FCC Test Report

(PART 27)

Report No.:	RF160621C21-8
FCC ID:	PY7-14784Z
Received Date:	Jun. 21, 2016
Test Date:	Jul. 03, 2016 ~ Jul. 14, 2016
Issued Date:	Jul. 15, 2016
Applicant:	Sony Mobile Communications Inc.
Address:	4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location (1):	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.
Test Location (2):	No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C

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

Table of Contents

Release Control Record 3

1 Certificate of Conformity 4

2 Summary of Test Results 5

2.1 Measurement Uncertainty 7
2.2 Test Site and Instruments 8

3 General Information 9

3.1 General Description of EUT 9
3.2 Configuration of System under Test 11
3.2.1 Description of Support Units 11
3.3 Test Mode Applicability and Tested Channel Detail 12
3.4 EUT Operating Conditions 17
3.5 General Description of Applied Standards 17

4 Test Types and Results 18

4.1 Output Power Measurement 18
4.1.1 Limits of Output Power Measurement 18
4.1.2 Test Procedures 18
4.1.3 Test Setup 19
4.1.4 Test Results 20
4.2 Frequency Stability Measurement 31
4.2.1 Limits of Frequency Stabiliity Measurement 31
4.2.2 Test Procedure 31
4.2.3 Test Setup 31
4.2.4 Test Results 32
4.3 Occupied Bandwidth Measurement 34
4.3.1 Limits of Occupied Bandwidth Measurement 34
4.3.2 Test Procedure 34
4.3.3 Test Setup 34
4.3.4 Test Result 35
4.4 Band Edge Measurement 42
4.4.1 Limits of Band Edge Measurement 42
4.4.2 Test Setup 42
4.4.3 Test Procedures 42
4.4.4 Test Results 43
4.5 Peak to Average Ratio 55
4.5.1 Limits of Peak to Average Ratio Measurement 55
4.5.2 Test Setup 55
4.5.3 Test Procedures 55
4.5.4 Test Results 56
4.6 Conducted Spurious Emissions 63
4.6.1 Limits of Conducted Spurious Emissions Measurement 63
4.6.2 Test Setup 63
4.6.3 Test Procedure 63
4.6.4 Test Results 64
4.7 Radiated Emission Measurement 67
4.7.1 Limits of Radiated Emission Measurement 67
4.7.2 Test Procedure 67
4.7.3 Deviation from Test Standard 67
4.7.4 Test Setup 67
4.7.5 Test Results 68

5 Pictures of Test Arrangements 76

Appendix – Information on the Testing Laboratories 77

Release Control Record

Issue No.	Description	Date Issued
RF160621C21-8	Original Release	Jul. 15, 2016

1 Certificate of Conformity

Product:	Mobile Phone
Brand:	Sony
Sample Status:	Identical Prototype
Applicant:	Sony Mobile Communications Inc.
Test Date:	Jul. 03, 2016 ~ Jul. 14, 2016
Standards:	FCC Part 27, Subpart C, L

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Evonne Liu , **Date:** Jul. 15, 2016

Evonne Liu / Specialist

Approved by : Stanley Wu , **Date:** Jul. 15, 2016

Stanley Wu / Assistant Manager

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2 (WCDMA)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(d)(4)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -37.24 dB at 3465.20 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 4)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(d)(4)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -36.79 dB at 3465 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 12)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(C)(10)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(g)	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(g)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(g)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -33.31 dB at 46.20 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 17)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(C)(10)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(g)	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(g)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(g)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -40.26 dB at 97.77 MHz.

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	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Test Site and Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY50010135	Jul. 18, 2015	Jul. 17, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna ETS-Lindgren	3117	00143293	Jan. 04, 2016	Jan. 03, 2017
Double Ridge Guide Horn Antenna EMCO	3115	5619	Jan. 04, 2016	Jan. 03, 2017
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Jan. 07, 2016	Jan. 06, 2017
Agilent Communications Tester-Wireless	8960 Series 10	MY53201073	Jul. 03, 2015	Jul. 02, 2017
Preamplifier Agilent	310N	187226	Jun. 24, 2016	Jun. 23, 2017
Preamplifier Agilent	83017A	MY39501357	Jun. 24, 2016	Jun. 23, 2017
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 24, 2016	Jun. 23, 2017
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 24, 2016	Jun. 23, 2017
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jul. 03, 2015	Jul. 02, 2017
Radio Communication Analyzer Anritsu	MT8820C	6201240432	Jul. 06, 2015	Jul. 05, 2017

Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 149147.
5. The IC Site Registration No. is IC7450I-1.

3 General Information

3.1 General Description of EUT

Product	Mobile Phone	
Brand	Sony	
Status of EUT	Identical Prototype	
Power Supply Rating	3.8Vdc (Embeded Battery) 5Vdc or 9Vdc or 12Vdc (Adapter)	
Modulation Type	WCDMA	QPSK, BPSK
	LTE	QPSK, 16QAM
Frequency Range	WCDMA	1712.4 ~ 1752.6 MHz
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1754.3 MHz
	LTE Band 4 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1753.5 MHz
	LTE Band 4 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1752.5 MHz
	LTE Band 4 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1750.0 MHz
	LTE Band 4 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1747.5 MHz
	LTE Band 4 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1745.0 MHz
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	699.7 ~ 715.3 MHz
	LTE Band 12 (Channel Bandwidth: 3 MHz)	700.5 ~ 714.5 MHz
	LTE Band 12 (Channel Bandwidth: 5 MHz)	701.5 ~ 713.5 MHz
	LTE Band 12 (Channel Bandwidth: 10 MHz)	704.0 ~ 711.0 MHz
	LTE Band 17 (Channel Bandwidth: 5 MHz)	706.5 ~ 713.5 MHz
	LTE Band 17 (Channel Bandwidth: 10 MHz)	709 ~ 711 MHz
Emission Designator	WCDMA	4M18F9W
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	QPSK : 1M09G7D 16QAM : 1M09W7D
	LTE Band 4 (Channel Bandwidth: 3 MHz)	QPSK : 2M70G7D 16QAM : 2M70W7D
	LTE Band 4 (Channel Bandwidth: 5 MHz)	QPSK : 4M49G7D 16QAM : 4M49W7D
	LTE Band 4 (Channel Bandwidth: 10 MHz)	QPSK : 8M96G7D 16QAM : 8M96W7D
	LTE Band 4 (Channel Bandwidth: 15 MHz)	QPSK : 13M4G7D 16QAM : 13M4W7D
	LTE Band 4 (Channel Bandwidth: 20 MHz)	QPSK : 17M90G7D 16QAM : 17M91W7D
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	QPSK : 1M09G7D 16QAM : 1M09W7D
	LTE Band 12 (Channel Bandwidth: 3 MHz)	QPSK : 2M70G7D 16QAM : 2M70W7D
	LTE Band 12 (Channel Bandwidth: 5 MHz)	QPSK : 4M49G7D 16QAM : 4M48W7D
	LTE Band 12 (Channel Bandwidth: 10 MHz)	QPSK : 8M96G7D 16QAM : 8M96W7D

	LTE Band 17 (Channel Bandwidth: 5 MHz)	QPSK : 4M49G7D 16QAM : 4M48W7D
	LTE Band 17 (Channel Bandwidth: 10 MHz)	QPSK : 8M95G7D 16QAM : 8M96W7D
Max. ERP Power	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	QPSK : 35.04 mW 16QAM : 29.44 mW
	LTE Band 12 (Channel Bandwidth: 3 MHz)	QPSK : 38.73 mW 16QAM : 30.87 mW
	LTE Band 12 (Channel Bandwidth: 5 MHz)	QPSK : 37.14 mW 16QAM : 29.44 mW
	LTE Band 12 (Channel Bandwidth: 10 MHz)	QPSK : 38.34 mW 16QAM : 30.81 mW
	LTE Band 17 (Channel Bandwidth: 5 MHz)	QPSK : 37.29 mW 16QAM : 27.08 mW
	LTE Band 17 (Channel Bandwidth: 10 MHz)	QPSK : 39.44 mW 16QAM : 27.15 mW
Max. EIRP Power	WCDMA	108.27mW
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	QPSK : 114.55 mW 16QAM : 91.52 mW
	LTE Band 4 (Channel Bandwidth: 3 MHz)	QPSK : 106.05 mW 16QAM : 96.83 mW
	LTE Band 4 (Channel Bandwidth: 5 MHz)	QPSK : 115.61 mW 16QAM : 95.39 mW
	LTE Band 4 (Channel Bandwidth: 10 MHz)	QPSK : 119.40 mW 16QAM : 98.06 mW
	LTE Band 4 (Channel Bandwidth: 15 MHz)	QPSK : 116.95 mW 16QAM : 96.72 mW
	LTE Band 4 (Channel Bandwidth: 20 MHz)	QPSK : 104.16 mW 16QAM : 91.90 mW
Antenna Type	Fixed Internal Antenna	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

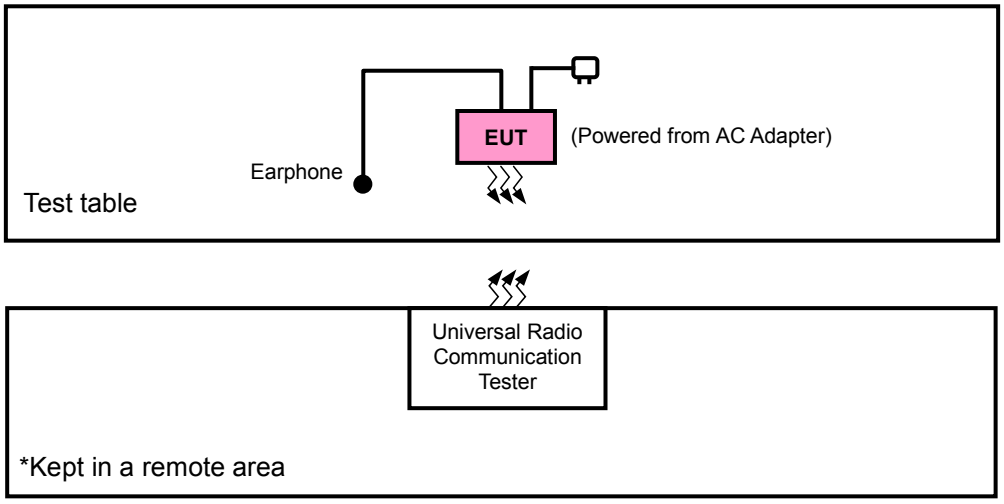
1. The EUT contains following accessory devices.

Product	Brand	Model	Type	Description
Adapter	Sony	UCH12	AC-0051	I/P: 100- 240Vac, 400mA, 50~60 Hz, O/P: 5.0Vdc, 2700 mA / O/P: 9.0Vdc, 1800 mA / O/P: 12.0Vdc, 1350 mA
Battery	Sony	1303-8269	N/A	3.8Vdc, 2700mAh
Earphone	Sony	MH410c	AG-1100	1.5m non-shielded cable w/o core
USB Cable	Sony	UCB20	AI-0160	0.95m shielded cable w/o core

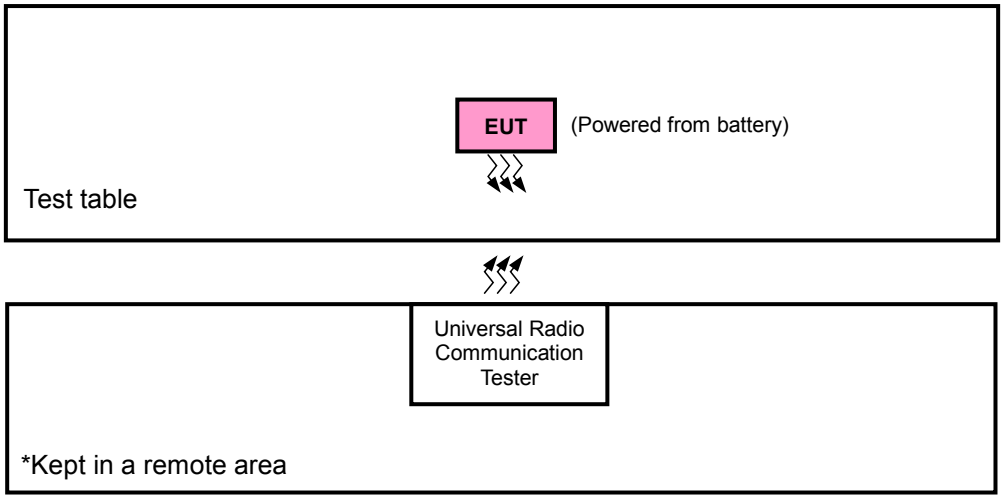
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<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.

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 as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	ERP / EIRP	Radiated Emission
WCDMA	X-plane	Y-axis
LTE Band 4	X-plane	Y-axis
LTE Band 12	Y-plane	Z-axis
LTE Band 17	X-plane	Z-axis

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	1312 to 1513	1312, 1413, 1513	WCDMA
-	Frequency Stability	1312 to 1513	1413	WCDMA
-	Occupied Bandwidth	1312 to 1513	1312, 1413, 1513	WCDMA
-	Band Edge	1312 to 1513	1312, 1513	WCDMA
-	Peak to Average Ratio	1312 to 1513	1312, 1413, 1513	WCDMA
-	Condcudeted Emission	1312 to 1513	1413	WCDMA
-	Radiated Emission	1312 to 1513	1413	WCDMA

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 RB / 5 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 14 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 49 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 74 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 RB / 99 RB Offset
-	Frequency Stability	19957 to 20393	20175	1.4 MHz	QPSK	1 RB / 5 RB Offset
		19965 to 20385	20175	3 MHz	QPSK	1 RB / 14 RB Offset
		19975 to 20375	20175	5 MHz	QPSK	1 RB / 24 RB Offset
		20000 to 20350	20175	10 MHz	QPSK	1 RB / 49 RB Offset
		20025 to 20325	20175	15 MHz	QPSK	1 RB / 74 RB Offset
		20050 to 20300	20175	20 MHz	QPSK	1 RB / 99 RB Offset
-	Occupied Bandwidth	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 RB / 2 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 7 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	12 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	36 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	50 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	19957 to 20393	19957	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			20393	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		19965 to 20385	19965	3 MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			20385	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		19975 to 20375	19975	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			20375	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		20000 to 20350	20000	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			20350	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		20025 to 20325	20025	15 MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			20325	15 MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		20050 to 20300	20050	20 MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			20300	20 MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
-	Conducted Emission	19957 to 20393	20175	1.4 MHz	QPSK	1 RB / 2 RB Offset
		19965 to 20385	20175	3 MHz	QPSK	1 RB / 7 RB Offset
		19975 to 20375	20175	5 MHz	QPSK	12 RB / 0 RB Offset
		20000 to 20350	20175	10 MHz	QPSK	50 RB / 0 RB Offset
		20025 to 20325	20175	15 MHz	QPSK	36 RB / 0 RB Offset
		20050 to 20300	20175	20 MHz	QPSK	50 RB / 0 RB Offset
-	Radiated Emission	20050 to 20300	20175	20 MHz	QPSK	1 RB / 99 RB Offset

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

LTE Band 12

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 2 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 RB / 7 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
-	Frequency Stability	23017 to 23173	23095	1.4 MHz	QPSK	1 RB / 2 RB Offset
		23025 to 23165	23095	3 MHz	QPSK	1 RB / 7 RB Offset
		23035 to 23155	23095	5 MHz	QPSK	1 RB / 12 RB Offset
		23060 to 23130	23095	10 MHz	QPSK	1 RB / 24 RB Offset
-	Occupied Bandwidth	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Band Edge	23017 to 23173	23017	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			23173	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		23025 to 23165	23025	3 MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			23165	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		23035 to 23155	23035	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			23155	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		23060 to 23130	23060	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			23130	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
-	Conducted Emission	23017 to 23173	23095	1.4 MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23095	3 MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23095	5 MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23095	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	23060 to 23130	23095	10 MHz	QPSK	1 RB / 24 RB Offset

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

LTE Band 17

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
-	Frequency Stability	23755 to 23825	23790	5 MHz	QPSK	1 RB / 12 RB Offset
		23780 to 23800	23790	10 MHz	QPSK	1 RB / 24 RB Offset
-	Occupied Bandwidth	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM	1 RB / 12 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM	1 RB / 24 RB Offset
-	Band Edge	23755 to 23825	23755	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			23825	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		23780 to 23800	23780	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			23800	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
-	Conducted Emission	23755 to 23825	23790	5 MHz	QPSK	1 RB / 12 RB Offset
		23780 to 23800	23790	10 MHz	QPSK	1 RB / 24 RB Offset
-	Radiated Emission	23780 to 23800	23790	10 MHz	QPSK	1 RB / 24 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 / EIRP	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Frequency Stability	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Occupied Bandwidth	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Band Edge	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Peak to Average Ratio	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Condcudeted Emission	25 deg. C, 65 % RH	3.8 Vdc	Taylor Liu
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee

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 971168 D01 Power Meas License Digital Systems v02r02
ANSI/TIA/EIA-603-D 2010

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

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

Portable stations (hand-held devices) operating in the 698-716 MHz band are limited to 3 watts ERP

4.1.2 Test Procedures

EIRP / ERP Measurement:

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

b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m 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 1 m to 4 m 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.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 - 2.15 dBi.

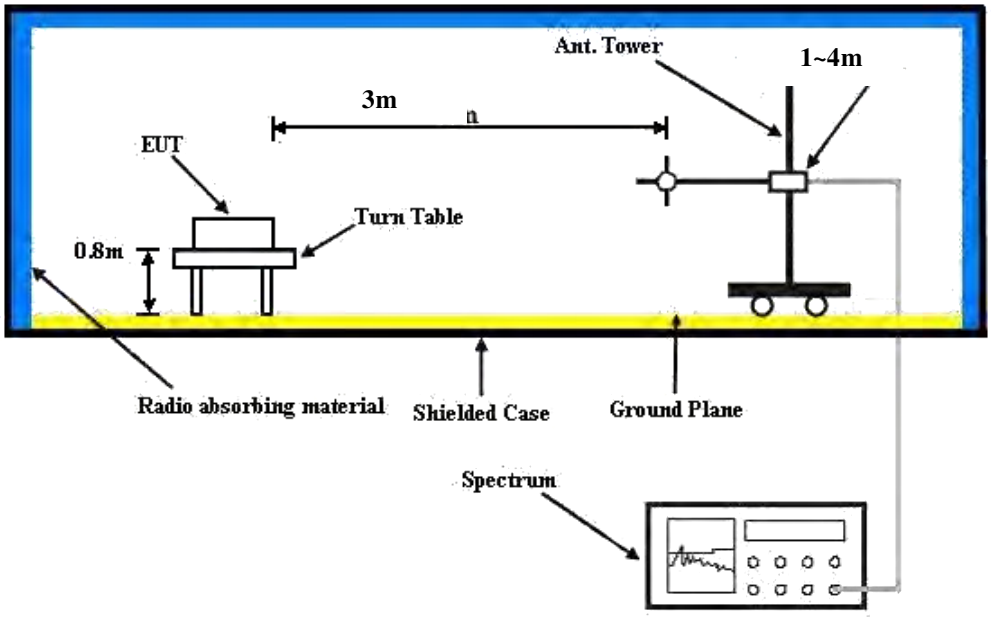
Conducted Power Measurement:

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:

4.1.4 Test Results

Conducted Output Power (dBm)

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	22.01	21.78	21.93
HSDPA Subtest-1	21.00	20.76	21.00
HSDPA Subtest-2	20.92	20.79	21.03
HSDPA Subtest-3	20.51	20.27	20.49
HSDPA Subtest-4	20.43	20.31	20.55
HSUPA Subtest-1	20.95	20.82	21.07
HSUPA Subtest-2	18.99	18.88	19.13
HSUPA Subtest-3	19.88	19.75	20.01
HSUPA Subtest-4	18.99	18.88	19.14
HSUPA Subtest-5	21.04	20.79	21.06

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19957	Mid Ch 20175	High Ch 20393		Low Ch 19957	Mid Ch 20175	High Ch 20393	
			1710.7 MHz	1732.5 MHz	1754.3 MHz		1710.7 MHz	1732.5 MHz	1754.3 MHz	
4 / 1.4M	1	0	21.89	21.47	21.35	0	21.03	21.23	20.92	0
	1	2	20.89	21.33	21.94	0	20.61	21.42	21.88	0
	1	5	21.19	21.42	21.68	0	21.22	21.31	21.13	0
	3	0	21.01	21.14	21.73	0	21.22	21.23	21.15	0
	3	1	20.91	21.28	21.85	0	21.14	21.26	21.22	0
	3	3	21.09	21.14	21.68	0	21.05	21.09	21.18	0
	6	0	21.14	21.33	21.56	0	20.32	20.46	20.81	0.5

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19965	Mid Ch 20175	High Ch 20385		Low Ch 19965	Mid Ch 20175	High Ch 20385	
			1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz	
4 / 3M	1	0	21.92	21.48	21.42	0	21.08	21.26	20.97	0
	1	7	21.03	21.36	21.99	0	20.63	21.47	21.91	0
	1	14	21.27	21.46	21.71	0	21.50	21.35	21.18	0
	8	0	21.14	21.22	21.77	0	20.41	20.80	21.08	0.5
	8	3	21.05	21.32	21.87	0	20.56	20.71	21.26	0.5
	8	7	21.02	21.22	21.71	0	20.47	20.56	20.98	0.5
	15	0	21.22	21.36	21.57	0	20.45	20.54	20.86	0.5

