

# FCC Test Report (PART 27)

Report No.: RF160517W001-6

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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## **RELEASE CONTROL RECORD**

Issue No.	Description	Date Issued
RF160517W001-6	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 27, Subpart C, M

FCC Part 2

ANSI /TIA/EIA-603-D

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.

	Amy			
Prepared by :		, Date:	Jun. 12, 2016	
	Amyee Qian / Engineer			
Approved by :	William	, Date:	Jun. 12, 2016	
	William Chung / Manager		<u> </u>	



## 2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2						
FCC Clause	Test Item Result		Remarks			
2.1046 Equivalent Isotropically radiated power		PASS	Meet the requirement of limit.			
2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	PASS	Meet the requirement of limit.			
2.1049	Occupied Bandwidth	PASS	Meet the requirement of limit.			
27.50(d)(5)	Peak to average ratio	PASS	Meet the requirement of limit.			
2.1049 27.53(m)(6)	Emission Bandwidth	PASS	Meet the requirement of limit.			
2.1051 27.53(m)(4)(6)	Band Edge Measurements	PASS	Meet the requirement of limit.			
2.1051 27.53(m)(4)(6)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.			
2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -5.09dB at 37.76MHz.			

## 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
Radiated Effissions up to 1 GHz	200MHz ~1000MHz	2.95 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.26 dB
Radiated Emissions above 1 GHZ	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	610		
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.8Vdc (battery)			
MODULATION TECHNOLOGY	LTE Band 7	QPSK, 16QAM		
	LTE Band 7 Channel Bandwidth: 5MHz	2502.5MHz ~ 2567.5MHz		
FREQUENCY RANGE	LTE Band 7 Channel Bandwidth: 10MHz	2505MHz ~ 2565MHz		
TREGOLIOT RANGE	LTE Band 7 Channel Bandwidth: 15MHz	2507.5MHz ~ 2562.5MHz		
	LTE Band 7 Channel Bandwidth: 20MHz	2510MHz ~ 2560MHz		
	LTE Band 7	QPSK: 4M49G7D		
	Channel Bandwidth: 5MHz	16QAM: 4M50W7D		
	LTE Band 7 Channel Bandwidth: 10MHz	QPSK: 8M95G7D		
EMISSION DESIGNATOR		16QAM: 8M94W7D		
	LTE Band 7 Channel Bandwidth: 15MHz	QPSK: 13M5G7D		
		16QAM: 13M4W7D		
	LTE Band 7 Channel Bandwidth: 20MHz	QPSK: 17M9G7D		
		16QAM: 17M9W7D		
	LTE Band 7 Channel Bandwidth: 5MHz	267mW		
MAX. EIRP POWER	LTE Band 7 Channel Bandwidth: 10MHz	299mW		
III/JAI LIIKI I GWLK	LTE Band 7 Channel Bandwidth: 15MHz	313mW		
	LTE Band 7 Channel Bandwidth: 20MHz	263mW		
ANTENNA TYPE	Fixed Internal antenna with 1dBi 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			
NPUT:	AC 100-240V, 150mA			
OUTPUT:	DC 5V, 1000mA			



ADAPTER 2			
BRAND:	LANIX		
MODEL:	Ilium L610-C		
NPUT:	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			

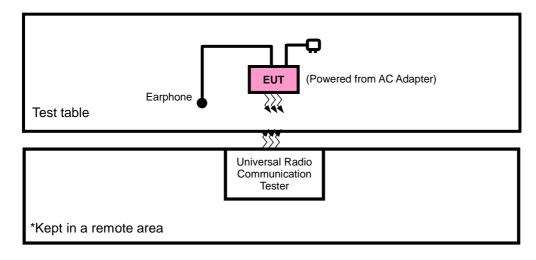
EARPHONE			
BRAND:	LANIX		
MODEL:	Ilium L610		
SIGNAL LINE:	1.5 METER		

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

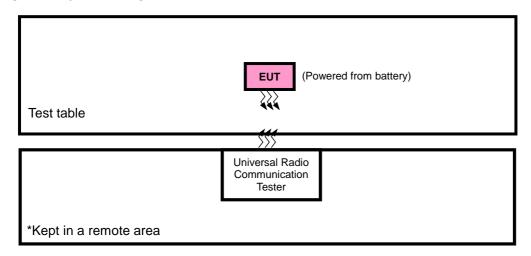


## 3.2 Configuration of System Under Test

## FOR RADIATION EMISSION TEST



## FOR E.R.P./E.I.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 X-plane. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
Α	EUT + Adapter + USB Cable with LTE link
В	EUT + Battery + USB Cable with LTE link

## LTE BAND 7

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
		20775 to 21425	20775, 21100, 21425	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
В	EIRP	20800 to 21400	20800, 21100, 21400	10MHz	QPSK, 16QAM	1 RB / 0RB Offset
В	EIRP	20825 to 21375	20825, 21100, 21375	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100 21350	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20775 to 21425	21100	5MHz	QPSK	1 RB / 0 RB Offset
Б.	FREQUENCY	20800 to 21400	21100	10MHz	QPSK	1 RB / 0RB Offset
В	STABILITY	20825 to 21375	21100	15MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	21100	20MHz	QPSK	1 RB / 0 RB Offset
		20775 to 21425	20775, 21100, 21425	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
Б	OCCUPIED	20800 to 21400	20800, 21100, 21400	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
В	BANDWIDTH	20825 to 21375	20825, 21100, 21375	15MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20850 to 21350	20850, 21100 21350	20MHz	QPSK, 16QAM	100 RB / 0 RB Offset
		20775 to 21425	20775, 21100, 21425	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
В	PEAK TO AVERAGE RATIO	20800 to 21400	20800, 21100, 21400	10MHz	QPSK, 16QAM	1 RB / 0RB Offset
В		20825 to 21375	20825, 21100, 21375	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100 21350	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20775 to 21425 20775, 21425 5MHz	EMILI-	QPSK	1 RB / 12 RB Offset	
		20775 to 21425	20775, 21425	SIVITZ	QPSK	25 RB / 0 RB Offset
		20800 to 21400	20800, 21400	10MHz	QPSK	1 RB / 24 RB Offset
	5445 5505	20000 to 21400	20000, 21400	TOWN 12	QF SIX	50 RB / 0 RB Offset
В	BAND EDGE	20825 to 21375	20825, 21375	15MHz	QPSK	1 RB / 37 RB Offset
		20023 to 21373	20023, 21373	131/11/12	QF SIX	75 RB / 0 RB Offset
		20050 to 24250	20050 24250	2011	QPSK	1 RB / 50 RB Offset
		20850 to 21350	20850, 21350	20MHz	QPSK	100 RB / 0 RB Offset
		20775 to 21425	21100	5MHz	QPSK	1 RB / 0 RB Offset
Б	CONDCUDETED	20800 to 21400	21100	10MHz	QPSK	1 RB / 0RB Offset
В	EMISSION	20825 to 21375	21100	15MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	21100	20MHz	QPSK	1 RB / 0 RB Offset
		20775 to 21425	21100	5MHz	QPSK	1 RB / 0 RB Offset
_	RADIATED	20800 to 21400	21100	10MHz	QPSK	1 RB / 0RB Offset
Α	EMISSION	20825 to 21375	21100	15MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	21100	20MHz	QPSK	1 RB / 0 RB Offset



