FCC Test Report

(PART 27)

Report No.:	RF181001C14-9
FCC ID:	A4RG020F
Test Model:	G020F
Received Date:	Oct. 01, 2018
Test Date:	Oct. 13, 2018 ~ Oct. 26, 2018
Issued Date:	Dec. 27, 2018
Applicant:	Google LLC
Address:	1600 Amphitheatre Parkway, Mountain View, CA 94043, 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 Vil, Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C)
Test Location (2):	B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C
FCC Registration / Designation Number:	427177 / TW0011

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Release Control Record

Issue No.	Description	Date Issued
RF181001C14-9	Original Release	Dec. 27, 2018

1 Certificate of Conformity

Product:	Smartphone
Test Model:	G020F
Sample Status:	Identical Prototype
Applicant:	Google LLC
Test Date:	Oct. 13, 2018 ~ Oct. 26, 2018
Standards:	FCC Part 27, Subpart C, H, F, L

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

Prepared by : _____ , **Date:** Dec. 27, 2018

Ivonne Wu / Supervisor

Approved by : _____ , **Date:** Dec. 27, 2018

Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2 (WCDMA)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(d)(4)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -36.05 dB at 3424.80 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 4)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(d)(4)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -36.53 dB at 3465.00 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.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
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 -29.26 dB at 2122.50 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 13)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(b)(10)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(c)(2)(4)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(c)(2)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(c)(2)&(f)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -9.04 dB at 1564.00 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 17)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(c)(10)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
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 -30.54 dB at 1420.00 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 66)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(d)(4)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 27.53(h)	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -36.02 dB at 3540.00 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) (±)
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-616	Dec. 14, 2017	Dec. 13, 2018
HORN Antenna ETS-Lindgren	3117	00143293	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Dec. 12, 2017	Dec. 11, 2018
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
MXG Vector signal generator Agilent	N5182B	MY53052658	May 24, 2018	May 23, 2019
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 19, 2018	Jun. 18, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 2019
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 16, 2017	Aug. 15, 2019
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019
DC Power Supply Topward	33010D	807748	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The IC Site Registration No. is 7450I-1.

3 General Information

3.1 General Description of EUT

Product	Smartphone	
Test Model	G020F	
Status of EUT	Identical Prototype	
Power Supply Rating	3.85 Vdc (Li-ion battery) 5.0 Vdc or 9 Vdc (adapter) 5.0 Vdc (host equipment)	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM, 64QAM
Frequency Range	WCDMA	1712.4 ~ 1752.6 MHz
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1754.3 MHz
	LTE Band 4 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1753.5 MHz
	LTE Band 4 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1752.5 MHz
	LTE Band 4 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1750.0 MHz
	LTE Band 4 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1747.5 MHz
	LTE Band 4 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1745.0 MHz
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	699.7 ~ 715.3 MHz
	LTE Band 12 (Channel Bandwidth: 3 MHz)	700.5 ~ 714.5 MHz
	LTE Band 12 (Channel Bandwidth: 5 MHz)	701.5 ~ 713.5 MHz
	LTE Band 12 (Channel Bandwidth: 10 MHz)	704.0 ~ 711.0 MHz
	LTE Band 13 (Channel Bandwidth: 5 MHz)	779.5 ~ 784.5 MHz
	LTE Band 13 (Channel Bandwidth: 10 MHz)	782.0 MHz
	LTE Band 17 (Channel Bandwidth: 5 MHz)	706.5 ~ 713.5 MHz
	LTE Band 17 (Channel Bandwidth: 10 MHz)	709.0 ~ 711.0 MHz
	LTE Band 66 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1779.3 MHz
	LTE Band 66 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1778.5 MHz
	LTE Band 66 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1777.5 MHz
	LTE Band 66 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1775.0 MHz
	LTE Band 66 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1772.5 MHz
	LTE Band 66 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1770.0 MHz

Emission Designator	WCDMA	4M15F9W
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 4 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 4 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 4 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE Band 4 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 4 (Channel Bandwidth: 20 MHz)	18M0W7D
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 12 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 12 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 12 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE Band 13 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 13 (Channel Bandwidth: 10 MHz)	8M96W7D
	LTE Band 17 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 17 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE Band 66 (Channel Bandwidth: 1.4 MHz)	1M09W7D
	LTE Band 66 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 66 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 66 (Channel Bandwidth: 10 MHz)	8M98W7D
	LTE Band 66 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 66 (Channel Bandwidth: 20 MHz)	18M0W7D
Max. ERP Power	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	88.49 mW
	LTE Band 12 (Channel Bandwidth: 3 MHz)	89.52 mW
	LTE Band 12 (Channel Bandwidth: 5 MHz)	90.34 mW
	LTE Band 12 (Channel Bandwidth: 10 MHz)	91.35 mW
	LTE Band 13 (Channel Bandwidth: 5 MHz)	50.71 mW
	LTE Band 13 (Channel Bandwidth: 10 MHz)	51.13 mW
	LTE Band 17 (Channel Bandwidth: 5 MHz)	89.87 mW
	LTE Band 17 (Channel Bandwidth: 10 MHz)	90.76 mW
Max. EIRP Power	WCDMA	227.25 mW
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	218.12 mW
	LTE Band 4 (Channel Bandwidth: 3 MHz)	220.14 mW
	LTE Band 4 (Channel Bandwidth: 5 MHz)	222.18 mW
	LTE Band 4 (Channel Bandwidth: 10 MHz)	224.23 mW
	LTE Band 4 (Channel Bandwidth: 15 MHz)	226.31 mW
	LTE Band 4 (Channel Bandwidth: 20 MHz)	228.40 mW
	LTE Band 66 (Channel Bandwidth: 1.4 MHz)	210.33 mW
	LTE Band 66 (Channel Bandwidth: 3 MHz)	211.79 mW
	LTE Band 66 (Channel Bandwidth: 5 MHz)	214.24 mW
	LTE Band 66 (Channel Bandwidth: 10 MHz)	216.02 mW
	LTE Band 66 (Channel Bandwidth: 15 MHz)	218.22 mW
	LTE Band 66 (Channel Bandwidth: 20 MHz)	220.24 mW

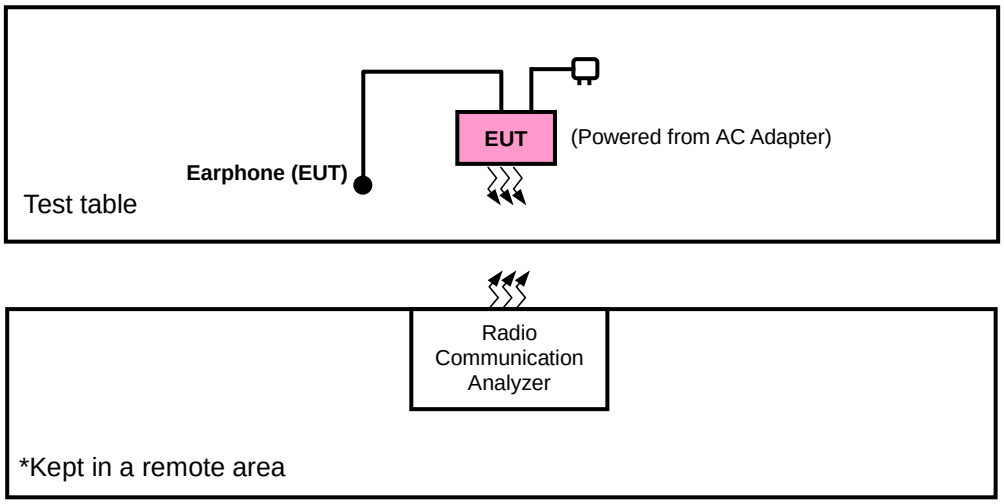
Antenna Type	PIFA Antenna	
Antenna Gain	WCDMA	-1.2 dBi (Main) / -4.6 dBi (Aux.)
	LTE Band 4	-1.2 dBi (Main) / -4.6 dBi (Aux.)
	LTE Band 12	-3 dBi (Main) / -6.3 dBi (Aux.)
	LTE Band 13	-5 dBi (Main) / -5 dBi (Aux.)
	LTE Band 17	-2.9 dBi (Main) / -6.2 dBi (Aux.)
	LTE Band 66	-1.3 dBi (Main) / -4.7 dBi (Aux.)
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

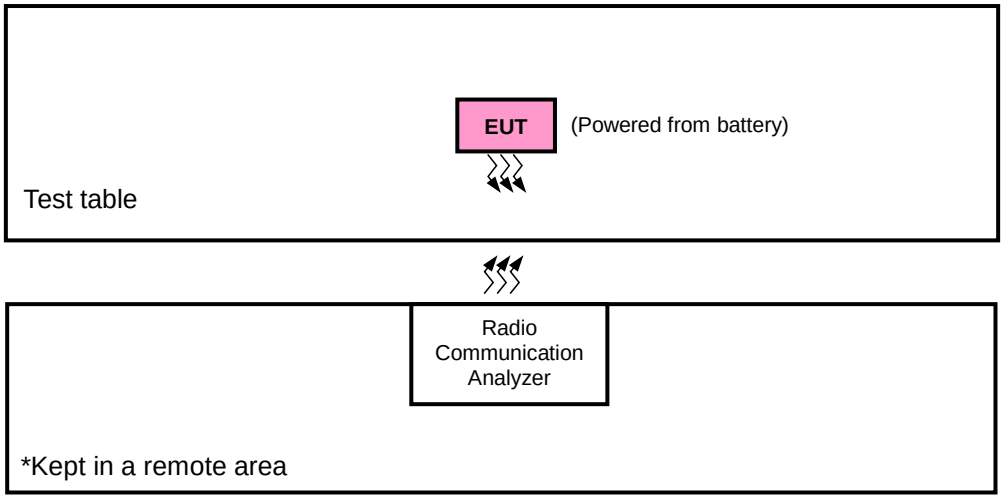
1. There’re 2 configurations for the EUT listed as below.
   Main Sample: EUT + Battery 1
   2nd Sample: EUT + Battery 2
   - ✧ After pre-tested with the EUT, only the worst configuration (main sample) was chosen for the final test.
2. The EUT’s accessories list refers to Ext. Pho.
3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.R.P. / E.I.R.P. Test>



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	ERP / EIRP	Radiated Emission
WCDMA	X-plane	Y-axis
LTE Band 4	X-plane	Y-axis
LTE Band 12	X-plane	Y-axis
LTE Band 13	X-plane	Y-axis
LTE Band 17	X-plane	X-axis
LTE Band 66	X-plane	Y-axis

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	1312 to 1513	1312, 1413, 1513	WCDMA
-	Modulation Characteristics	1312 to 1513	1413	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
-	Conducted 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, 64QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	20050 to 20300	20050	20 MHz	QPSK, 16QAM, 64QAM	25 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, 64QAM	6 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	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	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 0 RB Offset

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, 64QAM	1 RB / 2 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 7 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 12 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
-	Modulation Characteristics	23060 to 23130	23060	10 MHz	QPSK, 16QAM, 64QAM	25 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, 64QAM	6 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM, 64QAM	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 / 2 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK	1 RB / 7 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 12 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 24 RB Offset
-	Radiated Emission	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 2 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 12 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 24 RB Offset

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

LTE Band 13

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 12 RB Offset
		23230	23230	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
-	Modulation Characteristics	23205 to 23255	23230	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
-	Frequency Stability	23205 to 23255	23205, 23255	5 MHz	QPSK	1 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Band Edge	23205 to 23255	23205	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			23255	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		23230	23230	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			23230	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
-	Conducted Emission	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK	1 RB / 12 RB Offset
		23230	23230	10 MHz	QPSK	1 RB / 24 RB Offset
-	Radiated Emission	23205 to 23255	23205, 23230, 23255	5 MHz	QPSK	1 RB / 12 RB Offset
		23230	23230	10 MHz	QPSK	1 RB / 24 RB Offset

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

LTE Band 17

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 49 RB Offset
-	Modulation Characteristics	23780 to 23800	23780	10 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
-	Frequency Stability	23755 to 23825	23755, 23825	5 MHz	QPSK	1 RB / 0 RB Offset
		23780 to 23800	23780, 23800	10 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 12 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
-	Band Edge	23755 to 23825	23755	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			23825	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		23780 to 23800	23780	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			23800	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
-	Conducted Emission	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK	1 RB / 24 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK	1 RB / 49 RB Offset
-	Radiated Emission	23755 to 23825	23755, 23790, 23825	5 MHz	QPSK	1 RB / 24 RB Offset
		23780 to 23800	23780, 23790, 23800	10 MHz	QPSK	1 RB / 49 RB Offset

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

LTE Band 66

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 2 RB Offset
		131987 to 132657	131987, 132322, 132657	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 7 RB Offset
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 12 RB Offset
		132022 to 132622	132022, 132322, 132622	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 24 RB Offset
		132047 to 132597	132047, 132322, 132597	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 37 RB Offset
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 50 RB Offset
-	Modulation Characteristics	131997 to 132647	132322	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
-	Frequency Stability	131979 to 132665	131979, 132665	1.4 MHz	QPSK	1 RB / 0 RB Offset
		131987 to 132657	131987, 132657	3 MHz	QPSK	1 RB / 0 RB Offset
		131997 to 132647	131997, 132647	5 MHz	QPSK	1 RB / 0 RB Offset
		132022 to 132622	132022, 132622	10 MHz	QPSK	1 RB / 0 RB Offset
		132047 to 132597	132047, 132597	15 MHz	QPSK	1 RB / 0 RB Offset
		132072 to 132572	132072, 132572	20 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK, 16QAM, 64QAM	6 RB / 0 RB Offset
		131987 to 132657	131987, 132322, 132657	3 MHz	QPSK, 16QAM, 64QAM	15 RB / 0 RB Offset
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		132022 to 132622	132022, 132322, 132622	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		132047 to 132597	132047, 132322, 132597	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		131987 to 132657	131987, 132322, 132657	3 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		132022 to 132622	132022, 132322, 132622	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		132047 to 132597	132047, 132322, 132597	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	131979 to 132665	131979	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			132665	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		131987 to 132657	131987	3 MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			132657	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		131997 to 132647	131997	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			132647	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		132022 to 132622	132022	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			132622	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		132047 to 132597	132047	15 MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			132597	15 MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		132072 to 132572	132072	20 MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			132572	20 MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
-	Conducted Emission	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK	1 RB / 2 RB Offset
		131987 to 132657	131987, 132322, 132657	3 MHz	QPSK	1 RB / 7 RB Offset
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK	1 RB / 12 RB Offset
		132022 to 132622	132022, 132322, 132622	10 MHz	QPSK	1 RB / 24 RB Offset
		132047 to 132597	132047, 132322, 132597	15 MHz	QPSK	1 RB / 37 RB Offset
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK	1 RB / 50 RB Offset
-	Radiated Emission	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK	1 RB / 2 RB Offset
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK	1 RB / 12 RB Offset
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK	1 RB / 50 RB Offset

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25 deg. C, 65 % RH	3.85 Vdc	Karl Lee
Modulation Characteristics	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Frequency Stability	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Occupied Bandwidth	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Band Edge	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Peak to Average Ratio	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Conducted Emission	25 deg. C, 65 % RH	3.85 Vdc	Wayne Lin
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2
FCC 47 CFR Part 27
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-E 2016
ANSI 63.26-2015

Note: All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

Portable stations (hand-held devices) operating in the 746-757 MHz, 776-788 MHz and 805-806 MHz band are limited to 3 watts ERP

Portable stations (hand-held device) operating in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

4.1.2 Test Procedures

EIRP / ERP Measurement:

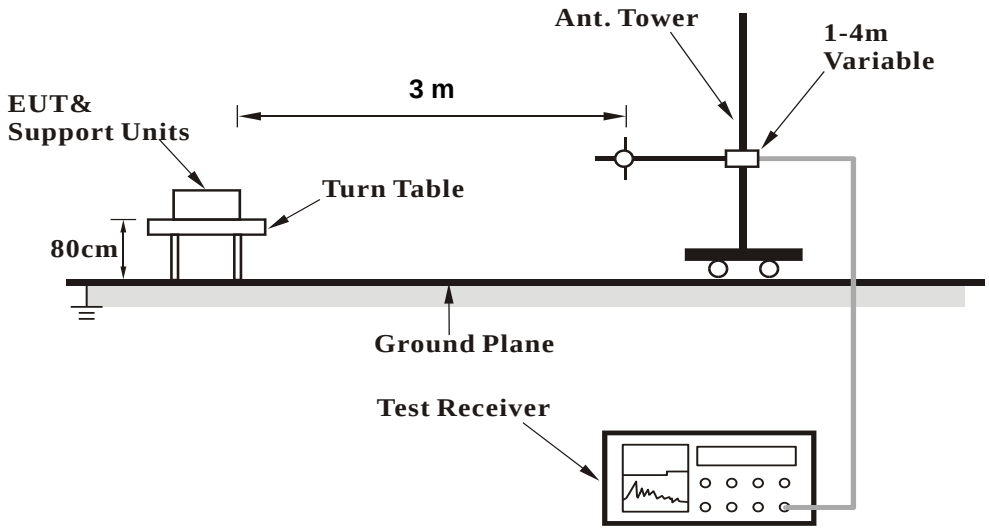
a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5 MHz for WCDMA and 10 MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15 dB.

Conducted Power Measurement:

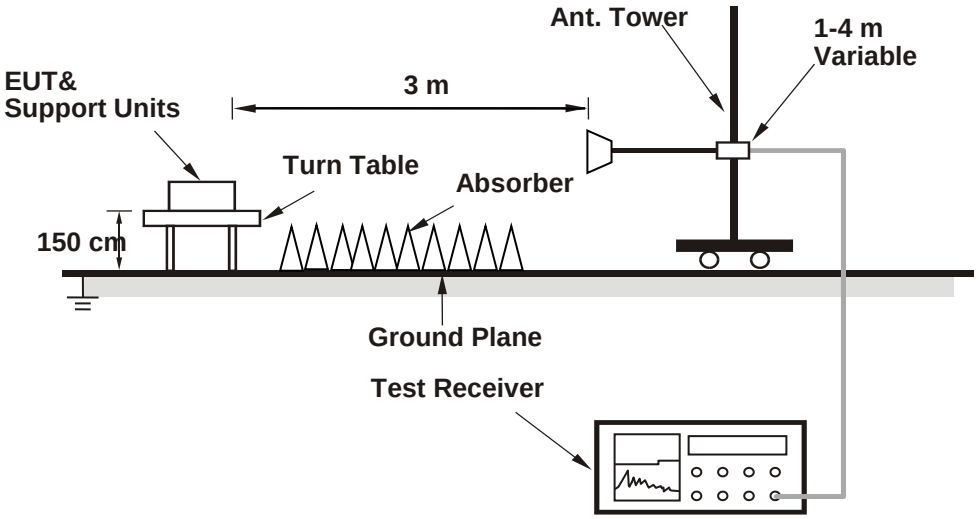
a. The EUT was set up for the maximum power with WCDMA and LTE link data modulation and link up with simulator.
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.3 Test Setup

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



<Radiated Emission above 1 GHz>



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

Conducted Power Measurement:

4.1.4 Test Results

The worst configuration mode is presented in the report as below. Please refer to SAR test report for more detail test mode.

Band		TX Antenna	WLAN Function	Body-Worn/Hotspot
WCDMA	B4	Ant 0	WLAN-Off	Body-Worn/Hotspot
LTE	B4	Ant 0	WLAN-Off	Body-Worn/Hotspot
	B12	Ant 0	WLAN-Off	Body-Worn/Hotspot
	B13	Ant 0	WLAN-Off	Body-Worn/Hotspot
	B17	Ant 0	WLAN-Off	Body-Worn/Hotspot
	B66	Ant 0	WLAN-Off	Body-Worn/Hotspot

Conducted Output Power (dBm)

Band	**WCDMA IV**		
Mode	**Body-Worn / Hotspot**		
Tx Antenna	**Ant-0**		
Channel	**1312**	**1413**	**1513**
Frequency (MHz)	**1712.4**	**1732.6**	**1752.6**
RMC 12.2K	23.07	23.08	23.01
HSDPA Subtest-1	22.04	22.05	21.98
HSDPA Subtest-2	22.05	22.06	21.99
HSDPA Subtest-3	21.61	21.62	21.55
HSDPA Subtest-4	21.60	21.61	21.54
DC-HSDPA Subtest-1	21.98	21.99	21.92
DC-HSDPA Subtest-2	21.99	22.00	21.93
DC-HSDPA Subtest-3	21.55	21.56	21.49
DC-HSDPA Subtest-4	21.54	21.55	21.48
HSUPA Subtest-1	22.21	22.22	22.15
HSUPA Subtest-2	20.18	20.19	20.12
HSUPA Subtest-3	21.16	21.17	21.10
HSUPA Subtest-4	20.17	20.18	20.11
HSUPA Subtest-5	22.20	22.21	22.14

LTE Band 4																
Body-Worn / Hotspot																
Ant-0																
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20050	20175	20300				Channel		20025	20175	20325	
		Frequency (MHz)		1720.0	1732.5	1745.0				Frequency (MHz)		1717.5	1732.5	1747.5	
20M	QPSK	1	0	23.31	23.35	23.25	0	15M	QPSK	1	0	23.26	23.30	23.20	0
		1	50	23.28	23.32	23.22	0			1	37	23.23	23.27	23.17	0
		1	99	23.16	23.20	23.10	0			1	74	23.11	23.15	23.05	0
		50	0	22.38	22.42	22.32	1			36	0	22.33	22.37	22.27	1
		50	25	22.35	22.39	22.29	1			36	19	22.30	22.34	22.24	1
		50	50	22.30	22.34	22.24	1			36	39	22.25	22.29	22.19	1
		100	0	22.42	22.46	22.36	1			75	0	22.37	22.41	22.31	1
	16QAM	1	0	22.29	22.33	22.23	1		16QAM	1	0	22.24	22.28	22.18	1
		1	50	22.26	22.30	22.20	1			1	37	22.21	22.25	22.15	1
		1	99	22.14	22.18	22.08	1			1	74	22.09	22.13	22.03	1
		50	0	21.36	21.40	21.30	2			36	0	21.31	21.35	21.25	2
		50	25	21.33	21.37	21.27	2			36	19	21.28	21.32	21.22	2
		50	50	21.28	21.32	21.22	2			36	39	21.23	21.27	21.17	2
		100	0	21.40	21.44	21.34	2			75	0	21.35	21.39	21.29	2
	64QAM	1	0	21.28	21.32	21.22	2		64QAM	1	0	21.23	21.27	21.17	2
		1	50	21.25	21.29	21.19	2			1	37	21.20	21.24	21.14	2
		1	99	21.13	21.17	21.07	2			1	74	21.08	21.12	21.02	2
		50	0	20.35	20.39	20.29	3			36	0	20.30	20.34	20.24	3
		50	25	20.32	20.36	20.26	3			36	19	20.27	20.31	20.21	3
		50	50	20.27	20.31	20.21	3			36	39	20.22	20.26	20.16	3
		100	0	20.39	20.43	20.33	3			75	0	20.34	20.38	20.28	3
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20000	20175	20350				Channel		19975	20175	20375	
		Frequency (MHz)		1715.0	1732.5	1750.0				Frequency (MHz)		1712.5	1732.5	1752.5	
10M	QPSK	1	0	23.19	23.23	23.13	0	5M	QPSK	1	0	23.11	23.15	23.05	0
		1	24	23.16	23.20	23.10	0			1	12	23.08	23.12	23.02	0
		1	49	23.04	23.08	22.98	0			1	24	22.96	23.00	22.90	0
		25	0	22.26	22.30	22.20	1			12	0	22.18	22.22	22.12	1
		25	12	22.23	22.27	22.17	1			12	6	22.15	22.19	22.09	1
		25	25	22.18	22.22	22.12	1			12	13	22.10	22.14	22.04	1
		50	0	22.30	22.34	22.24	1			25	0	22.22	22.26	22.16	1
	16QAM	1	0	22.17	22.21	22.11	1		16QAM	1	0	22.09	22.13	22.03	1
		1	24	22.14	22.18	22.08	1			1	12	22.06	22.10	22.00	1
		1	49	22.02	22.06	21.96	1			1	24	21.94	21.98	21.88	1
		25	0	21.24	21.28	21.18	2			12	0	21.16	21.20	21.10	2
		25	12	21.21	21.25	21.15	2			12	6	21.13	21.17	21.07	2
		25	25	21.16	21.20	21.10	2			12	13	21.08	21.12	21.02	2
		50	0	21.28	21.32	21.22	2			25	0	21.20	21.24	21.14	2
	64QAM	1	0	21.16	21.20	21.10	2		64QAM	1	0	21.08	21.12	21.02	2
		1	24	21.13	21.17	21.07	2			1	12	21.05	21.09	20.99	2
		1	49	21.01	21.05	20.95	2			1	24	20.93	20.97	20.87	2
		25	0	20.23	20.27	20.17	3			12	0	20.15	20.19	20.09	3
		25	12	20.20	20.24	20.14	3			12	6	20.12	20.16	20.06	3
		25	25	20.15	20.19	20.09	3			12	13	20.07	20.11	20.01	3
		50	0	20.27	20.31	20.21	3			25	0	20.19	20.23	20.13	3
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		19965	20175	20385				Channel		19957	20175	20393	
		Frequency (MHz)		1711.5	1732.5	1753.5				Frequency (MHz)		1710.7	1732.5	1754.3	
3M	QPSK	1	0	23.06	23.10	23.00	0	1.4M	QPSK	1	0	23.00	23.04	22.94	0
		1	7	23.03	23.07	22.97	0			1	2	22.97	23.01	22.91	0
		1	14	22.91	22.95	22.85	0			1	5	22.85	22.89	22.79	0
		8	0	22.13	22.17	22.07	1			3	0	22.77	22.81	22.71	0
		8	3	22.10	22.14	22.04	1			3	1	22.74	22.78	22.68	0
		8	7	22.05	22.09	21.99	1			3	3	22.69	22.73	22.63	0
		15	0	22.17	22.21	22.11	1			6	0	22.11	22.15	22.05	1
	16QAM	1	0	22.04	22.08	21.98	1		16QAM	1	0	21.98	22.02	21.92	1
		1	7	22.01	22.05	21.95	1			1	2	21.95	21.99	21.89	1
		1	14	21.89	21.93	21.83	1			1	5	21.83	21.87	21.77	1
		8	0	21.11	21.15	21.05	2			3	0	21.75	21.79	21.69	1
		8	3	21.08	21.12	21.02	2			3	1	21.72	21.76	21.66	1
		8	7	21.03	21.07	20.97	2			3	3	21.67	21.71	21.61	1
		15	0	21.15	21.19	21.09	2			6	0	21.09	21.13	21.03	2
	64QAM	1	0	21.03	21.07	20.97	2		64QAM	1	0	20.97	21.01	20.91	2
		1	7	21.00	21.04	20.94	2			1	2	20.94	20.98	20.88	2
		1	14	20.88	20.92	20.82	2			1	5	20.82	20.86	20.76	2
		8	0	20.10	20.14	20.04	3			3	0	20.74	20.78	20.68	2
		8	3	20.07	20.11	20.01	3			3	1	20.71	20.75	20.65	2
		8	7	20.02	20.06	19.96	3			3	3	20.66	20.70	20.60	2
		15	0	20.14	20.18	20.08	3			6	0	20.08	20.12	20.02	3

LTE Band 12 Body-Worn / Hotspot Ant-0															
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23060	23095	23130				Channel		23035	23095	23155	
		Frequency (MHz)		704.0	707.5	711.0				Frequency (MHz)		701.5	707.5	713.5	
10M	QPSK	1	0	24.28	24.23	24.32	0	5M	QPSK	1	0	24.25	24.20	24.29	0
		1	24	24.40	24.35	24.44	0			1	12	24.37	24.32	24.41	0
		1	49	24.38	24.33	24.42	0			1	24	24.35	24.30	24.39	0
		25	0	23.42	23.37	23.46	1			12	0	23.39	23.34	23.43	1
		25	12	23.48	23.43	23.52	1			12	6	23.45	23.40	23.49	1
		25	25	23.44	23.39	23.48	1			12	13	23.41	23.36	23.45	1
		50	0	23.38	23.33	23.42	1			25	0	23.35	23.30	23.39	1
	16QAM	1	0	23.25	23.20	23.29	1		16QAM	1	0	23.22	23.17	23.26	1
		1	24	23.37	23.32	23.41	1			1	12	23.34	23.29	23.38	1
		1	49	23.35	23.30	23.39	1			1	24	23.32	23.27	23.36	1
		25	0	22.39	22.34	22.43	2			12	0	22.36	22.31	22.40	2
		25	12	22.45	22.40	22.49	2			12	6	22.42	22.37	22.46	2
		25	25	22.41	22.36	22.45	2			12	13	22.38	22.33	22.42	2
		50	0	22.35	22.30	22.39	2			25	0	22.32	22.27	22.36	2
	64QAM	1	0	22.27	22.22	22.31	2		64QAM	1	0	22.24	22.19	22.28	2
		1	24	22.39	22.34	22.43	2			1	12	22.36	22.31	22.40	2
		1	49	22.37	22.32	22.41	2			1	24	22.34	22.29	22.38	2
		25	0	21.41	21.36	21.45	3			12	0	21.38	21.33	21.42	3
		25	12	21.47	21.42	21.51	3			12	6	21.44	21.39	21.48	3
		25	25	21.43	21.38	21.47	3			12	13	21.40	21.35	21.44	3
		50	0	21.37	21.32	21.41	3			25	0	21.34	21.29	21.38	3
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23025	23095	23165				Channel		23017	23095	23173	
		Frequency (MHz)		700.5	707.5	714.5				Frequency (MHz)		699.7	707.5	715.3	
3M	QPSK	1	0	24.20	24.15	24.24	0	1.4M	QPSK	1	0	24.18	24.13	24.22	0
		1	7	24.32	24.27	24.36	0			1	2	24.30	24.25	24.34	0
		1	14	24.30	24.25	24.34	0			1	5	24.28	24.23	24.32	0
		8	0	23.34	23.29	23.38	1			3	0	24.13	24.08	24.17	0
		8	3	23.40	23.35	23.44	1			3	1	24.19	24.14	24.23	0
		8	7	23.36	23.31	23.40	1			3	3	24.15	24.10	24.19	0
		15	0	23.30	23.25	23.34	1			6	0	23.28	23.23	23.32	1
	16QAM	1	0	23.17	23.12	23.21	1		16QAM	1	0	23.15	23.10	23.19	1
		1	7	23.29	23.24	23.33	1			1	2	23.27	23.22	23.31	1
		1	14	23.27	23.22	23.31	1			1	5	23.25	23.20	23.29	1
		8	0	22.31	22.26	22.35	2			3	0	23.10	23.05	23.14	1
		8	3	22.37	22.32	22.41	2			3	1	23.16	23.11	23.20	1
		8	7	22.33	22.28	22.37	2			3	3	23.12	23.07	23.16	1
		15	0	22.27	22.22	22.31	2			6	0	22.25	22.20	22.29	2
	64QAM	1	0	22.19	22.14	22.23	2		64QAM	1	0	22.17	22.12	22.21	2
		1	7	22.31	22.26	22.35	2			1	2	22.29	22.24	22.33	2
		1	14	22.29	22.24	22.33	2			1	5	22.27	22.22	22.31	2
		8	0	21.33	21.28	21.37	3			3	0	22.12	22.07	22.16	2
		8	3	21.39	21.34	21.43	3			3	1	22.18	22.13	22.22	2
		8	7	21.35	21.30	21.39	3			3	3	22.14	22.09	22.18	2
		15	0	21.29	21.24	21.33	3			6	0	21.27	21.22	21.31	3

