FCC Test Report

(Part 27 – WCDMA B4, LTE B4/B7/B12/B13/B17/B38/B41)

Report No.:	RFBGTL-WTW-P22020475-8
FCC ID:	APYHRO00314
Received Date:	Feb. 19, 2022
Test Date:	Apr. 25 ~ Apr. 29, 2022
Issued Date:	May 30, 2022
Applicant:	SHARP Corporation Mobile Communication BU
Address:	2-13-1 Iida Hachihonmatsu Higashi-hiroshima City, Hiroshima 730-0192, Japan
Manufacturer:	Sharp Corporation
Address:	1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN
FCC Registration / Designation Number:	788550 / TW0003
Test Location (2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration / Designation Number:	281270 / TW0032

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBGTL-WTW-P22020475-8	Original release	May 30, 2022

1 Certificate of Conformity

Product:	Smart Phone
Brand:	SHARP
Sample Status:	Engineering sample
Applicant:	SHARP Corporation Mobile Communication BU
Manufacturer:	Sharp Corporation
Test Date:	Apr. 25 ~ Apr. 29, 2022
Standards:	FCC Part 27, Subpart C, H, L, M

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 : Celine Chou , **Date:** May 30, 2022

Celine Chou / Senior Specialist

Approved by : Jeremy Lin , **Date:** May 30, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

For WCDMA Band 4, LTE Band 4

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (d)	Equivalent Isotropically 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	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53 (h)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
27.50 (d)(5)	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53 (h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53 (h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -33.20dB at 33.88MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For LTE Band 7, LTE Band 38, LTE Band 41

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (h)(2)	Equivalent Isotropically 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	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53 (m)(4)(6)	Channel Edge / Out of Band Emission Measurements	Pass	Meet the requirement of limit.
--	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53 (m)(4)(6)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53 (m)(4)(6)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -19.40dB at 5186.00MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For LTE Band 12, LTE Band 17

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (c)	Equivalent 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	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53 (g)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
--	Peak To Average Ratio	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 -44.40dB at 1415.00MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For LTE Band 13

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(b)	Equivalent 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	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(c)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
--	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53(c)(f)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(c)(f))	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -14.20dB at 1564.00MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038B	MY60180018	Feb. 18, 2022	Feb. 17, 2023
Spectrum Analyzer KEYSIGHT	N9020B	MY60110513	Dec. 24, 2021	Dec. 23, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-1214	Oct. 27, 2021	Oct. 26, 2022
HORN Antenna RF SPIN	DRH18-E	210101A18E	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	9170-1049	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC330N	980798	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980809	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980786	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM-(9000+3000+1000)	201244+ 201232+ 210103	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM-NM-(9000+3000+500)	201251+ 201249+ 201248	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM-(5000+3000+2000)	201261+201258+201255	Jan. 17, 2022	Jan. 16, 2023
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFA-515BSN	NA	NA	NA
Turn Table Max-Full	MFT-201SS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208676	NA	NA
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Jan. 03, 2022	Jan. 02, 2023
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 02, 2021	Jun. 01, 2022
DC power supply Keysight	U8002A	MY56330015	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Feb. 16, 2022	Feb. 15, 2023

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in WM Chamber 9.

3 General Information

3.1 General Description of EUT

Product	Smart Phone	
Brand	SHARP	
Sample Status	Engineering sample	
Power Supply Rating	3.87Vdc (Battery) 5Vdc (Adapter)	
Modulation Type	WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM, 64QAM	
Operating Frequency	WCDMA Band 4	1712.4MHz ~ 1752.6MHz
	LTE Band 4 (Channel Bandwidth 1.4MHz)	1710.7MHz ~ 1754.3MHz
	LTE Band 4 (Channel Bandwidth 3MHz)	1711.5MHz ~ 1753.5MHz
	LTE Band 4 (Channel Bandwidth 5MHz)	1712.5MHz ~ 1752.5MHz
	LTE Band 4 (Channel Bandwidth 10MHz)	1715.0MHz ~ 1750.0MHz
	LTE Band 4 (Channel Bandwidth 15MHz)	1717.5MHz ~ 1747.5MHz
	LTE Band 4 (Channel Bandwidth 20MHz)	1720.0MHz ~ 1745.0MHz
	LTE Band 7 (Channel Bandwidth 5MHz)	2502.5MHz ~ 2567.5MHz
	LTE Band 7 (Channel Bandwidth 10MHz)	2505.0MHz ~ 2565.0MHz
	LTE Band 7 (Channel Bandwidth 15MHz)	2507.5MHz ~ 2562.5MHz
	LTE Band 7 (Channel Bandwidth 20MHz)	2510.0MHz ~ 2560.0MHz
	LTE Band 12 (Channel Bandwidth 1.4MHz)	699.7MHz ~ 715.3MHz
	LTE Band 12 (Channel Bandwidth 3MHz)	700.5MHz ~ 714.5MHz
	LTE Band 12 (Channel Bandwidth 5MHz)	701.5MHz ~ 713.5MHz
	LTE Band 12 (Channel Bandwidth 10MHz)	704.0MHz ~ 711.0MHz
	LTE Band 13 (Channel Bandwidth 5MHz)	779.5MHz ~ 784.5MHz
	LTE Band 13 (Channel Bandwidth 10MHz)	782.0MHz
	LTE Band 17 (Channel Bandwidth 5MHz)	706.5MHz ~ 713.5MHz
	LTE Band 17 (Channel Bandwidth 10MHz)	709.0MHz ~ 711.0MHz
	LTE Band 38 (Channel Bandwidth 5MHz)	2572.5MHz ~ 2617.5MHz
	LTE Band 38 (Channel Bandwidth 10MHz)	2575.0MHz ~ 2615.0MHz
	LTE Band 38 (Channel Bandwidth 15MHz)	2577.5MHz ~ 2612.5MHz
	LTE Band 38 (Channel Bandwidth 20MHz)	2580.0MHz ~ 2610.0MHz
	LTE Band 41 (Channel Bandwidth 5MHz)	2498.5MHz ~ 2687.5MHz
	LTE Band 41 (Channel Bandwidth 10MHz)	2501.0MHz ~ 2685.0 MHz
	LTE Band 41 (Channel Bandwidth 15MHz)	2503.5MHz ~ 2682.5MHz
	LTE Band 41 (Channel Bandwidth 20MHz)	2506.0MHz ~ 2680.0 MHz

Max. EIRP Power	WCDMA Band 4	68.707mW (18.37dBm)		
		QPSK	16QAM	64QAM
	LTE Band 4 (Channel Bandwidth 1.4MHz)	48.084mW (16.82dBm)	41.210mW (16.15dBm)	32.584mW (15.13dBm)
	LTE Band 4 (Channel Bandwidth 3MHz)	48.306mW (16.84dBm)	40.458mW (16.07dBm)	32.137mW (15.07dBm)
	LTE Band 4 (Channel Bandwidth 5MHz)	47.315mW (16.75dBm)	40.832mW (16.11dBm)	31.915mW (15.04dBm)
	LTE Band 4 (Channel Bandwidth 10MHz)	47.753mW (16.79dBm)	40.272mW (16.05dBm)	32.063mW (15.06dBm)
	LTE Band 4 (Channel Bandwidth 15MHz)	48.084mW (16.82dBm)	40.551mW (16.08dBm)	32.285mW (15.09dBm)
	LTE Band 4 (Channel Bandwidth 20MHz)	62.373mW (17.95dBm)	52.845mW (17.23dBm)	41.879mW (16.22dBm)
	LTE Band 7 (Channel Bandwidth 5MHz)	102.094mW (20.09dBm)	79.983mW (19.03dBm)	59.841mW (17.77dBm)
	LTE Band 7 (Channel Bandwidth 10MHz)	102.802mW (20.12dBm)	80.724mW (19.07dBm)	60.256mW (17.80dBm)
	LTE Band 7 (Channel Bandwidth 15MHz)	103.039mW (20.13dBm)	80.538mW (19.06dBm)	60.674mW (17.83dBm)
	LTE Band 7 (Channel Bandwidth 20MHz)	133.352mW (21.25dBm)	104.232mW (20.18dBm)	78.705mW (18.96dBm)
	LTE Band 38 (Channel Bandwidth 5MHz)	112.460mW (20.51dBm)	91.411mW (19.61dBm)	69.024mW (18.39dBm)
	LTE Band 38 (Channel Bandwidth 10MHz)	111.686mW (20.48dBm)	90.573mW (19.57dBm)	68.865mW (18.38dBm)
	LTE Band 38 (Channel Bandwidth 15MHz)	111.173mW (20.46dBm)	91.411mW (19.61dBm)	68.391mW (18.35dBm)
	LTE Band 38 (Channel Bandwidth 20MHz)	155.955mW (21.93dBm)	118.577mW (20.74dBm)	89.536mW (19.52dBm)
	LTE Band 41 (Channel Bandwidth 5MHz)	123.027mW (20.90dBm)	101.391mW (20.06dBm)	76.208mW (18.82dBm)
	LTE Band 41 (Channel Bandwidth 10MHz)	123.310mW (20.91dBm)	102.565mW (20.11dBm)	76.384mW (18.83dBm)
	LTE Band 41 (Channel Bandwidth 15MHz)	123.310mW (20.91dBm)	101.625mW (20.07dBm)	77.090mW (18.87dBm)
	LTE Band 41 (Channel Bandwidth 20MHz)	171.396mW (22.34dBm)	142.561mW (21.54dBm)	107.647mW (20.32dBm)

		QPSK	16QAM	64QAM
Max. ERP Power	LTE Band 12 (Channel Bandwidth 1.4MHz)	30.761mW (14.88dBm)	25.177mW (14.01dBm)	19.498mW (12.90dBm)
	LTE Band 12 (Channel Bandwidth 3MHz)	30.761mW (14.88dBm)	25.410mW (14.05dBm)	19.724mW (12.95dBm)
	LTE Band 12 (Channel Bandwidth 5MHz)	30.620mW (14.86dBm)	25.351mW (14.04dBm)	19.634mW (12.93dBm)
	LTE Band 12 (Channel Bandwidth 10MHz)	40.087mW (16.03dBm)	33.266mW (15.22dBm)	25.468mW (14.06dBm)
	LTE Band 13 (Channel Bandwidth 5MHz)	32.810mW (15.16dBm)	27.990mW (14.47dBm)	22.233mW (13.47dBm)
	LTE Band 13 (Channel Bandwidth 10MHz)	41.687mW (16.20dBm)	35.237mW (15.47dBm)	27.990mW (14.47dBm)
	LTE Band 17 (Channel Bandwidth 5MHz)	31.696mW (15.01dBm)	27.102mW (14.33dBm)	20.137mW (13.04dBm)
	LTE Band 17 (Channel Bandwidth 10MHz)	40.926mW (16.12dBm)	33.343mW (15.23dBm)	26.182mW (14.18dBm)

Emission Designator	WCDMA Band 4	4M18F9W		
		QPSK	16QAM	64QAM
	LTE Band 4 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W	1M09D7W
	LTE Band 4 (Channel Bandwidth 3MHz)	2M70G7D	2M70D7W	2M71D7W
	LTE Band 4 (Channel Bandwidth 5MHz)	4M50G7D	4M50D7W	4M50D7W
	LTE Band 4 (Channel Bandwidth 10MHz)	8M98G7D	8M99D7W	9M00D7W
	LTE Band 4 (Channel Bandwidth 15MHz)	13M5G7D	13M5D7W	13M5D7W
	LTE Band 4 (Channel Bandwidth 20MHz)	18M0G7D	18M0D7W	18M0D7W
	LTE Band 7 (Channel Bandwidth 5MHz)	4M50G7D	4M50D7W	4M50D7W
	LTE Band 7 (Channel Bandwidth 10MHz)	8M99G7D	8M98D7W	8M99D7W
	LTE Band 7 (Channel Bandwidth 15MHz)	13M5G7D	13M5D7W	13M5D7W
	LTE Band 7 (Channel Bandwidth 20MHz)	18M0G7D	18M0D7W	18M0D7W
	LTE Band 12 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W	1M09D7W
	LTE Band 12 (Channel Bandwidth 3MHz)	2M70G7D	2M70D7W	2M70D7W
	LTE Band 12 (Channel Bandwidth 5MHz)	4M50G7D	4M50D7W	4M50D7W
	LTE Band 12 (Channel Bandwidth 10MHz)	8M98G7D	8M98D7W	8M98D7W
	LTE Band 13 (Channel Bandwidth 5MHz)	4M50G7D	4M50D7W	4M50D7W
	LTE Band 13 (Channel Bandwidth 10MHz)	8M96G7D	8M96D7W	8M96D7W
	LTE Band 17 (Channel Bandwidth 5MHz)	4M50G7D	4M50D7W	4M50D7W
	LTE Band 17 (Channel Bandwidth 10MHz)	8M97G7D	8M97D7W	8M98D7W
	LTE Band 38 (Channel Bandwidth 5MHz)	4M50G7D	4M49D7W	4M50D7W
	LTE Band 38 (Channel Bandwidth 10MHz)	8M98G7D	8M98D7W	8M98D7W
	LTE Band 38 (Channel Bandwidth 15MHz)	13M5G7D	13M5D7W	13M5D7W
	LTE Band 38 (Channel Bandwidth 20MHz)	18M0G7D	18M0D7W	18M0D7W
	LTE Band 41 (Channel Bandwidth 5MHz)	4M49G7D	4M49D7W	4M50D7W
	LTE Band 41 (Channel Bandwidth 10MHz)	8M98G7D	8M98D7W	8M99D7W
	LTE Band 41 (Channel Bandwidth 15MHz)	13M5G7D	13M5D7W	13M5D7W
	LTE Band 41 (Channel Bandwidth 20MHz)	18M0G7D	18M0D7W	18M0D7W
Antenna Type	Refer to note			
Antenna Connector	Refer to note			
Accessory Device	NA			
Cable Supplied	NA			

Note:

1. The EUT uses following devices.

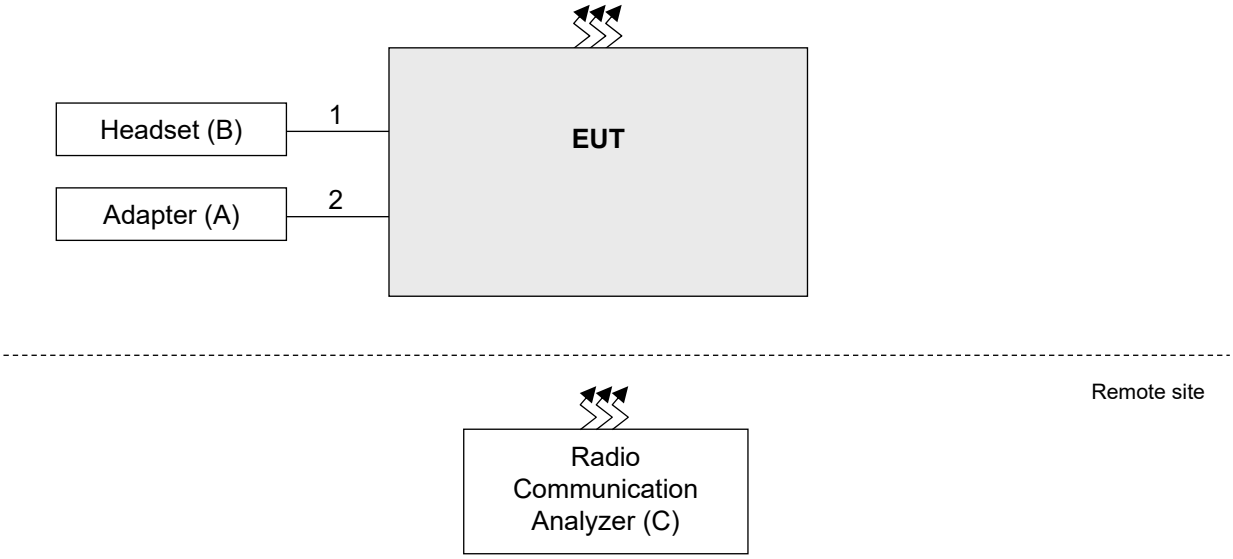
Product	Brand	Model	Description
Adapter (Support unit)	Salom	XN-2QC25	Input: 100-240Vac, 50/60Hz, 0.2A Output: 5.0Vdc, 800mA
Battery	-	-	3.87Vdc, Rated 4870mAh (18.9Wh), Typ. 5000mAh (19.4Wh)
Headset (Support unit)	Ambibio	AB-HI02JS	-
USB cable (Support unit)	Luxshare-ICT	L6KU2007-CS-H	0.95m shielded cable without core

2. The antenna information is listed as below.

Ant. No.	Type	Connector	Gain (dBi)										
			GSM 850	GSM 1900	WCDMA B2 / LTE B2	WCDMA B4 / LTE B4	WCDMA B5 / LTE B5	LTE B7	LTE B12	LTE B13	LTE B17	LTE B38	LTE B41
1	PIFA	IPEX	-	-2.9	-2.9	-4.9	-	-1.8	-	-	-	-1.9	-1.9
3	PIFA	IPEX	-4.8	-	-	-	-4.8	-	-5.6	-5.3	-5.6	-	-

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.2 Configuration of System under 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. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Adapter	Salom	XN-2QC25	N/A	N/A	Provided by client
B.	Headset	Ambibio	AB-HI02JS	N/A	N/A	Provided by client
C.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item C acted as a communication partner to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Earphone Cable	1	1.1	N	0	Provided by client
2.	USB Cable	1	1	Y	0	Provided by client

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	Radiated Emission
WCDMA Band 4	Z-plane
LTE Band 4	Z-plane
LTE Band 7	Z-plane
LTE Band 12	Z-plane
LTE Band 13	Z-plane
LTE Band 17	Z-plane
LTE Band 38	Z-plane
LTE Band 41	Z-plane

WCDMA Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Modulation Characteristics	1312 to 1513	1413 (1732.6MHz)	WCDMA, HSDPA, HSUPA
-	Frequency Stability	1312 to 1513	1312 (1712.4MHz), 1513 (1752.6MHz)	WCDMA
-	Occupied Bandwidth	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Band Edge	1312 to 1513	1312 (1712.4MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Peak To Average Ratio	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Conducted Emission	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA, HSDPA, HSUPA
-	Radiated Emission	1312 to 1513	1312 (1712.4MHz), 1413 (1732.6MHz), 1513 (1752.6MHz)	WCDMA

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	EIRP	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1 Half Full
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1 Half Full
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	20050 to 20300	20175 (1732.5MHz)	20MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	19957 to 20393	19957 (1710.7MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	Full
		19965 to 20385	19965 (1711.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	Full
		19975 to 20375	19975 (1712.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	Full
		20000 to 20350	20000 (1715.0MHz), 20350 (1750.0MHz)	10MHz	QPSK	Full
		20025 to 20325	20025 (1717.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	Full
		20050 to 20300	20050 (1720.0MHz), 20300 (1745.0MHz)	20MHz	QPSK	Full
-	Emission Bandwidth	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK / 16QAM	Full
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK / 16QAM	Full
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK / 16QAM	Full
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK / 16QAM	Full
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK / 16QAM	Full
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK / 16QAM	Full

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	Band Edge	19957 to 20393	19957 (1710.7MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1 Half Full
		19965 to 20385	19965 (1711.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	1 Half Full
		19975 to 20375	19975 (1712.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1 Half Full
		20000 to 20350	20000 (1715.0MHz), 20350 (1750.0MHz)	10MHz	QPSK	1 Half Full
		20025 to 20325	20025 (1717.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	1 Half Full
		20050 to 20300	20050 (1720.0MHz), 20300 (1745.0MHz)	20MHz	QPSK	1 Half Full
-	Peak To Average Ratio	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK / 16QAM / 64QAM	1

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	Conducted Emission	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	1
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK	1
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	1
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK	1
-	Radiated Emission	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK	1

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

LTE Band 7

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	EIRP	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1 Half Full
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	20850 to 21350	21100 (2535.0MHz)	20MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	20775 to 21425	20775 (2502.5MHz), 21425 (2567.5MHz)	5MHz	QPSK	Full
		20800 to 21400	20800 (2505.0MHz), 21400 (2565.0MHz)	10MHz	QPSK	Full
		20825 to 21375	20825 (2507.5MHz), 21375 (2562.5MHz)	15MHz	QPSK	Full
		20850 to 21350	20850 (2510.0MHz), 21350 (2560.0MHz)	20MHz	QPSK	Full
-	Emission Bandwidth	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK / 16QAM / 64QAM	Full
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15MHz	QPSK / 16QAM / 64QAM	Full
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK / 16QAM / 64QAM	Full
-	Out-of-Band Emissions	20775 to 21425	20775 (2502.5MHz), 21425 (2567.5MHz)	5MHz	QPSK	1 Half Full
		20800 to 21400	20800 (2505.0MHz), 21400 (2565.0MHz)	10MHz	QPSK	1 Half Full
		20825 to 21375	20825 (2507.5MHz), 21375 (2562.5MHz)	15MHz	QPSK	1 Half Full
		20850 to 21350	20850 (2510.0MHz), 21350 (2560.0MHz)	20MHz	QPSK	1 Half Full

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	Peak to Average Ratio	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK / 16QAM / 64QAM	1
-	Conducted Emission	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK	1
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10MHz	QPSK	1
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15MHz	QPSK	1
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK	1
-	Radiated Emission	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK	1
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK	1

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

LTE Band 12

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	ERP	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1 Half Full
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1 Half Full
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0 MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	23060 to 23130	23095 (707.5MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	23017 to 23173	23017 (699.7MHz), 23173 (715.3MHz)	1.4MHz	QPSK	Full
		23025 to 23165	23025 (700.5MHz), 23165 (714.5MHz)	3MHz	QPSK	Full
		23035 to 23155	23035 (701.5MHz), 23155 (713.5MHz)	5MHz	QPSK	Full
		23060 to 23130	23060 (704.0MHz), 23130 (711.0MHz)	10MHz	QPSK	Full
-	Emission Bandwidth	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	Full
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK / 16QAM / 64QAM	Full
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK / 16QAM / 64QAM	Full
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
-	Band Edge	23017 to 23173	23017 (699.7MHz), 23173 (715.3MHz)	1.4MHz	QPSK	1 Half Full
		23025 to 23165	23025 (700.5MHz), 23165 (714.5MHz)	3MHz	QPSK	1 Half Full
		23035 to 23155	23035 (701.5MHz), 23155 (713.5MHz)	5MHz	QPSK	1 Half Full
		23060 to 23130	23060 (704.0MHz), 23130 (711.0MHz)	10MHz	QPSK	1 Half Full

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	Peak to Average Ratio	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1
-	Conducted Emission	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK	1
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK	1
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK	1
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0MHz)	10MHz	QPSK	1
-	Radiated Emission	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK	1
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK	1
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0MHz)	10MHz	QPSK	1

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

LTE Band 13

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		23230	23230 (782.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	23230	23230 (782.0MHz),	10MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	23205 to 23255	23205 (779.5MHz), 23255 (784.5MHz)	5MHz	QPSK	Full
		23230	23230 (782.0MHz),	10MHz	QPSK	Full
-	Emission Bandwidth	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK / 16QAM / 64QAM	Full
		23230	23230 (782.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
-	Band Edge	23205 to 23255	23205 (779.5MHz), 23255 (784.5MHz)	5MHz	QPSK	1 Half Full
		23230	23230 (782.0MHz)	10MHz	QPSK	1 Half Full
-	Peak to Average Ratio	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1
		23230	23230 (782.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1
-	Conducted Emission	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK	1
		23230	23230 (782.0MHz)	10MHz	QPSK	1
-	Radiated Emission	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK	1
		23230	23230 (782.0MHz)	10MHz	QPSK	1

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

LTE Band 17

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	ERP	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	23780 to 23800	23790 (710.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	23755 to 23825	23755 (706.5MHz), 23825 (713.5MHz)	5MHz	QPSK	Full
		23780 to 23800	23780 (709.0MHz), 23800 (711.0MHz)	10MHz	QPSK	Full
-	Emission Bandwidth	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK / 16QAM / 64QAM	Full
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
-	Band Edge	23755 to 23825	23755 (706.5MHz), 23825 (713.5MHz)	5MHz	QPSK	1 Half Full
		23780 to 23800	23780 (709.0MHz), 23800 (711.0MHz)	10MHz	QPSK	1 Half Full
-	Peak to Average Ratio	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1
-	Conducted Emission	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK	1
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK	1
-	Radiated Emission	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK	1
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK	1

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521-1 Section 6.6.3.1.4.1, choose the 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

LTE Band 38

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	EIRP	37775 to 38225	37775 (2572.5MHz), 38000 (2595.0MHz), 38225 (2617.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		37800 to 38200	37800 (2575.0MHz), 38000 (2595.0MHz), 38200 (2615.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
		37825 to 38175	37825 (2577.5MHz), 38000 (2595.0MHz), 38175 (2612.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1 Half Full
		37850 to 38150	37850 (2580.0MHz), 38000 (2595.0MHz), 38150 (2610.0MHz)	20MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	37850 to 38150	38000 (2595.0MHz)	20MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	37775 to 38225	37775 (2572.5MHz), 38225 (2617.5MHz)	5MHz	QPSK	Full
		37800 to 38200	37800 (2575.0MHz), 38200 (2615.0MHz)	10MHz	QPSK	Full
		37825 to 38175	37825 (2577.5MHz), 38175 (2612.5MHz)	15MHz	QPSK	Full
		37850 to 38150	37850 (2580.0MHz), 38150 (2610.0MHz)	20MHz	QPSK	Full
-	Emission Bandwidth	37775 to 38225	37775 (2572.5MHz), 38000 (2595.0MHz), 38225 (2617.5MHz)	5MHz	QPSK / 16QAM / 64QAM	Full
		37800 to 38200	37800 (2575.0MHz), 38000 (2595.0MHz), 38200 (2615.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
		37825 to 38175	37825 (2577.5MHz), 38000 (2595.0MHz), 38175 (2612.5MHz)	15MHz	QPSK / 16QAM / 64QAM	Full
		37850 to 38150	37850 (2580.0MHz), 38000 (2595.0MHz), 38150 (2610.0MHz)	20MHz	QPSK / 16QAM / 64QAM	Full
-	Out-of-Band Emissions	37775 to 38225	37775 (2572.5MHz), 38225 (2617.5MHz)	5MHz	QPSK	1 Half Full
		37800 to 38200	37800 (2575.0MHz), 38200 (2615.0MHz)	10MHz	QPSK	1 Half Full
		37825 to 38175	37825 (2577.5MHz), 38175 (2612.5MHz)	15MHz	QPSK	1 Half Full
		37850 to 38150	37850 (2580.0MHz), 38150 (2610.0MHz)	20MHz	QPSK	1 Half Full

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	Peak to Average Ratio	37775 to 38225	37775 (2572.5MHz), 38000 (2595.0MHz), 38225 (2617.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1
		37800 to 38200	37800 (2575.0MHz), 38000 (2595.0MHz), 38200 (2615.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1
		37825 to 38175	37825 (2577.5MHz), 38000 (2595.0MHz), 38175 (2612.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1
		37850 to 38150	37850 (2580.0MHz), 38000 (2595.0MHz), 38150 (2610.0MHz)	20MHz	QPSK / 16QAM / 64QAM	1
-	Conducted Emission	37775 to 38225	37775 (2572.5MHz), 38000 (2595.0MHz), 38225 (2617.5MHz)	5MHz	QPSK	1
		37800 to 38200	37800 (2575.0MHz), 38000 (2595.0MHz), 38200 (2615.0MHz)	10MHz	QPSK	1
		37825 to 38175	37825 (2577.5MHz), 38000 (2595.0MHz), 38175 (2612.5MHz)	15MHz	QPSK	1
		37850 to 38150	37850 (2580.0MHz), 38000 (2595.0MHz), 38150 (2610.0MHz)	20MHz	QPSK	1
-	Radiated Emission	37775 to 38225	37775 (2572.5MHz), 38000 (2595.0MHz), 38225 (2617.5MHz)	5MHz	QPSK	1
		37850 to 38150	37850 (2580.0MHz), 38000 (2595.0MHz), 38150 (2610.0MHz)	20MHz	QPSK	1

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

LTE Band 41

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	EIRP	39675 to 41565	39675 (2498.5MHz), 40620 (2593.0MHz), 41565 (2687.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		39700 to 41540	39700 (2501.0MHz), 40620 (2593.0MHz), 41540 (2685.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
		39725 to 41515	39725 (2503.5MHz), 40620 (2593.0MHz), 41515 (2682.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1 Half Full
		39750 to 41490	39750 (2506.0MHz), 40620 (2593.0MHz), 41490 (2680.0MHz)	20MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	39750 to 41490	40620 (2593.0MHz)	20MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	39675 to 41565	39675 (2498.5MHz), 41565 (2687.5MHz)	5MHz	QPSK	Full
		39700 to 41540	39700 (2501.0MHz), 41540 (2685.0MHz)	10MHz	QPSK	Full
		39725 to 41515	39725 (2503.5MHz), 41515 (2682.5MHz)	15MHz	QPSK	Full
		39750 to 41490	39750 (2506.0MHz), 41490 (2680.0MHz)	20MHz	QPSK	Full
-	Emission Bandwidth	39675 to 41565	39675 (2498.5MHz), 40620 (2593.0MHz), 41565 (2687.5MHz)	5MHz	QPSK / 16QAM / 64QAM	Full
		39700 to 41540	39700 (2501.0MHz), 40620 (2593.0MHz), 41540 (2685.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
		39725 to 41515	39725 (2503.5MHz), 40620 (2593.0MHz), 41515 (2682.5MHz)	15MHz	QPSK / 16QAM / 64QAM	Full
		39750 to 41490	39750 (2506.0MHz), 40620 (2593.0MHz), 41490 (2680.0MHz)	20MHz	QPSK / 16QAM / 64QAM	Full
-	Out-of-Band Emissions	39675 to 41565	39675 (2498.5MHz), 41565 (2687.5MHz)	5MHz	QPSK	1 Half Full
		39700 to 41540	39700 (2501.0MHz), 41540 (2685.0MHz)	10MHz	QPSK	1 Half Full
		39725 to 41515	39725 (2503.5MHz), 41515 (2682.5MHz)	15MHz	QPSK	1 Half Full
		39750 to 41490	39750 (2506.0MHz), 41490 (2680.0MHz)	20MHz	QPSK	1 Half Full

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	Peak to Average Ratio	39675 to 41565	39675 (2498.5MHz), 40620 (2593.0MHz), 41565 (2687.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1
		39700 to 41540	39700 (2501.0MHz), 40620 (2593.0MHz), 41540 (2685.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1
		39725 to 41515	39725 (2503.5MHz), 40620 (2593.0MHz), 41515 (2682.5MHz)	15MHz	QPSK / 16QAM / 64QAM	1
		39750 to 41490	39750 (2506.0MHz), 40620 (2593.0MHz), 41490 (2680.0MHz)	20MHz	QPSK / 16QAM / 64QAM	1
-	Conducted Emission	39675 to 41565	39675 (2498.5MHz), 40620 (2593.0MHz), 41565 (2687.5MHz)	5MHz	QPSK	1
		39700 to 41540	39700 (2501.0MHz), 40620 (2593.0MHz), 41540 (2685.0MHz)	10MHz	QPSK	1
		39725 to 41515	39725 (2503.5MHz), 40620 (2593.0MHz), 41515 (2682.5MHz)	15MHz	QPSK	1
		39750 to 41490	39750 (2506.0MHz), 40620 (2593.0MHz), 41490 (2680.0MHz)	20MHz	QPSK	1
-	Radiated Emission	39675 to 41565	39675 (2498.5MHz), 40620 (2593.0MHz), 41565 (2687.5MHz)	5MHz	QPSK	1
		39750 to 41490	39750 (2506.0MHz), 40620 (2593.0MHz), 41490 (2680.0MHz)	20MHz	QPSK	1

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP / ERP	25deg. C, 60%RH	3.87Vdc	Willy Cheng
Modulation Characteristics	25deg. C, 60%RH	3.87Vdc	Willy Cheng
Frequency Stability	25deg. C, 60%RH	3.87Vdc	Willy Cheng
Occupied Bandwidth	25deg. C, 60%RH	3.87Vdc	Willy Cheng
Band Edge	25deg. C, 60%RH	3.87Vdc	Willy Cheng
Peak To Average Ratio	25deg. C, 60%RH	3.87Vdc	Willy Cheng
Conducted Emission	25deg. C, 60%RH	3.87Vdc	Willy Cheng
Radiated Emission	27deg. C, 66%RH	120Vac, 60Hz	Tim Chen

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 and References

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

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

For WCMDA Band 4, LTE Band 4:
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.

For LTE Band 7, LTE Band 38, LTE Band 41:
Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

For LTE Band 12, LTE Band 17:
Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.
Portable stations (hand-held devices) 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.

