FCC Test Report

Report No.: AGC04183150401FE12

FCC ID	:	2AEMHM4GLTE
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Mobile Phone
BRAND NAME	:	OEM
MODEL NAME	:	M4GLTE
CLIENT	:	Shenzhen RF Technology Co., Ltd
DATE OF ISSUE	:	May 14, 2015
STANDARD(S)	:	FCC Part 27 Rules
REPORT VERSION	:	V1.0

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd.*

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 14, 2015	Valid	Original Report

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1.VERIFICATION OF COMPLIANCE

Applicant	Shenzhen RF Technology Co., Ltd
Address	F/3~5, BuildingD, Longhua Baokun Industrial Zone, Baoan District, Shenzhen, China
Manufacturer	Shenzhen RF Technology Co., Ltd
Address	F/3~5, BuildingD, Longhua Baokun Industrial Zone, Baoan District, Shenzhen, China
Product Designation	Mobile Phone
Brand Name	OEM
Test Model	M4GLTE
Date of test	Apr.27, 2015 to May 13,2015
Deviation	None
Condition of Test Sample	Normal

We hereby certify that:

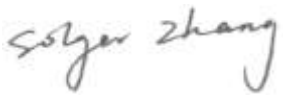
The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2009 and TIA/EIA 603. The sample tested as described in this report is in compliance with the FCC Rules Part 27.
The test results of this report relate only to the tested sample identified in this report.

Tested By : 

Bart Xie May 14, 2015

Reviewed By : 

Kidd Yang May 14, 2015

Approved By: 

Solger Zhang May 14, 2015

2. GENERAL INFORMATION

2.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Radio System Type:	LTE	
Hardware version:	L800B-25	
Software version:	SW-M4QL-OEM-L800B-V01-20150101	
Frequency Bands:	☐FDD Band 2 ☒FDD Band 4 ☐FDD Band 5 ☒FDD Band 17 ☐FDD Band 25 ☐FDD Band 26 ☐TDD Band 41 (U.S. Bands) ☐FDD Band 1 ☐FDD Band 3 ☐FDD Band 7 ☐FDD Band 8 ☐FDD Band 20 ☐TDD Band 33 ☐TDD Band 34 ☐TDD Band 38 ☐FDD Band 40 ☐FDD Band 42 ☐FDD Band 43 (Non-U.S. Bands)	
Frequency Range	LTE Band 4	Transmission (TX): 1710 to 1755 MHz
		Receiving (RX): 2110 to 2155 MHz
	LTE Band 17	Transmission (TX): 706.5 to 713.5 MHz
		Receiving (RX): 736.5 ~ 743.5 MHz
Supported Channel Bandwidth	LTE Band 4	☒ 1.4 MHz ☒ 3 MHz ☒ 5 MHz ☒ 10 MHz ☒ 15 MHz ☒ 20 MHz
	LTE Band 17	☒ 5 MHz ☒ 10 MHz
Antenna:	PIFA Antenna	
Type of Modulation	QPSK/16QAM	
Antenna gain:	-0.7dBi(LTE band 4), -1.0dBi(LTE band 17)	
Power Supply:	DC 3.7V by battery	
Battery parameter:	DC3.7V/2000mAh	
Adapter Input:	AC100-240V, 50-60Hz, 0.3A	
Adapter Output:	DC5V, 1A	
Dual Card:	WCDMA / GSM/LTE Card Slot GSM Card Slot	
Power Class	3	
Extreme Vol. Limits:	DC3.4 V to 4.2 V (Normal: DC3.7 V)	
Extreme Temp. Tolerance	-10℃ to +50℃	
*** Note: The High Voltage DC4.2V and Low Voltage DC3.4V were declared by manufacturer, The EUT couldn't be operating normally with higher or lower voltage.		

2.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AEMHM4GLTE**, filing to comply with the FCC Part27 requirements.

2.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI C 63.4: 2009; TIA/EIA 603 and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.
KDB 971168 D01 Power Meas License Digital Systems v02r01

2.4 TEST FACILITY

Site	Compliance Certification Services (Shenzhen) Inc.
Location	No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd.,Guan Lan Town, Baoan District, Shenzhen, China
Description	Test Firm Registration Number: 441872

2.5 MEASUREMENT INSTRUMENTS

Name of Equipment	Manufacturer	Model	S/N	Calibration Date	Calibration Due.
SPECTRUM ANALYZER	AGILENT	E4440A	US41421290	Feb.17,2015	Feb.16,2016
TEST RECEIVER	R&S	ESCI	100694	July 25, 2014	July 24, 2015
COMMUNICATION TESTER	AGILENT	8960	122500087	July 25, 2014	July 24, 2015
COMMUNICATION TESTER	R&S	CMW500	120909	Oct. 21, 2014	Oct. 20, 2015
SIGNAL GENERATOR	AGILENT	E4438C	MY44260051	Feb.23,2015	Feb. 22,2016
LISN	R&S	ESH3-Z5	838979/009	July 25, 2014	July 24, 2015
CLIMATE CHAMBER	ALBATROSS	--	--	July 25, 2014	July 24, 2015
Loop Antenna	A.H.	SAS-562B	SEL0097	May 10, 2014	May 09, 2015
Loop Antenna	A.H.	SAS-562B	SEL0097	May 09, 2015	May 08, 2016
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Aug.16, 2014	Aug.15, 2015
Substitution Antenna	EMCO	3142C	00060447	Aug.17,2013	Aug.16,2015
Substitution Antenna	EM	EM-AH-10180	69	Apr.19, 2015	Apr.18, 2016
Horn Antenna	EM	EM-AH-10180	67	Feb.17,2015	Feb.16,2016
Horn Antenna	A.H. Systems Inc.	SAS-574	N/A	June 6, 2014	June 5, 2015
Radiation Cable 1	Sat	RE1	R003	June 4, 2014	June 3, 2015
Radiation Cable 2	Sat	RE2	R002	June 4, 2014	June 3, 2015
Conduction Cable	Sat	CE1	C001	June 4, 2014	June 3, 2015

Radiated Emission Test Site 966(2)					
Name of Equipment	**Manufacturer**	**Model**	**S/N**	**Calibration Date**	**Calibration Due.**
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	Mar.01, 2015	Mar.01, 2016
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	Mar.09, 2015	Mar.08, 2016
Amplifier	MITEQ	AM-1604-3000	1123808	Mar.18, 2015	Mar.17, 2016
High Noise Amplifier	Agilent	8449B	3008A01838	Mar.18, 2015	Mar.17, 2016
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	July 10, 2014	July 09, 2015
Bilog Antenna	SCHAFFNER	CBL6143	5082	Mar.01, 2015	Mar.01, 2016
Horn Antenna	SCHWARZBECK	BBHA9120	D286	Mar.01, 2015	Mar.01, 2016
Loop Antenna	COM-POWER	AL-130	121044	Sep.27, 2014	Sep.26, 2015
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	Feb.28, 2015	Feb.27, 2016
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

Conducted Emission Test Site					
Name of Equipment	**Manufacturer**	**Model**	**S/N**	**Calibration Date**	**Calibration Due.**
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	Mar.09, 2015	Mar.08, 2016
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	Mar.09, 2015	Mar.08, 2016
LISN	EMCO	3825/2	8901-1459	Mar.09, 2015	Mar.08, 2016
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	Mar.04, 2015	Mar.03, 2016
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

2.6 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

2.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. SYSTEM TEST CONFIGURATION

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

3.3 GENERAL TECHNICAL REQUIREMENTS

Item Number	Item Description		FCC Rules
1	Output Power	Conducted output power	2.1046/27.50(d)/ 27.50(c)
		Radiated output power	
2	Peak-to-Average Ratio	Peak-to-Average Ratio	27.50(d)
3	Spurious Emission	Conducted spurious emission	2.1051 / 27.53(h)/ 27.53(g)
		Radiated spurious emission	
4	Mains Conducted Emission		15.107 / 15.207
5	Frequency Stability		2.1055/27.54
6	Occupied Bandwidth		2.1049 (h)(i)
7	Emission Bandwidth		2.1049/27.53(h)/ 27.53(g)
8	Band Edge		27.53(h)/ 27.53(g)

Note: Testing was performed by configuring EUT to maximum output power status, the declared output power class for different.

3.4 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

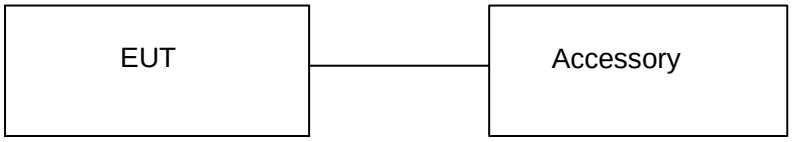


Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Mobile Phone	M4GLTE	FCC ID: 2AEMHM4GLTE	EUT
2	Adapter	M4GLTE	DC5V /1A	Accessory
3	Battery	M4GLTE	DC3.7V/ 2000mAh	Accessory
4	Earphone	M4GLTE	N/A	Accessory
5	USB Cable	M4GLTE	N/A	Accessory

****Note: All the accessories have been used during the test. The following "EUT" in setup diagram means EUT system.*

4. SUMMARY OF TEST RESULTS

Item Number	Item Description		FCC Rules	Result
1	Output Power	Conducted Output Power	2.1046/27.50(d)/ 27.50(c)	Pass
		Radiated Output Power		
2	Peak-to-Average Ratio	Peak-to-Average Ratio	27.50(d)	Pass
3	Spurious Emission	Conducted Spurious Emission	2.1051 / 27.53(h)/ 27.53(g)	Pass
		Radiated Spurious Emission		
4	Mains Conducted Emission		15.107 / 15.207	Pass
5	Frequency Stability		2.1055/27.54	Pass
6	Occupied Bandwidth		2.1049 (h)(i)	Pass
7	Emission Bandwidth		2.1049/27.53(h)/ 27.53(g)	Pass
8	Band Edge		27.53(h)/ 27.53(g)	Pass

5. DESCRIPTION OF TEST MODES

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMW 500) to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both LTE frequency band.

*****Note:** LTE band 4 mode and LTE band 17 mode have been tested during the test.

The worst condition was recorded in the test report if no other modes test data.

Test Mode	Test Modes Description
LTE	LTE system, QPSK modulation
LTE	LTE system, 16QAM modulation

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 4	TX (1.4M)	Channel 19957	Channel 20175	Channel 20393
		1710.7 MHz	1732.5 MHz	1754.3 MHz
	TX (3M)	Channel 19965	Channel 20175	Channel 20385
		1711.5 MHz	1732.5 MHz	1753.5 MHz
	TX (5M)	Channel 19975	Channel 20175	Channel 20375
		1712.5 MHz	1732.5 MHz	1752.5 MHz
	TX (10M)	Channel 20000	Channel 20175	Channel 20350
		1715 MHz	1732.5 MHz	1750 MHz
	TX (15M)	Channel 20025	Channel 20175	Channel 20325
		1717.5 MHz	1732.5 MHz	1747.5 MHz
	TX (20M)	Channel 20050	Channel 20175	Channel 20300
		1720 MHz	1732.5 MHz	1745 MHz
	RX (1.4M)	Channel 1957	Channel 2175	Channel 2393
		2110.7 MHz	2132.5 MHz	2154.3 MHz
	RX (3M)	Channel 1965	Channel 2175	Channel 2385
		2111.5 MHz	2132.5 MHz	2153.5 MHz
	RX (5M)	Channel 1975	Channel 2175	Channel 2375
		2112.5 MHz	2132.5 MHz	2152.5 MHz
	RX (10M)	Channel 2000	Channel 2175	Channel 2350
		2115 MHz	2132.5 MHz	2150 MHz
	RX (15M)	Channel 2025	Channel 2175	Channel 2325
		2117.5 MHz	2132.5 MHz	2147.5 MHz
	RX (20M)	Channel 2050	Channel 2175	Channel 2300
		2120 MHz	2132.5 MHz	2145 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 17	TX (5M)	Channel 23755	Channel 23790	Channel 23825
		706.5 MHz	710 MHz	713.5 MHz
	TX (10M)	Channel 23780	Channel 23790	Channel 23800
		709 MHz	710 MHz	711 MHz
	RX (5M)	Channel 5755	Channel 5790	Channel 5825
		736.5 MHz	740 MHz	743.5 MHz
	RX (10M)	Channel 5780	Channel 5790	Channel 5800
		739 MHz	740 MHz	743.5 MHz

6. OUTPUT POWER

6.1 Conducted Output Power

6.1.1 Procedures: (According with KDB 971168)

The transmitter output port was connected to base station.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Measure the maximum burst average power and average power for other modulation signal.

The EUT was setup for the max output power with pseudo random data modulation. Power was measured with Spectrum Analyzer. The measurements were performed on all modes (LTE Band 4) at 3 typical channels (the Top Channel, the Middle Channel and the Bottom Channel) for each band.

The instrument must have an available measurement/resolution bandwidth that is equal to or exceeds the OBW. If this capability is available, then the following procedure can be used to determine the total peak output power.

a) Set the RBW ≥ OBW.

b) Set VBW ≥ 3 × RBW. c)

Set span ≥ 2 x RBW

d) Sweep time = auto couple.

e) Detector = peak.

f) Ensure that the number of measurement points ≥ span/RBW.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

1) Use the peak marker function to determine the peak amplitude level.

6.1.2 MEASUREMENT RESULT

Conducted Output Power Limits for LTE Band 4		
Mode	**Average Power**	**Tolerance(dB)**
LTE	23 dBm (0.2W)	- 2.7

LTE Band 4

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
20MHz	20050	1720.0	QPSK	1	0	0	24.14
				1	49	0	24.00
				1	99	0	23.84
				50	0	1	24.03
				50	24	1	23.87
				50	49	1	23.80
				100	0	1	23.91
			16QAM	1	0	1	21.13
				1	49	1	24.24
				1	99	1	24.03
				50	0	2	23.94
				50	24	2	23.87
				50	49	2	23.71
				100	0	2	23.67
	20175	1732.5	QPSK	1	0	0	23.90
				1	49	0	23.77
				1	99	0	23.88
				50	0	1	23.78
				50	24	1	23.74
				50	49	1	23.81
				100	0	1	23.79
			16QAM	1	0	1	23.99
				1	49	1	23.90
				1	99	1	24.00
				50	0	2	23.68
				50	24	2	23.66
				50	49	2	23.73
				100	0	2	23.99
	20300	1745.0	QPSK	1	0	0	23.86
				1	49	0	23.95
				1	99	0	24.59
				50	0	1	23.82
				50	24	1	23.88
				50	49	1	24.08
				100	0	1	23.93
			16QAM	1	0	1	24.05
				1	49	1	24.13
				1	99	1	24.56
				50	0	2	23.79
				50	24	2	23.82
				50	49	2	23.96
				100	0	2	23.83

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
15MHz	20025	1717.5	QPSK	1	0	0	23.99
				1	37	0	23.90
				1	74	0	23.75
				36	0	1	24.25
				36	16	1	24.20
				36	35	1	24.10
				75	0	1	24.18
			16QAM	1	0	1	24.15
				1	37	1	24.02
				1	74	1	23.92
				36	0	2	24.10
				36	16	2	24.04
				36	35	2	23.92
				75	0	2	24.02
	20175	1732.5	QPSK	1	0	0	23.71
				1	37	0	23.65
				1	74	0	23.72
				36	0	1	23.90
				36	16	1	23.82
				36	35	1	23.84
				75	0	1	23.88
			16QAM	1	0	1	23.87
				1	37	1	23.88
				1	74	1	23.92
				36	0	2	23.80
				36	16	2	23.76
				36	35	2	23.76
				75	0	2	23.81
	20325	1747.5	QPSK	1	0	0	23.76
				1	37	0	23.93
				1	74	0	24.51
				36	0	1	23.94
				36	16	1	24.11
				36	35	1	24.38
				75	0	1	24.16
			16QAM	1	0	1	23.97
				1	37	1	24.04
				1	74	1	24.49
				36	0	2	23.89
				36	16	2	24.00
				36	35	2	24.18
				75	0	2	24.03

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	20000	1715.0	QPSK	1	0	0	23.97
				1	24	0	23.99
				1	49	0	23.83
				25	0	1	24.05
				25	12	1	24.03
				25	24	1	23.95
				50	0	1	23.97
			16QAM	1	0	1	24.13
				1	24	1	24.14
				1	49	1	23.95
				25	0	2	23.91
				25	12	2	23.89
				25	24	2	23.80
				50	0	2	23.87
	20175	1732.5	QPSK	1	0	0	23.66
				1	24	0	23.65
				1	49	0	23.62
				25	0	1	23.70
				25	12	1	23.70
				25	24	1	23.70
				50	0	1	23.72
			16QAM	1	0	1	23.83
				1	24	1	23.87
				1	49	1	23.84
				25	0	2	23.65
				25	12	2	23.65
				25	24	2	23.67
				50	0	2	23.66
	20350	1750.0	QPSK	1	0	0	23.79
				1	24	0	24.05
				1	49	0	24.41
				25	0	1	23.91
				25	12	1	24.01
				25	24	1	24.20
				50	0	1	24.02
			16QAM	1	0	1	24.05
				1	24	1	24.20
				1	49	1	24.50
				25	0	2	23.77
				25	12	2	23.86
				25	24	2	24.00
				50	0	2	23.88

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	19975	1712.5	QPSK	1	0	0	23.99
				1	12	0	23.97
				1	24	0	23.95
				12	0	1	24.06
				12	6	1	24.06
				12	11	1	24.06
				25	0	1	24.01
			16QAM	1	0	1	24.20
				1	12	1	24.15
				1	24	1	24.13
				12	0	2	24.05
				12	6	2	24.05
				12	11	2	24.04
				25	0	2	23.92
	20175	1732.5	QPSK	1	0	0	23.67
				1	12	0	23.65
				1	24	0	23.64
				12	0	1	23.76
				12	6	1	23.75
				12	11	1	23.74
				25	0	1	23.67
			16QAM	1	0	1	23.92
				1	12	1	23.91
				1	24	1	23.93
				12	0	2	23.79
				12	6	2	23.78
				12	11	2	23.81
				25	0	2	23.65
	20375	1752.5	QPSK	1	0	0	24.18
				1	12	0	24.33
				1	24	0	24.52
				12	0	1	24.13
				12	6	1	24.20
				12	11	1	24.33
				25	0	1	24.20
			16QAM	1	0	1	23.90
				1	12	1	24.07
				1	24	1	24.22
				12	0	2	23.98
				12	6	2	24.07
				12	11	2	24.15
				25	0	2	24.01

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
3MHz	19965	1711.5	QPSK	1	0	0	23.80
				1	7	0	23.81
				1	14	0	23.83
				8	0	1	24.00
				8	4	1	24.01
				8	7	1	24.03
				15	0	1	23.96
			16QAM	1	0	1	24.00
				1	7	1	23.99
				1	14	1	23.97
				8	0	2	23.96
				8	4	2	23.97
				8	7	2	23.95
				15	0	2	23.82
	20175	1732.5	QPSK	1	0	0	23.50
				1	7	0	23.50
				1	14	0	23.53
				8	0	1	23.66
				8	4	1	23.64
				8	7	1	23.65
				15	0	1	23.64
			16QAM	1	0	1	23.70
				1	7	1	23.74
				1	14	1	23.64
				8	0	2	23.69
				8	4	2	23.65
				8	7	2	23.55
				15	0	2	23.70
	20385	1753.5	QPSK	1	0	0	24.15
				1	7	0	24.28
				1	14	0	24.36
				8	0	1	24.35
				8	4	1	24.40
				8	7	1	24.46
				15	0	1	24.21
			16QAM	1	0	1	24.20
				1	7	1	24.29
				1	14	1	24.39
				8	0	2	24.15
				8	4	2	24.20
				8	7	2	24.26
				15	0	2	24.04

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
1.4MHz	19957	1710.7	QPSK	1	0	0	23.73
				1	2	0	23.83
				1	5	0	23.79
				3	0	0	23.91
				3	1	0	23.91
				3	2	0	23.91
				6	0	1	24.01
			16QAM	1	0	1	23.96
				1	2	1	24.08
				1	5	1	23.97
				3	0	1	23.96
				3	1	1	23.92
				3	2	1	23.93
				6	0	2	23.88
	20175	1732.5	QPSK	1	0	0	23.53
				1	2	0	23.60
				1	5	0	23.57
				3	0	0	23.61
				3	1	0	23.58
				3	2	0	23.63
				6	0	1	23.64
			16QAM	1	0	1	23.81
				1	2	1	23.90
				1	5	1	23.82
				3	0	1	23.53
				3	1	1	23.54
				3	2	1	23.58
				6	0	2	23.54
	20393	1754.3	QPSK	1	0	0	24.24
				1	2	0	24.32
				1	5	0	24.32
				3	0	0	24.27
				3	1	0	24.28
				3	2	0	24.29
				6	0	1	24.55
			16QAM	1	0	1	24.22
				1	2	1	24.35
				1	5	1	24.29
				3	0	1	24.08
				3	1	1	24.10
				3	2	1	24.14
				6	0	2	24.40

LTE Band 17

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
10MHz	23780	709	QPSK	1	0	0	24.18
				1	24	0	24.27
				1	49	0	24.04
				25	0	1	23.24
				25	12	1	23.20
				25	24	1	23.15
				50	0	1	23.18
			16QAM	1	0	1	23.63
				1	24	1	23.62
				1	49	1	23.43
				25	0	2	22.42
				25	12	2	22.39
				25	24	2	22.32
				50	0	2	22.22
	23790	710	QPSK	1	0	0	24.10
				1	24	0	24.10
				1	49	0	23.84
				25	0	1	23.11
				25	12	1	23.06
				25	24	1	23.00
				50	0	1	22.99
			16QAM	1	0	1	23.14
				1	24	1	23.13
				1	49	1	22.94
				25	0	2	22.17
				25	12	2	22.13
				25	24	2	22.04
				50	0	2	22.05
	23800	711	QPSK	1	0	0	23.87
				1	24	0	23.74
				1	49	0	23.42
				25	0	1	22.89
				25	12	1	22.70
				25	24	1	22.64
				50	0	1	22.74
			16QAM	1	0	1	23.11
				1	24	1	22.95
				1	49	1	22.62
				25	0	2	21.99
				25	12	2	21.83
				25	24	2	21.74
				50	0	2	21.81

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power (dBm)
5MHz	23755	706.5	QPSK	1	0	0	24.17
				1	12	0	24.04
				1	24	0	23.76
				12	0	1	23.17
				12	6	1	23.07
				12	11	1	22.96
				25	0	1	23.08
			16QAM	1	0	1	23.50
				1	12	1	23.34
				1	24	1	23.08
				12	0	2	22.20
				12	6	2	22.12
				12	11	2	22.03
				25	0	2	22.11
	23790	710	QPSK	1	0	0	24.15
				1	12	0	23.90
				1	24	0	23.63
				12	0	1	23.11
				12	6	1	23.03
				12	11	1	22.87
				25	0	1	23.02
			16QAM	1	0	1	23.47
				1	12	1	23.24
				1	24	1	22.94
				12	0	2	22.17
				12	6	2	22.07
				12	11	2	21.92
				25	0	2	22.03
	23825	713.5	QPSK	1	0	0	24.16
				1	12	0	23.88
				1	24	0	23.50
				12	0	1	23.09
				12	6	1	22.95
				12	11	1	22.77
				25	0	1	22.95
			16QAM	1	0	1	23.57
				1	12	1	23.33
				1	24	1	22.94
				12	0	2	22.13
				12	6	2	22.03
				12	11	2	21.81
				25	0	2	22.02

According to 3GPP 36.521 sub-clause 6.2.3.3, the maximum output power is allowed to be reduced by following the table.

