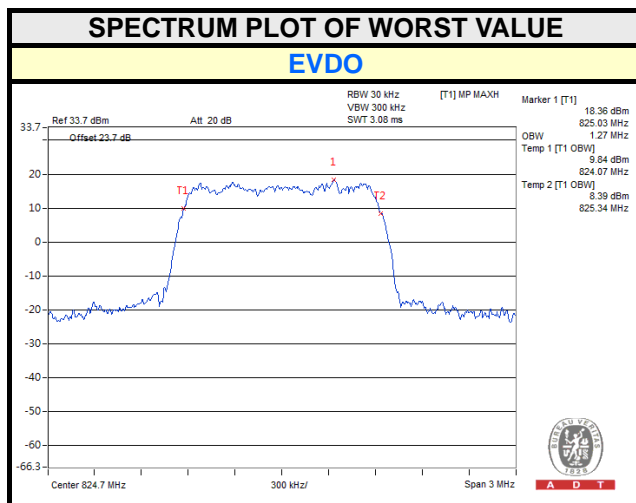


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4.3.3 TEST RESULTS

EVDO

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)
1013	824.70	1.27
384	836.52	1.27
777	848.31	1.27

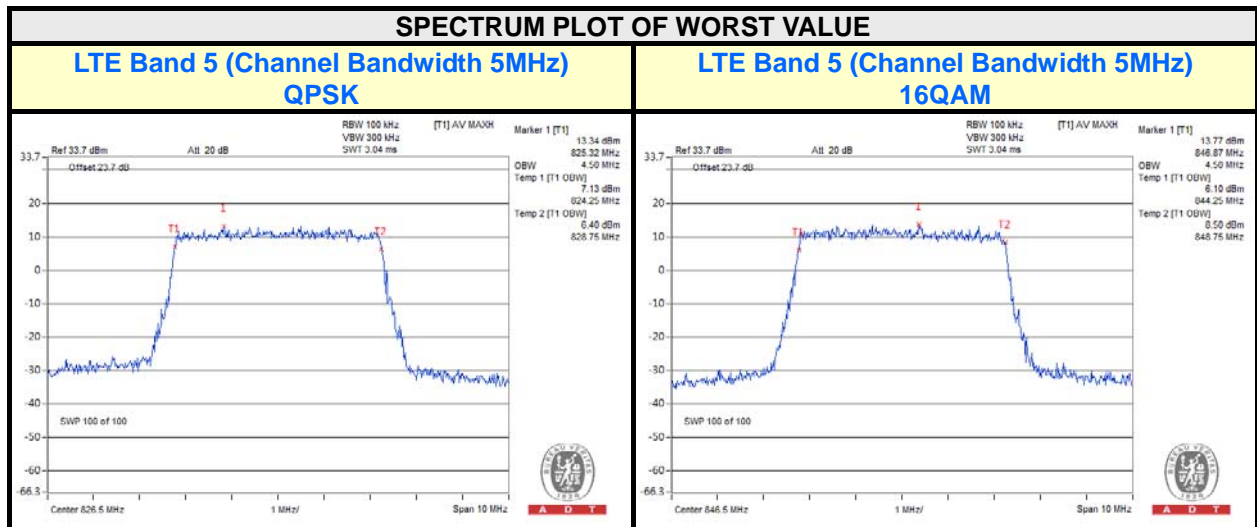




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LTE Band 5 (Channel Bandwidth 5MHz)

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)	
		QPSK	16QAM
20425	826.5	4.50	4.48
20525	836.5	4.50	4.50
20625	846.5	4.48	4.50

