FCC Test Report

(PART 24)

Report No.: RF160517W001-4

FCC ID: ZC4L610

Test Model: Ilium L610

Received Date: May 17, 2016

Test Date: May 18, 2016 ~ Jun. 11, 2016

Issued Date: Jun. 12, 2016

Applicant: Corporativo Lanix S.A. de C.V.

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

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RELEASE CONTROL RECORD

Issue No.	Description	Date Issued
RF160517W001-4	Original release	Jun. 12, 2016

1 Certificate of Conformity

Product: Smartphone

Brand: LANIX

Test Model: Ilium L610

Sample Status: Production unit

Applicant: Corporativo Lanix S.A. de C.V.

Test Date: May 18, 2016 ~ Jun. 11, 2016

Standards: FCC Part 24, Subpart E

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 EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Jun. 12, 2016

Amyee Qian / Engineer

Approved by : _____ , **Date:** Jun. 12, 2016

William Chung / Manager

2 Summary of Test Results

Applied Standard: FCC Part 24 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 24.232	Effective Radiated Power	PASS	Meet the requirement of limit.
2.1046 24.232(d)	Peak To Average Ratio	PASS	Meet the requirement of limit.
2.1055 24.235	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 24.238(b)	Occupied Bandwidth	PASS	Meet the requirement of limit.
24.238(b)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 24.238	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 24.238	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -16.39dB at 5640.00MHz.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

2.2 Test Site And Instruments

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Apr. 05,16	Apr. 04,17
Bilog Antenna 1	Teseq	CBL 6111D	30643	Jun. 25,15	Jun. 24,16
Bilog Antenna 2	Teseq	CBL 6111D	27089	Jun. 25,15	Jun. 24,16
Horn Antenna	ETS-Lindgren	3117	00062558	May 30,14	May 29,17
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 21,14	Jan. 20,17
Amplifier	Burgeon	BPA-530	100220	Apr. 05,16	Apr. 04,17
Pre-Amplifier	HP	8449B	3008A00409	Apr. 24,16	Apr. 23,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 11,15	Nov. 10,16
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 08, 14	Aug. 07, 16
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 12,16	Mar. 11,18
Test Software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A
Power Meter	Anritsu	ML2495A	1139001	Feb.19,16	Feb. 18,17
Power Sensor	Anritsu	MA2411B	1126068	Feb.19,16	Feb. 18,17
Power Sensor	Keysight	U2021XA	MY55060016	May 27,15	May 26,17
Power Sensor	Keysight	U2021XA	MY55060018	May 27,15	May 26,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 12, 15	Oct. 11, 16
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.07,15	Sep. 06,16
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 09,15	Nov. 08,16
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Signal Generator	Agilent	N5183A	MY50140980	Apr. 21, 16	Apr. 20, 17
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Sep. 01,15	Aug. 31,16
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Oct. 12, 15	Oct. 11, 16

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

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

3 General Information

3.1 General Description of EUT

PRODUCT	Smartphone	
BRAND	LANIX	
MODEL NAME	Ilium L610	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.8Vdc (battery)	
MODULATION TYPE	**GSM, GPRS:** GMSK **EDGE:** GMSK, 8PSK **WCDMA :** BPSK **LTE Band 2:** QPSK, 16QAM	
FREQUENCY RANGE	**GSM, GPRS, EDGE:** 1850.2MHz ~ 1909.8MHz	
	WCDMA: 1852.4MHz ~ 1907.6MHz	
	LTE Band 2 **Channel Bandwidth: 1.4MHz**	1850.7MHz ~ 1909.3MHz
	LTE Band 2 **Channel Bandwidth: 3MHz**	1851.5MHz ~ 1908.5MHz
	LTE Band 2 **Channel Bandwidth: 5MHz**	1852.5MHz ~ 1907.5MHz
	LTE Band 2 **Channel Bandwidth: 10MHz**	1855.0MHz ~ 1905.0MHz
	LTE Band 2 **Channel Bandwidth: 15MHz**	1857.5MHz ~ 1902.5MHz
	LTE Band 2 **Channel Bandwidth: 20MHz**	1860.0MHz ~ 1900.0MHz
MAX. EIRP POWER	**GSM:** 857mW	
	EDGE: 441mW	
	WCDMA: 234mW	
	LTE Band 2 **Channel Bandwidth: 1.4MHz**	269mW
	LTE Band 2 **Channel Bandwidth: 3MHz**	265mW
	LTE Band 2 **Channel Bandwidth: 5MHz**	268mW
	LTE Band 2 **Channel Bandwidth: 10MHz**	272mW
	LTE Band 2 **Channel Bandwidth: 15MHz**	267mW
	LTE Band 2 **Channel Bandwidth: 20MHz**	241mW

EMISSION DESIGNATOR	**GSM**	246KGXW
	EDGE	250KG7W
	WCDMA	4M18F9W
	LTE Band 2 Channel Bandwidth: 1.4MHz	QPSK: 1M09G7D
		16QAM: 1M09W7D
	LTE Band 2 Channel Bandwidth: 3MHz	QPSK: 2M70G7D
		16QAM: 2M68W7D
	LTE Band 2 Channel Bandwidth: 5MHz	QPSK: 4M49G7D
		16QAM: 4M49W7D
	LTE Band 2 Channel Bandwidth: 10MHz	QPSK: 8M96G7D
		16QAM: 8M94W7D
	LTE Band 2 Channel Bandwidth: 15MHz	QPSK: 13M5G7D
		16QAM: 13M5W7D
	LTE Band 2 Channel Bandwidth: 20MHz	QPSK: 17M9G7D
		16QAM: 17M9W7D
ANTENNA TYPE	Fixed Internal antenna with 0dBi gain	
HW VERSION	V0.10	
SW VERSION	Ilium L610_TELCEL_SW_01_01	
ACCESSORY DEVICE	Refer to note as below	
DATA CABLE	USB cable: shielded, detachable, 0.8 m Earphone cable: Unshielded, detachable, 1.5 m	

Note:

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

ADAPTER 1	
BRAND:	LANIX
MODEL:	Ilium L610-C
INPUT:	AC 100-240V, 150mA
OUTPUT:	DC 5V, 1000mA

ADAPTER 2	
BRAND:	LANIX
MODEL:	Ilium L610-C
INPUT:	AC 100-240V, 150mA
OUTPUT:	DC 5V, 1000mA

4. The EUT matched the following USB Cable and Earphone.

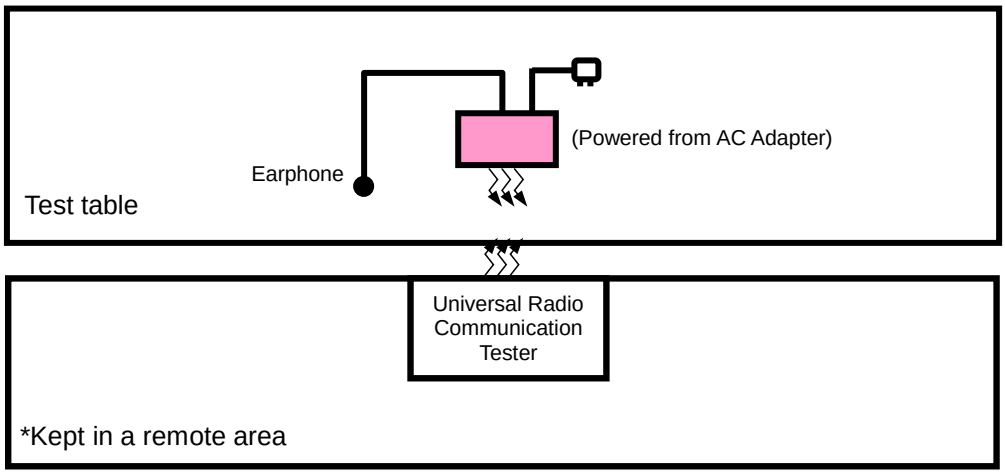
USB CABLE	
BRAND:	LANIX
MODEL:	Ilium L610
SIGNAL LINE:	0.8 METER

EARPHONE	
BRAND:	LANIX
MODEL:	Ilium L610
SIGNAL LINE:	1.5 METER

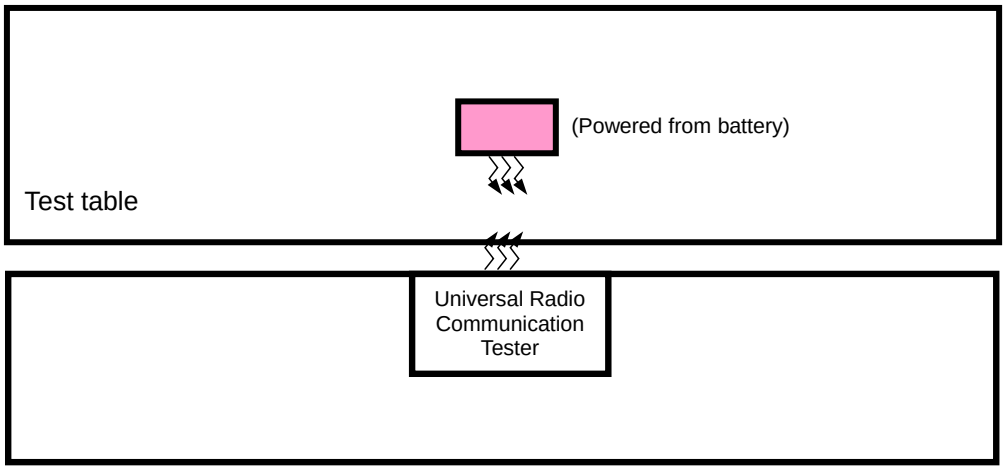
5. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.2 Configuration Of System Under Test

FOR RADIATION EMISSION TEST



FOR E.R.P. TEST



3.2.1 Description Of Support Units

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m

NOTE:

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

3.3 Test Mode Applicability and Tested Channel Detail

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

Test results are presented in the report as below.

Test Mode	Test Condition
A	Power from adapter
B	Power from battery

GSM MODE

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
A	EIRP	512 to 810	512, 661, 810	GSM
B	Frequency Stability	512 to 810	661	GSM
A	Occupied Bandwidth	512 to 810	512, 661, 810	GSM, EDGE
A	Band Edge	512 to 810	512, 810	GSM, EDGE
A	Peak To Average Ratio	512 to 810	512, 661, 810	GSM, EDGE
A	Condcudeted Emission	512 to 810	512, 661, 810	GSM, EDGE
A	Radiated Emission Below 1GHz	512 to 810	512	GSM
A	Radiated Emission Above 1GHz	512 to 810	512, 661, 810	GSM

WCDMA MODE

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
A	EIRP	9262 to 9538	9262, 9400, 9538	WCDMA
B	Frequency Stability	9262 to 9538	9400	WCDMA
A	Occupied Bandwidth	9262 to 9538	9262, 9400, 9538	WCDMA
A	Band Edge	9262 to 9538	9262, 9538	WCDMA
A	Peak To Average Ratio	9262 to 9538	9262, 9400, 9538	WCDMA
A	Condcudeted Emission	9262 to 9538	9262, 9400, 9538	WCDMA
A	Radiated Emission Below 1GHz	9262 to 9538	9262	WCDMA
A	Radiated Emission Above 1GHz	9262 to 9538	9262, 9400, 9538	WCDMA

LTE BAND 2

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	18607 to 19193	18900	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18900	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18900	20MHz	QPSK	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	100 RB / 0 RB Offset
B	PEAK TO AVERAGE RATIO	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset

B	BAND EDGE	18607 to 19193	18607	1.4MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			19193	1.4MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		18615 to 19185	18615	3MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			19185	3MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		18625 to 19175	18625	5MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			19175	5MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		18650 to 19150	18650	10MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			19150	10MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		18675 to 19125	18675	15MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			19125	15MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		18700 to 19100	18700	20MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			19100	20MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
B	CONDCUDETED EMISSION	18607 to 19193	18900	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18900	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18900	20MHz	QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	18607 to 19193	18900	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18900	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18900	20MHz	QPSK	1 RB / 0 RB Offset

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	21deg. C, 71%RH 22deg. C, 71%RH	DC 3.8V from battery	Yuqiang Yin
Frequency Stability	24deg. C, 64%RH	DC 3.8V from battery	Yuqiang Yin
Occupied Bandwidth	24deg. C, 64%RH	DC 3.8V from battery	Yuqiang Yin
Band Edge	24deg. C, 64%RH	DC 3.8V from battery	Yuqiang Yin
Peak To Average Ratio	24deg. C, 64%RH	DC 3.8V from battery	Yuqiang Yin
Condcudeted Emission	24deg. C, 64%RH	5Vdc from adapter	Alex Chen
Radiated Emission	21deg. C, 71%RH	DC 3.8V from battery	Yuqiang Yin

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards

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

FCC 47 CFR Part 2

FCC 47 CFR Part 24

KDB 971168 D01 Power Meas License Digital Systems v02r02

ANSI/TIA/EIA-603-D

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

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

4.1.2 Test Procedures

EIRP / ERP Measurement:

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

b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

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

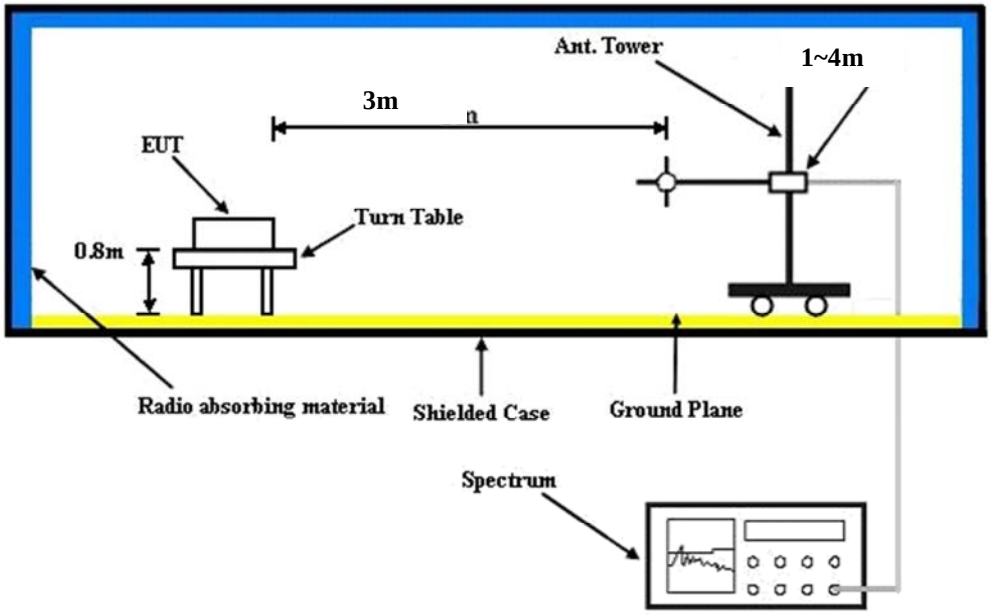
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

Conducted Power Measurement:

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

4.1.3 Test Setup

EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:

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

4.1.4 Test Results

CONDUCTED OUTPUT POWER (dBm)

Band	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8
GSM	**31.22**	30.98	31.11
GPRS 8	31.21	30.95	31.04
GPRS 10	29.30	29.29	29.14
GPRS 11	27.21	27.30	27.43
GPRS 12	25.20	25.20	25.37
EDGE 8 (MCS1)	24.89	24.89	25.08
EDGE 10 (MCS1)	23.47	23.51	23.69
EDGE 11 (MCS9)	22.17	22.19	22.35
EDGE 12 (MCS9)	20.75	20.78	20.92

Band	WCDMA II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	22.49	22.33	**22.66**
HSPA			
HSDPA Subtest-1	21.34	21.32	21.57
HSDPA Subtest-2	21.01	21.11	21.36
HSDPA Subtest-3	20.71	20.81	21.08
HSDPA Subtest-4	20.00	20.12	20.06
HSUPA Subtest-1	21.04	20.91	21.23
HSUPA Subtest-2	19.57	19.49	19.70
HSUPA Subtest-3	20.06	20.14	20.26
HSUPA Subtest-4	19.39	19.52	19.60
HSUPA Subtest-5	21.54	21.50	21.62

LTE Band 2							
BW	Modulation	RB Size	RB Offset	Low CH 18607 Frequency 1850.7 MHz	Mid CH 18900 Frequency 1880 MHz	High CH 19193 Frequency 1909.3 MHz	3GPP MPR (dB)
1.4MHz	QPSK	1	0	23.25	23.27	23.30	0
		1	2	23.04	23.18	23.27	0
		1	5	23.07	23.13	23.22	0
		3	0	23.24	23.26	23.29	0
		3	1	23.03	23.17	23.26	0
		3	3	23.06	23.12	23.21	0
		6	0	22.16	22.11	22.23	1
	16QAM	1	0	22.22	22.28	22.31	1
		1	2	22.16	22.29	22.29	1
		1	5	21.99	22.22	22.21	1
		3	0	22.20	22.26	22.29	1
		3	1	22.14	22.27	22.27	1
		3	3	21.97	22.20	22.19	1
		6	0	21.22	21.16	21.22	2

LTE Band 2							
BW	Modulation	RB Size	RB Offset	Low CH 18615 Frequency 1851.5 MHz	Mid CH 18900 Frequency 1880 MHz	High CH 19185 Frequency 1908.5 MHz	3GPP MPR (dB)
3 MHz	QPSK	1	0	23.28	23.30	23.33	0
		1	7	23.07	23.21	23.30	0
		1	14	23.10	23.16	23.25	0
		8	0	22.08	22.24	22.32	1
		8	3	22.03	22.21	22.17	1
		8	7	22.02	22.16	22.30	1
		15	0	22.19	22.14	22.26	1
	16QAM	1	0	22.25	22.31	22.34	1
		1	7	22.19	22.32	22.32	1
		1	14	22.02	22.25	22.24	1
		8	0	21.09	21.37	21.37	2
		8	3	21.23	21.38	21.48	2
		8	7	21.09	21.36	21.37	2
		15	0	21.25	21.19	21.25	2

BW	Modulation	RB Size	RB Offset	Low CH 18625	Mid CH 18900	High CH 19175	3GPP MPR (dB)
				Frequency 1852.5 MHz	Frequency 1880 MHz	Frequency 1907.5 MHz	
5 MHz	QPSK	1	0	23.31	23.33	23.36	0
		1	12	23.10	23.24	23.33	0
		1	24	23.13	23.19	23.28	0
		12	0	22.11	22.27	22.35	1
		12	6	22.06	22.24	22.20	1
		12	13	22.05	22.19	22.33	1
		25	0	22.22	22.17	22.29	1
	16QAM	1	0	22.28	22.34	22.37	1
		1	12	22.22	22.35	22.35	1
		1	24	22.05	22.28	22.27	1
		12	0	21.12	21.40	21.40	2
		12	6	21.26	21.41	21.51	2
		12	13	21.12	21.39	21.40	2
		25	0	21.28	21.22	21.28	2
LTE Band 2							
BW	**Modulation**	**RB Size**	**RB Offset**	**Low CH 18650**	**Mid CH 18900**	**High CH 19150**	**3GPP MPR (dB)**
				Frequency 1855 MHz	**Frequency 1880 MHz**	**Frequency 1905 MHz**	
10 MHz	QPSK	1	0	23.33	23.35	23.38	0
		1	24	23.12	23.26	23.35	0
		1	49	23.15	23.21	23.30	0
		25	0	22.13	22.29	22.37	1
		25	12	22.08	22.26	22.22	1
		25	25	22.07	22.21	22.35	1
		50	0	22.24	22.19	22.31	1
	16QAM	1	0	22.30	22.36	22.39	1
		1	24	22.24	22.37	22.37	1
		1	49	22.07	22.30	22.29	1
		25	0	21.14	21.42	21.42	2
		25	12	21.28	21.43	21.53	2
		25	25	21.14	21.41	21.42	2
		50	0	21.30	21.24	21.30	2
BW	**Modulation**	**RB Size**	**RB Offset**	**Low CH 18675**	**Mid CH 18900**	**High CH 19125**	**3GPP MPR (dB)**
				Frequency 1857.5 MHz	**Frequency 1880 MHz**	**Frequency 1902.5 MHz**	
15 MHz	**QPSK**	1	0	23.49	23.29	**23.56**	0

