FCC Test Report

(PART 27)

Report No.:	RF180207C11-8
FCC ID:	MSQZ01RD
Test Model:	ASUS_Z01RD / ASUS_Z01RS
Received Date:	Feb. 07, 2018
Test Date:	Mar. 02, 2018 ~ Apr. 11, 2018
Issued Date:	May 02, 2018
Applicant:	ASUSTek COMPUTER INC.
Address:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
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
FCC Registration / Designation Number:	427177 / TW0011

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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 **10**

3.1 General Description of EUT 10
3.2 Configuration of System under Test 12
3.2.1 Description of Support Units 12
3.3 Test Mode Applicability and Tested Channel Detail 13
3.4 EUT Operating Conditions 18
3.5 General Description of Applied Standards 18

4 Test Types and Results **19**

4.1 Output Power Measurement 19
4.1.1 Limits of Output Power Measurement 19
4.1.2 Test Procedures 19
4.1.3 Test Setup 20
4.1.4 Test Results 21
4.2 Frequency Stability Measurement 36
4.2.1 Limits of Frequency Stabiliity Measurement 36
4.2.2 Test Procedure 36
4.2.3 Test Setup 36
4.2.4 Test Results 37
4.3 Occupied Bandwidth Measurement 50
4.3.1 Limits of Occupied Bandwidth Measurement 50
4.3.2 Test Procedure 50
4.3.3 Test Setup 50
4.3.4 Test Result 51
4.4 Band Edge Measurement 58
4.4.1 Limits of Band Edge Measurement 58
4.4.2 Test Setup 58
4.4.3 Test Procedures 58
4.4.4 Test Results 59
4.5 Peak to Average Ratio 71
4.5.1 Limits of Peak to Average Ratio Measurement 71
4.5.2 Test Setup 71
4.5.3 Test Procedures 71
4.5.4 Test Results 72
4.6 Conducted Spurious Emissions 79
4.6.1 Limits of Conducted Spurious Emissions Measurement 79
4.6.2 Test Setup 79
4.6.3 Test Procedure 79
4.6.4 Test Results 80
4.7 Radiated Emission Measurement 107
4.7.1 Limits of Radiated Emission Measurement 107
4.7.2 Test Procedure 107
4.7.3 Deviation from Test Standard 107
4.7.4 Test Setup 108
4.7.5 Test Results 109

5 Pictures of Test Arrangements **171**

Appendix – Information on the Testing Laboratories **172**

Release Control Record

Issue No.	Description	Date Issued
RF180207C11-8	Original Release	May 02, 2018

1 Certificate of Conformity

Product: ASUS Phone

Brand: ASUS

Test Model: ASUS_Z01RD / ASUS_Z01RS

Sample Status: Production Unit

Applicant: ASUSTek COMPUTER INC.

Test Date: Mar. 02, 2018 ~ Apr. 11, 2018

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 RF characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** May 02, 2018

Ivonne Wu / Supervisor

Approved by : _____ , **Date:** May 02, 2018

Dylan Chiou / Project Engineer

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 -33.22 dB at 3424.80 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 -23.43 dB at 6980.00 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 -31.97 dB at 2122.50 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 -32.21 dB at 2130.00 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	MY52260177	Jul. 05, 2017	Jul. 04, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
Double Ridge Guide Horn Antenna EMCO	3115	5619	Nov. 30, 2017	Nov. 29, 2018
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Dec. 06, 2017	Dec. 05, 2018
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 07, 2017	Jul. 06, 2018
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 24, 2017	Oct. 23, 2018
Preamplifier Agilent	310N	187226	Jun. 23, 2017	Jun. 22, 2018
Preamplifier Agilent	83017A	MY39501357	Jun. 23, 2017	Jun. 22, 2018
Power Meter Anritsu	ML2495A	1012010	Aug. 15, 2017	Aug. 14, 2018
Power Sensor Anritsu	MA2411B	1315050	Aug. 15, 2017	Aug. 14, 2018
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 26, 2017	Jun. 25, 2018
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 26, 2017	Jun. 25, 2018
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
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	Jun. 28, 2017	Jun. 27, 2019
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Dec. 28, 2017	Dec. 27, 2018
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 08, 2017	Sep. 07, 2018
DC Power Supply Topward	33010D	807748	Oct. 25, 2016	Oct. 24, 2018
Digital Multimeter Fluke	87-III	70360742	Jun. 30, 2017	Jun. 29, 2018

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 IC Site Registration No. is IC7450I-1.

3 General Information

3.1 General Description of EUT

Product	ASUS Phone	
Brand	ASUS	
Test Model	ASUS_Z01RD / ASUS_Z01RS	
Status of EUT	Production Unit	
Power Supply Rating	5.0 Vdc or 9.0 Vdc (adapter) 5.0 Vdc (host equipment) 3.85 Vdc (battery)	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM, 64QAM
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)	709.0 ~ 711.0 MHz
Emission Designator	WCDMA	4M17F9W
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 4 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 4 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 4 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE Band 4 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 4 (Channel Bandwidth: 20 MHz)	18M0W7D
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 12 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 12 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 12 (Channel Bandwidth: 10 MHz)	8M99W7D
	LTE Band 17 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 17 (Channel Bandwidth: 10 MHz)	9M01W7D

Max. ERP Power	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	31.98 mW
	LTE Band 12 (Channel Bandwidth: 3 MHz)	31.91 mW
	LTE Band 12 (Channel Bandwidth: 5 MHz)	32.44 mW
	LTE Band 12 (Channel Bandwidth: 10 MHz)	32.94 mW
	LTE Band 17 (Channel Bandwidth: 5 MHz)	31.83 mW
	LTE Band 17 (Channel Bandwidth: 10 MHz)	32.65 mW
Max. EIRP Power	WCDMA	144.11 mW
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	126.91 mW
	LTE Band 4 (Channel Bandwidth: 3 MHz)	127.20 mW
	LTE Band 4 (Channel Bandwidth: 5 MHz)	127.26 mW
	LTE Band 4 (Channel Bandwidth: 10 MHz)	128.44 mW
	LTE Band 4 (Channel Bandwidth: 15 MHz)	128.97 mW
	LTE Band 4 (Channel Bandwidth: 20 MHz)	131.13 mW
Antenna Type	PIFA Antenna	
Antenna Gain	WCDMA	-2.1 dBi (Main) -6.4 dBi (Aux.)
	LTE Band 4	-2.1 dBi (Main) -6.4 dBi (Aux.)
	LTE Band 12	-5.5 dBi (Main) -7.4 dBi (Aux.)
	LTE Band 17	-5.5 dBi (Main) -7.4 dBi (Aux.)
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

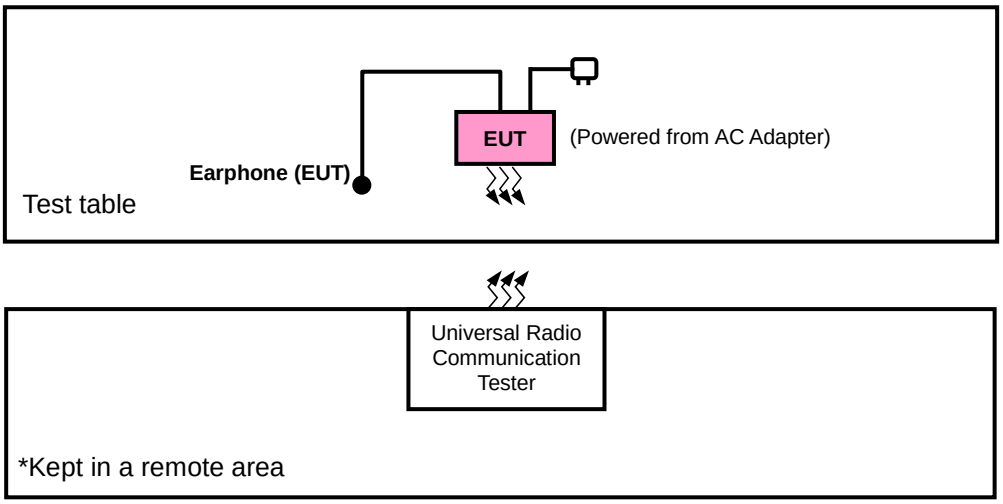
1. All models are listed as below.

Brand	SKU	Model	Difference
ASUS	WW-5CA	ASUS_Z01RD	Dual SIM
	WW Operator-5CA	ASUS_Z01RS	Single SIM
* The models have the same layout, circuit, and components, but different SIM card slot, therefore, only ASUS_Z01RD was chosen for the final test.			

2. There're 2 configurations for the EUT listed as below.
   Main Sample: EUT + CPU 1 + Rear Camera 1 + Front Camera 1 + UFS 3 + DDR 3
   2nd Sample: EUT + CPU 2 + Rear Camera 2 + Front Camera 2 + UFS 3 + DDR 3
   ✧ Only the worst test data was presented in the report.
3. The EUT's accessories list refers to Ext. Pho.
4. 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>



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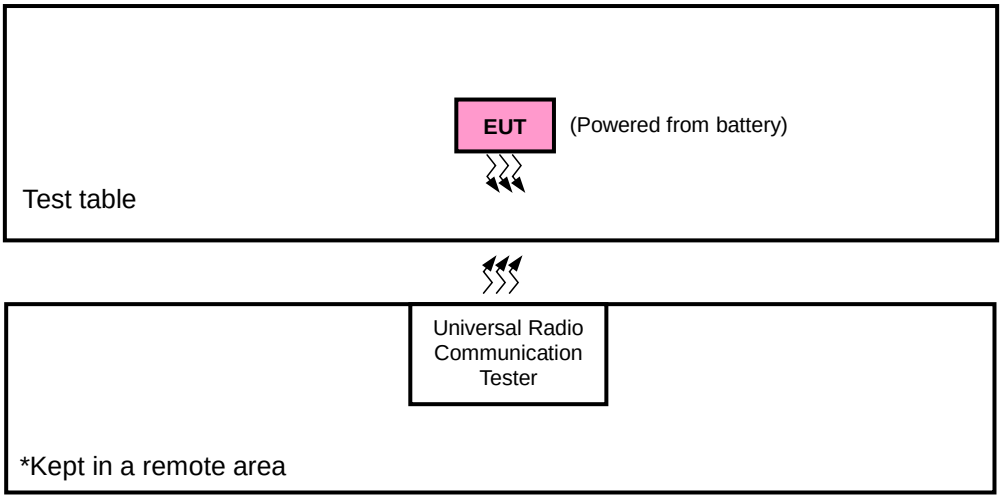


3.2.1 Description of Support Units

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:

EUT Configure Mode	Description
A	Main Sample
B	2nd Sample

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

WCDMA

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

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	EIRP	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
A	Frequency Stability	19957 to 20393	19957, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965, 20385	3 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000, 20350	10 MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20025, 20325	15 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20300	20 MHz	QPSK	1 RB / 0 RB Offset
A	Occupied Bandwidth	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset
A	Peak to Average Ratio	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	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
A	Conducted Emission	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 0 RB Offset
A	Radiated Emission	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 0 RB Offset
B		20050 to 20300	20300	20 MHz	QPSK	1 RB / 0 RB Offset

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

LTE Band 12

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	ERP	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 5 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 14 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 49 RB Offset
A	Frequency Stability	23017 to 23173	23017, 23173	1.4 MHz	QPSK	1 RB / 5 RB Offset
		23025 to 23165	23025, 23165	3 MHz	QPSK	1 RB / 14 RB Offset
		23035 to 23155	23035, 23155	5 MHz	QPSK	1 RB / 24 RB Offset
		23060 to 23130	23060, 23130	10 MHz	QPSK	1 RB / 49 RB Offset
A	Occupied Bandwidth	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
A	Peak to Average Ratio	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 5 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 14 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 49 RB Offset
A	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

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	Conducted Emission	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 5 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK	1 RB / 14 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 24 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 49 RB Offset
A	Radiated Emission	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 5 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 14 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 49 RB Offset
B		23060 to 23130	23095	10 MHz	QPSK	1 RB / 49 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
A	ERP	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 49 RB Offset
A	Frequency Stability	23755 to 23825	23755, 23825	5 MHz	QPSK	1 RB / 24 RB Offset
		23780 to 23800	23780, 23800	10 MHz	QPSK	1 RB / 49 RB Offset
A	Occupied Bandwidth	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
A	Peak to Average Ratio	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 49 RB Offset
A	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
A	Conducted Emission	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK	1 RB / 24 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK	1 RB / 49 RB Offset
A	Radiated Emission	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK	1 RB / 24 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK	1 RB / 49 RB Offset
B		23780 to 23800	23790	10 MHz	QPSK	1 RB / 49 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	3.85 Vdc	Karl Lee
Frequency Stability	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Occupied Bandwidth	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Band Edge	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Peak to Average Ratio	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Conducted Emission	25 deg. C, 65 % RH	3.85 Vdc	Vincent Huang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee / Charles Hsiao

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-E 2016
ANSI 63.26-2015

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:

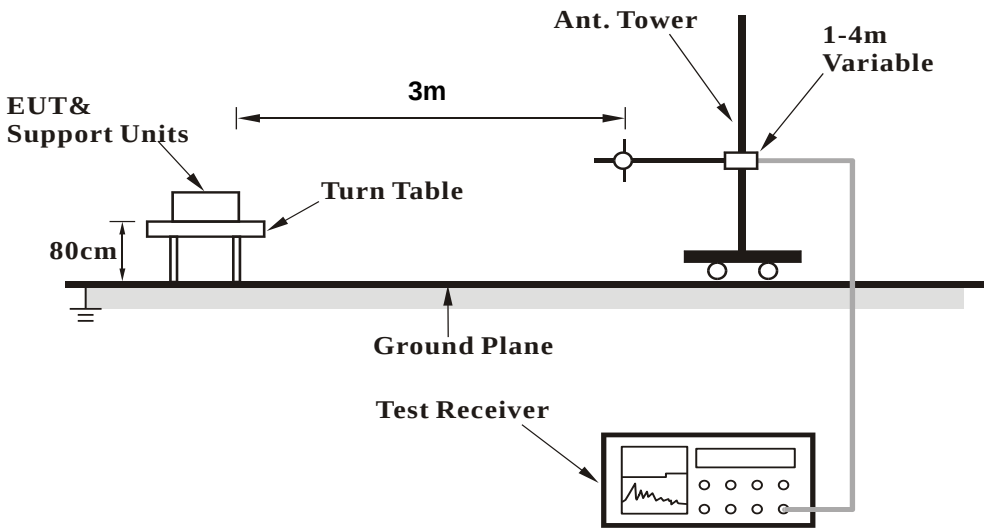
a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5 MHz for WCDMA and 10 MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height 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:

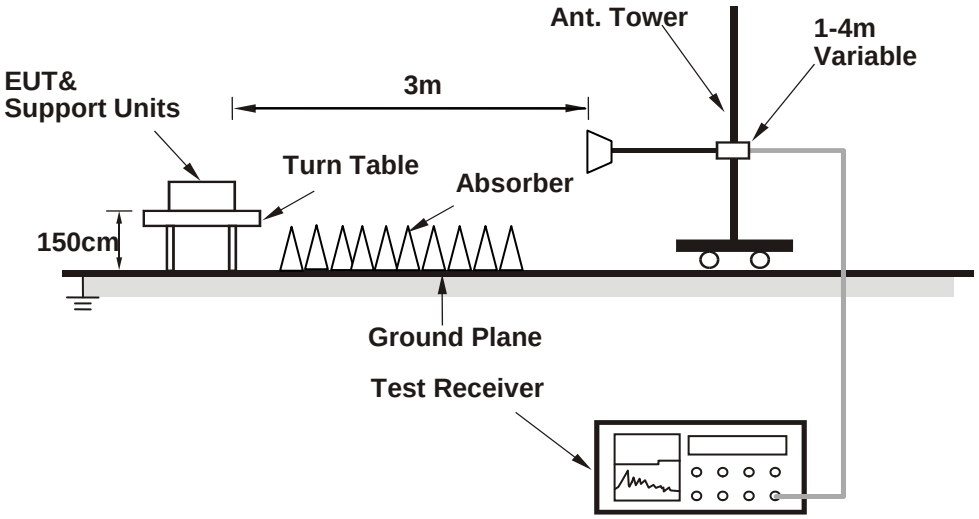
a. The EUT was set up for the maximum power with WCDMA and LTE link data modulation and link up with simulator.
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.3 Test Setup

EIRP / ERP Measurement:
<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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	23.98	23.92	23.95
HSDPA Subtest-1	22.94	22.88	22.91
HSDPA Subtest-2	22.91	22.85	22.88
HSDPA Subtest-3	22.47	22.41	22.44
HSDPA Subtest-4	22.44	22.38	22.41
DC-HSDPA Subtest-1	22.78	22.72	22.75
DC-HSDPA Subtest-2	22.75	22.69	22.72
DC-HSDPA Subtest-3	22.31	22.25	22.28
DC-HSDPA Subtest-4	22.28	22.22	22.25
HSUPA Subtest-1	22.99	22.93	22.96
HSUPA Subtest-2	20.93	20.87	20.90
HSUPA Subtest-3	22.00	21.94	21.97
HSUPA Subtest-4	20.98	20.92	20.95
HSUPA Subtest-5	22.98	22.95	22.98

LTE Band 4

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20050	20175	20300	
		Frequency (MHz)		1720.0	1732.5	1745.0	
20M	QPSK	1	0	23.37	23.34	23.33	0
		1	50	23.23	23.11	23.21	0
		1	99	23.04	23.02	23.13	0
		50	0	22.38	22.28	22.28	1
		50	25	22.19	22.18	22.18	1
		50	50	22.11	22.12	22.21	1
		100	0	22.21	22.17	22.20	1
	16QAM	1	0	22.34	22.31	22.30	1
		1	50	22.20	22.08	22.18	1
		1	99	22.01	21.99	22.10	1
		50	0	21.35	21.25	21.25	2
		50	25	21.16	21.15	21.15	2
		50	50	21.08	21.09	21.18	2
		100	0	21.18	21.14	21.17	2
	64QAM	1	0	21.31	21.28	21.27	2
		1	50	21.17	21.05	21.15	2
		1	99	20.98	20.96	21.07	2
		50	0	20.32	20.22	20.22	3
		50	25	20.13	20.12	20.12	3
		50	50	20.05	20.06	20.15	3
		100	0	20.15	20.11	20.14	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20025	20175	20325	
		Frequency (MHz)		1717.5	1732.5	1747.5	
15M	QPSK	1	0	23.25	23.22	23.21	0
		1	37	23.11	22.99	23.09	0
		1	74	22.92	22.90	23.01	0
		36	0	22.26	22.16	22.16	1
		36	19	22.07	22.06	22.06	1
		36	39	21.99	22.00	22.09	1
		75	0	22.09	22.05	22.08	1
	16QAM	1	0	22.22	22.19	22.18	1
		1	37	22.08	21.96	22.06	1
		1	74	21.89	21.87	21.98	1
		36	0	21.23	21.13	21.13	2
		36	19	21.04	21.03	21.03	2
		36	39	20.96	20.97	21.06	2
		75	0	21.06	21.02	21.05	2
	64QAM	1	0	21.19	21.16	21.15	2
		1	37	21.05	20.93	21.03	2
		1	74	20.86	20.84	20.95	2
		36	0	20.20	20.10	20.10	3
		36	19	20.01	20.00	20.00	3
		36	39	19.93	19.94	20.03	3
		75	0	20.03	19.99	20.02	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20000	20175	20350	
		Frequency (MHz)		1715.0	1732.5	1750.0	
10M	QPSK	1	0	23.12	23.09	23.08	0
		1	24	22.98	22.86	22.96	0
		1	49	22.79	22.77	22.88	0
		25	0	22.13	22.03	22.03	1
		25	12	21.94	21.93	21.93	1
		25	25	21.86	21.87	21.96	1
		50	0	21.96	21.92	21.95	1
	16QAM	1	0	22.09	22.06	22.05	1
		1	24	21.95	21.83	21.93	1
		1	49	21.76	21.74	21.85	1
		25	0	21.10	21.00	21.00	2
		25	12	20.91	20.90	20.90	2
		25	25	20.83	20.84	20.93	2
		50	0	20.93	20.89	20.92	2
	64QAM	1	0	21.06	21.03	21.02	2
		1	24	20.92	20.80	20.90	2
		1	49	20.73	20.71	20.82	2
		25	0	20.07	19.97	19.97	3
		25	12	19.88	19.87	19.87	3
		25	25	19.80	19.81	19.90	3
		50	0	19.90	19.86	19.89	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		19975	20175	20375	
		Frequency (MHz)		1712.5	1732.5	1752.5	
5M	QPSK	1	0	23.04	23.01	23.00	0
		1	12	22.90	22.78	22.88	0
		1	24	22.71	22.69	22.80	0
		12	0	22.05	21.95	21.95	1
		12	6	21.86	21.85	21.85	1
		12	13	21.78	21.79	21.88	1
		25	0	21.88	21.84	21.87	1
	16QAM	1	0	22.01	21.98	21.97	1
		1	12	21.87	21.75	21.85	1
		1	24	21.68	21.66	21.77	1
		12	0	21.02	20.92	20.92	2
		12	6	20.83	20.82	20.82	2
		12	13	20.75	20.76	20.85	2
		25	0	20.85	20.81	20.84	2
	64QAM	1	0	20.98	20.95	20.94	2
		1	12	20.84	20.72	20.82	2
		1	24	20.65	20.63	20.74	2
		12	0	19.99	19.89	19.89	3
		12	6	19.80	19.79	19.79	3
		12	13	19.72	19.73	19.82	3
		25	0	19.82	19.78	19.81	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		19965	20175	20385	
		Frequency (MHz)		1711.5	1732.5	1753.5	
3M	QPSK	1	0	22.96	22.93	22.92	0
		1	7	22.82	22.70	22.80	0
		1	14	22.63	22.61	22.72	0
		8	0	21.97	21.87	21.87	1
		8	3	21.78	21.77	21.77	1
		8	7	21.70	21.71	21.80	1
		15	0	21.80	21.76	21.79	1
	16QAM	1	0	21.93	21.90	21.89	1
		1	7	21.79	21.67	21.77	1
		1	14	21.60	21.58	21.69	1
		8	0	20.94	20.84	20.84	2
		8	3	20.75	20.74	20.74	2
		8	7	20.67	20.68	20.77	2
		15	0	20.77	20.73	20.76	2
	64QAM	1	0	20.90	20.87	20.86	2
		1	7	20.76	20.64	20.74	2
		1	14	20.57	20.55	20.66	2
		8	0	19.91	19.81	19.81	3
		8	3	19.72	19.71	19.71	3
		8	7	19.64	19.65	19.74	3
		15	0	19.74	19.70	19.73	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		19957	20175	20393	
		Frequency (MHz)		1710.7	1732.5	1754.3	
1.4M	QPSK	1	0	22.89	22.86	22.85	0
		1	2	22.75	22.63	22.73	0
		1	5	22.56	22.54	22.65	0
		3	0	22.73	22.63	22.63	0
		3	1	22.54	22.53	22.53	0
		3	3	22.46	22.47	22.56	0
		6	0	21.73	21.69	21.72	1
	16QAM	1	0	21.86	21.83	21.82	1
		1	2	21.72	21.60	21.70	1
		1	5	21.53	21.51	21.62	1
		3	0	21.70	21.60	21.60	1
		3	1	21.51	21.50	21.50	1
		3	3	21.43	21.44	21.53	1
		6	0	20.70	20.66	20.69	2
	64QAM	1	0	20.83	20.80	20.79	2
		1	2	20.69	20.57	20.67	2
		1	5	20.50	20.48	20.59	2
		3	0	20.67	20.57	20.57	2
		3	1	20.48	20.47	20.47	2
		3	3	20.40	20.41	20.50	2
		6	0	19.67	19.63	19.66	3

LTE Band 12

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23060	23095	23130				Channel		23035	23095	23155	
		Frequency (MHz)		704.0	707.5	711.0				Frequency (MHz)		701.5	707.5	713.5	
10M	QPSK	1	0	22.68	22.81	22.91	0	5M	QPSK	1	0	22.56	22.69	22.79	0
		1	24	22.86	22.88	22.93	0			1	12	22.74	22.76	22.81	0
		1	49	22.89	22.99	22.97	0			1	24	22.77	22.87	22.85	0
		25	0	21.83	21.95	21.96	1			12	0	21.71	21.83	21.84	1
		25	12	21.91	21.97	21.94	1			12	6	21.79	21.85	21.82	1
		25	25	21.97	21.98	21.97	1			12	13	21.85	21.86	21.85	1
		50	0	21.92	21.94	21.91	1			25	0	21.80	21.82	21.79	1
	16QAM	1	0	21.66	21.79	21.89	1		16QAM	1	0	21.54	21.67	21.77	1
		1	24	21.84	21.86	21.91	1			1	12	21.72	21.74	21.79	1
		1	49	21.87	21.97	21.95	1			1	24	21.75	21.85	21.83	1
		25	0	20.81	20.93	20.94	2			12	0	20.69	20.81	20.82	2
		25	12	20.89	20.95	20.92	2			12	6	20.77	20.83	20.80	2
		25	25	20.95	20.96	20.95	2			12	13	20.83	20.84	20.83	2
		50	0	20.90	20.92	20.89	2			25	0	20.78	20.80	20.77	2
	64QAM	1	0	20.64	20.77	20.87	2		64QAM	1	0	20.52	20.65	20.75	2
		1	24	20.82	20.84	20.89	2			1	12	20.70	20.72	20.77	2
		1	49	20.85	20.95	20.93	2			1	24	20.73	20.83	20.81	2
		25	0	19.79	19.91	19.92	3			12	0	19.67	19.79	19.80	3
		25	12	19.87	19.93	19.90	3			12	6	19.75	19.81	19.78	3
		25	25	19.93	19.94	19.93	3			12	13	19.81	19.82	19.81	3
		50	0	19.88	19.90	19.87	3			25	0	19.76	19.78	19.75	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23025	23095	23165				Channel		23017	23095	23173	
		Frequency (MHz)		700.5	707.5	714.5				Frequency (MHz)		699.7	707.5	715.3	
3M	QPSK	1	0	22.48	22.61	22.71	0	1.4M	QPSK	1	0	22.35	22.48	22.58	0
		1	7	22.66	22.68	22.73	0			1	2	22.53	22.55	22.60	0
		1	14	22.69	22.79	22.77	0			1	5	22.56	22.66	22.64	0
		8	0	21.63	21.75	21.76	1			3	0	22.30	22.42	22.43	0
		8	3	21.71	21.77	21.74	1			3	1	22.38	22.44	22.41	0
		8	7	21.77	21.78	21.77	1			3	3	22.44	22.45	22.44	0
		15	0	21.72	21.74	21.71	1			6	0	21.59	21.61	21.58	1
	16QAM	1	0	21.46	21.59	21.69	1		16QAM	1	0	21.33	21.46	21.56	1
		1	7	21.64	21.66	21.71	1			1	2	21.51	21.53	21.58	1
		1	14	21.67	21.77	21.75	1			1	5	21.54	21.64	21.62	1
		8	0	20.61	20.73	20.74	2			3	0	21.19	21.31	21.32	1
		8	3	20.69	20.75	20.72	2			3	1	21.27	21.33	21.30	1
		8	7	20.75	20.76	20.75	2			3	3	21.33	21.34	21.33	1
		15	0	20.70	20.72	20.69	2			6	0	20.57	20.59	20.56	2
	64QAM	1	0	20.44	20.57	20.67	2		64QAM	1	0	20.31	20.44	20.54	2
		1	7	20.62	20.64	20.69	2			1	2	20.49	20.51	20.56	2
		1	14	20.65	20.75	20.73	2			1	5	20.52	20.62	20.60	2
		8	0	19.59	19.71	19.72	3			3	0	20.17	20.29	20.30	2
		8	3	19.67	19.73	19.70	3			3	1	20.25	20.31	20.28	2
		8	7	19.73	19.74	19.73	3			3	3	20.31	20.32	20.31	2
		15	0	19.68	19.70	19.67	3			6	0	19.55	19.57	19.54	3