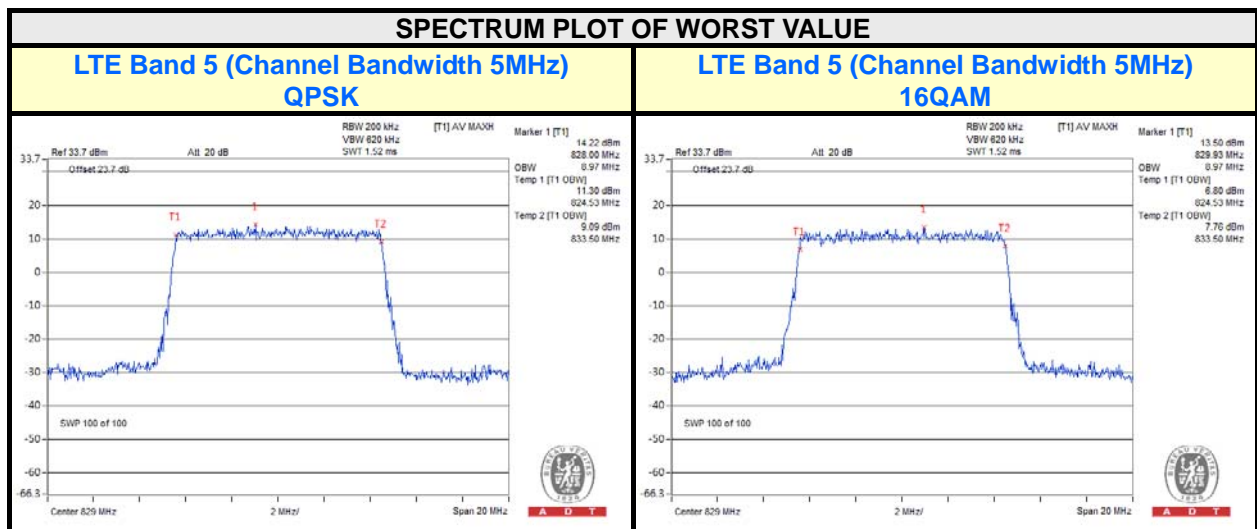




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LTE Band 5 (Channel Bandwidth 10MHz)

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)	
		QPSK	16QAM
20450	829	8.97	8.97
20525	836.5	8.97	8.93
20600	844	8.93	8.93

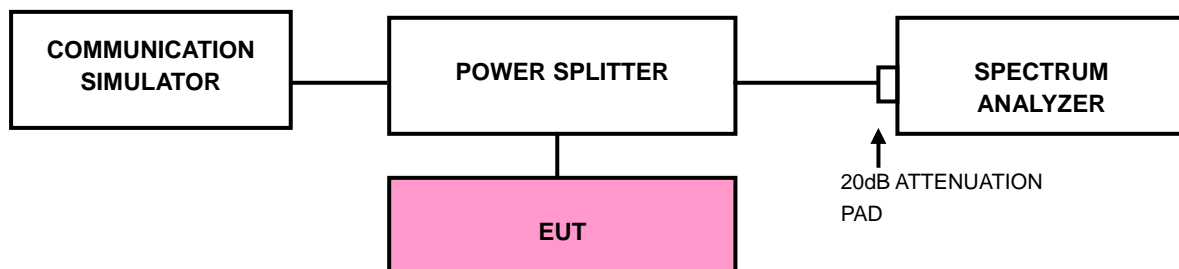


4.4 BAND EDGE MEASUREMENT

4.4.1 LIMITS OF BAND EDGE MEASUREMENT

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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4.4.2 TEST SETUP



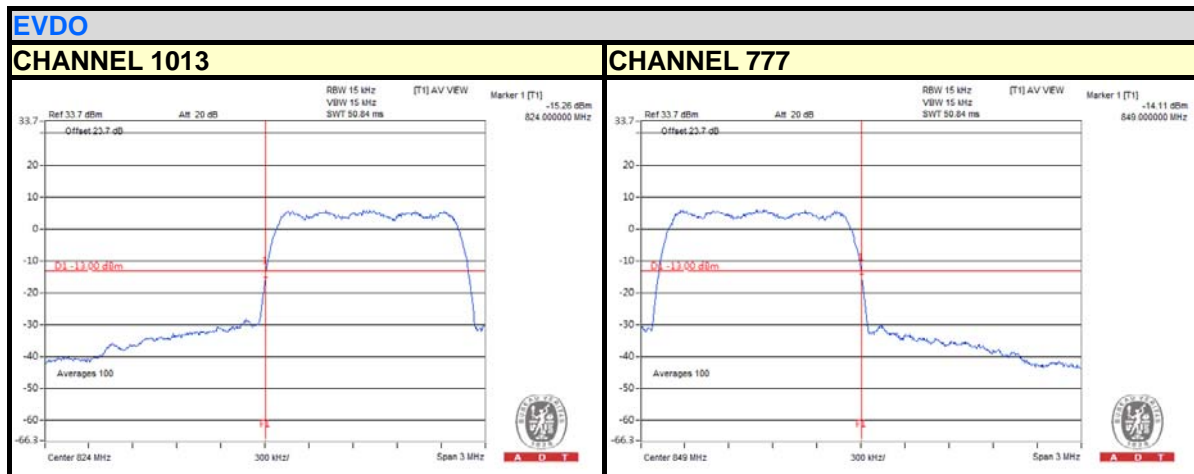
4.4.3 TEST PROCEDURES

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 3MHz. RB of the spectrum is 15kHz and VB of the spectrum is 15kHz (EVDO).
- The center frequency of spectrum is the band edge frequency and span is 10MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE).
- Record the max trace plot into the test report.