		1	37	23.36	23.38	23.41	0
		1	74	23.15	23.29	23.38	0
		36	0	23.18	23.24	23.33	1
		36	19	22.16	22.32	22.40	1
		36	39	22.11	22.29	22.25	1
		75	0	22.10	22.24	22.38	1
	16QAM	1	0	22.27	22.22	22.34	1
		1	37	22.33	22.39	22.42	1
		1	74	22.27	22.40	22.40	1
		36	0	22.10	22.33	22.32	2
		36	19	21.17	21.45	21.45	2
		36	39	21.31	21.46	21.56	2
		75	0	21.17	21.44	21.45	2

LTE Band 2

BW	**Modulation**	**RB Size**	**RB Offset**	**Low CH 18700**	**Mid CH 18900**	**High CH 19100**	**3GPP MPR (dB)**
				Frequency 1860 MHz	**Frequency 1880 MHz**	**Frequency 1900 MHz**	
20MHz	**QPSK**	1	0	23.41	23.43	**23.46**	0
		1	50	23.20	23.34	23.43	0
		1	99	23.23	23.29	23.38	0
		50	0	22.21	22.37	22.45	1
		50	25	22.16	22.34	22.30	1
		50	50	22.15	22.29	22.43	1
		100	0	22.32	22.27	22.39	1
	16QAM	1	0	22.38	22.44	22.47	1
		1	50	22.32	22.45	22.45	1
		1	99	22.15	22.38	22.37	1
		50	0	21.22	21.50	21.50	2
		50	25	21.36	21.51	21.61	2
		50	50	21.22	21.49	21.50	2
		100	0	21.38	21.32	21.38	2

EIRP POWER (dBm)

GSM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
512	1850.2	-20.62	43.83	23.21	209.41	H
661	1880.0	-20.79	43.57	22.78	189.67	H
810	1909.8	-20.86	44.57	23.71	234.96	H
512	1850.2	-17.44	46.39	28.95	785.24	V
661	1880.0	-17.77	47.10	29.33	**856.64**	V
810	1909.8	-17.28	45.98	28.70	740.63	V

EDGE

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
512	1850.2	-23.78	43.83	20.05	101.16	H
661	1880.0	-23.58	43.57	19.99	99.77	H
810	1909.8	-23.27	44.57	21.30	134.90	H
512	1850.2	-20.49	46.39	25.90	389.05	V
661	1880.0	-20.65	47.10	26.45	**441.37**	V
810	1909.8	-20.17	45.98	25.81	380.72	V

WCDMA

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
9262	1852.4	-25.15	43.83	18.68	73.79	H
9400	1880.0	-25.21	43.57	18.36	68.55	H
9538	1907.6	-25.05	44.57	19.52	89.54	H
9262	1852.4	-23.19	46.39	23.20	208.93	V
9400	1880.0	-23.41	47.10	23.69	**233.78**	V
9538	1907.6	-23.38	45.98	22.60	181.80	V

REMARKS: 1. EIRP Output Power (dBm) = LVL (dBm) + Correction Factor (dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18607	1850.7	-26.99	43.83	16.84	48.35	H	2
18900	1880.0	-26.04	43.57	17.53	56.62	H	2
19193	1909.3	-26.73	44.32	17.59	57.40	H	2
18607	1850.7	-23.17	46.41	23.24	210.91	V	2
18900	1880.0	-22.78	47.07	24.29	**268.53**	V	2
19193	1909.3	-23.35	45.88	22.53	179.23	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18607	1850.7	-27.86	43.83	15.97	39.57	H	2
18900	1880.0	-26.97	43.57	16.60	45.71	H	2
19193	1909.3	-27.69	44.32	16.63	46.02	H	2
18607	1850.7	-24.04	46.41	22.37	172.62	V	2
18900	1880.0	-23.71	47.07	23.36	216.77	V	2
19193	1909.3	-24.31	45.88	21.57	143.68	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18615	1851.5	-26.97	43.82	16.85	48.44	H	2
18900	1880.0	-26.10	43.57	17.47	55.85	H	2
19185	1908.5	-26.68	44.38	17.70	58.83	H	2
18615	1851.5	-23.15	46.45	23.30	213.85	V	2
18900	1880.0	-22.84	47.07	24.23	**264.85**	V	2
19185	1908.5	-23.30	45.88	22.58	181.13	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18615	1851.5	-28.04	43.82	15.78	37.86	H	2
18900	1880.0	-26.99	43.57	16.58	45.50	H	2
19185	1908.5	-27.67	44.38	16.71	46.84	H	2
18615	1851.5	-24.22	46.45	22.23	167.15	V	2
18900	1880.0	-23.73	47.07	23.34	215.77	V	2
19185	1908.5	-24.29	45.88	21.59	144.21	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18625	1852.5	-27.03	43.83	16.80	47.84	H	2
18900	1880.0	-26.05	43.57	17.52	56.49	H	2
19175	1907.5	-26.63	44.19	17.56	56.99	H	2
18625	1852.5	-23.21	46.46	23.25	211.49	V	2
18900	1880.0	-22.79	47.07	24.28	**267.92**	V	2
19175	1907.5	-23.25	45.89	22.64	183.70	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18625	1852.5	-27.86	43.83	15.97	39.52	H	2
18900	1880.0	-27.07	43.57	16.50	44.67	H	2
19175	1907.5	-27.73	44.19	16.46	44.24	H	2
18625	1852.5	-24.04	46.46	22.42	174.70	V	2
18900	1880.0	-23.81	47.07	23.26	211.84	V	2
19175	1907.5	-24.35	45.89	21.54	142.59	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18650	1855.0	-26.84	43.86	17.02	50.36	H	2
18900	1880.0	-13.20	43.57	30.37	1088.93	H	2
19150	1905.0	-26.50	43.99	17.49	56.16	H	2
18650	1855.0	-23.02	46.28	23.26	211.74	V	2
18900	1880.0	-22.73	47.07	24.34	**271.64**	V	2
19150	1905.0	-23.12	45.92	22.80	190.63	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18650	1855.0	-27.99	43.86	15.87	38.65	H	2
18900	1880.0	-27.09	43.57	16.48	44.46	H	2
19150	1905.0	-27.66	43.99	16.33	42.99	H	2
18650	1855.0	-24.17	46.28	22.11	162.48	V	2
18900	1880.0	-23.83	47.07	23.24	210.86	V	2
19150	1905.0	-24.28	45.92	21.64	145.95	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18675	1857.5	-26.85	43.99	17.14	51.78	H	2
18900	1880.0	-26.06	43.57	17.51	56.36	H	2
19125	1902.5	-26.57	43.66	17.09	51.11	H	2
18675	1857.5	-23.03	45.93	22.90	194.85	V	2
18900	1880.0	-22.80	47.07	24.27	**267.30**	V	2
19125	1902.5	-23.19	46.20	23.01	200.08	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18675	1857.5	-27.71	43.99	16.28	42.48	H	2
18900	1880.0	-26.93	43.57	16.64	46.13	H	2
19125	1902.5	-27.42	43.66	16.24	42.02	H	2
18675	1857.5	-23.89	45.93	22.04	159.85	V	2
18900	1880.0	-23.67	47.07	23.40	218.78	V	2
19125	1902.5	-24.04	46.20	22.16	164.51	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18700	1860.0	-27.43	43.50	16.07	40.45	H	2
18900	1880.0	-26.51	43.57	17.06	50.82	H	2
19100	1900.0	-27.15	43.62	16.47	44.32	H	2
18700	1860.0	-23.61	45.57	21.96	157.04	V	2
18900	1880.0	-23.25	47.07	23.82	**240.99**	V	2
19100	1900.0	-23.77	46.26	22.49	177.46	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	LIMIT (W)
18700	1860.0	-28.36	43.50	15.14	32.65	H	2
18900	1880.0	-27.58	43.57	15.99	39.72	H	2
19100	1900.0	-27.98	43.62	15.64	36.61	H	2
18700	1860.0	-24.54	45.57	21.03	126.77	V	2
18900	1880.0	-24.32	47.07	22.75	188.36	V	2
19100	1900.0	-24.60	46.26	21.66	146.59	V	2

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.2.2 Test Procedure

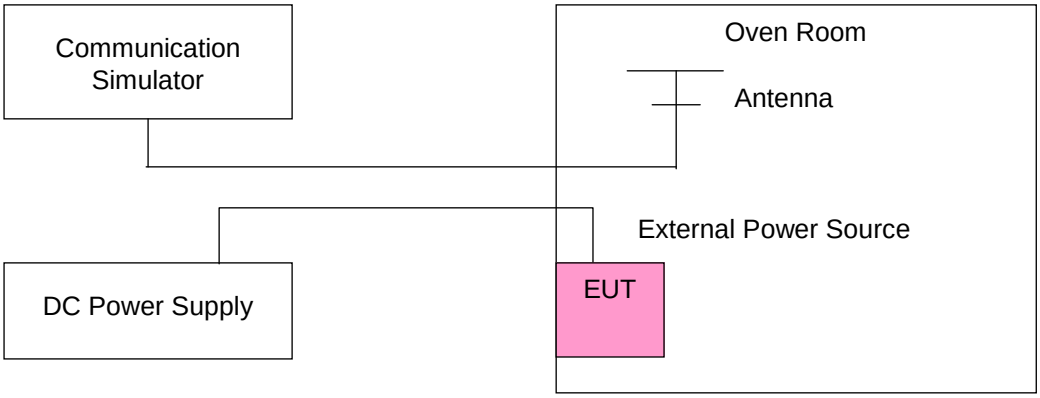
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 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

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)			LIMIT (ppm)
	GSM	EDGE	WCDMA	
3.8	0.0013	0.0014	0.0014	2.5
3.6	-0.0016	-0.0017	-0.0018	2.5
4.2	-0.0013	-0.0015	-0.0014	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	FREQUENCY ERROR (ppm)			LIMIT (ppm)
	GSM	EDGE	WCDMA	
-30	-0.0059	-0.0054	-0.0057	2.5
-20	-0.0053	-0.0048	-0.0051	2.5
-10	-0.0046	-0.0040	-0.0044	2.5
0	-0.0039	-0.0036	-0.0037	2.5
10	-0.0032	-0.0028	-0.0031	2.5
20	-0.0024	-0.0022	-0.0023	2.5
30	-0.0017	-0.0013	-0.0016	2.5
40	-0.0011	-0.0007	-0.0011	2.5
50	-0.0003	-0.0001	-0.0003	2.5
60	0.0002	0.0004	0.0003	2.5

LTE BAND 2

AFC FREQUENCY ERROR vs. VOLTAGE							
VOLTAGE (Volts)	FREQUENCY ERROR (ppm)						LIMIT (ppm)
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz	
3.8	0.0029	0.0025	0.0038	0.0031	0.0035	0.0027	2.5
3.6	-0.0035	-0.0038	-0.0047	-0.0038	-0.0042	-0.0035	2.5
4.2	-0.0031	-0.0034	-0.0041	-0.0035	-0.0037	-0.0030	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

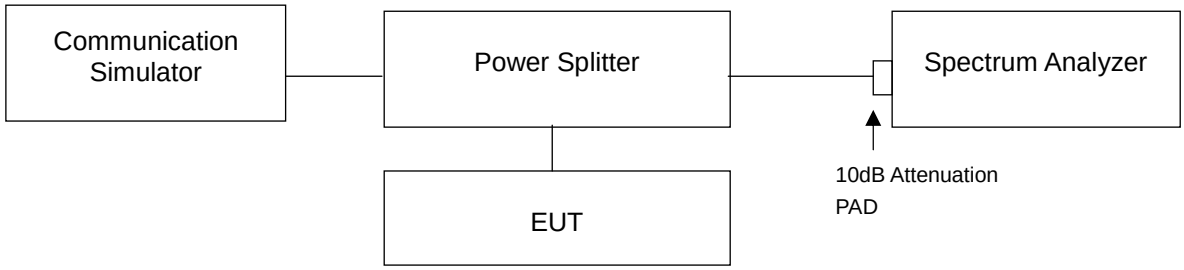
AFC FREQUENCY ERROR vs. TEMPERATURE							
TEMP. (℃)	FREQUENCY ERROR (ppm)						LIMIT (ppm)
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz	
-30	-0.0059	-0.0057	-0.0059	-0.0058	-0.0060	-0.0057	2.5
-20	-0.0053	-0.0049	-0.0054	-0.0051	-0.0055	-0.0049	2.5
-10	-0.0045	-0.0043	-0.0046	-0.0046	-0.0048	-0.0043	2.5
0	-0.0038	-0.0036	-0.0039	-0.0038	-0.0040	-0.0036	2.5
10	-0.0030	-0.0029	-0.0032	-0.0031	-0.0033	-0.0029	2.5
20	-0.0023	-0.0022	-0.0026	-0.0023	-0.0025	-0.0022	2.5
30	-0.0017	-0.0015	-0.0018	-0.0017	-0.0019	-0.0014	2.5
40	-0.0010	-0.0008	-0.0013	-0.0010	-0.0011	-0.0008	2.5
50	-0.0003	-0.0002	-0.0005	-0.0003	-0.0002	-0.0001	2.5
60	0.0004	0.0004	0.0002	0.0004	0.0004	0.0004	2.5

4.3 Occupied Bandwidth Measurement

4.3.1 Test Procedure

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

4.3.2 Test Setup

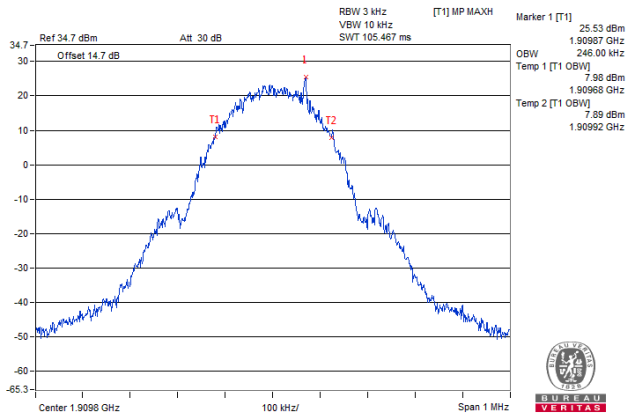


4.3.3 Test Result

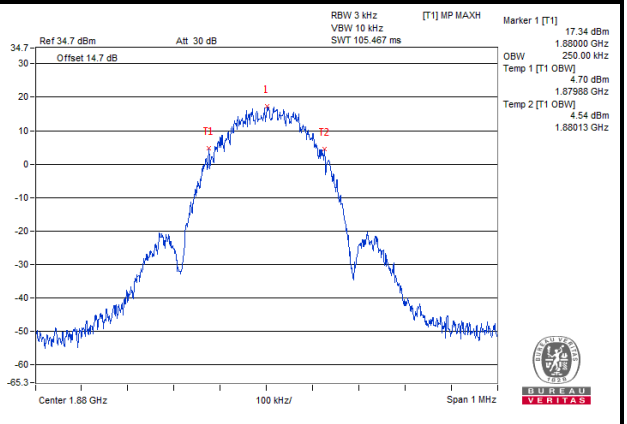
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)		CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)
		GSM	EDGE			WCDMA
512	1850.2	242.00	247.00	9262	1852.4	4.16
661	1880.0	243.00	250.00	9400	1880.0	4.18
810	1909.8	246.00	243.00	9538	1907.6	4.15

SPECTRUM PLOT OF WORST VALUE

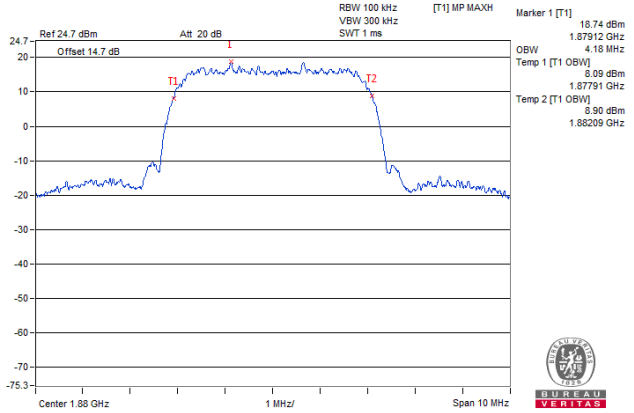
GSM



EDGE



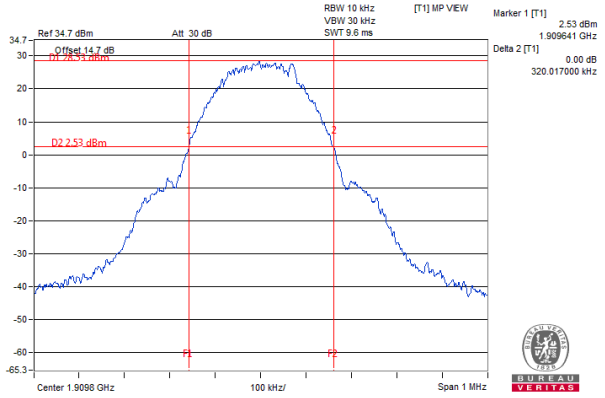
WCDMA



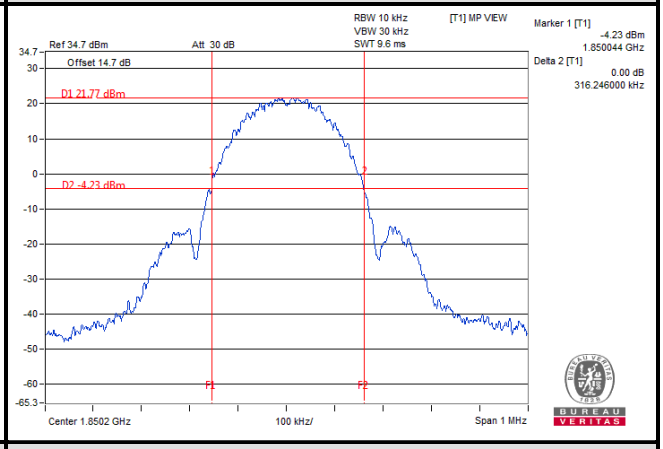
CHANNEL	FREQUENCY (MHz)	26dB BANDWIDTH (kHz)		CHANNEL	FREQUENCY (MHz)	26dB BANDWIDTH (MHz)
		GSM	EDGE			WCDMA
512	1850.2	319.67	316.25	9262	1852.4	4.71
661	1880.0	315.03	303.78	9400	1880.0	4.72
810	1909.8	320.02	314.59	9538	1907.6	4.74

SPECTRUM PLOT OF WORST VALUE

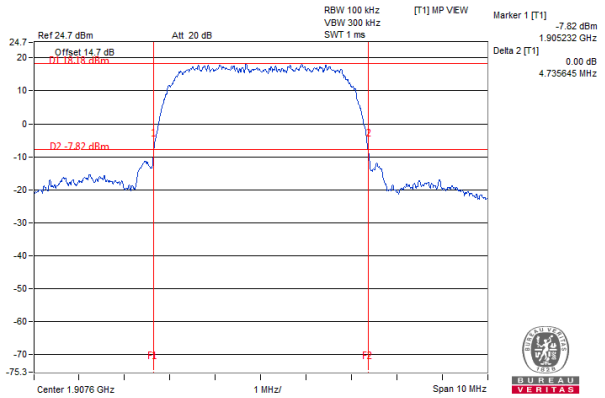
GSM



EDGE



WCDMA

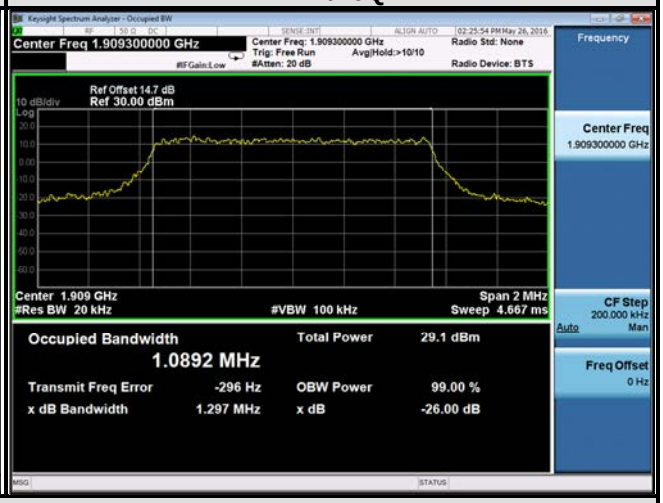


LTE band 2							
Channel Bandwidth : 1.4MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	1.09	1.09	18607	1850.7	1.26	1.26
18900	1880	1.09	1.09	18900	1880	1.26	1.28
19193	1909.3	1.09	1.09	19193	1909.3	1.28	1.30