LTE Band 13 Body-Worn / Hotspot Ant-0																
BW	MCS Index	RB Size	RB Offset		Mid		3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel			23230					Channel		23205	23230	23225	
		Frequency (MHz)			782.0					Frequency (MHz)		779.5	782.0	784.5	
10M	QPSK	1	0		24.31		0	5M	QPSK	1	0	23.82	24.28	24.37	0
		1	24		24.37		0			1	12	23.89	24.35	24.44	0
		1	49		24.28		0			1	24	23.79	24.25	24.34	0
		25	0		23.43		1			12	0	22.95	23.41	23.50	1
		25	12		23.46		1			12	6	22.97	23.43	23.52	1
		25	25		23.39		1			12	13	22.91	23.37	23.46	1
		50	0		23.41		1			25	0	22.92	23.38	23.47	1
	16QAM	1	0		23.29		1		16QAM	1	0	22.80	23.26	23.35	1
		1	24		23.35		1			1	12	22.87	23.33	23.42	1
		1	49		23.26		1			1	24	22.77	23.23	23.32	1
		25	0		22.41		2			12	0	21.93	22.39	22.48	2
		25	12		22.44		2			12	6	21.95	22.41	22.50	2
		25	25		22.37		2			12	13	21.89	22.35	22.44	2
		50	0		22.39		2			25	0	21.90	22.36	22.45	2
	64QAM	1	0		22.26		2		64QAM	1	0	21.75	22.21	22.30	2
		1	24		22.32		2			1	12	21.82	22.28	22.37	2
		1	49		22.23		2			1	24	21.72	22.18	22.27	2
		25	0		21.38		3			12	0	20.88	21.34	21.43	3
		25	12		21.41		3			12	6	20.90	21.36	21.45	3
		25	25		21.34		3			12	13	20.84	21.30	21.39	3
		50	0		21.36		3			25	0	20.85	21.31	21.40	3

LTE Band 17 Body-Worn / Hotspot Ant-0															
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23780	23790	23800				Channel		23755	23790	23825	
		Frequency (MHz)		709.0	710.0	711.0				Frequency (MHz)		706.5	710.0	713.5	
10M	QPSK	1	0	24.73	24.75	24.71	0	5M	QPSK	1	0	24.68	24.70	24.66	0
		1	24	24.81	24.83	24.79	0			1	12	24.76	24.78	24.74	0
		1	49	24.83	24.85	24.81	0			1	24	24.78	24.80	24.76	0
		25	0	23.95	23.97	23.93	1			12	0	23.90	23.92	23.88	1
		25	12	23.94	23.96	23.92	1			12	6	23.89	23.91	23.87	1
		25	25	23.96	23.98	23.94	1			12	13	23.91	23.93	23.89	1
		50	0	23.91	23.93	23.89	1			25	0	23.86	23.88	23.84	1
	16QAM	1	0	23.70	23.72	23.68	1		16QAM	1	0	23.65	23.67	23.63	1
		1	24	23.78	23.80	23.76	1			1	12	23.73	23.75	23.71	1
		1	49	23.80	23.82	23.78	1			1	24	23.75	23.77	23.73	1
		25	0	22.92	22.94	22.90	2			12	0	22.87	22.89	22.85	2
		25	12	22.91	22.93	22.89	2			12	6	22.86	22.88	22.84	2
		25	25	22.93	22.95	22.91	2			12	13	22.88	22.90	22.86	2
		50	0	22.88	22.90	22.86	2			25	0	22.83	22.85	22.81	2
	64QAM	1	0	22.65	22.67	22.63	2		64QAM	1	0	22.60	22.62	22.58	2
		1	24	22.73	22.75	22.71	2			1	12	22.68	22.70	22.66	2
		1	49	22.75	22.77	22.73	2			1	24	22.70	22.72	22.68	2
		25	0	21.87	21.89	21.85	3			12	0	21.82	21.84	21.80	3
		25	12	21.86	21.88	21.84	3			12	6	21.81	21.83	21.79	3
		25	25	21.88	21.90	21.86	3			12	13	21.83	21.85	21.81	3
		50	0	21.83	21.85	21.81	3			25	0	21.78	21.80	21.76	3

LTE Band 66
Body-Worn / Hotspot
Ant-0

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		132072	132322	132572				Channel		132047	132322	132597	
		Frequency (MHz)		1720.0	1745.0	1770.0				Frequency (MHz)		1717.5	1745.0	1772.5	
20M	QPSK	1	0	23.37	23.32	23.41	0	15M	QPSK	1	0	23.30	23.25	23.34	0
		1	50	23.50	23.45	23.54	0			1	37	23.43	23.38	23.47	0
		1	99	23.42	23.37	23.46	0			1	74	23.35	23.30	23.39	0
		50	0	22.37	22.32	22.41	1			36	0	22.30	22.25	22.34	1
		50	25	22.40	22.35	22.44	1			36	19	22.33	22.28	22.37	1
		50	50	22.30	22.25	22.34	1			36	39	22.23	22.18	22.27	1
		100	0	22.36	22.31	22.40	1			75	0	22.29	22.24	22.33	1
	16QAM	1	0	22.32	22.27	22.36	1		16QAM	1	0	22.25	22.20	22.29	1
		1	50	22.45	22.40	22.49	1			1	37	22.38	22.33	22.42	1
		1	99	22.37	22.32	22.41	1			1	74	22.30	22.25	22.34	1
		50	0	21.32	21.27	21.36	2			36	0	21.25	21.20	21.29	2
		50	25	21.35	21.30	21.39	2			36	19	21.28	21.23	21.32	2
		50	50	21.25	21.20	21.29	2			36	39	21.18	21.13	21.22	2
		100	0	21.31	21.26	21.35	2			75	0	21.24	21.19	21.28	2
	64QAM	1	0	21.30	21.25	21.34	2		64QAM	1	0	21.23	21.18	21.27	2
		1	50	21.43	21.38	21.47	2			1	37	21.36	21.31	21.40	2
		1	99	21.35	21.30	21.39	2			1	74	21.28	21.23	21.32	2
		50	0	20.30	20.25	20.34	3			36	0	20.23	20.18	20.27	3
		50	25	20.33	20.28	20.37	3			36	19	20.26	20.21	20.30	3
		50	50	20.23	20.18	20.27	3			36	39	20.16	20.11	20.20	3
		100	0	20.29	20.24	20.33	3			75	0	20.22	20.17	20.26	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		132022	132322	132622				Channel		131997	132322	132647	
		Frequency (MHz)		1715.0	1745.0	1775.0				Frequency (MHz)		1712.5	1745.0	1777.5	
10M	QPSK	1	0	23.25	23.20	23.29	0	5M	QPSK	1	0	23.16	23.11	23.20	0
		1	24	23.38	23.33	23.42	0			1	12	23.29	23.24	23.33	0
		1	49	23.30	23.25	23.34	0			1	24	23.21	23.16	23.25	0
		25	0	22.25	22.20	22.29	1			12	0	22.16	22.11	22.20	1
		25	12	22.28	22.23	22.32	1			12	6	22.19	22.14	22.23	1
		25	25	22.18	22.13	22.22	1			12	13	22.09	22.04	22.13	1
		50	0	22.24	22.19	22.28	1			25	0	22.15	22.10	22.19	1
	16QAM	1	0	22.20	22.15	22.24	1		16QAM	1	0	22.11	22.06	22.15	1
		1	24	22.33	22.28	22.37	1			1	12	22.24	22.19	22.28	1
		1	49	22.25	22.20	22.29	1			1	24	22.16	22.11	22.20	1
		25	0	21.20	21.15	21.24	2			12	0	21.11	21.06	21.15	2
		25	12	21.23	21.18	21.27	2			12	6	21.14	21.09	21.18	2
		25	25	21.13	21.08	21.17	2			12	13	21.04	20.99	21.08	2
		50	0	21.19	21.14	21.23	2			25	0	21.10	21.05	21.14	2
	64QAM	1	0	21.18	21.13	21.22	2		64QAM	1	0	21.09	21.04	21.13	2
		1	24	21.31	21.26	21.35	2			1	12	21.22	21.17	21.26	2
		1	49	21.23	21.18	21.27	2			1	24	21.14	21.09	21.18	2
		25	0	20.18	20.13	20.22	3			12	0	20.09	20.04	20.13	3
		25	12	20.21	20.16	20.25	3			12	6	20.12	20.07	20.16	3
		25	25	20.11	20.06	20.15	3			12	13	20.02	19.97	20.06	3
		50	0	20.17	20.12	20.21	3			25	0	20.08	20.03	20.12	3

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		131987	132322	132657				Channel		131979	132322	132665	
		Frequency (MHz)		1711.5	1745.5	1778.5				Frequency (MHz)		1710.7	1745.0	1779.3	
3M	QPSK	1	0	23.11	23.06	23.15	0	1.4M	QPSK	1	0	23.06	23.01	23.10	0
		1	7	23.24	23.19	23.28	0			1	2	23.19	23.14	23.23	0
		1	14	23.16	23.11	23.20	0			1	5	23.11	23.06	23.15	0
		8	0	22.11	22.06	22.15	1			3	0	22.86	22.81	22.90	0
		8	3	22.14	22.09	22.18	1			3	1	22.89	22.84	22.93	0
		8	7	22.04	21.99	22.08	1			3	3	22.79	22.74	22.83	0
		15	0	22.10	22.05	22.14	1			6	0	22.05	22.00	22.09	1
	16QAM	1	0	22.06	22.01	22.10	1		16QAM	1	0	22.01	21.96	22.05	1
		1	7	22.19	22.14	22.23	1			1	2	22.14	22.09	22.18	1
		1	14	22.11	22.06	22.15	1			1	5	22.06	22.01	22.10	1
		8	0	21.06	21.01	21.10	2			3	0	21.81	21.76	21.85	1
		8	3	21.09	21.04	21.13	2			3	1	21.84	21.79	21.88	1
		8	7	20.99	20.94	21.03	2			3	3	21.74	21.69	21.78	1
		15	0	21.05	21.00	21.09	2			6	0	21.00	20.95	21.04	2
	64QAM	1	0	21.04	20.99	21.08	2		64QAM	1	0	20.99	20.94	21.03	2
		1	7	21.17	21.12	21.21	2			1	2	21.12	21.07	21.16	2
		1	14	21.09	21.04	21.13	2			1	5	21.04	20.99	21.08	2
		8	0	20.04	19.99	20.08	3			3	0	20.79	20.74	20.83	2
		8	3	20.07	20.02	20.11	3			3	1	20.82	20.77	20.86	2
		8	7	19.97	19.92	20.01	3			3	3	20.72	20.67	20.76	2
		15	0	20.03	19.98	20.07	3			6	0	19.98	19.93	20.02	3

ERP Power (dBm)

LTE Band 12							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23017	699.7	-11.10	32.719	19.47	88.49	H
	23095	707.5	-11.16	32.736	19.43	87.62	
	23173	715.3	-11.00	32.591	19.44	87.92	
	23017	699.7	-17.04	32.69	13.50	22.39	V
	23095	707.5	-17.27	32.81	13.39	21.83	
	23173	715.3	-17.16	32.74	13.43	22.03	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	23017	699.7	-12.11	32.719	18.46	70.13	H
	23095	707.5	-12.16	32.736	18.43	69.60	
	23173	715.3	-12.01	32.591	18.43	69.68	
	23017	699.7	-18.05	32.69	12.49	17.74	V
	23095	707.5	-18.27	32.81	12.39	17.34	
	23173	715.3	-18.16	32.74	12.43	17.50	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	23017	699.7	-13.11	32.719	17.46	55.71	H
	23095	707.5	-13.16	32.736	17.43	55.28	
	23173	715.3	-13.02	32.591	17.42	55.22	
	23017	699.7	-19.06	32.69	11.48	14.06	V
	23095	707.5	-19.28	32.81	11.38	13.74	
	23173	715.3	-19.16	32.74	11.43	13.90	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 12							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23025	700.5	-11.05	32.719	19.52	89.52	H
	23095	707.5	-11.13	32.736	19.46	88.23	
	23165	714.5	-10.97	32.591	19.47	88.53	
	23025	700.5	-17.00	32.69	13.54	22.59	V
	23095	707.5	-17.23	32.81	13.43	22.03	
	23165	714.5	-17.12	32.74	13.47	22.23	
Channel Bandwidth: 3 MHz / 16QAM							
X	23025	700.5	-12.06	32.719	18.51	70.94	H
	23095	707.5	-12.14	32.736	18.45	69.92	
	23165	714.5	-11.98	32.591	18.46	70.16	
	23025	700.5	-18.01	32.69	12.53	17.91	V
	23095	707.5	-18.23	32.81	12.43	17.50	
	23165	714.5	-18.13	32.74	12.46	17.62	
Channel Bandwidth: 3 MHz / 64QAM							
X	23025	700.5	-13.06	32.719	17.51	56.35	H
	23095	707.5	-13.15	32.736	17.44	55.41	
	23165	714.5	-12.98	32.591	17.46	55.73	
	23025	700.5	-19.02	32.69	11.52	14.19	V
	23095	707.5	-19.24	32.81	11.42	13.87	
	23165	714.5	-19.13	32.74	11.46	14.00	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 12							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23035	701.5	-11.01	32.719	19.56	90.34	H
	23095	707.5	-11.10	32.736	19.49	88.84	
	23155	713.5	-10.93	32.591	19.51	89.35	
	23035	701.5	-16.95	32.69	13.59	22.86	V
	23095	707.5	-17.19	32.81	13.47	22.23	
	23155	713.5	-17.09	32.74	13.50	22.39	
Channel Bandwidth: 5 MHz / 16QAM							
X	23035	701.5	-12.01	32.719	18.56	71.76	H
	23095	707.5	-12.11	32.736	18.48	70.40	
	23155	713.5	-11.94	32.591	18.50	70.81	
	23035	701.5	-17.96	32.69	12.58	18.11	V
	23095	707.5	-18.20	32.81	12.46	17.62	
	23155	713.5	-18.10	32.74	12.49	17.74	
Channel Bandwidth: 5 MHz / 64QAM							
X	23035	701.5	-13.02	32.719	17.55	56.87	H
	23095	707.5	-13.12	32.736	17.47	55.80	
	23155	713.5	-12.94	32.591	17.50	56.25	
	23035	701.5	-18.96	32.69	11.58	14.39	V
	23095	707.5	-19.21	32.81	11.45	13.96	
	23155	713.5	-19.11	32.74	11.48	14.06	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 12							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23060	704.0	-10.97	32.727	19.61	91.35	H
	23095	707.5	-11.05	32.739	19.54	89.93	
	23130	711.0	-11.03	32.728	19.55	90.12	
	23060	704.0	-16.98	32.75	13.62	23.01	V
	23095	707.5	-17.14	32.81	13.52	22.49	
	23130	711.0	-17.15	32.84	13.54	22.58	
Channel Bandwidth: 10 MHz / 16QAM							
X	23060	704.0	-11.97	32.727	18.61	72.56	H
	23095	707.5	-12.06	32.739	18.53	71.27	
	23130	711.0	-12.04	32.728	18.54	71.42	
	23060	704.0	-17.99	32.75	12.61	18.24	V
	23095	707.5	-18.15	32.81	12.51	17.82	
	23130	711.0	-18.16	32.84	12.53	17.91	
Channel Bandwidth: 10 MHz / 64QAM							
X	23060	704.0	-12.98	32.727	17.60	57.50	H
	23095	707.5	-13.07	32.739	17.52	56.48	
	23130	711.0	-13.05	32.728	17.53	56.60	
	23060	704.0	-18.99	32.75	11.61	14.49	V
	23095	707.5	-19.16	32.81	11.50	14.13	
	23130	711.0	-19.16	32.84	11.53	14.22	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 13							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23205	779.5	-13.60	32.771	17.02	50.36	H
	23230	782.0	-13.54	32.741	17.05	50.71	
	23255	784.5	-13.70	32.854	17.00	50.16	
	23205	779.5	-19.40	32.5	10.95	12.45	V
	23230	782.0	-19.34	32.52	11.03	12.68	
	23255	784.5	-19.48	32.62	10.99	12.56	
Channel Bandwidth: 5 MHz / 16QAM							
X	23205	779.5	-14.61	32.771	16.01	39.91	H
	23230	782.0	-14.55	32.741	16.04	40.19	
	23255	784.5	-14.71	32.854	15.99	39.76	
	23205	779.5	-20.40	32.5	9.95	9.89	V
	23230	782.0	-20.35	32.52	10.02	10.05	
	23255	784.5	-20.49	32.62	9.98	9.95	
Channel Bandwidth: 5 MHz / 64QAM							
X	23205	779.5	-15.62	32.771	15.00	31.63	H
	23230	782.0	-15.56	32.741	15.03	31.85	
	23255	784.5	-15.71	32.854	14.99	31.58	
	23205	779.5	-21.41	32.5	8.94	7.83	V
	23230	782.0	-21.36	32.52	9.01	7.96	
	23255	784.5	-21.50	32.62	8.97	7.89	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 13							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23230	782.0	-13.50	32.737	17.09	51.13	H
	23230	782.0	-19.30	32.52	11.07	12.79	V
Channel Bandwidth: 10 MHz / 16QAM							
X	23230	782.0	-14.51	32.737	16.08	40.52	H
	23230	782.0	-20.31	32.52	10.06	10.14	V
Channel Bandwidth: 10 MHz / 64QAM							
X	23230	782.0	-15.51	32.737	15.08	32.19	H
	23230	782.0	-21.32	32.52	9.05	8.04	V

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 17							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23755	706.5	-11.06	32.719	19.51	89.31	H
	23790	710.0	-11.05	32.736	19.54	89.87	
	23825	713.5	-10.95	32.591	19.49	88.94	
	23755	706.5	-16.06	32.69	14.48	28.05	V
	23790	710.0	-16.13	32.81	14.53	28.38	
	23825	713.5	-16.13	32.74	14.46	27.93	
Channel Bandwidth: 5 MHz / 16QAM							
X	23755	706.5	-12.06	32.719	18.51	70.94	H
	23790	710.0	-12.06	32.736	18.53	71.22	
	23825	713.5	-11.96	32.591	18.48	70.49	
	23755	706.5	-17.06	32.69	13.48	22.28	V
	23790	710.0	-17.14	32.81	13.52	22.49	
	23825	713.5	-17.14	32.74	13.45	22.13	
Channel Bandwidth: 5 MHz / 64QAM							
X	23755	706.5	-13.06	32.719	17.51	56.35	H
	23790	710.0	-13.07	32.736	17.52	56.44	
	23825	713.5	-12.96	32.591	17.48	55.99	
	23755	706.5	-18.07	32.69	12.47	17.66	V
	23790	710.0	-18.14	32.81	12.52	17.86	
	23825	713.5	-18.15	32.74	12.44	17.54	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 17							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23780	709.0	-11.03	32.727	19.55	90.09	H
	23790	710.0	-11.01	32.739	19.58	90.76	
	23800	711.0	-11.05	32.728	19.53	89.70	
	23780	709.0	-16.08	32.75	14.52	28.31	V
	23790	710.0	-16.09	32.81	14.57	28.64	
	23800	711.0	-16.19	32.84	14.50	28.18	
Channel Bandwidth: 10 MHz / 16QAM							
X	23780	709.0	-12.04	32.727	18.54	71.40	H
	23790	710.0	-12.01	32.739	18.58	72.09	
	23800	711.0	-12.06	32.728	18.52	71.09	
	23780	709.0	-17.08	32.75	13.52	22.49	V
	23790	710.0	-17.10	32.81	13.56	22.70	
	23800	711.0	-17.19	32.84	13.50	22.39	
Channel Bandwidth: 10 MHz / 64QAM							
X	23780	709.0	-13.05	32.727	17.53	56.58	H
	23790	710.0	-13.02	32.739	17.57	57.13	
	23800	711.0	-13.06	32.728	17.52	56.47	
	23780	709.0	-18.09	32.75	12.51	17.82	V
	23790	710.0	-18.11	32.81	12.55	17.99	
	23800	711.0	-18.20	32.84	12.49	17.74	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

EIRP Power (dBm)