Table 6.2.3.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (For PRACH, PUCCH and SRS transmission, the allowed MPR is according to that specified for PUSCH QPSK modulation for the corresponding transmission bandwidth.).

When PRACH, PUCCH are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

For each subframe, the MPR is evaluated per slot and given by the maximum value taken over the transmission(s) within the slot, the maximum MPR over the two slots is then applied for the entire subframe.

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5.3 apply. The normative reference for this requirement is TS 36.101 clause 6.2.3.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

6.2 RADIATED OUTPUT POWER

6.2.1 MEASUREMENT METHOD

The measurements procedures specified in TIA-603C-2004 were applied.

1 In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.

2 The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as ARpl=Pin + 2.15 - Pr. The ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl

3 The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.

4 From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.

5 The EUT is then put into continuously transmitting mode at its maximum power level.

6 Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 27.50(d)(4). The "reference path loss" from Step1 is added to this result.

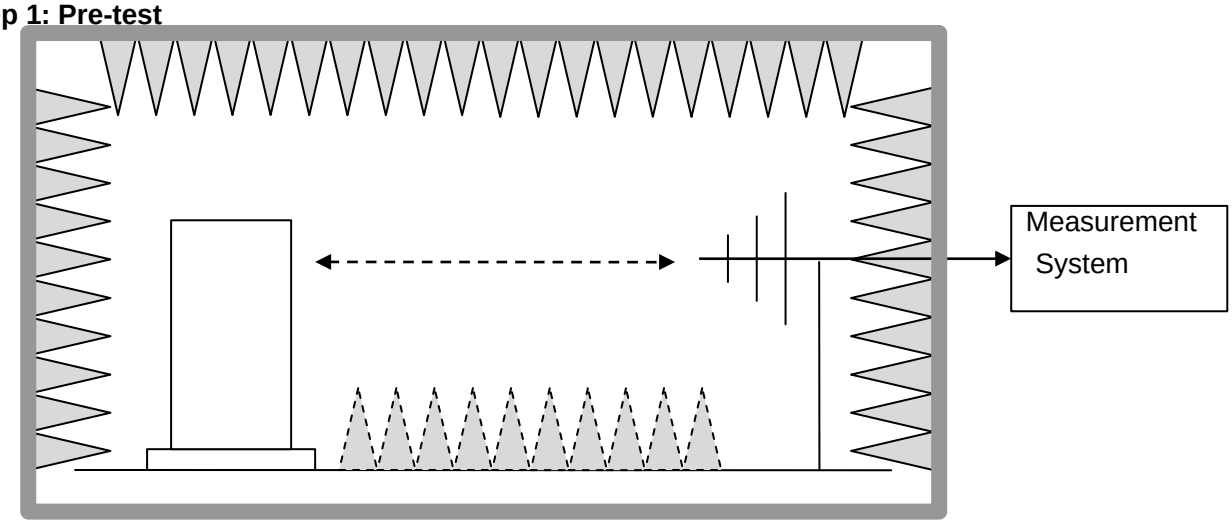
7 This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).

8 ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi..

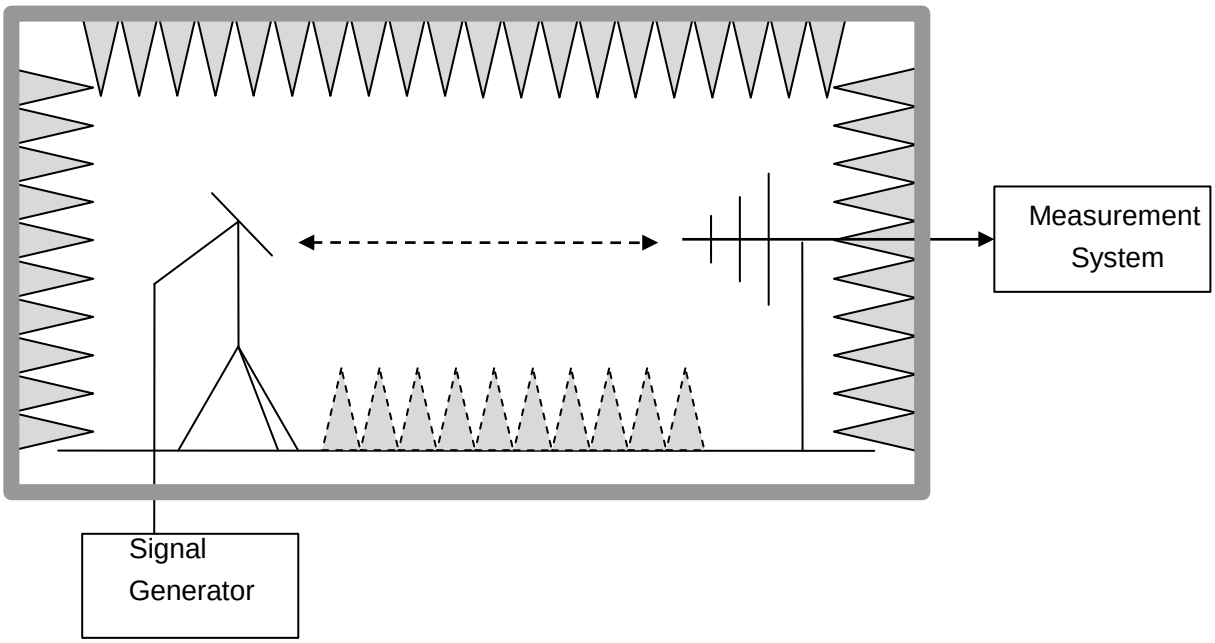
Test Setup

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP



6.2.2 PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 27.50(d) specifies, “Mobile/portable stations are limited to 1 watts e.i.r.p.

Rule Part 27.50(c)(10) specifies “Portable stations (hand-held devices) are limited to 3 watts ERP”.

Mode	Nominal Peak Power
LTE Band 4	<=30 dBm (1W)
LTE Band 17	<=34.77dBm(3W)

6.2.3 MEASUREMENT RESULT

EIRP for LTE Band4 (Part 27)

Frequency	Channel Bandwidth	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
1710.7	1.4	QPSK	1/0	12.77	V	7.95	0.79	19.93	30
1732.5	1.4	QPSK	1/0	12.69	V	7.95	0.79	19.85	30
1754.3	1.4	QPSK	1/0	12.86	V	7.95	0.79	20.02	30
1710.7	1.4	QPSK	1/0	11.88	H	7.95	0.79	19.04	30
1732.5	1.4	QPSK	1/0	11.8	H	7.95	0.79	18.96	30
1754.3	1.4	QPSK	1/0	11.71	H	7.95	0.79	18.87	30
1710.7	1.4	16-QAM	1/5	12.72	V	7.95	0.79	19.88	30
1732.5	1.4	16-QAM	1/0	12.61	V	7.95	0.79	19.77	30
1754.3	1.4	16-QAM	1/0	12.82	V	7.95	0.79	19.98	30
1710.7	1.4	16-QAM	1/5	11.84	H	7.95	0.79	19	30
1732.5	1.4	16-QAM	1/0	11.89	H	7.95	0.79	19.05	30
1754.3	1.4	16-QAM	1/0	11.73	H	7.95	0.79	18.89	30
1711.5	3	QPSK	1/0	12.54	V	7.95	0.79	19.7	30
1732.5	3	QPSK	1/0	12.67	V	7.95	0.79	19.83	30
1753.5	3	QPSK	1/0	13.07	V	7.95	0.79	20.23	30
1711.5	3	QPSK	1/0	11.99	H	7.95	0.79	19.15	30
1732.5	3	QPSK	1/0	11.62	H	7.95	0.79	18.78	30
1753.5	3	QPSK	1/0	12.1	H	7.95	0.79	19.26	30
1711.5	3	16-QAM	1/0	13.06	V	7.95	0.79	20.22	30
1732.5	3	16-QAM	1/0	12.87	V	7.95	0.79	20.03	30
1753.5	3	16-QAM	1/0	12.62	V	7.95	0.79	19.78	30
1711.5	3	16-QAM	1/0	11.69	H	7.95	0.79	18.85	30
1732.5	3	16-QAM	1/0	12.21	H	7.95	0.79	19.37	30
1753.5	3	16-QAM	1/0	11.81	H	7.95	0.79	18.97	30
1712.5	5	QPSK	1/0	12.6	V	7.95	0.79	19.76	30
1732.5	5	QPSK	1/0	13.09	V	7.95	0.79	20.25	30
1752.5	5	QPSK	1/24	13.07	V	7.95	0.79	20.23	30
1712.5	5	QPSK	1/0	12.07	H	7.95	0.79	19.23	30
1732.5	5	QPSK	1/0	12.03	H	7.95	0.79	19.19	30
1752.5	5	QPSK	1/24	11.67	H	7.95	0.79	18.83	30
1712.5	5	16-QAM	1/0	12.93	V	7.95	0.79	20.09	30
1732.5	5	16-QAM	1/0	13.1	V	7.95	0.79	20.26	30
1752.5	5	16-QAM	1/24	12.61	V	7.95	0.79	19.77	30
1712.5	5	16-QAM	1/0	11.81	H	7.95	0.79	18.97	30
1732.5	5	16-QAM	1/0	11.94	H	7.95	0.79	19.1	30
1752.5	5	16-QAM	1/24	11.72	H	7.95	0.79	18.88	30
1715	10	QPSK	1/0	13.03	V	7.95	0.79	20.19	30
1732.5	10	QPSK	1/49	12.9	V	7.95	0.79	20.06	30
1750	10	QPSK	1/0	12.6	V	7.95	0.79	19.76	30
1715	10	QPSK	1/0	11.88	H	7.95	0.79	19.04	30
1732.5	10	QPSK	1/49	11.79	H	7.95	0.79	18.95	30
1750	10	QPSK	1/0	11.94	H	7.95	0.79	19.1	30
1715	10	16-QAM	1/0	13.07	V	7.95	0.79	20.23	30
1732.5	10	16-QAM	1/49	13.16	V	7.95	0.79	20.32	30
1750	10	16-QAM	1/0	12.84	V	7.95	0.79	20	30

Frequency	Channel BW	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
1715	10	16-QAM	1/0	12.07	H	7.95	0.79	19.23	30
1732.5	10	16-QAM	1/49	12.18	H	7.95	0.79	19.34	30
1750	10	16-QAM	1/0	11.92	H	7.95	0.79	19.08	30
1717.5	15	QPSK	1/0	12.94	V	7.95	0.79	20.1	30
1732.5	15	QPSK	1/74	12.63	V	7.95	0.79	19.79	30
1747.5	15	QPSK	1/0	12.89	V	7.95	0.79	20.05	30
1717.5	15	QPSK	1/0	12.07	H	7.95	0.79	19.23	30
1732.5	15	QPSK	1/74	12.04	H	7.95	0.79	19.2	30
1747.5	15	QPSK	1/0	11.82	H	7.95	0.79	18.98	30
1717.5	15	16-QAM	1/0	12.74	V	7.95	0.79	19.9	30
1732.5	15	16-QAM	1/74	12.79	V	7.95	0.79	19.95	30
1747.5	15	16-QAM	1/0	12.99	V	7.95	0.79	20.15	30
1717.5	15	16-QAM	1/0	12.02	H	7.95	0.79	19.18	30
1732.5	15	16-QAM	1/74	11.88	H	7.95	0.79	19.04	30
1747.5	15	16-QAM	1/0	11.8	H	7.95	0.79	18.96	30
1720	20	QPSK	1/99	12.93	V	7.95	0.79	20.09	30
1732.5	20	QPSK	1/99	13.18	V	7.95	0.79	20.34	30
1745	20	QPSK	1/0	12.81	V	7.95	0.79	19.97	30
1720	20	QPSK	1/99	11.92	H	7.95	0.79	19.08	30
1732.5	20	QPSK	1/99	11.64	H	7.95	0.79	18.8	30
1745	20	QPSK	1/0	12.19	H	7.95	0.79	19.35	30
1720	20	16-QAM	1/99	13.23	V	7.95	0.79	20.39	30
1732.5	20	16-QAM	1/99	12.94	V	7.95	0.79	20.1	30
1745	20	16-QAM	1/0	12.81	V	7.95	0.79	19.97	30
1720	20	16-QAM	1/99	12.08	H	7.95	0.79	19.24	30
1732.5	20	16-QAM	1/99	11.92	H	7.95	0.79	19.08	30

ERP for LTE Band17 (Part 27)

Frequency	Channel BW	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
706.5	5	QPSK	1/0	12.07	H	6.7	0.49	18.28	34.77
710	5	QPSK	1/0	12.18	H	6.7	0.49	18.39	34.77
713.5	5	QPSK	1/0	11.92	H	6.7	0.49	18.13	34.77
706.5	5	QPSK	1/0	12.94	V	6.7	0.49	19.15	34.77
710	5	QPSK	1/0	12.63	V	6.7	0.49	18.84	34.77
713.5	5	QPSK	1/0	12.89	V	6.7	0.49	19.1	34.77
706.5	5	16-QAM	1/0	12.07	H	6.7	0.49	18.28	34.77
710	5	16-QAM	1/0	12.04	H	6.7	0.49	18.25	34.77
713.5	5	16-QAM	1/0	11.82	H	6.7	0.49	18.03	34.77
706.5	5	16-QAM	1/0	12.74	V	6.7	0.49	18.95	34.77
710	5	16-QAM	1/0	12.79	V	6.7	0.49	19	34.77
713.5	5	16-QAM	1/0	12.99	V	6.7	0.49	19.2	34.77
709	10	QPSK	1/0	12.02	H	6.7	0.49	18.23	34.77
710	10	QPSK	1/0	11.88	H	6.7	0.49	18.09	34.77
711	10	QPSK	1/0	11.8	H	6.7	0.49	18.01	34.77

Frequency	Channel BW	Mode.	RB	Substituted level	Antenna Polarization	Antenna Gain correction	Cable Loss	Absolute Level	Limit (dBm)
709	10	QPSK	1/0	12.93	V	6.7	0.49	19.14	34.77
710	10	QPSK	1/0	13.18	V	6.7	0.49	19.39	34.77
711	10	QPSK	1/0	12.81	V	6.7	0.49	19.02	34.77
709	10	16-QAM	1/0	11.92	H	6.7	0.49	18.13	34.77
710	10	16-QAM	1/0	11.64	H	6.7	0.49	17.85	34.77
711	10	16-QAM	1/0	12.19	H	6.7	0.49	18.4	34.77
709	10	16-QAM	1/0	13.23	V	6.7	0.49	19.44	34.77
710	10	16-QAM	1/0	12.94	V	6.7	0.49	19.15	34.77
711	10	16-QAM	1/0	12.81	V	6.7	0.49	19.02	34.77

Note: Above is worst mode data.

6.3. Peak-to-Average Ratio

6.3.1 MEASUREMENT METHOD

FCC: 27.50(a)

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

According to KDB 971168 v02r01 5.7.1:

a)Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms

e)Record the maximum PAPR level associated with a probability of 0.1%

6.3.2 PROVISIONS APPLICABLE

This is the test for the Peak-to-Average Ratio from the EUT.

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

6.3.3 MEASUREMENT RESULT

LTE Band 4 (Part 27)

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio (dB)	Limit (dB)	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.39	<13	PASS
		1	3	3.41	<13	PASS
		1	5	3.35	<13	PASS
		3	0	3.65	<13	PASS
		3	2	3.54	<13	PASS
		3	3	3.59	<13	PASS
		6	0	4.14	<13	PASS

	MCH	1	0	3.93	<13	PASS
		1	3	3.98	<13	PASS
		1	5	4.02	<13	PASS
		3	0	4.33	<13	PASS
		3	2	4.36	<13	PASS
		3	3	4.42	<13	PASS
		6	0	4.81	<13	PASS
	HCH	1	0	2.52	<13	PASS
		1	3	2.5	<13	PASS
		1	5	2.54	<13	PASS
		3	0	2.83	<13	PASS
		3	2	2.73	<13	PASS
		3	3	2.8	<13	PASS
		6	0	3.21	<13	PASS
16QAM	LCH	1	0	3.77	<13	PASS
		1	3	3.68	<13	PASS
		1	5	3.64	<13	PASS
		3	0	3.94	<13	PASS
		3	2	3.86	<13	PASS
		3	3	3.84	<13	PASS
		6	0	4.32	<13	PASS
	MCH	1	0	4.23	<13	PASS
		1	3	4.4	<13	PASS
		1	5	4.35	<13	PASS
		3	0	4.64	<13	PASS
		3	2	4.67	<13	PASS
		3	3	4.68	<13	PASS
		6	0	5.08	<13	PASS
	HCH	1	0	2.82	<13	PASS
		1	3	2.84	<13	PASS
		1	5	2.82	<13	PASS
		3	0	3.02	<13	PASS
		3	2	2.95	<13	PASS
		3	3	2.97	<13	PASS
		6	0	3.47	<13	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.51	<13	PASS
		1	7	3.5	<13	PASS
		1	14	3.31	<13	PASS
		8	0	3.91	<13	PASS
		8	4	3.73	<13	PASS
		8	7	3.89	<13	PASS
		15	0	4.39	<13	PASS
	MCH	1	0	3.98	<13	PASS
		1	7	4.17	<13	PASS
		1	14	4.26	<13	PASS
		8	0	4.53	<13	PASS
		8	4	4.63	<13	PASS
		8	7	4.77	<13	PASS
		15	0	4.99	<13	PASS
	HCH	1	0	2.54	<13	PASS
		1	7	2.49	<13	PASS
		1	14	2.49	<13	PASS
		8	0	2.97	<13	PASS
		8	4	2.76	<13	PASS
		8	7	2.99	<13	PASS
		15	0	3.78	<13	PASS
16QAM	LCH	1	0	3.74	<13	PASS
		1	7	3.63	<13	PASS
		1	14	3.53	<13	PASS
		8	0	4.07	<13	PASS
		8	4	3.87	<13	PASS
		8	7	4.03	<13	PASS
		15	0	4.68	<13	PASS
	MCH	1	0	4.16	<13	PASS
		1	7	4.42	<13	PASS
		1	14	4.49	<13	PASS
		8	0	4.71	<13	PASS
		8	4	4.78	<13	PASS
		8	7	4.94	<13	PASS
		15	0	5.35	<13	PASS

	HCH	1	0	3.01	<13	PASS
		1	7	2.89	<13	PASS
		1	14	2.91	<13	PASS
		8	0	3.22	<13	PASS
		8	4	3	<13	PASS
		8	7	3.21	<13	PASS
		15	0	4.01	<13	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.38	<13	PASS
		1	12	3.24	<13	PASS
		1	24	3.15	<13	PASS
		12	0	3.83	<13	PASS
		12	6	3.66	<13	PASS
		12	13	3.73	<13	PASS
		25	0	4.36	<13	PASS
	MCH	1	0	3.8	<13	PASS
		1	12	3.98	<13	PASS
		1	24	4.14	<13	PASS
		12	0	4.5	<13	PASS
		12	6	4.51	<13	PASS
		12	13	4.75	<13	PASS
		25	0	5.03	<13	PASS
	HCH	1	0	2.76	<13	PASS
		1	12	2.55	<13	PASS
		1	24	2.54	<13	PASS
		12	0	3.18	<13	PASS
		12	6	2.88	<13	PASS
		12	13	2.99	<13	PASS
		25	0	3.78	<13	PASS
16QAM	LCH	1	0	3.72	<13	PASS
		1	12	3.62	<13	PASS
		1	24	3.54	<13	PASS
		12	0	4.03	<13	PASS
		12	6	3.81	<13	PASS
		12	13	3.88	<13	PASS
		25	0	4.58	<13	PASS
	MCH	1	0	4.18	<13	PASS

		1	12	4.39	<13	PASS
		1	24	4.48	<13	PASS
		12	0	4.7	<13	PASS
		12	6	4.71	<13	PASS
		12	13	4.97	<13	PASS
		25	0	5.29	<13	PASS
	HCH	1	0	3.02	<13	PASS
		1	12	2.8	<13	PASS
		1	24	2.8	<13	PASS
		12	0	3.45	<13	PASS
		12	6	3.18	<13	PASS
		12	13	3.24	<13	PASS
		25	0	4.04	<13	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	3.51	<13	PASS
		1	24	3.16	<13	PASS
		1	49	3.13	<13	PASS
		25	0	4.17	<13	PASS
		25	12	3.81	<13	PASS
		25	25	4.03	<13	PASS
		50	0	4.5	<13	PASS
	MCH	1	0	3.73	<13	PASS
		1	24	4.13	<13	PASS
		1	49	4.44	<13	PASS
		25	0	4.72	<13	PASS
		25	12	4.73	<13	PASS
		25	25	4.87	<13	PASS
		50	0	5.06	<13	PASS
	HCH	1	0	3.4	<13	PASS
		1	24	2.76	<13	PASS
		1	49	2.44	<13	PASS
		25	0	4.07	<13	PASS
		25	12	3.42	<13	PASS
		25	25	3.57	<13	PASS
		50	0	4.34	<13	PASS
16QAM	LCH	1	0	3.71	<13	PASS