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

1.4MHz/QPSK

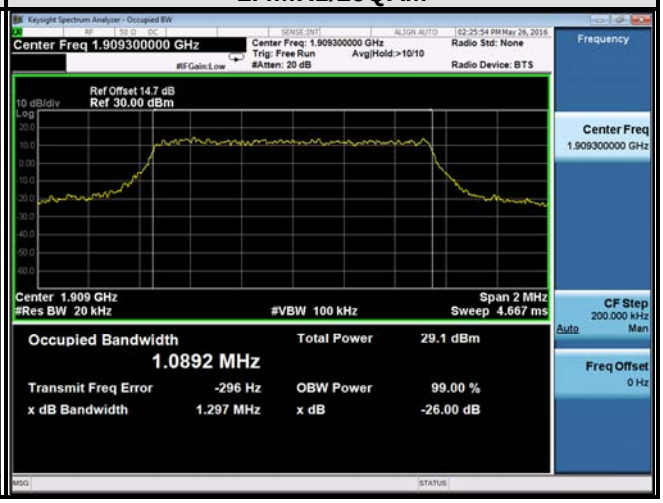
1.4MHz/16QAM



SPECTRUM PLOT OF WORST VALUE of 26dB Bandwidth

1.4MHz/QPSK

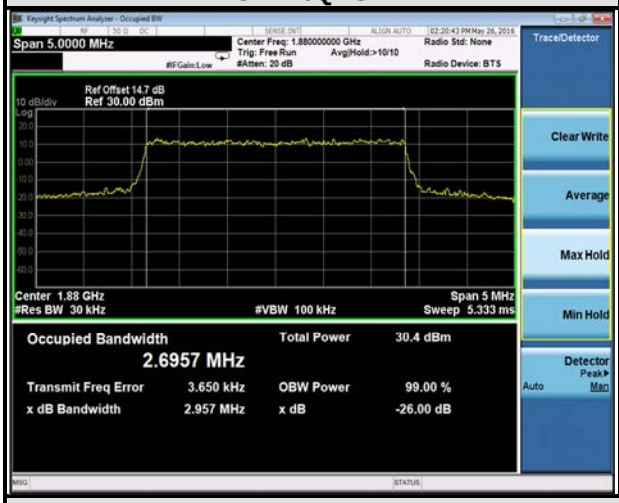
1.4MHz/16QAM



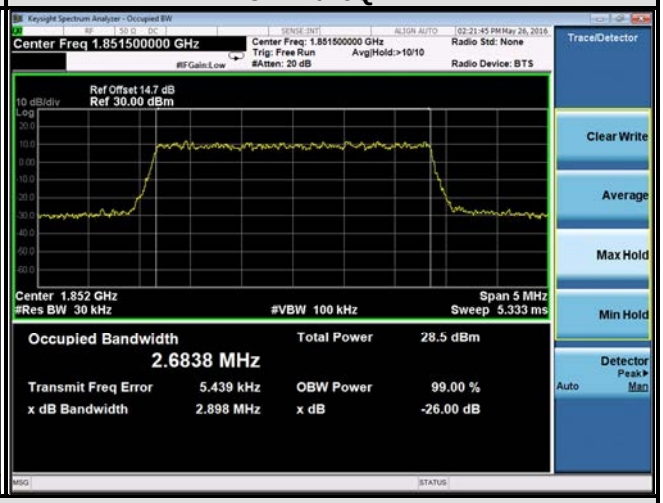
LTE band 2							
Channel Bandwidth : 3MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18615	1851.5	2.69	2.68	18615	1851.5	2.93	2.90
18900	1880	2.70	2.68	18900	1880	2.96	2.93
19185	1908.5	2.69	2.68	19185	1908.5	2.94	2.92

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

3MHz/QPSK

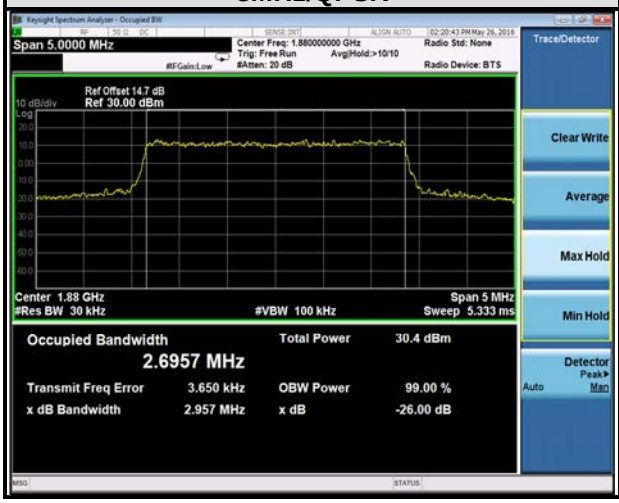


3MHz/16QAM

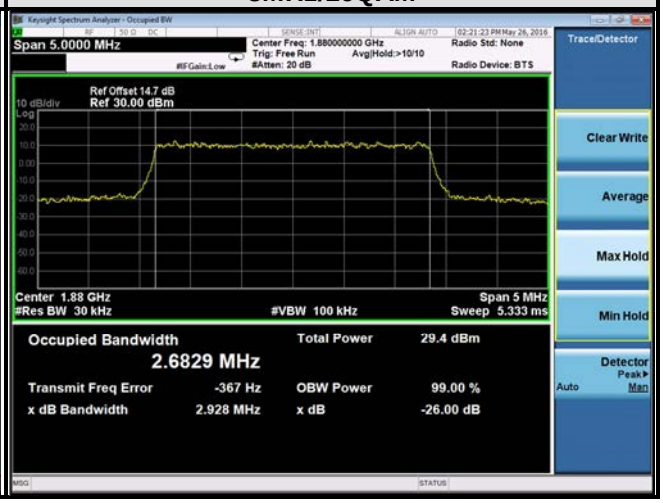


SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

3MHz/QPSK



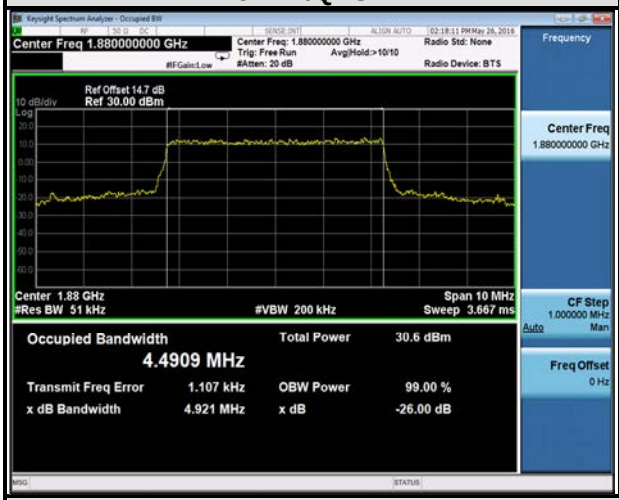
3MHz/16QAM



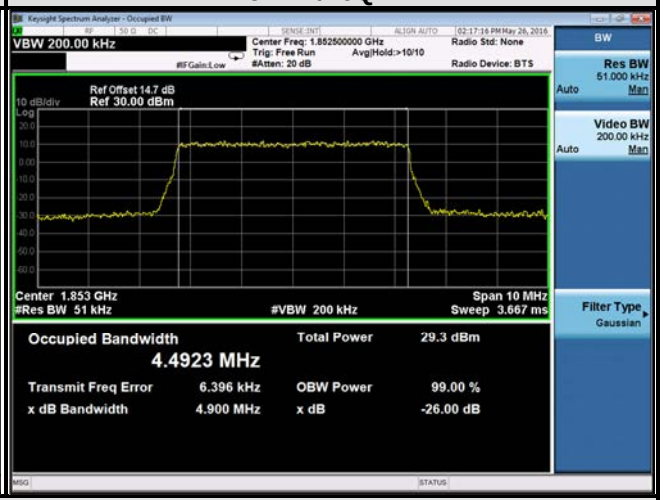
LTE band 2							
Channel Bandwidth : 5 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	4.49	4.49	18625	1852.5	4.92	4.90
18900	1880	4.49	4.48	18900	1880	4.92	4.91
19175	1907.5	4.48	4.48	19175	1907.5	4.92	4.88

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

5MHz/QPSK



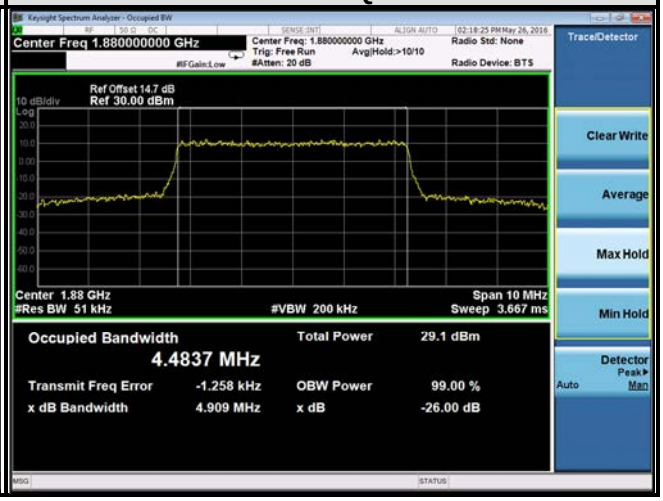
5MHz/16QAM



SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

5MHz/QPSK

5MHz/16QAM

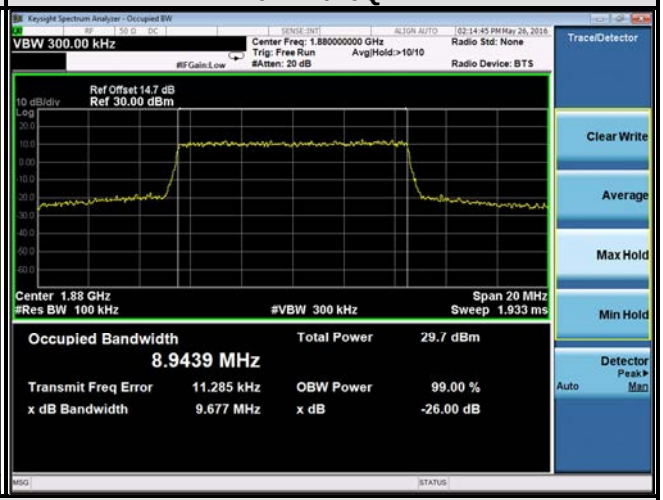


LTE band 2							
Channel Bandwidth : 10 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18650	1855	8.94	8.93	18650	1855	9.68	9.65
18900	1880	8.96	8.94	18900	1880	9.75	9.68
19150	1905	8.95	8.94	19150	1905	9.71	9.69

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

10MHz/QPSK

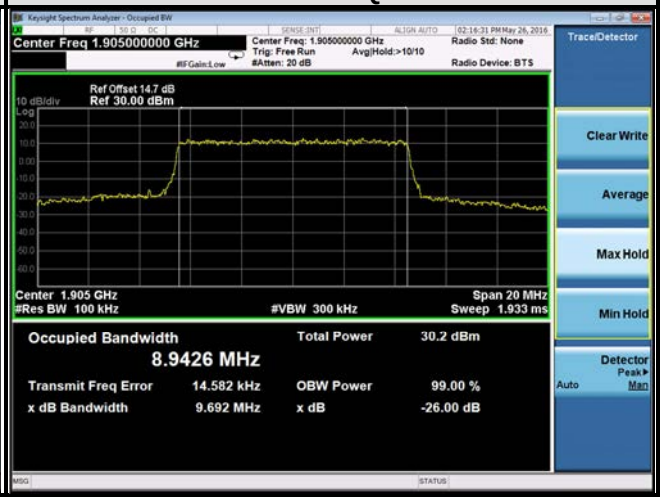
10MHz/16QAM



SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

10MHz/QPSK

10MHz/16QAM

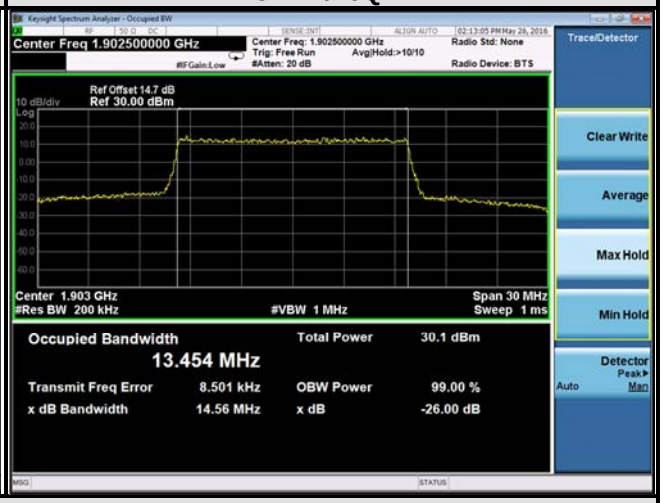


LTE band 2							
Channel Bandwidth : 15 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	13.42	13.43	18675	1857.5	14.58	14.52
18900	1880	13.43	13.42	18900	1880	14.53	14.53
19125	1902.5	13.45	13.45	19125	1902.5	14.45	14.56

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

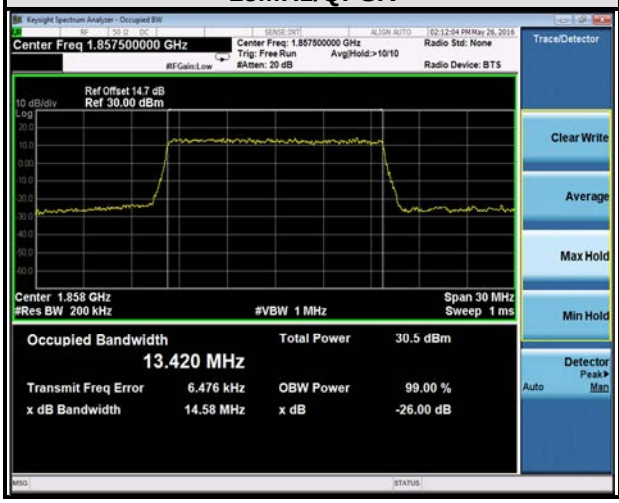
15MHz/QPSK

15MHz/16QAM

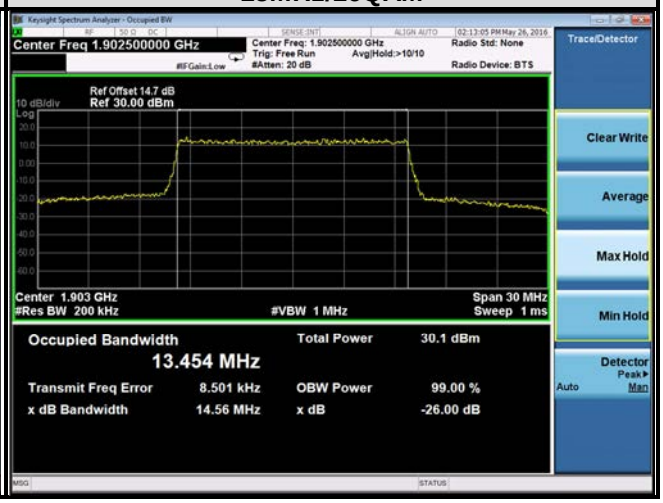


SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

15MHz/QPSK



15MHz/16QAM



LTE band 2							
Channel Bandwidth : 20 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
18700	1860	17.93	17.86	18700	1860	19.35	19.00
18900	1880	17.92	17.87	18900	1880	19.08	19.08
19100	1900	17.93	17.88	19100	1900	19.22	19.08

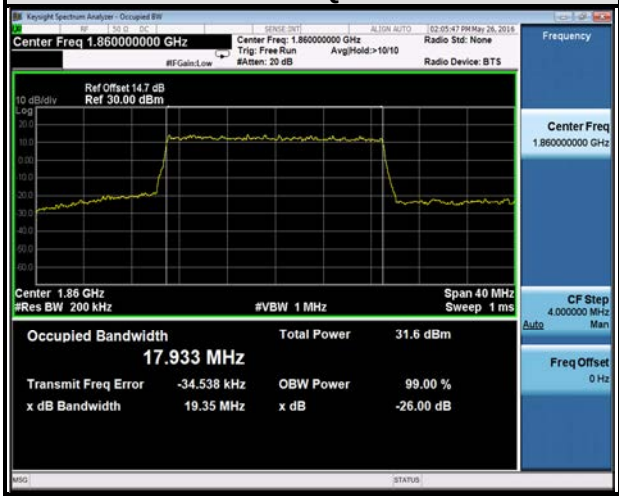
SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

20MHz/QPSK

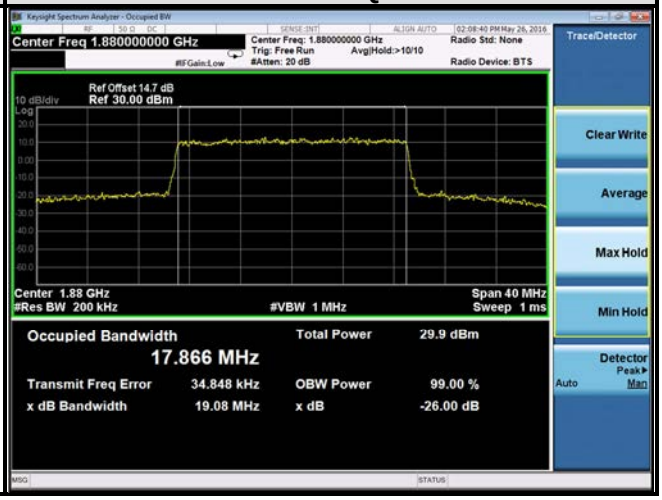
20MHz/16QAM

SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

20MHz/QPSK



20MHz/16QAM

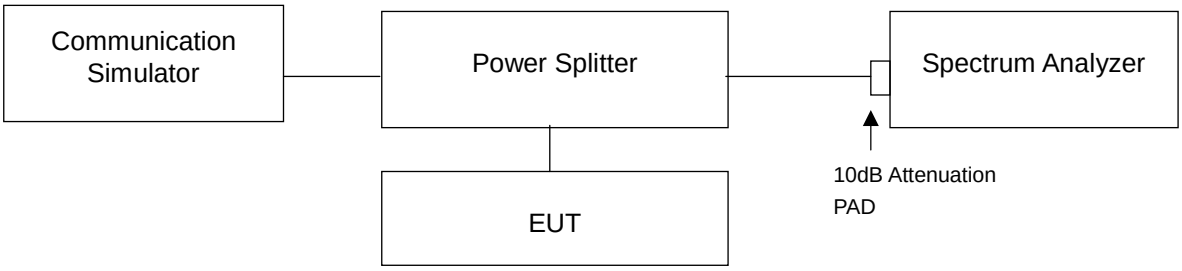


4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4.4.2 Test Setup



4.4.3 Test Procedures

a. All measurements were done at low and high operational frequency range.

b. The center frequency of spectrum is the band edge frequency and span is 1.5MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz (GSM/ GPRS/EDGE).

c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (WCDMA).

d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 20kHz and VB of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz)

e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz. (LTE bandwidth 3MHz)

f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 50kHz and VB of the spectrum is 200kHz. (LTE bandwidth 5MHz)