WCDMA							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	1312	1712.4	-18.92	42.49	23.57	227.25	H
	1413	1732.6	-18.83	42.33	23.50	223.72	
	1513	1752.6	-18.54	42.10	23.56	226.99	
	1312	1712.4	-23.40	42.99	19.59	90.99	V
	1413	1732.6	-23.26	42.74	19.48	88.72	
	1513	1752.6	-22.68	42.21	19.53	89.74	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	19957	1710.7	-19.16	42.49	23.33	215.03	H
	20175	1732.5	-18.94	42.33	23.39	218.12	
	20393	1754.3	-18.81	42.10	23.29	213.30	
	19957	1710.7	-23.69	42.99	19.30	85.11	V
	20175	1732.5	-23.37	42.74	19.37	86.50	
	20393	1754.3	-22.95	42.21	19.26	84.33	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	19957	1710.7	-20.16	42.49	22.33	170.80	H
	20175	1732.5	-19.94	42.33	22.39	173.26	
	20393	1754.3	-19.82	42.10	22.28	169.04	
	19957	1710.7	-24.70	42.99	18.29	67.45	V
	20175	1732.5	-24.38	42.74	18.36	68.55	
	20393	1754.3	-23.96	42.21	18.25	66.79	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	19957	1710.7	-21.17	42.49	21.32	135.36	H
	20175	1732.5	-20.95	42.33	21.38	137.31	
	20393	1754.3	-20.83	42.10	21.27	133.97	
	19957	1710.7	-25.71	42.99	17.28	53.46	V
	20175	1732.5	-25.39	42.74	17.35	54.33	
	20393	1754.3	-24.96	42.21	17.25	53.09	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	19965	1711.5	-19.12	42.49	23.37	217.02	H
	20175	1732.5	-18.90	42.33	23.43	220.14	
	20385	1753.5	-18.77	42.10	23.33	215.28	
	19965	1711.5	-23.65	42.99	19.34	85.90	V
	20175	1732.5	-23.33	42.74	19.41	87.30	
	20385	1753.5	-22.91	42.21	19.30	85.11	
Channel Bandwidth: 3 MHz / 16QAM							
X	19965	1711.5	-20.12	42.49	22.37	172.39	H
	20175	1732.5	-19.91	42.33	22.42	174.46	
	20385	1753.5	-19.78	42.10	22.32	170.61	
	19965	1711.5	-24.65	42.99	18.34	68.23	V
	20175	1732.5	-24.33	42.74	18.41	69.34	
	20385	1753.5	-23.92	42.21	18.29	67.45	
Channel Bandwidth: 3 MHz / 64QAM							
X	19965	1711.5	-21.13	42.49	21.36	136.62	H
	20175	1732.5	-20.92	42.33	21.41	138.26	
	20385	1753.5	-20.79	42.10	21.31	135.21	
	19965	1711.5	-25.65	42.99	17.34	54.20	V
	20175	1732.5	-25.34	42.74	17.40	54.95	
	20385	1753.5	-24.93	42.21	17.28	53.46	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	19975	1712.5	-19.09	42.49	23.40	218.52	H
	20175	1732.5	-18.86	42.33	23.47	222.18	
	20375	1752.5	-18.74	42.10	23.36	216.77	
	19975	1712.5	-23.61	42.99	19.38	86.70	V
	20175	1732.5	-23.30	42.74	19.44	87.90	
	20375	1752.5	-22.87	42.21	19.34	85.90	
Channel Bandwidth: 5 MHz / 16QAM							
X	19975	1712.5	-20.10	42.49	22.39	173.18	H
	20175	1732.5	-19.86	42.33	22.47	176.48	
	20375	1752.5	-19.75	42.10	22.35	171.79	
	19975	1712.5	-24.61	42.99	18.38	68.87	V
	20175	1732.5	-24.31	42.74	18.43	69.66	
	20375	1752.5	-23.87	42.21	18.34	68.23	
Channel Bandwidth: 5 MHz / 64QAM							
X	19975	1712.5	-21.11	42.49	21.38	137.25	H
	20175	1732.5	-20.87	42.33	21.46	139.86	
	20375	1752.5	-20.76	42.10	21.34	136.14	
	19975	1712.5	-25.61	42.99	17.38	54.70	V
	20175	1732.5	-25.32	42.74	17.42	55.21	
	20375	1752.5	-24.87	42.21	17.34	54.20	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	20000	1715.0	-19.06	42.49	23.43	220.04	H
	20175	1732.5	-18.82	42.33	23.51	224.23	
	20350	1750.0	-18.70	42.10	23.40	218.78	
	20000	1715.0	-23.57	42.99	19.42	87.50	V
	20175	1732.5	-23.26	42.74	19.48	88.72	
	20350	1750.0	-22.83	42.21	19.38	86.70	
Channel Bandwidth: 10 MHz / 16QAM							
X	20000	1715.0	-20.06	42.49	22.43	174.78	H
	20175	1732.5	-19.82	42.33	22.51	178.11	
	20350	1750.0	-19.71	42.10	22.39	173.38	
	20000	1715.0	-24.58	42.99	18.41	69.34	V
	20175	1732.5	-24.26	42.74	18.48	70.47	
	20350	1750.0	-23.84	42.21	18.37	68.71	
Channel Bandwidth: 10 MHz / 64QAM							
X	20000	1715.0	-21.07	42.49	21.42	138.52	H
	20175	1732.5	-20.83	42.33	21.50	141.16	
	20350	1750.0	-20.72	42.10	21.38	137.40	
	20000	1715.0	-25.59	42.99	17.40	54.95	V
	20175	1732.5	-25.26	42.74	17.48	55.98	
	20350	1750.0	-24.85	42.21	17.36	54.45	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 15 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	20025	1717.5	-19.00	42.49	23.49	223.10	H
	20175	1732.5	-18.78	42.33	23.55	226.31	
	20325	1747.5	-18.66	42.10	23.44	220.80	
	20025	1717.5	-23.53	42.99	19.46	88.31	V
	20175	1732.5	-23.22	42.74	19.52	89.54	
	20325	1747.5	-22.79	42.21	19.42	87.50	
Channel Bandwidth: 15 MHz / 16QAM							
X	20025	1717.5	-20.00	42.49	22.49	177.21	H
	20175	1732.5	-19.78	42.33	22.55	179.76	
	20325	1747.5	-19.67	42.10	22.43	174.98	
	20025	1717.5	-24.53	42.99	18.46	70.15	V
	20175	1732.5	-24.22	42.74	18.52	71.12	
	20325	1747.5	-23.80	42.21	18.41	69.34	
Channel Bandwidth: 15 MHz / 64QAM							
X	20025	1717.5	-21.00	42.49	21.49	140.77	H
	20175	1732.5	-20.79	42.33	21.54	142.46	
	20325	1747.5	-20.68	42.10	21.42	138.68	
	20025	1717.5	-25.54	42.99	17.45	55.59	V
	20175	1732.5	-25.23	42.74	17.51	56.36	
	20325	1747.5	-24.81	42.21	17.40	54.95	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	20050	1720.0	-18.96	42.49	23.53	225.16	H
	20175	1732.5	-18.74	42.33	23.59	228.40	
	20300	1745.0	-18.62	42.10	23.48	222.84	
	20050	1720.0	-23.48	42.99	19.51	89.33	V
	20175	1732.5	-23.17	42.74	19.57	90.57	
	20300	1745.0	-22.75	42.21	19.46	88.31	
Channel Bandwidth: 20 MHz / 16QAM							
X	20050	1720.0	-19.96	42.49	22.53	178.85	H
	20175	1732.5	-19.75	42.33	22.58	181.01	
	20300	1745.0	-19.63	42.10	22.47	176.60	
	20050	1720.0	-24.48	42.99	18.51	70.96	V
	20175	1732.5	-24.17	42.74	18.57	71.94	
	20300	1745.0	-23.76	42.21	18.45	69.98	
Channel Bandwidth: 20 MHz / 64QAM							
X	20050	1720.0	-20.96	42.49	21.52	141.97	H
	20175	1732.5	-20.76	42.33	21.57	143.45	
	20300	1745.0	-20.64	42.10	21.46	139.96	
	20050	1720.0	-25.49	42.99	17.50	56.23	V
	20175	1732.5	-25.18	42.74	17.56	57.02	
	20300	1745.0	-24.77	42.21	17.44	55.46	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 66							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	131979	1710.7	-13.27	36.45	23.18	207.97	H
	132322	1745.0	-13.57	36.80	23.23	210.33	
	132665	1779.3	-13.78	36.94	23.16	207.16	
	131979	1710.7	-17.06	37.28	20.22	105.12	V
	132322	1745.0	-17.38	37.63	20.25	105.93	
	132665	1779.3	-17.42	37.64	20.22	105.20	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	131979	1710.7	-14.27	36.45	22.18	165.20	H
	132322	1745.0	-14.58	36.80	22.22	166.69	
	132665	1779.3	-14.78	36.94	22.16	164.55	
	131979	1710.7	-18.06	37.28	19.22	83.50	V
	132322	1745.0	-18.39	37.63	19.24	83.95	
	132665	1779.3	-18.43	37.64	19.21	83.37	
Channel Bandwidth: 1.4 MHz / 64QAM							
X	131979	1710.7	-15.27	36.45	21.18	131.22	H
	132322	1745.0	-15.59	36.80	21.21	132.10	
	132665	1779.3	-15.78	36.94	21.16	130.71	
	131979	1710.7	-19.06	37.28	18.22	66.33	V
	132322	1745.0	-19.40	37.63	18.23	66.53	
	132665	1779.3	-19.43	37.64	18.21	66.22	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 66							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	131987	1711.5	-13.21	36.45	23.24	210.86	H
	132322	1745.0	-13.54	36.80	23.26	211.79	
	132657	1778.5	-13.74	36.94	23.20	209.07	
	131987	1711.5	-17.02	37.28	20.26	106.10	V
	132322	1745.0	-17.34	37.63	20.29	106.91	
	132657	1778.5	-17.37	37.64	20.27	106.41	
Channel Bandwidth: 3 MHz / 16QAM							
X	131987	1711.5	-14.22	36.45	22.23	167.11	H
	132322	1745.0	-14.54	36.80	22.26	168.23	
	132657	1778.5	-14.75	36.94	22.19	165.69	
	131987	1711.5	-18.03	37.28	19.25	84.08	V
	132322	1745.0	-18.34	37.63	19.29	84.92	
	132657	1778.5	-18.38	37.64	19.26	84.33	
Channel Bandwidth: 3 MHz / 64QAM							
X	131987	1711.5	-15.23	36.45	21.22	132.43	H
	132322	1745.0	-15.54	36.80	21.26	133.63	
	132657	1778.5	-15.76	36.94	21.18	131.31	
	131987	1711.5	-19.04	37.28	18.24	66.63	V
	132322	1745.0	-19.34	37.63	18.29	67.45	
	132657	1778.5	-19.38	37.64	18.26	66.99	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 66							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	131997	1712.5	-13.19	36.45	23.26	211.84	H
	132322	1745.0	-13.49	36.80	23.31	214.24	
	132647	1777.5	-13.70	36.94	23.24	211.01	
	131997	1712.5	-16.98	37.28	20.30	107.08	V
	132322	1745.0	-17.30	37.63	20.33	107.89	
	132647	1777.5	-17.34	37.64	20.30	107.15	
Channel Bandwidth: 5 MHz / 16QAM							
X	131997	1712.5	-14.20	36.45	22.25	167.88	H
	132322	1745.0	-14.50	36.80	22.30	169.79	
	132647	1777.5	-14.71	36.94	22.23	167.22	
	131997	1712.5	-17.98	37.28	19.30	85.06	V
	132322	1745.0	-18.31	37.63	19.32	85.51	
	132647	1777.5	-18.35	37.64	19.29	84.92	
Channel Bandwidth: 5 MHz / 64QAM							
X	131997	1712.5	-15.21	36.45	21.24	133.05	H
	132322	1745.0	-15.51	36.80	21.29	134.56	
	132647	1777.5	-15.72	36.94	21.22	132.53	
	131997	1712.5	-18.98	37.28	18.30	67.56	V
	132322	1745.0	-19.31	37.63	18.32	67.92	
	132647	1777.5	-19.36	37.64	18.28	67.30	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 66							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	132022	1715.0	-13.33	36.64	23.31	214.29	H
	132322	1745.0	-13.45	36.80	23.35	216.02	
	132622	1775.0	-13.52	36.80	23.28	212.81	
	132022	1715.0	-17.11	37.44	20.33	107.87	V
	132322	1745.0	-17.26	37.63	20.37	108.87	
	132622	1775.0	-17.30	37.64	20.34	108.02	
Channel Bandwidth: 10 MHz / 16QAM							
X	132022	1715.0	-14.34	36.64	22.30	169.82	H
	132322	1745.0	-14.46	36.80	22.34	171.20	
	132622	1775.0	-14.52	36.80	22.28	169.04	
	132022	1715.0	-18.12	37.44	19.32	85.49	V
	132322	1745.0	-18.26	37.63	19.37	86.48	
	132622	1775.0	-18.31	37.64	19.33	85.61	
Channel Bandwidth: 10 MHz / 64QAM							
X	132022	1715.0	-15.35	36.64	21.29	134.59	H
	132322	1745.0	-15.46	36.80	21.34	135.99	
	132622	1775.0	-15.53	36.80	21.27	133.97	
	132022	1715.0	-19.13	37.44	18.31	67.75	V
	132322	1745.0	-19.27	37.63	18.36	68.53	
	132622	1775.0	-19.32	37.64	18.32	67.84	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 66							
Channel Bandwidth: 15 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	132047	1717.5	-13.11	36.45	23.34	215.77	H
	132322	1745.0	-13.41	36.80	23.39	218.22	
	132597	1772.5	-13.62	36.94	23.32	214.93	
	132047	1717.5	-16.90	37.28	20.38	109.07	V
	132322	1745.0	-17.23	37.63	20.40	109.65	
	132597	1772.5	-17.26	37.64	20.38	109.14	
Channel Bandwidth: 15 MHz / 16QAM							
X	132047	1717.5	-14.12	36.45	22.33	171.00	H
	132322	1745.0	-14.42	36.80	22.38	172.94	
	132597	1772.5	-14.63	36.94	22.31	170.33	
	132047	1717.5	-17.91	37.28	19.37	86.44	V
	132322	1745.0	-18.24	37.63	19.39	86.90	
	132597	1772.5	-18.26	37.64	19.38	86.70	
Channel Bandwidth: 15 MHz / 64QAM							
X	132047	1717.5	-15.12	36.45	21.33	135.83	H
	132322	1745.0	-15.43	36.80	21.37	137.06	
	132597	1772.5	-15.64	36.94	21.30	134.99	
	132047	1717.5	-18.92	37.28	18.36	68.50	V
	132322	1745.0	-19.24	37.63	18.39	69.02	
	132597	1772.5	-19.27	37.64	18.37	68.71	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 66							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	132072	1720.0	-13.06	36.45	23.39	218.27	H
	132322	1745.0	-13.37	36.80	23.43	220.24	
	132572	1770.0	-13.58	36.94	23.36	216.92	
	132072	1720.0	-16.86	37.28	20.42	110.08	V
	132322	1745.0	-17.18	37.63	20.45	110.92	
	132572	1770.0	-17.23	37.64	20.41	109.90	
Channel Bandwidth: 20 MHz / 16QAM							
X	132072	1720.0	-14.07	36.45	22.38	172.98	H
	132322	1745.0	-14.38	36.80	22.42	174.54	
	132572	1770.0	-14.59	36.94	22.35	171.91	
	132072	1720.0	-17.86	37.28	19.42	87.44	V
	132322	1745.0	-18.19	37.63	19.44	87.90	
	132572	1770.0	-18.24	37.64	19.40	87.10	
Channel Bandwidth: 20 MHz / 64QAM							
X	132072	1720.0	-15.07	36.45	21.38	137.40	H
	132322	1745.0	-15.39	36.80	21.41	138.32	
	132572	1770.0	-15.60	36.94	21.34	136.24	
	132072	1720.0	-18.86	37.28	18.42	69.45	V
	132322	1745.0	-19.20	37.63	18.43	69.66	
	132572	1770.0	-19.24	37.64	18.40	69.18	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

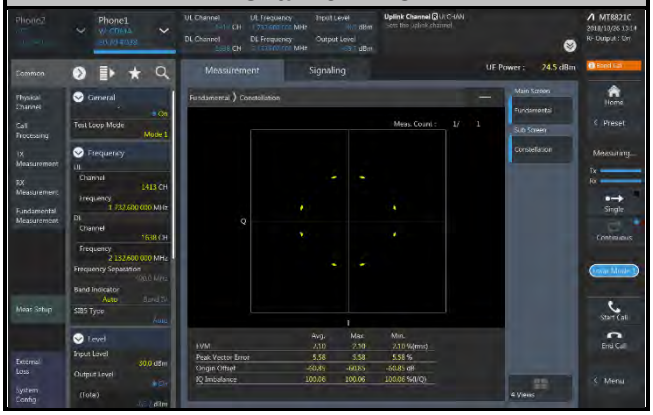
4.2.2 Test Setup

4.2.3 Test Procedure

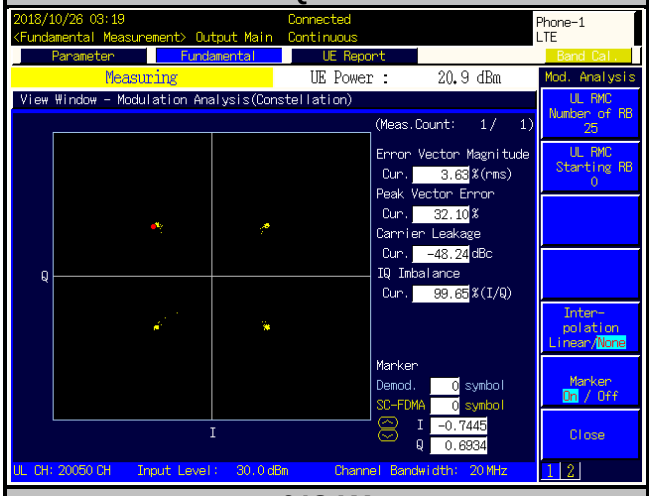
Connect the EUT to Communication Simulator via the antenna connector. The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

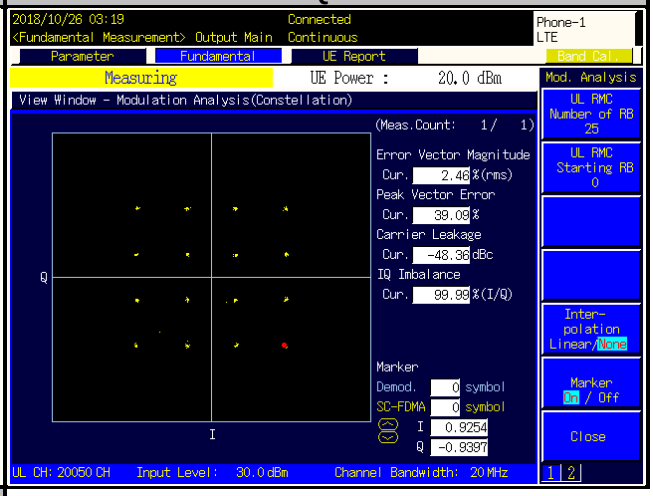
4.2.4 Test Results

Spectrum Plot of Measurement
WCDMA
Channel 1413

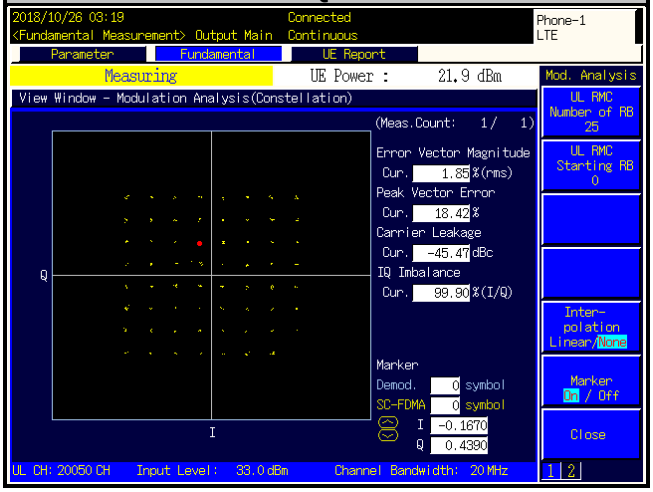


Spectrum Plot of Measurement	
LTE Band 4	
Channel 20050	
QPSK	16QAM



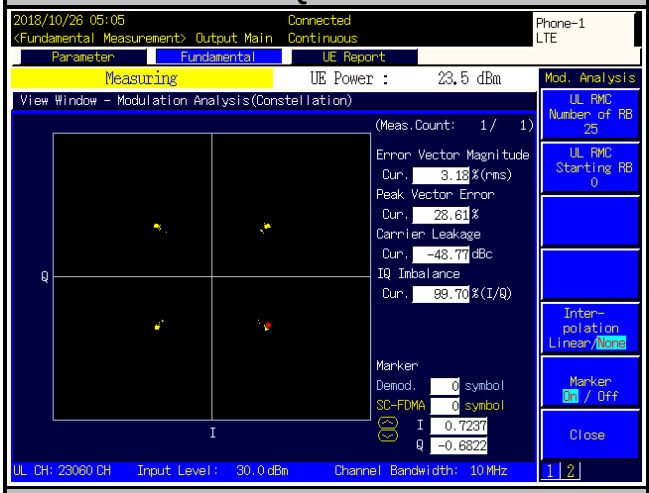


64QAM

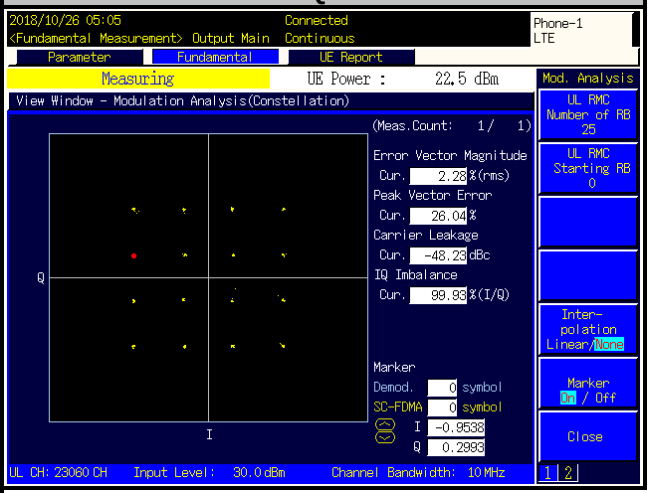


Spectrum Plot of Measurement
LTE Band 12
Channel 23060

QPSK



16QAM



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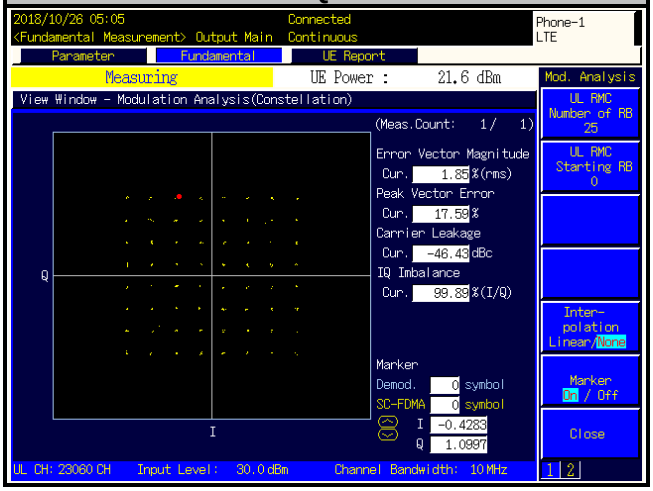
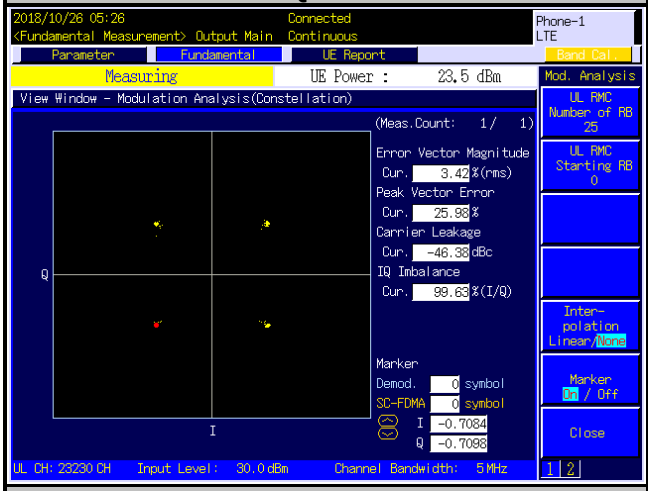


Spectrum Plot of Measurement
LTE Band 13
Channel 23230

QPSK



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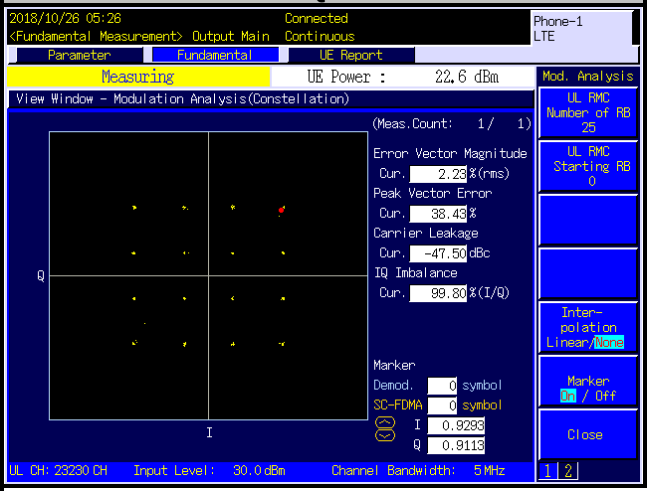

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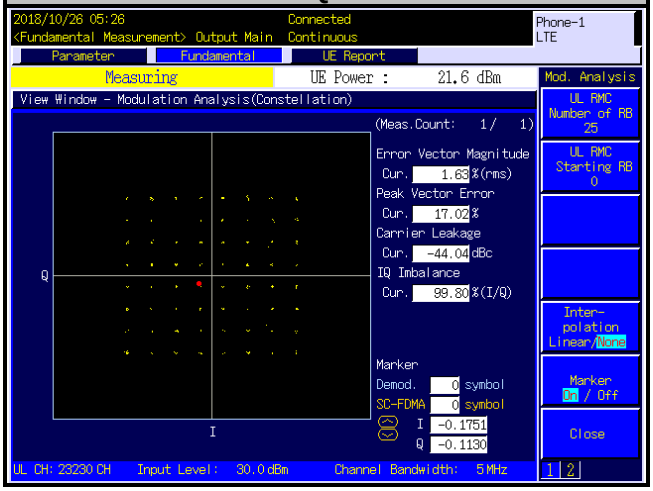
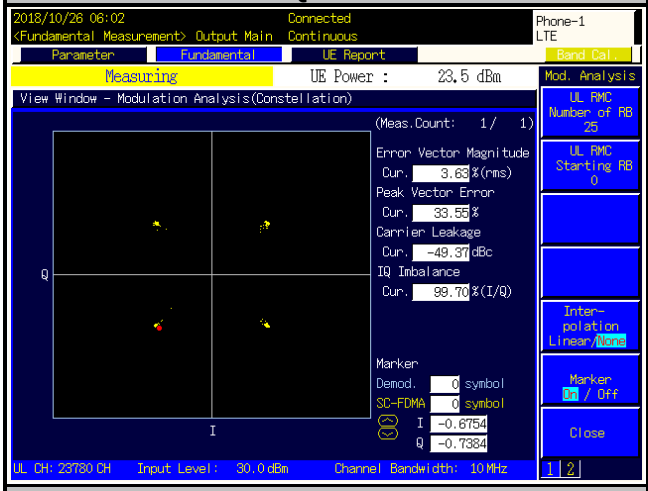
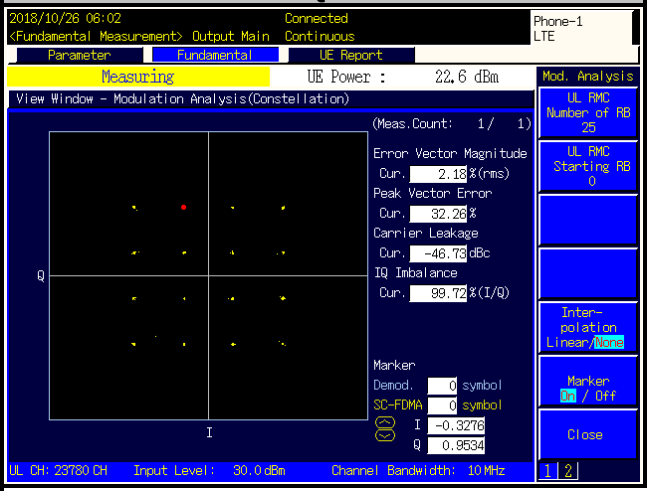


Spectrum Plot of Measurement
LTE Band 17
Channel 23780

QPSK



16QAM



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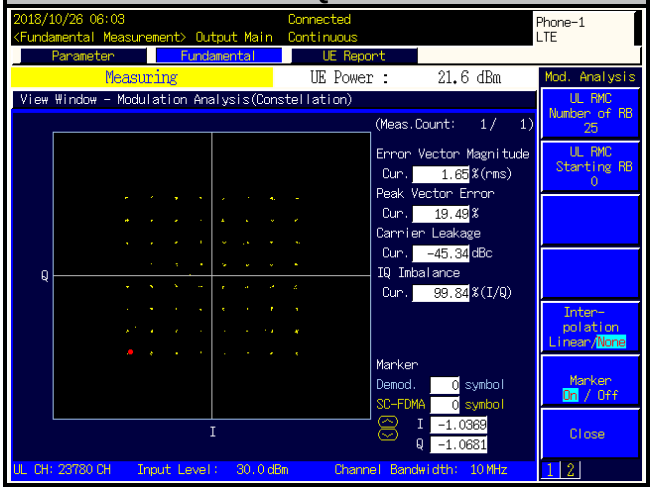
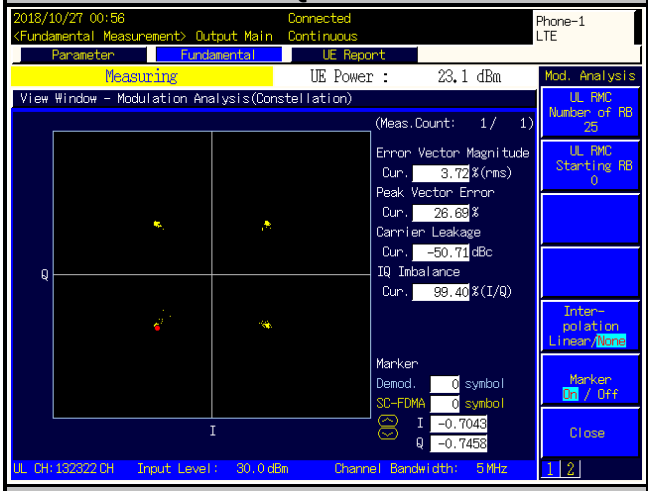
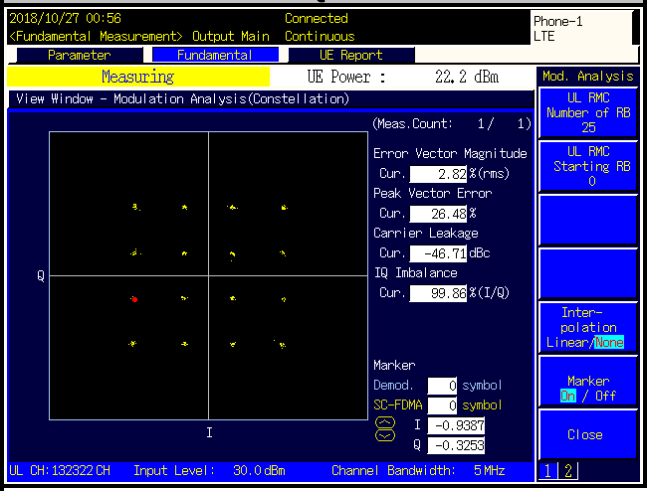


Spectrum Plot of Measurement
LTE Band 66
Channel 132322

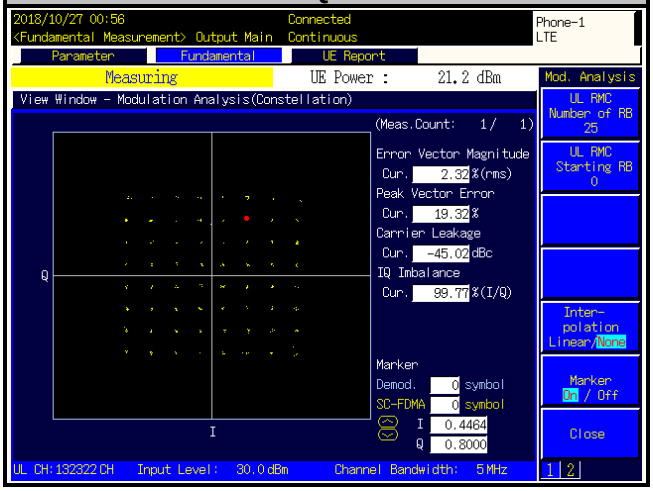
QPSK



16QAM



64QAM



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

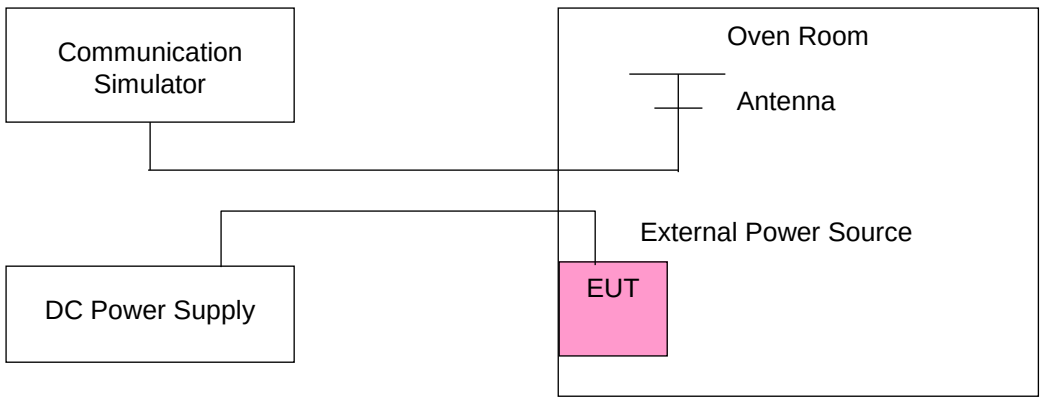
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

4.3.2 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.