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4.4.4 TEST RESULTS



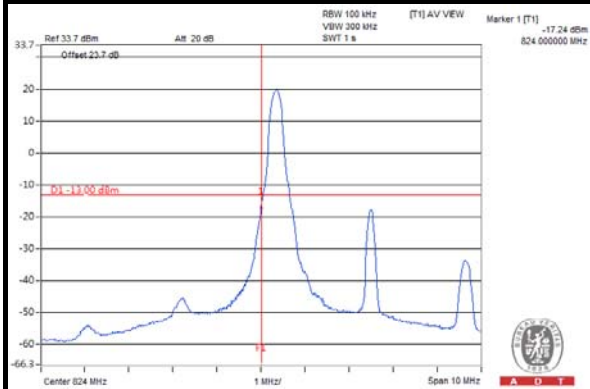


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LTE Band 5 (Channel Bandwidth 5MHz)

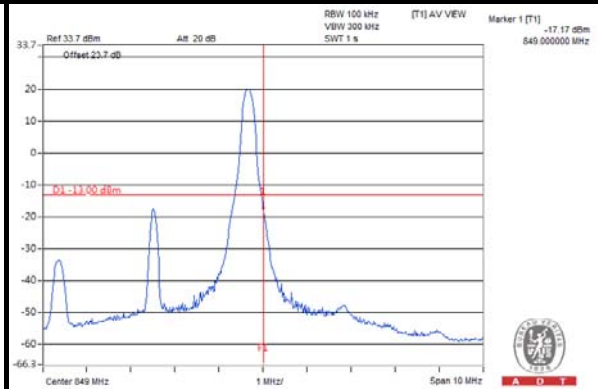
CHANNEL 20425

1RB / 0RB offset



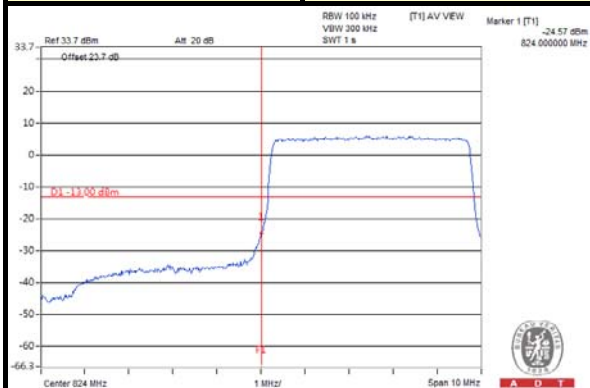
CHANNEL 20625

1RB / 0RB offset



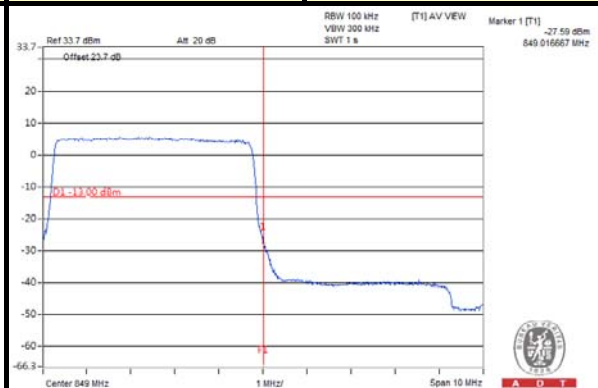
CHANNEL 20425

1RB / 24RB offset



CHANNEL 20625

