FCC Test Report (LTE)

Report No.: RF161201C02-2

FCC ID: G95-MGM0110VZN

Equipment Name: LTE Router

Trade Name: technicolor

Model Number: MBHA10

Product Code: DSLMVZ011GM

Received Date: Dec. 01, 2016

Test Date: Dec. 06 to 16, 2016

Issued Date: Mar. 08, 2017

Applicant: Technicolor Connected Home USA LLC

Address: 5030 Sugarloaf Parkway Building Lawrenceville Georgia United States 30044

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. 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
RF161201C02-2	Original release.	Mar. 08, 2017

1 Certificate of Conformity

Equipment Name: LTE Router

Trade Name: technicolor

Test Model: MBHA10

Product Code: DSLMVZ011GM

Sample Status: Product Unit

Applicant: Technicolor Connected Home USA LLC

Test Date: Dec. 06 to 16, 2016

Standards: 47 CFR FCC Part 27

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 EMI characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Mar. 08, 2017

Claire Kuan / Specialist

Approved by : _____ , **Date:** Mar. 08, 2017

May Chen / Manager

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2					
Section	**Ref. Std. Clause**	**Description**	**Measured**	**Limit**	**Result**
4.1	2.1046 27.50(h)(2)	Output Power	Meet the requirement of limit.	1710-1755 MHz : 1 watt EIRP. 698-787 MHz : 3 watts ERP	PASS
4.2	2.1055 27.54	Frequency Stability	Meet the requirement of limit.	Stay with the authorized bands of operation	PASS
4.3	2.1049 27.53(m)(6)	Emission Bandwidth	Meet the requirement of limit.	-	-
4.4	2.1051 27.53(m)(4)(6)	Band Edge Measurements	Meet the requirement of limit margin is -1.96dB at 1709.99MHz	-13dBm	PASS
4.5	---	Peak to Average Ratio	Meet the requirement of limit.	Not exceed 13 dB	PASS
4.6	2.1051 27.53(m)(4)(6)	Conducted Spurious Emissions	Meet the requirement of limit.	Under -13dBm	PASS
4.7	2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	Meet the requirement of limit. Minimum passing margin is -15.96dB at 69.06MHz	Under -13dBm	PASS

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	30MHz ~ 1GHz	5.36 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.47 dB
	6GHz ~ 18GHz	3.75 dB
	18GHz ~ 40GHz	3.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Basic Description of Equipment Under Test (LTE)

Items	Description				
Equipment Name	LTE Router				
Trade Name	technicolor				
Model Number	MBHA10				
Product Code	DSLMVZ011GM				
FCC ID	G95-MGM0110VZN				
Power Type	From power adapter				
Antenna	Refer section 3.10				
EUT Stage	■	Product Unit		☐	Pre-Sample
Operating Band	LTE	Band IV		■	LTE Bandwidth 5 MHz: 1712.5MHz ~1752.5MHz
				■	LTE Bandwidth 10 MHz: 1715MHz ~1750MHz
				■	LTE Bandwidth 15 MHz: 1717.5MHz ~1747.5MHz
				■	LTE Bandwidth 20 MHz: 1720MHz ~1745MHz
		Band XIII		■	LTE Bandwidth 5 MHz: 779.5MHz ~ 784.5MHz
				■	LTE Bandwidth 10 MHz: 782MHz
Max. EIRP Power	LTE	Band IV	QPSK	■	LTE Bandwidth 5 MHz: 26.51 dBm
				■	LTE Bandwidth 10 MHz: 26.06 dBm
				■	LTE Bandwidth 15 MHz: 25.30 dBm
				■	LTE Bandwidth 20 MHz: 25.55 dBm
			16QAM	■	LTE Bandwidth 5 MHz: 24.31 dBm
				■	LTE Bandwidth 10 MHz: 23.83 dBm
				■	LTE Bandwidth 15 MHz: 24.21 dBm
				■	LTE Bandwidth 20 MHz: 24.53 dBm
Max. ERP Power		Band XIII	QPSK	■	LTE Bandwidth 5 MHz: 23.82 dBm
				■	LTE Bandwidth 10 MHz: 24.12 dBm
			16QAM	■	LTE Bandwidth 5 MHz: 22.72 dBm
				■	LTE Bandwidth 10 MHz: 22.68 dBm

Emission Designator	LTE	Band IV	QPSK	■	LTE Bandwidth 5 MHz: 4M55G7D
				■	LTE Bandwidth 10 MHz: 9M06G7D
				■	LTE Bandwidth 15 MHz: 13M5G7D
				■	LTE Bandwidth 20 MHz: 18M2G7D
			16QAM	■	LTE Bandwidth 5 MHz: 5M55D7W
				■	LTE Bandwidth 10 MHz: 9M04D7W
				■	LTE Bandwidth 15 MHz: 13M5D7W
				■	LTE Bandwidth 20 MHz: 18M1D7W
		Band XIII	QPSK	■	LTE Bandwidth 5 MHz: 4M56G7D
				■	LTE Bandwidth 10 MHz: 9M02G7D
			16QAM	■	LTE Bandwidth 5 MHz: 4M56D7W
				■	LTE Bandwidth 10 MHz: 9M02D7W
Product Type	For LTE (1TX, 2RX)				
Nominal Bandwidth	For Band IV: 5MHz / 10MHz / 15MHz / 20MHz For Band XIII: 5MHz / 10MHz				
Modulation	QPSK, 16QAM				
I/O Ports	LAN Port x 1 RJ31 Port x 1 FXS Port x 1 SIM Port x1 Console Port x 1 (For engineer debug use only)				
Hardware Version	FGR1				
Software Version	16.4.7446-3130000-20161220230657-aa636a7383f23e65d07560e3fbe49cd6cbed2ce0				

3.2 Accessories

Li-ion Battery:

Model	BP-MGM0110
Manufacturer	GETAC TECHNOLOGY CORP.
Rating	3.7V, 2500mAh / 9.25Wh

Power supply:

Model	WAE002
P/N	DSL37544940
Manufacturer	AcBel
Input	100/240Vac , 50/60Hz , 0.7A
Output	12Vdc , 2A
DC power cord	1.5m

3.3 Feature of Equipment Under Test

Please refer to user manual.

3.4 Information Provided by the Manufacturer

Interface Availability

Interface / Model	DC 12Vdc	RJ31-X Alarm	Ethernet 10/100 Mbps	FXS	SIM	Zigbee	Z-Wave	BT	GPS	LTE (4G)	WLAN 802.11a/b/g/n/ac (2.4GHz 2*2) (5GHz 2*2 ac)
MBHA10	● (2A)	● (1 port)	● (1 port)	● (1 port)	● (1 port)	●	●	●	●	●	●

● : Equipped
○ : Not Equipped

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 27

KDB 971168 D01 Power Meas License Digital Systems v02r02, 10/17/2014

ANSI/TIA/EIA-603-D 2010

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

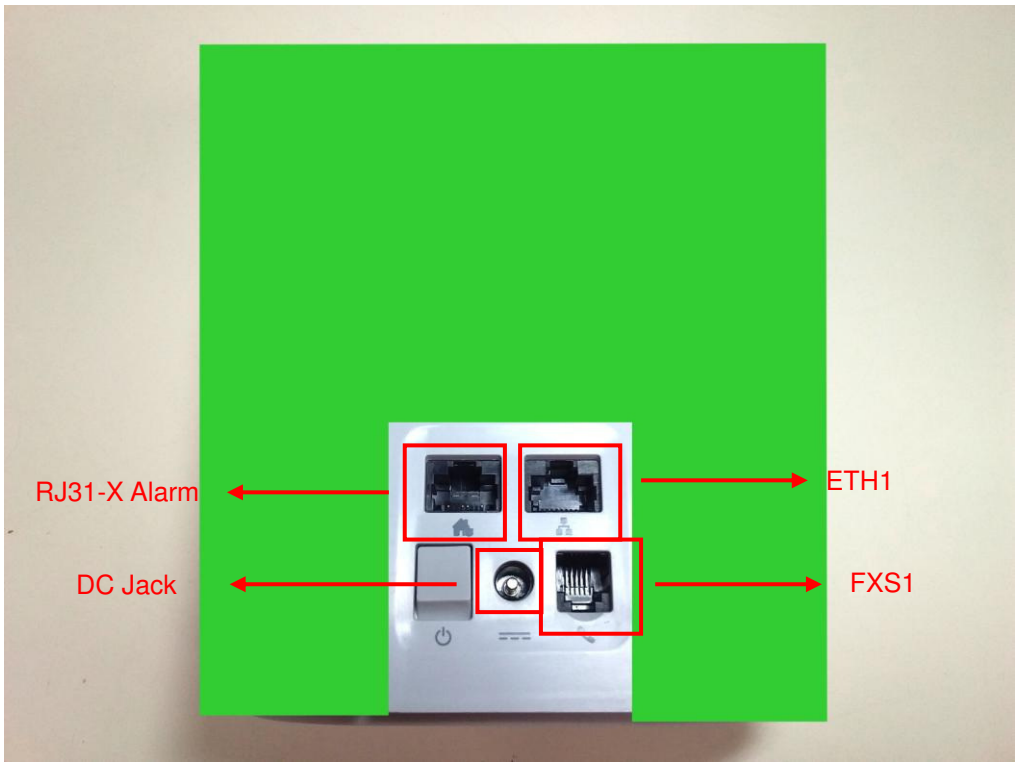
NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

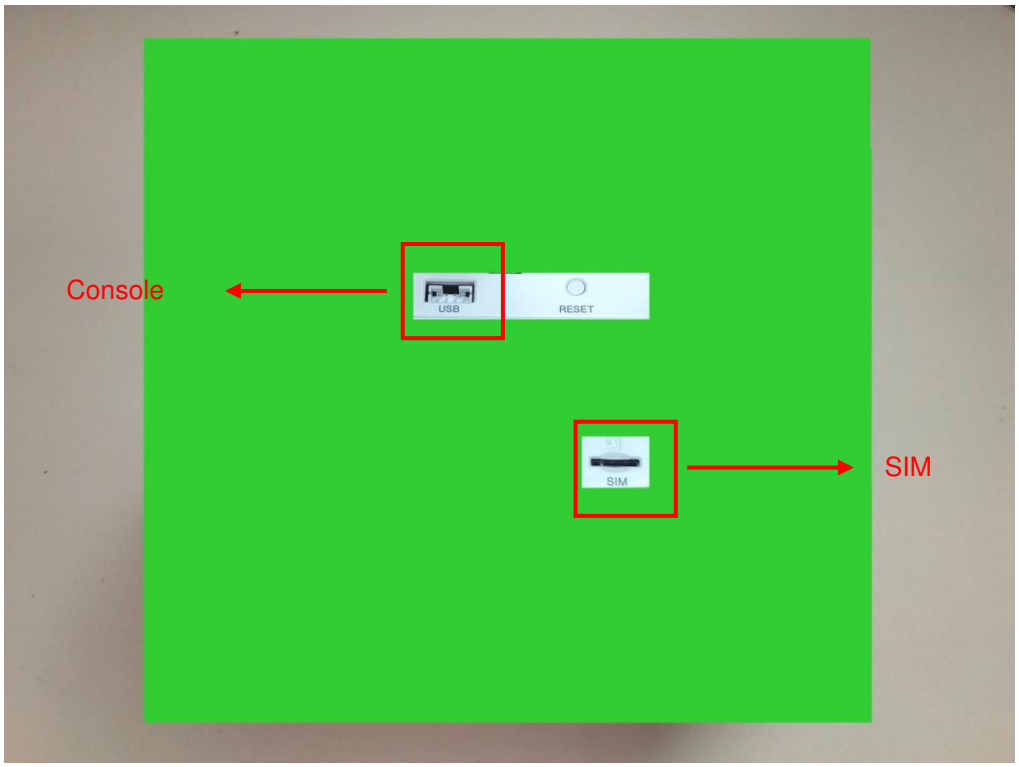
3.6 Cabling Attached to the Equipment

Cable and Interconnection

Interface	Cable Type	Cable Length Delivered with the Modem	"Real Life" Cable Length that can be Attached to this Type of Interface	Cable Length to be used for Testing	Internal/ External Connection
ETH1	UTP Cat 5	1 meter	> 10 meter	10 meter	Internal
RJ31-X Alarm	UTP Cat 3	1 meter	> 10 meter	10 meter	Internal
FXS1	UTP Cat 3	1 meter	> 10 meter	10 meter flat cable	Internal
AC power	-	-	-	-	External

3.7 Panel Drawing





3.8 Radio General Information

Transmit Operating Mode		Transmit Muitiple Antennas	
■	Operating mode 1	■	1TX 2Rx

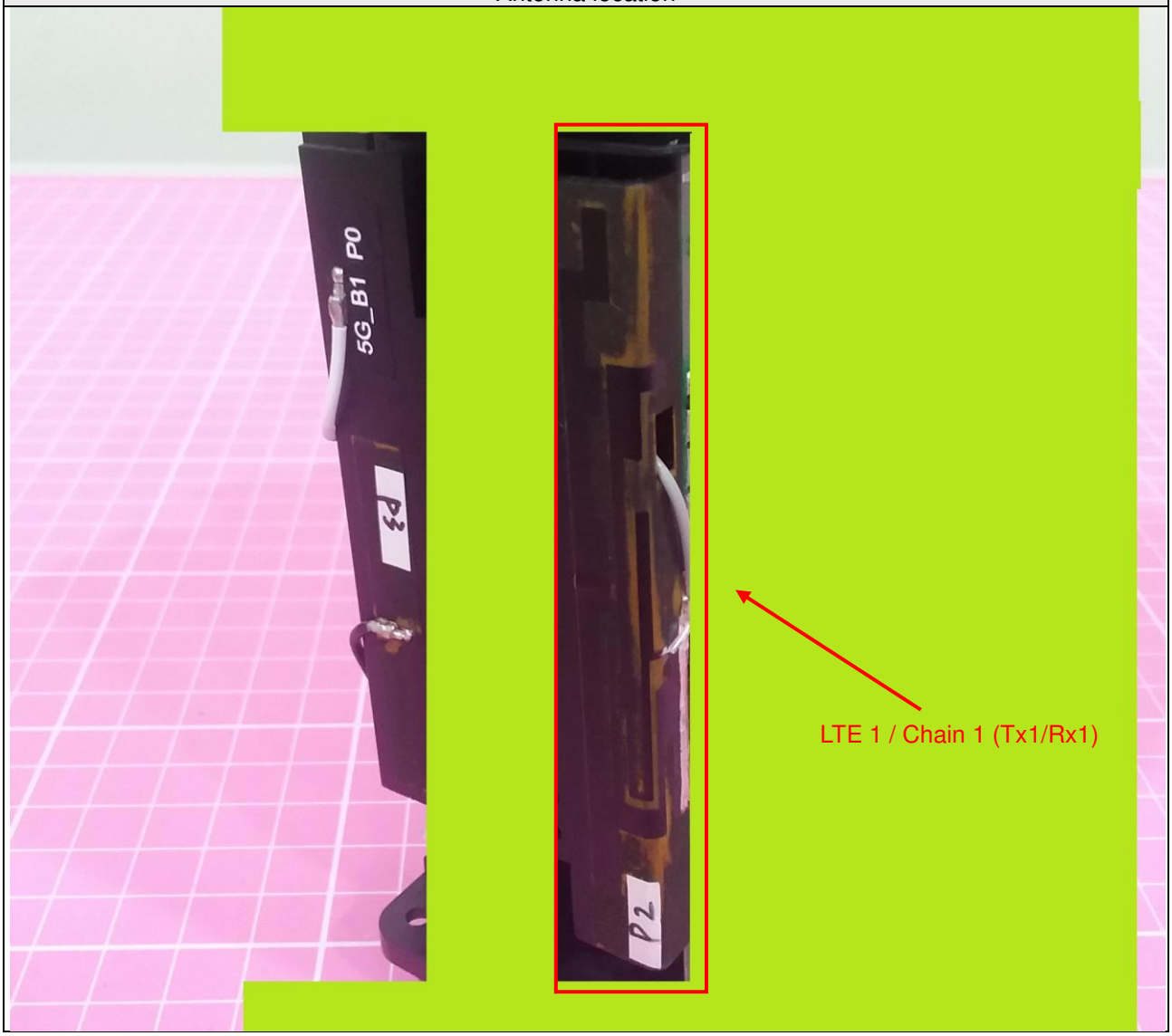
3.9 Antenna Requirements

No special requirements

3.10 Antenna Information

Antenna Information					
Ant.	**Brand**	**Model No.**	**Antenna Type**	**Connector**	**Cable Length**
LTE1	INPAQ	WA-F-LTE5LA-04-001	FPCB Antenna	I-PEX	79.2 mm
LTE2	INPAQ	WA-F-LTE5LALC-12-001	FPCB Antenna	I-PEX	61.3 mm

Antenna location



Antenna location

Ant	UTRA Band	Uplink (UL)						Downlink (DL)					
		Freq.	Gain	Freq.	Gain	Freq.	Gain	Freq.	Gain	Freq.	Gain	Freq.	Gain
LTE 1	Band IV	1710	1.83	1747.5	1.99	1785	1.91	2110	0.89	2132.5	1.79	2155	1.86
	Band XIII	777	2.67	782	2.35	787	1.96	746	1.06	750.5	1.58	756	1.94
LTE 2	Band IV	1710	1.73	1747.5	1.53	1785	1.36	2110	1.78	2132.5	1.93	2155	2.27
	Band XIII	777	0.81	782	0.78	787	0.85	746	1.01	750.5	0.72	756	0.44

Note: Freq. (Frequency) unit is “MHz”.

3.11 Table for Carrier Frequency

Radio Channels Information													
UTRA Band	BW (MHz)	Uplink (UL)						Downlink (DL)					
		Low		Middle		High		Low		Middle		High	
		NUL	Freq.	NUL	Freq.	NUL	Freq.	NUL	Freq.	NUL	Freq.	NUL	Freq.
Band IV	5	19975	1712.5	20175	1732.5	20375	1752.5	1975	2112.5	2175	2132.5	2375	2152.5
	10	20000	1715	20175	1732.5	20350	1750	2000	2115	2175	2132.5	2350	2150
	15	20025	1717.5	20175	1732.5	20325	1747.5	2025	2117.5	2175	2132.5	2325	2147.5
	20	20050	1720	20175	1732.5	20300	1745	2050	2120	2175	2132.5	2300	2145
Band XIII	5	23205	779.5	23230	782	23255	784.5	5205	748.5	5230	751	5255	753.5
	10	23230	782	23230	782	23230	782	5230	751	5230	751	5230	751

Note: Freq. (Frequency) unit is “MHz”.

3.12 Table for Test Modes

LTE Band IV

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
EIRP	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
FREQUENCY STABILITY	19975 to 20375	20175	5MHz	QPSK	1 RB / 0 RB Offset
	20000 to 20350	20175	10MHz	QPSK	1 RB / 0 RB Offset
	20025 to 20325	20175	15MHz	QPSK	1 RB / 0 RB Offset
	20050 to 20300	20175	20MHz	QPSK	1 RB / 0 RB Offset
EMISSION BANDWIDTH	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	75 RB / 0 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	100 RB / 0 RB Offset
PEAK TO AVERAGE RATIO	19975 to 20375	19975, 20175, 20375	5MHz	QPSK	25 RB / 0 RB Offset
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK	50 RB / 0 RB Offset
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK	75 RB / 0 RB Offset
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK	100 RB / 0 RB Offset
BAND EDGE	19975 to 20375	19957	5MHz	QPSK	1 RB / 0 RB Offset
		20393			1 RB / 24 RB Offset
		19957, 20393			25 RB / 0 RB Offset
	20000 to 20350	20000	10MHz	QPSK	1 RB / 0 RB Offset
		20350			1 RB / 49 RB Offset
		20000, 20350			50 RB / 0 RB Offset
	20025 to 20325	20025	15MHz	QPSK	1 RB / 0 RB Offset
		20325			1 RB / 74 RB Offset
		20025, 20325			75 RB / 0 RB Offset
	20050 to 20300	20050	20MHz	QPSK	1 RB / 0 RB Offset
		20300			1 RB / 99 RB Offset
		20050, 20300			100 RB / 0 RB Offset
CONDCUDETED SPURIOUS EMISSION	19975 to 20375	20175	5MHz	QPSK	1 RB / 0 RB Offset
	20000 to 20350	20175	10MHz	QPSK	1 RB / 0 RB Offset
	20025 to 20325	20175	15MHz	QPSK	1 RB / 0 RB Offset
	20050 to 20300	20175	20MHz	QPSK	1 RB / 0 RB Offset
RADIATED SPURIOUS EMISSION	19975 to 20375	20175	5MHz	QPSK	1 RB / 0 RB Offset
	20000 to 20350	20175	10MHz	QPSK	1 RB / 0 RB Offset
	20025 to 20325	20175	15MHz	QPSK	1 RB / 0 RB Offset
	20050 to 20300	20175	20MHz	QPSK	1 RB / 0 RB Offset

Note:

1. The device with multiple operating mode, measurements on the middle channel were tested to determine the worst case mode.

LTE Band XIII

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
ERP	23205 to 23255	23205, 23230, 23255	5MHz	QPSK/16QAM	1 RB / 0 RB Offset
	23230	23230	10MHz	QPSK/16QAM	1 RB / 0 RB Offset
FREQUENCY STABILITY	23205 to 23255	23230	5MHz	QPSK	1 RB / 0 RB Offset
	23230	23230	10MHz	QPSK	1 RB / 0 RB Offset
EMISSION BANDWIDTH	23205 to 23255	23205, 23230, 23255	5MHz	QPSK/16QAM	25 RB / 0 RB Offset
	23230	23230	10MHz	QPSK/16QAM	50 RB / 0 RB Offset
PEAK TO AVERAGE RATIO	23205 to 23255	23205, 23230, 23255	5MHz	QPSK	25 RB / 0 RB Offset
	23230	23230	10MHz	QPSK	50 RB / 0 RB Offset
BAND EDGE	23205 to 23255	23205	5MHz	QPSK	1 RB / 0 RB Offset
		23255			1 RB / 24 RB Offset
		23205, 23255			25 RB / 0 RB Offset
	23230	23230	10MHz	QPSK	1 RB / 0 RB Offset
					1 RB / 49 RB Offset
					50 RB / 0 RB Offset
CONDCUDETED SPURIOUS EMISSION	23205 to 23255	23230	5MHz	QPSK	1 RB / 0 RB Offset
	23230	23230	10MHz	QPSK	1 RB / 0 RB Offset
RADIATED SPURIOUS EMISSION	23205 to 23255	23230	5MHz	QPSK	1 RB / 0 RB Offset
	23230	23230	10MHz	QPSK	1 RB / 0 RB Offset

Note:

1. The device with multiple operating mode, measurements on the middle channel were tested to determine the worst case mode.

3.13 Parameters of Test Software Setting

During testing, 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. The RF output power is going to be fixed on the firmware of the final end product.

3.14 On Time and Duty Cycle

No special requirements

3.15 Testing Location Information

Test Site Location					
Address	(1) E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.				
TEL	886-3-6668565				
FAX	886-3-6668323				
Test Site No.	**Site Category**	**Location**	**FCC Reg. No.**	**IC Reg. No.**	**VCCI Reg. No**
Chamber 3	966 Chamber	Hsinchu	147459	20331-1	-
Oven 2	Oven	Hsinchu	-	-	-

3.16 EUT Diagram & Support Equipment

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.