LTE Band 17

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23780	23790	23800				Channel		23755	23790	23825	
		Frequency (MHz)		709.0	710.0	711.0				Frequency (MHz)		706.5	710.0	713.5	
10M	QPSK	1	0	22.78	22.86	22.84	0	5M	QPSK	1	0	22.65	22.73	22.71	0
		1	24	22.96	22.93	22.92	0			1	12	22.83	22.80	22.79	0
		1	49	22.97	22.98	22.99	0			1	24	22.84	22.85	22.86	0
		25	0	21.89	21.96	21.97	1			12	0	21.76	21.83	21.84	1
		25	12	21.92	21.94	21.95	1			12	6	21.79	21.81	21.82	1
		25	25	21.96	21.96	21.99	1			12	13	21.83	21.83	21.86	1
		50	0	21.93	21.94	21.96	1			25	0	21.80	21.81	21.83	1
	16QAM	1	0	21.77	21.85	21.83	1		16QAM	1	0	21.64	21.72	21.70	1
		1	24	21.95	21.92	21.91	1			1	12	21.82	21.79	21.78	1
		1	49	21.96	21.97	21.98	1			1	24	21.83	21.84	21.85	1
		25	0	20.88	20.95	20.96	2			12	0	20.75	20.82	20.83	2
		25	12	20.91	20.93	20.94	2			12	6	20.78	20.80	20.81	2
		25	25	20.95	20.95	20.98	2			12	13	20.82	20.82	20.85	2
		50	0	20.92	20.93	20.95	2			25	0	20.79	20.80	20.82	2
	64QAM	1	0	20.80	20.88	20.86	2		64QAM	1	0	20.67	20.75	20.73	2
		1	24	20.98	20.95	20.94	2			1	12	20.85	20.82	20.81	2
		1	49	20.99	21.00	20.96	2			1	24	20.86	20.87	20.88	2
		25	0	19.91	19.98	19.99	3			12	0	19.78	19.85	19.86	3
		25	12	19.94	19.96	19.97	3			12	6	19.81	19.83	19.84	3
		25	25	19.98	19.98	19.96	3			12	13	19.85	19.85	19.88	3
		50	0	19.95	19.96	19.98	3			25	0	19.82	19.83	19.85	3

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)**
X	23017	699.7	-15.52	32.719	15.05	31.98	H
	23095	707.5	-15.59	32.736	15.00	31.59	
	23173	715.3	-15.42	32.591	15.02	31.78	
	23017	699.7	-21.53	32.69	9.01	7.96	V
	23095	707.5	-21.68	32.81	8.98	7.91	
	23173	715.3	-21.53	32.74	9.06	8.05	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	23017	699.7	-16.53	32.719	14.04	25.35	H
	23095	707.5	-16.57	32.736	14.02	25.21	
	23173	715.3	-16.45	32.591	13.99	25.07	
	23017	699.7	-22.53	32.69	8.01	6.32	V
	23095	707.5	-22.71	32.81	7.95	6.24	
	23173	715.3	-22.55	32.74	8.04	6.37	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	23017	699.7	-17.55	32.719	13.02	20.04	H
	23095	707.5	-17.56	32.736	13.03	20.07	
	23173	715.3	-17.42	32.591	13.02	20.05	
	23017	699.7	-23.55	32.69	6.99	5.00	V
	23095	707.5	-23.68	32.81	6.98	4.99	
	23173	715.3	-23.56	32.74	7.03	5.05	

LTE Band 12							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23025	700.5	-15.53	32.719	15.04	31.91	H
	23095	707.5	-15.58	32.736	15.01	31.67	
	23165	714.5	-15.41	32.591	15.03	31.85	
	23025	700.5	-21.56	32.69	8.98	7.91	V
	23095	707.5	-21.62	32.81	9.04	8.02	
	23165	714.5	-21.58	32.74	9.01	7.96	
Channel Bandwidth: 3 MHz / 16QAM							
X	23025	700.5	-16.55	32.719	14.02	25.23	H
	23095	707.5	-16.57	32.736	14.02	25.21	
	23165	714.5	-16.38	32.591	14.06	25.47	
	23025	700.5	-22.49	32.69	8.05	6.38	V
	23095	707.5	-22.65	32.81	8.01	6.32	
	23165	714.5	-22.59	32.74	8.00	6.31	
Channel Bandwidth: 3 MHz / 64QAM							
X	23025	700.5	-17.54	32.719	13.03	20.09	H
	23095	707.5	-17.60	32.736	12.99	19.89	
	23165	714.5	-17.35	32.591	13.09	20.38	
	23025	700.5	-23.50	32.69	7.04	5.06	V
	23095	707.5	-23.61	32.81	7.05	5.07	
	23165	714.5	-23.57	32.74	7.02	5.04	

LTE Band 12							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
X	23035	701.5	-15.51	32.719	15.06	32.06	H
	23095	707.5	-15.56	32.736	15.03	31.81	
	23155	713.5	-15.33	32.591	15.11	32.44	
	23035	701.5	-21.52	32.69	9.02	7.98	V
	23095	707.5	-21.69	32.81	8.97	7.89	
	23155	713.5	-21.55	32.74	9.04	8.02	
Channel Bandwidth: 5 MHz / 16QAM							
X	23035	701.5	-16.52	32.719	14.05	25.40	H
	23095	707.5	-16.57	32.736	14.02	25.21	
	23155	713.5	-16.30	32.591	14.14	25.95	
	23035	701.5	-22.53	32.69	8.01	6.32	V
	23095	707.5	-22.72	32.81	7.94	6.22	
	23155	713.5	-22.50	32.74	8.09	6.44	
Channel Bandwidth: 5 MHz / 64QAM							
X	23035	701.5	-17.54	32.719	13.03	20.09	H
	23095	707.5	-17.56	32.736	13.03	20.07	
	23155	713.5	-17.32	32.591	13.12	20.52	
	23035	701.5	-23.55	32.69	6.99	5.00	V
	23095	707.5	-23.70	32.81	6.96	4.97	
	23155	713.5	-23.53	32.74	7.06	5.08	

LTE Band 12							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23060	704.0	-15.40	32.727	15.18	32.94	H
	23095	707.5	-15.43	32.739	15.16	32.80	
	23130	711.0	-15.49	32.728	15.09	32.27	
	23060	704.0	-21.42	32.75	9.18	8.28	V
	23095	707.5	-21.49	32.81	9.17	8.26	
	23130	711.0	-21.60	32.84	9.09	8.11	
Channel Bandwidth: 10 MHz / 16QAM							
X	23060	704.0	-16.42	32.727	14.16	26.04	H
	23095	707.5	-16.45	32.739	14.14	25.94	
	23130	711.0	-16.51	32.728	14.07	25.52	
	23060	704.0	-22.43	32.75	8.17	6.56	V
	23095	707.5	-22.50	32.81	8.16	6.55	
	23130	711.0	-22.63	32.84	8.06	6.40	
Channel Bandwidth: 10 MHz / 64QAM							
X	23060	704.0	-17.41	32.727	13.17	20.73	H
	23095	707.5	-17.46	32.739	13.13	20.55	
	23130	711.0	-17.55	32.728	13.03	20.08	
	23060	704.0	-23.42	32.75	7.18	5.22	V
	23095	707.5	-23.58	32.81	7.08	5.11	
	23130	711.0	-23.66	32.84	7.03	5.05	

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	-15.54	32.719	15.03	31.83	H
	23790	710.0	-15.56	32.736	15.03	31.81	
	23825	713.5	-15.45	32.591	14.99	31.56	
	23755	706.5	-21.52	32.69	9.02	7.98	V
	23790	710.0	-21.66	32.81	9.00	7.94	
	23825	713.5	-21.66	32.74	8.93	7.82	
Channel Bandwidth: 5 MHz / 16QAM							
X	23755	706.5	-16.55	32.719	14.02	25.23	H
	23790	710.0	-16.52	32.736	14.07	25.50	
	23825	713.5	-16.46	32.591	13.98	25.01	
	23755	706.5	-22.54	32.69	8.00	6.31	V
	23790	710.0	-22.62	32.81	8.04	6.37	
	23825	713.5	-22.63	32.74	7.96	6.25	
Channel Bandwidth: 5 MHz / 64QAM							
X	23755	706.5	-17.57	32.719	13.00	19.95	H
	23790	710.0	-17.55	32.736	13.04	20.12	
	23825	713.5	-17.46	32.591	12.98	19.87	
	23755	706.5	-23.54	32.69	7.00	5.01	V
	23790	710.0	-23.65	32.81	7.01	5.02	
	23825	713.5	-23.66	32.74	6.93	4.93	

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	-15.46	32.727	15.12	32.49	H
	23790	710.0	-15.45	32.739	15.14	32.65	
	23800	711.0	-15.50	32.728	15.08	32.20	
	23780	709.0	-21.45	32.75	9.15	8.22	V
	23790	710.0	-21.52	32.81	9.14	8.20	
	23800	711.0	-21.65	32.84	9.04	8.02	
Channel Bandwidth: 10 MHz / 16QAM							
X	23780	709.0	-16.48	32.727	14.10	25.69	H
	23790	710.0	-16.47	32.739	14.12	25.82	
	23800	711.0	-16.55	32.728	14.03	25.28	
	23780	709.0	-22.43	32.75	8.17	6.56	V
	23790	710.0	-22.54	32.81	8.12	6.49	
	23800	711.0	-22.66	32.84	8.03	6.35	
Channel Bandwidth: 10 MHz / 64QAM							
X	23780	709.0	-17.46	32.727	13.12	20.50	H
	23790	710.0	-17.41	32.739	13.18	20.79	
	23800	711.0	-17.55	32.728	13.03	20.08	
	23780	709.0	-23.46	32.75	7.14	5.18	V
	23790	710.0	-23.55	32.81	7.11	5.14	
	23800	711.0	-23.61	32.84	7.08	5.11	

EIRP Power (dBm)

WCDMA							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	1312	1712.4	-20.96	42.49	21.53	142.07	H
	1413	1732.6	-20.74	42.33	21.59	144.11	
	1513	1752.6	-20.55	42.10	21.55	142.89	
	1312	1712.4	-25.48	42.99	17.51	56.36	V
	1413	1732.6	-25.20	42.74	17.54	56.75	
	1513	1752.6	-24.66	42.21	17.55	56.89	

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	-21.45	42.49	21.04	126.91	H
	20175	1732.5	-21.33	42.33	21.00	125.81	
	20393	1754.3	-21.09	42.10	21.01	126.18	
	19957	1710.7	-25.99	42.99	17.00	50.12	V
	20175	1732.5	-25.72	42.74	17.02	50.35	
	20393	1754.3	-25.22	42.21	16.99	50.00	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	19957	1710.7	-22.46	42.49	20.03	100.58	H
	20175	1732.5	-22.31	42.33	20.02	100.39	
	20393	1754.3	-22.15	42.10	19.95	98.86	
	19957	1710.7	-27.00	42.99	15.99	39.72	V
	20175	1732.5	-26.71	42.74	16.03	40.09	
	20393	1754.3	-26.21	42.21	16.00	39.81	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	19957	1710.7	-23.47	42.49	19.02	79.71	H
	20175	1732.5	-23.35	42.33	18.98	79.01	
	20393	1754.3	-23.16	42.10	18.94	78.34	
	19957	1710.7	-28.02	42.99	14.97	31.41	V
	20175	1732.5	-27.70	42.74	15.04	31.92	
	20393	1754.3	-27.23	42.21	14.98	31.48	

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	-21.44	42.49	21.05	127.20	H
	20175	1732.5	-21.31	42.33	21.02	126.39	
	20385	1753.5	-21.08	42.10	21.02	126.47	
	19965	1711.5	-25.96	42.99	17.03	50.47	V
	20175	1732.5	-25.71	42.74	17.03	50.47	
	20385	1753.5	-25.21	42.21	17.00	50.12	
Channel Bandwidth: 3 MHz / 16QAM							
X	19965	1711.5	-22.46	42.49	20.03	100.58	H
	20175	1732.5	-22.32	42.33	20.01	100.16	
	20385	1753.5	-22.05	42.10	20.05	101.16	
	19965	1711.5	-26.98	42.99	16.01	39.90	V
	20175	1732.5	-26.73	42.74	16.01	39.90	
	20385	1753.5	-26.24	42.21	15.97	39.54	
Channel Bandwidth: 3 MHz / 64QAM							
X	19965	1711.5	-23.45	42.49	19.04	80.08	H
	20175	1732.5	-23.30	42.33	19.03	79.93	
	20385	1753.5	-23.06	42.10	19.04	80.17	
	19965	1711.5	-27.96	42.99	15.03	31.84	V
	20175	1732.5	-27.71	42.74	15.03	31.84	
	20385	1753.5	-27.21	42.21	15.00	31.62	