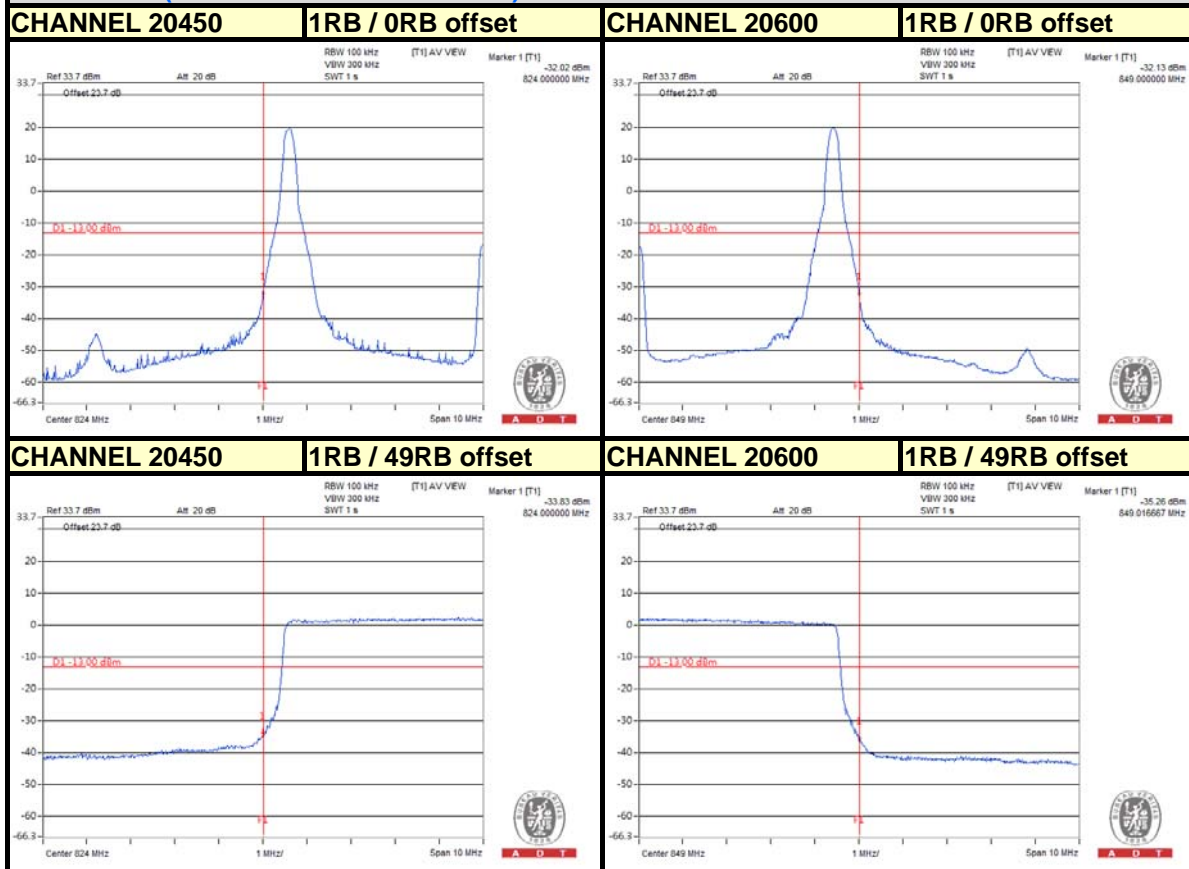
1RB / 24RB offset





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LTE Band 5 (Channel Bandwidth 10MHz)



4.5 CONDUCTED SPURIOUS EMISSIONS

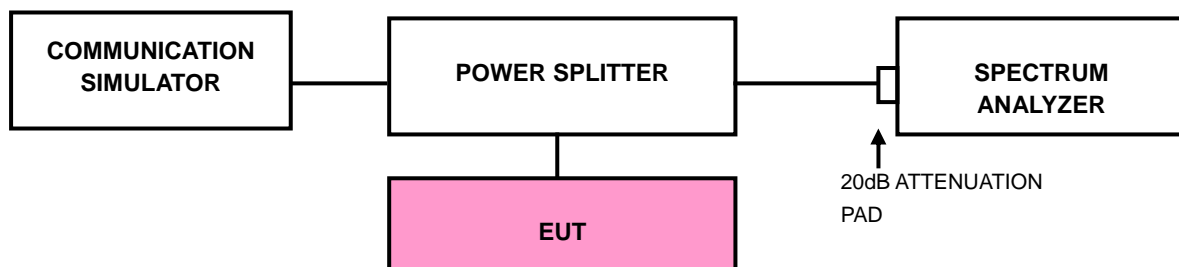
4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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 .

4.5.2 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 9kHz to 9GHz (EVDO/ LTE). 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