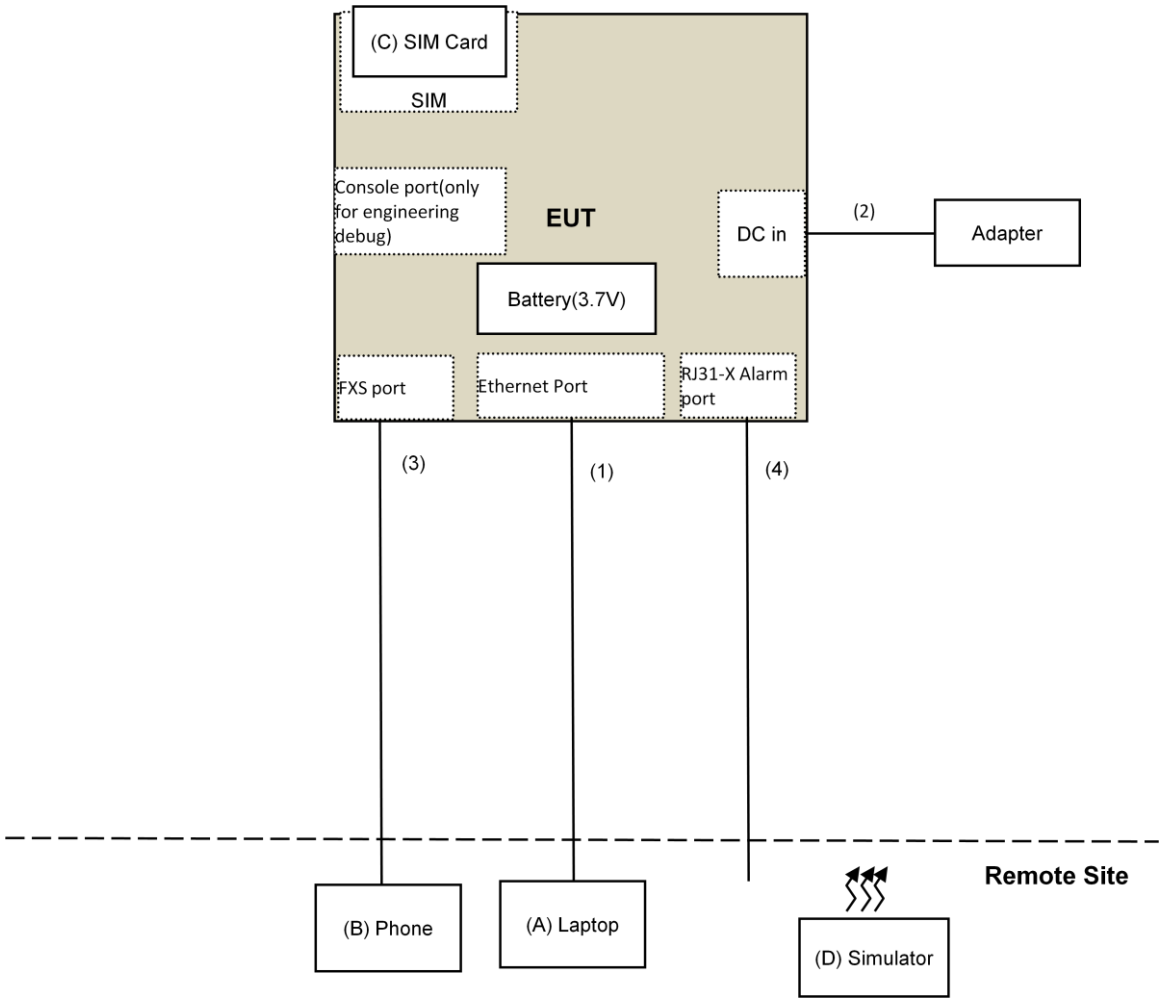
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6440	F9LYQ32	FCC DoC	Provided by Lab
B.	Phone	WONDER	WD-303	8C17DA02763	NA	Provided by Lab
C.	SIM Card	R&S	CRT-Z3	NA	NA	Provided by Lab
D.	Simulator	Anritsu	MT8820C	6201127458	NA	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Internal/external connection	Remarks
1.	RJ-45 Cable	1	10	No	0	External	Provided by Lab
2.	DC Cable	1	1.8	No	0	Internal	Supplied by client
3.	RJ-11 Cable	1	10	No	0	External	Provided by Lab
4.	RJ-31 Cable	1	10	No	0	External	Provided by Lab

EUT Diagram


(C) SIM Card
SIM
Console port(only for engineering debug)
EUT
DC in
(2)
Adapter
Battery(3.7V)
FXS port
Ethernet Port
RJ31-X Alarm port
(3)
(1)
(4)
Remote Site
(B) Phone
(A) Laptop
(D) Simulator

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band are limited to 1 watt EIRP.

Portable stations (hand-held devices) operating in the 698-787 MHz band are limited to 3 watts ERP

4.1.2 Test Procedures

EIRP / ERP Measurement:

a. All measurements were done at low, middle and high operational frequency range. Set the RBW ≥OBW and VBW≥3xRBW.

b. Substitution method is used for EIRP 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 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. ERP power can be calculated form EIRP power by subtracting the gain of dipole, ERP power = EIPR power - 2.15dBi.

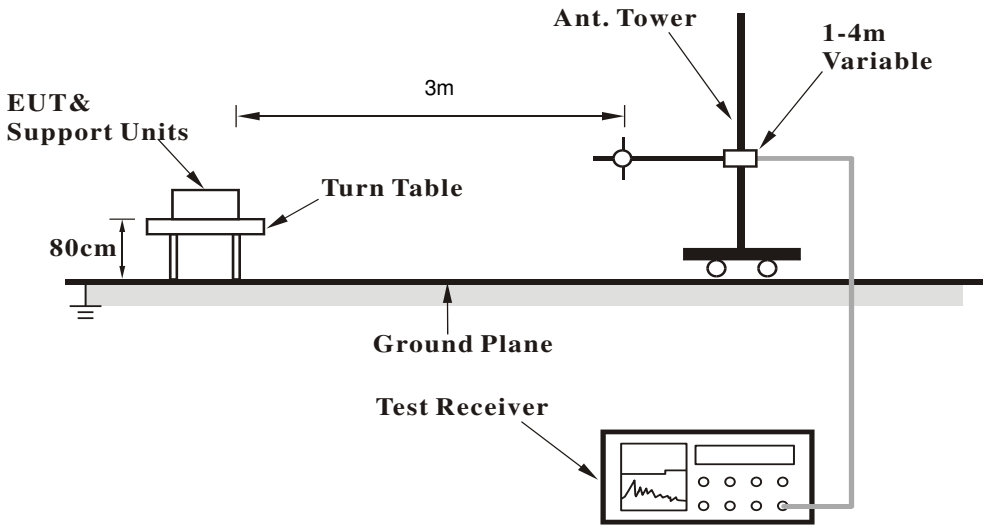
Conducted Power Measurement:

The EUT was set up for the maximum power with 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.

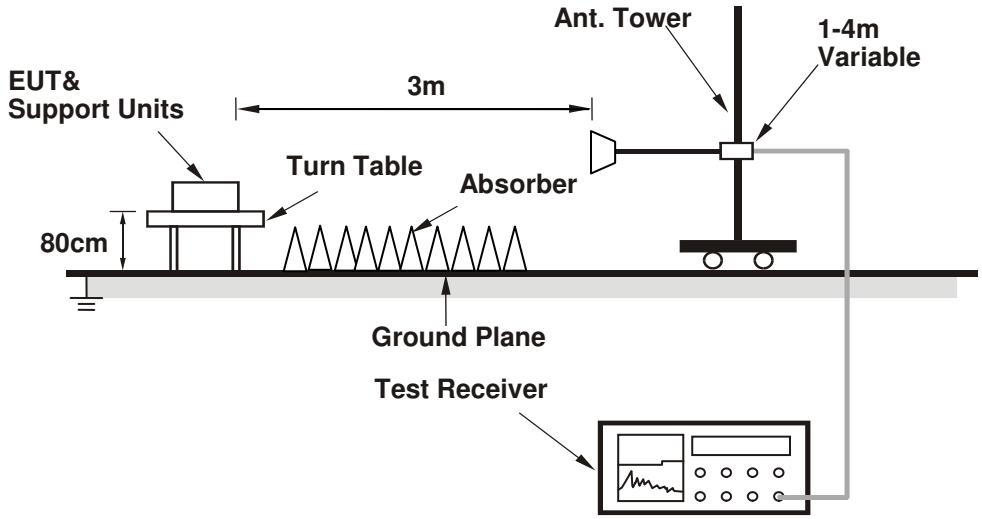
Note: The worst case vertical or horizontal polarization have been investigated and reported in this report.

4.1.3 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

CONDUCTED POWER MEASUREMENT:

4.1.4 Test Results

Temperature	25°C	Humidity	63%
Test Engineer	Gary Cheng		

CONDUCTED OUTPUT POWER (dBm)

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low Ch 19975	Mid Ch 20175	High Ch 20375	Low CH 19975	Mid CH 20175	High CH 20375
			1712.5 MHz	1732.5 MHz	1752.5 MHz	1712.5 MHz	1732.5 MHz	1752.5 MHz
IV / 5M	1	0	23.7	23.95	23.33	23	23.29	22.92
	1	12	23.5	**24.21**	23.54	22.7	23.58	22.86
	1	24	23.4	24.03	23.3	22.5	22.92	22.19
	12	0	23.7	23.01	22.46	21.5	22.01	21.3
	12	6	22.9	23.14	22.48	21.6	22.11	21.33
	12	13	22.7	23.34	22.38	21.4	22.14	21.31
	25	0	23.7	23.11	22.51	21.4	22.07	21.49

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low Ch 20000	Mid Ch 20175	High Ch 20350	Low Ch 20000	Mid Ch 20175	High Ch 20350
			1715.0 MHz	1732.5 MHz	1750.0 MHz	1715.0 MHz	1732.5 MHz	1750.0 MHz
IV / 10M	1	0	23.4	23.69	23.41	22.7	22.82	22.87
	1	24	23.6	**24.3**	23.67	22.3	23.25	22.86
	1	49	22.6	23.69	23.01	22	22.93	22.49
	25	0	22.5	23.02	22.62	21.4	21.88	21.43
	25	12	22.5	23.24	22.58	21.4	22.27	21.46
	25	25	22.2	23.19	22.41	21	22.04	21.23
	50	0	22.3	23.05	22.53	21.2	21.96	21.41

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low Ch 20025	Mid Ch 20175	High Ch 20325	Low Ch 20025	Mid Ch 20175	High Ch 20325
			1717.5 MHz	1732.5 MHz	1747.5 MHz	1717.5 MHz	1732.5 MHz	1747.5 MHz
IV / 15M	1	0	23.4	23.38	23.83	22.5	22.93	23.12
	1	37	23.8	**24.85**	24.33	23.1	24.05	23.65
	1	74	23.2	23.72	23.03	22	23.14	22.24
	36	0	22.8	23.21	23.05	21.7	22.17	22.01
	36	19	22.8	23.69	23.2	21.7	22.65	22.17
	36	39	22.5	23.37	22.8	21.4	22.34	21.72
	75	0	22.6	23.37	22.98	21.4	22.23	21.81

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low Ch 20050	Mid Ch 20175	High Ch 20300	Low Ch 20050	Mid Ch 20175	High Ch 20300
			1720.0 MHz	1732.5 MHz	1745.0 MHz	1720.0 MHz	1732.5 MHz	1745.0 MHz
IV / 20M	1	0	24.3	24.42	**24.86**	23.7	23.6	24.05
	1	50	23.2	24.38	23.94	22.7	23.57	23.16
	1	99	24.6	24.79	24.22	24.1	23.99	23.7
	50	0	22.7	23.35	23.35	21.8	22.27	22.39
	50	25	22.4	23.5	23.14	22.2	22.38	22.05
	50	50	22.7	23.52	23.01	23.1	22.44	21.95
	100	0	22.5	23.48	23.21	24.1	22.38	22.16

Band / BW	RB Size	RB Offset	QPSK			16QAM		
			Low Ch 23205	Mid Ch 23230	High Ch 23255	Low Ch 23205	Mid Ch 23230	High Ch 23255
			779.5 MHz	782.0 MHz	784.5 MHz	779.5 MHz	782.0 MHz	784.5 MHz
XIII / 5M	1	0	23.6	**24.16**	23.82	22.7	23.39	23.29
	1	12	24	23.63	24.12	23	22.74	23.13
	1	24	23.7	23.87	23.38	23	23.34	22.81
	12	0	22.7	22.87	23	21.7	21.95	22.09
	12	6	22.9	22.72	23.08	22	21.85	22.03
	12	13	23	22.74	22.98	22	21.69	22.09
	25	0	23.2	22.84	23.08	22.3	21.94	22.15

Band / BW	RB Size	RB Offset	QPSK	16QAM
			Mid Ch 23230	Mid Ch 23230
			782.0 MHz	782.0 MHz
XIII / 10M	1	0	23.78	23.22
	1	24	23.54	23.58
	1	49	23.66	22.49
	25	0	**23.87**	22
	25	12	23.36	22.5
	25	25	23.19	22.24
	50	0	23.66	22.68

EIRP POWER (dBm)

LTE Band IV

Channel Bandwidth: 5MHz / QPSK							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	EIRP Limit (mW)
19975	1712.5	V	23.69	2.78	26.47	443.61	1000
20175	1732.5	V	23.71	2.80	26.51	447.71	1000
20375	1752.5	V	23.31	2.81	26.12	409.26	1000
Channel Bandwidth: 10MHz / QPSK							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Limit (mW)
20000	1715.0	V	23.28	2.78	26.06	403.65	1000
20175	1732.5	V	23.07	2.80	25.87	386.37	1000
20350	1750.0	V	22.46	2.81	25.27	336.51	1000
Channel Bandwidth: 15MHz / QPSK							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Limit (mW)
20025	1717.5	V	22.19	2.78	24.97	314.05	1000
20175	1732.5	V	22.37	2.80	25.17	328.85	1000
20325	1747.5	V	22.49	2.81	25.30	338.84	1000
Channel Bandwidth: 20MHz / QPSK							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Limit (mW)
20050	1720.0	V	22.50	2.78	25.28	337.29	1000
20175	1732.5	V	22.32	2.80	25.12	325.09	1000
20300	1745.0	V	22.74	2.81	25.55	358.92	1000

Channel Bandwidth: 5MHz / 16QAM							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	EIRP Limit (mW)
19975	1712.5	V	21.43	2.78	24.21	263.63	1000
20175	1732.5	V	21.51	2.80	24.31	269.77	1000
20375	1752.5	V	21.30	2.81	24.11	257.63	1000
Channel Bandwidth: 10MHz / 16QAM							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Limit (mW)
20000	1715.0	V	21.05	2.78	23.83	241.55	1000
20175	1732.5	V	20.89	2.80	23.69	233.88	1000
20350	1750.0	V	21.02	2.81	23.83	241.55	1000
Channel Bandwidth: 15MHz / 16QAM							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Limit (mW)
20025	1717.5	V	20.88	2.78	23.66	232.27	1000
20175	1732.5	V	21.20	2.80	24.00	251.19	1000
20325	1747.5	V	21.40	2.81	24.21	263.63	1000
Channel Bandwidth: 20MHz / 16QAM							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Limit (mW)
20050	1720.0	V	21.71	2.78	24.49	281.19	1000
20175	1732.5	V	21.66	2.80	24.46	279.25	1000
20300	1745.0	V	21.72	2.81	24.53	283.79	1000

ERP POWER (dBm)

LTE Band XIII

Channel Bandwidth: 5MHz / QPSK							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	ERP Limit (mW)
23205	779.5	V	21.89	1.56	23.45	221.31	3000
23230	782.0	V	22.38	1.44	23.82	240.99	3000
23255	784.5	V	21.38	1.43	22.81	190.99	3000
Channel Bandwidth: 10MHz / QPSK							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	ERP Limit (mW)
23230	782.0	V	22.68	1.44	24.12	258.23	3000

Channel Bandwidth: 5MHz / 16QAM							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	ERP Limit (mW)
23205	779.5	V	20.50	1.56	22.06	160.69	3000
23230	782.0	V	21.28	1.44	22.72	187.07	3000
23255	784.5	V	21.25	1.43	22.68	185.35	3000
Channel Bandwidth: 10MHz / 16QAM							
Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	ERP Limit (mW)
23230	782.0	V	21.24	1.44	22.68	185.35	3000

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stability Measurement

According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.2.2 Test Procedure

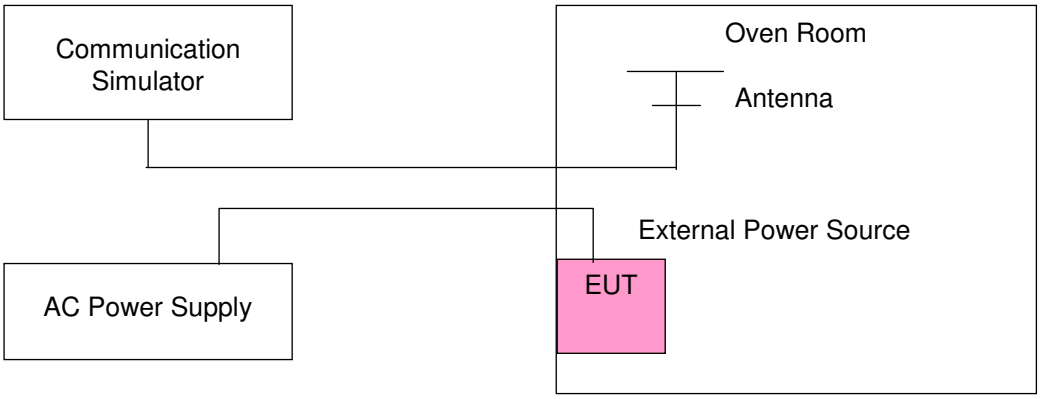
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the AC 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 ±0.5 ℃ 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

Temperature	25°C	**Humidity**	63%
Test Engineer	Gary Cheng		

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)				Pass/Fail
	LTE Band IV				
	5MHz	10MHz	15MHz	20MHz	
102	0.042	0.055	0.036	0.055	Pass
138	0.059	0.035	0.046	0.047	Pass

TEMP. (℃)	Frequency Error (ppm)				Pass/Fail
	LTE Band IV				
	5MHz	10MHz	15MHz	20MHz	
50	0.049	0.054	0.033	0.050	Pass
40	0.041	0.032	0.042	0.035	Pass
30	0.058	0.033	0.056	0.029	Pass
20	0.035	0.035	0.059	0.058	Pass
10	0.049	0.054	0.042	0.036	Pass
0	0.038	0.045	0.032	0.046	Pass
-10	0.055	0.056	0.054	0.031	Pass
-20	0.036	0.049	0.037	0.029	Pass
-30	0.052	0.051	0.059	0.059	Pass

Voltage (Volts)	Frequency Error (ppm)		Pass/Fail
	LTE Band XIII		
	5MHz	10MHz	
102	0.043	0.051	Pass
138	0.056	0.054	Pass

TEMP. (℃)	Frequency Error (ppm)		Pass/Fail
	LTE Band XIII		
	5MHz	10MHz	
50	0.031	0.045	Pass
40	0.054	0.045	Pass
30	0.045	0.041	Pass
20	0.036	0.033	Pass
10	0.042	0.029	Pass
0	0.055	0.040	Pass
-10	0.045	0.055	Pass
-20	0.045	0.055	Pass
-30	0.042	0.049	Pass

4.3 Emission Bandwidth Measurement

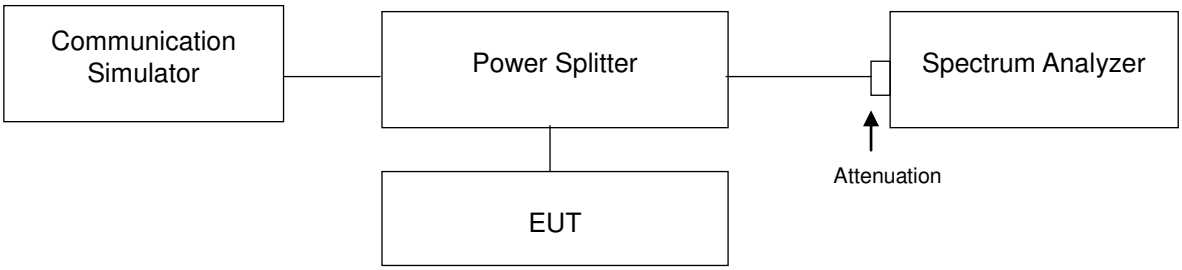
4.3.1 Limits of Emission Bandwidth Measurement

According to FCC 27.53(m)(6) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

4.3.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW≥1% x OBW and VBW≥3 x VBW. The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

4.3.3 Test Setup



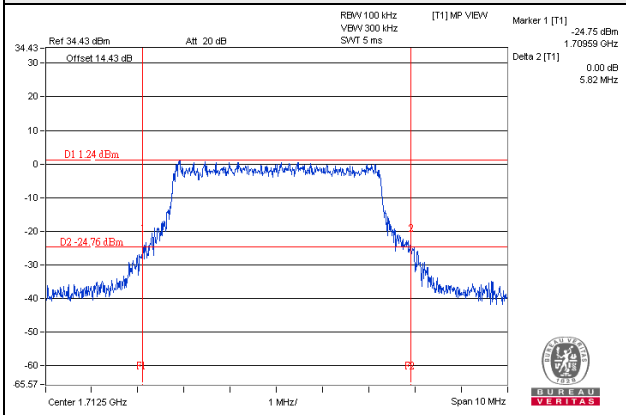
4.3.4 Test Result (-26dBc Bandwidth)

Temperature	25°C	**Humidity**	63%
Test Engineer	Gary Cheng		

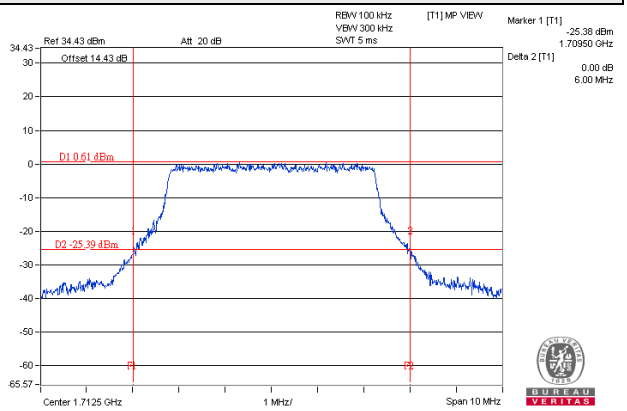
LTE Band IV							
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	5.82	6.00	20000	1715	11.15	11.19
20175	1732.5	5.91	6.00	20175	1732.5	11.51	11.69
20375	1752.5	5.66	5.91	20350	1750	11.31	11.31
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	16.37	16.24	20050	1720	20.63	20.90
20175	1732.5	16.05	16.30	20175	1732.5	21.00	21.12
20325	1747.5	15.91	16.65	20300	1745	21.22	20.78

