TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 24**
	47 CFR FCC Part 27
	47 CFR FCC Part 2
Report No.:	RFBEOE-WTW-P23060395-7
FCC ID:	MQT-AT150E18U
Product:	Terminal
Brand:	XAC
Model No.:	xCL_AT-150-E-18U
Received Date:	2023/6/28
Test Date:	2023/7/6 ~ 2023/7/21
Issued Date:	2023/9/1
Applicant:	XAC AUTOMATION CORP.
Address:	4F, No. 30, INDUSTRY E. RD. IX, SCIENCE-BASED INDUSTRIAL PARK,HSINCHU,TAIWAN
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
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Test Location (2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
FCC Registration /	788550 / TW0003
Designation Number:	281270 / TW0032

Approved by: Jeremy . Lin , **Date:** 2023/9/1

Jeremy Lin / Project Engineer

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Prepared by : Lena Wang / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBEOE-WTW-P23060395-7	Original Release	2023/9/1

1 Certificate

Product:	Terminal
Brand:	XAC
Test Model:	xCL_AT-150-E-18U
Sample Status:	Engineering Sample
Applicant:	XAC AUTOMATION CORP.
Test Date:	2023/7/6 ~ 2023/7/21
Standard:	47 CFR FCC Part 24 47 CFR FCC Part 27 47 CFR FCC Part 2
Measurement procedure:	ANSI/TIA/EIA-603-E 2016 ANSI C63.26-2015 KDB 971168 D01 Power Meas License Digital Systems v03r01

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.

2 Summary of Test Results

47 CFR FCC Part 24 47 CFR FCC Part 27 47 CFR FCC Part 2			
Standard / Clause	Test Item	Result	Remark
FCC 47 CFR Part 2.1046 FCC 47 CFR Part 24.232 (c) FCC 47 CFR Part 27.50(d) FCC 47 CFR Part 27.50(c)	Effective Radiated Power and Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
FCC 47 CFR Part 24.232 (d) FCC 47 CFR Part 27.50(d)	Peak to Average Ratio	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1049	Bandwidth	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1051 FCC 47 CFR Part 24.238 FCC 47 CFR Part 27.53(h) FCC 47 CFR Part 27.53(g)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 24.238 FCC 47 CFR Part 27.53(h) FCC 47 CFR Part 27.53(g)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -29.99 dB at 212.36 MHz
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 24.238 FCC 47 CFR Part 27.53(h) FCC 47 CFR Part 27.53(g)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -12.11 dB at 16920.00 MHz
FCC 47 CFR Part 2.1055 FCC 47 CFR Part 24.235 FCC 47 CFR Part 27.54	Frequency Stability	Pass	Meet the requirement of limit.

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	Specification	Expanded Uncertainty (k=2) (±)
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3.00 dB
	30 MHz ~ 1 GHz	2.93 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	1.76 dB
	18 GHz ~ 40 GHz	1.77 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Terminal
Brand	XAC
Test Model	xCL_AT-150-E-18U
Model Difference	Refer to Note as below
Status of EUT	Engineering Sample
Power Supply Rating	Refer to note

Note:

1. EUT Overview

Band / Bandwidth	TX Frequency Range (MHz)	Max. EIRP Power	
		QPSK	16QAM
LTE Band 2 (Channel Bandwidth 1.4MHz)	1850.7-1909.3	297.852mW (24.74dBm)	253.513mW (24.04dBm)
LTE Band 2 (Channel Bandwidth 3MHz)	1851.5-1908.5	299.226mW (24.76dBm)	247.742mW (23.94dBm)
LTE Band 2 (Channel Bandwidth 5MHz)	1852.5-1907.5	304.089mW (24.83dBm)	255.859mW (24.08dBm)
LTE Band 2 (Channel Bandwidth 10MHz)	1855.0-1905.0	302.691mW (24.81dBm)	247.742mW (23.94dBm)
LTE Band 2 (Channel Bandwidth 15MHz)	1857.5-1902.5	307.610mW (24.88dBm)	248.886mW (23.96dBm)
LTE Band 2 (Channel Bandwidth 20MHz)	1860.0-1900.0	312.608mW (24.95dBm)	251.189mW (24.00dBm)
LTE Band 4 (Channel Bandwidth 1.4MHz)	1710.7-1754.3	309.742mW (24.91dBm)	264.850mW (24.23dBm)
LTE Band 4 (Channel Bandwidth 3MHz)	1711.5-1753.5	316.228mW (25.00dBm)	270.396mW (24.32dBm)
LTE Band 4 (Channel Bandwidth 5MHz)	1712.5-1752.5	313.329mW (24.96dBm)	267.917mW (24.28dBm)
LTE Band 4 (Channel Bandwidth 10MHz)	1715.0-1750.0	313.329mW (24.96dBm)	263.633mW (24.21dBm)
LTE Band 4 (Channel Bandwidth 15MHz)	1717.5-1747.5	316.228mW (25.00dBm)	270.396mW (24.32dBm)
LTE Band 4 (Channel Bandwidth 20MHz)	1720.0-1745.0	319.154mW (25.04dBm)	251.768mW (24.01dBm)

Band / Bandwidth	TX Frequency Range (MHz)	Max. ERP Power	
		QPSK	16QAM
LTE Band 12 (Channel Bandwidth 1.4MHz)	699.7-715.3	125.314mW (20.98dBm)	106.660mW (20.28dBm)
LTE Band 12 (Channel Bandwidth 3MHz)	700.5-714.5	124.165mW (20.94dBm)	106.414mW (20.27dBm)
LTE Band 12 (Channel Bandwidth 5MHz)	701.5-713.5	125.893mW (21.00dBm)	107.399mW (20.31dBm)
LTE Band 12 (Channel Bandwidth 10MHz)	704.0-711.0	129.718mW (21.13dBm)	103.039mW (20.13dBm)

Band / Bandwidth	TX Frequency Range (MHz)	Emission Designator	
		QPSK	16QAM
LTE Band 2 (Channel Bandwidth 1.4MHz)	1850.7-1909.3	1M09G7D	1M09D7W
LTE Band 2 (Channel Bandwidth 3MHz)	1851.5-1908.5	2M70G7D	2M70D7W
LTE Band 2 (Channel Bandwidth 5MHz)	1852.5-1907.5	4M49G7D	4M50D7W
LTE Band 2 (Channel Bandwidth 10MHz)	1855.0-1905.0	8M97G7D	8M97D7W
LTE Band 2 (Channel Bandwidth 15MHz)	1857.5-1902.5	13M5G7D	13M5D7W
LTE Band 2 (Channel Bandwidth 20MHz)	1860.0-1900.0	18M0G7D	18M0D7W
LTE Band 4 (Channel Bandwidth 1.4MHz)	1710.7-1754.3	1M09G7D	1M09D7W
LTE Band 4 (Channel Bandwidth 3MHz)	1711.5-1753.5	2M70G7D	2M70D7W
LTE Band 4 (Channel Bandwidth 5MHz)	1712.5-1752.5	4M49G7D	4M49D7W
LTE Band 4 (Channel Bandwidth 10MHz)	1715.0-1750.0	8M97G7D	8M97D7W
LTE Band 4 (Channel Bandwidth 15MHz)	1717.5-1747.5	13M5G7D	13M5D7W
LTE Band 4 (Channel Bandwidth 20MHz)	1720.0-1745.0	18M0G7D	18M0D7W
LTE Band 12 (Channel Bandwidth 1.4MHz)	699.7-715.3	1M09G7D	1M09D7W
LTE Band 12 (Channel Bandwidth 3MHz)	700.5-714.5	2M70G7D	2M70D7W
LTE Band 12 (Channel Bandwidth 5MHz)	701.5-713.5	4M50G7D	4M49D7W
LTE Band 12 (Channel Bandwidth 10MHz)	704.0-711.0	8M97G7D	8M97D7W

2. The EUT uses following accessories.

Product	Brand	Model	Description	Remark
Battery	IES	IDS155GA	3.88 Vdc, 3780 mAh	Accessory of EUT