		1	24	3.42	<13	PASS
		1	49	3.4	<13	PASS
		25	0	4.4	<13	PASS
		25	12	3.97	<13	PASS
		25	25	4.24	<13	PASS
		50	0	4.8	<13	PASS
	MCH	1	0	3.97	<13	PASS
		1	24	4.28	<13	PASS
		1	49	4.51	<13	PASS
		25	0	5	<13	PASS
		25	12	4.93	<13	PASS
		25	25	5.19	<13	PASS
		50	0	5.42	<13	PASS
	HCH	1	0	3.87	<13	PASS
		1	24	3.18	<13	PASS
		1	49	2.9	<13	PASS
		25	0	4.33	<13	PASS
		25	12	3.62	<13	PASS
		25	25	3.81	<13	PASS
		50	0	4.65	<13	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	10.25	<13	PASS
		1	37	3.14	<13	PASS
		1	74	10.44	<13	PASS
		37	0	4.57	<13	PASS
		37	18	3.96	<13	PASS
		37	38	4.46	<13	PASS
		75	0	4.97	<13	PASS
	MCH	1	0	9.98	<13	PASS
		1	37	4.2	<13	PASS
		1	74	10.03	<13	PASS
		37	0	4.64	<13	PASS
		37	18	4.87	<13	PASS
		37	38	4.64	<13	PASS
		75	0	5.05	<13	PASS
	HCH	1	0	9.82	<13	PASS

		1	37	3.13	<13	PASS
		1	74	11.16	<13	PASS
		37	0	4.61	<13	PASS
		37	18	4.06	<13	PASS
		37	38	4.45	<13	PASS
		75	0	4.95	<13	PASS
16QAM	LCH	1	0	10.67	<13	PASS
		1	37	3.4	<13	PASS
		1	74	11.16	<13	PASS
		37	0	5.34	<13	PASS
		37	18	4.22	<13	PASS
		37	38	5.31	<13	PASS
		75	0	5.71	<13	PASS
	MCH	1	0	10.14	<13	PASS
		1	37	4.41	<13	PASS
		1	74	10.91	<13	PASS
		37	0	5.68	<13	PASS
		37	18	5.15	<13	PASS
		37	38	5.68	<13	PASS
		75	0	6.04	<13	PASS
	HCH	1	0	9.83	<13	PASS
		1	37	3.44	<13	PASS
		1	74	12.19	<13	PASS
		37	0	5.55	<13	PASS
		37	18	4.33	<13	PASS
		37	38	5.18	<13	PASS
		75	0	5.77	<13	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	7.02	<13	PASS
		1	49	3.08	<13	PASS
		1	99	6.35	<13	PASS
		50	0	5.42	<13	PASS
		50	25	4.48	<13	PASS
		50	50	5.56	<13	PASS
		100	0	5.81	<13	PASS
	MCH	1	0	6.17	<13	PASS

		1	49	4.03	<13	PASS
		1	99	6.09	<13	PASS
		50	0	5.53	<13	PASS
		50	25	5.07	<13	PASS
		50	50	5.74	<13	PASS
		100	0	5.83	<13	PASS
	HCH	1	0	5.97	<13	PASS
		1	49	3.71	<13	PASS
		1	99	6.83	<13	PASS
		50	0	5.47	<13	PASS
		50	25	4.77	<13	PASS
		50	50	5.79	<13	PASS
		100	0	5.76	<13	PASS
16QAM	LCH	1	0	7.81	<13	PASS
		1	49	3.19	<13	PASS
		1	99	6.95	<13	PASS
		50	0	6.11	<13	PASS
		50	25	4.85	<13	PASS
		50	50	6.13	<13	PASS
		100	0	6.45	<13	PASS
	MCH	1	0	6.4	<13	PASS
		1	49	4.39	<13	PASS
		1	99	6.72	<13	PASS
		50	0	6.48	<13	PASS
		50	25	5.42	<13	PASS
		50	50	6.48	<13	PASS
		100	0	6.73	<13	PASS
	HCH	1	0	6.33	<13	PASS
		1	49	3.89	<13	PASS
		1	99	7.21	<13	PASS
		50	0	6.36	<13	PASS
		50	25	5.12	<13	PASS
		50	50	6.36	<13	PASS
		100	0	6.5	<13	PASS

LTE Band 17 (Part 27)

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	5.18	<13	PASS
		1	12	4.53	<13	PASS
		1	24	4.21	<13	PASS
		12	0	5.7	<13	PASS
		12	6	5.37	<13	PASS
		12	13	5.21	<13	PASS
		25	0	5.57	<13	PASS
	MCH	1	0	4.29	<13	PASS
		1	12	4.71	<13	PASS
		1	24	5.34	<13	PASS
		12	0	5.19	<13	PASS
		12	6	5.43	<13	PASS
		12	13	5.81	<13	PASS
		25	0	5.66	<13	PASS
	HCH	1	0	5.41	<13	PASS
		1	12	5.43	<13	PASS
		1	24	4.44	<13	PASS
		12	0	6.01	<13	PASS
		12	6	5.9	<13	PASS
		12	13	5.64	<13	PASS
		25	0	5.89	<13	PASS
16QAM	LCH	1	0	6.08	<13	PASS
		1	12	5.42	<13	PASS
		1	24	5.1	<13	PASS
		12	0	6.44	<13	PASS
		12	6	6.19	<13	PASS
		12	13	6	<13	PASS
		25	0	6.36	<13	PASS
	MCH	1	0	5.04	<13	PASS
		1	12	5.48	<13	PASS
		1	24	6.15	<13	PASS
		12	0	6.09	<13	PASS
		12	6	6.34	<13	PASS
		12	13	6.63	<13	PASS

		25	0	6.39	<13	PASS
	HCH	1	0	6.34	<13	PASS
		1	12	6.67	<13	PASS
		1	24	5.47	<13	PASS
		12	0	6.68	<13	PASS
		12	6	6.66	<13	PASS
		12	13	6.4	<13	PASS
		25	0	6.61	<13	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	1	0	5.25	<13	PASS
		1	24	4.33	<13	PASS
		1	49	5.53	<13	PASS
		25	0	5.46	<13	PASS
		25	12	5.44	<13	PASS
		25	25	5.81	<13	PASS
		50	0	5.6	<13	PASS
	MCH	1	0	4.97	<13	PASS
		1	24	4.68	<13	PASS
		1	49	5.21	<13	PASS
		25	0	5.38	<13	PASS
		25	12	5.53	<13	PASS
		25	25	5.88	<13	PASS
		50	0	5.65	<13	PASS
	HCH	1	0	4.5	<13	PASS
		1	24	5.05	<13	PASS
		1	49	4.48	<13	PASS
		25	0	5.39	<13	PASS
		25	12	5.74	<13	PASS
		25	25	5.89	<13	PASS
		50	0	5.69	<13	PASS
16QAM	LCH	1	0	6.23	<13	PASS
		1	24	5.22	<13	PASS
		1	49	6.47	<13	PASS
		25	0	6.24	<13	PASS
		25	12	6.23	<13	PASS
		25	25	6.6	<13	PASS

		50	0	6.31	<13	PASS
	MCH	1	0	5.87	<13	PASS
		1	24	5.54	<13	PASS
		1	49	6.07	<13	PASS
		25	0	6.16	<13	PASS
		25	12	6.28	<13	PASS
		25	25	6.7	<13	PASS
		50	0	6.33	<13	PASS
	HCH	1	0	5.38	<13	PASS
		1	24	5.99	<13	PASS
		1	49	5.43	<13	PASS
		25	0	6.17	<13	PASS
		25	12	6.51	<13	PASS
		25	25	6.63	<13	PASS
		50	0	6.43	<13	PASS

7. SPURIOUS EMISSION

7.1 CONDUCTED SPURIOUS EMISSION

7.1.1 MEASUREMENT METHOD

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

Test Procedure Used

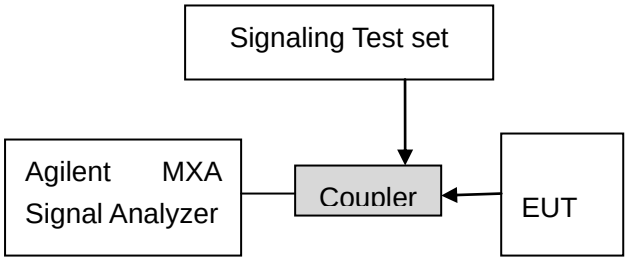
KDB 971168 v02r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = max hold
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Test Instrument & Measurement Setup

shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

Test Note

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

7.1.2 MEASUREMENT RESULT

PLEASE REFER TO: APPENDIX I TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

Note: 1. As no emission found in standby or receive mode, no recording in this report.

7.2 Radiated Spurious Emission

7.2.1 TEST OVERVIEW

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 v02r01 – Section 5.8

ANSI/TIA-603-C-2004 – Section 2.2.12

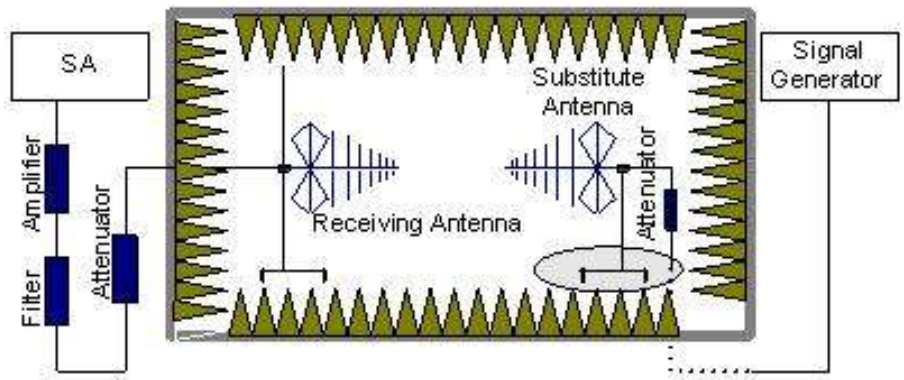
Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

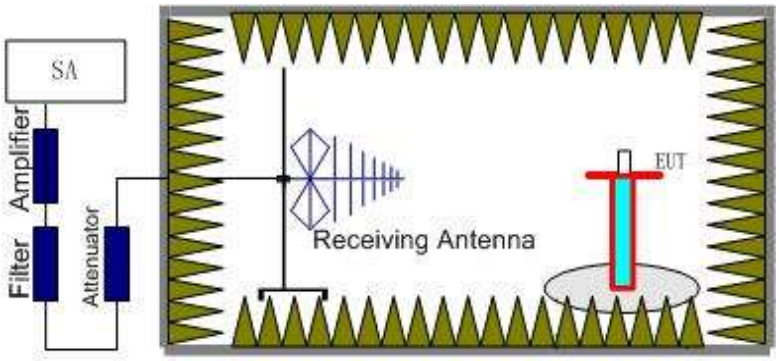
Test Setup

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）The SA is calibrated using following setup.



b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE band 4 and LTE band 17. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: $Power=P_{Mea}+A_{Rpl}$

7.2.2 PROVISIONS APPLICABLE

(a) On any frequency outside a licensee’s frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Note: only result the worst condition of each test mode:

7.2.3 MEASUREMENT RESULT

LTE Band 4 (Part 27)

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3440	-47.36	V	10.06	2.52	-39.82	-13	-26.82
3440	-48.13	H	10.06	2.52	-40.59	-13	-27.59
257.4	-54.39	V	6.7	0.24	-47.93	-13	-34.93
640.2	-50.22	H	6.5	0.39	-44.11	-13	-31.11

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3465	-47.55	V	10.09	2.52	-39.98	-13	-26.98
3465	-48.29	H	10.09	2.52	-40.72	-13	-27.72
256.9	-54.72	V	6.7	0.24	-48.26	-13	-35.26
639.8	-50.17	H	6.5	0.39	-44.06	-13	-31.06

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3490	-47.69	V	10.09	2.52	-40.12	-13	-27.12
3490	-48.37	H	10.09	2.52	-40.8	-13	-27.8
254.6	-54.82	V	6.7	0.24	-48.36	-13	-35.36
639.4	-50.09	H	6.5	0.39	-43.98	-13	-30.98

Note: EUT Field Strength (dBm) = Reading (Signal generator) + Antenna Gain (substitution antenna) - Cable loss (From Signal Generator to substitution antenna)

Below 30MHZ no Spurious found and The GSM modes is the worst condition.

LTE Band 17 (Part 27)

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
2492	-46.74	V	10.72	2.18	-38.2	-13	-25.2
2740	-47.27	H	10.72	2.18	-38.73	-13	-25.73
259.2	-51.85	V	6.2	0.27	-45.92	-13	-32.92
643.5	-52.17	H	7.4	0.79	-45.56	-13	-32.56

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3458	-48.85	V	10.07	2.52	-41.3	-13	-28.3
3385	-47.89	H	10.07	2.52	-40.34	-13	-27.34
526.5	-55.16	V	6.7	0.24	-48.7	-13	-35.7
534.7	-51.85	H	6.5	0.79	-46.14	-13	-33.14

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3150	-49.53	V	10.06	2.52	-41.99	-13	-28.99
3150	-48.16	H	10.02	2.52	-40.66	-13	-27.66
426.5	-51.94	V	6.7	0.24	-45.48	-13	-32.48
635.4	-50.28	H	6.5	0.79	-44.57	-13	-31.57

Note: EUT Field Strength (dBm) = Reading (Signal generator) + Antenna Gain (substitution antenna) - Cable loss (From Signal Generator to substitution antenna)

Below 30MHZ no Spurious found and The GSM modes is the worst condition.

8. MAINS CONDUCTED EMISSION

8.1 MEASUREMENT METHOD

The measurement procedure specified in ANSI C63.4-2003 was used for testing. Conducted Emission was measured with travel charger.

8.2 PROVISIONS APPLICABLE

Frequency of Emission (MHz)	Conducted Limit(dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50
*Decreases with the logarithm of the frequency. *The lower limit shall apply at the transition frequency.		

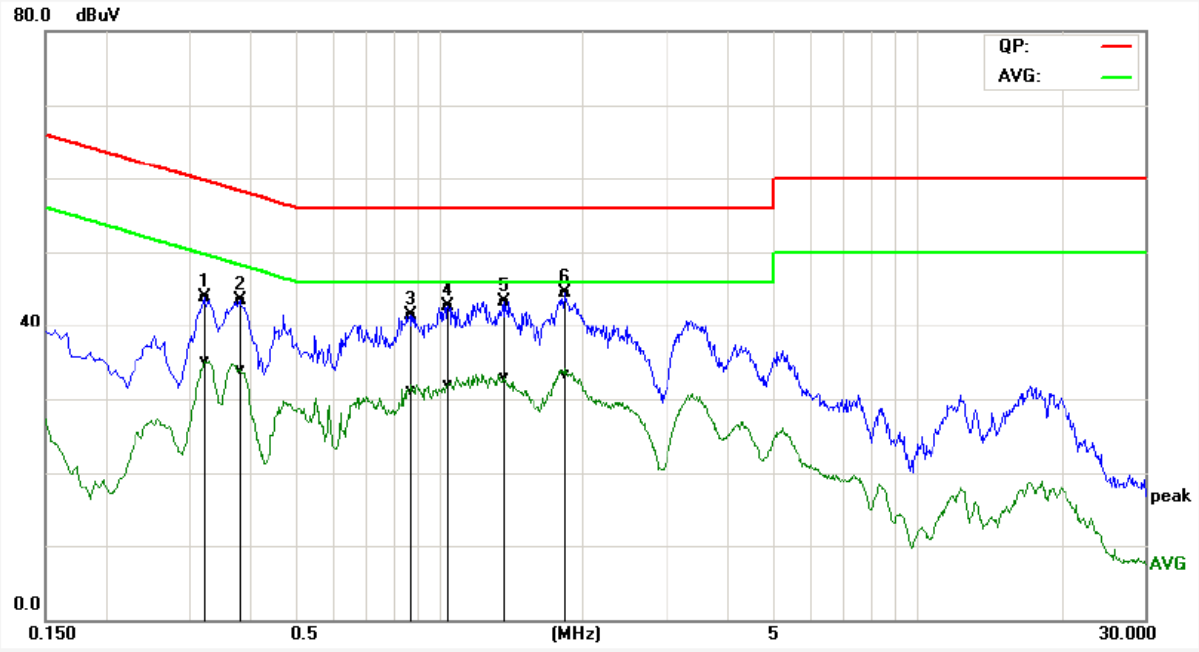
Note: The LTE Band mode is the worst condition and the test result as following:

8.3 MEASUREMENT RESULT

LINE CONDUCTED EMISSION - L

Job No.:	20150428-1	Date:	2015-4-28
Company:		Time:	14:55:59
Standard:	FCC Class B Conduction(QP)	Temp.(C)/Hum.(%):	26(C) / 60 %
Test item:	Conduction Test	EUT:	
Line :	L1	Test Voltage	AC 120V/60Hz
Model:	M4GLTE	Test By :	

Description: LTE BAND 4

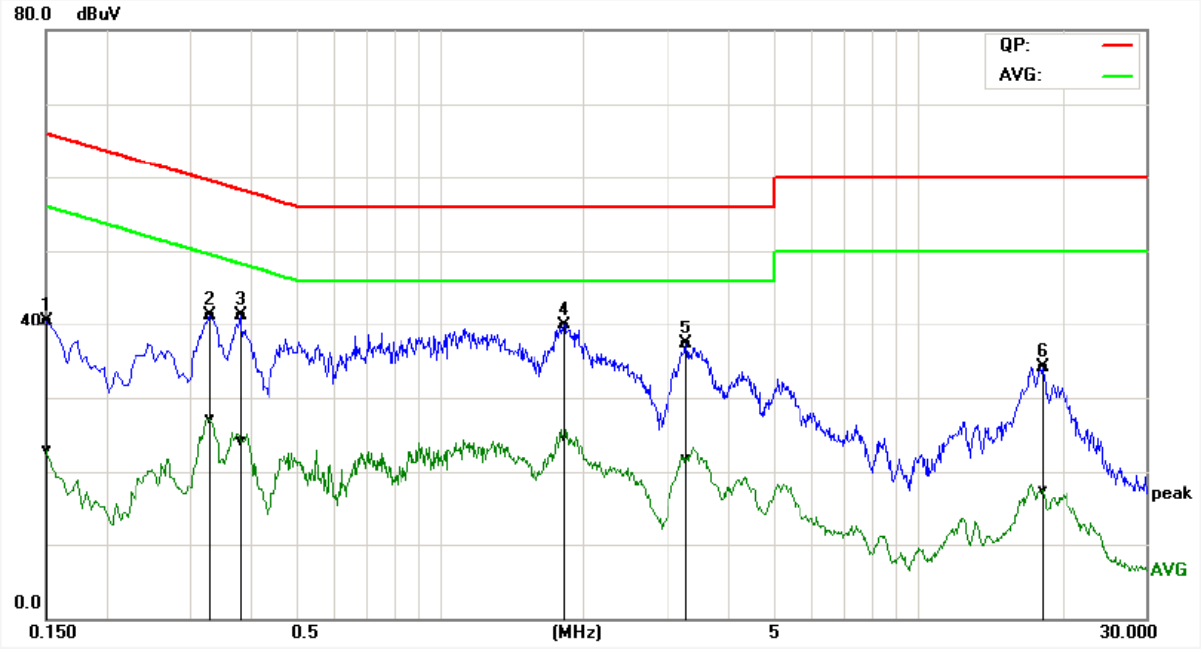


No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1P	0.3220	34.17	25.34	9.69	43.86	35.03	59.65	49.66	-15.79	-14.63	Pass
2P	0.3820	33.77	24.27	9.68	43.45	33.95	58.23	48.24	-14.78	-14.29	Pass
3P	0.8740	31.84	21.34	9.74	41.58	31.08	56.00	46.00	-14.42	-14.92	Pass
4P	1.0460	32.90	22.20	9.71	42.61	31.91	56.00	46.00	-13.39	-14.09	Pass
5P	1.3619	33.66	23.23	9.72	43.38	32.95	56.00	46.00	-12.62	-13.05	Pass
6*	1.8420	34.79	23.62	9.73	44.52	33.35	56.00	46.00	-11.48	-12.65	Pass

LINE CONDUCTED EMISSION - N

Job No.:	20150428-1	Date: 2015-4-28	
Company:		Time: 14:59:44	
Standard:	FCC Class B Conduction(QP)	Temp.(C)/Hum.(%):	26(C) / 60 %
Test item:	Conduction Test	EUT:	
Line :	N	Test Voltage	AC 120V/60Hz
Model:	M4GLTE	Test By :	

Description: LTE BAND 4



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1P	0.1500	30.77	13.17	9.78	40.55	22.95	65.99	56.00	-25.44	-33.05	Pass
2P	0.3300	31.52	17.41	9.75	41.27	27.16	59.45	49.45	-18.18	-22.29	Pass
3P	0.3820	31.66	14.41	9.72	41.38	24.13	58.23	48.24	-16.85	-24.11	Pass
4*	1.8220	30.16	15.05	9.75	39.91	24.80	56.00	46.00	-16.09	-21.20	Pass
5P	3.2820	27.61	11.95	9.75	37.36	21.70	56.00	46.00	-18.64	-24.30	Pass
6P	18.2460	24.48	7.59	9.72	34.20	17.31	60.00	50.00	-25.80	-32.69	Pass

9. FREQUENCY STABILITY

9.1 MEASUREMENT METHOD

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1 , Measure the carrier frequency at room temperature.

2 , Subject the EUT to overnight soak at -10℃.