Spectrum Plot

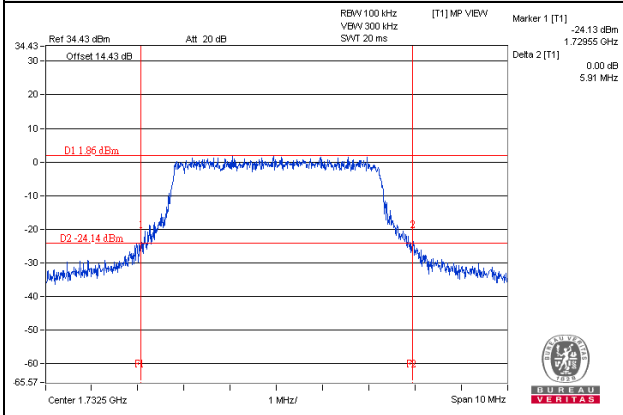
5MHz QPSK Lowest Channel



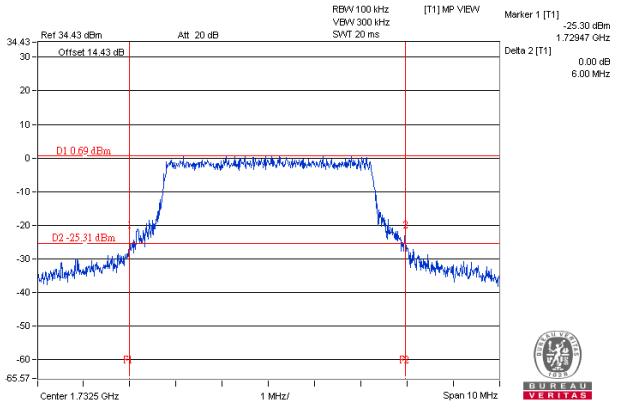
5MHz 16QAM Lowest Channel



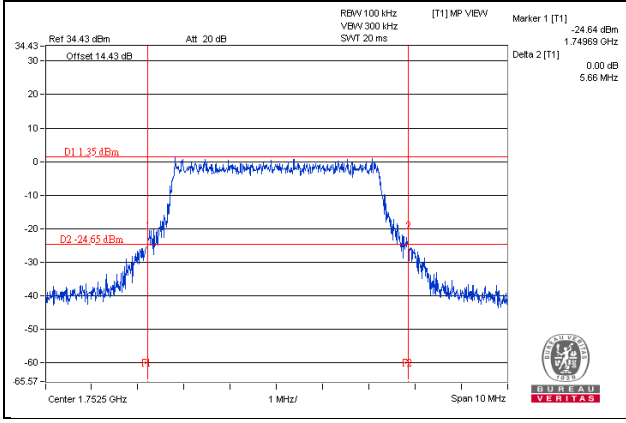
5MHz QPSK Middle Channel



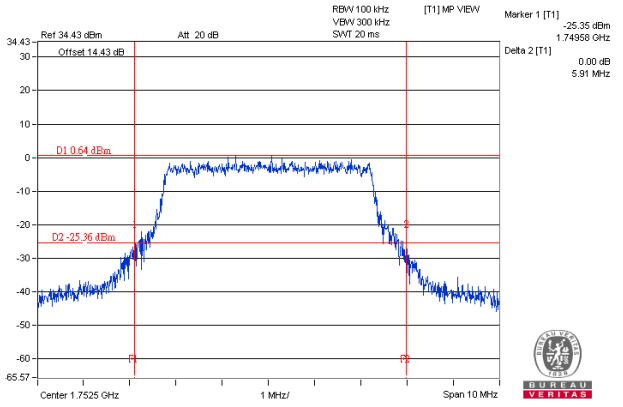
5MHz 16QAM Middle Channel



5MHz QPSK Highest Channel

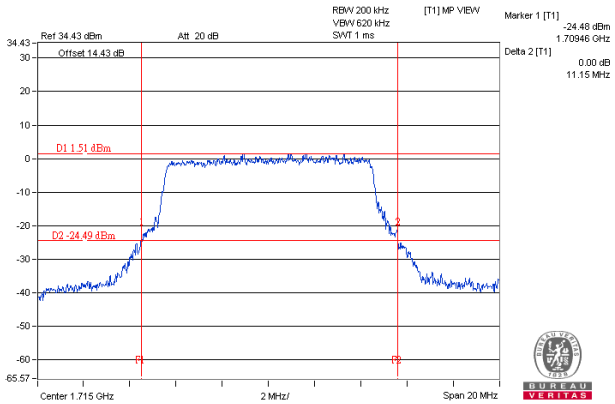


5MHz 16QAM Highest Channel

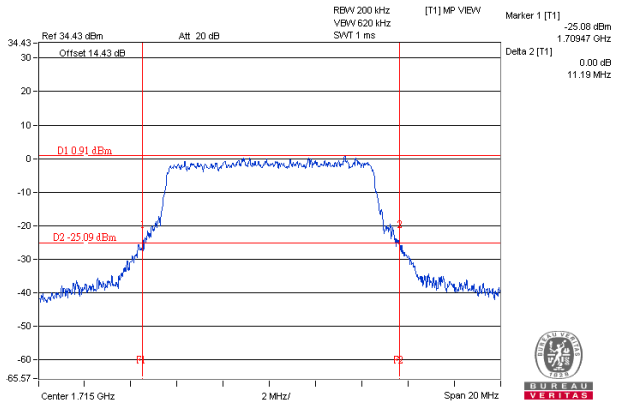


Spectrum Plot

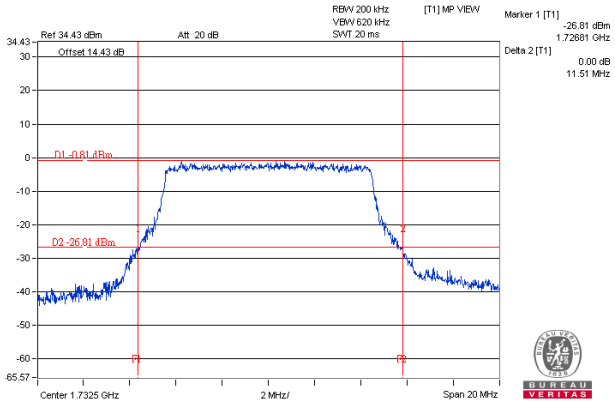
10MHz QPSK Lowest Channel



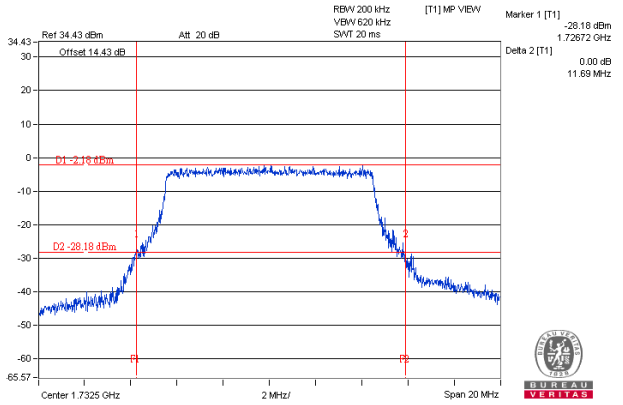
10MHz 16QAM Lowest Channel



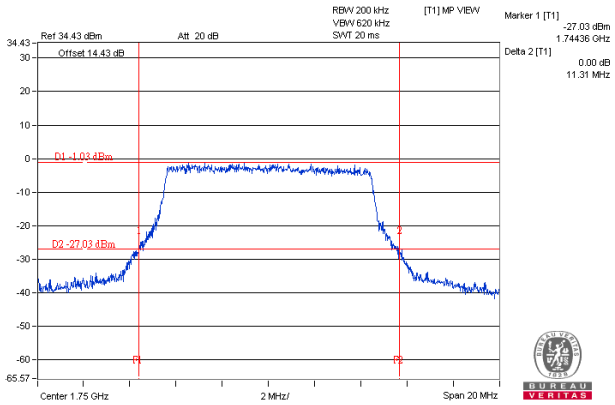
10MHz QPSK Middle Channel



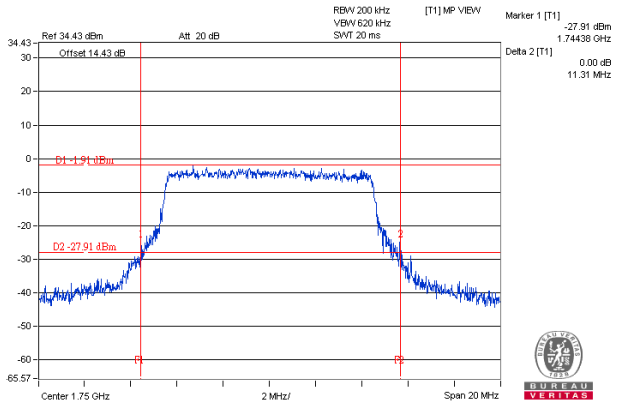
10MHz 16QAM Middle Channel



10MHz QPSK Highest Channel

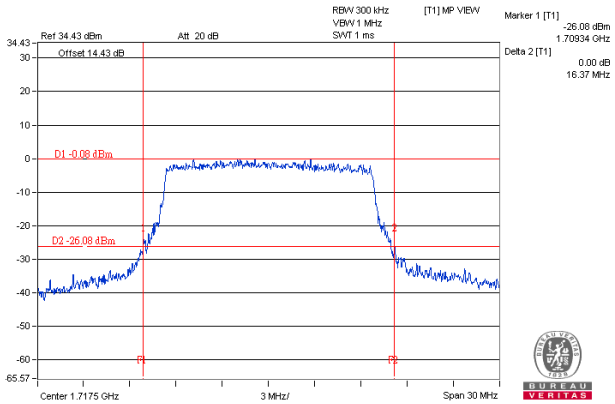


10MHz 16QAM Highest Channel

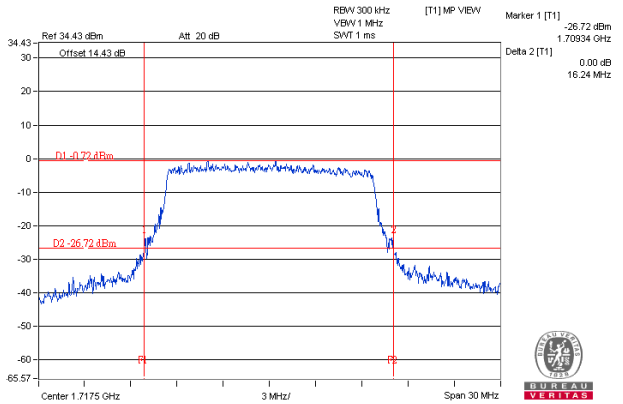


Spectrum Plot

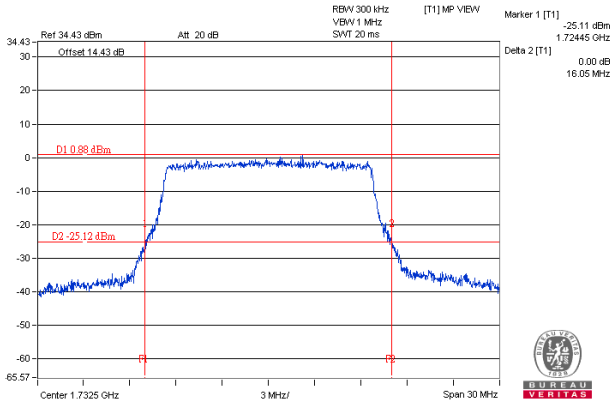
15MHz QPSK Lowest Channel



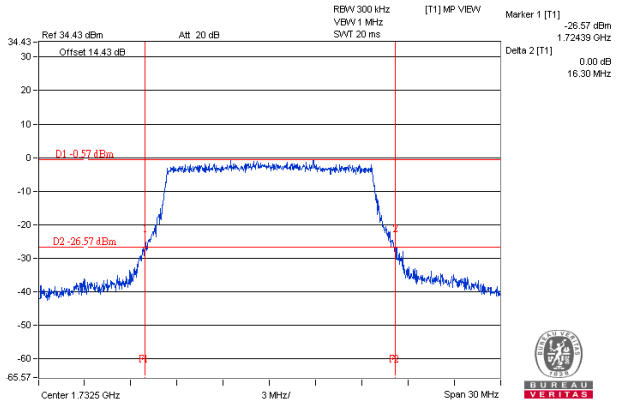
15MHz 16QAM Lowest Channel



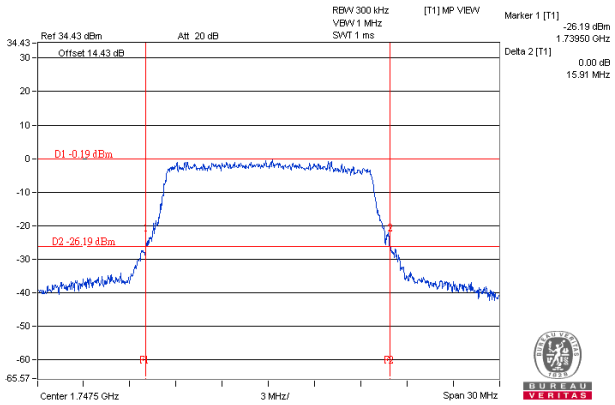
15MHz QPSK Middle Channel



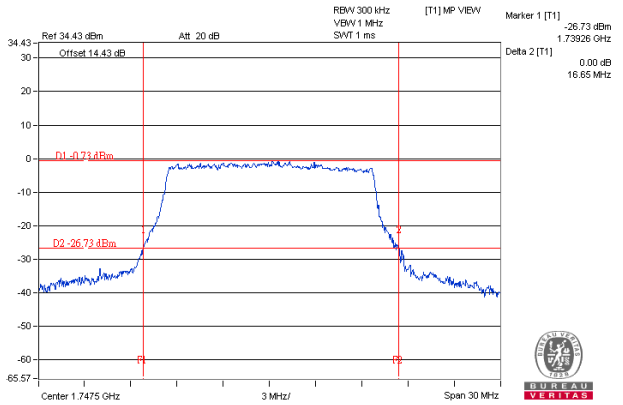
15MHz 16QAM Middle Channel



15MHz QPSK Highest Channel

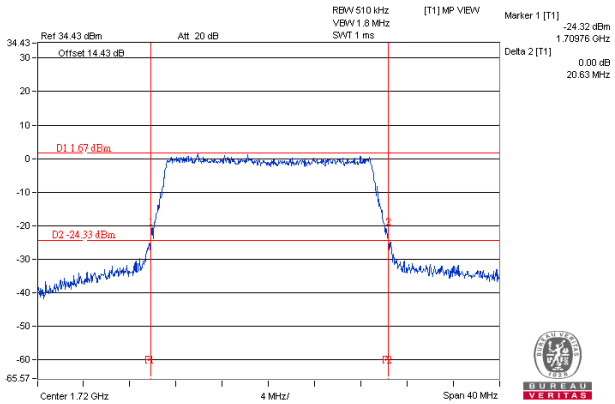


15MHz 16QAM Highest Channel

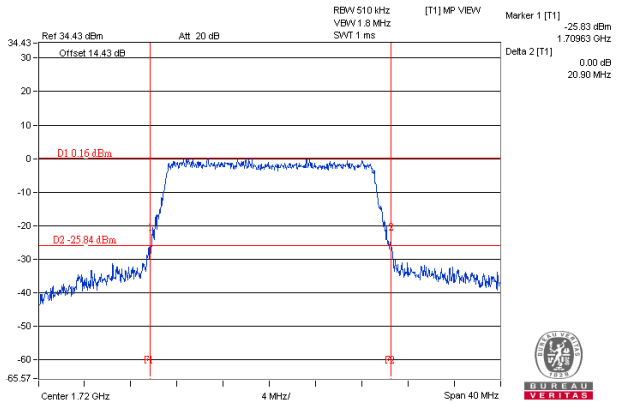


Spectrum Plot

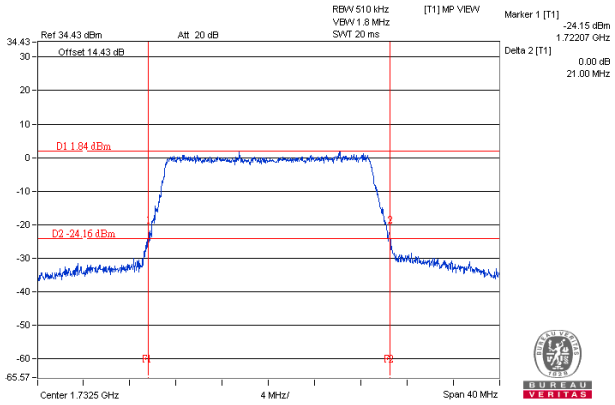
20MHz QPSK Lowest Channel



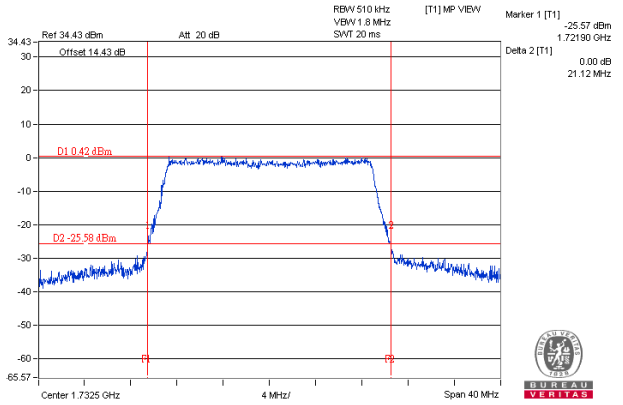
20MHz 16QAM Lowest Channel



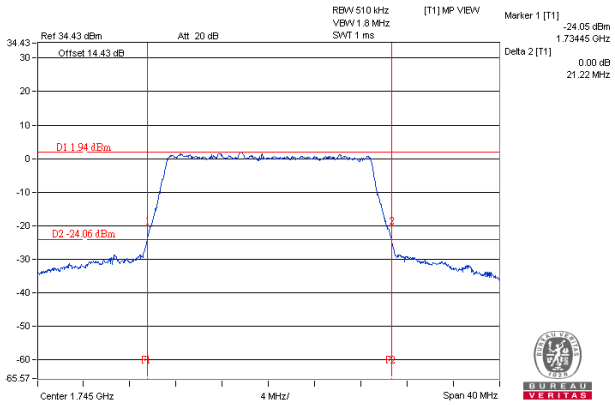
20MHz QPSK Middle Channel



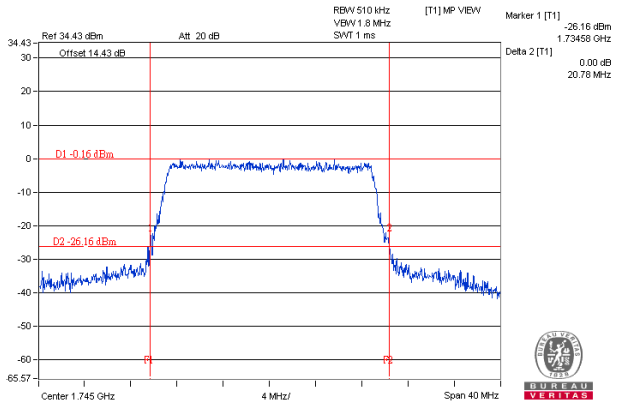
20MHz 16QAM Middle Channel



20MHz QPSK Highest Channel



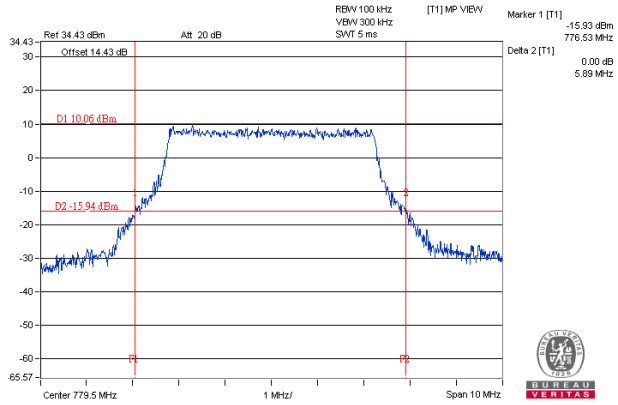
20MHz 16QAM Highest Channel



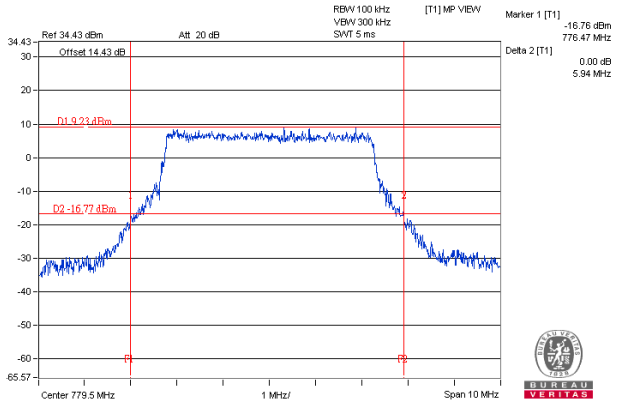
LTE Band XIII							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23205	779.5	5.89	5.94	23230	782	11.23	11.55
23230	782	5.84	5.76				
23255	784.5	5.95	5.81				