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

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna	Brand	Model	Gain (dBi)			Antenna Type
			1850~1910MHz	1710~1755MHz	699~716MHz	
WWAN	AWAN	ALF6P-100013	2.42	2.56	0.13	PIFA

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. There're 2 configurations for the EUT listed as below : Mode A: EUT + Adapter 1 Mode B: EUT + Adapter 2
Worst Case:	X-axis/ Y-axis/ Z-axis Worst Condition: X-axis

For LTE Band 2

Mode	Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
B	EIRP	18607 (1850.70 MHz) 18900 (1880.00 MHz) 19193 (1909.30 MHz)	1.4 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		18615 (1851.50 MHz) 18900 (1880.00 MHz) 19185 (1908.50 MHz)	3 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		18625 (1852.50 MHz) 18900 (1880.00 MHz) 19175 (1907.50 MHz)	5 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		18650 (1855.00 MHz) 18900 (1880.00 MHz) 19150 (1905.00 MHz)	10 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		18675 (1857.50 MHz) 18900 (1880.00 MHz) 19125 (1902.50 MHz)	15 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		18700 (1860.00 MHz) 18900 (1880.00 MHz) 19100 (1900.00 MHz)	20 MHz	QPSK / 16QAM	1 RB Half RB Full RB
B	Modulation Characteristics	18900 (1880.00 MHz)	20 MHz	QPSK / 16QAM	Full RB
B	Frequency Stability	18607 (1850.70 MHz) 19193 (1909.30 MHz)	1.4 MHz	QPSK	Full RB
		18615 (1851.50 MHz) 19185 (1908.50 MHz)	3 MHz	QPSK	Full RB
		18625 (1852.50 MHz) 19175 (1907.50 MHz)	5 MHz	QPSK	Full RB
		18650 (1855.00 MHz) 19150 (1905.00 MHz)	10 MHz	QPSK	Full RB
		18675 (1857.50 MHz) 19125 (1902.50 MHz)	15 MHz	QPSK	Full RB
		18700 (1860.00 MHz) 19100 (1900.00 MHz)	20 MHz	QPSK	Full RB

Mode	Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
B	Occupied Bandwidth	18607 (1850.70 MHz) 18900 (1880.00 MHz) 19193 (1909.30 MHz)	1.4 MHz	QPSK / 16QAM	Full RB
		18615 (1851.50 MHz) 18900 (1880.00 MHz) 19185 (1908.50 MHz)	3 MHz	QPSK / 16QAM	Full RB
		18625 (1852.50 MHz) 18900 (1880.00 MHz) 19175 (1907.50 MHz)	5 MHz	QPSK / 16QAM	Full RB
		18650 (1855.00 MHz) 18900 (1880.00 MHz) 19150 (1905.00 MHz)	10 MHz	QPSK / 16QAM	Full RB
		18675 (1857.50 MHz) 18900 (1880.00 MHz) 19125 (1902.50 MHz)	15 MHz	QPSK / 16QAM	Full RB
		18700 (1860.00 MHz) 18900 (1880.00 MHz) 19100 (1900.00 MHz)	20 MHz	QPSK / 16QAM	Full RB
B	Peak to Average Ratio	18607 (1850.70 MHz) 18900 (1880.00 MHz) 19193 (1909.30 MHz)	1.4 MHz	QPSK / 16QAM	1 RB
		18615 (1851.50 MHz) 18900 (1880.00 MHz) 19185 (1908.50 MHz)	3 MHz	QPSK / 16QAM	1 RB
		18625 (1852.50 MHz) 18900 (1880.00 MHz) 19175 (1907.50 MHz)	5 MHz	QPSK / 16QAM	1 RB
		18650 (1855.00 MHz) 18900 (1880.00 MHz) 19150 (1905.00 MHz)	10 MHz	QPSK / 16QAM	1 RB
		18675 (1857.50 MHz) 18900 (1880.00 MHz) 19125 (1902.50 MHz)	15 MHz	QPSK / 16QAM	1 RB
		18700 (1860.00 MHz) 18900 (1880.00 MHz) 19100 (1900.00 MHz)	20 MHz	QPSK / 16QAM	1 RB

Mode	Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
B	Conducted Emission	18607 (1850.70 MHz) 18900 (1880.00 MHz) 19193 (1909.30 MHz)	1.4 MHz	QPSK	1 RB Full RB
		18615 (1851.50 MHz) 18900 (1880.00 MHz) 19185 (1908.50 MHz)	3 MHz	QPSK	1 RB Full RB
		18625 (1852.50 MHz) 18900 (1880.00 MHz) 19175 (1907.50 MHz)	5 MHz	QPSK	1 RB Full RB
		18650 (1855.00 MHz) 18900 (1880.00 MHz) 19150 (1905.00 MHz)	10 MHz	QPSK	1 RB Full RB
		18675 (1857.50 MHz) 18900 (1880.00 MHz) 19125 (1902.50 MHz)	15 MHz	QPSK	1 RB Full RB
		18700 (1860.00 MHz) 18900 (1880.00 MHz) 19100 (1900.00 MHz)	20 MHz	QPSK	1 RB Full RB
A, B	Radiated Spurious Emissions below 1GHz	18900(1880.00 MHz)	20 MHz	QPSK	1 RB
B	Radiated Spurious Emissions above 1GHz	18607 (1850.70 MHz) 18900 (1880.00 MHz) 19193 (1909.30 MHz)	1.4 MHz	QPSK	1 RB
		18625 (1852.50 MHz) 18900 (1880.00 MHz) 19175 (1907.50 MHz)	5 MHz	QPSK	1 RB
		18700 (1860.00 MHz) 18900 (1880.00 MHz) 19100 (1900.00 MHz)	20 MHz	QPSK	1 RB

For LTE Band 4

Mode	Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
B	EIRP	19957 (1710.70 MHz) 20175 (1732.50 MHz) 20393 (1754.30 MHz)	1.4 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		19965 (1711.50 MHz) 20175 (1732.50 MHz) 20385 (1753.50 MHz)	3 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		19975 (1712.50 MHz) 20175 (1732.50 MHz) 20375 (1752.50 MHz)	5 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		20000 (1715.00 MHz) 20175 (1732.50 MHz) 20350 (1750.00 MHz)	10 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		20025 (1717.50 MHz) 20175 (1732.50 MHz) 20325 (1747.50 MHz)	15 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		20050 (1720.00 MHz) 20175 (1732.50 MHz) 20300 (1745.00 MHz)	20 MHz	QPSK / 16QAM	1 RB Half RB Full RB
B	Modulation Characteristics	20175 (1732.50 MHz)	20 MHz	QPSK / 16QAM	Full RB
B	Frequency Stability	19957 (1710.70 MHz) 20393 (1754.30 MHz)	1.4 MHz	QPSK	Full RB
		19965 (1711.50 MHz) 20385 (1753.50 MHz)	3 MHz	QPSK	Full RB
		19975 (1712.50 MHz) 20375 (1752.50 MHz)	5 MHz	QPSK	Full RB
		20000 (1715.00 MHz) 20350 (1750.00 MHz)	10 MHz	QPSK	Full RB
		20025 (1717.50 MHz) 20325 (1747.50 MHz)	15 MHz	QPSK	Full RB
		20050 (1720.00 MHz) 20300 (1745.00 MHz)	20 MHz	QPSK	Full RB
B	Occupied Bandwidth	19957 (1710.70 MHz) 20175 (1732.50 MHz) 20393 (1754.30 MHz)	1.4 MHz	QPSK / 16QAM	Full RB
		19965 (1711.50 MHz) 20175 (1732.50 MHz) 20385 (1753.50 MHz)	3 MHz	QPSK / 16QAM	Full RB
		19975 (1712.50 MHz) 20175 (1732.50 MHz) 20375 (1752.50 MHz)	5 MHz	QPSK / 16QAM	Full RB
		20000 (1715.00 MHz) 20175 (1732.50 MHz) 20350 (1750.00 MHz)	10 MHz	QPSK / 16QAM	Full RB
		20025 (1717.50 MHz) 20175 (1732.50 MHz) 20325 (1747.50 MHz)	15 MHz	QPSK / 16QAM	Full RB
		20050 (1720.00 MHz) 20175 (1732.50 MHz) 20300 (1745.00 MHz)	20 MHz	QPSK / 16QAM	Full RB