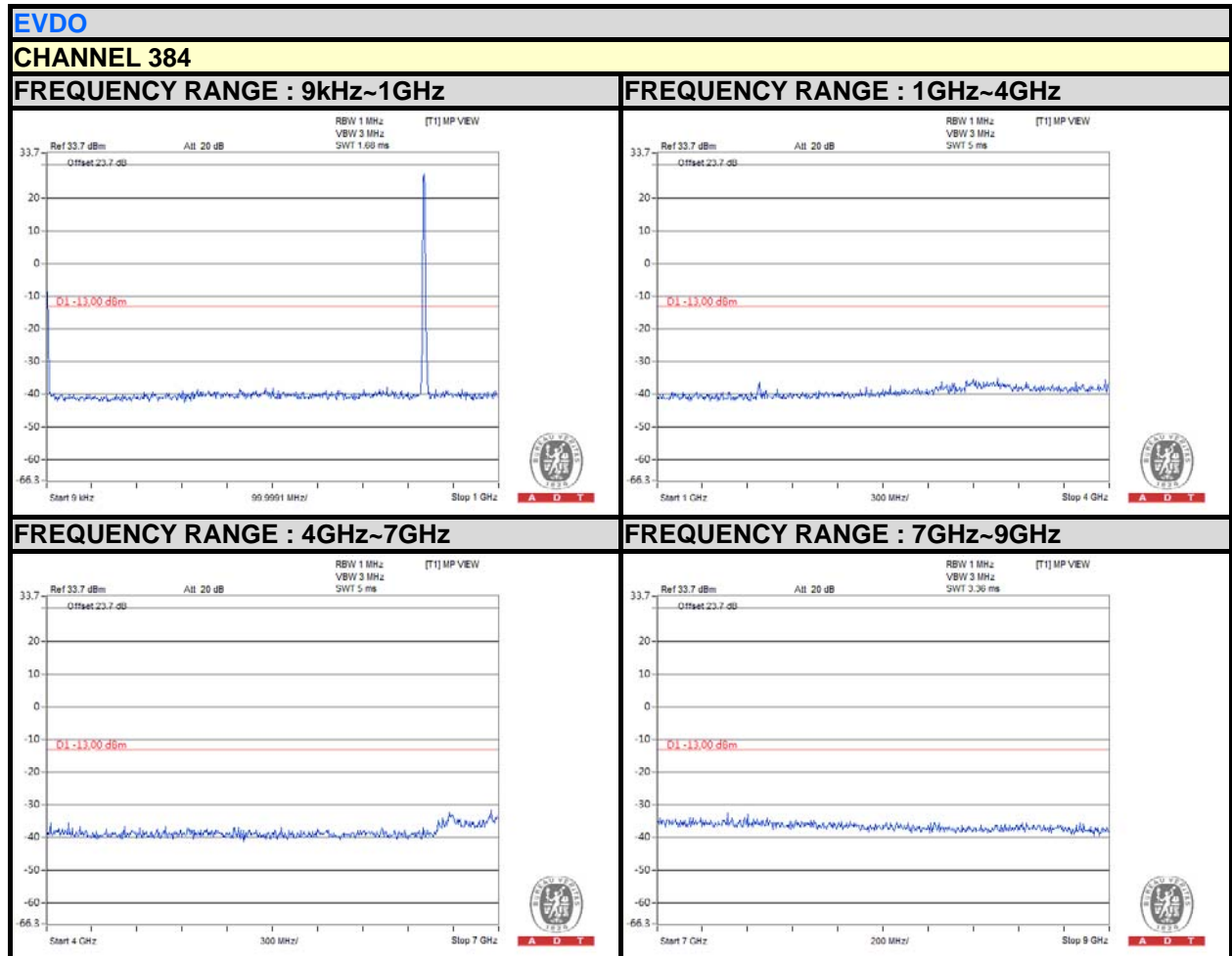
4.5.3 TEST SETUP





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4.5.4 TEST RESULTS



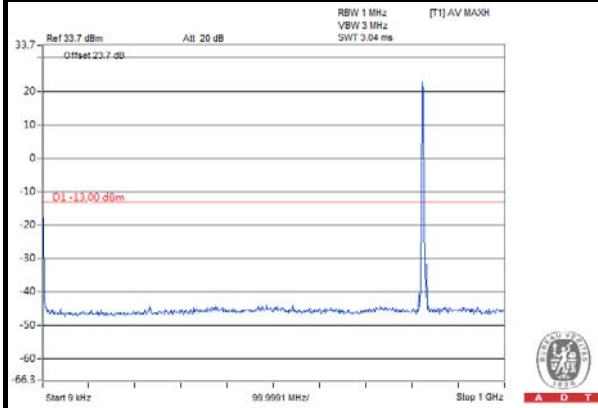


A D T

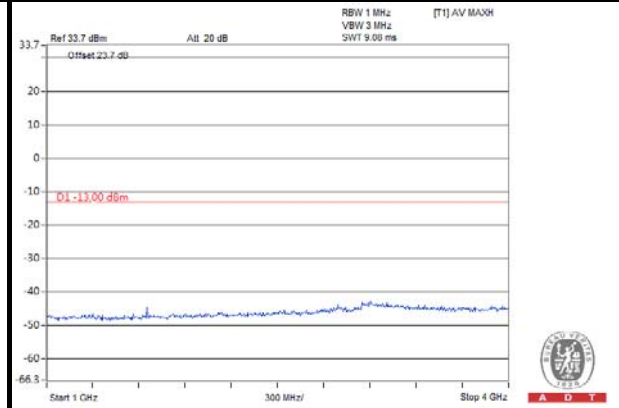
LTE Band 5 (Channel Bandwidth 5MHz)