Spectrum Plot

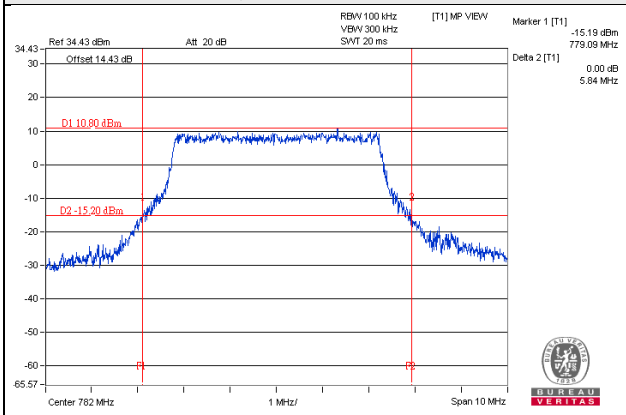
5MHz QPSK Lowest Channel



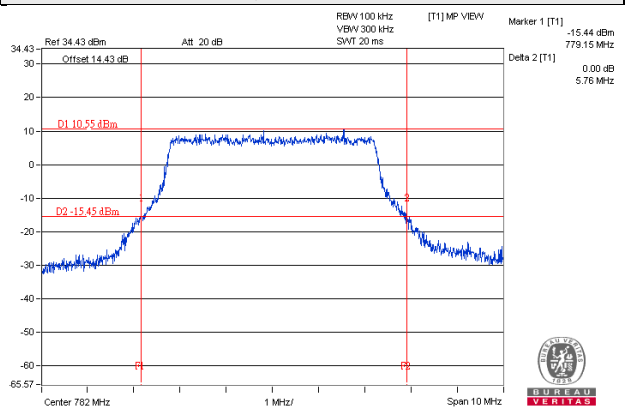
5MHz 16QAM Lowest Channel



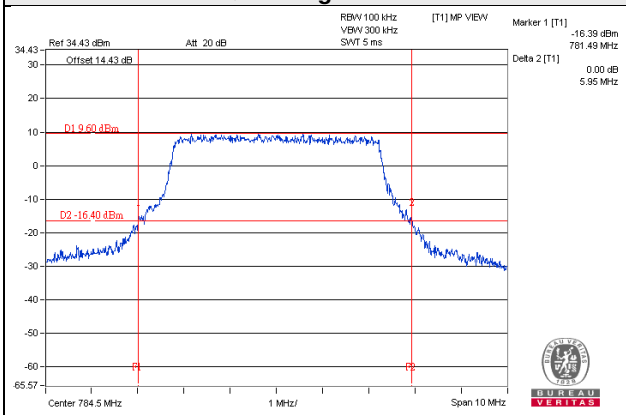
5MHz QPSK Middle Channel



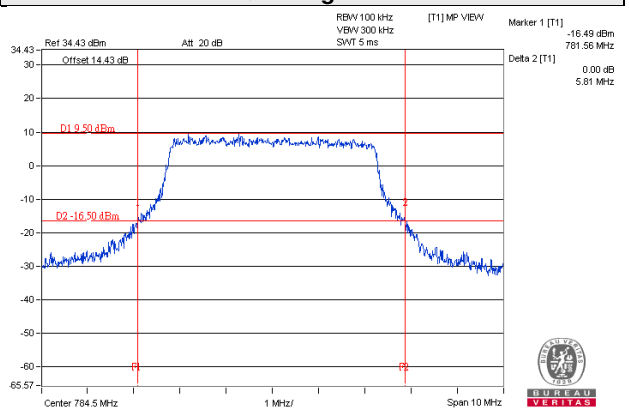
5MHz 16QAM Middle Channel

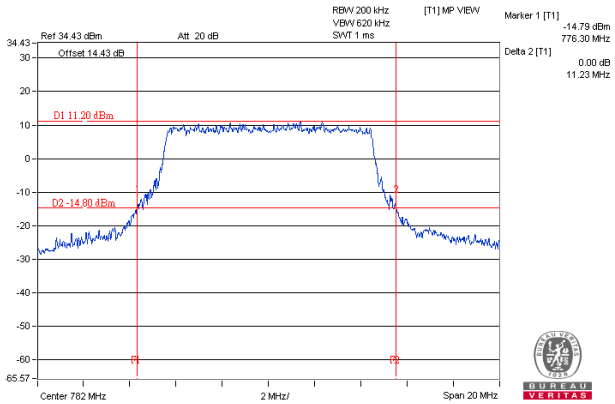
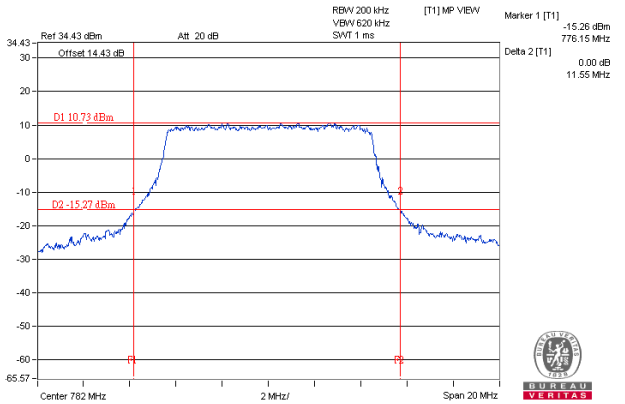


5MHz QPSK Highest Channel



5MHz 16QAM Highest Channel



Spectrum Plot	
10MHz QPSK	**10MHz 16QAM**
	

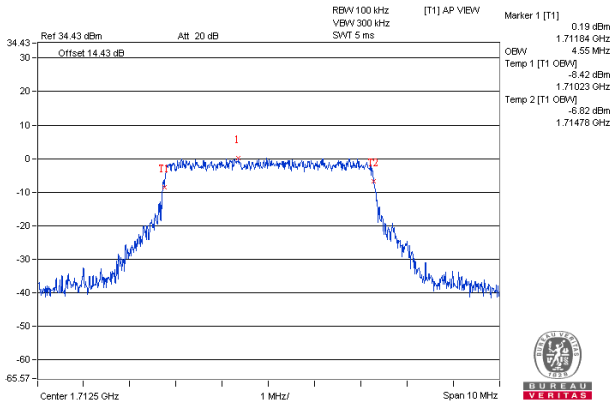
4.3.5 Test Results (Occupied Bandwidth)

Temperature	25°C	**Humidity**	63%
Test Engineer	Gary Cheng		

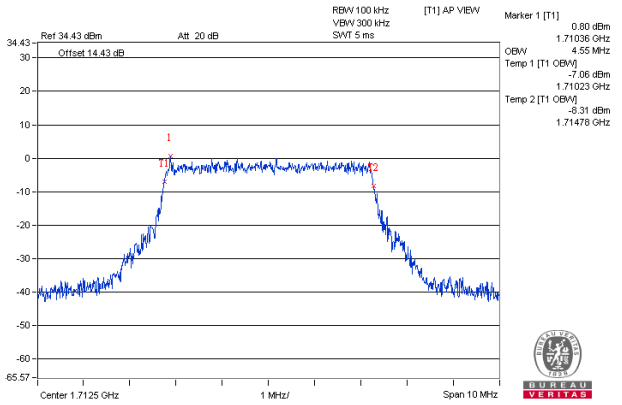
LTE Band IV							
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	FREQ. (MHz)	99% Occupied Bandwidth (MHz)		Channel	FREQ. (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.55	4.55	20000	1715	9.06	9.04
20175	1732.5	4.53	4.52	20175	1732.5	8.94	8.98
20375	1752.5	4.54	4.53	20350	1750	8.96	8.96
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	FREQ. (MHz)	99% Occupied Bandwidth (MHz)		Channel	FREQ. (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	13.53	13.53	20050	1720	18.24	18.12
20175	1732.5	13.47	13.41	20175	1732.5	17.92	17.92
20325	1747.5	13.44	13.44	20300	1745	17.92	17.96