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19975	Mid Ch 20175	High Ch 20375		Low CH 19975	Mid CH 20175	High CH 20375	
			1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz	
4 / 5M	1	0	22.00	21.62	21.52	0	21.20	21.35	21.12	0
	1	12	21.18	21.49	22.04	0	20.81	21.54	21.97	0
	1	24	21.42	21.58	21.80	0	20.65	21.44	21.29	0
	12	0	21.30	21.34	21.87	0	20.56	20.97	21.20	0.5
	12	6	21.21	21.46	21.97	0	20.75	20.88	21.35	0.5
	12	13	21.15	21.34	21.80	0	20.63	20.75	21.13	0.5
	25	0	21.34	21.49	21.70	0	20.59	20.68	21.01	0.5

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 20000	Mid Ch 20175	High Ch 20350		Low Ch 20000	Mid Ch 20175	High Ch 20350	
			1715.0 MHz	1732.5 MHz	1750.0 MHz		1715.0 MHz	1732.5 MHz	1750.0 MHz	
4 / 10M	1	0	22.05	21.68	21.62	0	21.28	21.44	21.20	0
	1	24	21.31	21.60	22.09	0	20.92	21.60	22.03	0
	1	49	21.52	21.66	21.87	0	20.82	21.50	21.37	0
	25	0	21.42	21.47	21.93	0	20.71	21.08	21.28	0.5
	25	12	21.34	21.57	22.03	0	20.87	21.00	21.44	0.5
	25	25	21.30	21.47	21.87	0	20.80	20.87	21.23	0.5
	50	0	21.47	21.60	21.76	0	20.76	20.83	21.10	0.5

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 20025	Mid Ch 20175	High Ch 20325		Low Ch 20025	Mid Ch 20175	High Ch 20325	
			1717.5 MHz	1732.5 MHz	1747.5 MHz		1717.5 MHz	1732.5 MHz	1747.5 MHz	
4 / 15M	1	0	22.10	21.80	21.74	0	21.36	21.51	21.31	0
	1	37	21.48	21.72	22.14	0	21.03	21.65	22.08	0
	1	74	21.66	21.78	21.96	0	20.93	21.57	21.46	0
	36	0	21.58	21.61	22.00	0	20.86	21.18	21.36	0.5
	36	19	21.50	21.69	22.08	0	20.99	21.09	21.51	0.5
	36	39	21.45	21.61	21.96	0	20.92	20.99	21.32	0.5
	75	0	21.61	21.72	21.87	0	20.90	20.95	21.22	0.5

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 20050	Mid Ch 20175	High Ch 20300		Low Ch 20050	Mid Ch 20175	High Ch 20300	
			1720.0 MHz	1732.5 MHz	1745.0 MHz		1720.0 MHz	1732.5 MHz	1745.0 MHz	
4 / 20M	1	0	22.15	21.87	21.82	0	21.44	21.56	21.39	0
	1	50	21.61	21.81	22.19	0	21.14	21.70	22.13	0
	1	99	21.76	21.86	22.02	0	21.07	21.62	21.52	0
	50	0	21.70	21.72	22.06	0	21.01	21.28	21.44	0.5
	50	25	21.62	21.79	22.14	0	21.10	21.20	21.56	0.5
	50	50	21.60	21.72	22.02	0	21.06	21.10	21.40	0.5
	100	0	21.72	21.81	21.94	0	21.04	21.08	21.30	0.5

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23017	Mid Ch 23095	High Ch 23173		Low Ch 23017	Mid Ch 23095	High Ch 23173	
			699.7 MHz	707.5 MHz	715.3 MHz		699.7 MHz	707.5 MHz	715.3 MHz	
12 / 1.4M	1	0	22.81	22.96	22.74	0	22.44	22.36	22.11	1
	1	2	23.15	23.20	23.26	0	22.23	22.34	22.32	1
	1	5	22.88	23.08	23.00	0	22.41	22.61	22.19	1
	3	0	22.78	22.70	22.80	0	22.45	22.41	22.39	1
	3	1	22.68	22.77	22.69	0	22.25	22.26	22.28	1
	3	3	22.68	22.71	22.78	0	22.15	22.14	22.09	1
	6	0	21.82	21.74	21.90	1	20.80	20.89	20.59	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23025	Mid Ch 23095	High Ch 23165		Low Ch 23025	Mid Ch 23095	High Ch 23165	
			700.5 MHz	707.5 MHz	714.5 MHz		700.5 MHz	707.5 MHz	714.5 MHz	
12 / 3M	1	0	22.89	23.05	22.85	0	22.49	22.44	22.19	1
	1	7	23.20	23.26	23.32	0	22.28	22.41	22.38	1
	1	14	22.97	23.12	23.08	0	22.46	22.66	22.25	1
	8	0	22.08	21.99	21.90	1	20.81	20.89	20.57	2
	8	3	22.12	22.05	22.14	1	20.95	20.95	20.81	2
	8	7	22.14	21.93	22.02	1	21.00	21.10	20.98	2
	15	0	21.95	21.89	22.03	1	20.89	20.98	20.70	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23035	Mid Ch 23095	High Ch 23155		Low Ch 23035	Mid Ch 23095	High Ch 23155	
			701.5 MHz	707.5 MHz	713.5 MHz		701.5 MHz	707.5 MHz	713.5 MHz	
12 / 5M	1	0	22.98	23.13	22.94	0	22.52	22.47	22.26	1
	1	12	23.28	23.32	23.37	0	22.34	22.46	22.43	1
	1	24	23.04	23.21	23.17	0	22.49	22.71	22.31	1
	12	0	22.19	22.09	22.05	1	20.95	21.01	20.72	2
	12	6	22.21	22.15	22.23	1	21.04	21.04	20.95	2
	12	13	22.23	22.06	22.12	1	21.09	21.17	21.07	2
	25	0	22.07	22.04	22.14	1	21.01	21.07	20.85	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23060	Mid Ch 23095	High Ch 23130		Low Ch 23060	Mid Ch 23095	High Ch 23130	
			704.0 MHz	707.5 MHz	711.0 MHz		704.0 MHz	707.5 MHz	711.0 MHz	
12 / 10M	1	0	23.06	23.20	23.03	0	22.59	22.55	22.37	1
	1	24	23.33	23.37	23.42	0	22.44	22.54	22.53	1
	1	49	23.12	23.26	23.22	0	22.57	22.76	22.42	1
	25	0	22.29	22.24	22.20	1	21.09	21.14	20.87	2
	25	12	22.31	22.27	22.32	1	21.17	21.17	21.09	2
	25	25	22.32	22.21	22.25	1	21.21	21.29	21.19	2
	50	0	22.22	22.19	22.26	1	21.14	21.19	21.00	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23755	Mid Ch 23790	High Ch 23825		Low Ch 23755	Mid Ch 23790	High Ch 23825	
			706.5 MHz	710.0 MHz	713.5 MHz		706.5 MHz	710.0 MHz	713.5 MHz	
17 / 5M	1	0	22.96	22.94	22.92	0	22.02	22.08	21.92	1
	1	12	23.21	23.33	23.24	0	22.29	22.03	22.03	1
	1	24	23.01	23.12	23.58	0	22.00	22.18	22.32	1
	12	0	22.15	22.09	22.00	1	21.18	21.15	21.01	2
	12	6	22.12	22.25	22.15	1	21.00	21.06	21.10	2
	12	13	22.18	22.15	22.31	1	21.20	21.13	21.08	2
	25	0	22.15	22.19	22.23	1	21.02	21.24	21.18	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23780	Mid Ch 23790	High Ch 23800		Low Ch 23780	Mid Ch 23790	High Ch 23800	
			709.0 MHz	710.0 MHz	711.0 MHz		709.0 MHz	710.0 MHz	711.0 MHz	
17 / 10M	1	0	23.05	23.03	23.01	0	22.12	22.15	22.03	1
	1	24	23.27	23.38	23.29	0	22.36	22.13	22.13	1
	1	49	23.09	23.19	23.63	0	22.11	22.25	22.37	1
	25	0	22.27	22.22	22.15	1	21.29	21.26	21.16	2
	25	12	22.25	22.35	22.27	1	21.15	21.19	21.22	2
	25	25	22.29	22.27	22.41	1	21.31	21.25	21.21	2
	50	0	22.27	22.30	22.34	1	21.17	21.35	21.29	2

ERP Power (dBm)

LTE Band 12							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
Y	23017	699.7	-15.52	32.719	15.05	31.98	H
	23095	707.5	-15.14	32.736	15.45	35.04	
	23173	715.3	-15.22	32.591	15.22	33.27	
	23017	699.7	-19.85	32.69	10.69	11.72	V
	23095	707.5	-19.68	32.81	10.98	12.53	
	23173	715.3	-19.78	32.74	10.81	12.05	
Channel Bandwidth: 1.4 MHz / 16QAM							
Y	23017	699.7	-15.88	32.719	14.69	29.44	H
	23095	707.5	-15.96	32.736	14.63	29.01	
	23173	715.3	-15.81	32.591	14.63	29.05	
	23017	699.7	-20.89	32.69	9.65	9.23	V
	23095	707.5	-20.85	32.81	9.81	9.57	
	23173	715.3	-20.81	32.74	9.78	9.51	

LTE Band 12							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
Y	23025	700.5	-14.75	32.719	15.82	38.19	H
	23095	707.5	-14.85	32.736	15.74	37.46	
	23165	714.5	-14.56	32.591	15.88	38.73	
	23025	700.5	-19.65	32.69	10.89	12.27	V
	23095	707.5	-20.21	32.81	10.45	11.09	
	23165	714.5	-19.82	32.74	10.77	11.94	
Channel Bandwidth: 3 MHz / 16QAM							
Y	23025	700.5	-15.74	32.719	14.83	30.40	H
	23095	707.5	-15.69	32.736	14.90	30.87	
	23165	714.5	-15.73	32.591	14.71	29.59	
	23025	700.5	-20.57	32.69	9.97	9.93	V
	23095	707.5	-20.70	32.81	9.96	9.91	
	23165	714.5	-20.97	32.74	9.62	9.16	

LTE Band 12							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Y	23035	701.5	-14.87	32.719	15.70	37.14	H
	23095	707.5	-14.92	32.736	15.67	36.86	
	23155	713.5	-14.89	32.591	15.55	35.90	
	23035	701.5	-19.82	32.69	10.72	11.80	V
	23095	707.5	-19.69	32.81	10.97	12.50	
	23155	713.5	-19.88	32.74	10.71	11.78	
Channel Bandwidth: 5 MHz / 16QAM							
Y	23035	701.5	-15.88	32.719	14.69	29.44	H
	23095	707.5	-15.92	32.736	14.67	29.28	
	23155	713.5	-15.85	32.591	14.59	28.78	
	23035	701.5	-20.65	32.69	9.89	9.75	V
	23095	707.5	-20.77	32.81	9.89	9.75	
	23155	713.5	-20.82	32.74	9.77	9.48	

LTE Band 12							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Y	23060	704.0	-14.74	32.727	15.84	38.34	H
	23095	707.5	-14.83	32.739	15.76	37.66	
	23130	711.0	-14.96	32.728	15.62	36.46	
	23060	704.0	-19.64	32.75	10.96	12.47	V
	23095	707.5	-20.27	32.81	10.39	10.94	
	23130	711.0	-20.38	32.84	10.31	10.74	
Channel Bandwidth: 10 MHz / 16QAM							
Y	23060	704.0	-15.69	32.727	14.89	30.81	H
	23095	707.5	-15.72	32.739	14.87	30.68	
	23130	711.0	-15.79	32.728	14.79	30.12	
	23060	704.0	-20.68	32.75	9.92	9.82	V
	23095	707.5	-20.74	32.81	9.92	9.82	
	23130	711.0	-20.92	32.84	9.77	9.48	

LTE Band 17							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	23755	706.5	-14.89	32.719	15.68	36.97	H
	23790	710.0	-14.87	32.736	15.72	37.29	
	23825	713.5	-14.76	32.591	15.68	36.99	
	23755	706.5	-20.01	32.69	10.53	11.30	V
	23790	710.0	-19.85	32.81	10.81	12.05	
	23825	713.5	-19.79	32.74	10.80	12.02	
Channel Bandwidth: 5 MHz / 16QAM							
X	23755	706.5	-16.51	32.719	14.06	25.46	H
	23790	710.0	-16.26	32.736	14.33	27.08	
	23825	713.5	-16.12	32.591	14.32	27.05	
	23755	706.5	-21.47	32.69	9.07	8.07	V
	23790	710.0	-21.36	32.81	9.30	8.51	
	23825	713.5	-21.27	32.74	9.32	8.55	

LTE Band 17							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	23780	709.0	-14.75	32.727	15.83	38.26	H
	23790	710.0	-14.63	32.739	15.96	39.44	
	23800	711.0	-14.89	32.728	15.69	37.05	
	23780	709.0	-19.85	32.75	10.75	11.89	V
	23790	710.0	-19.79	32.81	10.87	12.22	
	23800	711.0	-19.81	32.84	10.88	12.25	
Channel Bandwidth: 10 MHz / 16QAM							
X	23780	709.0	-16.24	32.727	14.34	27.15	H
	23790	710.0	-16.34	32.739	14.25	26.60	
	23800	711.0	-16.28	32.728	14.30	26.90	
	23780	709.0	-21.41	32.75	9.19	8.30	V
	23790	710.0	-21.28	32.81	9.38	8.67	
	23800	711.0	-21.11	32.84	9.58	9.08	

EIRP Power (dBm)

WCDMA							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	1312	1712.4	-22.14	42.49	20.35	108.27	H
	1413	1732.6	-22.25	42.33	20.08	101.79	
	1513	1752.6	-22.08	42.10	20.02	100.46	
	1312	1712.4	-25.63	42.99	17.36	54.45	V
	1413	1732.6	-25.74	42.74	17.00	50.12	
	1513	1752.6	-24.68	42.21	17.53	56.62	

LTE Band 4							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	19957	1710.7	-22.14	42.49	20.35	108.27	H
	20175	1732.5	-22.01	42.33	20.32	107.57	
	20393	1754.3	-21.51	42.10	20.59	114.55	
	19957	1710.7	-25.75	42.99	17.24	52.92	V
	20175	1732.5	-25.63	42.74	17.11	51.40	
	20393	1754.3	-25.21	42.21	17.00	50.12	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	19957	1710.7	-22.87	42.49	19.62	91.52	H
	20175	1732.5	-23.11	42.33	19.22	83.50	
	20393	1754.3	-22.50	42.10	19.60	91.20	
	19957	1710.7	-26.33	42.99	16.66	46.34	V
	20175	1732.5	-26.47	42.74	16.27	42.36	
	20393	1754.3	-26.18	42.21	16.03	40.09	

LTE Band 4							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	19965	1711.5	-22.23	42.49	20.26	106.05	H
	20175	1732.5	-22.10	42.33	20.23	105.37	
	20385	1753.5	-21.88	42.10	20.22	105.20	
	19965	1711.5	-25.45	42.99	17.54	56.75	V
	20175	1732.5	-25.58	42.74	17.16	52.00	
	20385	1753.5	-25.15	42.21	17.06	50.82	
Channel Bandwidth: 3 MHz / 16QAM							
X	19965	1711.5	-22.74	42.49	19.75	94.30	H
	20175	1732.5	-22.88	42.33	19.45	88.04	
	20385	1753.5	-22.24	42.10	19.86	96.83	
	19965	1711.5	-26.29	42.99	16.70	46.77	V
	20175	1732.5	-26.52	42.74	16.22	41.88	
	20385	1753.5	-26.03	42.21	16.18	41.50	

LTE Band 4							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	19975	1712.5	-22.34	42.49	20.15	103.40	H
	20175	1732.5	-22.26	42.33	20.07	101.55	
	20375	1752.5	-21.47	42.10	20.63	115.61	
	19975	1712.5	-25.33	42.99	17.66	58.34	V
	20175	1732.5	-25.51	42.74	17.23	52.84	
	20375	1752.5	-25.11	42.21	17.10	51.29	
Channel Bandwidth: 5 MHz / 16QAM							
X	19975	1712.5	-22.69	42.49	19.80	95.39	H
	20175	1732.5	-22.72	42.33	19.61	91.35	
	20375	1752.5	-22.54	42.10	19.56	90.36	
	19975	1712.5	-26.35	42.99	16.64	46.13	V
	20175	1732.5	-26.47	42.74	16.27	42.36	
	20375	1752.5	-25.87	42.21	16.34	43.05	

LTE Band 4							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20000	1715.0	-22.41	42.49	20.08	101.74	H
	20175	1732.5	-22.23	42.33	20.10	102.26	
	20350	1750.0	-21.33	42.10	20.77	119.40	
	20000	1715.0	-25.27	42.99	17.72	59.16	V
	20175	1732.5	-25.61	42.74	17.13	51.64	
	20350	1750.0	-25.02	42.21	17.19	52.36	
Channel Bandwidth: 10 MHz / 16QAM							
X	20000	1715.0	-22.57	42.49	19.92	98.06	H
	20175	1732.5	-22.66	42.33	19.67	92.62	
	20350	1750.0	-22.72	42.10	19.38	86.70	
	20000	1715.0	-26.62	42.99	16.37	43.35	V
	20175	1732.5	-26.55	42.74	16.19	41.59	
	20350	1750.0	-25.93	42.21	16.28	42.46	

LTE Band 4							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20025	1717.5	-22.16	42.49	20.33	107.77	H
	20175	1732.5	-22.31	42.33	20.02	100.39	
	20325	1747.5	-21.42	42.10	20.68	116.95	
	20025	1717.5	-25.44	42.99	17.55	56.89	V
	20175	1732.5	-25.36	42.74	17.38	54.70	
	20325	1747.5	-25.01	42.21	17.20	52.48	
Channel Bandwidth: 15 MHz / 16QAM							
X	20025	1717.5	-22.63	42.49	19.86	96.72	H
	20175	1732.5	-22.74	42.33	19.59	90.93	
	20325	1747.5	-22.81	42.10	19.29	84.92	
	20025	1717.5	-26.55	42.99	16.44	44.06	V
	20175	1732.5	-26.26	42.74	16.48	44.46	
	20325	1747.5	-25.88	42.21	16.33	42.95	

LTE Band 4							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	20050	1720.0	-22.47	42.49	20.02	100.35	H
	20175	1732.5	-22.15	42.33	20.18	104.16	
	20300	1745.0	-21.97	42.10	20.13	103.04	
	20050	1720.0	-25.26	42.99	17.73	59.29	V
	20175	1732.5	-25.42	42.74	17.32	53.95	
	20300	1745.0	-24.89	42.21	17.32	53.95	
Channel Bandwidth: 20 MHz / 16QAM							
X	20050	1720.0	-22.85	42.49	19.63	91.90	H
	20175	1732.5	-22.91	42.33	19.42	87.44	
	20300	1745.0	-22.75	42.10	19.35	86.10	
	20050	1720.0	-26.41	42.99	16.58	45.50	V
	20175	1732.5	-26.26	42.74	16.48	44.46	
	20300	1745.0	-25.52	42.21	16.69	46.67	

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

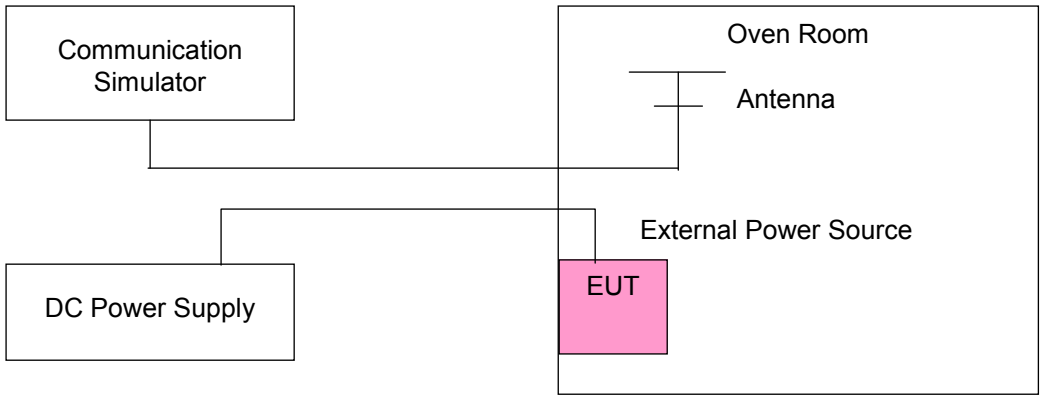
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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 ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.2.3 Test Setup



4.2.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)							Limit (ppm)
	WCDMA	LTE Band 4						
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
3.8	0.002	0.001	0.001	0.002	0.002	0.002	0.001	2.5
3.6	0.000	0.001	0.001	0.002	0.002	0.002	0.001	2.5
4.2	-0.001	0.002	0.002	0.001	0.002	0.001	0.001	2.5