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1712.400002	0.001	1752.600003	0.001
3.6	1712.400003	0.002	1752.600003	0.001
4.4	1712.400004	0.002	1752.600004	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.400002	0.001	1752.600003	0.002
-20	1712.400004	0.002	1752.600003	0.002
-10	1712.400002	0.001	1752.600002	0.001
0	1712.400001	0.001	1752.600003	0.002
10	1712.400004	0.002	1752.600001	0.001
20	1712.399996	-0.002	1752.599998	-0.001
30	1712.399998	-0.001	1752.599997	-0.002
40	1712.399997	-0.002	1752.599999	-0.001
50	1712.399997	-0.002	1752.599996	-0.002
55	1712.399999	-0.001	1752.599997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1710.700003	0.002	1754.300004	0.002
3.6	1710.700002	0.001	1754.300002	0.001
4.4	1710.700001	0.001	1754.300002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	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
-20	1710.700001	0.001	1754.300003	0.001
-10	1710.700003	0.002	1754.300004	0.002
0	1710.700002	0.001	1754.300003	0.002
10	1710.700003	0.002	1754.300002	0.001
20	1710.699996	-0.002	1754.299999	-0.001
30	1710.699997	-0.002	1754.299997	-0.002
40	1710.699996	-0.002	1754.299999	-0.001
50	1710.699997	-0.002	1754.299996	-0.002
55	1710.699999	-0.001	1754.299997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1711.500003	0.002	1753.500003	0.001
3.6	1711.500003	0.001	1753.500001	0.001
4.4	1711.500001	0.001	1753.500002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1711.500003	0.002	1753.500003	0.002
-20	1711.500002	0.001	1753.500004	0.002
-10	1711.500001	0.001	1753.500004	0.002
0	1711.500002	0.001	1753.500003	0.002
10	1711.500004	0.002	1753.500003	0.002
20	1711.499999	-0.001	1753.499997	-0.002
30	1711.499997	-0.002	1753.499997	-0.002
40	1711.499998	-0.001	1753.499998	-0.001
50	1711.499999	-0.001	1753.499997	-0.002
55	1711.499997	-0.002	1753.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1712.500003	0.002	1752.500001	0.001
3.6	1712.500003	0.002	1752.500003	0.002
4.4	1712.500002	0.001	1752.500002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500002	0.001	1752.500002	0.001
-20	1712.500002	0.001	1752.500001	0.001
-10	1712.500004	0.002	1752.500002	0.001
0	1712.500004	0.002	1752.500003	0.001
10	1712.500003	0.002	1752.500001	0.001
20	1712.499998	-0.001	1752.499997	-0.002
30	1712.499997	-0.002	1752.499998	-0.001
40	1712.499999	-0.001	1752.499998	-0.001
50	1712.499996	-0.002	1752.499997	-0.002
55	1712.499997	-0.002	1752.499997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1715.000002	0.001	1750.000003	0.002
3.6	1715.000004	0.002	1750.000002	0.001
4.4	1715.000002	0.001	1750.000001	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000003	0.002	1750.000004	0.002
-20	1715.000002	0.001	1750.000004	0.002
-10	1715.000004	0.002	1750.000001	0.001
0	1715.000003	0.002	1750.000002	0.001
10	1715.000001	0.001	1750.000003	0.002
20	1714.999997	-0.002	1749.999998	-0.001
30	1714.999999	-0.001	1749.999997	-0.001
40	1714.999999	-0.001	1749.999998	-0.001
50	1714.999998	-0.001	1749.999997	-0.002
55	1714.999999	-0.001	1749.999996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1717.500003	0.002	1747.500002	0.001
3.6	1717.500003	0.002	1747.500003	0.001
4.4	1717.500004	0.002	1747.500002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500002	0.001	1747.500002	0.001
-20	1717.500002	0.001	1747.500004	0.002
-10	1717.500004	0.002	1747.500004	0.002
0	1717.500002	0.001	1747.500001	0.001
10	1717.500004	0.002	1747.500003	0.001
20	1717.499997	-0.002	1747.499999	-0.001
30	1717.499998	-0.001	1747.499999	-0.001
40	1717.499997	-0.002	1747.499997	-0.002
50	1717.499996	-0.002	1747.499998	-0.001
55	1717.499999	-0.001	1747.499996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1720.000003	0.002	1745.000001	0.001
3.6	1720.000002	0.001	1745.000002	0.001
4.4	1720.000003	0.002	1745.000004	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000001	0.001	1745.000002	0.001
-20	1720.000001	0.001	1745.000004	0.002
-10	1720.000002	0.001	1745.000001	0.001
0	1720.000002	0.001	1745.000002	0.001
10	1720.000002	0.001	1745.000002	0.001
20	1719.999998	-0.001	1744.999998	-0.001
30	1719.999997	-0.002	1744.999997	-0.001
40	1719.999997	-0.002	1744.999998	-0.001
50	1719.999999	-0.001	1744.999997	-0.002
55	1719.999996	-0.002	1744.999996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	699.700003	0.005	715.300002	0.003
3.6	699.700002	0.003	715.300002	0.003
4.4	699.700004	0.005	715.300001	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	699.700002	0.003	715.300004	0.005
-20	699.700003	0.004	715.300002	0.003
-10	699.700001	0.002	715.300001	0.002
0	699.700004	0.006	715.300001	0.002
10	699.700003	0.004	715.300002	0.003
20	699.699996	-0.005	715.299997	-0.004
30	699.699998	-0.003	715.299999	-0.001
40	699.699997	-0.005	715.299996	-0.005
50	699.699997	-0.004	715.299996	-0.005
55	699.699997	-0.004	715.299996	-0.005

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	700.500004	0.005	714.500002	0.003
3.6	700.500004	0.006	714.500003	0.004
4.4	700.500002	0.003	714.500004	0.005

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	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
-20	700.500002	0.002	714.500003	0.004
-10	700.500001	0.002	714.500001	0.002
0	700.500002	0.003	714.500002	0.003
10	700.500004	0.005	714.500003	0.003
20	700.499998	-0.003	714.499998	-0.003
30	700.499996	-0.006	714.499999	-0.001
40	700.499998	-0.003	714.499996	-0.005
50	700.499998	-0.002	714.499997	-0.004
55	700.499999	-0.001	714.499998	-0.003

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	701.500002	0.003	713.500003	0.004
3.6	701.500003	0.004	713.500004	0.005
4.4	701.500002	0.002	713.500002	0.003

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	701.500003	0.004	713.500002	0.003
-20	701.500003	0.004	713.500001	0.001
-10	701.500003	0.004	713.500003	0.005
0	701.500004	0.006	713.500002	0.003
10	701.500001	0.002	713.500004	0.006
20	701.499999	-0.002	713.499997	-0.004
30	701.499997	-0.004	713.499997	-0.005
40	701.499998	-0.003	713.499997	-0.004
50	701.499997	-0.005	713.499999	-0.002
55	701.499996	-0.006	713.499999	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	704.000003	0.004	711.000002	0.003
3.6	704.000002	0.002	711.000004	0.005
4.4	704.000002	0.003	711.000001	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	704.000003	0.004	711.000002	0.002
-20	704.000004	0.006	711.000002	0.003
-10	704.000001	0.002	711.000001	0.002
0	704.000002	0.003	711.000003	0.005
10	704.000002	0.003	711.000003	0.004
20	703.999999	-0.002	710.999997	-0.005
30	703.999997	-0.005	710.999996	-0.005
40	703.999999	-0.002	710.999996	-0.005
50	703.999996	-0.005	710.999996	-0.005
55	703.999998	-0.003	710.999997	-0.004

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 13			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	779.500002	0.002	784.500003	0.003
3.6	779.500002	0.002	784.500003	0.004
4.4	779.500002	0.002	784.500004	0.005

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	779.500001	0.001	784.500001	0.002
-20	779.500001	0.001	784.500002	0.003
-10	779.500003	0.004	784.500001	0.002
0	779.500004	0.005	784.500002	0.003
10	779.500001	0.001	784.500001	0.001
20	779.499997	-0.003	784.499998	-0.002
30	779.499996	-0.005	784.499998	-0.003
40	779.499997	-0.004	784.499997	-0.004
50	779.499998	-0.002	784.499999	-0.002
55	779.499999	-0.002	784.499997	-0.004

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 13	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
3.85	782.000001	0.001
3.6	782.000003	0.003
4.4	782.000003	0.004

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
-30	782.000001	0.002
-20	782.000001	0.002
-10	782.000003	0.004
0	782.000004	0.004
10	782.000001	0.001
20	781.999998	-0.003
30	781.999998	-0.003
40	781.999998	-0.002
50	781.999997	-0.004
55	781.999996	-0.005

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 17			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	706.500001	0.002	713.500003	0.004
3.6	706.500001	0.001	713.500004	0.005
4.4	706.500004	0.005	713.500004	0.005

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 17			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	706.500002	0.003	713.500003	0.005
-20	706.500002	0.002	713.500002	0.003
-10	706.500001	0.002	713.500003	0.004
0	706.500002	0.002	713.500004	0.006
10	706.500001	0.001	713.500003	0.004
20	706.499999	-0.002	713.499999	-0.002
30	706.499999	-0.002	713.499997	-0.004
40	706.499996	-0.005	713.499996	-0.006
50	706.499998	-0.003	713.499999	-0.002
55	706.499998	-0.003	713.499997	-0.004

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 17			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	709.000003	0.004	711.000001	0.002
3.6	709.000001	0.002	711.000001	0.002
4.4	709.000001	0.002	711.000002	0.003

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 17			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	709.000004	0.005	711.000003	0.004
-20	709.000004	0.005	711.000001	0.002
-10	709.000003	0.005	711.000003	0.004
0	709.000004	0.005	711.000002	0.002
10	709.000004	0.005	711.000003	0.004
20	708.999999	-0.002	710.999996	-0.005
30	708.999997	-0.004	710.999997	-0.005
40	708.999999	-0.001	710.999998	-0.002
50	708.999997	-0.005	710.999996	-0.005
55	708.999998	-0.003	710.999999	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1710.700001	0.001	1779.300004	0.002
3.6	1710.700002	0.001	1779.300002	0.001
4.4	1710.700002	0.001	1779.300002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1710.700002	0.001	1779.300004	0.002
-20	1710.700001	0.001	1779.300002	0.001
-10	1710.700001	0.001	1779.300003	0.002
0	1710.700001	0.001	1779.300002	0.001
10	1710.700001	0.001	1779.300004	0.002
20	1710.699998	-0.001	1779.299997	-0.002
30	1710.699998	-0.001	1779.299996	-0.002
40	1710.699999	-0.001	1779.299999	-0.001
50	1710.699998	-0.001	1779.299996	-0.002
55	1710.699997	-0.002	1779.299997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1711.500004	0.002	1778.500002	0.001
3.6	1711.500003	0.002	1778.500003	0.002
4.4	1711.500004	0.002	1778.500003	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1711.500002	0.001	1778.500002	0.001
-20	1711.500002	0.001	1778.500004	0.002
-10	1711.500003	0.002	1778.500001	0.001
0	1711.500003	0.001	1778.500002	0.001
10	1711.500002	0.001	1778.500003	0.002
20	1711.499996	-0.002	1778.499998	-0.001
30	1711.499999	-0.001	1778.499997	-0.002
40	1711.499997	-0.002	1778.499999	-0.001
50	1711.499997	-0.002	1778.499997	-0.002
55	1711.499997	-0.002	1778.499999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1712.500002	0.001	1777.500004	0.002
3.6	1712.500002	0.001	1777.500001	0.001
4.4	1712.500002	0.001	1777.500004	0.002

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500002	0.001	1777.500002	0.001
-20	1712.500002	0.001	1777.500003	0.002
-10	1712.500002	0.001	1777.500002	0.001
0	1712.500003	0.002	1777.500004	0.002
10	1712.500004	0.002	1777.500003	0.002
20	1712.499998	-0.001	1777.499998	-0.001
30	1712.499997	-0.002	1777.499999	-0.001
40	1712.499997	-0.002	1777.499998	-0.001
50	1712.499997	-0.002	1777.499997	-0.002
55	1712.499999	-0.001	1777.499997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1715.000003	0.002	1775.000002	0.001
3.6	1715.000001	0.001	1775.000001	0.001
4.4	1715.000004	0.002	1775.000002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000002	0.001	1775.000001	0.001
-20	1715.000003	0.002	1775.000004	0.002
-10	1715.000001	0.001	1775.000004	0.002
0	1715.000002	0.001	1775.000002	0.001
10	1715.000002	0.001	1775.000002	0.001
20	1714.999998	-0.001	1774.999999	-0.001
30	1714.999997	-0.002	1774.999998	-0.001
40	1714.999996	-0.002	1774.999997	-0.002
50	1714.999996	-0.002	1774.999998	-0.001
55	1714.999998	-0.001	1774.999999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1717.500001	0.001	1772.500002	0.001
3.6	1717.500002	0.001	1772.500002	0.001
4.4	1717.500001	0.001	1772.500002	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500004	0.002	1772.500004	0.002
-20	1717.500002	0.001	1772.500004	0.002
-10	1717.500003	0.002	1772.500002	0.001
0	1717.500003	0.002	1772.500002	0.001
10	1717.500004	0.002	1772.500002	0.001
20	1717.499998	-0.001	1772.499999	-0.001
30	1717.499998	-0.001	1772.499998	-0.001
40	1717.499996	-0.002	1772.499997	-0.002
50	1717.499997	-0.002	1772.499999	-0.001
55	1717.499997	-0.002	1772.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.85	1720.000004	0.002	1770.000001	0.001
3.6	1720.000001	0.001	1770.000004	0.002
4.4	1720.000002	0.001	1770.000001	0.001

Note: The applicant defined the normal working voltage of the battery is from 3.6 Vdc to 4.4 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000004	0.002	1770.000001	0.001
-20	1720.000003	0.002	1770.000004	0.002
-10	1720.000003	0.002	1770.000003	0.001
0	1720.000003	0.002	1770.000004	0.002
10	1720.000002	0.001	1770.000004	0.002
20	1719.999997	-0.002	1769.999996	-0.002
30	1719.999998	-0.001	1769.999997	-0.002
40	1719.999999	-0.001	1769.999997	-0.002
50	1719.999999	-0.001	1769.999999	-0.001
55	1719.999999	-0.001	1769.999997	-0.002

4.4 Occupied Bandwidth Measurement

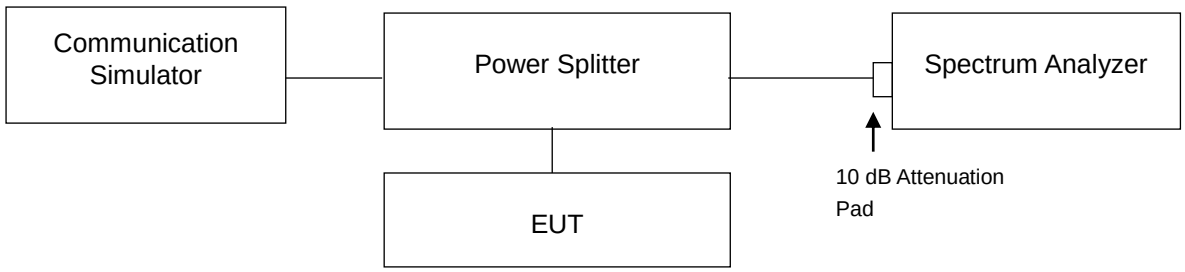
4.4.1 Limits of Occupied Bandwidth Measurement

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.

4.4.2 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.

4.4.3 Test Setup

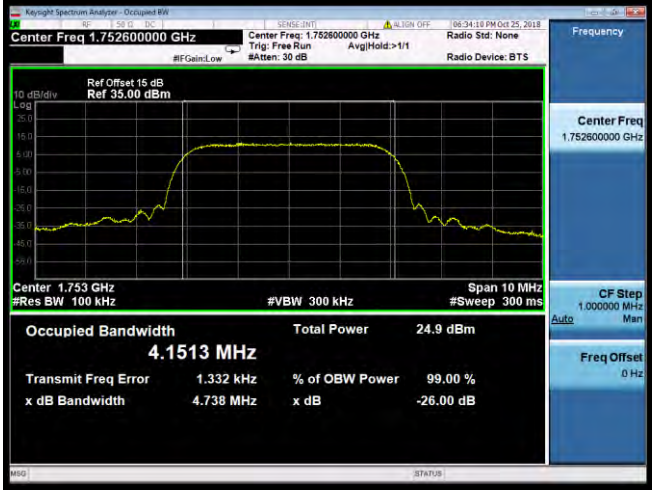


4.4.4 Test Result

<99 % Occupied Bandwidth>

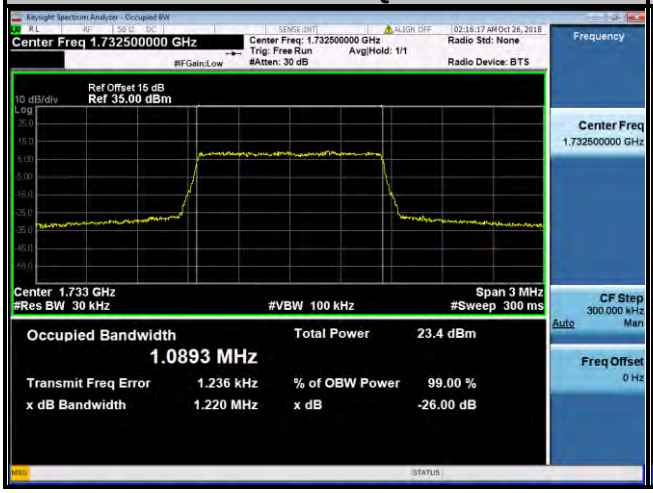
WCDMA		
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**
1312	1712.4	4.1511
1413	1732.6	4.1463
1513	1752.6	4.1513

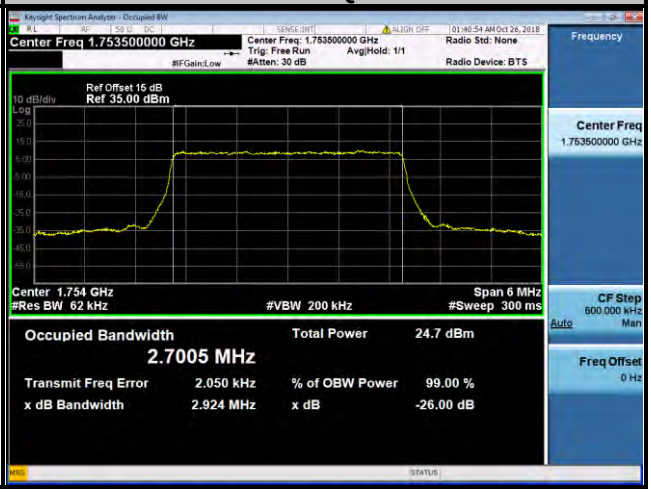
Spectrum Plot of Worst Value



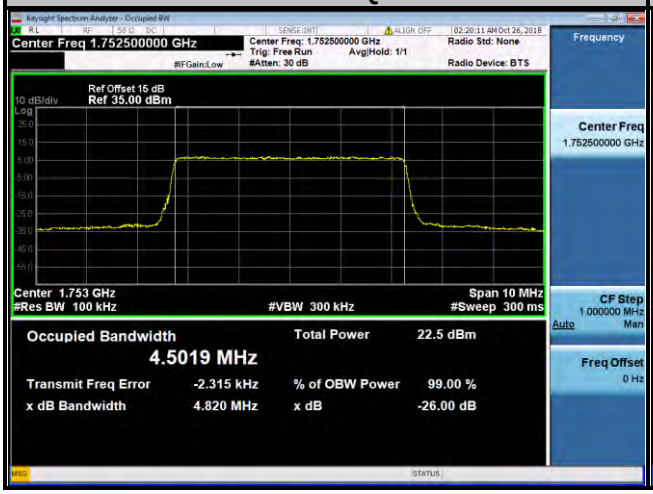
LTE Band 4									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19957	1710.7	1.0859	1.0886	1.0885	19965	1711.5	2.7000	2.6970	2.6993
20175	1732.5	1.0854	1.0873	1.0893	20175	1732.5	2.6995	2.6970	2.6980
20393	1754.3	1.0857	1.0889	1.0884	20385	1753.5	2.7005	2.6965	2.6987

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





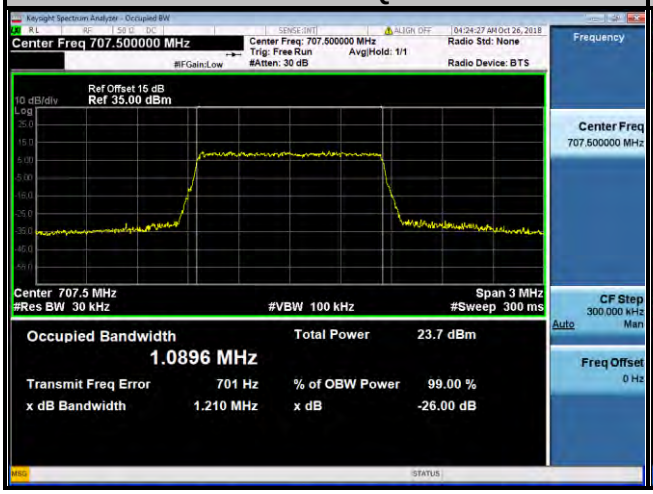
LTE Band 4									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19975	1712.5	4.4895	4.4925	4.5011	20000	1715.0	8.9683	8.9708	8.9740
20175	1732.5	4.4914	4.4965	4.4980	20175	1732.5	8.9676	8.9726	8.9752
20375	1752.5	4.4891	4.4939	4.5019	20350	1750.0	8.9692	8.9745	8.9767

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

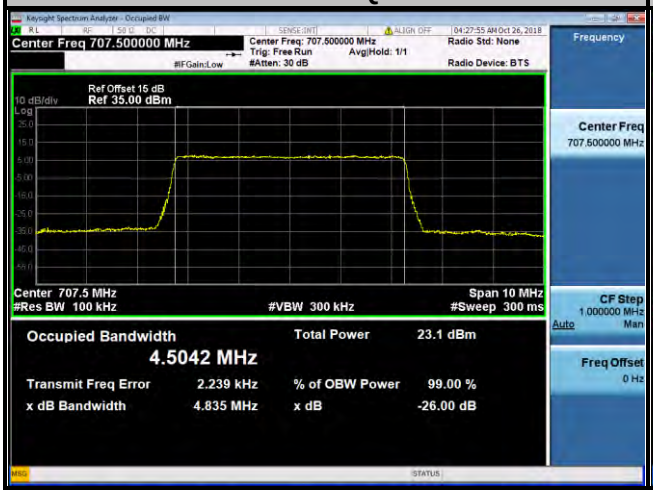
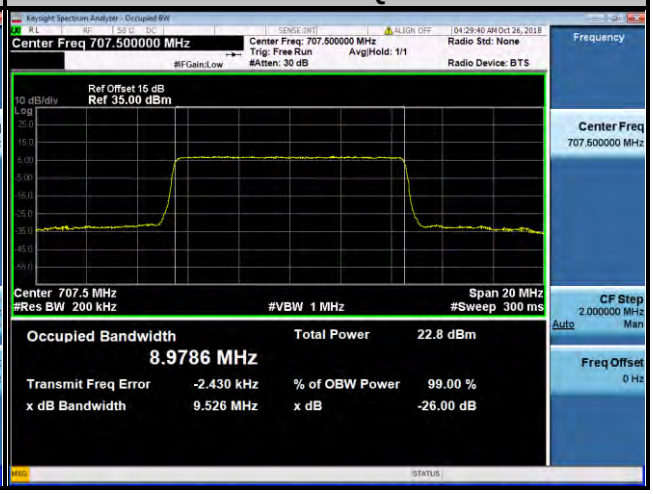
LTE Band 4									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20025	1717.5	13.464	13.453	13.450	20050	1720.0	17.940	17.967	17.957
20175	1732.5	13.453	13.445	13.441	20175	1732.5	17.928	17.946	17.946
20325	1747.5	13.459	13.449	13.446	20300	1745.0	17.934	17.957	17.948

Spectrum Plot of Worst Value	
15 MHz / QPSK	20 MHz / 16QAM

LTE Band 12									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23017	699.7	1.0871	1.0884	1.0895	23025	700.5	2.7022	2.6971	2.6975
23095	707.5	1.0859	1.0862	1.0896	23095	707.5	2.7014	2.6977	2.6971
23173	715.3	1.0870	1.0870	1.0874	23165	714.5	2.6999	2.6950	2.6957

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

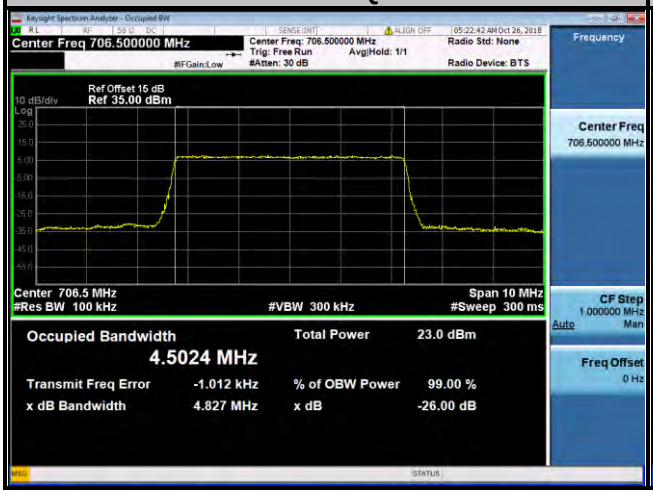
LTE Band 12									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23035	701.5	4.4901	4.4933	4.5020	23060	704.0	8.9635	8.9669	8.9727
23095	707.5	4.4920	4.4931	4.5042	23095	707.5	8.9709	8.9781	8.9786
23155	713.5	4.4868	4.4896	4.4974	23130	711.0	8.9588	8.9600	8.9666

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

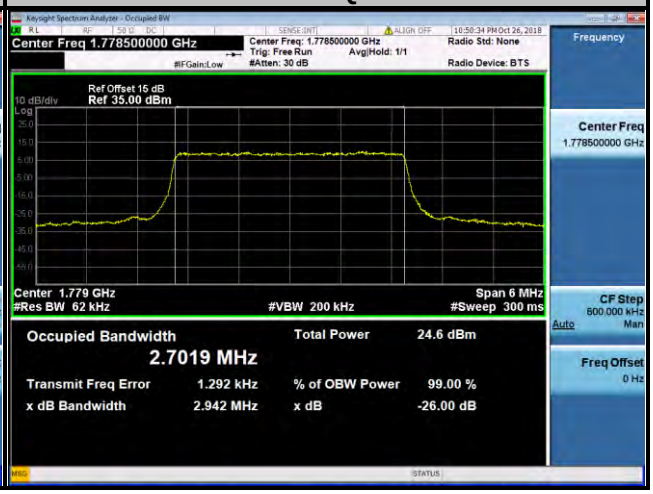
LTE Band 13									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23205	779.5	4.4875	4.4898	4.4980	23230	782.0	8.9557	8.9629	8.9640
23230	782.0	4.4848	4.4881	4.4948					
23255	784.5	4.4939	4.4966	4.5018					

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

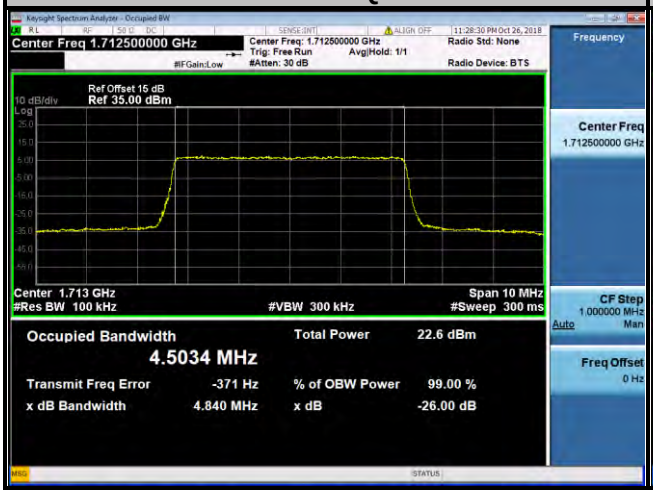
LTE Band 17									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23755	706.5	4.4904	4.4910	4.5024	23780	709.0	8.9702	8.9763	8.9771
23790	710.0	4.4921	4.4917	4.5016	23790	710.0	8.9669	8.9738	8.9799
23825	713.5	4.4852	4.4889	4.4966	23800	711.0	8.9573	8.9626	8.9682

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

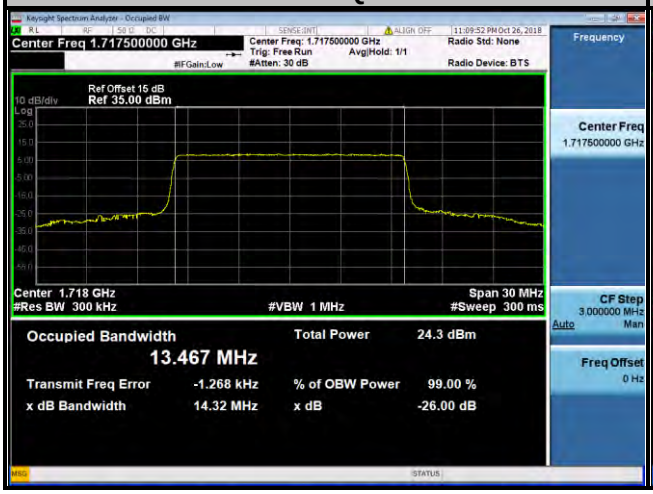
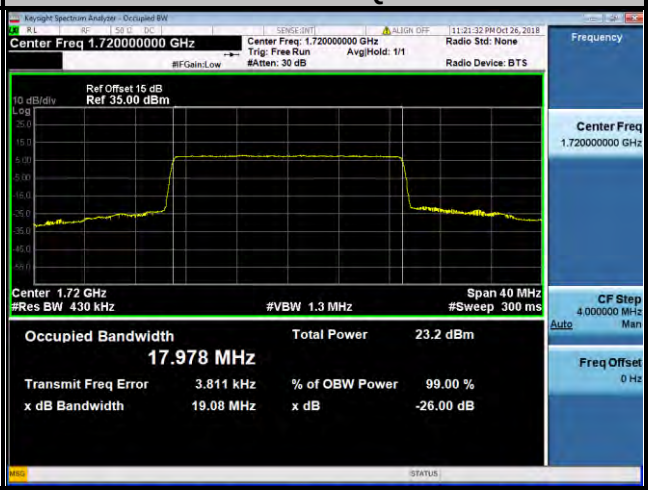
LTE Band 66									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131979	1710.7	1.0868	1.0893	1.0877	131987	1711.5	2.7013	2.6975	2.6962
132322	1745.0	1.0858	1.0896	1.0881	132322	1745.0	2.6996	2.6975	2.6986
132665	1779.3	1.0876	1.0871	1.0892	132657	1778.5	2.7019	2.6977	2.6993

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

LTE Band 66									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131997	1712.5	4.4910	4.4925	4.5034	132022	1715.0	8.9724	8.9735	8.9787
132322	1745.0	4.4906	4.4942	4.5017	132322	1745.0	8.9696	8.9696	8.9744
132647	1777.5	4.4908	4.4945	4.5006	132622	1775.0	8.9713	8.9777	8.9781

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

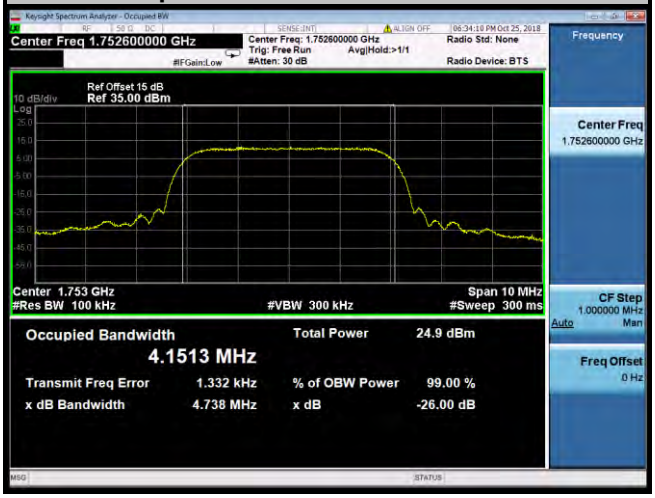
LTE Band 66									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
132047	1717.5	13.467	13.458	13.457	132072	1720.0	17.953	17.978	17.965
132322	1745.0	13.455	13.447	13.442	132322	1745.0	17.936	17.951	17.947
132597	1772.5	13.461	13.446	13.441	132572	1770.0	17.926	17.952	17.939