Spectrum Plot

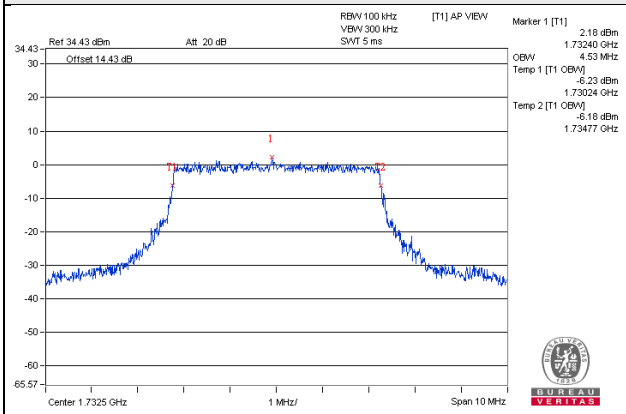
5MHz QPSK Lowest Channel



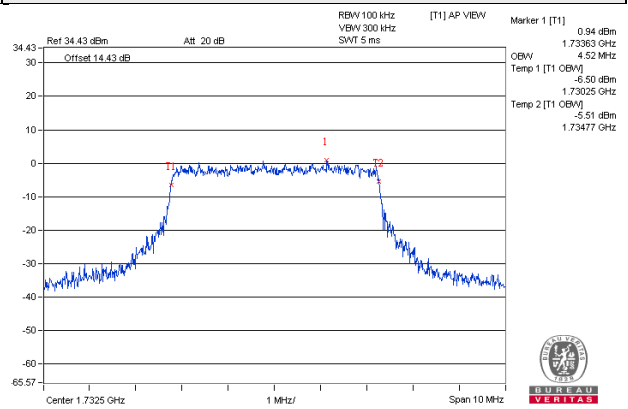
5MHz 16QAM Lowest Channel



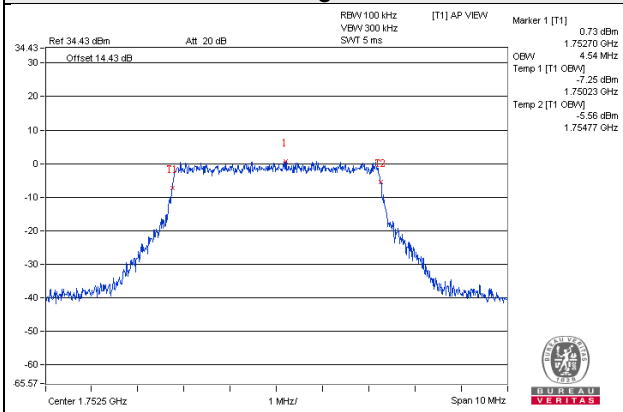
5MHz QPSK Middle Channel



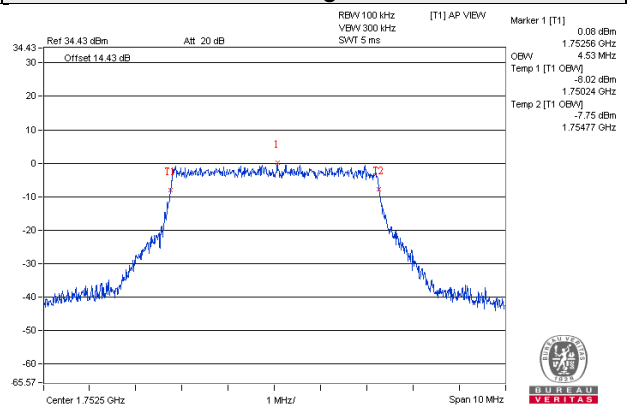
5MHz 16QAM Middle Channel



5MHz QPSK Highest Channel

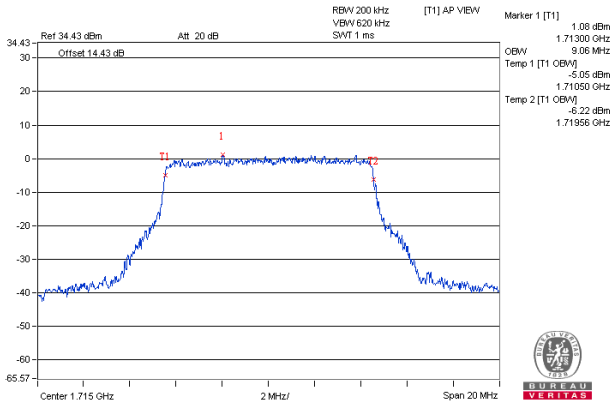


5MHz 16QAM Highest Channel

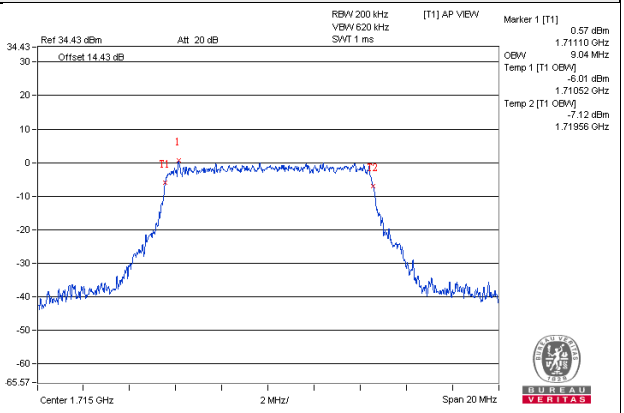


Spectrum Plot

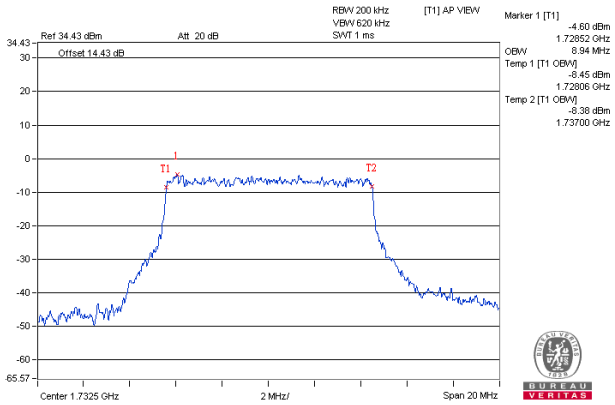
10MHz QPSK Lowest Channel



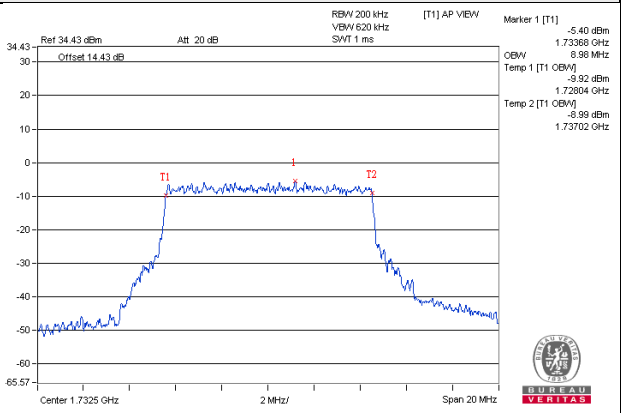
10MHz 16QAM Lowest Channel



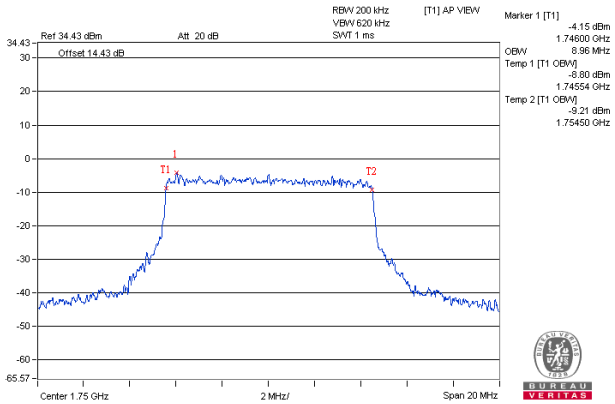
10MHz QPSK Middle Channel



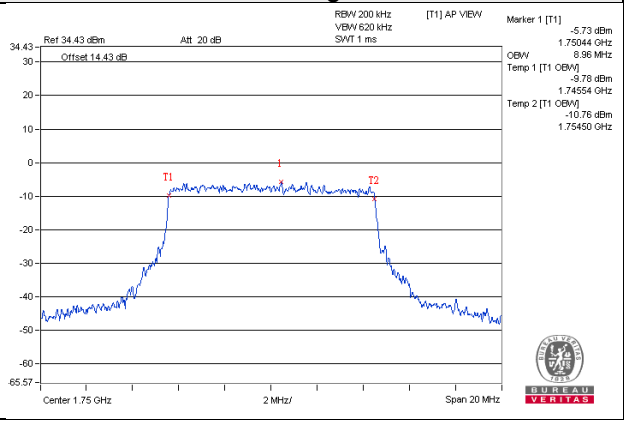
10MHz 16QAM Middle Channel



10MHz QPSK Highest Channel

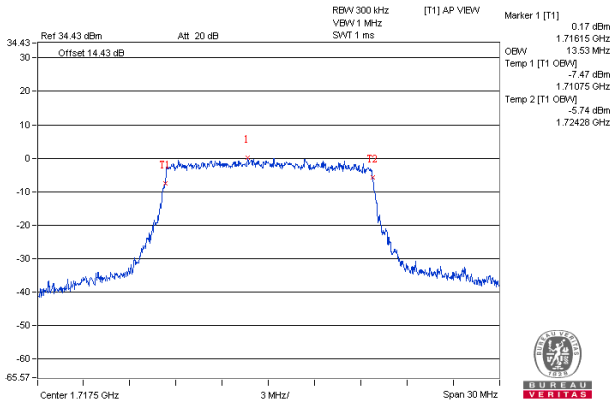


10MHz 16QAM Highest Channel

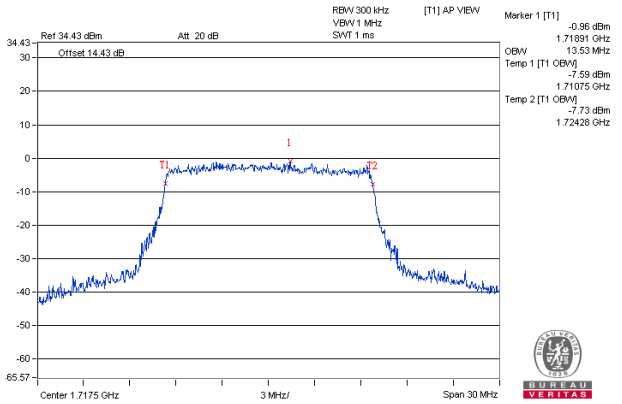


Spectrum Plot

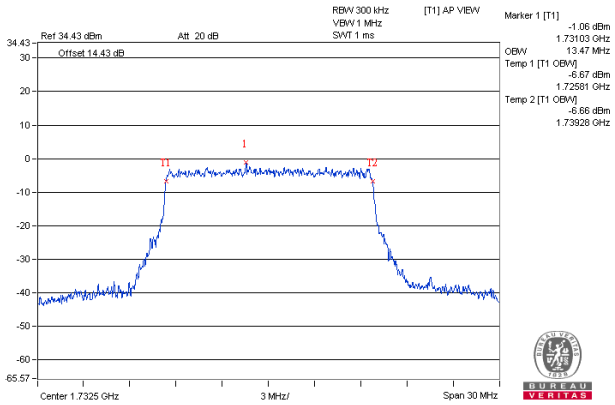
15MHz QPSK Lowest Channel



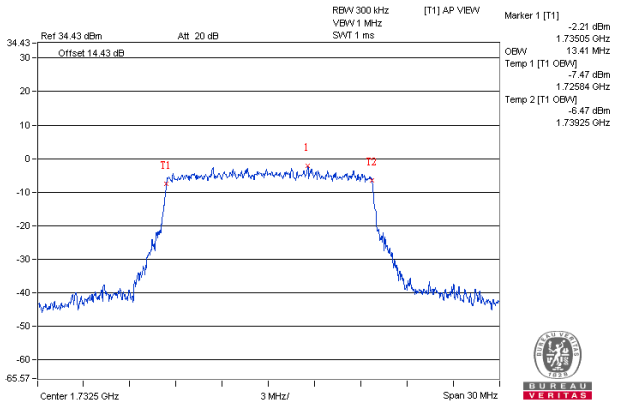
15MHz 16QAM Lowest Channel



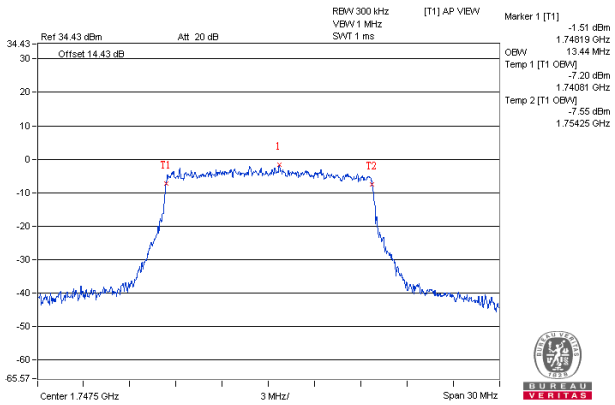
15MHz QPSK Middle Channel



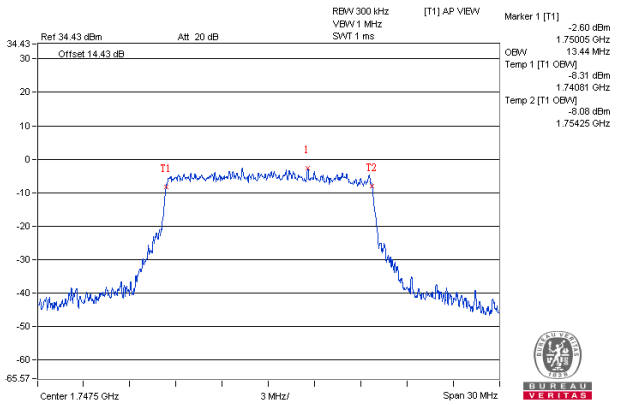
15MHz 16QAM Middle Channel



15MHz QPSK Highest Channel

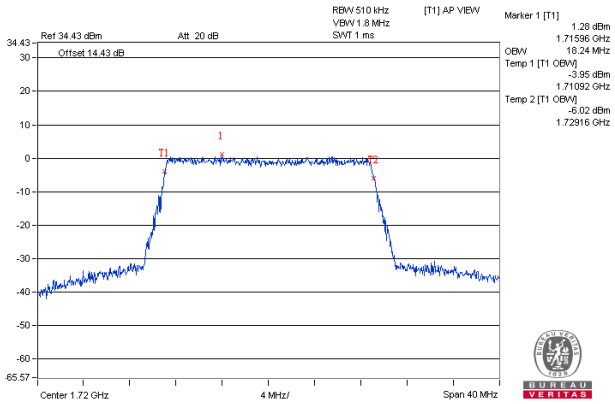


15MHz 16QAM Highest Channel

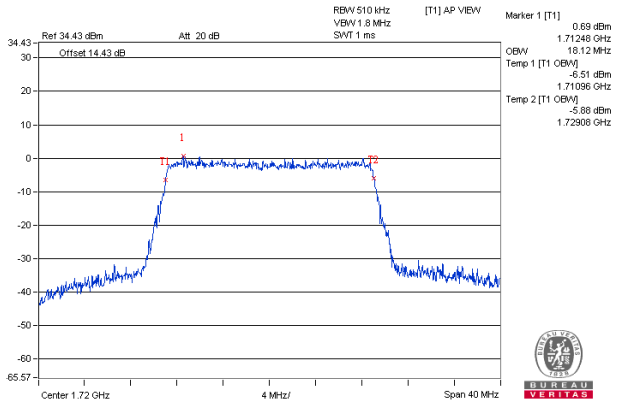


Spectrum Plot

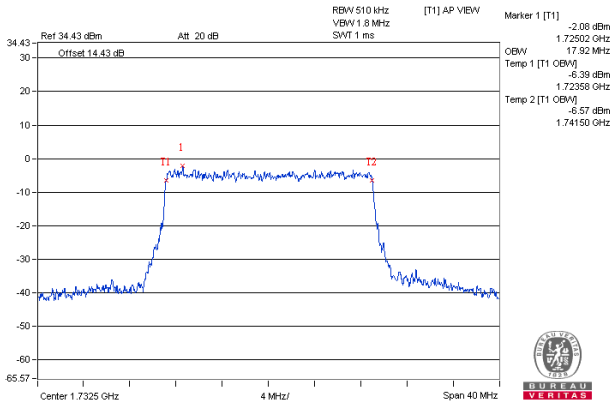
20MHz QPSK Lowest Channel



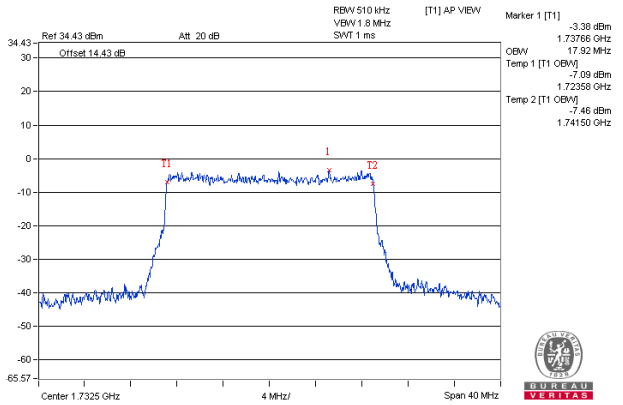
20MHz 16QAM Lowest Channel



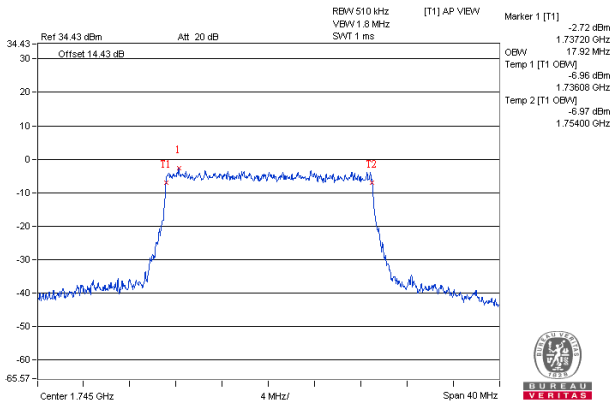
20MHz QPSK Middle Channel



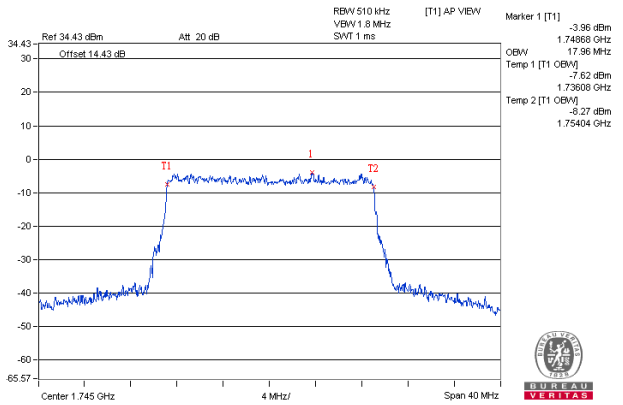
20MHz 16QAM Middle Channel



20MHz QPSK Highest Channel



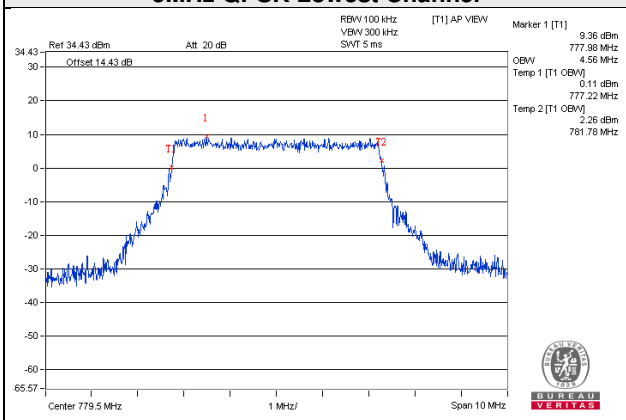
20MHz 16QAM Highest Channel



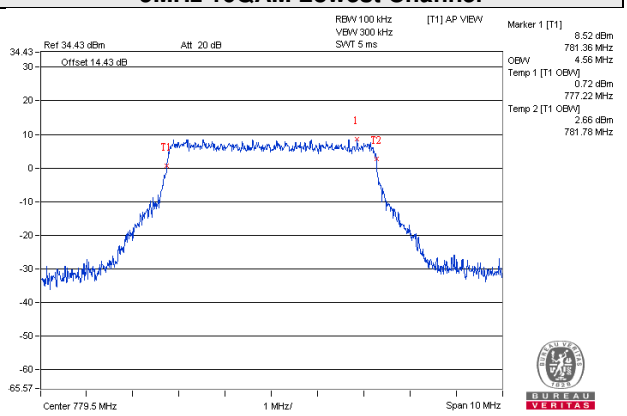
LTE Band XIII							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		Channel	FREQ. (MHz)	99% Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23205	779.5	4.56	4.56	23230	782	9.02	9.02
23230	782	4.53	4.55				
23255	784.5	4.51	4.51				

Spectrum Plot

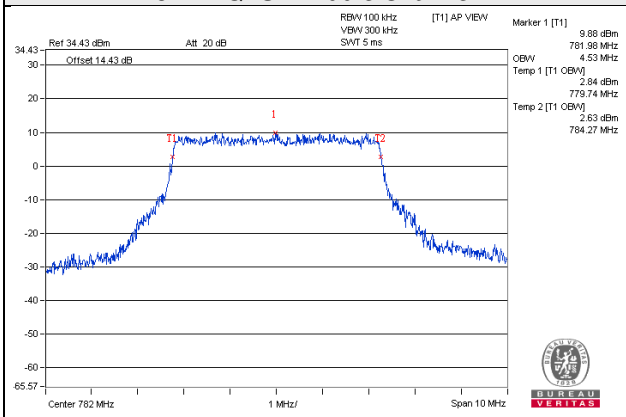
5MHz QPSK Lowest Channel



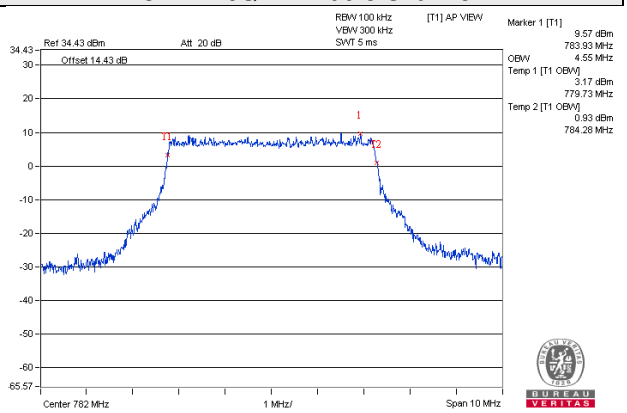
5MHz 16QAM Lowest Channel



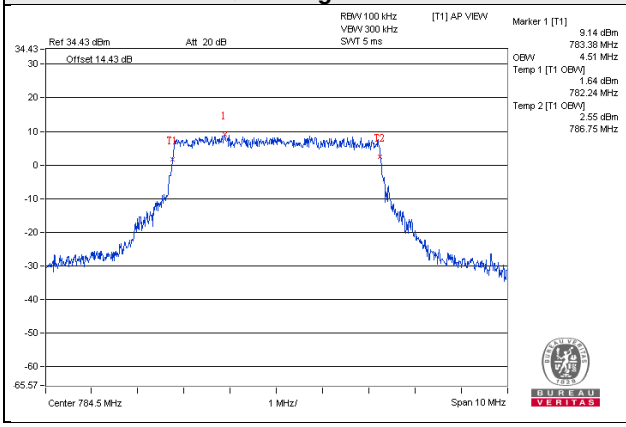
5MHz QPSK Middle Channel



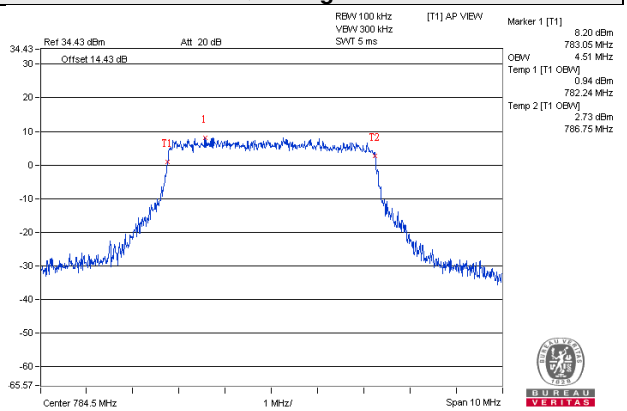
5MHz 16QAM Middle Channel



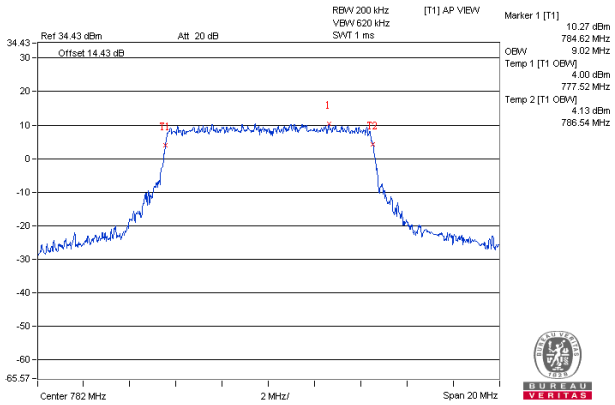
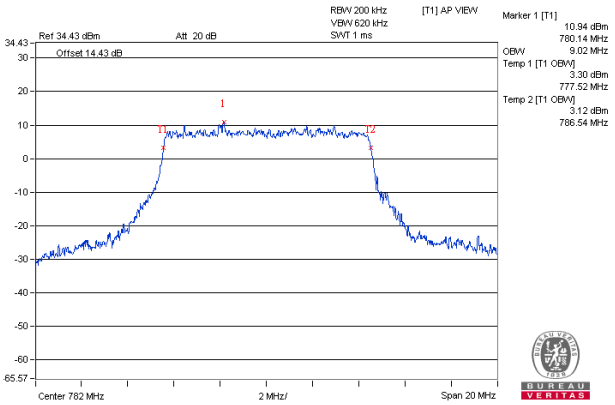
5MHz QPSK Highest Channel



5MHz 16QAM Highest Channel



Spectrum Plot

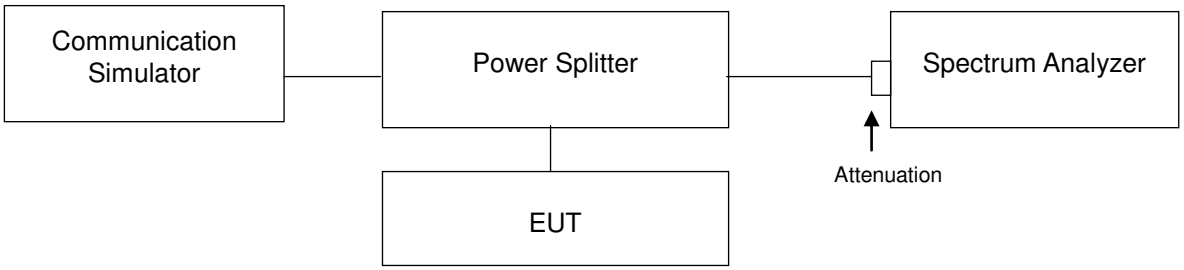
10MHz QPSK	10MHz 16QAM
	

4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

According to FCC 27.53(m)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than 43 + 10 log (P) dB at the channel edge, the limit of emission equal to –13dBm. And 55 + 10 log (P) dB at 5.5 MHz from the channel edges, the limit of emission equal to –25dBm.In the 1MHz 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



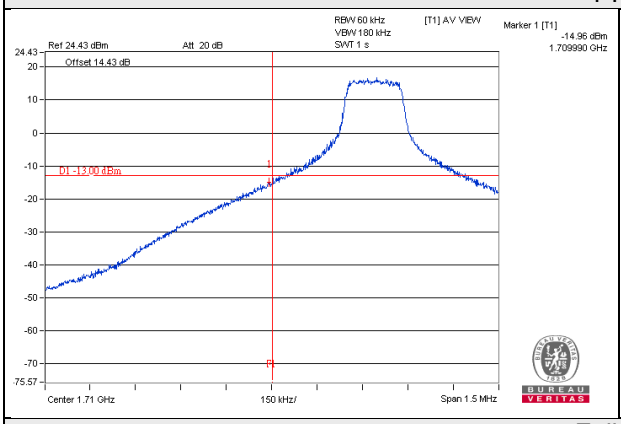
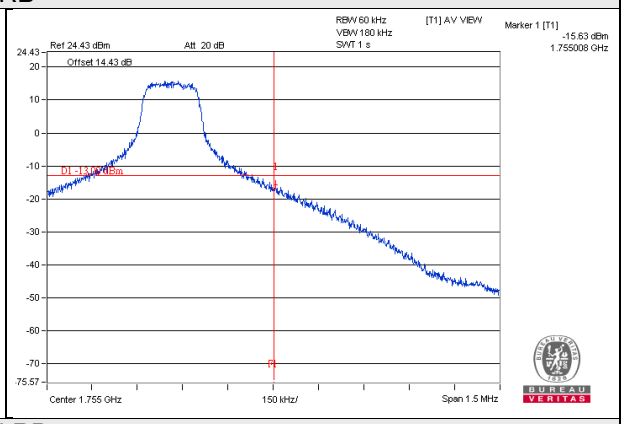
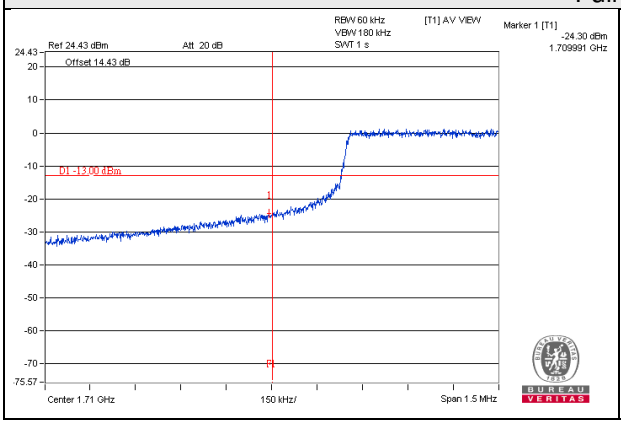
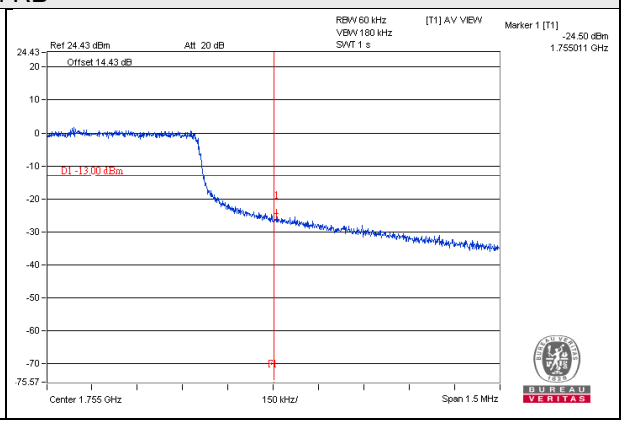
4.4.3 Test Procedures

a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and s RBW of the spectrum is >1% emission bandwidth and VBW of the spectrum is ≧ 3*RB.
c. Record the max trace plot into the test report.

4.4.4 Test Results

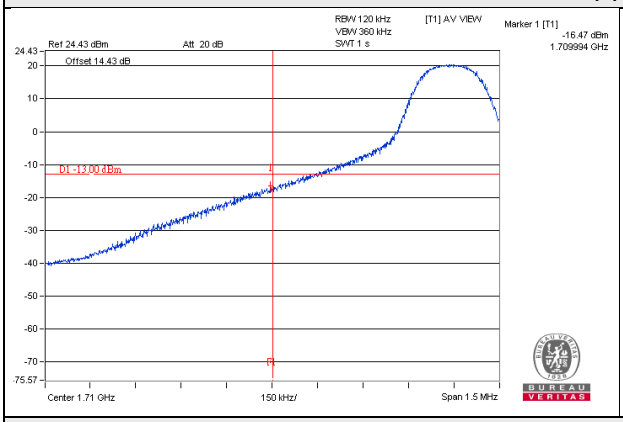
Temperature	25°C	**Humidity**	63%
Test Engineer	Gary Cheng		

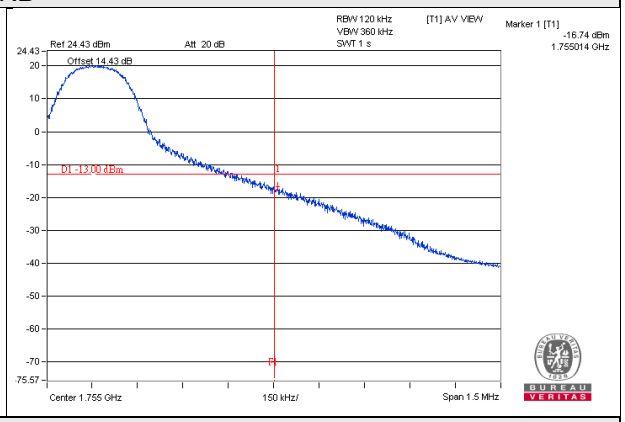
LTE Band IV						
5MHz						
Mode	Channel	Frequency (GHz)	Measurement Value(dBm)	Limit (dBm)	Margin (dBm)	Result
1RB / 0 RB Offset	19975	1.709990	-14.96	-13.00	-1.96	Pass
1RB / 24 RB Offset	20375	1.755008	-15.63	-13.00	-2.63	Pass
25RB / 0 RB Offset	19975	1.709991	-24.30	-13.00	-11.30	Pass
25RB / 0 RB Offset	20375	1.755011	-24.50	-13.00	-11.50	Pass

Channel	19975	Channel	20375
1 RB			
			
Full RB			
			

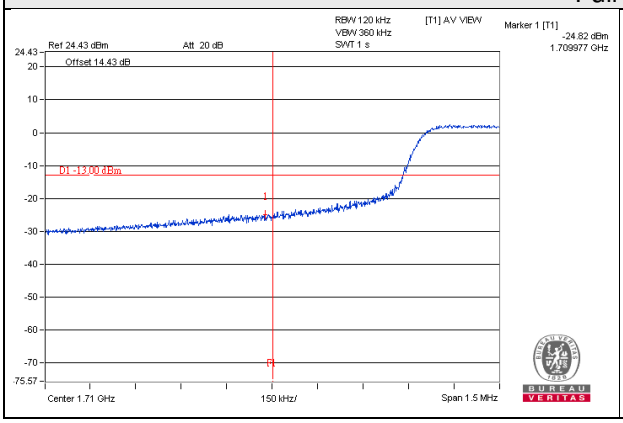
LTE Band IV						
10MHz						
Mode	Channel	Frequency (GHz)	Measurement Value(dBm)	Limit (dBm)	Margin (dBm)	Result
1RB / 0 RB Offset	20000	1.709994	-16.47	-13.00	-3.47	Pass
1RB / 49 RB Offset	20350	1.755014	-16.74	-13.00	-3.74	Pass
50RB / 0 RB Offset	20000	1.709977	-24.82	-13.00	-11.82	Pass
50RB / 0 RB Offset	20350	1.755005	-24.46	-13.00	-11.46	Pass

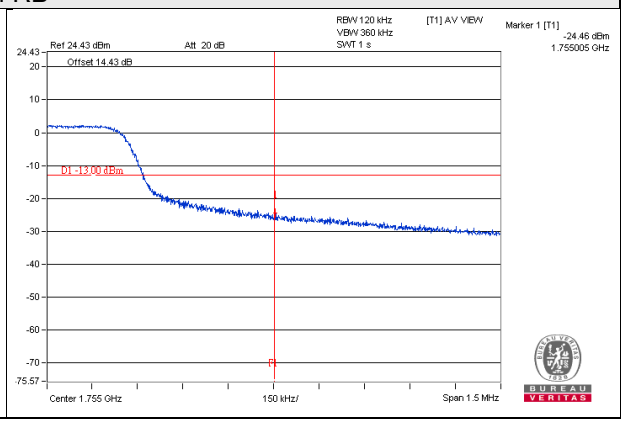
Channel	20000	Channel	20350
1 RB			





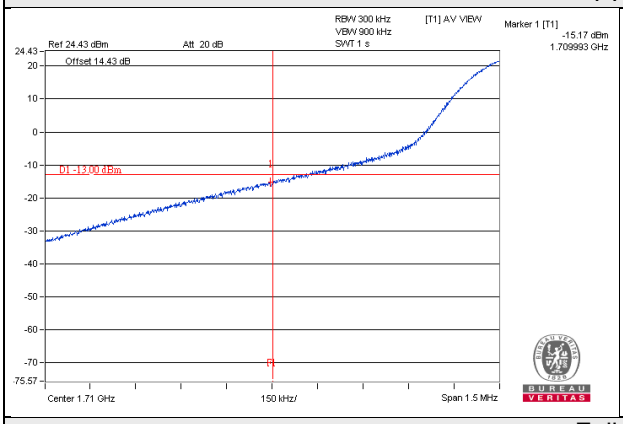
Full RB

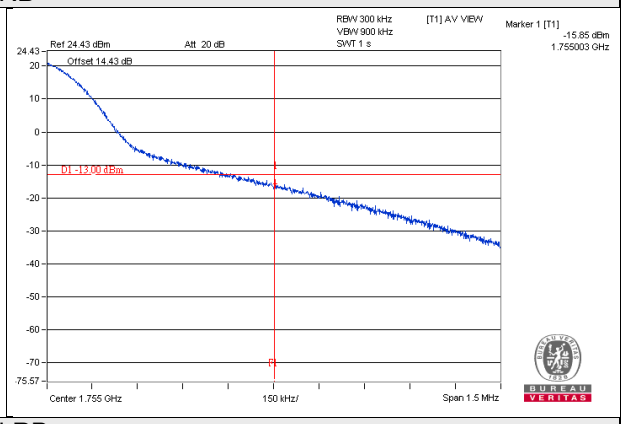




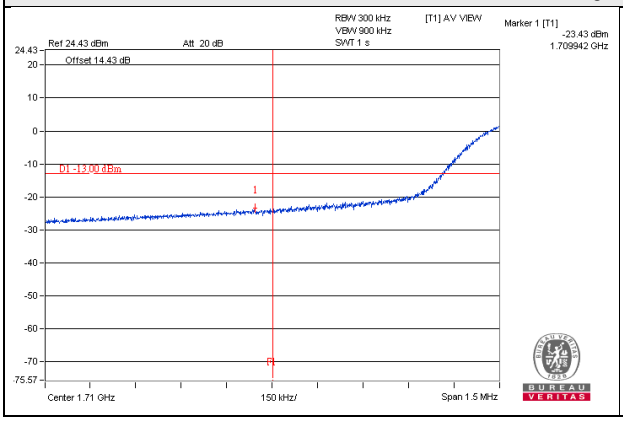
LTE Band IV						
15MHz						
Mode	Channel	Frequency (GHz)	Measurement Value(dBm)	Limit (dBm)	Margin (dBm)	Result
1RB / 0 RB Offset	20025	1.709993	-15.17	-13.00	-2.17	Pass
1RB / 74 RB Offset	20325	1.755003	-15.85	-13.00	-2.85	Pass
75RB / 0 RB Offset	20025	1.709942	-23.43	-13.00	-10.43	Pass
75RB / 0 RB Offset	20325	1.755005	-22.82	-13.00	-9.82	Pass