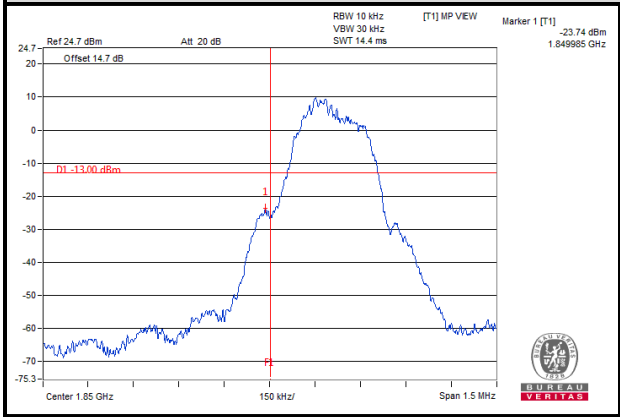
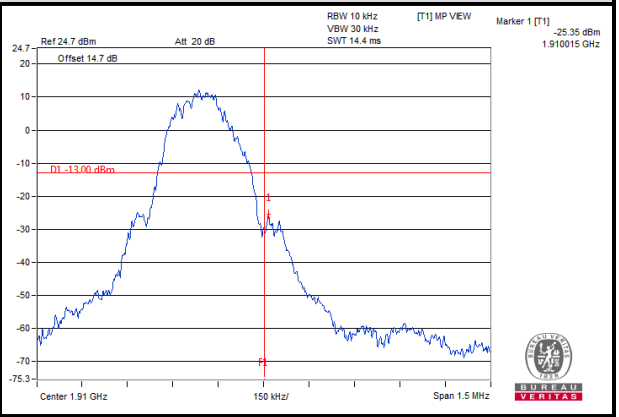
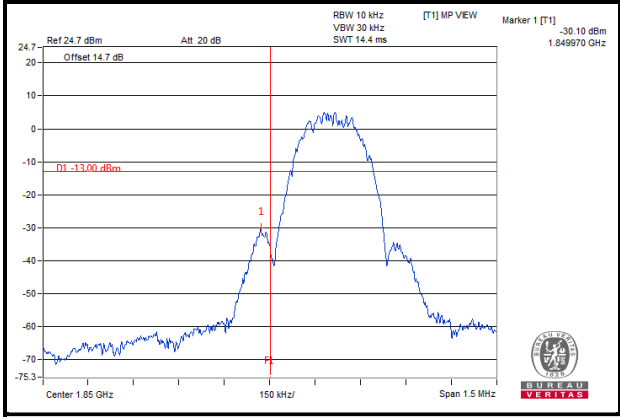
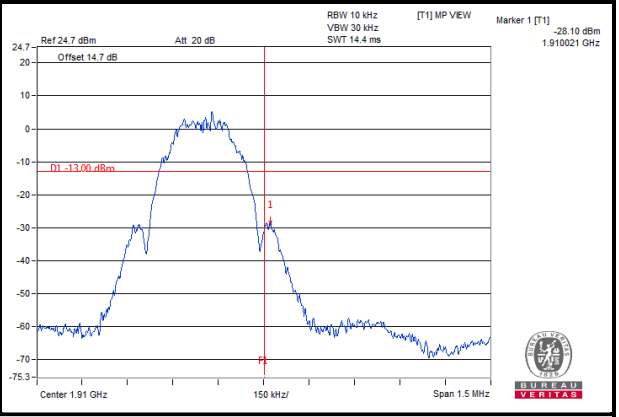
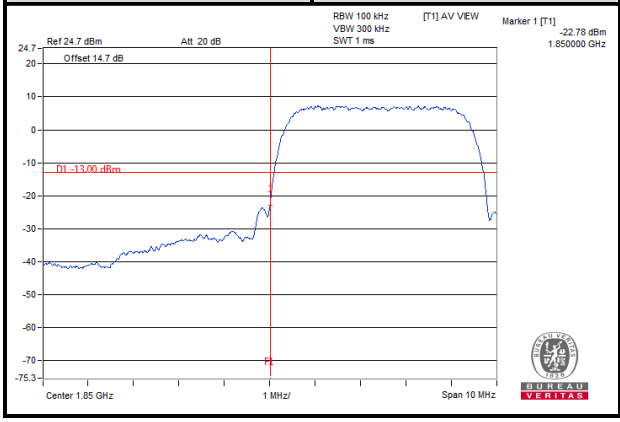
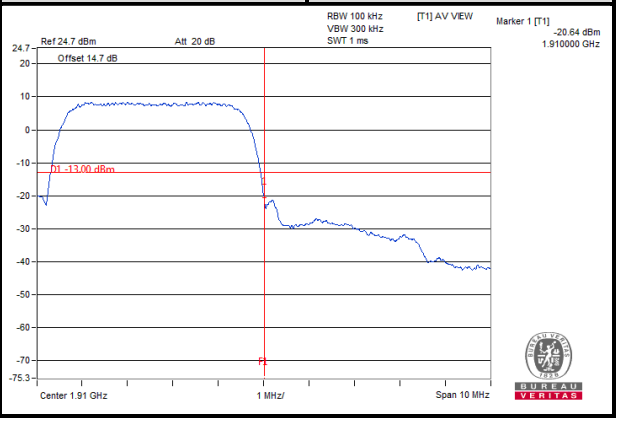
g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz. (LTE bandwidth 10MHz)

h. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz. (LTE bandwidth 15MHz)

i. he center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz. (LTE bandwidth 20MHz)

j. Record the max trace plot into the test report.

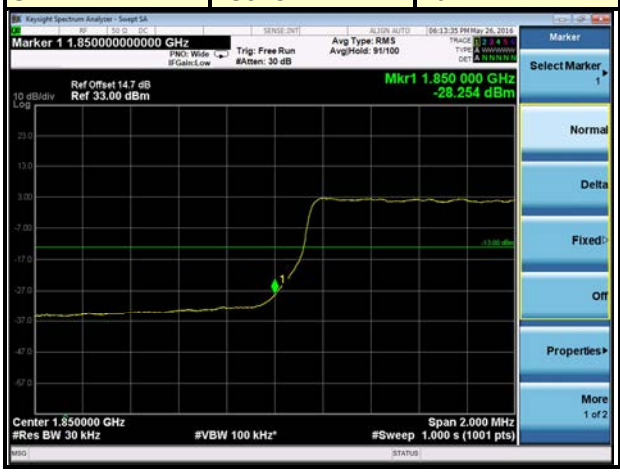
4.4.4 Test Results

GSM			
CHANNEL	512	CHANNEL	810
GSM			
			
EDGE			
CHANNEL	512	CHANNEL	810
			
WCDMA			
CHANNEL	9262	CHANNEL	9538
			

LTE BAND 2

Channel Bandwidth: 1.4MHz					
CHANNEL	18607	1 RB	CHANNEL	19193	1 RB
CHANNEL	18607	Full RB	CHANNEL	19193	Full RB

LTE BAND 2

Channel Bandwidth: 3MHz					
CHANNEL	18615	1 RB	CHANNEL	19185	1 RB
CHANNEL	18615	Full RB	CHANNEL	19185	Full RB
					

LTE BAND 2

Channel Bandwidth: 5MHz					
CHANNEL	18625	1 RB	CHANNEL	19175	1 RB
CHANNEL	18625	Full RB	CHANNEL	19175	Full RB

LTE BAND 2

Channel Bandwidth: 10MHz					
CHANNEL	18650	1 RB	CHANNEL	19150	1 RB
CHANNEL	18650	Full RB	CHANNEL	19150	Full RB

LTE BAND 2

Channel Bandwidth: 15MHz					
CHANNEL	18675	1 RB	CHANNEL	19125	1 RB
CHANNEL	18675	Full RB	CHANNEL	19125	Full RB

LTE BAND 2

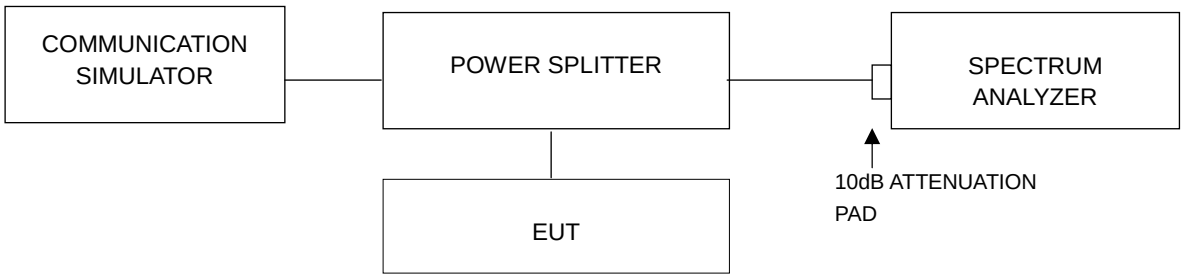
Channel Bandwidth: 20MHz					
CHANNEL	18700	1 RB	CHANNEL	19100	1 RB
CHANNEL	18700	Full RB	CHANNEL	19100	Full RB

4.5 Peak To Average Ratio

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

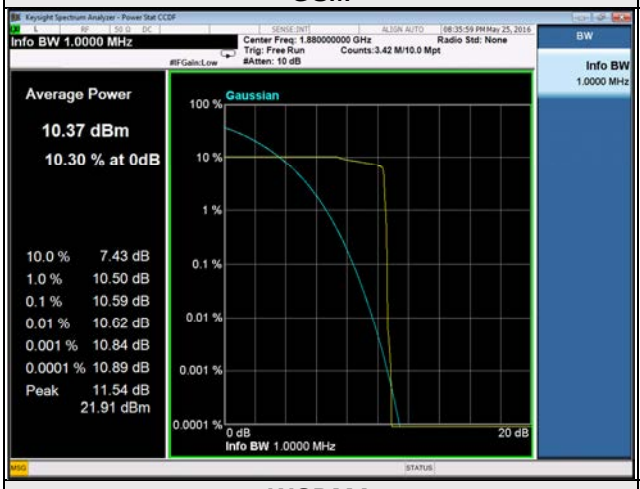
1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 Test Results

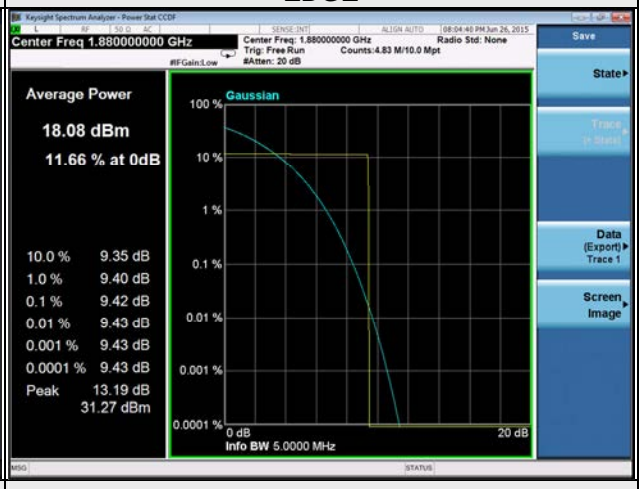
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		Channel	Frequency (MHz)	Peak To Average Ratio (dB)
		GSM	EDGE			WCDMA
661	1880.0	10.59	9.42	9400	1880.0	3.58

SPECTRUM PLOT OF WORST VALUE

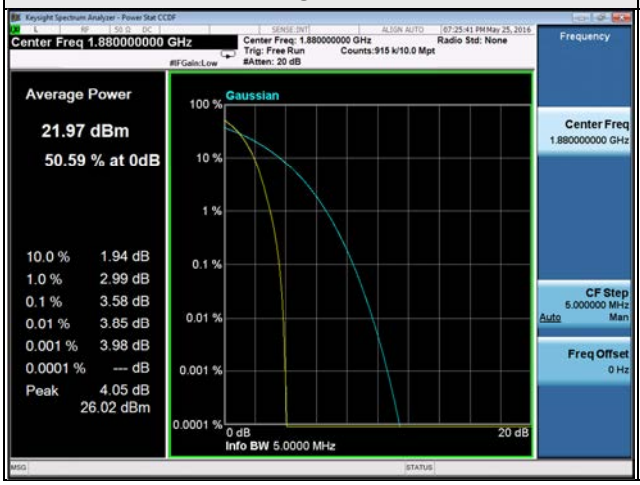
GSM



EDGE



WCDMA

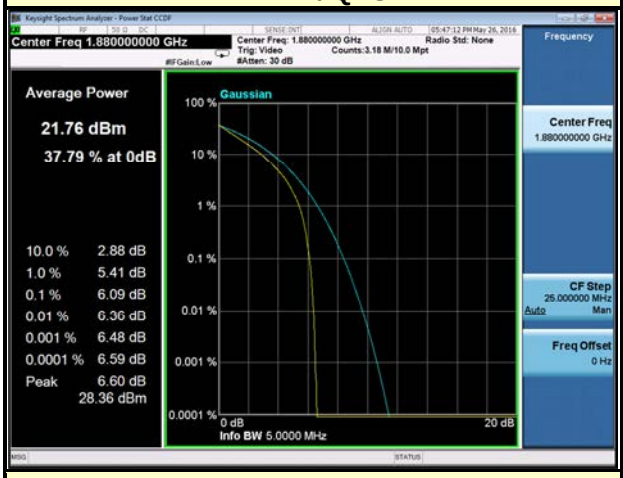


LTE BAND 2

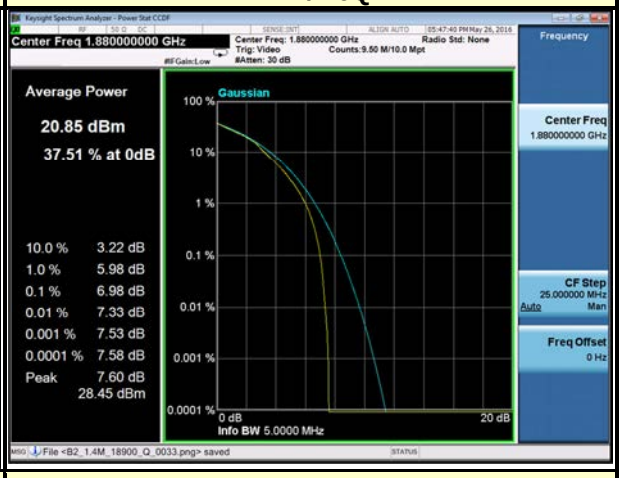
CHANNEL BANDWIDTH: 1.4MHz				CHANNEL BANDWIDTH: 3MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	5.58	6.25	18615	1851.5	5.63	6.40
18900	1880	6.09	6.98	18900	1880	6.28	7.09
19193	1909.3	5.50	6.33	19185	1908.5	5.72	6.54

SPECTRUM PLOT OF WORST VALUE

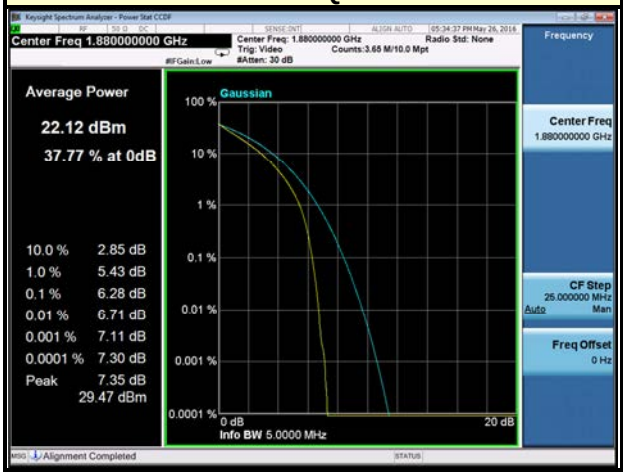
1.4MHz / QPSK



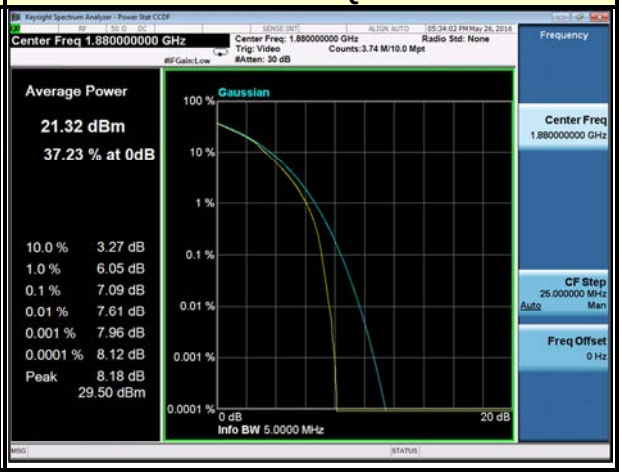
1.4MHz / 16QAM



3MHz / QPSK



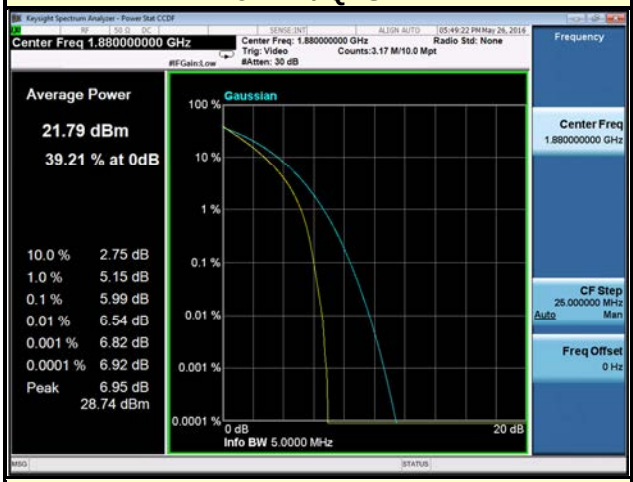
3MHz / 16QAM



CHANNEL BANDWIDTH: 5MHz				CHANNEL BANDWIDTH: 10MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	5.46	6.31	18650	1855	5.20	6.03
18900	1880	5.99	6.88	18900	1880	5.33	6.27
19175	1907.5	5.64	6.57	19150	1905	5.58	6.86

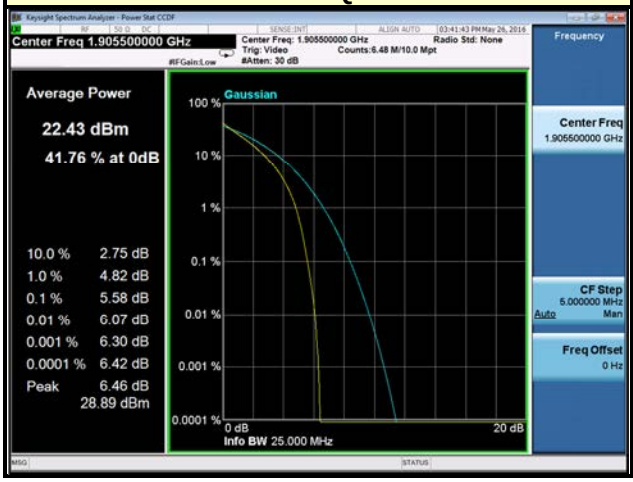
SPECTRUM PLOT OF WORST VALUE

5MHz / QPSK



5MHz / 16QAM

10MHz / QPSK

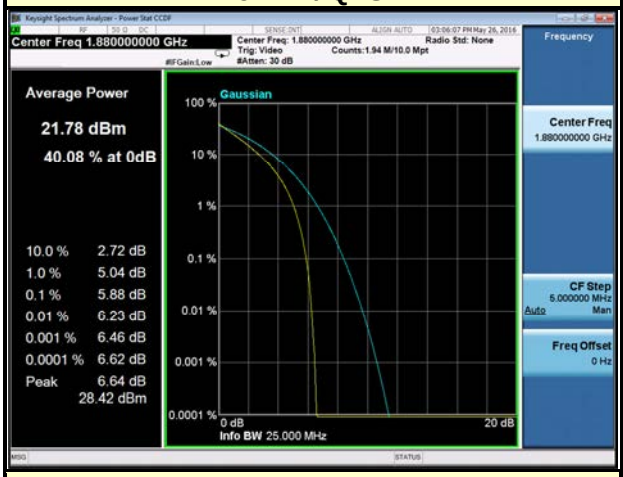


10MHz / 16QAM

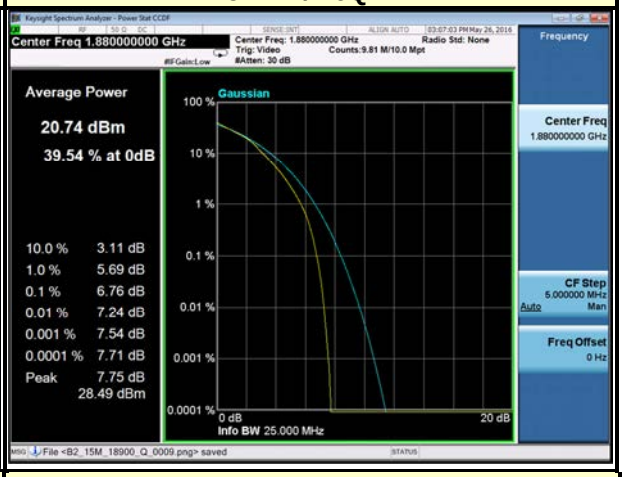
CHANNEL BANDWIDTH: 15MHz				CHANNEL BANDWIDTH: 20MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	5.41	6.14	18700	1860	5.50	6.28
18900	1880	5.88	6.76	18900	1880	5.67	6.55
19125	1902.5	5.61	6.48	19100	1900	5.55	6.35

