FCC Test Report

(PART 27)

Report No.:	RF170406C35-2
FCC ID:	B32V400M4G
Test Model:	V400m Plus 4G
Received Date:	Apr. 06, 2017
Test Date:	Apr. 20, 2017 ~ May 15, 2017
Issued Date:	May 17, 2017
Applicant:	Verifone, Inc.
Address:	1400 West Stanford Ranch Road Suite 200 Rocklin CA 95765 USA
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.

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Release Control Record

Issue No.	Description	Date Issued
RF170406C35-2	Original Release	May 17, 2017

1 Certificate of Conformity

Product:	Point of Sale Terminal
Brand:	Verifone
Test Model:	V400m Plus 4G
Sample Status:	Identical Prototype
Applicant:	Verifone, Inc.
Test Date:	Apr. 20, 2017 ~ May 15, 2017
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 : _____ , **Date:** May 17, 2017

Ivonne Wu / Supervisor

Approved by : _____ , **Date:** May 17, 2017

David Huang / 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 -34.02 dB at 41.64 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 -32.87 dB at 3490.00 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 -32.53 dB at 1422.00 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	2.93 dB
	200 MHz ~1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Test Site and Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Feb. 17, 2017	Feb. 16, 2018
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 16, 2016	Dec. 15, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 26, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 12, 2016	Dec. 13, 2017
Double Ridge Guide Horn Antenna EMCO	3115	5619	Dec. 26, 2016	Dec. 27, 2017
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Dec. 12, 2016	Dec. 13, 2017
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 08, 2016	Jul. 07, 2017
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 19, 2016	Oct. 18, 2017
Preamplifier EMCI	EMC 012645	980115	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 184045	980116	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 330H	980112	Oct. 21, 2016	Oct. 20, 2017
Power Meter Anritsu	ML2495A	1232002	Sep. 08, 2016	Sep. 07, 2017
Power Sensor Anritsu	MA2411B	1207325	Sep. 08, 2016	Sep. 07, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 21, 2016	Oct. 20, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 21, 2016	Oct. 20, 2017
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 21, 2016	Oct. 20, 2017
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer	MT8820C	6201300640	Aug. 10, 2015	Aug. 09, 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 HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

3 General Information

3.1 General Description of EUT

Product	Point of Sale Terminal	
Brand	Verifone	
Test Model	V400m Plus 4G	
Status of EUT	Identical Prototype	
Power Supply Rating	5.0 Vdc (adapter) 3.85 Vdc (Li-ion battery)	
Modulation Type	WCDMA	QPSK
	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
Emission Designator	WCDMA	4M18F9W
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 4 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 4 (Channel Bandwidth: 5 MHz)	4M49W7D
	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)	4M49W7D
	LTE Band 12 (Channel Bandwidth: 10 MHz)	9M00W7D
Max. ERP Power	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	84.72mW
	LTE Band 12 (Channel Bandwidth: 3 MHz)	87.50mW
	LTE Band 12 (Channel Bandwidth: 5 MHz)	88.72mW
	LTE Band 12 (Channel Bandwidth: 10 MHz)	90.36mW
Max. EIRP Power	WCDMA	142.89mW
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	220.80mW
	LTE Band 4 (Channel Bandwidth: 3 MHz)	223.87mW
	LTE Band 4 (Channel Bandwidth: 5 MHz)	225.42mW
	LTE Band 4 (Channel Bandwidth: 10 MHz)	229.03mW
	LTE Band 4 (Channel Bandwidth: 15 MHz)	231.74mW
	LTE Band 4 (Channel Bandwidth: 20 MHz)	236.05mW

Antenna Type	Fixed Internal Antenna
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

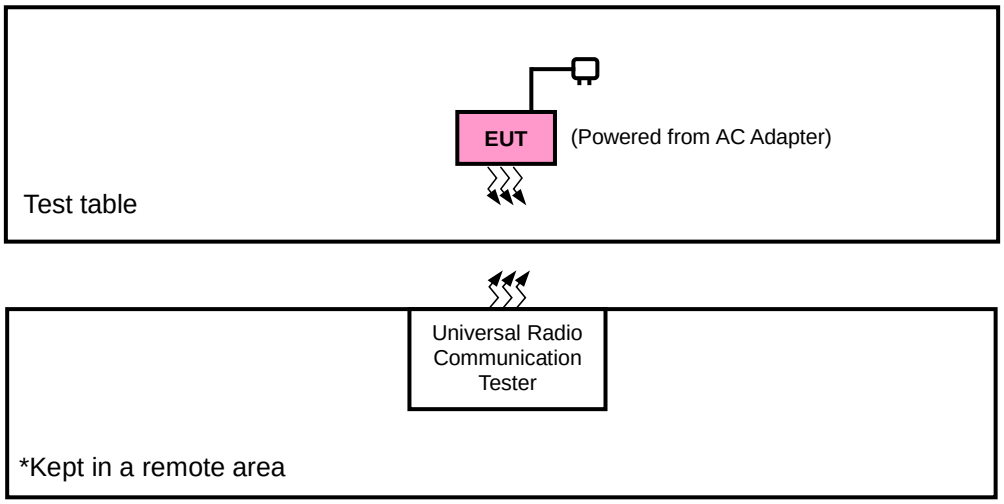
1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	Verifone	AM11A-050A	I/P: 100-240 Vac, 50/60 Hz, 500 mA O/P: 5 Vdc, 2.2 A 1.75m non-shielded cable w/o core Manufacturer: Phihong
Adapter 2	Verifone	VF0402	I/P: 100-240 Vac, 50/60 Hz, 500 mA O/P: 5 Vdc, 2.2 A 1.75m non-shielded cable w/o core Manufacturer: Salcomp
Battery	Verifone	BPK475-001	3.85 Vdc, 2890 mAh

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>



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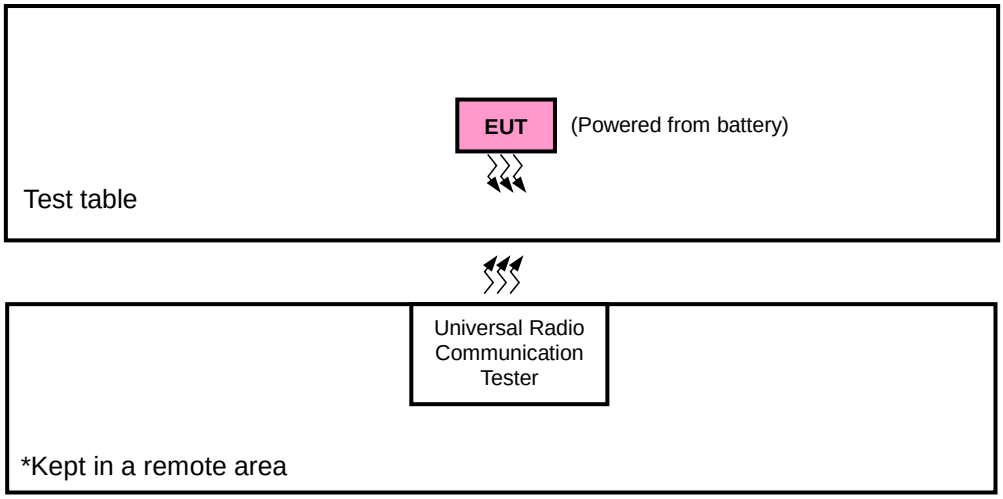


3.2.1 Description of Support Units

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:

Band	ERP / EIRP	Radiated Emission
WCDMA	Y-plane	X-axis
LTE Band 4	Y-plane	X-axis
LTE Band 12	X-plane	Y-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	1312, 1513	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	1312, 1413, 1513	WCDMA
-	Radiated Emission	1312 to 1513	1312, 1413, 1513	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 / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	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
-	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 / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 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	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
-	Radiated Emission	20050 to 20300	20050, 20175, 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
-	ERP	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
-	Frequency Stability	23017 to 23173	23017, 23173	1.4 MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23025, 23165	3 MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23155	5 MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23130	10 MHz	QPSK	1 RB / 0 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	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	23060 to 23130	23060, 23095, 23130	10 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.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25 deg. C, 65 % RH	3.85 Vdc	Gavin Wu
Frequency Stability	25 deg. C, 65 % RH	120 Vac, 60 Hz	Anson Lin
Occupied Bandwidth	25 deg. C, 65 % RH	120 Vac, 60 Hz	Anson Lin
Band Edge	25 deg. C, 65 % RH	120 Vac, 60 Hz	Anson Lin
Peak to Average Ratio	25 deg. C, 65 % RH	120 Vac, 60 Hz	Anson Lin
Condcudeted Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Anson Lin
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu & Getaz Yang

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.

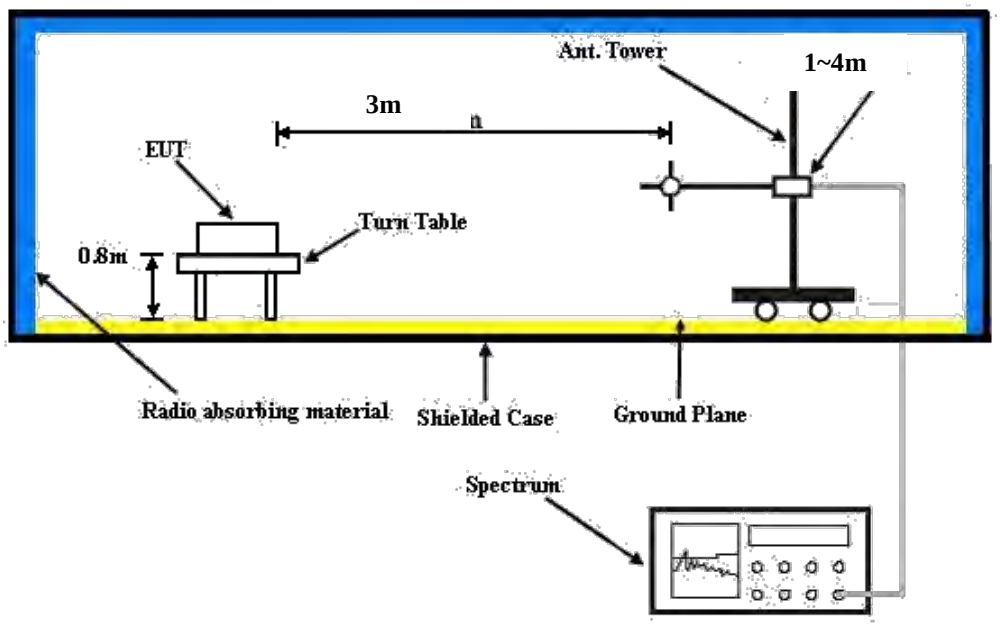
Conducted Power Measurement:

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	24.18	23.82	23.92
HSDPA Subtest-1	24.17	23.81	23.91
HSDPA Subtest-2	23.69	23.33	23.43
HSDPA Subtest-3	23.07	22.71	22.81
HSDPA Subtest-4	22.87	22.51	22.61
HSUPA Subtest-1	23.10	22.74	22.84
HSUPA Subtest-2	21.34	20.98	21.08
HSUPA Subtest-3	22.44	22.08	22.18
HSUPA Subtest-4	20.47	20.11	20.21
HSUPA Subtest-5	24.05	23.69	23.79

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	23.28	23.18	22.93	0	22.25	22.15	21.90	1
	1	2	22.66	22.58	22.34	0	21.63	21.55	21.31	1
	1	5	22.36	22.29	22.07	0	21.33	21.26	21.04	1
	3	0	22.24	22.18	21.85	0	21.21	21.15	20.82	1
	3	1	21.94	21.89	21.66	0	20.91	20.86	20.63	1
	3	3	21.89	21.74	21.51	0	20.86	20.71	20.51	1
	6	0	21.97	21.92	21.76	1	20.94	20.89	20.73	2

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	23.30	23.20	22.95	0	22.27	22.17	21.92	1
	1	7	22.68	22.60	22.36	0	21.65	21.57	21.33	1
	1	14	22.38	22.31	22.09	0	21.35	21.28	21.06	1
	8	0	22.26	22.20	21.87	1	21.23	21.17	20.84	2
	8	3	21.96	21.91	21.68	1	20.93	20.88	20.65	2
	8	7	21.91	21.76	21.53	1	20.88	20.73	20.52	2
	15	0	21.99	21.94	21.78	1	20.96	20.91	20.75	2

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	23.32	23.22	22.97	0	22.29	22.19	21.94	1
	1	12	22.70	22.62	22.38	0	21.67	21.59	21.35	1
	1	24	22.40	22.33	22.11	0	21.37	21.30	21.08	1
	12	0	22.28	22.22	21.89	1	21.25	21.19	20.86	2
	12	6	21.98	21.93	21.70	1	20.95	20.90	20.67	2
	12	13	21.93	21.78	21.55	1	20.90	20.75	20.53	2
	25	0	22.01	21.96	21.80	1	20.98	20.93	20.77	2

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	23.35	23.25	23.00	0	22.32	22.22	21.97	1
	1	24	22.73	22.65	22.41	0	21.70	21.62	21.38	1
	1	49	22.43	22.36	22.14	0	21.40	21.33	21.11	1
	25	0	22.31	22.25	21.92	1	21.28	21.22	20.89	2
	25	12	22.01	21.96	21.73	1	20.98	20.93	20.70	2
	25	25	21.96	21.81	21.58	1	20.93	20.78	20.55	2
	50	0	22.04	21.99	21.83	1	21.01	20.96	20.80	2

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	23.38	23.28	23.03	0	22.35	22.25	22.00	1
	1	37	22.76	22.68	22.44	0	21.73	21.65	21.41	1
	1	74	22.46	22.39	22.17	0	21.43	21.36	21.14	1
	36	0	22.34	22.28	21.95	1	21.31	21.25	20.92	2
	36	19	22.04	21.99	21.76	1	21.01	20.96	20.73	2
	36	39	21.99	21.84	21.61	1	20.96	20.81	20.58	2
	75	0	22.07	22.02	21.86	1	21.04	20.99	20.83	2

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	23.43	23.33	23.08	0	22.40	22.30	22.05	1
	1	50	22.81	22.73	22.49	0	21.78	21.70	21.46	1
	1	99	22.51	22.44	22.22	0	21.48	21.41	21.19	1
	50	0	22.39	22.33	22.00	1	21.36	21.30	20.97	2
	50	25	22.09	22.04	21.81	1	21.06	21.01	20.78	2
	50	50	22.04	21.89	21.66	1	21.01	20.86	20.63	2
	100	0	22.12	22.07	21.91	1	21.09	21.04	20.88	2

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	22.85	23.02	22.80	0	21.91	22.06	21.84	1
	1	2	22.83	22.96	22.72	0	21.83	22.00	21.68	1
	1	5	22.45	22.56	22.39	0	21.48	21.57	21.31	1
	3	0	22.01	22.10	21.88	0	20.94	21.12	20.87	1
	3	1	21.94	22.08	21.85	0	20.91	21.06	20.75	1
	3	3	21.76	21.87	21.68	0	20.66	20.85	20.62	1
	6	0	21.80	22.00	21.72	1	20.80	20.98	20.69	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	22.95	23.08	22.91	0	22.00	22.13	21.93	1
	1	7	22.92	23.03	22.86	0	21.95	22.08	21.79	1
	1	14	22.58	22.69	22.44	0	21.57	21.70	21.44	1
	8	0	22.12	22.20	22.00	1	21.10	21.22	21.04	2
	8	3	22.04	22.18	21.95	1	21.03	21.20	20.96	2
	8	7	21.85	22.00	21.83	1	20.82	21.00	20.78	2
	15	0	21.94	22.10	21.89	1	20.92	21.11	20.83	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	23.01	23.13	22.96	0	22.05	22.17	21.99	1
	1	12	22.96	23.09	22.84	0	21.98	22.14	21.90	1
	1	24	22.67	22.74	22.55	0	21.65	21.74	21.54	1
	12	0	22.18	22.30	22.14	1	21.22	21.29	21.13	2
	12	6	22.15	22.27	22.09	1	21.12	21.27	21.02	2
	12	13	22.00	22.14	21.97	1	20.98	21.10	20.93	2
	25	0	22.10	22.21	22.05	1	21.04	21.20	20.98	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	23.07	23.18	23.03	0	22.10	22.23	22.06	1
	1	24	23.05	23.15	22.97	0	22.06	22.19	22.01	1
	1	49	22.72	22.83	22.69	0	21.78	21.85	21.63	1
	25	0	22.32	22.41	22.26	1	21.33	21.42	21.26	2
	25	12	22.27	22.39	22.20	1	21.25	21.40	21.21	2
	25	25	22.15	22.26	22.11	1	21.12	21.24	21.08	2
	50	0	22.22	22.33	22.18	1	21.20	21.33	21.15	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)**
X	23017	699.7	-8.98	30.36	19.23	83.75	H
	23095	707.5	-8.74	30.17	19.28	84.72	
	23173	715.3	-8.80	30.17	19.22	83.56	
	23017	699.7	-15.26	32.03	14.62	28.97	V
	23095	707.5	-15.19	31.98	14.64	29.11	
	23173	715.3	-15.34	32.06	14.57	28.64	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	23017	699.7	-9.52	30.36	18.69	73.96	H
	23095	707.5	-9.28	30.17	18.74	74.82	
	23173	715.3	-9.31	30.17	18.71	74.30	
	23017	699.7	-15.83	32.03	14.05	25.41	V
	23095	707.5	-15.74	31.98	14.09	25.64	
	23173	715.3	-15.88	32.06	14.03	25.29	

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	-8.62	30.17	19.40	87.10	H
	23095	707.5	-8.60	30.17	19.42	87.50	
	23165	714.5	-8.65	30.18	19.38	86.70	
	23025	700.5	-15.09	31.96	14.72	29.65	V
	23095	707.5	-15.05	31.98	14.78	30.06	
	23165	714.5	-15.13	32.03	14.75	29.85	
Channel Bandwidth: 3 MHz / 16QAM							
X	23025	700.5	-9.26	30.17	18.76	75.16	H
	23095	707.5	-9.22	30.17	18.80	75.86	
	23165	714.5	-9.25	30.18	18.78	75.51	
	23025	700.5	-15.64	31.96	14.17	26.12	V
	23095	707.5	-15.63	31.98	14.20	26.30	
	23165	714.5	-15.69	32.03	14.19	26.24	

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	-8.56	30.17	19.46	88.31	H
	23095	707.5	-8.54	30.17	19.48	88.72	
	23155	713.5	-8.59	30.18	19.44	87.90	
	23035	701.5	-14.96	31.96	14.85	30.55	V
	23095	707.5	-14.94	31.98	14.89	30.83	
	23155	713.5	-15.02	32.03	14.86	30.62	
Channel Bandwidth: 5 MHz / 16QAM							
X	23035	701.5	-9.16	30.17	18.86	76.91	H
	23095	707.5	-9.14	30.17	18.88	77.27	
	23155	713.5	-9.18	30.18	18.85	76.74	
	23035	701.5	-15.53	31.96	14.28	26.79	V
	23095	707.5	-15.52	31.98	14.31	26.98	
	23155	713.5	-15.58	32.03	14.30	26.92	

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	-8.47	30.17	19.55	90.16	H
	23095	707.5	-8.46	30.17	19.56	90.36	
	23130	711.0	-8.49	30.18	19.54	89.95	
	23060	704.0	-14.90	31.96	14.91	30.97	V
	23095	707.5	-14.87	31.98	14.96	31.33	
	23130	711.0	-14.94	32.03	14.94	31.19	
Channel Bandwidth: 10 MHz / 16QAM							
X	23060	704.0	-9.08	30.17	18.94	78.34	H
	23095	707.5	-9.06	30.17	18.96	78.70	
	23130	711.0	-9.10	30.18	18.93	78.16	
	23060	704.0	-15.46	31.96	14.35	27.23	V
	23095	707.5	-15.43	31.98	14.40	27.54	
	23130	711.0	-15.50	32.03	14.38	27.42	

EIRP Power (dBm)

WCDMA							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Y	1312	1712.4	-19.69	36.29	16.60	45.70	H
	1413	1732.6	-20.05	36.69	16.64	46.12	
	1513	1752.6	-20.37	36.98	16.61	45.80	
	1312	1712.4	-15.58	37.11	21.53	142.17	V
	1413	1732.6	-16.05	37.60	21.55	142.89	
	1513	1752.6	-16.13	37.65	21.52	141.87	

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)**
Y	19957	1710.7	-20.11	36.45	16.34	43.05	H
	20175	1732.5	-20.40	36.80	16.40	43.64	
	20393	1754.3	-20.55	36.94	16.39	43.58	
	19957	1710.7	-13.91	37.28	23.37	217.12	V
	20175	1732.5	-14.19	37.63	23.44	220.80	
	20393	1754.3	-14.25	37.64	23.39	218.27	
Channel Bandwidth: 1.4 MHz / 16QAM							
Y	19957	1710.7	-20.43	36.45	16.02	39.99	H
	20175	1732.5	-20.73	36.80	16.07	40.45	
	20393	1754.3	-20.89	36.94	16.05	40.30	
	19957	1710.7	-14.64	37.28	22.64	183.53	V
	20175	1732.5	-14.96	37.63	22.67	184.93	
	20393	1754.3	-15.02	37.64	22.62	182.81	

LTE Band 4							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	19965	1711.5	-20.01	36.45	16.44	44.06	H
	20175	1732.5	-20.33	36.80	16.47	44.35	
	20385	1753.5	-20.49	36.94	16.45	44.19	
	19965	1711.5	-13.85	37.28	23.43	220.14	V
	20175	1732.5	-14.13	37.63	23.50	223.87	
	20385	1753.5	-14.19	37.64	23.45	221.31	
Channel Bandwidth: 3 MHz / 16QAM							
Y	19965	1711.5	-20.39	36.45	16.06	40.36	H
	20175	1732.5	-20.67	36.80	16.13	41.01	
	20385	1753.5	-20.85	36.94	16.09	40.67	
	19965	1711.5	-14.58	37.28	22.70	186.08	V
	20175	1732.5	-14.84	37.63	22.79	190.11	
	20385	1753.5	-14.96	37.64	22.68	185.35	

LTE Band 4							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	19975	1712.5	-19.92	36.45	16.53	44.98	H
	20175	1732.5	-20.23	36.80	16.57	45.38	
	20375	1752.5	-20.40	36.94	16.54	45.11	
	19975	1712.5	-13.76	37.28	23.52	224.75	V
	20175	1732.5	-14.10	37.63	23.53	225.42	
	20375	1752.5	-14.13	37.64	23.51	224.39	
Channel Bandwidth: 5 MHz / 16QAM							
Y	19975	1712.5	-20.21	36.45	16.24	42.07	H
	20175	1732.5	-20.53	36.80	16.27	42.35	
	20375	1752.5	-20.71	36.94	16.23	42.00	
	19975	1712.5	-14.49	37.28	22.79	189.98	V
	20175	1732.5	-14.78	37.63	22.85	192.75	
	20375	1752.5	-14.83	37.64	22.81	190.99	

LTE Band 4							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	20000	1715.0	-20.03	36.64	16.61	45.81	H
	20175	1732.5	-20.18	36.80	16.62	45.87	
	20350	1750.0	-20.21	36.80	16.59	45.60	
	20000	1715.0	-13.86	37.44	23.58	227.98	V
	20175	1732.5	-14.03	37.63	23.60	229.03	
	20350	1750.0	-14.05	37.64	23.59	228.30	
Channel Bandwidth: 10 MHz / 16QAM							
Y	20000	1715.0	-20.35	36.64	16.29	42.56	H
	20175	1732.5	-20.50	36.80	16.30	42.61	
	20350	1750.0	-20.52	36.80	16.28	42.46	
	20000	1715.0	-14.58	37.44	22.86	193.15	V
	20175	1732.5	-14.71	37.63	22.92	195.84	
	20350	1750.0	-14.74	37.64	22.90	194.76	

LTE Band 4							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Y	20025	1717.5	-19.81	36.45	16.64	46.13	H
	20175	1732.5	-20.12	36.80	16.68	46.55	
	20325	1747.5	-20.28	36.94	16.66	46.38	
	20025	1717.5	-13.64	37.28	23.64	231.05	V
	20175	1732.5	-13.98	37.63	23.65	231.74	
	20325	1747.5	-14.01	37.64	23.63	230.67	
Channel Bandwidth: 15 MHz / 16QAM							
Y	20025	1717.5	-20.14	36.45	16.31	42.76	H
	20175	1732.5	-20.44	36.80	16.36	43.24	
	20325	1747.5	-20.60	36.94	16.34	43.08	
	20025	1717.5	-14.28	37.28	23.00	199.39	V
	20175	1732.5	-14.56	37.63	23.07	202.77	
	20325	1747.5	-14.62	37.64	23.02	200.45	

LTE Band 4							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Y	20050	1720.0	-19.73	36.45	16.72	46.99	H
	20175	1732.5	-20.05	36.80	16.75	47.30	
	20300	1745.0	-20.21	36.94	16.73	47.13	
	20050	1720.0	-13.58	37.28	23.70	234.26	V
	20175	1732.5	-13.90	37.63	23.73	236.05	
	20300	1745.0	-13.92	37.64	23.72	235.50	
Channel Bandwidth: 20 MHz / 16QAM							
Y	20050	1720.0	-20.06	36.45	16.39	43.55	H
	20175	1732.5	-20.37	36.80	16.43	43.94	
	20300	1745.0	-20.52	36.94	16.42	43.88	
	20050	1720.0	-14.15	37.28	23.13	205.45	V
	20175	1732.5	-14.49	37.63	23.14	206.06	
	20300	1745.0	-14.53	37.64	23.11	204.64	