**Note:** This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

## **Test Condition:**

Test Item	Environmental Conditions	Input Power	Tested By
ERP	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
Condcudeted Emission	24deg. C, 64%RH	DC 3.8V from battery	Yuqiang Yin
Radiated Emission	21deg. C, 71%RH	5Vdc from adapter	Alex Chen

## 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 27

**KDB Publication 971168 D02** 

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.r.p.

#### 4.1.2 Test Procedures

#### EIRP / ERP Measurement:

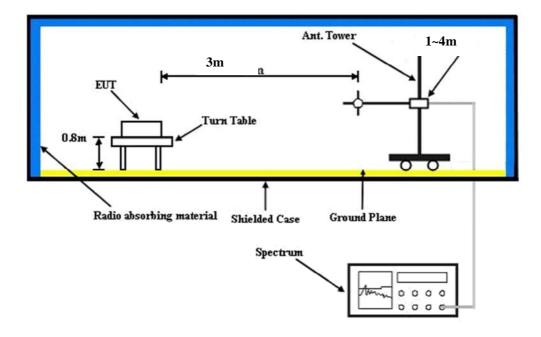
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the 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:**

- a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
- b. 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

## AVERAGE CONDUCTED OUTPUT POWER (dBm)

	LTE Band 7										
BW	Modulation	RB	RB	Low CH 20775	Mid CH 21100	High CH 21425	MPR				
BVV	Wodulation	Size	Offset	Frequency 2502.5 MHz	Frequency 2535 MHz	Frequency 2567.5 MHz	WIPK				
		1	0	20.91	20.90	20.94	0				
		1	12	20.71	20.89	20.77	0				
		1	24	20.88	20.68	20.91	0				
	QPSK	12	0	19.79	19.80	19.95	1				
		12	6	19.74	19.76	19.92	1				
		12	13	19.78	19.75	19.84	1				
5 MHz		25	0	19.79	19.82	19.93	1				
3 IVITZ		1	0	19.88	19.89	19.90	1				
		1	12	19.91	19.68	19.89	1				
		1	24	19.89	19.88	19.92	1				
	16QAM	12	0	18.67	18.91	18.91	2				
		12	6	18.60	18.80	18.91	2				
		12	13	18.71	18.64	18.92	2				
		25	0	18.79	18.67	18.96	2				

				LTE Band 7			
BW	Modulation	RB	RB	Low CH 20800	Mid CH 21100	High CH 21400	мор
DVV	Wodulation	Size	Offset	Frequency 2505 MHz	Frequency 2535 MHz	Frequency 2565 MHz	MPR
		1	0	20.95	20.94	20.98	0
		1	24	20.75	20.93	20.81	0
		1	49	20.92	20.72	20.95	0
	QPSK	25	0	19.83	19.84	19.99	1
		25	12	19.78	19.80	19.96	1
		25	25	19.82	19.79	19.88	1
40 MH-		50	0	19.83	19.86	19.97	1
10 MHz		1	0	19.92	19.93	19.94	1
		1	24	19.95	19.72	19.93	1
		1	49	19.93	19.92	19.96	1
	16QAM	25	0	18.71	18.95	18.95	2
		25	12	18.64	18.84	18.95	2
		25	25	18.75	18.68	18.96	2
		50	0	18.83	18.71	19.00	2



DW.		RB	RB	Low CH 20825	Mid CH 21100	High CH 21375	
BW	Modulation	Size	Offset	Frequency 2507.5 MHz	Frequency 2535 MHz	Frequency 2562.5 MHz	MPR
		1	0	21.01	21.00	21.04	0
		1	37	20.81	20.99	20.87	0
		1	74	20.98	20.78	21.01	0
	QPSK	36	0	19.89	19.90	20.05	1
		36	19	19.84	19.86	20.02	1
		36	39	19.88	19.85	19.94	1
15 MHz		75	0	19.89	19.92	20.03	1
13 WITZ		1	0	19.98	19.99	20.00	1
		1	37	20.01	19.78	19.99	1
		1	74	19.99	19.98	20.02	1
	16QAM	36	0	18.77	19.01	19.01	2
		36	19	18.70	18.90	19.01	2
		36	39	18.81	18.74	19.02	2
		75	0	18.89	18.77	19.06	2

	LTE Band 7										
BW	Modulation	RB	RB	Low CH 20850	Mid CH 21100	High CH 21350	MPR				
BW	Modulation	Size	Offset	Frequency 2510 MHz	Frequency 2535 MHz	Frequency 2560 MHz	WIPK				
		1	0	21.04	21.03	21.07	0				
		1	50	20.84	21.02	20.90	0				
	QPSK	1	99	21.01	20.81	21.04	0				
		50	0	19.92	19.93	20.08	1				
		50	25	19.87	19.89	20.05	1				
		50	50	19.91	19.88	19.97	1				
20 MHz		100	0	19.92	19.95	20.06	1				
ZU WITZ		1	0	20.01	20.02	20.03	1				
		1	50	20.04	19.81	20.02	1				
		1	99	20.02	20.01	20.05	1				
	16QAM	50	0	18.80	19.04	19.04	2				
		50	25	18.73	18.93	19.04	2				
		50	50	18.84	18.77	19.05	2				
		100	0	18.92	18.80	19.09	2				