Mode	Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
B	Peak to Average Ratio	19957 (1710.70 MHz) 20175 (1732.50 MHz) 20393 (1754.30 MHz)	1.4 MHz	QPSK / 16QAM	1 RB
		19965 (1711.50 MHz) 20175 (1732.50 MHz) 20385 (1753.50 MHz)	3 MHz	QPSK / 16QAM	1 RB
		19975 (1712.50 MHz) 20175 (1732.50 MHz) 20375 (1752.50 MHz)	5 MHz	QPSK / 16QAM	1 RB
		20000 (1715.00 MHz) 20175 (1732.50 MHz) 20350 (1750.00 MHz)	10 MHz	QPSK / 16QAM	1 RB
		20025 (1717.50 MHz) 20175 (1732.50 MHz) 20325 (1747.50 MHz)	15 MHz	QPSK / 16QAM	1 RB
		20050 (1720.00 MHz) 20175 (1732.50 MHz) 20300 (1745.00 MHz)	20 MHz	QPSK / 16QAM	1 RB
B	Conducted Emission	19957 (1710.70 MHz) 20175 (1732.50 MHz) 20393 (1754.30 MHz)	1.4 MHz	QPSK	1 RB Full RB
		19965 (1711.50 MHz) 20175 (1732.50 MHz) 20385 (1753.50 MHz)	3 MHz	QPSK	1 RB Full RB
		19975 (1712.50 MHz) 20175 (1732.50 MHz) 20375 (1752.50 MHz)	5 MHz	QPSK	1 RB Full RB
		20000 (1715.00 MHz) 20175 (1732.50 MHz) 20350 (1750.00 MHz)	10 MHz	QPSK	1 RB Full RB
		20025 (1717.50 MHz) 20175 (1732.50 MHz) 20325 (1747.50 MHz)	15 MHz	QPSK	1 RB Full RB
		20050 (1720.00 MHz) 20175 (1732.50 MHz) 20300 (1745.00 MHz)	20 MHz	QPSK	1 RB Full RB
A, B	Radiated Spurious Emissions below 1GHz	20300(1745.00 MHz)	20 MHz	QPSK	1 RB
B	Radiated Spurious Emissions above 1GHz	19957 (1710.70 MHz) 20175 (1732.50 MHz) 20393 (1754.30 MHz)	1.4 MHz	QPSK	1 RB
		19975 (1712.50 MHz) 20175 (1732.50 MHz) 20375 (1752.50 MHz)	5 MHz	QPSK	1 RB
		20050 (1720.00 MHz) 20175 (1732.50 MHz) 20300 (1745.00 MHz)	20 MHz	QPSK	1 RB

For LTE Band 12

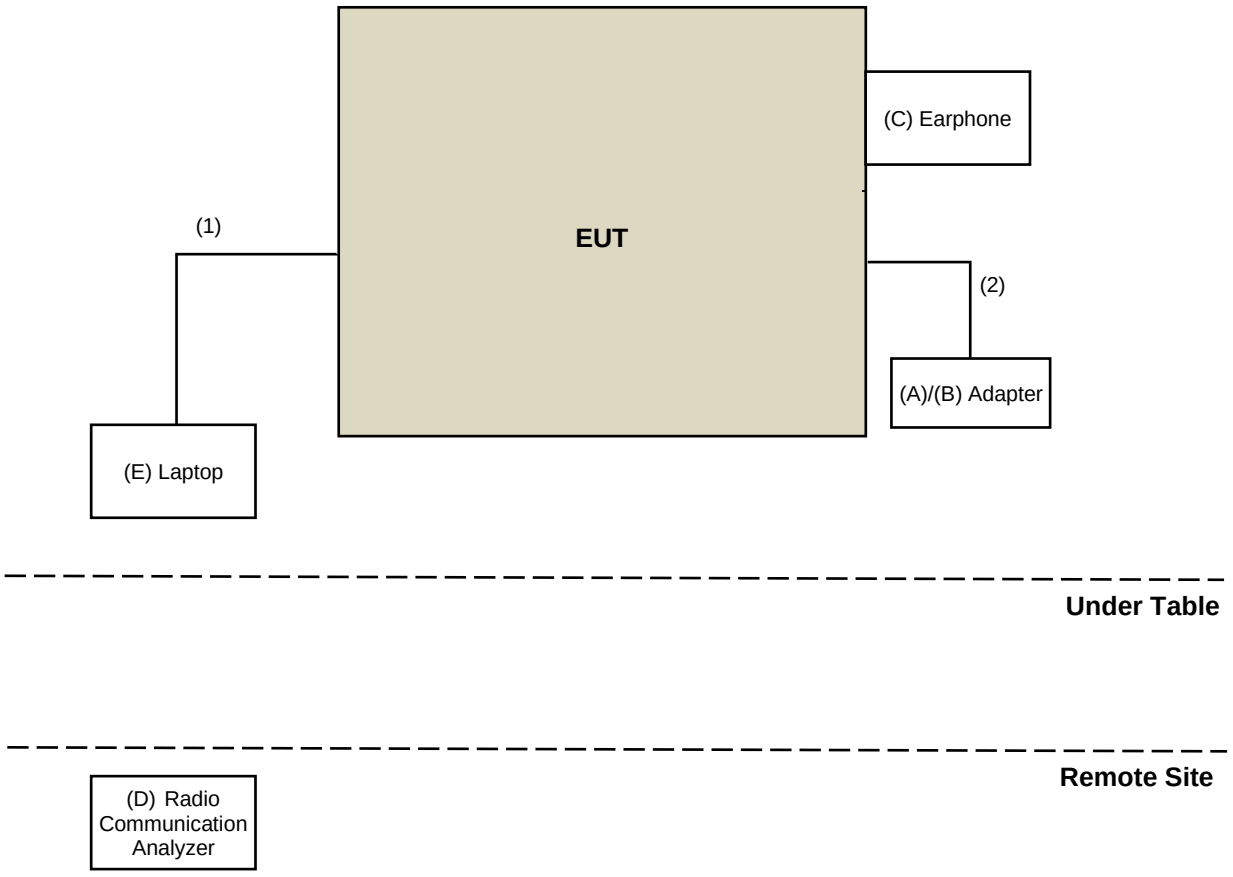
Mode	Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
B	ERP	23017 (699.70 MHz) 23095 (707.50 MHz) 23173 (715.30 MHz)	1.4 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		23025 (700.50 MHz) 23095 (707.50 MHz) 23165 (714.50 MHz)	3 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		23035 (701.50 MHz) 23095 (707.50 MHz) 23155 (713.50 MHz)	5 MHz	QPSK / 16QAM	1 RB Half RB Full RB
		23060 (704.00 MHz) 23095 (707.50 MHz) 23130 (711.00 MHz)	10 MHz	QPSK / 16QAM	1 RB Half RB Full RB
B	Modulation Characteristics	23095 (707.50 MHz)	10 MHz	QPSK / 16QAM	Full RB
B	Frequency Stability	23017 (699.70 MHz) 23173 (715.30 MHz)	1.4 MHz	QPSK	Full RB
		23025 (700.50 MHz) 23165 (714.50 MHz)	3 MHz	QPSK	Full RB
		23035 (701.50 MHz) 23155 (713.50 MHz)	5 MHz	QPSK	Full RB
		23060 (704.00 MHz) 23130 (711.00 MHz)	10 MHz	QPSK	Full RB
B	Occupied Bandwidth	23017 (699.70 MHz) 23095 (707.50 MHz) 23173 (715.30 MHz)	1.4 MHz	QPSK / 16QAM	Full RB
		23025 (700.50 MHz) 23095 (707.50 MHz) 23165 (714.50 MHz)	3 MHz	QPSK / 16QAM	Full RB
		23035 (701.50 MHz) 23095 (707.50 MHz) 23155 (713.50 MHz)	5 MHz	QPSK / 16QAM	Full RB
		23060 (704.00 MHz) 23095 (707.50 MHz) 23130 (711.00 MHz)	10 MHz	QPSK / 16QAM	Full RB
B	Peak to Average Ratio	23017 (699.70 MHz) 23095 (707.50 MHz) 23173 (715.30 MHz)	1.4 MHz	QPSK / 16QAM	1 RB
		23025 (700.50 MHz) 23095 (707.50 MHz) 23165 (714.50 MHz)	3 MHz	QPSK / 16QAM	1 RB
		23035 (701.50 MHz) 23095 (707.50 MHz) 23155 (713.50 MHz)	5 MHz	QPSK / 16QAM	1 RB
		23060 (704.00 MHz) 23095 (707.50 MHz) 23130 (711.00 MHz)	10 MHz	QPSK / 16QAM	1 RB