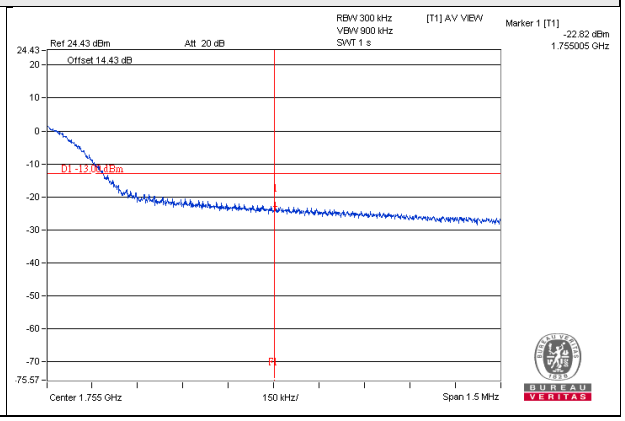
Channel	20025	Channel	20325
1 RB			





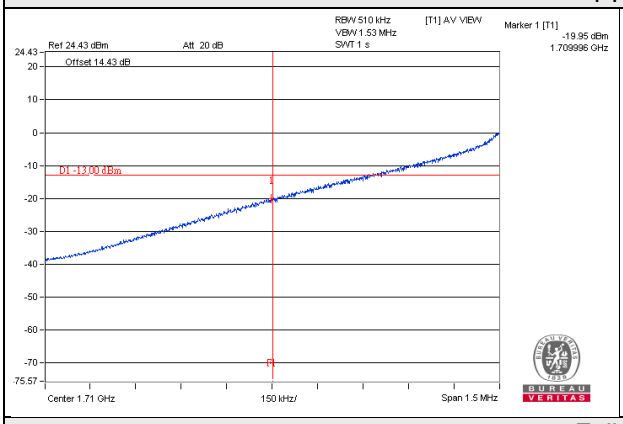
Full RB

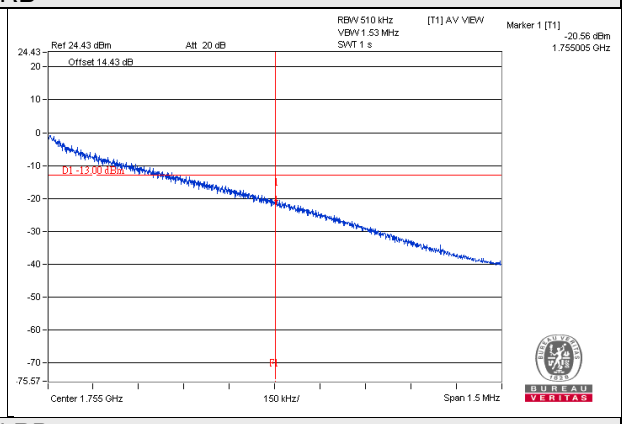




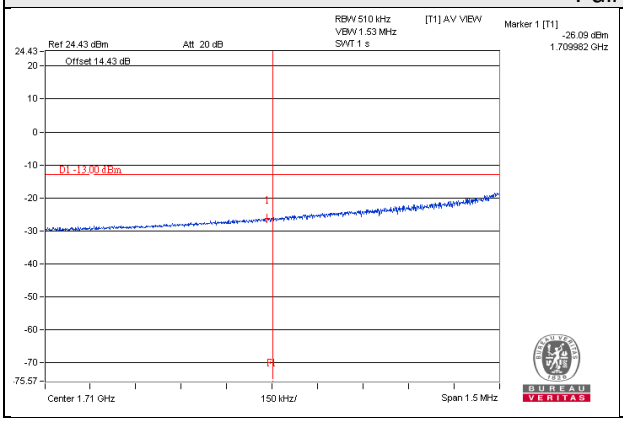
LTE Band IV						
20MHz						
Mode	Channel	Frequency (MHz)	Measurement Value(dBm)	Limit (dBm)	Margin (dBm)	Result
1RB / 0 RB Offset	20050	1.709996	-19.95	-13.00	-6.95	Pass
1RB / 99 RB Offset	20300	1.755005	-20.56	-13.00	-7.56	Pass
100RB / 0 RB Offset	20050	1.709982	-26.09	-13.00	-13.09	Pass
100RB / 0 RB Offset	20300	1.755009	-24.72	-13.00	-11.72	Pass

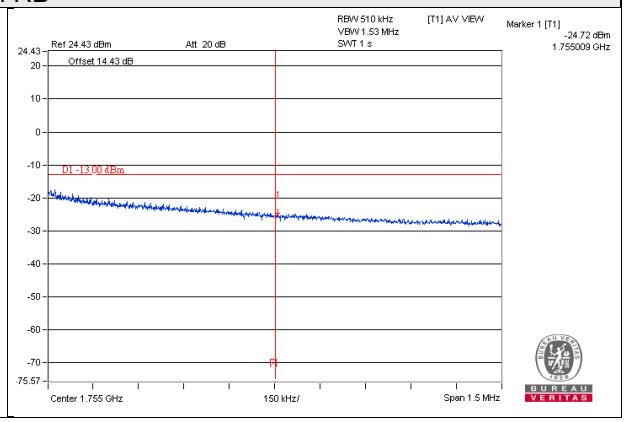
Channel	20050	Channel	20300
1 RB			



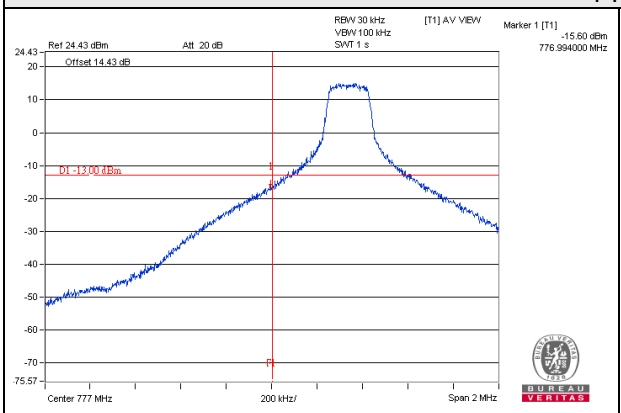
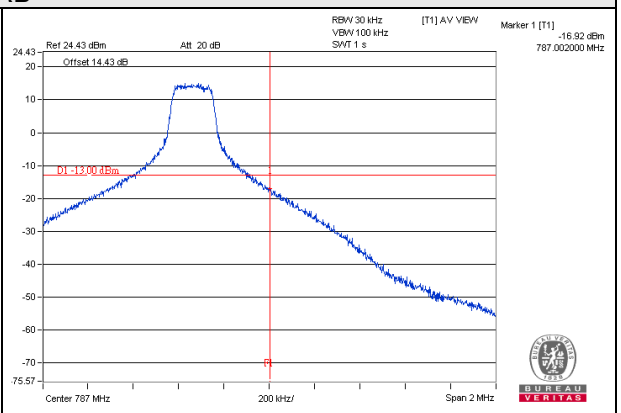
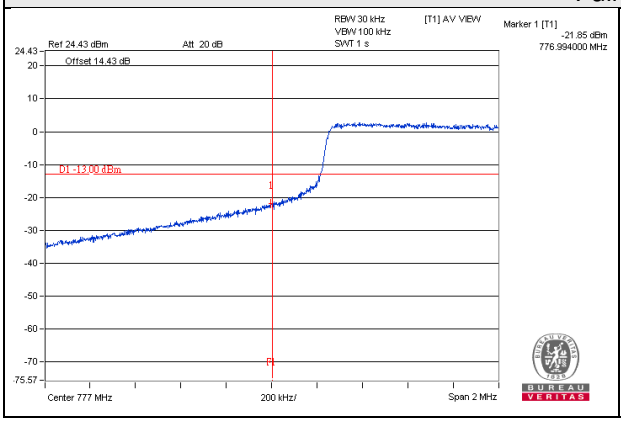
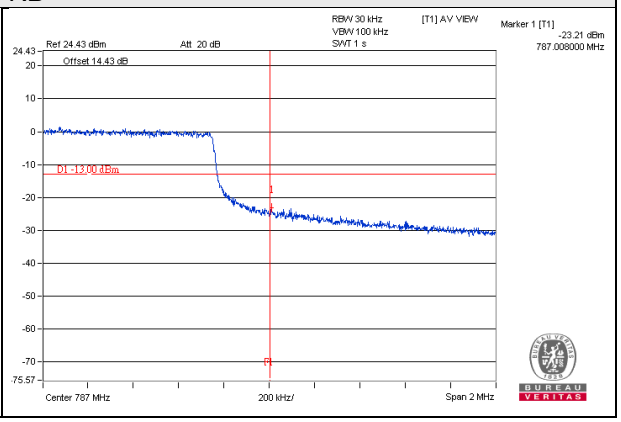


Full RB



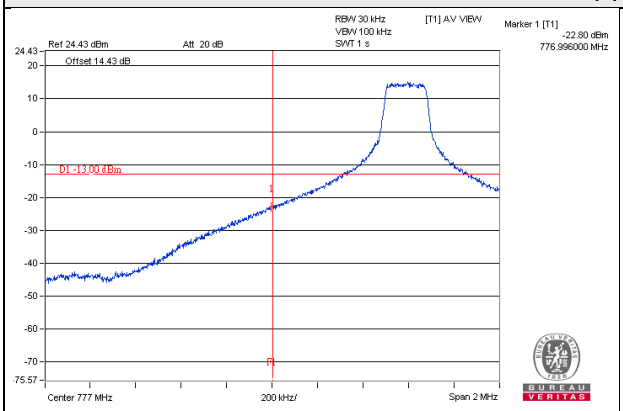


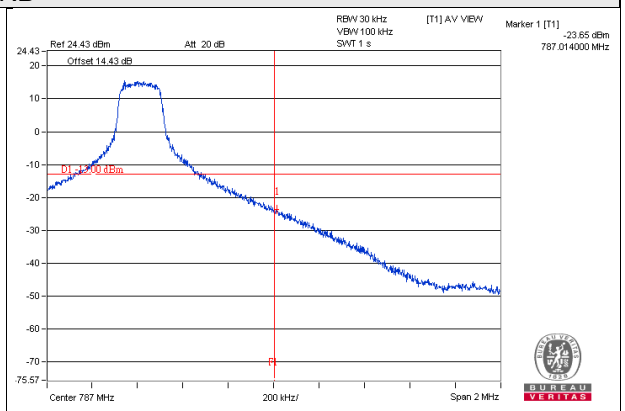
LTE Band XIII						
5MHz						
Mode	Channel	Frequency (MHz)	Measurement Value(dBm)	Limit (dBm)	Margin (dBm)	Result
1RB / 0 RB Offset	23205	776.994	-15.60	-13.00	-2.60	Pass
1RB / 24 RB Offset	23255	787.002	-16.92	-13.00	-3.92	Pass
25RB / 0 RB Offset	23205	776.994	-21.85	-13.00	-8.85	Pass
25RB / 0 RB Offset	23255	787.008	-23.21	-13.00	-10.21	Pass

Channel	23205	Channel	23255
1 RB			
			
Full RB			
			

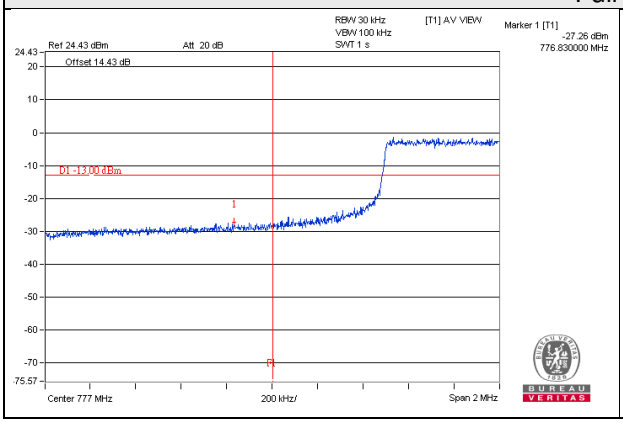
LTE Band IV						
10MHz						
Mode	Channel	Frequency (MHz)	Measurement Value(dBm)	Limit (dBm)	Margin (dBm)	Result
1RB / 0 RB Offset	23230	776.996	-22.80	-13.00	-9.80	Pass
1RB / 49 RB Offset	23230	787.014	-23.65	-13.00	-10.65	Pass
50RB / 0 RB Offset	23230	776.830	-27.26	-13.00	-14.26	Pass
50RB / 0 RB Offset	23230	787.008	-27.16	-13.00	-14.16	Pass

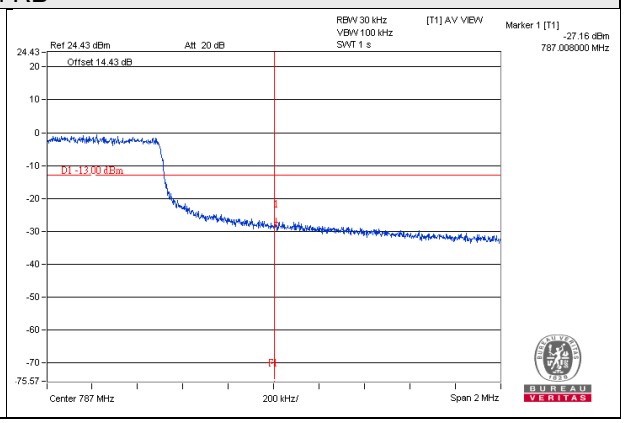
Channel	23230	Channel	23230
1 RB			





Full RB



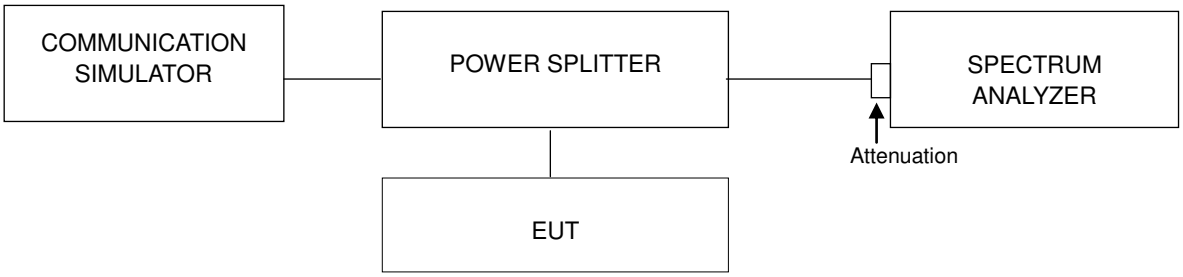


4.5 Peak to Average Ratio Measurement

4.5.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.5.2 Test Setup



4.5.3 Test Procedures

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

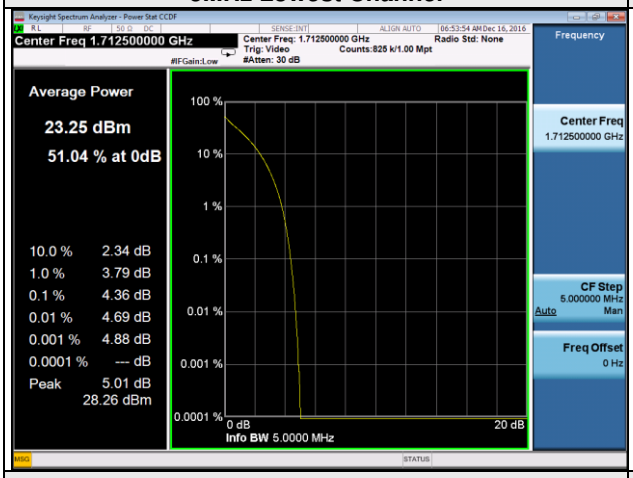
4.5.4 Test Results

Temperature	25°C	**Humidity**	63%
Test Engineer	Gary Cheng		

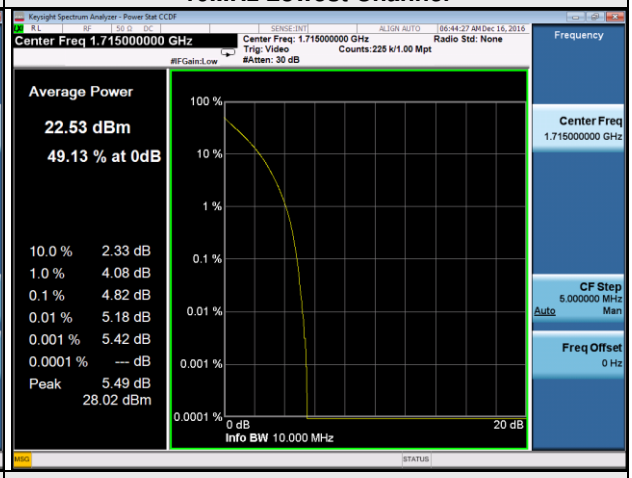
LTE Band IV					
Channel Bandwidth: 5MHz			**Channel Bandwidth: 10MHz**		
Channel	Frequency (MHz)	Peak to Average Ratio (dB)	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
19975	1712.5	4.36	20000	1715	4.82
20175	1732.5	4.72	20175	1732.5	4.77
20375	1752.5	4.6	20350	1750	4.74
Channel Bandwidth: 15MHz			**Channel Bandwidth: 20MHz**		
Channel	Frequency (MHz)	Peak to Average Ratio (dB)	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
20025	1717.5	4.93	20050	1720	4.43
20175	1732.5	4.53	20175	1732.5	4.48
20325	1747.5	4.62	20300	1745	3.93