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

Frequency Error vs. Temperature

Temp. (℃)	Frequency Error (ppm)							Limit (ppm)
	WCDMA	LTE Band 4						
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
-30	0.001	0.001	0.001	0.002	0.001	0.001	0.002	2.5
-20	0.002	0.001	0.002	0.001	-0.001	0.001	0.001	2.5
-10	0.001	0.001	0.001	-0.001	-0.002	-0.002	0.001	2.5
0	0.001	0.002	0.001	-0.001	-0.001	-0.001	-0.001	2.5
10	-0.001	0.002	-0.001	-0.001	-0.001	-0.001	-0.001	2.5
20	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	2.5
30	-0.002	-0.001	-0.001	-0.001	0.002	-0.001	-0.001	2.5
40	-0.001	-0.002	-0.001	0.002	0.001	0.002	-0.002	2.5
50	0.002	-0.001	0.001	0.001	0.001	0.002	0.002	2.5
55	0.001	-0.002	0.002	0.001	0.002	0.001	0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (ppm)						Limit (ppm)
	LTE Band 12				LTE Band 17		
	1.4 MHz	3 MHz	5 MHz	10 MHz	5 MHz	10 MHz	
3.8	0.003	0.003	0.005	0.004	0.001	0.004	2.5
3.6	0.002	0.006	0.003	0.005	0.004	0.002	2.5
4.2	0.001	0.002	0.004	0.003	0.004	0.005	2.5

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

Frequency Error vs. Temperature

Temp. (℃)	Frequency Error (ppm)						Limit (ppm)
	LTE Band 12				LTE Band 17		
	1.4 MHz	3 MHz	5 MHz	10 MHz	5 MHz	10 MHz	
-30	-0.005	0.004	0.004	0.002	0.004	0.003	2.5
-20	-0.005	0.004	-0.003	0.003	0.002	0.005	2.5
-10	-0.006	0.003	-0.005	-0.004	0.005	0.001	2.5
0	-0.005	0.005	-0.002	-0.003	0.000	0.006	2.5
10	-0.002	-0.003	-0.002	-0.003	-0.002	0.003	2.5
20	0.005	-0.005	-0.002	-0.005	-0.005	-0.005	2.5
30	0.002	-0.004	0.003	-0.004	-0.005	-0.005	2.5
40	0.005	-0.002	0.005	0.005	-0.005	-0.002	2.5
50	0.003	-0.005	0.004	0.002	0.004	-0.004	2.5
55	0.006	0.002	0.002	0.003	0.005	-0.005	2.5

4.3 Occupied Bandwidth Measurement

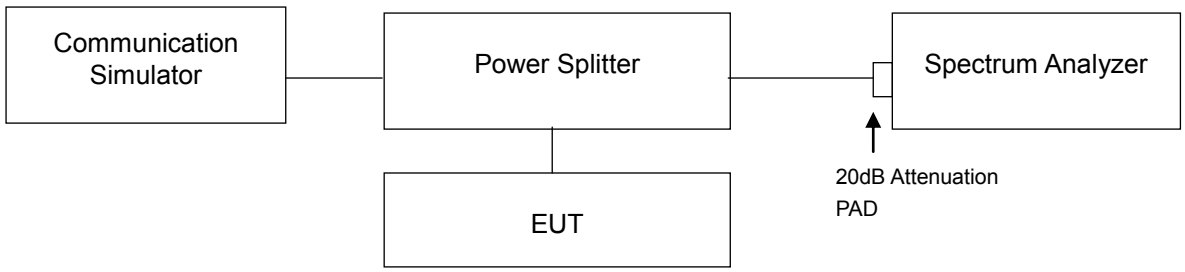
4.3.1 Limits of Occupied Bandwidth Measurement

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 Procedure

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.

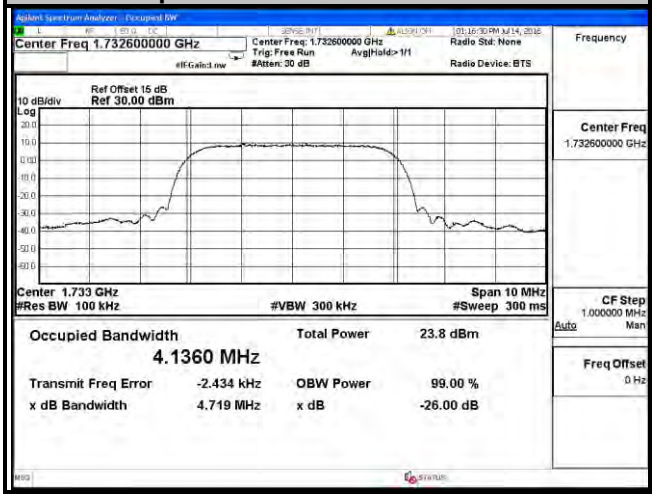
4.3.3 Test Setup



4.3.4 Test Result

WCDMA		
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**
1312	1712.4	4.1310
1413	1732.6	4.1360
1513	1752.6	4.1282

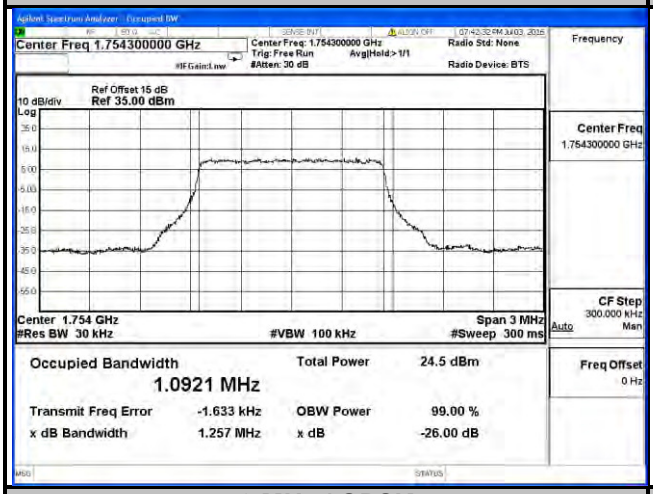
Spectrum Plot of Worst Value



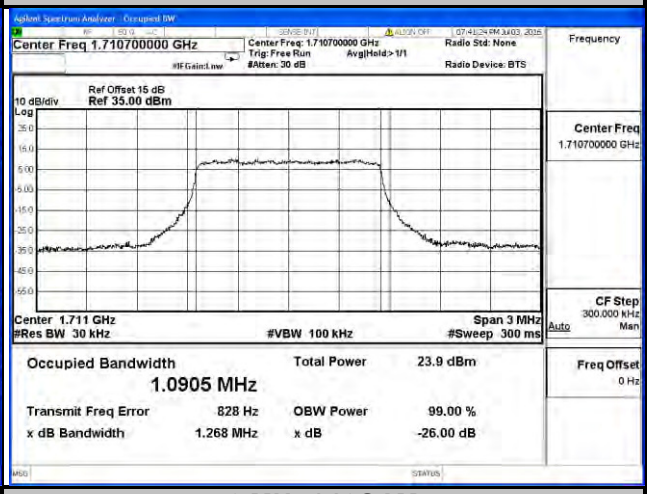
LTE Band 4							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	1.0911	1.0905	19965	1711.5	2.6949	2.6944
20175	1732.5	1.0905	1.0888	20175	1732.5	2.6957	2.6944
20393	1754.3	1.0921	1.0883	20385	1753.5	2.6952	2.6957

Spectrum Plot of Worst Value

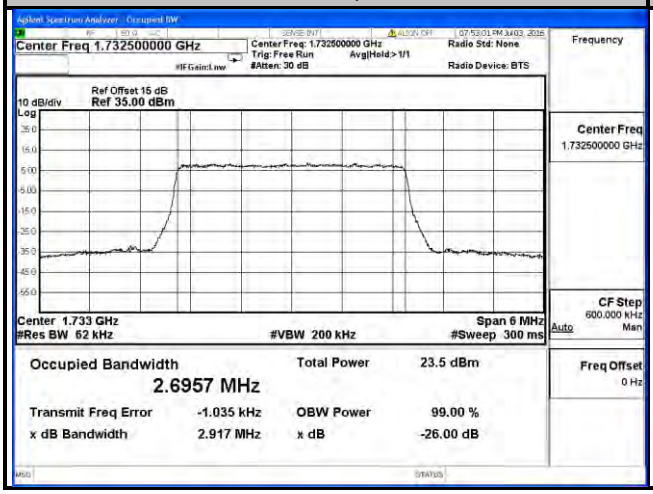
1.4 MHz / QPSK



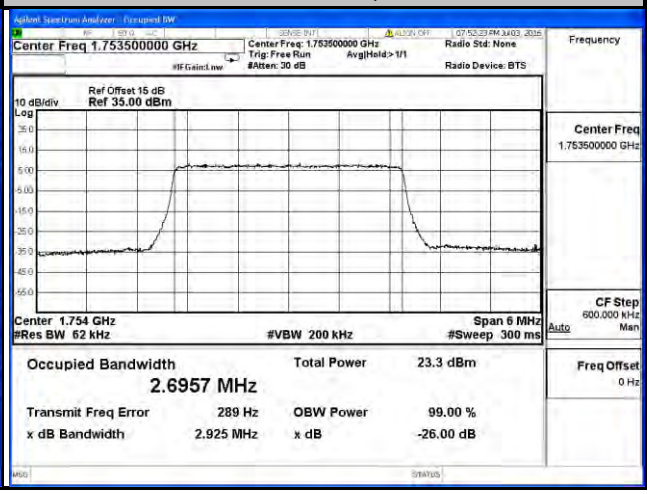
1.4 MHz / 16QAM



3 MHz / QPSK



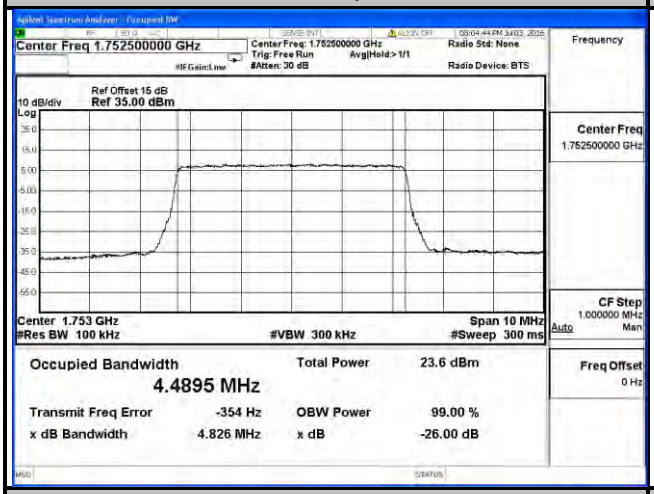
3 MHz / 16QAM



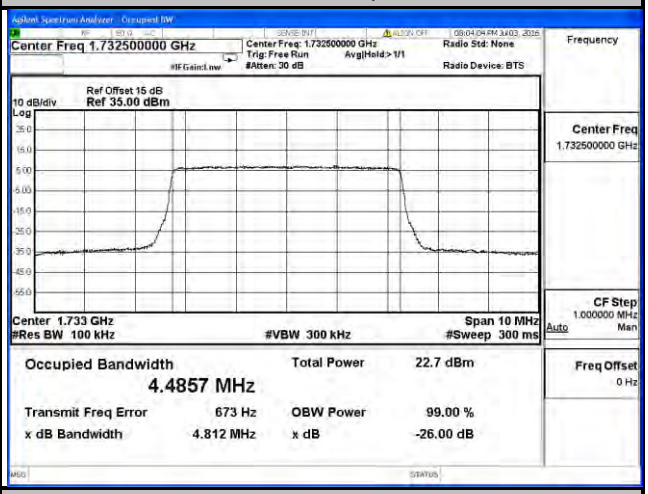
LTE Band 4							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.4870	4.4838	20000	1715.0	8.9458	8.9483
20175	1732.5	4.4854	4.4857	20175	1732.5	8.9565	8.9554
20375	1752.5	4.4895	4.4836	20350	1750.0	8.9518	8.9519

Spectrum Plot of Worst Value

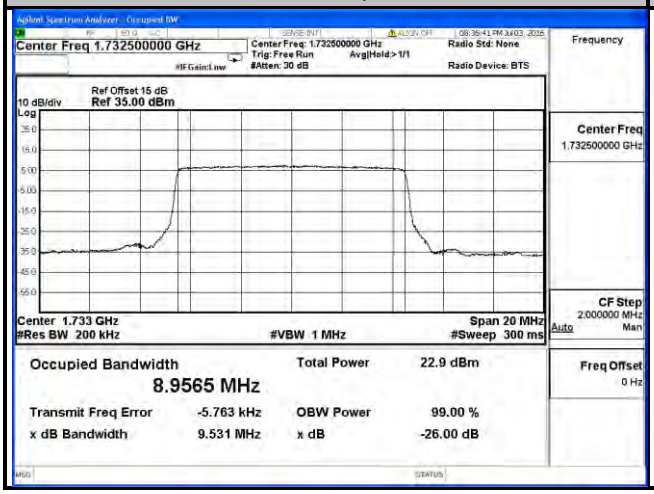
5 MHz / QPSK



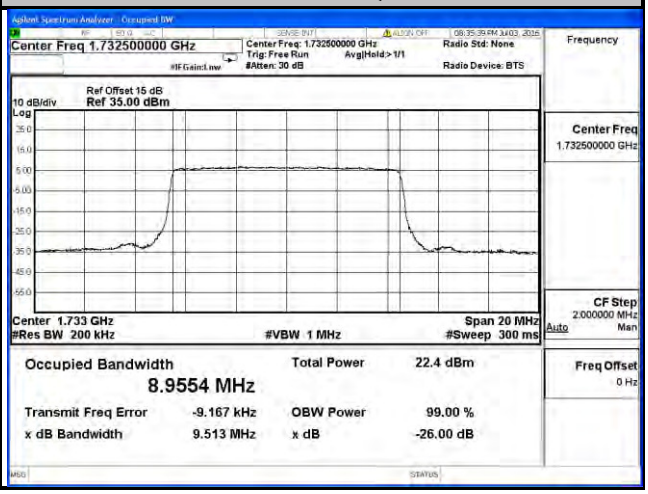
5 MHz / 16QAM



10 MHz / QPSK



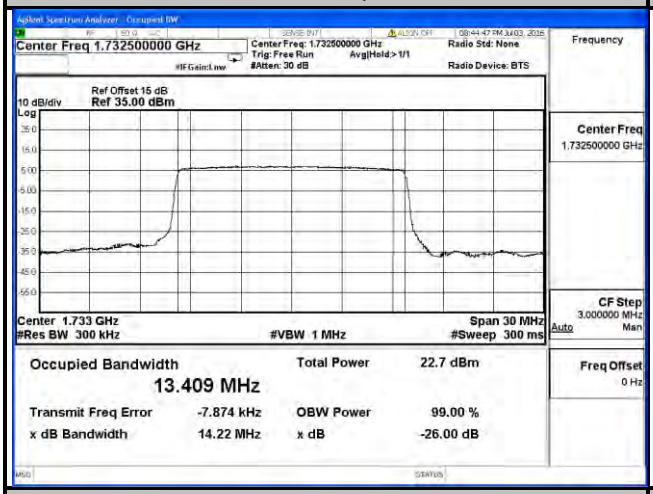
10 MHz / 16QAM



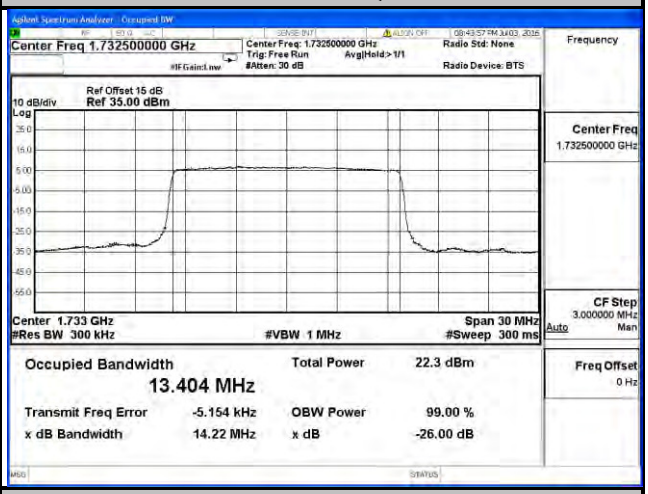
LTE Band 4							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	13.397	13.389	20050	1720.0	17.858	17.855
20175	1732.5	13.409	13.404	20175	1732.5	17.896	17.901
20325	1747.5	13.407	13.403	20300	1745.0	17.899	17.911

Spectrum Plot of Worst Value

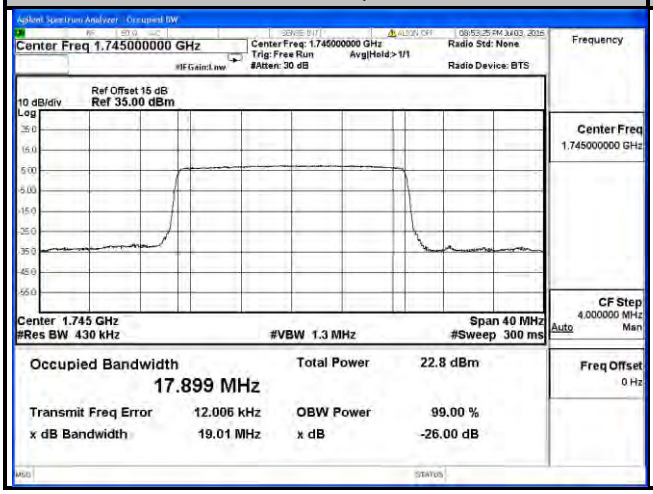
15 MHz / QPSK



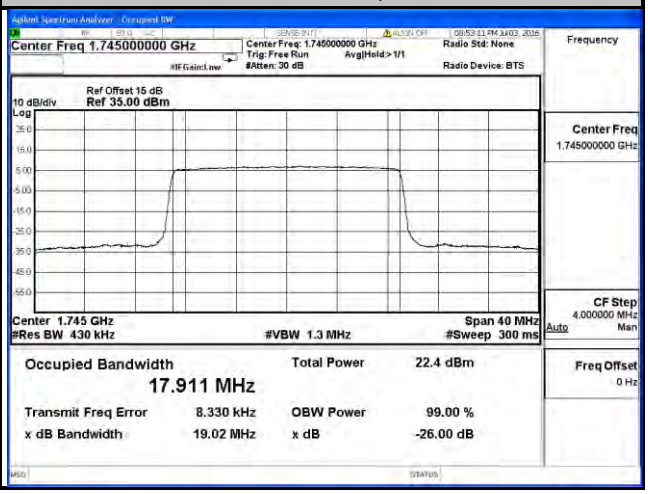
15 MHz / 16QAM



20 MHz / QPSK



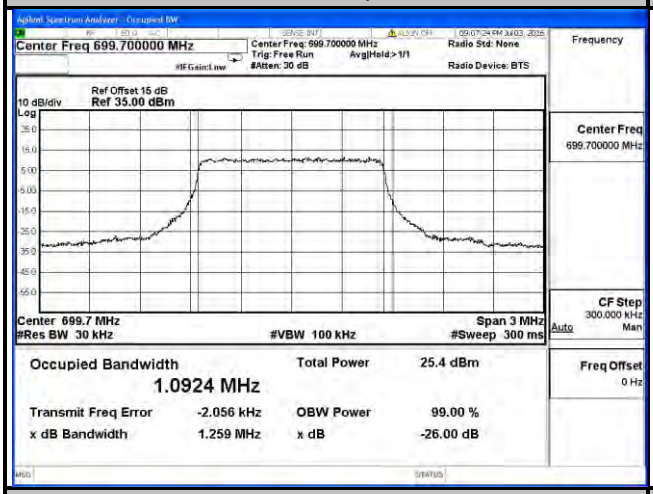
20 MHz / 16QAM



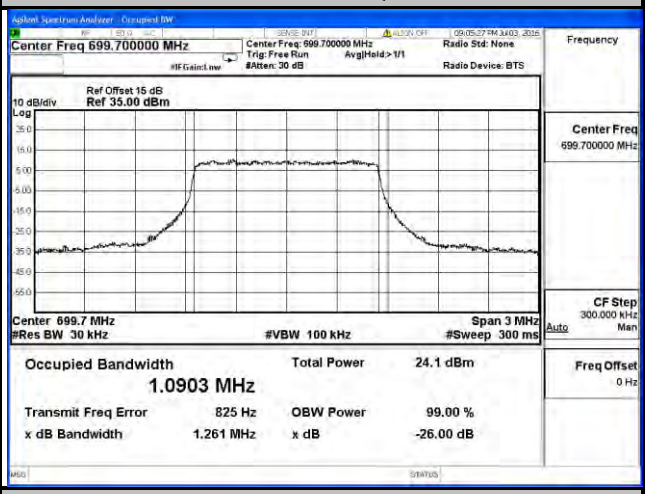
LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	1.0924	1.0903	23025	700.5	2.6964	2.6949
23095	707.5	1.0914	1.0890	23095	707.5	2.6933	2.6943
23173	715.3	1.0919	1.0888	23165	714.5	2.6936	2.6955