## **EIRP**

## LTE BAND 7

## **CHANNEL BANDWIDTH: 5MHz QPSK**

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)	Limit (W)
20775	2502.5	-25.18	45.65	20.47	111.38	Н	2
21100	2535.0	-25.28	46.04	20.76	118.99	Н	2
21425	2567.5	-24.74	45.87	21.13	129.60	Н	2
20775	2502.5	-22.61	47.03	24.42	276.57	V	2
21100	2535.0	-23.23	46.57	23.34	215.77	V	2
21425	2567.5	-22.71	46.98	24.27	267.30	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)
20775	2502.5	-26.01	45.65	19.64	92.00	Н	2
21100	2535.0	-26.30	46.04	19.74	94.08	Н	2
21425	2567.5	-25.84	45.87	20.03	100.60	Н	2
20775	2502.5	-23.44	47.03	23.59	228.45	V	2
21100	2535.0	-24.25	46.57	22.32	170.61	V	2
21425	2567.5	-23.81	46.98	23.17	207.49	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)
20800	2505.0	-24.99	45.65	20.66	116.39	Н	2
21100	2535.0	-25.22	46.04	20.82	120.64	Н	2
21400	2565.0	-24.61	46.07	21.46	139.80	Н	2
20800	2505.0	-22.42	47.18	24.76	298.95	V	2
21100	2535.0	-23.17	46.57	23.40	218.78	V	2
21400	2565.0	-22.58	47.06	24.48	280.80	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)
20800	2505.0	-26.14	45.65	19.51	89.31	Н	2
21100	2535.0	-26.32	46.04	19.72	93.65	Н	2
21400	2565.0	-25.77	46.07	20.30	107.03	Н	2
20800	2505.0	-23.57	47.18	23.61	229.40	V	2
21100	2535.0	-24.27	46.57	22.30	169.82	V	2
21400	2565.0	-23.74	47.06	23.32	214.98	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)
20825	2507.5	-25.00	45.63	20.63	115.69	Н	2
21100	2535.0	-25.29	46.04	20.75	118.71	Н	2
21375	2562.5	-24.68	45.94	21.26	133.60	Н	2
20825	2507.5	-22.43	47.39	24.96	313.26	V	2
21100	2535.0	-23.24	46.57	23.33	215.28	V	2
21375	2562.5	-22.65	47.00	24.35	272.21	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)
20825	2507.5	-25.86	45.63	19.77	94.91	Н	2
21100	2535.0	-26.16	46.04	19.88	97.16	Н	2
21375	2562.5	-25.53	45.94	20.41	109.85	Н	2
20825	2507.5	-23.29	47.39	24.10	256.98	V	2
21100	2535.0	-24.11	46.57	22.46	176.20	V	2
21375	2562.5	-23.50	47.00	23.50	223.82	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)
20850	2510.0	-25.58	45.80	20.22	105.17	Н	2
21100	2535.0	-25.74	46.04	20.30	107.03	Н	2
21350	2560.0	-25.26	45.83	20.57	114.10	Н	2
20850	2510.0	-23.01	47.21	24.20	263.03	V	2
21100	2535.0	-23.69	46.57	22.88	193.91	V	2
21350	2560.0	-23.23	47.07	23.84	242.05	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)
20850	2510.0	-26.51	45.80	19.29	84.90	Н	2
21100	2535.0	-26.81	46.04	19.23	83.66	Н	2
21350	2560.0	-26.09	45.83	19.74	94.25	Н	2
20850	2510.0	-23.94	47.21	23.27	212.32	V	2
21100	2535.0	-24.76	46.57	21.81	151.57	V	2
21350	2560.0	-24.06	47.07	23.01	199.94	V	2

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



## 4.2 Frequency Stability Measurement

## 4.2.1 Limits of Frequency Stability Measurement

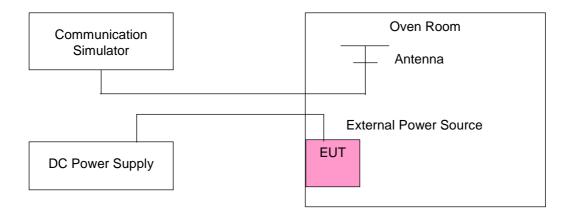
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

#### 4.2.2 Test Procedure

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

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

## 4.2.3 Test Setup





## 4.2.4 Test Results

## FREQUENCY ERROR vs. VOLTAGE

		FREQUENCY	ERROR (ppm)		
VOLTAGE (Volts)		LIMIT (ppm)			
(10110)	5MHz	10MHz	15MHz	20MHz	
3.8	0.0010	0.0007	0.0006	0.0009	2.5
3.6	-0.0013	-0.0010	-0.0010	-0.0012	2.5
4.2	-0.0012	-0.0009	-0.0009	-0.0011	2.5

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

## FREQUENCY ERROR vs. TEMPERATURE

		FREQUENCY	ERROR (ppm)			
TEMP. (℃)		LTE B	AND 7		LIMIT (ppm)	
	5MHz	10MHz	15MHz	20MHz		
-30	-0.0042	-0.0044	-0.0042	-0.0043	2.5	
-20	-0.0037	-0.0040	-0.0037	-0.0037	2.5	
-10	-0.0032	-0.0033	-0.0032	-0.0033	2.5	
0	-0.0027	-0.0028	-0.0027	-0.0028	2.5	
+10	-0.0022	-0.0023	-0.0022	-0.0023	2.5	
+20	-0.0017	-0.0017	-0.0016	-0.0017	2.5	
+30	-0.0012	-0.0013	-0.0012	-0.0011	2.5	
+40	-0.0008	-0.0008	-0.0008	-0.0007	2.5	
+50	-0.0003	-0.0002	-0.0003	-0.0001	2.5	
+60	0.0002	0.0003	0.0002	0.0005	2.5	