Mode	Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
B	Conducted Emission	23017 (699.70 MHz) 23095 (707.50 MHz) 23173 (715.30 MHz)	1.4 MHz	QPSK	1 RB Full RB
		23025 (700.50 MHz) 23095 (707.50 MHz) 23165 (714.50 MHz)	3 MHz	QPSK	1 RB Full RB
		23035 (701.50 MHz) 23095 (707.50 MHz) 23155 (713.50 MHz)	5 MHz	QPSK	1 RB Full RB
		23060 (704.00 MHz) 23095 (707.50 MHz) 23130 (711.00 MHz)	10 MHz	QPSK	1 RB Full RB
A, B	Radiated Spurious Emissions below 1GHz	23130(711.00 MHz)	10 MHz	QPSK	1 RB
B	Radiated Spurious Emissions above 1GHz	23017 (699.70 MHz) 23095 (707.50 MHz) 23173 (715.30 MHz)	1.4 MHz	QPSK	1 RB
		23035 (701.50 MHz) 23095 (707.50 MHz) 23155 (713.50 MHz)	5 MHz	QPSK	1 RB
		23060 (704.00 MHz) 23095 (707.50 MHz) 23130 (711.00 MHz)	10 MHz	QPSK	1 RB

3.4 Test Program Used and Operation Descriptions

There is no need to controlling software during the test, and the EUT can be paired with the Radio Communication Analyzer to test the connection when it is powered on.

3.5 Connection Diagram of EUT and Peripheral Devices



3.6 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Adapter	DEE VAN ENTERPRISE CO., LTD	DSA-33PDA FUS	NA	NA	Supplied by applicant
B	Adapter	MASS POWER	NBS10B050200VUU	NA	NA	Supplied by applicant
C	Earphone	Apple	MB77PFEB	NA	NA	Provided by Lab
D	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	NA	Provided by Lab
E	Laptop	Lenovo	20J4 MD A003TW	PF-11H9AK	NA	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB Cable	1	1.2	Yes	0	Supplied by applicant
2	POGO PIN Cable	1	1	Yes	0	Supplied by applicant

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
N9030B - PXA Signal Analyzer KEYSIGHT	N9030B	MY57140488	2023/3/6	2024/3/5
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2023/3/3	2024/3/2
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Fixed Attenuator Woken	MDCS18N-10	MDCS18N-10-01	2023/3/27	2024/3/26

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/7/21

4.2 Modulation Characteristics

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
N9030B - PXA Signal Analyzer KEYSIGHT	N9030B	MY57140488	2023/3/6	2024/3/5
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2023/3/3	2024/3/2
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/7/6

4.3 Peak to Average Ratio

Refer to section 4.1 to get information of the instruments.

4.4 Bandwidth

Refer to section 4.1 to get information of the instruments.

4.5 Conducted Spurious Emissions

Refer to section 4.1 to get information of the instruments.

4.6 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-1213	2022/10/20	2023/10/19
EMI Test Receiver R&S	ESR3	102782	2022/12/12	2023/12/11
Loop Antenna Electro-Metrics	EM-6879	269	2022/9/19	2023/9/18
Loop Antenna TESEQ	HLA 6121	45745	2022/7/27	2023/7/26
Preamplifier EMCI	EMC330N	980782	2023/1/16	2024/1/15
	EMC001340	980201	2022/9/23	2023/9/22
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2023/1/7	2024/1/6
	EMCCFD400-NM-NM-500	201233	2023/1/16	2024/1/15
	EMCCFD400-NM-NM-3000	201235	2023/1/16	2024/1/15
	EMCCFD400-NM-NM-9000	201236(with PAD)	2023/1/16	2024/1/15
Signal & Spectrum Analyzer R&S	FSW43	101866	2023/1/10	2024/1/9
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2023/7/12

4.7 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
EMI Test Receiver R&S	ESR3	102782	2022/12/12	2023/12/11
Horn Antenna RFSPIN	DRH18-E	210103A18E	2022/11/13	2023/11/12
Horn Antenna Schwarzbeck	BBHA 9170	9170-1049	2022/11/13	2023/11/12
Preamplifier EMCI	EMC118A45SE	980808	2022/12/29	2023/12/28
	EMC184045SE	980788	2023/1/16	2024/1/15
RF Coaxial Cable EMCI	EMC101G-KM-KM-2000	201254	2023/1/16	2024/1/15
	EMC101G-KM-KM-3000	201257	2023/1/16	2024/1/15
	EMC101G-KM-KM-5000	201260	2023/1/16	2024/1/15
	EMC104-SM-SM-1000	210102	2023/1/16	2024/1/15
	EMC104-SM-SM-3000	201231	2023/1/16	2024/1/15
	EMC104-SM-SM-9000	201243	2023/1/16	2024/1/15
Signal & Spectrum Analyzer R&S	FSW43	101866	2023/1/10	2024/1/9
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2023/7/10 ~ 2023/7/11

4.8 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
3-channel DC power supply JIN YIH Technology	ODP3033	ODP30332128138	N/A	N/A
Digital Multimeter Fluke	87-III	70360742	2023/7/6	2024/7/5
Signal and spectrum analyzer R&S	FSV3044	101105	2023/2/22	2024/2/21
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	2022/12/27	2023/12/26
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2023/3/3	2024/3/2
Fixed Attenuator Woken	MDCS18N-10	MDCS18N-10-01	2023/3/27	2024/3/26

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/7/21

5 Limits of Test Items

5.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

For LTE Band 2:

Mobile and portable stations are limited to 2 watts EIRP.

For 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 12:

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.

5.2 Modulation Characteristics

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

5.3 Peak to Average Ratio

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

5.4 Bandwidth

According to FCC 47 CFR part 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.

5.5 Conducted Spurious Emissions

For LTE Band 2:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13 dBm.

For LTE Band 4:

According to FCC 47 CFR part 27.53(h), for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 MHz 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 12:

According to FCC 47 CFR part 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.

5.6 Radiated Spurious Emissions below 1GHz

For LTE Band 2:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13 dBm.

For LTE Band 4:

According to FCC 47 CFR part 27.53(h), for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz 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. The limit of emission is equal to -13 dBm.

For LTE Band 12:

According to FCC 47 CFR part 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. The limit of emissions is equal to -13 dBm.

5.7 Radiated Spurious Emissions above 1GHz

For LTE Band 2:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13 dBm.

For LTE Band 4:

According to FCC 47 CFR part 27.53(h), for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz 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. The limit of emission is equal to -13 dBm.

For LTE Band 12:

According to FCC 47 CFR part 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. The limit of emissions is equal to -13 dBm.