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stabiliity Measurement

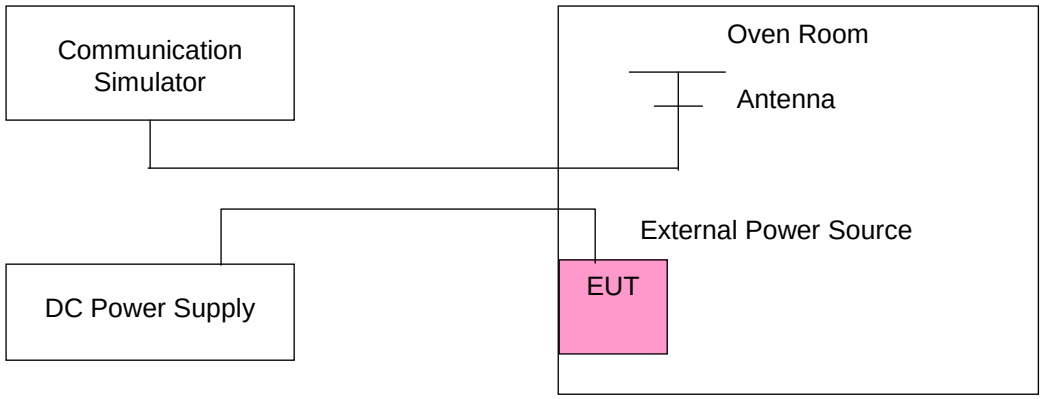
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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)	
120	1712.400001	0.0006	1752.600002	0.0011	2.5
102	1712.400001	0.0004	1752.600003	0.0016	2.5
138	1712.399998	-0.0012	1752.600001	0.0004	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	0.0009	1752.600001	0.0006	2.5
-20	1712.400003	0.0015	1752.600002	0.0011	2.5
-10	1712.400001	0.0005	1752.600003	0.0016	2.5
0	1712.399999	-0.0006	1752.600004	0.0021	2.5
10	1712.399998	-0.0011	1752.600004	0.0023	2.5
20	1712.399998	-0.0015	1752.600000	0.0001	2.5
30	1712.399997	-0.0020	1752.599998	-0.0011	2.5
40	1712.400000	-0.0002	1752.599997	-0.0015	2.5
50	1712.399997	-0.0015	1752.599999	-0.0006	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)	
120	1710.700003	0.002	1754.300003	0.002	2.5
102	1710.700003	0.002	1754.300001	0.001	2.5
138	1710.700004	0.002	1754.300001	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	1710.700002	0.001	1754.300001	0.001	2.5
-20	1710.700001	0.001	1754.300002	0.001	2.5
-10	1710.700003	0.002	1754.300001	0.001	2.5
0	1710.700001	0.001	1754.300001	0.001	2.5
10	1710.700002	0.001	1754.300004	0.002	2.5
20	1710.699997	-0.002	1754.299998	-0.001	2.5
30	1710.699998	-0.001	1754.299998	-0.001	2.5
40	1710.699996	-0.002	1754.299998	-0.001	2.5
50	1710.699999	-0.001	1754.299997	-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)	
120	1711.500001	0.001	1753.500003	0.002	2.5
102	1711.500004	0.002	1753.500003	0.001	2.5
138	1711.500003	0.002	1753.500002	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	1711.500001	0.001	1753.500001	0.001	2.5
-20	1711.500003	0.001	1753.500003	0.001	2.5
-10	1711.500003	0.002	1753.500002	0.001	2.5
0	1711.500002	0.001	1753.500003	0.001	2.5
10	1711.500001	0.001	1753.500001	0.001	2.5
20	1711.499997	-0.002	1753.499998	-0.001	2.5
30	1711.499997	-0.002	1753.499997	-0.002	2.5
40	1711.499998	-0.001	1753.499998	-0.001	2.5
50	1711.499999	-0.001	1753.499996	-0.002	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)	
120	1712.500004	0.002	1752.500002	0.001	2.5
102	1712.500004	0.002	1752.500004	0.002	2.5
138	1712.500002	0.001	1752.500004	0.002	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	1712.500003	0.002	1752.500002	0.001	2.5
-20	1712.500003	0.002	1752.500004	0.002	2.5
-10	1712.500003	0.002	1752.500004	0.002	2.5
0	1712.500003	0.002	1752.500002	0.001	2.5
10	1712.500004	0.002	1752.500001	0.001	2.5
20	1712.499997	-0.002	1752.499997	-0.002	2.5
30	1712.499998	-0.001	1752.499997	-0.002	2.5
40	1712.499998	-0.001	1752.499998	-0.001	2.5
50	1712.499996	-0.002	1752.499996	-0.002	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)	
120	1715.000004	0.002	1750.000004	0.002	2.5
102	1715.000002	0.001	1750.000003	0.002	2.5
138	1715.000004	0.002	1750.000003	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	1715.000002	0.001	1750.000002	0.001	2.5
0	1715.000002	0.001	1750.000001	0.001	2.5
10	1715.000002	0.001	1750.000003	0.002	2.5
20	1714.999997	-0.002	1749.999996	-0.002	2.5
30	1714.999999	-0.001	1749.999998	-0.001	2.5
40	1714.999998	-0.001	1749.999999	-0.001	2.5
50	1714.999999	-0.001	1749.999996	-0.002	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)	
120	1717.500003	0.002	1747.500002	0.001	2.5
102	1717.500004	0.002	1747.500004	0.002	2.5
138	1717.500003	0.002	1747.500001	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	1717.500003	0.001	1747.500003	0.002	2.5
-20	1717.500002	0.001	1747.500002	0.001	2.5
-10	1717.500004	0.002	1747.500003	0.002	2.5
0	1717.500004	0.002	1747.500002	0.001	2.5
10	1717.500004	0.002	1747.500002	0.001	2.5
20	1717.499998	-0.001	1747.499997	-0.002	2.5
30	1717.499998	-0.001	1747.499998	-0.001	2.5
40	1717.499998	-0.001	1747.499998	-0.001	2.5
50	1717.499998	-0.001	1747.499998	-0.001	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)	
120	1720.000001	0.001	1745.000003	0.002	2.5
102	1720.000003	0.002	1745.000004	0.002	2.5
138	1720.000002	0.001	1745.000002	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	1720.000003	0.002	1745.000002	0.001	2.5
-20	1720.000002	0.001	1745.000003	0.002	2.5
-10	1720.000002	0.001	1745.000003	0.002	2.5
0	1720.000002	0.001	1745.000004	0.002	2.5
10	1720.000002	0.001	1745.000002	0.001	2.5
20	1719.999998	-0.001	1744.999997	-0.002	2.5
30	1719.999997	-0.002	1744.999996	-0.002	2.5
40	1719.999998	-0.001	1744.999996	-0.002	2.5
50	1719.999997	-0.002	1744.999998	-0.001	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)	
120	699.700003	0.005	715.300003	0.004	2.5
102	699.700003	0.004	715.300004	0.005	2.5
138	699.700002	0.002	715.300003	0.004	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	0.002	715.300002	0.003	2.5
-20	699.700003	0.004	715.300001	0.002	2.5
-10	699.700003	0.004	715.300001	0.002	2.5
0	699.700004	0.005	715.300003	0.004	2.5
10	699.700003	0.004	715.300003	0.004	2.5
20	699.699997	-0.004	715.299997	-0.004	2.5
30	699.699997	-0.004	715.299999	-0.002	2.5
40	699.699996	-0.006	715.299996	-0.005	2.5
50	699.699998	-0.003	715.299999	-0.002	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)	
120	700.500004	0.005	714.500003	0.004	2.5
102	700.500002	0.003	714.500002	0.003	2.5
138	700.500003	0.004	714.500002	0.002	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	700.500004	0.005	714.500002	0.003	2.5
-20	700.500002	0.003	714.500002	0.002	2.5
-10	700.500002	0.003	714.500002	0.003	2.5
0	700.500002	0.003	714.500003	0.004	2.5
10	700.500003	0.004	714.500003	0.004	2.5
20	700.499997	-0.004	714.499996	-0.005	2.5
30	700.499998	-0.003	714.499998	-0.003	2.5
40	700.499999	-0.002	714.499998	-0.003	2.5
50	700.499997	-0.004	714.499997	-0.005	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)	
120	701.500003	0.004	713.500003	0.003	2.5
102	701.500001	0.002	713.500002	0.003	2.5
138	701.500003	0.004	713.500001	0.002	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	713.500002	0.003	2.5
-20	701.500002	0.002	713.500004	0.005	2.5
-10	701.500001	0.002	713.500004	0.006	2.5
0	701.500003	0.004	713.500001	0.001	2.5
10	701.500002	0.002	713.500004	0.005	2.5
20	701.499998	-0.003	713.499998	-0.002	2.5
30	701.499998	-0.002	713.499997	-0.004	2.5
40	701.499996	-0.005	713.499998	-0.003	2.5
50	701.499997	-0.005	713.499998	-0.003	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)	
120	704.000001	0.001	711.000004	0.005	2.5
102	704.000003	0.004	711.000002	0.003	2.5
138	704.000002	0.002	711.000003	0.004	2.5

Note: The applicant defined the normal working voltage of the battery is from 102 Vac to 138 Vac.

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	711.000001	0.002	2.5
-20	704.000002	0.002	711.000004	0.006	2.5
-10	704.000002	0.003	711.000004	0.005	2.5
0	704.000002	0.003	711.000001	0.001	2.5
10	704.000004	0.005	711.000002	0.003	2.5
20	703.999997	-0.005	710.999997	-0.004	2.5
30	703.999998	-0.003	710.999998	-0.003	2.5
40	703.999997	-0.005	710.999996	-0.006	2.5
50	703.999997	-0.004	710.999997	-0.005	2.5

4.3 Occupied Bandwidth Measurement

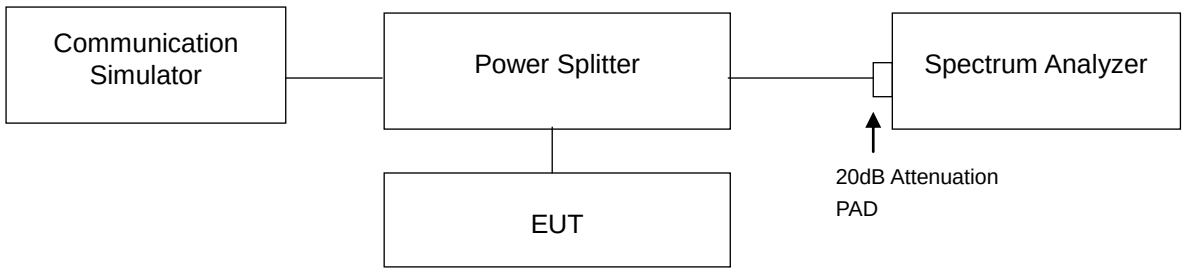
4.3.1 Limits of Occupied Bandwidth Measurement

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.

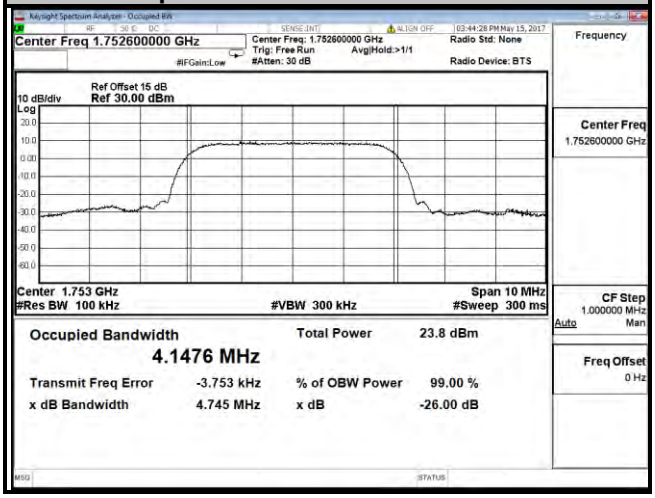
4.3.3 Test Setup



4.3.4 Test Result

WCDMA		
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**
1312	1712.4	4.1382
1413	1732.6	4.1398
1513	1752.6	4.1476

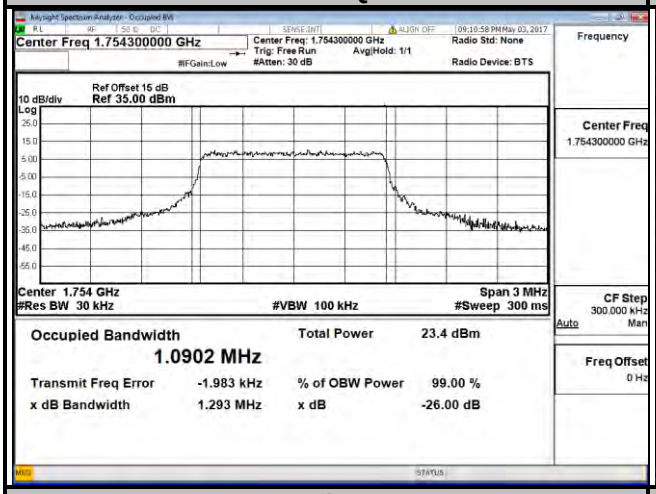
Spectrum Plot of Worst Value



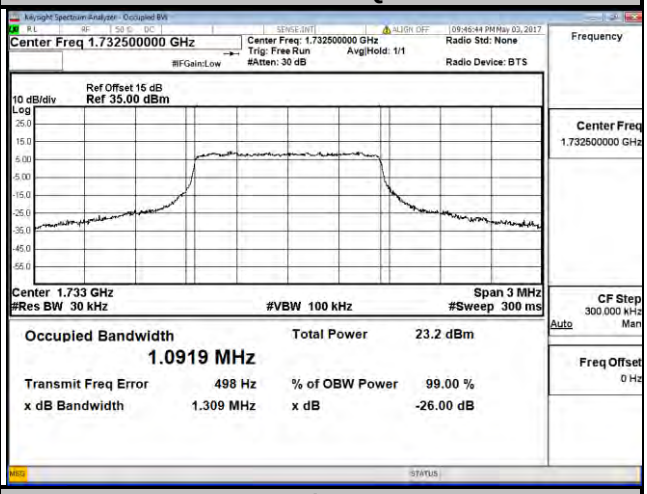
LTE Band 4							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	1.0888	1.0899	19965	1711.5	2.7026	2.6961
20175	1732.5	1.0898	1.0919	20175	1732.5	2.7005	2.6972
20393	1754.3	1.0902	1.0904	20385	1753.5	2.7023	2.6974

Spectrum Plot of Worst Value

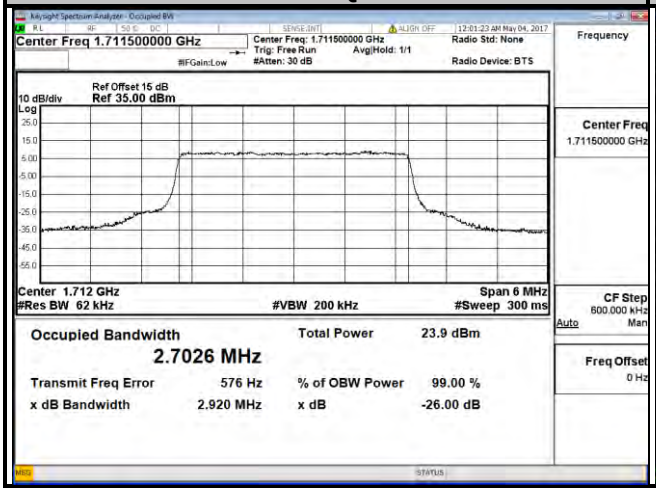
1.4 MHz / QPSK



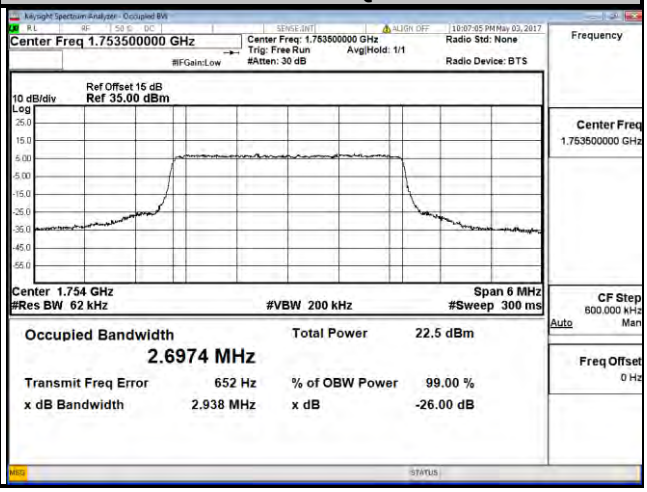
1.4 MHz / 16QAM



3 MHz / QPSK



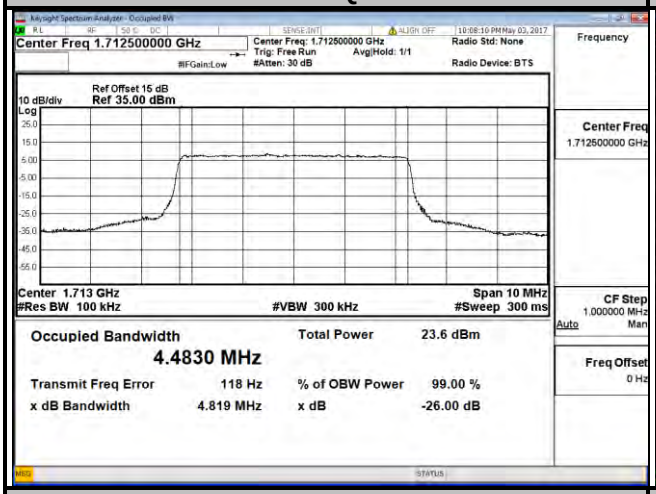
3 MHz / 16QAM



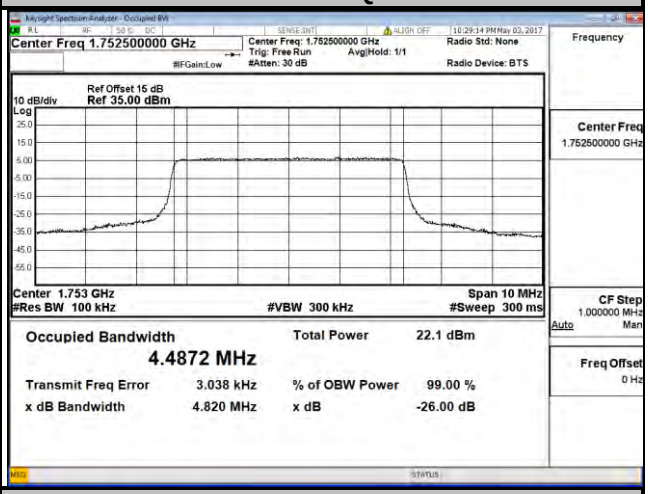
LTE Band 4							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.4830	4.4844	20000	1715.0	8.9744	8.9751
20175	1732.5	4.4804	4.4830	20175	1732.5	8.9609	8.9567
20375	1752.5	4.4828	4.4872	20350	1750.0	8.9778	8.9844

Spectrum Plot of Worst Value

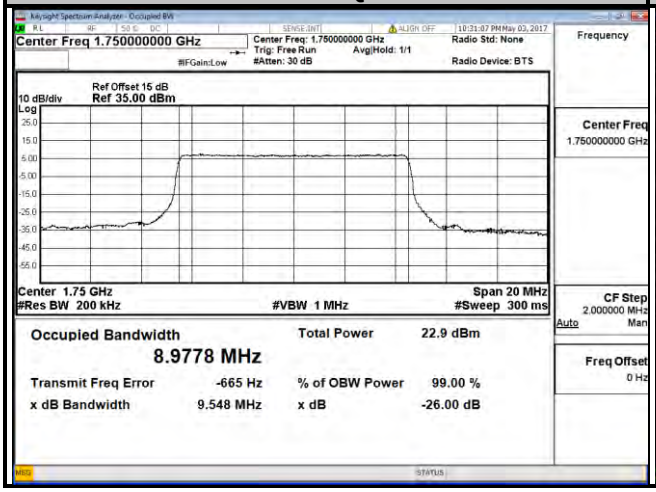
5 MHz / QPSK



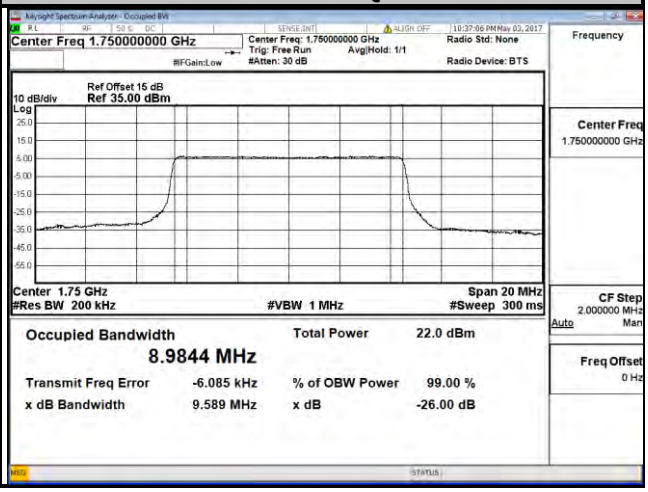
5 MHz / 16QAM



10 MHz / QPSK



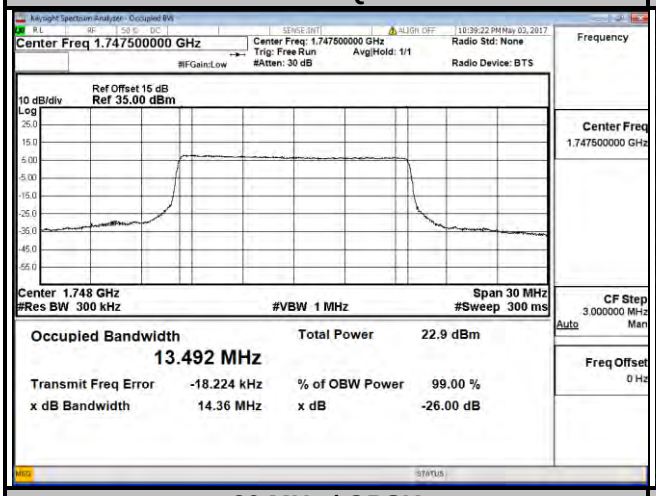
10 MHz / 16QAM



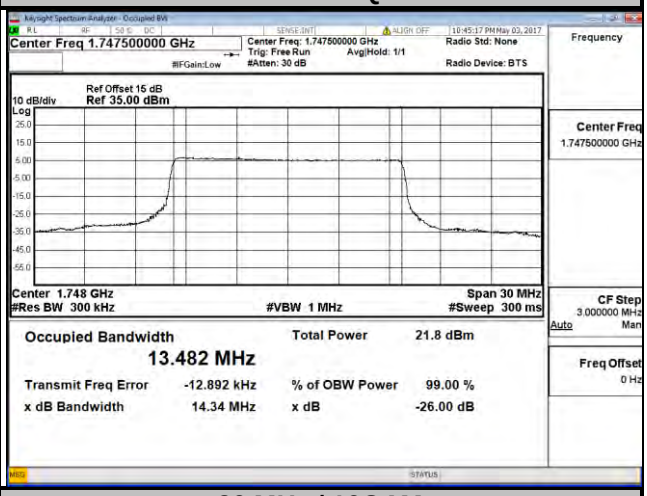
LTE Band 4							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	13.486	13.475	20050	1720.0	17.986	18.006
20175	1732.5	13.426	13.410	20175	1732.5	17.858	17.881
20325	1747.5	13.492	13.482	20300	1745.0	17.954	17.972

Spectrum Plot of Worst Value

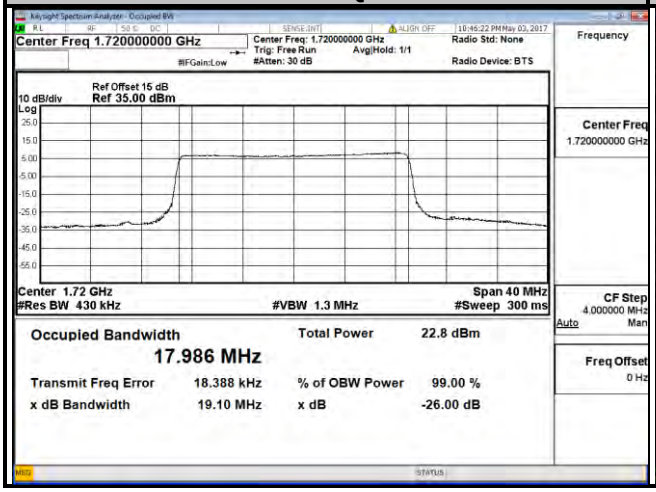
15 MHz / QPSK



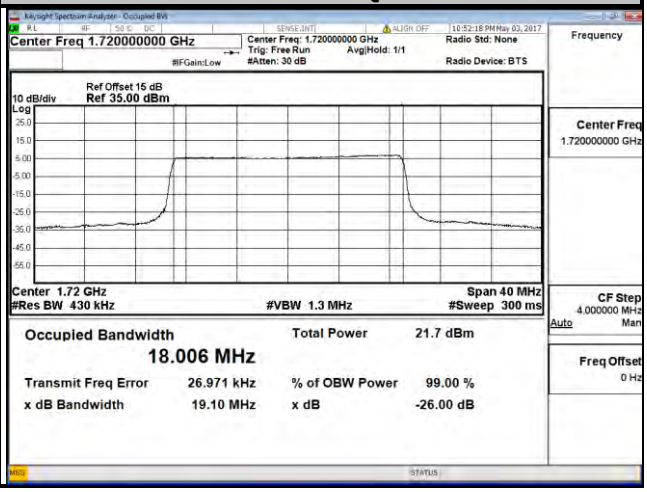
15 MHz / 16QAM



20 MHz / QPSK



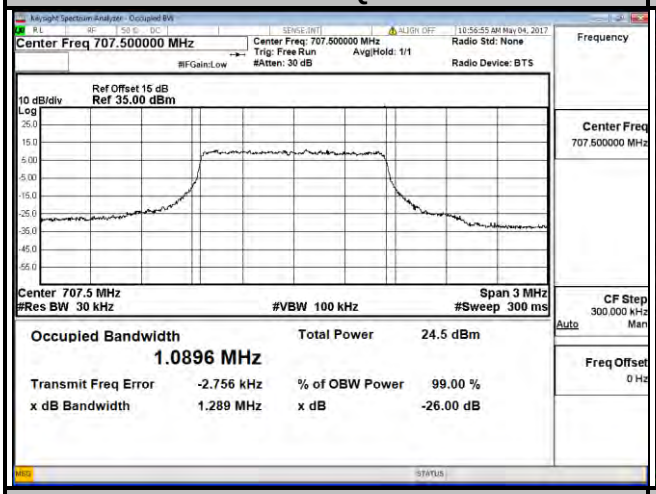
20 MHz / 16QAM



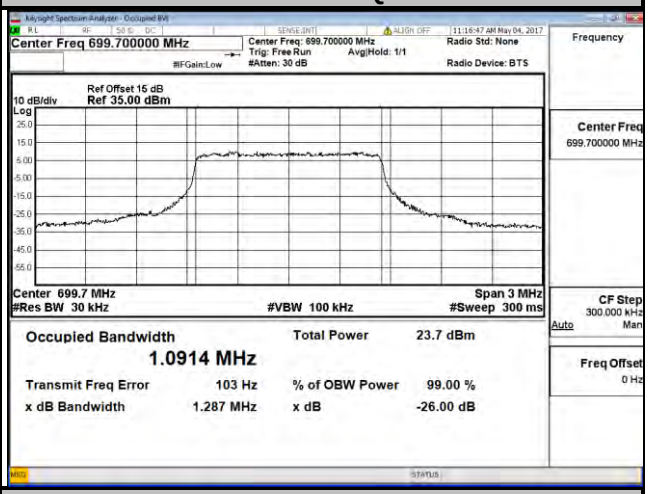
LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	1.0874	1.0914	23025	700.5	2.7035	2.6959
23095	707.5	1.0896	1.0894	23095	707.5	2.7010	2.6982
23173	715.3	1.0886	1.0900	23165	714.5	2.6975	2.6942