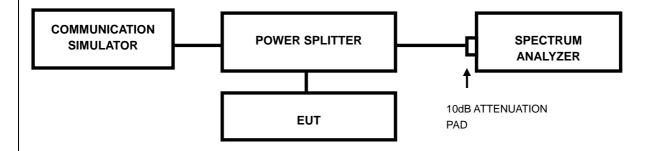


## 4.3 Occupied Bandwidth Measurement

## 4.3.1 Limits Of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

## 4.3.2 Test Setup



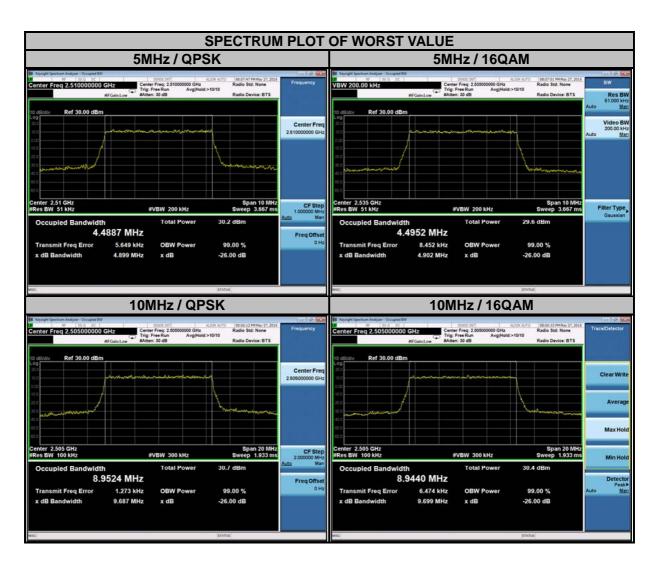
#### 4.3.3 Test Procedures

- a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.



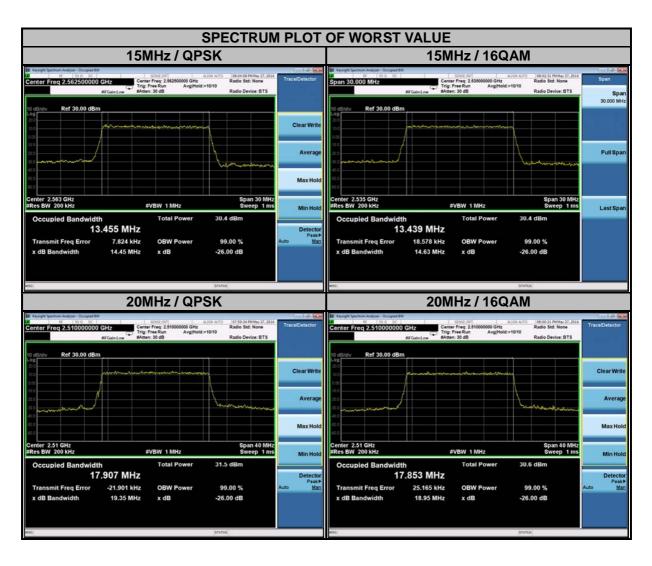
## 4.3.4 Test Result

LTE BAND 7												
	CHANNEL BAND	WIDTH: 5MHz		C	HANNEL BAND	WIDTH: 10MH	z					
CHANNEL	FREQUENCY	99% OCCUPIED ENCY BANDWIDTH (MHz)		CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)						
	(MHz)	QPSK	16QAM		(MHz)	QPSK	16QAM					
20775	2502.5	4.49	4.49 4.48		2505	8.95	8.94					
21100	2535	4.48 4.50		21100	2535	8.94	8.94					
21425	2567.5	4.47	4.47 4.48		2565	8.94	8.94					





LTE BAND 7										
C	HANNEL BANDV	VIDTH: 15MHz	:	C	HANNEL BAND	VIDTH: 20MH	z			
CHANNEL	FREQUENCY	99% OCC BANDWID		CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)				
	(MHz)	QPSK	16QAM		(MHz)	QPSK	16QAM			
20825	2507.5	13.41	13.41 13.43		2510	17.91	17.85			
21100	2535	13.43 13.44		21100	2535	17.89	17.85			
21375	2562.5	13.46	13.42	21350	2560	17.86	17.85			



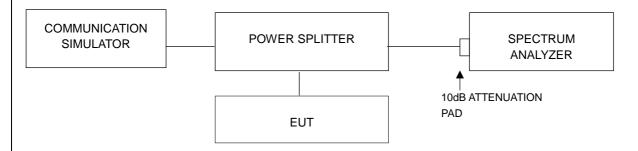


## 4.4 Peak To Average Ratio

## 4.4.1 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

## 4.4.2 Test Setup



## 4.4.3 Test Procedures

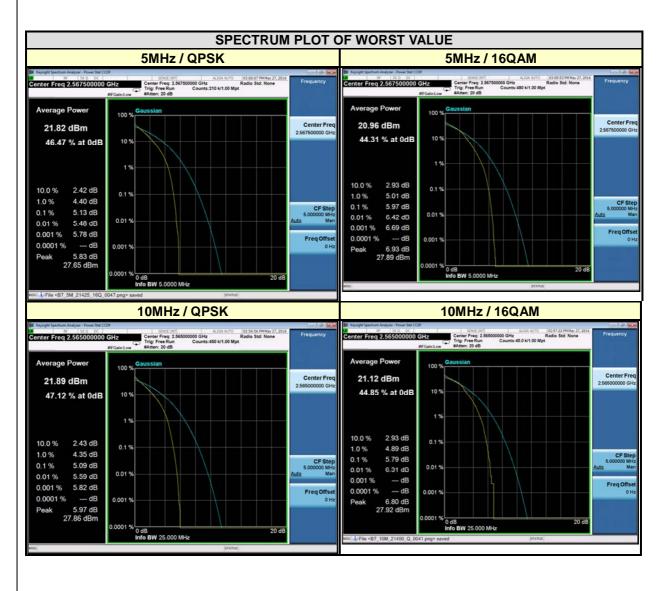
- 1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
- 2. Set the number of counts to a value that stabilizes the measured CCDF curve;
- 3. Record the maximum PAPR level associated with a probability of 0.1%.