For LTE Band 13:
Control stations and mobile stations in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.
Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

4.1.2 Test Procedures

Conducted Power Measurement:

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

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$EIRP = P_{Meas} + G_T$

$ERP = P_{Meas} + G_T - 2.15$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

Conducted Power Measurement:

4.1.4 Test Results

Conducted Output Power (dBm)

Band	WCDMA IV		
TX Channel	1312	1413	1513
Rx Channel	1537	1638	1738
Frequency	1712.4	1732.6	1752.6
RMC 12.2K	22.54	23.27	22.81
HSDPA Subtest-1	21.79	22.15	21.94
HSDPA Subtest-2	20.53	20.59	21.48
HSDPA Subtest-3	20.09	20.68	21.33
HSDPA Subtest-4	20.05	21.47	21.49
HSUPA Subtest-1	20.51	21.11	21.89
HSUPA Subtest-2	18.50	19.07	19.90
HSUPA Subtest-3	20.55	20.09	20.95
HSUPA Subtest-4	18.53	19.10	19.89
HSUPA Subtest-5	20.50	21.10	21.90

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	22.69	22.85	22.68
		1	50	22.45	22.61	22.43
		1	99	22.41	22.47	22.42
		50	0	21.61	21.77	21.59
		50	25	21.49	21.65	21.47
		50	50	21.46	21.62	21.44
		100	0	21.47	21.63	21.45
20M	16QAM	1	0	21.97	22.13	21.95
		1	50	21.69	21.85	21.67
		1	99	21.59	21.75	21.57
		50	0	20.54	20.70	20.52
		50	25	20.50	20.66	20.48
		50	50	20.45	20.61	20.43
		100	0	20.41	20.55	20.42
20M	64QAM	1	0	20.96	21.12	20.94
		1	50	20.91	21.07	20.89
		1	99	20.66	20.82	20.64
		50	0	19.53	19.69	19.51
		50	25	19.48	19.64	19.46
		50	50	19.42	19.58	19.45
		100	0	19.51	19.67	19.49

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	21.55	21.72	21.55
		1	37	21.35	21.47	21.33
		1	74	21.33	21.34	21.32
		36	0	20.47	20.58	20.44
		36	19	20.38	20.55	20.34
		36	39	20.33	20.51	20.32
		75	0	20.35	20.53	20.33
15M	16QAM	1	0	20.85	20.98	20.78
		1	37	20.51	20.67	20.57
		1	74	20.46	20.55	20.39
		36	0	19.40	19.50	19.36
		36	19	19.40	19.48	19.35
		36	39	19.33	19.47	19.31
		75	0	19.31	19.41	19.32
15M	64QAM	1	0	19.76	19.99	19.83
		1	37	19.75	19.95	19.77
		1	74	19.51	19.64	19.46
		36	0	18.42	18.57	18.39
		36	19	18.34	18.51	18.33
		36	39	18.32	18.47	18.32
		75	0	18.34	18.49	18.33

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	21.52	21.69	21.56
		1	24	21.31	21.51	21.32
		1	49	21.32	21.31	21.31
		25	0	20.51	20.57	20.46
		25	12	20.32	20.50	20.37
		25	25	20.32	20.51	20.34
		50	0	20.32	20.51	20.31
10M	16QAM	1	0	20.82	20.95	20.79
		1	24	20.59	20.74	20.51
		1	49	20.42	20.64	20.40
		25	0	19.41	19.60	19.32
		25	12	19.31	19.48	19.36
		25	25	19.32	19.46	19.32
		50	0	19.32	19.36	19.32
10M	64QAM	1	0	19.85	19.94	19.84
		1	24	19.71	19.96	19.70
		1	49	19.48	19.66	19.46
		25	0	18.40	18.54	18.35
		25	12	18.34	18.51	18.36
		25	25	18.31	18.42	18.35
		50	0	18.37	18.48	18.34

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	21.56	21.65	21.50
		1	12	21.33	21.45	21.32
		1	24	21.31	21.33	21.31
		12	0	20.41	20.62	20.47
		12	6	20.35	20.46	20.34
		12	13	20.35	20.46	20.32
		25	0	20.32	20.50	20.31
5M	16QAM	1	0	20.87	21.01	20.81
		1	12	20.56	20.70	20.47
		1	24	20.41	20.63	20.46
		12	0	19.40	19.51	19.38
		12	6	19.33	19.55	19.32
		12	13	19.32	19.48	19.33
		25	0	19.31	19.37	19.32
5M	64QAM	1	0	19.79	19.94	19.76
		1	12	19.80	19.91	19.74
		1	24	19.47	19.66	19.50
		12	0	18.42	18.49	18.35
		12	6	18.35	18.52	18.32
		12	13	18.33	18.40	18.32
		25	0	18.36	18.50	18.39

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	21.49	21.74	21.50
		1	7	21.32	21.46	21.32
		1	14	21.32	21.31	21.31
		8	0	20.41	20.67	20.43
		8	3	20.39	20.46	20.34
		8	7	20.35	20.43	20.31
		15	0	20.31	20.43	20.31
3M	16QAM	1	0	20.79	20.97	20.85
		1	7	20.54	20.69	20.47
		1	14	20.40	20.63	20.37
		8	0	19.44	19.60	19.41
		8	3	19.32	19.55	19.36
		8	7	19.31	19.45	19.33
		15	0	19.31	19.37	19.31
3M	64QAM	1	0	19.79	19.97	19.75
		1	7	19.76	19.88	19.76
		1	14	19.54	19.68	19.54
		8	0	18.42	18.54	18.34
		8	3	18.31	18.45	18.31
		8	7	18.31	18.43	18.35
		15	0	18.38	18.48	18.36

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	21.49	21.70	21.46
		1	2	21.48	21.56	21.36
		1	5	21.31	21.44	21.45
		3	0	21.69	21.72	21.53
		3	1	21.53	21.60	21.34
		3	3	21.39	21.62	21.41
		6	0	20.48	20.55	20.36
1.4M	16QAM	1	0	20.92	21.05	20.94
		1	2	20.65	20.86	20.69
		1	5	20.48	20.74	20.50
		3	0	20.55	20.74	20.45
		3	1	20.50	20.62	20.40
		3	3	20.45	20.60	20.50
		6	0	19.40	19.48	19.31
1.4M	64QAM	1	0	19.94	20.03	19.91
		1	2	19.85	20.03	19.83
		1	5	19.53	19.90	19.56
		3	0	19.52	19.73	19.46
		3	1	19.51	19.62	19.44
		3	3	19.31	19.45	19.36
		6	0	18.53	18.75	18.54

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	22.74	23.05	22.68
		1	50	22.61	22.62	22.55
		1	99	22.56	22.57	22.50
		50	0	21.75	21.76	21.69
		50	25	21.65	21.66	21.59
		50	50	21.60	21.61	21.54
		100	0	21.64	21.65	21.58
20M	16QAM	1	0	21.97	21.98	21.91
		1	50	21.80	21.81	21.74
		1	99	21.76	21.77	21.70
		50	0	20.74	20.75	20.68
		50	25	20.71	20.72	20.65
		50	50	20.67	20.68	20.61
		100	0	20.72	20.73	20.66
20M	64QAM	1	0	20.75	20.76	20.69
		1	50	20.61	20.62	20.55
		1	99	20.54	20.55	20.48
		50	0	19.77	19.78	19.71
		50	25	19.68	19.69	19.62
		50	50	19.64	19.65	19.58
		100	0	19.65	19.66	19.59

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	21.63	21.93	21.53
		1	37	21.44	21.52	21.43
		1	74	21.40	21.44	21.38
		36	0	20.61	20.63	20.51
		36	19	20.52	20.52	20.47
		36	39	20.49	20.47	20.39
		75	0	20.52	20.47	20.39
15M	16QAM	1	0	20.77	20.86	20.77
		1	37	20.62	20.68	20.63
		1	74	20.62	20.63	20.55
		36	0	19.58	19.60	19.56
		36	19	19.53	19.55	19.50
		36	39	19.47	19.49	19.49
		75	0	19.62	19.54	19.56
15M	64QAM	1	0	19.63	19.61	19.49
		1	37	19.44	19.51	19.44
		1	74	19.36	19.44	19.37
		36	0	18.62	18.61	18.61
		36	19	18.49	18.53	18.47
		36	39	18.54	18.51	18.44
		75	0	18.47	18.47	18.43

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	21.60	21.92	21.54
		1	24	21.45	21.42	21.43
		1	49	21.41	21.42	21.32
		25	0	20.65	20.63	20.54
		25	12	20.51	20.52	20.45
		25	25	20.41	20.49	20.41
		50	0	20.44	20.54	20.40
10M	16QAM	1	0	20.87	20.82	20.79
		1	24	20.62	20.68	20.55
		1	49	20.62	20.63	20.60
		25	0	19.62	19.61	19.50
		25	12	19.61	19.54	19.48
		25	25	19.49	19.48	19.48
		50	0	19.61	19.59	19.54
10M	64QAM	1	0	19.60	19.58	19.53
		1	24	19.44	19.45	19.39
		1	49	19.41	19.35	19.32
		25	0	18.57	18.60	18.57
		25	12	18.49	18.49	18.43
		25	25	18.50	18.48	18.42
		50	0	18.47	18.49	18.47

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	21.63	21.89	21.58
		1	12	21.51	21.42	21.43
		1	24	21.43	21.40	21.35
		12	0	20.57	20.63	20.58
		12	6	20.51	20.51	20.44
		12	13	20.42	20.49	20.36
		25	0	20.50	20.52	20.39
5M	16QAM	1	0	20.83	20.80	20.79
		1	12	20.62	20.68	20.60
		1	24	20.57	20.58	20.57
		12	0	19.54	19.55	19.53
		12	6	19.55	19.61	19.46
		12	13	19.49	19.51	19.45
		25	0	19.55	19.59	19.48
5M	64QAM	1	0	19.57	19.56	19.53
		1	12	19.44	19.48	19.41
		1	24	19.34	19.37	19.31
		12	0	18.67	18.64	18.60
		12	6	18.49	18.57	18.50
		12	13	18.51	18.48	18.48
		25	0	18.55	18.55	18.49

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	23.73	23.78	23.58
		1	24	23.58	23.63	23.43
		1	49	23.47	23.52	23.32
		25	0	22.72	22.77	22.57
		25	12	22.56	22.61	22.41
		25	25	22.54	22.59	22.39
		50	0	22.63	22.68	22.48
10M	16QAM	1	0	22.92	22.97	22.77
		1	24	22.79	22.84	22.64
		1	49	22.70	22.75	22.55
		25	0	21.69	21.74	21.54
		25	12	21.65	21.70	21.50
		25	25	21.63	21.68	21.48
		50	0	21.65	21.70	21.50
10M	64QAM	1	0	21.76	21.81	21.61
		1	24	21.72	21.77	21.57
		1	49	21.67	21.72	21.52
		25	0	20.73	20.78	20.58
		25	12	20.66	20.71	20.51
		25	25	20.63	20.68	20.48
		50	0	20.68	20.73	20.53

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	22.59	22.61	22.47
		1	12	22.47	22.45	22.33
		1	24	22.30	22.34	22.22
		12	0	21.57	21.63	21.38
		12	6	21.37	21.44	21.27
		12	13	21.38	21.42	21.24
		25	0	21.48	21.51	21.36
5M	16QAM	1	0	21.76	21.79	21.66
		1	12	21.61	21.69	21.48
		1	24	21.51	21.62	21.41
		12	0	20.56	20.56	20.39
		12	6	20.49	20.51	20.32
		12	13	20.43	20.58	20.34
		25	0	20.47	20.55	20.30
5M	64QAM	1	0	20.66	20.68	20.46
		1	12	20.52	20.58	20.46
		1	24	20.55	20.55	20.38
		12	0	19.60	19.58	19.46
		12	6	19.53	19.51	19.32
		12	13	19.50	19.51	19.29
		25	0	19.52	19.58	19.42

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	22.57	22.63	22.41
		1	7	22.48	22.44	22.23
		1	14	22.28	22.35	22.13
		8	0	21.61	21.61	21.39
		8	3	21.37	21.49	21.27
		8	7	21.44	21.39	21.27
		15	0	21.44	21.56	21.31
3M	16QAM	1	0	21.72	21.80	21.57
		1	7	21.59	21.64	21.48
		1	14	21.50	21.59	21.36
		8	0	20.56	20.59	20.43
		8	3	20.51	20.50	20.31
		8	7	20.46	20.55	20.33
		15	0	20.53	20.57	20.33
3M	64QAM	1	0	20.56	20.70	20.43
		1	7	20.61	20.64	20.46
		1	14	20.49	20.57	20.34
		8	0	19.60	19.63	19.48
		8	3	19.46	19.59	19.40
		8	7	19.44	19.50	19.34
		15	0	19.50	19.63	19.36

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	22.51	22.63	22.46
		1	2	22.36	22.44	22.15
		1	5	22.17	22.33	22.19
		3	0	22.51	22.52	22.38
		3	1	22.41	22.32	22.30
		3	3	22.39	22.41	22.20
		6	0	21.44	21.50	21.27
1.4M	16QAM	1	0	21.64	21.76	21.61
		1	2	21.63	21.60	21.36
		1	5	21.44	21.46	21.37
		3	0	21.52	21.53	21.29
		3	1	21.44	21.52	21.25
		3	3	21.34	21.46	21.25
		6	0	20.39	20.52	20.18
1.4M	64QAM	1	0	20.54	20.56	20.41
		1	2	20.53	20.64	20.28
		1	5	20.57	20.54	20.19
		3	0	20.45	20.65	20.32
		3	1	20.37	20.52	20.27
		3	3	20.35	20.48	20.19
		6	0	19.50	19.52	19.21

LTE Band 13				
BW	MCS Index	RB Size	RB Offset	Low
		Channel		23230
		Frequency (MHz)		782
10M	QPSK	1	0	23.65
		1	24	23.57
		1	49	23.44
		25	0	22.71
		25	12	22.63
		25	25	22.61
		50	0	22.68
10M	16QAM	1	0	22.92
		1	24	22.73
		1	49	22.59
		25	0	21.70
		25	12	21.61
		25	25	21.58
		50	0	21.64
10M	64QAM	1	0	21.92
		1	24	21.90
		1	49	21.62
		25	0	20.68
		25	12	20.58
		25	25	20.51
		50	0	20.77

LTE Band 13						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	22.61	22.56	22.58
		1	12	22.47	22.54	22.55
		1	24	22.36	22.34	22.39
		12	0	21.65	21.71	21.70
		12	6	21.61	21.57	21.54
		12	13	21.52	21.59	21.60
		25	0	21.68	21.68	21.61
5M	16QAM	1	0	21.84	21.92	21.90
		1	12	21.65	21.66	21.68
		1	24	21.50	21.50	21.58
		12	0	20.70	20.69	20.70
		12	6	20.57	20.61	20.51
		12	13	20.49	20.57	20.54
		25	0	20.62	20.57	20.60
5M	64QAM	1	0	20.88	20.92	20.91
		1	12	20.80	20.89	20.83
		1	24	20.55	20.58	20.54
		12	0	19.60	19.63	19.64
		12	6	19.52	19.56	19.53
		12	13	19.47	19.47	19.48
		25	0	19.73	19.73	19.74

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23780	23790	23800
		Frequency (MHz)		709	710	711
10M	QPSK	1	0	23.73	23.87	23.66
		1	24	23.58	23.72	23.51
		1	49	23.50	23.64	23.43
		25	0	22.53	22.67	22.46
		25	12	22.49	22.63	22.42
		25	25	22.47	22.61	22.40
		50	0	22.51	22.65	22.44
10M	16QAM	1	0	22.47	22.61	22.69
		1	24	22.84	22.98	22.77
		1	49	22.68	22.82	22.61
		25	0	21.55	21.69	21.48
		25	12	21.44	21.58	21.37
		25	25	21.41	21.55	21.34
		50	0	21.51	21.65	21.44
10M	64QAM	1	0	21.79	21.93	21.72
		1	24	21.67	21.81	21.60
		1	49	21.58	21.72	21.51
		25	0	20.63	20.77	20.56
		25	12	20.60	20.74	20.53
		25	25	20.58	20.72	20.51
		50	0	20.52	20.66	20.45

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23755	23790	23825
		Frequency (MHz)		706.5	710	713.5
5M	QPSK	1	0	22.59	22.76	22.50
		1	12	22.39	22.56	22.34
		1	24	22.37	22.48	22.27
		12	0	21.35	21.47	21.30
		12	6	21.37	21.49	21.28
		12	13	21.36	21.50	21.30
		25	0	21.32	21.52	21.33
5M	16QAM	1	0	21.97	22.08	21.90
		1	12	21.71	21.88	21.59
		1	24	21.55	21.69	21.50
		12	0	20.38	20.58	20.32
		12	6	20.24	20.45	20.25
		12	13	20.21	20.38	20.23
		25	0	20.39	20.45	20.31
5M	64QAM	1	0	20.62	20.79	20.62
		1	12	20.56	20.70	20.46
		1	24	20.41	20.62	20.39
		12	0	19.49	19.59	19.46
		12	6	19.50	19.59	19.36
		12	13	19.40	19.60	19.33
		25	0	19.42	19.48	19.31

LTE Band 38						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		37850	38000	38150
		Frequency (MHz)		2580	2595	2610
20M	QPSK	1	0	23.68	23.70	23.83
		1	50	23.29	23.41	23.52
		1	99	23.25	23.37	23.48
		50	0	22.26	22.38	22.49
		50	25	22.23	22.35	22.46
		50	50	22.13	22.25	22.36
		100	0	22.20	22.32	22.43
20M	16QAM	1	0	22.41	22.53	22.64
		1	50	22.24	22.36	22.47
		1	99	22.20	22.32	22.43
		50	0	21.18	21.30	21.41
		50	25	21.15	21.27	21.38
		50	50	21.11	21.23	21.34
		100	0	21.16	21.28	21.39
20M	64QAM	1	0	21.19	21.31	21.42
		1	50	21.15	21.17	21.28
		1	99	21.13	21.15	21.26
		50	0	20.21	20.33	20.44
		50	25	20.12	20.24	20.35
		50	50	20.18	20.20	20.31
		100	0	20.19	20.21	20.32

LTE Band 38						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		37825	38000	38175
		Frequency (MHz)		2577.5	2595	2612.5
15M	QPSK	1	0	22.15	22.34	22.36
		1	37	22.11	22.31	22.33
		1	74	22.11	22.18	22.34
		36	0	21.16	21.22	21.35
		36	19	21.13	21.23	21.32
		36	39	21.01	21.08	21.23
		75	0	21.05	21.22	21.33
15M	16QAM	1	0	21.31	21.35	21.51
		1	37	21.04	21.16	21.37
		1	74	21.02	21.16	21.26
		36	0	20.03	20.17	20.22
		36	19	20.02	20.15	20.20
		36	39	20.01	20.04	20.14
		75	0	20.06	20.16	20.23
15M	64QAM	1	0	20.08	20.16	20.25
		1	37	20.01	20.04	20.12
		1	74	20.01	20.04	20.15
		36	0	19.09	19.22	19.33
		36	19	19.01	19.07	19.21
		36	39	19.01	19.03	19.13
		75	0	19.08	19.05	19.19

LTE Band 38						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		37800	38000	38200
		Frequency (MHz)		2575	2595	2615
10M	QPSK	1	0	22.12	22.31	22.37
		1	24	22.19	22.26	22.36
		1	49	22.05	22.24	22.38
		25	0	21.07	21.26	21.32
		25	12	21.10	21.24	21.29
		25	25	21.09	21.08	21.23
		50	0	21.02	21.13	21.23
10M	16QAM	1	0	21.30	21.39	21.47
		1	24	21.13	21.18	21.31
		1	49	21.10	21.13	21.29
		25	0	20.08	20.18	20.26
		25	12	20.03	20.07	20.22
		25	25	20.03	20.08	20.19
		50	0	20.03	20.13	20.22
10M	64QAM	1	0	20.03	20.20	20.28
		1	24	20.05	20.10	20.16
		1	49	20.05	20.01	20.11
		25	0	19.10	19.21	19.32
		25	12	19.02	19.12	19.22
		25	25	19.08	19.08	19.16
		50	0	19.04	19.05	19.12

LTE Band 38						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		37775	38000	38225
		Frequency (MHz)		2572.5	2595	2617.5
5M	QPSK	1	0	22.12	22.24	22.41
		1	12	22.15	22.26	22.34
		1	24	22.13	22.18	22.37
		12	0	21.15	21.23	21.35
		12	6	21.08	21.24	21.26
		12	13	21.08	21.15	21.21
		25	0	21.01	21.21	21.28
5M	16QAM	1	0	21.23	21.43	21.51
		1	12	21.12	21.21	21.28
		1	24	21.02	21.17	21.27
		12	0	20.09	20.14	20.29
		12	6	20.01	20.12	20.26
		12	13	20.04	20.13	20.16
		25	0	20.06	20.13	20.28
5M	64QAM	1	0	20.07	20.13	20.29
		1	12	20.07	20.04	20.12
		1	24	20.04	20.02	20.08
		12	0	19.09	19.16	19.28
		12	6	19.04	19.05	19.20
		12	13	19.10	19.01	19.13
		25	0	19.02	19.07	19.13

LTE Band 41						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		39750	40620	41490
		Frequency (MHz)		2506	2593	2680
20M	QPSK	1	0	24.24	23.95	24.20
		1	50	24.16	23.97	24.11
		1	99	24.08	23.99	24.03
		50	0	23.22	22.93	23.17
		50	25	23.17	22.98	23.12
		50	50	23.14	22.95	23.09
		100	0	23.20	22.91	23.15
20M	16QAM	1	0	23.44	23.15	23.39
		1	50	23.27	22.98	23.22
		1	99	23.23	22.94	23.18
		50	0	22.21	21.92	22.16
		50	25	22.18	21.99	22.13
		50	50	22.14	21.95	22.09
		100	0	22.19	22.00	22.14
20M	64QAM	1	0	22.22	21.93	22.17
		1	50	22.08	21.99	22.03
		1	99	22.06	21.97	22.01
		50	0	21.24	20.95	21.19
		50	25	21.15	20.96	21.10
		50	50	21.11	20.92	21.06
		100	0	21.12	20.93	21.07

LTE Band 41						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		39725	40620	41515
		Frequency (MHz)		2503.5	2593	2682.5
15M	QPSK	1	0	22.81	22.62	22.65
		1	37	22.68	22.59	22.53
		1	74	22.65	22.56	22.65
		36	0	21.82	21.60	21.64
		36	19	21.72	21.62	21.59
		36	39	21.64	21.61	21.54
		75	0	21.77	21.63	21.56
15M	16QAM	1	0	21.97	21.73	21.84
		1	37	21.85	21.65	21.63
		1	74	21.79	21.53	21.62
		36	0	20.80	20.54	20.63
		36	19	20.70	20.65	20.60
		36	39	20.70	20.60	20.51
		75	0	20.72	20.57	20.57
15M	64QAM	1	0	20.77	20.60	20.61
		1	37	20.65	20.63	20.63
		1	74	20.63	20.62	20.52
		36	0	19.83	19.60	19.60
		36	19	19.71	19.51	19.53
		36	39	19.71	19.59	19.52
		75	0	19.64	19.55	19.51

LTE Band 41						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		39700	40620	41540
		Frequency (MHz)		2501	2593	2685
10M	QPSK	1	0	22.81	22.57	22.64
		1	24	22.76	22.63	22.52
		1	49	22.60	22.63	22.58
		25	0	21.73	21.53	21.56
		25	12	21.68	21.61	21.51
		25	25	21.71	21.59	21.52
		50	0	21.73	21.65	21.63
10M	16QAM	1	0	22.01	21.78	21.84
		1	24	21.85	21.55	21.60
		1	49	21.74	21.56	21.65
		25	0	20.81	20.54	20.56
		25	12	20.76	20.51	20.59
		25	25	20.66	20.58	20.64
		50	0	20.73	20.57	20.55
10M	64QAM	1	0	20.73	20.65	20.56
		1	24	20.66	20.56	20.64
		1	49	20.58	20.61	20.64
		25	0	19.74	19.52	19.58
		25	12	19.70	19.58	19.63
		25	25	19.65	19.64	19.64
		50	0	19.72	19.60	19.61

LTE Band 41						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		39675	40620	41565
		Frequency (MHz)		2498.5	2593	2687.5
5M	QPSK	1	0	22.80	22.55	22.64
		1	12	22.71	22.64	22.53
		1	24	22.59	22.64	22.61
		12	0	21.76	21.65	21.60
		12	6	21.69	21.60	21.58
		12	13	21.67	21.64	21.65
		25	0	21.77	21.54	21.55
5M	16QAM	1	0	21.96	21.79	21.82
		1	12	21.78	21.63	21.61
		1	24	21.80	21.58	21.63
		12	0	20.81	20.55	20.59
		12	6	20.69	20.54	20.54
		12	13	20.69	20.58	20.56
		25	0	20.71	20.53	20.54
5M	64QAM	1	0	20.72	20.51	20.59
		1	12	20.62	20.54	20.56
		1	24	20.60	20.51	20.64
		12	0	19.78	19.53	19.63
		12	6	19.69	19.61	19.53
		12	13	19.61	19.53	19.54
		25	0	19.62	19.53	19.52

EIRP / ERP Power (dBm)

Band	WCDMA IV		
TX Channel	1312	1413	1513
Rx Channel	1537	1638	1738
Frequency	1712.4	1732.6	1752.6
RMC 12.2K	17.64	18.37	17.91
HSDPA Subtest-1	16.89	17.25	17.04
HSDPA Subtest-2	15.63	15.69	16.58
HSDPA Subtest-3	15.19	15.78	16.43
HSDPA Subtest-4	15.15	16.57	16.59
HSUPA Subtest-1	15.61	16.21	16.99
HSUPA Subtest-2	13.60	14.17	15.00
HSUPA Subtest-3	15.65	15.19	16.05
HSUPA Subtest-4	13.63	14.20	14.99
HSUPA Subtest-5	15.60	16.20	17.00

*EIRP = Conducted + antenna gain (-4.90dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	17.79	17.95	17.78
		1	50	17.55	17.71	17.53
		1	99	17.51	17.57	17.52
		50	0	16.71	16.87	16.69
		50	25	16.59	16.75	16.57
		50	50	16.56	16.72	16.54
		100	0	16.57	16.73	16.55
20M	16QAM	1	0	17.07	17.23	17.05
		1	50	16.79	16.95	16.77
		1	99	16.69	16.85	16.67
		50	0	15.64	15.80	15.62
		50	25	15.60	15.76	15.58
		50	50	15.55	15.71	15.53
		100	0	15.51	15.65	15.52
20M	64QAM	1	0	16.06	16.22	16.04
		1	50	16.01	16.17	15.99
		1	99	15.76	15.92	15.74
		50	0	14.63	14.79	14.61
		50	25	14.58	14.74	14.56
		50	50	14.52	14.68	14.55
		100	0	14.61	14.77	14.59

*EIRP = Conducted + antenna gain (-4.90dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	16.65	16.82	16.65
		1	37	16.45	16.57	16.43
		1	74	16.43	16.44	16.42
		36	0	15.57	15.68	15.54
		36	19	15.48	15.65	15.44
		36	39	15.43	15.61	15.42
		75	0	15.45	15.63	15.43
15M	16QAM	1	0	15.95	16.08	15.88
		1	37	15.61	15.77	15.67
		1	74	15.56	15.65	15.49
		36	0	14.50	14.60	14.46
		36	19	14.50	14.58	14.45
		36	39	14.43	14.57	14.41
		75	0	14.41	14.51	14.42
15M	64QAM	1	0	14.86	15.09	14.93
		1	37	14.85	15.05	14.87
		1	74	14.61	14.74	14.56
		36	0	13.52	13.67	13.49
		36	19	13.44	13.61	13.43
		36	39	13.42	13.57	13.42
		75	0	13.44	13.59	13.43

*EIRP = Conducted + antenna gain (-4.90dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	16.62	16.79	16.66
		1	24	16.41	16.61	16.42
		1	49	16.42	16.41	16.41
		25	0	15.61	15.67	15.56
		25	12	15.42	15.60	15.47
		25	25	15.42	15.61	15.44
		50	0	15.42	15.61	15.41
10M	16QAM	1	0	15.92	16.05	15.89
		1	24	15.69	15.84	15.61
		1	49	15.52	15.74	15.50
		25	0	14.51	14.70	14.42
		25	12	14.41	14.58	14.46
		25	25	14.42	14.56	14.42
		50	0	14.42	14.46	14.42
10M	64QAM	1	0	14.95	15.04	14.94
		1	24	14.81	15.06	14.80
		1	49	14.58	14.76	14.56
		25	0	13.50	13.64	13.45
		25	12	13.44	13.61	13.46
		25	25	13.41	13.52	13.45
		50	0	13.47	13.58	13.44

*EIRP = Conducted + antenna gain (-4.90dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	16.66	16.75	16.60
		1	12	16.43	16.55	16.42
		1	24	16.41	16.43	16.41
		12	0	15.51	15.72	15.57
		12	6	15.45	15.56	15.44
		12	13	15.45	15.56	15.42
		25	0	15.42	15.60	15.41
5M	16QAM	1	0	15.97	16.11	15.91
		1	12	15.66	15.80	15.57
		1	24	15.51	15.73	15.56
		12	0	14.50	14.61	14.48
		12	6	14.43	14.65	14.42
		12	13	14.42	14.58	14.43
		25	0	14.41	14.47	14.42
5M	64QAM	1	0	14.89	15.04	14.86
		1	12	14.90	15.01	14.84
		1	24	14.57	14.76	14.60
		12	0	13.52	13.59	13.45
		12	6	13.45	13.62	13.42
		12	13	13.43	13.50	13.42
		25	0	13.46	13.60	13.49

*EIRP = Conducted + antenna gain (-4.90dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	16.59	16.84	16.60
		1	7	16.42	16.56	16.42
		1	14	16.42	16.41	16.41
		8	0	15.51	15.77	15.53
		8	3	15.49	15.56	15.44
		8	7	15.45	15.53	15.41
		15	0	15.41	15.53	15.41
3M	16QAM	1	0	15.89	16.07	15.95
		1	7	15.64	15.79	15.57
		1	14	15.50	15.73	15.47
		8	0	14.54	14.70	14.51
		8	3	14.42	14.65	14.46
		8	7	14.41	14.55	14.43
		15	0	14.41	14.47	14.41
3M	64QAM	1	0	14.89	15.07	14.85
		1	7	14.86	14.98	14.86
		1	14	14.64	14.78	14.64
		8	0	13.52	13.64	13.44
		8	3	13.41	13.55	13.41
		8	7	13.41	13.53	13.45
		15	0	13.48	13.58	13.46

*EIRP = Conducted + antenna gain (-4.90dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	16.59	16.80	16.56
		1	2	16.58	16.66	16.46
		1	5	16.41	16.54	16.55
		3	0	16.79	16.82	16.63
		3	1	16.63	16.70	16.44
		3	3	16.49	16.72	16.51
		6	0	15.58	15.65	15.46
1.4M	16QAM	1	0	16.02	16.15	16.04
		1	2	15.75	15.96	15.79
		1	5	15.58	15.84	15.60
		3	0	15.65	15.84	15.55
		3	1	15.60	15.72	15.50
		3	3	15.55	15.70	15.60
		6	0	14.50	14.58	14.41
1.4M	64QAM	1	0	15.04	15.13	15.01
		1	2	14.95	15.13	14.93
		1	5	14.63	15.00	14.66
		3	0	14.62	14.83	14.56
		3	1	14.61	14.72	14.54
		3	3	14.41	14.55	14.46
		6	0	13.63	13.85	13.64

*EIRP = Conducted + antenna gain (-4.90dBi)

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	20.94	21.25	20.88
		1	50	20.81	20.82	20.75
		1	99	20.76	20.77	20.70
		50	0	19.95	19.96	19.89
		50	25	19.85	19.86	19.79
		50	50	19.80	19.81	19.74
		100	0	19.84	19.85	19.78
20M	16QAM	1	0	20.17	20.18	20.11
		1	50	20.00	20.01	19.94
		1	99	19.96	19.97	19.90
		50	0	18.94	18.95	18.88
		50	25	18.91	18.92	18.85
		50	50	18.87	18.88	18.81
		100	0	18.92	18.93	18.86
20M	64QAM	1	0	18.95	18.96	18.89
		1	50	18.81	18.82	18.75
		1	99	18.74	18.75	18.68
		50	0	17.97	17.98	17.91
		50	25	17.88	17.89	17.82
		50	50	17.84	17.85	17.78
		100	0	17.85	17.86	17.79

*EIRP = Conducted + antenna gain (-1.80dBi)

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	19.83	20.13	19.73
		1	37	19.64	19.72	19.63
		1	74	19.60	19.64	19.58
		36	0	18.81	18.83	18.71
		36	19	18.72	18.72	18.67
		36	39	18.69	18.67	18.59
		75	0	18.72	18.67	18.59
15M	16QAM	1	0	18.97	19.06	18.97
		1	37	18.82	18.88	18.83
		1	74	18.82	18.83	18.75
		36	0	17.78	17.80	17.76
		36	19	17.73	17.75	17.70
		36	39	17.67	17.69	17.69
		75	0	17.82	17.74	17.76
15M	64QAM	1	0	17.83	17.81	17.69
		1	37	17.64	17.71	17.64
		1	74	17.56	17.64	17.57
		36	0	16.82	16.81	16.81
		36	19	16.69	16.73	16.67
		36	39	16.74	16.71	16.64
		75	0	16.67	16.67	16.63

*EIRP = Conducted + antenna gain (-1.80dBi)

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	19.80	20.12	19.74
		1	24	19.65	19.62	19.63
		1	49	19.61	19.62	19.52
		25	0	18.85	18.83	18.74
		25	12	18.71	18.72	18.65
		25	25	18.61	18.69	18.61
		50	0	18.64	18.74	18.60
10M	16QAM	1	0	19.07	19.02	18.99
		1	24	18.82	18.88	18.75
		1	49	18.82	18.83	18.80
		25	0	17.82	17.81	17.70
		25	12	17.81	17.74	17.68
		25	25	17.69	17.68	17.68
		50	0	17.81	17.79	17.74
10M	64QAM	1	0	17.80	17.78	17.73
		1	24	17.64	17.65	17.59
		1	49	17.61	17.55	17.52
		25	0	16.77	16.80	16.77
		25	12	16.69	16.69	16.63
		25	25	16.70	16.68	16.62
		50	0	16.67	16.69	16.67

*EIRP = Conducted + antenna gain (-1.80dBi)

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	19.83	20.09	19.78
		1	12	19.71	19.62	19.63
		1	24	19.63	19.60	19.55
		12	0	18.77	18.83	18.78
		12	6	18.71	18.71	18.64
		12	13	18.62	18.69	18.56
		25	0	18.70	18.72	18.59
5M	16QAM	1	0	19.03	19.00	18.99
		1	12	18.82	18.88	18.80
		1	24	18.77	18.78	18.77
		12	0	17.74	17.75	17.73
		12	6	17.75	17.81	17.66
		12	13	17.69	17.71	17.65
		25	0	17.75	17.79	17.68
5M	64QAM	1	0	17.77	17.76	17.73
		1	12	17.64	17.68	17.61
		1	24	17.54	17.57	17.51
		12	0	16.87	16.84	16.80
		12	6	16.69	16.77	16.70
		12	13	16.71	16.68	16.68
		25	0	16.75	16.75	16.69

*EIRP = Conducted + antenna gain (-1.80dBi)