Spectrum Plot

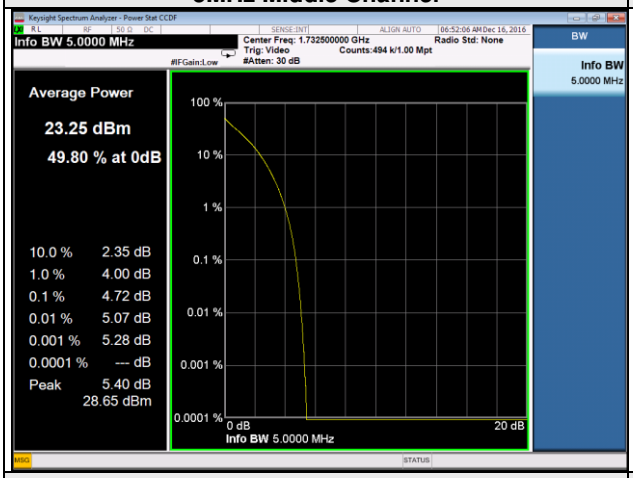
5MHz Lowest Channel



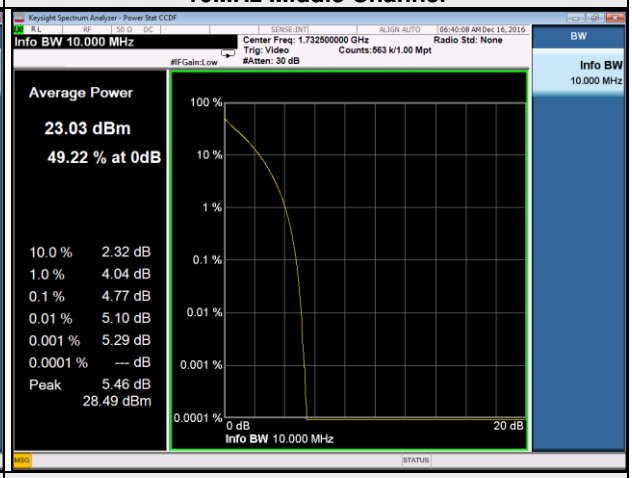
10MHz Lowest Channel



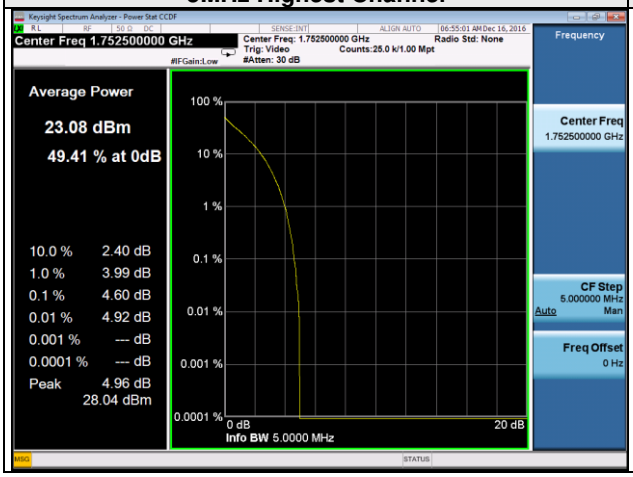
5MHz Middle Channel



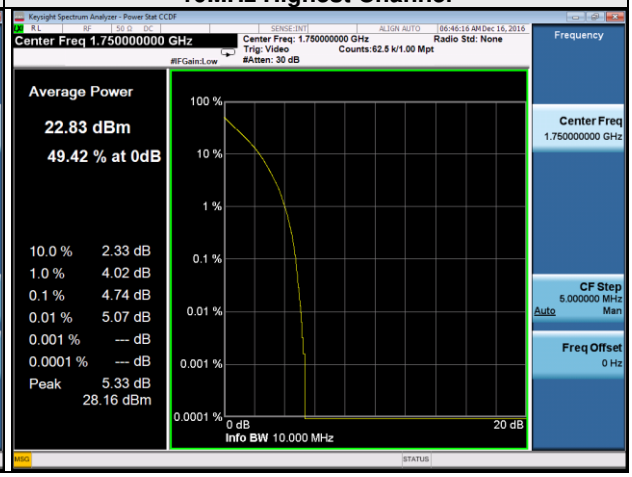
10MHz Middle Channel



5MHz Highest Channel

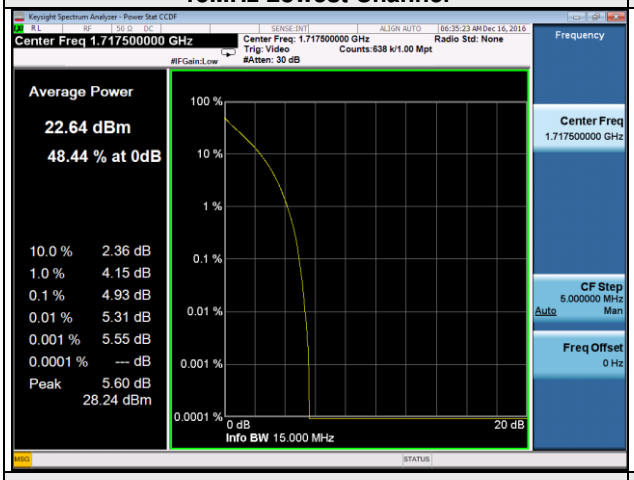


10MHz Highest Channel

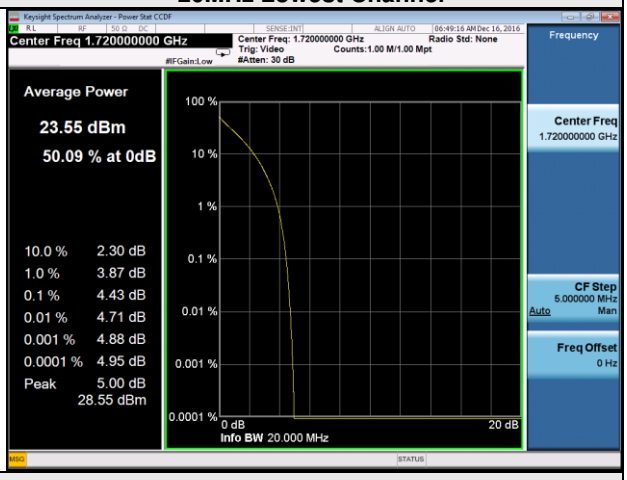


Spectrum Plot

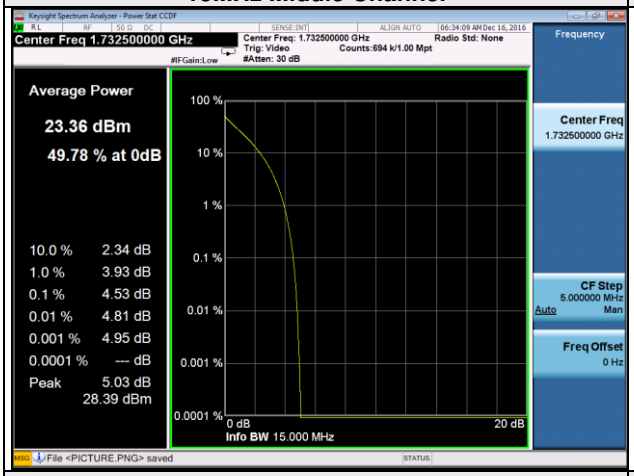
15MHz Lowest Channel



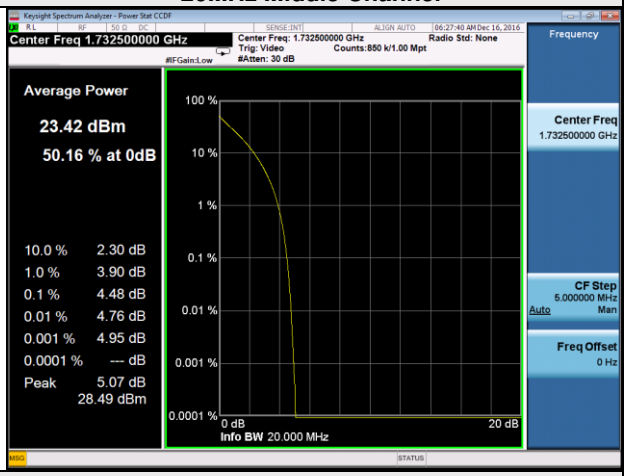
20MHz Lowest Channel



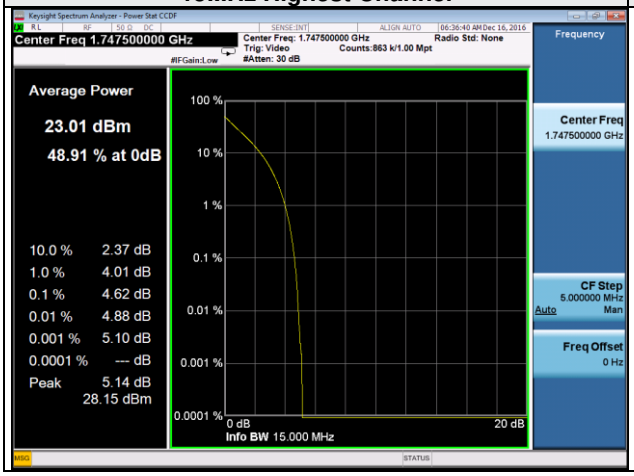
15MHz Middle Channel



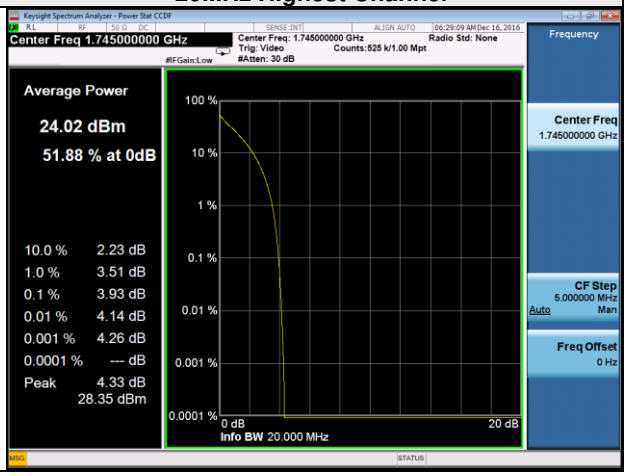
20MHz Middle Channel



15MHz Highest Channel



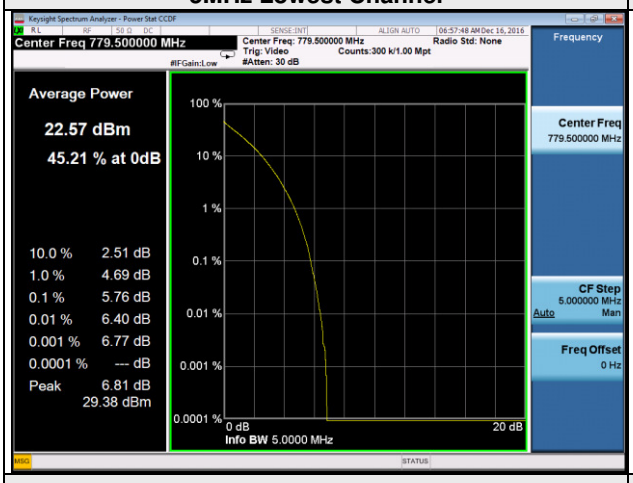
20MHz Highest Channel



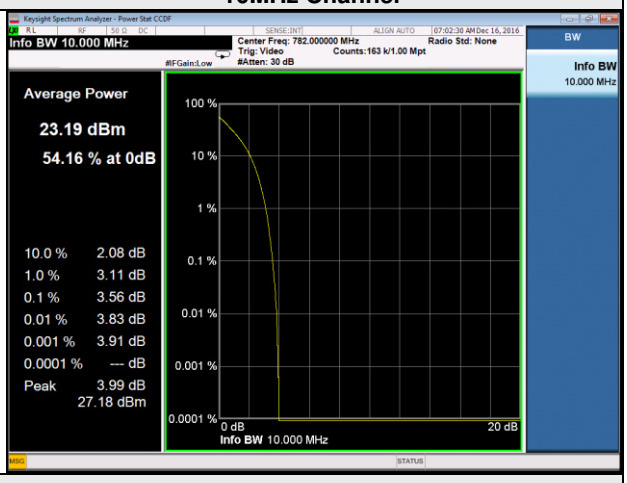
LTE Band XIII					
Channel Bandwidth: 5MHz			Channel Bandwidth: 10MHz		
Channel	Frequency (MHz)	Peak to Average Ratio (dB)	Channel	Frequency (MHz)	Peak to Average Ratio (dB)
23205	779.5	5.79	23230	782	3.56
23230	782	5.39			
23255	784.5	4.38			

Spectrum Plot

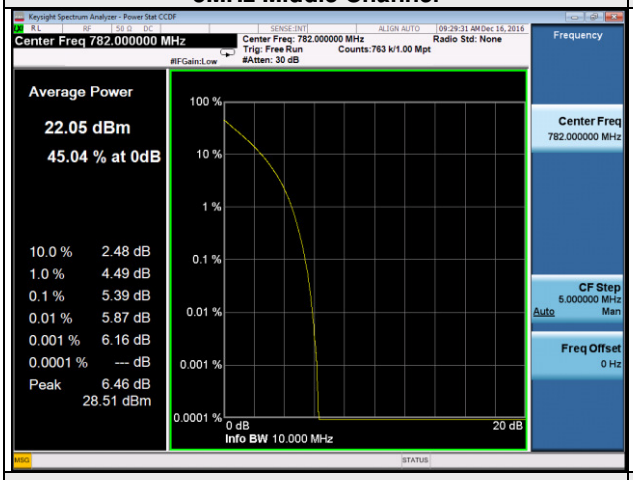
5MHz Lowest Channel



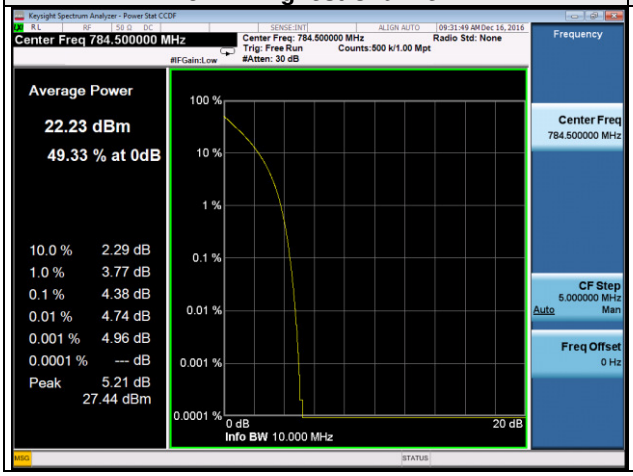
10MHz Channel



5MHz Middle Channel



5MHz Highest Channel

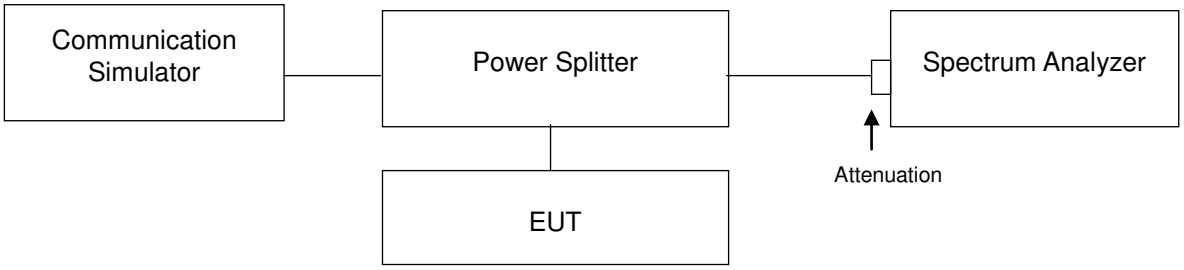


4.6 Conducted Spurious Emissions Measurement

4.6.1 Limits of Conducted Spurious Emissions Measurement

In the FCC 27.53(m)(4), On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. The emission limit equal to –13dBm.

4.6.2 Test Setup



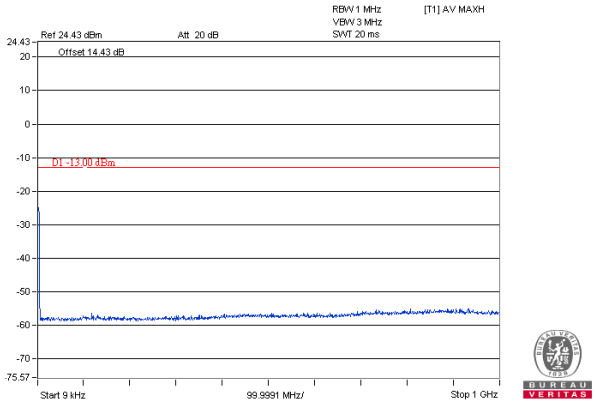
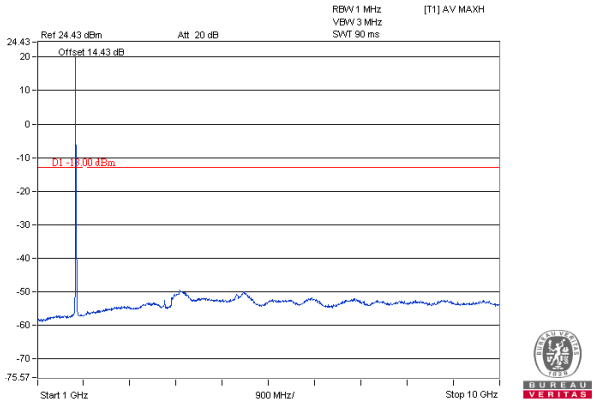
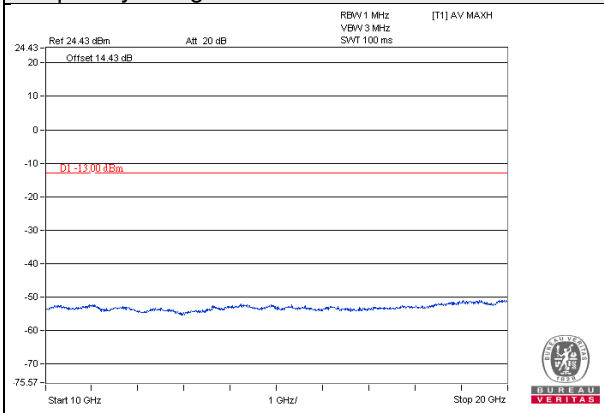
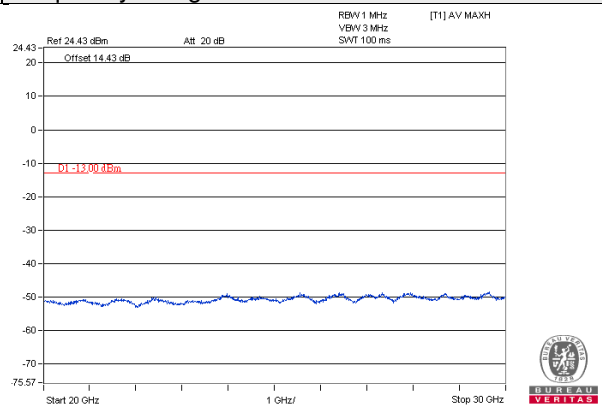
4.6.3 Test Procedure

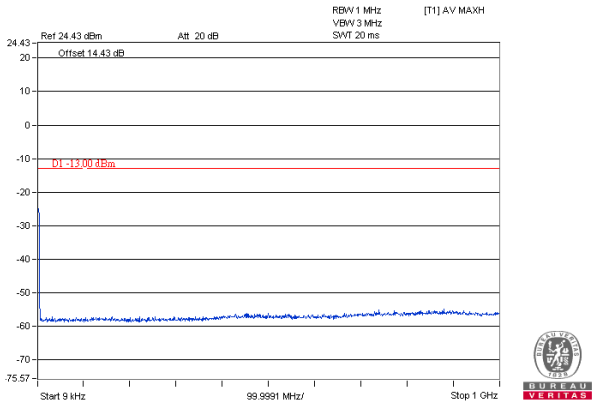
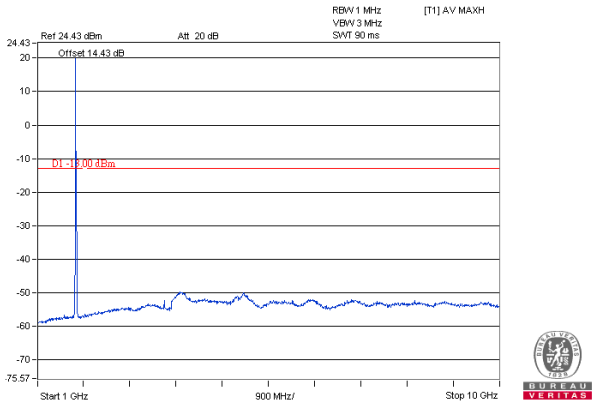
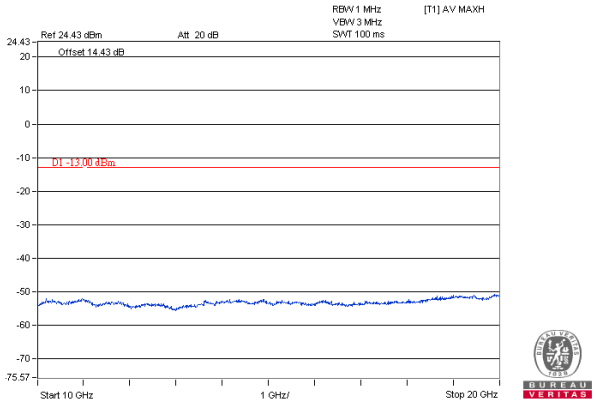
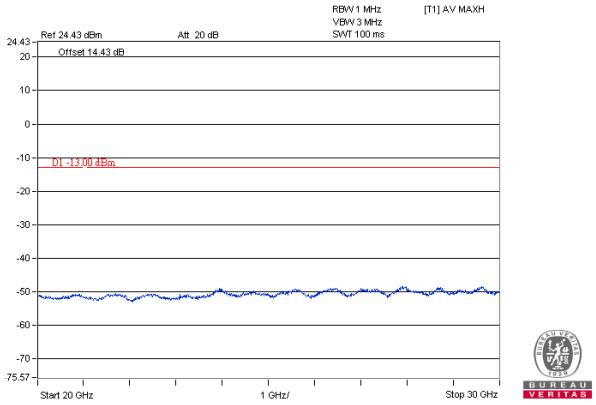
a. All measurements were done at 3 channels: low, middle and high operational frequency range, only the middle frequency is recorded.

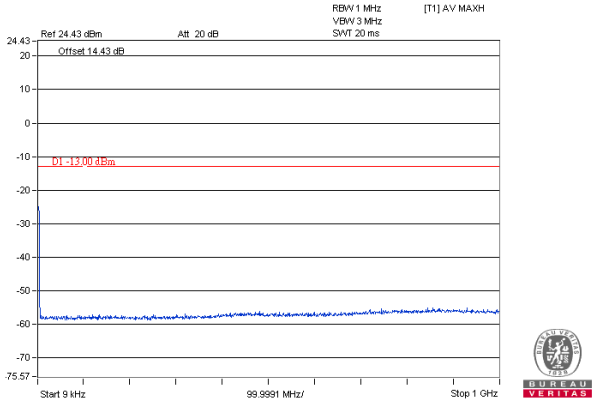
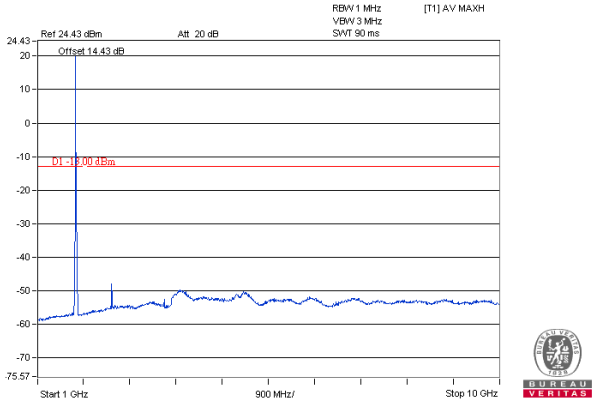
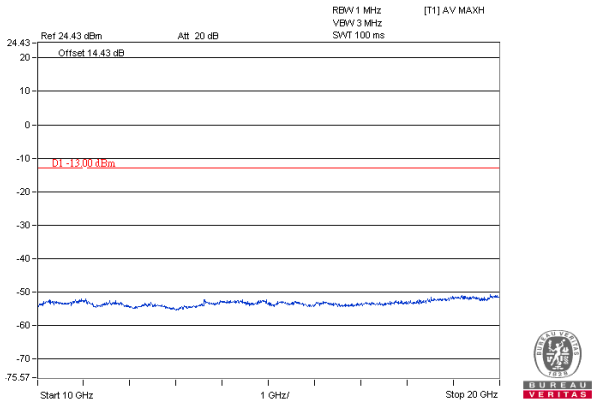
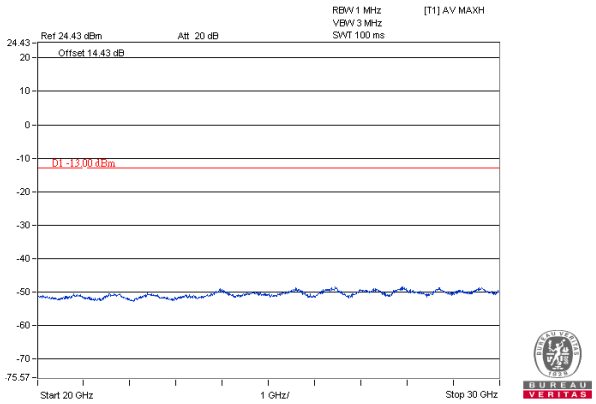
b. When the spectrum scanned from 9kHz to 30GHz, it shall be connected to the 10dB pad attenuated the carried frequency. The spectrum set RBW = 1MHz, VBW = 3MHz.

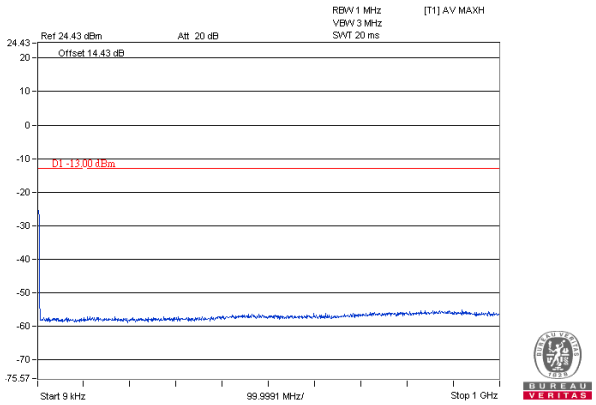
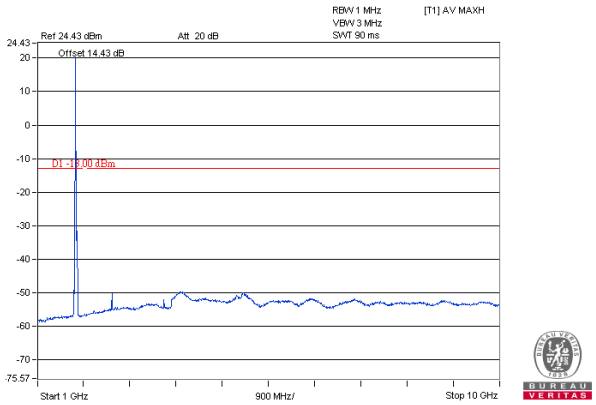
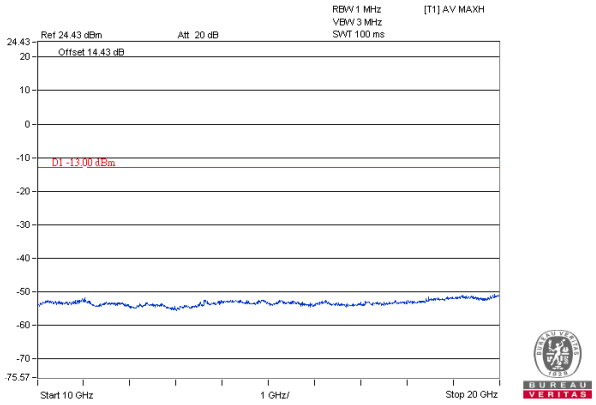
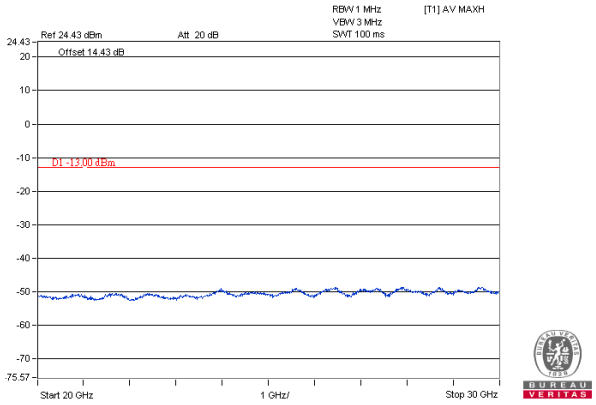
4.6.4 Test Results

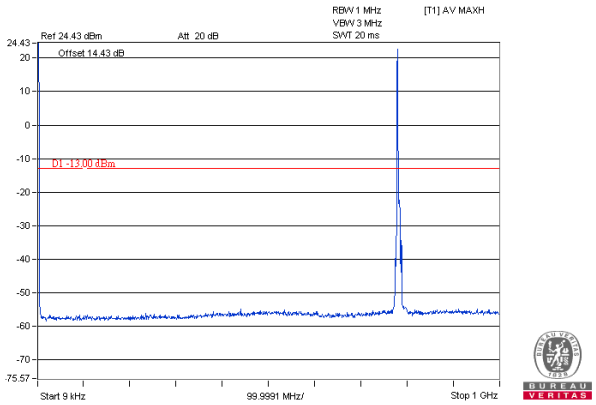
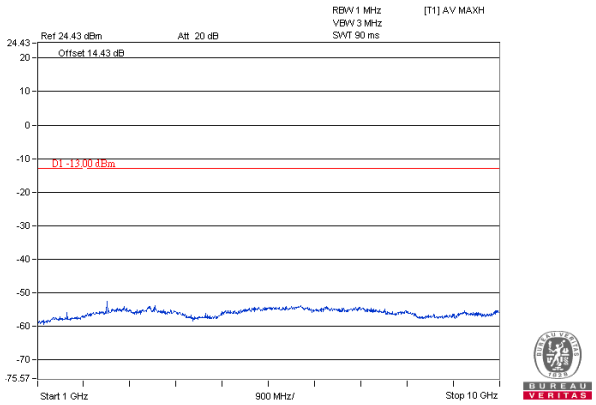
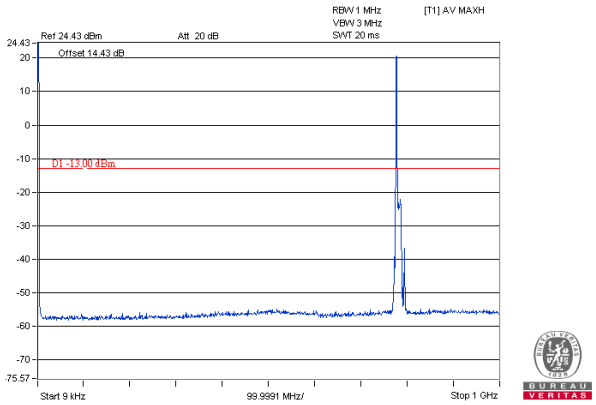
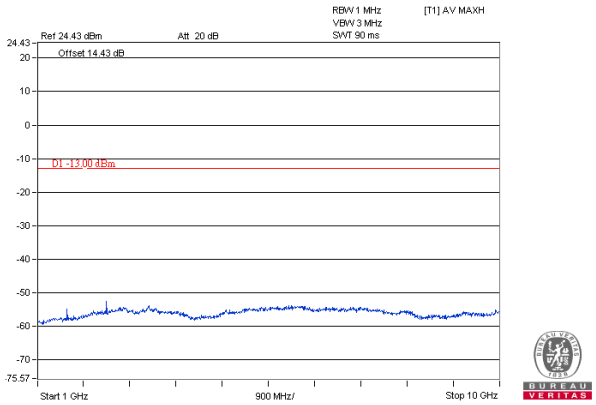
Temperature	25°C	**Humidity**	63%
Test Engineer	Gary Cheng		

LTE Band IV	
Channel Bandwidth: 5MHz	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~20GHz	Frequency Range : 20GHz~30GHz
	

Channel Bandwidth: 10MHz	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~20GHz	Frequency Range : 20GHz~30GHz
	

Channel Bandwidth: 15MHz	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~20GHz	Frequency Range : 20GHz~30GHz
	

Channel Bandwidth: 20MHz	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~20GHz	Frequency Range : 20GHz~30GHz
	

Band XIII	
Channel Bandwidth: 5MHz	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Channel Bandwidth: 10MHz	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	

4.7 Radiated Spurious Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

In the FCC 27.53(m) (4), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. The emission limit equal to –13dBm.