5.8 Frequency Stability

For LTE Band 2, LTE Band 4, LTE Band 12:

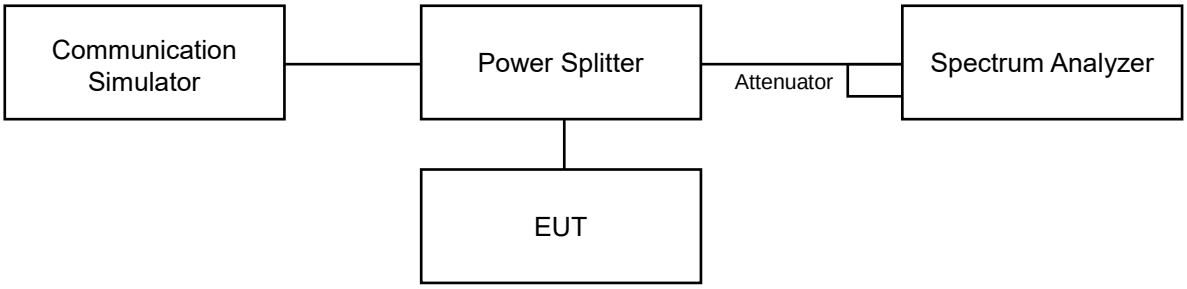
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

6 Test Arrangements

6.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

6.1.1 Test Setup

Conducted Power Measurement:



6.1.2 Test Procedure

Conducted Power Measurement:

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology. The power measurement was performed on emulator and power value was measured from power function on emulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Measurement method refers to ANSI C63.26 section 5.2.4.4.

a. Set span to 2 × to 3 × the OBW.
b. Set RBW = 1% to 5% of the OBW.
c. Set VBW ≥ 3 × RBW.
d. Set number of measurement points in sweep ≥ 2 × span / RBW.
e. Set Sweep time = auto-couple.
f. Detector = power averaging (rms).
g. Set sweep trigger to “free run.”
h. Trace average at least 100 traces in power averaging (rms) mode.
i. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band or channel power measurement function with band/channel limits set equal to the OBW band edges.
j. If Duty cycle < 98%, Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.

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

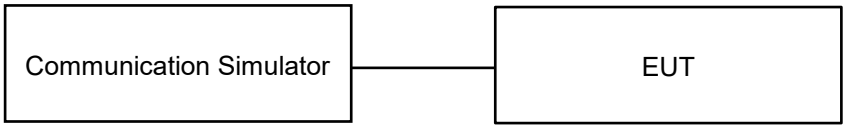
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

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)

6.2 Modulation Characteristics

6.2.1 Test Setup

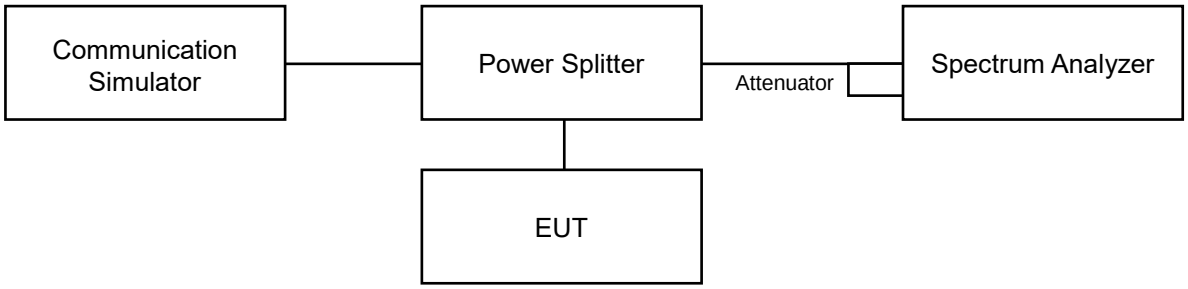


6.2.2 Test Procedure

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.

6.3 Peak to Average Ratio

6.3.1 Test Setup

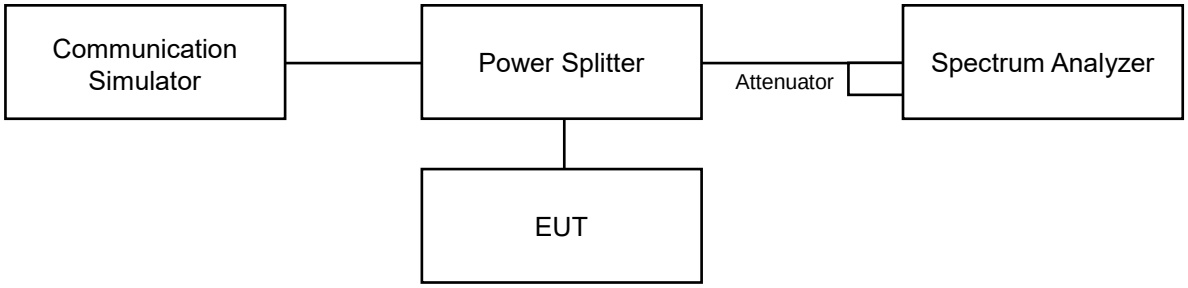


6.3.2 Test Procedure

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

6.4 Bandwidth

6.4.1 Test Setup



6.4.2 Test Procedure

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

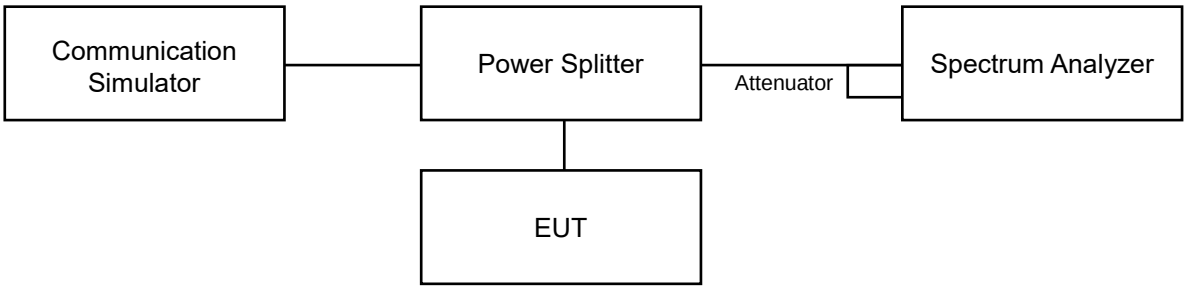
a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and 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.

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 reference value by either of the following:
g. 1) 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).
h. 2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.
i. 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.
j. If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).
k. 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. The spectral envelope can cross the "−X dB amplitude" at multiple points. The lowest or highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the "−X dB amplitude."
l. 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).

6.5 Conducted Spurious Emissions

6.5.1 Test Setup



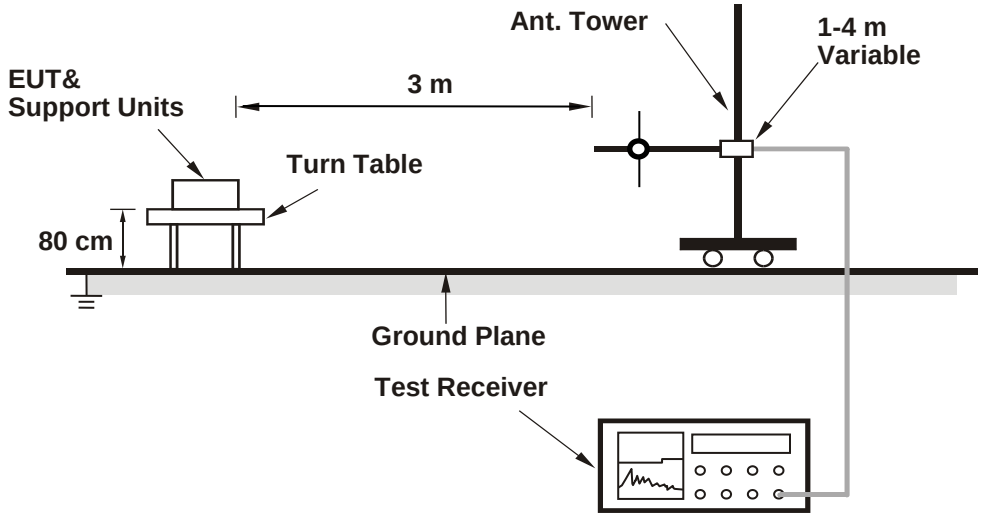
6.5.2 Test Procedure

a. Measurement refer to ANSI C63.26 section 5.7.
b. All measurements were done at 3 channels: low, middle and high operational frequency range.
c. Measuring frequency range is from 9 kHz up to the tenth harmonic of the hightest fundamental frequency or to 40 GHz, whichever is lower. 20 dB attenuation pad is connected with spectrum.
d. The fundamental frequency above 1 GHz, the spectrum set RBW = 1 MHz, VBW = 3 MHz, Detector = Average.
e. The fundamental frequency below 1 GHz, the spectrum set RBW ≥ 100 kHz, VBW ≥ 3 x RBW, Detector = Average.
f. Measuring frequency band edge, narrow RBW (no less than 1% of the OBW) is used for conducted emission measurement.