, With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on channel 20175 for LTE band 4 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

3 , Repeat the above measurements at 10℃ increments from -10℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

4 , Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.

5 , Subject the EUT to overnight soak at +50℃.

6 , With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.

7 , Repeat the above measurements at 10℃ increments from +50℃ to -10℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.

8 , At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

9.2 PROVISIONS APPLICABLE

9.2.1 For Hand carried battery powered equipment

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to nsure that the fundamental emission stays within the authorized frequency block.

9.2.2 For equipment powered by primary supply voltage

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

9.3 MEASUREMENT RESULT (WORST)

LTE Band 4 (Part 27)

Middle Channel, f_O = 1732.5 MHz				
Temperature (℃)	**Power Supplied**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-10	3.7	-1.53	-0.002167	2.5
0		2.07	0.002936	2.5
10		0.19	0.000263	2.5
20		1.75	0.002458	2.5
30		1.32	0.001854	2.5
40		1.69	0.002377	2.5
50		-1.17	-0.001644	2.5
55		-0.07	-0.000100	2.5
25	4.2	-1.62	-0.002266	2.5
	3.5	-0.06	-0.000081	2.5

Note: The EUT doesn’t work below -10℃

LTE Band 17 (Part 27)

Middle Channel, f_o = 710 MHz				
Temperature (℃)	**Power Supplied**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-10	3.7	0.30	0.000425	2.5
0		1.33	0.001883	2.5
10		0.96	0.001357	2.5
20		0.66	0.000931	2.5
30		0.26	0.000364	2.5
40		1.16	0.001640	2.5
50		0.40	0.000567	2.5
55		1.77	0.002511	2.5
25	4.2	0.49	0.000688	2.5
	3.5	-0.07	-0.000101	2.5

Note: The EUT doesn't work below -10℃

10. OCCUPIED BANDWIDTH

10.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

10.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

10.3 MEASUREMENT RESULT

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

LTE Band 4 (Part 27)

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	2.1458	PASS
	MCH	6	0	1.2093	PASS
	HCH	6	0	2.1519	PASS
16QAM	LCH	6	0	2.2725	PASS
	MCH	6	0	1.2527	PASS
	HCH	6	0	2.3966	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	4.1678	PASS
	MCH	15	0	2.8764	PASS
	HCH	15	0	4.9247	PASS
16QAM	LCH	15	0	5.3560	PASS
	MCH	15	0	2.8891	PASS
	HCH	15	0	5.7755	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz

Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	7.1651	PASS
	MCH	25	0	4.8131	PASS
	HCH	25	0	8.6441	PASS
16QAM	LCH	25	0	8.6454	PASS
	MCH	25	0	4.9087	PASS
	HCH	25	0	9.5917	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	13.2832	PASS
	MCH	50	0	9.5711	PASS
	HCH	50	0	15.0897	PASS
16QAM	LCH	50	0	15.6670	PASS
	MCH	50	0	9.5936	PASS
	HCH	50	0	17.4820	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	22.3298	PASS
	MCH	75	0	15.0049	PASS
	HCH	75	0	21.8224	PASS
16QAM	LCH	75	0	23.4261	PASS
	MCH	75	0	15.8236	PASS
	HCH	75	0	23.6038	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	20.1161	PASS
	MCH	100	0	18.8977	PASS
	HCH	100	0	22.5225	PASS
16QAM	LCH	100	0	24.0155	PASS
	MCH	100	0	19.4594	PASS
	HCH	100	0	24.7291	PASS

LTE Band 17 (Part 27)

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.6656	PASS
	MCH	25	0	4.7424	PASS
	HCH	25	0	4.7258	PASS
16QAM	LCH	25	0	4.7270	PASS
	MCH	25	0	4.7264	PASS
	HCH	25	0	4.8052	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.4124	PASS
	MCH	50	0	9.2763	PASS
	HCH	50	0	9.2682	PASS
16QAM	LCH	50	0	9.2473	PASS
	MCH	50	0	9.3526	PASS
	HCH	50	0	9.3041	PASS

11. EMISSION BANDWIDTH

11.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

11.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

11.3 MEASUREMENT RESULT

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

LTE Band 4 (Part 27)

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.09229	PASS
	MCH	6	0	1.07636	PASS
	HCH	6	0	1.11124	PASS
16QAM	LCH	6	0	1.10423	PASS
	MCH	6	0	1.08186	PASS
	HCH	6	0	1.19025	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.69718	PASS
	MCH	15	0	2.68337	PASS
	HCH	15	0	2.71047	PASS
16QAM	LCH	15	0	2.70551	PASS
	MCH	15	0	2.68821	PASS
	HCH	15	0	2.72784	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz

Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.51062	PASS
	MCH	25	0	4.48749	PASS
	HCH	25	0	4.51847	PASS
16QAM	LCH	25	0	4.51568	PASS
	MCH	25	0	4.48669	PASS
	HCH	25	0	4.54597	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.96811	PASS
	MCH	50	0	8.95876	PASS
	HCH	50	0	8.98612	PASS
16QAM	LCH	50	0	8.98998	PASS
	MCH	50	0	8.95147	PASS
	HCH	50	0	9.01846	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	13.47786	PASS
	MCH	75	0	13.44527	PASS
	HCH	75	0	13.48411	PASS
16QAM	LCH	75	0	13.49792	PASS
	MCH	75	0	13.45248	PASS
	HCH	75	0	13.50335	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	17.90270	PASS
	MCH	100	0	17.91879	PASS
	HCH	100	0	17.88731	PASS
16QAM	LCH	100	0	17.91116	PASS
	MCH	100	0	17.93097	PASS
	HCH	100	0	17.90119	PASS

LTE Band 17 (Part 27)

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.47745	PASS
	MCH	25	0	4.47617	PASS
	HCH	25	0	4.47562	PASS
16QAM	LCH	25	0	4.47513	PASS
	MCH	25	0	4.48044	PASS
	HCH	25	0	4.47317	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.90458	PASS
	MCH	50	0	8.91266	PASS
	HCH	50	0	8.92051	PASS
16QAM	LCH	50	0	8.90787	PASS
	MCH	50	0	8.90690	PASS
	HCH	50	0	8.94653	PASS

12. BAND EDGE

12.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

12.2 PROVISIONS APPLICABLE

As Specified in FCC rules of §2.1051 §24.238(a) §27.53(e) §27.53(g)
KDB 971168 v02r01 – Section 6.0

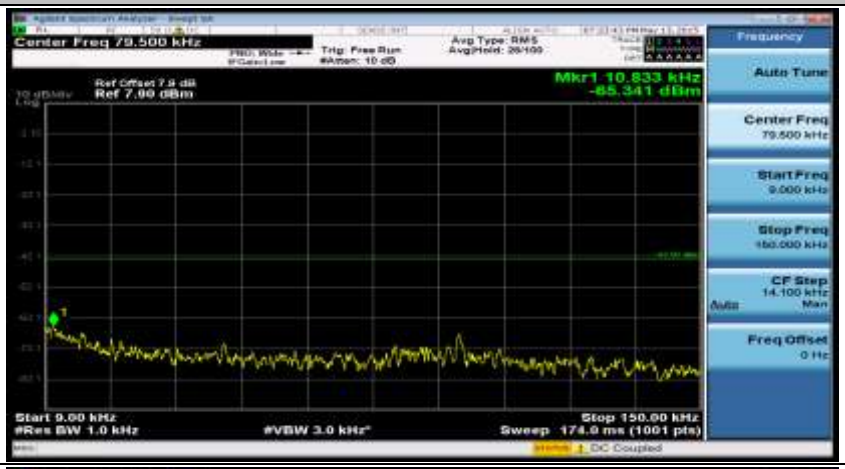
12.3 MEASUREMENT RESULT

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.
The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.
Please refers to Appendix III for compliance test plots for band edges

APPENDIX A

TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

CONDUCTED EMISSION IN LTE BAND 4

(Channel Bandwidth: 5 MHz)_LCH_QPSK_1RB#0


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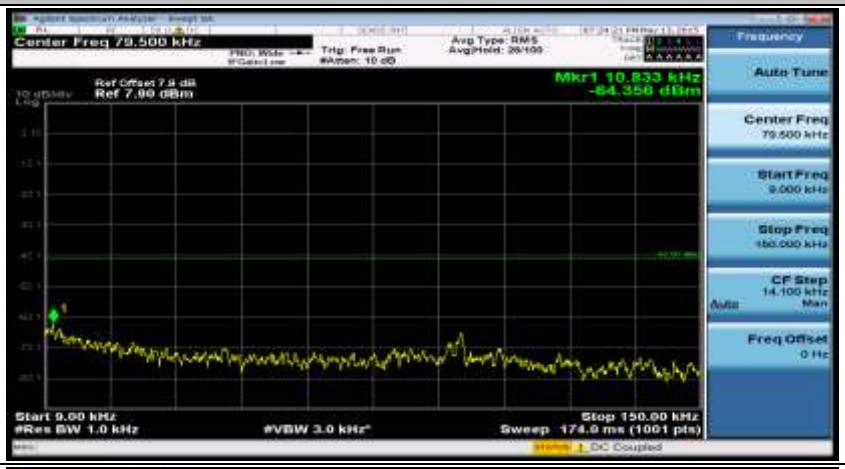
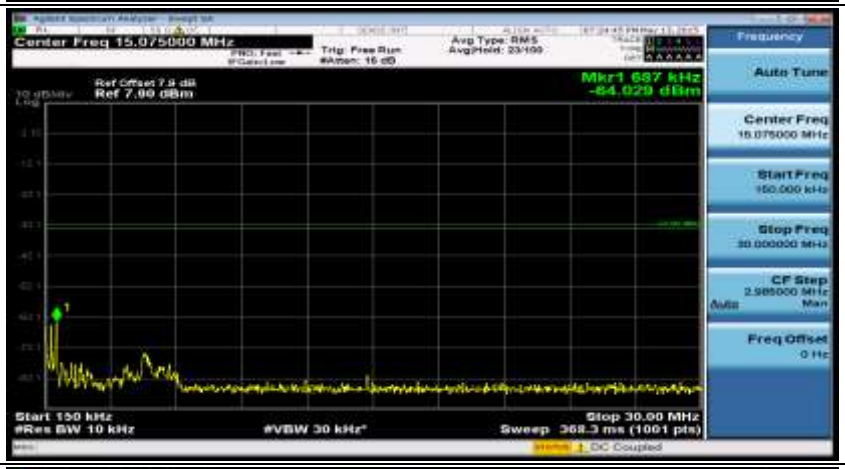
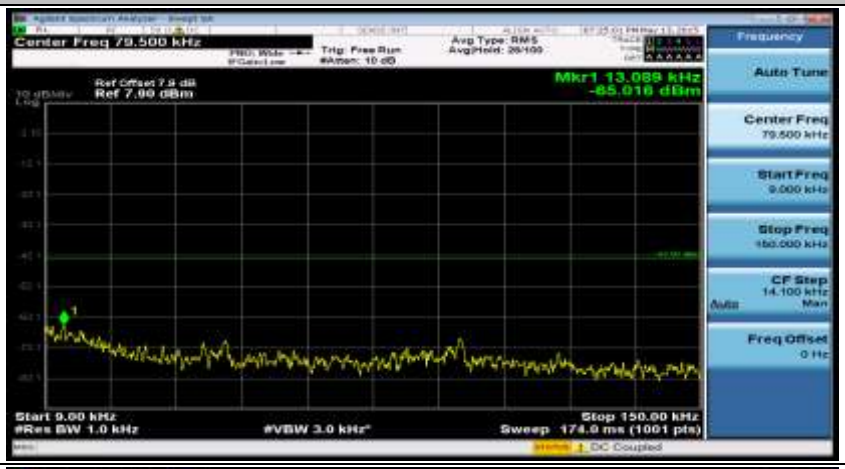
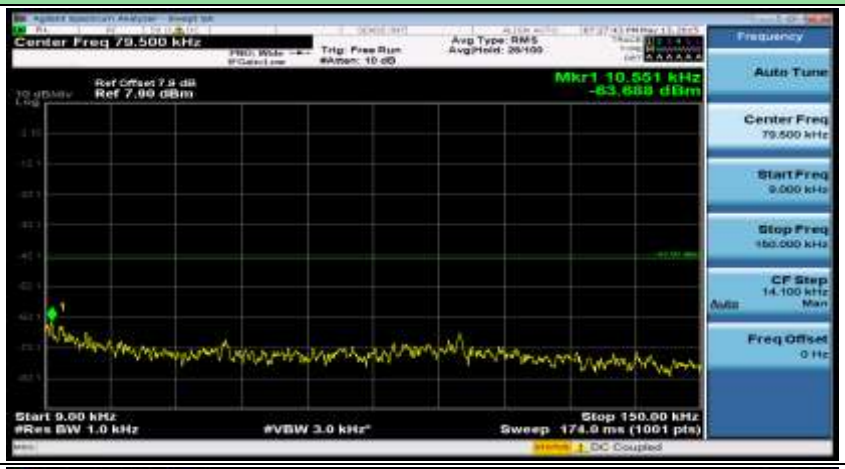
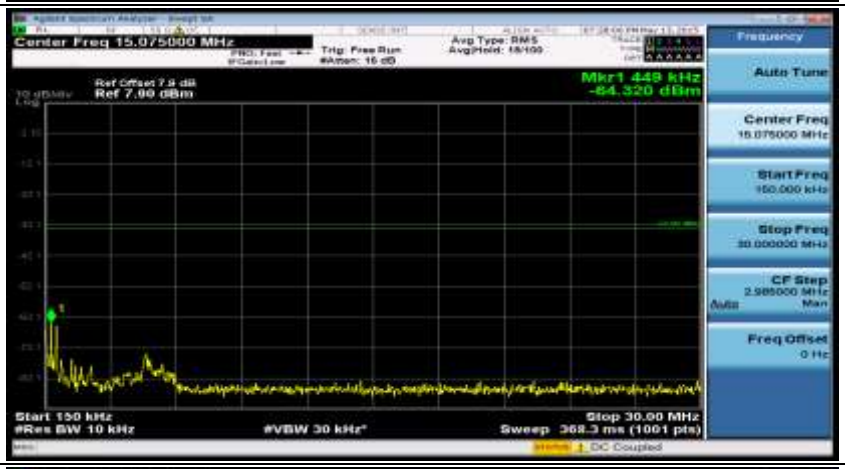
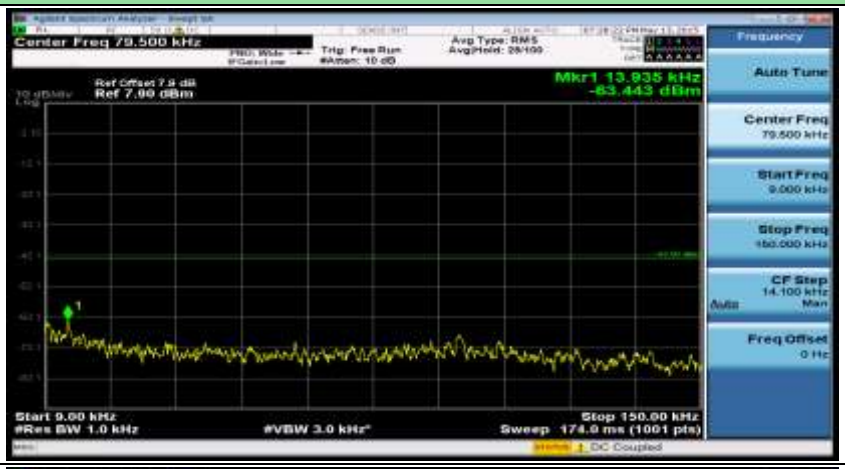
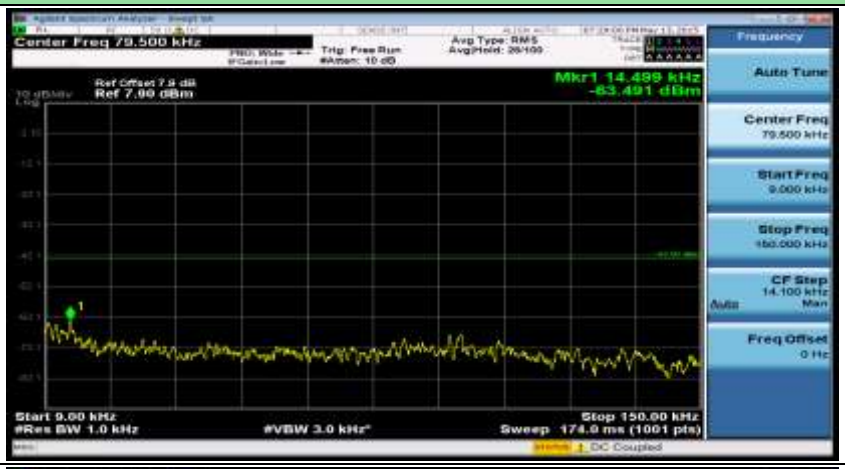
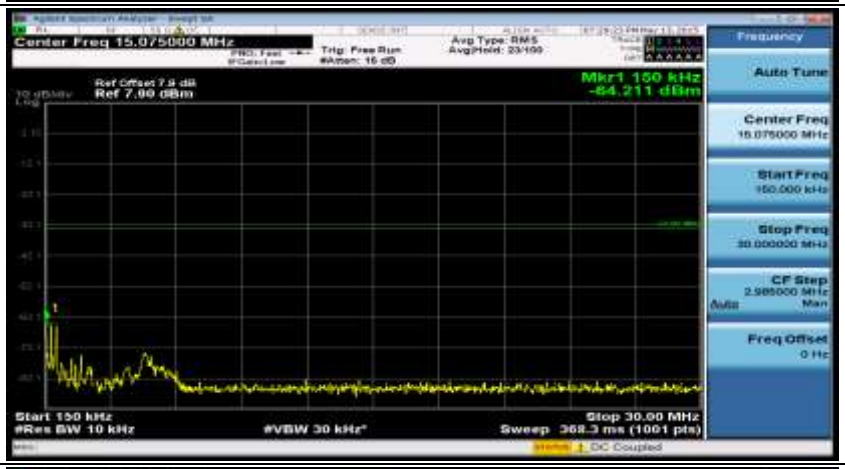



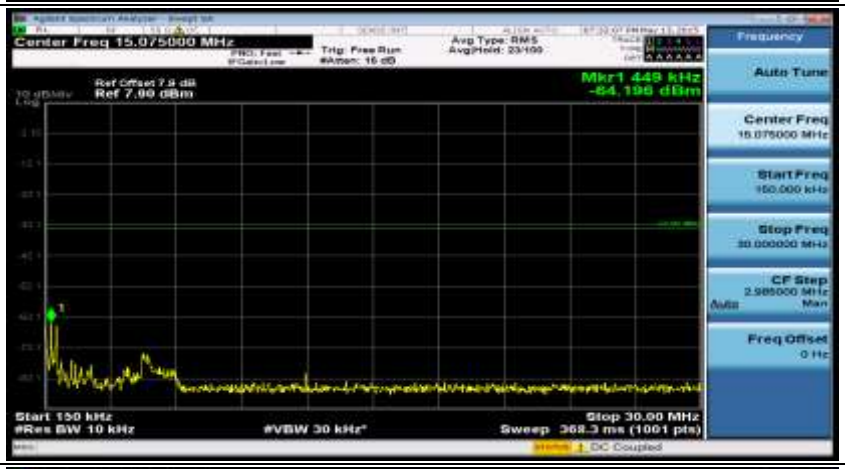

(Channel Bandwidth: 5 MHz)_LCH_QPSK_1RB#24


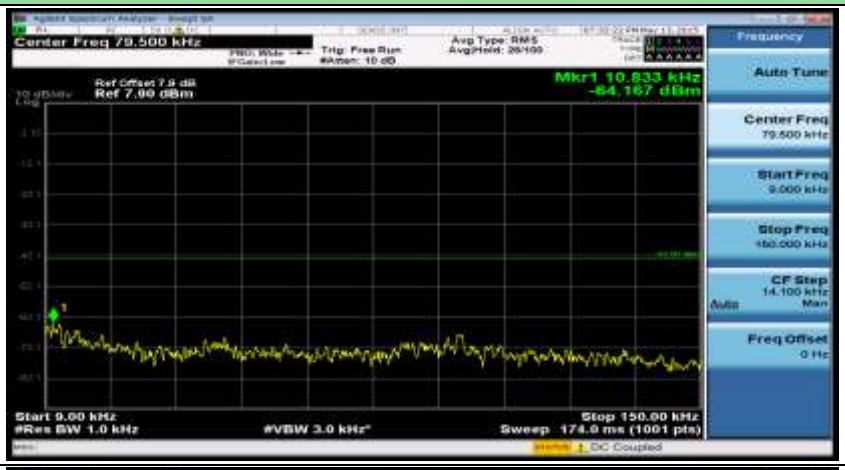
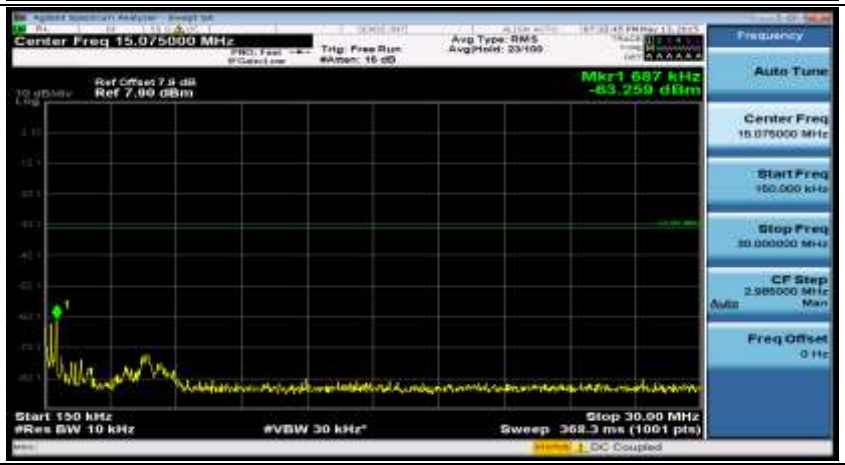
(Channel Bandwidth: 5 MHz)_MCH_QPSK_1RB#0