Spectrum Plot of Worst Value

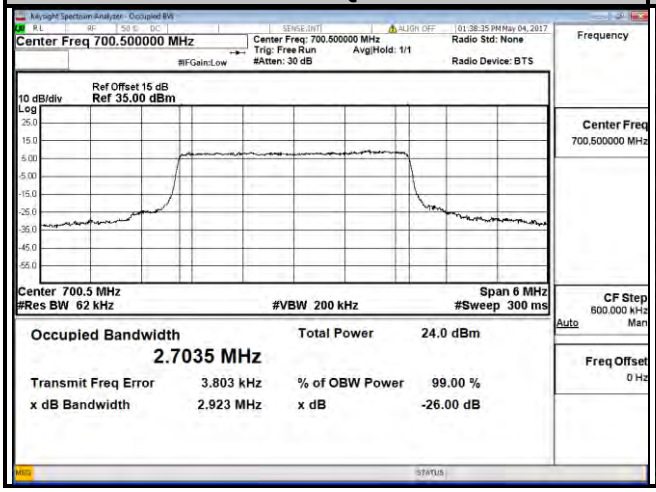
1.4 MHz / QPSK



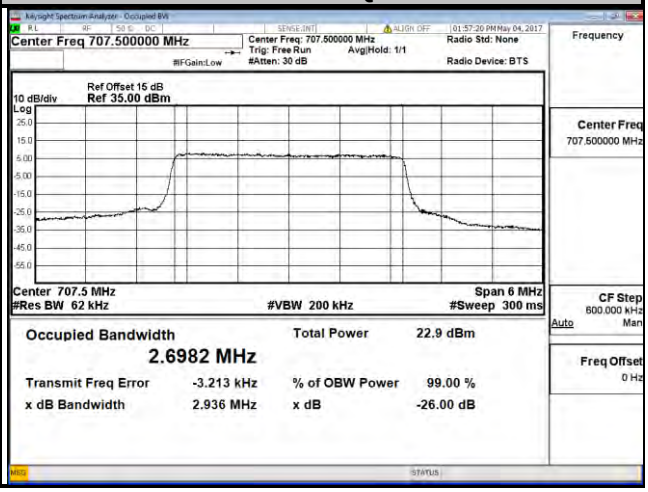
1.4 MHz / 16QAM



3 MHz / QPSK



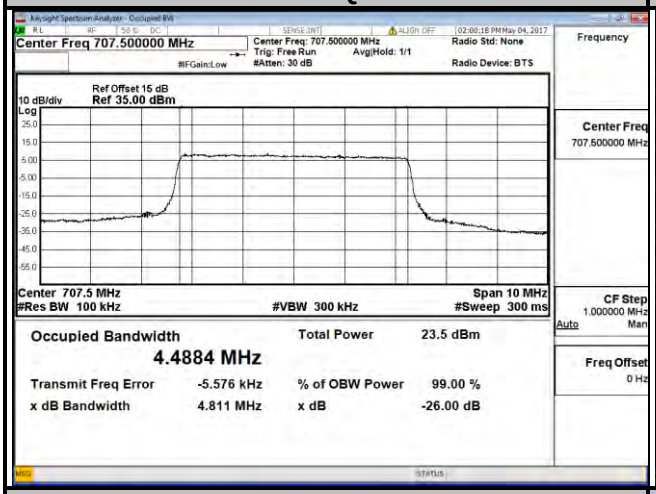
3 MHz / 16QAM



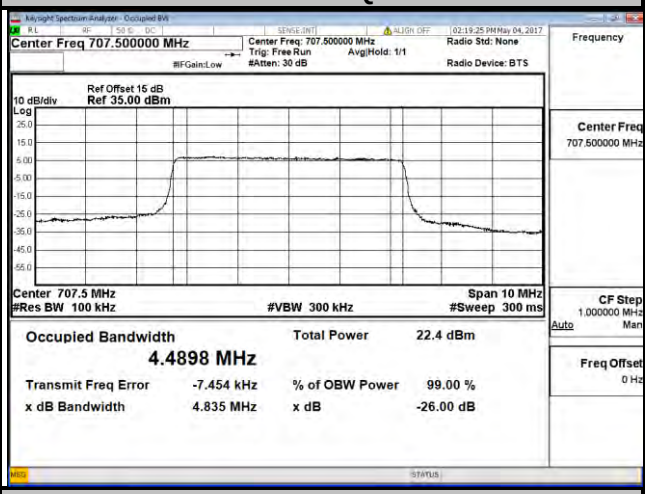
LTE Band 12							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	4.4796	4.4806	23060	704.0	8.9451	8.9501
23095	707.5	4.4884	4.4898	23095	707.5	8.9903	8.9970
23155	713.5	4.4720	4.4732	23130	711.0	8.9745	8.9768

Spectrum Plot of Worst Value

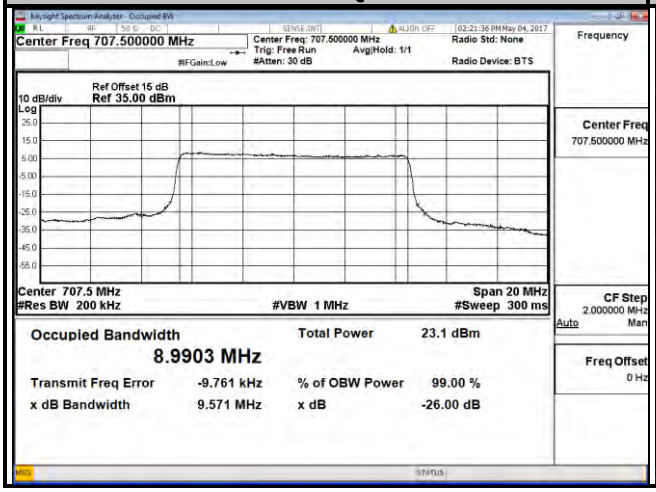
5 MHz / QPSK



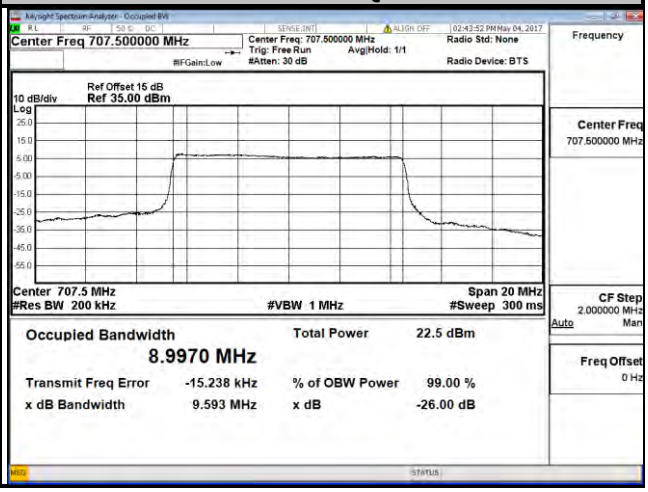
5 MHz / 16QAM



10 MHz / QPSK



10 MHz / 16QAM



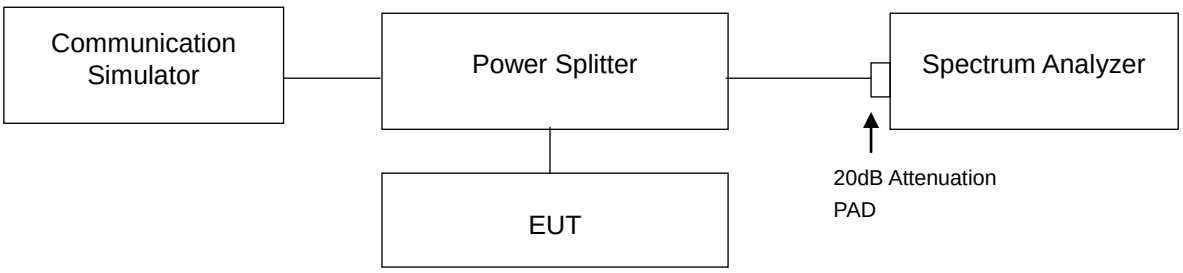
4.4 Band Edge Measurement

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.

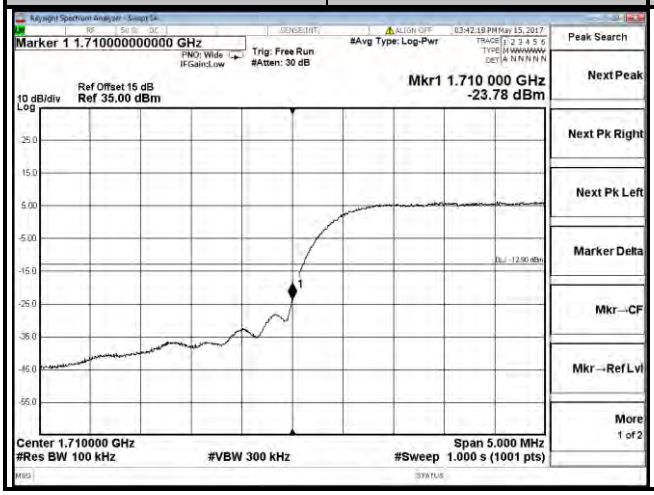
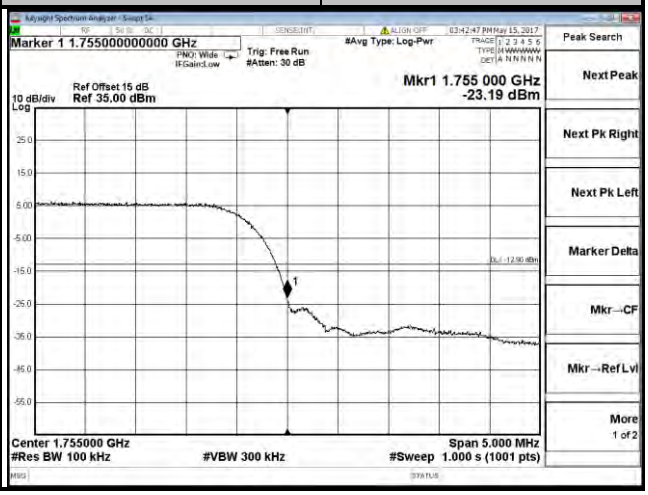
4.4.2 Test Setup

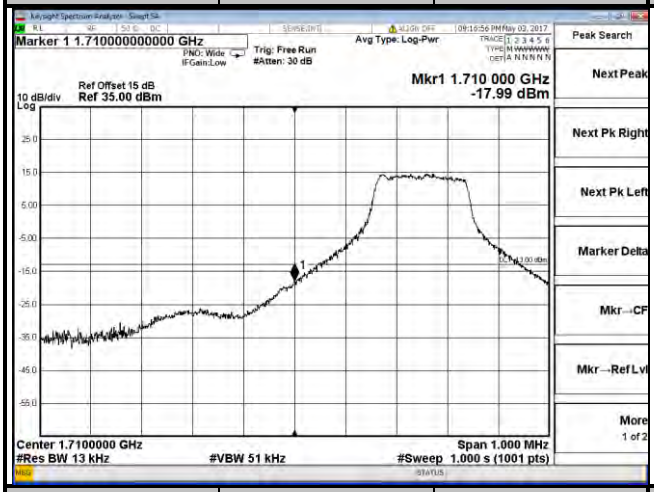
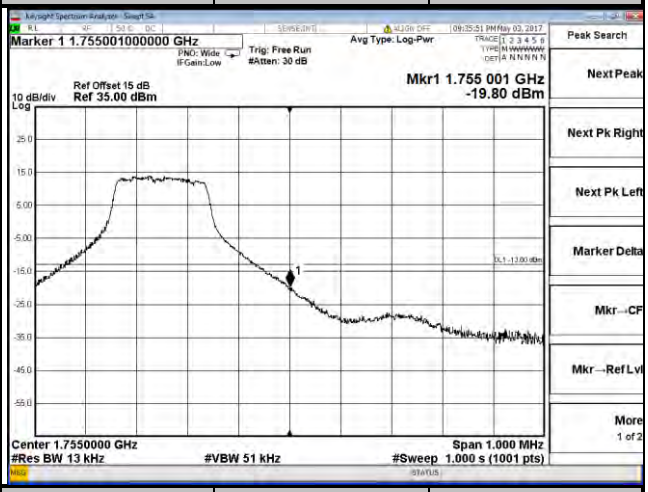
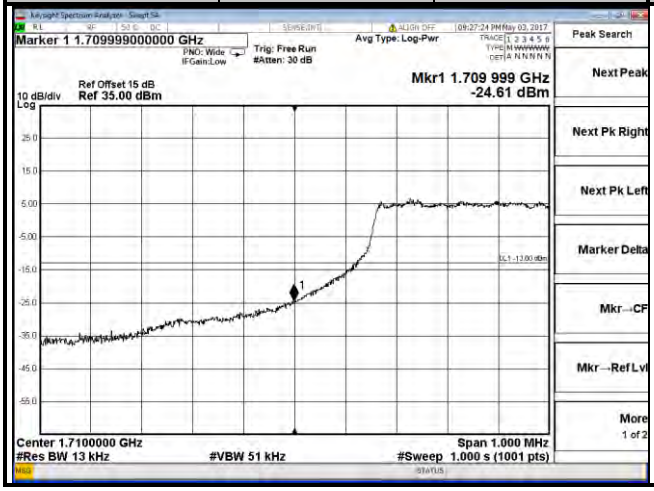
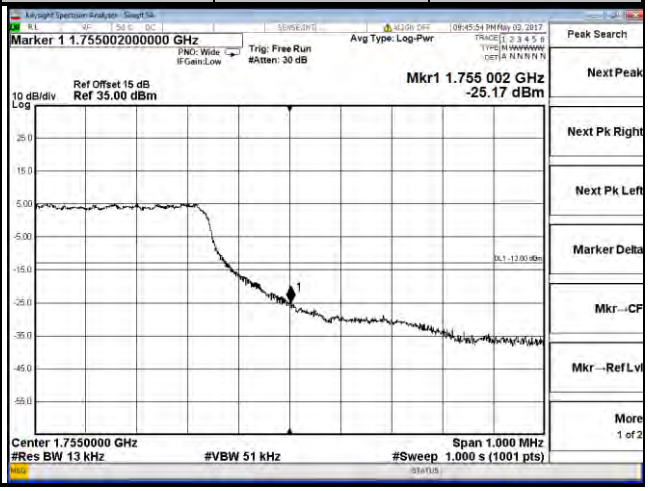


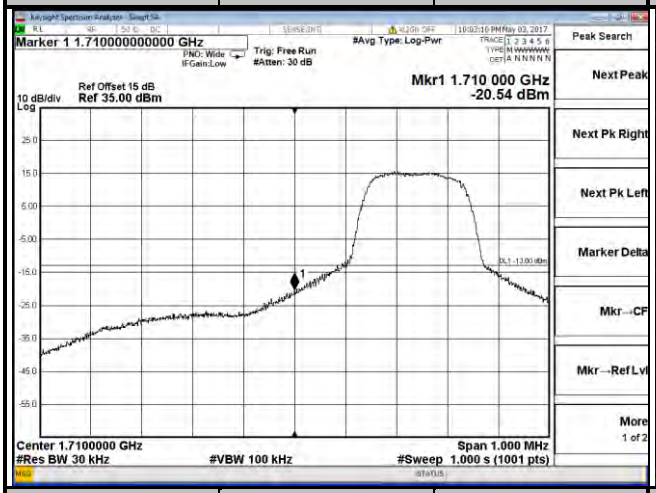
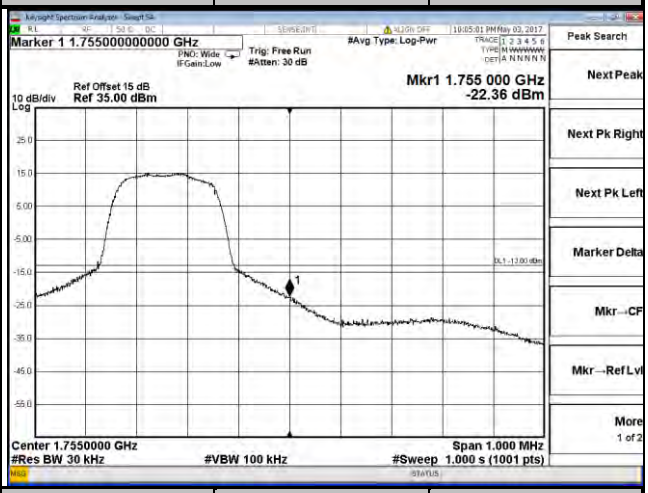
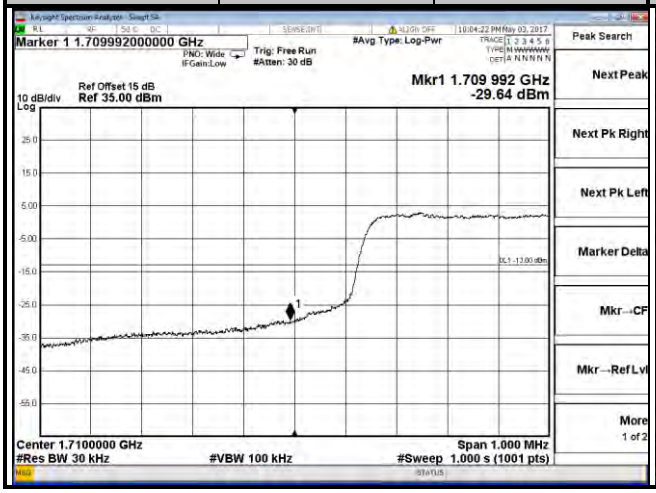
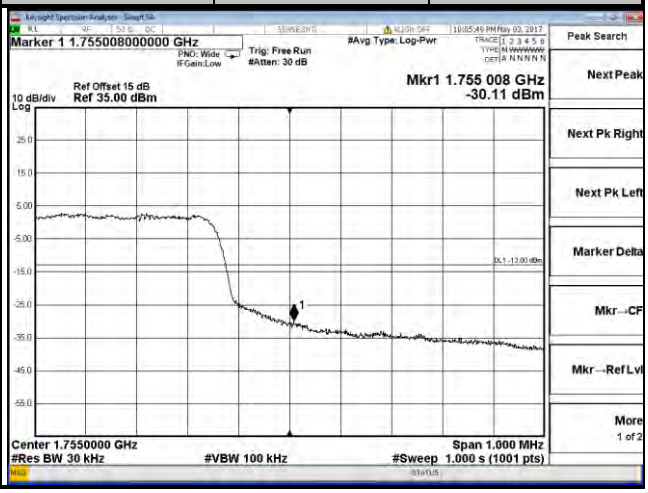
4.4.3 Test Procedures

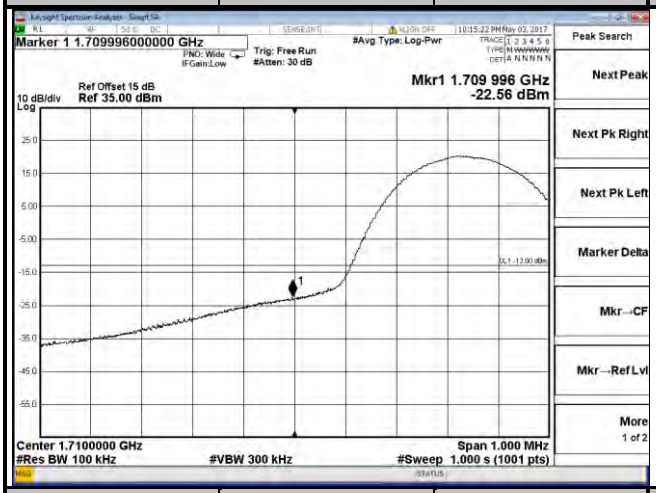
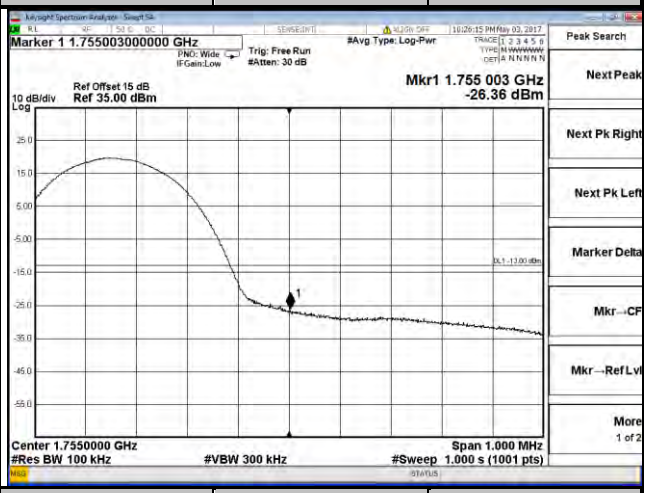
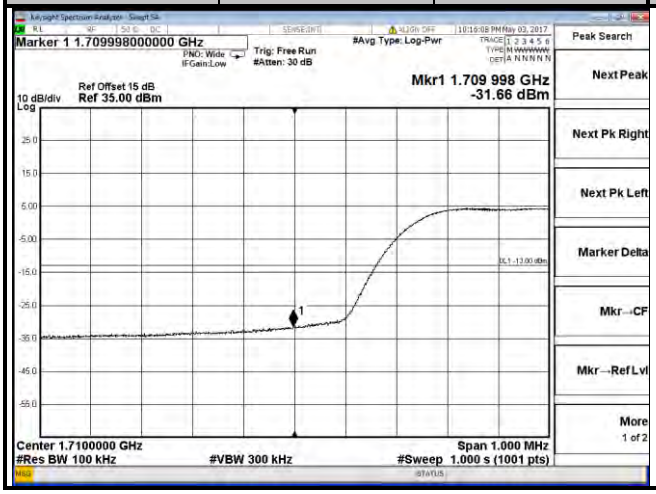
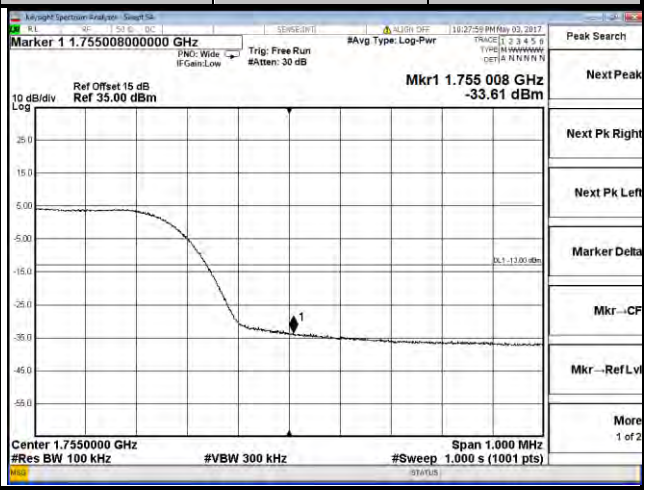
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
c. The center frequency of spectrum is the band edge frequency and span 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.