Spectrum Plot of Worst Value	
15 MHz / QPSK	20 MHz / 16QAM
	

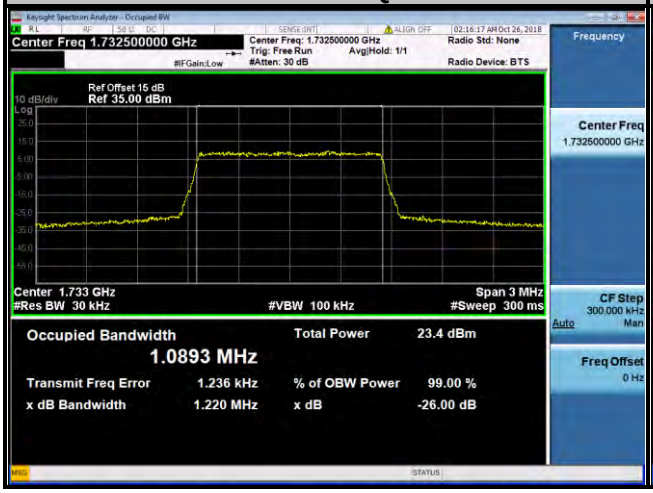
<26 dB Bandwidth>

WCDMA		
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
1312	1712.4	4.737
1413	1732.6	4.737
1513	1752.6	4.738

Spectrum Plot of Worst Value



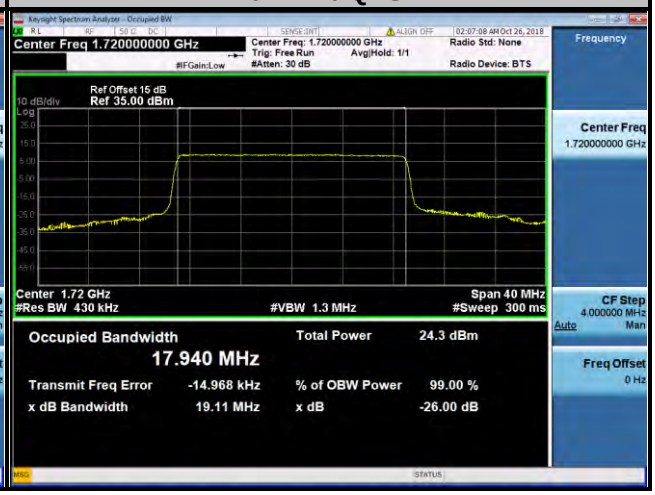
LTE Band 4									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19957	1710.7	1.216	1.220	1.217	19965	1711.5	2.928	2.932	2.897
20175	1732.5	1.217	1.218	1.220	20175	1732.5	2.930	2.937	2.908
20393	1754.3	1.220	1.216	1.214	20385	1753.5	2.924	2.928	2.902

Spectrum Plot of Worst Value	
1.4 MHz / 64QAM	3 MHz / 16QAM
	

LTE Band 4									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19975	1712.5	4.802	4.794	4.829	20000	1715.0	9.538	9.513	9.525
20175	1732.5	4.832	4.813	4.832	20175	1732.5	9.541	9.523	9.524
20375	1752.5	4.837	4.803	4.820	20350	1750.0	9.534	9.523	9.528

Spectrum Plot of Worst Value	
5 MHz / QPSK	10 MHz / QPSK

LTE Band 4									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20025	1717.5	14.31	14.26	14.27	20050	1720.0	19.11	19.07	19.06
20175	1732.5	14.28	14.26	14.26	20175	1732.5	19.09	19.05	19.06
20325	1747.5	14.27	14.24	14.25	20300	1745.0	19.07	19.03	19.05

Spectrum Plot of Worst Value	
15 MHz / QPSK	20 MHz / QPSK
	

LTE Band 12									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23017	699.7	1.220	1.217	1.216	23025	700.5	2.931	2.930	2.907
23095	707.5	1.219	1.216	1.210	23095	707.5	2.931	2.930	2.901
23173	715.3	1.215	1.213	1.211	23165	714.5	2.941	2.919	2.907

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

LTE Band 12									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23035	701.5	4.818	4.804	4.820	23060	704.0	9.535	9.512	9.525
23095	707.5	4.840	4.805	4.835	23095	707.5	9.538	9.517	9.526
23155	713.5	4.828	4.806	4.821	23130	711.0	9.532	9.520	9.515

Spectrum Plot of Worst Value	
5 MHz / QPSK	10 MHz / QPSK

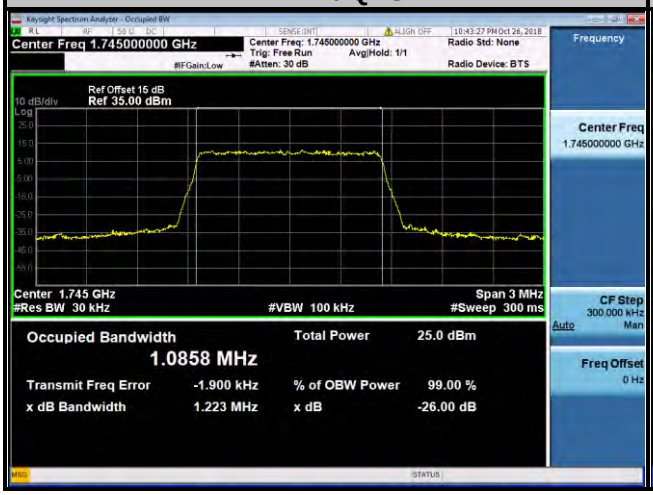
LTE Band 13									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23205	779.5	4.835	4.805	4.816	23230	782.0	9.507	9.507	9.519
23230	782.0	4.818	4.792	4.820					
23255	784.5	4.836	4.811	4.831					

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

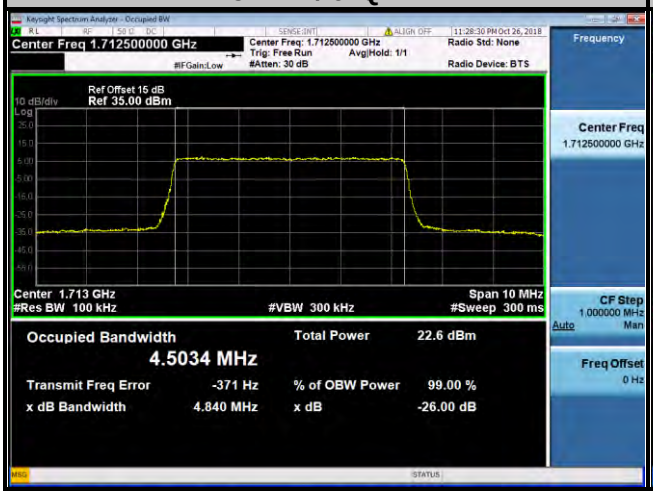
LTE Band 17									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23755	706.5	4.813	4.806	4.827	23780	709.0	9.539	9.530	9.530
23790	710.0	4.836	4.798	4.838	23790	710.0	9.545	9.512	9.537
23825	713.5	4.835	4.803	4.832	23800	711.0	9.531	9.513	9.512

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

LTE Band 66									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131979	1710.7	1.222	1.218	1.210	131987	1711.5	2.922	2.929	2.905
132322	1745.0	1.223	1.215	1.218	132322	1745.0	2.937	2.930	2.901
132665	1779.3	1.222	1.221	1.218	132657	1778.5	2.942	2.934	2.916

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

LTE Band 66									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131997	1712.5	4.830	4.797	4.840	132022	1715.0	9.530	9.512	9.538
132322	1745.0	4.835	4.806	4.831	132322	1745.0	9.525	9.513	9.525
132647	1777.5	4.820	4.808	4.832	132622	1775.0	9.535	9.521	9.547

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

LTE Band 66									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)			Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
132047	1717.5	14.32	14.26	14.25	132072	1720.0	19.14	19.08	19.08
132322	1745.0	14.28	14.25	14.25	132322	1745.0	19.08	19.03	19.04
132597	1772.5	14.29	14.25	14.25	132572	1770.0	19.10	19.05	19.08

Spectrum Plot of Worst Value	
15 MHz / QPSK	20 MHz / QPSK

4.5 Band Edge Measurement

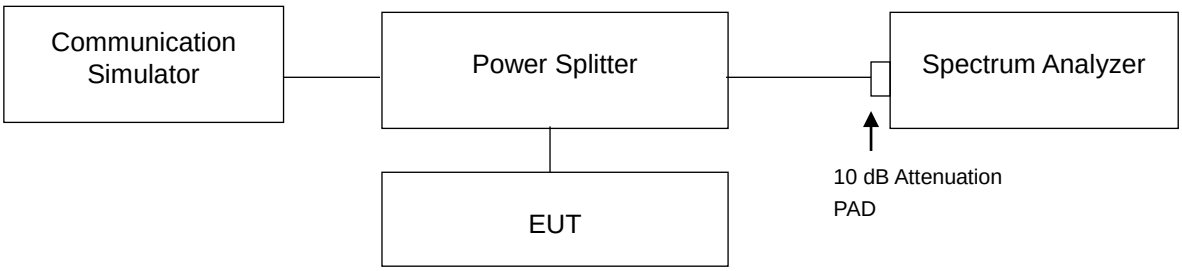
4.5.1 Limits of Band Edge Measurement

For operations in the 698-787 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 746-758 MHz band and the 776-788 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.
On all frequencies between 763-775 MHz and 793-805 MHz, by a factor no less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

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 log (P) dB.

4.5.2 Test Setup



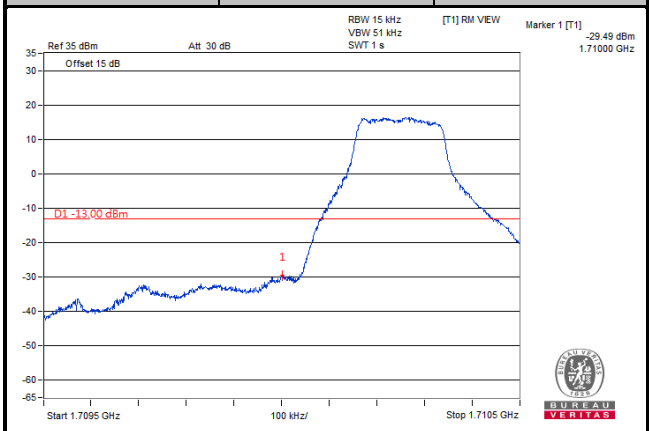
4.5.3 Test Procedures

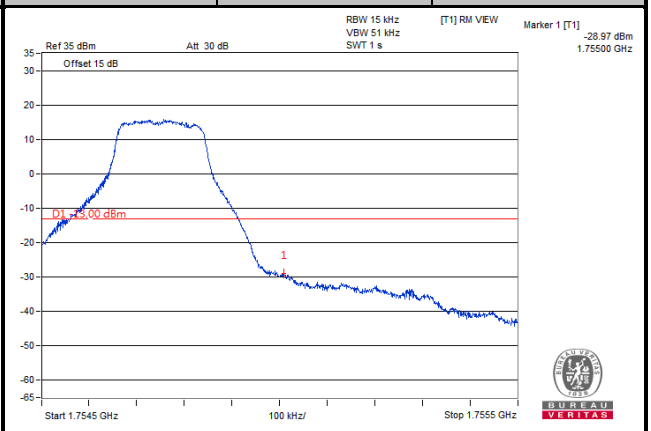
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
c. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 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 62 kHz and VB of the spectrum is 200 kHz (LTE Bandwidth 5 MHz).
f. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
g. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
h. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 200 kHz and VB of the spectrum is 1 MHz (LTE Bandwidth 20 MHz).
i. Record the max. trace plot into the test report.

4.5.4 Test Results

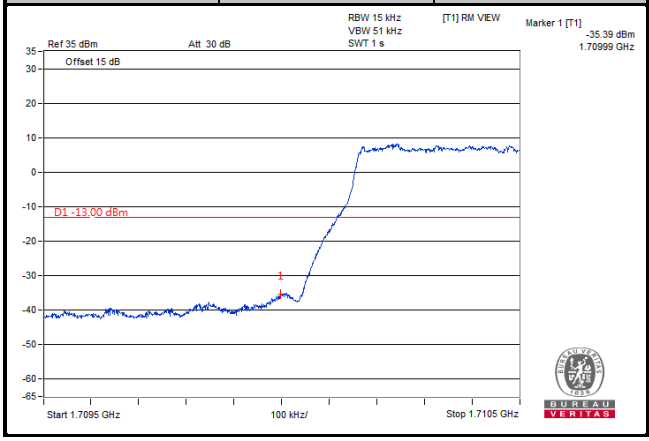
WCDMA			
Channel	1312	Channel	1513

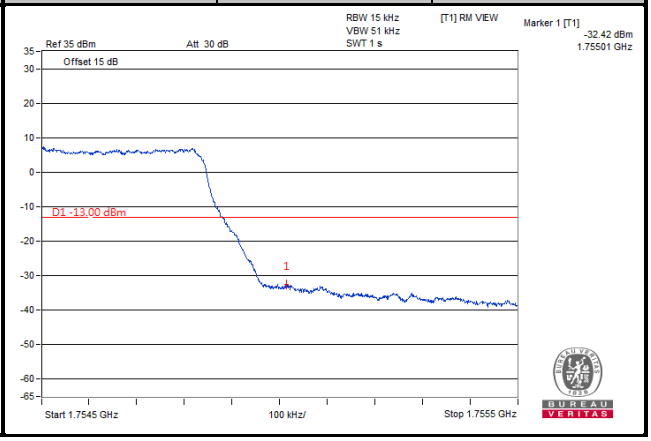
LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	19957	1 RB	Channel	20393	1 RB

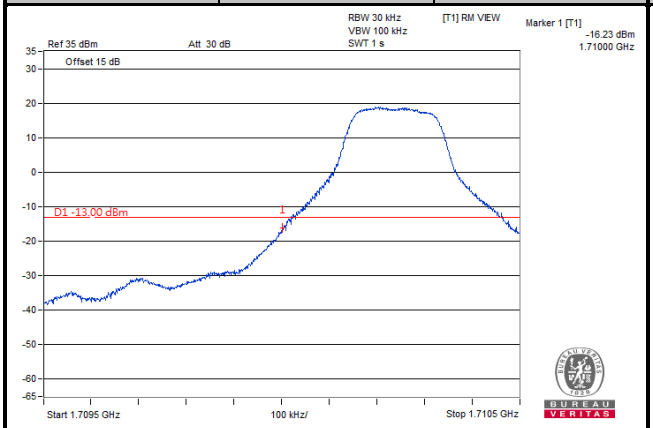
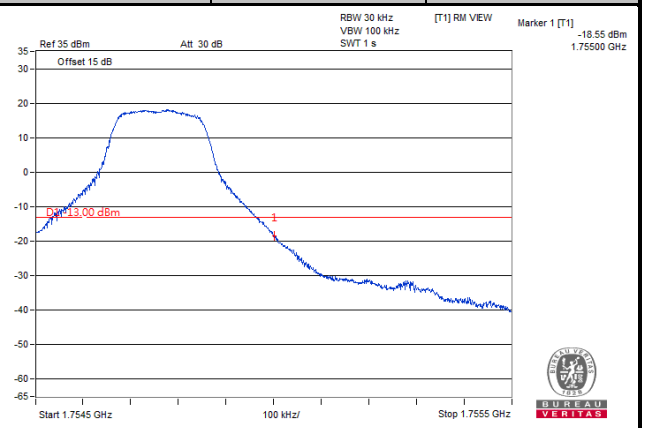
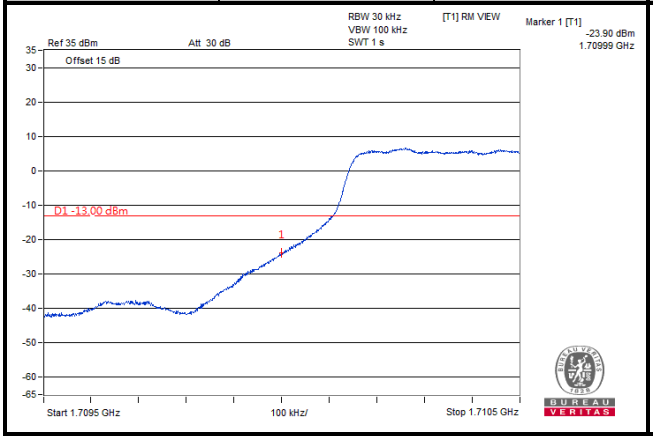
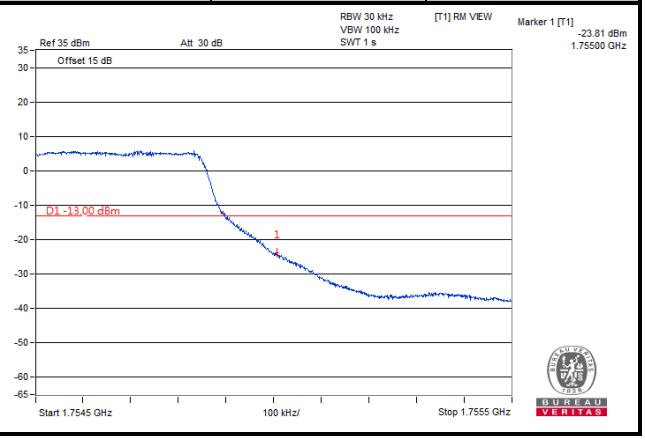


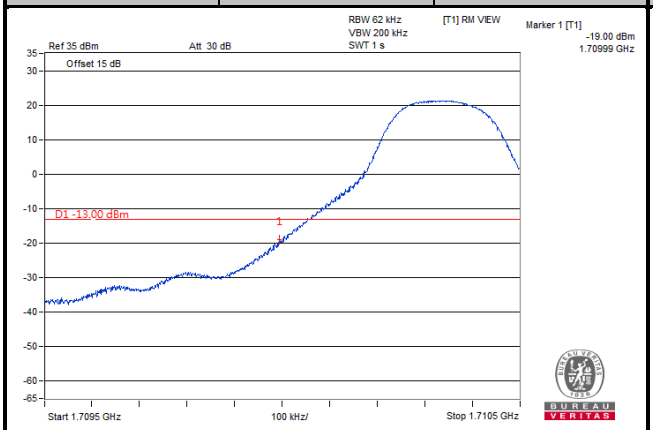
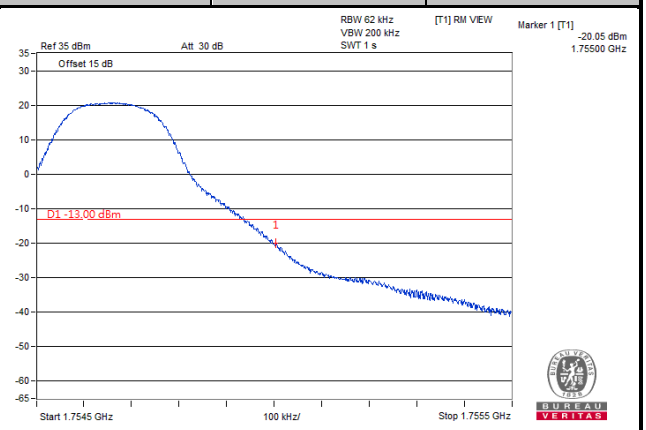
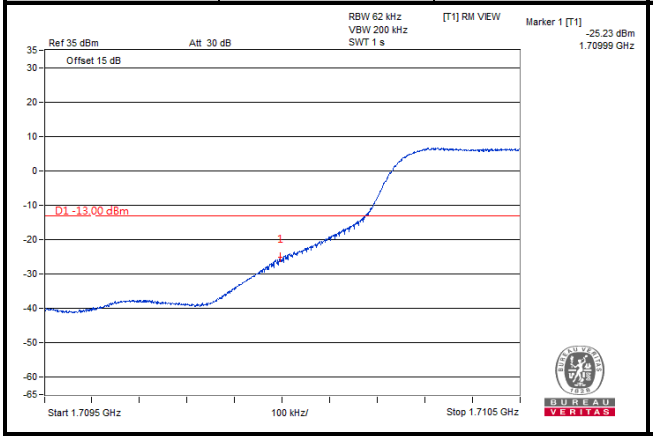
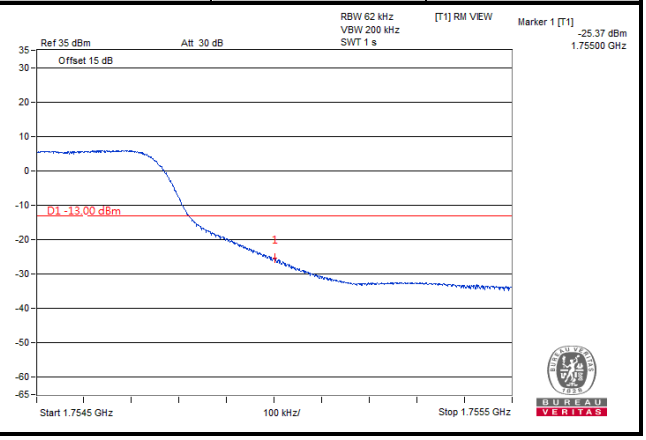


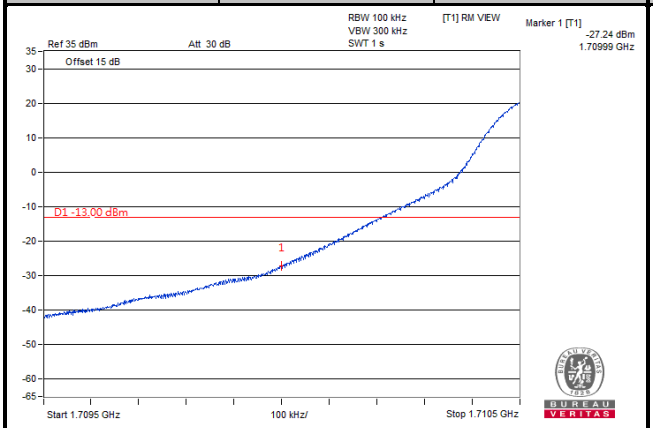
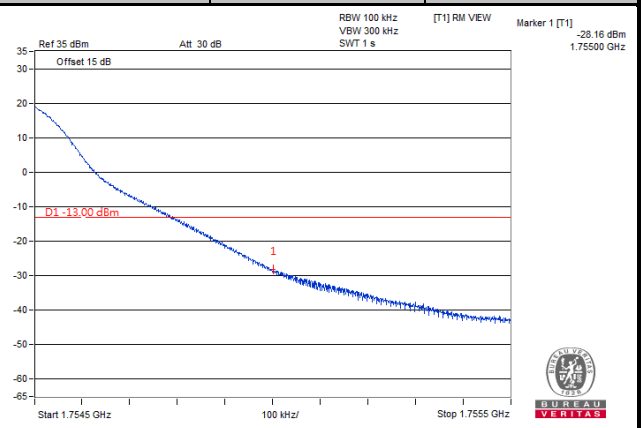
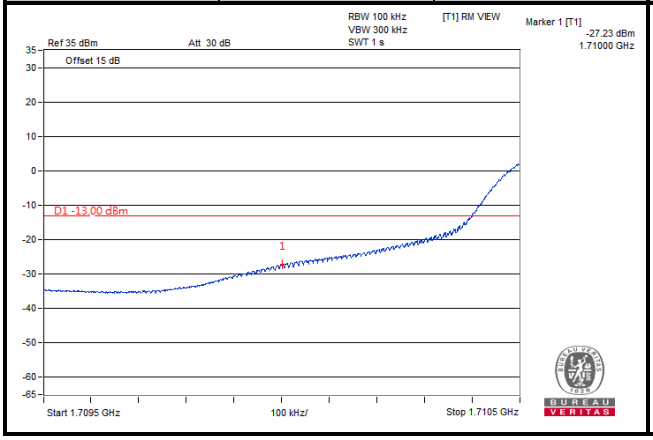
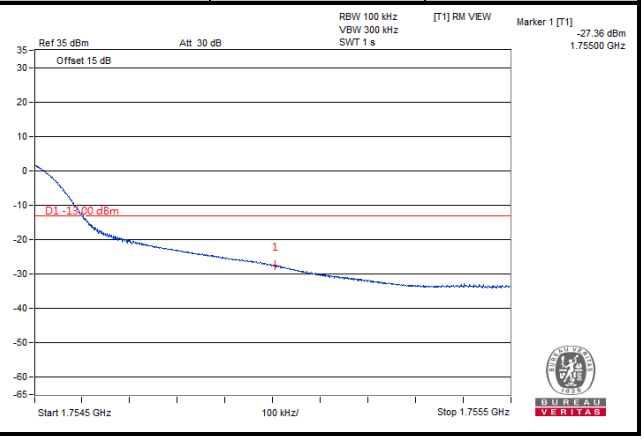
Channel	19957	6 RB	Channel	20393	6 RB

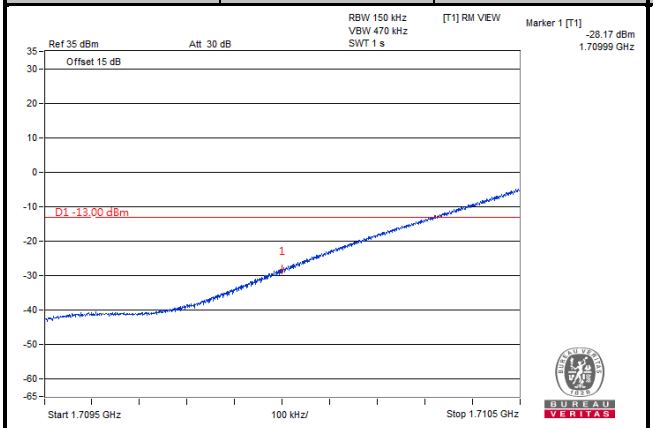
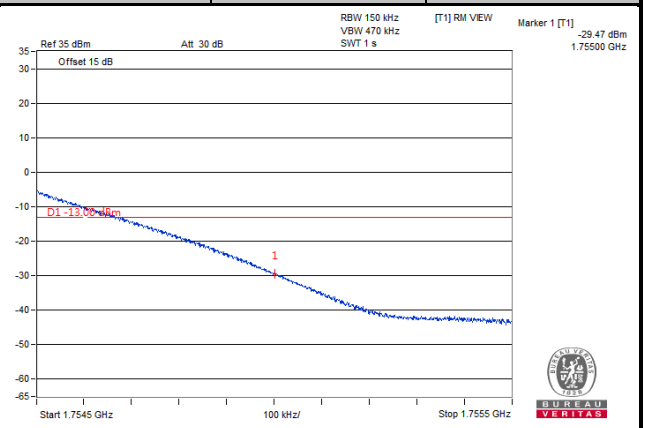
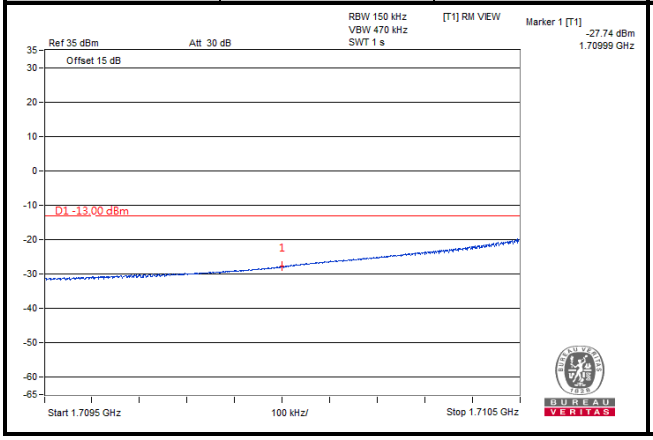
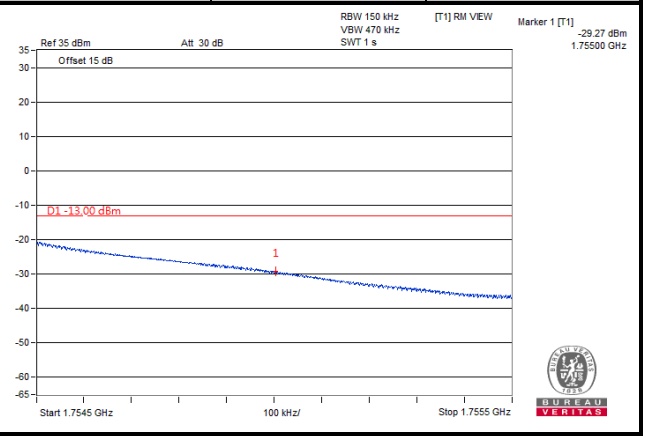