Spectrum Plot of Worst Value

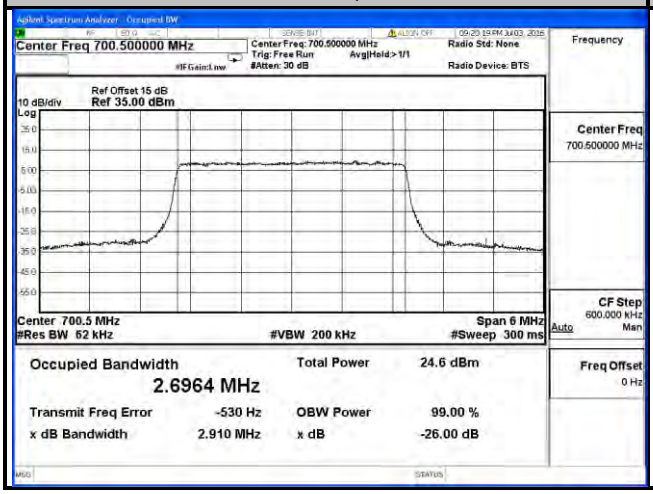
1.4 MHz / QPSK



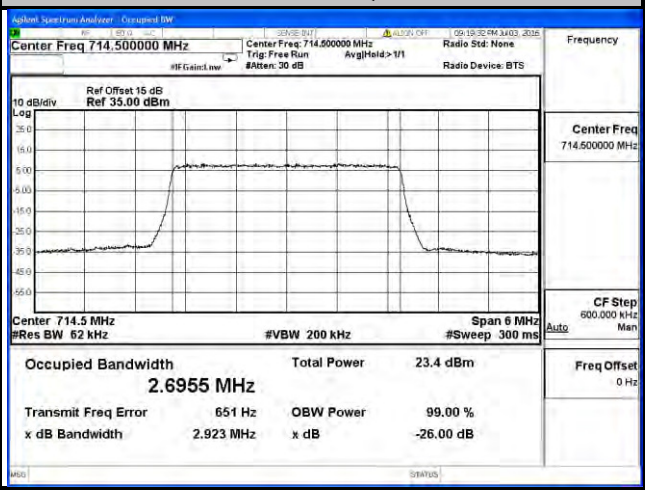
1.4 MHz / 16QAM



3 MHz / QPSK



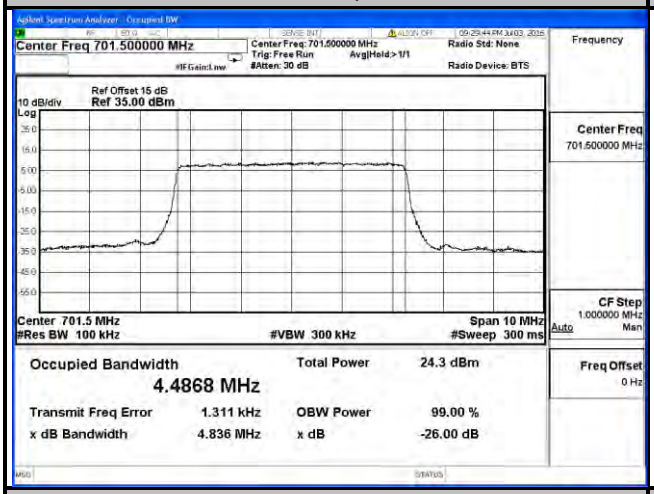
3 MHz / 16QAM



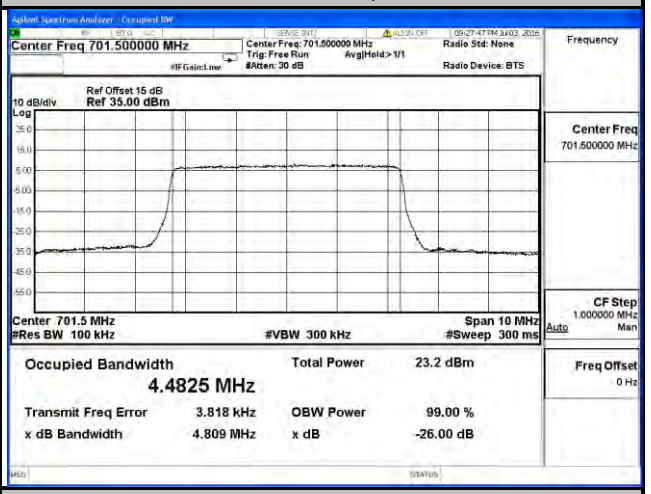
LTE Band 12							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	4.4868	4.4825	23060	704.0	8.9552	8.9602
23095	707.5	4.4824	4.4778	23095	707.5	8.9497	8.9523
23155	713.5	4.4837	4.4813	23130	711.0	8.9519	8.9499

Spectrum Plot of Worst Value

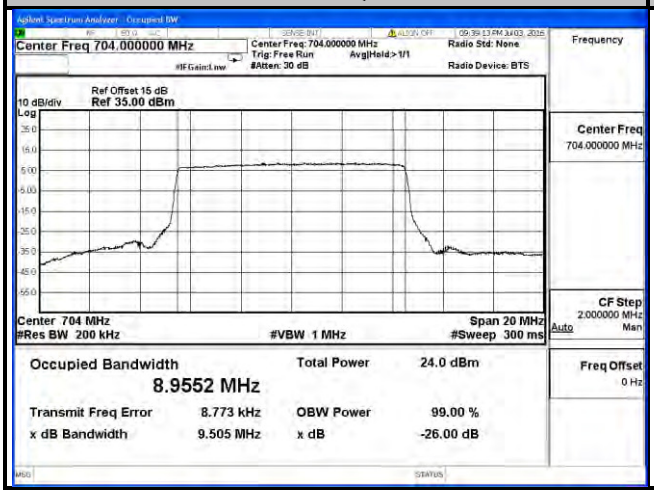
5 MHz / QPSK



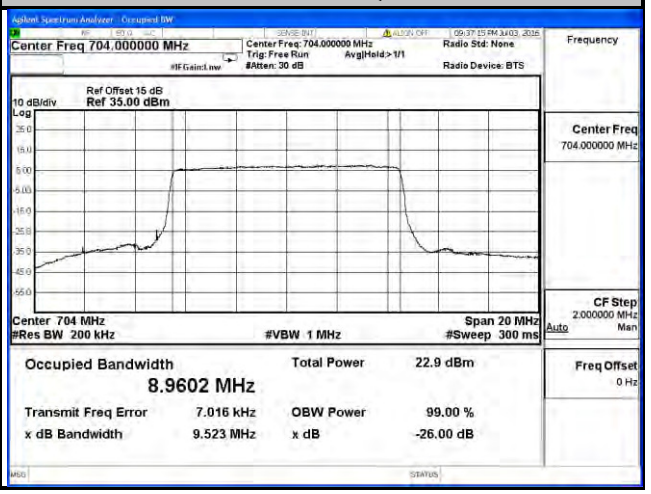
5 MHz / 16QAM



10 MHz / QPSK



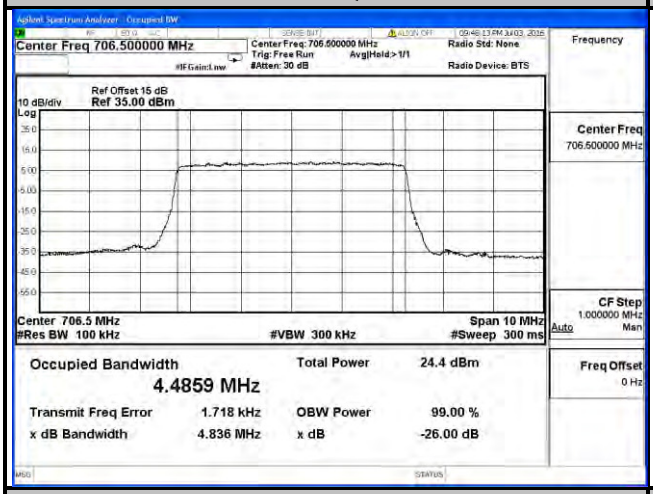
10 MHz / 16QAM



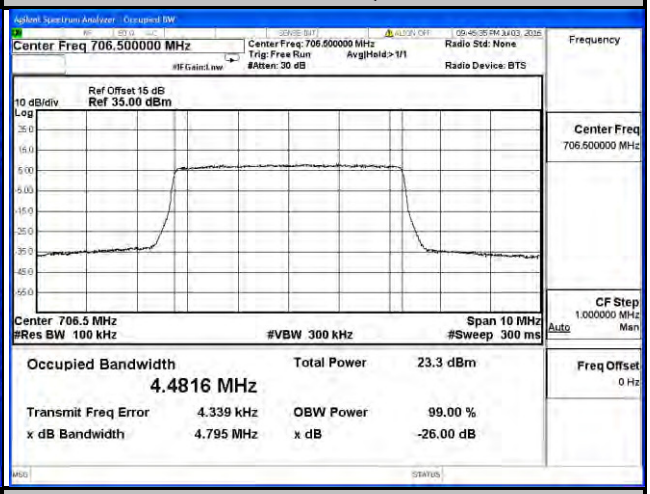
LTE Band 17							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23755	706.5	4.4859	4.4816	23780	709.0	8.9476	8.9467
23790	710.0	4.4835	4.4808	23790	710.0	8.9467	8.9507
23825	713.5	4.4842	4.4807	23800	711.0	8.9485	8.9560

Spectrum Plot of Worst Value

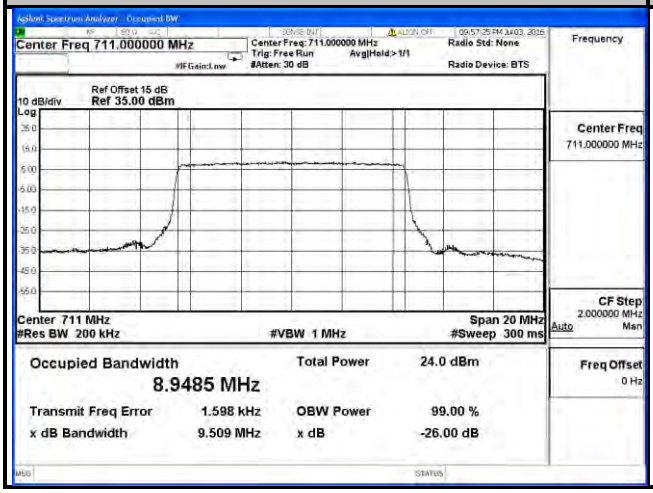
5 MHz / QPSK



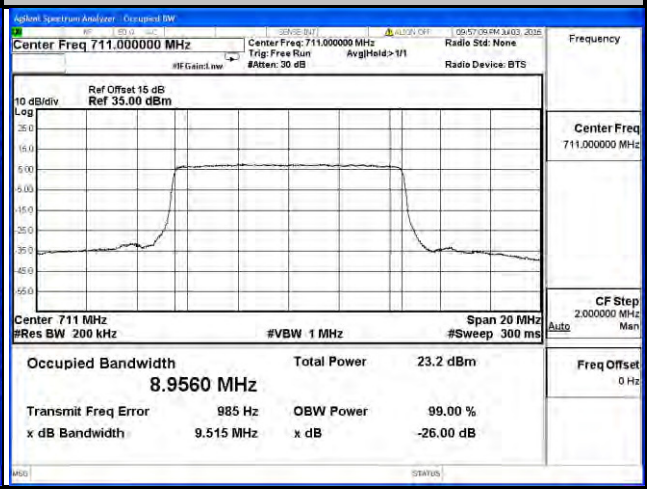
5 MHz / 16QAM



10 MHz / QPSK



10 MHz / 16QAM



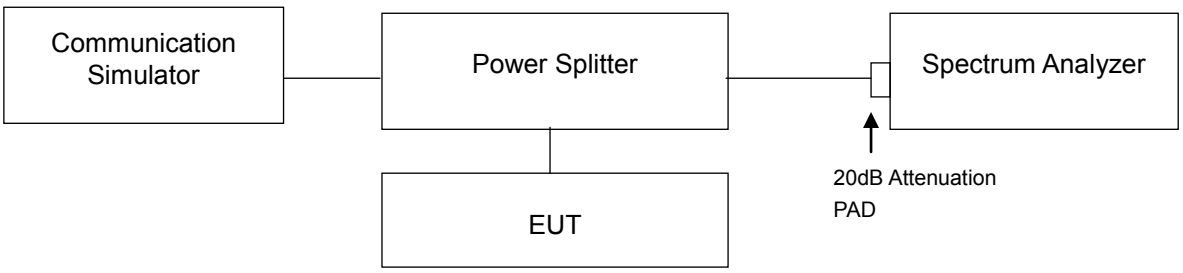
4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

For operations in the 698-716 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.
However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

For operations in the 1710–1755 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

4.4.2 Test Setup

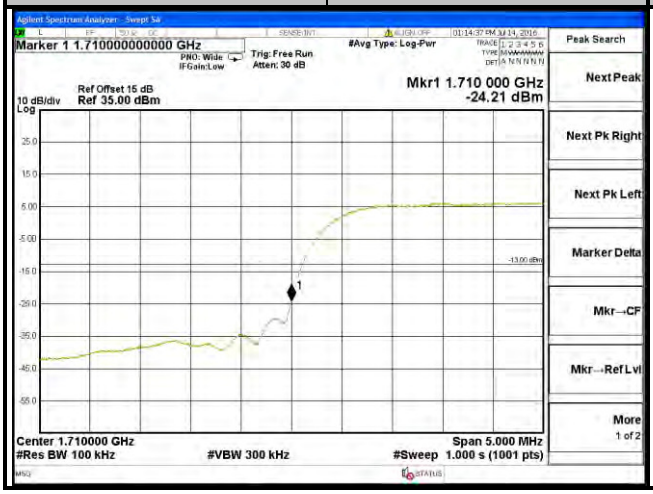


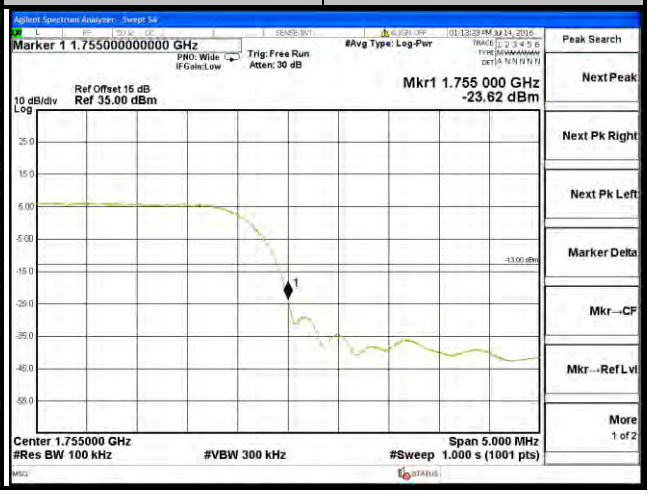
4.4.3 Test Procedures

a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
c. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 13 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
d. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
e. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 5 MHz/10 MHz).
f. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
g. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 180 kHz and VB of the spectrum is 560 kHz (LTE Bandwidth 20 MHz).
h. Record the max trace plot into the test report.

4.4.4 Test Results

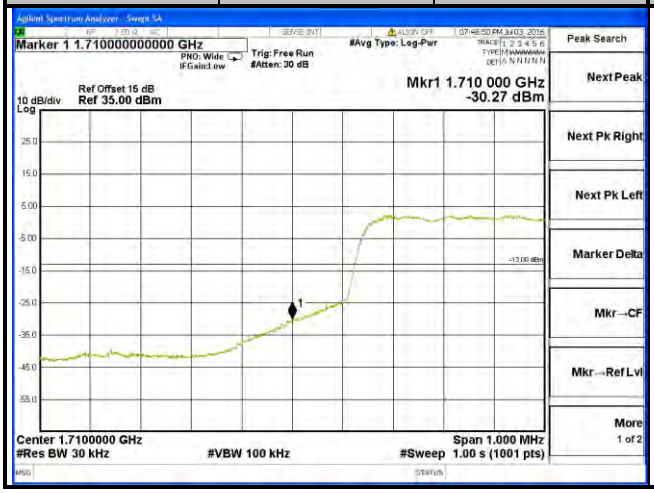
WCDMA			
Channel	1312	Channel	1513

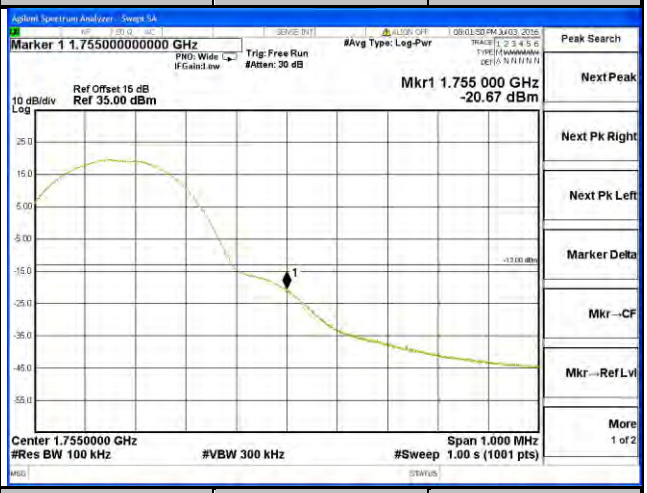
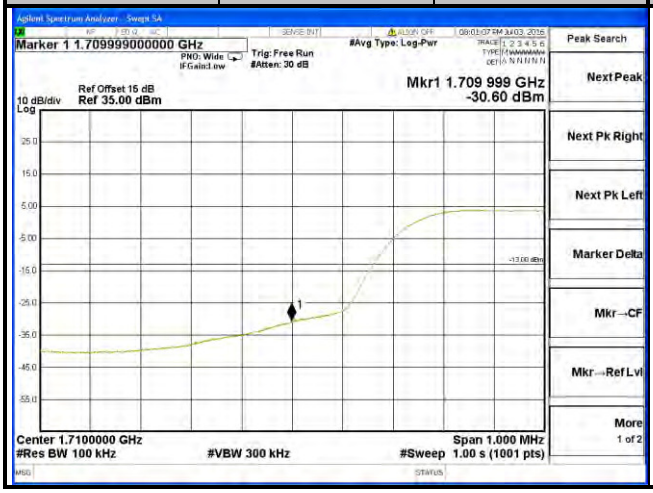
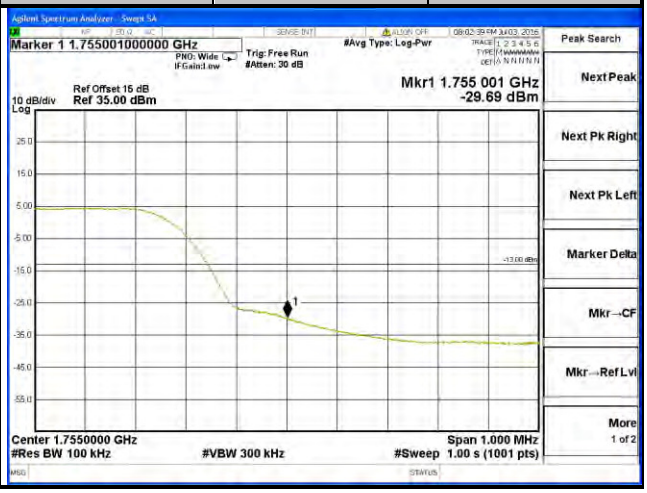


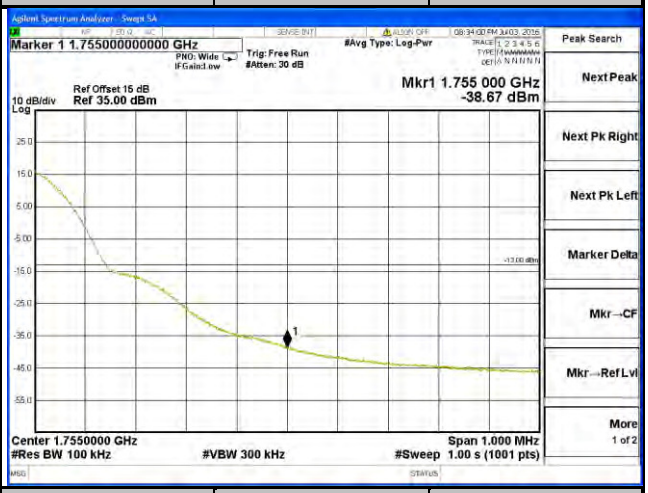
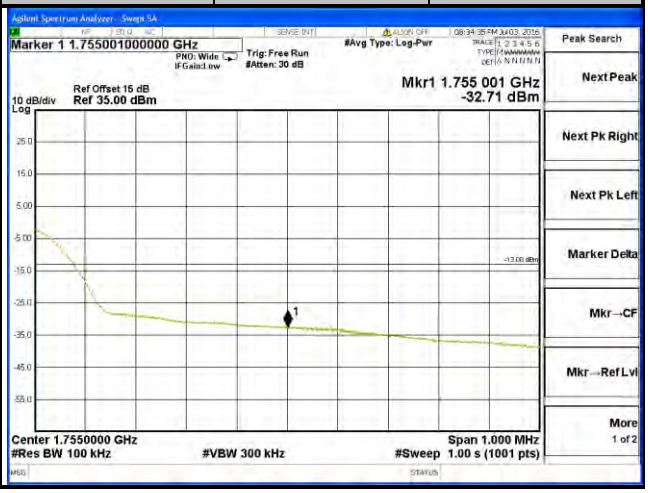