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	-21.46	42.49	21.03	126.62	H
	20175	1732.5	-21.28	42.33	21.05	127.26	
	20375	1752.5	-21.06	42.10	21.04	127.06	
	19975	1712.5	-25.94	42.99	17.05	50.70	V
	20175	1732.5	-25.70	42.74	17.04	50.58	
	20375	1752.5	-25.15	42.21	17.06	50.82	
Channel Bandwidth: 5 MHz / 16QAM							
X	19975	1712.5	-22.47	42.49	20.02	100.35	H
	20175	1732.5	-22.31	42.33	20.02	100.39	
	20375	1752.5	-22.05	42.10	20.05	101.16	
	19975	1712.5	-26.96	42.99	16.03	40.09	V
	20175	1732.5	-26.72	42.74	16.02	39.99	
	20375	1752.5	-26.18	42.21	16.03	40.09	
Channel Bandwidth: 5 MHz / 64QAM							
X	19975	1712.5	-23.45	42.49	19.04	80.08	H
	20175	1732.5	-23.26	42.33	19.07	80.67	
	20375	1752.5	-23.02	42.10	19.08	80.91	
	19975	1712.5	-27.95	42.99	15.04	31.92	V
	20175	1732.5	-27.71	42.74	15.03	31.84	
	20375	1752.5	-27.20	42.21	15.01	31.70	

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	-21.44	42.49	21.05	127.20	H
	20175	1732.5	-21.24	42.33	21.09	128.44	
	20350	1750.0	-21.05	42.10	21.05	127.35	
	20000	1715.0	-25.91	42.99	17.08	51.05	V
	20175	1732.5	-25.70	42.74	17.04	50.58	
	20350	1750.0	-25.14	42.21	17.07	50.93	
Channel Bandwidth: 10 MHz / 16QAM							
X	20000	1715.0	-22.41	42.49	20.08	101.74	H
	20175	1732.5	-22.25	42.33	20.08	101.79	
	20350	1750.0	-22.08	42.10	20.02	100.46	
	20000	1715.0	-26.93	42.99	16.06	40.36	V
	20175	1732.5	-26.71	42.74	16.03	40.09	
	20350	1750.0	-26.22	42.21	15.99	39.72	
Channel Bandwidth: 10 MHz / 64QAM							
X	20000	1715.0	-23.42	42.49	19.07	80.63	H
	20175	1732.5	-23.29	42.33	19.04	80.11	
	20350	1750.0	-23.11	42.10	18.99	79.25	
	20000	1715.0	-27.92	42.99	15.07	32.14	V
	20175	1732.5	-27.72	42.74	15.02	31.77	
	20350	1750.0	-27.23	42.21	14.98	31.48	

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	-21.38	42.49	21.11	128.97	H
	20175	1732.5	-21.24	42.33	21.09	128.44	
	20325	1747.5	-21.08	42.10	21.02	126.47	
	20025	1717.5	-25.90	42.99	17.09	51.17	V
	20175	1732.5	-25.68	42.74	17.06	50.82	
	20325	1747.5	-25.16	42.21	17.05	50.70	
Channel Bandwidth: 15 MHz / 16QAM							
X	20025	1717.5	-22.37	42.49	20.12	102.68	H
	20175	1732.5	-22.21	42.33	20.12	102.73	
	20325	1747.5	-22.05	42.10	20.05	101.16	
	20025	1717.5	-26.93	42.99	16.06	40.36	V
	20175	1732.5	-26.71	42.74	16.03	40.09	
	20325	1747.5	-26.21	42.21	16.00	39.81	
Channel Bandwidth: 15 MHz / 64QAM							
X	20025	1717.5	-23.38	42.49	19.11	81.38	H
	20175	1732.5	-23.19	42.33	19.14	81.98	
	20325	1747.5	-23.08	42.10	19.02	79.80	
	20025	1717.5	-27.91	42.99	15.08	32.21	V
	20175	1732.5	-27.68	42.74	15.06	32.06	
	20325	1747.5	-27.18	42.21	15.03	31.84	

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	-21.37	42.49	21.12	129.27	H
	20175	1732.5	-21.15	42.33	21.18	131.13	
	20300	1745.0	-21.02	42.10	21.08	128.23	
	20050	1720.0	-25.88	42.99	17.11	51.40	V
	20175	1732.5	-25.57	42.74	17.17	52.12	
	20300	1745.0	-25.12	42.21	17.09	51.17	
Channel Bandwidth: 20 MHz / 16QAM							
X	20050	1720.0	-22.35	42.49	20.14	103.16	H
	20175	1732.5	-22.12	42.33	20.21	104.88	
	20300	1745.0	-22.06	42.10	20.04	100.93	
	20050	1720.0	-26.85	42.99	16.14	41.11	V
	20175	1732.5	-26.58	42.74	16.16	41.30	
	20300	1745.0	-26.11	42.21	16.10	40.74	
Channel Bandwidth: 20 MHz / 64QAM							
X	20050	1720.0	-23.32	42.49	19.17	82.51	H
	20175	1732.5	-23.13	42.33	19.20	83.12	
	20300	1745.0	-23.08	42.10	19.02	79.80	
	20050	1720.0	-27.86	42.99	15.13	32.58	V
	20175	1732.5	-27.57	42.74	15.17	32.89	
	20300	1745.0	-27.11	42.21	15.10	32.36	

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

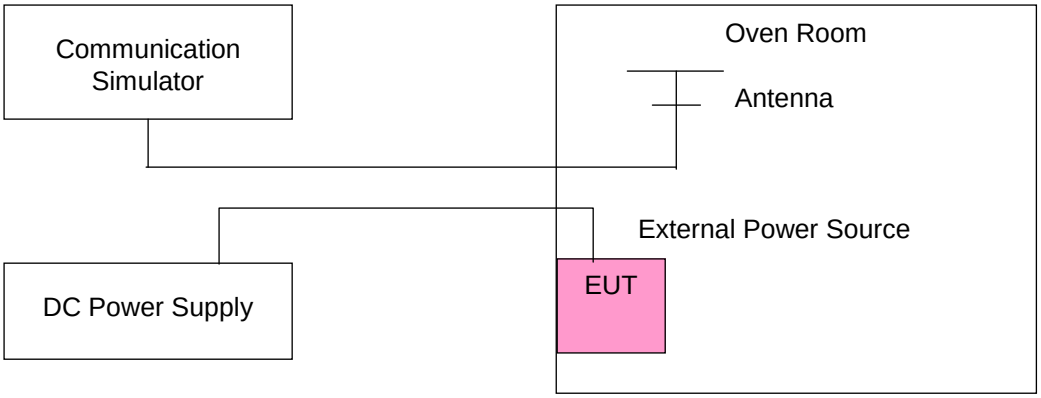
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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)	WCDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	1712.400002	0.001	1752.600002	0.001	2.5
3.6	1712.400003	0.002	1752.600004	0.002	2.5
4.38	1712.400003	0.002	1752.600001	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	WCDMA				Limit (ppm)
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1712.400002	0.001	1752.600004	0.002	2.5
-20	1712.400004	0.002	1752.600003	0.002	2.5
-10	1712.400001	0.001	1752.600004	0.002	2.5
0	1712.400001	0.001	1752.600001	0.001	2.5
10	1712.399996	-0.002	1752.599998	-0.001	2.5
20	1712.399996	-0.002	1752.599996	-0.002	2.5
30	1712.399997	-0.002	1752.599997	-0.001	2.5
40	1712.399998	-0.001	1752.599996	-0.002	2.5
50	1712.399998	-0.001	1752.599996	-0.002	2.5
55	1712.400001	0.001	1752.600004	0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	1710.700002	0.001	1754.300003	0.001	2.5
3.6	1710.700001	0.001	1754.300002	0.001	2.5
4.38	1710.700002	0.001	1754.300003	0.002	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1710.700001	0.001	1754.300001	0.001	2.5
-20	1710.700003	0.002	1754.300004	0.002	2.5
-10	1710.700004	0.002	1754.300001	0.001	2.5
0	1710.700004	0.002	1754.300002	0.001	2.5
10	1710.699996	-0.002	1754.299997	-0.002	2.5
20	1710.699997	-0.002	1754.299996	-0.002	2.5
30	1710.699996	-0.002	1754.299998	-0.001	2.5
40	1710.699998	-0.001	1754.299998	-0.001	2.5
50	1710.699999	-0.001	1754.299996	-0.002	2.5
55	1710.700004	0.002	1754.300003	0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	1711.500004	0.002	1753.500004	0.002	2.5
3.6	1711.500003	0.002	1753.500003	0.002	2.5
4.38	1711.500002	0.001	1753.500002	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1711.500003	0.002	1753.500003	0.002	2.5
-20	1711.500002	0.001	1753.500003	0.001	2.5
-10	1711.500002	0.001	1753.500002	0.001	2.5
0	1711.500003	0.002	1753.500003	0.002	2.5
10	1711.499998	-0.001	1753.499997	-0.002	2.5
20	1711.499997	-0.002	1753.499998	-0.001	2.5
30	1711.499998	-0.001	1753.499996	-0.002	2.5
40	1711.499998	-0.001	1753.499997	-0.002	2.5
50	1711.499998	-0.001	1753.499996	-0.002	2.5
55	1711.500001	0.001	1753.500003	0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	1712.500003	0.002	1752.500001	0.001	2.5
3.6	1712.500002	0.001	1752.500003	0.002	2.5
4.38	1712.500002	0.001	1752.500003	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1712.500001	0.001	1752.500002	0.001	2.5
-20	1712.500004	0.002	1752.500002	0.001	2.5
-10	1712.500002	0.001	1752.500003	0.002	2.5
0	1712.500004	0.002	1752.500004	0.002	2.5
10	1712.499998	-0.001	1752.499998	-0.001	2.5
20	1712.499996	-0.002	1752.499997	-0.002	2.5
30	1712.499999	-0.001	1752.499997	-0.002	2.5
40	1712.499997	-0.002	1752.499997	-0.002	2.5
50	1712.499998	-0.001	1752.499997	-0.002	2.5
55	1712.500004	0.002	1752.500002	0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	1715.000004	0.002	1750.000003	0.002	2.5
3.6	1715.000003	0.002	1750.000004	0.002	2.5
4.38	1715.000003	0.002	1750.000002	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1715.000003	0.002	1750.000002	0.001	2.5
-20	1715.000003	0.002	1750.000002	0.001	2.5
-10	1715.000003	0.002	1750.000004	0.002	2.5
0	1715.000003	0.002	1750.000001	0.001	2.5
10	1714.999997	-0.002	1749.999997	-0.001	2.5
20	1714.999998	-0.001	1749.999996	-0.002	2.5
30	1714.999999	-0.001	1749.999997	-0.002	2.5
40	1714.999997	-0.002	1749.999996	-0.002	2.5
50	1714.999997	-0.002	1749.999996	-0.002	2.5
55	1715.000003	0.002	1750.000002	0.001	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 15 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	1717.500003	0.002	1747.500004	0.002	2.5
3.6	1717.500004	0.002	1747.500003	0.002	2.5
4.38	1717.500004	0.002	1747.500002	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 15 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1717.500002	0.001	1747.500002	0.001	2.5
-20	1717.500003	0.002	1747.500002	0.001	2.5
-10	1717.500004	0.002	1747.500003	0.002	2.5
0	1717.500003	0.002	1747.500003	0.002	2.5
10	1717.499997	-0.002	1747.499996	-0.002	2.5
20	1717.499999	-0.001	1747.499998	-0.001	2.5
30	1717.499998	-0.001	1747.499999	-0.001	2.5
40	1717.499998	-0.001	1747.499996	-0.002	2.5
50	1717.499997	-0.002	1747.499998	-0.001	2.5
55	1717.500002	0.001	1747.500003	0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 20 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	1720.000004	0.002	1745.000002	0.001	2.5
3.6	1720.000001	0.001	1745.000004	0.002	2.5
4.38	1720.000004	0.002	1745.000002	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4				Limit (ppm)
	Channel Bandwidth: 20 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	1720.000004	0.002	1745.000003	0.002	2.5
-20	1720.000002	0.001	1745.000002	0.001	2.5
-10	1720.000004	0.002	1745.000002	0.001	2.5
0	1720.000003	0.002	1745.000001	0.001	2.5
10	1719.999998	-0.001	1744.999998	-0.001	2.5
20	1719.999998	-0.001	1744.999997	-0.002	2.5
30	1719.999998	-0.001	1744.999997	-0.002	2.5
40	1719.999998	-0.001	1744.999997	-0.002	2.5
50	1719.999998	-0.001	1744.999997	-0.002	2.5
55	1720.000002	0.001	1745.000003	0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	699.700003	0.004	715.300002	0.003	2.5
3.6	699.700002	0.002	715.300002	0.002	2.5
4.38	699.700002	0.003	715.300002	0.002	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12				Limit (ppm)
	Channel Bandwidth: 1.4 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	699.700002	0.003	715.300003	0.005	2.5
-20	699.700004	0.006	715.300001	0.002	2.5
-10	699.700003	0.004	715.300004	0.006	2.5
0	699.700003	0.004	715.300003	0.005	2.5
10	699.699999	-0.001	715.299997	-0.004	2.5
20	699.699998	-0.003	715.299997	-0.005	2.5
30	699.699998	-0.002	715.299999	-0.002	2.5
40	699.699998	-0.003	715.299999	-0.002	2.5
50	699.699997	-0.005	715.299999	-0.001	2.5
55	699.700002	0.002	715.300003	0.005	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	700.500002	0.002	714.500001	0.002	2.5
3.6	700.500003	0.004	714.500003	0.005	2.5
4.38	700.500002	0.002	714.500001	0.002	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12				Limit (ppm)
	Channel Bandwidth: 3 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	700.500001	0.001	714.500001	0.002	2.5
-20	700.500002	0.002	714.500003	0.004	2.5
-10	700.500002	0.003	714.500004	0.005	2.5
0	700.500001	0.001	714.500003	0.004	2.5
10	700.499996	-0.005	714.499997	-0.005	2.5
20	700.499999	-0.002	714.499997	-0.005	2.5
30	700.499997	-0.005	714.499998	-0.003	2.5
40	700.499998	-0.003	714.499996	-0.005	2.5
50	700.499997	-0.005	714.499998	-0.003	2.5
55	700.500004	0.006	714.500003	0.004	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	701.500003	0.005	713.500001	0.002	2.5
3.6	701.500004	0.006	713.500003	0.004	2.5
4.38	701.500004	0.005	713.500002	0.002	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	701.500002	0.003	713.500001	0.002	2.5
-20	701.500002	0.002	713.500004	0.005	2.5
-10	701.500002	0.002	713.500001	0.002	2.5
0	701.500004	0.006	713.500004	0.005	2.5
10	701.499997	-0.004	713.499999	-0.002	2.5
20	701.499997	-0.004	713.499998	-0.003	2.5
30	701.499997	-0.004	713.499997	-0.004	2.5
40	701.499998	-0.003	713.499997	-0.004	2.5
50	701.499999	-0.002	713.499997	-0.005	2.5
55	701.500004	0.005	713.500003	0.004	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	704.000002	0.003	711.000003	0.004	2.5
3.6	704.000002	0.003	711.000002	0.002	2.5
4.38	704.000001	0.002	711.000004	0.005	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	704.000003	0.004	711.000002	0.002	2.5
-20	704.000002	0.003	711.000001	0.002	2.5
-10	704.000001	0.001	711.000003	0.004	2.5
0	704.000002	0.003	711.000003	0.005	2.5
10	703.999999	-0.002	710.999997	-0.004	2.5
20	703.999996	-0.005	710.999997	-0.004	2.5
30	703.999998	-0.003	710.999999	-0.002	2.5
40	703.999997	-0.004	710.999999	-0.002	2.5
50	703.999998	-0.002	710.999998	-0.004	2.5
55	704.000002	0.003	711.000001	0.002	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 17				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	706.500004	0.006	713.500002	0.003	2.5
3.6	706.500001	0.002	713.500004	0.005	2.5
4.38	706.500003	0.004	713.500003	0.004	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 17				Limit (ppm)
	Channel Bandwidth: 5 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	706.500003	0.005	713.500001	0.001	2.5
-20	706.500003	0.004	713.500002	0.002	2.5
-10	706.500002	0.003	713.500004	0.005	2.5
0	706.500003	0.005	713.500002	0.002	2.5
10	706.499996	-0.005	713.499998	-0.002	2.5
20	706.499998	-0.004	713.499999	-0.002	2.5
30	706.499997	-0.004	713.499997	-0.004	2.5
40	706.499998	-0.003	713.499996	-0.005	2.5
50	706.499997	-0.004	713.499999	-0.002	2.5
55	706.500002	0.002	713.500002	0.003	2.5