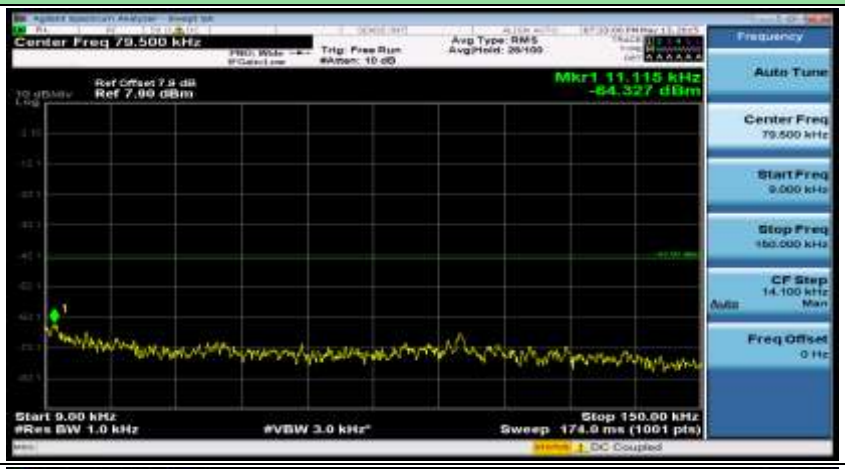
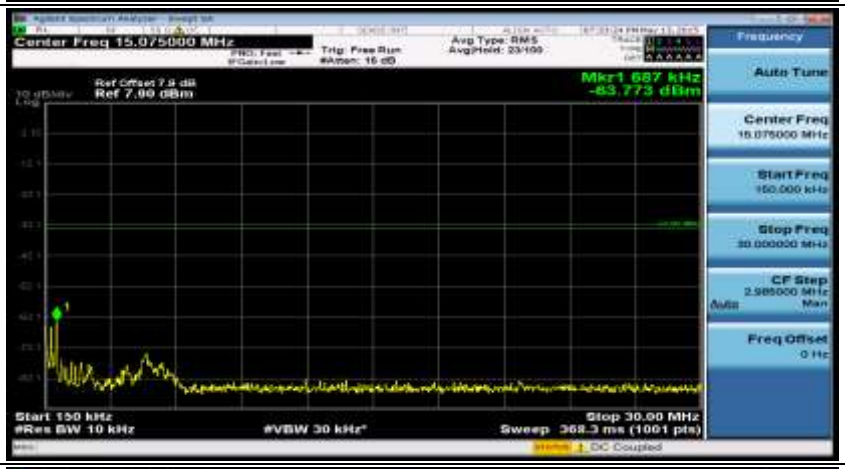

(Channel Bandwidth: 5 MHz)_MCH_QPSK_1RB#12


(Channel Bandwidth: 5 MHz)_MCH_QPSK_1RB#24



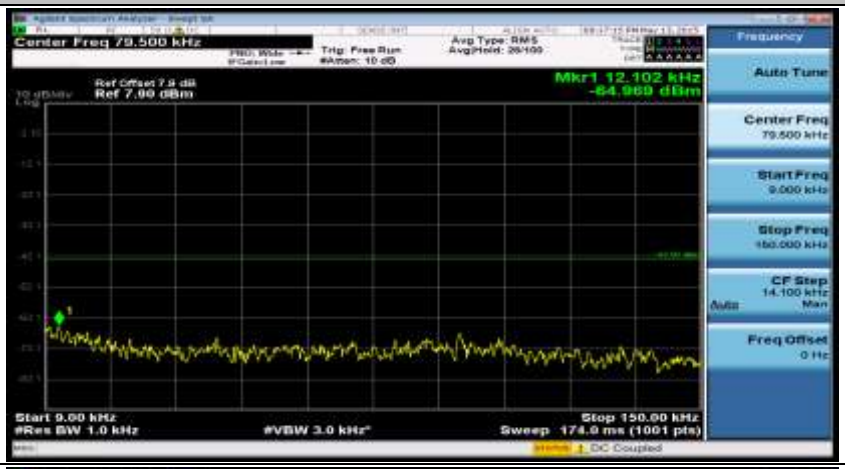

(Channel Bandwidth: 5 MHz)_HCH_QPSK_1RB#0




(Channel Bandwidth: 5 MHz)_HCH_QPSK_1RB#12



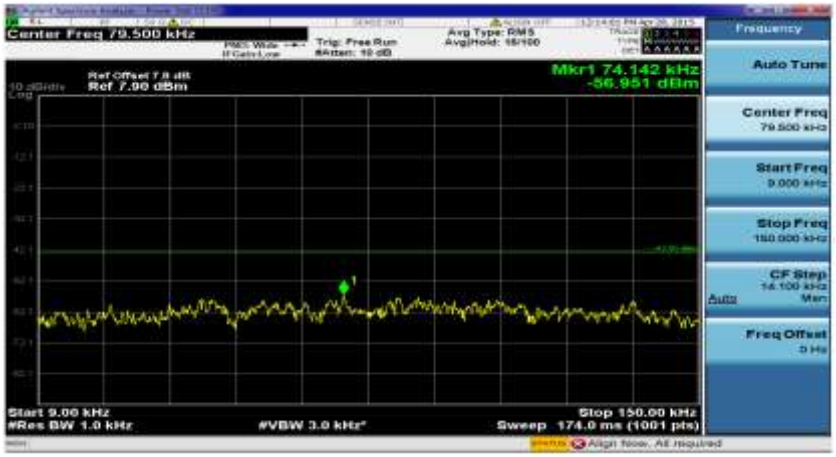

(Channel Bandwidth: 5 MHz)_HCH_QPSK_1RB#24



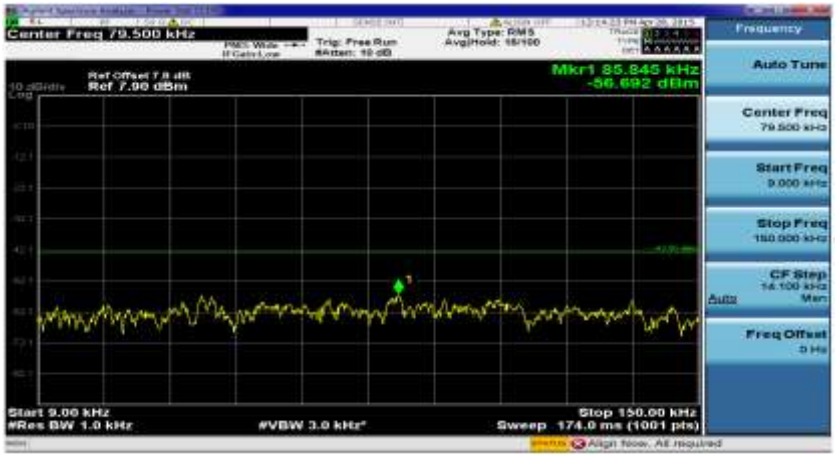

CONDUCTED EMISSION IN LTE BAND 17

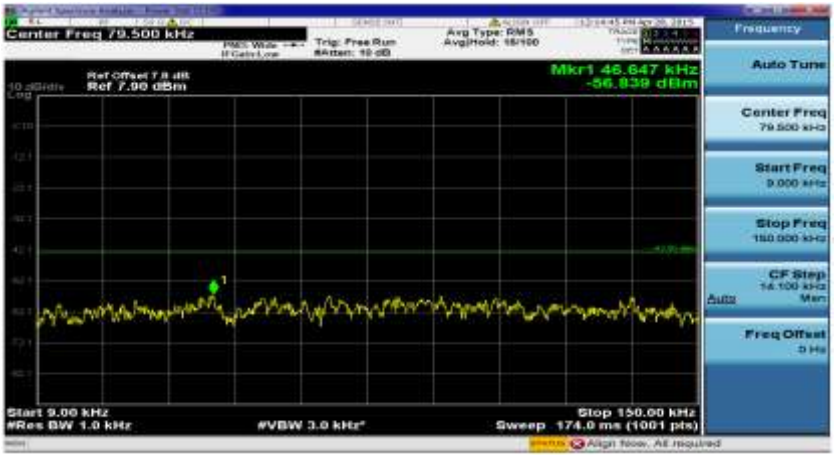
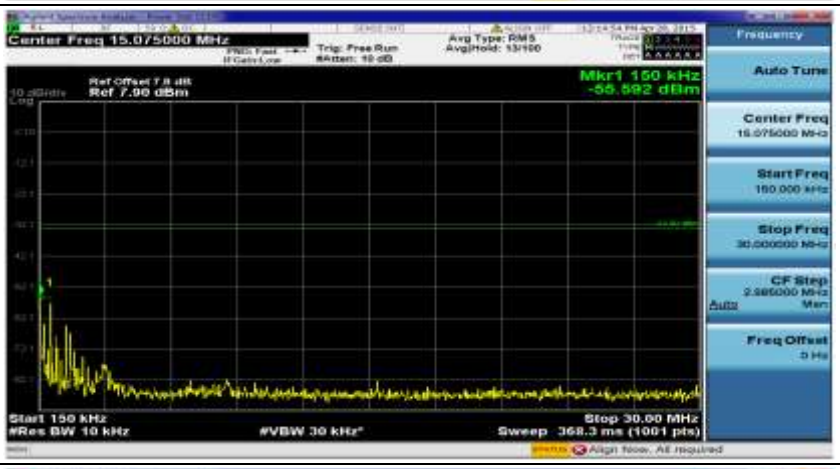
(Channel Bandwidth: 5 MHz)_LCH_QPSK_1RB#0


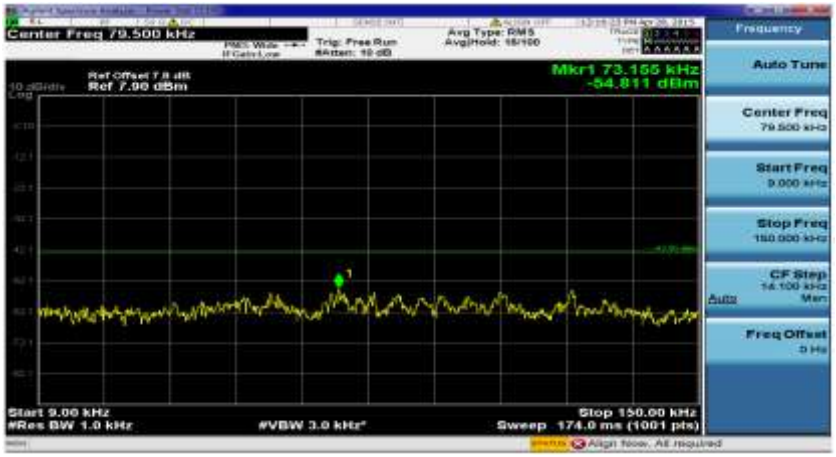
(Channel Bandwidth: 5 MHz)_LCH_QPSK_1RB#12

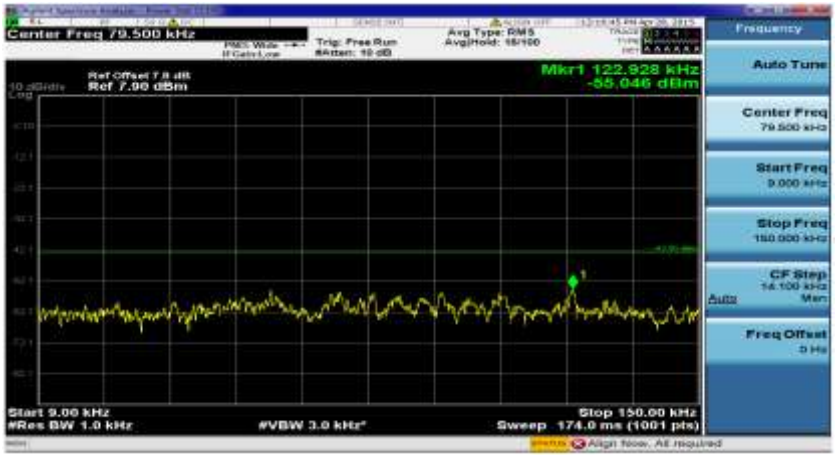

(Channel Bandwidth: 5 MHz)_LCH_QPSK_1RB#24

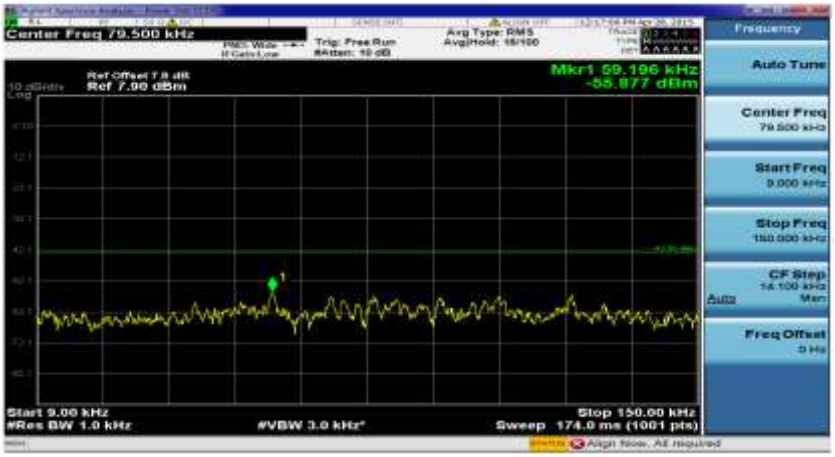
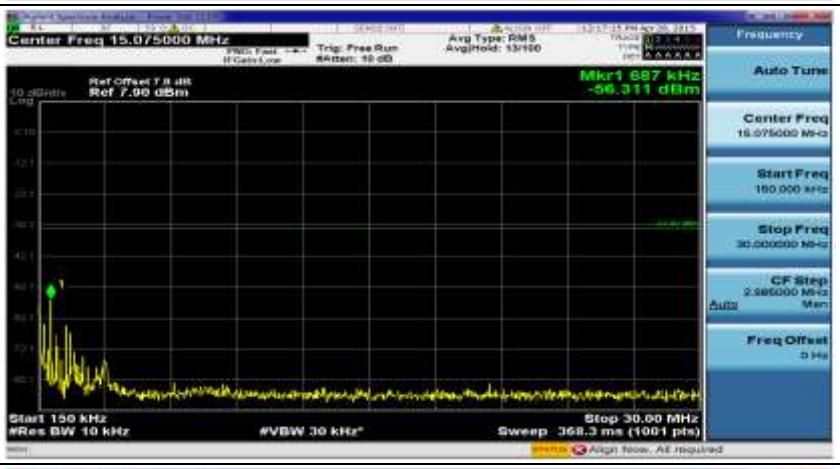

(Channel Bandwidth: 5 MHz)_MCH_QPSK_1RB#0


(Channel Bandwidth: 5 MHz)_MCH_QPSK_1RB#12


(Channel Bandwidth: 5 MHz)_MCH_QPSK_1RB#24




(Channel Bandwidth: 5 MHz)_HCH_QPSK_1RB#0


(Channel Bandwidth: 5 MHz)_HCH_QPSK_1RB#12


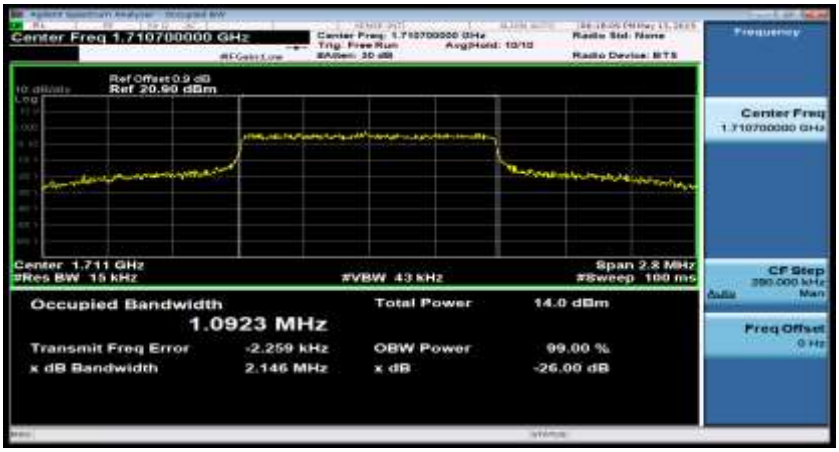
(Channel Bandwidth: 5 MHz)_HCH_QPSK_1RB#24




APPENDIX B
TEST PLOTS FOR OCCUPIED BANDWIDTH (99%)
EMISSION BANDWIDTH (-26dBC)

LTE Band 4

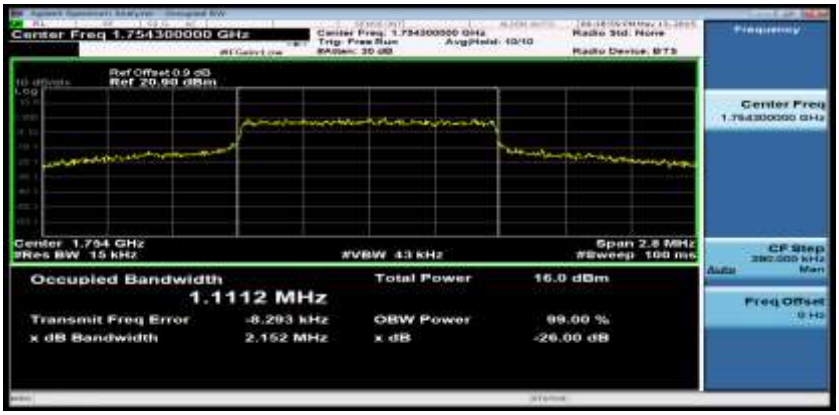
Channel Bandwidth: 1.4 MHz

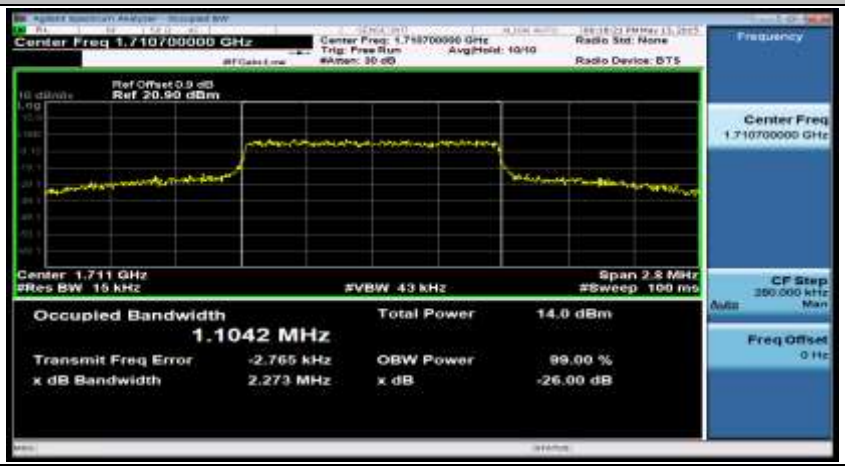
(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_6RB#0

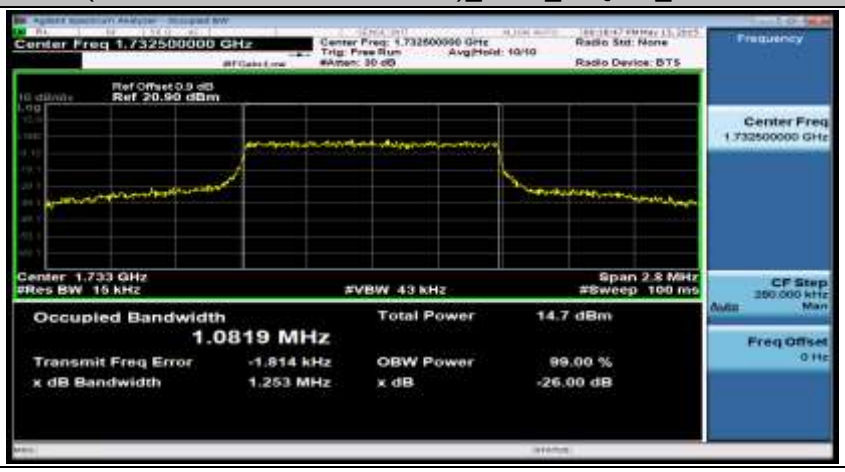


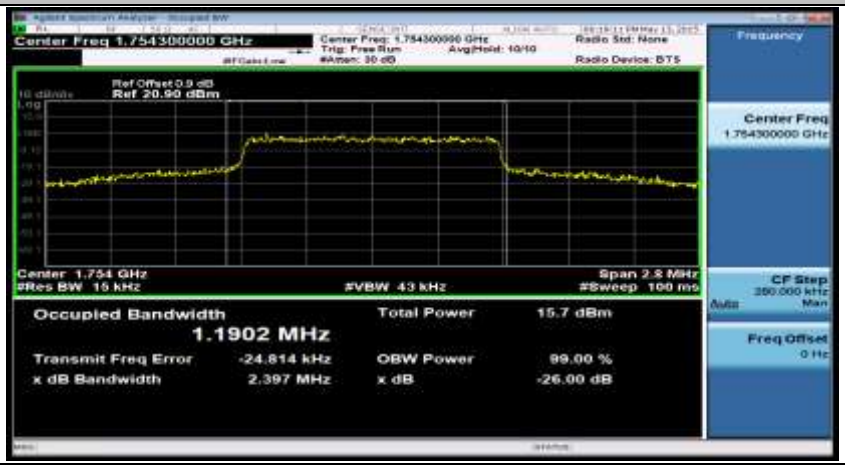
(Channel Bandwidth: 1.4 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_6RB#0