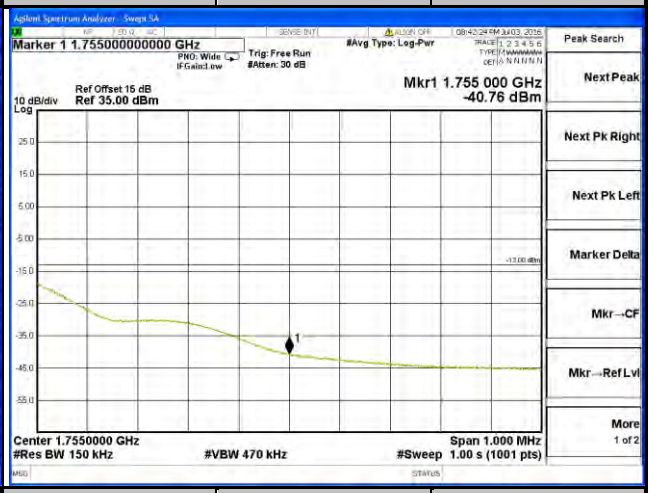
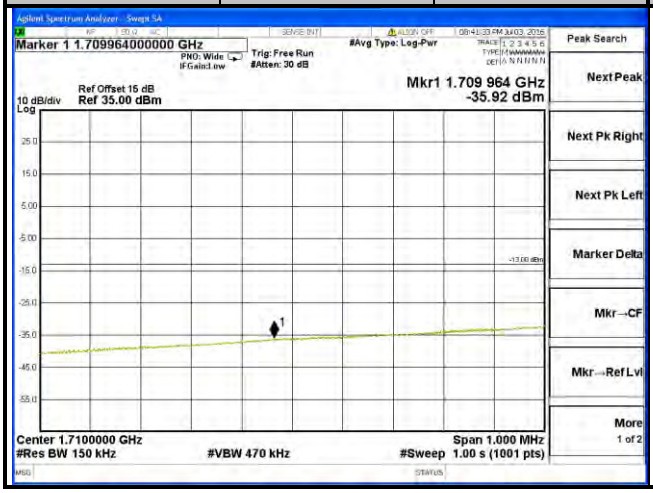
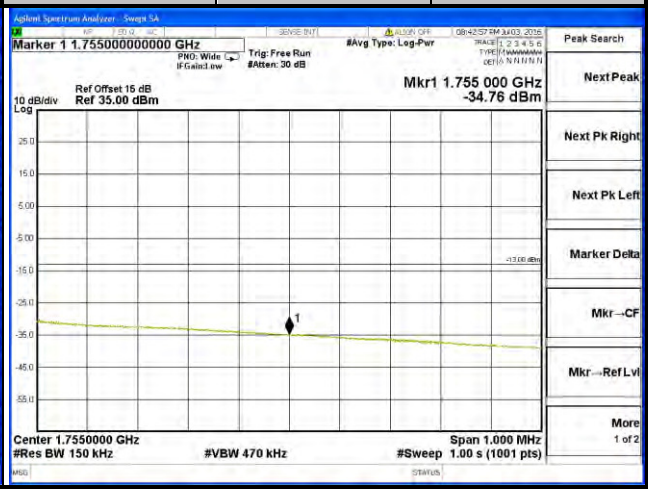
LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	19957	6 RB	Channel	20393	6 RB

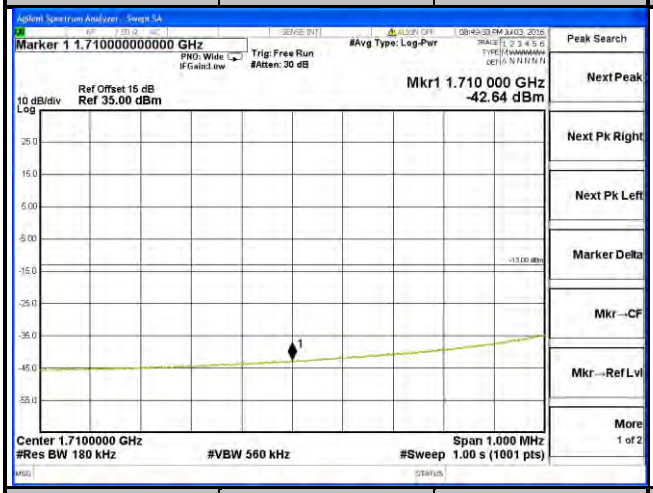
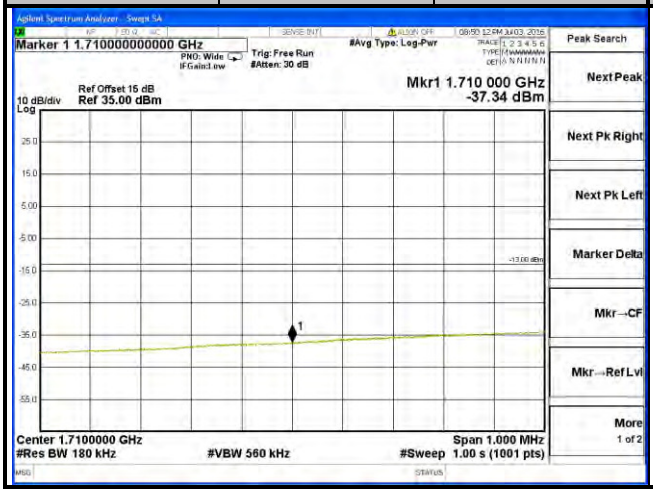
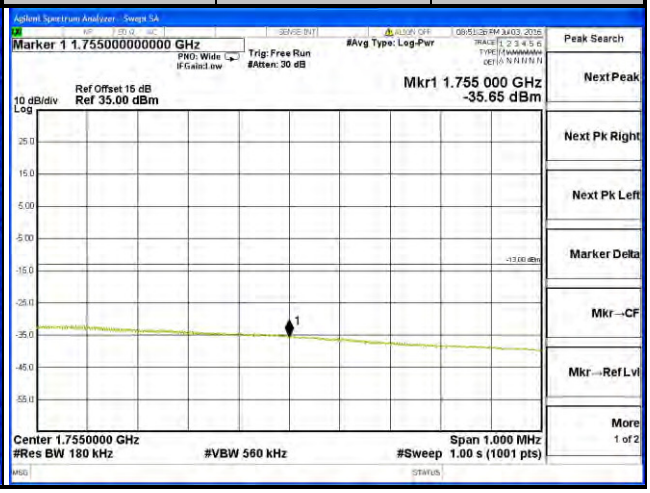
Channel	19957	25 RB	Channel	20393	25 RB

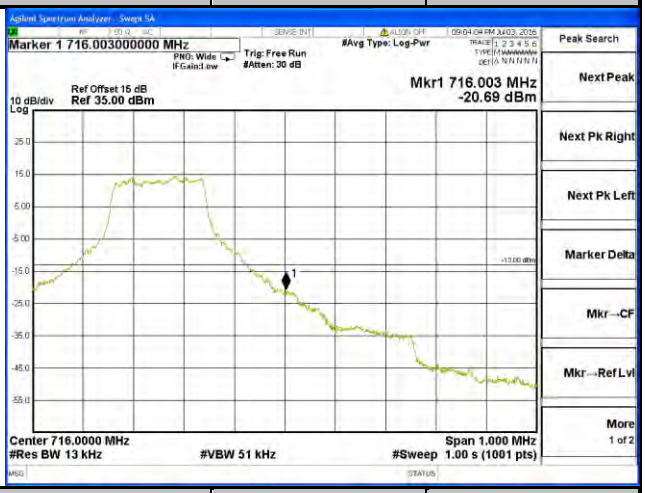
LTE Band 4					
Channel Bandwidth: 3 MHz					
Channel	19965	1 RB	Channel	20385	1 RB
Channel	19965	15 RB	Channel	20385	15 RB
					

LTE Band 4					
Channel Bandwidth: 5 MHz					
Channel	19975	1 RB	Channel	20375	1 RB
					
Channel	19975	25 RB	Channel	20375	25 RB
					

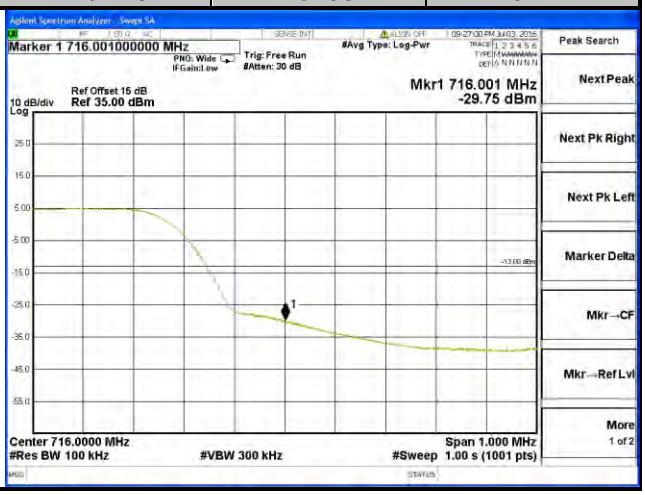
LTE Band 4					
Channel Bandwidth: 10 MHz					
Channel	20000	1 RB	Channel	20350	1 RB
					
Channel	20000	50 RB	Channel	20350	50 RB
					

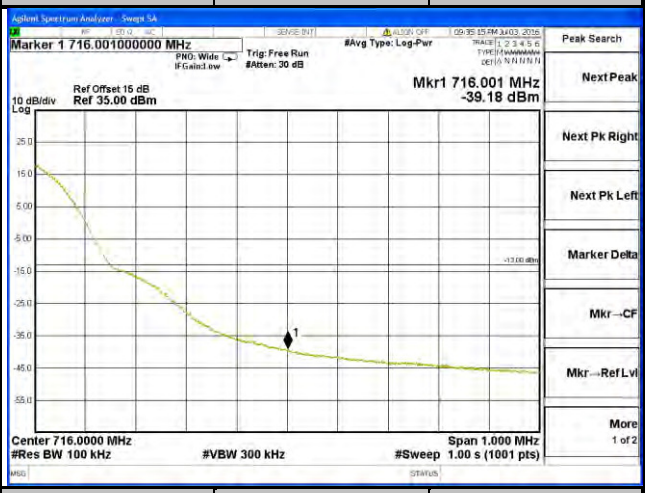
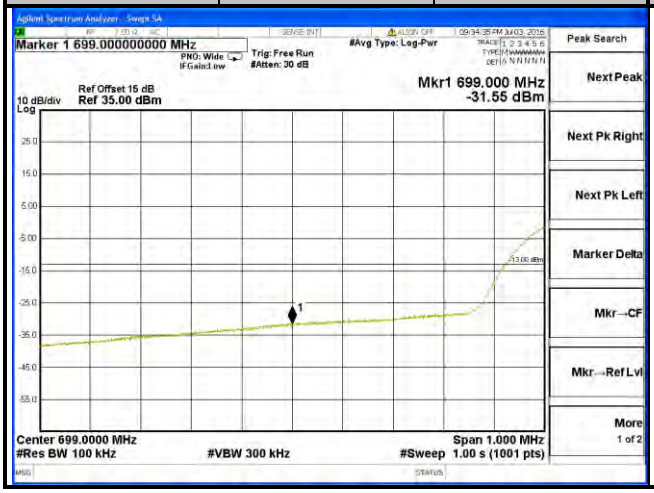
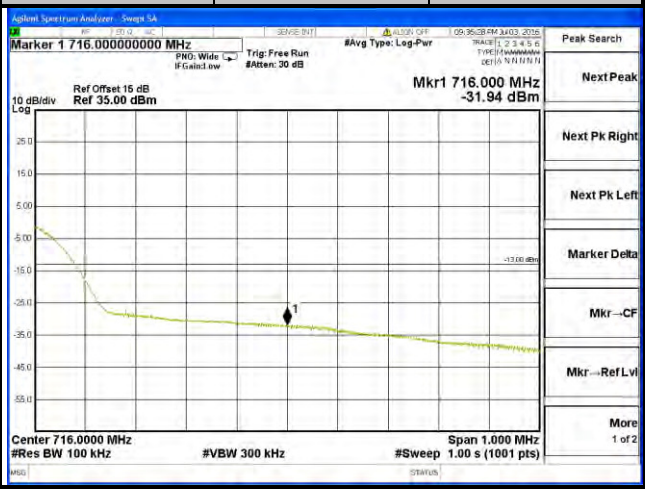
LTE Band 4					
Channel Bandwidth: 15 MHz					
Channel	20025	1 RB	Channel	20325	1 RB
					
Channel	20025	75 RB	Channel	20325	75 RB
					

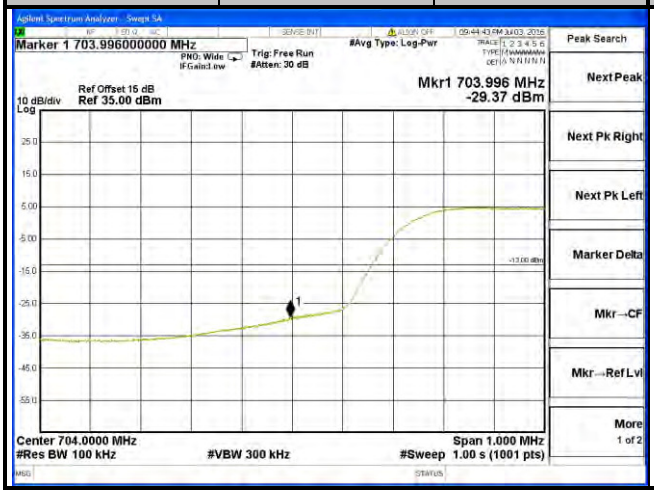
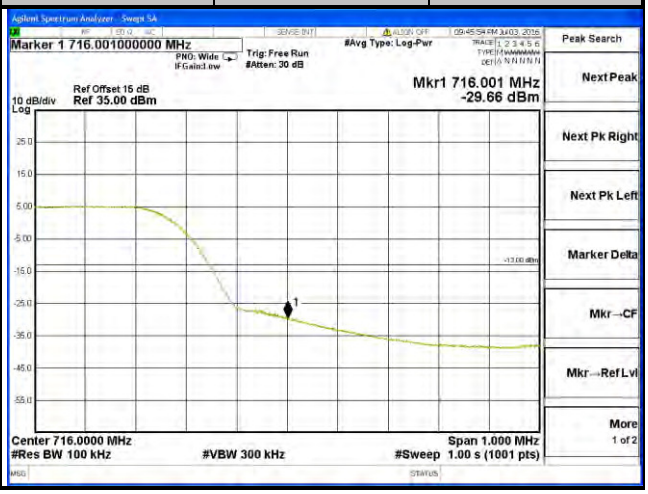
LTE Band 4					
Channel Bandwidth: 20 MHz					
Channel	20050	1 RB	Channel	20300	1 RB
					
Channel	20050	100 RB	Channel	20300	100 RB
					

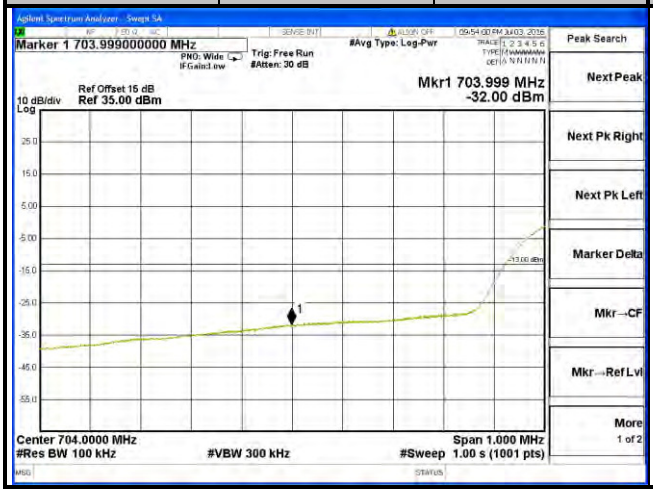
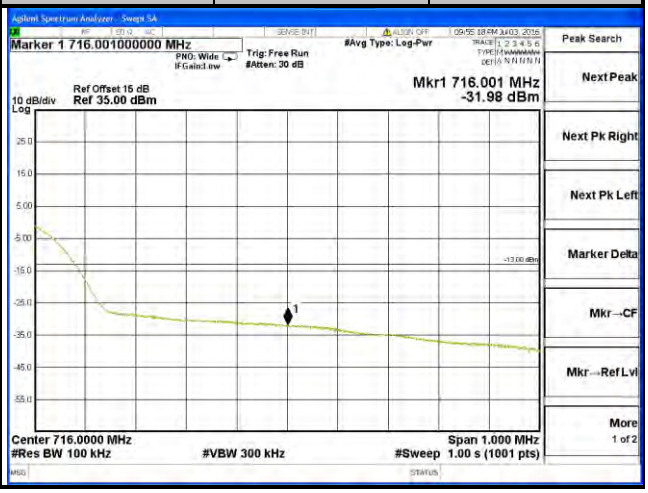
LTE Band 12					
Channel Bandwidth: 1.4 MHz					
Channel	23017	1 RB	Channel	23173	1 RB
					
Channel	23017	6 RB	Channel	23173	6 RB

LTE Band 12					
Channel Bandwidth: 3 MHz					
Channel	23025	1 RB	Channel	23165	1 RB
Channel	23025	15 RB	Channel	23165	15 RB

LTE Band 12					
Channel Bandwidth: 5 MHz					
Channel	23035	1 RB	Channel	23155	1 RB
Channel	23035	25 RB	Channel	23155	25 RB
					

LTE Band 12					
Channel Bandwidth: 10 MHz					
Channel	23060	1 RB	Channel	23130	1 RB
					
Channel	23060	50 RB	Channel	23130	50 RB
					

LTE Band 17					
Channel Bandwidth: 5 MHz					
Channel	23755	1 RB	Channel	23825	1 RB
Channel	23755	25 RB	Channel	23825	25 RB
					

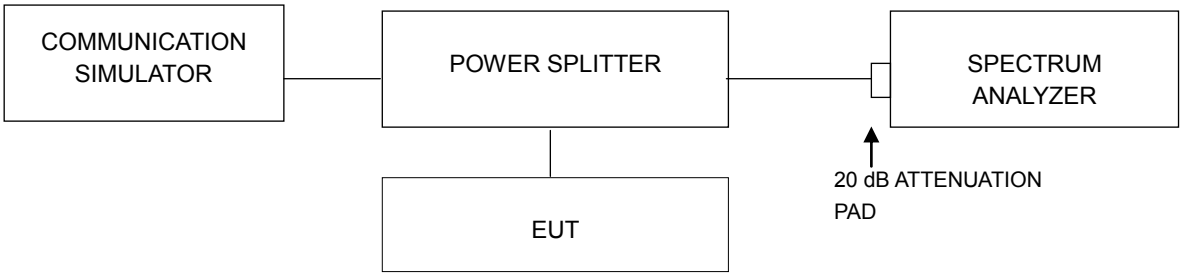
LTE Band 17					
Channel Bandwidth: 10 MHz					
Channel	23780	1 RB	Channel	23800	1 RB
Channel	23780	50 RB	Channel	23800	50 RB
					

4.5 Peak to Average Ratio

4.5.1 Limits of Peak to Average Ratio Measurement

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

4.5.2 Test Setup

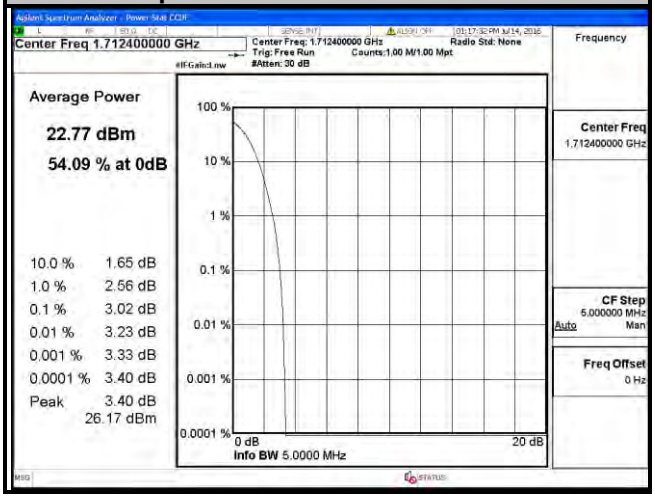


4.5.3 Test Procedures

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

4.5.4 Test Results

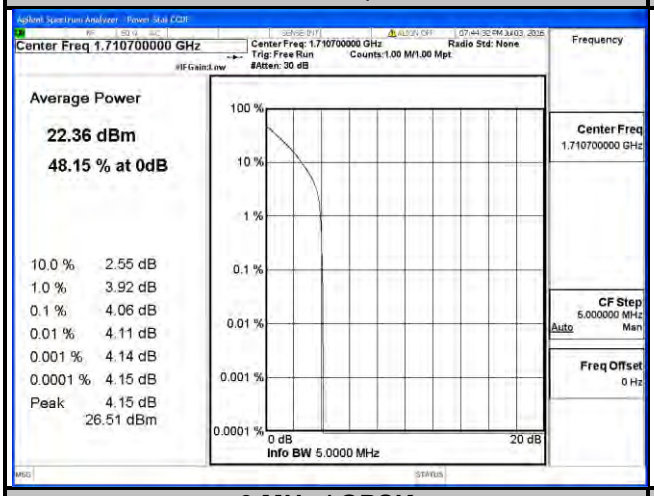
WCDMA		
Channel	**Frequency (MHz)**	**Peak to Average Ratio (dB)**
1312	1712.4	3.02
1413	1732.6	2.96
1513	1752.6	2.97