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 17				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
3.85	709.000003	0.005	711.000003	0.004	2.5
3.6	709.000003	0.004	711.000003	0.004	2.5
4.38	709.000001	0.002	711.000003	0.004	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.38 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 17				Limit (ppm)
	Channel Bandwidth: 10 MHz				
	Low Channel		High Channel		
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	709.000004	0.006	711.000004	0.006	2.5
-20	709.000003	0.004	711.000002	0.002	2.5
-10	709.000004	0.006	711.000002	0.003	2.5
0	709.000004	0.006	711.000004	0.006	2.5
10	708.999999	-0.001	710.999998	-0.003	2.5
20	708.999999	-0.002	710.999998	-0.003	2.5
30	708.999996	-0.006	710.999996	-0.006	2.5
40	708.999996	-0.006	710.999996	-0.005	2.5
50	708.999998	-0.002	710.999998	-0.003	2.5
55	709.000002	0.003	711.000004	0.005	2.5

4.3 Occupied Bandwidth Measurement

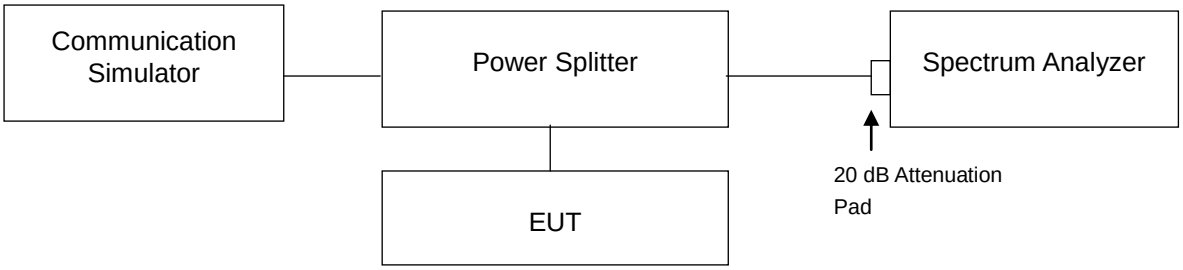
4.3.1 Limits of Occupied Bandwidth Measurement

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.

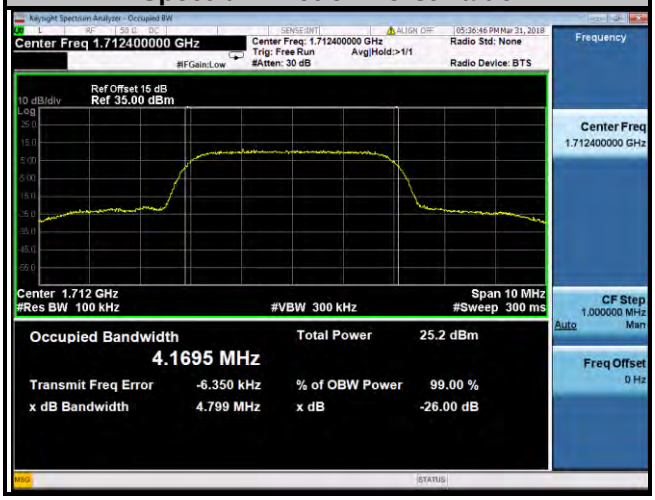
4.3.3 Test Setup



4.3.4 Test Result

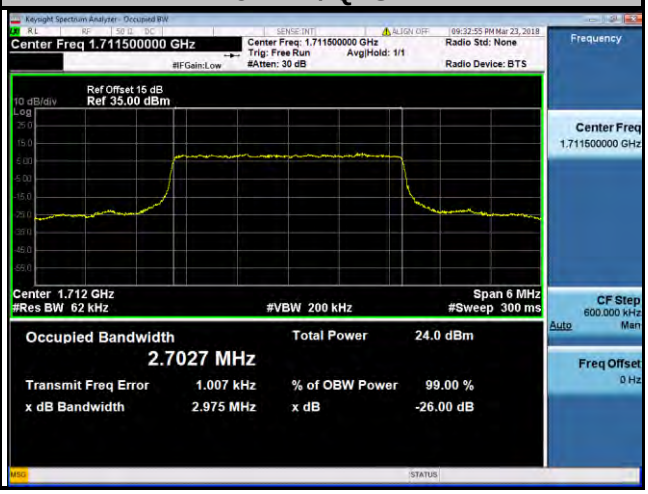
WCDMA		
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**
1312	1712.4	4.1695
1413	1732.6	4.1387
1513	1752.6	4.1374

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	64QAM			QPSK	16QAM	64QAM
19957	1710.7	1.0913	1.0922	1.0898	19965	1711.5	2.7027	2.6981	2.6962
20175	1732.5	1.0875	1.0876	1.0883	20175	1732.5	2.6976	2.6958	2.6973
20393	1754.3	1.0858	1.0881	1.0875	20385	1753.5	2.6997	2.6955	2.6966

Spectrum Plot of Worst Value	
1.4 MHz / 16QAM	3 MHz / QPSK



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	64QAM			QPSK	16QAM	64QAM
19975	1712.5	4.4913	4.4952	4.4970	20000	1715.0	8.9675	8.9769	8.9783
20175	1732.5	4.4859	4.4868	4.4957	20175	1732.5	8.9525	8.9584	8.9594
20375	1752.5	4.4875	4.4902	4.4990	20350	1750.0	8.9711	8.9707	8.9741

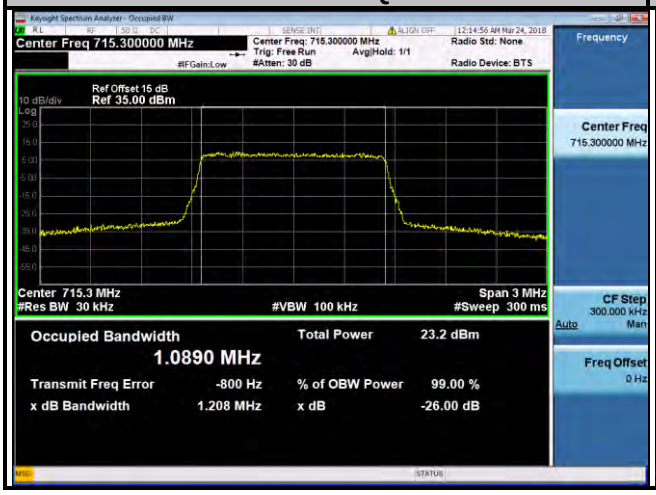
Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 64QAM

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	64QAM			QPSK	16QAM	64QAM
20025	1717.5	13.474	13.463	13.457	20050	1720.0	17.958	17.982	17.970
20175	1732.5	13.422	13.413	13.412	20175	1732.5	17.854	17.879	17.873
20325	1747.5	13.470	13.459	13.453	20300	1745.0	17.929	17.956	17.950

Spectrum Plot of Worst Value	
15 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	64QAM			QPSK	16QAM	64QAM
23017	699.7	1.0855	1.0882	1.0876	23025	700.5	2.6965	2.6929	2.6929
23095	707.5	1.0877	1.0873	1.0889	23095	707.5	2.7019	2.6989	2.6982
23173	715.3	1.0876	1.0890	1.0880	23165	714.5	2.6970	2.6916	2.6917

Spectrum Plot of Worst Value	
1.4 MHz / 16QAM	3 MHz / QPSK



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	64QAM			QPSK	16QAM	64QAM
23035	701.5	4.4796	4.4803	4.4918	23060	704.0	8.9262	8.9352	8.9323
23095	707.5	4.4916	4.4959	4.5027	23095	707.5	8.9880	8.9923	8.9937
23155	713.5	4.4734	4.4757	4.4870	23130	711.0	8.9685	8.9715	8.9789

Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 64QAM

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	64QAM			QPSK	16QAM	64QAM
23755	706.5	4.4884	4.4905	4.4917	23780	709.0	9.0040	9.0079	9.0042
23790	710.0	4.4952	4.4949	4.4978	23790	710.0	8.9946	8.9998	8.9969
23825	713.5	4.4749	4.4775	4.4802	23800	711.0	8.9746	8.9724	8.9665

Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 16QAM

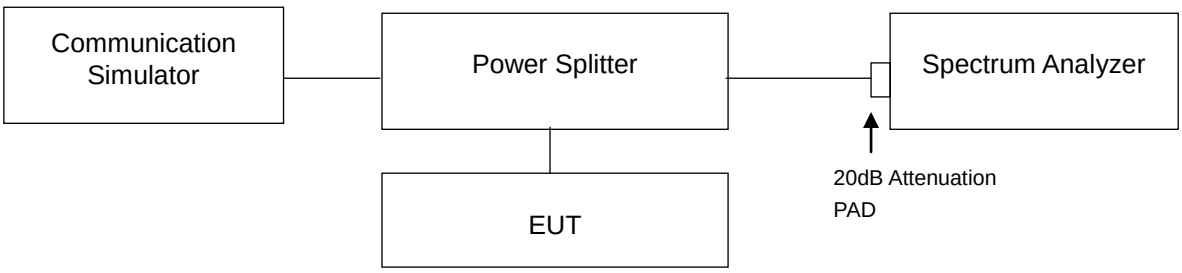
4.4 Band Edge Measurement

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

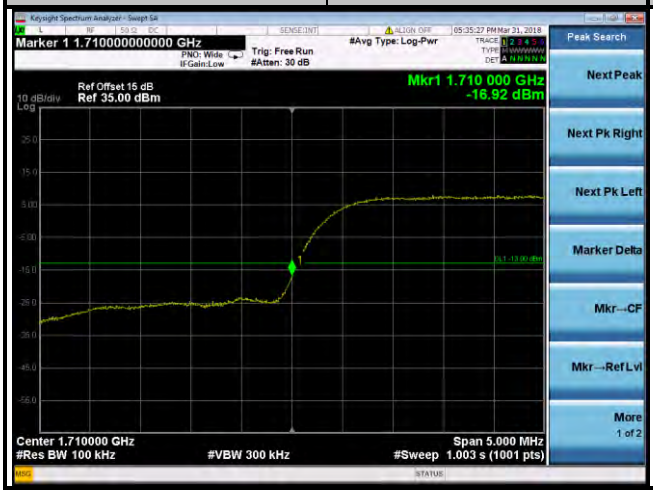


4.4.3 Test Procedures

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 30 kHz and VB of the spectrum is 100 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 62 kHz and VB of the spectrum is 200 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).
f. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 200 kHz and VB of the spectrum is 1 MHz (LTE Bandwidth 10 MHz).
g. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 300 kHz and VB of the spectrum is 1 MHz (LTE Bandwidth 15 MHz / 20 MHz).
h. Record the max. trace plot into the test report.