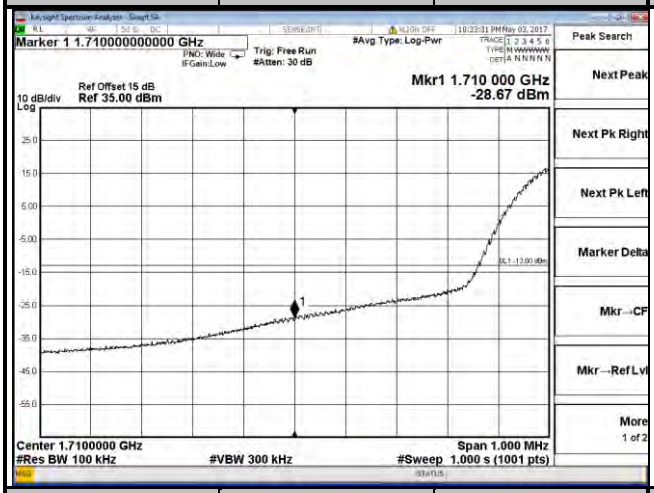
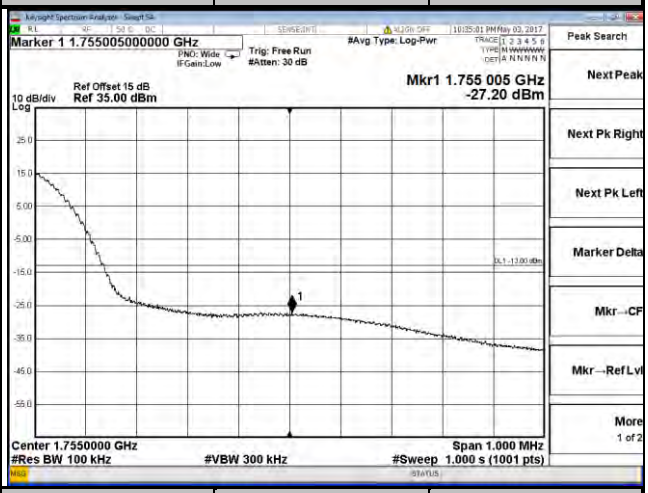
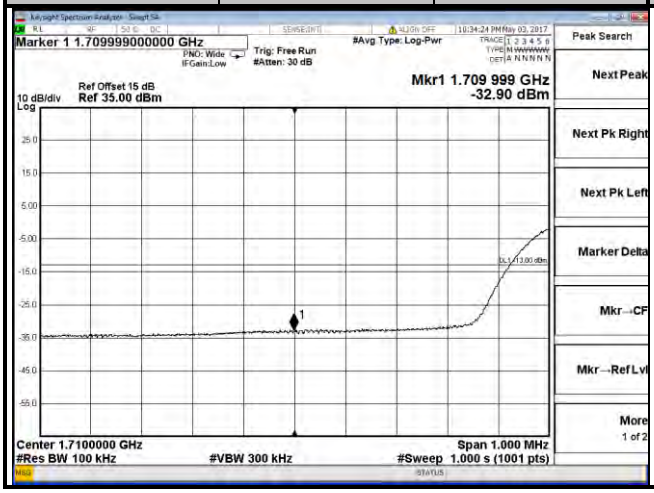
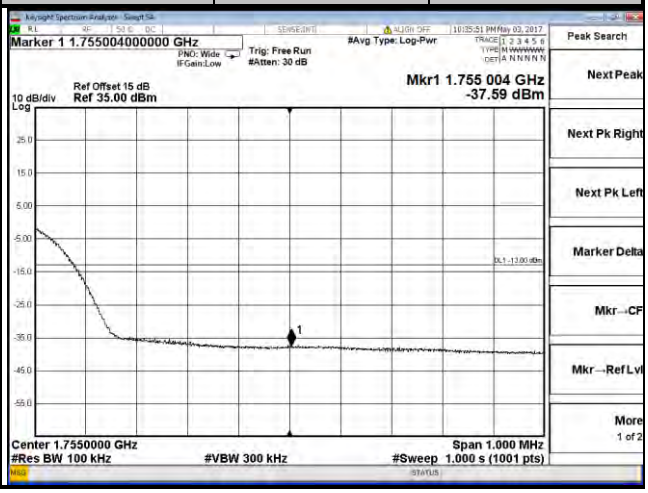
4.4.4 Test Results

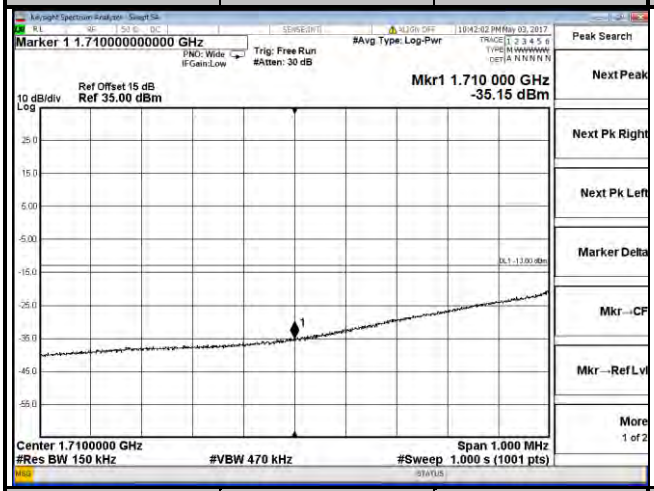
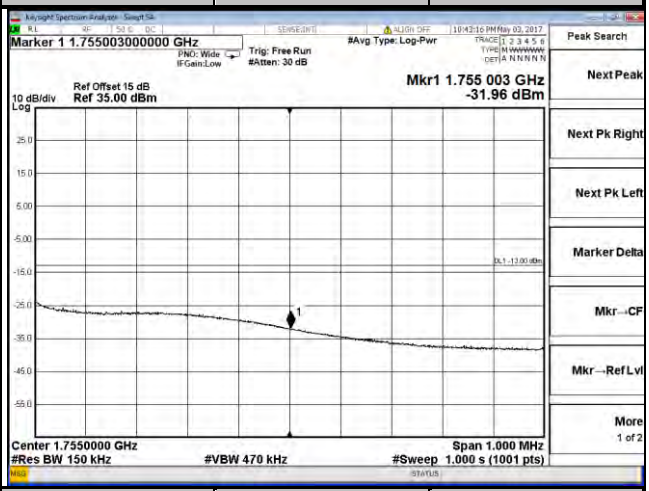
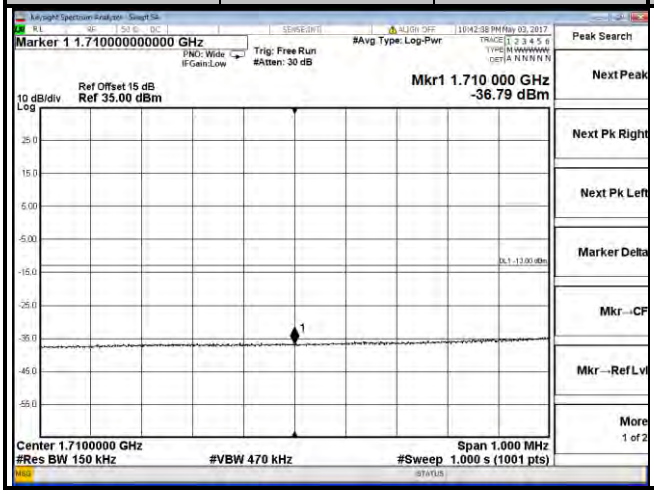
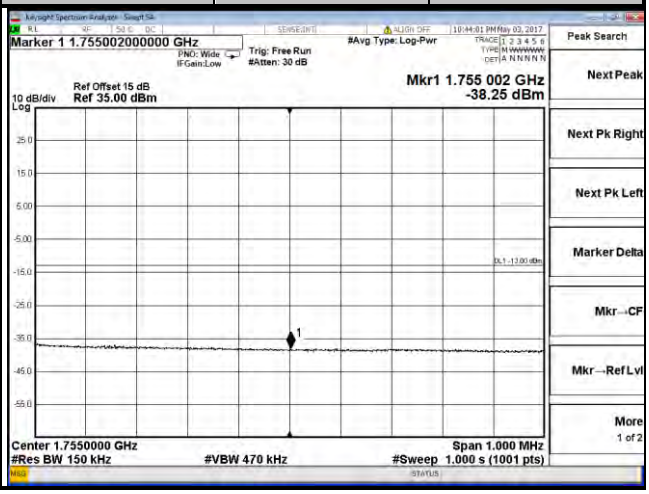
WCDMA			
Channel	1312	Channel	1513
			

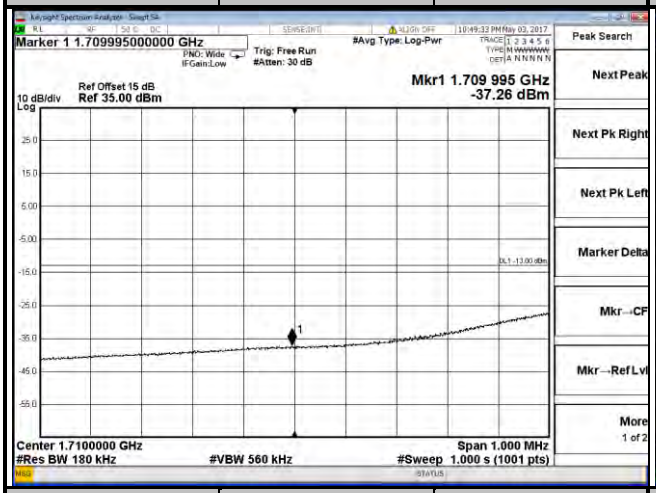
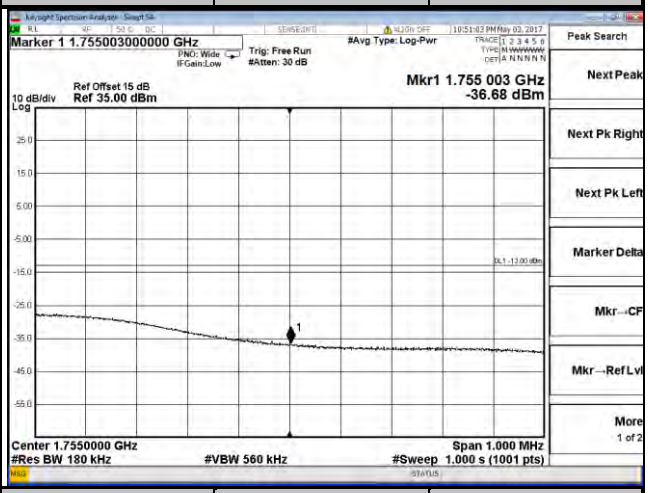
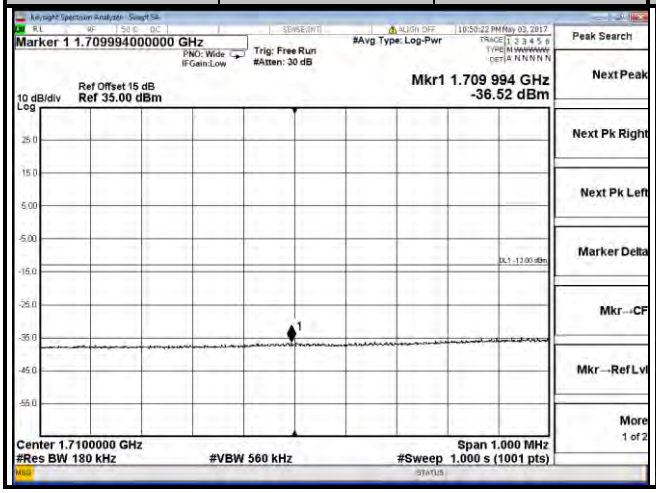
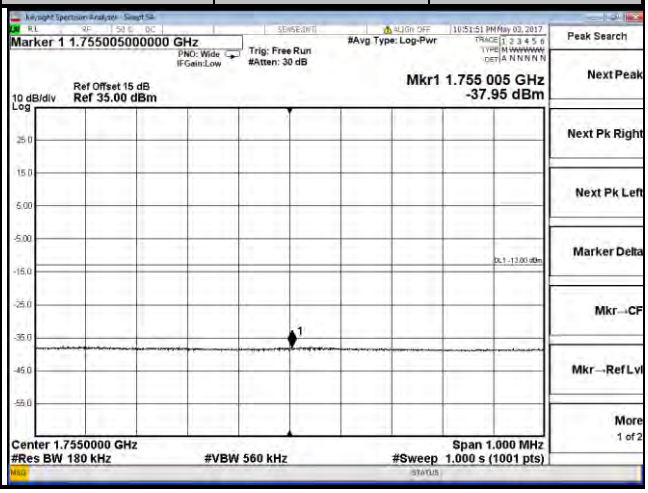
LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	19957	6 RB	Channel	20393	6 RB
					
Channel	19957	25 RB	Channel	20393	25 RB
					

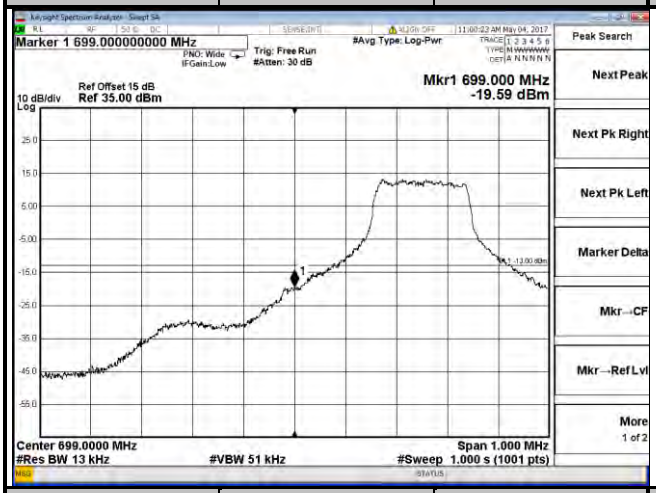
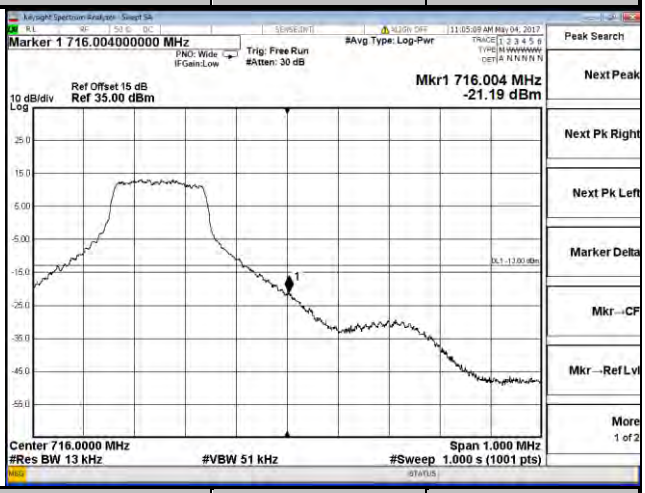
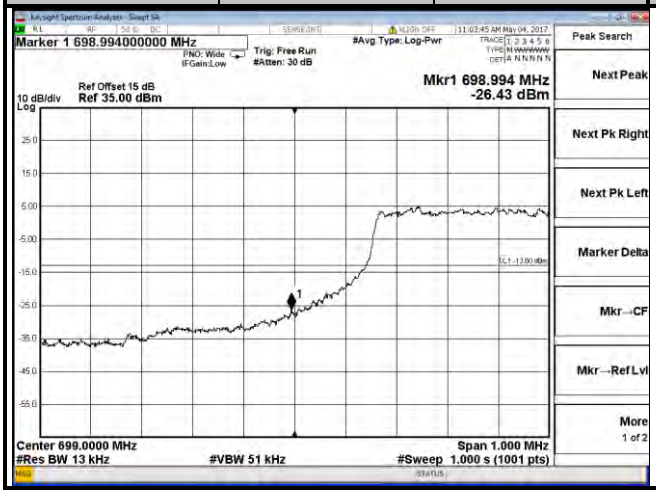
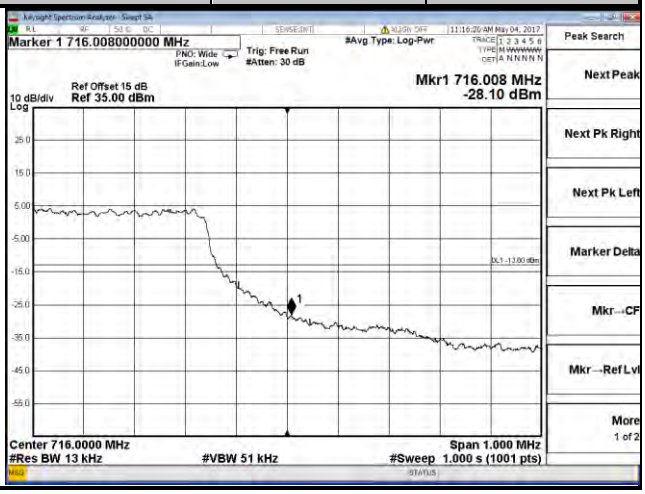
LTE Band 4					
Channel Bandwidth: 3 MHz					
Channel	19965	1 RB	Channel	20385	1 RB
					
Channel	19965	15 RB	Channel	20385	15 RB
					

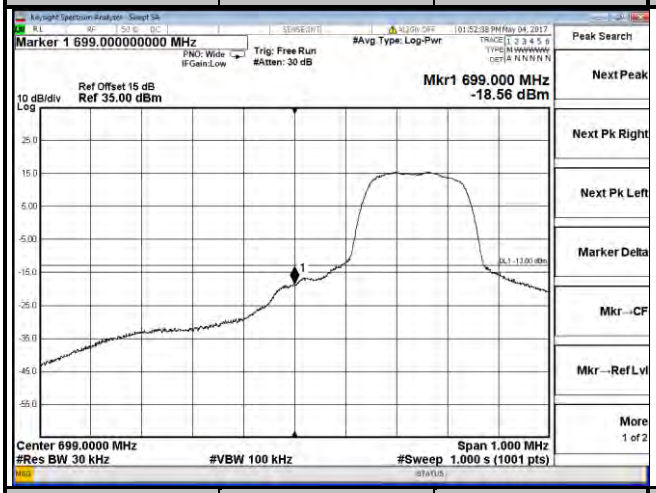
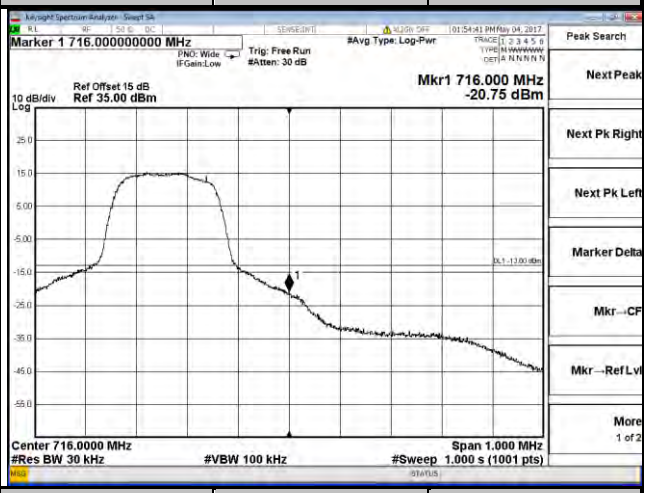
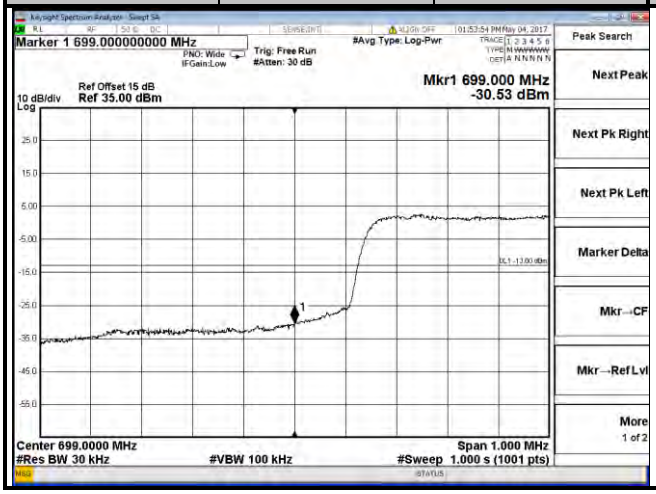
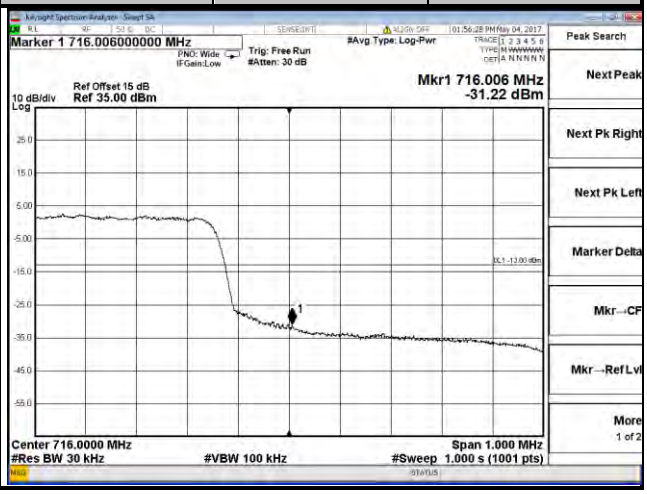
LTE Band 4					
Channel Bandwidth: 5 MHz					
Channel	19975	1 RB	Channel	20375	1 RB
					
Channel	19975	25 RB	Channel	20375	25 RB
					

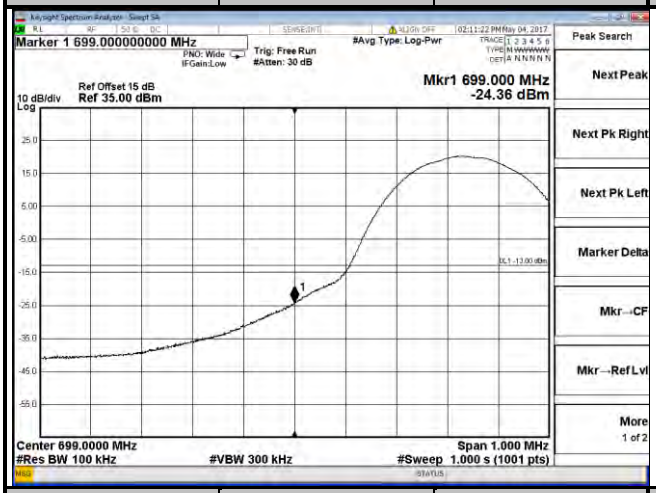
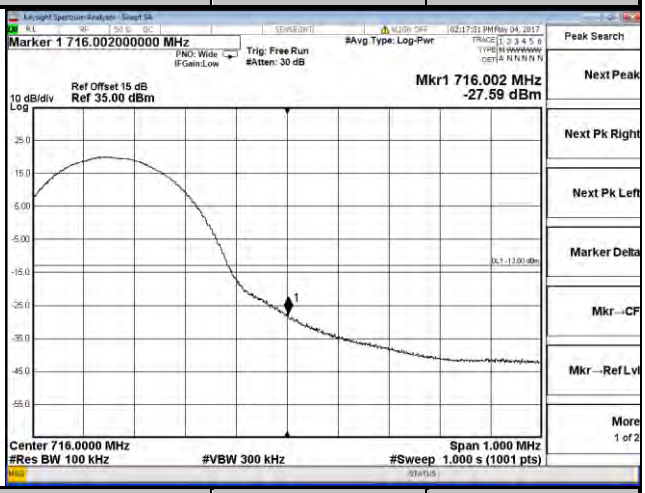
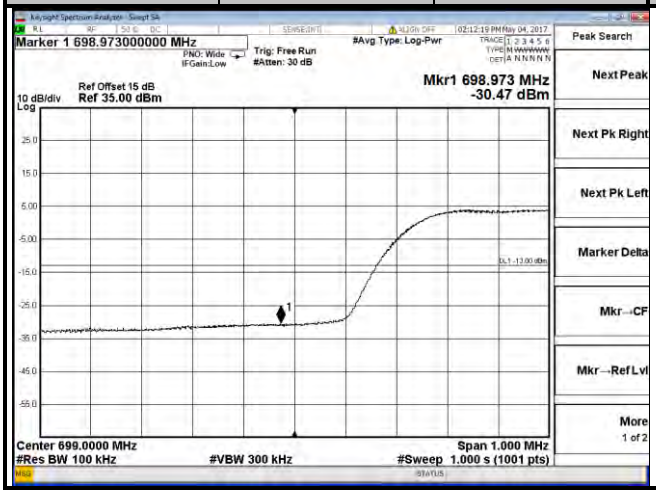
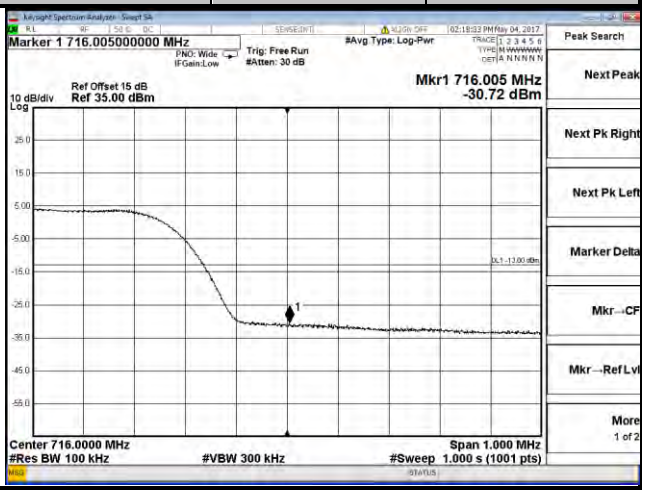
LTE Band 4					
Channel Bandwidth: 10 MHz					
Channel	20000	1 RB	Channel	20350	1 RB
					
Channel	20000	50 RB	Channel	20350	50 RB
					

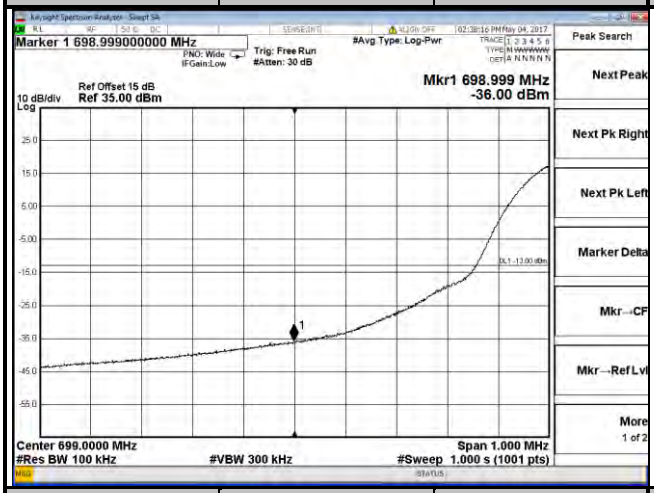
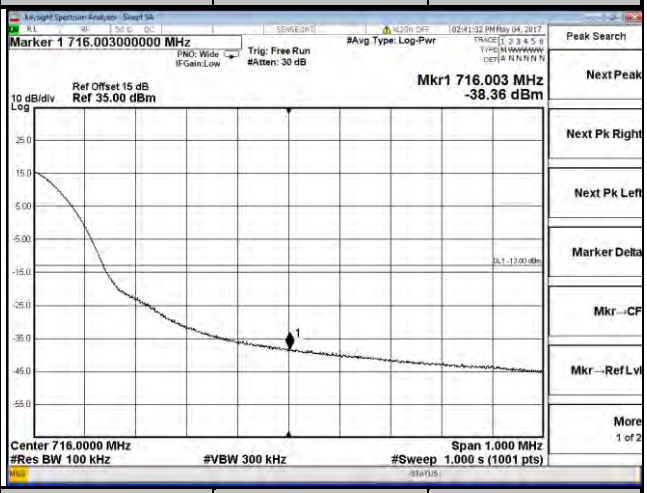
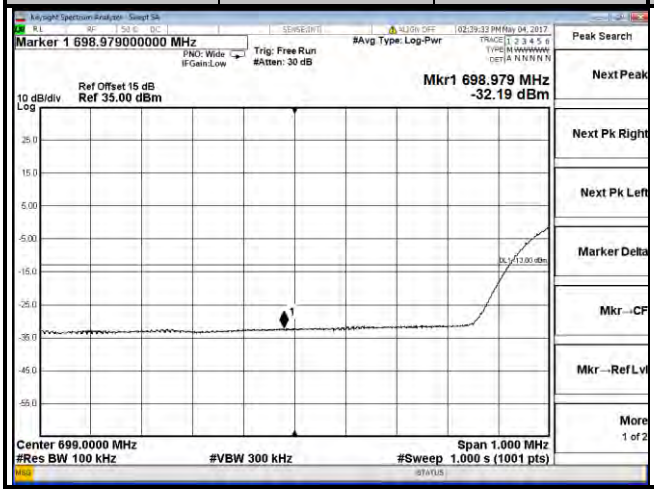
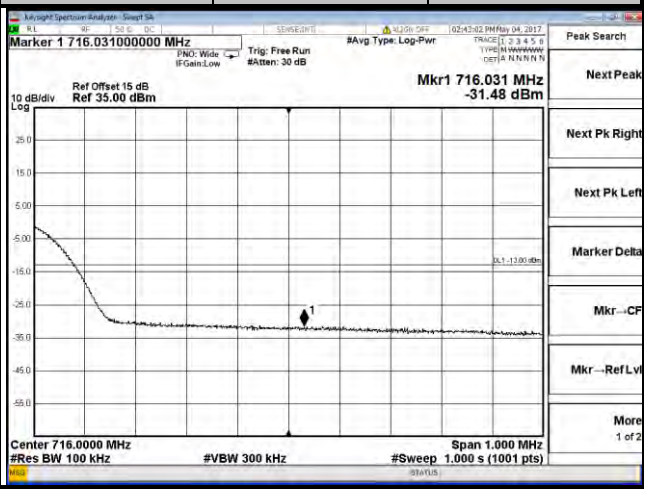
LTE Band 4					
Channel Bandwidth: 15 MHz					
Channel	20025	1 RB	Channel	20325	1 RB
					