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	15.98	16.03	15.83
		1	24	15.83	15.88	15.68
		1	49	15.72	15.77	15.57
		25	0	14.97	15.02	14.82
		25	12	14.81	14.86	14.66
		25	25	14.79	14.84	14.64
		50	0	14.88	14.93	14.73
10M	16QAM	1	0	15.17	15.22	15.02
		1	24	15.04	15.09	14.89
		1	49	14.95	15.00	14.80
		25	0	13.94	13.99	13.79
		25	12	13.90	13.95	13.75
		25	25	13.88	13.93	13.73
		50	0	13.90	13.95	13.75
10M	64QAM	1	0	14.01	14.06	13.86
		1	24	13.97	14.02	13.82
		1	49	13.92	13.97	13.77
		25	0	12.98	13.03	12.83
		25	12	12.91	12.96	12.76
		25	25	12.88	12.93	12.73
		50	0	12.93	12.98	12.78

*ERP = Conducted + antenna gain (-5.60dBi) - 2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	14.84	14.86	14.72
		1	12	14.72	14.70	14.58
		1	24	14.55	14.59	14.47
		12	0	13.82	13.88	13.63
		12	6	13.62	13.69	13.52
		12	13	13.63	13.67	13.49
		25	0	13.73	13.76	13.61
5M	16QAM	1	0	14.01	14.04	13.91
		1	12	13.86	13.94	13.73
		1	24	13.76	13.87	13.66
		12	0	12.81	12.81	12.64
		12	6	12.74	12.76	12.57
		12	13	12.68	12.83	12.59
		25	0	12.72	12.80	12.55
5M	64QAM	1	0	12.91	12.93	12.71
		1	12	12.77	12.83	12.71
		1	24	12.80	12.80	12.63
		12	0	11.85	11.83	11.71
		12	6	11.78	11.76	11.57
		12	13	11.75	11.76	11.54
		25	0	11.77	11.83	11.67

*ERP = Conducted + antenna gain (-5.60dBi) - 2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	14.82	14.88	14.66
		1	7	14.73	14.69	14.48
		1	14	14.53	14.60	14.38
		8	0	13.86	13.86	13.64
		8	3	13.62	13.74	13.52
		8	7	13.69	13.64	13.52
		15	0	13.69	13.81	13.56
3M	16QAM	1	0	13.97	14.05	13.82
		1	7	13.84	13.89	13.73
		1	14	13.75	13.84	13.61
		8	0	12.81	12.84	12.68
		8	3	12.76	12.75	12.56
		8	7	12.71	12.80	12.58
		15	0	12.78	12.82	12.58
3M	64QAM	1	0	12.81	12.95	12.68
		1	7	12.86	12.89	12.71
		1	14	12.74	12.82	12.59
		8	0	11.85	11.88	11.73
		8	3	11.71	11.84	11.65
		8	7	11.69	11.75	11.59
		15	0	11.75	11.88	11.61

*ERP = Conducted + antenna gain (-5.60dBi) - 2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	14.76	14.88	14.71
		1	2	14.61	14.69	14.40
		1	5	14.42	14.58	14.44
		3	0	14.76	14.77	14.63
		3	1	14.66	14.57	14.55
		3	3	14.64	14.66	14.45
		6	0	13.69	13.75	13.52
1.4M	16QAM	1	0	13.89	14.01	13.86
		1	2	13.88	13.85	13.61
		1	5	13.69	13.71	13.62
		3	0	13.77	13.78	13.54
		3	1	13.69	13.77	13.50
		3	3	13.59	13.71	13.50
		6	0	12.64	12.77	12.43
1.4M	64QAM	1	0	12.79	12.81	12.66
		1	2	12.78	12.89	12.53
		1	5	12.82	12.79	12.44
		3	0	12.70	12.90	12.57
		3	1	12.62	12.77	12.52
		3	3	12.60	12.73	12.44
		6	0	11.75	11.77	11.46

*ERP = Conducted + antenna gain (-5.60dBi) - 2.15

LTE Band 13				
BW	MCS Index	RB Size	RB Offset	Low
		Channel		23230
		Frequency (MHz)		782
10M	QPSK	1	0	16.20
		1	24	16.12
		1	49	15.99
		25	0	15.26
		25	12	15.18
		25	25	15.16
		50	0	15.23
10M	16QAM	1	0	15.47
		1	24	15.28
		1	49	15.14
		25	0	14.25
		25	12	14.16
		25	25	14.13
		50	0	14.19
10M	64QAM	1	0	14.47
		1	24	14.45
		1	49	14.17
		25	0	13.23
		25	12	13.13
		25	25	13.06
		50	0	13.32

*ERP = Conducted + antenna gain (-5.30dBi) - 2.15

LTE Band 13						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	15.16	15.11	15.13
		1	12	15.02	15.09	15.10
		1	24	14.91	14.89	14.94
		12	0	14.20	14.26	14.25
		12	6	14.16	14.12	14.09
		12	13	14.07	14.14	14.15
		25	0	14.23	14.23	14.16
5M	16QAM	1	0	14.39	14.47	14.45
		1	12	14.20	14.21	14.23
		1	24	14.05	14.05	14.13
		12	0	13.25	13.24	13.25
		12	6	13.12	13.16	13.06
		12	13	13.04	13.12	13.09
		25	0	13.17	13.12	13.15
5M	64QAM	1	0	13.43	13.47	13.46
		1	12	13.35	13.44	13.38
		1	24	13.10	13.13	13.09
		12	0	12.15	12.18	12.19
		12	6	12.07	12.11	12.08
		12	13	12.02	12.02	12.03
		25	0	12.28	12.28	12.29

*ERP = Conducted + antenna gain (-5.30dBi) - 2.15

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23780	23790	23800
		Frequency (MHz)		709	710	711
10M	QPSK	1	0	15.98	16.12	15.91
		1	24	15.83	15.97	15.76
		1	49	15.75	15.89	15.68
		25	0	14.78	14.92	14.71
		25	12	14.74	14.88	14.67
		25	25	14.72	14.86	14.65
		50	0	14.76	14.90	14.69
10M	16QAM	1	0	14.72	14.86	14.94
		1	24	15.09	15.23	15.02
		1	49	14.93	15.07	14.86
		25	0	13.80	13.94	13.73
		25	12	13.69	13.83	13.62
		25	25	13.66	13.80	13.59
		50	0	13.76	13.90	13.69
10M	64QAM	1	0	14.04	14.18	13.97
		1	24	13.92	14.06	13.85
		1	49	13.83	13.97	13.76
		25	0	12.88	13.02	12.81
		25	12	12.85	12.99	12.78
		25	25	12.83	12.97	12.76
		50	0	12.77	12.91	12.70

*ERP = Conducted + antenna gain (-5.60dBi) - 2.15

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23755	23790	23825
		Frequency (MHz)		706.5	710	713.5
5M	QPSK	1	0	14.84	15.01	14.75
		1	12	14.64	14.81	14.59
		1	24	14.62	14.73	14.52
		12	0	13.60	13.72	13.55
		12	6	13.62	13.74	13.53
		12	13	13.61	13.75	13.55
		25	0	13.57	13.77	13.58
5M	16QAM	1	0	14.22	14.33	14.15
		1	12	13.96	14.13	13.84
		1	24	13.80	13.94	13.75
		12	0	12.63	12.83	12.57
		12	6	12.49	12.70	12.50
		12	13	12.46	12.63	12.48
		25	0	12.64	12.70	12.56
5M	64QAM	1	0	12.87	13.04	12.87
		1	12	12.81	12.95	12.71
		1	24	12.66	12.87	12.64
		12	0	11.74	11.84	11.71
		12	6	11.75	11.84	11.61
		12	13	11.65	11.85	11.58
		25	0	11.67	11.73	11.56

*ERP = Conducted + antenna gain (-5.60dBi) - 2.15

LTE Band 38						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		37850	38000	38150
		Frequency (MHz)		2580	2595	2610
20M	QPSK	1	0	21.78	21.80	21.93
		1	50	21.39	21.51	21.62
		1	99	21.35	21.47	21.58
		50	0	20.36	20.48	20.59
		50	25	20.33	20.45	20.56
		50	50	20.23	20.35	20.46
		100	0	20.30	20.42	20.53
20M	16QAM	1	0	20.51	20.63	20.74
		1	50	20.34	20.46	20.57
		1	99	20.30	20.42	20.53
		50	0	19.28	19.40	19.51
		50	25	19.25	19.37	19.48
		50	50	19.21	19.33	19.44
		100	0	19.26	19.38	19.49
20M	64QAM	1	0	19.29	19.41	19.52
		1	50	19.25	19.27	19.38
		1	99	19.23	19.25	19.36
		50	0	18.31	18.43	18.54
		50	25	18.22	18.34	18.45
		50	50	18.28	18.30	18.41
		100	0	18.29	18.31	18.42

*EIRP = Conducted + antenna gain (-1.90dBi)

LTE Band 38						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		37825	38000	38175
		Frequency (MHz)		2577.5	2595	2612.5
15M	QPSK	1	0	20.25	20.44	20.46
		1	37	20.21	20.41	20.43
		1	74	20.21	20.28	20.44
		36	0	19.26	19.32	19.45
		36	19	19.23	19.33	19.42
		36	39	19.11	19.18	19.33
		75	0	19.15	19.32	19.43
15M	16QAM	1	0	19.41	19.45	19.61
		1	37	19.14	19.26	19.47
		1	74	19.12	19.26	19.36
		36	0	18.13	18.27	18.32
		36	19	18.12	18.25	18.30
		36	39	18.11	18.14	18.24
		75	0	18.16	18.26	18.33
15M	64QAM	1	0	18.18	18.26	18.35
		1	37	18.11	18.14	18.22
		1	74	18.11	18.14	18.25
		36	0	17.19	17.32	17.43
		36	19	17.11	17.17	17.31
		36	39	17.11	17.13	17.23
		75	0	17.18	17.15	17.29

*EIRP = Conducted + antenna gain (-1.90dBi)

LTE Band 38						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		37800	38000	38200
		Frequency (MHz)		2575	2595	2615
10M	QPSK	1	0	20.22	20.41	20.47
		1	24	20.29	20.36	20.46
		1	49	20.15	20.34	20.48
		25	0	19.17	19.36	19.42
		25	12	19.20	19.34	19.39
		25	25	19.19	19.18	19.33
		50	0	19.12	19.23	19.33
10M	16QAM	1	0	19.40	19.49	19.57
		1	24	19.23	19.28	19.41
		1	49	19.20	19.23	19.39
		25	0	18.18	18.28	18.36
		25	12	18.13	18.17	18.32
		25	25	18.13	18.18	18.29
		50	0	18.13	18.23	18.32
10M	64QAM	1	0	18.13	18.30	18.38
		1	24	18.15	18.20	18.26
		1	49	18.15	18.11	18.21
		25	0	17.20	17.31	17.42
		25	12	17.12	17.22	17.32
		25	25	17.18	17.18	17.26
		50	0	17.14	17.15	17.22

*EIRP = Conducted + antenna gain (-1.90dBi)

LTE Band 38						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		37775	38000	38225
		Frequency (MHz)		2572.5	2595	2617.5
5M	QPSK	1	0	20.22	20.34	20.51
		1	12	20.25	20.36	20.44
		1	24	20.23	20.28	20.47
		12	0	19.25	19.33	19.45
		12	6	19.18	19.34	19.36
		12	13	19.18	19.25	19.31
		25	0	19.11	19.31	19.38
5M	16QAM	1	0	19.33	19.53	19.61
		1	12	19.22	19.31	19.38
		1	24	19.12	19.27	19.37
		12	0	18.19	18.24	18.39
		12	6	18.11	18.22	18.36
		12	13	18.14	18.23	18.26
		25	0	18.16	18.23	18.38
5M	64QAM	1	0	18.17	18.23	18.39
		1	12	18.17	18.14	18.22
		1	24	18.14	18.12	18.18
		12	0	17.19	17.26	17.38
		12	6	17.14	17.15	17.30
		12	13	17.20	17.11	17.23
		25	0	17.12	17.17	17.23

*EIRP = Conducted + antenna gain (-1.90dBi)

LTE Band 41						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		39750	40620	41490
		Frequency (MHz)		2506	2593	2680
20M	QPSK	1	0	22.34	22.05	22.30
		1	50	22.26	22.07	22.21
		1	99	22.18	22.09	22.13
		50	0	21.32	21.03	21.27
		50	25	21.27	21.08	21.22
		50	50	21.24	21.05	21.19
		100	0	21.30	21.01	21.25
20M	16QAM	1	0	21.54	21.25	21.49
		1	50	21.37	21.08	21.32
		1	99	21.33	21.04	21.28
		50	0	20.31	20.02	20.26
		50	25	20.28	20.09	20.23
		50	50	20.24	20.05	20.19
		100	0	20.29	20.10	20.24
20M	64QAM	1	0	20.32	20.03	20.27
		1	50	20.18	20.09	20.13
		1	99	20.16	20.07	20.11
		50	0	19.34	19.05	19.29
		50	25	19.25	19.06	19.20
		50	50	19.21	19.02	19.16
		100	0	19.22	19.03	19.17

*EIRP = Conducted + antenna gain (-1.90dBi)

LTE Band 41						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		39725	40620	41515
		Frequency (MHz)		2503.5	2593	2682.5
15M	QPSK	1	0	20.91	20.72	20.75
		1	37	20.78	20.69	20.63
		1	74	20.75	20.66	20.75
		36	0	19.92	19.70	19.74
		36	19	19.82	19.72	19.69
		36	39	19.74	19.71	19.64
		75	0	19.87	19.73	19.66
15M	16QAM	1	0	20.07	19.83	19.94
		1	37	19.95	19.75	19.73
		1	74	19.89	19.63	19.72
		36	0	18.90	18.64	18.73
		36	19	18.80	18.75	18.70
		36	39	18.80	18.70	18.61
		75	0	18.82	18.67	18.67
15M	64QAM	1	0	18.87	18.70	18.71
		1	37	18.75	18.73	18.73
		1	74	18.73	18.72	18.62
		36	0	17.93	17.70	17.70
		36	19	17.81	17.61	17.63
		36	39	17.81	17.69	17.62
		75	0	17.74	17.65	17.61

*EIRP = Conducted + antenna gain (-1.90dBi)

LTE Band 41						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		39700	40620	41540
		Frequency (MHz)		2501	2593	2685
10M	QPSK	1	0	20.91	20.67	20.74
		1	24	20.86	20.73	20.62
		1	49	20.70	20.73	20.68
		25	0	19.83	19.63	19.66
		25	12	19.78	19.71	19.61
		25	25	19.81	19.69	19.62
		50	0	19.83	19.75	19.73
10M	16QAM	1	0	20.11	19.88	19.94
		1	24	19.95	19.65	19.70
		1	49	19.84	19.66	19.75
		25	0	18.91	18.64	18.66
		25	12	18.86	18.61	18.69
		25	25	18.76	18.68	18.74
		50	0	18.83	18.67	18.65
10M	64QAM	1	0	18.83	18.75	18.66
		1	24	18.76	18.66	18.74
		1	49	18.68	18.71	18.74
		25	0	17.84	17.62	17.68
		25	12	17.80	17.68	17.73
		25	25	17.75	17.74	17.74
		50	0	17.82	17.70	17.71

*EIRP = Conducted + antenna gain (-1.90dBi)

LTE Band 41						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		39675	40620	41565
		Frequency (MHz)		2498.5	2593	2687.5
5M	QPSK	1	0	20.90	20.65	20.74
		1	12	20.81	20.74	20.63
		1	24	20.69	20.74	20.71
		12	0	19.86	19.75	19.70
		12	6	19.79	19.70	19.68
		12	13	19.77	19.74	19.75
		25	0	19.87	19.64	19.65
5M	16QAM	1	0	20.06	19.89	19.92
		1	12	19.88	19.73	19.71
		1	24	19.90	19.68	19.73
		12	0	18.91	18.65	18.69
		12	6	18.79	18.64	18.64
		12	13	18.79	18.68	18.66
		25	0	18.81	18.63	18.64
5M	64QAM	1	0	18.82	18.61	18.69
		1	12	18.72	18.64	18.66
		1	24	18.70	18.61	18.74
		12	0	17.88	17.63	17.73
		12	6	17.79	17.71	17.63
		12	13	17.71	17.63	17.64
		25	0	17.72	17.63	17.62

*EIRP = Conducted + antenna gain (-1.90dBi)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

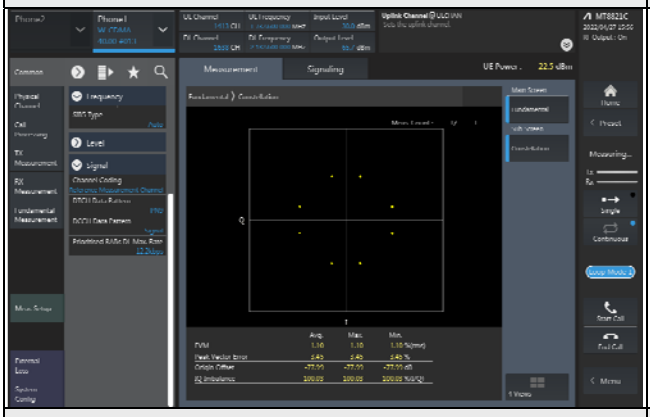
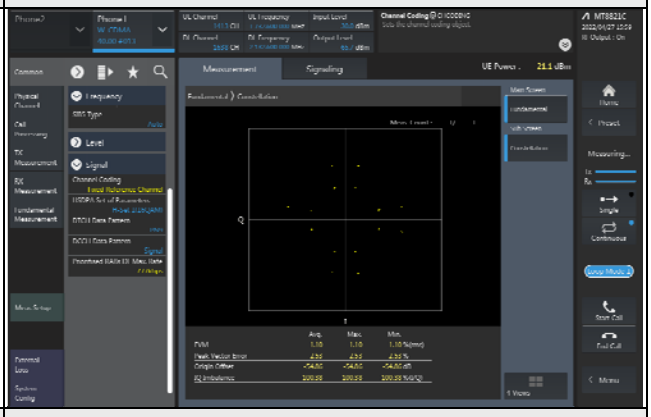
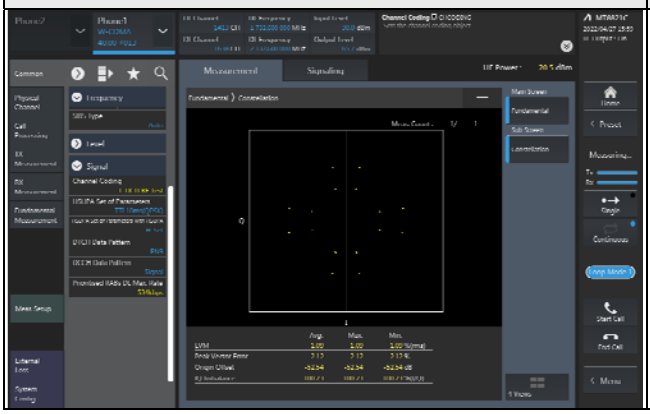
4.2.2 Test Procedure

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.

4.2.3 Test Setup

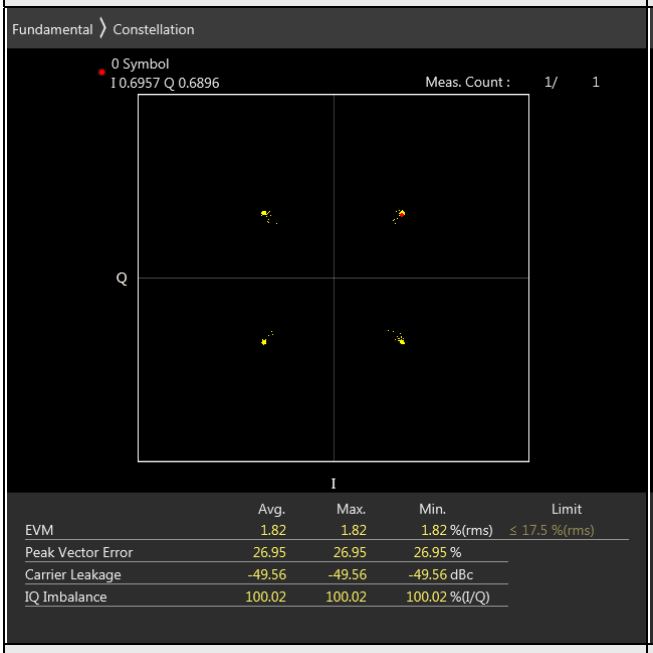
4.2.4 Test Results

WCDMA Band 4

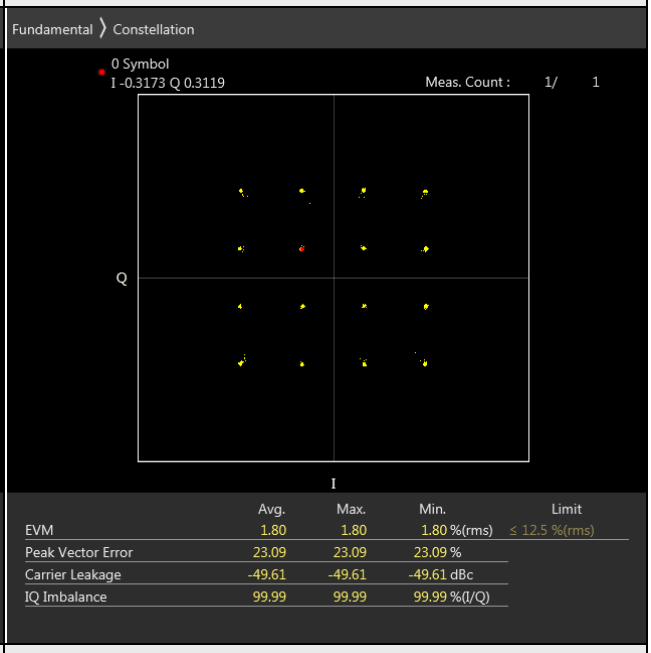
Spectrum Plot of Measurement Value	
Channel: 1413 / Frequency (MHz): 1732.6MHz	
WCDMA	HSDPA
	
HSUPA	
	

LTE Band 4

Spectrum Plot of Measurement Value	
Channel: 20175 / Frequency (MHz): 1732.5MHz	
QPSK	16QAM

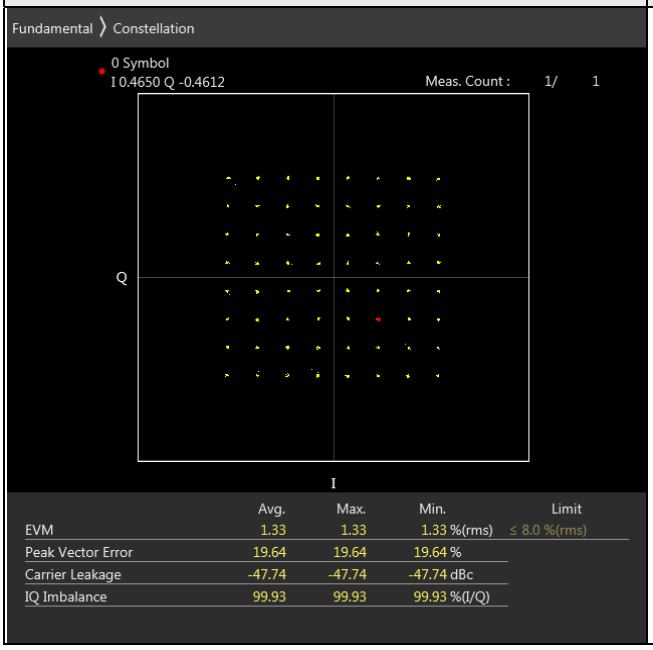


	Avg.	Max.	Min.	Limit
EVM	1.82	1.82	1.82 %(rms)	≤ 17.5 %(rms)
Peak Vector Error	26.95	26.95	26.95 %	
Carrier Leakage	-49.56	-49.56	-49.56 dBc	
IQ Imbalance	100.02	100.02	100.02 %(I/Q)	



	Avg.	Max.	Min.	Limit
EVM	1.80	1.80	1.80 %(rms)	≤ 12.5 %(rms)
Peak Vector Error	23.09	23.09	23.09 %	
Carrier Leakage	-49.61	-49.61	-49.61 dBc	
IQ Imbalance	99.99	99.99	99.99 %(I/Q)	

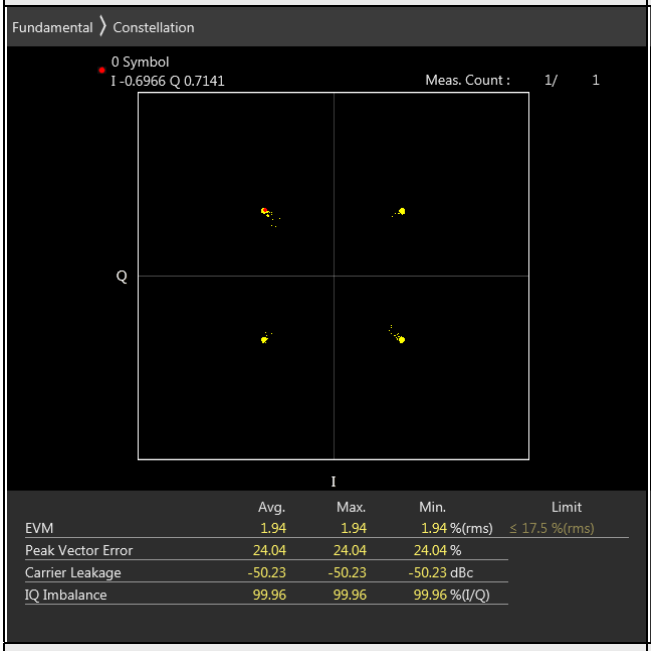
64QAM	



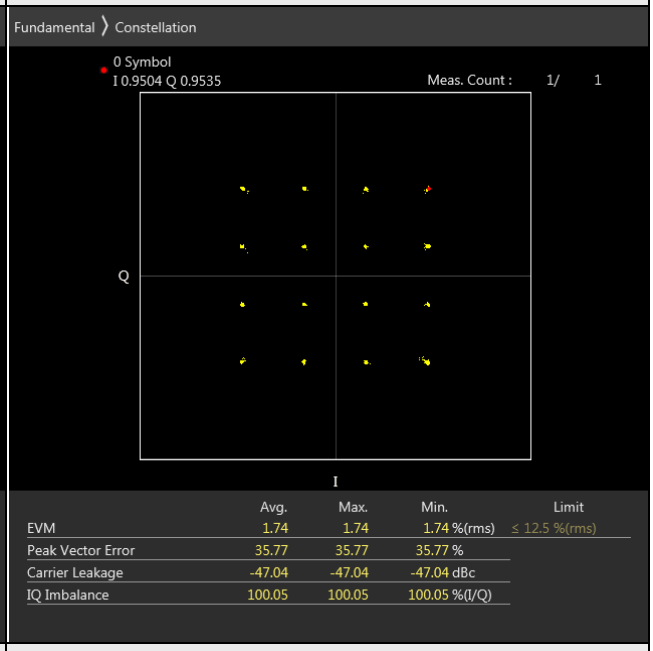
	Avg.	Max.	Min.	Limit
EVM	1.33	1.33	1.33 %(rms)	≤ 8.0 %(rms)
Peak Vector Error	19.64	19.64	19.64 %	
Carrier Leakage	-47.74	-47.74	-47.74 dBc	
IQ Imbalance	99.93	99.93	99.93 %(I/Q)	

LTE Band 7

Spectrum Plot of Measurement Value	
Channel: 21100 / Frequency (MHz): 2535.0MHz	
QPSK	16QAM

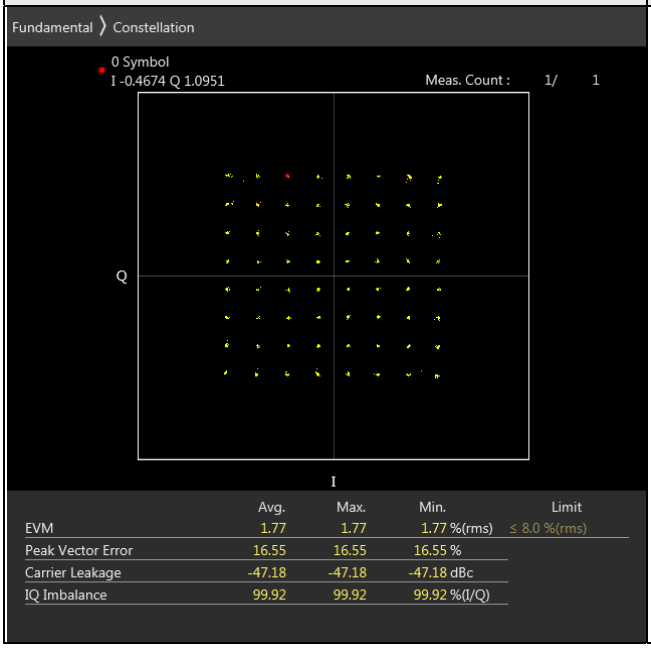


	Avg.	Max.	Min.	Limit
EVM	1.94	1.94	1.94 %(rms)	≤ 17.5 %(rms)
Peak Vector Error	24.04	24.04	24.04 %	
Carrier Leakage	-50.23	-50.23	-50.23 dBc	
IQ Imbalance	99.96	99.96	99.96 %(I/Q)	



	Avg.	Max.	Min.	Limit
EVM	1.74	1.74	1.74 %(rms)	≤ 12.5 %(rms)
Peak Vector Error	35.77	35.77	35.77 %	
Carrier Leakage	-47.04	-47.04	-47.04 dBc	
IQ Imbalance	100.05	100.05	100.05 %(I/Q)	

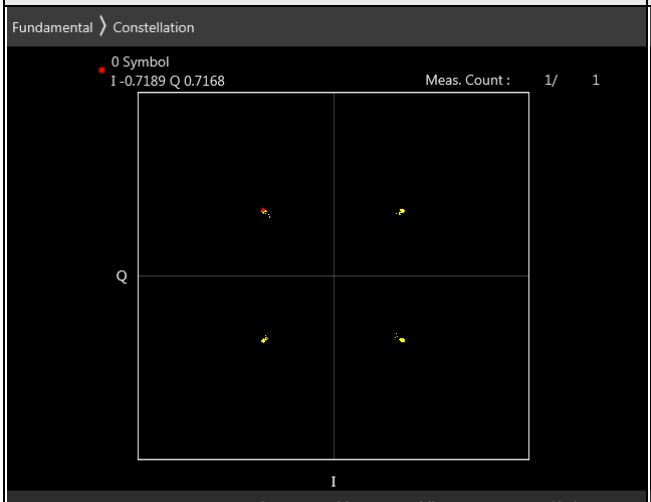
64QAM	



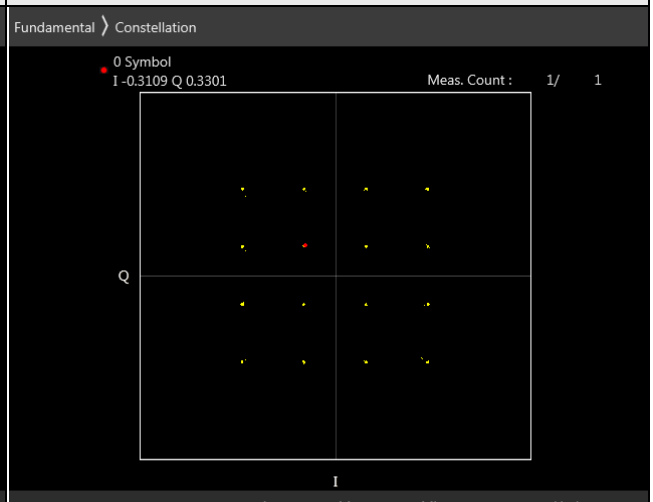
	Avg.	Max.	Min.	Limit
EVM	1.77	1.77	1.77 %(rms)	≤ 8.0 %(rms)
Peak Vector Error	16.55	16.55	16.55 %	
Carrier Leakage	-47.18	-47.18	-47.18 dBc	
IQ Imbalance	99.92	99.92	99.92 %(I/Q)	

LTE Band 12

Spectrum Plot of Measurement Value	
Channel: 23095 / Frequency (MHz): 707.5MHz	
QPSK	16QAM

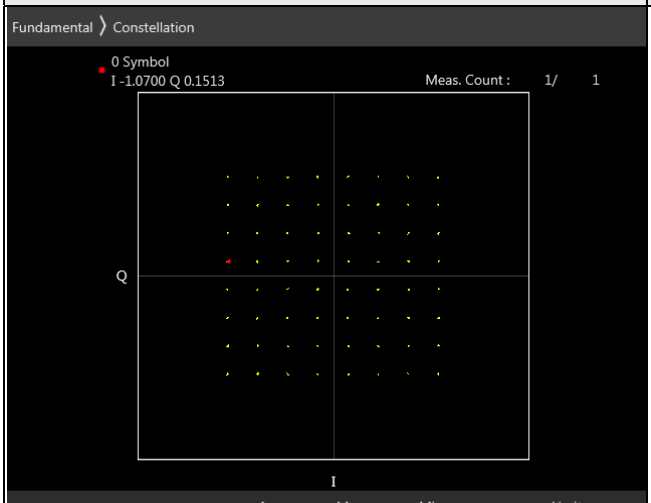


	Avg.	Max.	Min.	Limit
EVM	2.00	2.00	2.00 %(rms)	≤ 17.5 %(rms)
Peak Vector Error	25.16	25.16	25.16 %	
Carrier Leakage	-43.01	-43.01	-43.01 dBc	
IQ Imbalance	99.76	99.76	99.76 %(I/Q)	



	Avg.	Max.	Min.	Limit
EVM	1.50	1.50	1.50 %(rms)	≤ 12.5 %(rms)
Peak Vector Error	26.24	26.24	26.24 %	
Carrier Leakage	-44.17	-44.17	-44.17 dBc	
IQ Imbalance	100.08	100.08	100.08 %(I/Q)	