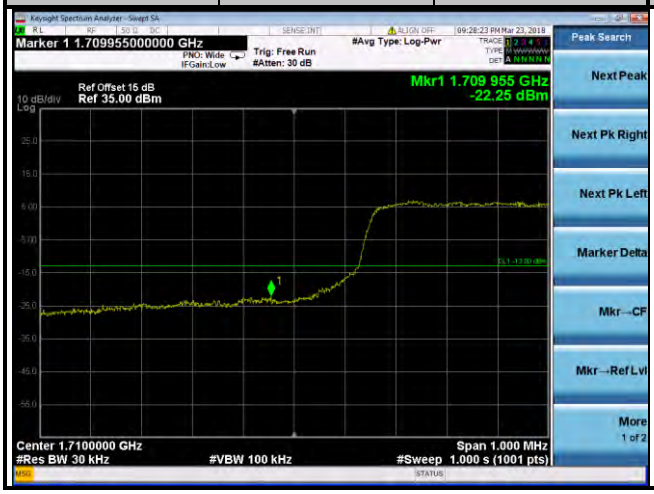
4.4.4 Test Results

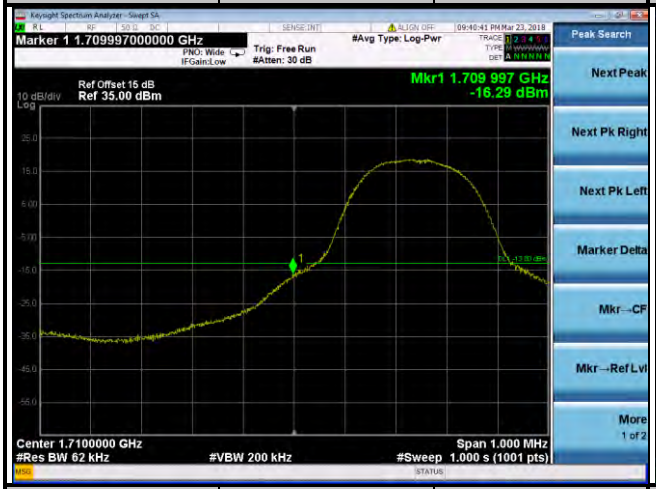
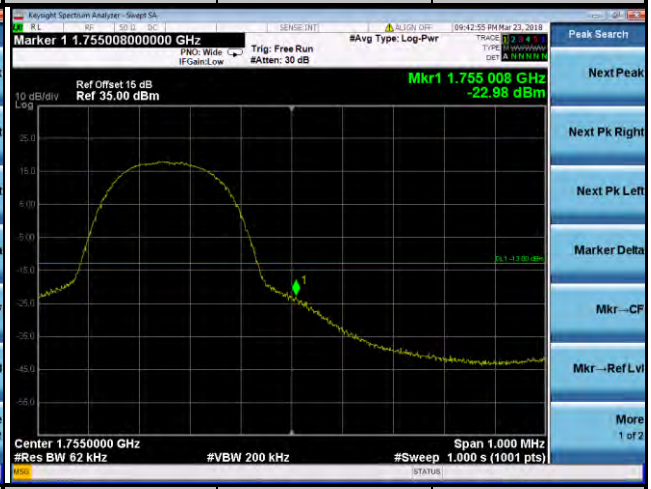
WCDMA			
Channel	1312	Channel	1513

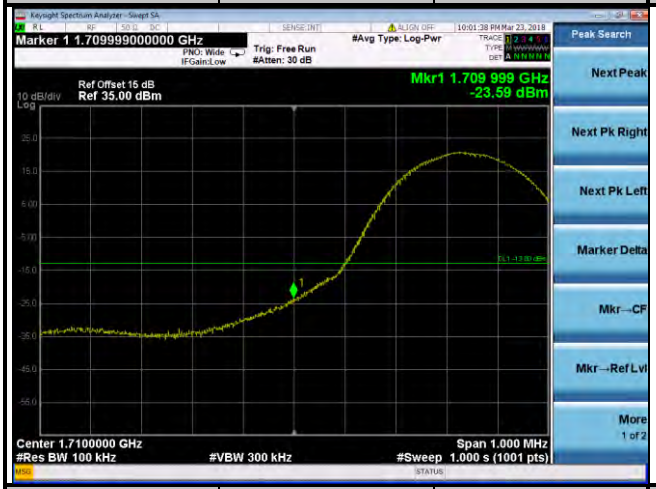
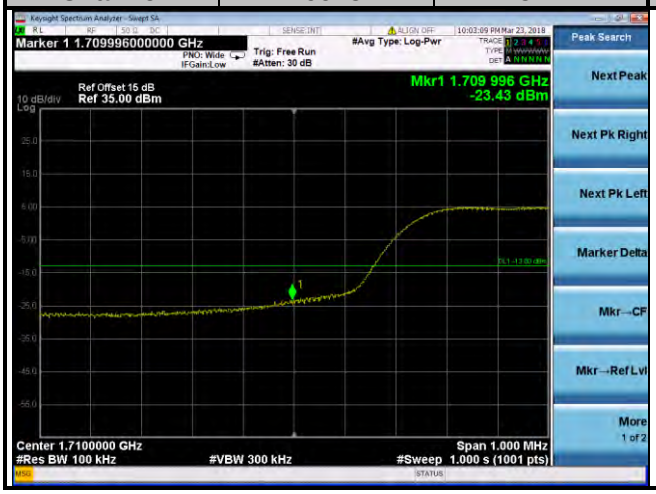


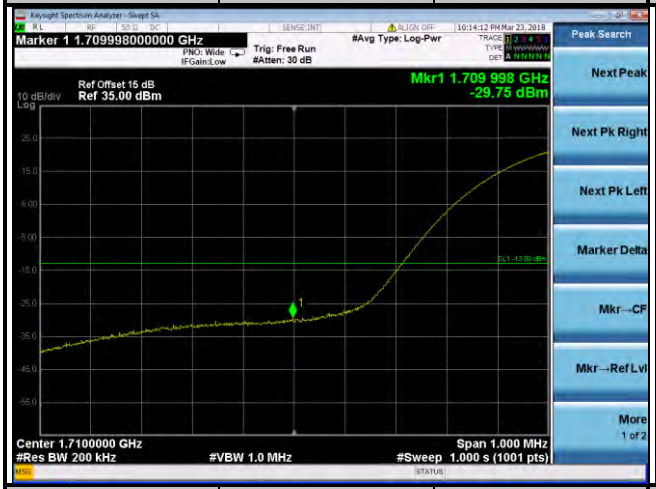
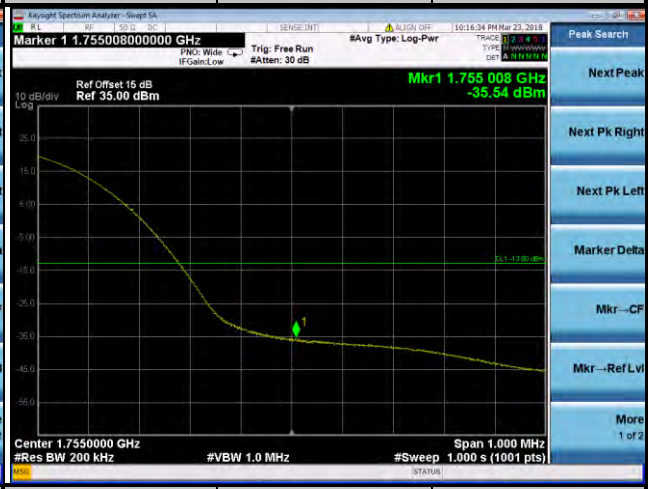
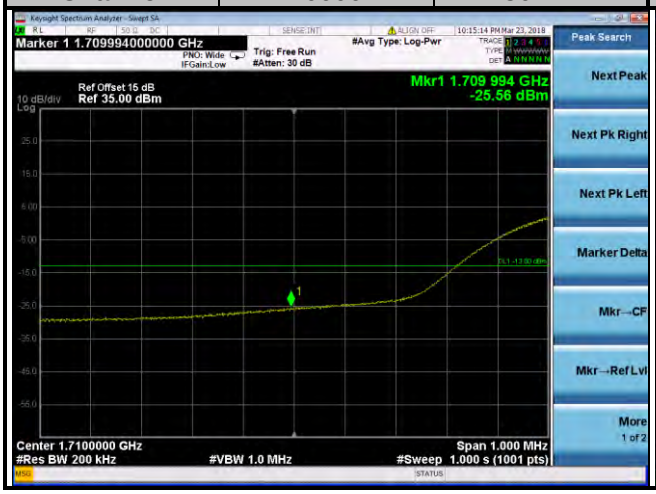
LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	19957	1 RB	Channel	20393	1 RB

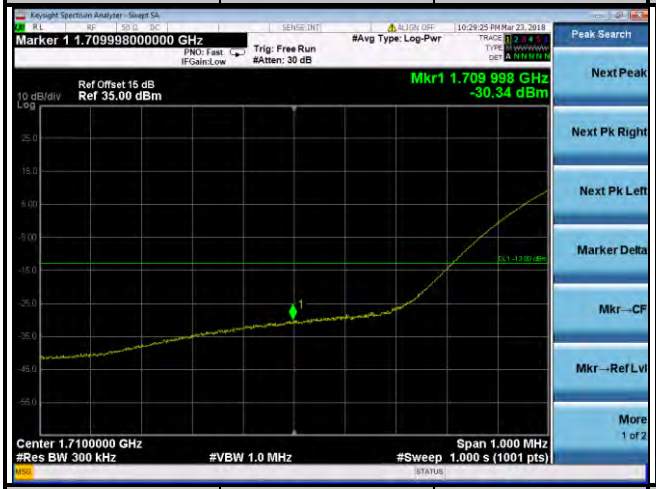
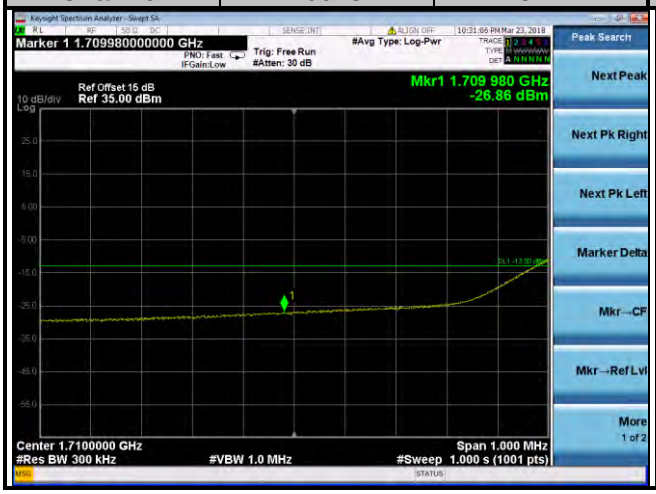
Channel	19957	6 RB	Channel	20393	6 RB

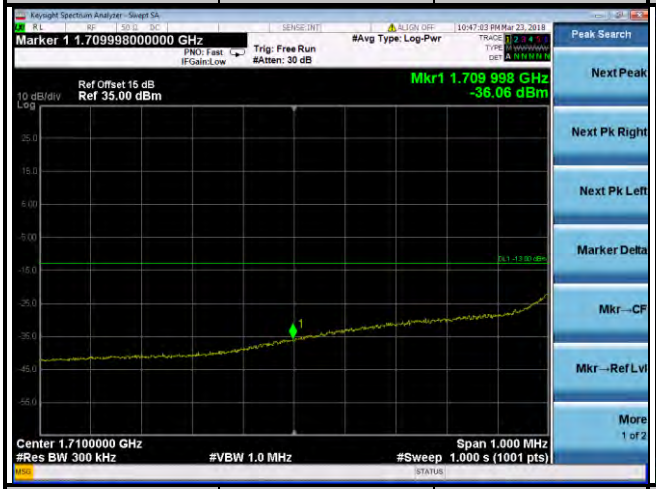
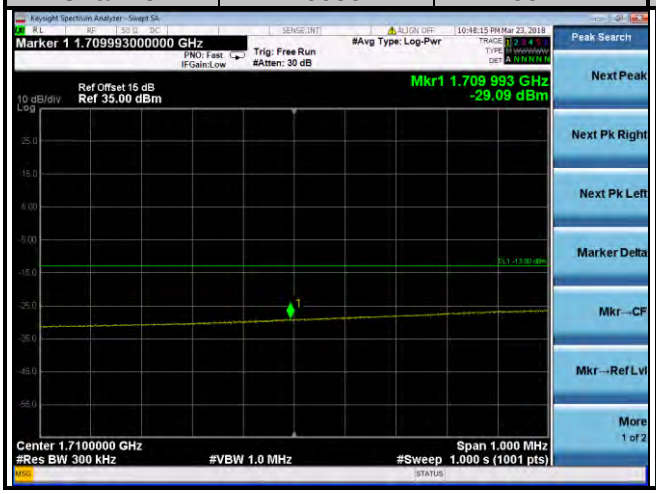


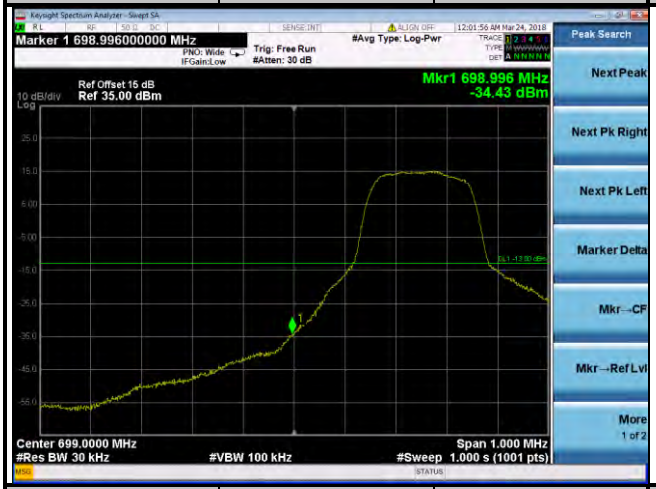
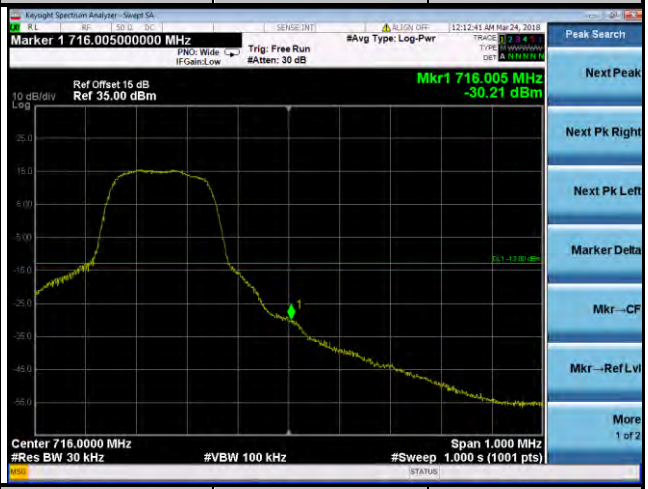
LTE Band 4					
Channel Bandwidth: 3 MHz					
Channel	19965	1 RB	Channel	20385	1 RB
					