Channel	20025	75 RB	Channel	20325	75 RB
					

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
					

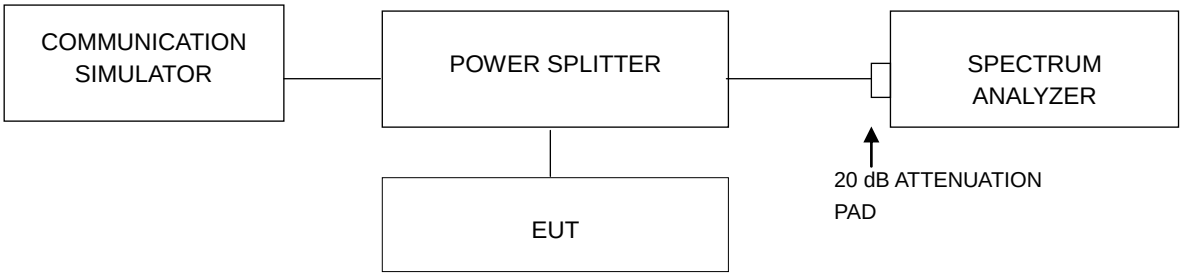
LTE Band 12					
Channel Bandwidth: 10 MHz					
Channel	23060	1 RB	Channel	23130	1 RB
					
Channel	23060	50 RB	Channel	23130	50 RB
					

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



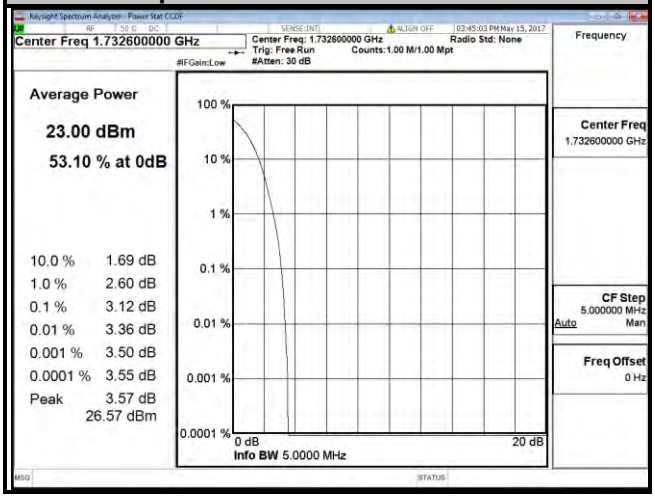
4.5.3 Test Procedures

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	3.05
1413	1732.6	3.12
1513	1752.6	2.82

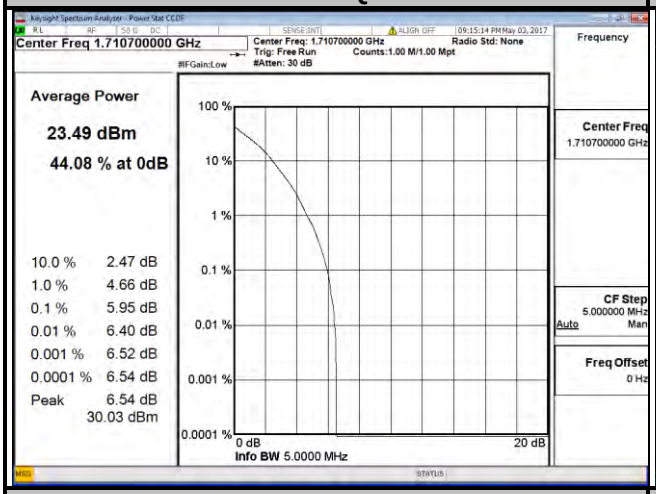
Spectrum Plot of Worst Value



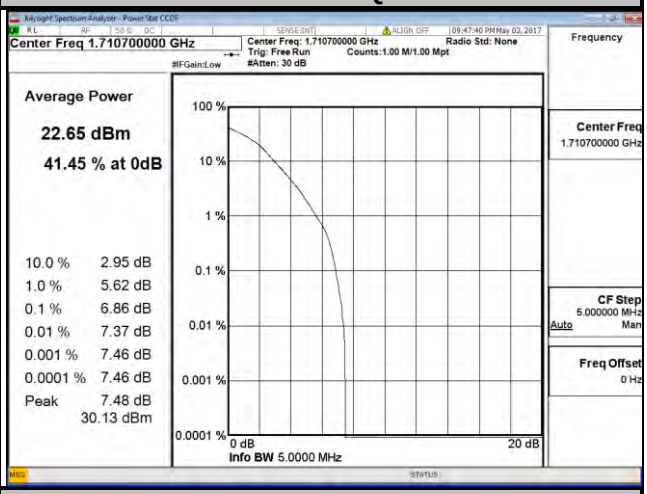
LTE Band 4							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	5.95	6.86	19965	1711.5	5.76	6.29
20175	1732.5	5.40	6.26	20175	1732.5	5.32	6.14
20393	1754.3	5.77	6.65	20385	1753.5	5.54	6.35

Spectrum Plot of Worst Value

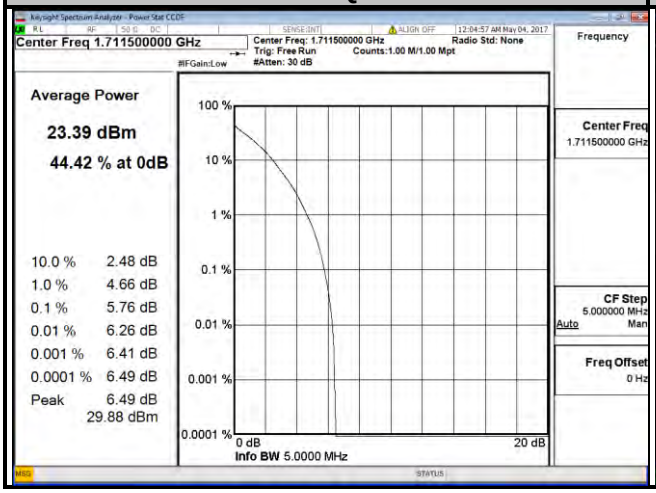
1.4 MHz / QPSK



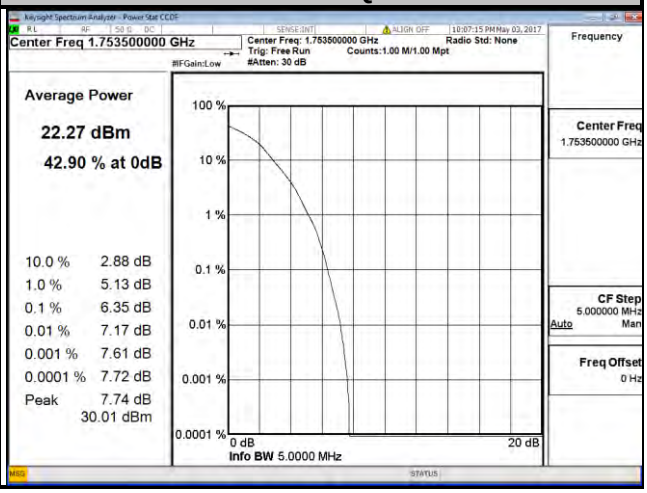
1.4 MHz / 16QAM



3 MHz / QPSK



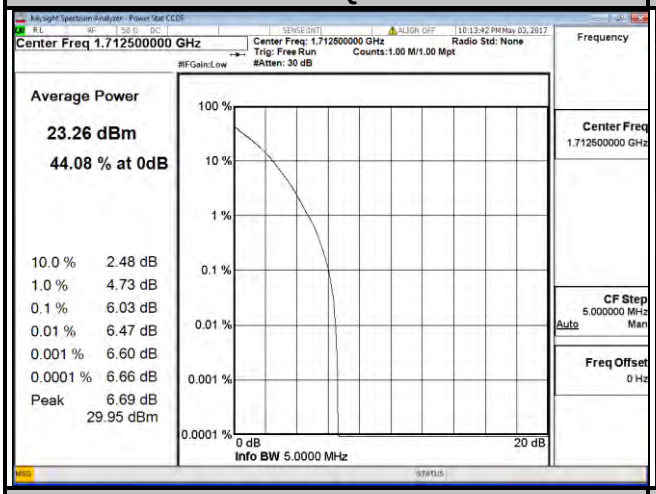
3 MHz / 16QAM



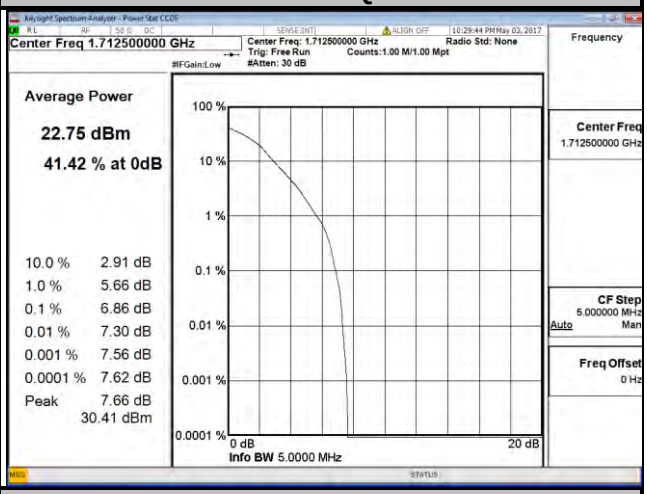
LTE Band 4							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	6.03	6.86	20000	1715.0	5.93	6.84
20175	1732.5	5.61	6.40	20175	1732.5	5.70	6.53
20375	1752.5	5.76	6.79	20350	1750.0	5.63	6.67

Spectrum Plot of Worst Value

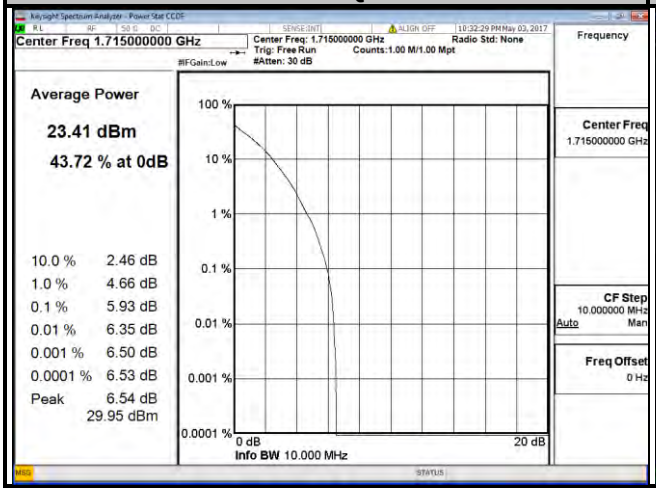
5 MHz / QPSK



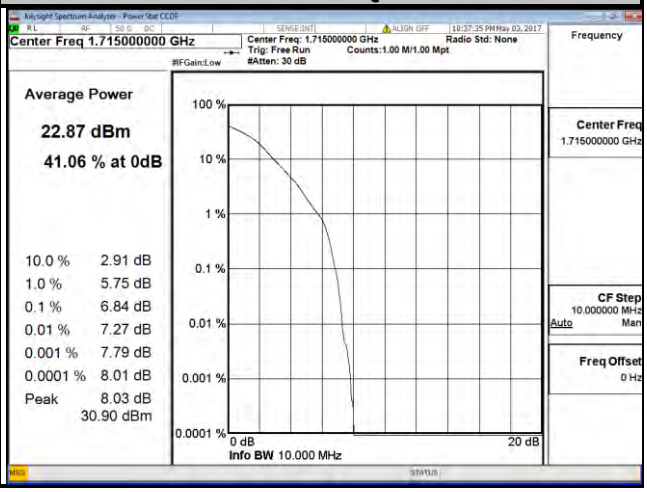
5 MHz / 16QAM



10 MHz / QPSK



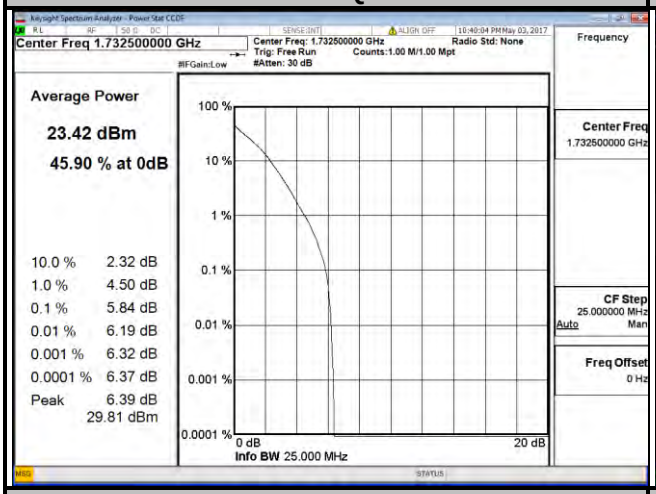
10 MHz / 16QAM



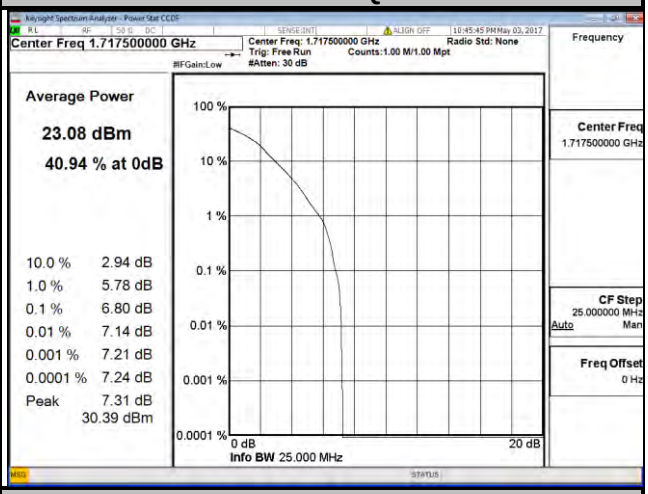
LTE Band 4							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	5.70	6.80	20050	1720.0	5.93	6.73
20175	1732.5	5.84	6.65	20175	1732.5	5.72	6.98
20325	1747.5	5.50	6.17	20300	1745.0	5.20	5.96

Spectrum Plot of Worst Value

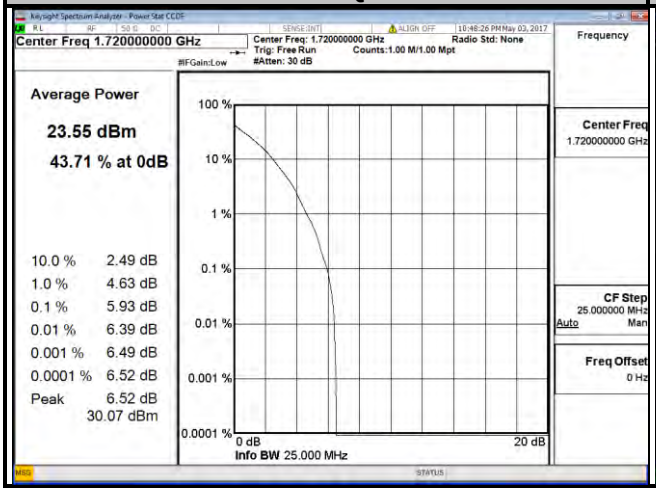
15 MHz / QPSK



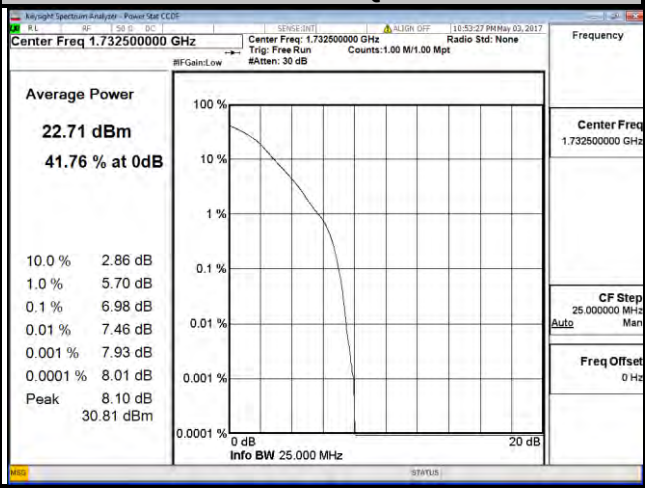
15 MHz / 16QAM



20 MHz / QPSK



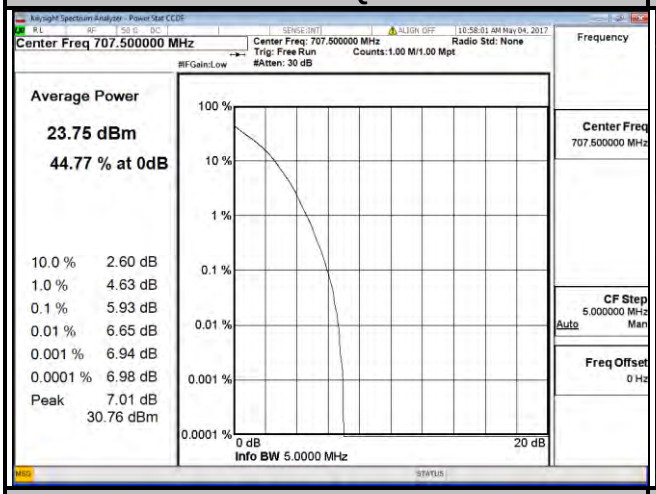
20 MHz / 16QAM



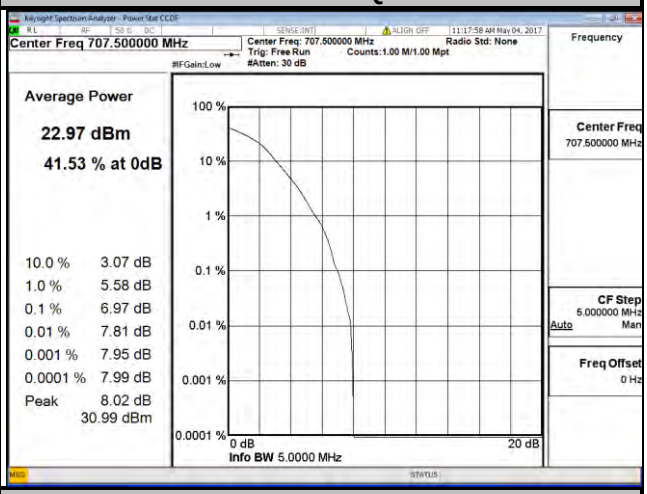
LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	5.08	5.95	23025	700.5	4.94	5.73
23095	707.5	5.93	6.97	23095	707.5	5.58	6.35
23173	715.3	5.45	6.57	23165	714.5	4.45	5.32

Spectrum Plot of Worst Value

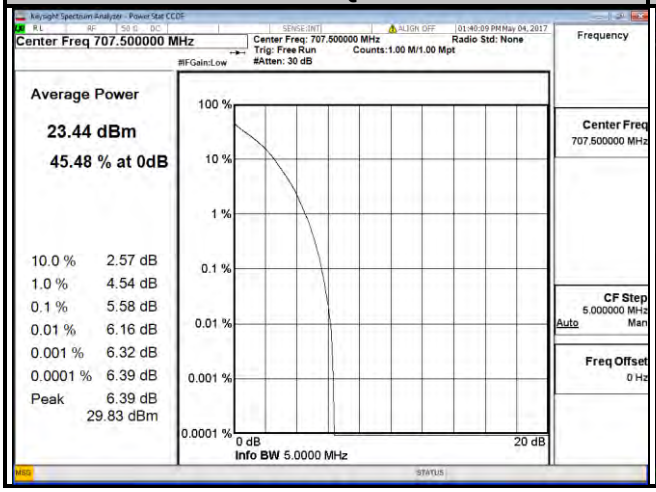
1.4 MHz / QPSK



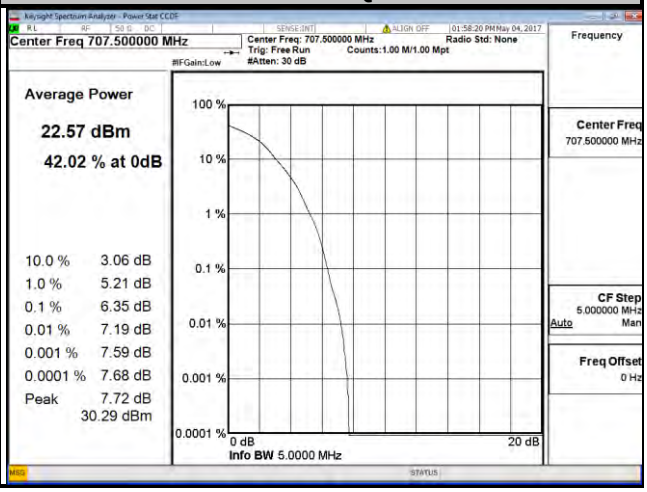
1.4 MHz / 16QAM



3 MHz / QPSK



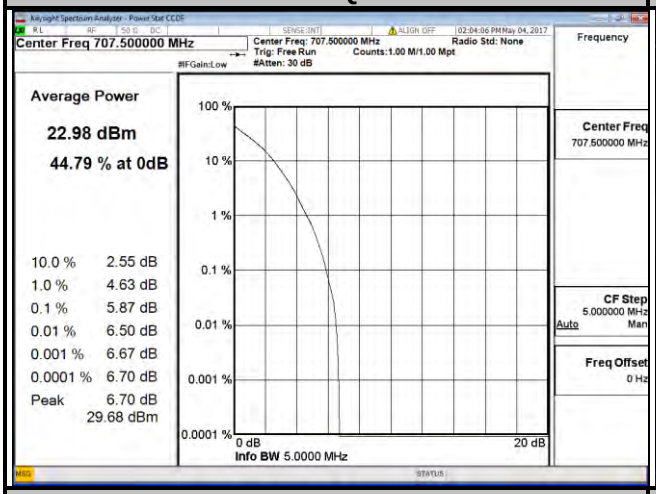
3 MHz / 16QAM



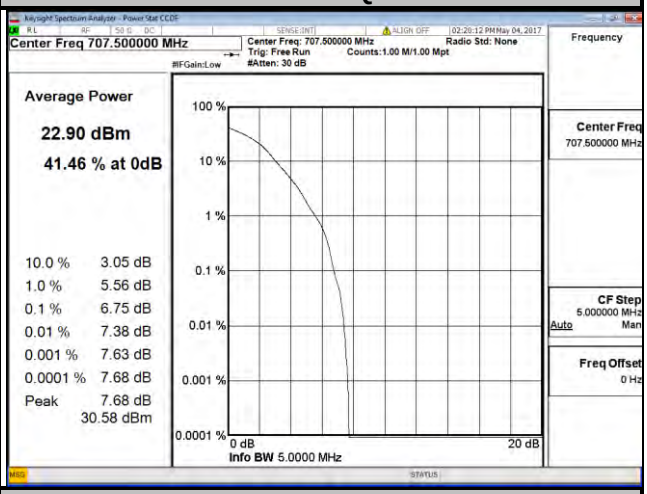
LTE Band 12							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	5.16	5.75	23060	704.0	5.04	5.81
23095	707.5	5.87	6.75	23095	707.5	5.62	6.70
23155	713.5	4.83	5.46	23130	711.0	5.76	6.77

Spectrum Plot of Worst Value

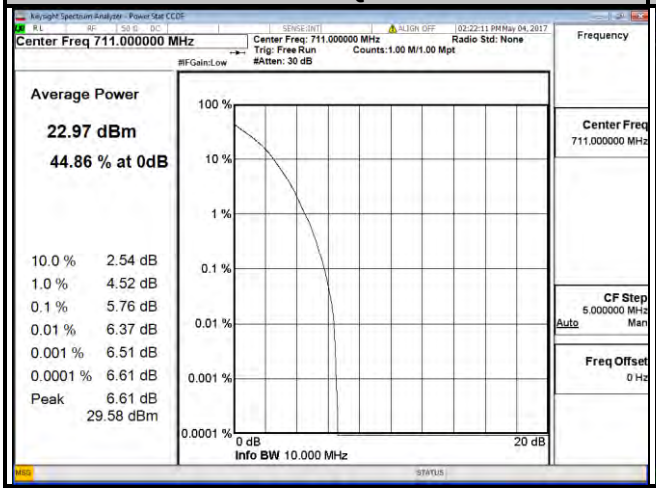
5 MHz / QPSK



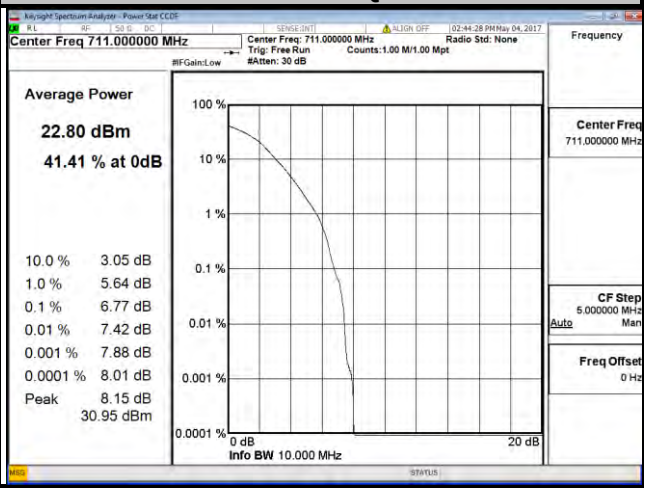
5 MHz / 16QAM



10 MHz / QPSK



10 MHz / 16QAM

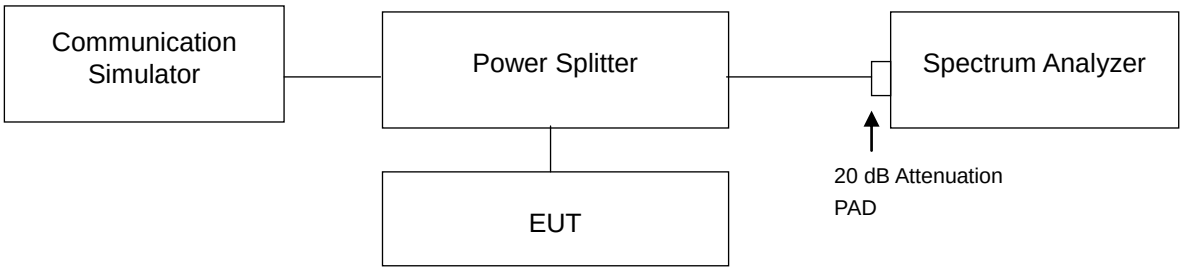


4.6 Conducted Spurious Emissions

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

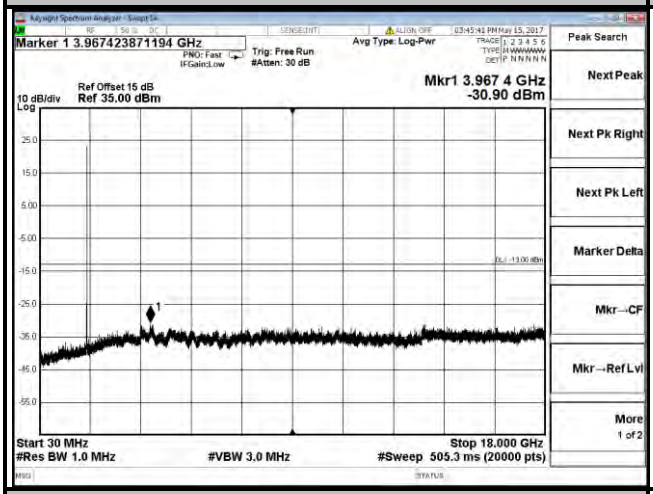
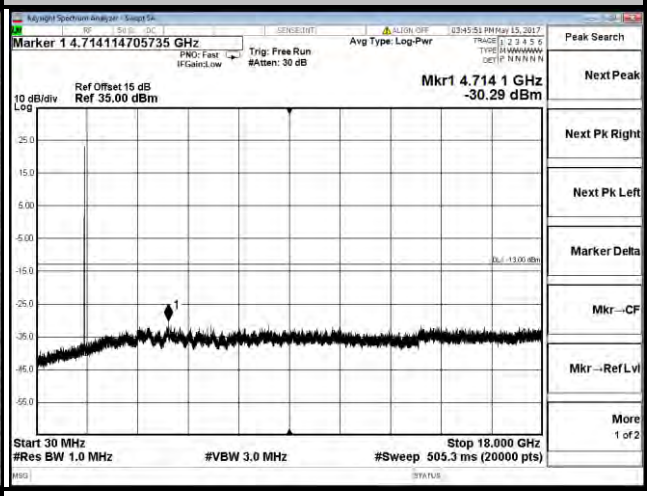
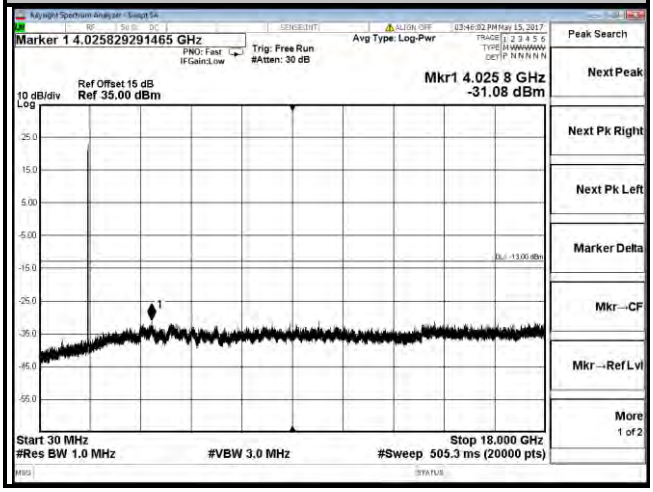