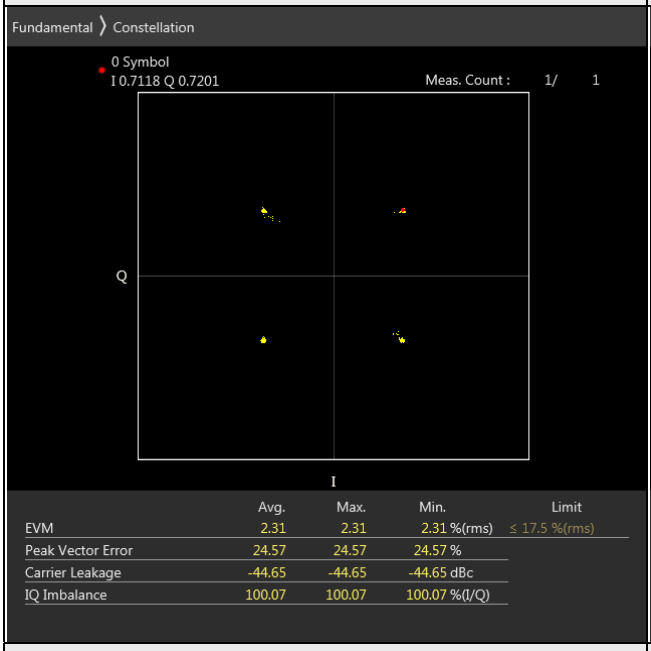
64QAM	



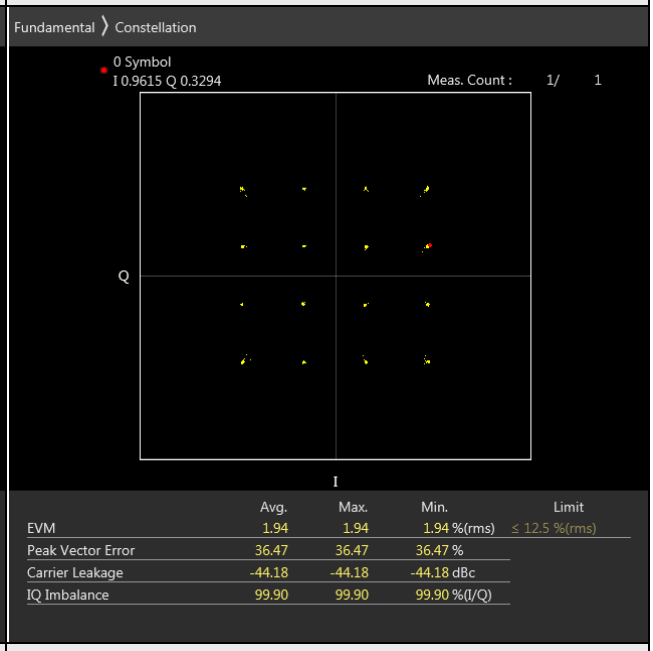
	Avg.	Max.	Min.	Limit
EVM	1.14	1.14	1.14 %(rms)	≤ 8.0 %(rms)
Peak Vector Error	18.20	18.20	18.20 %	
Carrier Leakage	-43.67	-43.67	-43.67 dBc	
IQ Imbalance	99.99	99.99	99.99 %(I/Q)	

LTE Band 13

Spectrum Plot of Measurement Value	
Channel: 23230 / Frequency (MHz): 782.0MHz	
QPSK	16QAM

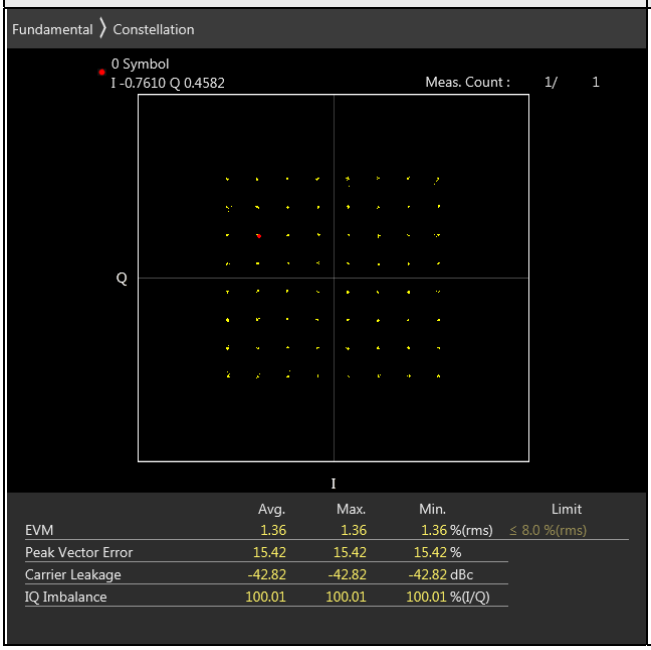


	Avg.	Max.	Min.	Limit
EVM	2.31	2.31	2.31 %(rms)	≤ 17.5 %(rms)
Peak Vector Error	24.57	24.57	24.57 %	
Carrier Leakage	-44.65	-44.65	-44.65 dBc	
IQ Imbalance	100.07	100.07	100.07 %(I/Q)	



	Avg.	Max.	Min.	Limit
EVM	1.94	1.94	1.94 %(rms)	≤ 12.5 %(rms)
Peak Vector Error	36.47	36.47	36.47 %	
Carrier Leakage	-44.18	-44.18	-44.18 dBc	
IQ Imbalance	99.90	99.90	99.90 %(I/Q)	

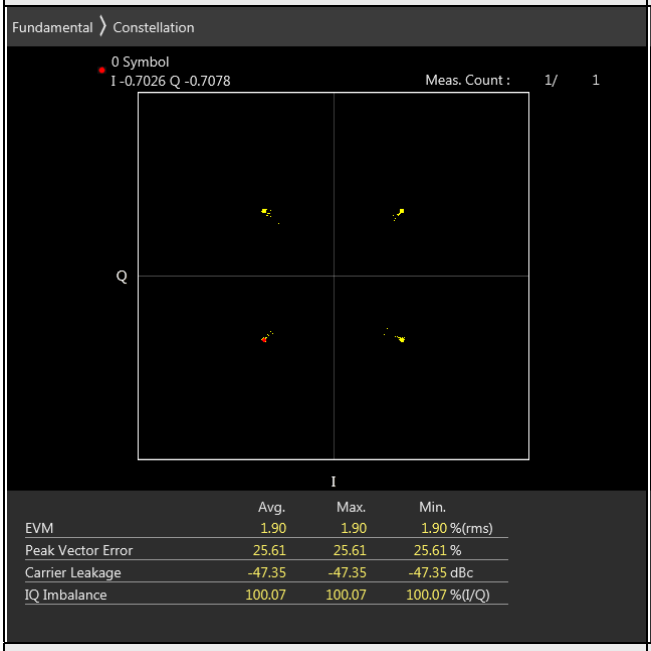
64QAM	



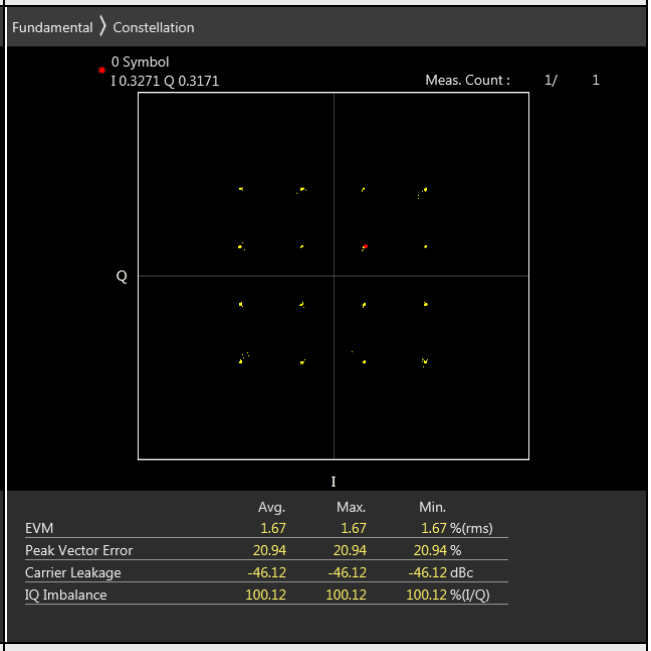
	Avg.	Max.	Min.	Limit
EVM	1.36	1.36	1.36 %(rms)	≤ 8.0 %(rms)
Peak Vector Error	15.42	15.42	15.42 %	
Carrier Leakage	-42.82	-42.82	-42.82 dBc	
IQ Imbalance	100.01	100.01	100.01 %(I/Q)	

LTE Band 17

Spectrum Plot of Measurement Value	
Channel: 23790 / Frequency (MHz): 710.0MHz	
QPSK	16QAM

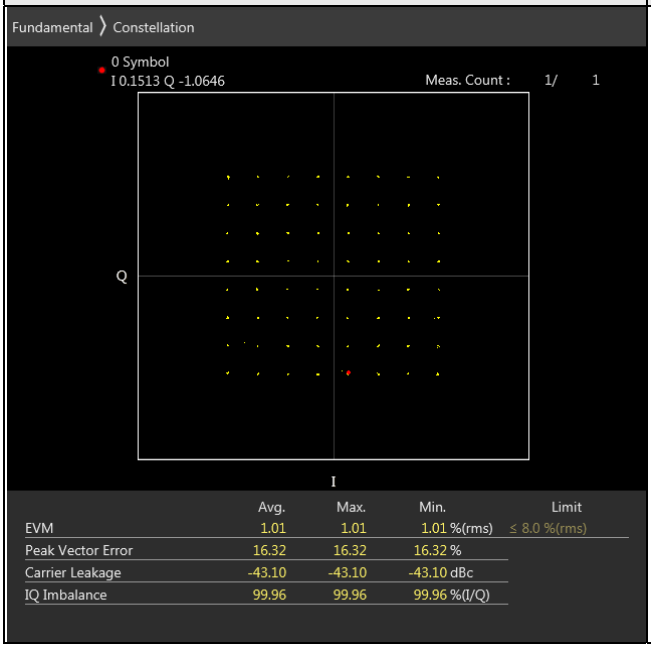


	Avg.	Max.	Min.	
EVM	1.90	1.90	1.90	%(rms)
Peak Vector Error	25.61	25.61	25.61	%
Carrier Leakage	-47.35	-47.35	-47.35	dBc
IQ Imbalance	100.07	100.07	100.07	%(I/Q)



	Avg.	Max.	Min.	
EVM	1.67	1.67	1.67	%(rms)
Peak Vector Error	20.94	20.94	20.94	%
Carrier Leakage	-46.12	-46.12	-46.12	dBc
IQ Imbalance	100.12	100.12	100.12	%(I/Q)

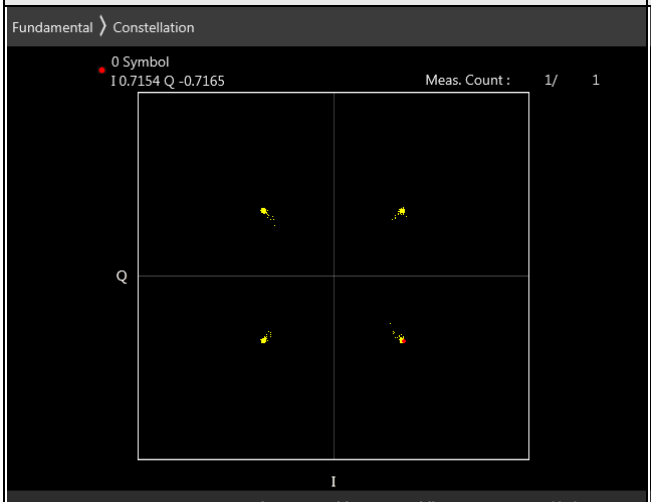
64QAM	



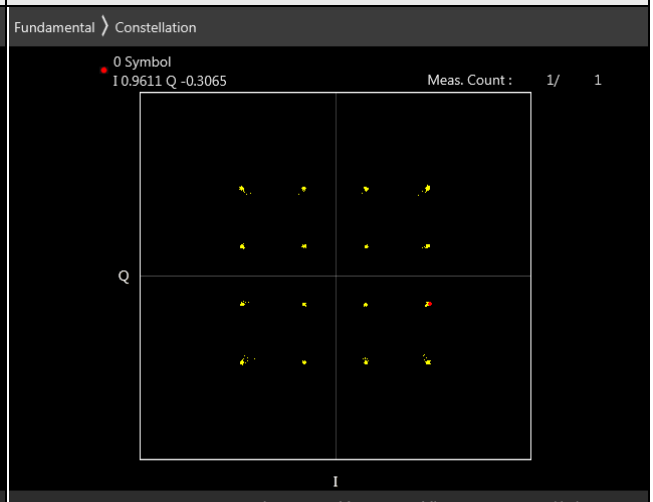
	Avg.	Max.	Min.		Limit
EVM	1.01	1.01	1.01	%(rms)	≤ 8.0 %(rms)
Peak Vector Error	16.32	16.32	16.32	%	
Carrier Leakage	-43.10	-43.10	-43.10	dBc	
IQ Imbalance	99.96	99.96	99.96	%(I/Q)	

LTE Band 38

Spectrum Plot of Measurement Value	
Channel: 38000 / Frequency (MHz): 2595.0MHz	
QPSK	16QAM

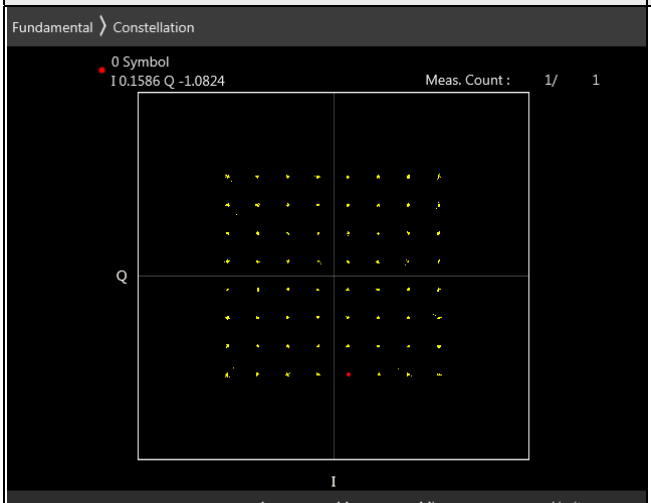


	Avg.	Max.	Min.	Limit
EVM	2.25	2.25	2.25 %(rms)	≤ 17.5 %(rms)
Peak Vector Error	25.94	25.94	25.94 %	
Carrier Leakage	-49.30	-49.30	-49.30 dBc	
IQ Imbalance	100.12	100.12	100.12 %(I/Q)	



	Avg.	Max.	Min.	Limit
EVM	1.68	1.68	1.68 %(rms)	≤ 12.5 %(rms)
Peak Vector Error	30.67	30.67	30.67 %	
Carrier Leakage	-47.71	-47.71	-47.71 dBc	
IQ Imbalance	99.90	99.90	99.90 %(I/Q)	

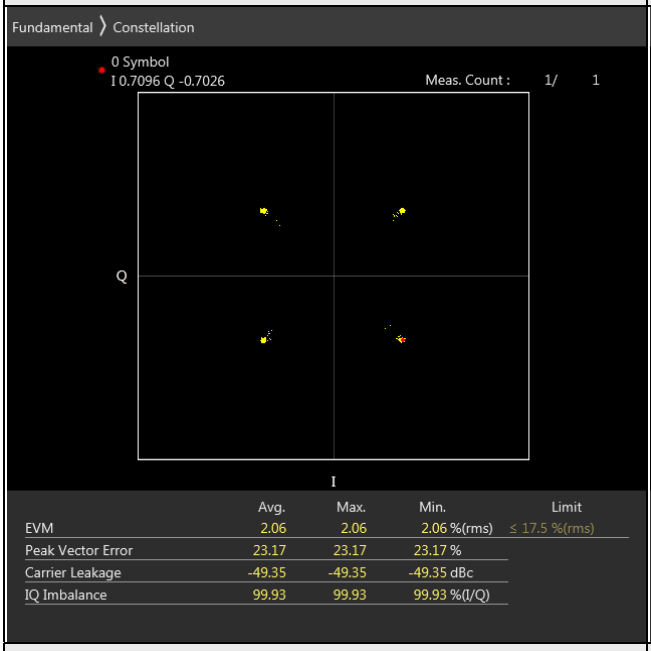
64QAM	



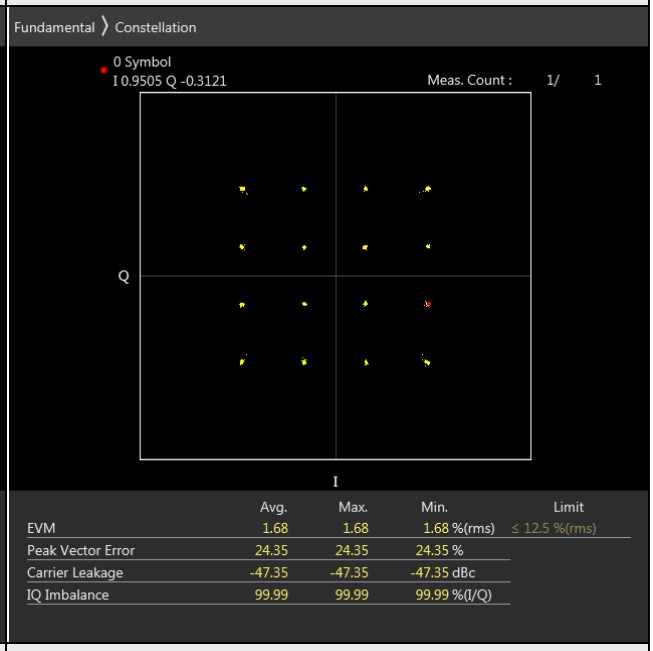
	Avg.	Max.	Min.	Limit
EVM	1.16	1.16	1.16 %(rms)	≤ 8.0 %(rms)
Peak Vector Error	13.87	13.87	13.87 %	
Carrier Leakage	-47.28	-47.28	-47.28 dBc	
IQ Imbalance	99.95	99.95	99.95 %(I/Q)	

LTE Band 41

Spectrum Plot of Measurement Value	
Channel: 40620 / Frequency (MHz): 2593.0MHz	
QPSK	16QAM

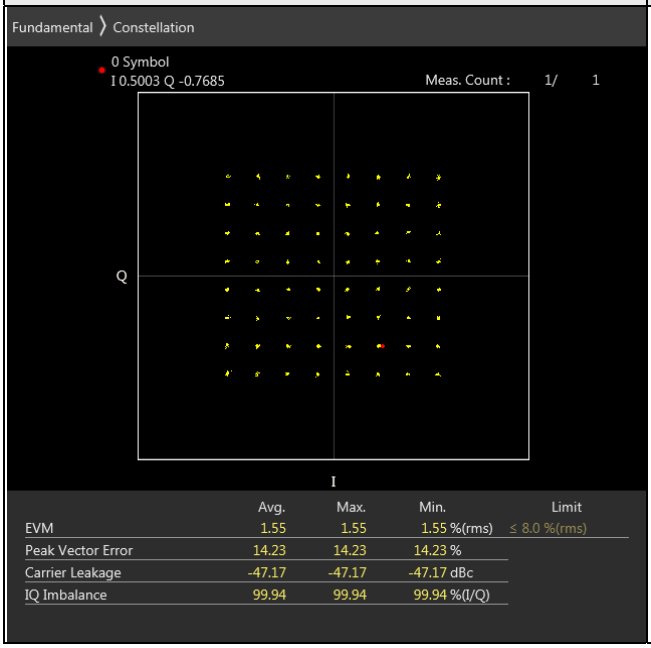


	Avg.	Max.	Min.	Limit
EVM	2.06	2.06	2.06 %(rms)	≤ 17.5 %(rms)
Peak Vector Error	23.17	23.17	23.17 %	
Carrier Leakage	-49.35	-49.35	-49.35 dBc	
IQ Imbalance	99.93	99.93	99.93 %(I/Q)	



	Avg.	Max.	Min.	Limit
EVM	1.68	1.68	1.68 %(rms)	≤ 12.5 %(rms)
Peak Vector Error	24.35	24.35	24.35 %	
Carrier Leakage	-47.35	-47.35	-47.35 dBc	
IQ Imbalance	99.99	99.99	99.99 %(I/Q)	

64QAM	



	Avg.	Max.	Min.	Limit
EVM	1.55	1.55	1.55 %(rms)	≤ 8.0 %(rms)
Peak Vector Error	14.23	14.23	14.23 %	
Carrier Leakage	-47.17	-47.17	-47.17 dBc	
IQ Imbalance	99.94	99.94	99.94 %(I/Q)	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT -30℃ ~ 50℃.

4.3.2 Test Procedure

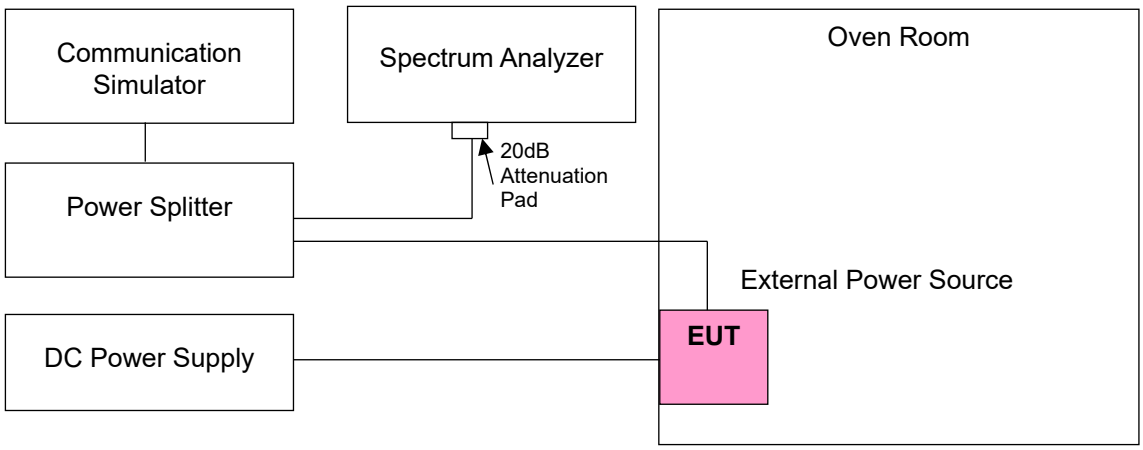
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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 (Vdc)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	1712.400001	0.001	1752.600004	0.002
3.87	1712.400002	0.001	1752.600001	0.001
4.45	1712.400002	0.001	1752.600001	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.400001	0.001	1752.600004	0.002
-20	1712.400002	0.001	1752.600004	0.002
-10	1712.400001	0.001	1752.600003	0.002
0	1712.400002	0.001	1752.600001	0.001
10	1712.399996	-0.002	1752.599998	-0.001
20	1712.399996	-0.002	1752.599999	-0.001
30	1712.399999	-0.001	1752.599997	-0.002
40	1712.399998	-0.001	1752.599996	-0.002
50	1712.399997	-0.002	1752.599999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	1710.700002	0.001	1754.300003	0.002
3.87	1710.700004	0.002	1754.300001	0.001
4.45	1710.700003	0.002	1754.300001	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

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	1710.700001	0.001	1754.300002	0.001
-20	1710.700003	0.002	1754.300002	0.001
-10	1710.700001	0.001	1754.300004	0.002
0	1710.700002	0.001	1754.300004	0.002
10	1710.699998	-0.001	1754.299997	-0.002
20	1710.699999	-0.001	1754.299997	-0.002
30	1710.699998	-0.001	1754.299998	-0.001
40	1710.699996	-0.002	1754.299996	-0.002
50	1710.699997	-0.002	1754.299996	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	1711.500004	0.002	1753.500004	0.002
3.87	1711.500004	0.002	1753.500004	0.002
4.45	1711.500003	0.002	1753.500002	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

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	1711.500001	0.001	1753.500003	0.002
-20	1711.500002	0.001	1753.500004	0.002
-10	1711.500001	0.001	1753.500004	0.002
0	1711.500004	0.002	1753.500004	0.002
10	1711.499999	-0.001	1753.499996	-0.002
20	1711.499996	-0.002	1753.499997	-0.002
30	1711.499997	-0.002	1753.499996	-0.002
40	1711.499997	-0.002	1753.499999	-0.001
50	1711.499999	-0.001	1753.499998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	1712.500002	0.001	1752.500001	0.001
3.87	1712.500003	0.002	1752.500004	0.002
4.45	1712.500002	0.001	1752.500002	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500004	0.002	1752.500002	0.001
-20	1712.500003	0.002	1752.500002	0.001
-10	1712.500003	0.002	1752.500002	0.001
0	1712.500003	0.002	1752.500002	0.001
10	1712.499996	-0.002	1752.499996	-0.002
20	1712.499997	-0.002	1752.499996	-0.002
30	1712.499999	-0.001	1752.499997	-0.002
40	1712.499996	-0.002	1752.499997	-0.002
50	1712.499998	-0.001	1752.499998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	1715.000001	0.001	1750.000002	0.001
3.87	1715.000004	0.002	1750.000004	0.002
4.45	1715.000004	0.002	1750.000001	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000002	0.001	1750.000004	0.002
-20	1715.000003	0.002	1750.000003	0.002
-10	1715.000003	0.002	1750.000001	0.001
0	1715.000003	0.002	1750.000001	0.001
10	1714.999996	-0.002	1749.999996	-0.002
20	1714.999996	-0.002	1749.999997	-0.002
30	1714.999998	-0.001	1749.999996	-0.002
40	1714.999999	-0.001	1749.999998	-0.001
50	1714.999998	-0.001	1749.999999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	1717.500004	0.002	1747.500004	0.002
3.87	1717.500004	0.002	1747.500002	0.001
4.45	1717.500004	0.002	1747.500002	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500001	0.001	1747.500002	0.001
-20	1717.500003	0.002	1747.500003	0.002
-10	1717.500003	0.002	1747.500003	0.002
0	1717.500001	0.001	1747.500004	0.002
10	1717.499997	-0.002	1747.499999	-0.001
20	1717.499999	-0.001	1747.499998	-0.001
30	1717.499997	-0.002	1747.499996	-0.002
40	1717.499997	-0.002	1747.499998	-0.001
50	1717.499996	-0.002	1747.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	1720.000003	0.002	1745.000003	0.002
3.87	1720.000003	0.002	1745.000004	0.002
4.45	1720.000003	0.002	1745.000004	0.002

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000001	0.001	1745.000004	0.002
-20	1720.000003	0.002	1745.000003	0.002
-10	1720.000002	0.001	1745.000004	0.002
0	1720.000001	0.001	1745.000002	0.001
10	1719.999996	-0.002	1744.999998	-0.001
20	1719.999996	-0.002	1744.999998	-0.001
30	1719.999998	-0.001	1744.999997	-0.002
40	1719.999996	-0.002	1744.999998	-0.001
50	1719.999998	-0.001	1744.999997	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2502.500003	0.001	2567.500001	0.000
3.87	2502.500001	0.000	2567.500001	0.000
4.45	2502.500003	0.001	2567.500001	0.000

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2502.500004	0.002	2567.500001	0.000
-20	2502.500002	0.001	2567.500003	0.001
-10	2502.500003	0.001	2567.500003	0.001
0	2502.500001	0.000	2567.500002	0.001
10	2502.499998	-0.001	2567.499999	0.000
20	2502.499996	-0.002	2567.499996	-0.002
30	2502.499996	-0.002	2567.499997	-0.001
40	2502.499999	0.000	2567.499996	-0.002
50	2502.499998	-0.001	2567.499998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2505.000002	0.001	2565.000004	0.002
3.87	2505.000001	0.000	2565.000003	0.001
4.45	2505.000004	0.002	2565.000004	0.002

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2505.000002	0.001	2565.000002	0.001
-20	2505.000003	0.001	2565.000004	0.002
-10	2505.000002	0.001	2565.000004	0.002
0	2505.000001	0.000	2565.000003	0.001
10	2504.999996	-0.002	2564.999999	0.000
20	2504.999998	-0.001	2564.999997	-0.001
30	2504.999999	0.000	2564.999999	0.000
40	2504.999996	-0.002	2564.999996	-0.002
50	2504.999998	-0.001	2564.999998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2507.500002	0.001	2562.500003	0.001
3.87	2507.500001	0.000	2562.500003	0.001
4.45	2507.500001	0.000	2562.500003	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2507.500002	0.001	2562.500002	0.001
-20	2507.500004	0.002	2562.500003	0.001
-10	2507.500001	0.000	2562.500001	0.000
0	2507.500004	0.002	2562.500003	0.001
10	2507.499998	-0.001	2562.499998	-0.001
20	2507.499996	-0.002	2562.499997	-0.001
30	2507.499997	-0.001	2562.499998	-0.001
40	2507.499996	-0.002	2562.499999	0.000
50	2507.499998	-0.001	2562.499997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2510.000001	0.000	2560.000001	0.000
3.87	2510.000002	0.001	2560.000002	0.001
4.45	2510.000001	0.000	2560.000004	0.002

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2510.000004	0.002	2560.000004	0.002
-20	2510.000003	0.001	2560.000004	0.002
-10	2510.000002	0.001	2560.000002	0.001
0	2510.000001	0.000	2560.000001	0.000
10	2509.999997	-0.001	2559.999997	-0.001
20	2509.999996	-0.002	2559.999998	-0.001
30	2509.999998	-0.001	2559.999996	-0.002
40	2509.999996	-0.002	2559.999998	-0.001
50	2509.999997	-0.001	2559.999997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 12			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	699.700004	0.006	715.300001	0.001
3.87	699.700001	0.001	715.300003	0.004
4.45	699.700004	0.006	715.300002	0.003

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

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	0.006
-20	699.700004	0.006	715.300001	0.001
-10	699.700002	0.003	715.300003	0.004
0	699.700003	0.004	715.300002	0.003
10	699.699998	-0.003	715.299998	-0.003
20	699.699997	-0.004	715.299998	-0.003
30	699.699996	-0.006	715.299997	-0.004
40	699.699996	-0.006	715.299997	-0.004
50	699.699998	-0.003	715.299999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 12			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	700.500003	0.004	714.500003	0.004
3.87	700.500004	0.006	714.500002	0.003
4.45	700.500002	0.003	714.500003	0.004

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

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	0.006	714.500002	0.003
-20	700.500002	0.003	714.500004	0.006
-10	700.500001	0.001	714.500004	0.006
0	700.500002	0.003	714.500002	0.003
10	700.499997	-0.004	714.499997	-0.004
20	700.499997	-0.004	714.499997	-0.004
30	700.499996	-0.006	714.499997	-0.004
40	700.499996	-0.006	714.499997	-0.004
50	700.499996	-0.006	714.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 12			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	701.500004	0.006	713.500003	0.004
3.87	701.500003	0.004	713.500002	0.003
4.45	701.500002	0.003	713.500002	0.003

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	701.500002	0.003	713.500002	0.003
-20	701.500002	0.003	713.500004	0.006
-10	701.500003	0.004	713.500003	0.004
0	701.500003	0.004	713.500002	0.003
10	701.499999	-0.001	713.499997	-0.004
20	701.499998	-0.003	713.499998	-0.003
30	701.499998	-0.003	713.499998	-0.003
40	701.499999	-0.001	713.499997	-0.004
50	701.499996	-0.006	713.499998	-0.003

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 12			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	704.000004	0.006	711.000001	0.001
3.87	704.000001	0.001	711.000004	0.006
4.45	704.000002	0.003	711.000001	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	704.000003	0.004	711.000004	0.006
-20	704.000002	0.003	711.000003	0.004
-10	704.000004	0.006	711.000004	0.006
0	704.000001	0.001	711.000004	0.006
10	703.999996	-0.006	710.999996	-0.006
20	703.999999	-0.001	710.999996	-0.006
30	703.999996	-0.006	710.999998	-0.003
40	703.999999	-0.001	710.999999	-0.001
50	703.999998	-0.003	710.999996	-0.006

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 13			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	779.500001	0.001	784.500002	0.003
3.87	779.500001	0.001	784.500004	0.005
4.45	779.500002	0.003	784.500002	0.003

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	779.500002	0.003	784.500004	0.005
-20	779.500002	0.003	784.500003	0.004
-10	779.500002	0.003	784.500002	0.003
0	779.500003	0.004	784.500002	0.003
10	779.499997	-0.004	784.499998	-0.003
20	779.499998	-0.003	784.499997	-0.004
30	779.499998	-0.003	784.499997	-0.004
40	779.499999	-0.001	784.499997	-0.004
50	779.499999	-0.001	784.499997	-0.004

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 13	
	Channel Bandwidth 10MHz	
	Frequency (MHz)	Frequency Error (ppm)
3.60	782.000003	0.004
3.87	782.000003	0.004
4.45	782.000004	0.005

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13	
	Channel Bandwidth 10MHz	
	Frequency (MHz)	Frequency Error (ppm)
-30	782.000001	0.001
-20	782.000004	0.005
-10	782.000004	0.005
0	782.000004	0.005
10	781.999996	-0.005
20	781.999998	-0.003
30	781.999998	-0.003
40	781.999999	-0.001
50	781.999999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 17			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	706.500002	0.003	713.500004	0.006
3.87	706.500001	0.001	713.500002	0.003
4.45	706.500003	0.004	713.500002	0.003

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 17			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	706.500003	0.004	713.500003	0.004
-20	706.500002	0.003	713.500004	0.006
-10	706.500001	0.001	713.500003	0.004
0	706.500002	0.003	713.500003	0.004
10	706.499998	-0.003	713.499998	-0.003
20	706.499999	-0.001	713.499997	-0.004
30	706.499999	-0.001	713.499998	-0.003
40	706.499998	-0.003	713.499997	-0.004
50	706.499996	-0.006	713.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 17			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	709.000003	0.004	711.000002	0.003
3.87	709.000002	0.003	711.000004	0.006
4.45	709.000002	0.003	711.000003	0.004

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 17			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	709.000002	0.003	711.000002	0.003
-20	709.000003	0.004	711.000003	0.004
-10	709.000001	0.001	711.000002	0.003
0	709.000001	0.001	711.000003	0.004
10	708.999996	-0.006	710.999997	-0.004
20	708.999996	-0.006	710.999999	-0.001
30	708.999997	-0.004	710.999998	-0.003
40	708.999998	-0.003	710.999997	-0.004
50	708.999996	-0.006	710.999998	-0.003