CHANNEL 20425

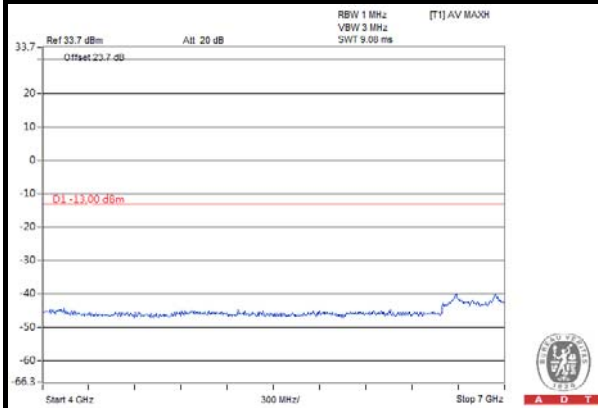
FREQUENCY RANGE : 9kHz~1GHz



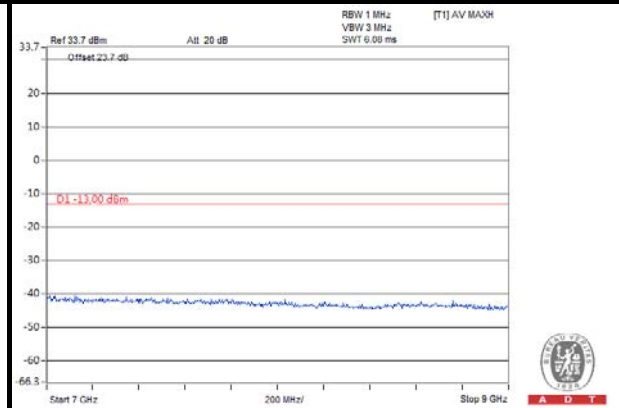
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



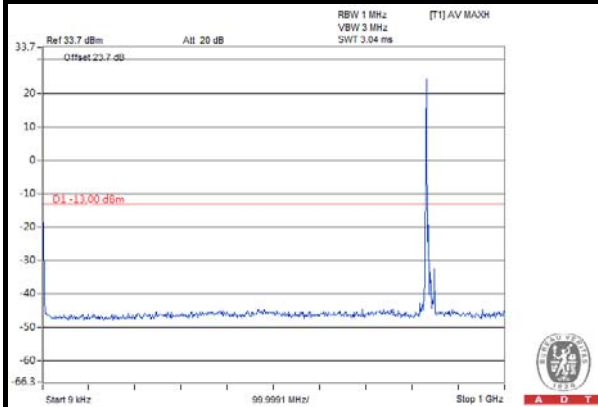


A D T

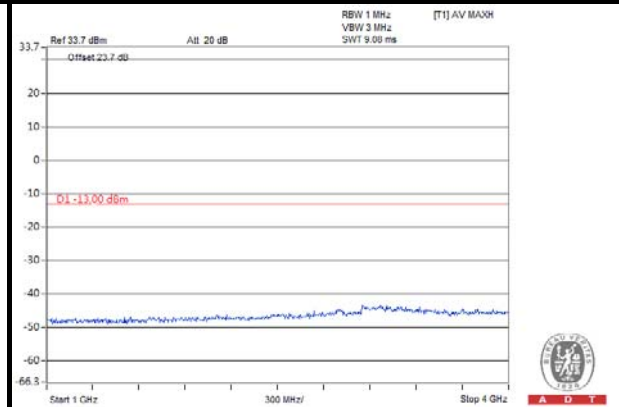
LTE Band 5 (Channel Bandwidth 10MHz)

CHANNEL 20525

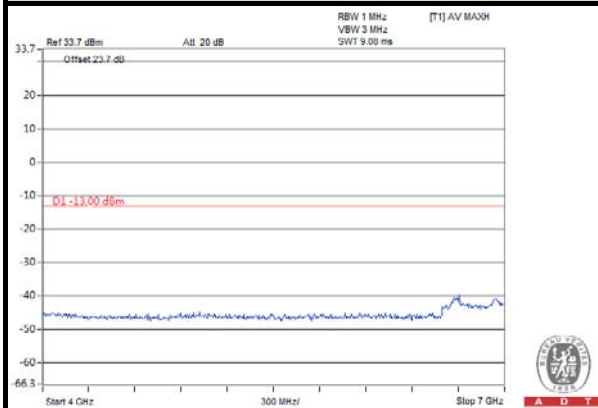
FREQUENCY RANGE : 9kHz~1GHz



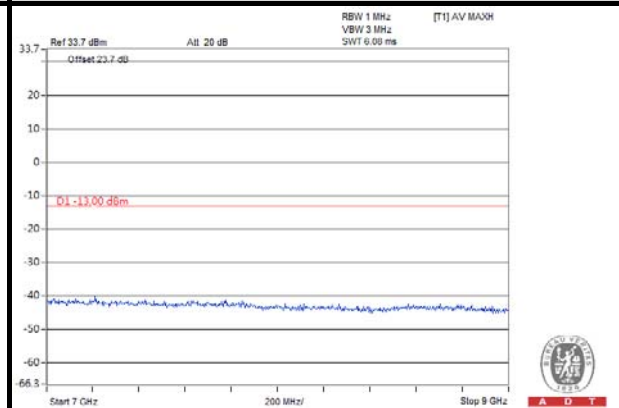
FREQUENCY RANGE : 1GHz~4GHz



FREQUENCY RANGE : 4GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



4.6 RADIATED EMISSION MEASUREMENT

4.6.1 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 .