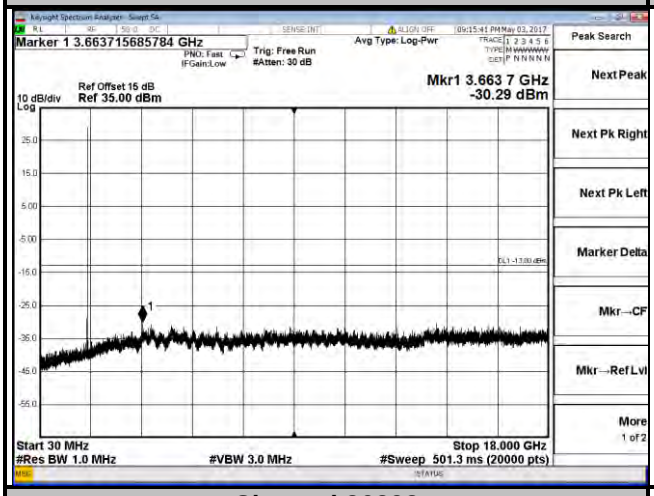
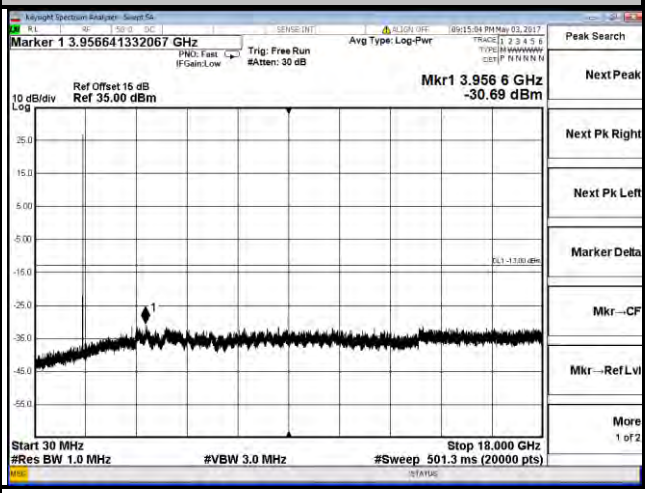
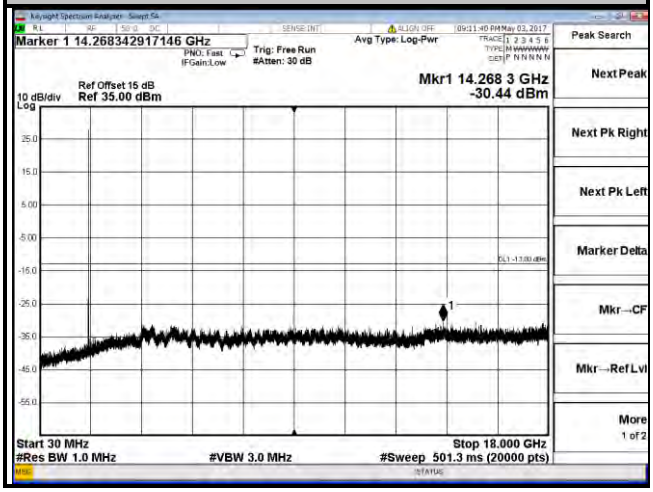
4.6.3 Test Procedure

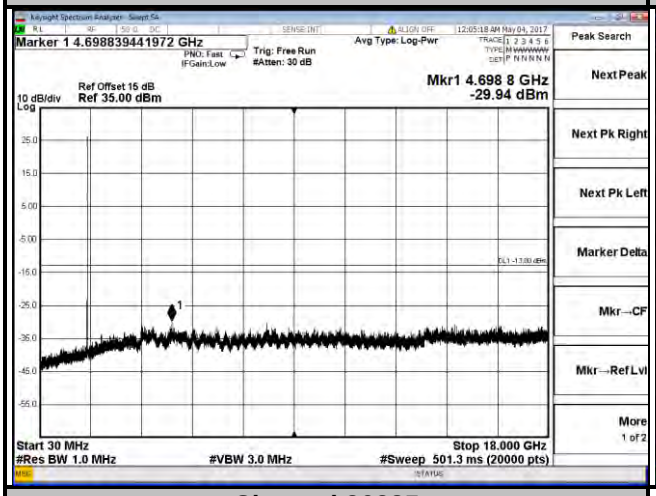
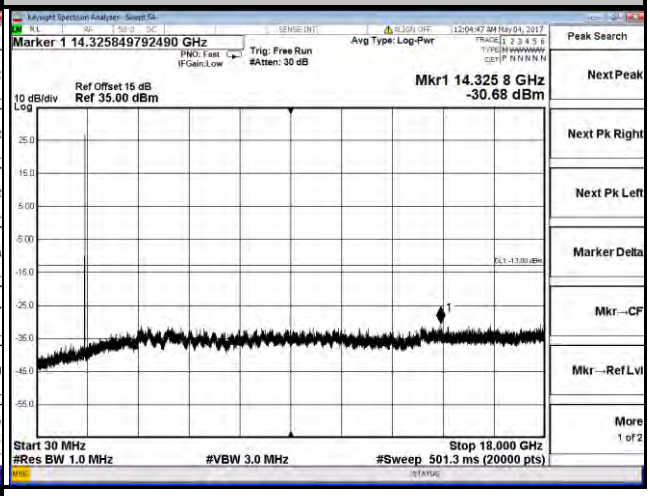
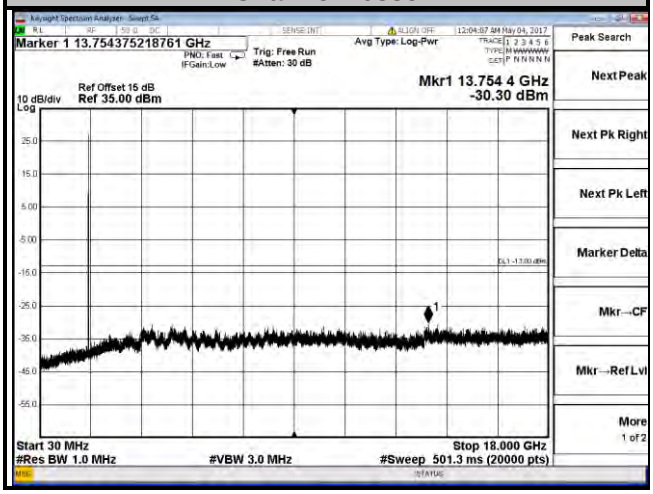
a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.

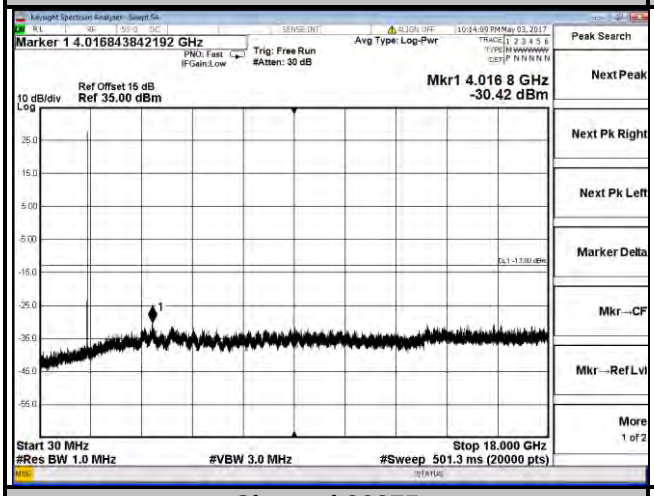
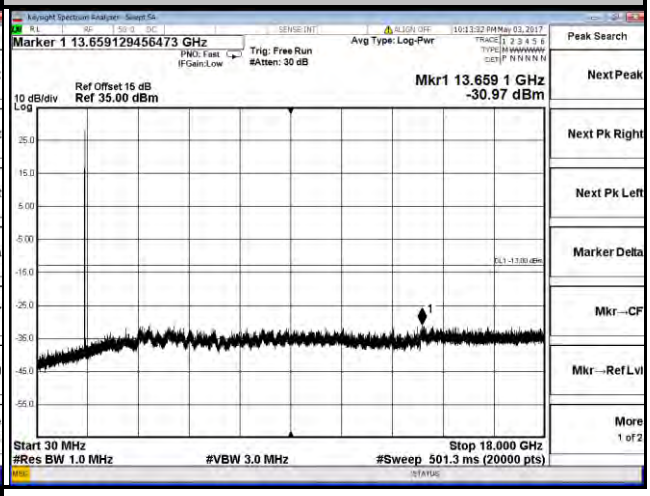
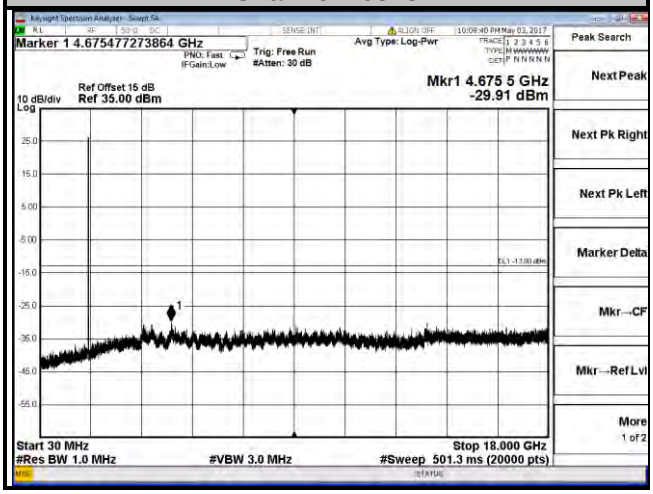
b. Measuring frequency range is from 30 MHz to 8 GHz for LTE Band 12 and from 30 MHz to 18 GHz for WCDMA and LTE Band 4. 10 dB attenuation pad is connected with spectrum. RBW=1 MHz and VBW=3 MHz are used for conducted emission measurement.

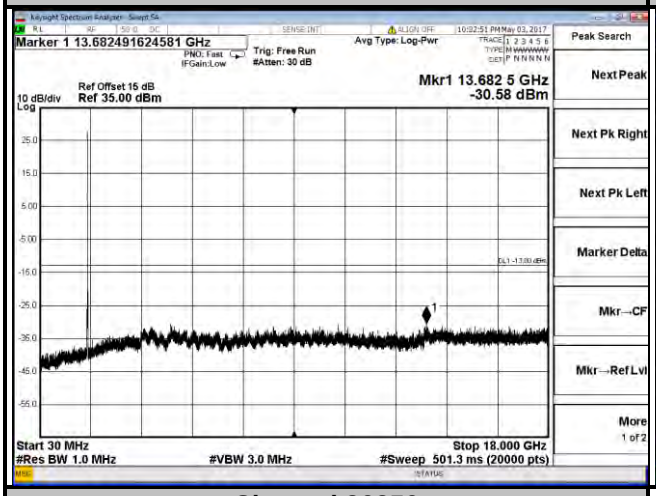
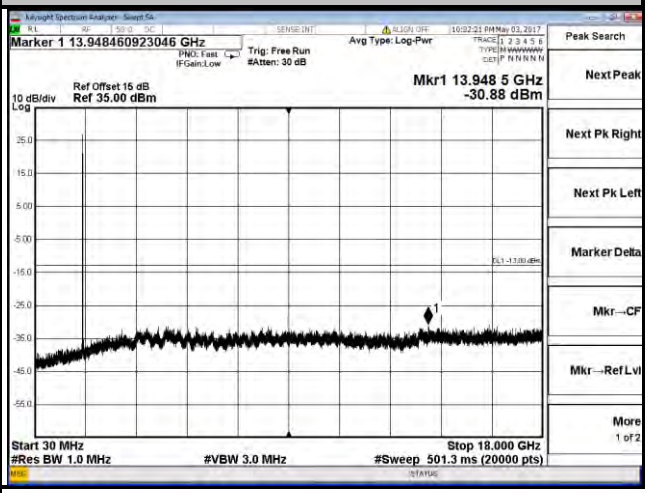
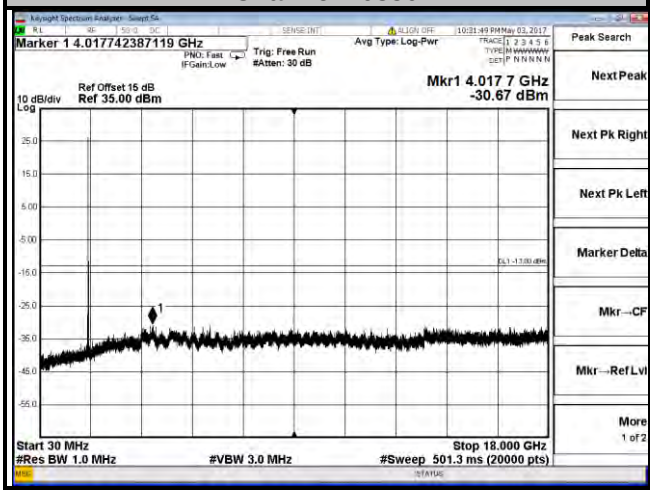
4.6.4 Test Results

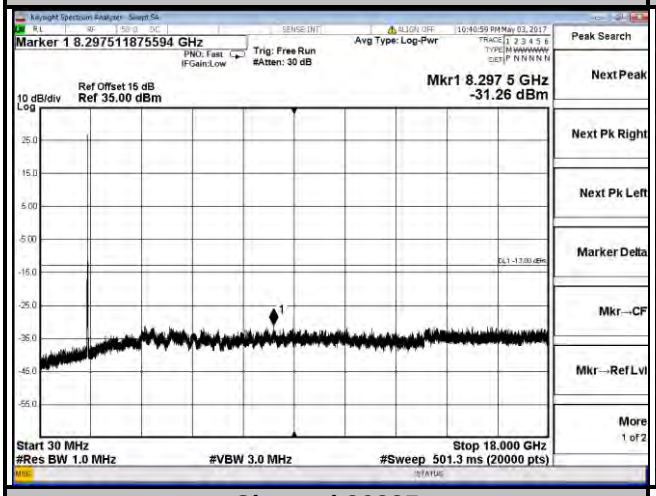
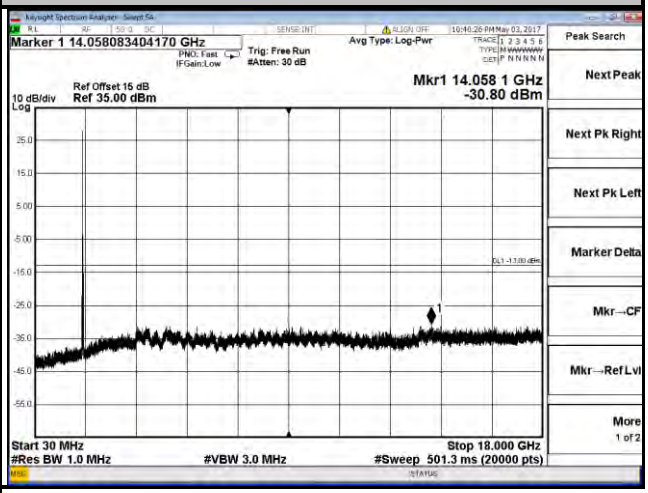
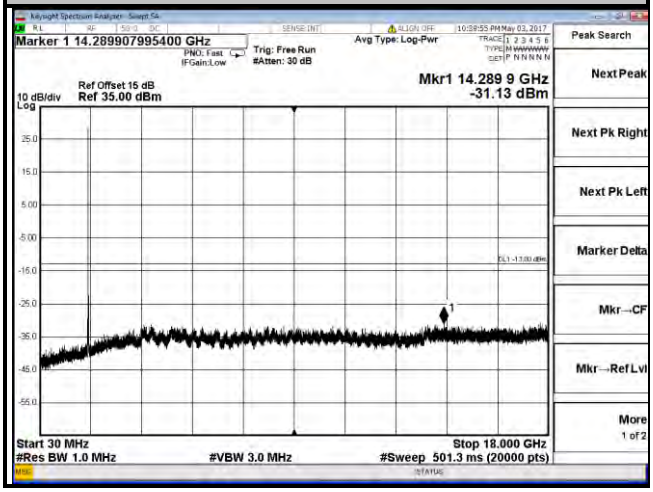
WCDMA	
Channel 1312	Channel 1413
	
Channel 1513	
	

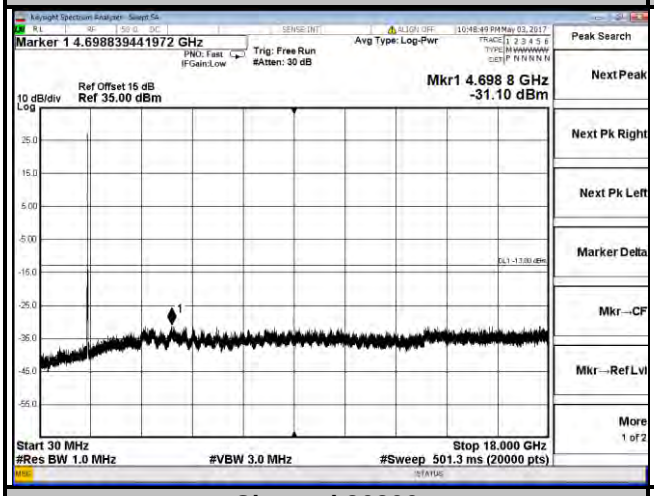
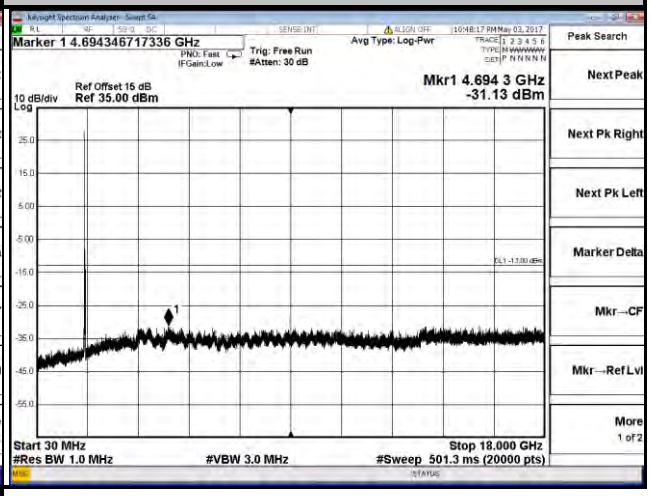
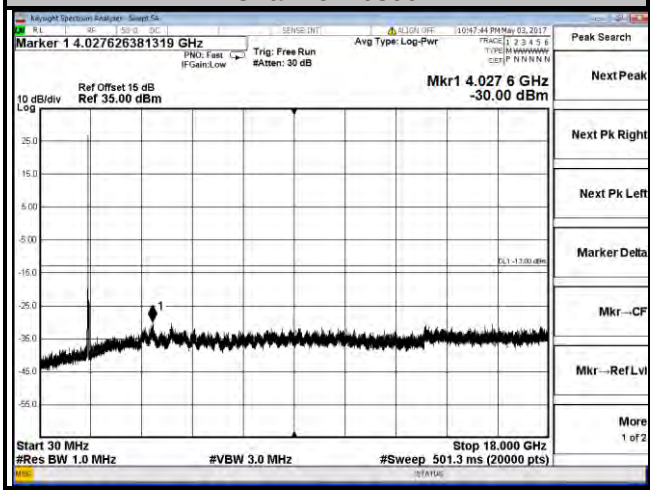
LTE Band 4	
Channel Bandwidth: 1.4 MHz	
Channel 19957	Channel 20175
	
Channel 20393	
	

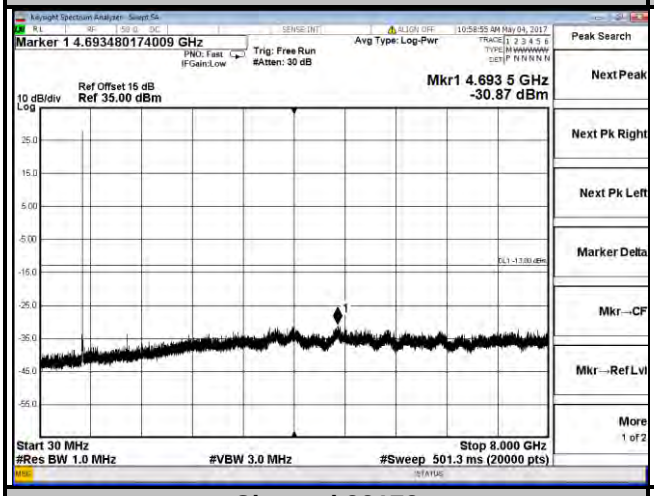
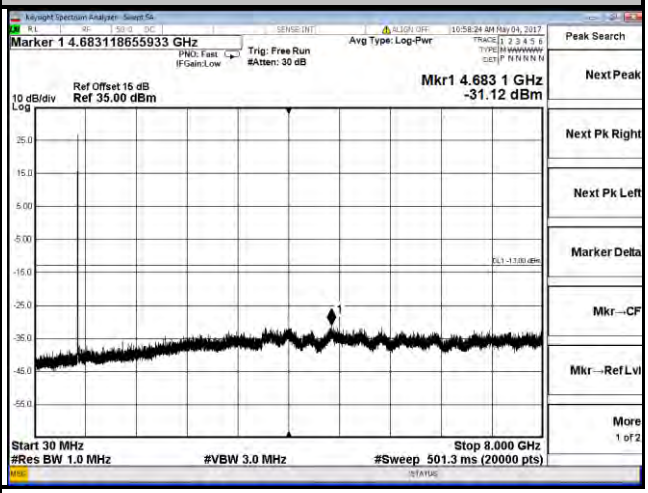
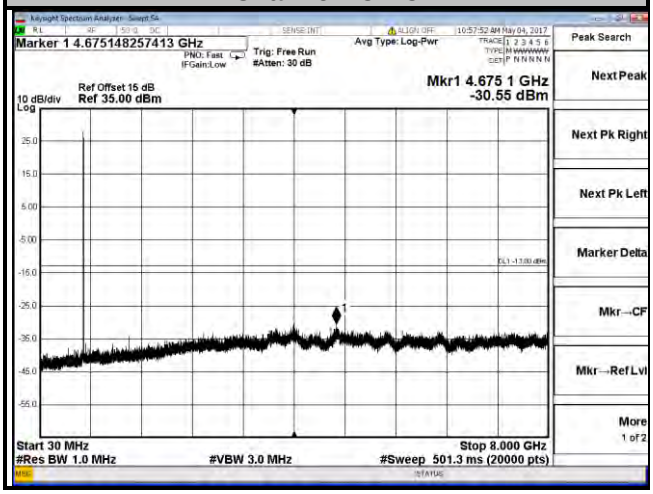
LTE Band 4	
Channel Bandwidth: 3 MHz	
Channel 19965	Channel 20175
	