SPECTRUM PLOT OF WORST VALUE

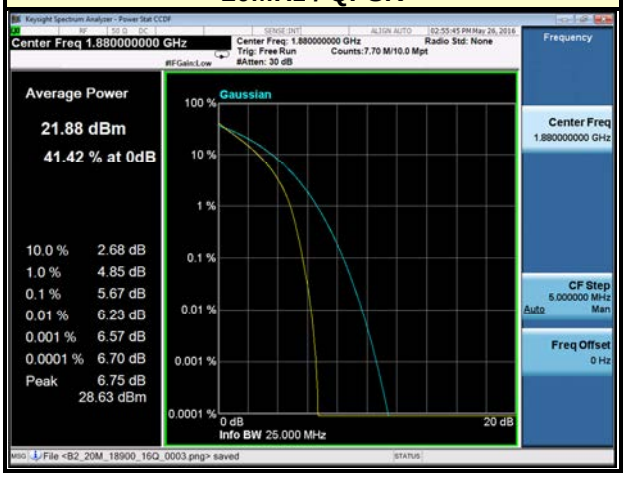
15MHz / QPSK



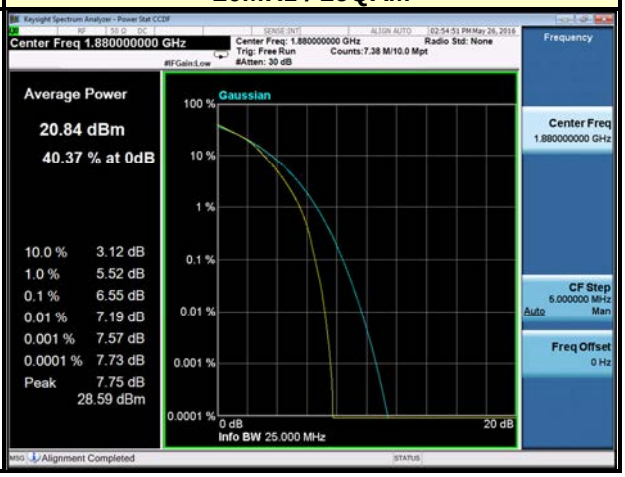
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

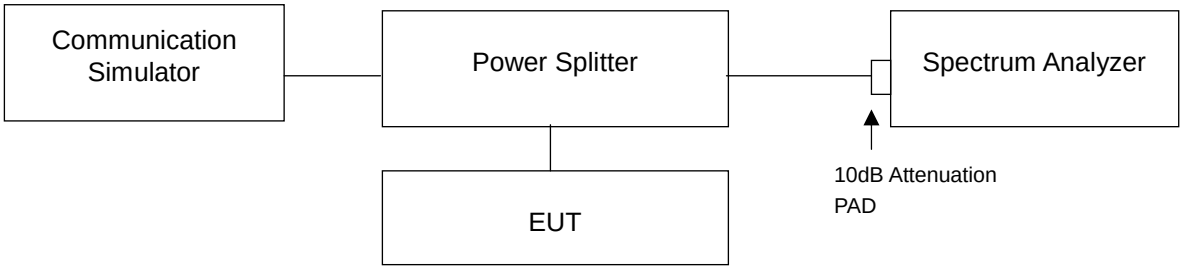


4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

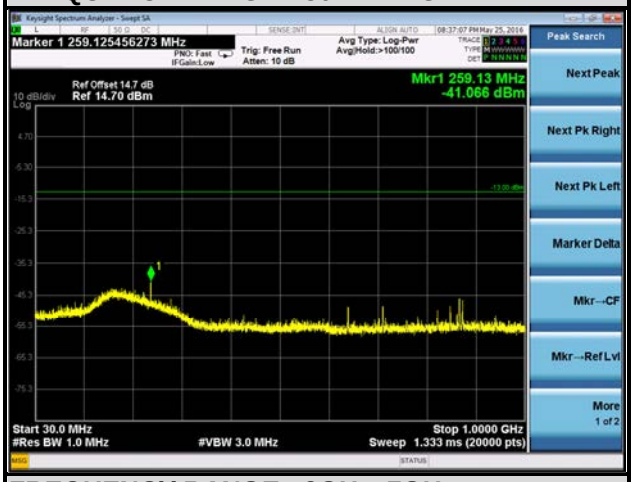
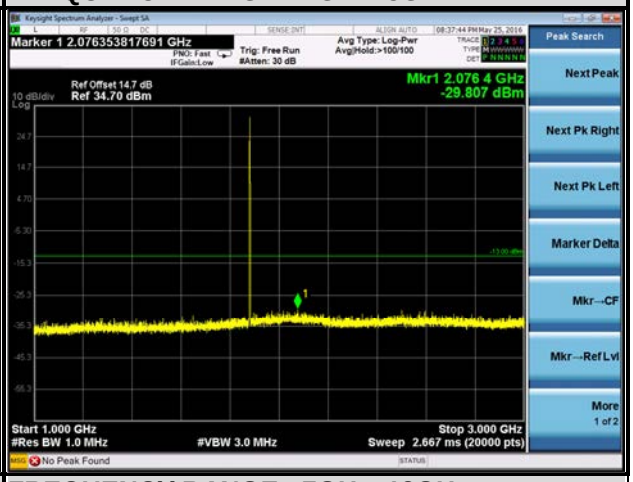
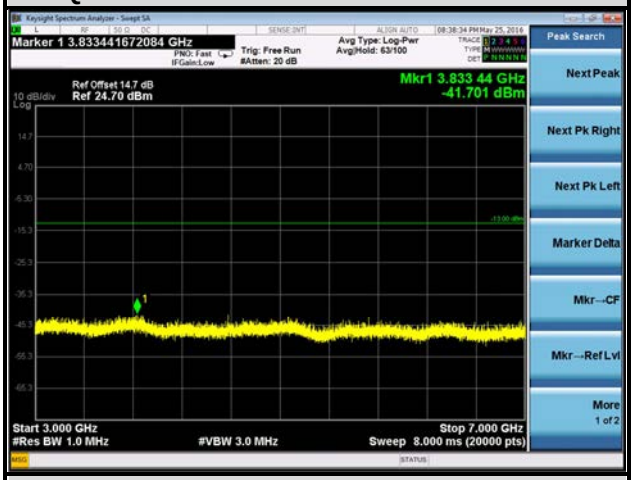
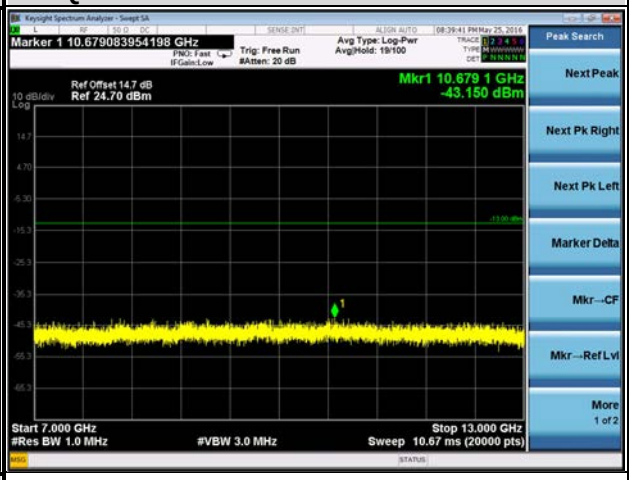
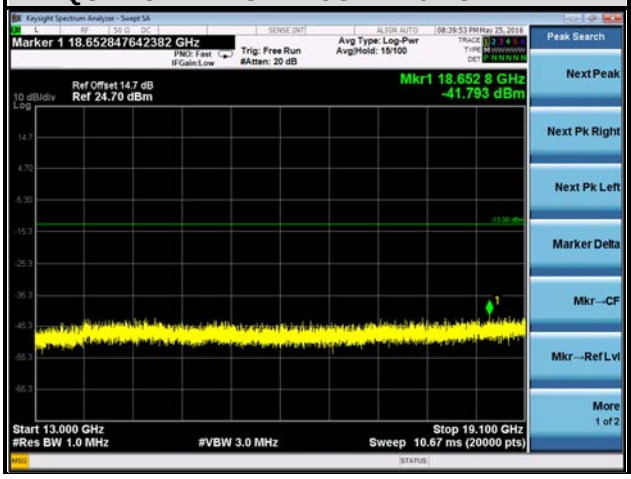
4.6.2 Test Setup



4.6.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9 kHz to 19.1GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