## 4.4.4 Test Results

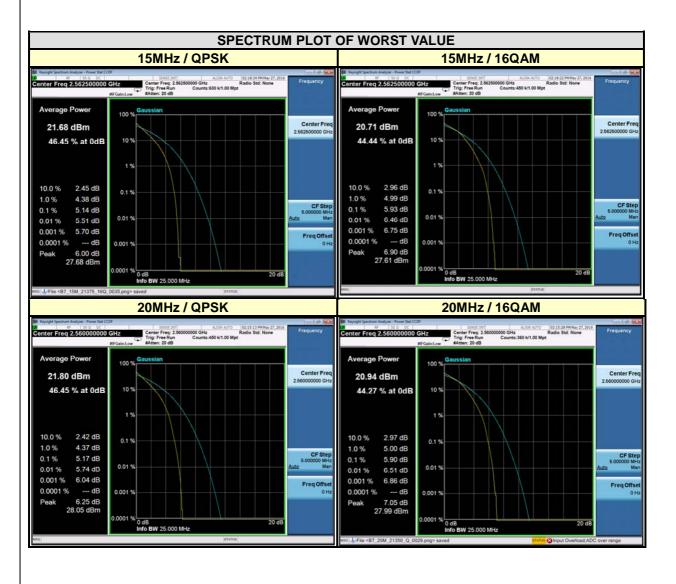
## LTE BAND 7

CH	ANNEL BANDV	VIDTH: 5MI	Ηz	CHANNEL BANDWIDTH: 10MHz				
CHANNEL	FREQUENCY	PEAK TO RATIO		CHANNEL	FREQUENCY	PEAK TO AVERAGE RATIO (dB)		
	(MHz)	QPSK	16QAM		(MHz)	QPSK	16QAM	
20775	2502.5	4.90	5.61	20800	2505	4.80	5.54	
21100	2535	5.06 5.89		21100	2535	5.05	5.77	
21425	2567.5	5.13	5.97	21400	2565	5.09	5.79	





CHA	NNEL BANDW	IDTH: 15M	Hz	CHANNEL BANDWIDTH: 20MHz				
CHANNEL	FREQUENCY	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY	PEAK TO AVERAGE RATIO (dB)		
	(MHz)	QPSK	16QAM		(MHz)	QPSK	16QAM	
20825	2507.5	4.91	5.70	20850	2510	4.97	5.73	
21100	2535	5.07	5.87	21100	2535	5.10	5.83	
21375	2562.5	5.14	5.93	21350	2560	5.17	5.90	



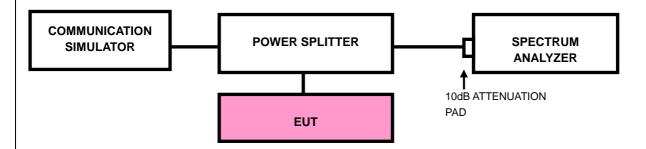


## 4.5 Band Edge Measurement

#### 4.5.1 Limits of Band Edge Measurement

According to FCC 27.53(m)(4) specified that For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. For mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed.

#### 4.5.2 Test Setup

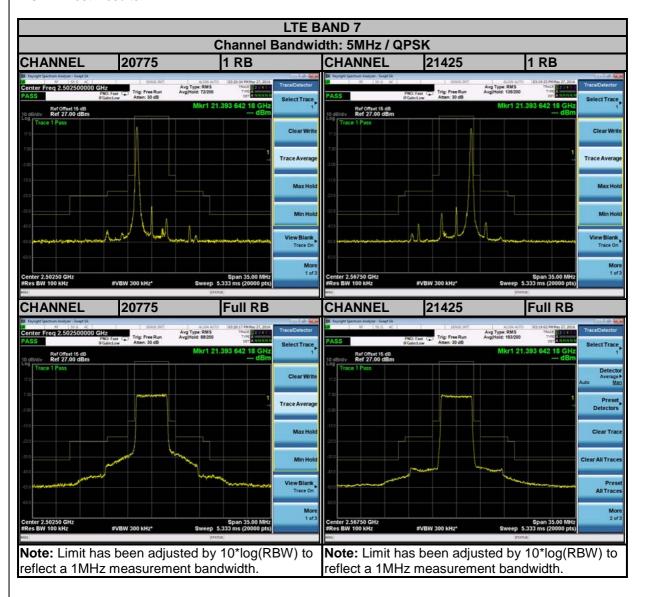


#### 4.5.3 Test Procedures

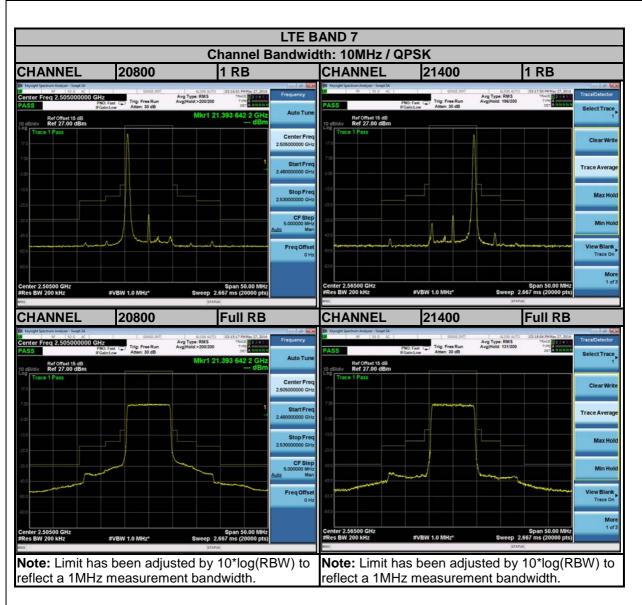
- a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- c. The center frequency of spectrum is the band edge frequency and span is 35MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (Channel bandwidth 5MHz).
- d. The center frequency of spectrum is the band edge frequency and span is 50MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 1MHz (Channel bandwidth 10MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 60MHz. RBW of the spectrum is 300kHz and VBW of the spectrum is 1MHz (Channel bandwidth 15MHz).
- f. The center frequency of spectrum is the band edge frequency and span is 80MHz. RBW of the spectrum is 500kHz and VBW of the spectrum is 2MHz (Channel bandwidth 20MHz).
- g. Record the max trace plot into the test report.