4.6.2 TEST PROCEDURES

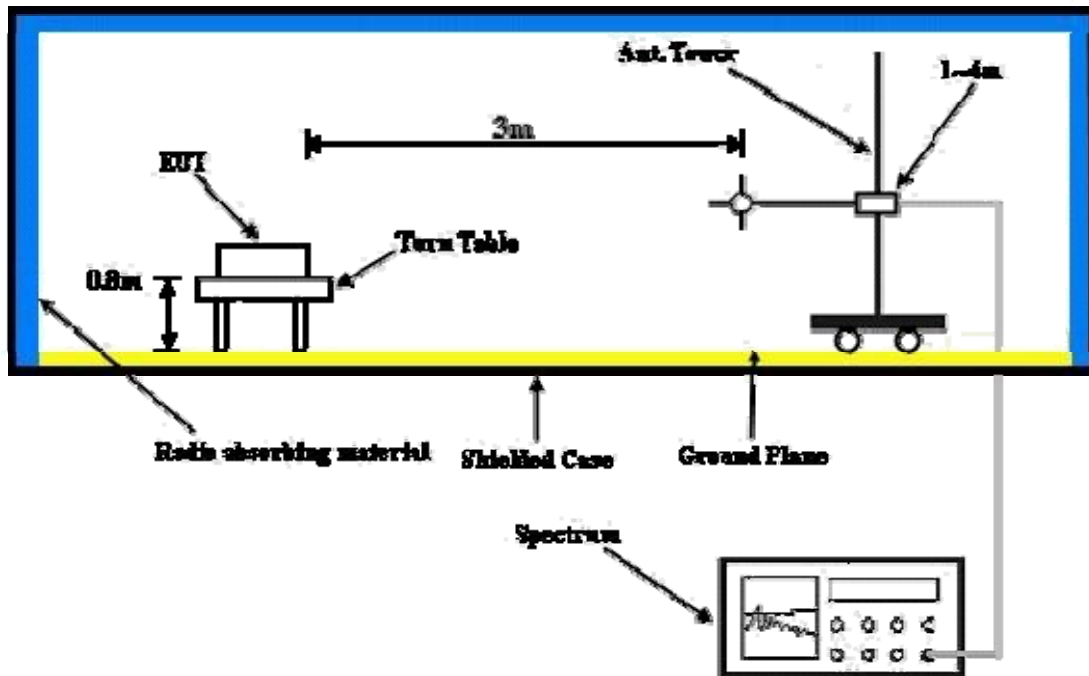
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $\text{E.R.P power} = \text{E.I.R.P power} - 2.15\text{dBi}$.

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

4.6.3 DEVIATION FROM TEST STANDARD

No deviation

4.6.4 TEST SETUP



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



4.6.5 TEST RESULTS

EVDO

MODE	TX channel 1013	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60Hz
TESTED BY	Chris Lin		

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	-47.53	-55.98	0.65	-55.33	-13.00	-42.33
2	212.36	-47.51	-61.36	5.46	-55.90	-13.00	-42.90
3	336.52	-50.93	-60.84	5.19	-55.65	-13.00	-42.65
4	608.12	-62.03	-66.78	4.49	-62.29	-13.00	-49.29
5	786.60	-67.28	-67.46	4.20	-63.26	-13.00	-50.26
6	957.32	-68.57	-65.35	3.91	-61.44	-13.00	-48.44
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	57.16	-44.58	-44.22	-8.21	-52.43	-13.00	-39.43
2	99.84	-50.21	-57.17	0.87	-56.30	-13.00	-43.30
3	210.42	-51.45	-61.55	5.46	-56.09	-13.00	-43.09
4	336.52	-57.93	-65.32	5.19	-60.13	-13.00	-47.13
5	650.80	-66.89	-67.22	4.85	-62.37	-13.00	-49.37
6	918.52	-68.86	-63.35	3.91	-59.44	-13.00	-46.44

REMARKS:

1. $ERP(dBm) = S.G\ Power\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. Correction Factor = gain of substitution antenna + cable loss



A D T

MODE	TX channel 1013	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60Hz
TESTED BY	Chris Lin		

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	1649.40	-44.78	-45.75	5.48	-40.27	-13.00	-27.27
2	2474.10	-57.44	-56.91	6.43	-50.48	-13.00	-37.48
3	3298.80	-62.74	-59.42	6.87	-52.55	-13.00	-39.55
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	1649.40	-45.98	-50.11	5.48	-44.63	-13.00	-31.63
2	2474.10	-57.65	-56.71	6.43	-50.28	-13.00	-37.28
3	3298.80	-61.58	-59.00	6.87	-52.13	-13.00	-39.13