Channel	19965	15 RB	Channel	20385	15 RB

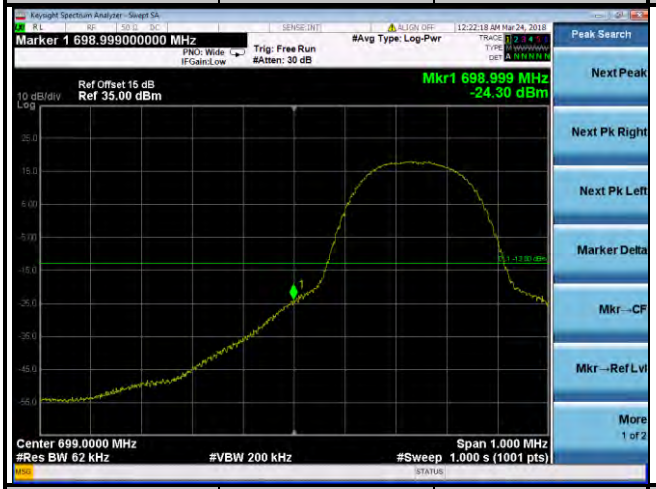
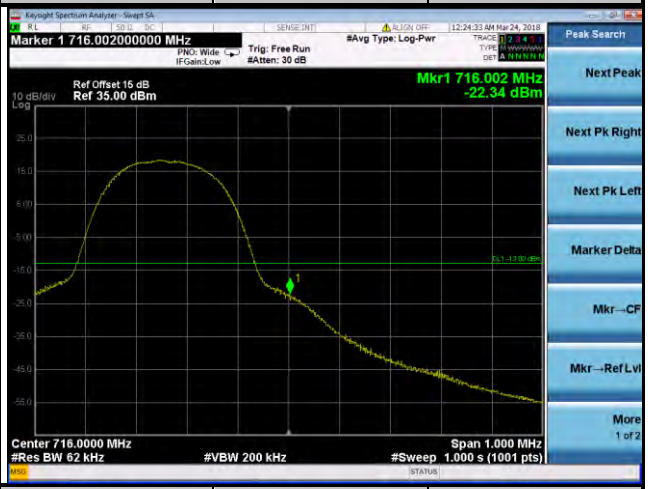
LTE Band 4					
Channel Bandwidth: 5 MHz					
Channel	19975	1 RB	Channel	20375	1 RB
					
Channel	19975	25 RB	Channel	20375	25 RB
					

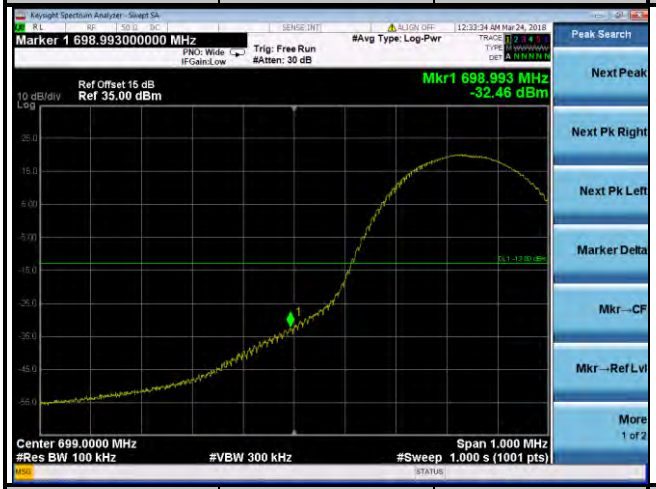
LTE Band 4					
Channel Bandwidth: 10 MHz					
Channel	20000	1 RB	Channel	20350	1 RB
					
Channel	20000	50 RB	Channel	20350	50 RB
					

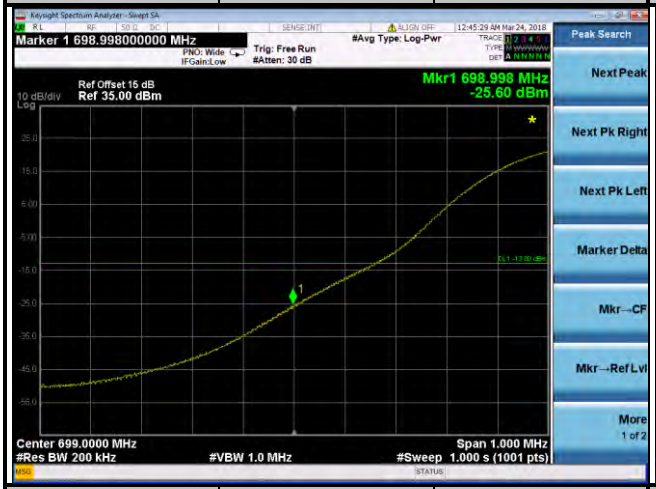
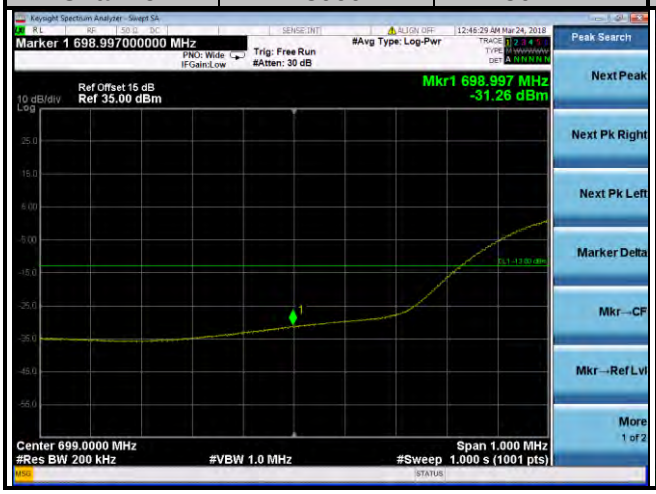
LTE Band 4					
Channel Bandwidth: 15 MHz					
Channel	20025	1 RB	Channel	20325	1 RB
					
Channel	20025	75 RB	Channel	20325	75 RB
					

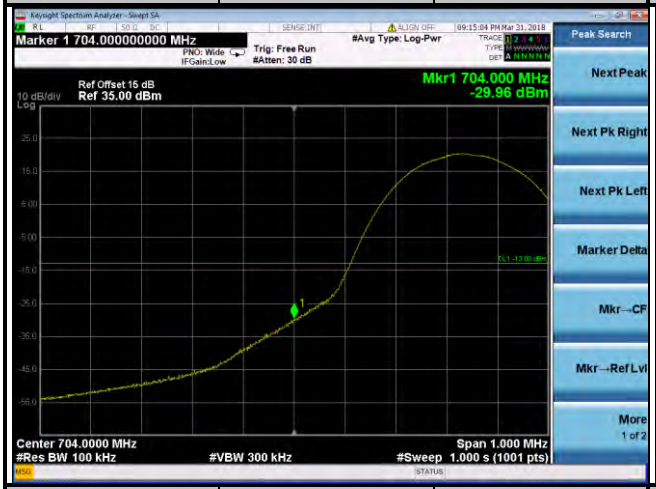
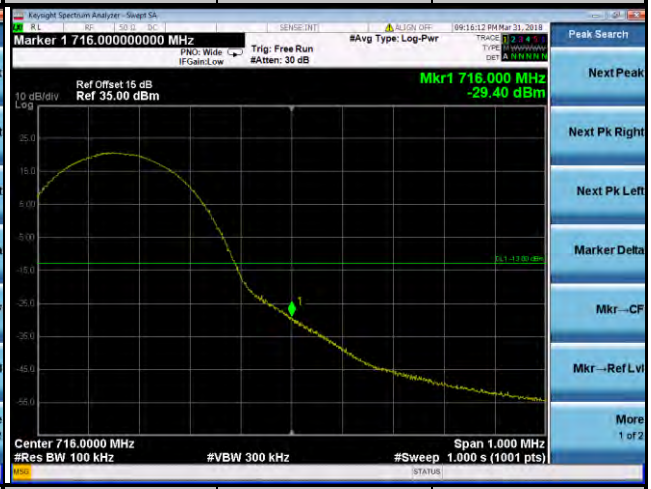
LTE Band 4					
Channel Bandwidth: 20 MHz					
Channel	20050	1 RB	Channel	20300	1 RB
					
Channel	20050	100 RB	Channel	20300	100 RB
					

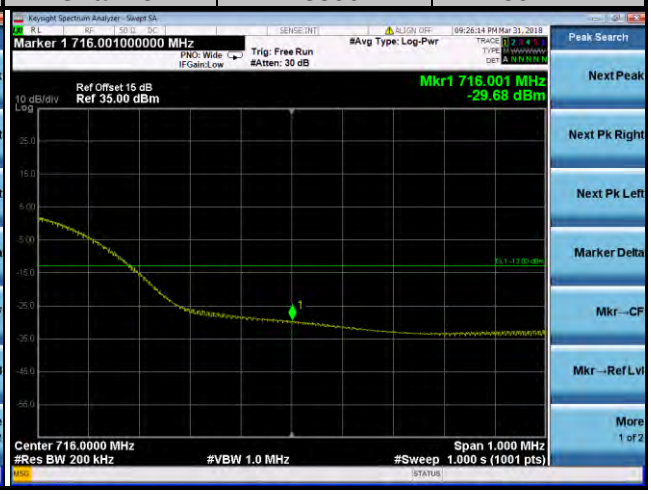
LTE Band 12					
Channel Bandwidth: 1.4 MHz					
Channel	23017	1 RB	Channel	23173	1 RB
					
Channel	23017	6 RB	Channel	23173	6 RB

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

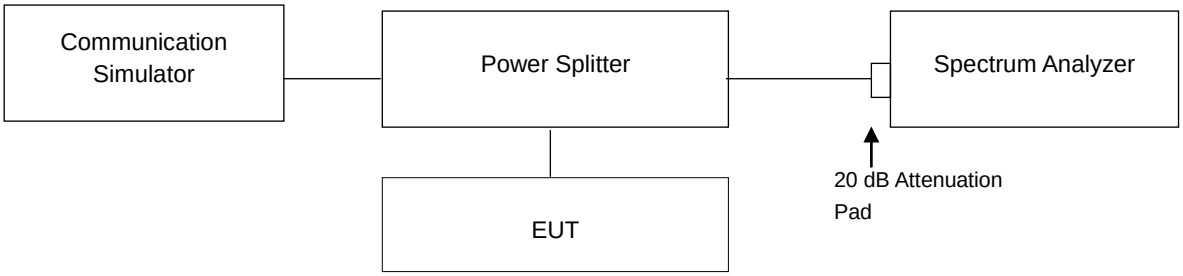
LTE Band 17					
Channel Bandwidth: 10 MHz					
Channel	23780	1 RB	Channel	23800	1 RB
Channel	23780	50 RB	Channel	23800	50 RB
					

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



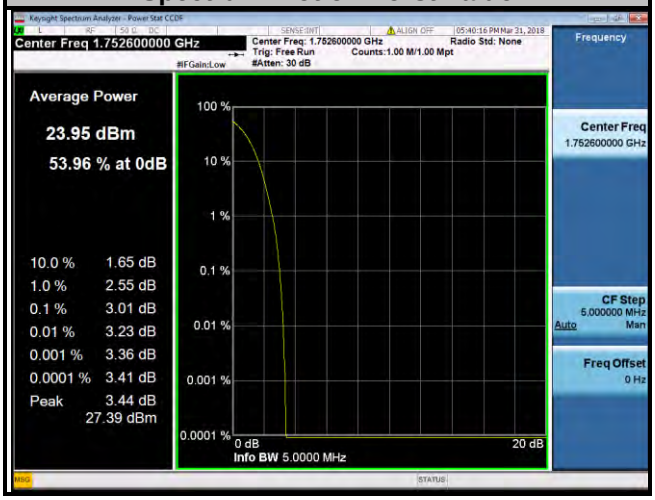
4.5.3 Test Procedures

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 %.