4.7.2 Test Procedure

a. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)

b. Substitution method is used for EIRP 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 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 antenna.

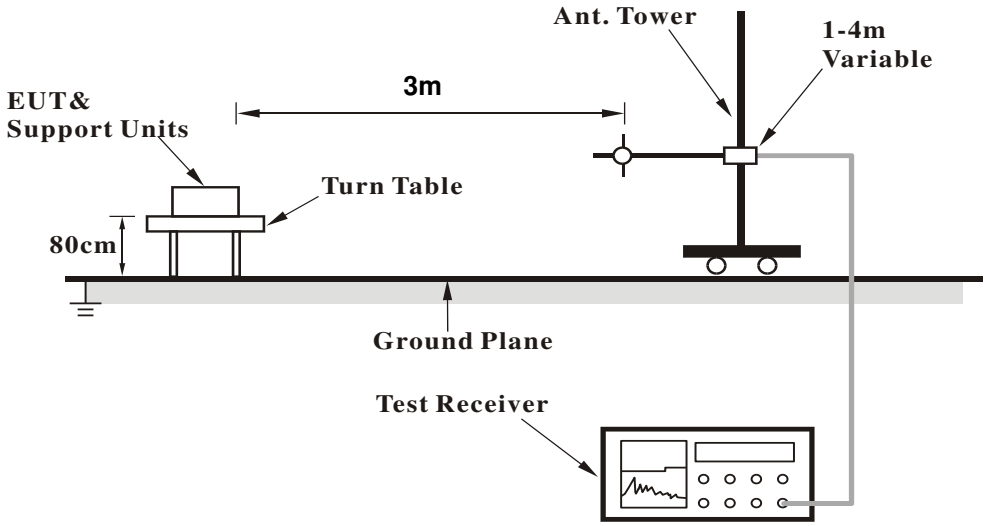
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.7.3 Deviation from Test Standard

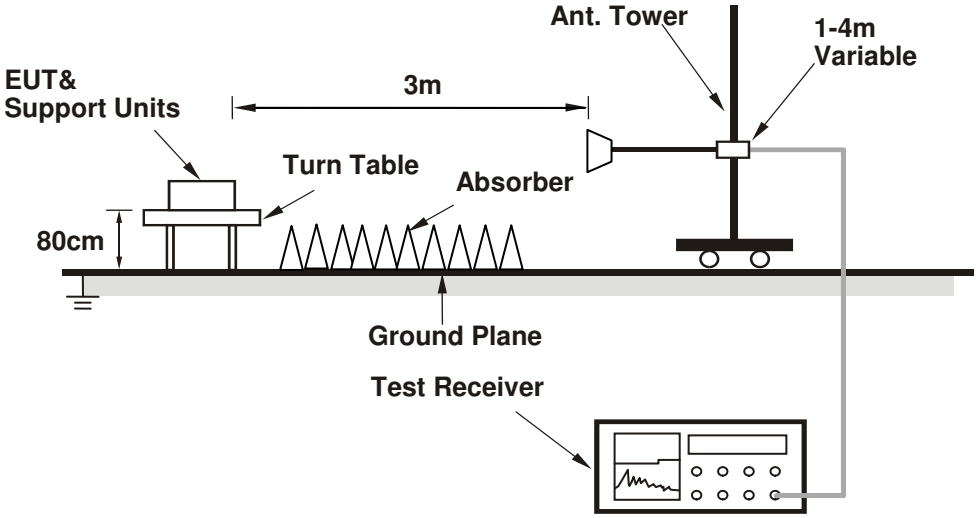
No deviation.

4.7.4 Test Setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.7.5 Test Results

Temperature	21°C	**Humidity**	65%
Test Engineer	Gary Cheng		

Below 1GHz

LTE Band IV:

Channel Bandwidth: 5MHz

Test Frequency	1732.5MHz	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	33.25	29.35	-43.08	-14.11	-57.19	-13	-44.19
2	69.26	30.65	-55.83	-2.40	-58.23	-13	-45.23
3	160.76	37.68	-50.93	-0.59	-51.52	-13	-38.52
4	349.76	31.59	-74.83	3.60	-71.23	-13	-58.23
5	648.78	38.85	-43.94	1.75	-42.20	-13	-29.20
6	750.14	44.37	-51.28	0.82	-50.46	-13	-37.46
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	32.22	38.35	-39.57	-14.21	-53.79	-13	-40.79
2	**69.06**	**38.26**	**-24.01**	**-4.95**	**-28.96**	**-13**	**-15.96**
3	150.55	35.86	-52.35	-0.99	-53.34	-13	-40.34
4	251.29	37.16	-57.81	3.89	-53.91	-13	-40.91
5	650.85	40.84	-41.95	1.74	-40.21	-13	-27.21
6	861.21	43.93	-35.85	0.91	-34.94	-13	-21.94

Remarks:

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

Channel Bandwidth: 10MHz

Test Frequency	1732.5MHz	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	31.33	28.92	-42.94	-14.57	-57.51	-13	-44.51
2	70.01	28.78	-57.74	-2.35	-60.10	-13	-47.10
3	159.03	38.46	-49.90	-0.84	-50.74	-13	-37.74
4	350.11	31.24	-75.17	3.59	-71.58	-13	-58.58
5	647.98	37.81	-44.98	1.75	-43.24	-13	-30.24
6	748.22	43.72	-51.90	0.79	-51.11	-13	-38.11
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	30.91	37.00	-40.95	-14.21	-55.16	-13	-42.16
2	68.76	36.66	-25.52	-5.04	-30.56	-13	-17.56
3	150.69	33.32	-54.90	-0.98	-55.88	-13	-42.88
4	250.21	36.12	-58.85	3.89	-54.95	-13	-41.95
5	650.02	40.79	-42.00	1.74	-40.26	-13	-27.26
6	860.93	43.01	-36.77	0.91	-35.86	-13	-22.86

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

Channel Bandwidth: 15MHz

Test Frequency	1732.5MHz	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	32.43	27.91	-44.27	-14.31	-58.58	-13	-45.58
2	69.54	29.31	-57.07	-2.38	-59.46	-13	-46.46
3	159.19	36.29	-52.10	-0.81	-52.91	-13	-39.91
4	349.33	30.56	-75.86	3.60	-72.26	-13	-59.26
5	647.73	36.57	-46.22	1.75	-44.48	-13	-31.48
6	748.03	43.43	-52.19	0.79	-51.40	-13	-38.40
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	30.72	35.28	-42.71	-14.21	-56.92	-13	-43.92
2	69.89	35.45	-27.06	-4.71	-31.77	-13	-18.77
3	149.27	34.23	-53.94	-1.03	-54.97	-13	-41.97
4	250.73	34.47	-60.50	3.89	-56.60	-13	-43.60
5	648.7	39.81	-42.98	1.75	-41.24	-13	-28.24
6	860.5	43.72	-36.07	0.92	-35.15	-13	-22.15

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

Channel Bandwidth: 20MHz

Test Frequency	1732.5MHz	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	33.21	27.77	-44.59	-14.12	-58.71	-13	-45.71
2	70.39	28.64	-57.82	-2.33	-60.15	-13	-47.15
3	160.13	36.07	-52.45	-0.68	-53.13	-13	-40.13
4	351.06	29.18	-77.23	3.59	-73.64	-13	-60.64
5	647.31	35.41	-47.39	1.75	-45.64	-13	-32.64
6	747.33	43.41	-52.20	0.78	-51.42	-13	-38.42
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	30.09	35.81	-42.36	-14.21	-56.57	-13	-43.57
2	68.88	34.08	-28.14	-5.00	-33.14	-13	-20.14
3	149.84	33.30	-54.89	-1.01	-55.90	-13	-42.90
4	248.76	35.07	-59.90	3.89	-56.00	-13	-43.00
5	649.17	39.16	-43.63	1.75	-41.89	-13	-28.89
6	861.51	42.00	-37.78	0.91	-36.87	-13	-23.87

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

LTE Band XIII:

Channel Bandwidth: 5MHz

Test Frequency	782MHz	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	33.81	24.80	-47.87	-13.97	-61.84	-13	-48.84
2	69.03	24.61	-62.20	-2.41	-64.61	-13	-51.61
3	162.43	32.49	-56.36	-0.35	-56.71	-13	-43.71
4	351.58	25.50	-80.91	3.59	-77.32	-13	-64.32
5	646.3	32.75	-50.05	1.75	-48.30	-13	-35.30
6	746.23	41.24	-54.35	0.76	-53.59	-13	-40.59
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	31.65	32.64	-45.22	-14.21	-59.43	-13	-46.43
2	67.92	29.71	-32.23	-5.28	-37.51	-13	-24.51
3	149.54	29.90	-58.28	-1.02	-59.30	-13	-46.30
4	249.1	30.90	-64.07	3.89	-60.17	-13	-47.17
5	651.74	35.38	-47.40	1.74	-45.67	-13	-32.67
6	863.73	37.89	-41.86	0.88	-40.98	-13	-27.98

Remarks:

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

Channel Bandwidth: 10MHz

Test Frequency	782MHz	Frequency Range	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	34.6	22.75	-50.19	-13.78	-63.96	-13	-50.96
2	68.67	23.39	-63.22	-2.43	-65.66	-13	-52.66
3	160.81	29.82	-58.80	-0.58	-59.38	-13	-46.38
4	353.29	23.45	-82.95	3.58	-79.37	-13	-66.37
5	644.78	29.98	-52.82	1.76	-51.07	-13	-38.07
6	747.26	40.01	-55.59	0.77	-54.82	-13	-41.82
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	32.21	30.38	-47.52	-14.21	-61.74	-13	-48.74
2	67.48	27.15	-34.66	-5.41	-40.07	-13	-27.07
3	150.15	27.70	-60.50	-1.00	-61.50	-13	-48.50
4	249.99	28.72	-66.25	3.89	-62.35	-13	-49.35
5	651.75	32.02	-50.76	1.74	-49.03	-13	-36.03
6	864.32	34.60	-45.15	0.88	-44.27	-13	-31.27

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

ABOVE 1GHz

LTE Band IV:

Channel Bandwidth: 5MHz

Test Frequency	1732.5 MHz	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	3465	40.52	-62.64	7.80	-54.84	-13	-41.84
2	5197.5	39.69	-64.84	7.05	-57.78	-13	-44.78
3	6930	42.74	-59.58	5.10	-54.47	-13	-41.47
4	8662.5	46.31	-56.40	4.23	-52.17	-13	-39.17
5	10395	46.73	-55.27	3.67	-51.60	-13	-38.60
6	12127.5	48.36	-53.12	4.38	-48.74	-13	-35.74
7	13860	51.57	-48.08	2.47	-45.62	-13	-32.62
8	15592.5	50.68	-47.19	3.49	-43.71	-13	-30.71
9	17325	54.83	-44.49	3.09	-41.40	-13	-28.40
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	3465	38.36	-64.80	7.80	-57.00	-13	-44.00
2	5197.5	40.24	-64.29	7.05	-57.23	-13	-44.23
3	6930	42.72	-59.60	5.10	-54.49	-13	-41.49
4	8662.5	45.43	-57.28	4.23	-53.05	-13	-40.05
5	10395	48.12	-53.88	3.67	-50.21	-13	-37.21
6	12127.5	48.34	-53.14	4.38	-48.76	-13	-35.76
7	13860	52.16	-47.49	2.47	-45.03	-13	-32.03
8	15592.5	50.81	-47.06	3.49	-43.58	-13	-30.58
9	17325	55.99	-43.33	3.09	-40.24	-13	-27.24

Remarks:

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

Channel Bandwidth: 10MHz

Test Frequency	1732.5 MHz	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	3465	39.94	-63.22	7.80	-55.42	-13	-42.42
2	5197.5	38.32	-66.21	7.05	-59.15	-13	-46.15
3	6930	42.22	-60.10	5.10	-54.99	-13	-41.99
4	8662.5	45.13	-57.58	4.23	-53.35	-13	-40.35
5	10395	45.58	-56.42	3.67	-52.75	-13	-39.75
6	12127.5	48.73	-52.75	4.38	-48.37	-13	-35.37
7	13860	51.18	-48.47	2.47	-46.01	-13	-33.01
8	15592.5	50.43	-47.44	3.49	-43.96	-13	-30.96
9	17325	54.62	-44.70	3.09	-41.61	-13	-28.61
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	3465	38.84	-64.32	7.80	-56.52	-13	-43.52
2	5197.5	40.27	-64.26	7.05	-57.20	-13	-44.20
3	6930	43.45	-58.87	5.10	-53.76	-13	-40.76
4	8662.5	46.9	-55.81	4.23	-51.58	-13	-38.58
5	10395	48.75	-53.25	3.67	-49.58	-13	-36.58
6	12127.5	48.44	-53.04	4.38	-48.66	-13	-35.66
7	13860	52.22	-47.43	2.47	-44.97	-13	-31.97
8	15592.5	51.39	-46.48	3.49	-43.00	-13	-30.00
9	17325	56.79	-42.53	3.09	-39.44	-13	-26.44

Remarks:

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

Channel Bandwidth: 15MHz

Test Frequency	1732.5 MHz	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	3465	39.18	-63.98	7.80	-56.18	-13	-43.18
2	5197.5	37.26	-67.27	7.05	-60.21	-13	-47.21
3	6930	41.6	-60.72	5.10	-55.61	-13	-42.61
4	8662.5	43.28	-59.43	4.23	-55.20	-13	-42.20
5	10395	43.57	-58.43	3.67	-54.76	-13	-41.76
6	12127.5	47.38	-54.10	4.38	-49.72	-13	-36.72
7	13860	49.64	-50.01	2.47	-47.55	-13	-34.55
8	15592.5	48.68	-49.19	3.49	-45.71	-13	-32.71
9	17325	53.15	-46.17	3.09	-43.08	-13	-30.08
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	3465	37.38	-65.78	7.80	-57.98	-13	-44.98
2	5197.5	38.98	-65.55	7.05	-58.49	-13	-45.49
3	6930	43.02	-59.30	5.10	-54.19	-13	-41.19
4	8662.5	45.87	-56.84	4.23	-52.61	-13	-39.61
5	10395	47.42	-54.58	3.67	-50.91	-13	-37.91
6	12127.5	48.26	-53.22	4.38	-48.84	-13	-35.84
7	13860	51.27	-48.38	2.47	-45.92	-13	-32.92
8	15592.5	51.5	-46.37	3.49	-42.89	-13	-29.89
9	17325	56.22	-43.10	3.09	-40.01	-13	-27.01

Remarks:

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

Channel Bandwidth: 20MHz

Test Frequency	1732.5 MHz	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	3465	39.69	-63.47	7.80	-55.67	-13	-42.67
2	5197.5	37.82	-66.71	7.05	-59.65	-13	-46.65
3	6930	41.38	-60.94	5.10	-55.83	-13	-42.83
4	8662.5	42.53	-60.18	4.23	-55.95	-13	-42.95
5	10395	43.51	-58.49	3.67	-54.82	-13	-41.82
6	12127.5	47.21	-54.27	4.38	-49.89	-13	-36.89
7	13860	48.9	-50.75	2.47	-48.29	-13	-35.29
8	15592.5	49.71	-48.16	3.49	-44.68	-13	-31.68
9	17325	52.33	-46.99	3.09	-43.90	-13	-30.90
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	3465	38.26	-64.90	7.80	-57.10	-13	-44.10
2	5197.5	39.98	-64.55	7.05	-57.49	-13	-44.49
3	6930	42.69	-59.63	5.10	-54.52	-13	-41.52
4	8662.5	46.24	-56.47	4.23	-52.24	-13	-39.24
5	10395	47.39	-54.61	3.67	-50.94	-13	-37.94
6	12127.5	48.46	-53.02	4.38	-48.64	-13	-35.64
7	13860	51.92	-47.73	2.47	-45.27	-13	-32.27
8	15592.5	51.65	-46.22	3.49	-42.74	-13	-29.74
9	17325	55.42	-43.90	3.09	-40.81	-13	-27.81

Remarks:

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

LTE Band XIII:

Channel Bandwidth: 5MHz

Test Frequency	782 MHz	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1564	42.1	-61.07	6.11	-54.96	-13	-41.96
2	2346	37.8	-61.43	6.73	-54.70	-13	-41.70
3	3128	39.9	-62.85	7.32	-55.53	-13	-42.53
4	3910	37.7	-67.00	7.58	-59.42	-13	-46.42
5	4692	42.8	-61.61	7.19	-54.42	-13	-41.42
6	5474	42.2	-62.74	7.11	-55.63	-13	-42.63
7	6256	43.2	-60.94	6.34	-54.60	-13	-41.60
8	7038	45.8	-56.27	4.94	-51.33	-13	-38.33
9	7820	47.4	-55.22	4.27	-50.95	-13	-37.95
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1564	39.80	-63.37	6.11	-57.26	-13	-44.26
2	2346	37.30	-61.93	6.73	-55.20	-13	-42.20
3	3128	39.50	-63.25	7.32	-55.93	-13	-42.93
4	3910	38.1	-66.60	7.58	-59.02	-13	-46.02
5	4692	39.8	-64.61	7.19	-57.42	-13	-44.42
6	5474	42.1	-62.84	7.11	-55.73	-13	-42.73
7	6256	42.3	-61.84	6.34	-55.50	-13	-42.50
8	7038	45.3	-56.77	4.94	-51.83	-13	-38.83
9	7820	46.5	-56.12	4.27	-51.85	-13	-38.85

Remarks:

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

Channel Bandwidth: 10MHz

Test Frequency	782 MHz	Frequency Range	Above 1000MHz

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1564	41.16	-62.01	6.11	-55.90	-13	-42.90
2	2346	37.05	-62.18	6.73	-55.45	-13	-42.45
3	3128	38.65	-64.10	7.32	-56.78	-13	-43.78
4	3910	36.91	-67.79	7.58	-60.21	-13	-47.21
5	4692	40.69	-63.72	7.19	-56.53	-13	-43.53
6	5474	39.67	-65.27	7.11	-58.16	-13	-45.16
7	6256	42.02	-62.12	6.34	-55.78	-13	-42.78
8	7038	43.79	-58.28	4.94	-53.34	-13	-40.34
9	7820	45.38	-57.24	4.27	-52.97	-13	-39.97
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBuV/m)	S.G Power Value (dBm)	Correction Factor (dB)	Emission Value (dBm)	Limit (dBm)	Margin (dB)
1	1564	38.29	-64.88	6.11	-58.77	-13	-45.77
2	2346	36.34	-62.89	6.73	-56.16	-13	-43.16
3	3128	38.61	-64.14	7.32	-56.82	-13	-43.82
4	3910	36.34	-68.36	7.58	-60.78	-13	-47.78
5	4692	38.69	-65.72	7.19	-58.53	-13	-45.53
6	5474	40.59	-64.35	7.11	-57.24	-13	-44.24
7	6256	41.12	-63.02	6.34	-56.68	-13	-43.68
8	7038	44.05	-58.02	4.94	-53.08	-13	-40.08
9	7820	45.03	-57.59	4.27	-53.32	-13	-40.32

Remarks:

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

4.8 List of Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 18, 2016	Aug. 17, 2017
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2014	Dec. 15, 2016
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-05	May 07, 2016	May 06, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-156	Jan. 04, 2016	Jan. 03, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 02, 2016	Apr. 01, 2017
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Jan. 20, 2016	Jan. 19, 2017
Pre-Amplifier Agilent	8449B	3008A02465	Apr. 05, 2016	Apr. 04, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150317 150321 150322	Mar. 30, 2016	Mar. 29, 2017
Spectrum Analyzer Keysight	N9030A	MY54490520	July 29, 2016	July 28, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated _V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The FCC Site Registration No. is 147459
5. The CANADA Site Registration No. is 20331-1
6. Tested Date: Dec. 06, 2016

Appendix A. 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:

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

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