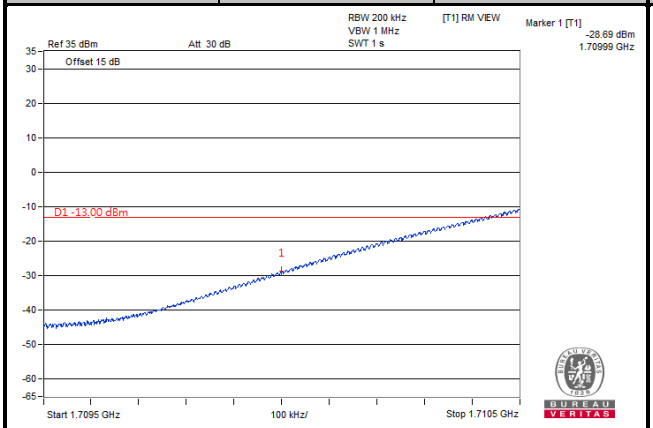
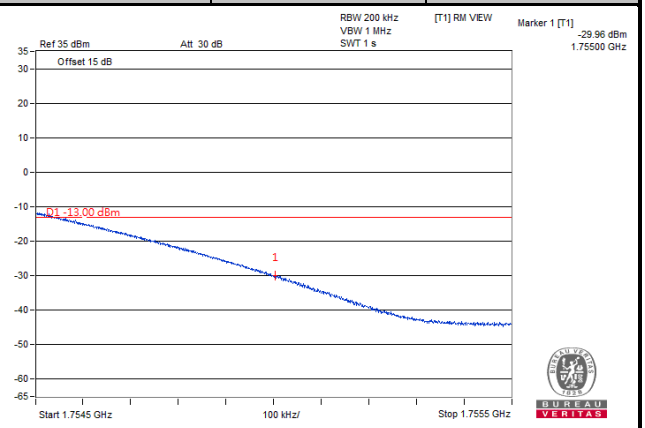
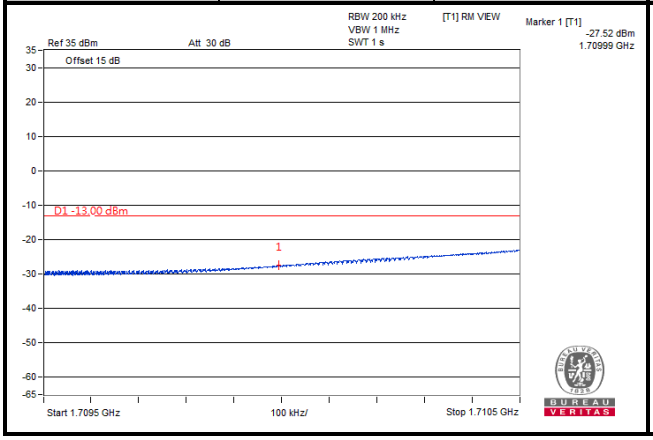
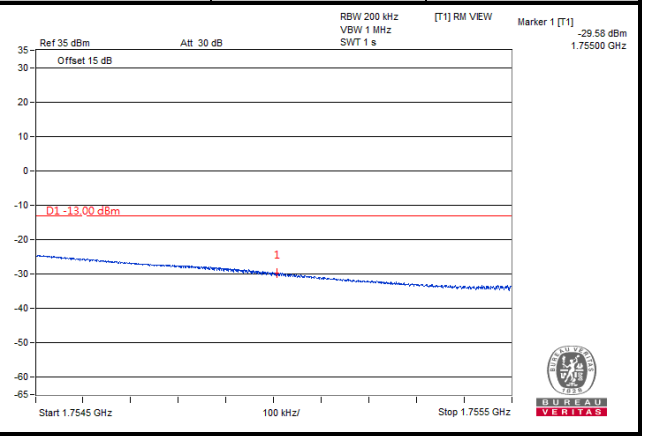


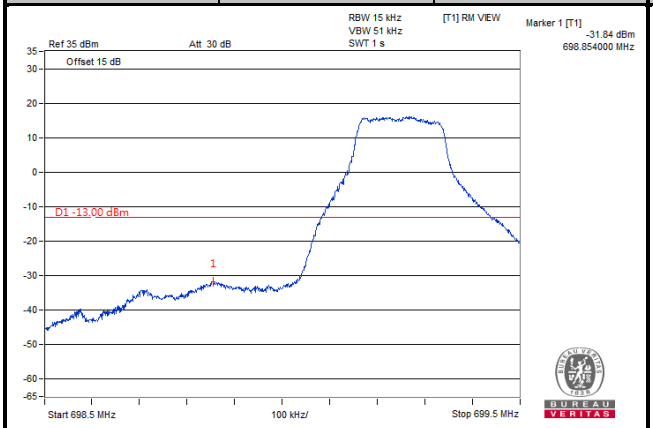
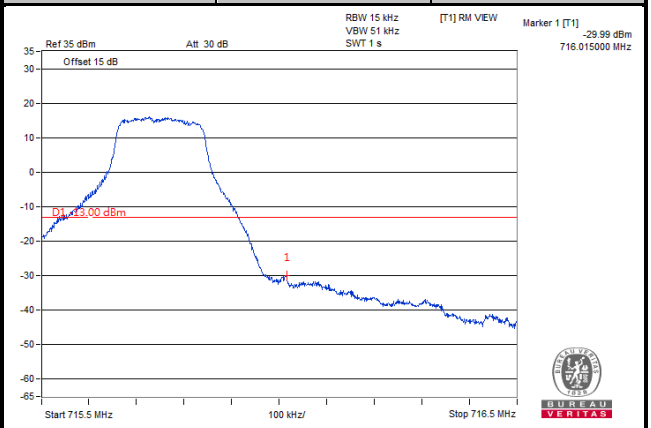
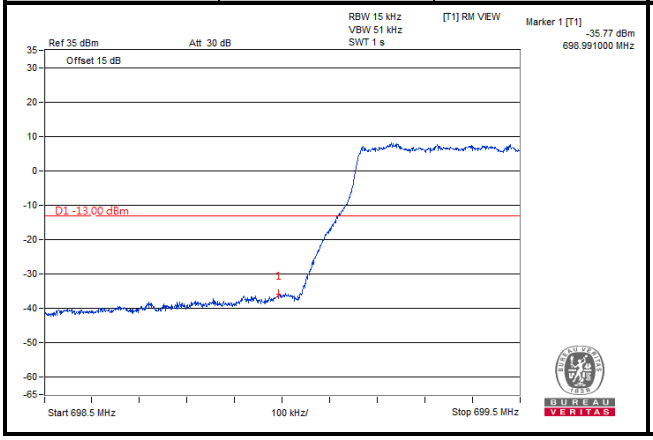
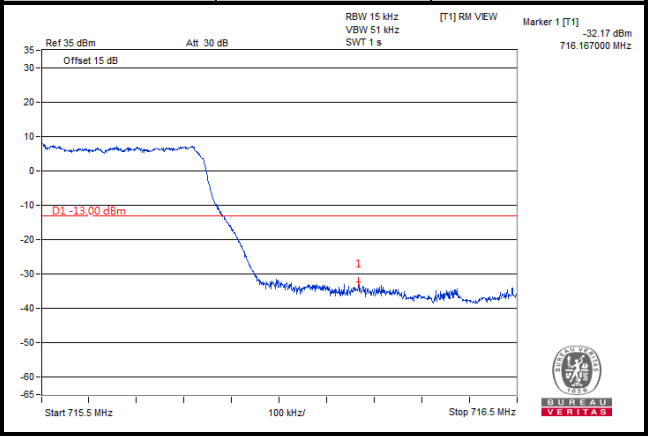
LTE Band 4					
Channel Bandwidth: 3 MHz					
Channel	19965	1 RB	Channel	20385	1 RB
					
Channel	19965	15 RB	Channel	20385	15 RB
					

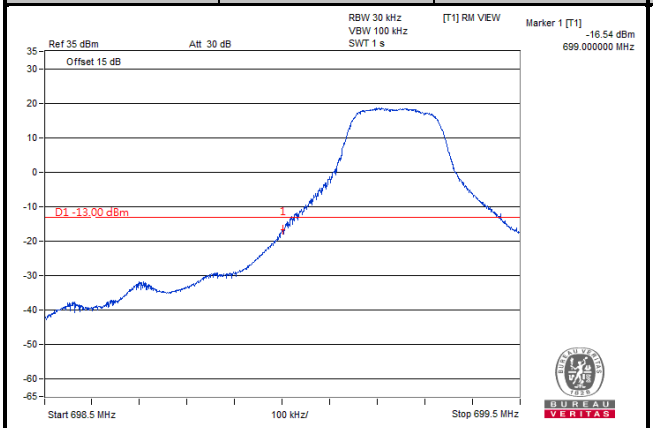
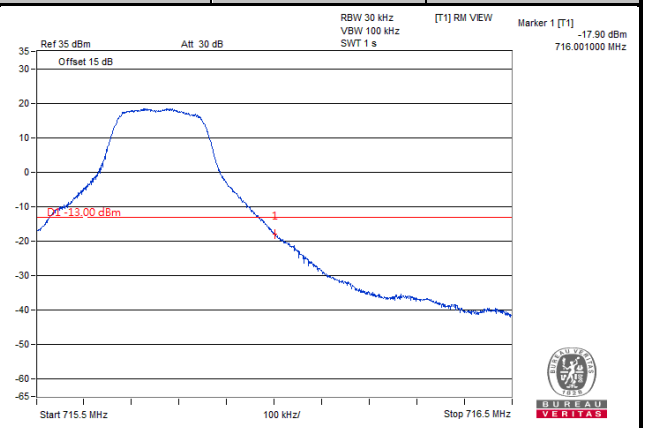
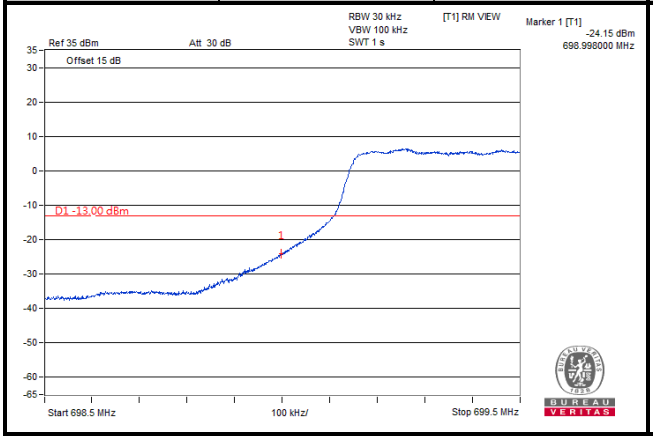
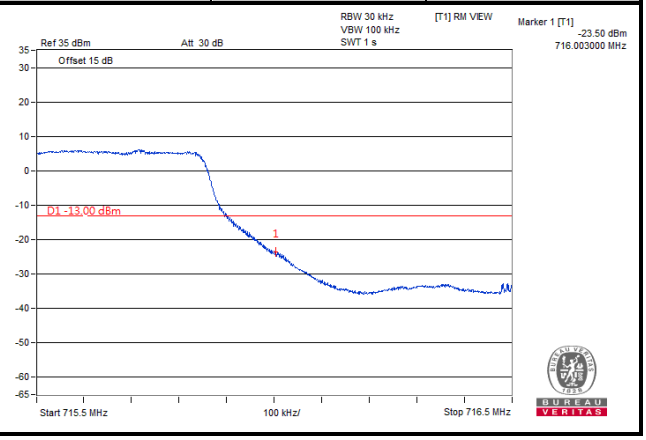
LTE Band 4					
Channel Bandwidth: 5 MHz					
Channel	19975	1 RB	Channel	20375	1 RB
					
Channel	19975	25 RB	Channel	20375	25 RB
					

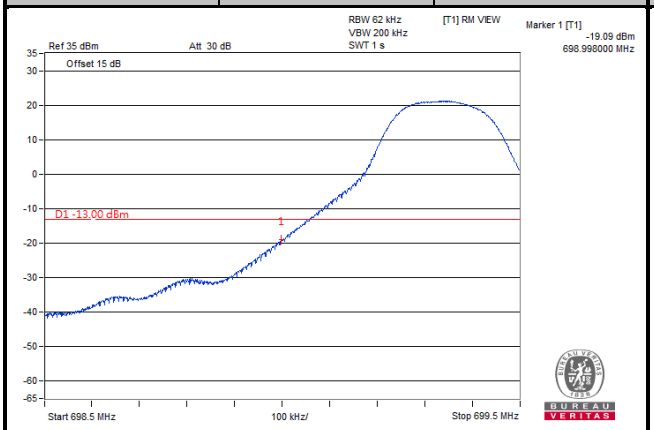
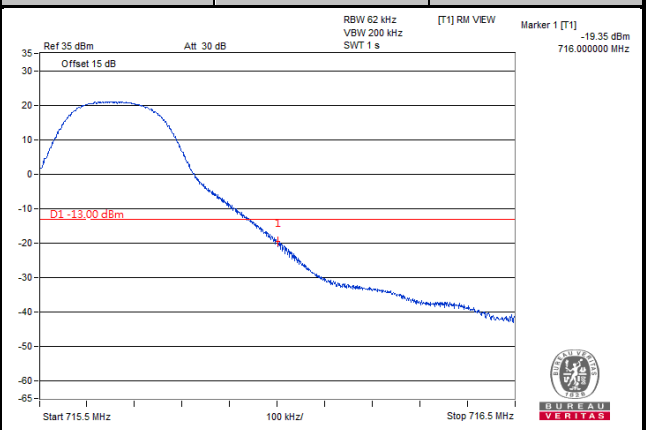
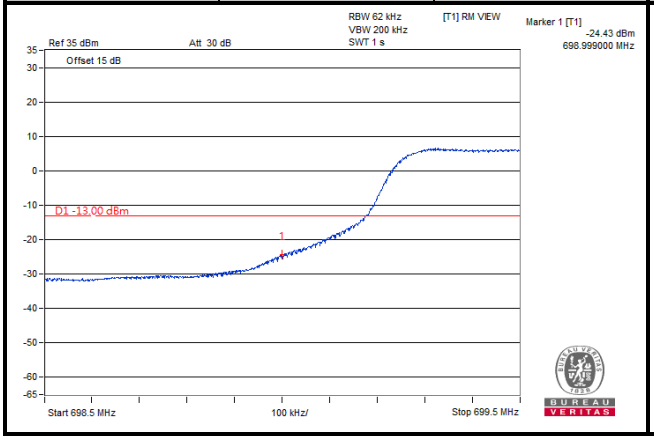
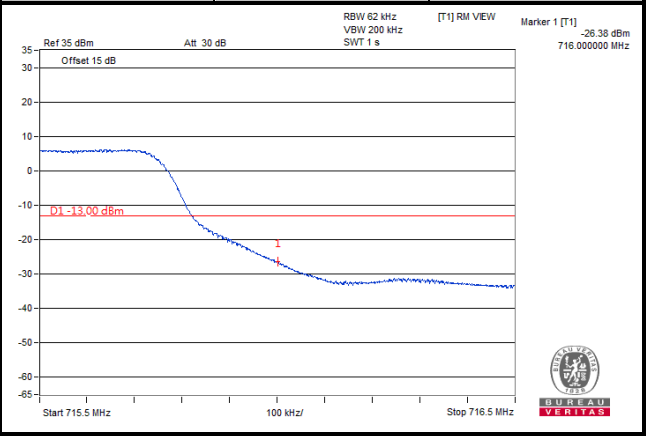
LTE Band 4					
Channel Bandwidth: 10 MHz					
Channel	20000	1 RB	Channel	20350	1 RB
					
Channel	20000	50 RB	Channel	20350	50 RB
					

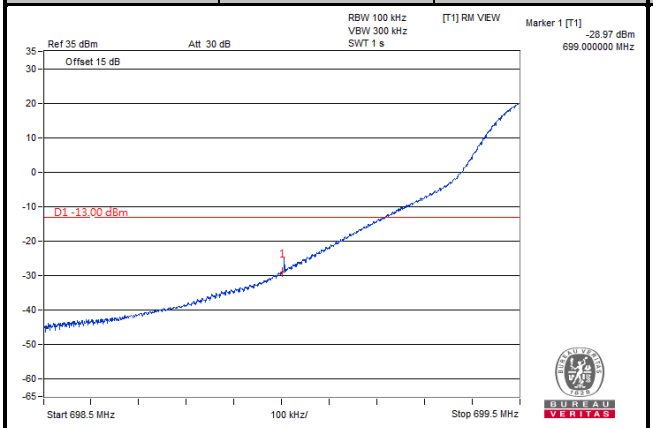
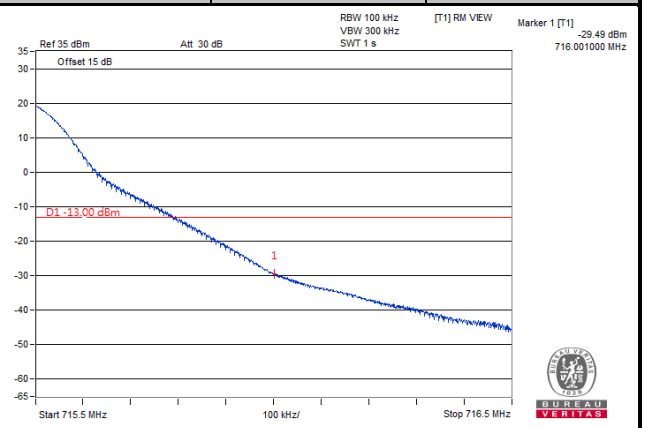
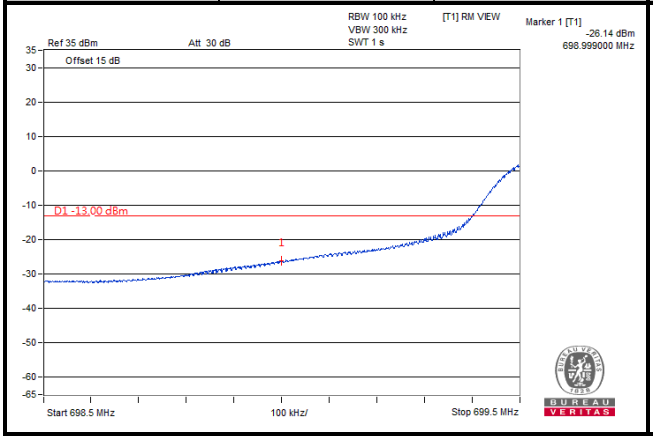
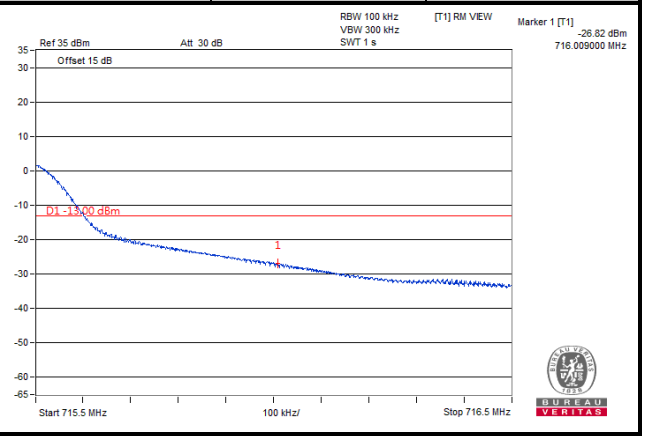
LTE Band 4					
Channel Bandwidth: 15 MHz					
Channel	20025	1 RB	Channel	20325	1 RB
					
Channel	20025	75 RB	Channel	20325	75 RB
					

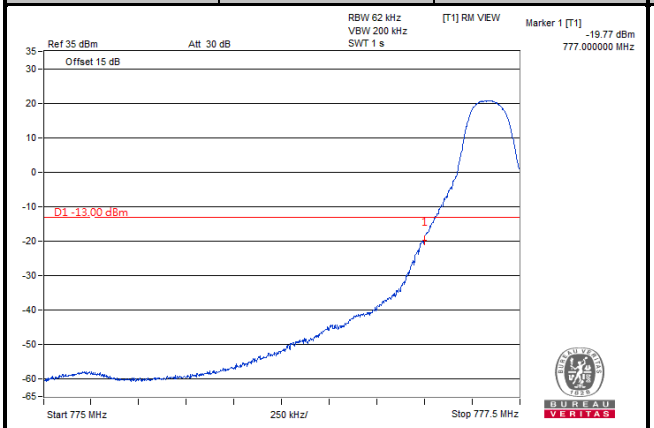
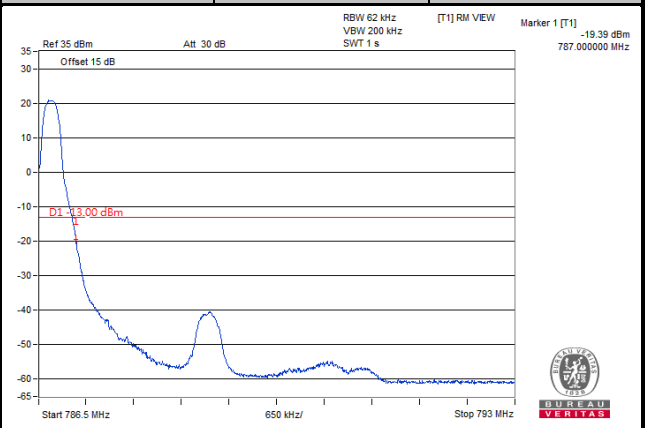
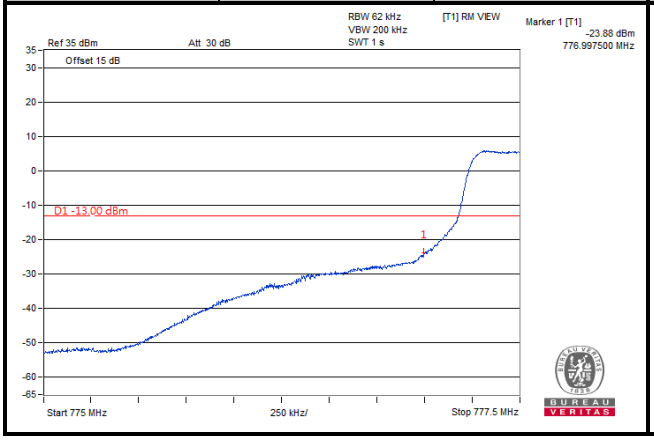
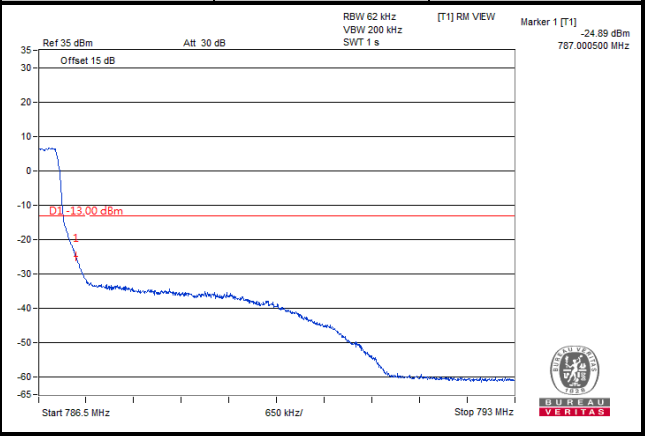
LTE Band 4					
Channel Bandwidth: 20 MHz					
Channel	20050	1 RB	Channel	20300	1 RB
					
Channel	20050	100 RB	Channel	20300	100 RB
					

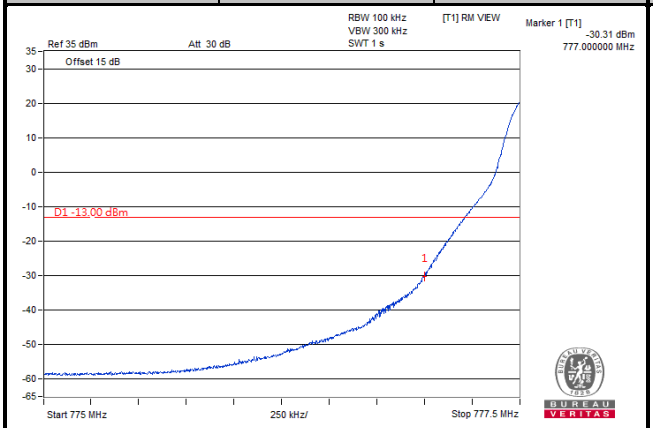
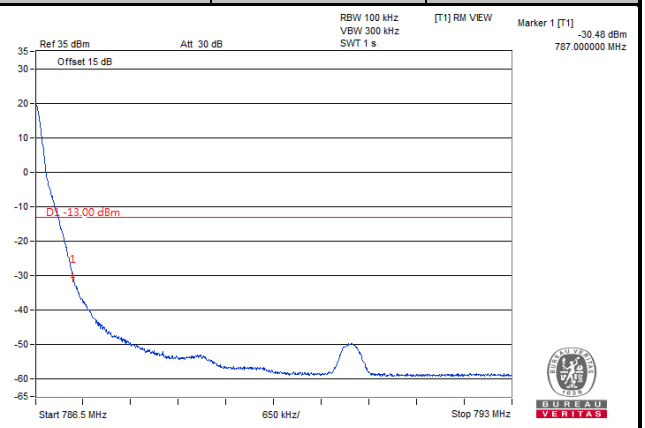
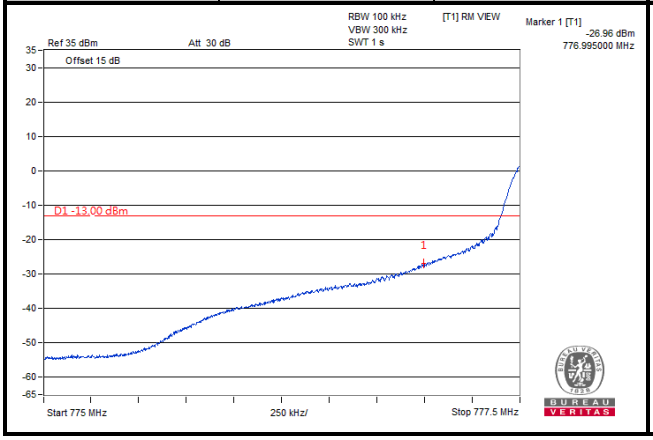
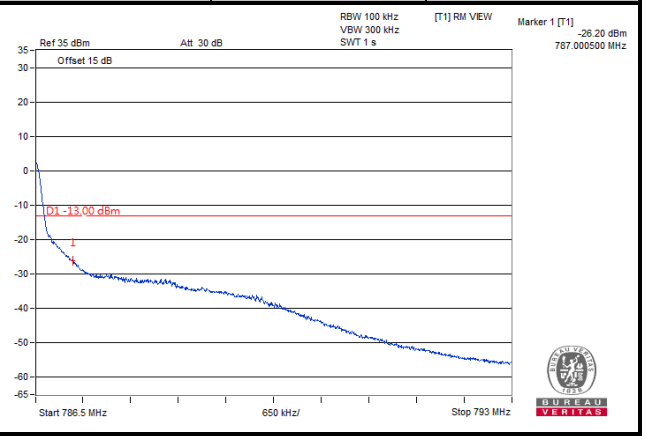
LTE Band 12					
Channel Bandwidth: 1.4 MHz					
Channel	23017	1 RB	Channel	23173	1 RB
					
Channel	23017	6 RB	Channel	23173	6 RB
					

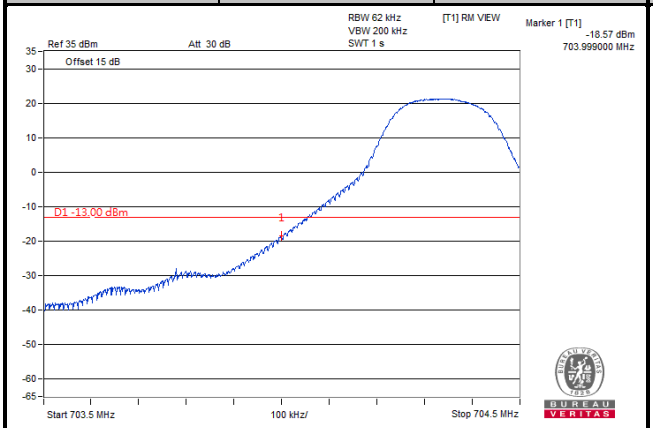
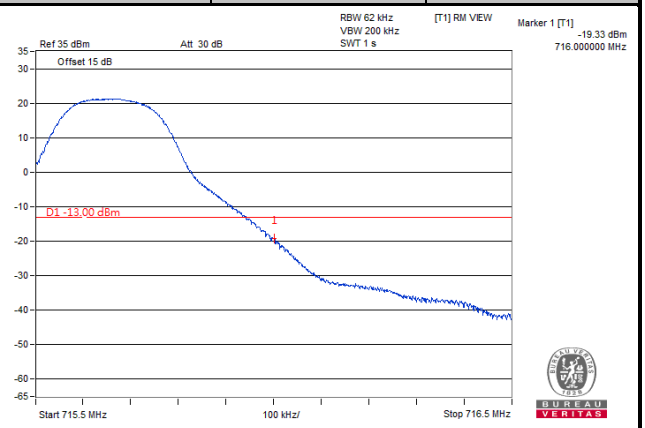
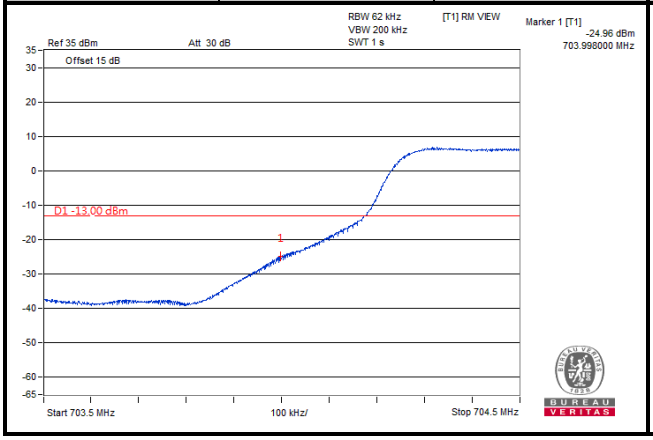
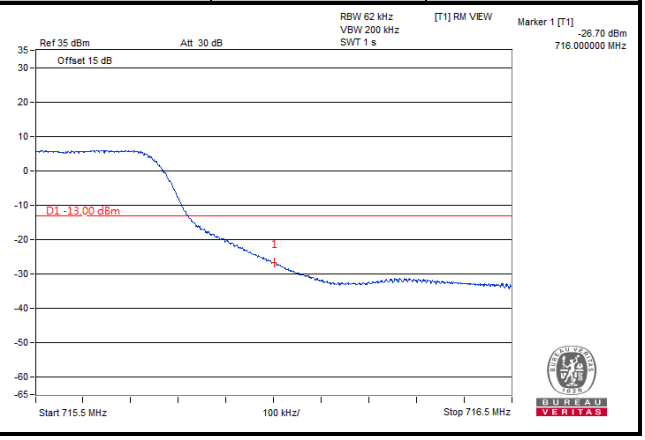
LTE Band 12					
Channel Bandwidth: 3 MHz					
Channel	23025	1 RB	Channel	23165	1 RB
					