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 38			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2572.500004	0.002	2617.500002	0.001
3.87	2572.500004	0.002	2617.500002	0.001
4.45	2572.500003	0.001	2617.500002	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 38			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2572.500003	0.001	2617.500001	0.000
-20	2572.500004	0.002	2617.500001	0.000
-10	2572.500002	0.001	2617.500002	0.001
0	2572.500002	0.001	2617.500003	0.001
10	2572.499997	-0.001	2617.499997	-0.001
20	2572.499997	-0.001	2617.499997	-0.001
30	2572.499997	-0.001	2617.499999	0.000
40	2572.499997	-0.001	2617.499999	0.000
50	2572.499999	0.000	2617.499999	0.000

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 38			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2575.000004	0.002	2615.000004	0.002
3.87	2575.000003	0.001	2615.000003	0.001
4.45	2575.000003	0.001	2615.000001	0.000

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 38			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2575.000004	0.002	2615.000001	0.000
-20	2575.000001	0.000	2615.000003	0.001
-10	2575.000002	0.001	2615.000004	0.002
0	2575.000002	0.001	2615.000004	0.002
10	2574.999998	-0.001	2614.999999	0.000
20	2574.999997	-0.001	2614.999998	-0.001
30	2574.999999	0.000	2614.999996	-0.002
40	2574.999998	-0.001	2614.999998	-0.001
50	2574.999998	-0.001	2614.999997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 38			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2577.500003	0.001	2612.500004	0.002
3.87	2577.500004	0.002	2612.500004	0.002
4.45	2577.500002	0.001	2612.500001	0.000

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 38			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2577.500002	0.001	2612.500001	0.000
-20	2577.500004	0.002	2612.500001	0.000
-10	2577.500002	0.001	2612.500002	0.001
0	2577.500004	0.002	2612.500001	0.000
10	2577.499998	-0.001	2612.499997	-0.001
20	2577.499996	-0.002	2612.499998	-0.001
30	2577.499999	0.000	2612.499996	-0.002
40	2577.499997	-0.001	2612.499999	0.000
50	2577.499999	0.000	2612.499998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 38			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2580.000003	0.001	2610.000002	0.001
3.87	2580.000004	0.002	2610.000001	0.000
4.45	2580.000001	0.000	2610.000000	0.000

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 38			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2580.000002	0.001	2610.000003	0.001
-20	2580.000004	0.002	2610.000004	0.002
-10	2580.000003	0.001	2610.000004	0.002
0	2580.000002	0.001	2610.000001	0.000
10	2579.999998	-0.001	2609.999997	-0.001
20	2579.999996	-0.002	2609.999998	-0.001
30	2579.999996	-0.002	2609.999998	-0.001
40	2579.999999	0.000	2609.999996	-0.002
50	2579.999999	0.000	2609.999996	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 41			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2498.500004	0.002	2687.500002	0.001
3.87	2498.500002	0.001	2687.500003	0.001
4.45	2498.500003	0.001	2687.500001	0.000

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 41			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2498.500003	0.001	2687.500002	0.001
-20	2498.500001	0.000	2687.500004	0.001
-10	2498.500003	0.001	2687.500003	0.001
0	2498.500003	0.001	2687.500002	0.001
10	2498.499996	-0.002	2687.499996	-0.001
20	2498.499998	-0.001	2687.499996	-0.001
30	2498.499996	-0.002	2687.499998	-0.001
40	2498.499997	-0.001	2687.499999	0.000
50	2498.499996	-0.002	2687.499996	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 41			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2501.000003	0.001	2685.000001	0.000
3.87	2501.000002	0.001	2685.000004	0.001
4.45	2501.000004	0.002	2685.000002	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 41			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2501.000004	0.002	2685.000002	0.001
-20	2501.000002	0.001	2685.000002	0.001
-10	2501.000001	0.000	2685.000003	0.001
0	2501.000001	0.000	2685.000004	0.001
10	2500.999998	-0.001	2684.999996	-0.001
20	2500.999998	-0.001	2684.999996	-0.001
30	2500.999998	-0.001	2684.999996	-0.001
40	2500.999997	-0.001	2684.999998	-0.001
50	2500.999996	-0.002	2684.999998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 41			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2503.500003	0.001	2682.500004	0.001
3.87	2503.500003	0.001	2682.500004	0.001
4.45	2503.500001	0.000	2682.500002	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 41			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2503.500002	0.001	2682.500001	0.000
-20	2503.500001	0.000	2682.500004	0.001
-10	2503.500001	0.000	2682.500003	0.001
0	2503.500001	0.000	2682.500003	0.001
10	2503.499997	-0.001	2682.499999	0.000
20	2503.499999	0.000	2682.499999	0.000
30	2503.499999	0.000	2682.499997	-0.001
40	2503.499997	-0.001	2682.499997	-0.001
50	2503.499999	0.000	2682.499997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 41			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	2506.000001	0.000	2680.000001	0.000
3.87	2506.000004	0.002	2680.000004	0.001
4.45	2506.000002	0.001	2680.000003	0.001

Note: The applicant defined the normal working voltage is from 3.60Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 41			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2506.000001	0.000	2680.000003	0.001
-20	2506.000001	0.000	2680.000002	0.001
-10	2506.000004	0.002	2680.000002	0.001
0	2506.000003	0.001	2680.000004	0.001
10	2505.999999	0.000	2679.999996	-0.001
20	2505.999998	-0.001	2679.999999	0.000
30	2505.999999	0.000	2679.999997	-0.001
40	2505.999997	-0.001	2679.999999	0.000
50	2505.999998	-0.001	2679.999997	-0.001

4.4 Emission Bandwidth Measurement

4.4.1 Limits of Emission Bandwidth Measurement

According to FCC 2.1049, the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 % of the total mean power radiated by a given emission.

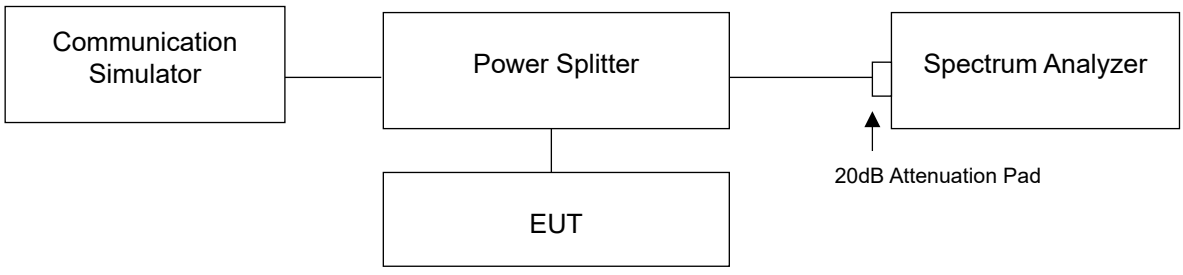
4.4.2 Test Procedure

For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f) Determine the following reference values: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
g) Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "−X dB amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
i) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

4.4.3 Test Setup



4.4.4 Test Result

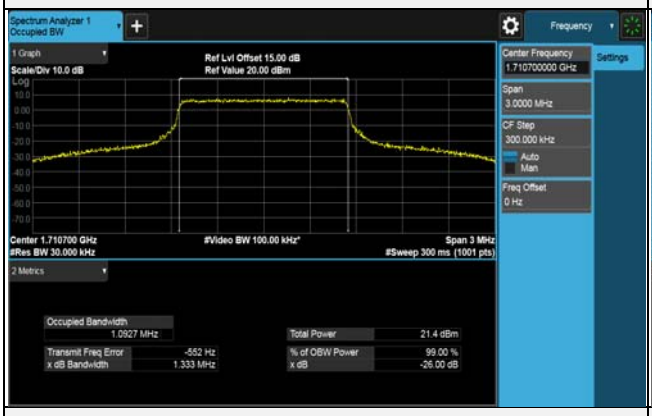
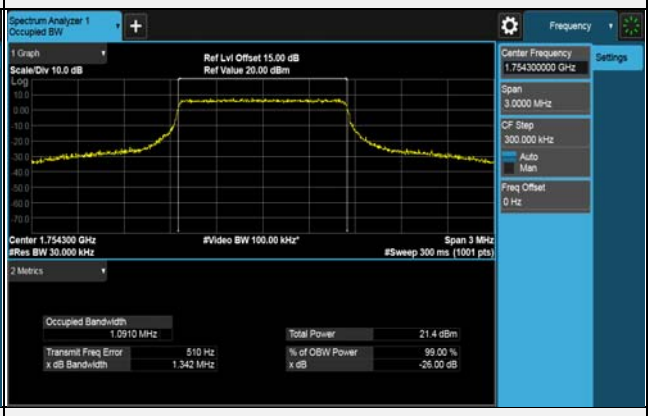
WCDMA

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
WCDMA	1312	1712.4	4.16	4.72
WCDMA	1413	1732.6	4.16	4.73
WCDMA	1513	1752.6	4.16	4.72
HSDPA	1312	1712.4	4.16	4.72
HSDPA	1413	1732.6	4.16	4.72
HSDPA	1513	1752.6	4.18	4.75
HSUPA	1312	1712.4	4.17	4.72
HSUPA	1413	1732.6	4.16	4.72
HSUPA	1513	1752.6	4.16	4.72

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
HSDPA CH 1513 (1752.6MHz)	HSDPA CH 1513 (1752.6MHz)

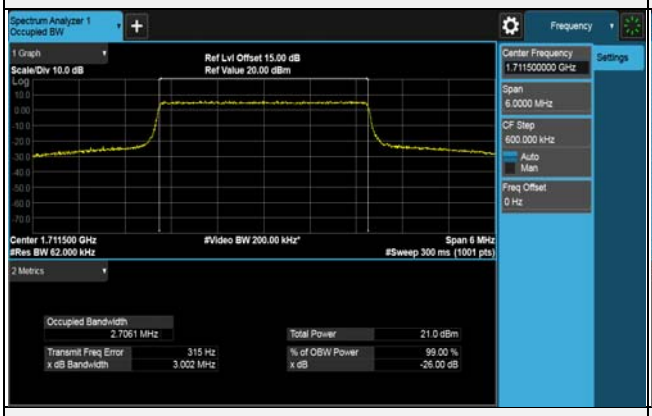
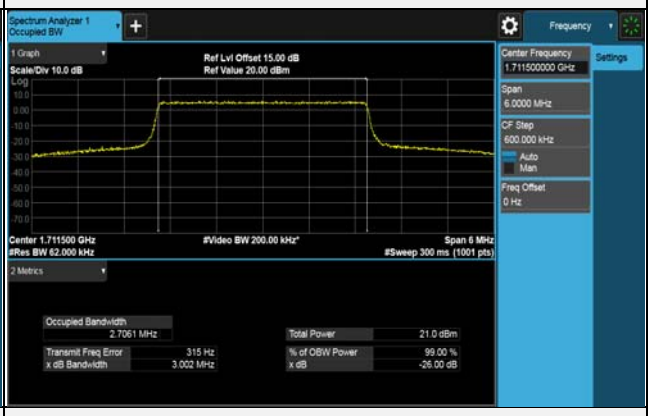
LTE Band 4 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	19957	1710.7	1.0901	1.295
QPSK	20175	1732.5	1.0902	1.303
QPSK	20393	1754.3	1.0909	1.303
16QAM	19957	1710.7	1.0910	1.304
16QAM	20175	1732.5	1.0916	1.302
16QAM	20393	1754.3	1.0911	1.322
64QAM	19957	1710.7	1.0927	1.333
64QAM	20175	1732.5	1.0924	1.316
64QAM	20393	1754.3	1.0910	1.342

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 19957 (1710.7MHz)	64QAM CH 20393 (1754.3MHz)

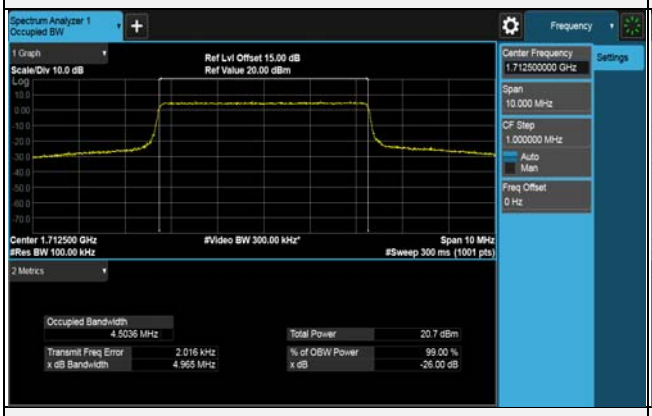
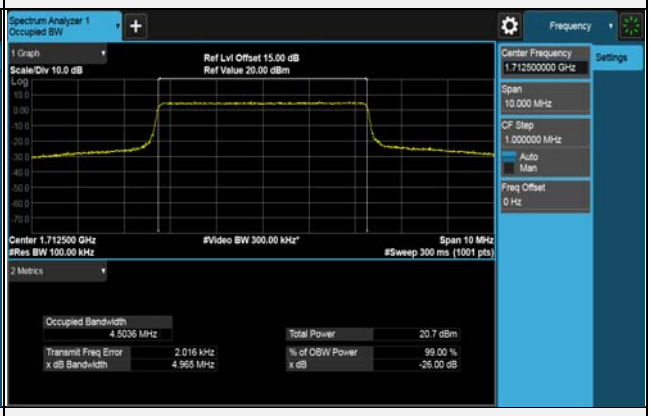
LTE Band 4 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	19965	1711.5	2.6996	2.956
QPSK	20175	1732.5	2.7027	2.953
QPSK	20385	1753.5	2.7046	2.966
16QAM	19965	1711.5	2.7039	2.954
16QAM	20175	1732.5	2.7027	2.966
16QAM	20385	1753.5	2.7005	2.944
64QAM	19965	1711.5	2.7061	3.002
64QAM	20175	1732.5	2.7058	2.976
64QAM	20385	1753.5	2.7048	3.002

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 19965 (1711.5MHz)	64QAM CH 19965 (1711.5MHz)

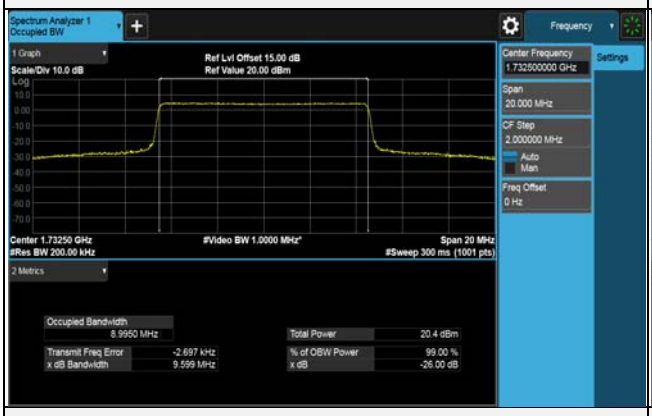
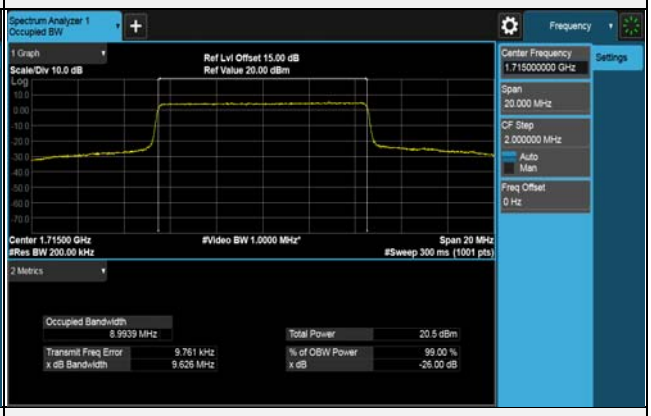
LTE Band 4 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	19975	1712.5	4.4939	4.883
QPSK	20175	1732.5	4.4975	4.849
QPSK	20375	1752.5	4.4969	4.901
16QAM	19975	1712.5	4.4943	4.865
16QAM	20175	1732.5	4.4961	4.911
16QAM	20375	1752.5	4.5009	4.905
64QAM	19975	1712.5	4.5036	4.965
64QAM	20175	1732.5	4.5024	4.915
64QAM	20375	1752.5	4.5003	4.912

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 19975 (1712.5MHz)	64QAM CH 19975 (1712.5MHz)

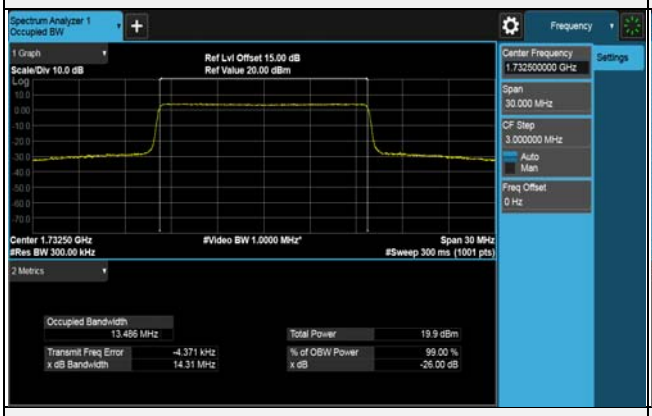
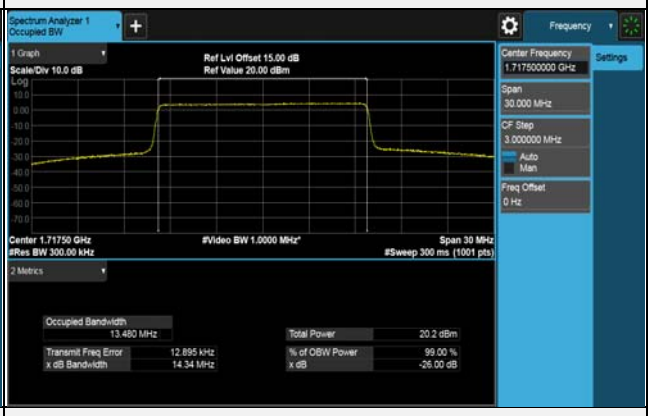
LTE Band 4 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20000	1715	8.9812	9.573
QPSK	20175	1732.5	8.9811	9.553
QPSK	20350	1750	8.9803	9.517
16QAM	20000	1715	8.9844	9.562
16QAM	20175	1732.5	8.9839	9.565
16QAM	20350	1750	8.9862	9.570
64QAM	20000	1715	8.9939	9.626
64QAM	20175	1732.5	8.9950	9.599
64QAM	20350	1750	8.9879	9.567

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 20175 (1732.5MHz)	64QAM CH 20000 (1715MHz)

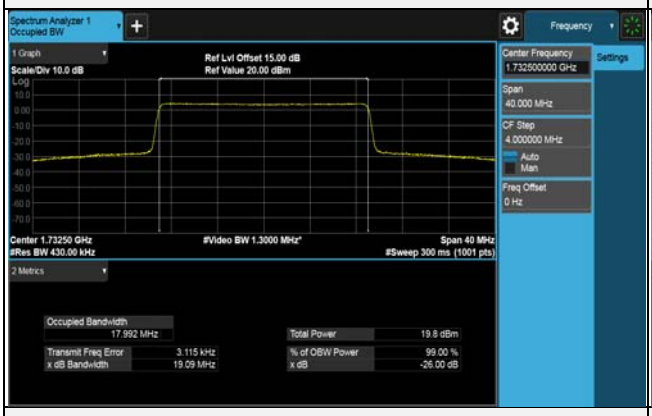
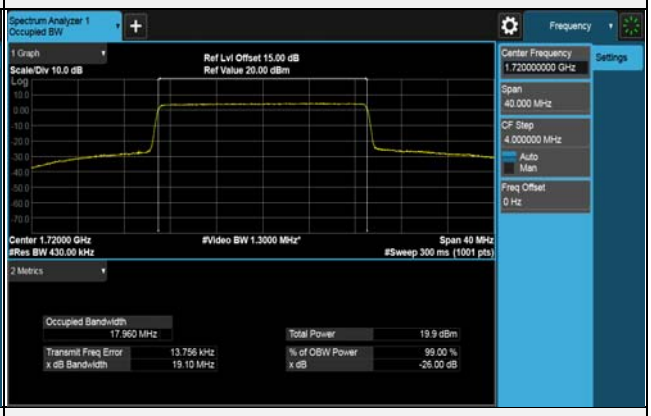
LTE Band 4 (Channel Bandwidth 15MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20025	1717.5	13.477	14.28
QPSK	20175	1732.5	13.463	14.27
QPSK	20325	1747.5	13.470	14.31
16QAM	20025	1717.5	13.473	14.25
16QAM	20175	1732.5	13.465	14.27
16QAM	20325	1747.5	13.469	14.33
64QAM	20025	1717.5	13.480	14.34
64QAM	20175	1732.5	13.486	14.31
64QAM	20325	1747.5	13.468	14.27

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 20175 (1732.5MHz)	64QAM CH 20025 (1717.5MHz)

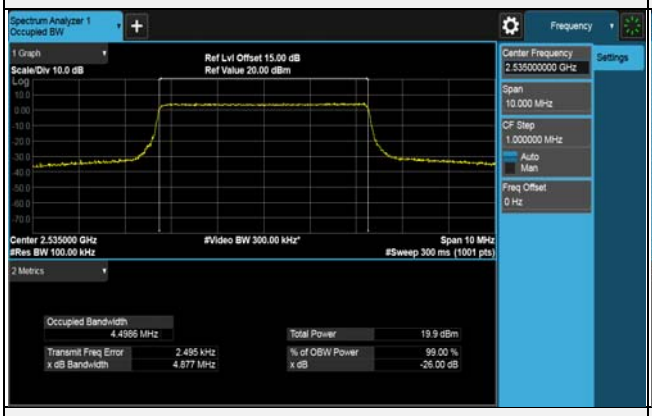
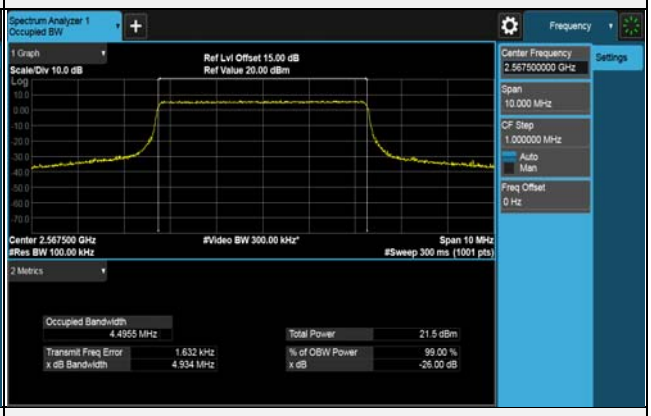
LTE Band 4 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20050	1720	17.958	19.05
QPSK	20175	1732.5	17.967	19.05
QPSK	20300	1745	17.985	19.08
16QAM	20050	1720	17.977	19.06
16QAM	20175	1732.5	17.970	19.06
16QAM	20300	1745	17.988	19.09
64QAM	20050	1720	17.960	19.10
64QAM	20175	1732.5	17.992	19.09
64QAM	20300	1745	17.970	19.06

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 20175 (1732.5MHz)	64QAM CH 20050 (1720MHz)

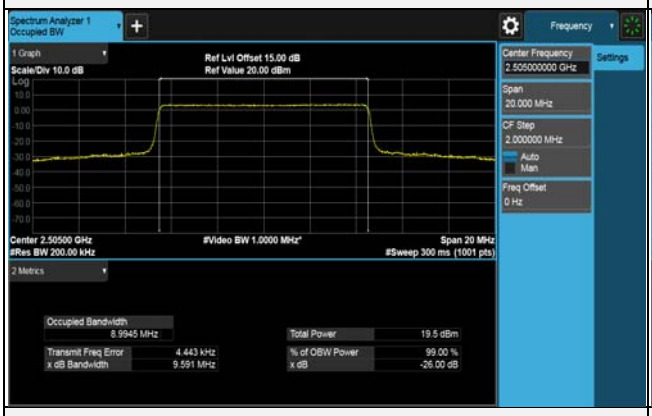
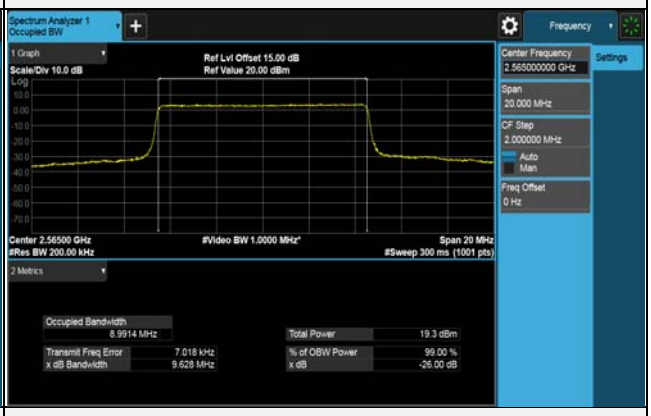
LTE Band 7 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20775	2502.5	4.4981	4.883
QPSK	21100	2535	4.4975	4.909
QPSK	21425	2567.5	4.4955	4.934
16QAM	20775	2502.5	4.4959	4.868
16QAM	21100	2535	4.4983	4.894
16QAM	21425	2567.5	4.4975	4.908
64QAM	20775	2502.5	4.4972	4.919
64QAM	21100	2535	4.4986	4.877
64QAM	21425	2567.5	4.4977	4.890

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 21100 (2535MHz)	QPSK CH 21425 (2567.5MHz)

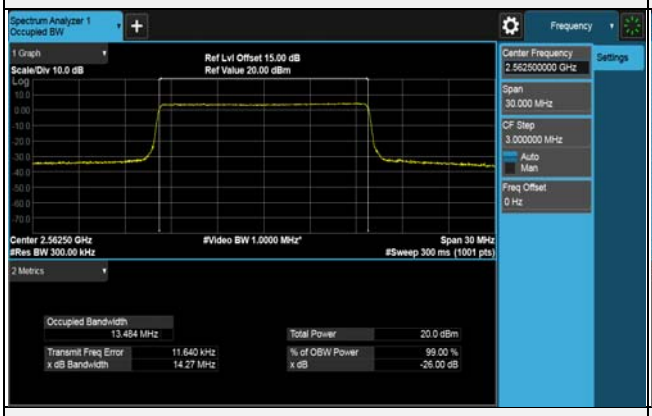
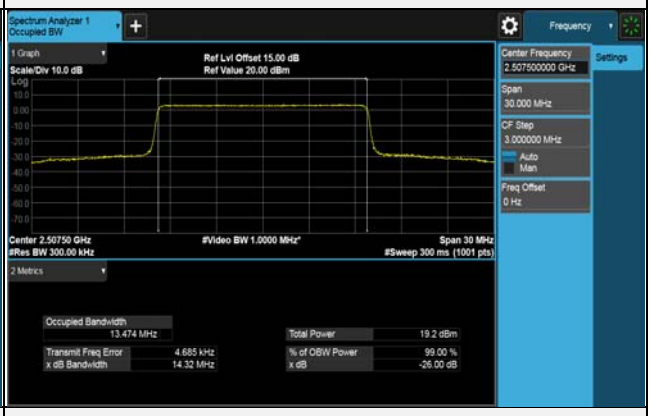
LTE Band 7 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20800	2505	8.9840	9.549
QPSK	21100	2535	8.9790	9.556
QPSK	21400	2565	8.9874	9.541
16QAM	20800	2505	8.9785	9.553
16QAM	21100	2535	8.9802	9.543
16QAM	21400	2565	8.9829	9.540
64QAM	20800	2505	8.9945	9.591
64QAM	21100	2535	8.9861	9.580
64QAM	21400	2565	8.9914	9.628

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 20800 (2505MHz)	64QAM CH 21400 (2565MHz)

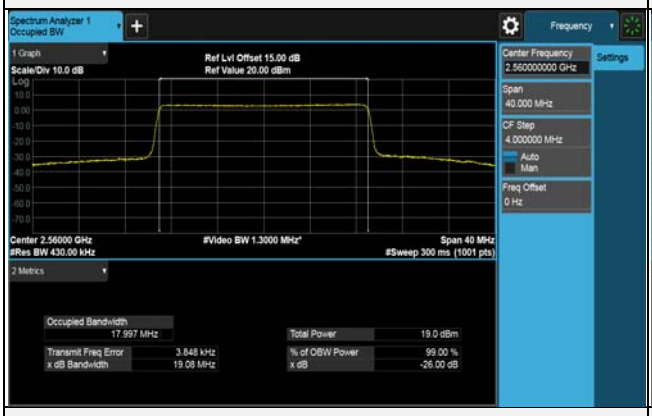
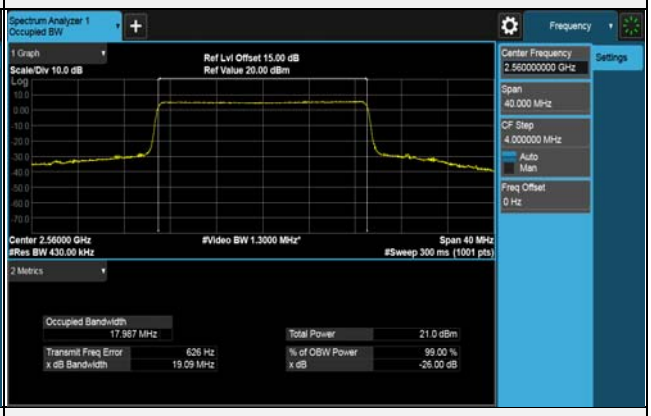
LTE Band 7 (Channel Bandwidth 15MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20825	2507.5	13.463	14.27
QPSK	21100	2535	13.464	14.29
QPSK	21375	2562.5	13.468	14.28
16QAM	20825	2507.5	13.465	14.28
16QAM	21100	2535	13.460	14.27
16QAM	21375	2562.5	13.484	14.27
64QAM	20825	2507.5	13.474	14.32
64QAM	21100	2535	13.467	14.27
64QAM	21375	2562.5	13.478	14.26

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
16QAM CH 21375 (2562.5MHz)	64QAM CH 20825 (2507.5MHz)

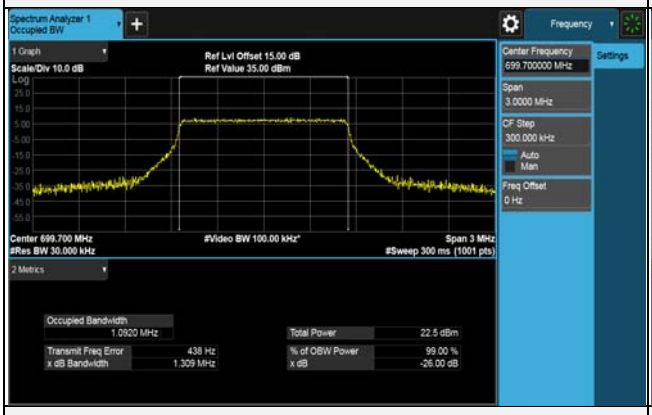
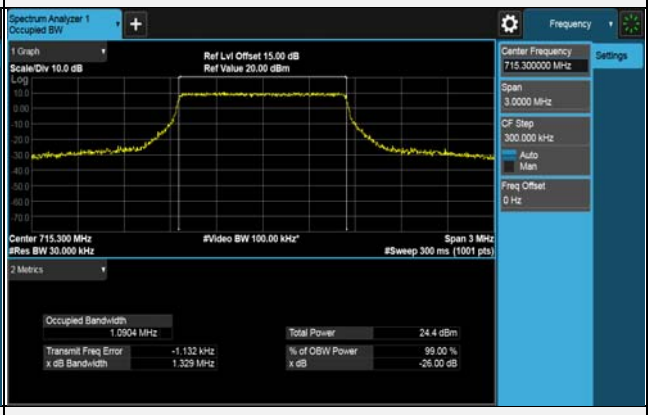
LTE Band 7 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	20850	2510	17.958	19.08
QPSK	21100	2535	17.963	19.06
QPSK	21350	2560	17.988	19.09
16QAM	20850	2510	17.952	19.05
16QAM	21100	2535	17.964	19.06
16QAM	21350	2560	17.983	19.04
64QAM	20850	2510	17.961	19.04
64QAM	21100	2535	17.966	19.06
64QAM	21350	2560	17.997	19.08

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 21350 (2560MHz)	QPSK CH 21350 (2560MHz)

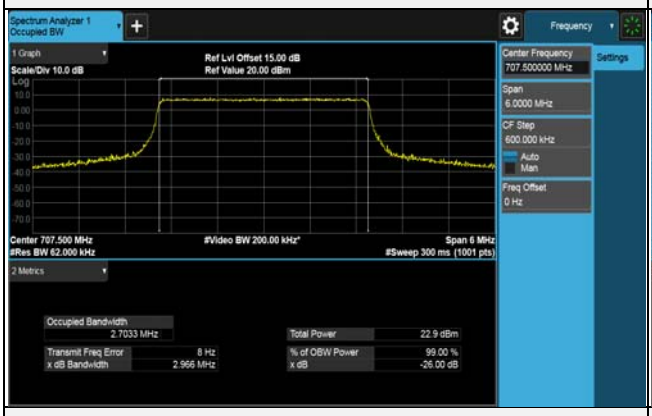
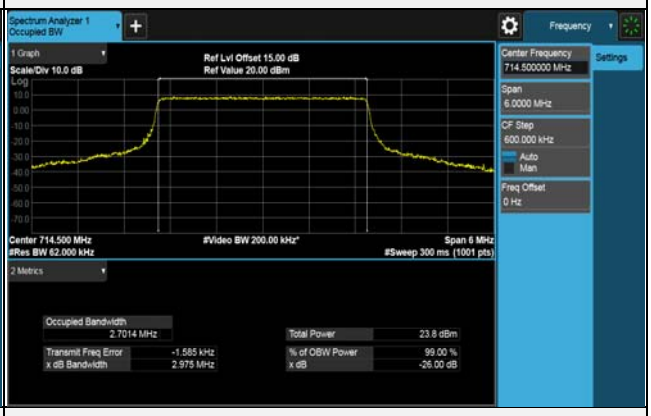
LTE Band 12 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23017	699.7	1.0902	1.292
QPSK	23095	707.5	1.0913	1.300
QPSK	23173	715.3	1.0904	1.329
16QAM	23017	699.7	1.0896	1.300
16QAM	23095	707.5	1.0908	1.297
16QAM	23173	715.3	1.0912	1.282
64QAM	23017	699.7	1.0920	1.309
64QAM	23095	707.5	1.0900	1.306
64QAM	23173	715.3	1.0897	1.291