REMARKS:

1. $ERP(dBm) = S.G \text{ Power Value (dBm)} + \text{Correction Factor (dB)}$.
2. Correction Factor = gain of substitution antenna + cable loss



LTE Band 5 (Channel Bandwidth 5MHz)

MODE	TX channel 20425	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60Hz
TESTED BY	Chris Lin		

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	37.76	-67.39	-53.94	-11.65	-65.59	-13.00	-52.59
2	394.72	-68.34	-75.21	5.26	-69.95	-13.00	-56.95
3	513.06	-66.72	-73.12	4.83	-68.29	-13.00	-55.29
4	629.46	-67.97	-72.23	4.66	-67.57	-13.00	-54.57
5	691.54	-67.47	-70.90	5.18	-65.72	-13.00	-52.72
6	984.48	-68.89	-65.20	3.91	-61.29	-13.00	-48.29

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	115.36	-55.30	-61.43	0.26	-61.17	-13.00	-48.17
2	206.54	-57.24	-67.32	5.46	-61.86	-13.00	-48.86
3	237.58	-57.59	-66.98	5.41	-61.57	-13.00	-48.57
4	447.10	-66.57	-70.84	5.09	-65.75	-13.00	-52.75
5	598.42	-67.57	-69.09	4.45	-64.64	-13.00	-51.64
6	759.44	-67.91	-65.50	4.53	-60.97	-13.00	-47.97

REMARKS:

1. $ERP(dBm) = S.G \text{ Power Value (dBm)} + \text{Correction Factor (dB)}$.
2. Correction Factor = gain of substitution antenna + cable loss



A D T

MODE	TX channel 20425	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60Hz
TESTED BY	Chris Lin		

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	1653.00	-42.57	-43.55	5.49	-38.06	-13.00	-25.06
2	2479.50	-55.58	-55.09	6.44	-48.65	-13.00	-35.65
3	3306.00	-57.96	-54.63	6.88	-47.75	-13.00	-34.75
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	1653.00	-54.85	-58.97	5.49	-53.48	-13.00	-40.48
2	2479.50	-59.77	-58.83	6.44	-52.39	-13.00	-39.39
3	3306.00	-60.12	-57.51	6.88	-50.63	-13.00	-37.63

REMARKS:

1. $ERP(dBm) = S.G\ Power\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. Correction Factor = gain of substitution antenna + cable loss



LTE Band 5 (Channel Bandwidth 10MHz)

MODE	TX channel 20525	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60Hz
TESTED BY	Chris Lin		

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	61.04	-54.86	-52.28	-7.33	-59.61	-13.00	-46.61
2	115.36	-61.35	-69.68	0.26	-69.42	-13.00	-56.42
3	225.94	-63.15	-76.83	5.44	-71.39	-13.00	-58.39
4	404.42	-67.86	-74.82	5.26	-69.56	-13.00	-56.56
5	561.56	-67.09	-72.96	4.60	-68.36	-13.00	-55.36
6	740.04	-68.55	-69.86	4.77	-65.09	-13.00	-52.09

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	61.04	-55.15	-55.97	-7.33	-63.30	-13.00	-50.30
2	125.06	-59.48	-64.82	-0.03	-64.85	-13.00	-51.85
3	239.52	-64.91	-74.36	5.41	-68.95	-13.00	-55.95
4	429.64	-67.47	-72.38	5.15	-67.23	-13.00	-54.23
5	689.60	-68.28	-68.06	5.16	-62.90	-13.00	-49.90
6	978.66	-68.67	-62.13	3.92	-58.21	-13.00	-45.21

REMARKS:

1. $ERP(dBm) = S.G\ Power\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. Correction Factor = gain of substitution antenna + cable loss



A D T

MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	INPUT POWER	120Vac, 60Hz
TESTED BY	Chris Lin		

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	-47.44	-48.48	5.54	-42.94	-13.00	-29.94
2	2509.50	-58.95	-58.53	6.45	-52.08	-13.00	-39.08
3	3346.00	-60.32	-56.96	6.94	-50.02	-13.00	-37.02
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	-52.33	-56.40	5.54	-50.86	-13.00	-37.86
2	2509.50	-57.85	-56.82	6.45	-50.37	-13.00	-37.37
3	3346.00	-61.22	-58.47	6.94	-51.53	-13.00	-38.53

REMARKS:

1. $ERP(dBm) = S.G \text{ Power Value (dBm)} + \text{Correction Factor (dB)}$.
2. Correction Factor = gain of substitution antenna + cable loss



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5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



6 INFORMATION ON 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 accredited and approved according to ISO/IEC 17025.

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

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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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7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

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