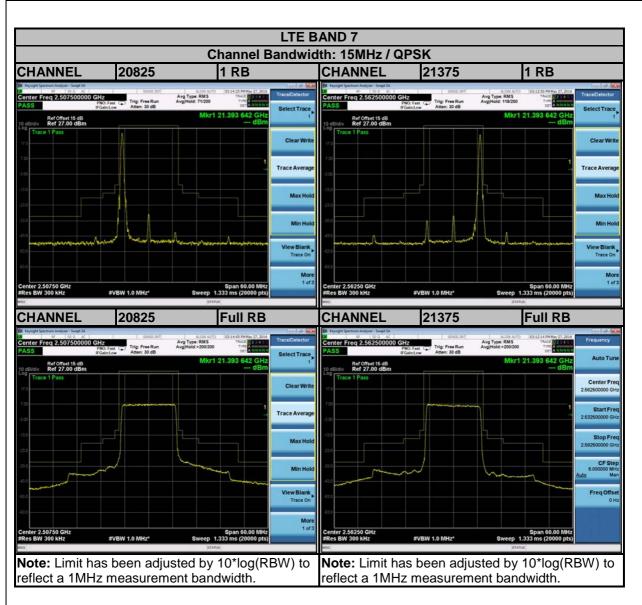
## 4.5.4 Test Results



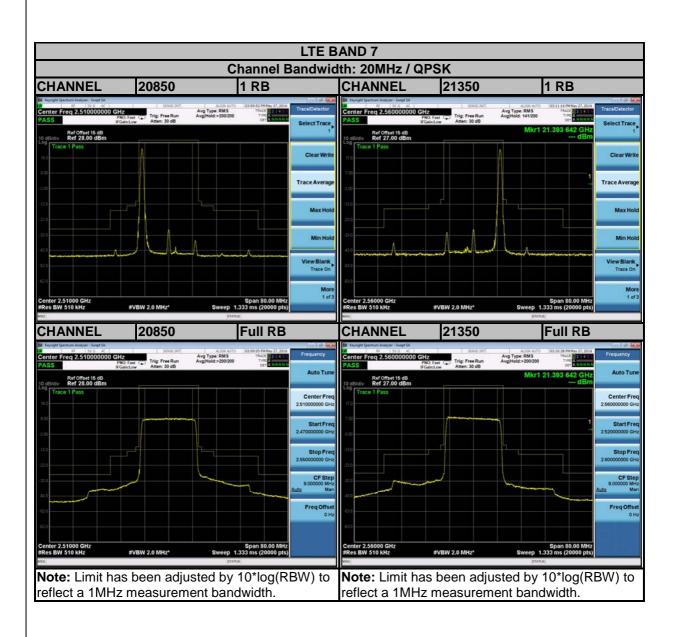














## 4.6 Conducted Spurious Emissions

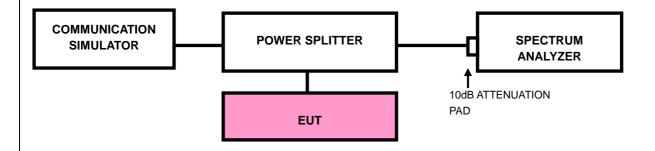
## 4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 55 +10 log10(P) dB. The limit of emission is equal to -25dBm.

#### 4.6.2 Test Procedure

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 30MHz to 27GHz for LTE Band 7. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

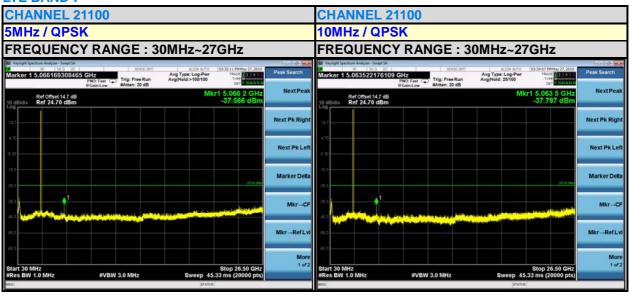
## 4.6.3 Test Setup

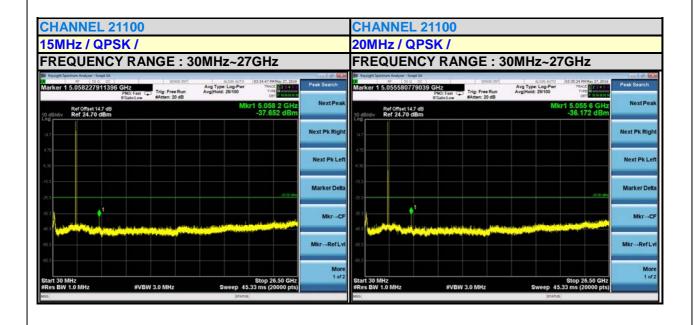




## 4.6.4 Test Results

## LTE BAND 7







#### 4.7 Radiated 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 55 + 10 log (P) dB. The emission limit equal to –25dBm.

#### 4.7.2 Test Procedure

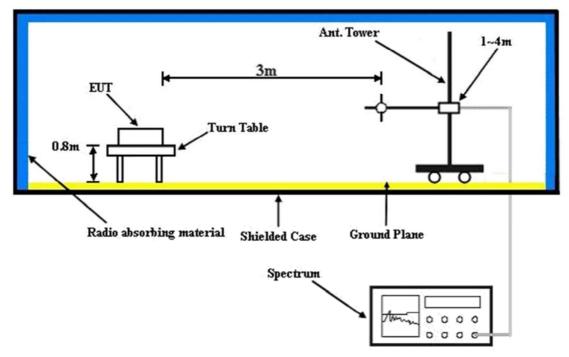
- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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 of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.7.3 Deviation from Test Standard No deviation.



## 4.7.4 Test Setup



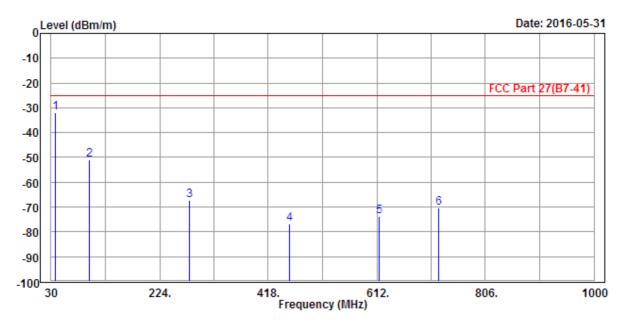
For the actual test configuration, please refer to the attached file (Test Setup Photo).