6.6 Radiated Spurious Emissions below 1GHz

6.6.1 Test Setup

For radiated emission 30 MHz to 1 GHz



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

6.6.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7

e. EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

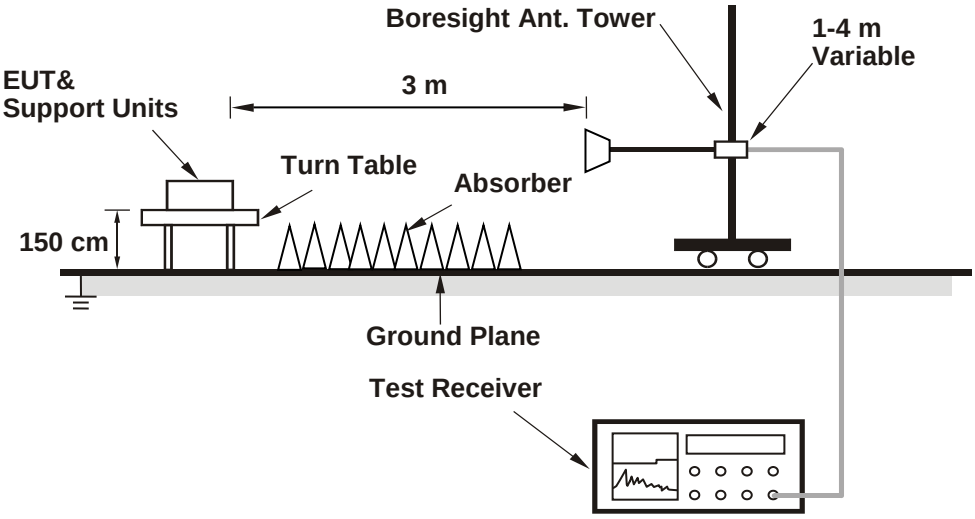
Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

6.7 Radiated Spurious Emissions above 1GHz

6.7.1 Test Setup

For radiated emission above 1 GHz



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

6.7.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

a. In the semi-anechoic chamber, EUT placed on the 1.5 m height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.

d. Following C63.26 section 5.5 and 5.2.7

e. EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.

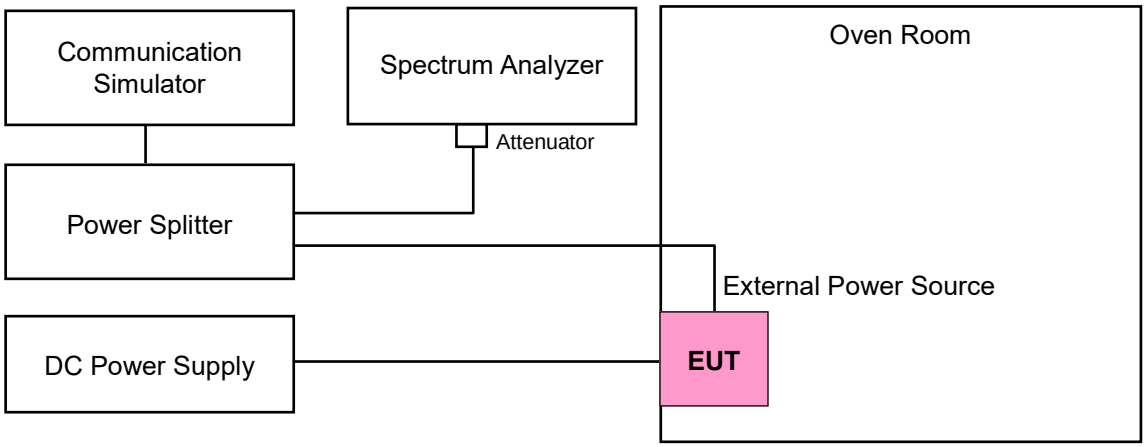
f. ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.

6.8 Frequency Stability

6.8.1 Test Setup



6.8.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

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.

7 Test Results of Test Item

7.1 Effective Radiated Power and Equivalent Isotropically Radiated Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 66% RH	Tested By:	Noah Chang

7.1.1 LTE Band 2

Conducted Output Power (dBm)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	22.42	22.53	22.43
		1	50	22.36	22.48	22.41
		1	99	22.32	22.45	22.39
		50	0	21.46	21.59	21.38
		50	25	21.17	21.36	21.14
		50	50	21.49	21.45	21.42
		100	0	21.54	21.55	21.55
20M	16QAM	1	0	21.42	21.58	21.46
		1	50	21.36	21.58	21.57
		1	99	21.47	21.51	21.48
		50	0	20.57	20.57	20.68
		50	25	20.41	20.31	20.21
		50	50	20.52	20.72	20.55
		100	0	20.77	20.61	20.69
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	22.38	22.46	22.37
		1	37	22.37	22.40	22.33
		1	74	22.27	22.31	22.28
		36	0	21.41	21.52	21.47
		36	19	21.32	21.44	21.32
		36	39	21.32	21.36	21.34
		75	0	21.37	21.42	21.41
15M	16QAM	1	0	21.41	21.51	21.53
		1	37	21.49	21.51	21.50
		1	74	21.35	21.54	21.39
		36	0	20.67	20.72	20.64
		36	19	20.51	20.62	20.37
		36	39	20.45	20.49	20.63
		75	0	20.52	20.70	20.51

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	22.29	22.39	22.33
		1	24	22.22	22.31	22.24
		1	49	22.09	22.21	22.10
		25	0	21.28	21.33	21.23
		25	12	21.29	21.41	21.36
		25	25	21.32	21.39	21.26
		50	0	21.28	21.37	21.24
10M	16QAM	1	0	21.52	21.39	21.49
		1	24	21.46	21.49	21.45
		1	49	21.26	21.28	21.38
		25	0	20.40	20.57	20.43
		25	12	20.36	20.45	20.46
		25	25	20.46	20.40	20.53
		50	0	20.28	20.64	20.28
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	22.39	22.41	22.33
		1	12	22.26	22.35	22.33
		1	24	22.14	22.23	22.15
		12	0	21.39	21.42	21.40
		12	6	21.18	21.27	21.25
		12	13	21.17	21.23	21.17
		25	0	21.33	21.43	21.37
5M	16QAM	1	0	21.66	21.45	21.45
		1	12	21.46	21.57	21.36
		1	24	21.41	21.30	21.16
		12	0	20.67	20.44	20.45
		12	6	20.33	20.32	20.46
		12	13	20.40	20.35	20.26
		25	0	20.36	20.65	20.63

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	22.14	22.23	22.12
		1	7	22.33	22.34	22.31
		1	14	22.26	22.29	22.22
		8	0	21.22	21.32	21.30
		8	3	21.22	21.29	21.27
		8	7	21.19	21.24	21.12
		15	0	21.26	21.27	21.23
3M	16QAM	1	0	21.35	21.31	21.16
		1	7	21.52	21.43	21.31
		1	14	21.29	21.49	21.44
		8	0	20.52	20.33	20.44
		8	3	20.24	20.50	20.56
		8	7	20.40	20.53	20.17
		15	0	20.43	20.27	20.29
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	22.11	22.21	22.08
		1	2	22.25	22.32	22.28
		1	5	22.13	22.23	22.11
		3	0	22.16	22.28	22.23
		3	1	22.22	22.32	22.26
		3	3	22.04	22.09	22.08
		6	0	21.12	21.21	21.13
1.4M	16QAM	1	0	21.22	21.50	21.26
		1	2	21.39	21.62	21.33
		1	5	21.15	21.40	21.23
		3	0	21.24	21.37	21.29
		3	1	21.40	21.49	21.31
		3	3	21.24	21.13	21.18
		6	0	20.34	20.51	20.15