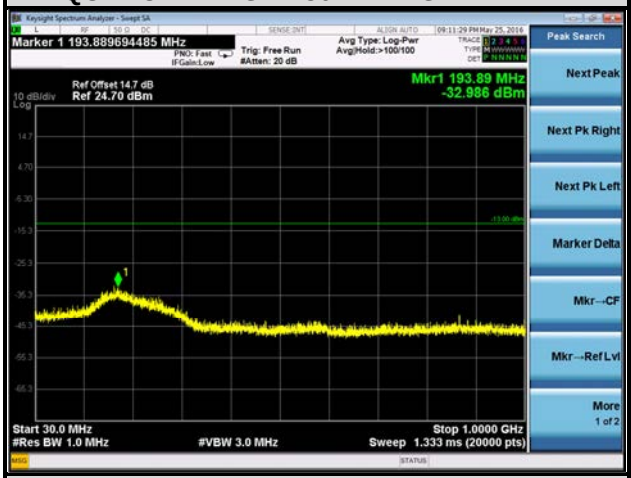
4.6.4 Test Results

GSM	
CHANNEL 661	
FREQUENCY RANGE : 30MHz~1GHz	FREQUENCY RANGE : 1GHz~3GHz
	
FREQUENCY RANGE : 3GHz~7GHz	FREQUENCY RANGE : 7GHz~13GHz
	
FREQUENCY RANGE : 13GHz~19.1GHz	
	

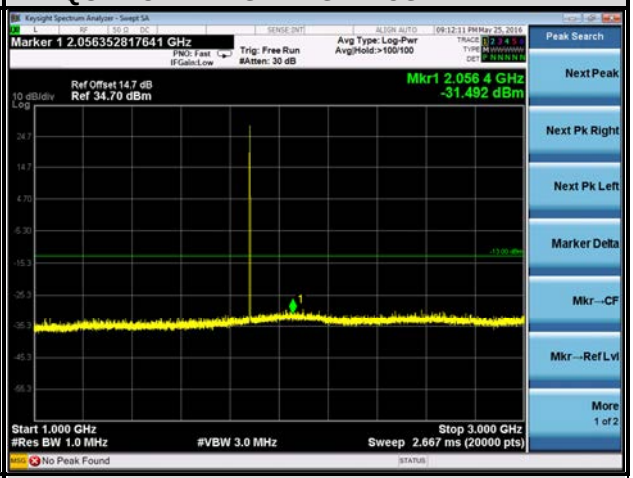
EDGE

CHANNEL 512

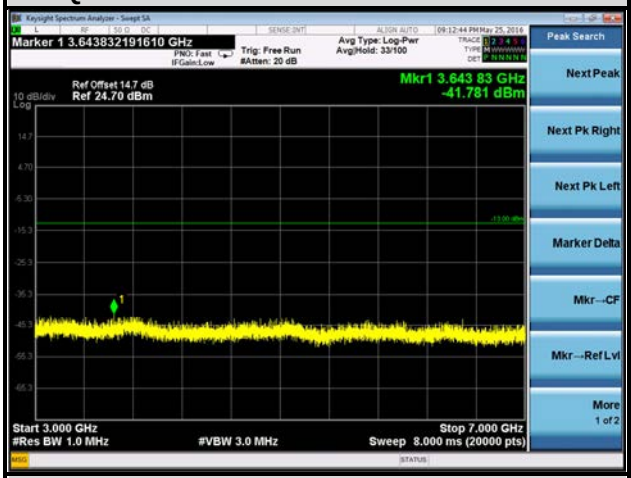
FREQUENCY RANGE : 30MHz~1GHz



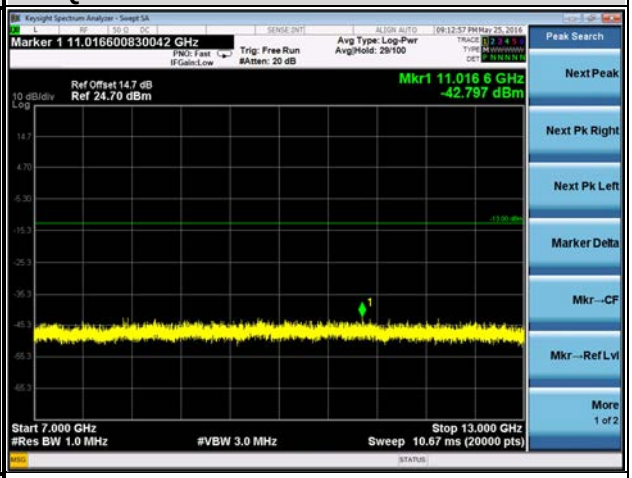
FREQUENCY RANGE : 1GHz~3GHz



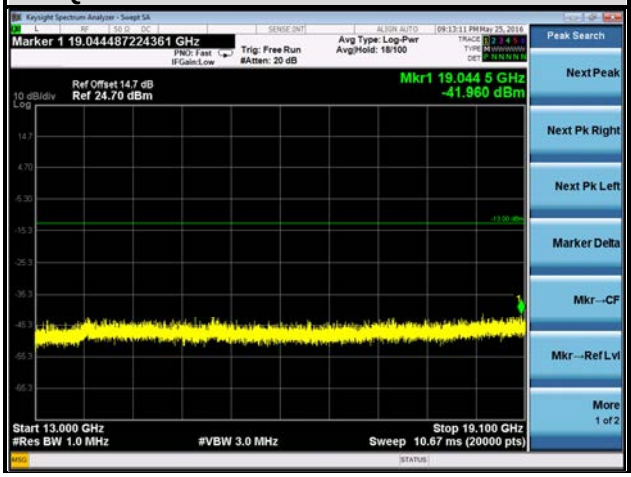
FREQUENCY RANGE : 3GHz~7GHz



FREQUENCY RANGE : 7GHz~13GHz



FREQUENCY RANGE : 13GHz~19.1GHz

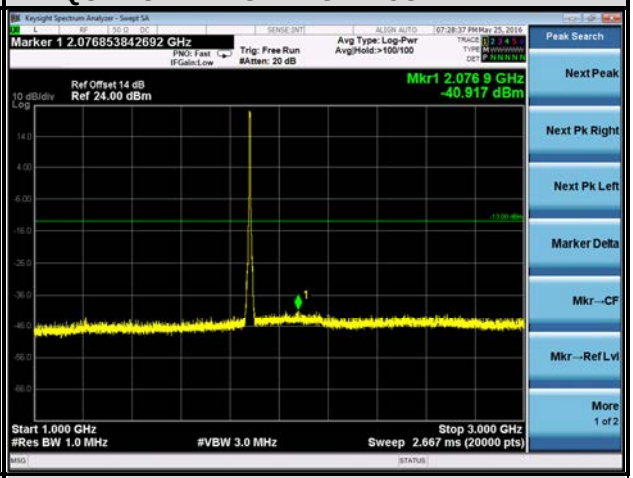


WCDMA

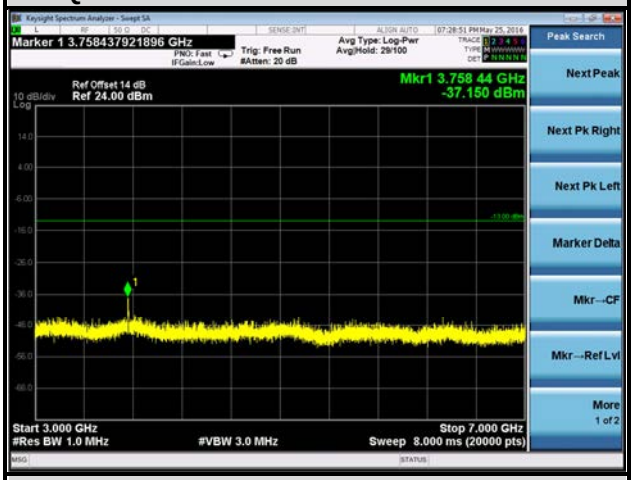
CHANNEL 9400

FREQUENCY RANGE : 30MHz~1GHz

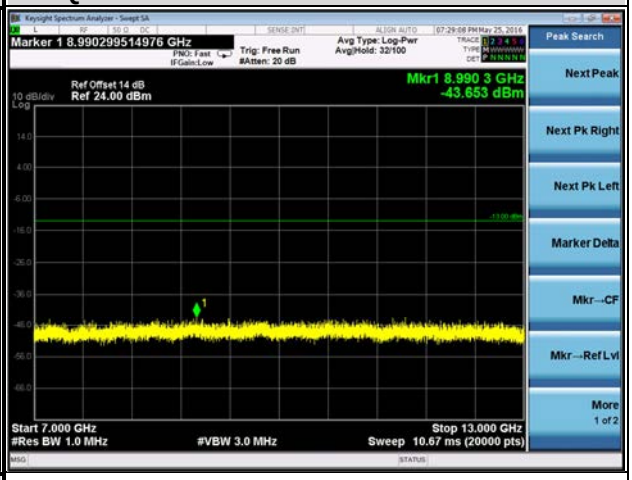
FREQUENCY RANGE : 1GHz~3GHz



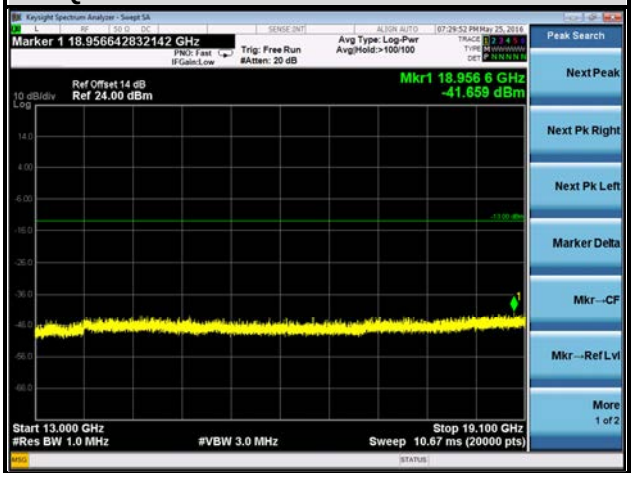
FREQUENCY RANGE : 3GHz~7GHz



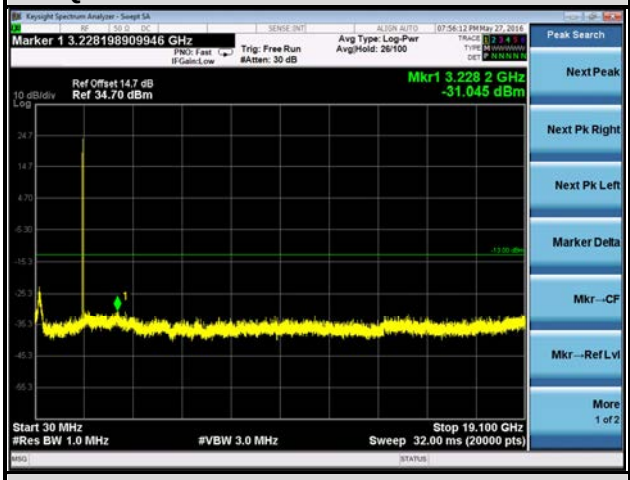
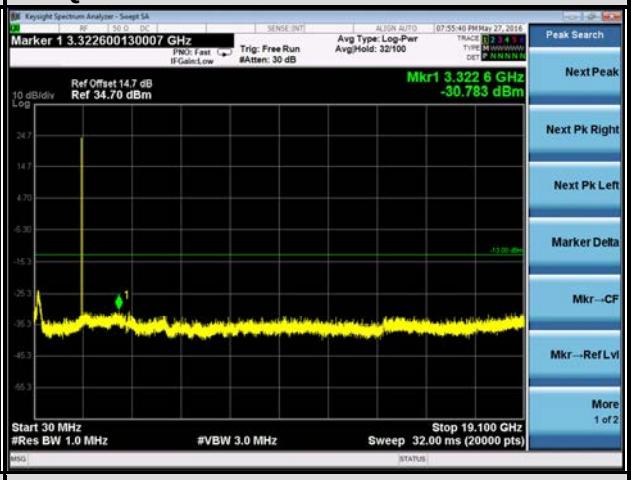
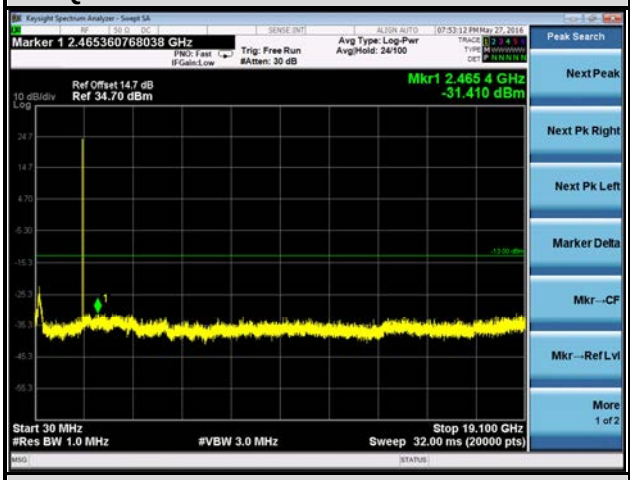
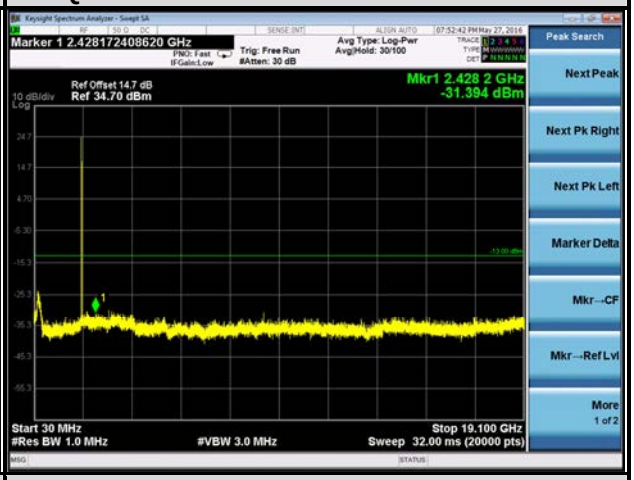
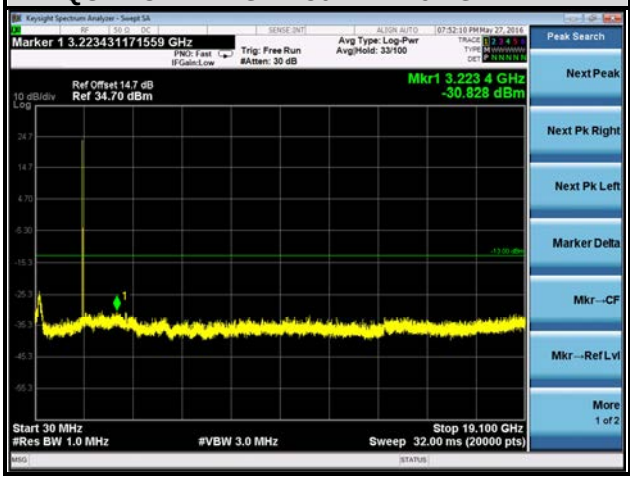
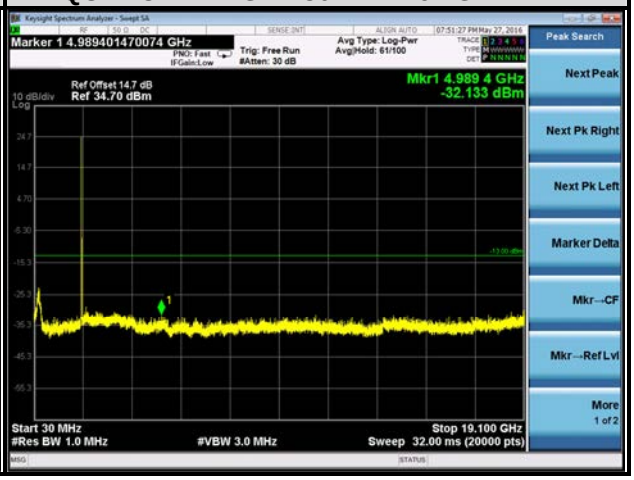
FREQUENCY RANGE : 7GHz~13GHz



FREQUENCY RANGE : 13GHz~19.1GHz



LTE BAND 2

CHANNEL 18900	CHANNEL 18900
1.4MHz / QPSK	**3MHz / QPSK**
FREQUENCY RANGE : 30MHz~19.1GHz	**FREQUENCY RANGE : 30MHz~19.1GHz**
	
CHANNEL 18900	**CHANNEL 18900**
5MHz / QPSK	**10MHz / QPSK**
FREQUENCY RANGE : 30MHz~19.1GHz	**FREQUENCY RANGE : 30MHz~19.1GHz**
	
CHANNEL 18900	**CHANNEL 18900**
15MHz / QPSK	**20MHz / QPSK**
FREQUENCY RANGE : 30MHz~19.1GHz	**FREQUENCY RANGE : 30MHz~19.1GHz**
	

4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

4.7.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

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

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

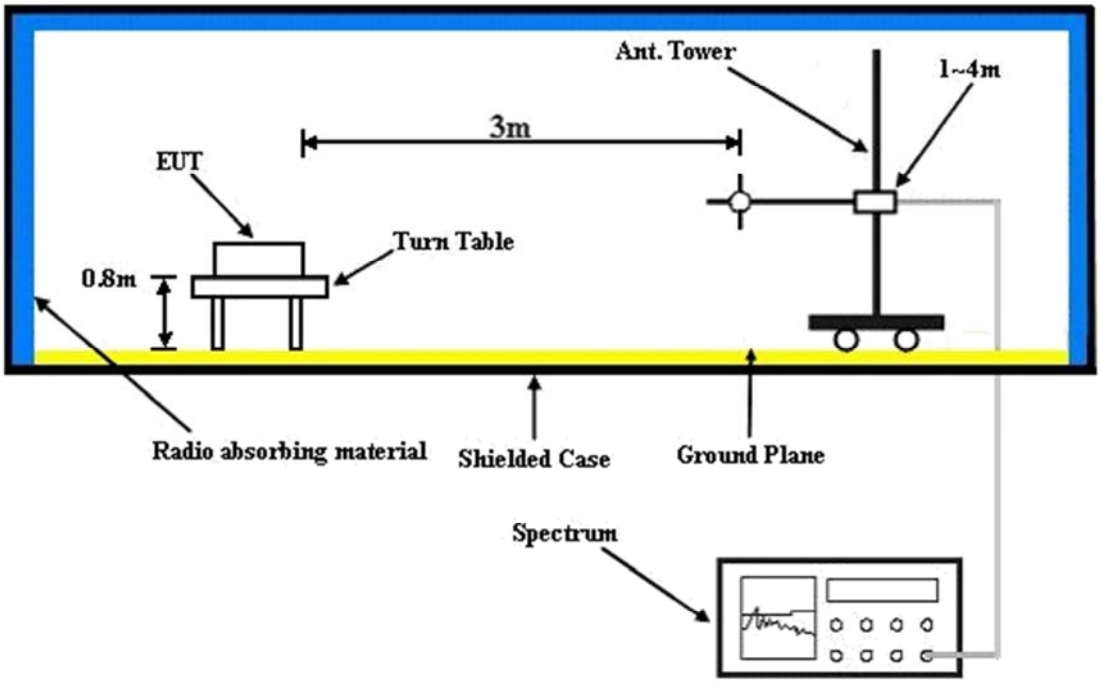
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

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

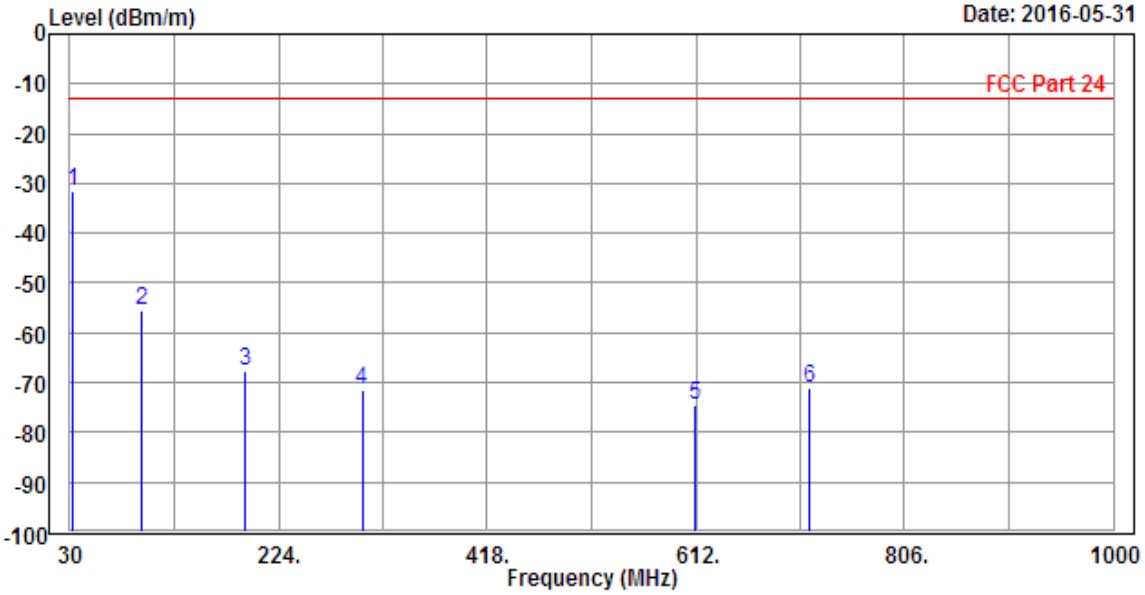


For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

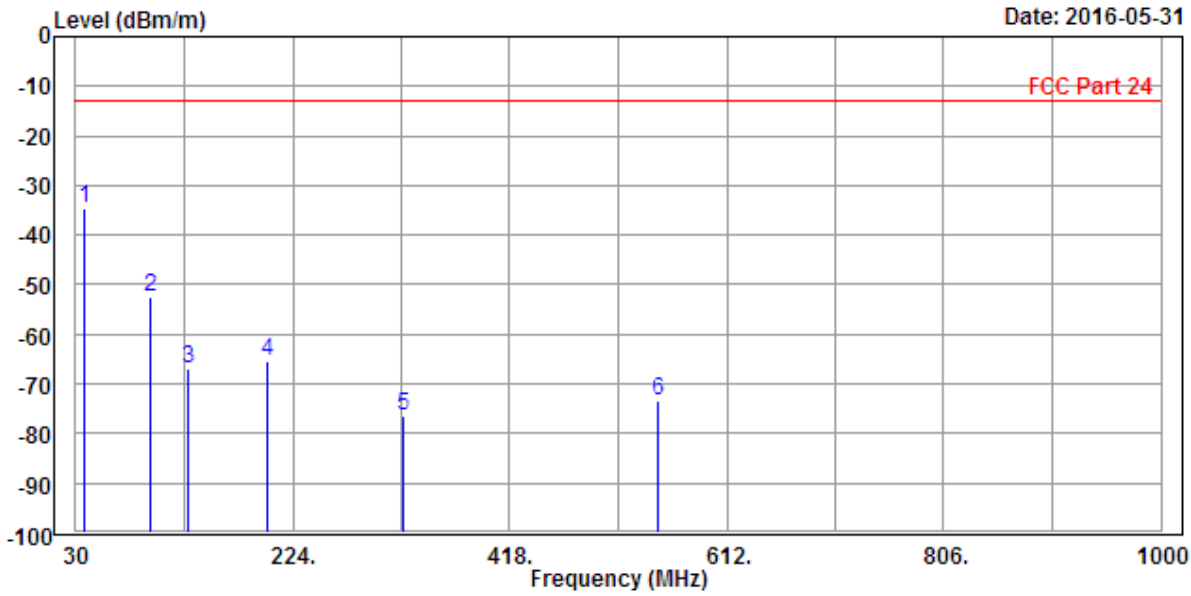
BELOW 1GHz WORST-CASE DATA

GSM 1900:




```
Condition: FCC Part 24 3m EIRP_26M-1GHz-20160505-EMC9135+3143B-FCC
EUT      : Baifone P4905
Mode     : PCS 1900
Test By  : Alex Chen
Remark   : IMEI  357288070008602
```

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	31.940	-31.56	-48.23	-13.00	-18.56	16.67	Peak	Horizontal
2		96.930	-55.66	-45.15	-13.00	-42.66	-10.51	Peak	Horizontal
3		192.960	-67.72	-50.30	-13.00	-54.72	-17.42	Peak	Horizontal
4		301.600	-71.64	-57.89	-13.00	-58.64	-13.75	Peak	Horizontal
5		611.030	-74.52	-66.19	-13.00	-61.52	-8.33	Peak	Horizontal
6		716.760	-71.12	-65.98	-13.00	-58.12	-5.14	Peak	Horizontal

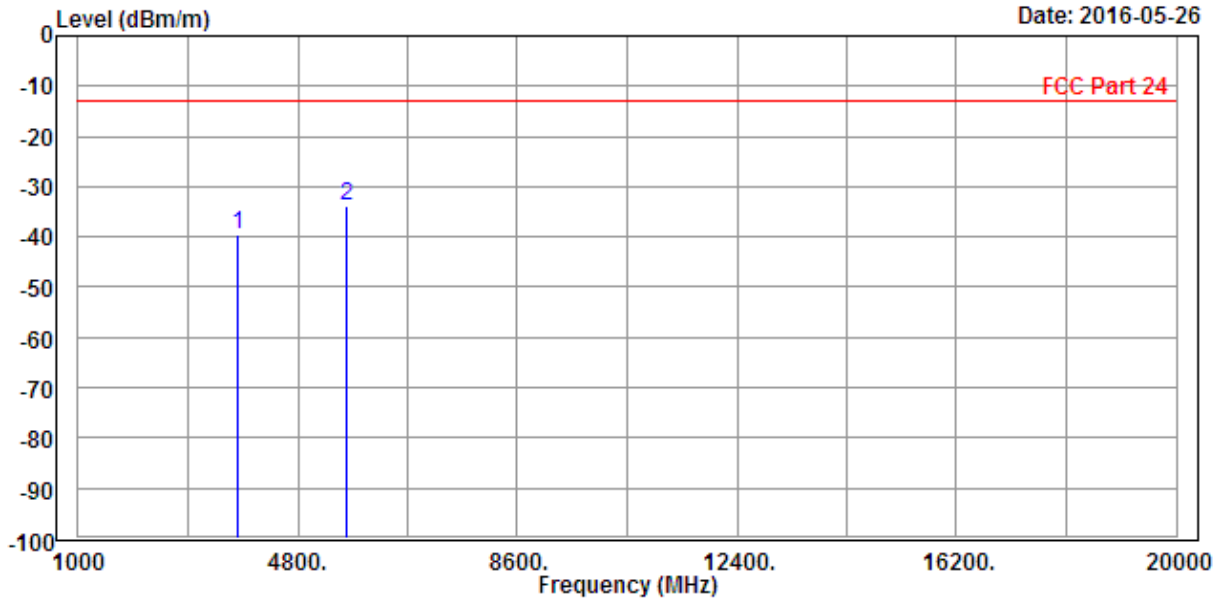


Condition: FCC Part 24 3m EIRP_26M-1GHz-20160505-EMC9135+3143B-FCC
EUT : Baifone P4905
Mode : PCS 1900
Test By : Alex Chen
Remark : IMEI 357288070008602

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	37.760	-34.66	-33.36	-13.00	-21.66	-1.30	Peak	Vertical
2		96.930	-52.34	-41.71	-13.00	-39.34	-10.63	Peak	Vertical
3		129.910	-67.09	-55.94	-13.00	-54.09	-11.15	Peak	Vertical
4		200.720	-65.40	-54.75	-13.00	-52.40	-10.65	Peak	Vertical
5		322.940	-76.61	-65.40	-13.00	-63.61	-11.21	Peak	Vertical
6		550.890	-73.25	-65.96	-13.00	-60.25	-7.29	Peak	Vertical

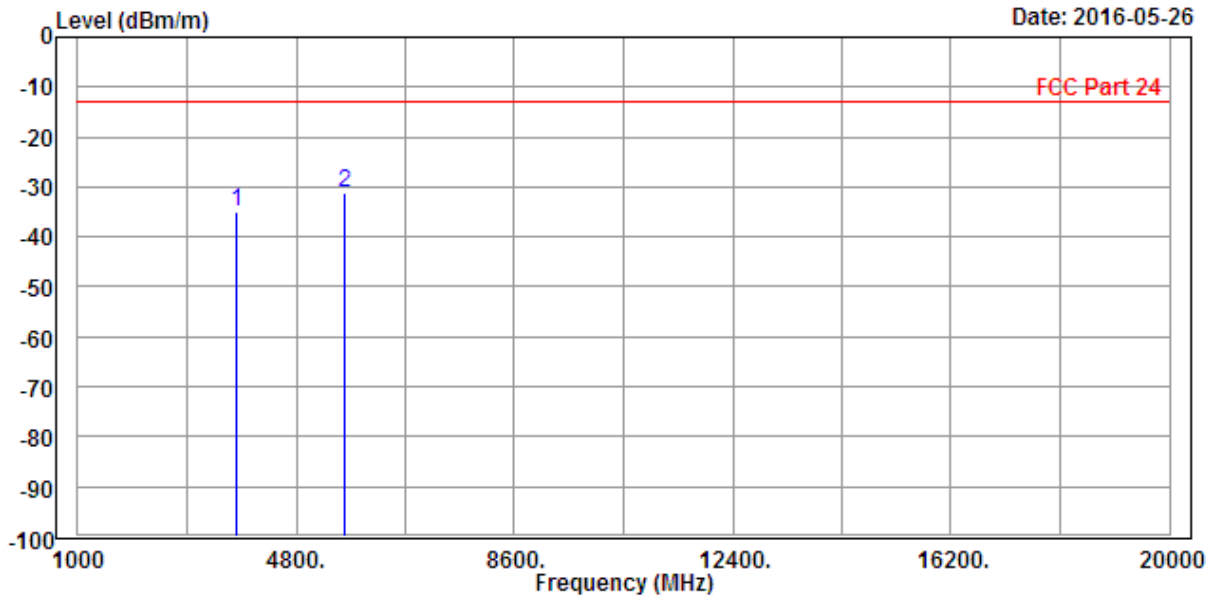
ABOVE 1GHz DATA

GSM 1900:



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : PCS 1900
Plan : X-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