Channel 20385	
	

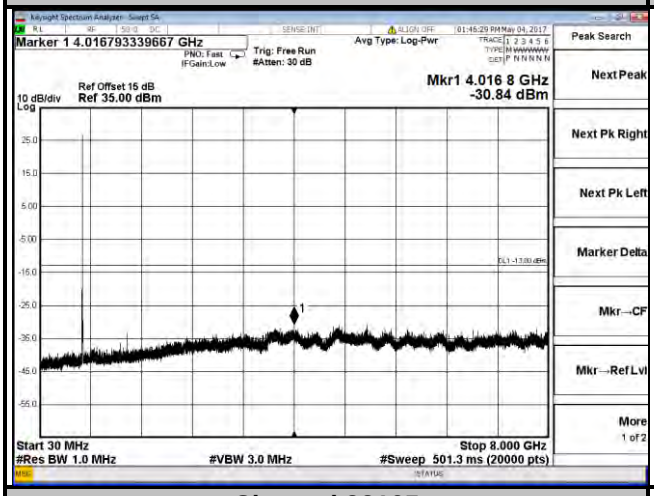
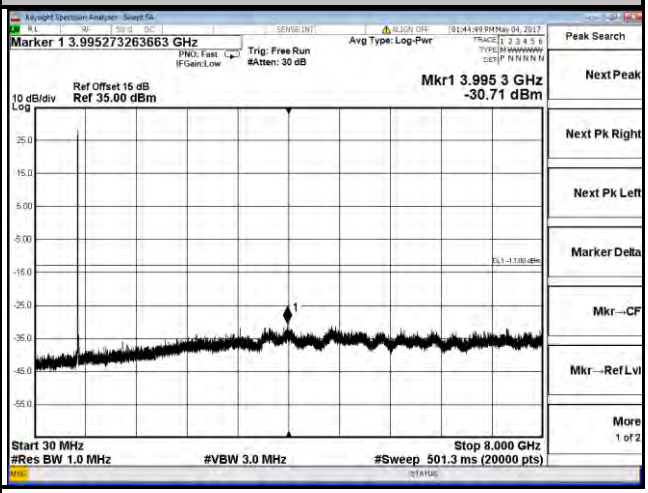
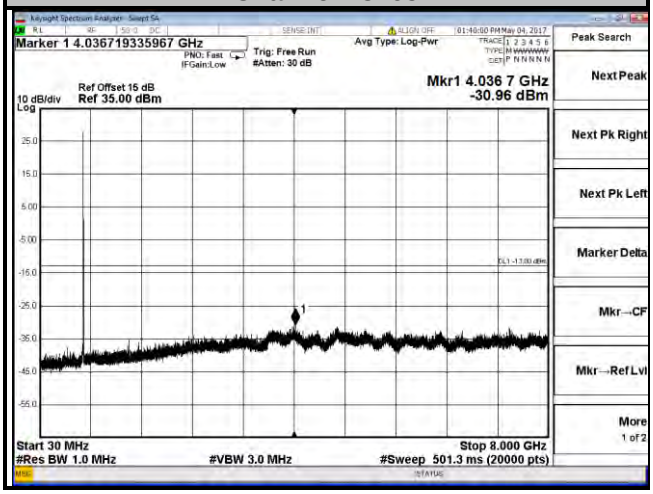
LTE Band 4	
Channel Bandwidth: 5 MHz	
Channel 19975	Channel 20175
	
Channel 20375	
	

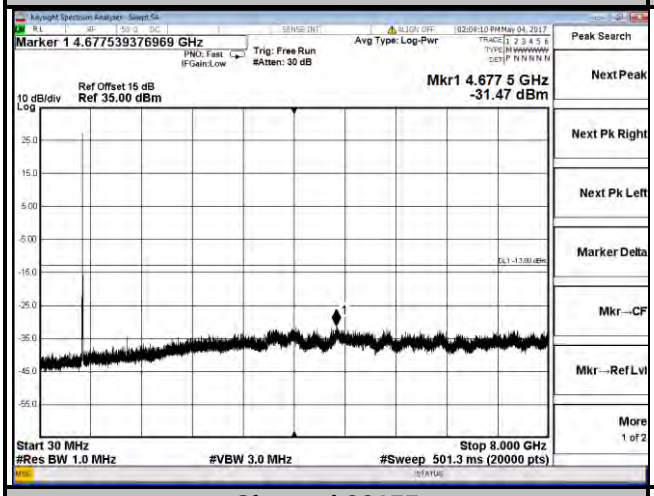
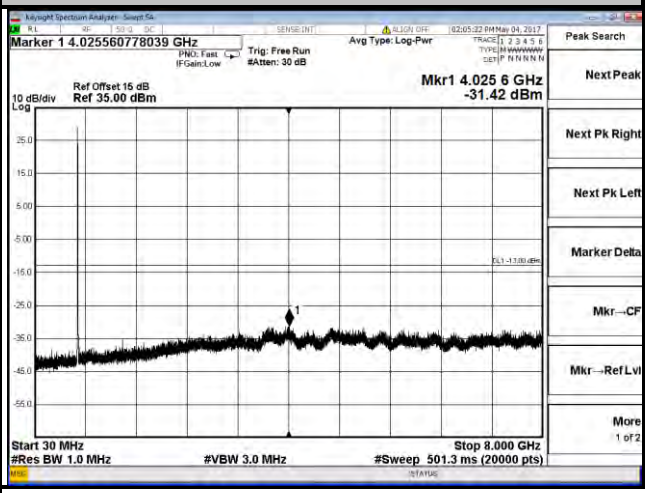
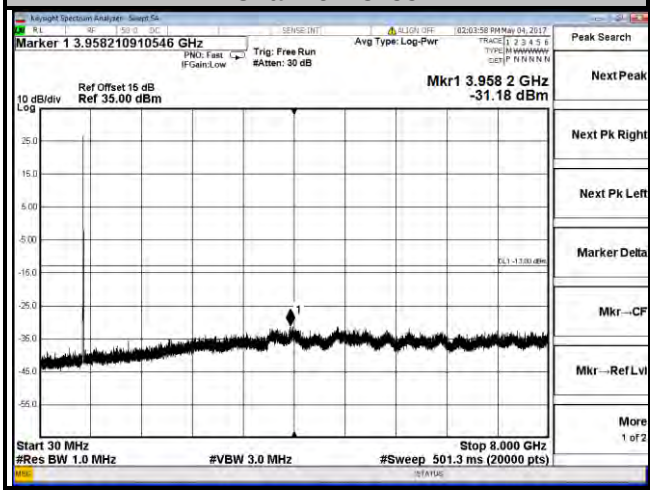
LTE Band 4	
Channel Bandwidth: 10 MHz	
Channel 20000	Channel 20175
	
Channel 20350	
	

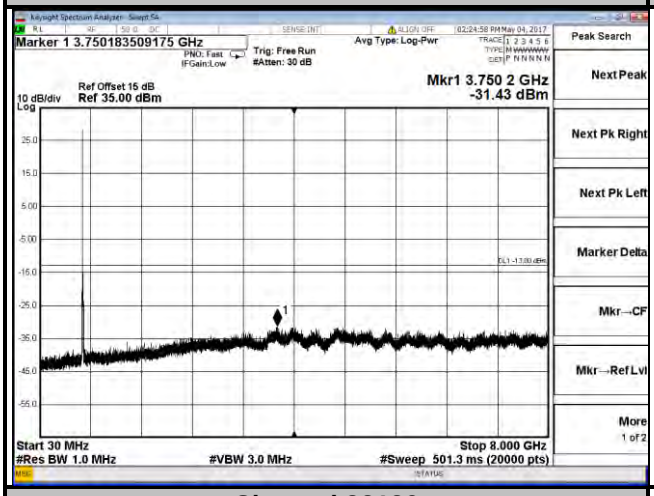
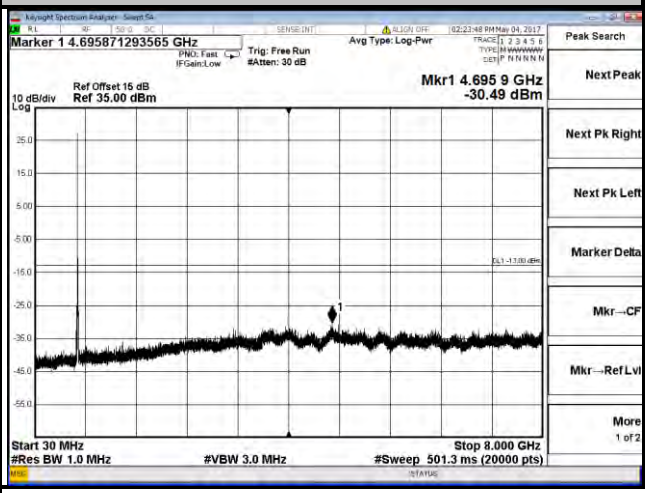
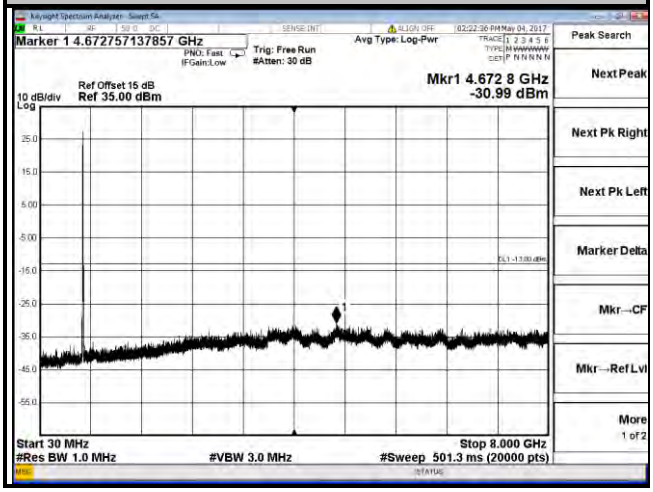
LTE Band 4	
Channel Bandwidth: 15 MHz	
Channel 20025	Channel 20175
	
Channel 20325	
	

LTE Band 4	
Channel Bandwidth: 20 MHz	
Channel 20050	Channel 20175
	
Channel 20300	
	

LTE Band 12	
Channel Bandwidth: 1.4 MHz	
Channel 23017	Channel 23095
	
Channel 23173	
	

LTE Band 12	
Channel Bandwidth: 3 MHz	
Channel 23025	Channel 23095
	
Channel 23165	
	

LTE Band 12	
Channel Bandwidth: 5 MHz	
Channel 23035	Channel 23095
	
Channel 23155	
	

LTE Band 12	
Channel Bandwidth: 10 MHz	
Channel 23060	Channel 23095
	
Channel 23130	
	

4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

a. 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

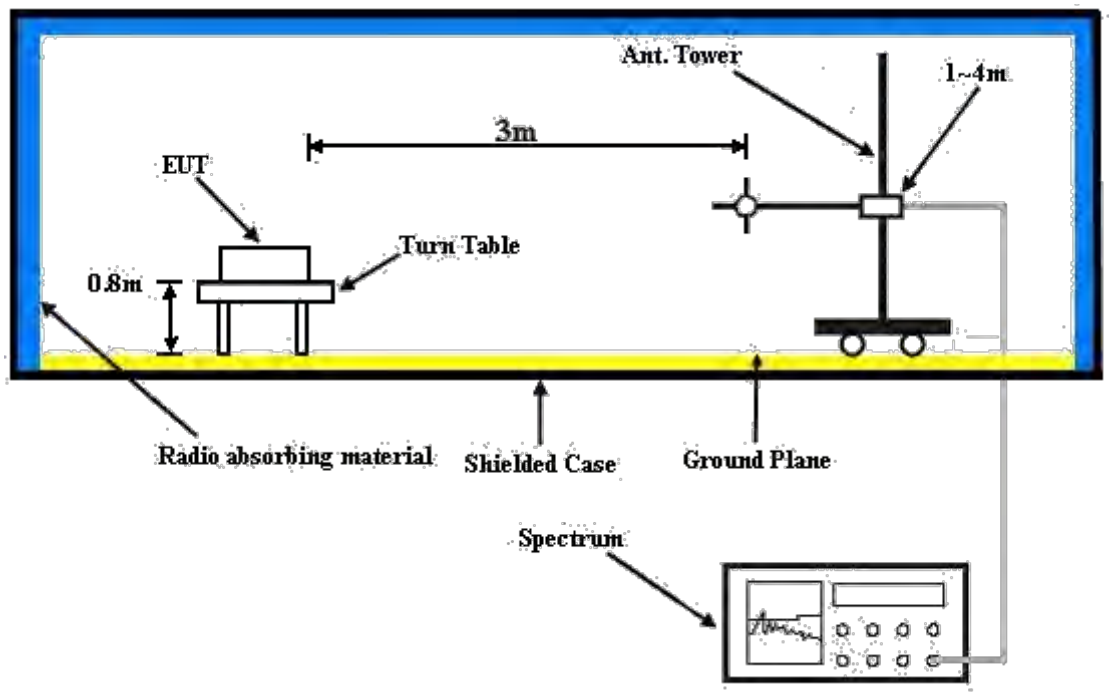
a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from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

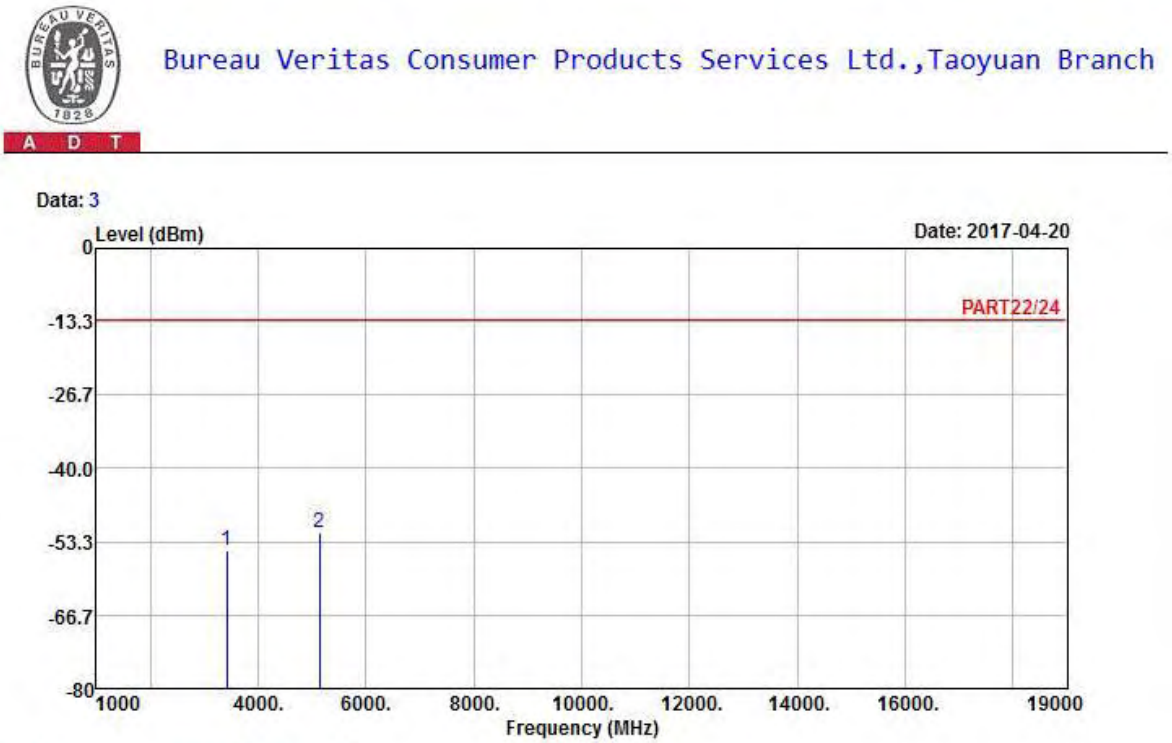


For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

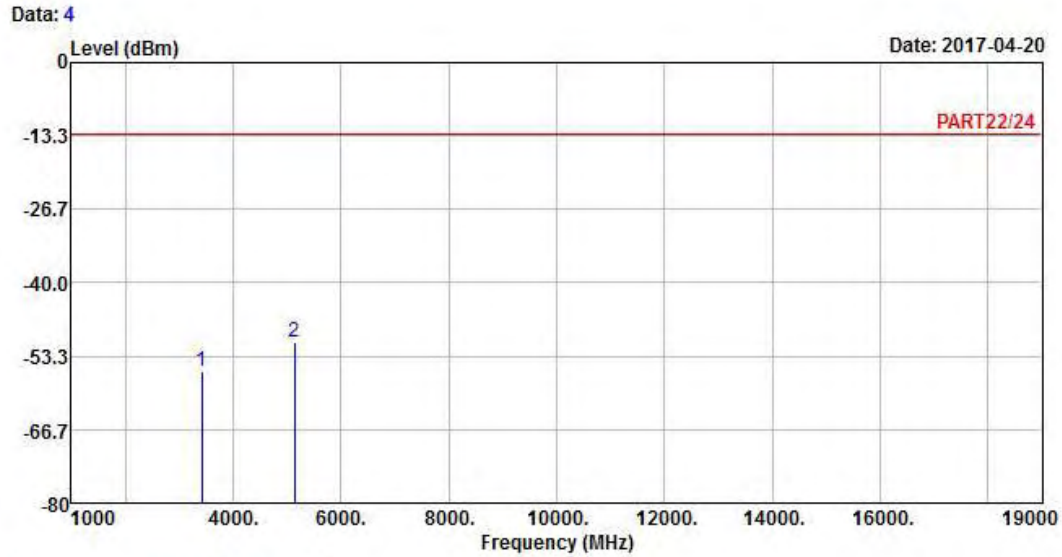
WCDMA:

Low Channel



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : WCDMA Band 4_L-CH Link
Tested by: Gavin Wu

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3424.80	-54.78	-45.69	-13.00	-41.78	-9.09	Peak
2 pp	5137.20	-51.69	-48.72	-13.00	-38.69	-2.97	Peak



Site : 966 Chamber 5
Condition: PART22/24 VERTICAL
Remak : WCDMA Band 4_L-CH Link
Tested by: Gavin Wu

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3424.80	-55.99	-46.90	-13.00	-42.99	-9.09	Peak
2 pp	5137.20	-50.81	-47.84	-13.00	-37.81	-2.97	Peak

Middle Channel

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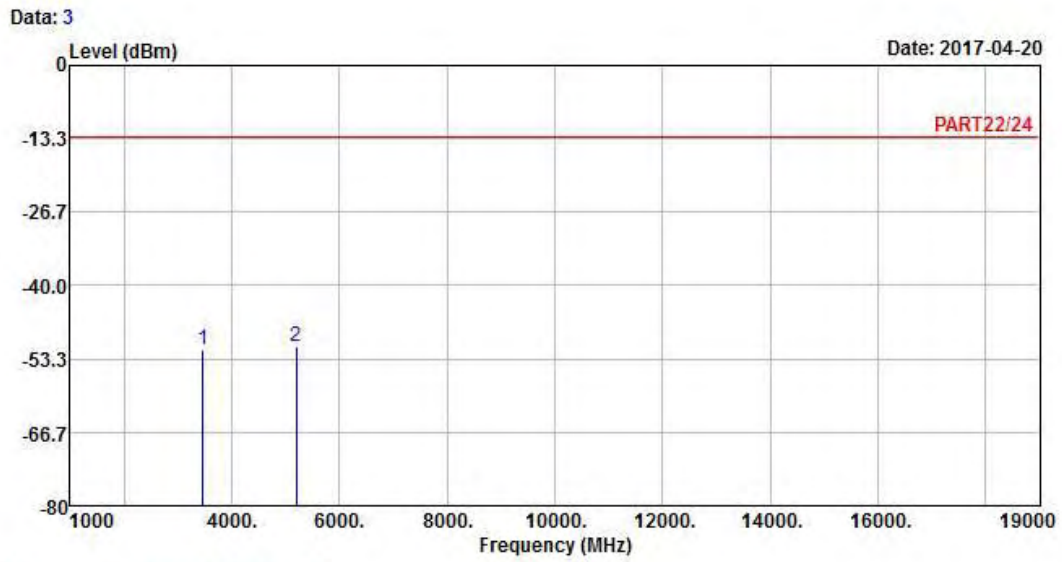
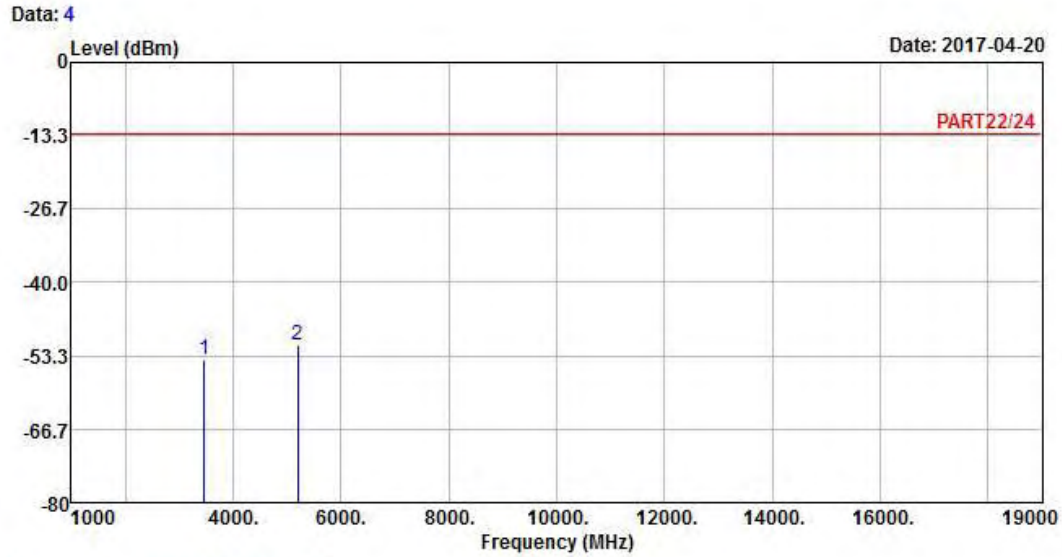


Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : WCDMA Band 4_M-CH Link
Tested by: Gavin Wu

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.20	-51.76	-42.85	-13.00	-38.76	-8.91	Peak
2 pp	5197.80	-51.12	-48.26	-13.00	-38.12	-2.86	Peak



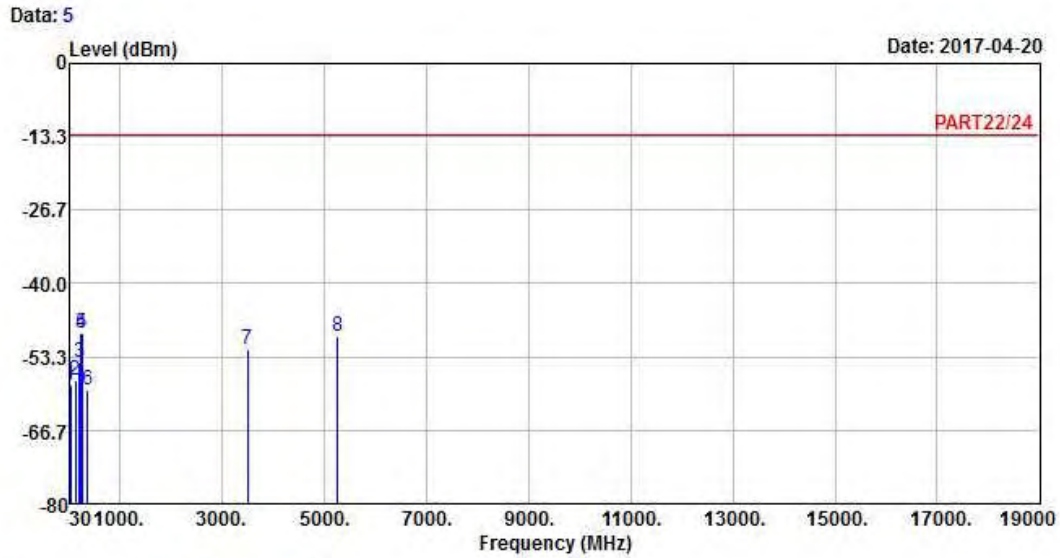
Site : 966 Chamber 5
Condition: PART22/24 VERTICAL
Remak : WCDMA Band 4_M-CH Link
Tested by: Gavin Wu

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.20	-53.97	-45.06	-13.00	-40.97	-8.91	Peak
2 pp	5197.80	-51.27	-48.41	-13.00	-38.27	-2.86	Peak

High Channel

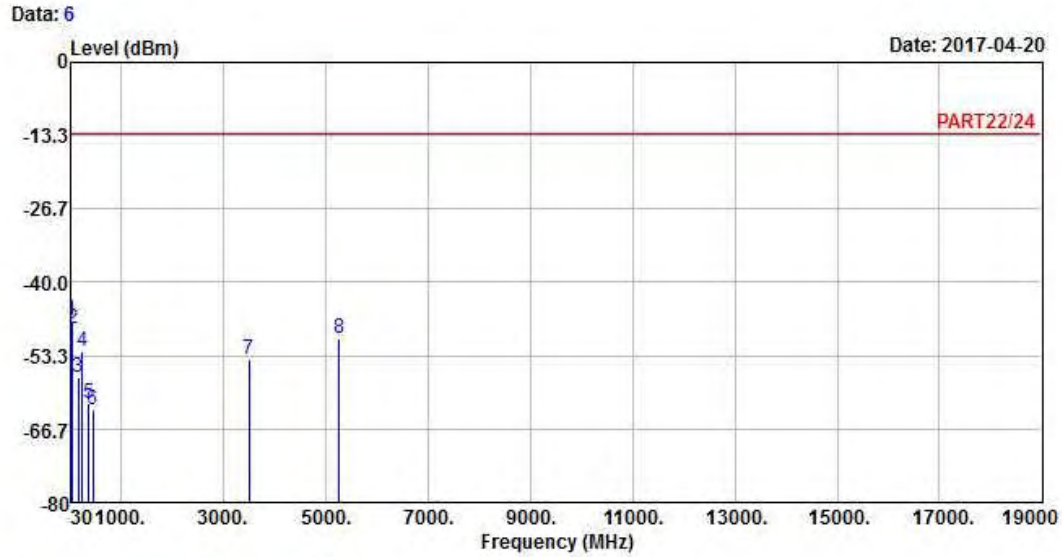
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T



Site : 966 Chamber 5
Condition: PART22/24 HORIZONTAL
Remak : WCDMA Band 4_H-CH Link
Tested by: Gavin Wu

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	42.61	-58.59	-57.65	-13.00	-45.59	-0.94	Peak
2	135.73	-57.52	-48.85	-13.00	-44.52	-8.67	Peak
3	212.36	-54.37	-46.86	-13.00	-41.37	-7.51	Peak
4	237.58	-49.10	-42.60	-13.00	-36.10	-6.50	Peak
5 pp	257.95	-49.07	-42.92	-13.00	-36.07	-6.15	Peak
6	364.65	-59.21	-53.06	-13.00	-46.21	-6.15	Peak
7	3505.20	-52.07	-43.96	-13.00	-39.07	-8.11	Peak
8	5257.80	-49.64	-47.16	-13.00	-36.64	-2.48	Peak



Site : 966 Chamber 5
Condition: PART22/24 VERTICAL
Remak : WCDMA Band 4_H-CH Link
Tested by: Gavin Wu

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	41.64	-47.02	-46.61	-13.00	-34.02	-0.41	Peak
2	58.13	-48.39	-41.26	-13.00	-35.39	-7.13	Peak
3	160.95	-57.39	-52.48	-13.00	-44.39	-4.91	Peak
4	237.58	-52.64	-46.14	-13.00	-39.64	-6.50	Peak
5	367.56	-62.07	-55.93	-13.00	-49.07	-6.14	Peak
6	452.92	-63.14	-57.64	-13.00	-50.14	-5.50	Peak
7	3505.20	-54.14	-46.03	-13.00	-41.14	-8.11	Peak
8	5257.80	-50.04	-47.56	-13.00	-37.04	-2.48	Peak