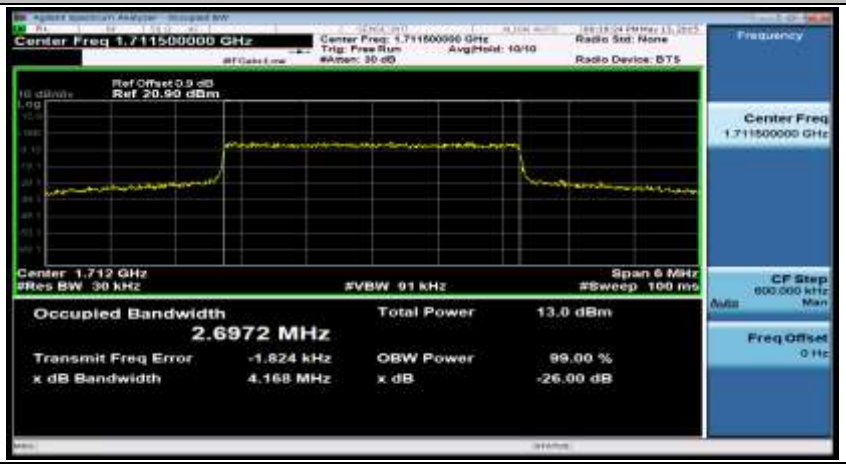
(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_6RB#0


(Channel Bandwidth: 1.4 MHz)_MCH_16QAM_6RB#0


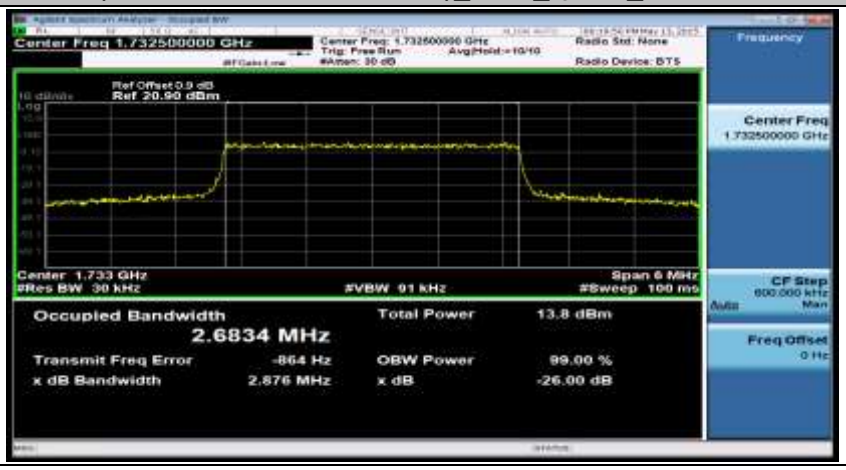
(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_6RB#0


Channel Bandwidth: 3 MHz

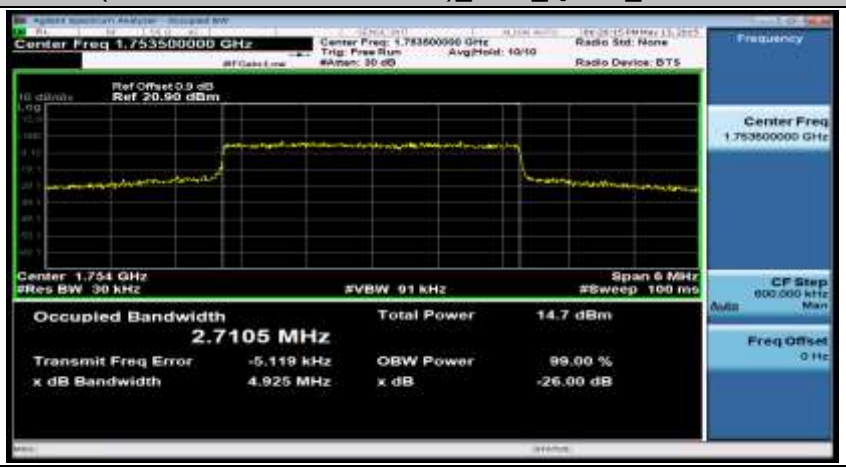
(Channel Bandwidth: 3 MHz)_LCH_QPSK_15RB#0

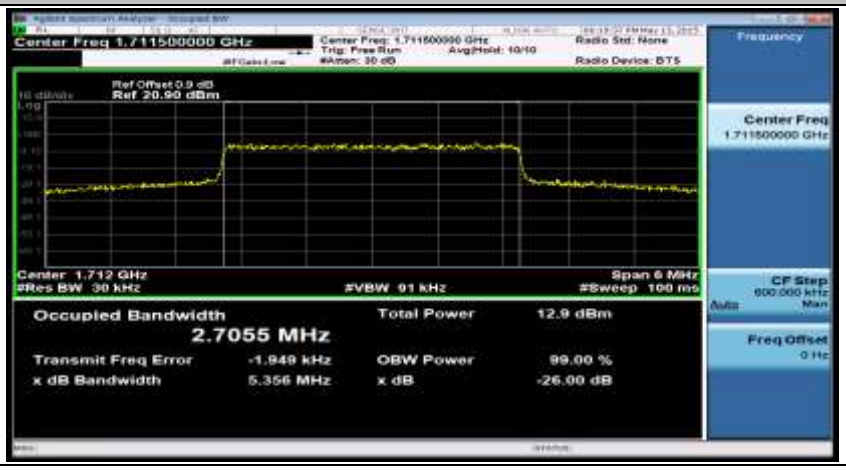


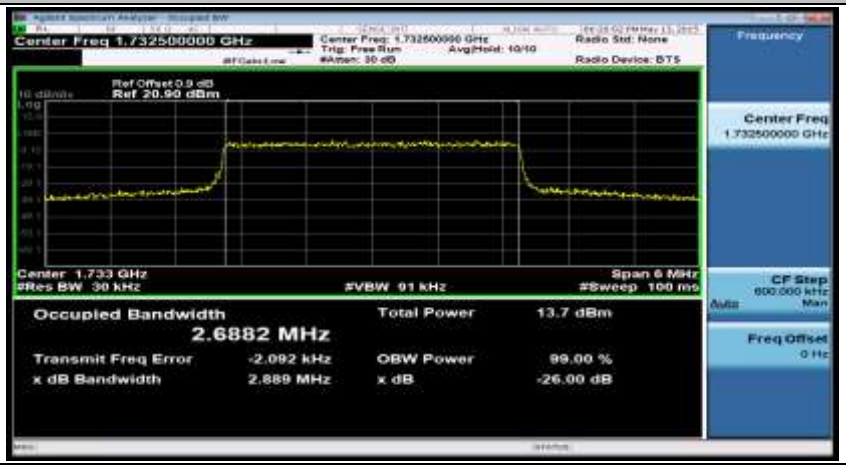
(Channel Bandwidth: 3 MHz)_MCH_QPSK_15RB#0

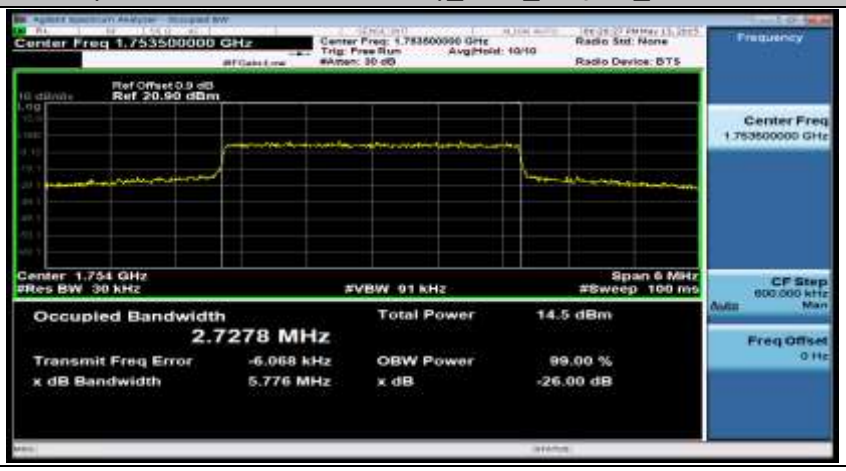


(Channel Bandwidth: 3 MHz)_HCH_QPSK_15RB#0



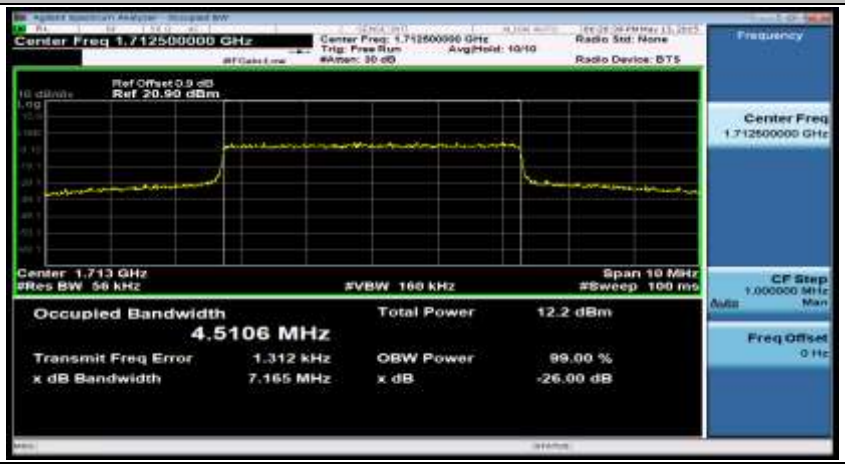
(Channel Bandwidth: 3 MHz)_LCH_16QAM_15RB#0


(Channel Bandwidth: 3 MHz)_MCH_16QAM_15RB#0


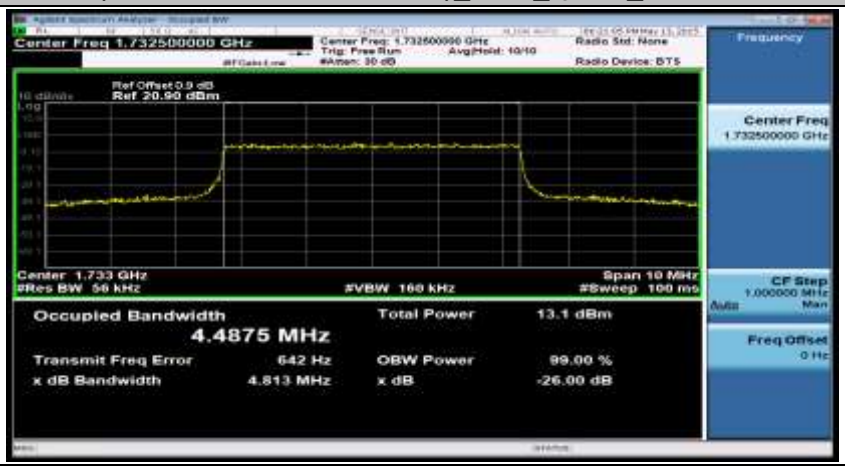
(Channel Bandwidth: 3 MHz)_HCH_16QAM_15RB#0


Channel Bandwidth: 5 MHz

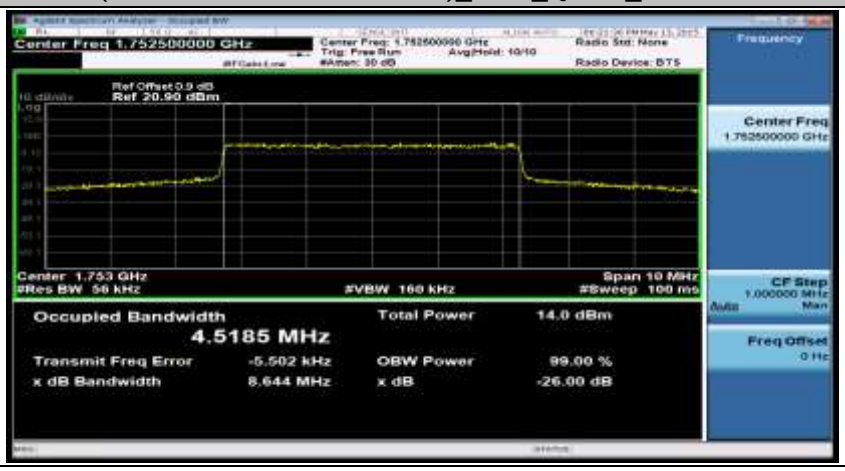
(Channel Bandwidth: 5 MHz)_LCH_QPSK_25RB#0

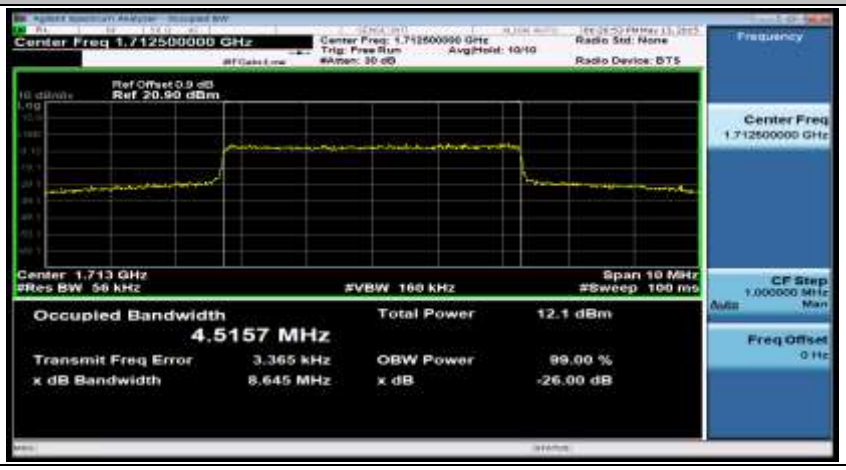


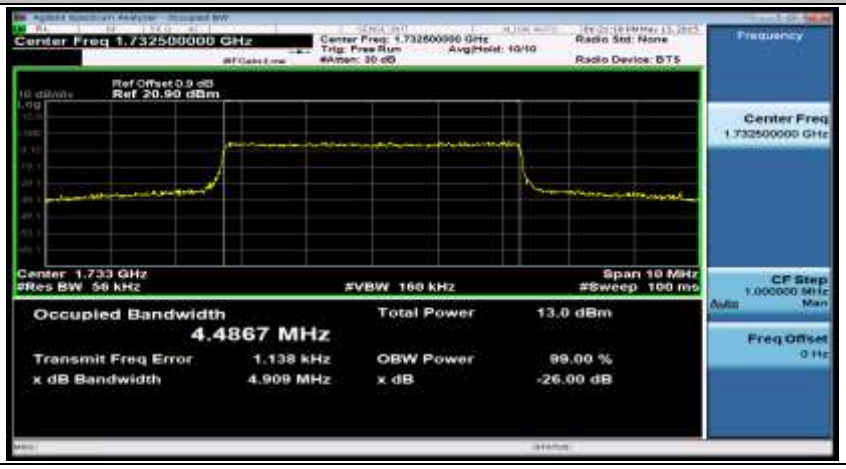
(Channel Bandwidth: 5 MHz)_MCH_QPSK_25RB#0



(Channel Bandwidth: 5 MHz)_HCH_QPSK_25RB#0



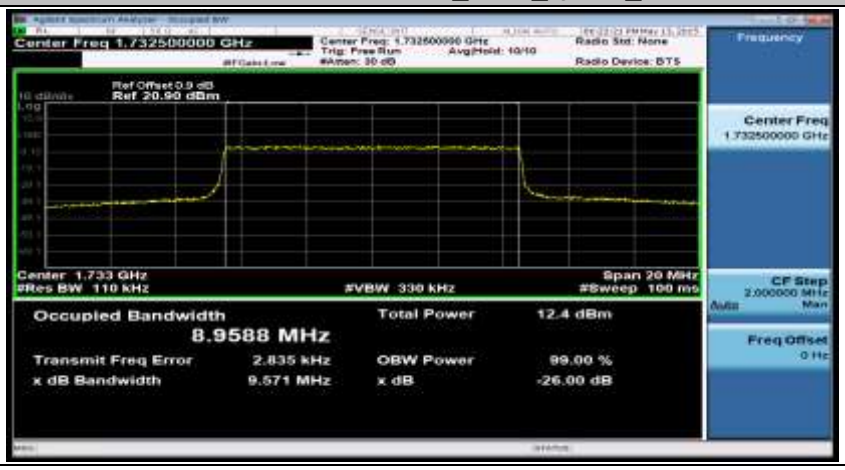
(Channel Bandwidth: 5 MHz)_LCH_16QAM_25RB#0


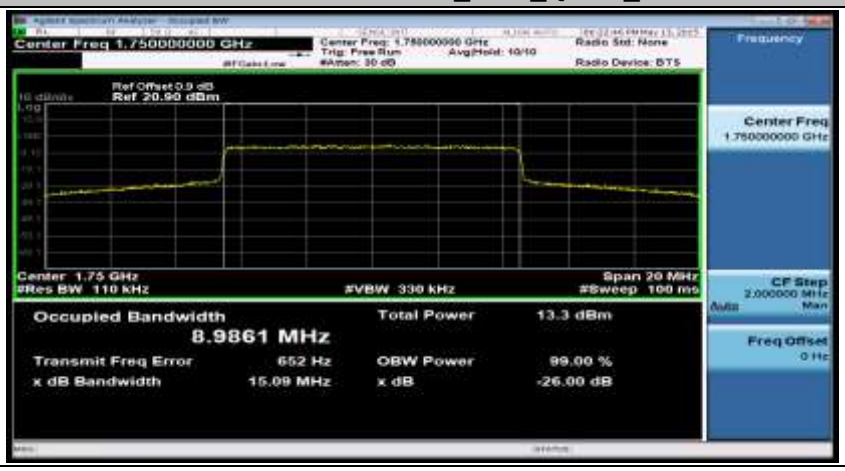
(Channel Bandwidth: 5 MHz)_MCH_16QAM_25RB#0


(Channel Bandwidth: 5 MHz)_HCH_16QAM_25RB#0

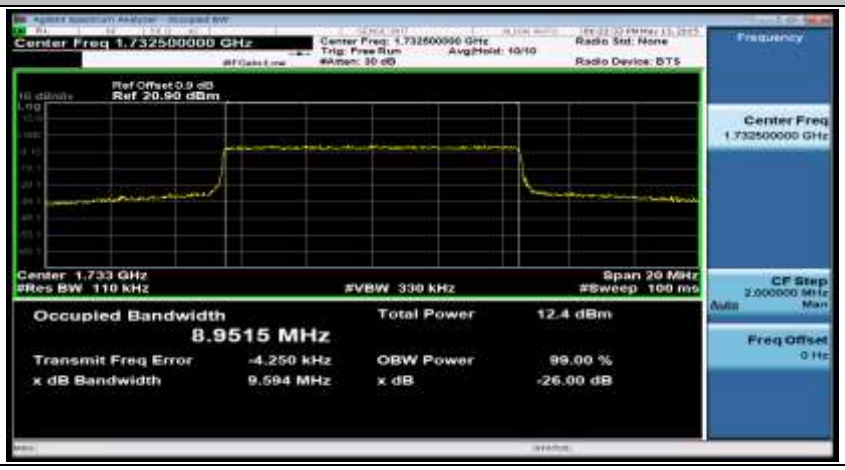

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz_LCH_QPSK_50RB#0


Channel Bandwidth: 10 MHz_MCH_QPSK_50RB#0


Channel Bandwidth: 10 MHz_HCH_QPSK_50RB#0


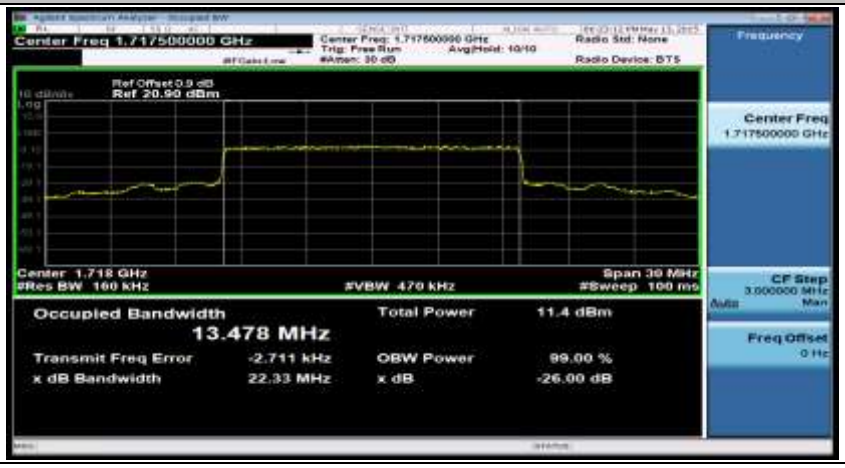
Channel Bandwidth: 10 MHz_LCH_16QAM_50RB#0


Channel Bandwidth: 10 MHz_MCH_16QAM_50RB#0


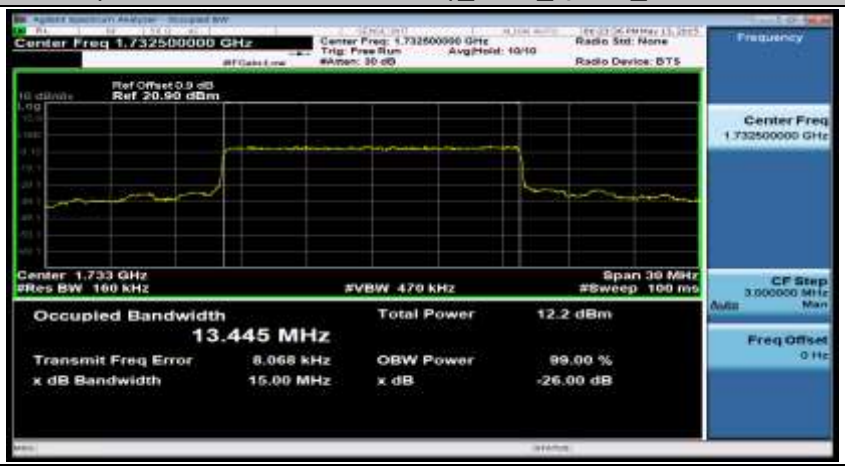
Channel Bandwidth: 10 MHz_HCH_16QAM_50RB#0