EIRP Power (dBm)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	24.84	**24.95**	24.85
		1	50	24.78	24.90	24.83
		1	99	24.74	24.87	24.81
		50	0	23.88	24.01	23.80
		50	25	23.59	23.78	23.56
		50	50	23.91	23.87	23.84
		100	0	23.96	23.97	23.97
20M	16QAM	1	0	23.84	**24.00**	23.88
		1	50	23.78	**24.00**	23.99
		1	99	23.89	23.93	23.90
		50	0	22.99	22.99	23.10
		50	25	22.83	22.73	22.63
		50	50	22.94	23.14	22.97
		100	0	23.19	23.03	23.11
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	24.80	**24.88**	24.79
		1	37	24.79	24.82	24.75
		1	74	24.69	24.73	24.70
		36	0	23.83	23.94	23.89
		36	19	23.74	23.86	23.74
		36	39	23.74	23.78	23.76
		75	0	23.79	23.84	23.83
15M	16QAM	1	0	23.83	23.93	23.95
		1	37	23.91	23.93	23.92
		1	74	23.77	**23.96**	23.81
		36	0	23.09	23.14	23.06
		36	19	22.93	23.04	22.79
		36	39	22.87	22.91	23.05
		75	0	22.94	23.12	22.93

*EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	24.71	**24.81**	24.75
		1	24	24.64	24.73	24.66
		1	49	24.51	24.63	24.52
		25	0	23.70	23.75	23.65
		25	12	23.71	23.83	23.78
		25	25	23.74	23.81	23.68
		50	0	23.70	23.79	23.66
10M	16QAM	1	0	**23.94**	23.81	23.91
		1	24	23.88	23.91	23.87
		1	49	23.68	23.70	23.80
		25	0	22.82	22.99	22.85
		25	12	22.78	22.87	22.88
		25	25	22.88	22.82	22.95
		50	0	22.70	23.06	22.70
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	24.81	**24.83**	24.75
		1	12	24.68	24.77	24.75
		1	24	24.56	24.65	24.57
		12	0	23.81	23.84	23.82
		12	6	23.60	23.69	23.67
		12	13	23.59	23.65	23.59
		25	0	23.75	23.85	23.79
5M	16QAM	1	0	**24.08**	23.87	23.87
		1	12	23.88	23.99	23.78
		1	24	23.83	23.72	23.58
		12	0	23.09	22.86	22.87
		12	6	22.75	22.74	22.88
		12	13	22.82	22.77	22.68
		25	0	22.78	23.07	23.05

*EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	24.56	24.65	24.54
		1	7	24.75	**24.76**	24.73
		1	14	24.68	24.71	24.64
		8	0	23.64	23.74	23.72
		8	3	23.64	23.71	23.69
		8	7	23.61	23.66	23.54
		15	0	23.68	23.69	23.65
3M	16QAM	1	0	23.77	23.73	23.58
		1	7	**23.94**	23.85	23.73
		1	14	23.71	23.91	23.86
		8	0	22.94	22.75	22.86
		8	3	22.66	22.92	22.98
		8	7	22.82	22.95	22.59
		15	0	22.85	22.69	22.71
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	24.53	24.63	24.50
		1	2	24.67	**24.74**	24.70
		1	5	24.55	24.65	24.53
		3	0	24.58	24.70	24.65
		3	1	24.64	**24.74**	24.68
		3	3	24.46	24.51	24.50
		6	0	23.54	23.63	23.55
1.4M	16QAM	1	0	23.64	23.92	23.68
		1	2	23.81	**24.04**	23.75
		1	5	23.57	23.82	23.65
		3	0	23.66	23.79	23.71
		3	1	23.82	23.91	23.73
		3	3	23.66	23.55	23.60
		6	0	22.76	22.93	22.57

*EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)

7.1.2 LTE Band 4

Conducted Output Power (dBm)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	22.40	22.48	22.45
		1	50	22.34	22.43	22.40
		1	99	22.32	22.41	22.38
		50	0	21.27	21.36	21.33
		50	25	21.21	21.30	21.27
		50	50	21.22	21.31	21.28
		100	0	21.18	21.27	21.24
20M	16QAM	1	0	21.44	21.45	21.41
		1	50	21.38	21.43	21.35
		1	99	21.34	21.39	21.31
		50	0	20.33	20.42	20.39
		50	25	20.33	20.42	20.39
		50	50	20.37	20.46	20.43
		100	0	20.30	20.39	20.36
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	22.34	22.44	22.44
		1	37	22.27	22.36	22.38
		1	74	22.26	22.41	22.34
		36	0	21.26	21.27	21.25
		36	19	21.15	21.30	21.19
		36	39	21.15	21.23	21.22
		75	0	21.12	21.19	21.20
15M	16QAM	1	0	21.50	21.62	21.52
		1	37	21.67	21.76	21.68
		1	74	21.54	21.60	21.52
		36	0	20.26	20.39	20.32
		36	19	20.30	20.42	20.31
		36	39	20.31	20.43	20.35
		75	0	20.25	20.35	20.36

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	22.28	22.40	22.39
		1	24	22.21	22.30	22.36
		1	49	22.25	22.31	22.23
		25	0	21.25	21.19	21.14
		25	12	21.15	21.27	21.07
		25	25	21.11	21.09	21.16
		50	0	21.07	21.16	21.14
10M	16QAM	1	0	21.45	21.59	21.40
		1	24	21.65	21.63	21.65
		1	49	21.49	21.51	21.40
		25	0	20.15	20.36	20.26
		25	12	20.21	20.42	20.26
		25	25	20.18	20.31	20.29
		50	0	20.11	20.33	20.34
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	22.33	22.40	22.34
		1	12	22.23	22.25	22.33
		1	24	22.19	22.31	22.09
		12	0	21.18	21.23	21.06
		12	6	21.05	21.21	21.01
		12	13	21.14	21.09	21.05
		25	0	21.04	21.18	21.07
5M	16QAM	1	0	21.40	21.52	21.50
		1	12	21.54	21.72	21.61
		1	24	21.44	21.48	21.37
		12	0	20.23	20.27	20.32
		12	6	20.21	20.32	20.25
		12	13	20.22	20.29	20.22
		25	0	20.22	20.24	20.30

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	22.27	22.44	22.44
		1	7	22.15	22.29	22.26
		1	14	22.12	22.27	22.32
		8	0	21.14	21.19	21.25
		8	3	21.08	21.15	21.19
		8	7	21.14	21.09	21.16
		15	0	21.01	21.05	21.07
3M	16QAM	1	0	21.39	21.56	21.47
		1	7	21.58	21.76	21.67
		1	14	21.39	21.47	21.43
		8	0	20.17	20.30	20.29
		8	3	20.20	20.29	20.25
		8	7	20.26	20.34	20.22
		15	0	20.12	20.23	20.32
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	22.20	22.35	22.31
		1	2	22.15	22.24	22.24
		1	5	22.16	22.34	22.25
		3	0	22.18	22.13	22.16
		3	1	22.04	22.25	22.17
		3	3	22.13	22.11	22.21
		6	0	21.11	21.16	21.11
1.4M	16QAM	1	0	21.45	21.48	21.43
		1	2	21.52	21.67	21.66
		1	5	21.42	21.54	21.41
		3	0	21.15	21.34	21.18
		3	1	21.24	21.33	21.19
		3	3	21.20	21.38	21.24
		6	0	20.24	20.22	20.21