LTE Band 4
Channel Bandwidth: 20 MHz / QPSK
Low Channel

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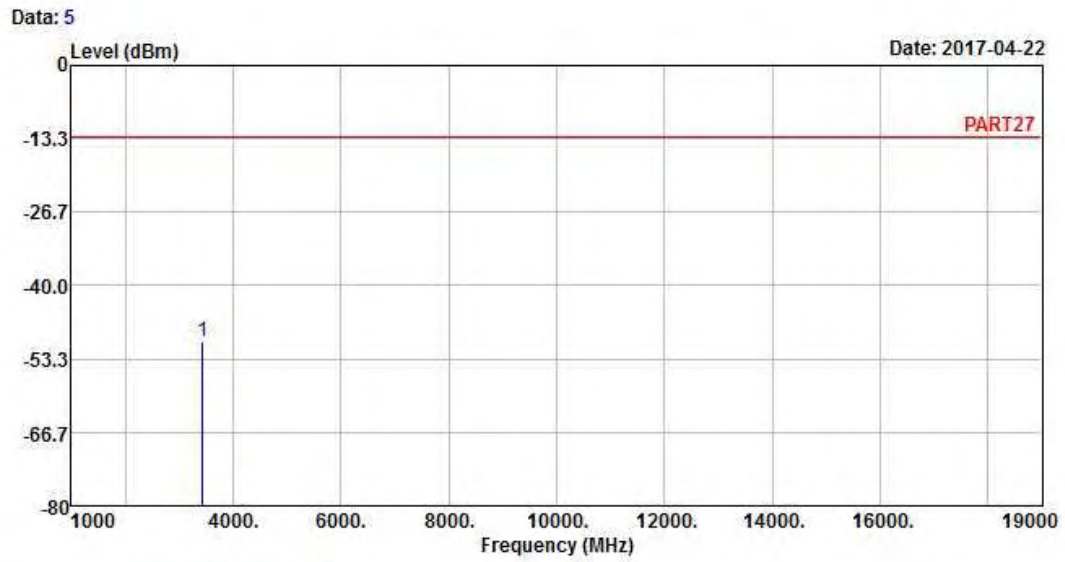
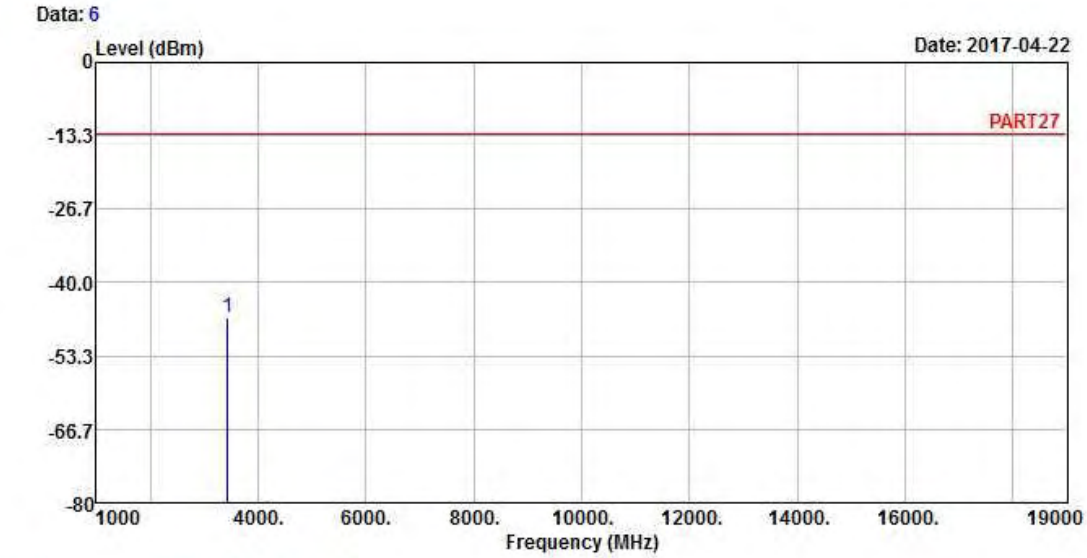


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M_L-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3440.00	-50.21	-41.21	-13.00	-37.21	-9.00	Peak

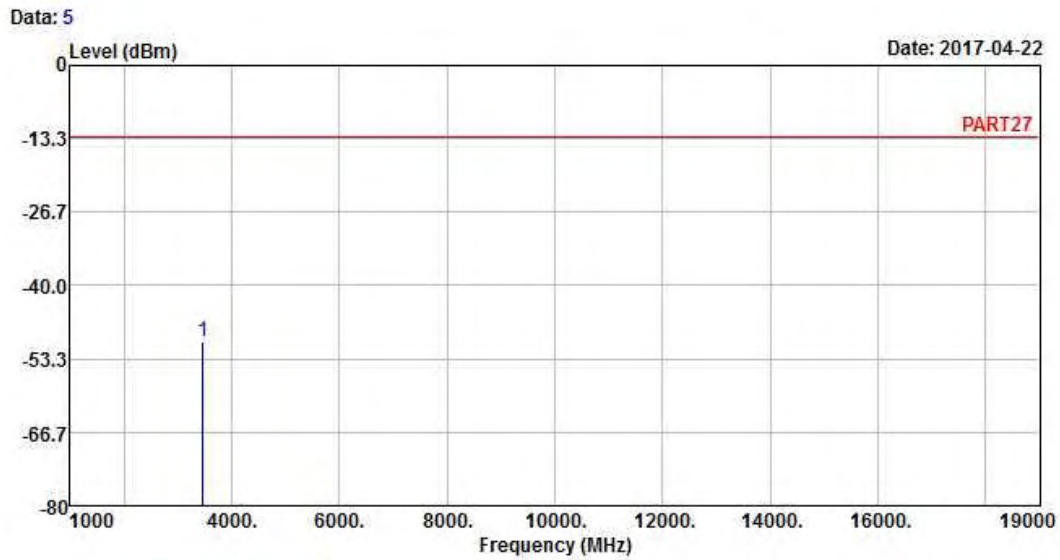


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M_L-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3440.00	-46.38	-37.38	-13.00	-33.38	-9.00	Peak

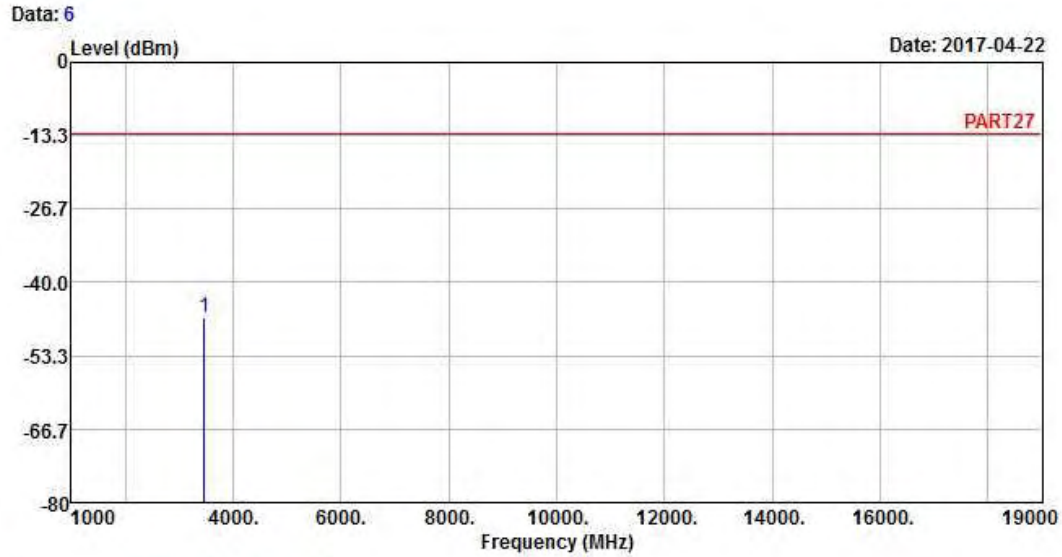
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M_M-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3465.00	-50.23	-41.32	-13.00	-37.23	-8.91	Peak

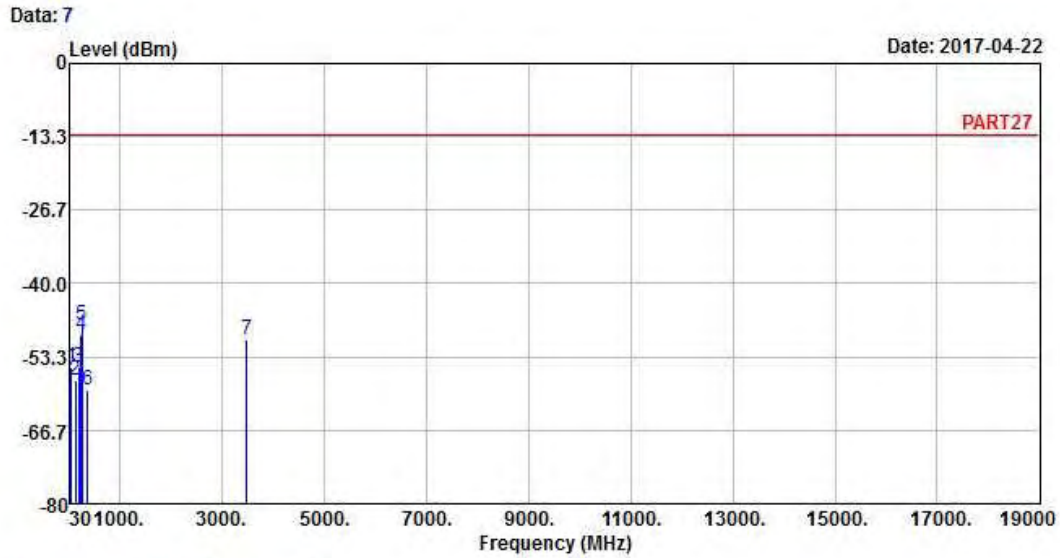


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M_M-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	3465.00	-46.42	-37.51	-13.00	-33.42	-8.91	Peak

High Channel

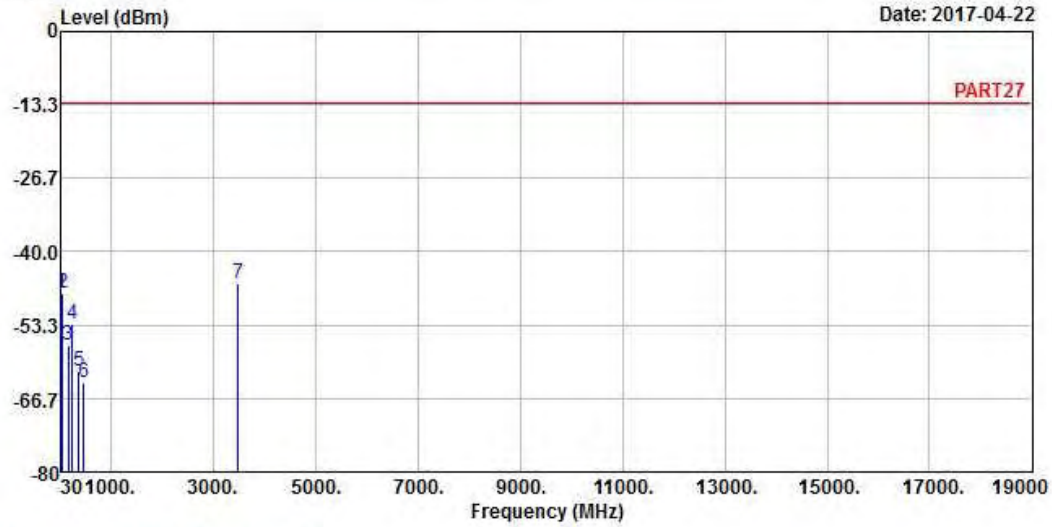
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M_H-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	43.58	-55.25	-53.78	-13.00	-42.25	-1.47	Peak
2	135.73	-57.51	-48.84	-13.00	-44.51	-8.67	Peak
3	192.96	-55.24	-47.87	-13.00	-42.24	-7.37	Peak
4	237.58	-49.27	-42.77	-13.00	-36.27	-6.50	Peak
5 pp	257.95	-47.47	-41.32	-13.00	-34.47	-6.15	Peak
6	366.59	-59.43	-53.29	-13.00	-46.43	-6.14	Peak
7	3490.00	-50.15	-41.64	-13.00	-37.15	-8.51	Peak

Data: 8

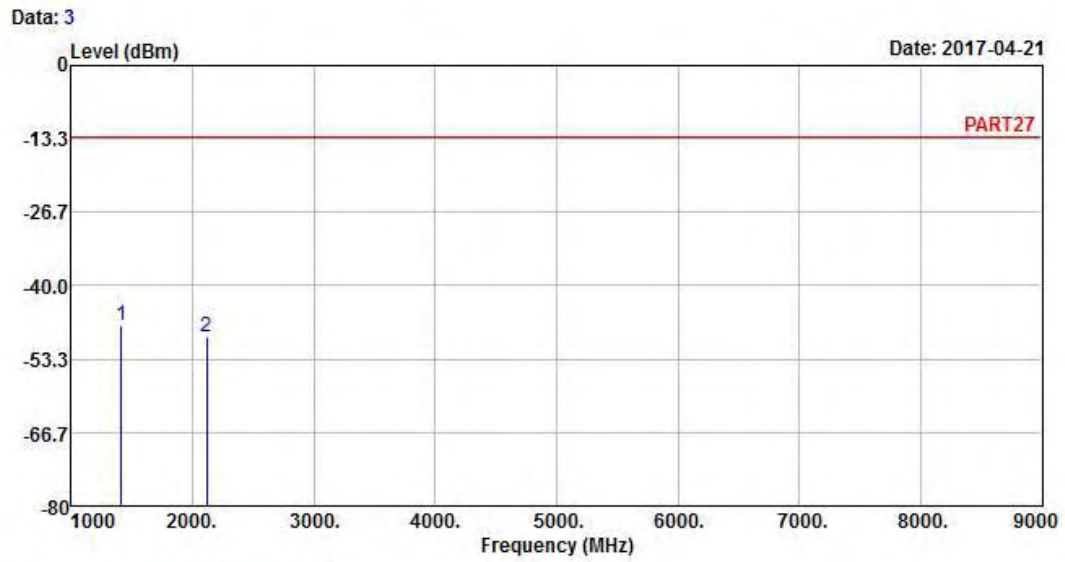


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M_H-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	40.67	-47.55	-47.67	-13.00	-34.55	0.12	Peak
2	58.13	-47.47	-40.34	-13.00	-34.47	-7.13	Peak
3	168.71	-56.90	-51.44	-13.00	-43.90	-5.46	Peak
4	237.58	-53.05	-46.55	-13.00	-40.05	-6.50	Peak
5	367.56	-61.63	-55.49	-13.00	-48.63	-6.14	Peak
6	463.59	-63.86	-58.56	-13.00	-50.86	-5.30	Peak
7 pp	3490.00	-45.87	-37.36	-13.00	-32.87	-8.51	Peak

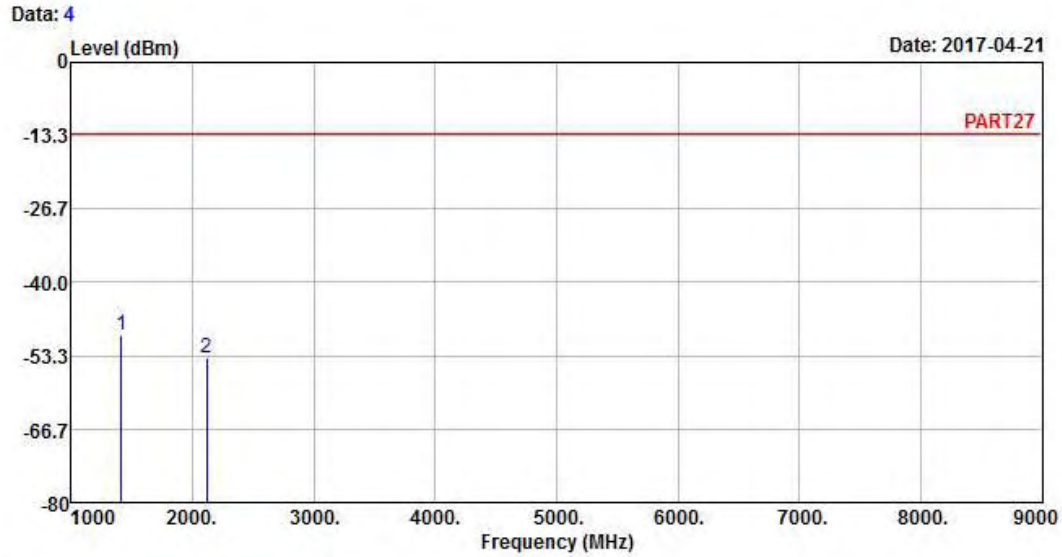
LTE Band 12
Channel Bandwidth: 10 MHz / QPSK
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M_L-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1408.00	-47.09	-32.75	-13.00	-34.09	-14.34	Peak
2	2112.00	-49.17	-36.93	-13.00	-36.17	-12.24	Peak

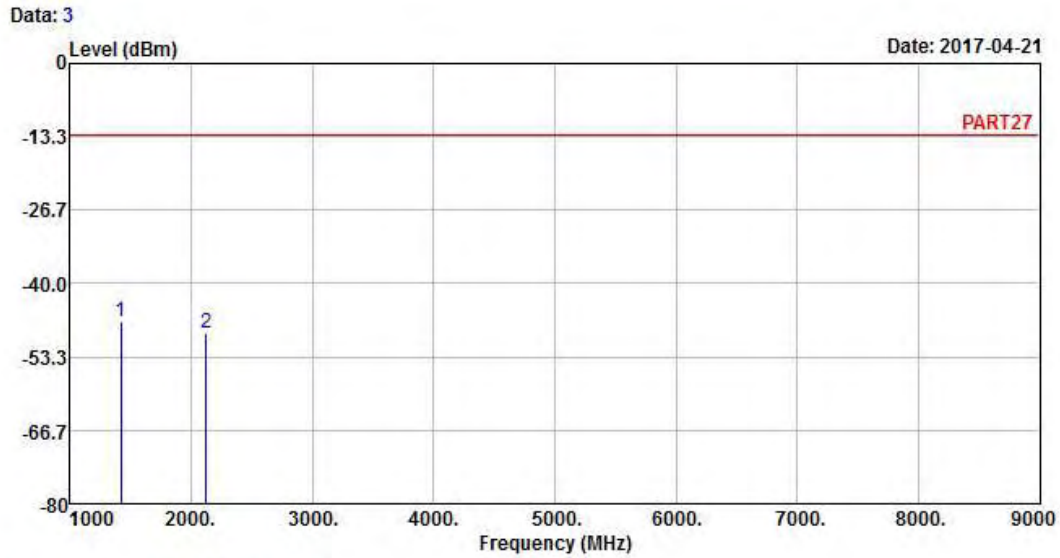


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M_L-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1408.00	-49.51	-35.17	-13.00	-36.51	-14.34	Peak
2	2112.00	-53.71	-41.47	-13.00	-40.71	-12.24	Peak

Middle Channel

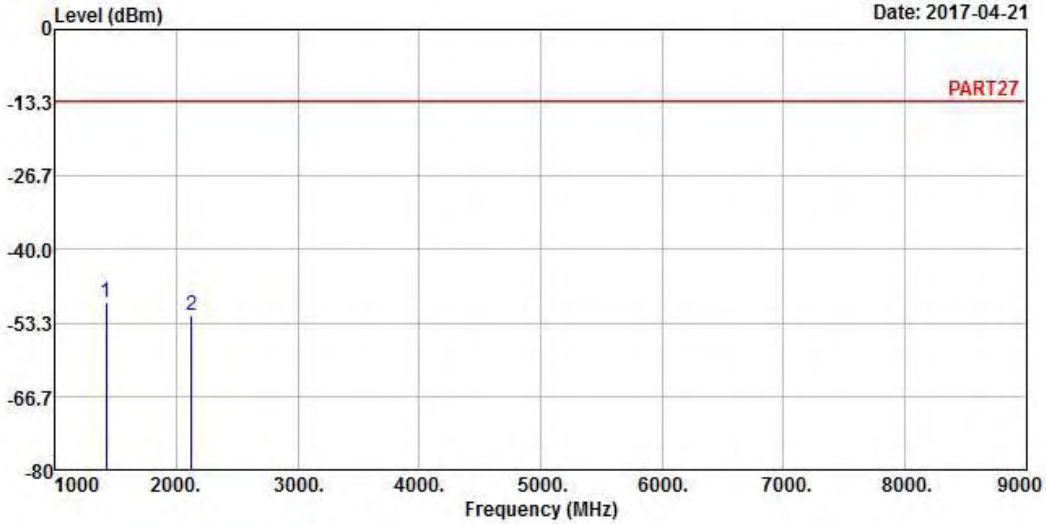
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M_M-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-46.83	-32.49	-13.00	-33.83	-14.34	Peak
2	2122.50	-49.12	-36.88	-13.00	-36.12	-12.24	Peak

Data: 4



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M_M-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-49.72	-35.38	-13.00	-36.72	-14.34	Peak
2	2122.50	-51.88	-39.64	-13.00	-38.88	-12.24	Peak

High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

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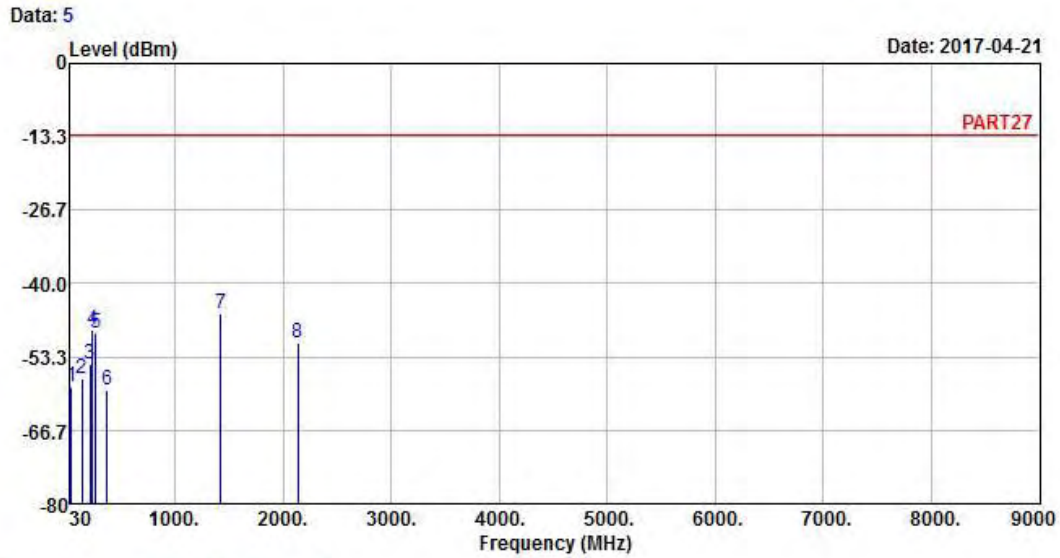
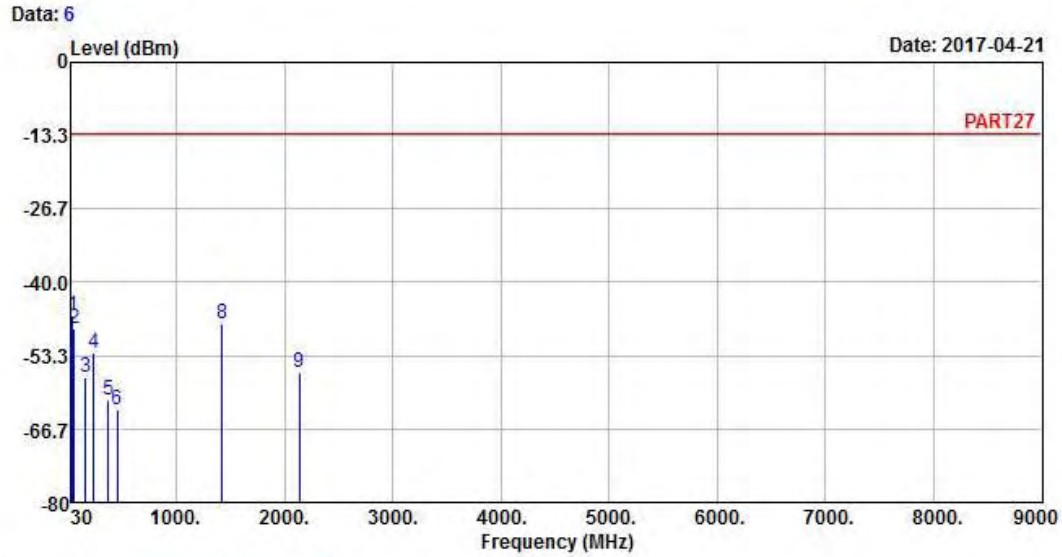


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M_H-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	42.61	-58.74	-57.80	-13.00	-45.74	-0.94	Peak
2	135.73	-57.17	-48.50	-13.00	-44.17	-8.67	Peak
3	212.36	-54.63	-47.12	-13.00	-41.63	-7.51	Peak
4	237.58	-48.51	-42.01	-13.00	-35.51	-6.50	Peak
5	264.74	-48.88	-42.59	-13.00	-35.88	-6.29	Peak
6	367.56	-59.29	-53.15	-13.00	-46.29	-6.14	Peak
7 pp	1422.00	-45.53	-31.19	-13.00	-32.53	-14.34	Peak
8	2133.00	-50.70	-38.63	-13.00	-37.70	-12.07	Peak



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M_H-CH Link
Tested by: Getaz Yang

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	41.64	-46.04	-45.63	-13.00	-33.04	-0.41	Peak
2	57.16	-48.36	-41.49	-13.00	-35.36	-6.87	Peak
3	159.98	-57.35	-52.51	-13.00	-44.35	-4.84	Peak
4	237.58	-52.99	-46.49	-13.00	-39.99	-6.50	Peak
5	367.56	-61.38	-55.24	-13.00	-48.38	-6.14	Peak
6	451.95	-63.22	-57.71	-13.00	-50.22	-5.51	Peak
7	515.00	-86.10	-82.01	-13.00	-73.10	-4.09	
8	1422.00	-47.52	-33.18	-13.00	-34.52	-14.34	Peak
9	2133.00	-56.53	-44.46	-13.00	-43.53	-12.07	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:

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Web Site: www.bureauveritas-adt.com

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

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