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 23017 (699.7MHz)	QPSK CH 23173 (715.3MHz)

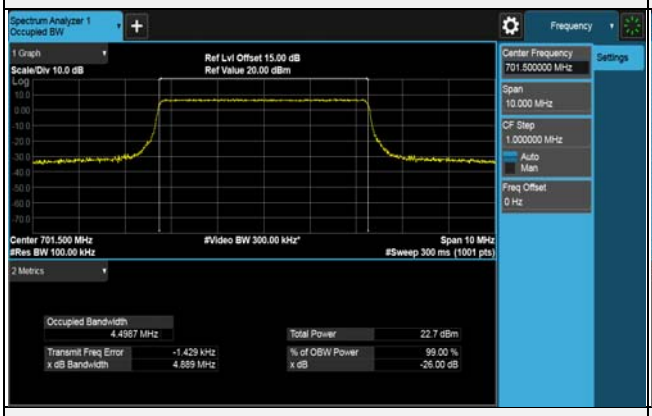
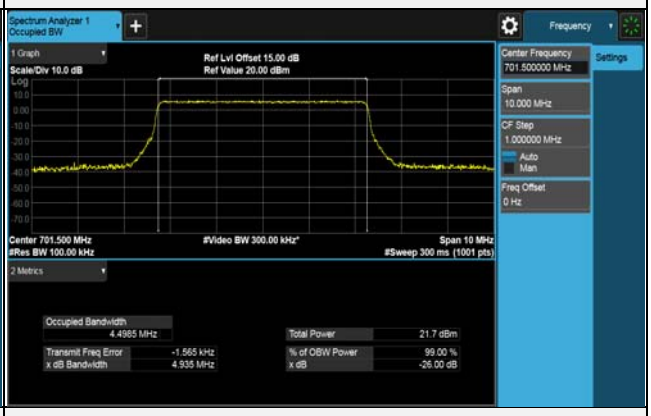
LTE Band 12 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23025	700.5	2.6990	2.954
QPSK	23095	707.5	2.7014	2.969
QPSK	23165	714.5	2.7014	2.975
16QAM	23025	700.5	2.6996	2.964
16QAM	23095	707.5	2.7033	2.966
16QAM	23165	714.5	2.7022	2.939
64QAM	23025	700.5	2.6996	2.936
64QAM	23095	707.5	2.6991	2.971
64QAM	23165	714.5	2.7011	2.956

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
16QAM CH 23095 (707.5MHz)	QPSK CH 23165 (714.5MHz)

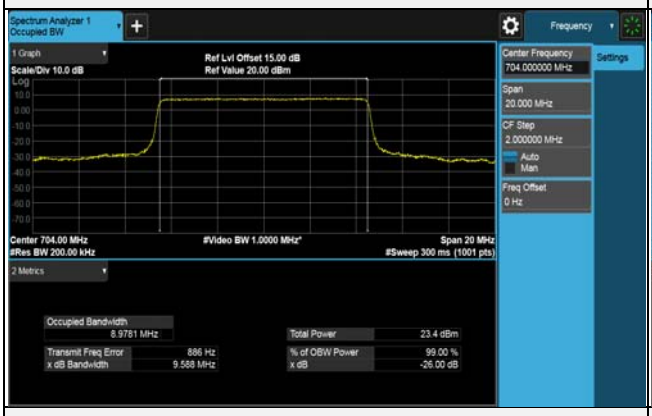
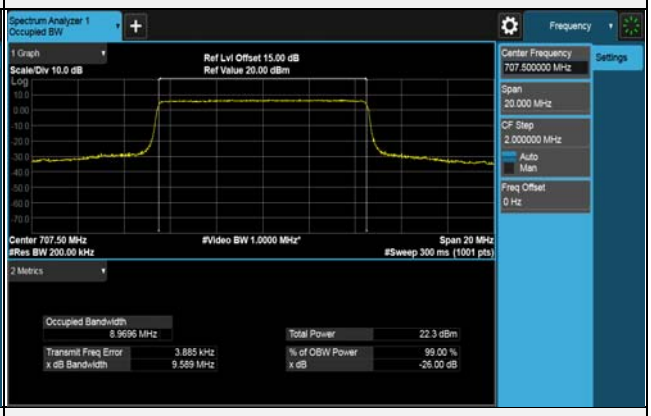
LTE Band 12 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23035	701.5	4.4968	4.856
QPSK	23095	707.5	4.4903	4.892
QPSK	23155	713.5	4.4950	4.914
16QAM	23035	701.5	4.4987	4.889
16QAM	23095	707.5	4.4950	4.891
16QAM	23155	713.5	4.4968	4.882
64QAM	23035	701.5	4.4985	4.935
64QAM	23095	707.5	4.4934	4.875
64QAM	23155	713.5	4.4955	4.897

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
16QAM CH 23035 (701.5MHz)	64QAM CH 23035 (701.5MHz)

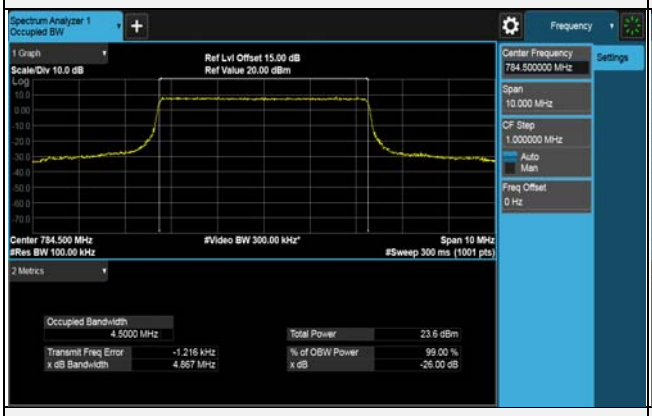
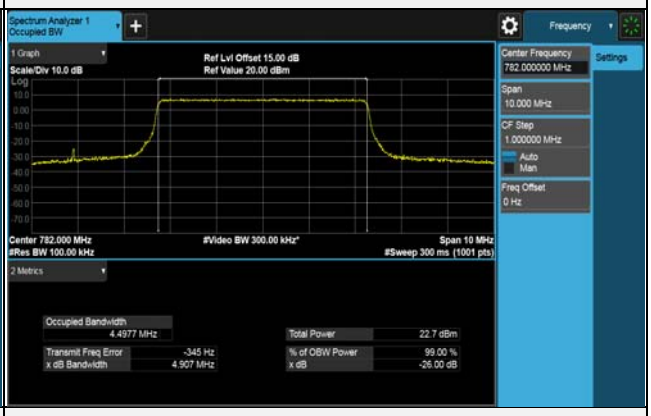
LTE Band 12 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23060	704	8.9781	9.588
QPSK	23095	707.5	8.9732	9.573
QPSK	23130	711	8.9686	9.557
16QAM	23060	704	8.9760	9.547
16QAM	23095	707.5	8.9696	9.589
16QAM	23130	711	8.9660	9.548
64QAM	23060	704	8.9767	9.552
64QAM	23095	707.5	8.9698	9.536
64QAM	23130	711	8.9689	9.531

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 23060 (704MHz)	16QAM CH 23095 (707.5MHz)

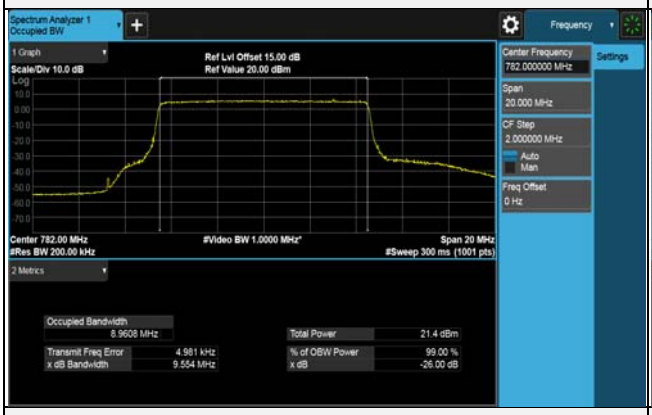
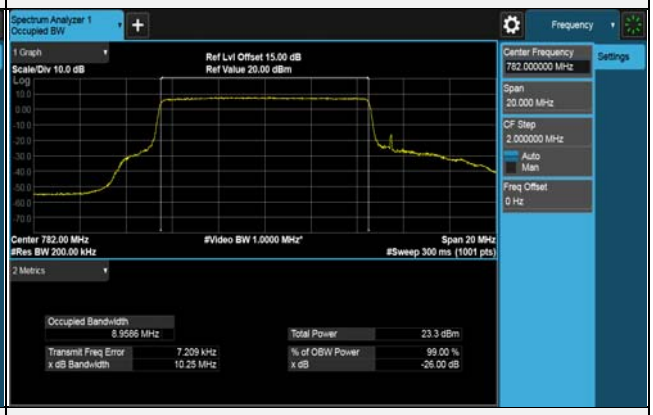
LTE Band 13 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23205	779.5	4.4905	4.856
QPSK	23230	782	4.4895	4.847
QPSK	23255	784.5	4.5000	4.867
16QAM	23205	779.5	4.4942	4.860
16QAM	23230	782	4.4977	4.907
16QAM	23255	784.5	4.4982	4.850
64QAM	23205	779.5	4.4911	4.898
64QAM	23230	782	4.4907	4.851
64QAM	23255	784.5	4.4959	4.902

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 23255 (784.5MHz)	16QAM CH 23230 (782MHz)

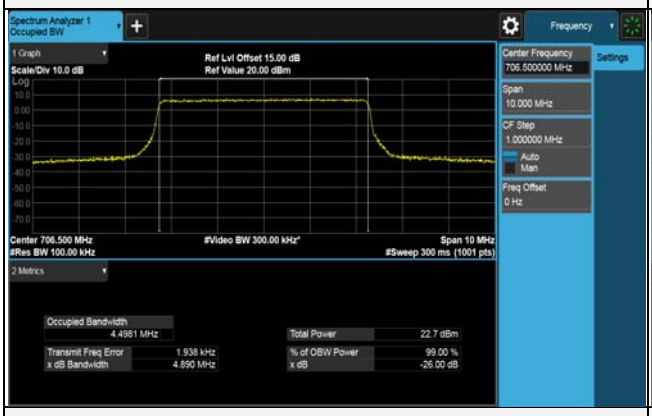
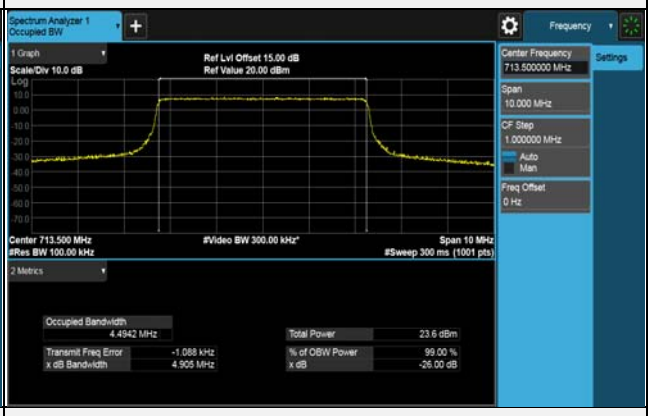
LTE Band 13 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23230	782	8.9586	10.247
16QAM	23230	782	8.9595	9.528
64QAM	23230	782	8.9608	9.554

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 23230 (782MHz)	QPSK CH 23230 (782MHz)

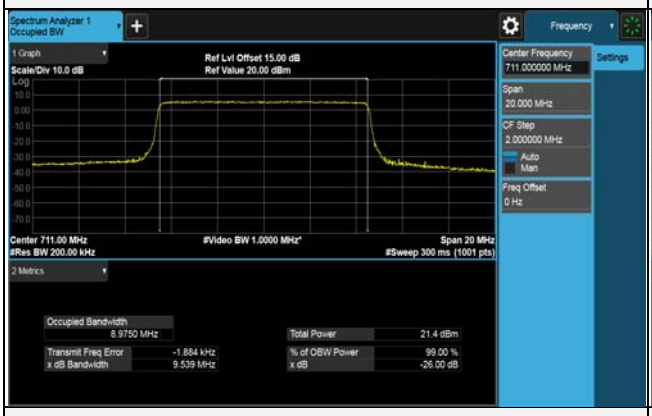
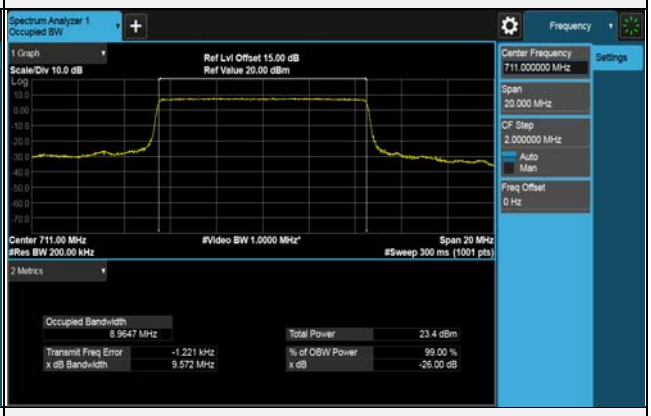
LTE Band 17 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23755	706.5	4.4955	4.876
QPSK	23790	710	4.4922	4.900
QPSK	23825	713.5	4.4942	4.905
16QAM	23755	706.5	4.4981	4.890
16QAM	23790	710	4.4964	4.872
16QAM	23825	713.5	4.4974	4.900
64QAM	23755	706.5	4.4955	4.862
64QAM	23790	710	4.4933	4.870
64QAM	23825	713.5	4.4941	4.892

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
16QAM CH 23755 (706.5MHz)	QPSK CH 23825 (713.5MHz)

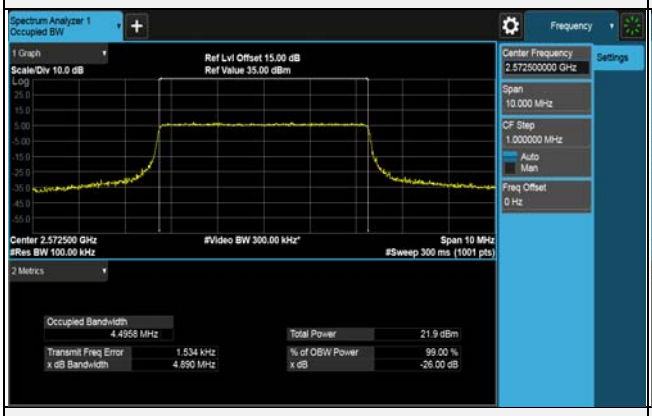
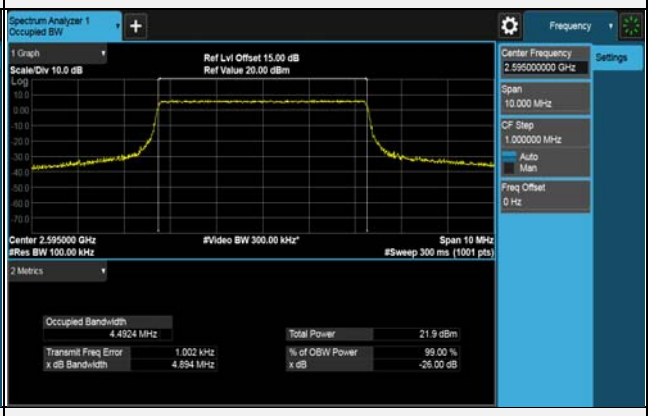
LTE Band 17 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23780	709	8.9654	9.571
QPSK	23790	710	8.9695	9.539
QPSK	23800	711	8.9647	9.572
16QAM	23780	709	8.9702	9.543
16QAM	23790	710	8.9629	9.554
16QAM	23800	711	8.9666	9.529
64QAM	23780	709	8.9663	9.513
64QAM	23790	710	8.9627	9.511
64QAM	23800	711	8.9750	9.539

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 23800 (711MHz)	QPSK CH 23800 (711MHz)

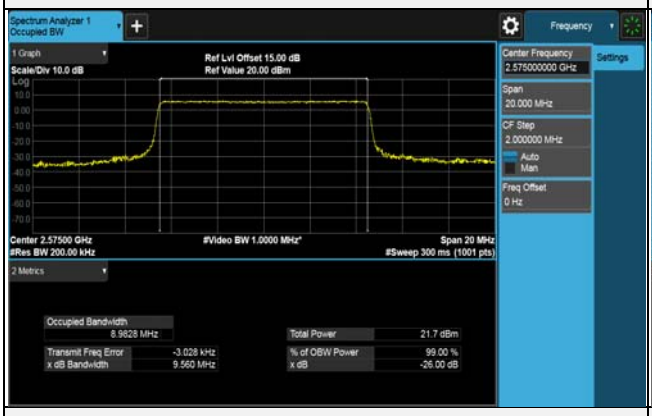
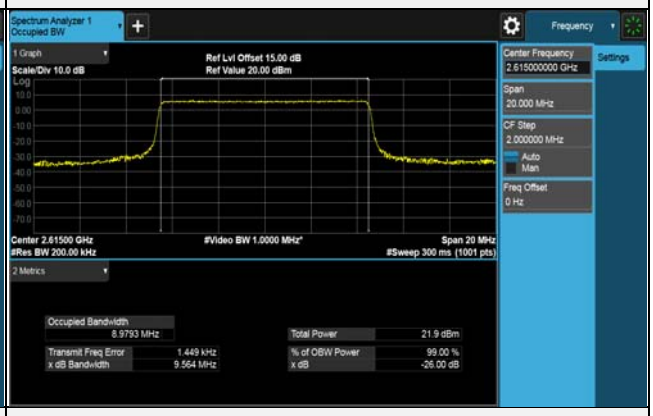
LTE Band 38 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	37775	2572.5	4.4958	4.890
QPSK	38000	2595	4.4924	4.894
QPSK	38225	2617.5	4.4940	4.870
16QAM	37775	2572.5	4.4943	4.874
16QAM	38000	2595	4.4935	4.886
16QAM	38225	2617.5	4.4909	4.887
64QAM	37775	2572.5	4.4934	4.830
64QAM	38000	2595	4.4956	4.863
64QAM	38225	2617.5	4.4911	4.838

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 37775 (2572.5MHz)	QPSK CH 38000 (2595MHz)

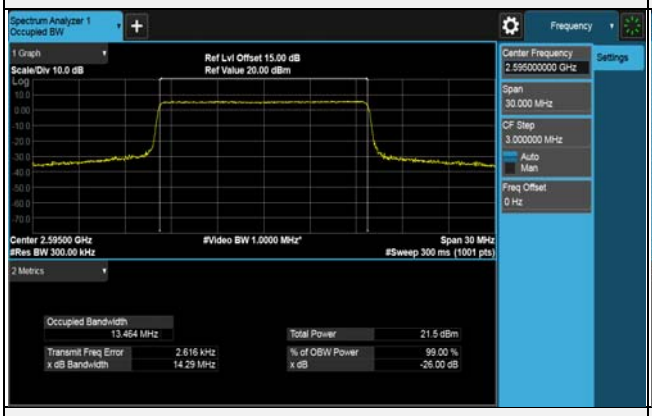
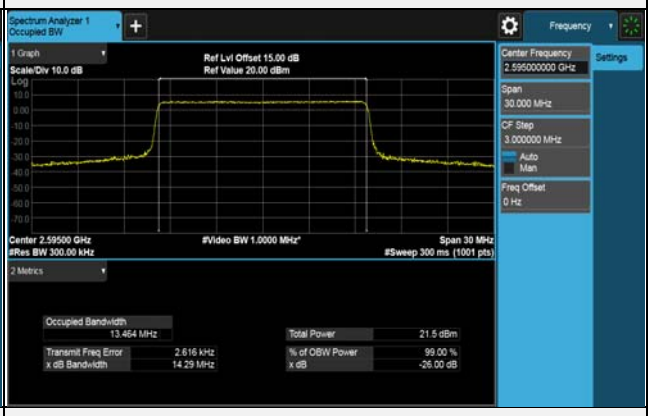
LTE Band 38 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	37800	2575	8.9828	9.560
QPSK	38000	2595	8.9753	9.542
QPSK	38200	2615	8.9793	9.564
16QAM	37800	2575	8.9821	9.555
16QAM	38000	2595	8.9780	9.516
16QAM	38200	2615	8.9800	9.537
64QAM	37800	2575	8.9761	9.536
64QAM	38000	2595	8.9743	9.541
64QAM	38200	2615	8.9753	9.542

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 37800 (2575MHz)	QPSK CH 38200 (2615MHz)

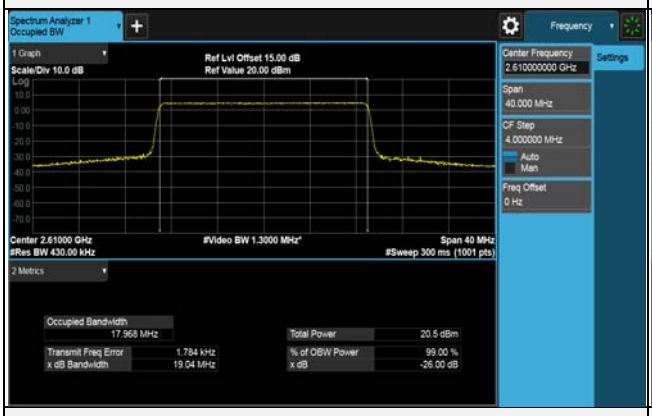
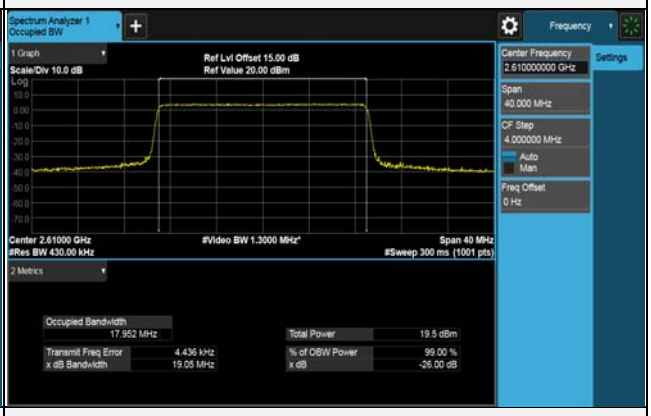
LTE Band 38 (Channel Bandwidth 15MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	37825	2577.5	13.456	14.27
QPSK	38000	2595	13.464	14.29
QPSK	38175	2612.5	13.455	14.28
16QAM	37825	2577.5	13.460	14.24
16QAM	38000	2595	13.463	14.24
16QAM	38175	2612.5	13.459	14.23
64QAM	37825	2577.5	13.457	14.25
64QAM	38000	2595	13.459	14.23
64QAM	38175	2612.5	13.451	14.24

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 38000 (2595MHz)	QPSK CH 38000 (2595MHz)

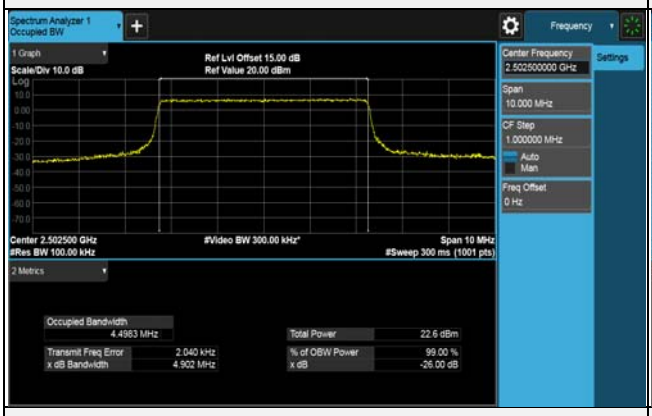
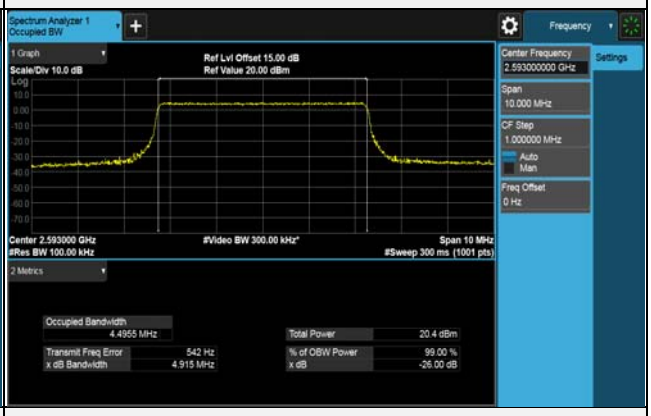
LTE Band 38 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	37850	2580	17.963	19.04
QPSK	38000	2595	17.967	19.04
QPSK	38150	2610	17.948	19.03
16QAM	37850	2580	17.960	19.03
16QAM	38000	2595	17.954	19.04
16QAM	38150	2610	17.968	19.04
64QAM	37850	2580	17.963	19.04
64QAM	38000	2595	17.955	19.03
64QAM	38150	2610	17.952	19.05

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
16QAM CH 38150 (2610MHz)	64QAM CH 38150 (2610MHz)

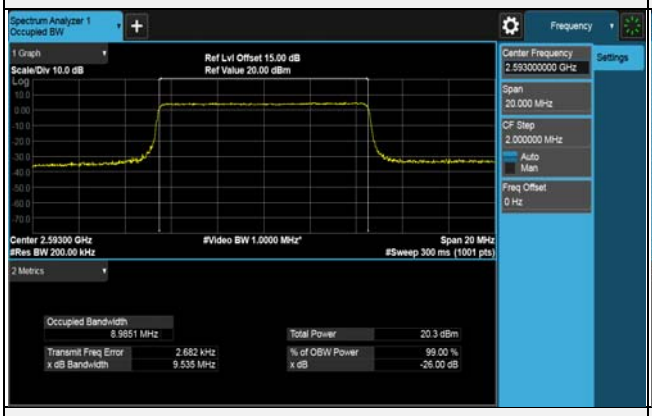
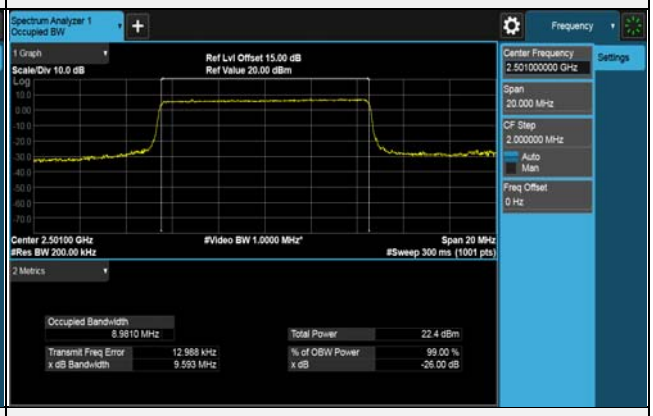
LTE Band 41 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	39675	2498.5	4.4922	4.862
QPSK	40620	2593	4.4915	4.904
QPSK	41565	2687.5	4.4920	4.857
16QAM	39675	2498.5	4.4915	4.900
16QAM	40620	2593	4.4933	4.814
16QAM	41565	2687.5	4.4934	4.864
64QAM	39675	2498.5	4.4950	4.882
64QAM	40620	2593	4.4955	4.915
64QAM	41565	2687.5	4.4943	4.875

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 39715 (2502.5MHz)	64QAM CH 40620 (2593MHz)

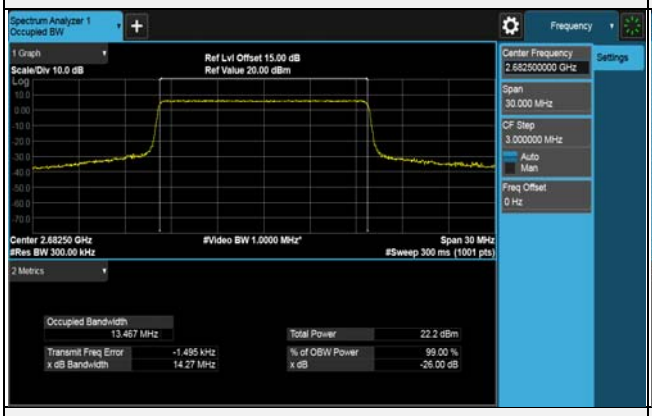
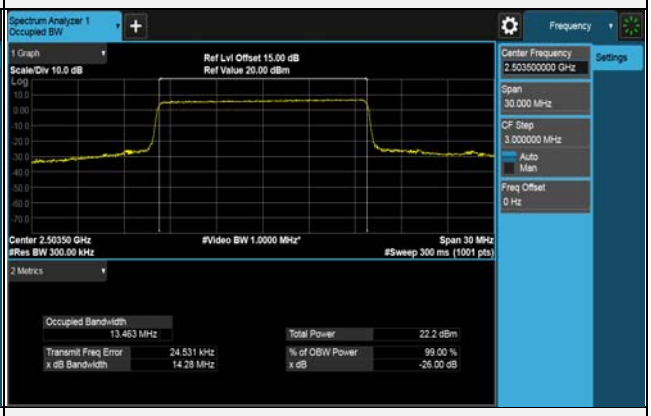
LTE Band 41 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	39700	2501	8.9810	9.593
QPSK	40620	2593	8.9817	9.507
QPSK	41540	2685	8.9796	9.573
16QAM	39700	2501	8.9792	9.537
16QAM	40620	2593	8.9793	9.584
16QAM	41540	2685	8.9844	9.535
64QAM	39700	2501	8.9834	9.554
64QAM	40620	2593	8.9851	9.535
64QAM	41540	2685	8.9784	9.573

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
64QAM CH 40620 (2593MHz)	QPSK CH 39700 (2501MHz)

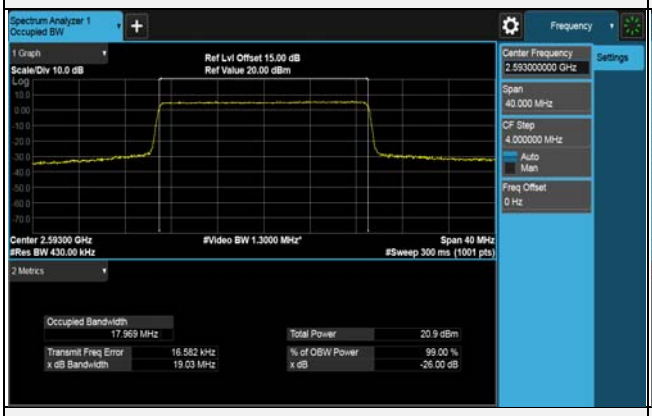
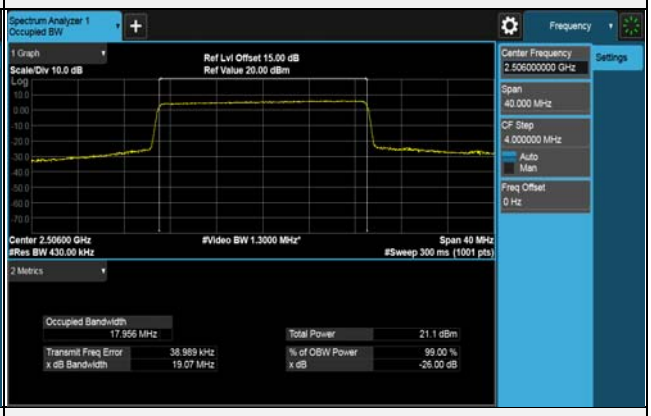
LTE Band 41 (Channel Bandwidth 15MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	39725	2503.5	13.463	14.28
QPSK	40620	2593	13.457	14.25
QPSK	41515	2682.5	13.467	14.27
16QAM	39725	2503.5	13.462	14.23
16QAM	40620	2593	13.465	14.25
16QAM	41515	2682.5	13.461	14.25
64QAM	39725	2503.5	13.454	14.24
64QAM	40620	2593	13.459	14.27
64QAM	41515	2682.5	13.456	14.25

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
QPSK CH 41515 (2682.5MHz)	QPSK CH 39725 (2503.5MHz)

LTE Band 41 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	39750	2506	17.954	19.05
QPSK	40620	2593	17.963	19.07
QPSK	41490	2680	17.958	19.02
16QAM	39750	2506	17.956	19.07
16QAM	40620	2593	17.969	19.03
16QAM	41490	2680	17.957	19.04
64QAM	39750	2506	17.946	19.02
64QAM	40620	2593	17.954	19.04
64QAM	41490	2680	17.960	19.04

Spectrum Plot of Worst Value	
Occupied bandwidth	26dB Bandwidth
	
16QAM CH 40620 (2593MHz)	16QAM CH 39750 (2506MHz)

4.5 Channel Edge / Out-of-Band Emissions Measurement

4.5.1 Limits of Band Edge / Out-of-Band Emissions Measurement

For WCDMA Band 4, LTE Band 4:
According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz, 1915-1920MHz, 1995-2000 MHz, 2000-2020MHz, 2110-2155MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log (P) dB. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

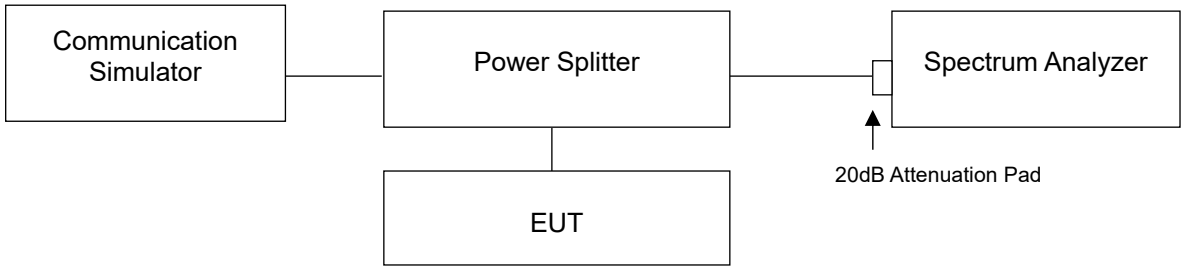
For LTE Band 7, LTE Band 38, LTE Band 41:
According to FCC 27.53(m)(4) regulations, any transmit power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5MHz. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

For LTE Band 12, LTE Band 17:
According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 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 LTE Band 13:
According to FCC 27.53(c)(2), for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) 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.