Spectrum Plot of Worst Value


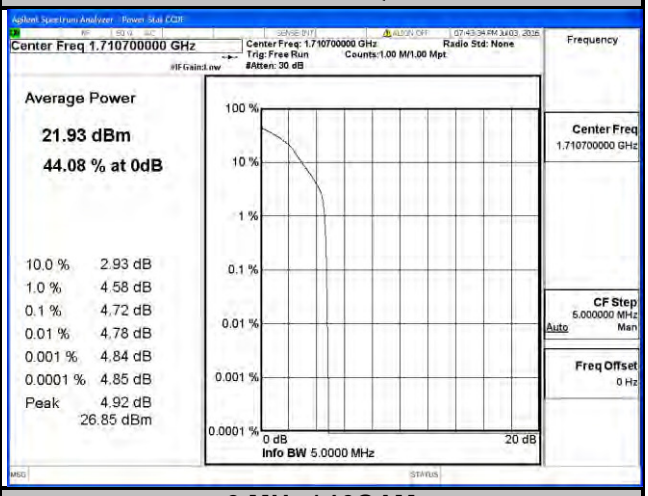
LTE Band 4							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	4.06	4.72	19965	1711.5	4.06	4.76
20175	1732.5	4.00	4.56	20175	1732.5	4.00	4.59
20393	1754.3	4.03	4.66	20385	1753.5	4.05	4.67

Spectrum Plot of Worst Value

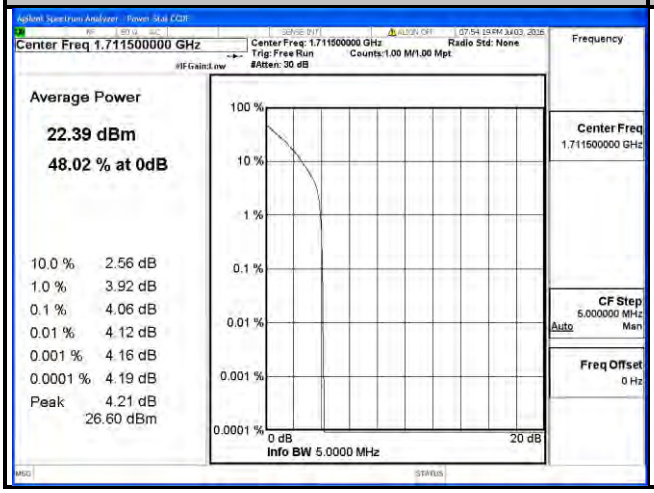
1.4 MHz / QPSK



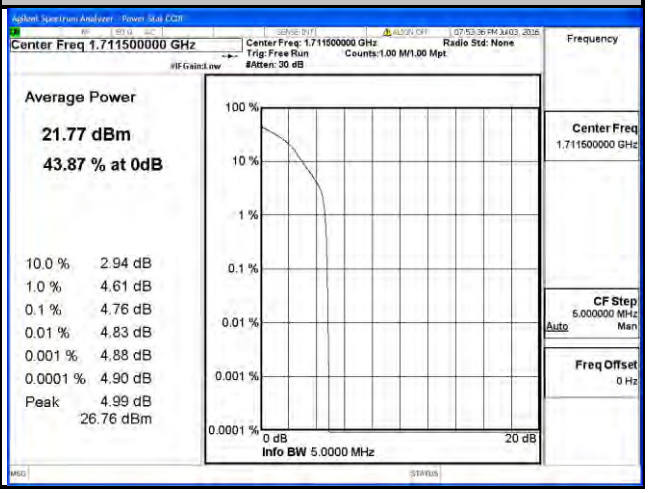
1.4 MHz / 16QAM



3 MHz / QPSK



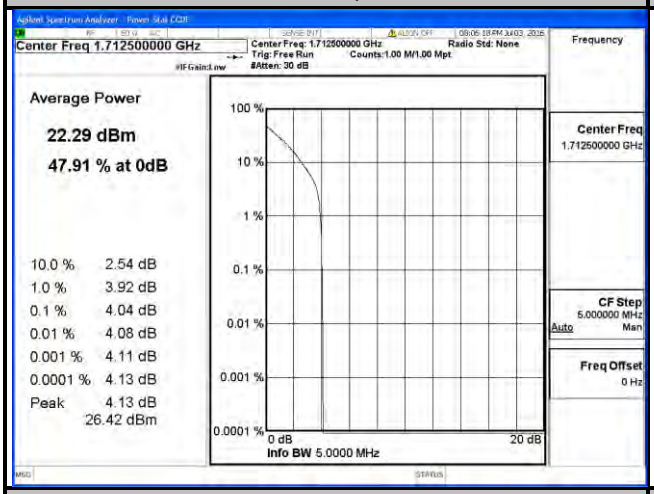
3 MHz / 16QAM



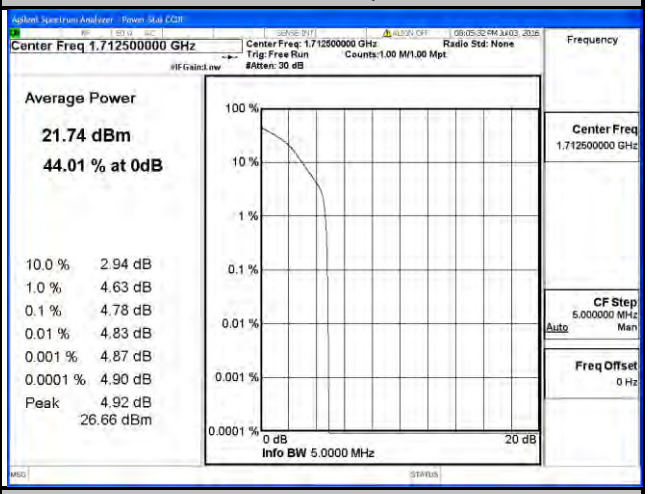
LTE Band 4							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.04	4.78	20000	1715.0	4.01	4.79
20175	1732.5	3.94	4.56	20175	1732.5	3.88	4.54
20375	1752.5	4.02	4.75	20350	1750.0	4.05	4.76

Spectrum Plot of Worst Value

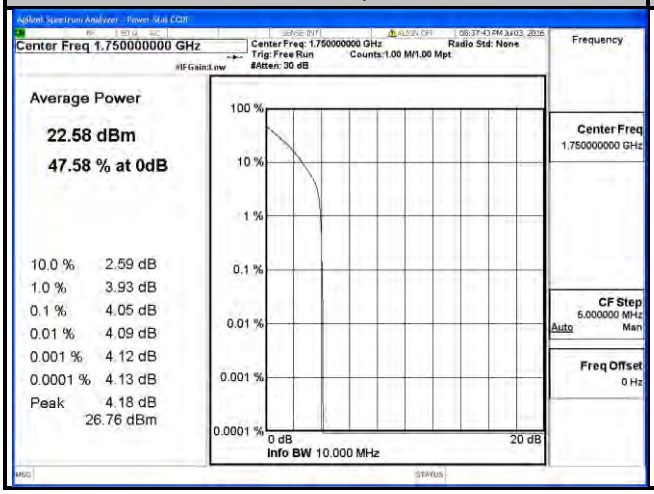
5 MHz / QPSK



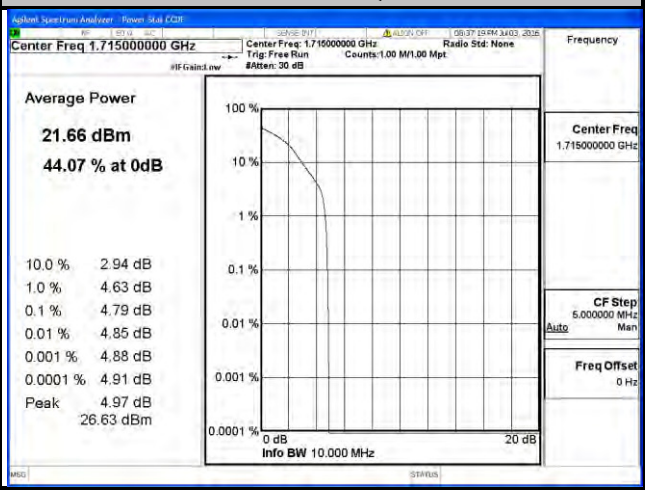
5 MHz / 16QAM



10 MHz / QPSK



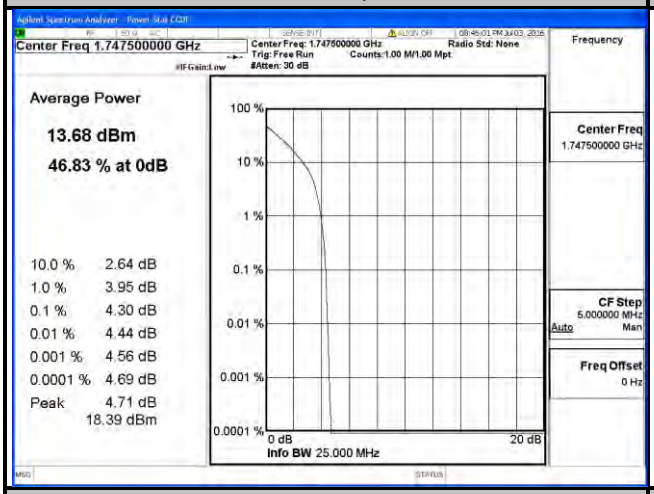
10 MHz / 16QAM



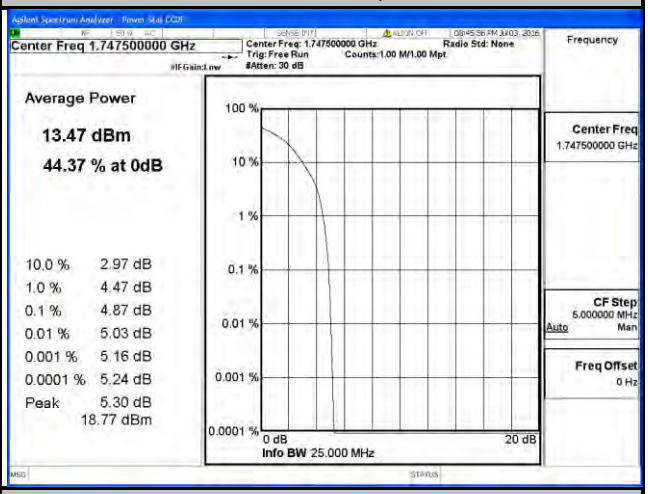
LTE Band 4							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	4.00	4.73	20050	1720.0	3.99	4.50
20175	1732.5	3.82	4.41	20175	1732.5	3.81	4.51
20325	1747.5	4.30	4.87	20300	1745.0	4.03	4.68

Spectrum Plot of Worst Value

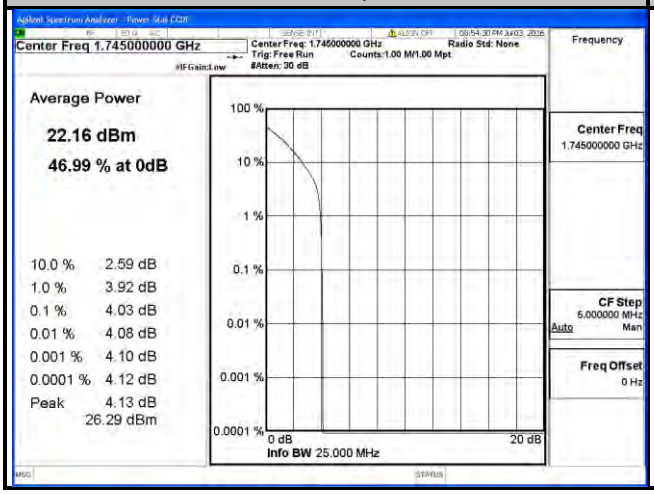
15 MHz / QPSK



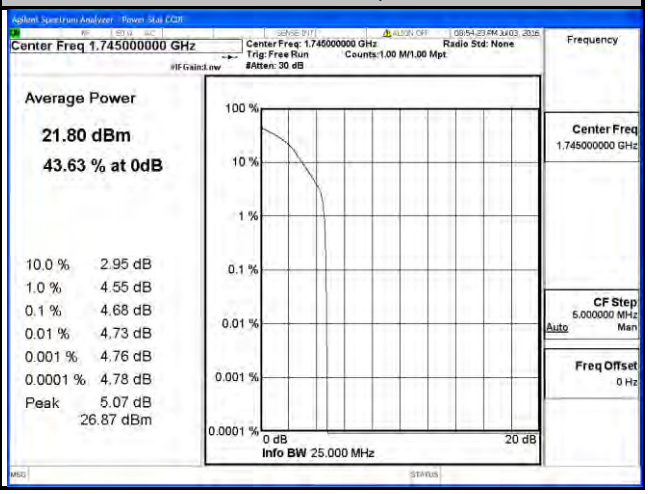
15 MHz / 16QAM



20 MHz / QPSK



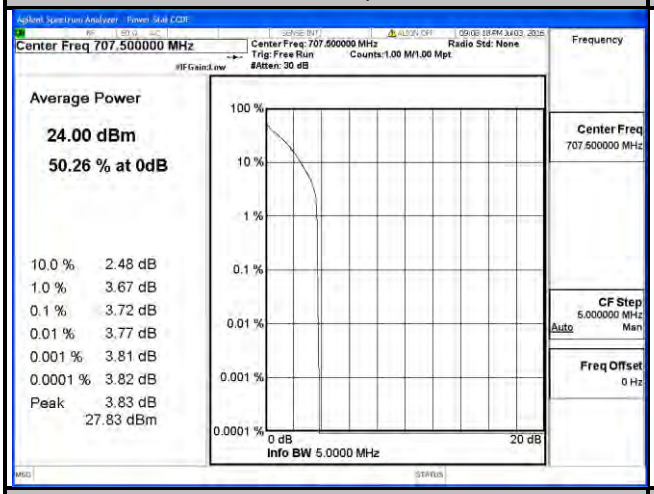
20 MHz / 16QAM



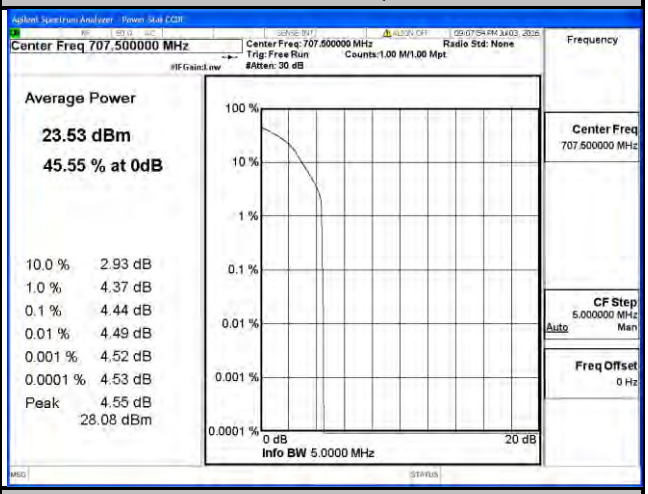
LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	3.35	4.20	23025	700.5	3.42	4.15
23095	707.5	3.72	4.44	23095	707.5	3.75	4.50
23173	715.3	3.64	4.37	23165	714.5	3.53	4.50

Spectrum Plot of Worst Value

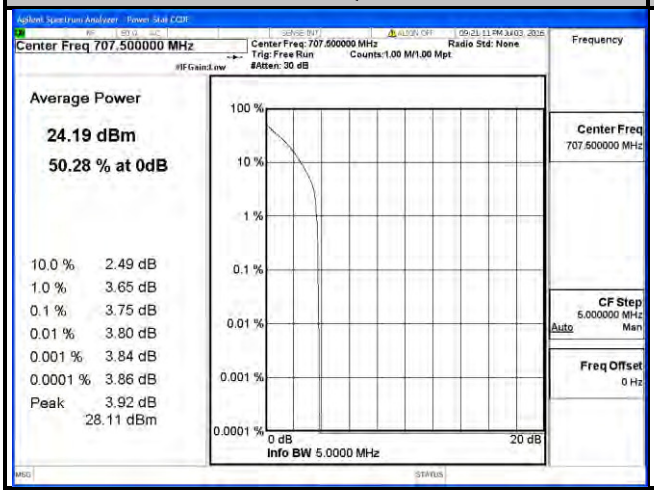
1.4 MHz / QPSK



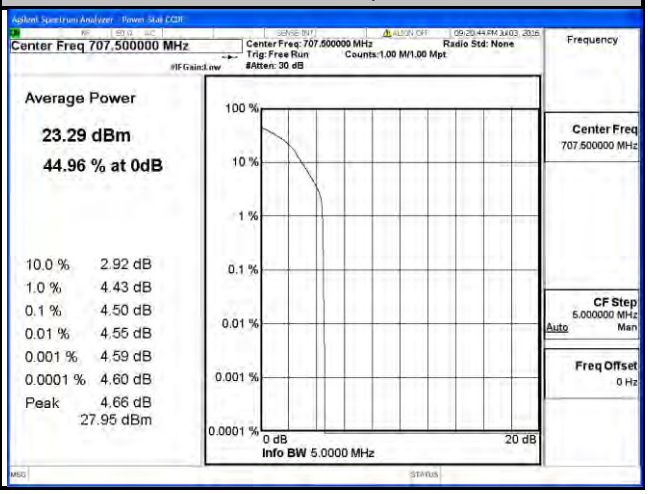
1.4 MHz / 16QAM



3 MHz / QPSK



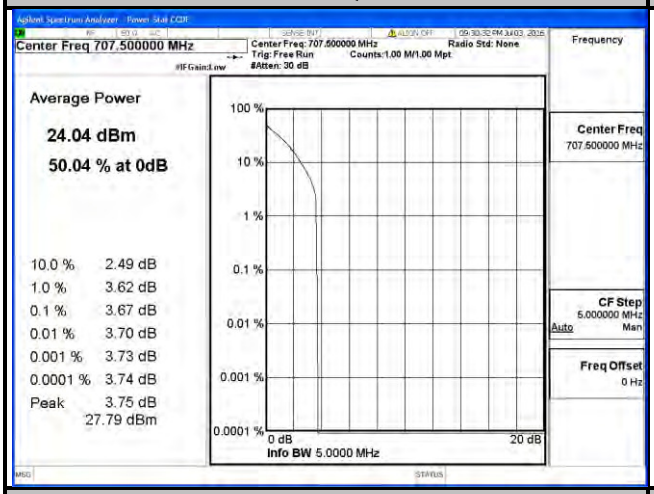
3 MHz / 16QAM



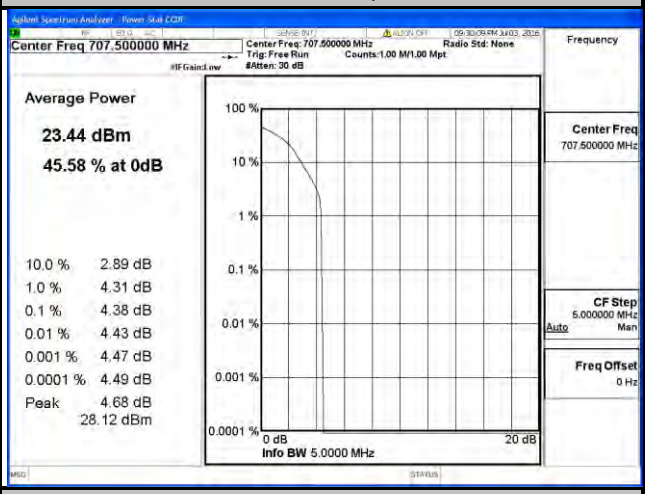
LTE Band 12							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	3.30	4.12	23060	704.0	3.39	4.08
23095	707.5	3.67	4.38	23095	707.5	3.60	4.37
23155	713.5	3.54	4.32	23130	711.0	3.67	4.39