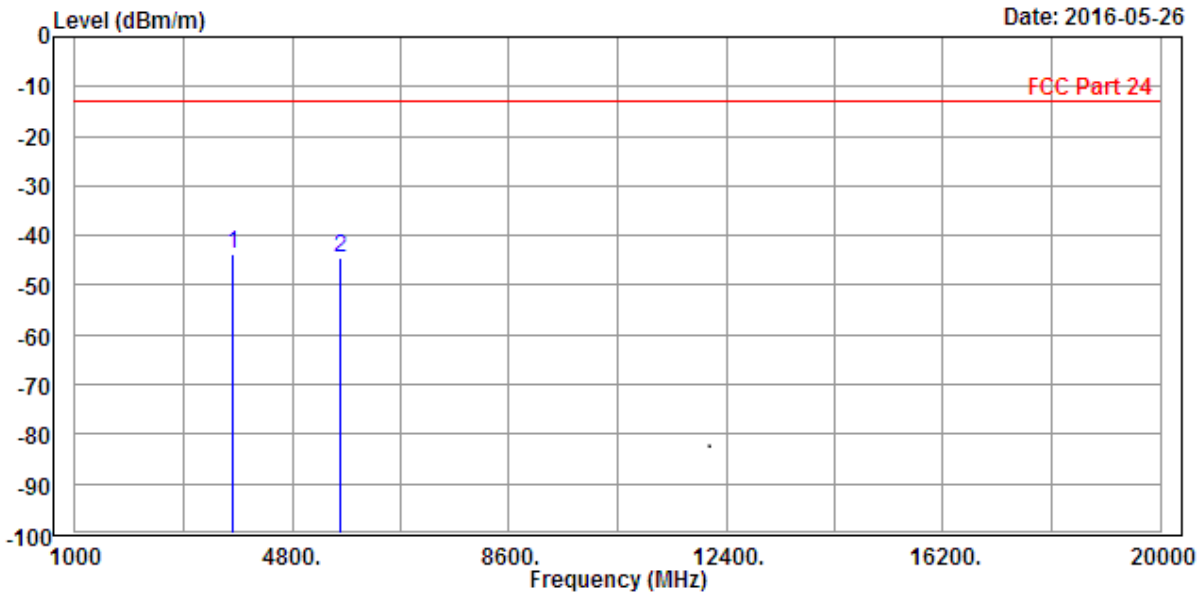
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-39.50	-42.89	-13.00	-26.50	3.39	Peak	Horizontal
2 PP	5640.000	-33.83	-42.95	-13.00	-20.83	9.12	Peak	Horizontal



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : PCS 1900
Plan : X-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

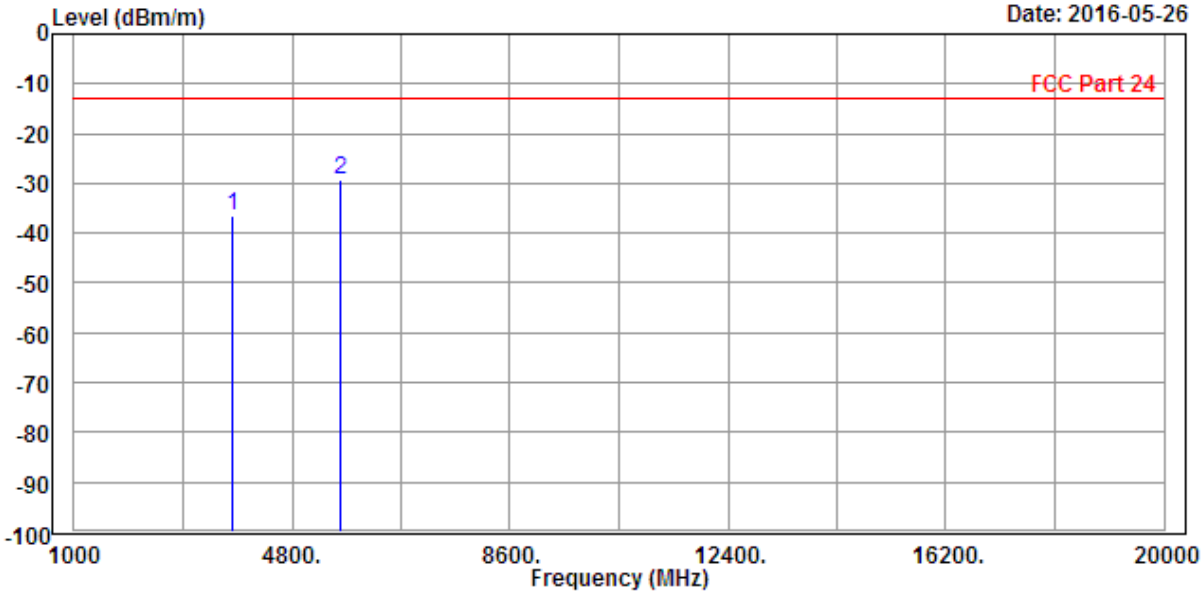
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3755.000	-35.00	-38.85	-13.00	-22.00	3.85	Peak	Vertical
2	PP	5640.000	-31.02	-39.28	-13.00	-18.02	8.26	Peak	Vertical

EDGE 1900:



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : Edge 1900
Plan : X-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

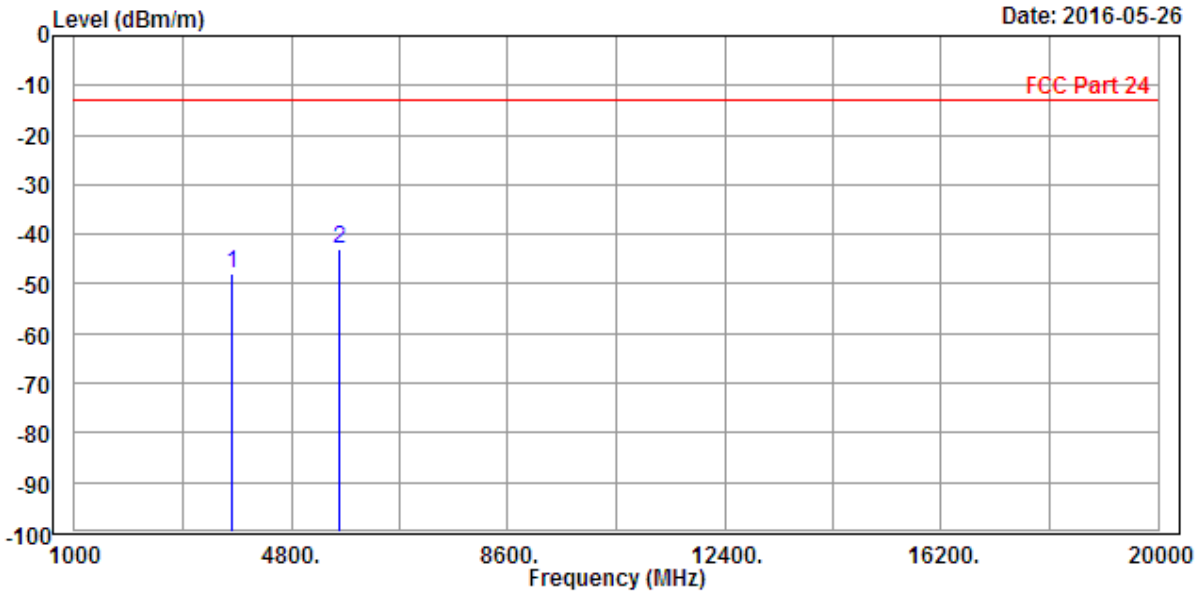
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3755.000	-43.64	-47.03	-13.00	-30.64	3.39	Peak	Horizontal
2		5640.000	-44.36	-53.48	-13.00	-31.36	9.12	Peak	Horizontal



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : Edge 1900
Plan : X-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

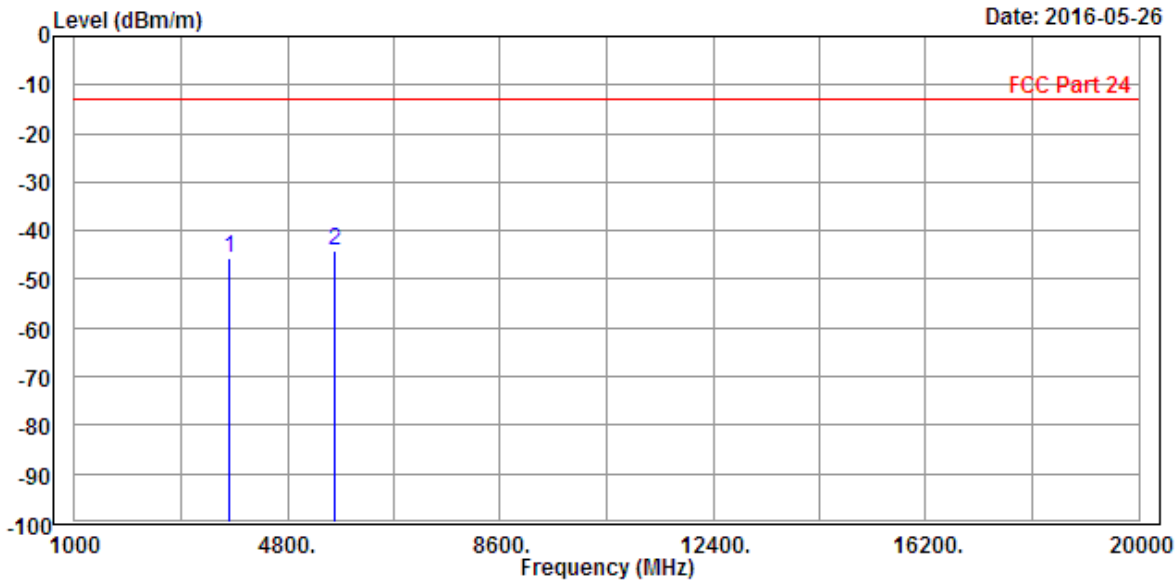
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3755.000	-36.67	-40.52	-13.00	-23.67	3.85	Peak	Vertical
2	PP	5640.000	-29.39	-37.65	-13.00	-16.39	8.26	Peak	Vertical

WCDMA Band II:



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : WCDMA Band2
Plan : X-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-47.76	-51.15	-13.00	-34.76	3.39	Peak	Horizontal
2 PP	5640.000	-43.09	-52.21	-13.00	-30.09	9.12	Peak	Horizontal

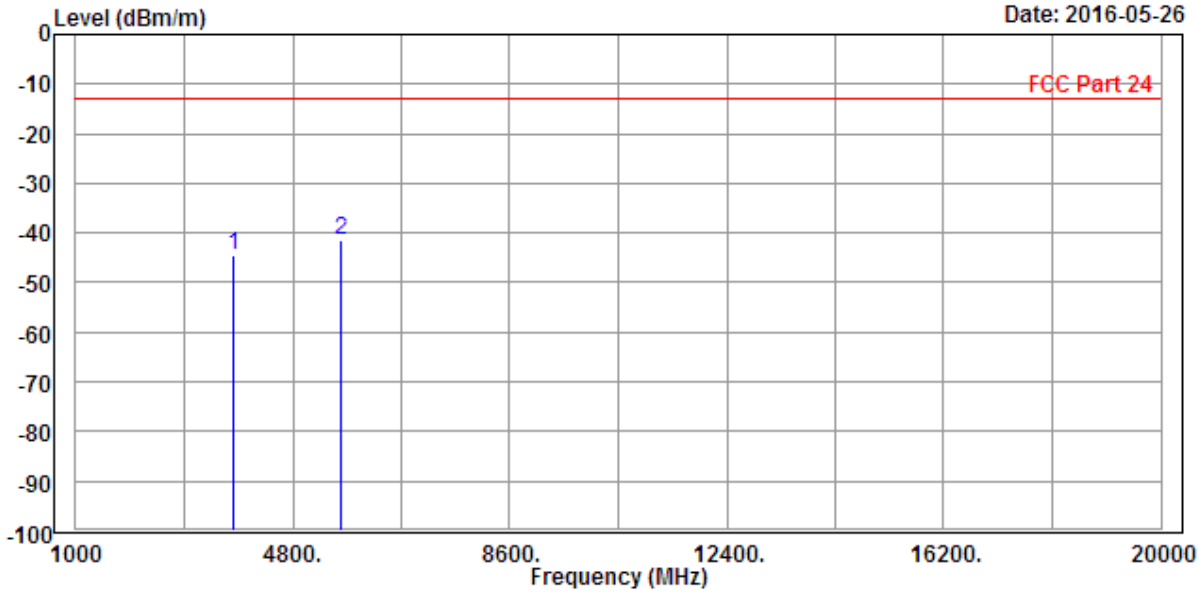


Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : WCDMA Band2
Plan : X-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-45.62	-49.47	-13.00	-32.62	3.85	Peak	Vertical
2 PP	5640.000	-43.96	-52.22	-13.00	-30.96	8.26	Peak	Vertical

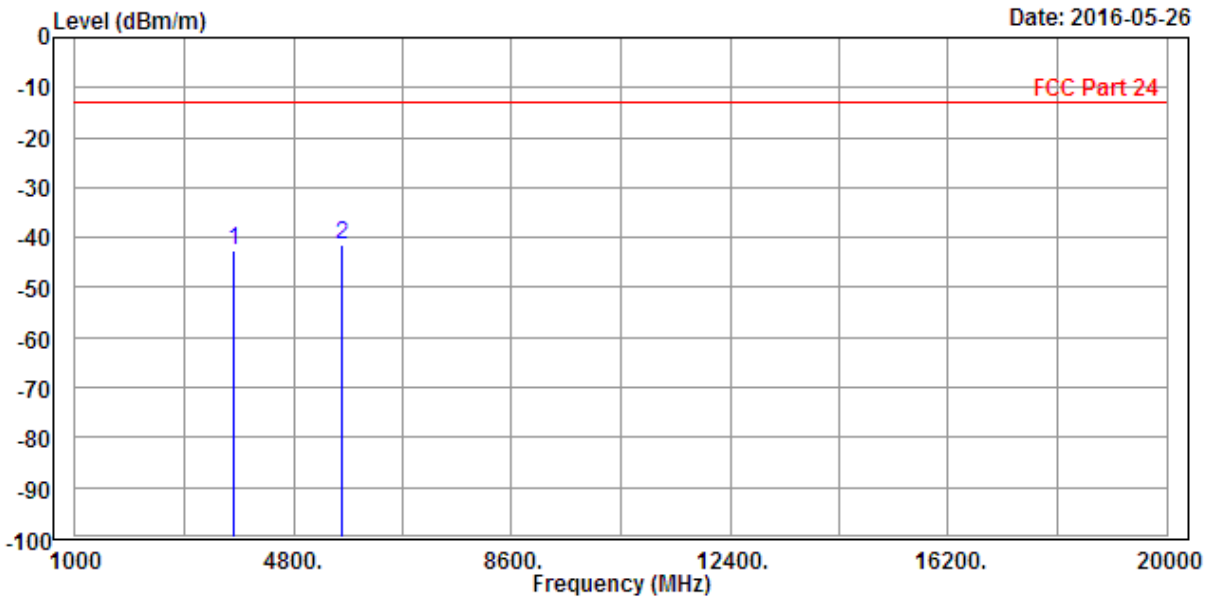
LTE Band 2

CHANNEL BANDWIDTH: 1.4MHz / QPSK




```
Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT      : Baifone P4905
Mode     : LTE Band2(1.4M)
Plan     : Y-Plan
Test By  : Alex Chen
Remark   : IMEI  357288070008602
```

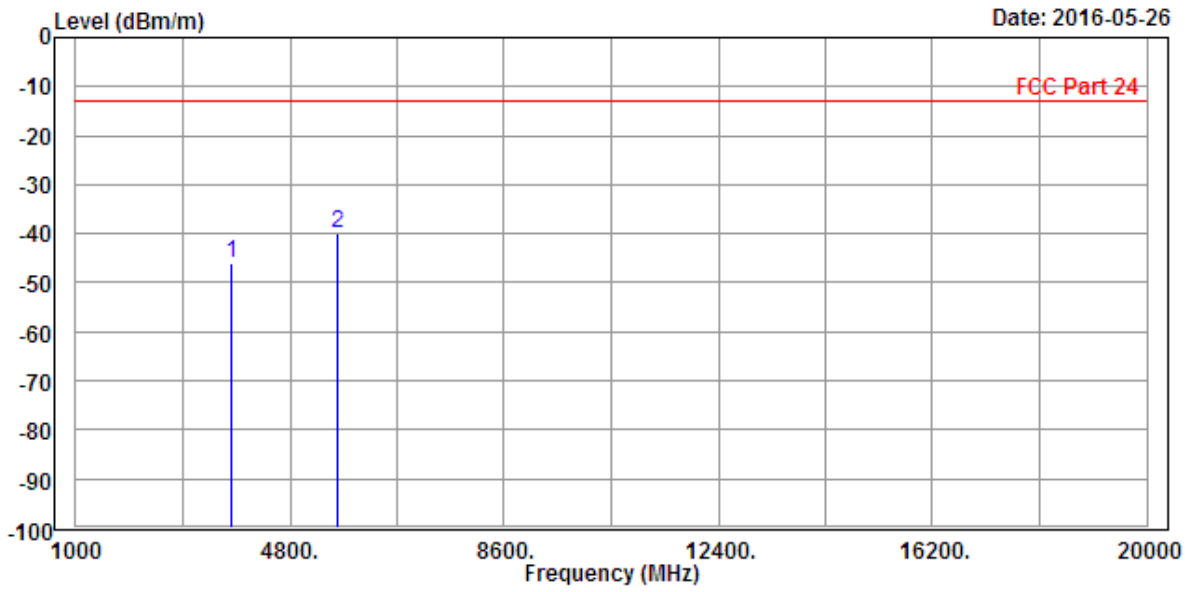
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3760.000	-44.41	-47.82	-13.00	-31.41	3.41	Peak	Horizontal
2 PP	5640.000	-41.47	-50.59	-13.00	-28.47	9.12	Peak	Horizontal



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(1.4M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

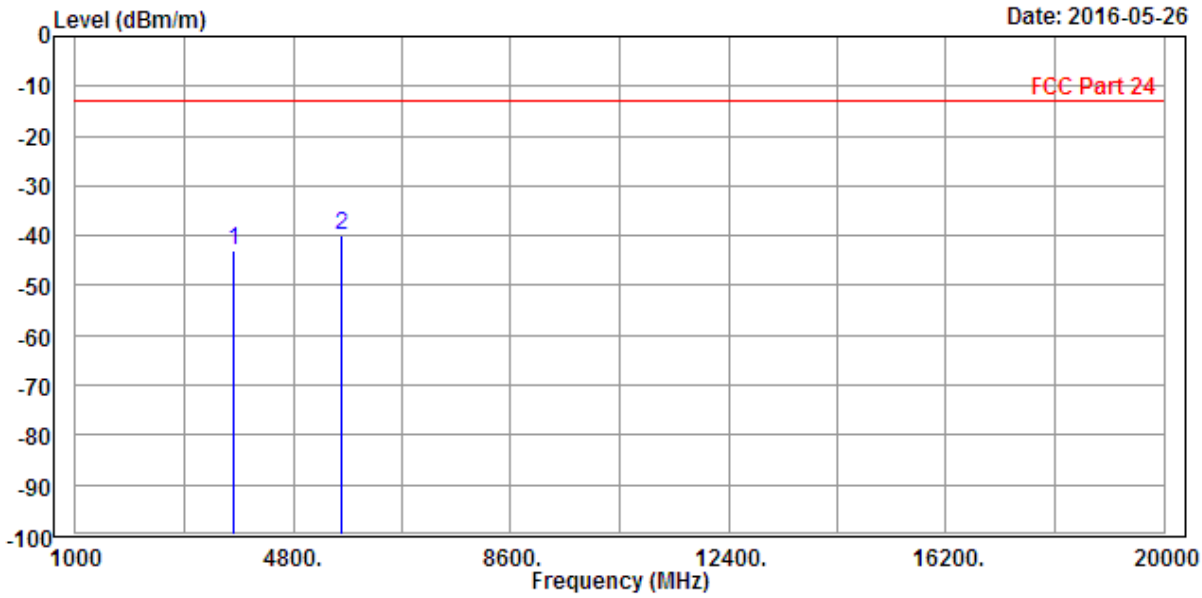
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3755.000	-42.51	-46.36	-13.00	-29.51	3.85	Peak	Vertical
2	PP	5640.000	-41.61	-49.87	-13.00	-28.61	8.26	Peak	Vertical

CHANNEL BANDWIDTH: 3MHz / QPSK



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(3M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