## 4.7.5 Test Results

## **BELOW 1GHz WORST-CASE DATA**

## LTE Band 7:

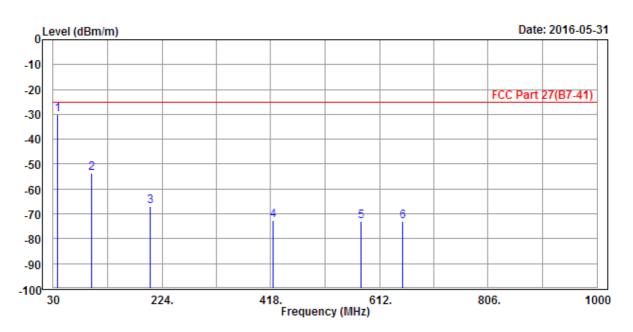


Condition: FCC Part 27(B7-41) 3m EIRP\_26M-1GHz-20160505-EMC9135+3143B-FCC

EUT : Baifone P4905 Mode : LTE Band7 Test By : Alex Chen

	Freq	Level	Read Level		Over Limit	Factor	Remark	Pol/Phase
_	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	37.760	-32.12	-44.36	-25.00	-7.12	12.24	Peak	Horizontal
2	97.900	-50.89	-40.18	-25.00	-25.89	-10.71	Peak	Horizontal
3	277.350	-67.30	-52.37	-25.00	-42.30	-14.93	Peak	Horizontal
4	455.830	-76.66	-66.24	-25.00	-51.66	-10.42	Peak	Horizontal
5	615.880	-73.85	-65.68	-25.00	-48.85	-8.17	Peak	Horizontal
6	722.580	-70.33	-65.27	-25.00	-45.33	-5.06	Peak	Horizontal





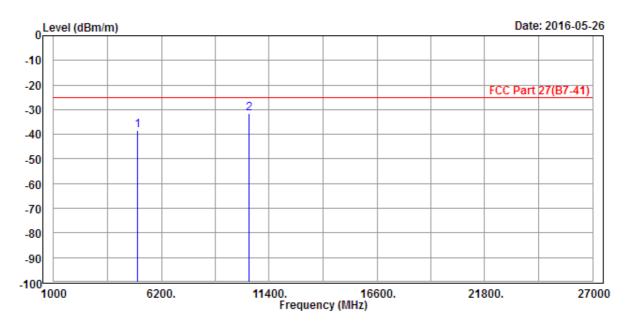
Condition: FCC Part 27(B7-41) 3m EIRP\_26M-1GHz-20160505-EMC9135+3143B-FCC

EUT : Baifone P4905 Mode : LTE Band7 Test By : Alex Chen

			Kead	Limit	Over			
	Freq	Level	Level	Line	Limit	Factor	Remark	Pol/Phase
_	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
		,		,		,		
1 PP	37.760	-30.09	-28.79	-25.00	-5.09	-1.30	Peak	Vertical
2		-53.58						Vertical
3	203.630	-66.96	-56.26	-25.00	-41.96	-10./0	Peak	Vertical
4	422.850	-72.63	-62.54	-25.00	-47.63	-10.09	Peak	Vertical
5	579.020	-73.17	-65.85	-25.00	-48.17	-7.32	Peak	Vertical
6	653.710	-72.82	-66.08	-25.00	-47.82	-6.74	Peak	Vertical



## ABOVE 1GHz LTE Band 7 CHANNEL BANDWIDTH: 5MHz / QPSK



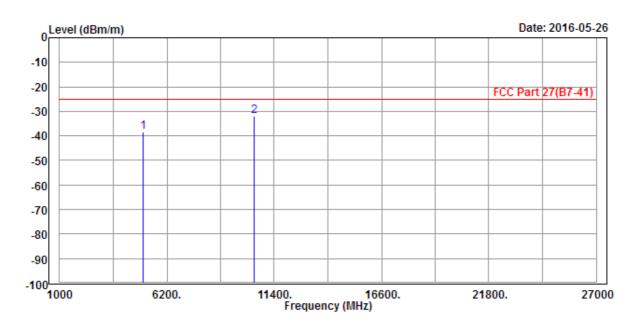
Condition: FCC Part 27(B7-41) 3m EIRP\_1G-18G-\_20160505-EMC012645B+3117-FCC

EUT : Baifone P4905 Mode : LTE Band7(5M)

Plan : Z-Plan Test By : Alex Chen

			Read	Limit	0ver			
	Freq	Level	Level	Line	Limit	Factor	Remark	Pol/Phase
	MHZ	dBm/m	dBm	dBm/m	dB	dB/m		
4	5056 000	20.52	46.06	25 00	43.50	0.44		
1	5056.000	-38.52	-46.96	-25.00	-13.52	8.44	Peak	Horizontal
2	PP10412.000	-31.42	-49.97	-25.00	-6.42	18.55	Peak	Horizontal





Condition: FCC Part 27(B7-41) 3m EIRP\_1G-18G-\_20160505-EMC012645B+3117-FCC

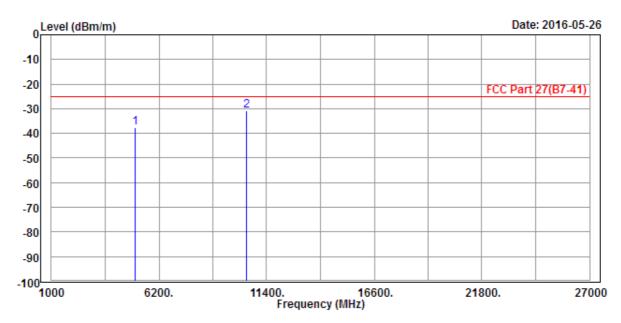
EUT : Baifone P4905 Mode : LTE Band7(5M)

Plan : Z-Plan Test By : Alex Chen

	Freq	Level		Limit Line		Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	5056.000 PP10412.000							Vertical Vertical