According to 27.53(c)(4), on all frequencies between 763-775MHz and 793-805MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations

4.5.2 Test Setup



4.5.3 Test Procedures

a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. Band edge measurements were done at 2 channels: low and high operational frequency range.

b. Measurement refer to ANSI C63.26 section 5.7.2 and FCC Part 27 section 27.53.

c. Record the max trace plot into the test report.

4.5.4 Test Results

WCDMA

	
1712.4MHz	1752.6MHz

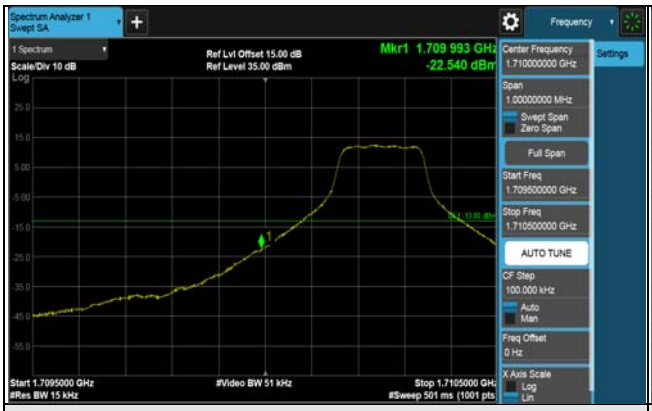
HSDPA

	
1712.4MHz	1752.6MHz

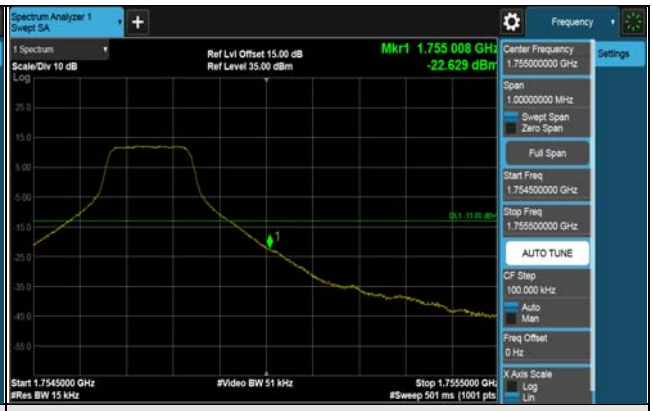
HSUPA

	
1712.4MHz	1752.6MHz

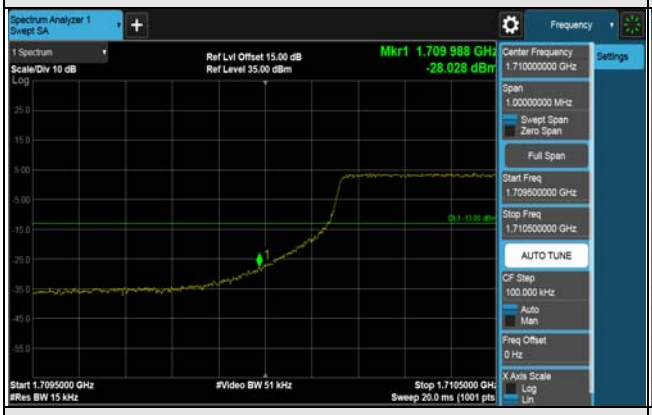
LTE Band 4 (Channel Bandwidth 1.4MHz)



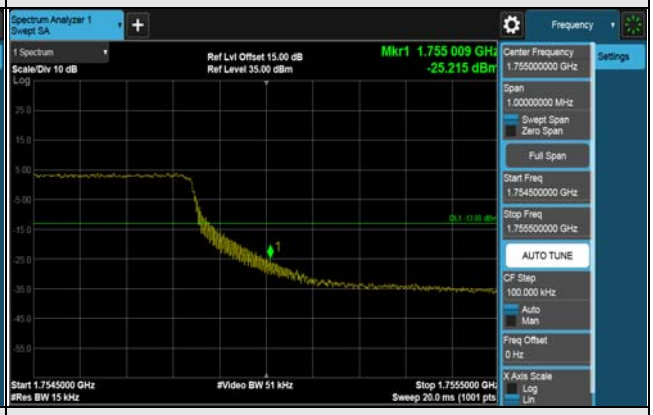
VRB (1710.7MHz)



VRB (1754.3MHz)

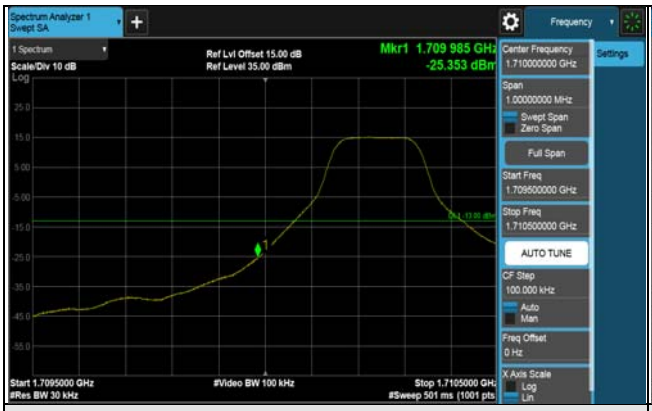


FULL (1710.7MHz)

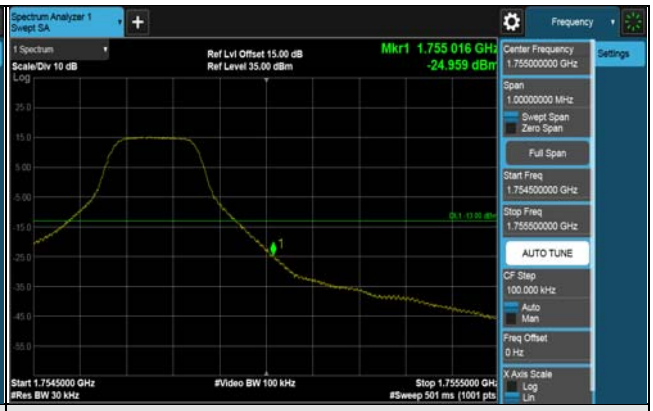


FULL (1754.3MHz)

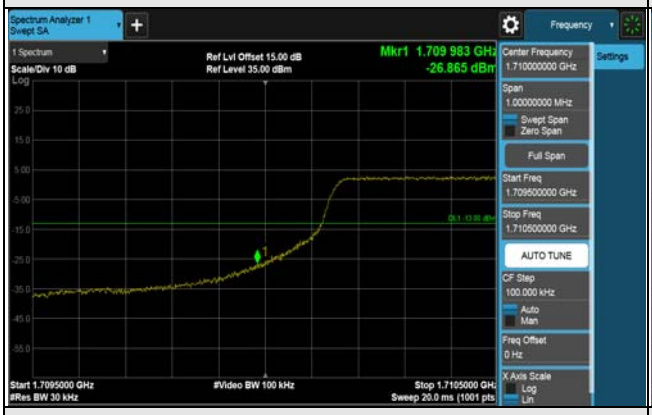
LTE Band 4 (Channel Bandwidth 3MHz)



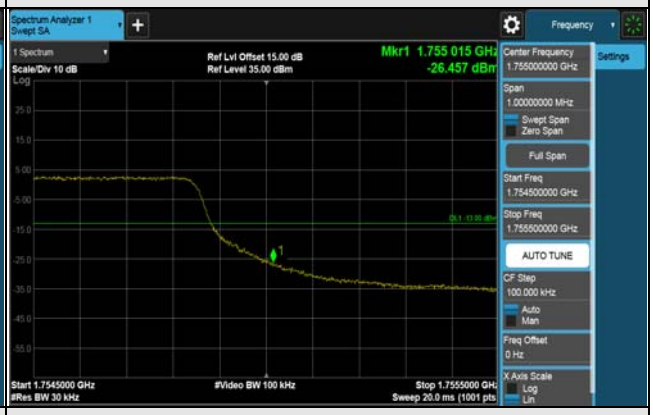
VRB (1711.5MHz)



VRB (1753.5MHz)



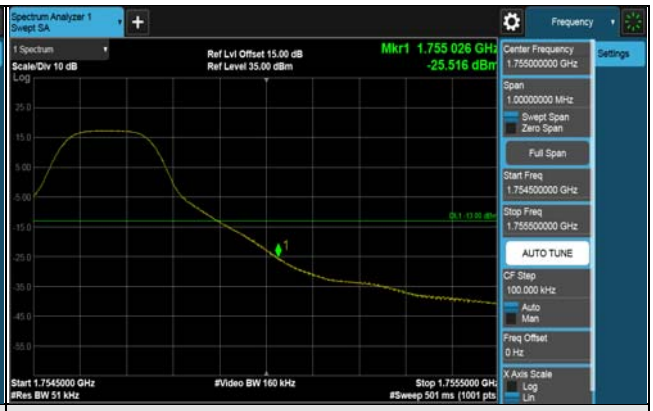
FULL (1711.5MHz)



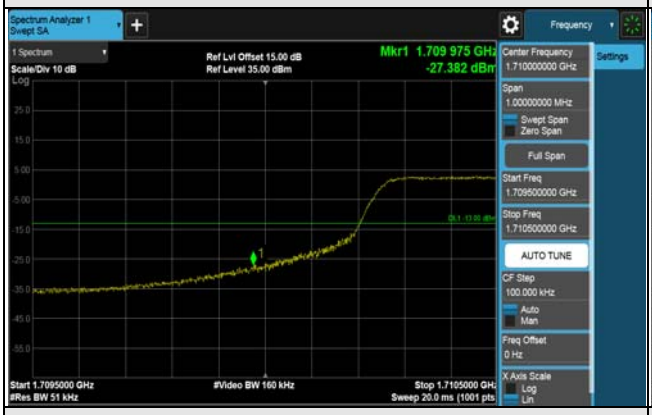
FULL (1753.5MHz)

LTE Band 4 (Channel Bandwidth 5MHz)

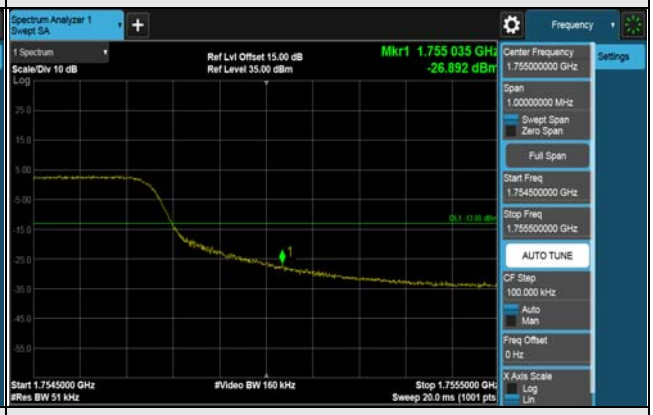
VRB (1712.5MHz)



VRB (1752.5MHz)

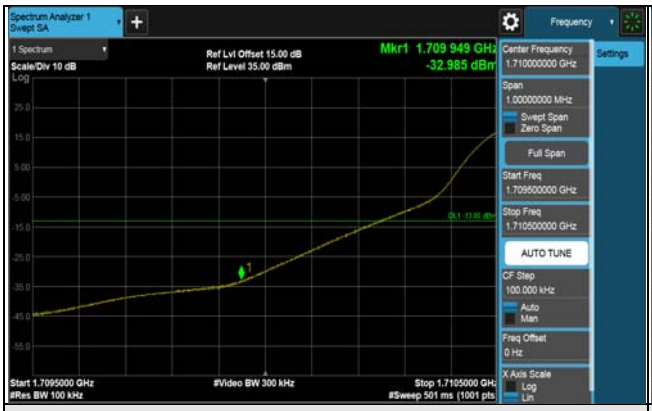


FULL (1712.5MHz)

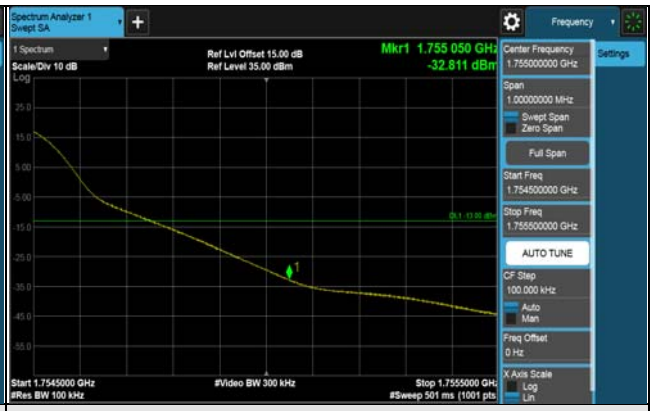


FULL (1752.5MHz)

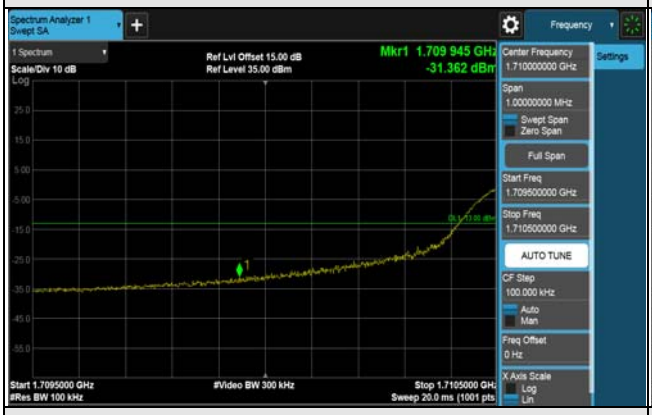
LTE Band 4 (Channel Bandwidth 10MHz)



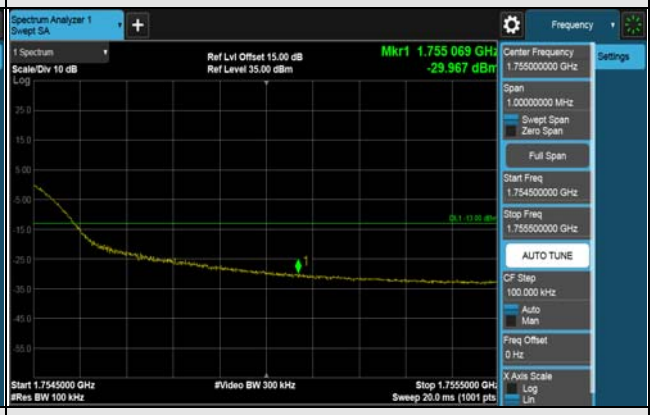
VRB (1715MHz)



VRB (1750MHz)

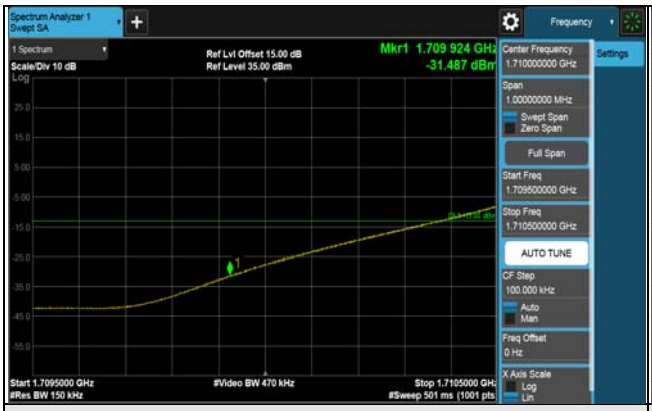


FULL (1715MHz)

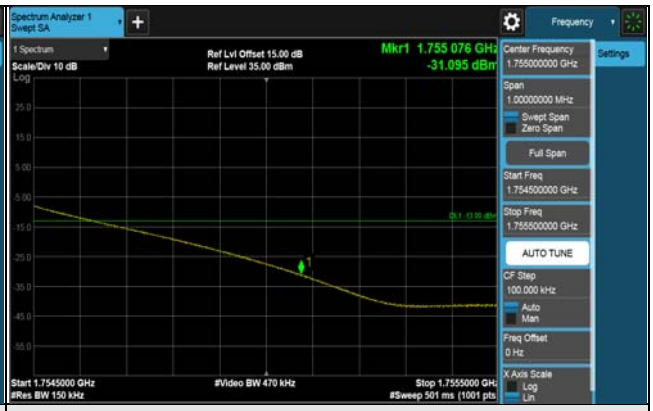


FULL (1750MHz)

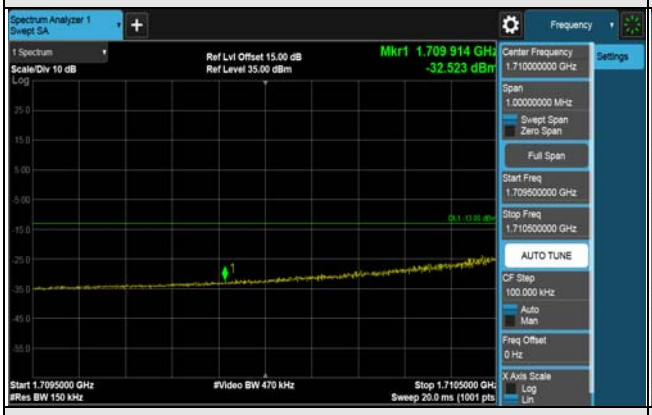
LTE Band 4 (Channel Bandwidth 15MHz)



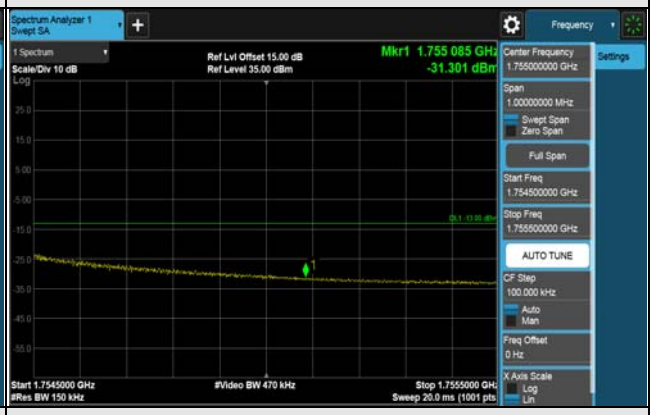
VRB (1717.5MHz)



VRB (1747.5MHz)

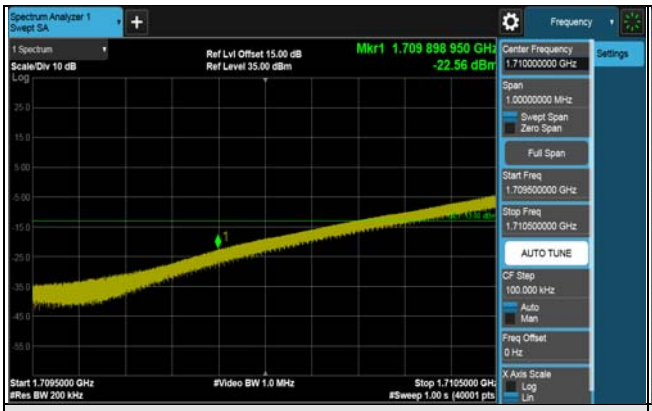


FULL (1717.5MHz)

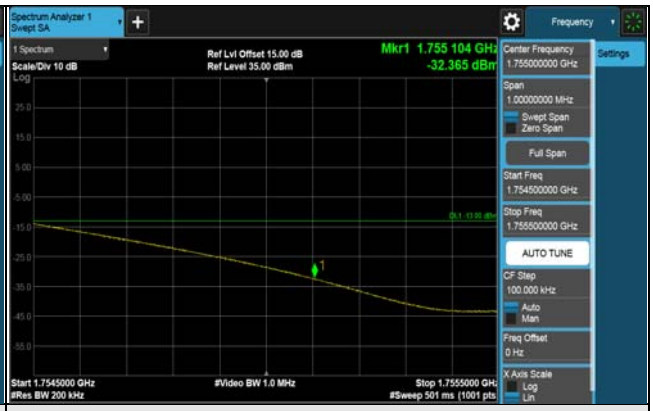


FULL (1747.5MHz)

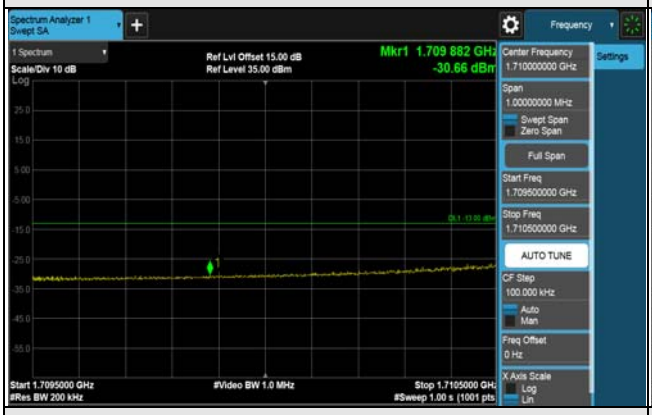
LTE Band 4 (Channel Bandwidth 20MHz)



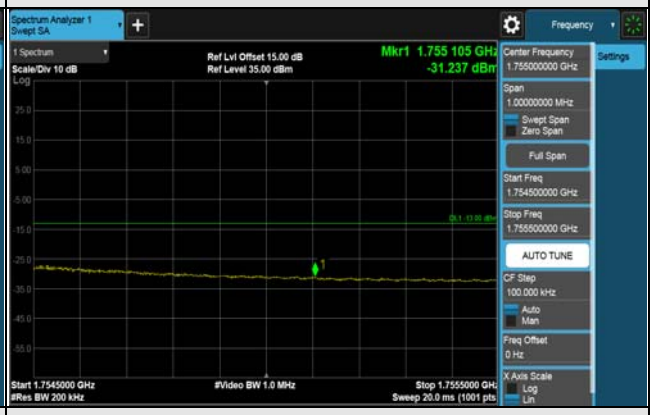
VRB (1720MHz)



VRB (1745MHz)

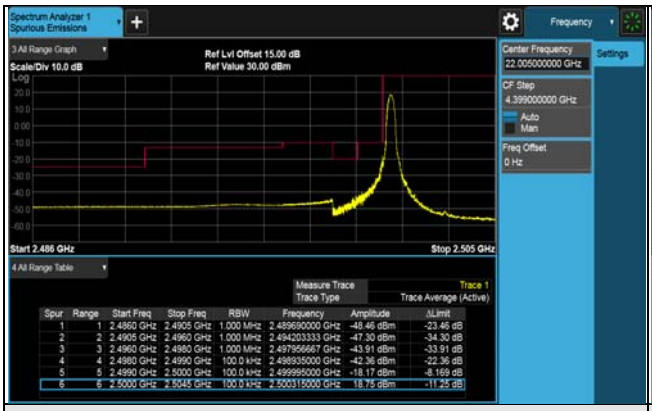


FULL (1720MHz)

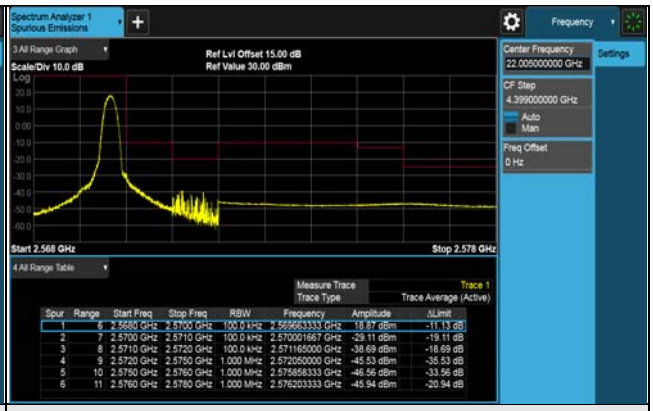


FULL (1745MHz)

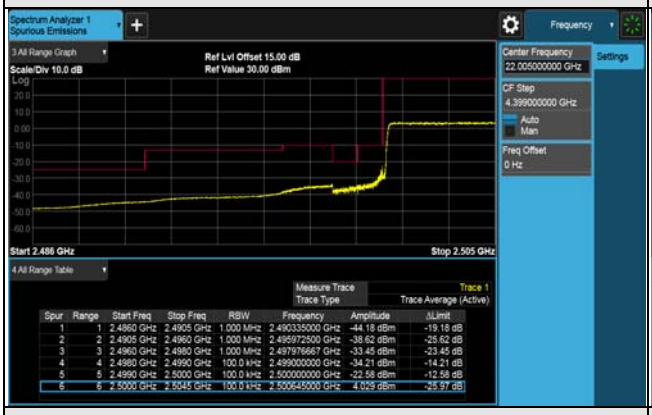
LTE Band 7 (Channel Bandwidth 5MHz)



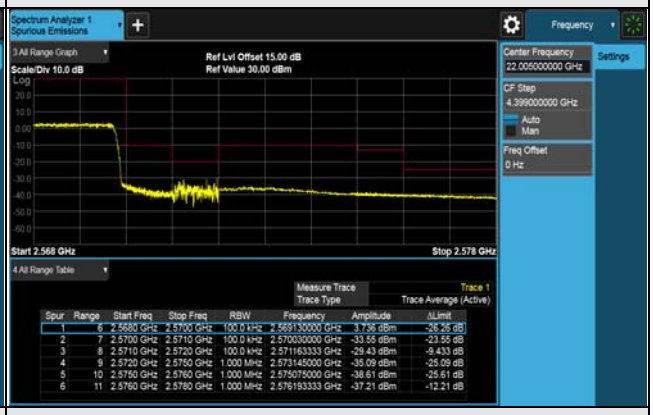
VRB (2502.5MHz)



VRB (2567.5MHz)

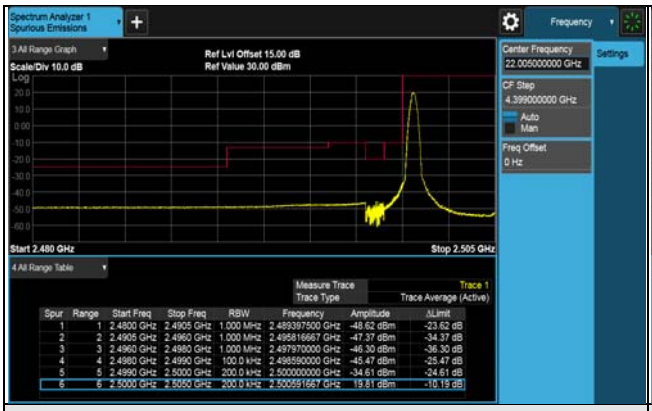


FULL (2502.5MHz)



FULL (2567.5MHz)

LTE Band 7 (Channel Bandwidth 10MHz)



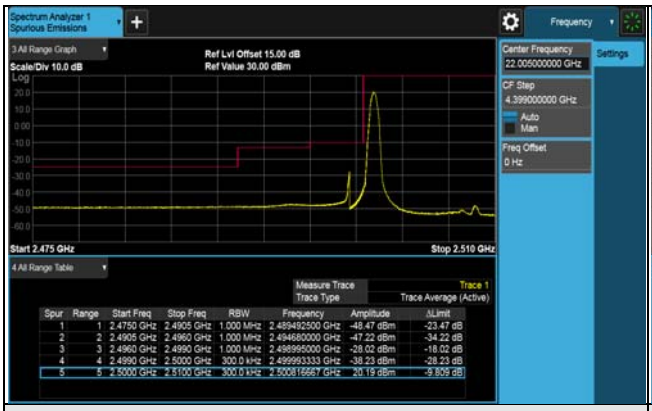
VRB (2505MHz)

VRB (2565MHz)

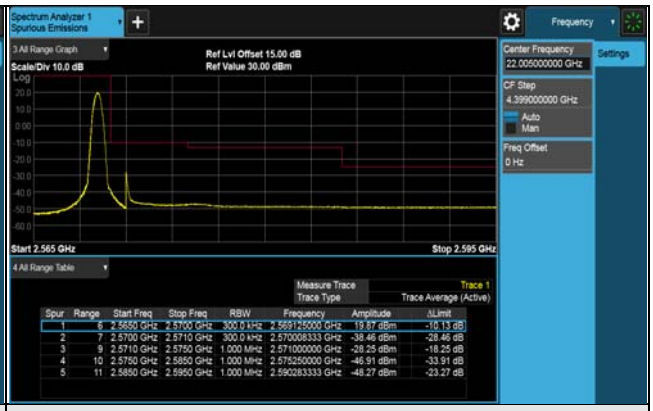
FULL (2505MHz)

FULL (2565MHz)

LTE Band 7 (Channel Bandwidth 15MHz)

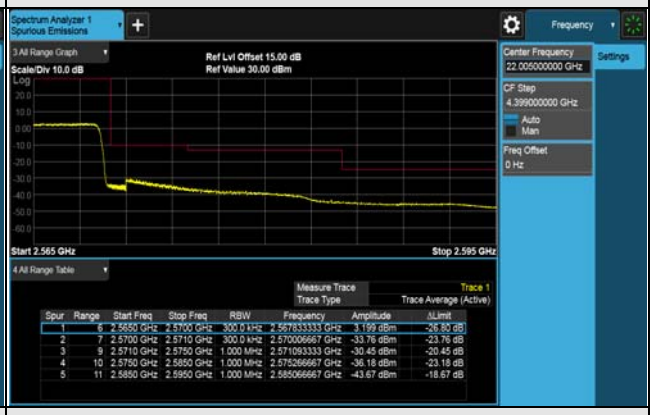


VRB (2507.5MHz)



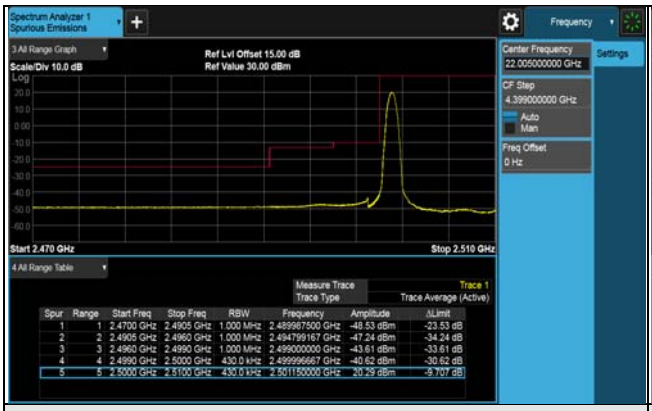
VRB (2562.5MHz)

FULL (2507.5MHz)

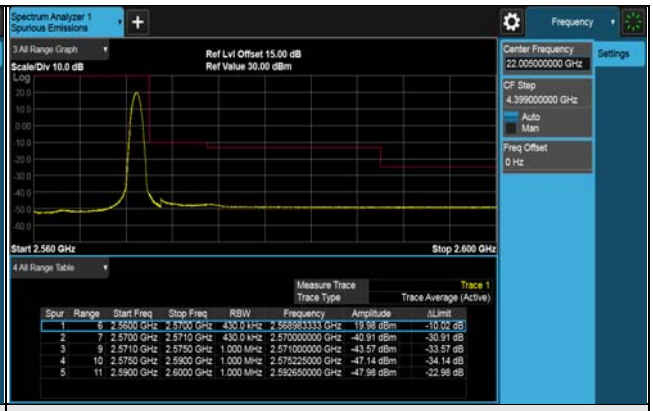


FULL (2562.5MHz)

LTE Band 7 (Channel Bandwidth 20MHz)



VRB (2510MHz)

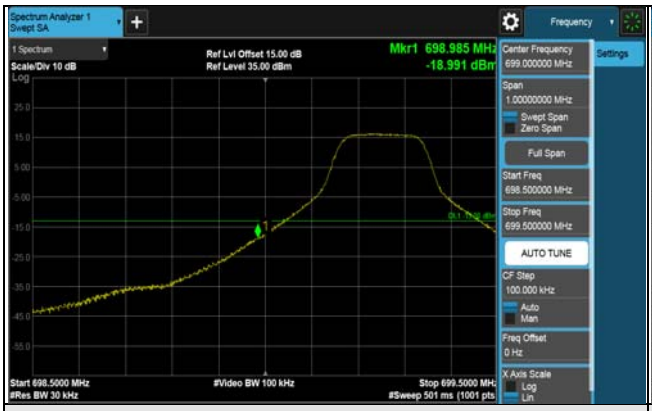


VRB (2560MHz)

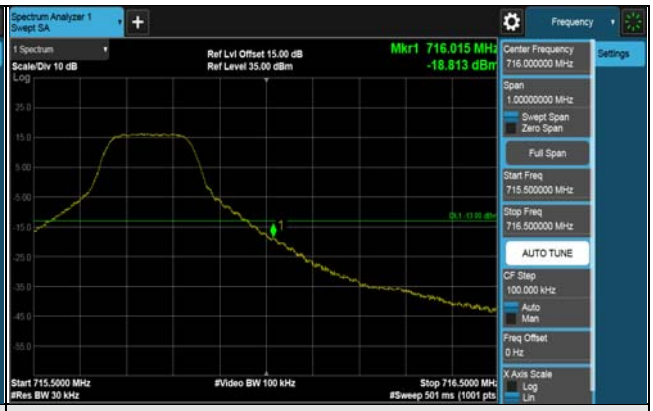
FULL (2510MHz)

FULL (2560MHz)

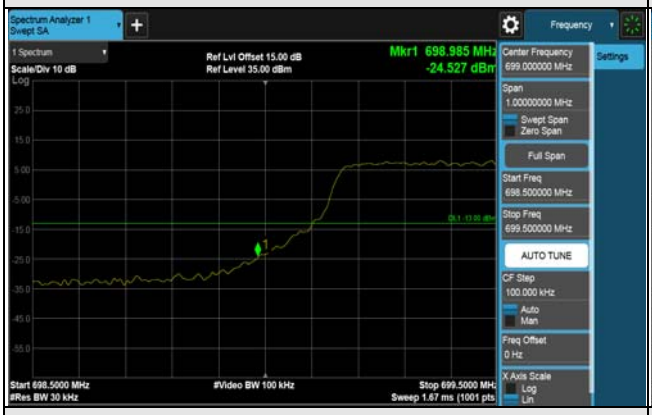
LTE Band 12 (Channel Bandwidth 1.4MHz)