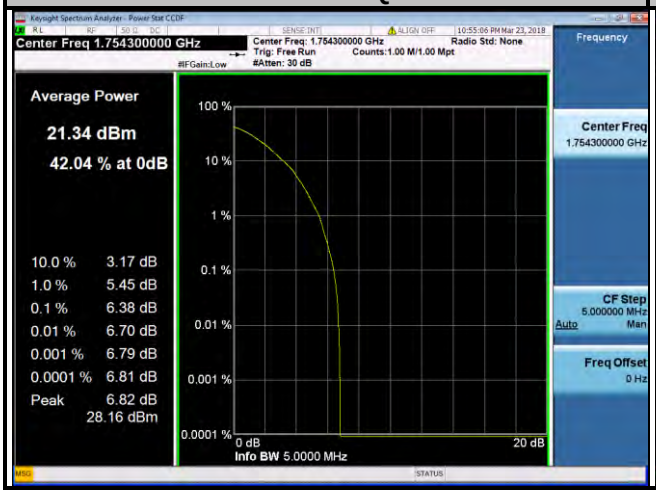
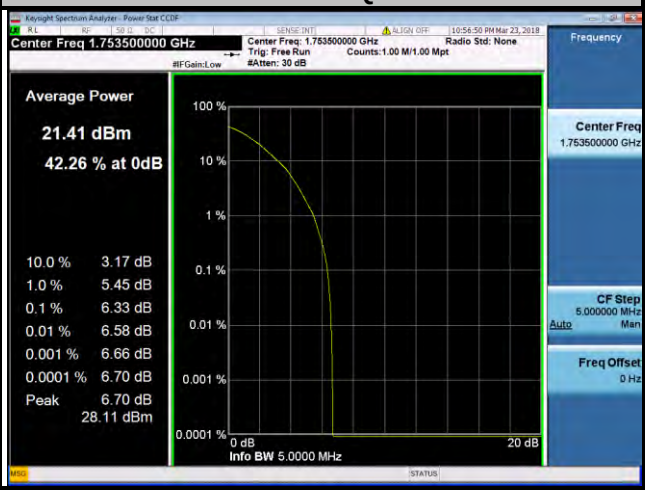
4.5.4 Test Results

WCDMA		
Channel	**Frequency (MHz)**	**Peak to Average Ratio (dB)**
1312	1712.4	2.48
1413	1732.6	2.88
1513	1752.6	3.01

Spectrum Plot of Worst Value

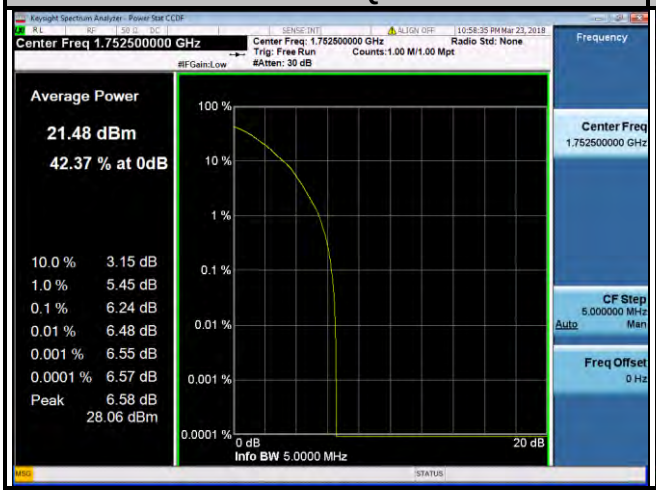


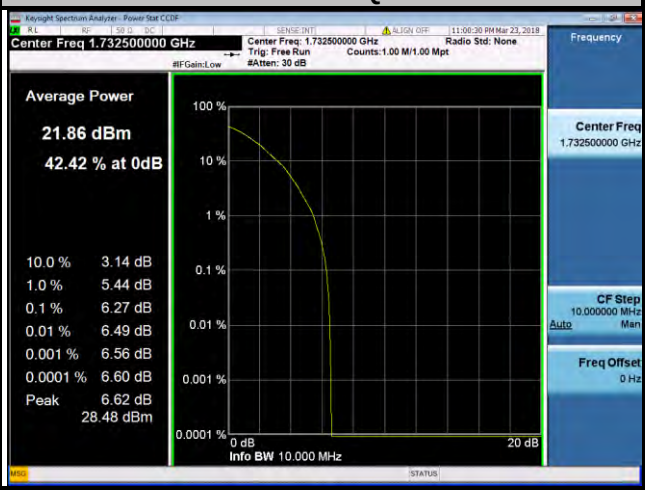
LTE Band 4									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19957	1710.7	2.92	4.04	5.02	19965	1711.5	2.85	3.98	4.98
20175	1732.5	3.60	4.92	5.99	20175	1732.5	3.51	4.86	6.08
20393	1754.3	3.81	5.21	6.38	20385	1753.5	3.66	5.08	6.33

Spectrum Plot of Worst Value	
1.4 MHz / 64QAM	3 MHz / 64QAM
	

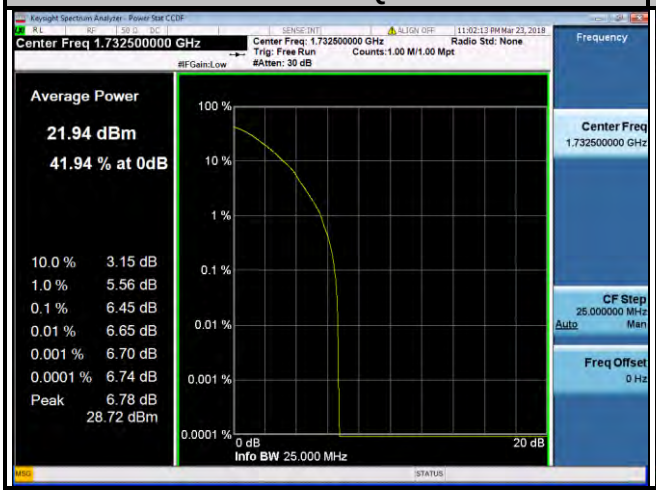
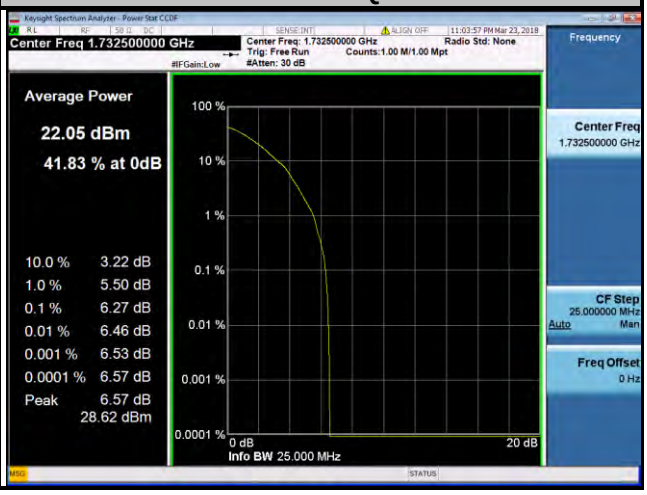
LTE Band 4									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19975	1712.5	2.80	3.95	4.90	20000	1715.0	2.75	3.85	4.89
20175	1732.5	3.51	4.92	6.12	20175	1732.5	3.57	4.99	6.27
20375	1752.5	3.60	5.01	6.24	20350	1750.0	3.38	4.61	5.86

Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 64QAM



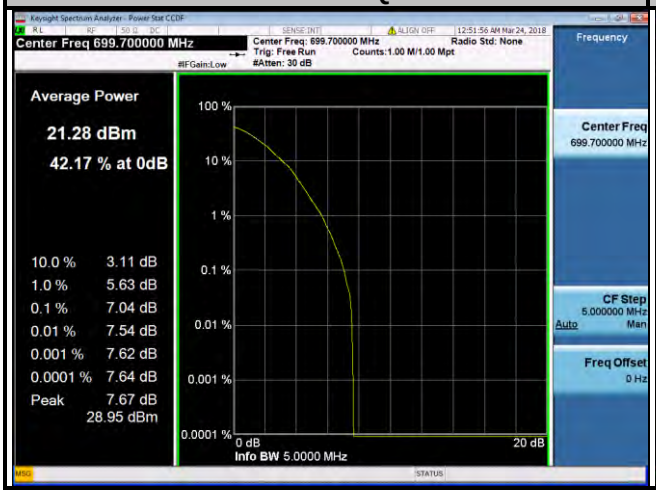


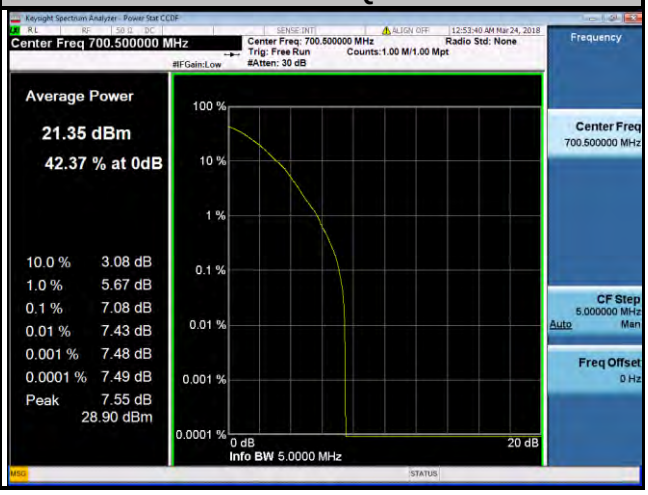
LTE Band 4									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20025	1717.5	2.71	3.79	4.83	20050	1720.0	2.68	3.79	4.87
20175	1732.5	3.60	5.01	6.45	20175	1732.5	3.56	5.00	6.27
20325	1747.5	3.21	4.42	5.51	20300	1745.0	3.17	4.41	5.61

Spectrum Plot of Worst Value	
15 MHz / 64QAM	20 MHz / 64QAM
	

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	64QAM			QPSK	16QAM	64QAM
23017	699.7	3.95	5.53	7.04	23025	700.5	3.72	5.41	7.08
23095	707.5	3.45	4.99	6.30	23095	707.5	3.30	4.91	6.40
23173	715.3	3.80	5.16	6.46	23165	714.5	3.67	5.35	6.83

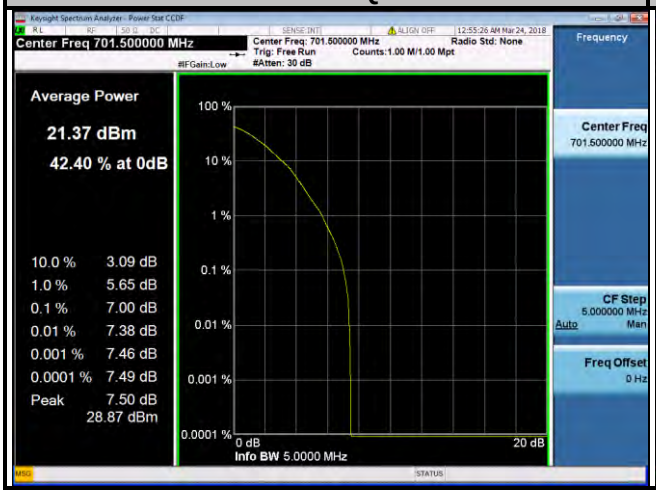
Spectrum Plot of Worst Value	
1.4 MHz / 64QAM	3 MHz / 64QAM

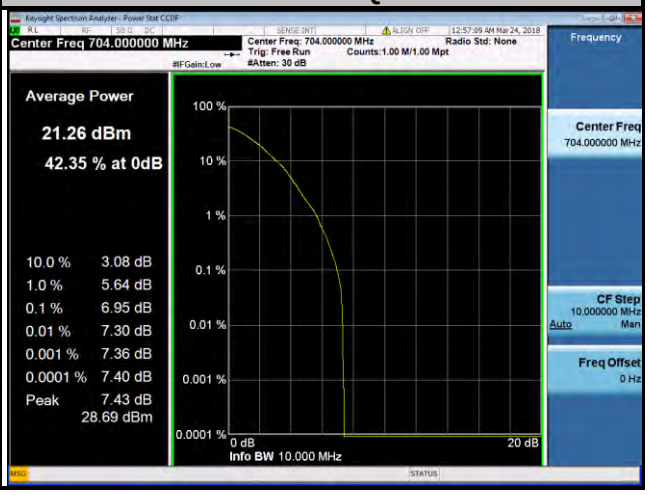


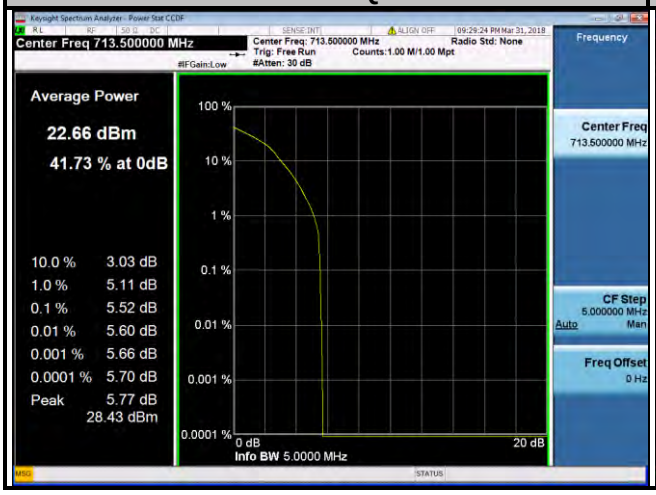
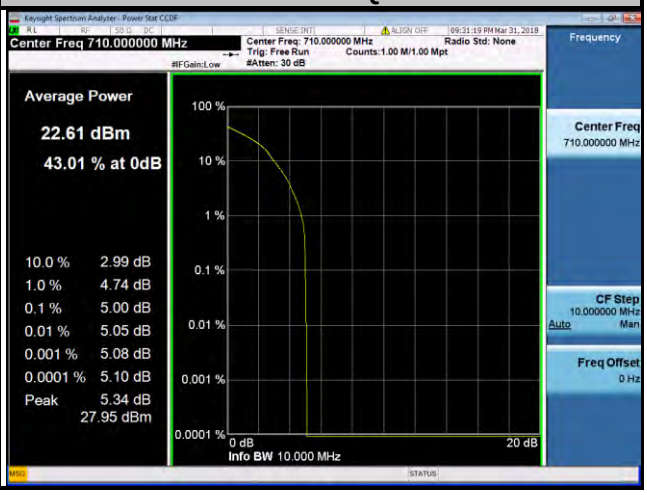


LTE Band 12									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23035	701.5	3.73	5.38	7.00	23060	704.0	3.68	5.32	6.95
23095	707.5	3.49	4.92	6.18	23095	707.5	3.38	4.78	6.10
23155	713.5	3.74	5.40	6.94	23130	711.0	3.24	4.83	6.29

Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 64QAM





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	64QAM			QPSK	16QAM	64QAM
23755	706.5	3.52	4.93	4.96	23780	709.0	3.47	4.99	4.95
23790	710.0	3.31	4.86	4.92	23790	710.0	3.41	4.93	5.00
23825	713.5	3.75	5.34	5.52	23800	711.0	3.28	4.79	4.95

Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 64QAM