Channel	23025	15 RB	Channel	23165	15 RB
					

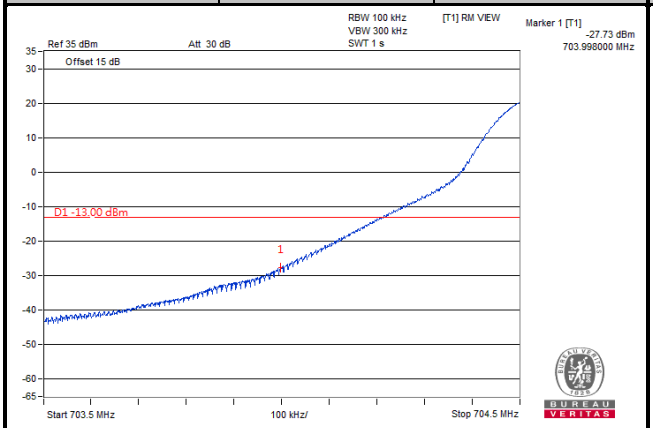
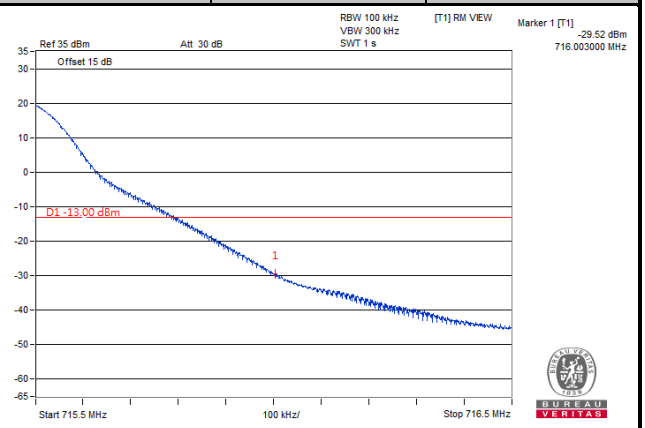
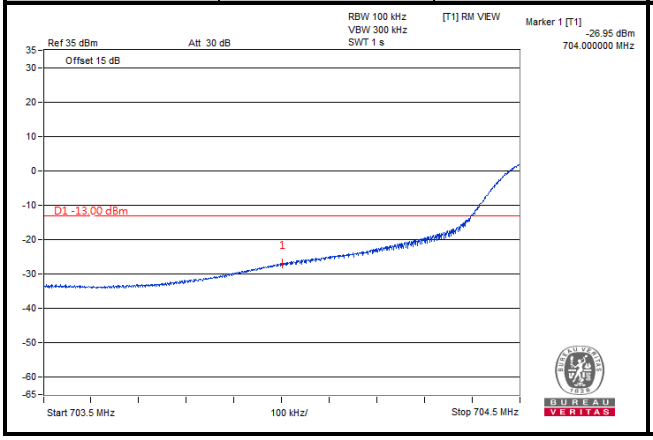
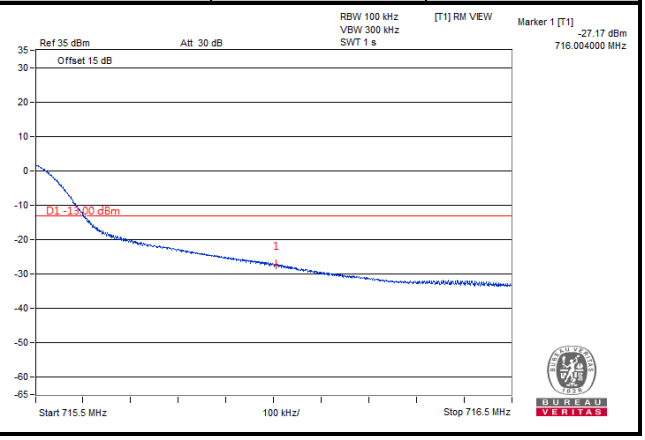
LTE Band 12					
Channel Bandwidth: 5 MHz					
Channel	23035	1 RB	Channel	23155	1 RB
					
Channel	23035	25 RB	Channel	23155	25 RB
					

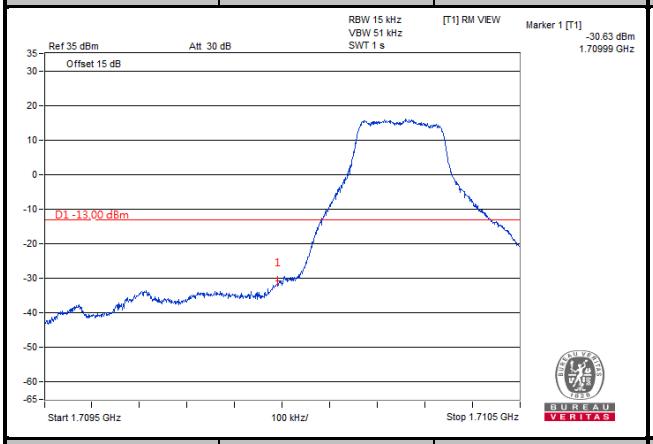
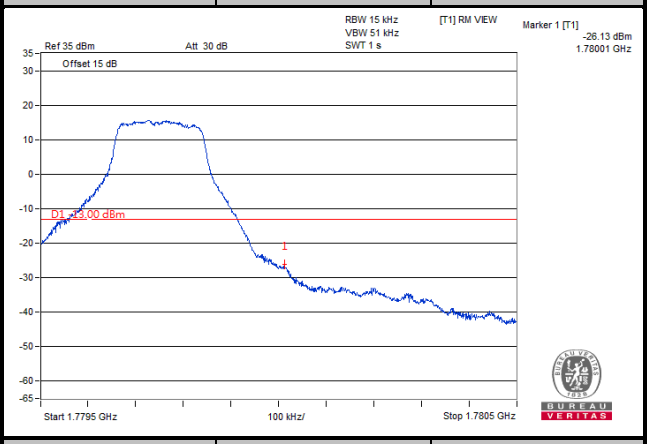
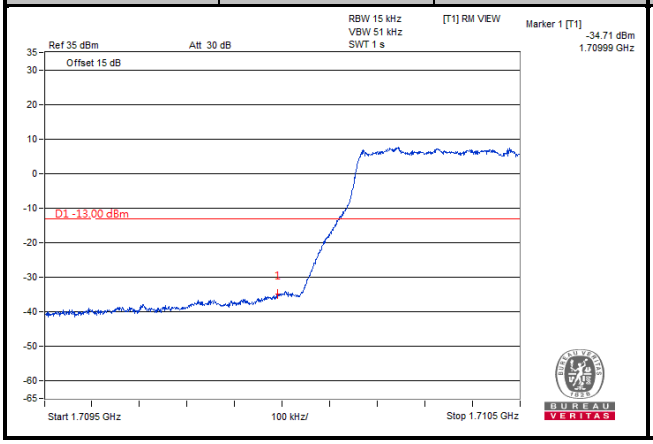
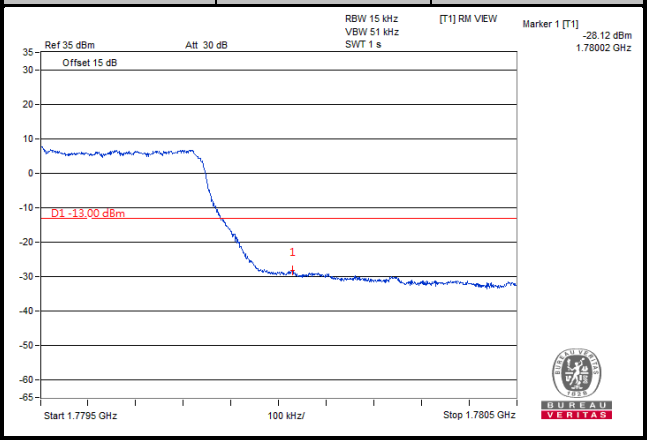
LTE Band 12					
Channel Bandwidth: 10 MHz					
Channel	23060	1 RB	Channel	23130	1 RB
					
Channel	23060	50 RB	Channel	23130	50 RB
					

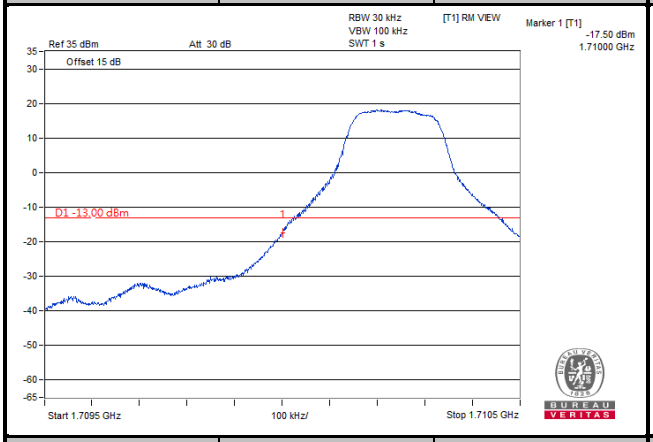
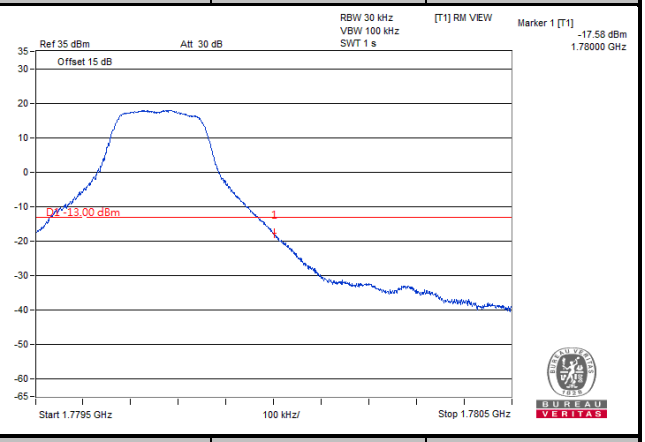
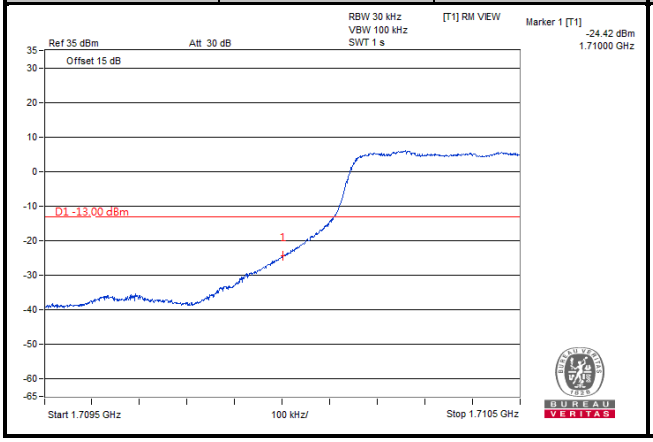
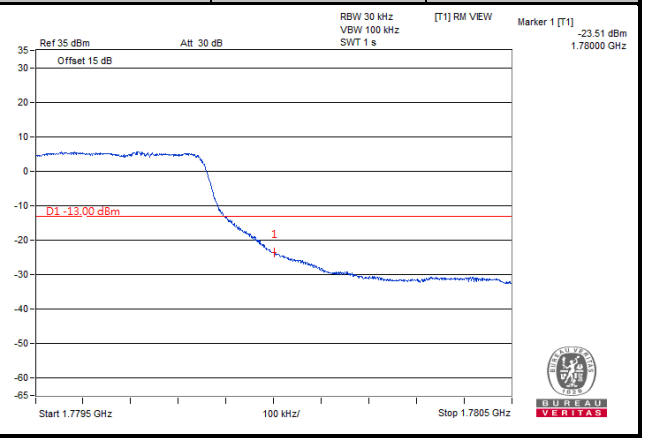
LTE Band 13					
Channel Bandwidth: 5 MHz					
Channel	23205	1 RB	Channel	23255	1 RB
					
Channel	23205	25 RB	Channel	23255	25 RB
					

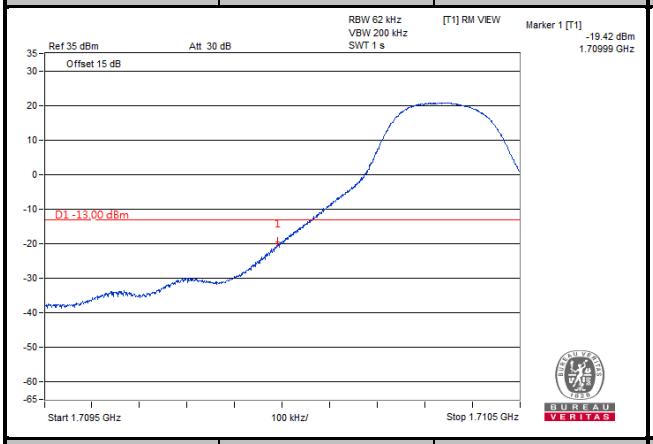
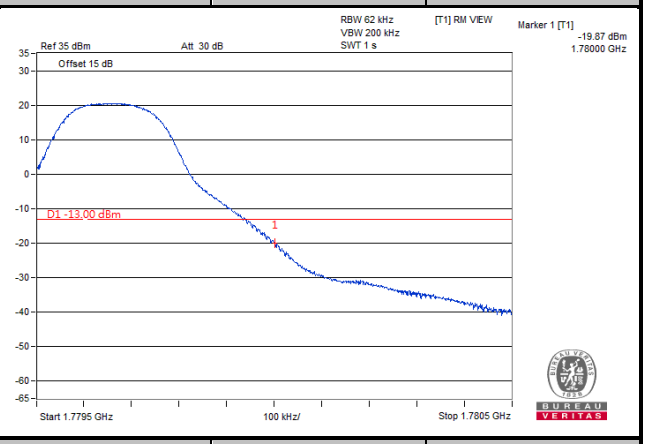
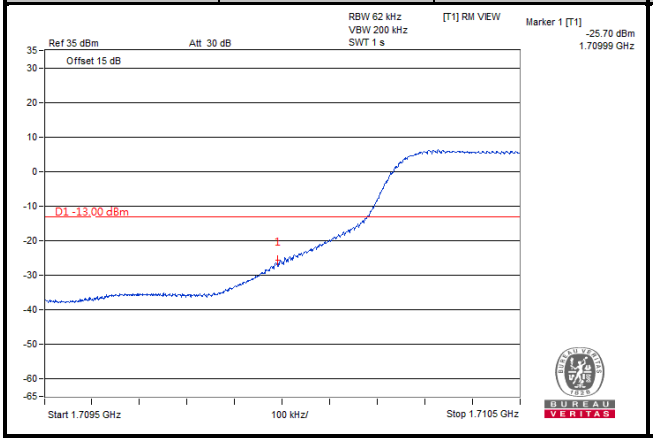
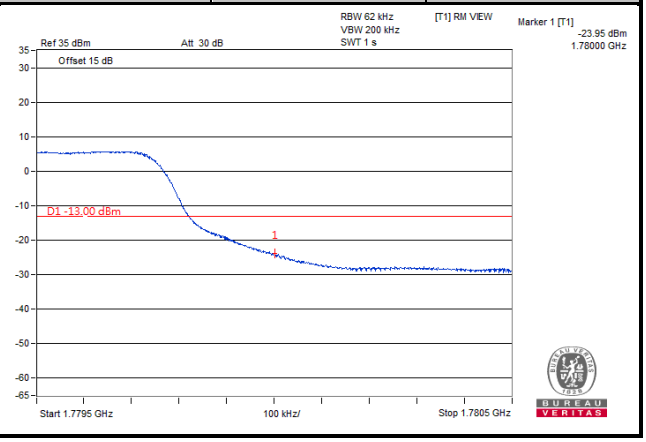
LTE Band 13					
Channel Bandwidth: 10 MHz					
Channel	23230	1 RB	Channel	23230	1 RB
					
Channel	23230	50 RB	Channel	23230	50 RB
					

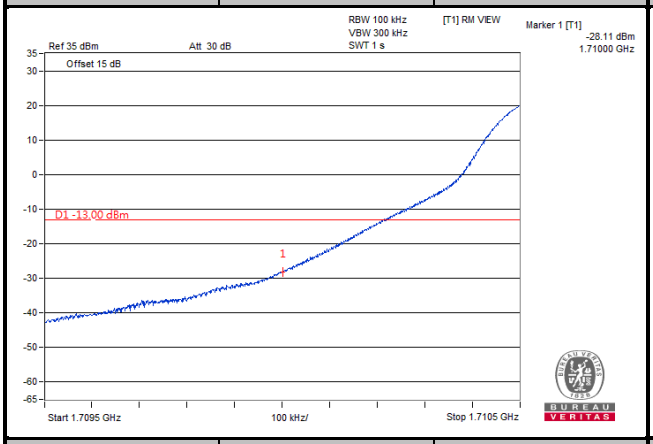
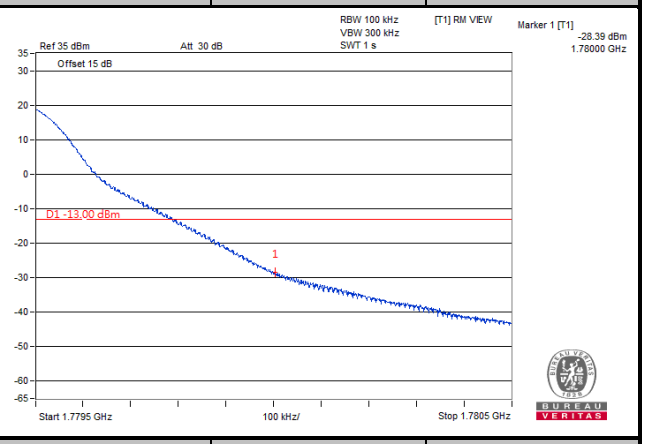
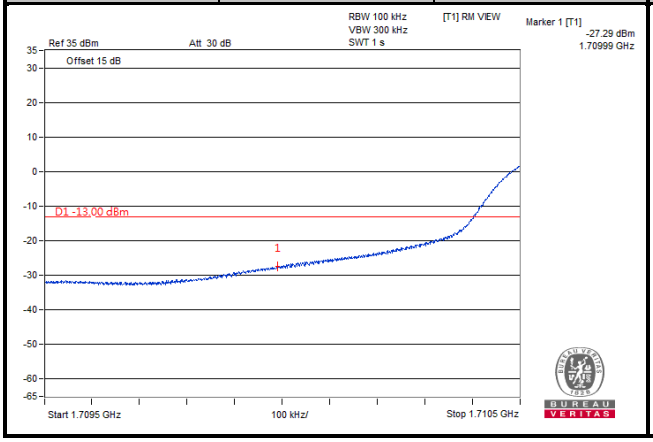
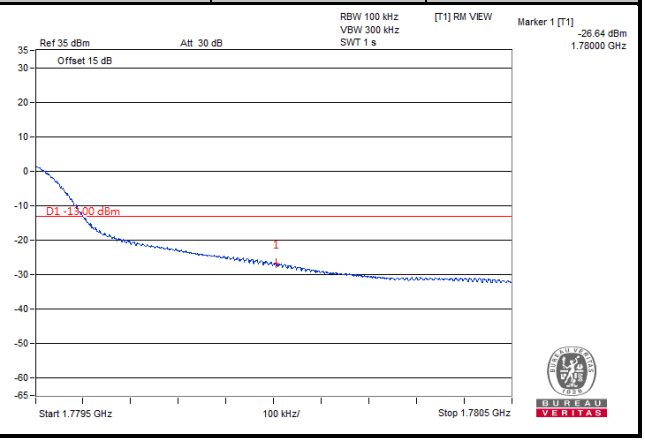
LTE Band 17					
Channel Bandwidth: 5 MHz					
Channel	23755	1 RB	Channel	23825	1 RB
					
Channel	23755	25 RB	Channel	23825	25 RB
					

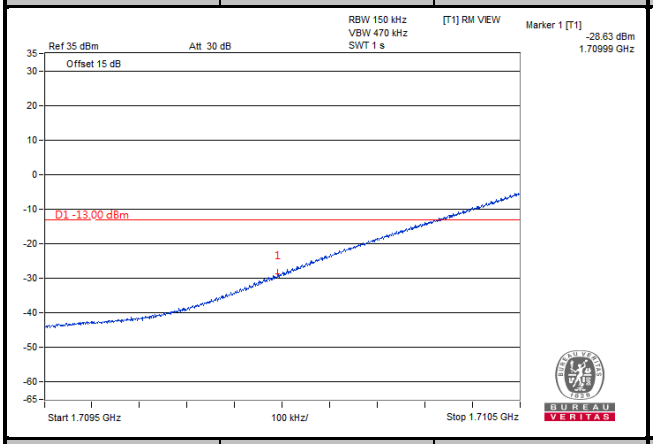
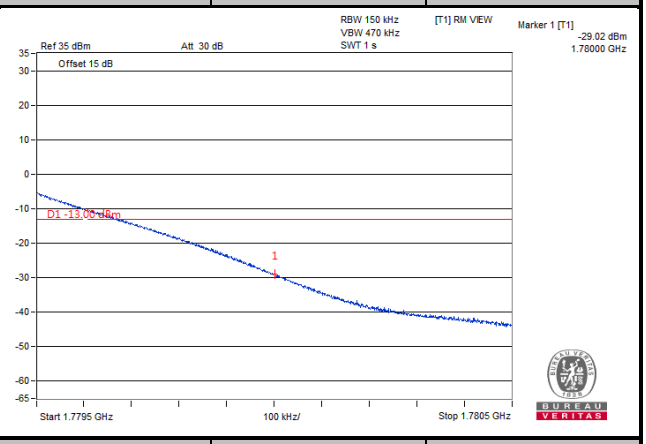
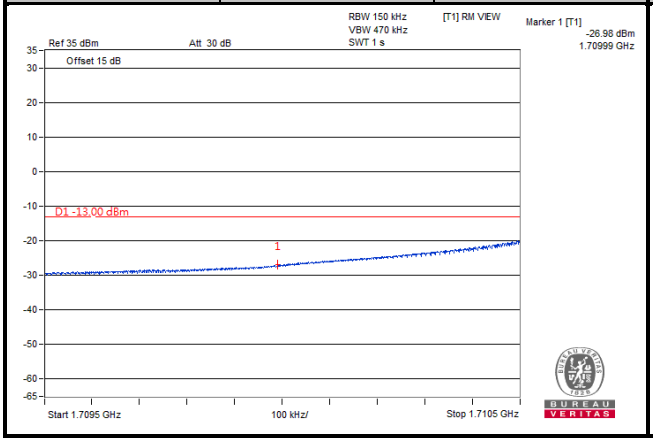
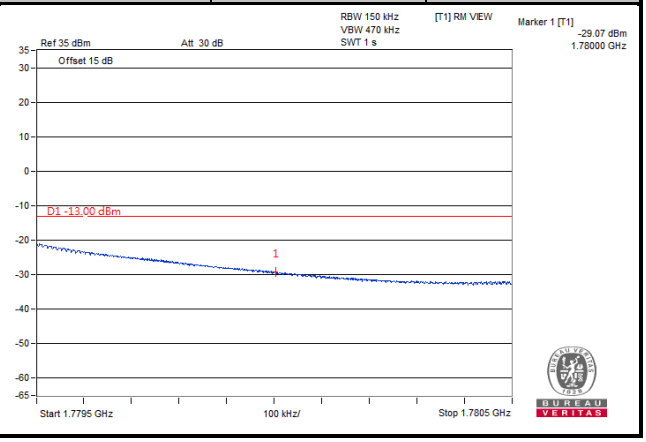
LTE Band 17					
Channel Bandwidth: 10 MHz					
Channel	23780	1 RB	Channel	23800	1 RB
					
Channel	23780	50 RB	Channel	23800	50 RB
					

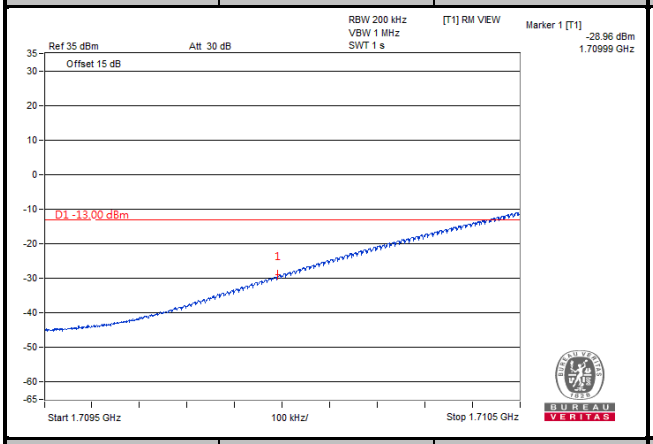
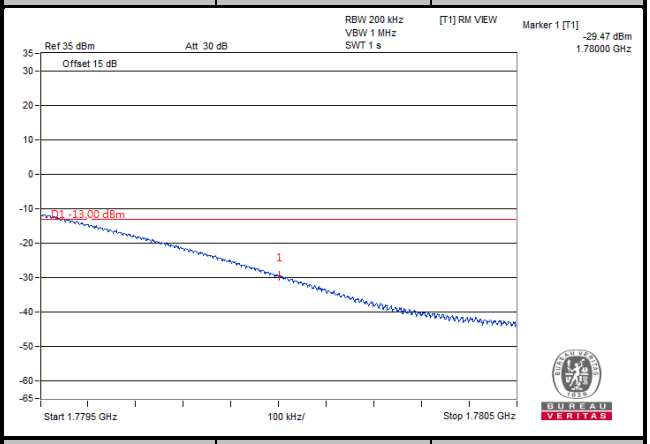
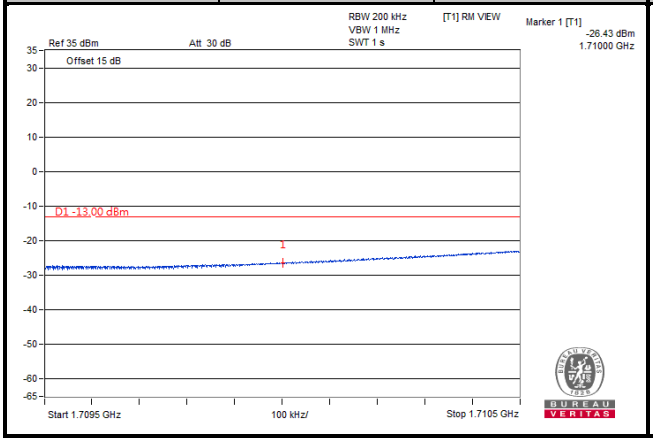
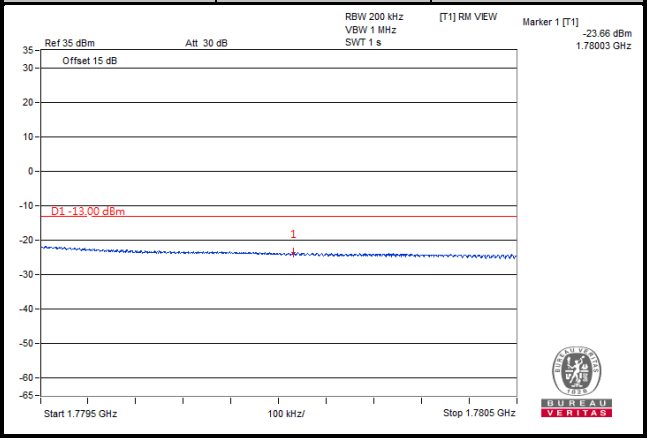
LTE Band 66					
Channel Bandwidth: 1.4 MHz					
Channel	131979	6 RB	Channel	132665	6 RB
					
Channel	131979	25 RB	Channel	132665	25 RB
					

LTE Band 66					
Channel Bandwidth: 3 MHz					
Channel	131987	1 RB	Channel	132657	1 RB
					