Channel Bandwidth: 15 MHz

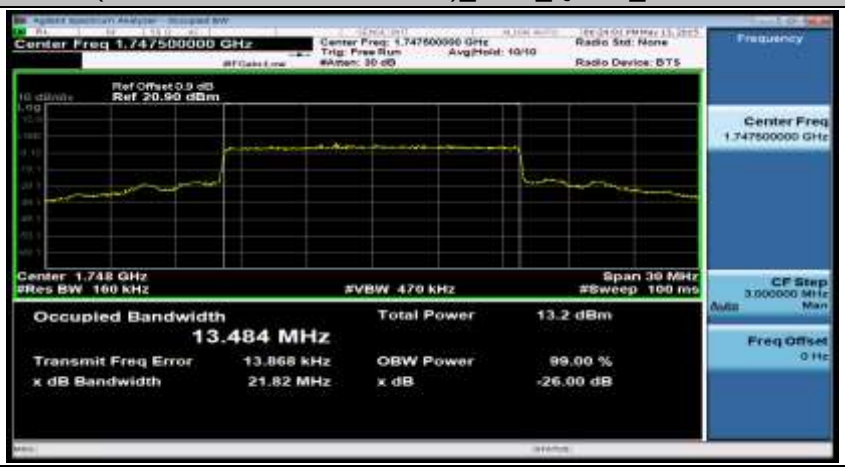
(Channel Bandwidth:15 MHz)_LCH_QPSK_75RB#0

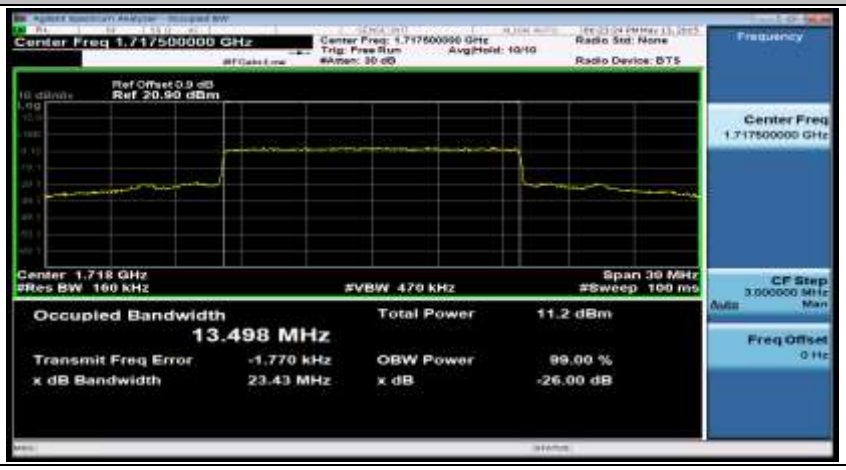


(Channel Bandwidth:15 MHz)_MCH_QPSK_75RB#0

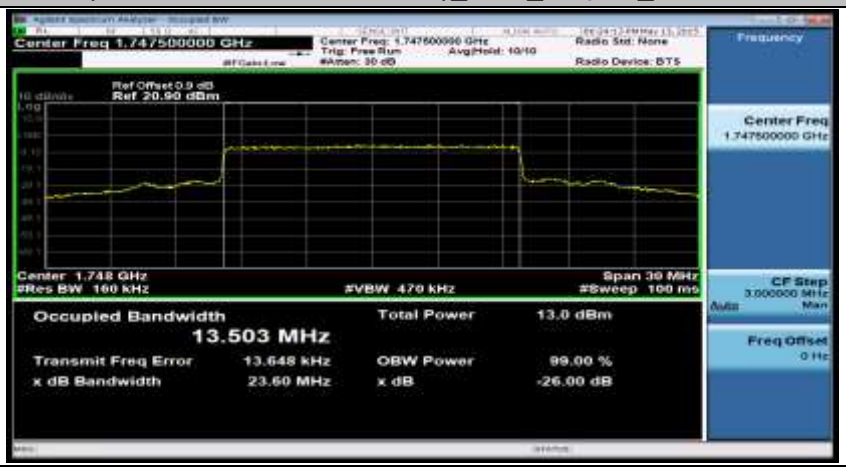


(Channel Bandwidth:15 MHz)_HCH_QPSK_75RB#0



(Channel Bandwidth:15 MHz)_LCH_16QAM_75RB#0


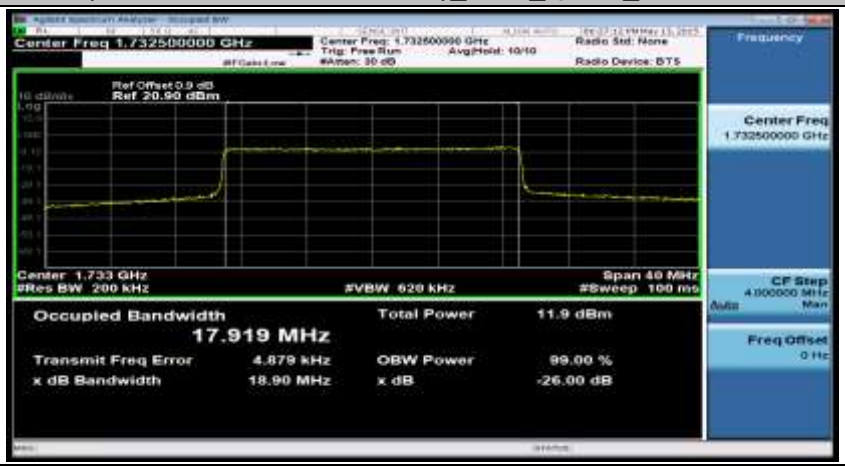
(Channel Bandwidth:15 MHz)_MCH_16QAM_75RB#0


(Channel Bandwidth:15 MHz)_HCH_16QAM_75RB#0


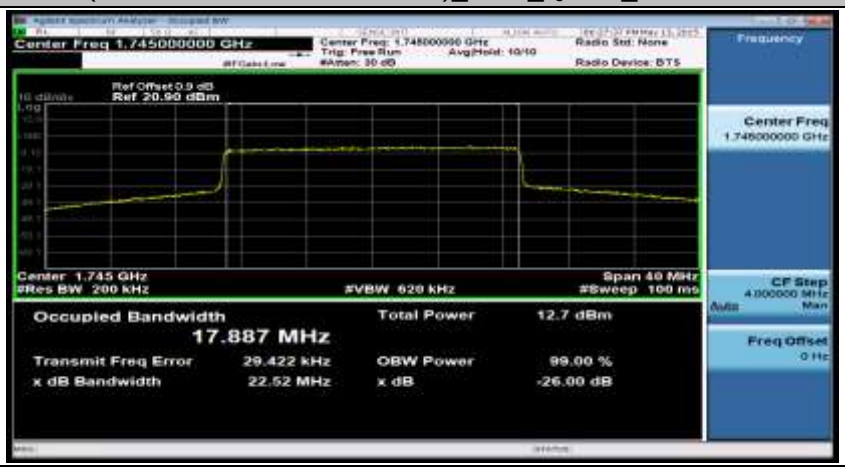
Channel Bandwidth: 20 MHz

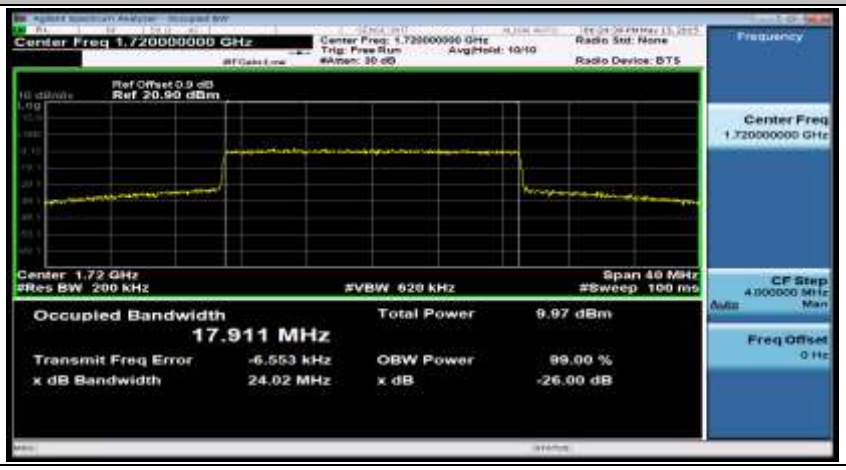
(Channel Bandwidth:20 MHz)_LCH_QPSK_100RB#0

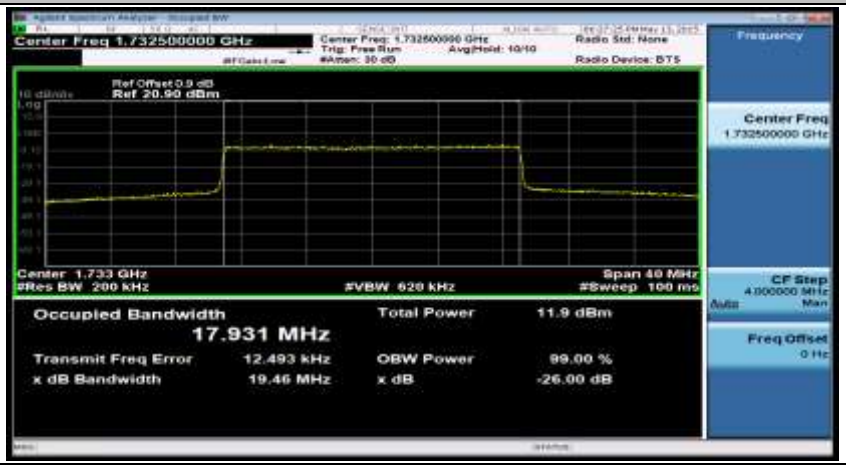
(Channel Bandwidth:20 MHz)_MCH_QPSK_100RB#0

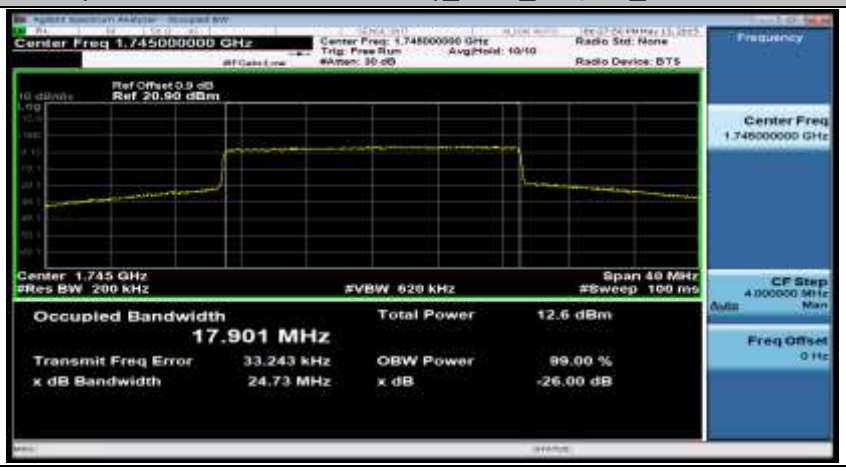


(Channel Bandwidth:20 MHz)_HCH_QPSK_100RB#0



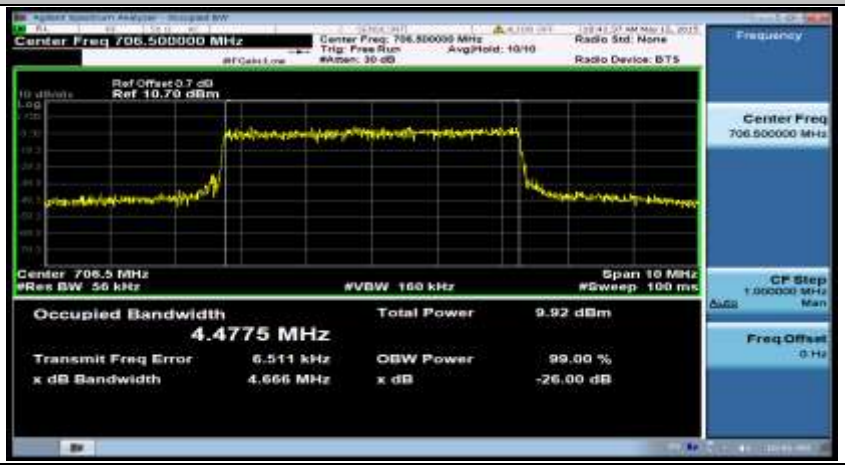
(Channel Bandwidth:20 MHz)_LCH_16QAM_100RB#0


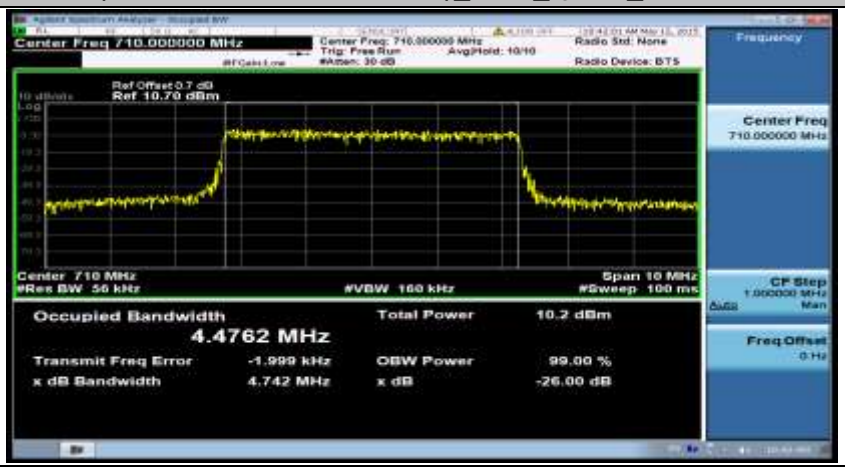
(Channel Bandwidth:20 MHz)_MCH_16QAM_100RB#0


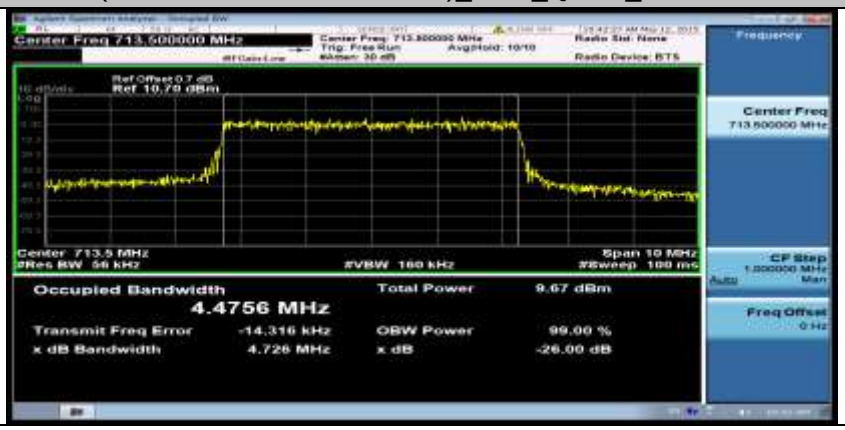
(Channel Bandwidth:20 MHz)_HCH_16QAM_100RB#0


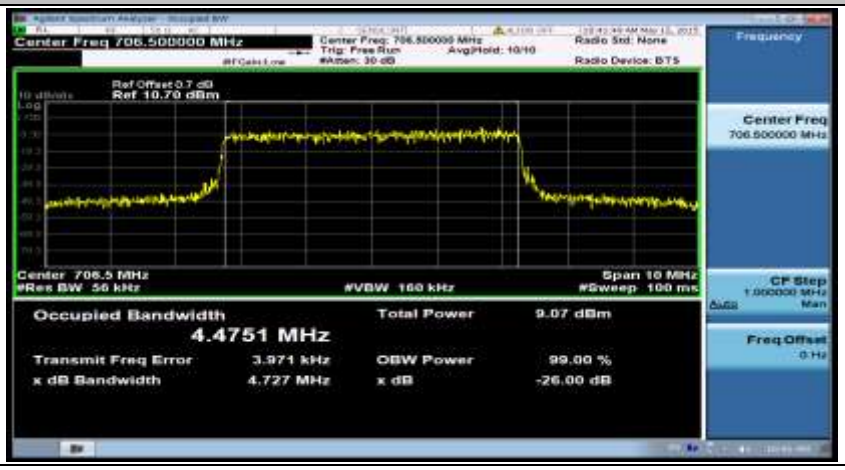
LTE BAND 17

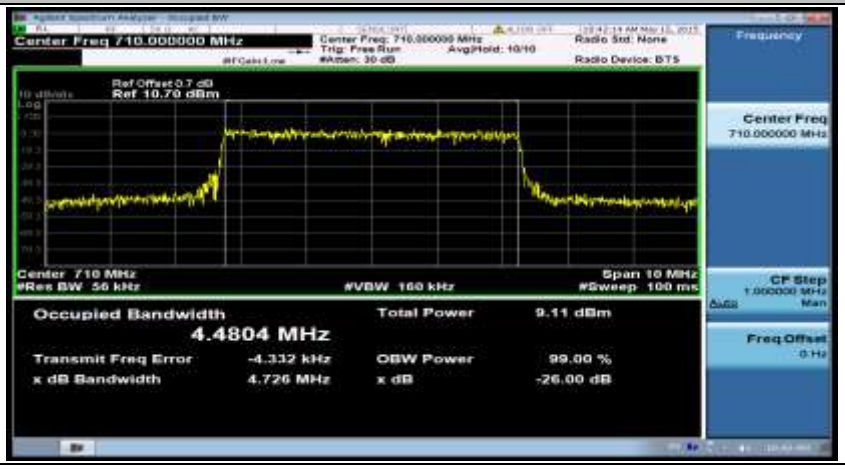
Channel Bandwidth: 5 MHz

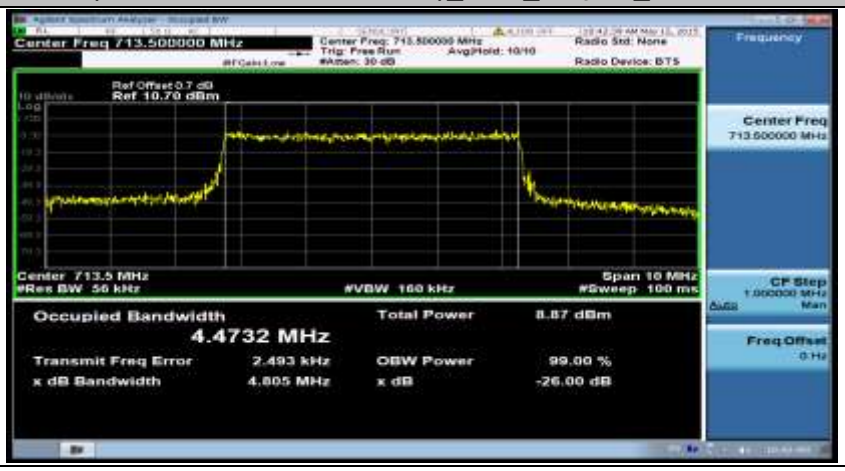
(Channel Bandwidth: 5 MHz)_LCH_QPSK_25RB#0


(Channel Bandwidth: 5 MHz)_MCH_QPSK_25RB#0


(Channel Bandwidth: 5 MHz)_HCH_QPSK_25RB#0


(Channel Bandwidth: 5 MHz)_LCH_16QAM_25RB#0


(Channel Bandwidth: 5 MHz)_MCH_16QAM_25RB#0


(Channel Bandwidth: 5 MHz)_HCH_16QAM_25RB#0


Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz_LCH_QPSK_50RB#0


Channel Bandwidth: 10 MHz_MCH_QPSK_50RB#0


Channel Bandwidth: 10 MHz_HCH_QPSK_50RB#0


Channel Bandwidth: 10 MHz_LCH_16QAM_50RB#0


Channel Bandwidth: 10 MHz_MCH_16QAM_50RB#0

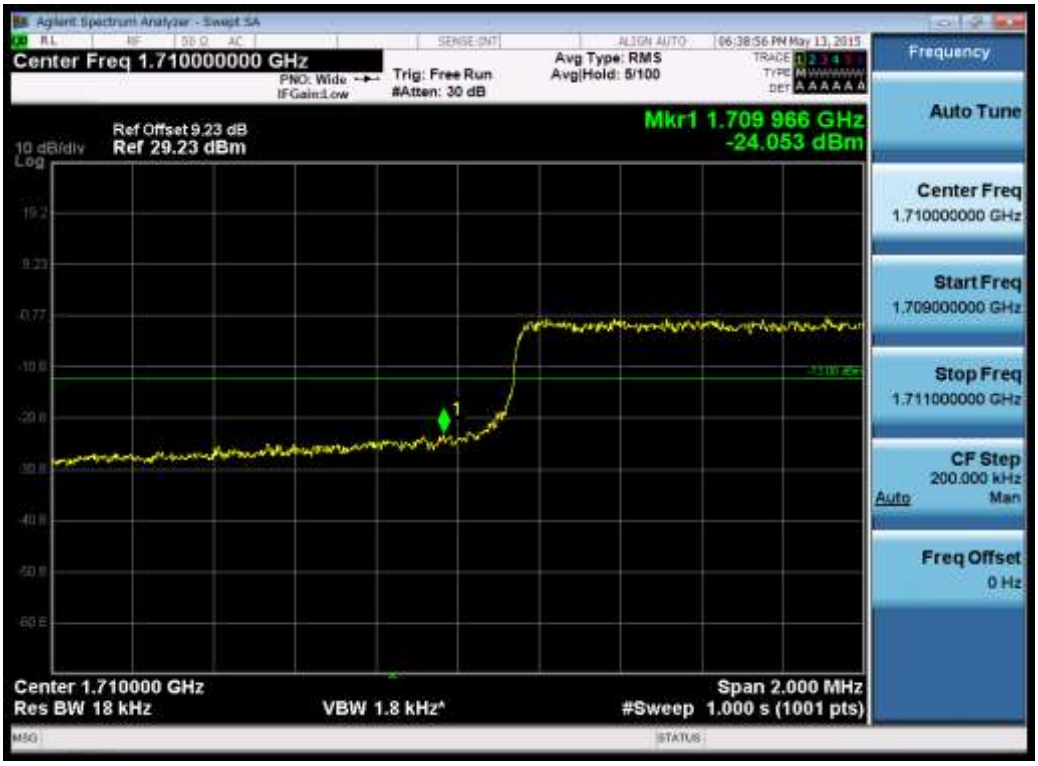

APPENDIX C

TEST PLOTS FOR BAND EDGES

Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 25)

High Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 25)

Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

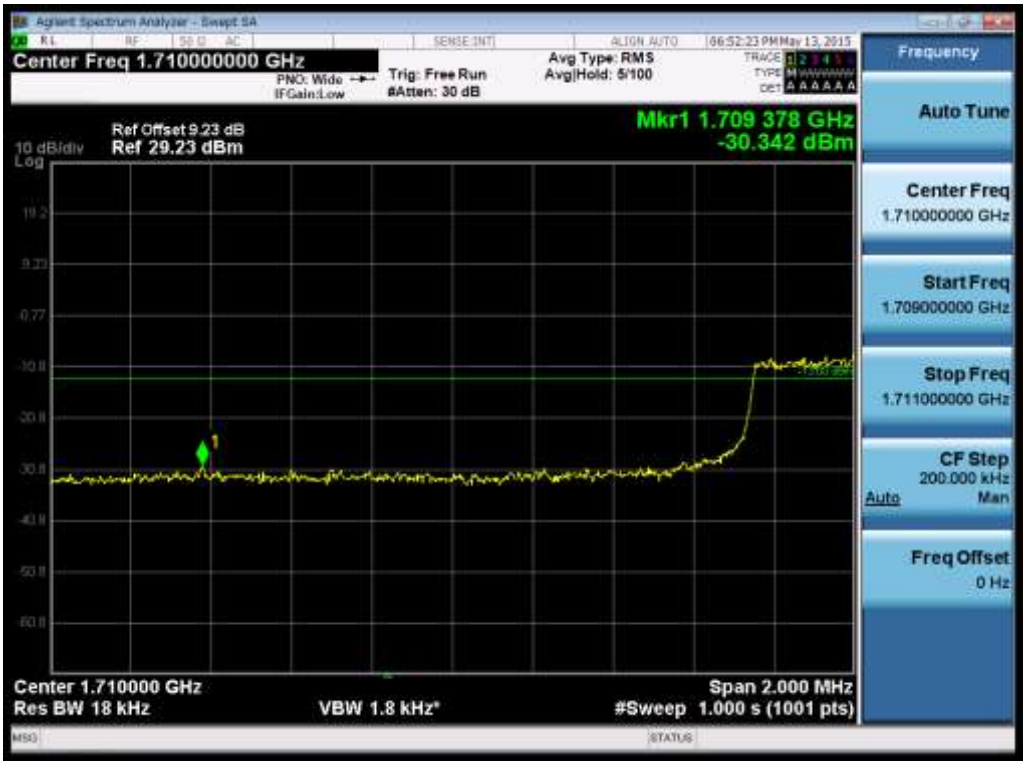
Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

High Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

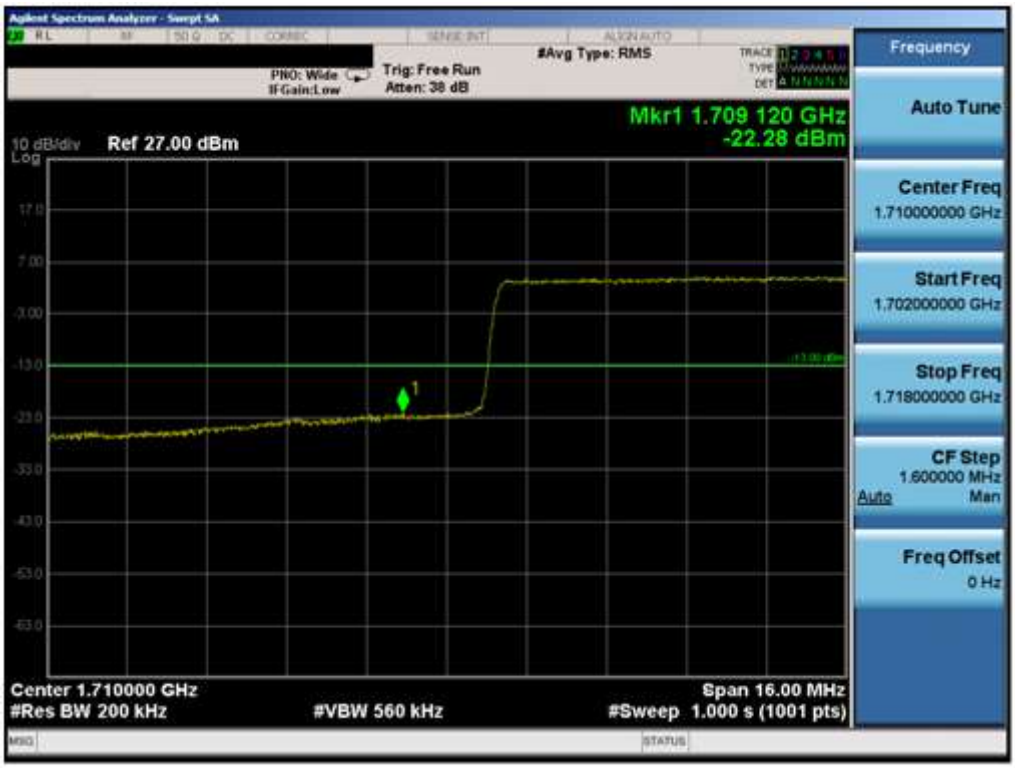
High Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



High Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



High Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

Lower Band Edge Plot (Band 17 – 5.0MHz QPSK – RB Size 25)

High Band Edge Plot (Band 17 – 5.0MHz QPSK – RB Size 25)

Lower Band Edge Plot (Band 17 – 10.0MHz QPSK – RB Size 50)

High Band Edge Plot (Band 17 – 10.0MHz QPSK – RB Size 50)

APPENDIX D

PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION

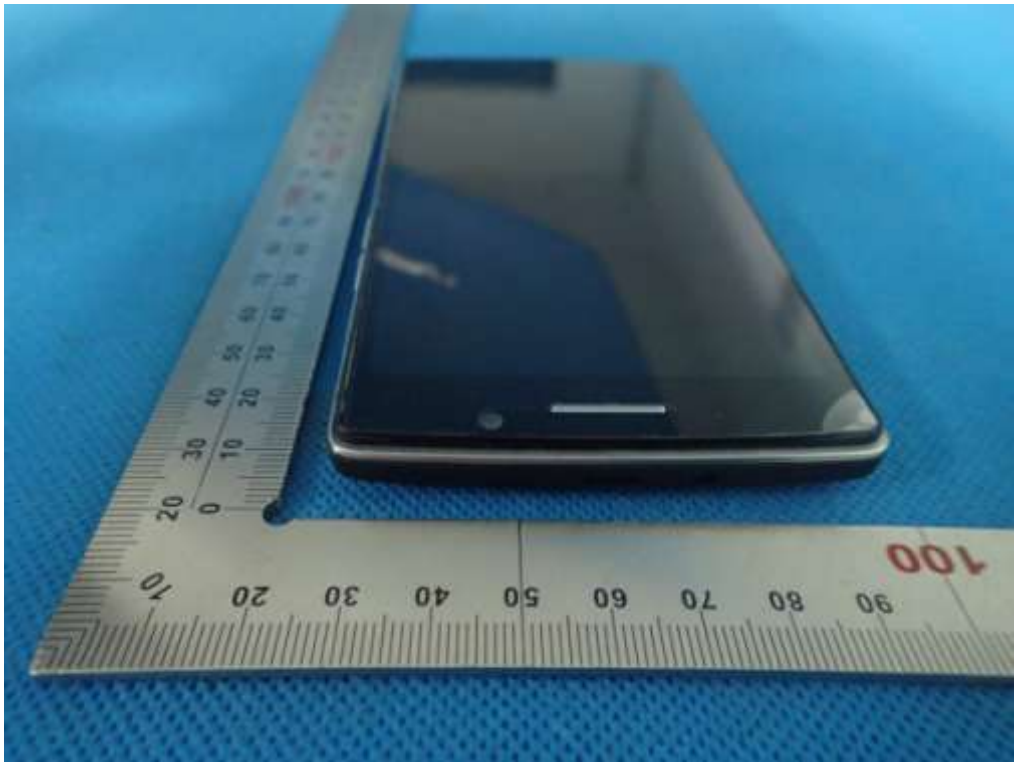
RADIATED SPURIOUS EMISSION


ROHDE&SCHWARZ
GSM

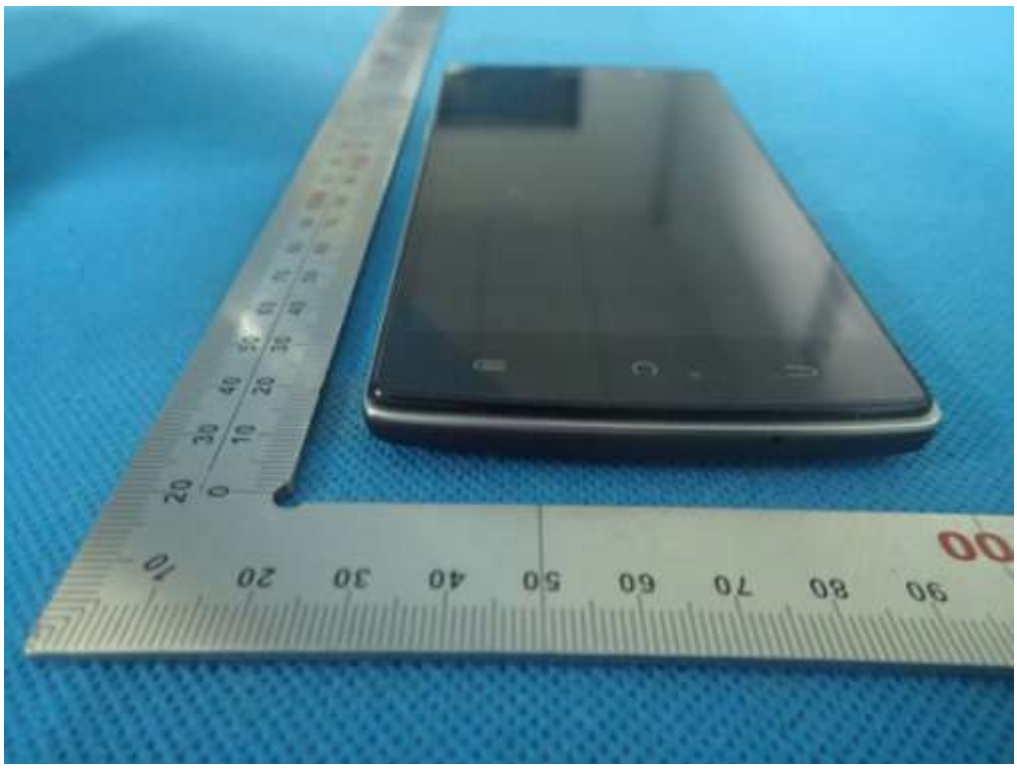
APPENDIX E
PHOTOGRAPHS OF EUT

TOTAL VIEW OF EUT

TOP VIEW OF EUT



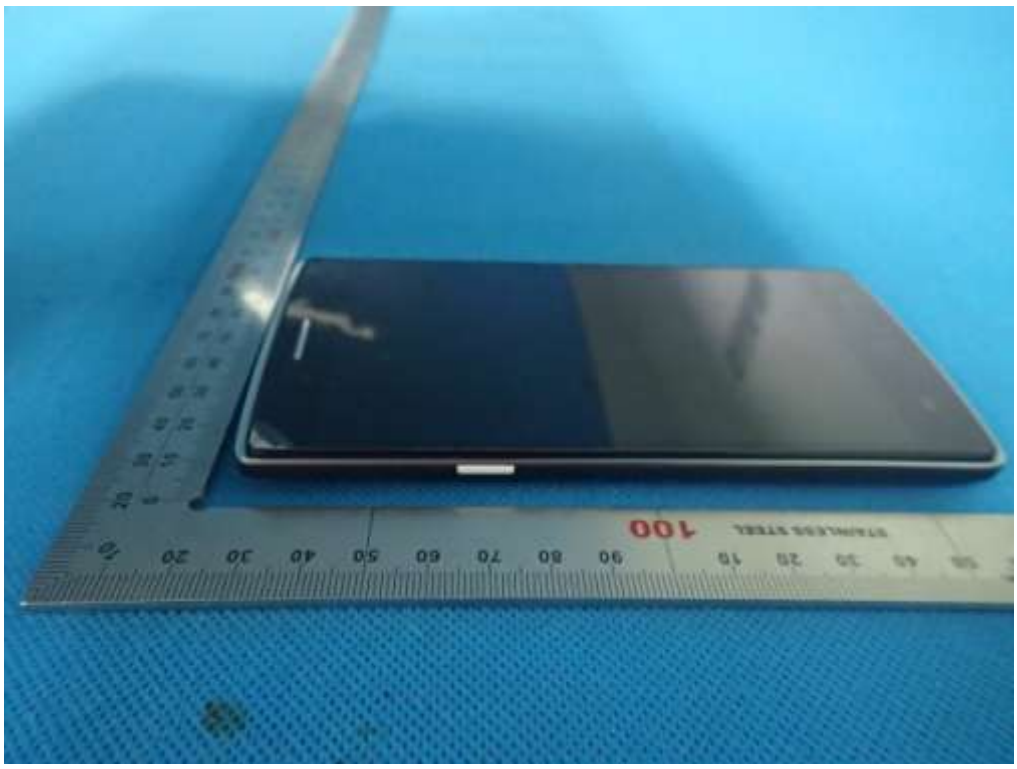
BOTTOM VIEW OF EUT



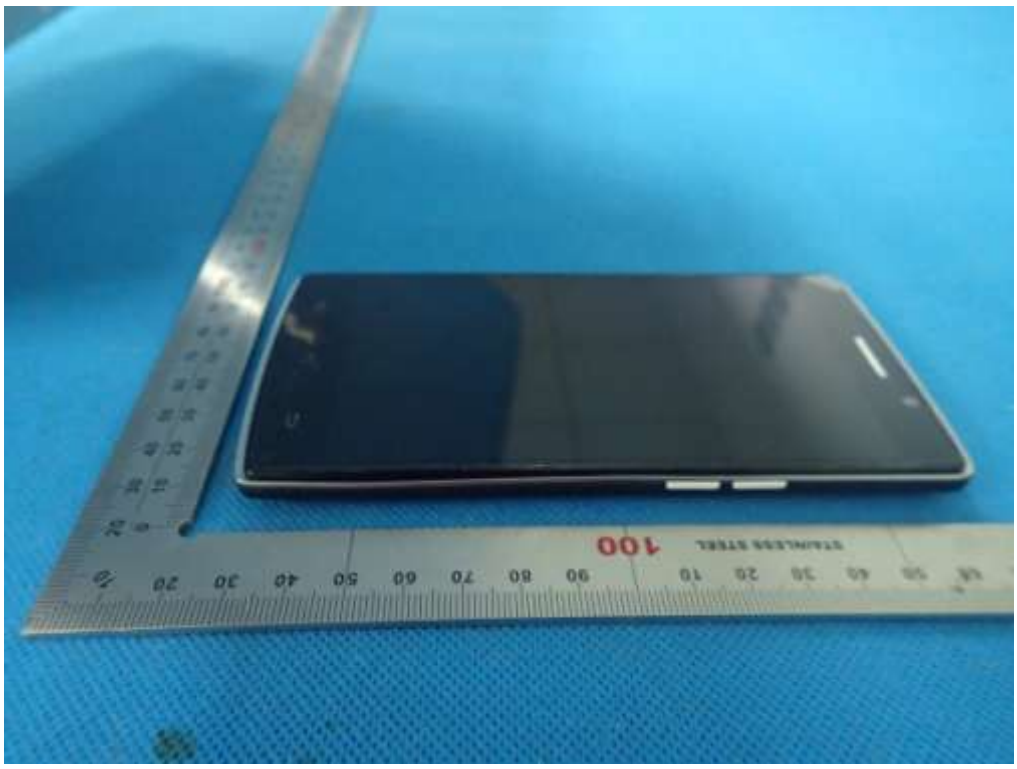
FRONT VIEW OF EUT

BACK VIEW OF EUT

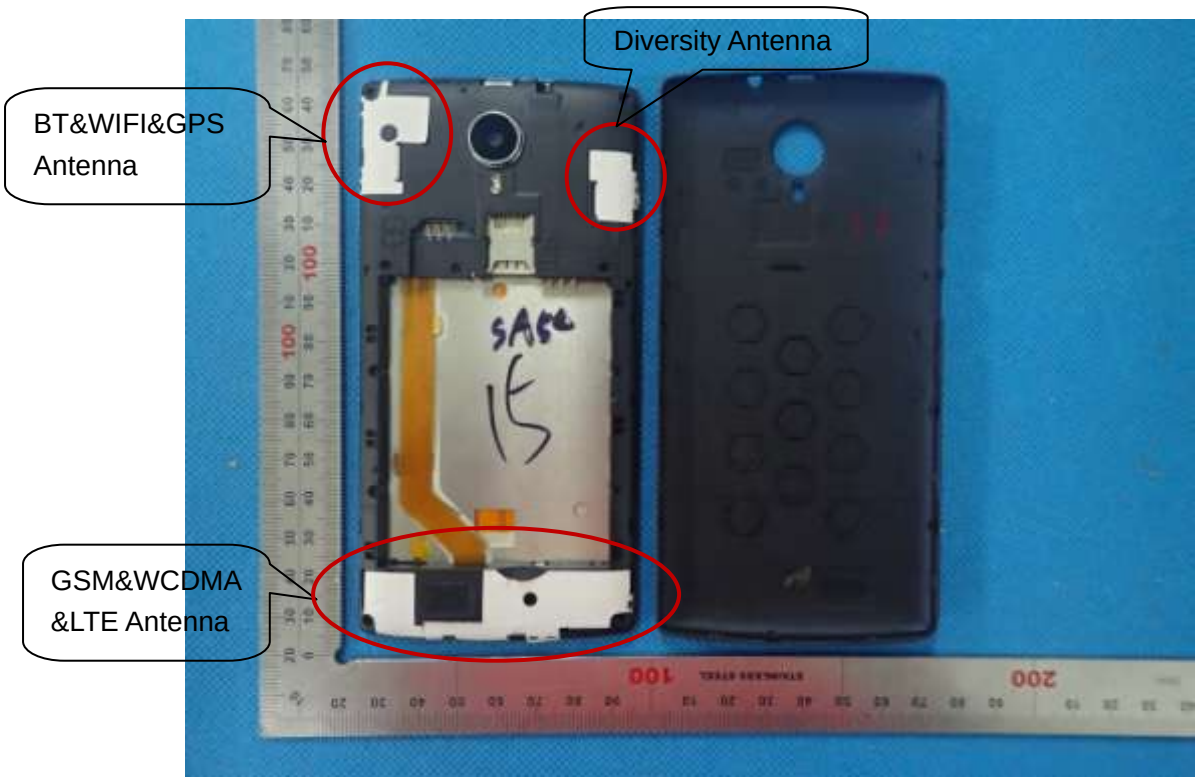
LEFT VIEW OF EUT



RIGHT VIEW OF EUT



OPEN VIEW OF EUT-1

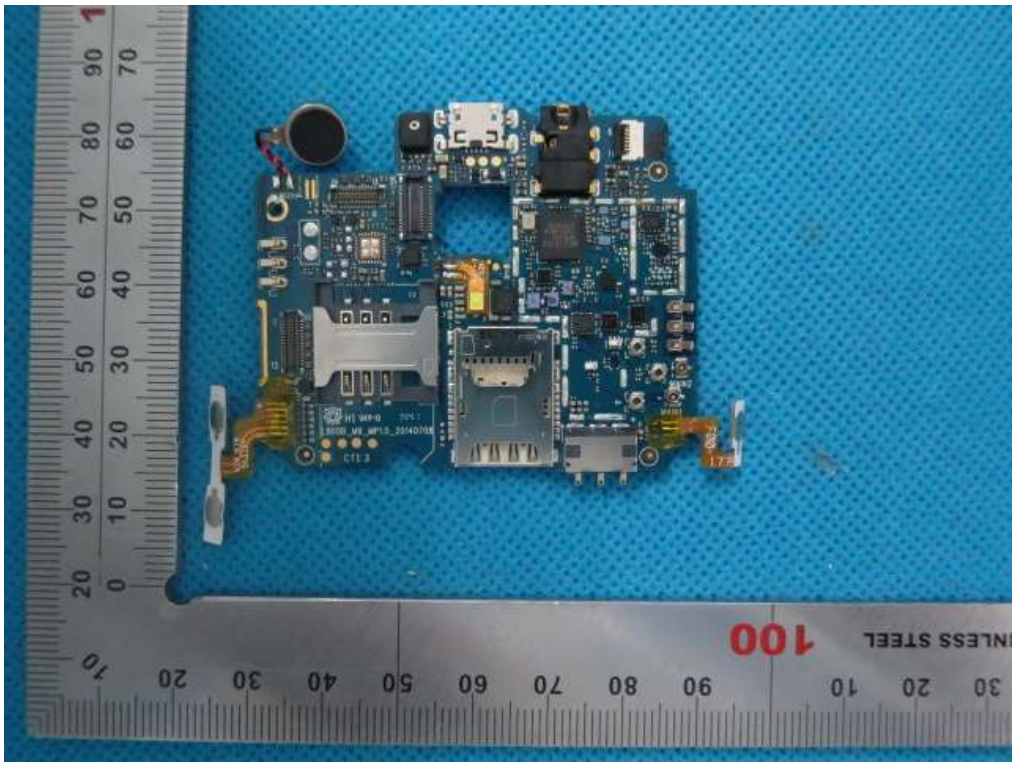


OPEN VIEW OF EUT-2

OPEN VIEW OF EUT-3

INTERNAL VIEW OF EUT-1

INTERNAL VIEW OF EUT-2



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