## **CHANNEL BANDWIDTH: 10MHz/QPSK**



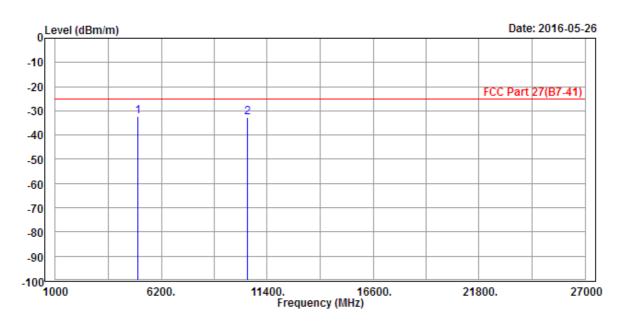
Condition: FCC Part 27(B7-41) 3m EIRP\_1G-18G-\_20160505-EMC012645B+3117-FCC

EUT : Baifone P4905 Mode : LTE Band7(10M)

Plan : X-Plan Test By : Alex Chen

	Freq	Level		Limit Line		Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	5056.000 PP10412.000							Horizontal Horizontal





Condition: FCC Part 27(B7-41) 3m EIRP\_1G-18G-\_20160505-EMC012645B+3117-FCC

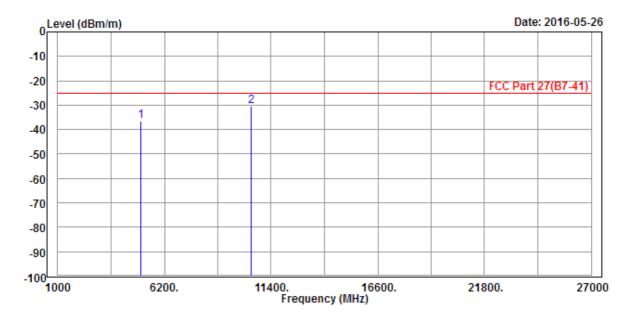
EUT : Baifone P4905 Mode : LTE Band7(10M)

Plan : X-Plan Test By : Alex Chen

Freq	Level		Limit Line		Factor	Remark	Pol/Phase
MHz	dBm/m	dBm	dBm/m	dB	dB/m		
PP 5056.000 10412.000							Vertical Vertical



## **CHANNEL BANDWIDTH: 15MHz / QPSK**



Condition: FCC Part 27(B7-41) 3m EIRP\_1G-18G-\_20160505-EMC012645B+3117-FCC

EUT : Baifone P4905 Mode : LTE Band7(15M)

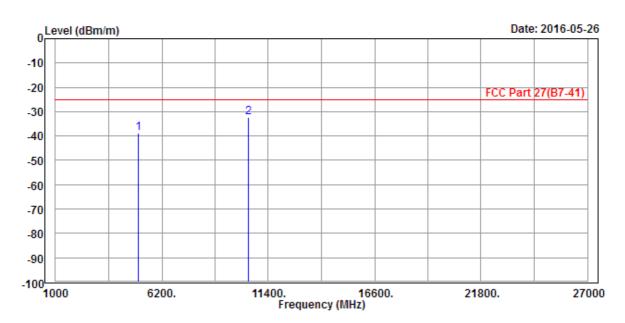
Plan : Z-Plan Test By : Alex Chen

Remark : IMEI 357288070008602

Freq	Level		Limit Line		Factor	Remark	Pol/Phase
MHz	dBm/m	dBm	dBm/m	dB	dB/m		

1 5056.000 -36.51 -44.95 -25.00 -11.51 8.44 Peak Horizontal 2 PP10412.000 -30.58 -49.13 -25.00 -5.58 18.55 Peak Horizontal





Condition: FCC Part 27(B7-41) 3m EIRP\_1G-18G-\_20160505-EMC012645B+3117-FCC

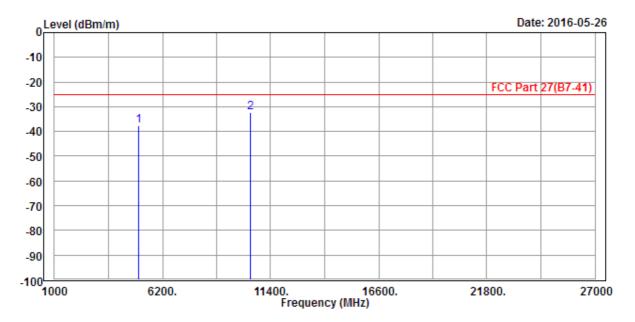
EUT : Baifone P4905 Mode : LTE Band7(15M)

Plan : Z-Plan Test By : Alex Chen

	Freq	Level		Limit Line		Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	5056.000 PP10412.000							Vertical Vertical



## **CHANNEL BANDWIDTH: 20MHz/QPSK**



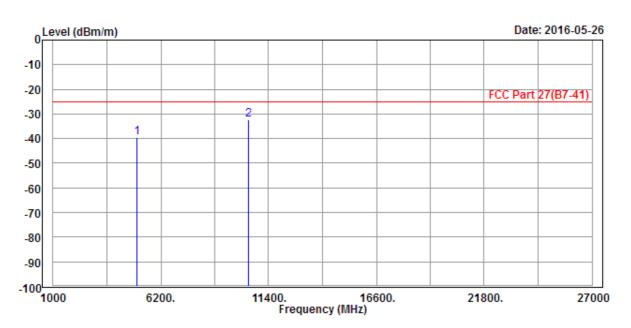
Condition: FCC Part 27(B7-41) 3m EIRP\_1G-18G-\_20160505-EMC012645B+3117-FCC

EUT : Baifone P4905 Mode : LTE Band7(20M)

Plan : Z-Plan Test By : Alex Chen

Freq Level Level Line Limit Factor Remark Pol	/Pnase
MHz dBm/m dBm dBm/m dB dB/m	
	izontal izontal





Condition: FCC Part 27(B7-41) 3m EIRP\_1G-18G-\_20160505-EMC012645B+3117-FCC

EUT : Baifone P4905 Mode : LTE Band7(20M)

Plan : Z-Plan Test By : Alex Chen

	Freq	Level		Limit Line		Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 2	5056.000 PP10412.000							Vertical 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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The address and road map of all our labs can be found in our web site also.

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