Channel	131987	15 RB	Channel	132657	15 RB
					

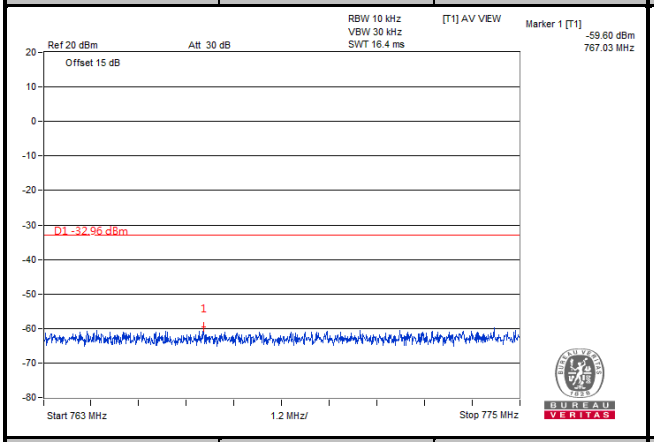
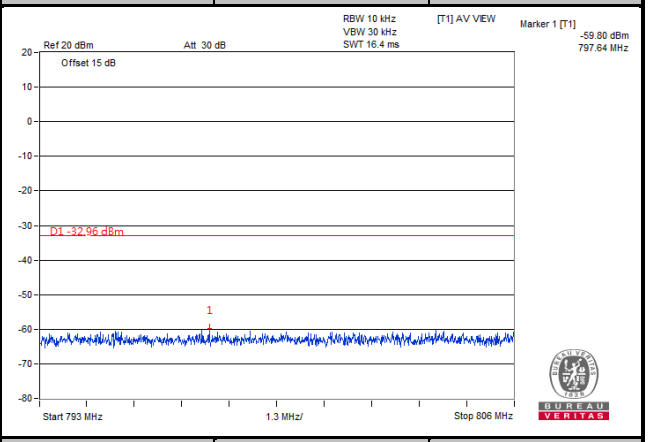
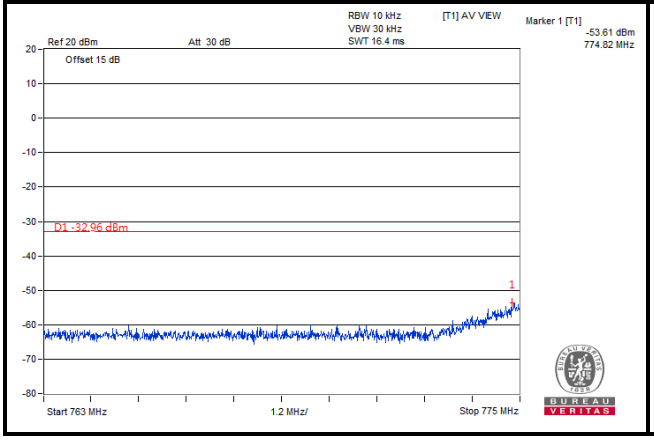
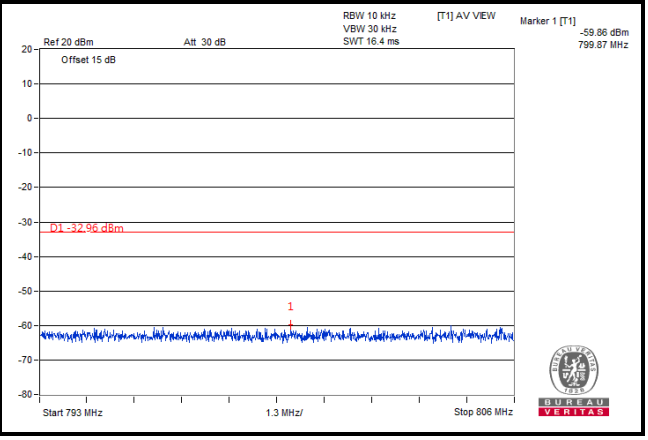
LTE Band 66					
Channel Bandwidth: 5 MHz					
Channel	131997	1 RB	Channel	132647	1 RB
					
Channel	131997	25 RB	Channel	132647	25 RB
					

LTE Band 66					
Channel Bandwidth: 10 MHz					
Channel	132022	1 RB	Channel	132622	1 RB
					
Channel	132022	50 RB	Channel	132622	50 RB
					

LTE Band 66					
Channel Bandwidth: 15 MHz					
Channel	132047	1 RB	Channel	132597	1 RB
					
Channel	132047	75 RB	Channel	132597	75 RB
					

LTE Band 66					
Channel Bandwidth: 20 MHz					
Channel	132072	1 RB	Channel	132572	1 RB
					
Channel	132072	100 RB	Channel	132572	100 RB
					

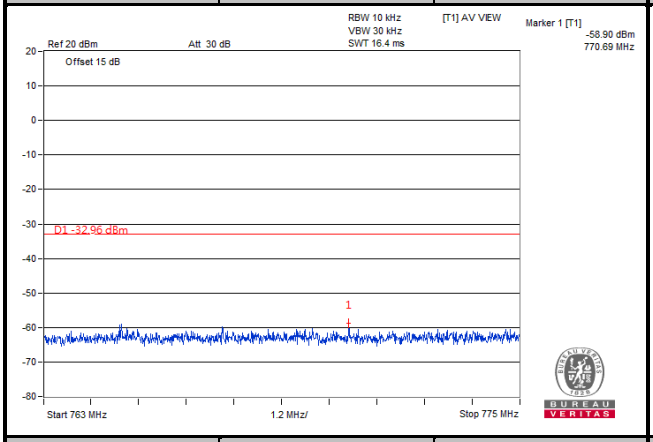
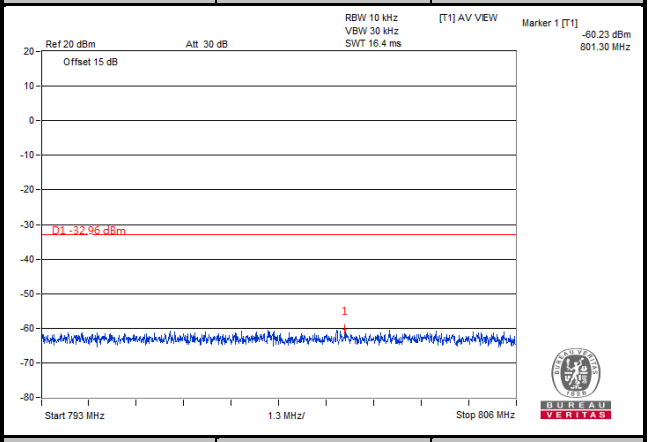
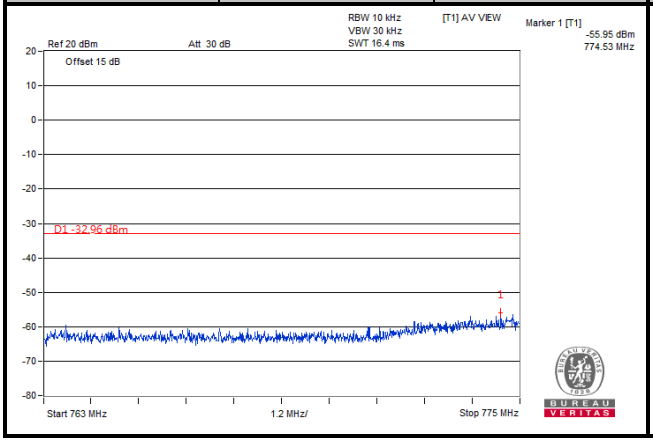
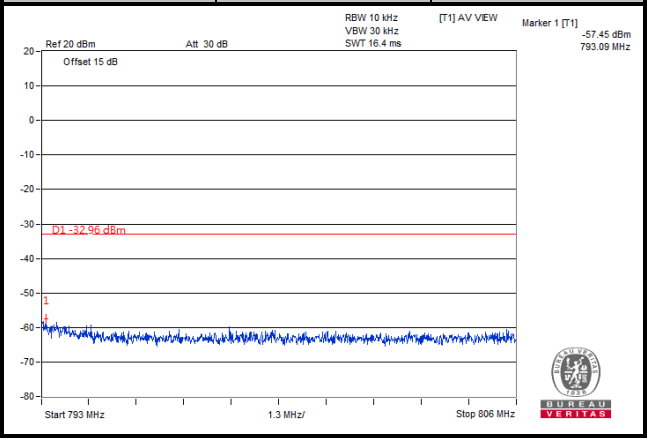
Emission Mask

LTE Band 13					
Channel Bandwidth: 5 MHz					
Channel	23205	1 RB	Channel	23255	1 RB
					
Channel	23205	25 RB	Channel	23255	25 RB
					

For the 763 - 775 MHz and 793 - 805 MHz band, the FCC limit is 65+10log(P[watt]) in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance. By using a 10 kHz bandwidth on the spectrum analyzer.

10log(10kHz/6.25kHz) = 2.04 dB

Limit line = -35 dBm + 2.04 dB = -32.96 dBm

LTE Band 13					
Channel Bandwidth: 10 MHz					
Channel	23230	1 RB	Channel	23230	1 RB
					
Channel	23230	50 RB	Channel	23230	50 RB
					

For the 763 - 775 MHz and 793 - 805 MHz band, the FCC limit is 65+10log(P[watt]) in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance. By using a 10 kHz bandwidth on the spectrum analyzer.

10log(10kHz/6.25kHz) = 2.04 dB

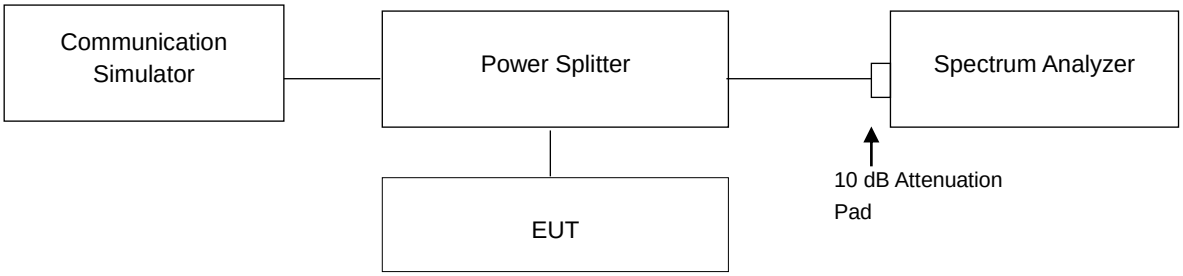
Limit line = -35 dBm + 2.04 dB =-32.96 dBm

4.6 Peak to Average Ratio

4.6.1 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.

4.6.2 Test Setup



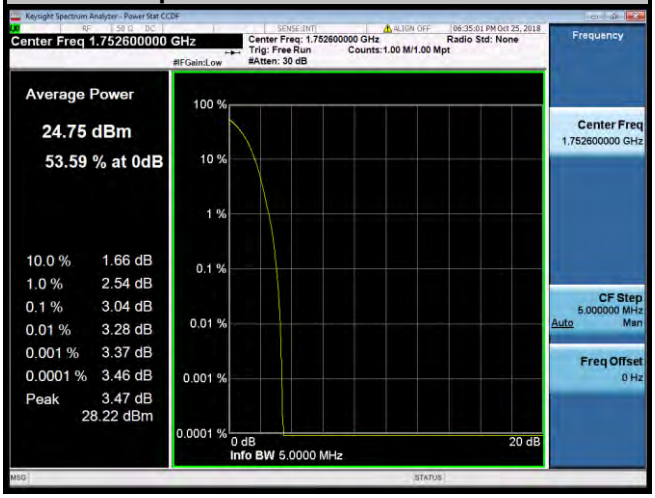
4.6.3 Test Procedures

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 %.

4.6.4 Test Results

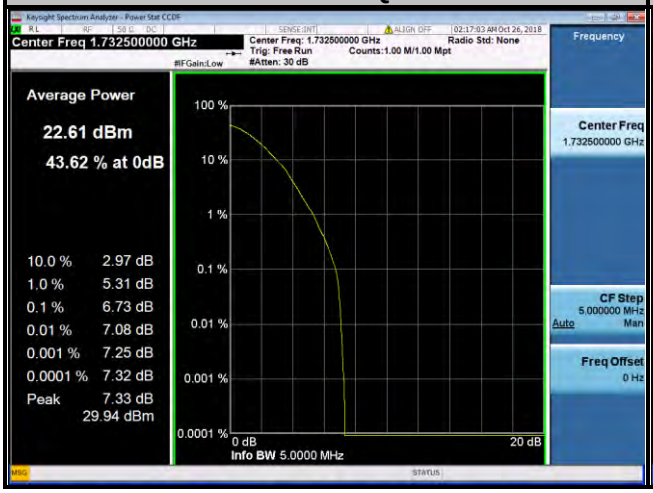
WCDMA		
Channel	**Frequency (MHz)**	**Peak to Average Ratio (dB)**
1312	1712.4	3.02
1413	1732.6	3.04
1513	1752.6	3.04

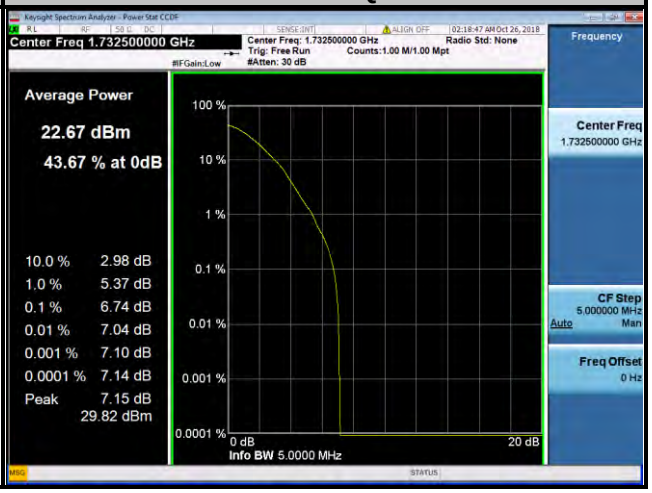
Spectrum Plot of Worst Value



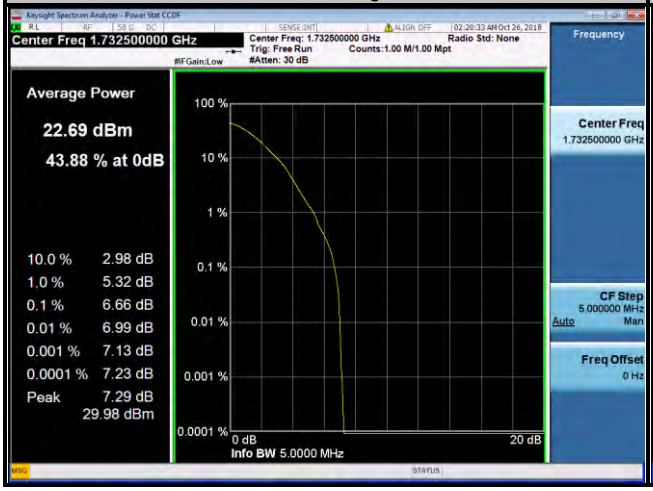
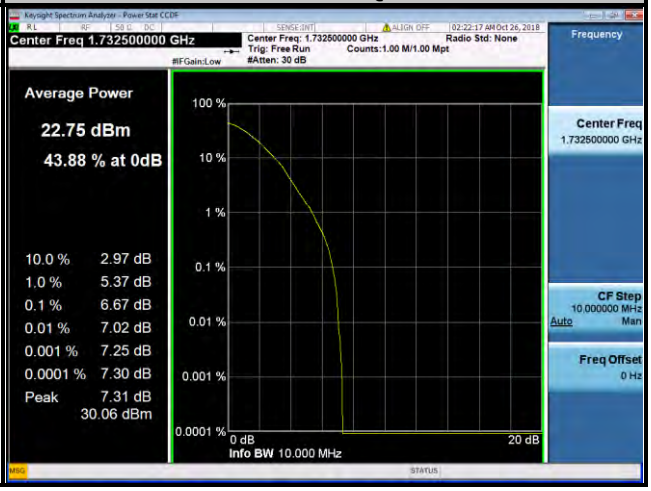
LTE Band 4									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19957	1710.7	3.81	5.00	6.07	19965	1711.5	3.61	5.00	6.07
20175	1732.5	3.81	5.46	6.73	20175	1732.5	3.56	5.25	6.74
20393	1754.3	3.80	5.47	6.72	20385	1753.5	3.58	5.28	6.70

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

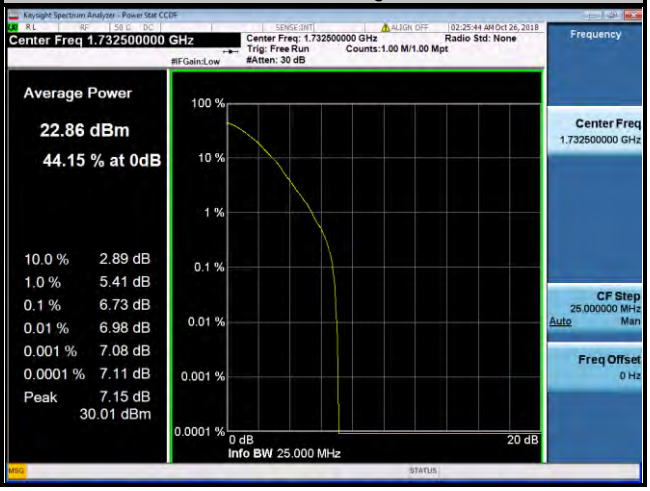




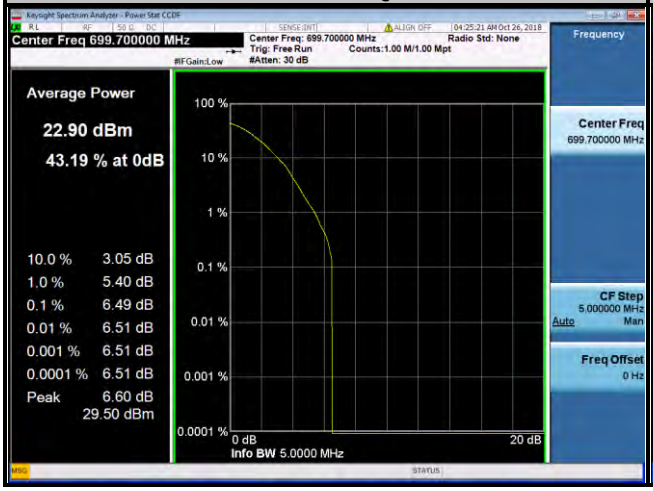
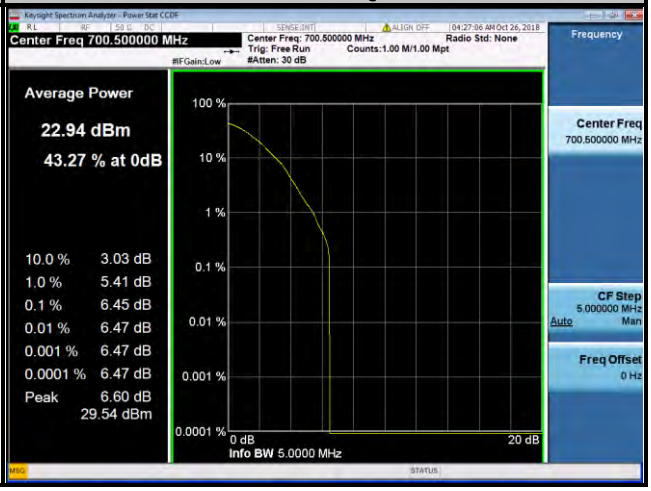
LTE Band 4									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19975	1712.5	3.61	5.03	6.10	20000	1715.0	3.51	4.90	5.99
20175	1732.5	3.56	5.27	6.66	20175	1732.5	3.48	5.30	6.67
20375	1752.5	3.60	5.31	6.45	20350	1750.0	3.51	4.89	6.05

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

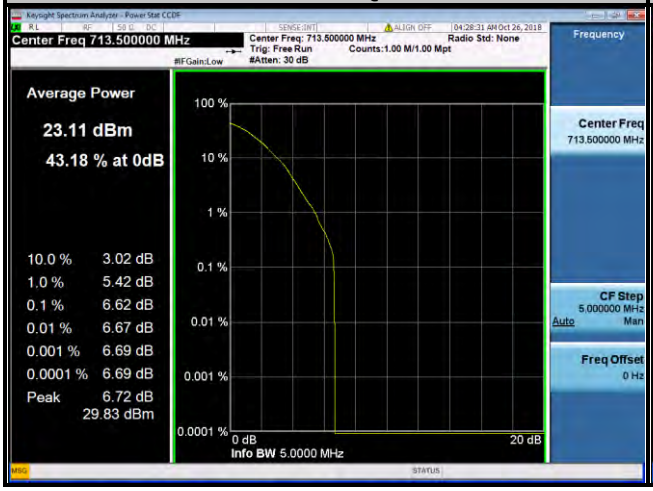
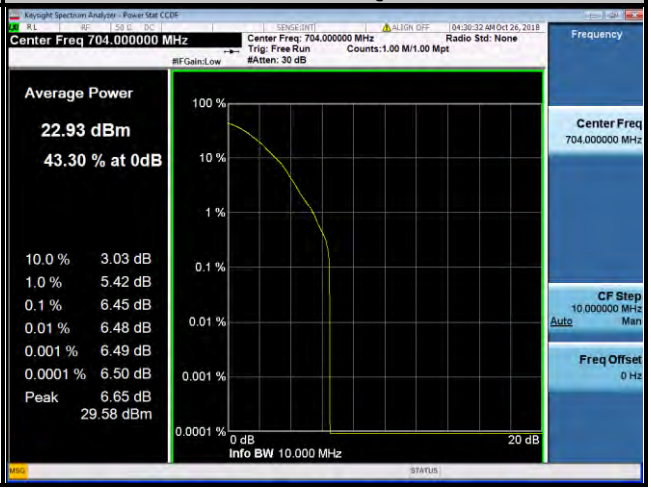
LTE Band 4									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20025	1717.5	3.49	4.95	6.03	20050	1720.0	3.54	5.00	6.00
20175	1732.5	3.49	5.14	6.60	20175	1732.5	3.57	5.12	6.73
20325	1747.5	3.48	5.20	6.32	20300	1745.0	3.46	5.23	6.62

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

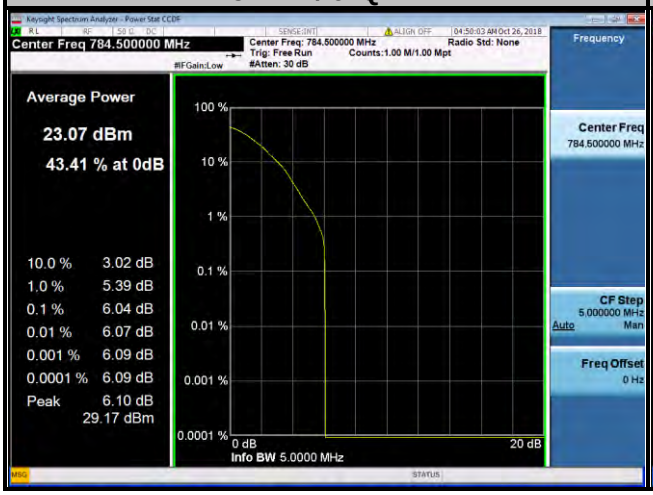
LTE Band 12									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23017	699.7	3.82	5.39	6.49	23025	700.5	3.61	5.31	6.45
23095	707.5	3.80	4.67	5.78	23095	707.5	3.58	4.67	5.81
23173	715.3	3.37	4.11	5.27	23165	714.5	3.55	5.03	6.17

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

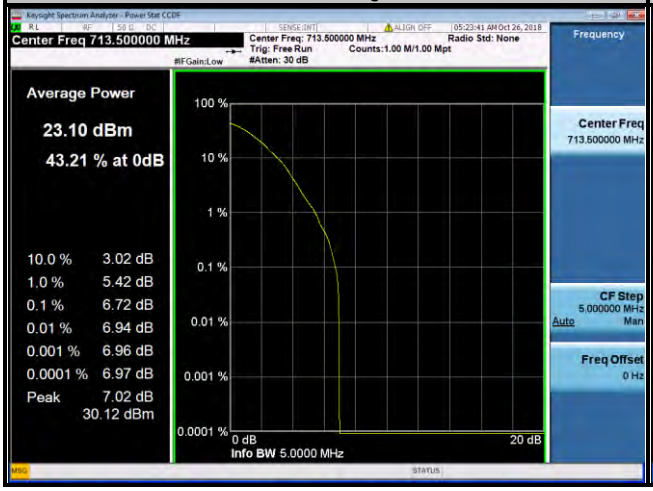
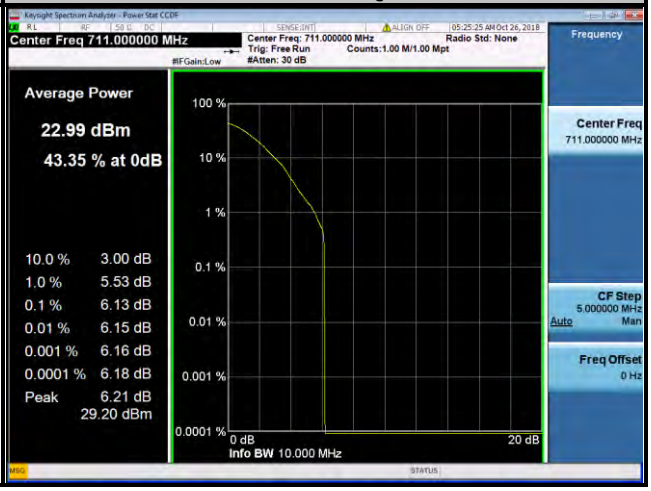
LTE Band 12									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23035	701.5	3.58	5.29	6.43	23060	704.0	3.53	5.26	6.45
23095	707.5	3.61	4.84	5.82	23095	707.5	3.54	5.01	6.11
23155	713.5	3.60	5.33	6.62	23130	711.0	3.51	4.61	5.71

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

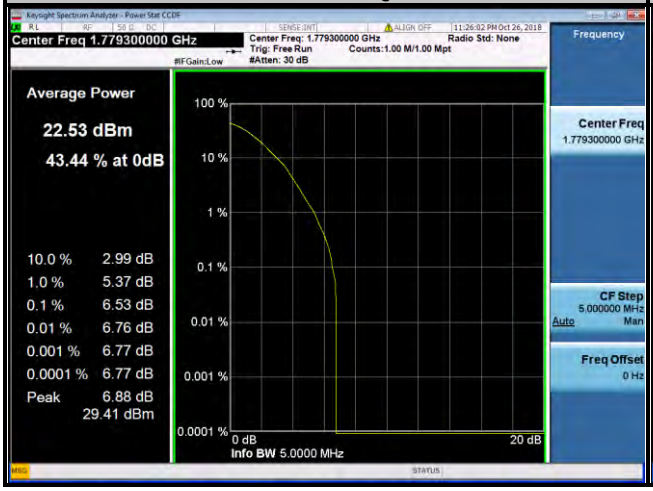
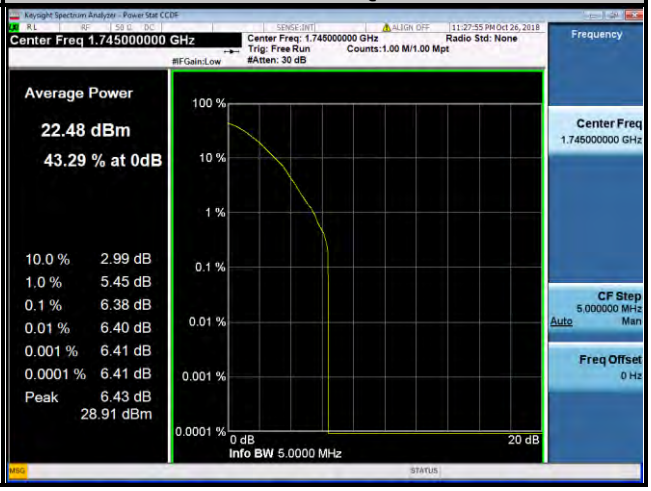
LTE Band 13									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23205	779.5	3.34	4.11	5.14	23230	782.0	3.32	4.07	5.18
23230	782.0	3.57	4.20	5.32					
23255	784.5	3.58	5.01	6.04					

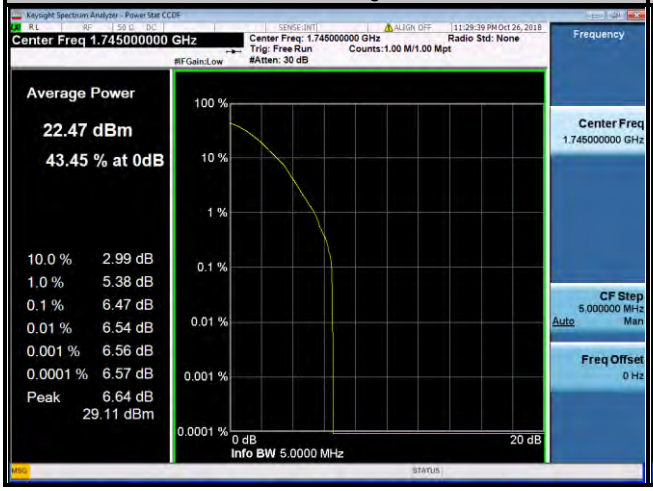
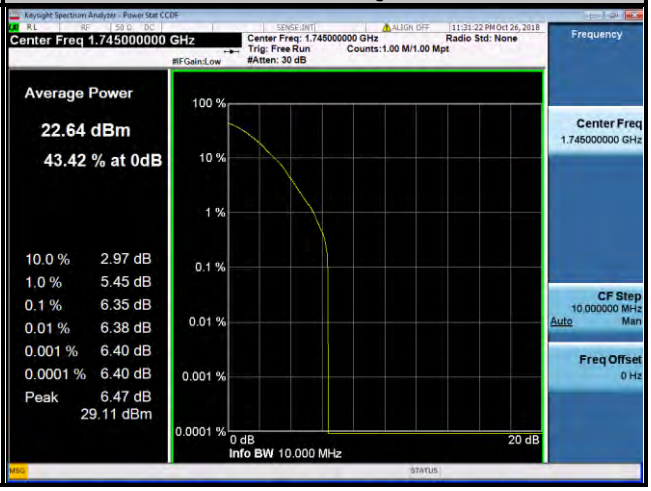
Spectrum Plot of Worst Value	
5 MHz / 64QAM	10 MHz / 64QAM
	

LTE Band 17									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23755	706.5	3.61	5.06	6.17	23780	709.0	3.52	5.00	6.10
23790	710.0	3.63	5.08	6.12	23790	710.0	3.53	4.86	6.03
23825	713.5	3.59	5.36	6.72	23800	711.0	3.54	4.84	6.13

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

LTE Band 66									
Channel Bandwidth: 1.4 MHz					Channel Bandwidth: 3 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131979	1710.7	3.81	5.05	6.11	131987	1711.5	3.60	5.07	6.19
132322	1745.0	3.83	5.26	6.26	132322	1745.0	3.62	5.28	6.38
132665	1779.3	3.78	5.49	6.53	132657	1778.5	3.56	5.23	6.29

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

LTE Band 66									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131997	1712.5	3.60	5.12	6.24	132022	1715.0	3.51	4.91	6.10
132322	1745.0	3.60	5.32	6.47	132322	1745.0	3.55	5.12	6.35
132647	1777.5	3.57	4.86	5.89	132622	1775.0	3.51	4.79	5.94

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