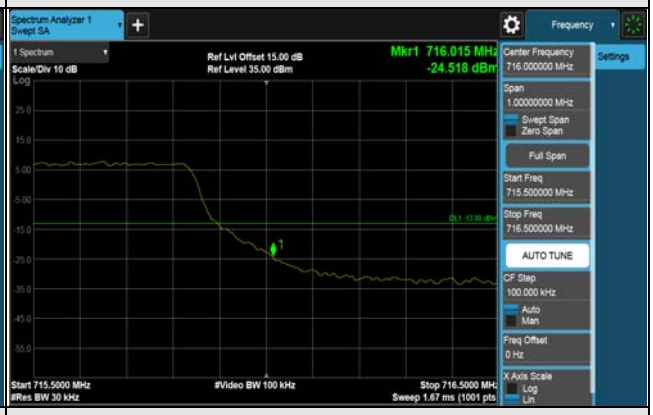
VRB (699.7MHz)



VRB (715.3MHz)

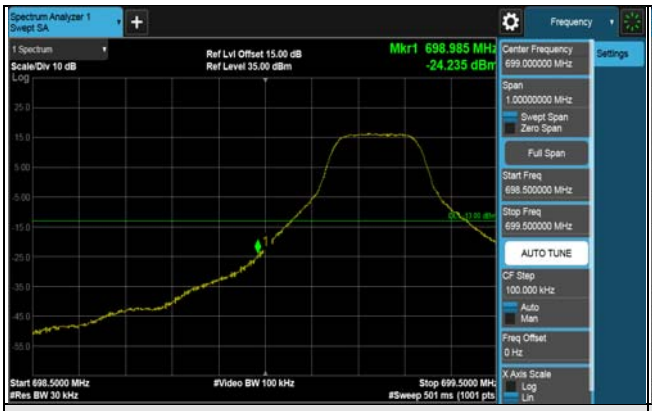


FULL (699.7MHz)

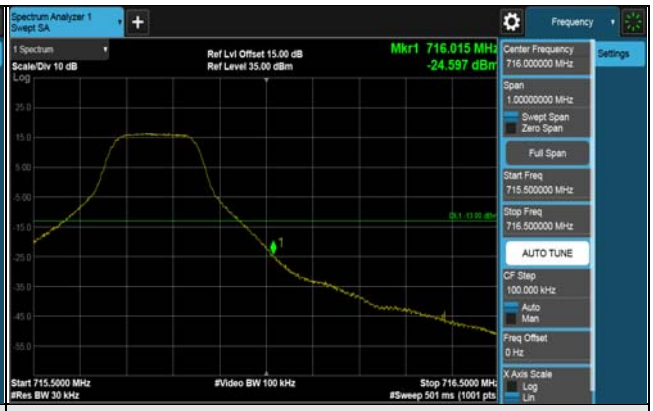


FULL (715.3MHz)

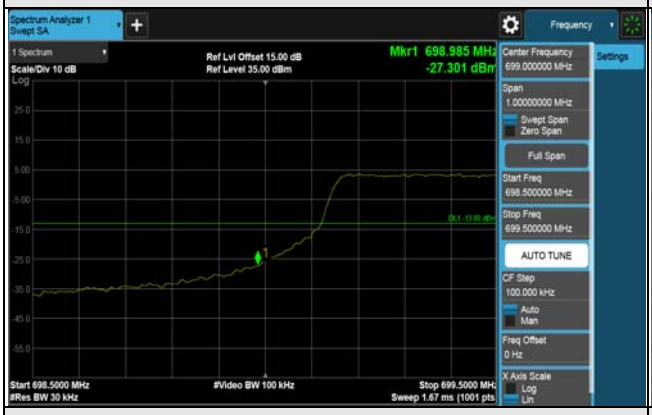
LTE Band 12 (Channel Bandwidth 3MHz)



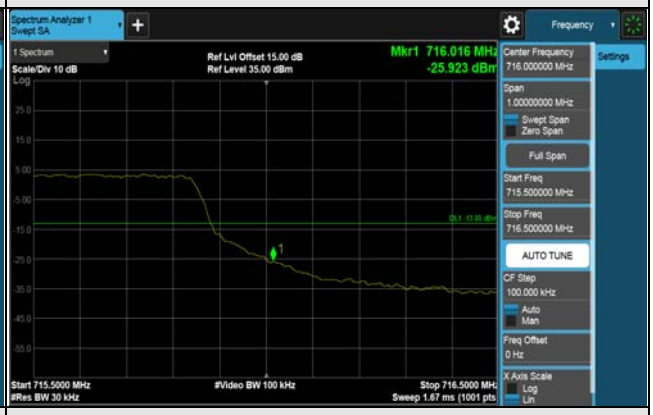
VRB (700.5MHz)



VRB (714.5MHz)



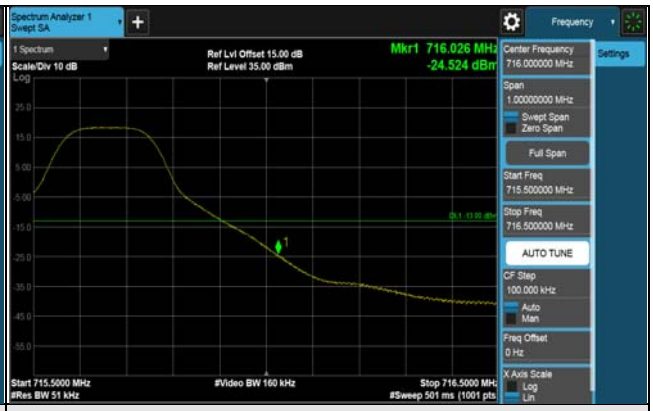
FULL (700.5MHz)



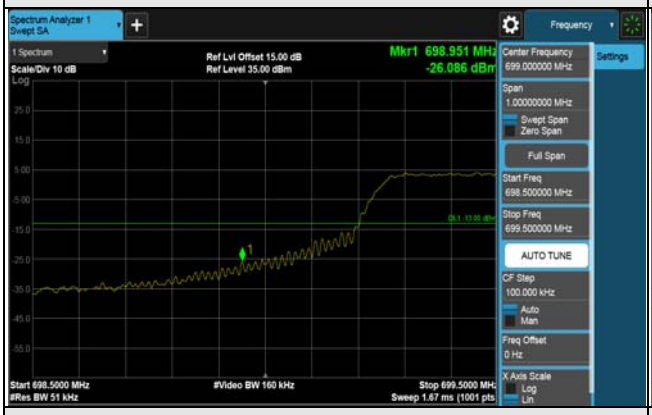
FULL (714.5MHz)

LTE Band 12 (Channel Bandwidth 5MHz)

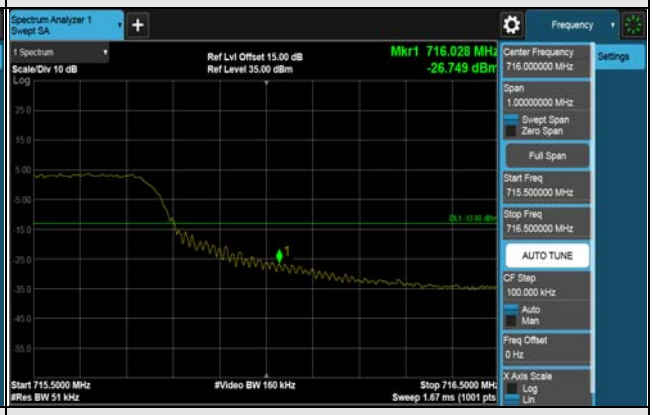
VRB (701.5MHz)



VRB (713.5MHz)

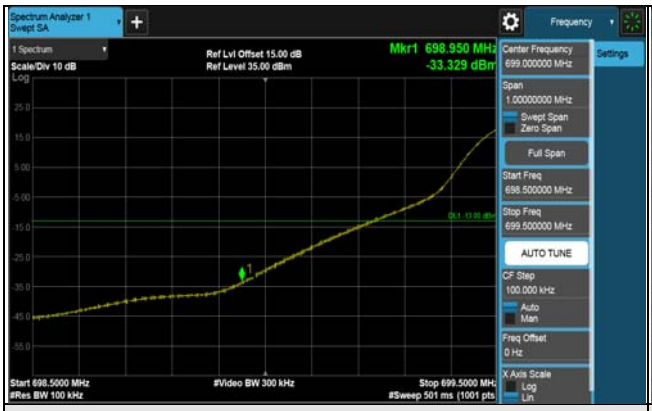


FULL (701.5MHz)

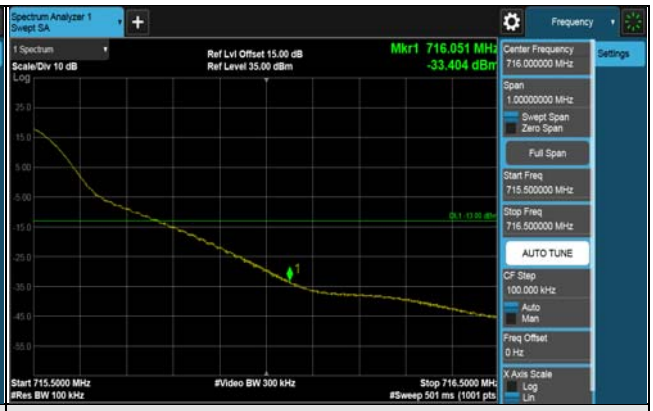


FULL (713.5MHz)

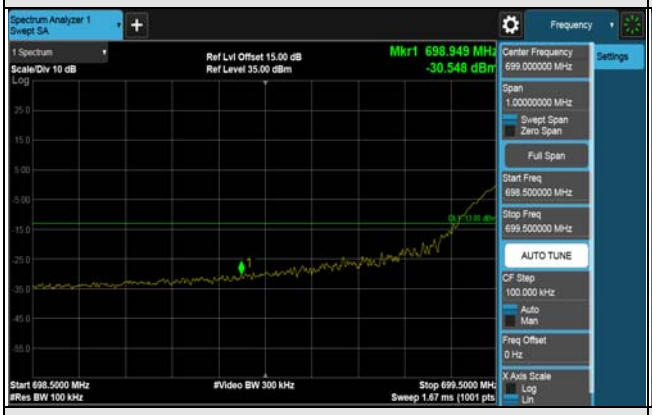
LTE Band 12 (Channel Bandwidth 10MHz)



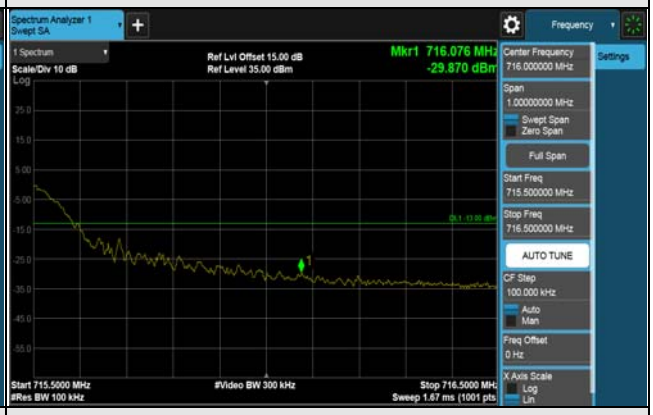
VRB (704MHz)



VRB (711MHz)

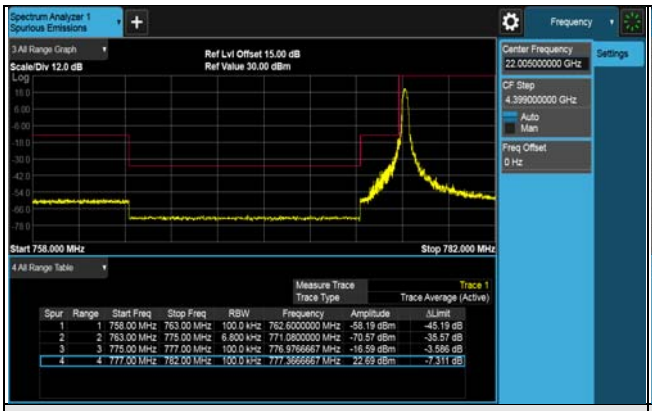


FULL (704MHz)

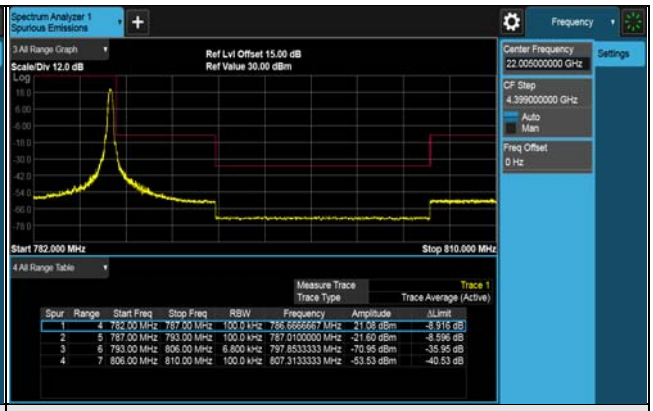


FULL (711MHz)

LTE Band 13 (Channel Bandwidth 5MHz)



VRB (779.5MHz)

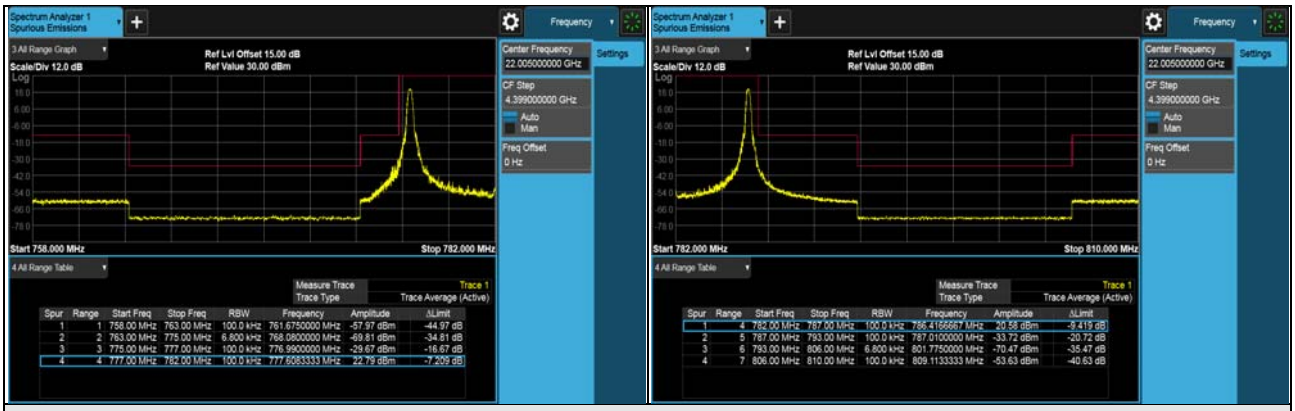


VRB (784.5MHz)

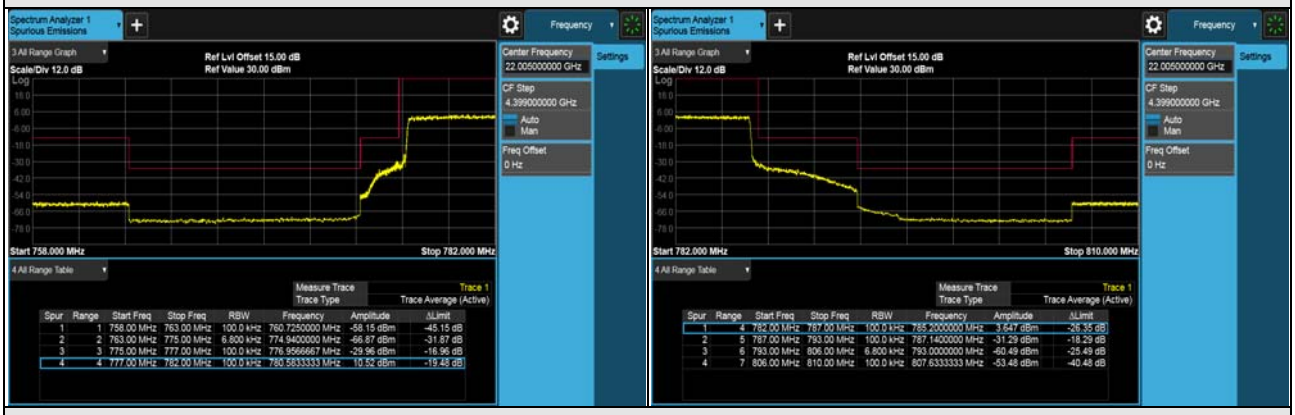
FULL (779.5MHz)

FULL (784.5MHz)

LTE Band 13 (Channel Bandwidth 10MHz)



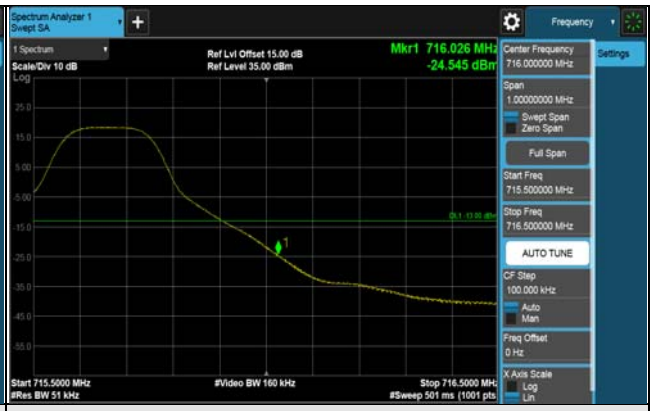
VRB (782MHz)



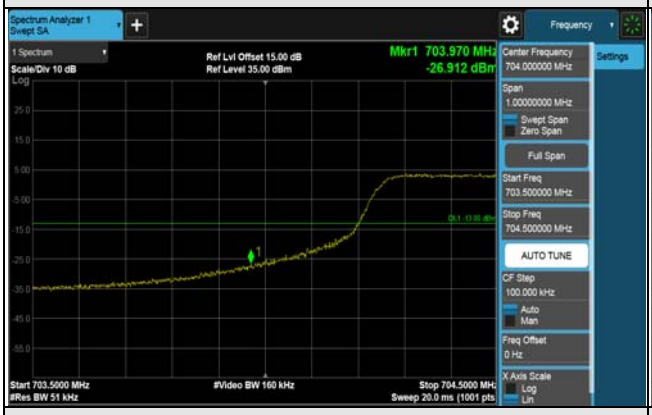
FULL (782MHz)

LTE Band 17 (Channel Bandwidth 5MHz)

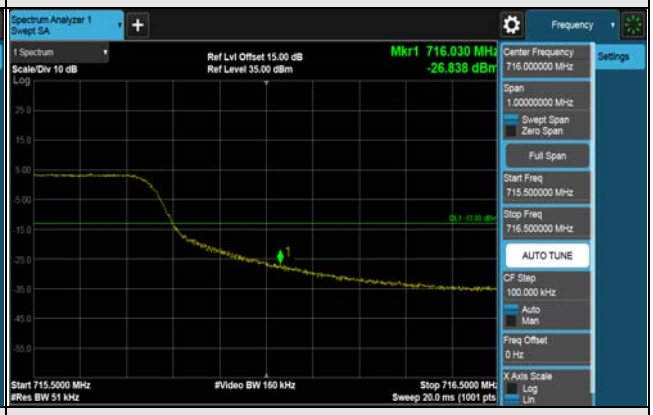
VRB (706.5MHz)



VRB (713.5MHz)



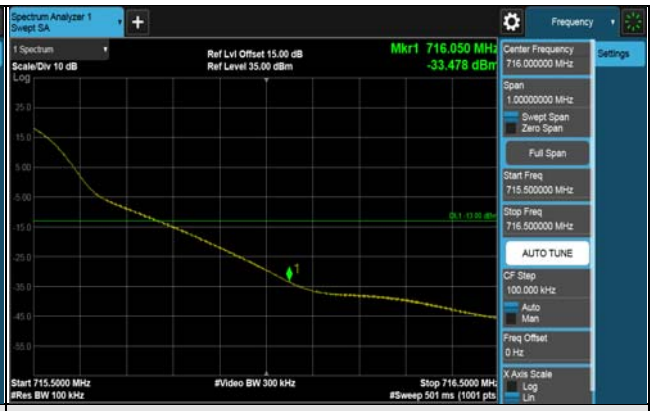
FULL (706.5MHz)



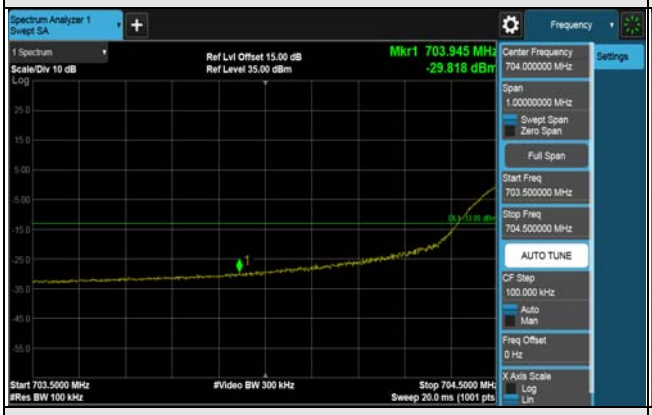
FULL (713.5MHz)

LTE Band 17 (Channel Bandwidth 10MHz)

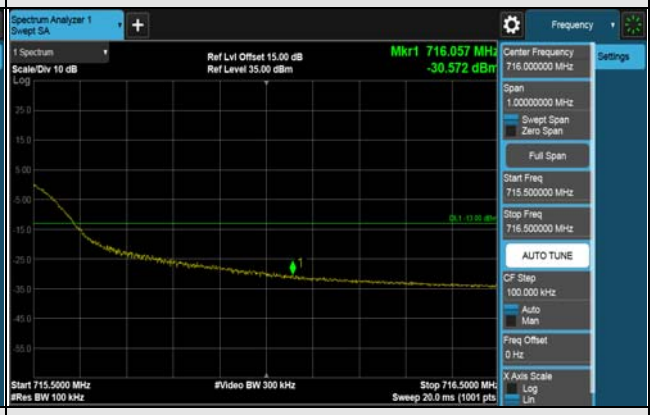
VRB (709MHz)



VRB (711MHz)

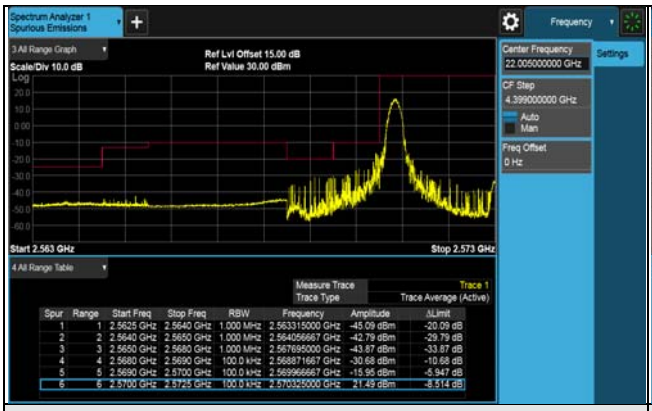


FULL (709MHz)

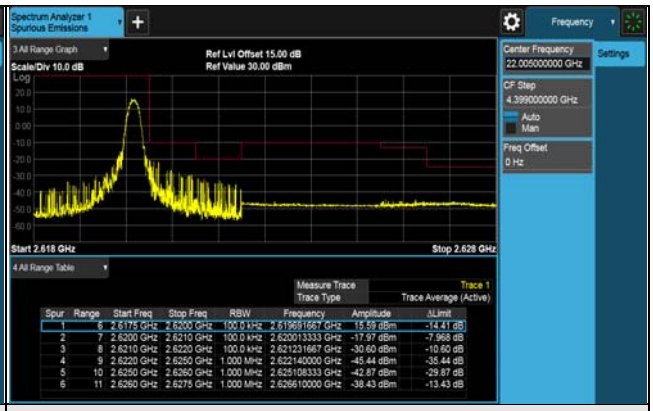


FULL (711MHz)

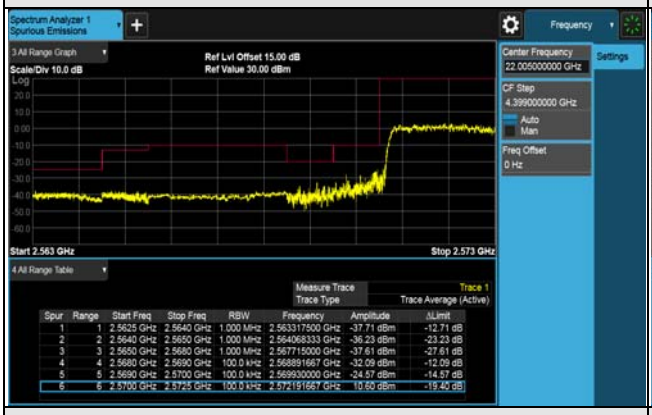
LTE Band 38 (Channel Bandwidth 5MHz)



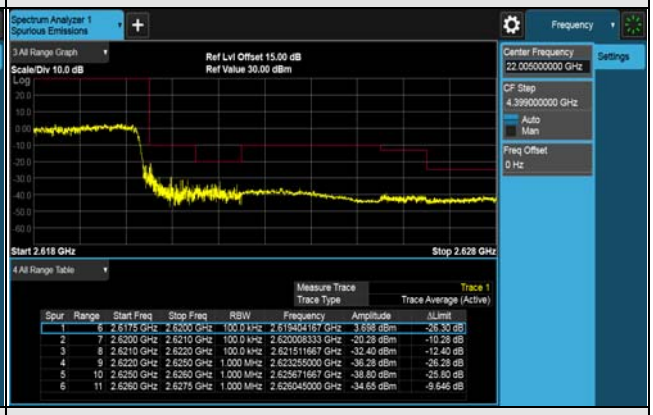
VRB (2572.5MHz)



VRB (2617.5MHz)

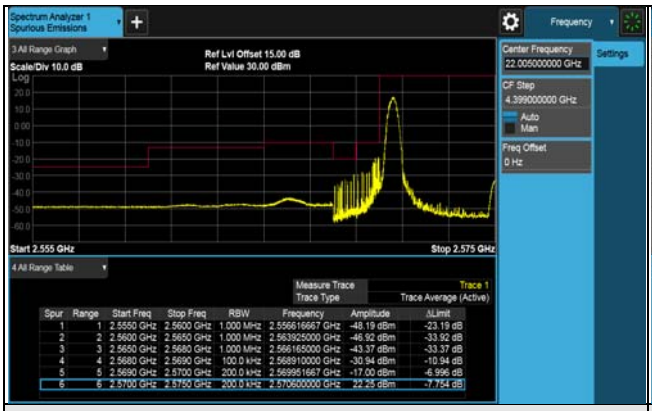


FULL (2572.5MHz)



FULL (2617.5MHz)

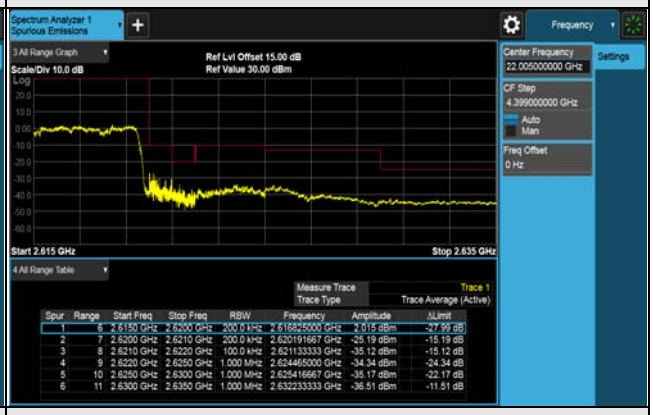
LTE Band 38 (Channel Bandwidth 10MHz)



VRB (2575MHz)

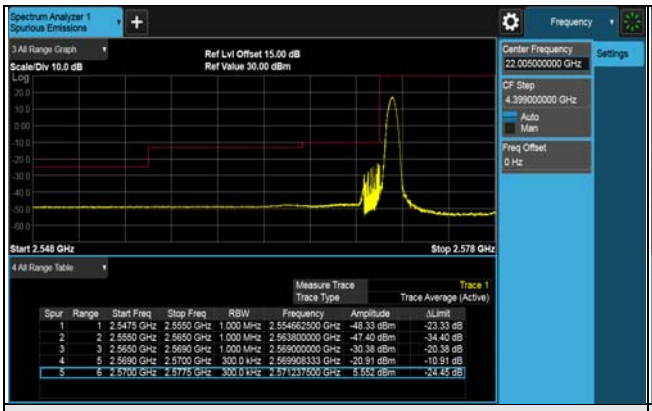
VRB (2615MHz)

FULL (2575MHz)



FULL (2615MHz)

LTE Band 38 (Channel Bandwidth 15MHz)



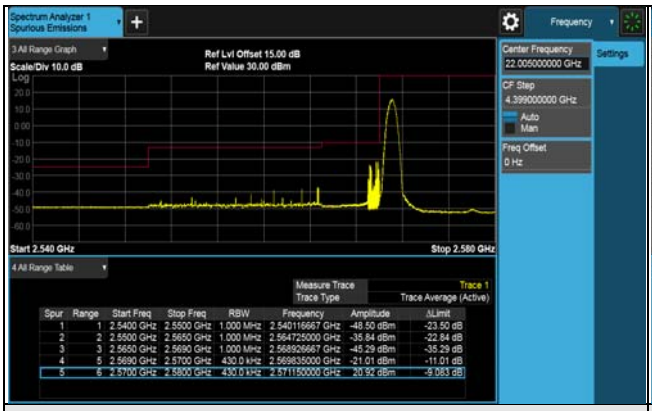
VRB (2577.5MHz)

VRB (2612.5MHz)

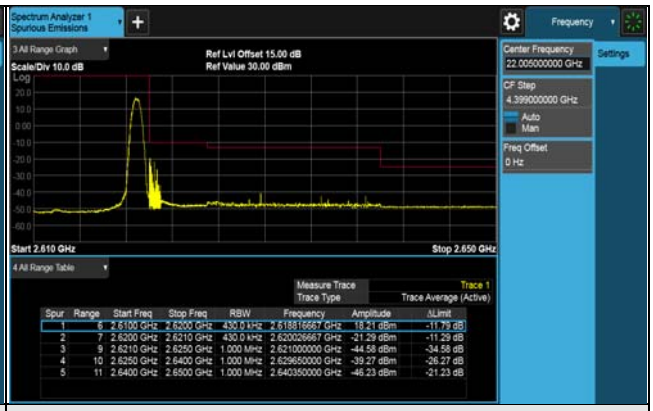
FULL (2577.5MHz)

FULL (2612.5MHz)

LTE Band 38 (Channel Bandwidth 20MHz)



VRB (2580MHz)

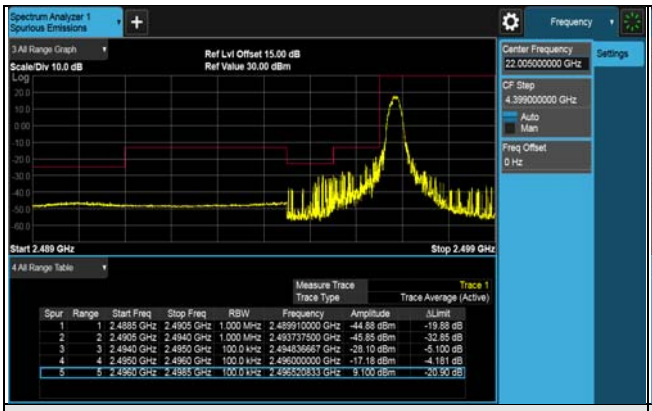


VRB (2610MHz)

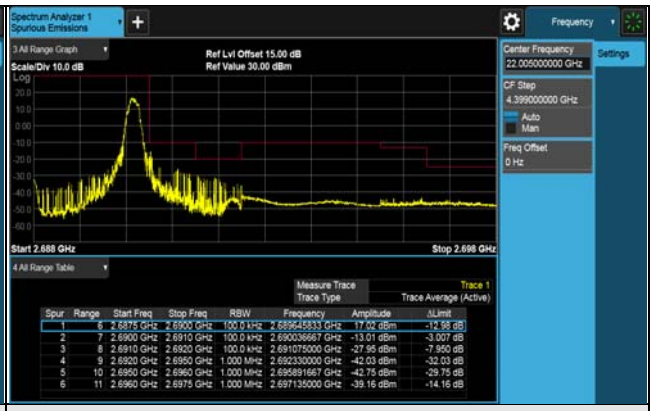
FULL (2580MHz)

FULL (2610MHz)

LTE Band 41 (Channel Bandwidth 5MHz)

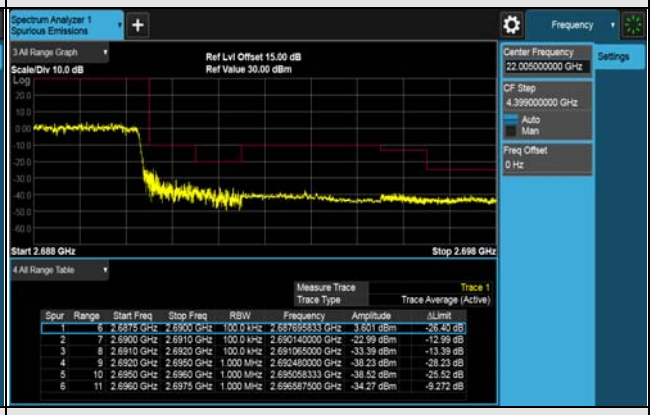


VRB (2498.5MHz)



VRB (2687.5MHz)

FULL (2498.5MHz)



FULL (2687.5MHz)