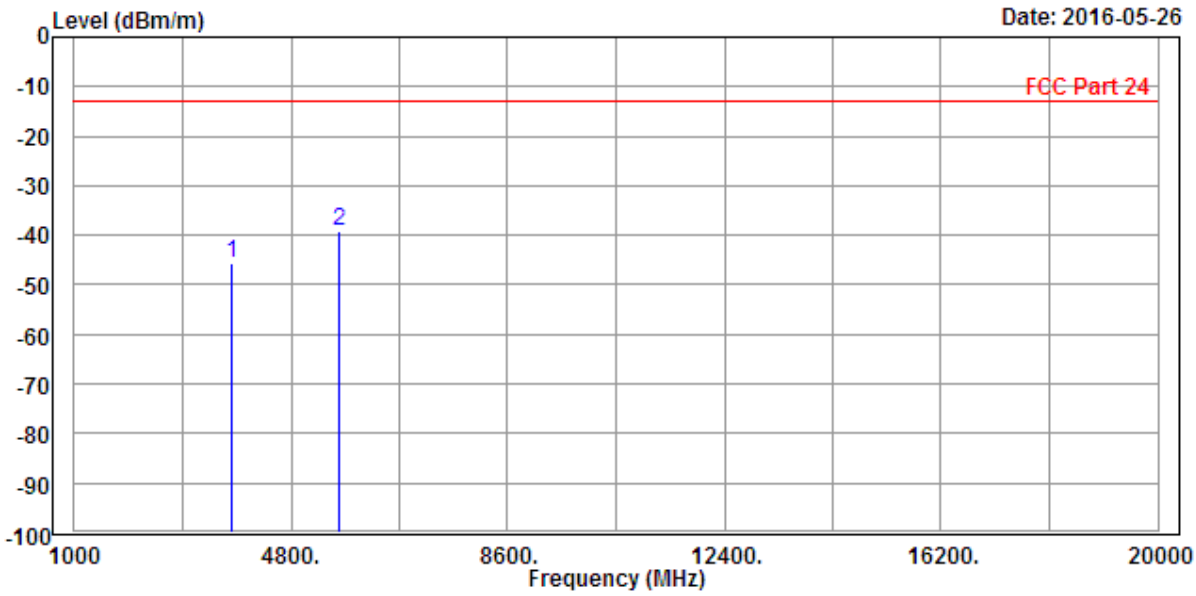
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-46.03	-49.42	-13.00	-33.03	3.39	Peak	Horizontal
2 PP	5640.000	-39.89	-49.01	-13.00	-26.89	9.12	Peak	Horizontal



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(3M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

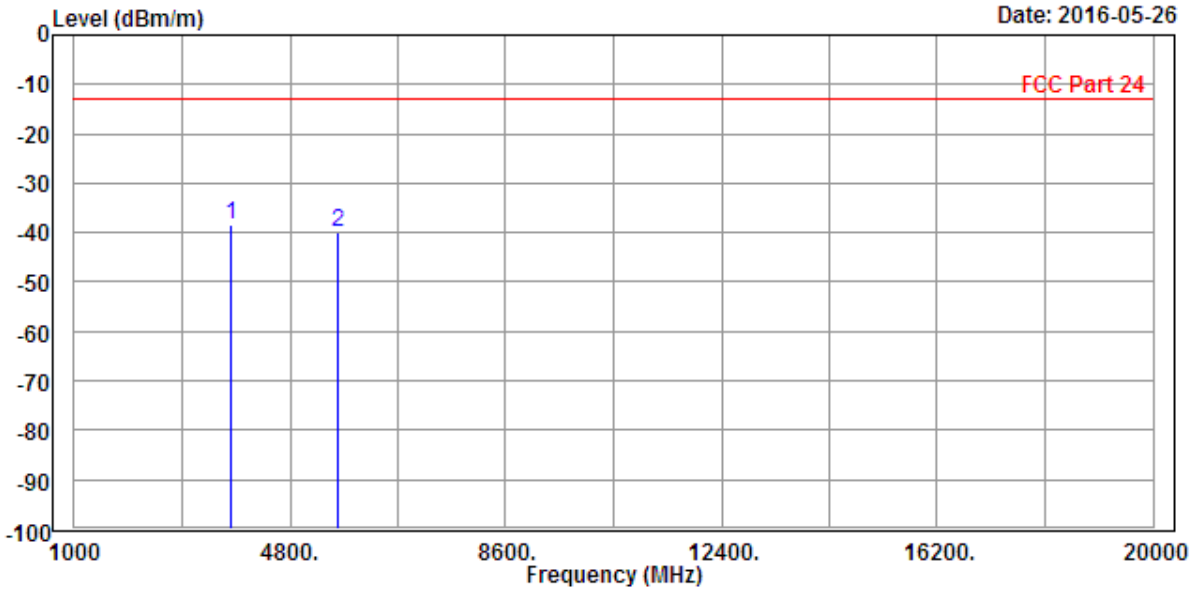
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3755.000	-42.99	-46.84	-13.00	-29.99	3.85	Peak	Vertical
2	PP	5640.000	-40.11	-48.37	-13.00	-27.11	8.26	Peak	Vertical

CHANNEL BANDWIDTH: 5MHz / QPSK



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(5M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

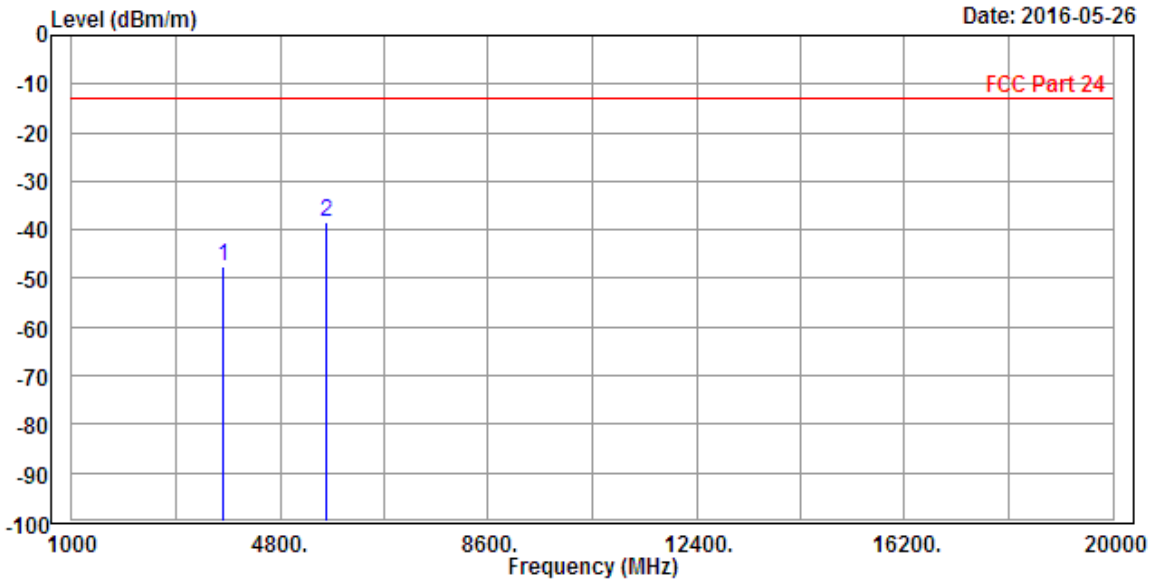
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-45.51	-48.90	-13.00	-32.51	3.39	Peak	Horizontal
2 PP	5640.000	-39.06	-48.18	-13.00	-26.06	9.12	Peak	Horizontal



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(5M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

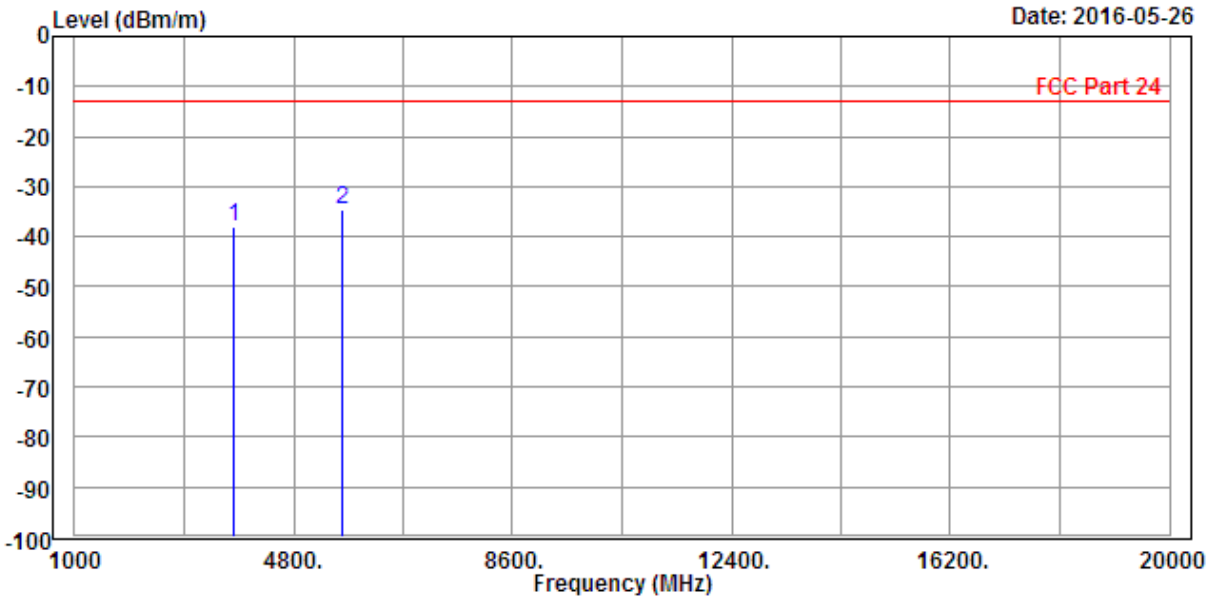
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3755.000	-38.39	-42.24	-13.00	-25.39	3.85	Peak	Vertical
2		5640.000	-39.95	-48.21	-13.00	-26.95	8.26	Peak	Vertical

CHANNEL BANDWIDTH: 10MHz / QPSK



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(10M)
Plan : X-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

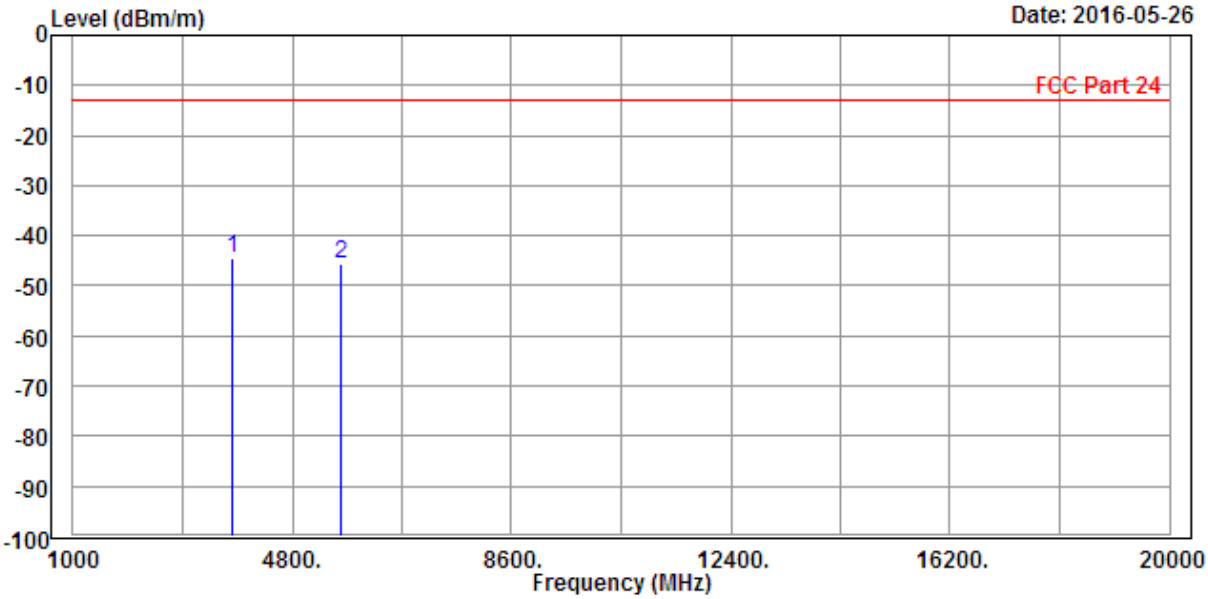
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-47.44	-50.83	-13.00	-34.44	3.39	Peak	Horizontal
2 PP	5640.000	-38.30	-47.42	-13.00	-25.30	9.12	Peak	Horizontal



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(10M)
Plan : X-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

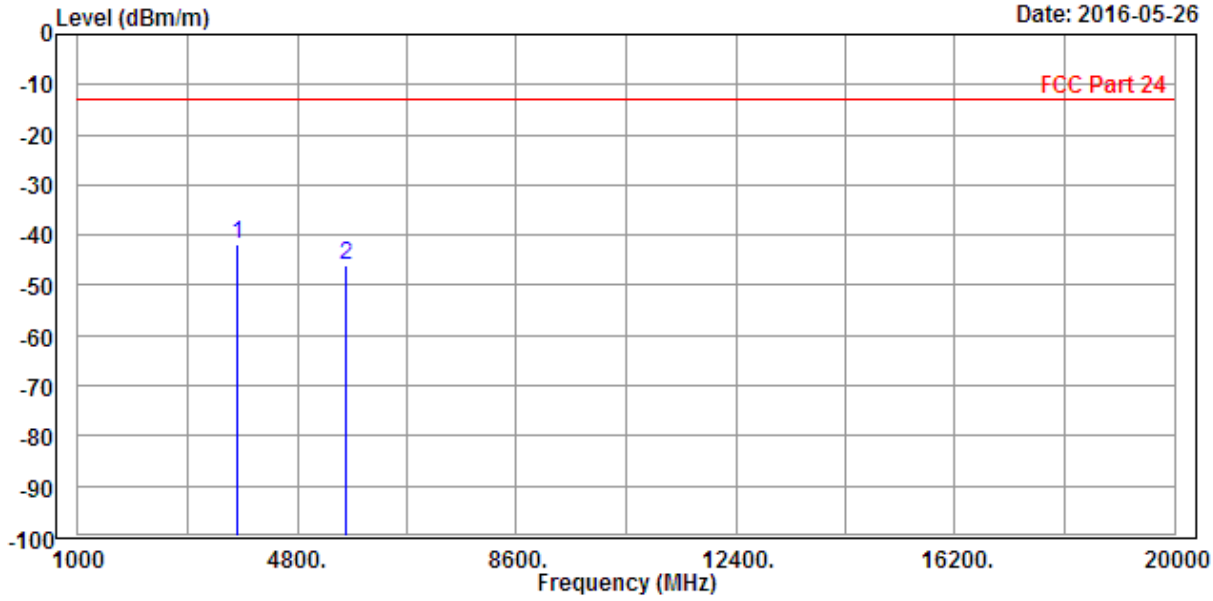
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		3755.000	-38.08	-41.93	-13.00	-25.08	3.85	Peak	Vertical
2	PP	5640.000	-34.64	-42.90	-13.00	-21.64	8.26	Peak	Vertical

CHANNEL BANDWIDTH: 15MHz / QPSK



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(15M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

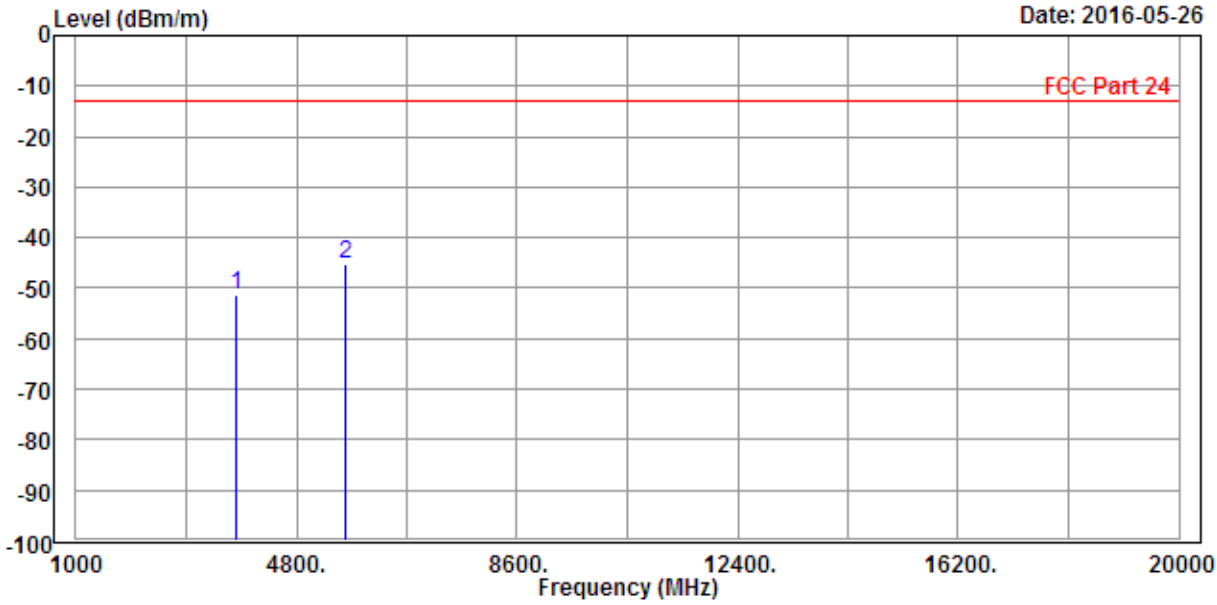
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3755.000	-44.36	-47.75	-13.00	-31.36	3.39	Peak	Horizontal
2		5640.000	-45.63	-54.75	-13.00	-32.63	9.12	Peak	Horizontal



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(15M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

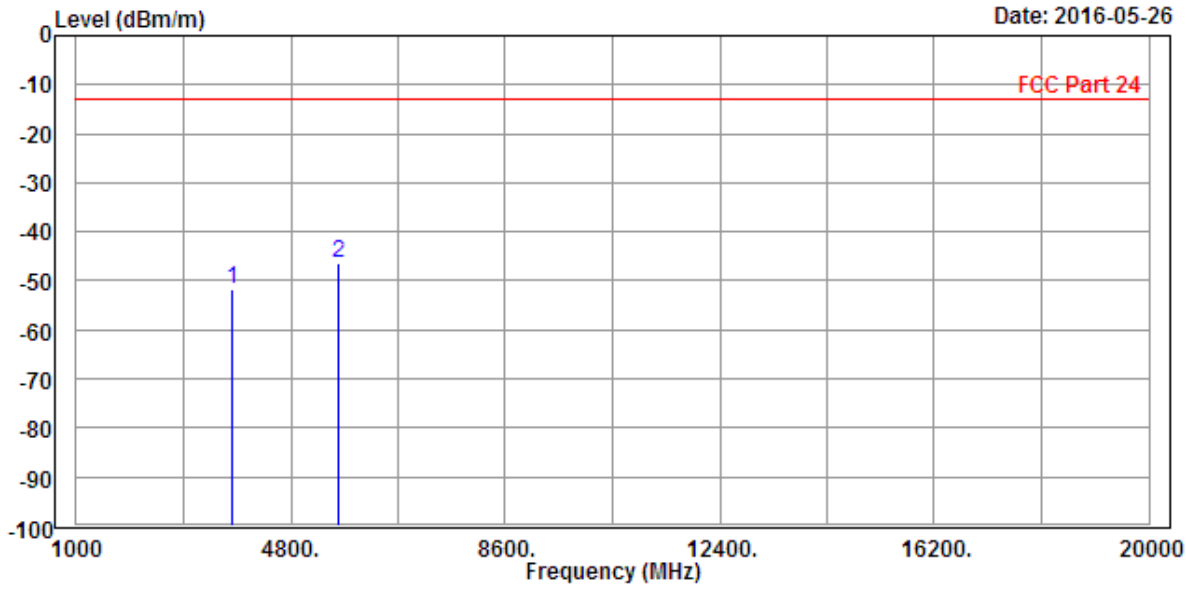
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	3760.000	-41.88	-45.76	-13.00	-28.88	3.88	Peak	Vertical
2		5640.000	-45.97	-54.23	-13.00	-32.97	8.26	Peak	Vertical

CHANNEL BANDWIDTH: 20MHz / QPSK



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(20M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-51.24	-54.63	-13.00	-38.24	3.39	Peak	Horizontal
2 PP	5640.000	-45.15	-54.27	-13.00	-32.15	9.12	Peak	Horizontal



Condition: FCC Part 24 3m EIRP_1G-18G-_20160505-EMC012645B+3117-FCC
EUT : Baifone P4905
Mode : LTE Band2(20M)
Plan : Y-Plan
Test By : Alex Chen
Remark : IMEI 357288070008602

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	3755.000	-51.84	-55.69	-13.00	-38.84	3.85	Peak	Vertical
2 PP	5640.000	-46.42	-54.68	-13.00	-33.42	8.26	Peak	Vertical

5 Pictures of Test Arrangements

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

Appendix – 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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Fax: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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