Spectrum Plot of Worst Value

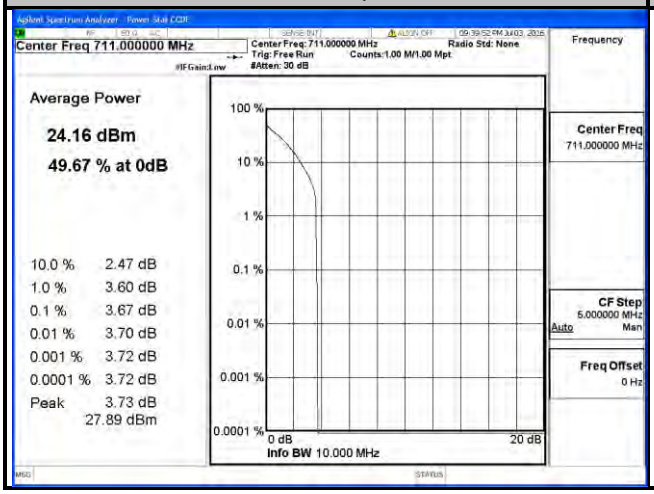
5 MHz / QPSK



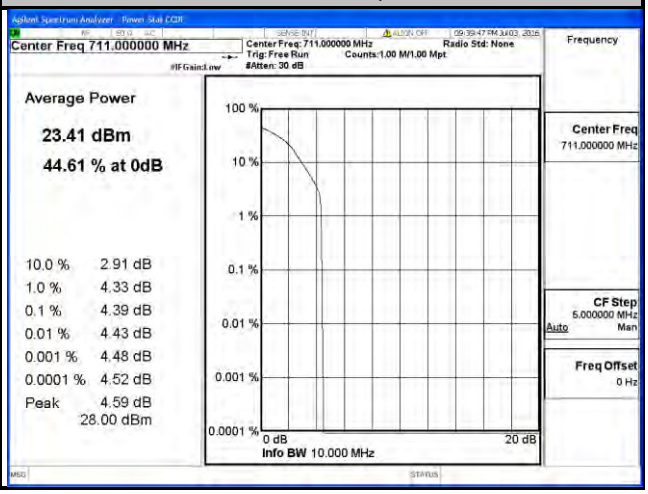
5 MHz / 16QAM



10 MHz / QPSK



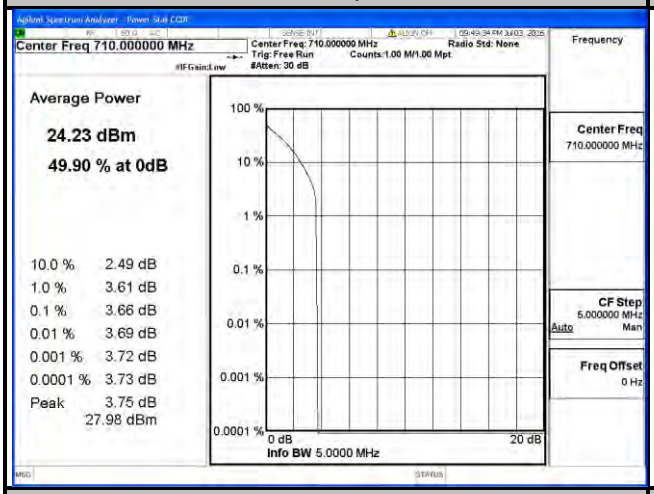
10 MHz / 16QAM



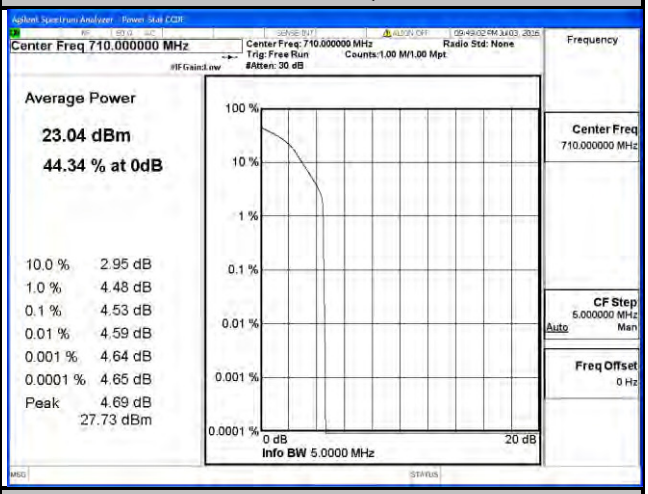
LTE Band 17							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23755	706.5	3.64	4.40	23780	709.0	3.55	4.50
23790	710.0	3.66	4.53	23790	710.0	3.69	4.52
23825	713.5	3.49	4.37	23800	711.0	3.67	4.55

Spectrum Plot of Worst Value

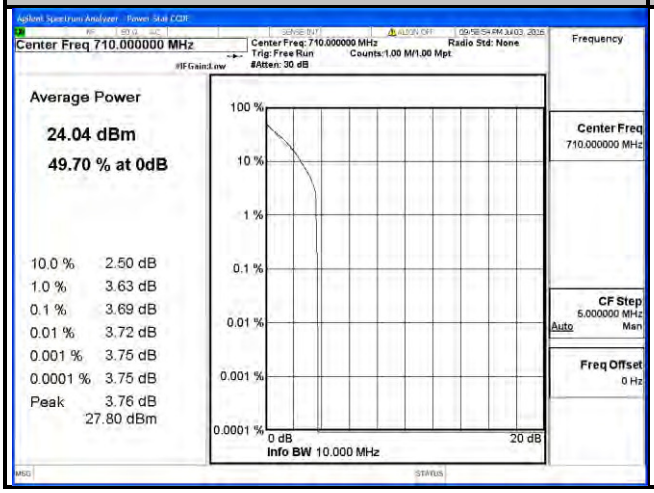
5 MHz / QPSK



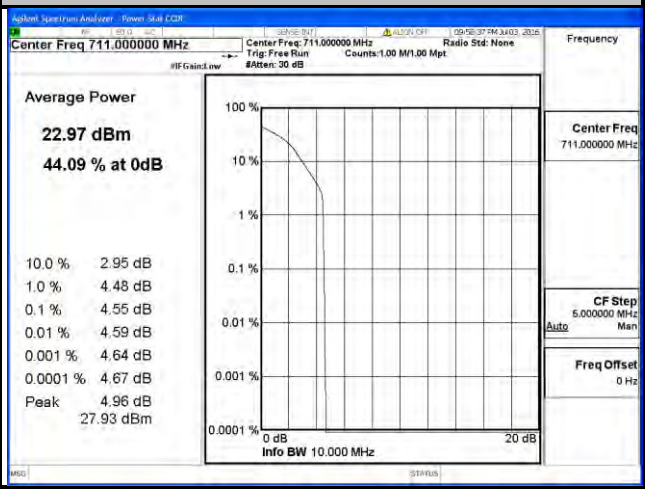
5 MHz / 16QAM



10 MHz / QPSK



10 MHz / 16QAM

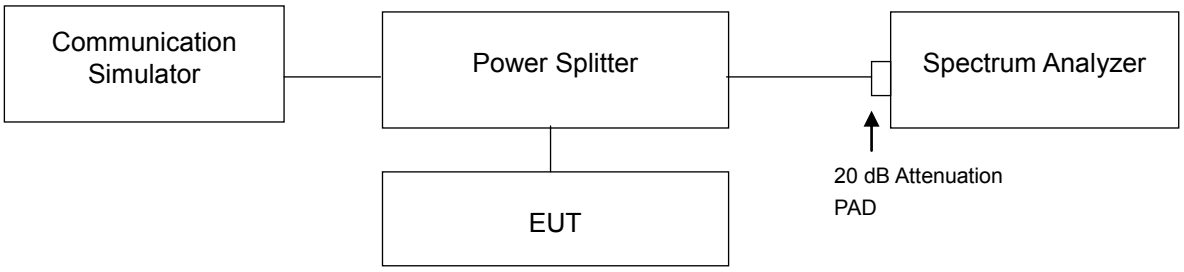


4.6 Conducted Spurious Emissions

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 43 +10 log10(P) dB. The limit of emission is equal to -13 dBm.

4.6.2 Test Setup



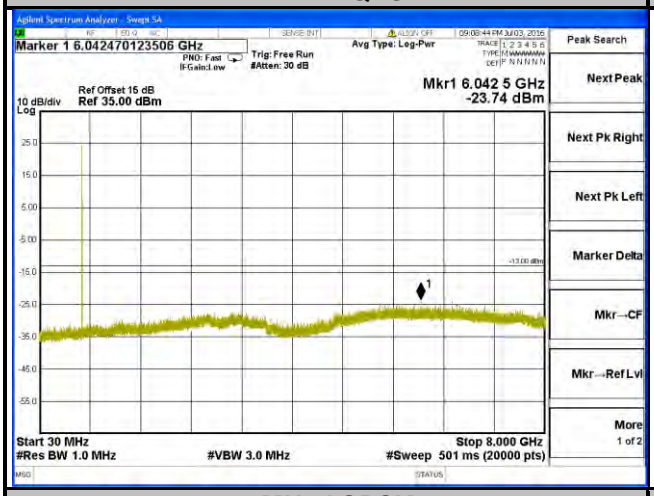
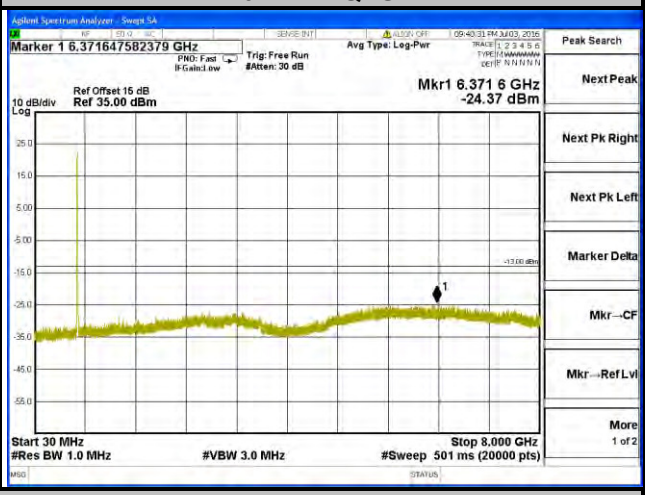
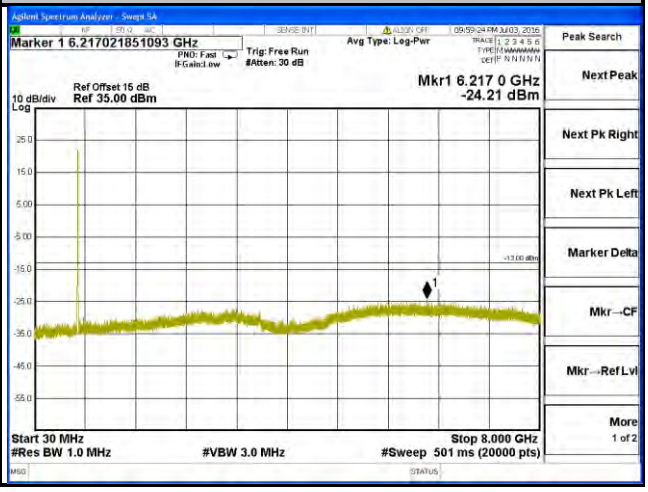
4.6.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.

b. Measuring frequency range is from 30 MHz to 8 GHz for LTE Band 17 and from 30 MHz to 18 GHz for LTE Band 4. 10 dB attenuation pad is connected with spectrum. RBW=1 MHz and VBW=3 MHz are used for conducted emission measurement.

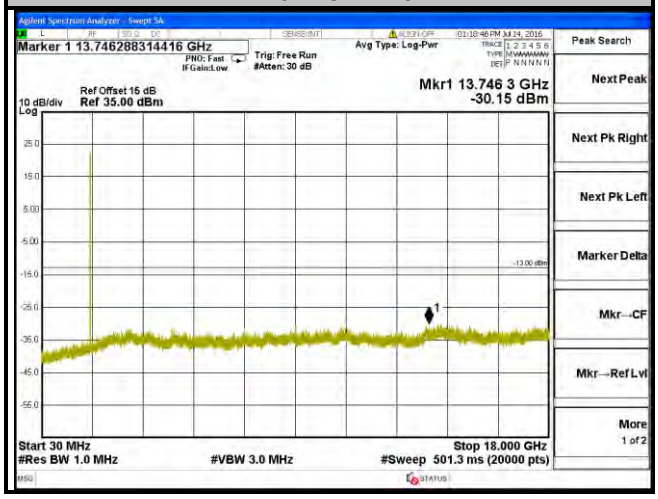
4.6.4 Test Results

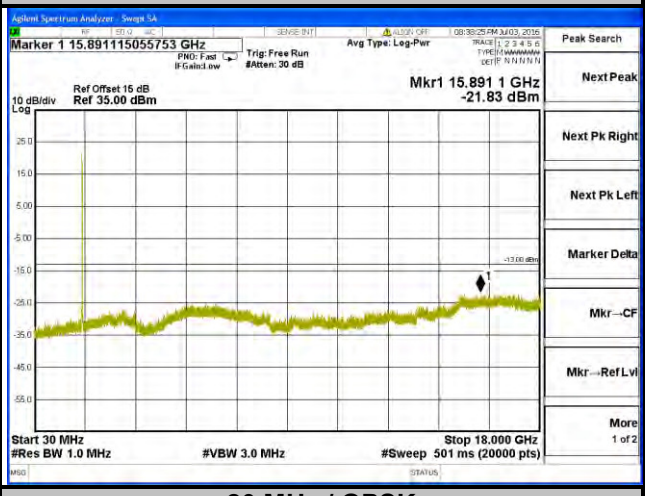
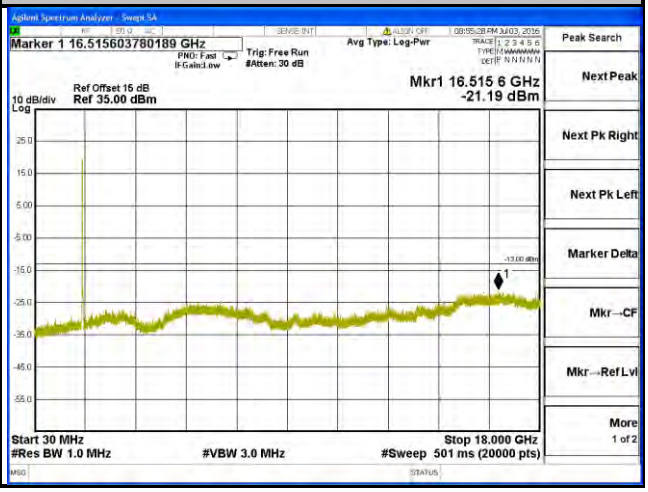
Frequency Range: 30 MHz ~ 8 GHz

LTE Band 12	
Channel 23095	
1.4 MHz / QPSK	3 MHz / QPSK
	
5 MHz / QPSK	10 MHz / QPSK
	
LTE Band 17	
Channel 23790	
5 MHz / QPSK	10 MHz / QPSK
	

Frequency Range: 30 MHz ~ 18 GHz

WCDMA
Channel 1413



LTE Band 4	
Channel 20175	
1.4 MHz / QPSK	3 MHz / QPSK
5 MHz / QPSK	10 MHz / QPSK
	
15 MHz / QPSK	20 MHz / QPSK
	

4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission is equal to -13 dBm.

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 0.8 m 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 1 m to 4 m 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.

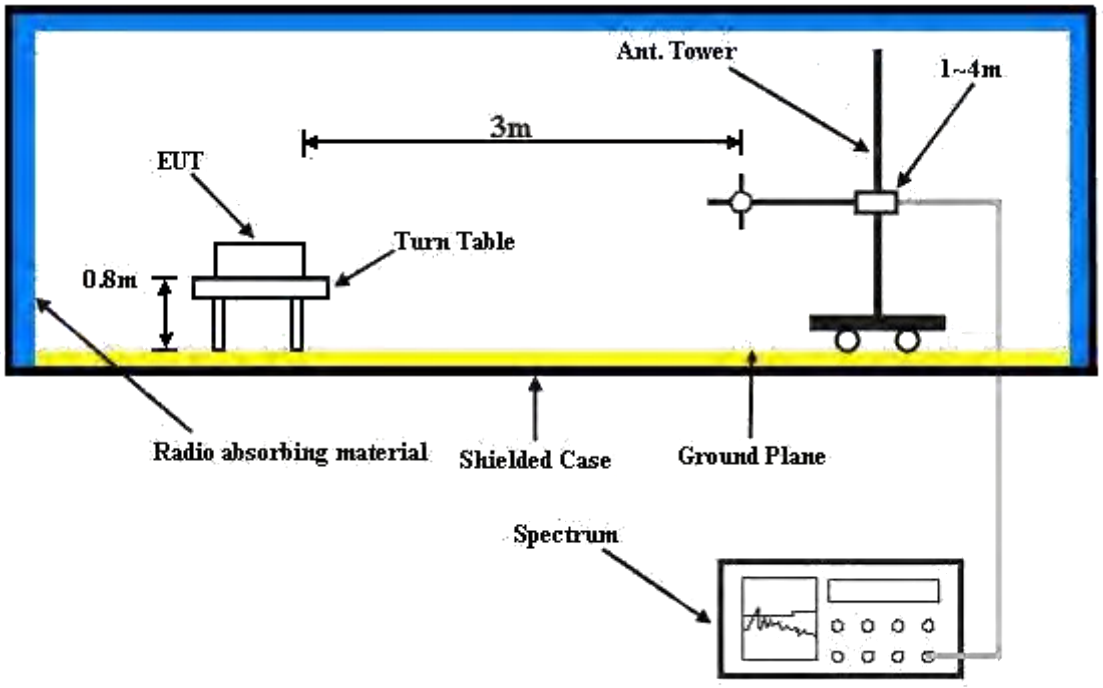
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dBi.

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

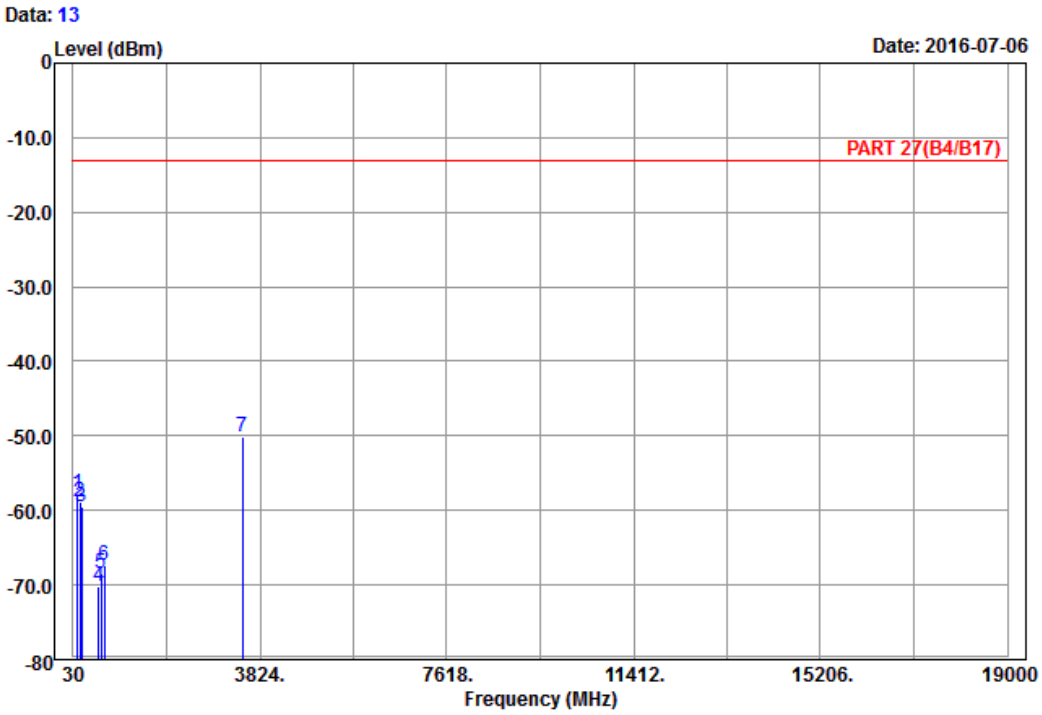


For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

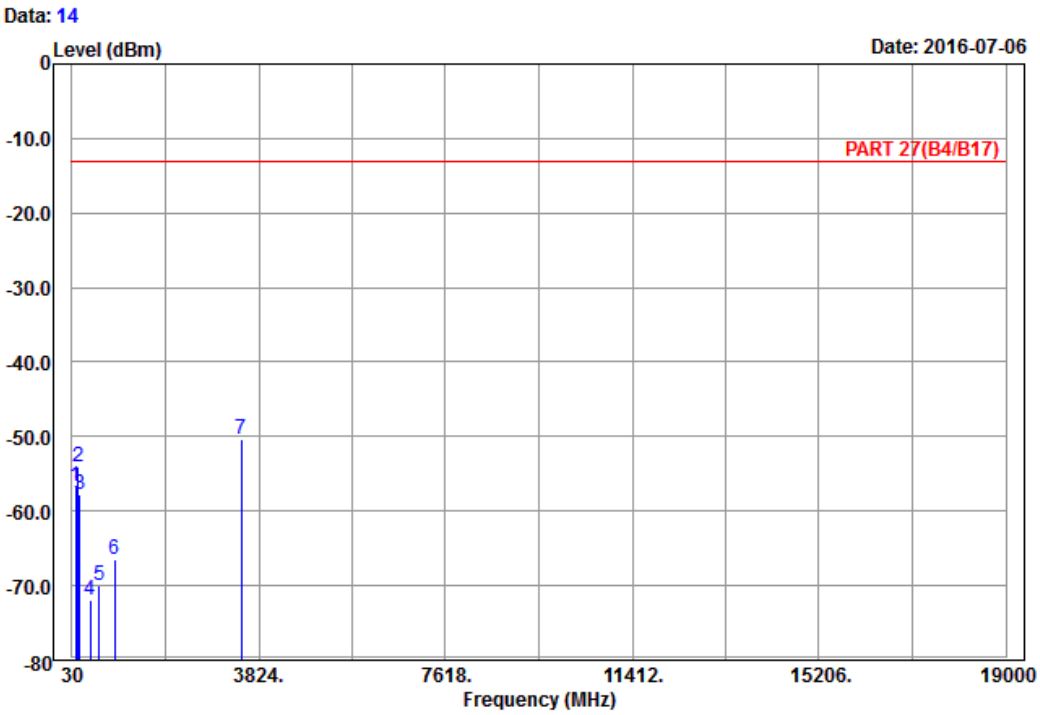
WCDMA:

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 27(B4/B17) Horizontal
Remark : Band IV_Link_CH1413
Tested by: Charles Hsiao

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	123.96	-57.71	-49.70	-13.00	-44.71	-8.01	Peak
2	175.80	-58.89	-52.80	-13.00	-45.89	-6.09	Peak
3	204.96	-59.41	-53.29	-13.00	-46.41	-6.12	Peak
4	551.30	-70.23	-68.61	-13.00	-57.23	-1.62	Peak
5	596.80	-68.50	-68.77	-13.00	-55.50	0.27	Peak
6	661.90	-67.45	-67.26	-13.00	-54.45	-0.19	Peak
7 pp	3465.20	-50.24	-64.58	-13.00	-37.24	14.34	Peak

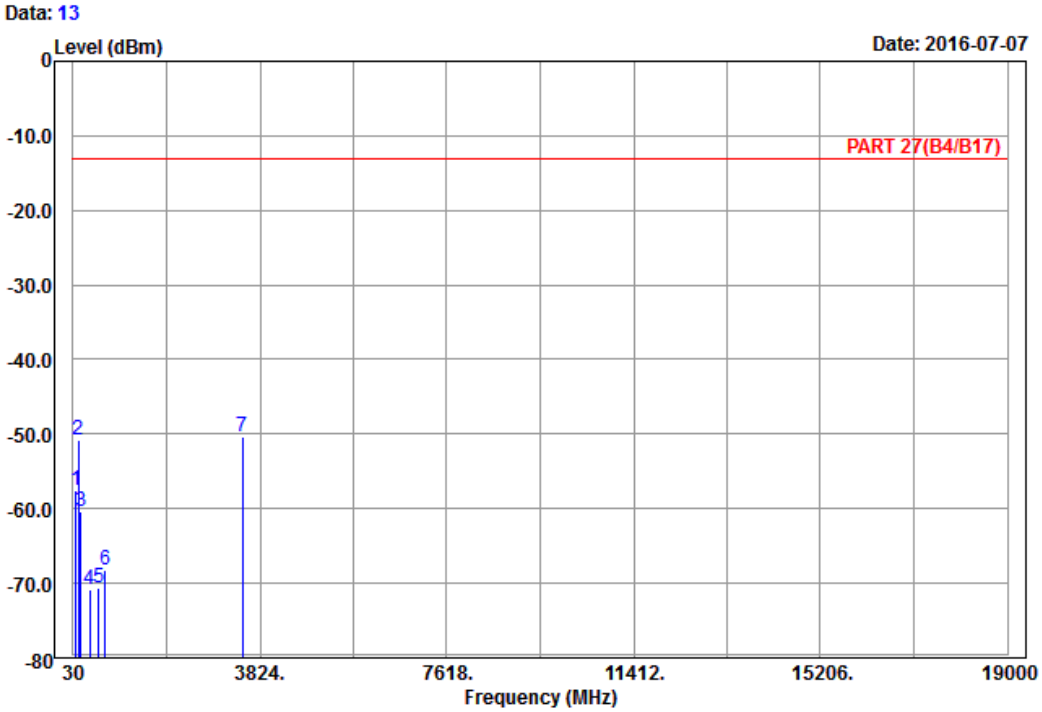


Site : 966 chamber 1
Condition: PART 27(B4/B17) Vertical
Remark : Band IV_Link_CH1413
Tested by: Charles Hsiao

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	109.92	-56.68	-47.73	-13.00	-43.68	-8.95	Peak
2	159.60	-54.00	-46.33	-13.00	-41.00	-7.67	Peak
3	194.16	-57.76	-51.85	-13.00	-44.76	-5.91	Peak
4	395.20	-71.96	-68.96	-13.00	-58.96	-3.00	Peak
5	577.20	-70.03	-69.49	-13.00	-57.03	-0.54	Peak
6	888.00	-66.56	-69.11	-13.00	-53.56	2.55	Peak
7 pp	3465.20	-50.28	-64.62	-13.00	-37.28	14.34	Peak

LTE Band 4
Channel Bandwidth: 20 MHz / QPSK

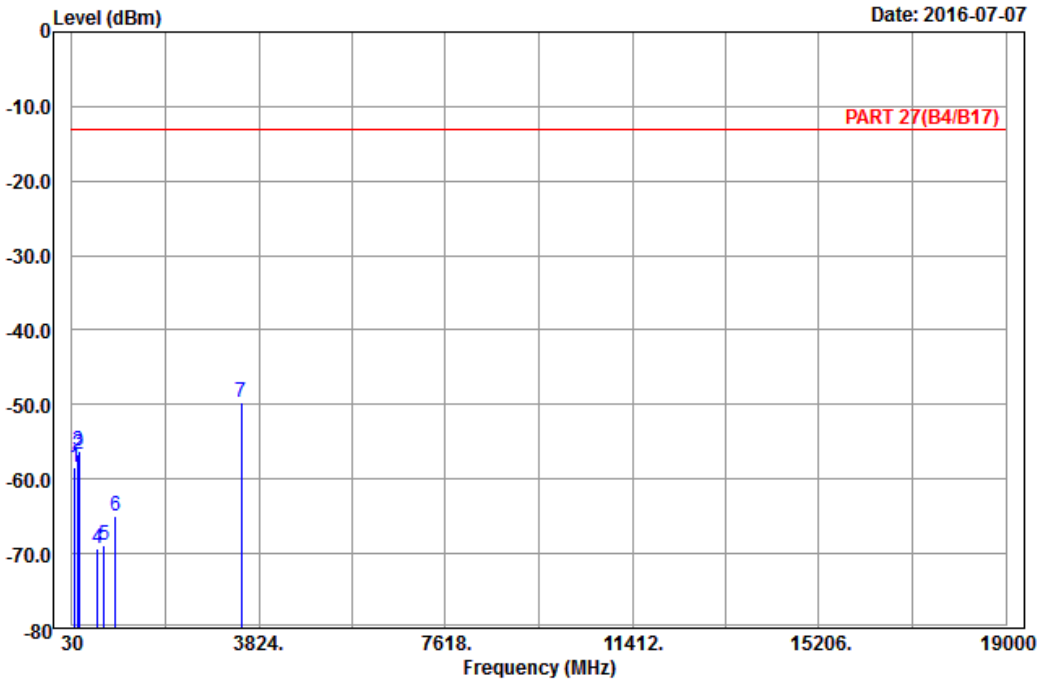
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 27(B4/B17) Horizontal
Remark : LTE_Band 4_Link_CH20175
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	95.61	-57.63	-47.29	-13.00	-44.63	-10.34	Peak
2	138.00	-50.68	-43.00	-13.00	-37.68	-7.68	Peak
3	189.03	-60.41	-54.69	-13.00	-47.41	-5.72	Peak
4	373.50	-70.92	-66.78	-13.00	-57.92	-4.14	Peak
5	546.40	-70.61	-68.66	-13.00	-57.61	-1.95	Peak
6	685.70	-68.29	-67.98	-13.00	-55.29	-0.31	Peak
7 pp	3465.00	-50.25	-64.59	-13.00	-37.25	14.34	Peak

Data: 14

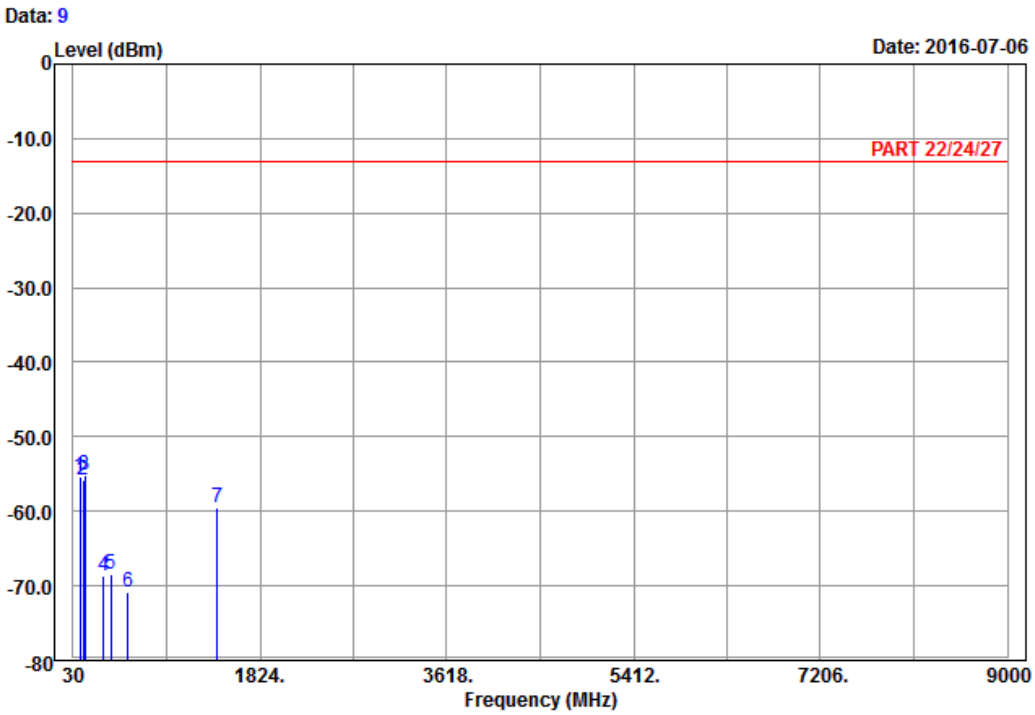


Site : 966 chamber 1
Condition: PART 27(B4/B17) Vertical
Remark : LTE_Band 4_Link_CH20175
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	93.72	-58.35	-47.90	-13.00	-45.35	-10.45	Peak
2	160.68	-56.72	-49.15	-13.00	-43.72	-7.57	Peak
3	177.69	-56.30	-50.42	-13.00	-43.30	-5.88	Peak
4	553.40	-69.34	-67.84	-13.00	-56.34	-1.50	Peak
5	686.40	-68.78	-68.47	-13.00	-55.78	-0.31	Peak
6	910.40	-64.95	-68.32	-13.00	-51.95	3.37	Peak
7 pp	3465.00	-49.79	-64.13	-13.00	-36.79	14.34	Peak

LTE Band 12
Channel Bandwidth: 10 MHz / QPSK

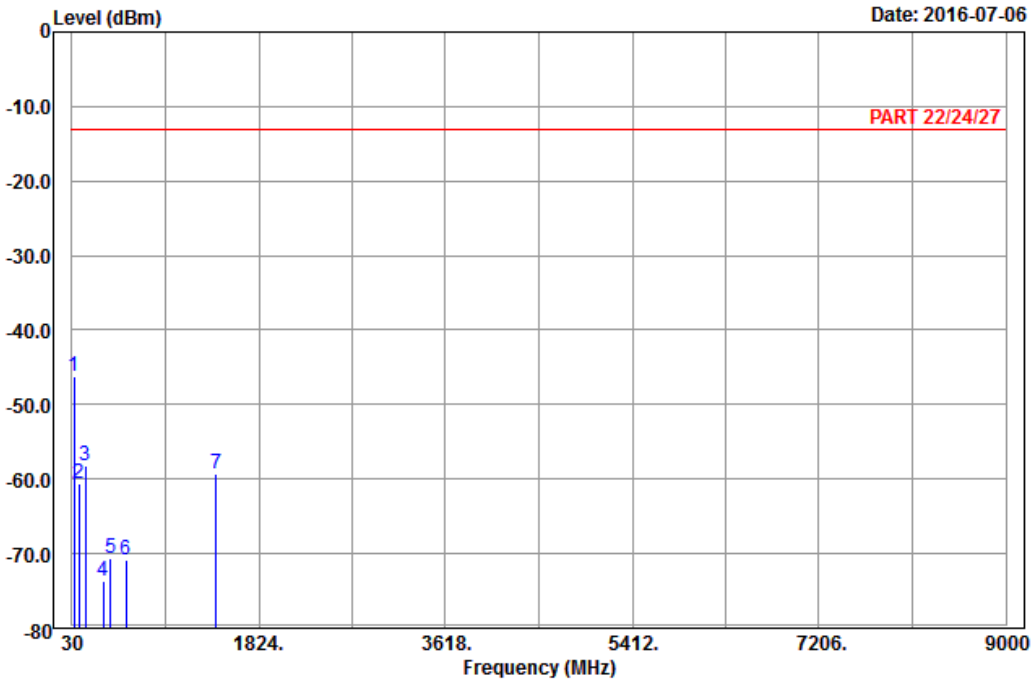
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 22/24/27 Horizontal
Remark : LTE_Band 12_Link_CH23095
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	93.18	-55.41	-44.90	-13.00	-42.41	-10.51	Peak
2	123.69	-55.91	-47.90	-13.00	-42.91	-8.01	Peak
3 pp	144.21	-55.04	-47.23	-13.00	-42.04	-7.81	Peak
4	322.40	-68.66	-62.96	-13.00	-55.66	-5.70	Peak
5	393.80	-68.40	-65.35	-13.00	-55.40	-3.05	Peak
6	559.00	-70.90	-69.60	-13.00	-57.90	-1.30	Peak
7	1415.00	-59.49	-65.85	-13.00	-46.49	6.36	Peak

Data: 10

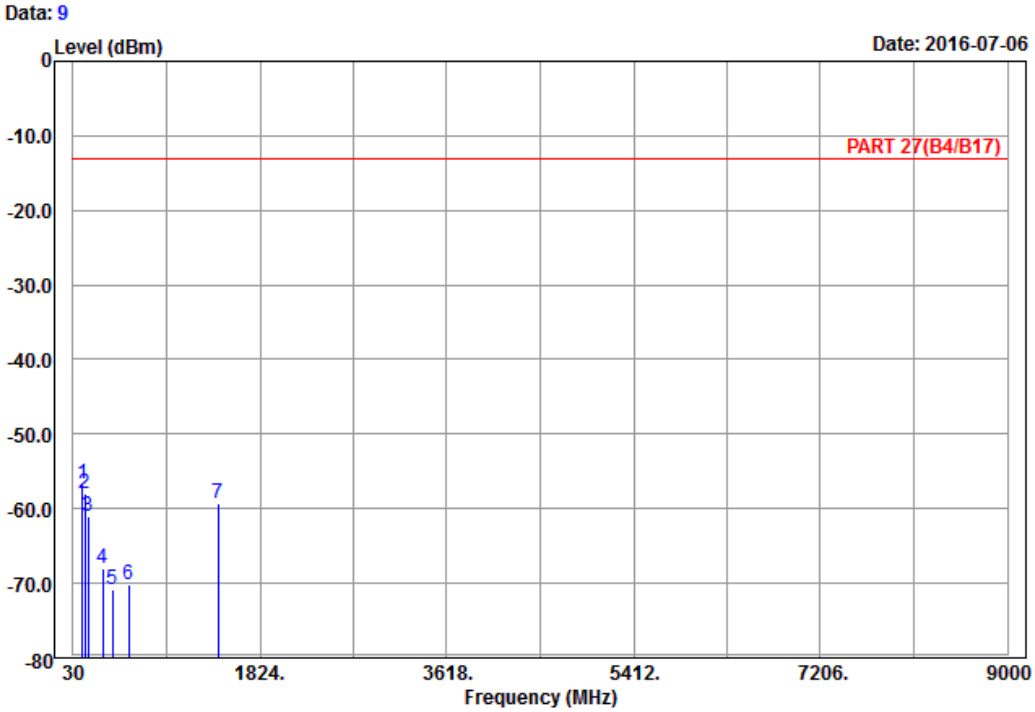


Site : 966 chamber 1
Condition: PART 22/24/27 Vertical
Remark : LTE_Band 12_Link_CH23095
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	46.20	-46.31	-33.51	-13.00	-33.31	-12.80	Peak
2	97.50	-60.60	-50.37	-13.00	-47.60	-10.23	Peak
3	155.28	-58.10	-50.29	-13.00	-45.10	-7.81	Peak
4	328.00	-73.68	-68.05	-13.00	-60.68	-5.63	Peak
5	401.50	-70.57	-67.79	-13.00	-57.57	-2.78	Peak
6	546.40	-70.86	-68.91	-13.00	-57.86	-1.95	Peak
7	1415.00	-59.34	-65.70	-13.00	-46.34	6.36	Peak

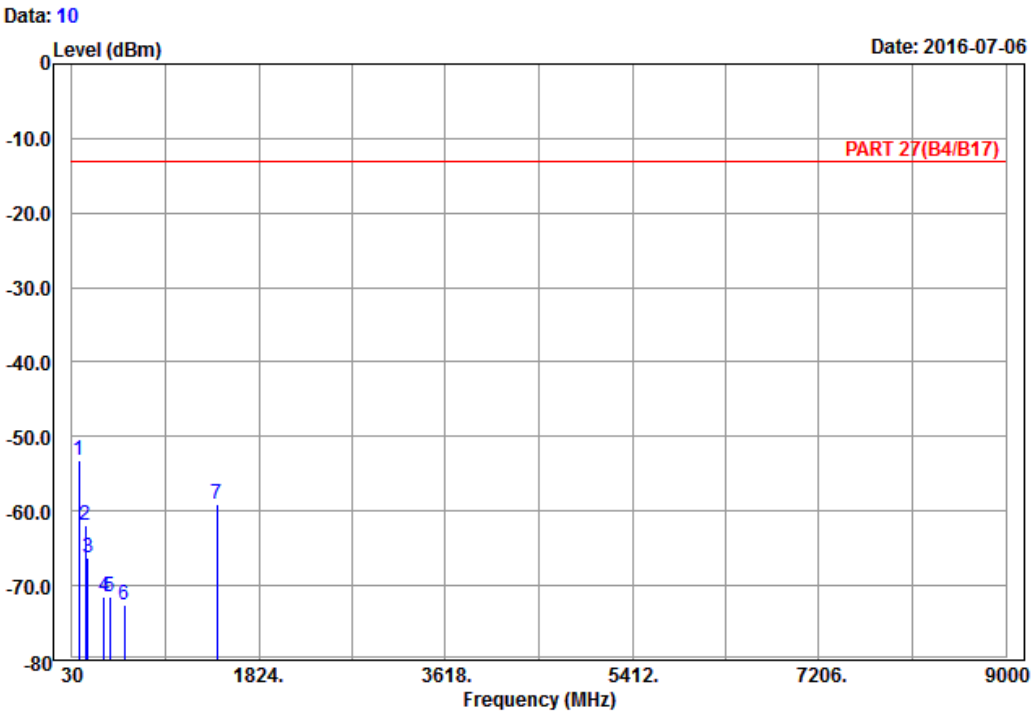
LTE Band 17
Channel Bandwidth: 10 MHz / QPSK

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 27(B4/B17) Horizontal
Remark : LTE_Band 17_Link_CH23790
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	122.88	-56.69	-48.62	-13.00	-43.69	-8.07	Peak
2	143.94	-57.93	-50.14	-13.00	-44.93	-7.79	Peak
3	176.61	-61.08	-55.09	-13.00	-48.08	-5.99	Peak
4	316.10	-67.97	-62.20	-13.00	-54.97	-5.77	Peak
5	408.50	-70.75	-67.82	-13.00	-57.75	-2.93	Peak
6	561.80	-70.25	-69.07	-13.00	-57.25	-1.18	Peak
7	1420.00	-59.23	-65.59	-13.00	-46.23	6.36	Peak



Site : 966 chamber 1
Condition: PART 27(B4/B17) Vertical
Remark : LTE_Band 17_Link_CH23790
Tested by: Karl Lee

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	97.77	-53.26	-43.03	-13.00	-40.26	-10.23	Peak
2	160.95	-61.94	-54.37	-13.00	-48.94	-7.57	Peak
3	181.74	-66.23	-60.64	-13.00	-53.23	-5.59	Peak
4	341.30	-71.57	-66.09	-13.00	-58.57	-5.48	Peak
5	393.10	-71.45	-68.35	-13.00	-58.45	-3.10	Peak
6	533.10	-72.60	-69.73	-13.00	-59.60	-2.87	Peak
7	1420.00	-58.97	-65.33	-13.00	-45.97	6.36	Peak

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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

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

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

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

--- END ---