EIRP Power (dBm)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	24.96	**25.04**	25.01
		1	50	24.90	24.99	24.96
		1	99	24.88	24.97	24.94
		50	0	23.83	23.92	23.89
		50	25	23.77	23.86	23.83
		50	50	23.78	23.87	23.84
		100	0	23.74	23.83	23.80
20M	16QAM	1	0	24.00	**24.01**	23.97
		1	50	23.94	23.99	23.91
		1	99	23.90	23.95	23.87
		50	0	22.89	22.98	22.95
		50	25	22.89	22.98	22.95
		50	50	22.93	23.02	22.99
		100	0	22.86	22.95	22.92
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	24.90	**25.00**	25.00
		1	37	24.83	24.92	24.94
		1	74	24.82	24.97	24.90
		36	0	23.82	23.83	23.81
		36	19	23.71	23.86	23.75
		36	39	23.71	23.79	23.78
		75	0	23.68	23.75	23.76
15M	16QAM	1	0	24.06	24.18	24.08
		1	37	24.23	**24.32**	24.24
		1	74	24.10	24.16	24.08
		36	0	22.82	22.95	22.88
		36	19	22.86	22.98	22.87
		36	39	22.87	22.99	22.91
		75	0	22.81	22.91	22.92

*EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	24.84	**24.96**	24.95
		1	24	24.77	24.86	24.92
		1	49	24.81	24.87	24.79
		25	0	23.81	23.75	23.70
		25	12	23.71	23.83	23.63
		25	25	23.67	23.65	23.72
		50	0	23.63	23.72	23.70
10M	16QAM	1	0	24.01	24.15	23.96
		1	24	**24.21**	24.19	24.21
		1	49	24.05	24.07	23.96
		25	0	22.71	22.92	22.82
		25	12	22.77	22.98	22.82
		25	25	22.74	22.87	22.85
		50	0	22.67	22.89	22.90
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	24.89	**24.96**	24.90
		1	12	24.79	24.81	24.89
		1	24	24.75	24.87	24.65
		12	0	23.74	23.79	23.62
		12	6	23.61	23.77	23.57
		12	13	23.70	23.65	23.61
		25	0	23.60	23.74	23.63
5M	16QAM	1	0	23.96	24.08	24.06
		1	12	24.10	**24.28**	24.17
		1	24	24.00	24.04	23.93
		12	0	22.79	22.83	22.88
		12	6	22.77	22.88	22.81
		12	13	22.78	22.85	22.78
		25	0	22.78	22.80	22.86

*EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)

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	24.83	**25.00**	25.00
		1	7	24.71	24.85	24.82
		1	14	24.68	24.83	24.88
		8	0	23.70	23.75	23.81
		8	3	23.64	23.71	23.75
		8	7	23.70	23.65	23.72
		15	0	23.57	23.61	23.63
3M	16QAM	1	0	23.95	24.12	24.03
		1	7	24.14	**24.32**	24.23
		1	14	23.95	24.03	23.99
		8	0	22.73	22.86	22.85
		8	3	22.76	22.85	22.81
		8	7	22.82	22.90	22.78
		15	0	22.68	22.79	22.88
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	24.76	**24.91**	24.87
		1	2	24.71	24.80	24.80
		1	5	24.72	24.90	24.81
		3	0	24.74	24.69	24.72
		3	1	24.60	24.81	24.73
		3	3	24.69	24.67	24.77
		6	0	23.67	23.72	23.67
1.4M	16QAM	1	0	24.01	24.04	23.99
		1	2	24.08	**24.23**	24.22
		1	5	23.98	24.10	23.97
		3	0	23.71	23.90	23.74
		3	1	23.80	23.89	23.75
		3	3	23.76	23.94	23.80
		6	0	22.80	22.78	22.77

*EIRP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi)

7.1.3 LTE Band 12

Conducted Output Power (dBm)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	23.06	23.15	23.06
		1	24	22.97	23.11	22.88
		1	49	22.79	22.99	22.84
		25	0	22.33	22.35	22.24
		25	12	22.05	22.06	22.02
		25	25	21.82	21.84	21.73
		50	0	22.17	22.22	22.12
10M	16QAM	1	0	22.15	22.14	22.10
		1	24	21.85	21.87	21.76
		1	49	22.12	22.14	22.03
		25	0	21.04	21.06	20.95
		25	12	20.96	20.98	20.87
		25	25	21.03	21.05	20.94
		50	0	20.78	20.80	20.69
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	23.01	23.02	22.90
		1	12	22.91	22.94	22.81
		1	24	22.74	22.71	22.64
		12	0	21.83	21.85	21.78
		12	6	21.90	21.91	21.77
		12	13	21.74	21.78	21.64
		25	0	21.76	21.69	21.66
5M	16QAM	1	0	22.31	22.33	22.22
		1	12	21.80	21.77	21.75
		1	24	22.03	22.08	21.97
		12	0	21.04	21.06	20.88
		12	6	20.92	20.95	20.86
		12	13	21.02	21.05	20.85
		25	0	20.72	20.79	20.61

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	22.88	22.96	22.75
		1	7	22.86	22.89	22.77
		1	14	22.66	22.62	22.63
		8	0	21.68	21.83	21.66
		8	3	21.84	21.77	21.71
		8	7	21.62	21.68	21.49
		15	0	21.67	21.56	21.56
3M	16QAM	1	0	22.26	22.29	22.12
		1	7	21.73	21.76	21.67
		1	14	21.88	21.94	21.94
		8	0	20.98	20.93	20.81
		8	3	20.82	20.88	20.85
		8	7	20.92	20.99	20.78
		15	0	20.64	20.75	20.48
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	22.98	23.00	22.64
		1	2	22.80	22.89	22.63
		1	5	22.72	22.60	22.50
		3	0	21.74	21.84	21.54
		3	1	21.75	21.77	21.63
		3	3	21.69	21.75	21.51
		6	0	21.76	21.61	21.54
1.4M	16QAM	1	0	22.30	22.23	22.13
		1	2	21.78	21.74	21.74
		1	5	21.97	21.93	21.83
		3	0	21.02	21.02	20.87
		3	1	20.87	20.87	20.81
		3	3	20.93	21.01	20.81
		6	0	20.70	20.75	20.55

ERP Power (dBm)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	21.04	**21.13**	21.04
		1	24	20.95	21.09	20.86
		1	49	20.77	20.97	20.82
		25	0	20.31	20.33	20.22
		25	12	20.03	20.04	20.00
		25	25	19.80	19.82	19.71
		50	0	20.15	20.20	20.10
10M	16QAM	1	0	**20.13**	20.12	20.08
		1	24	19.83	19.85	19.74
		1	49	20.10	20.12	20.01
		25	0	19.02	19.04	18.93
		25	12	18.94	18.96	18.85
		25	25	19.01	19.03	18.92
		50	0	18.76	18.78	18.67
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	20.99	**21.00**	20.88
		1	12	20.89	20.92	20.79
		1	24	20.72	20.69	20.62
		12	0	19.81	19.83	19.76
		12	6	19.88	19.89	19.75
		12	13	19.72	19.76	19.62
		25	0	19.74	19.67	19.64
5M	16QAM	1	0	20.29	**20.31**	20.20
		1	12	19.78	19.75	19.73
		1	24	20.01	20.06	19.95
		12	0	19.02	19.04	18.86
		12	6	18.90	18.93	18.84
		12	13	19.00	19.03	18.83
		25	0	18.70	18.77	18.59

*ERP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi) - 2.15

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	20.86	**20.94**	20.73
		1	7	20.84	20.87	20.75
		1	14	20.64	20.60	20.61
		8	0	19.66	19.81	19.64
		8	3	19.82	19.75	19.69
		8	7	19.60	19.66	19.47
		15	0	19.65	19.54	19.54
3M	16QAM	1	0	20.24	**20.27**	20.10
		1	7	19.71	19.74	19.65
		1	14	19.86	19.92	19.92
		8	0	18.96	18.91	18.79
		8	3	18.80	18.86	18.83
		8	7	18.90	18.97	18.76
		15	0	18.62	18.73	18.46
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	20.96	**20.98**	20.62
		1	2	20.78	20.87	20.61
		1	5	20.70	20.58	20.48
		3	0	19.72	19.82	19.52
		3	1	19.73	19.75	19.61
		3	3	19.67	19.73	19.49
		6	0	19.74	19.59	19.52
1.4M	16QAM	1	0	**20.28**	20.21	20.11
		1	2	19.76	19.72	19.72
		1	5	19.95	19.91	19.81
		3	0	19.00	19.00	18.85
		3	1	18.85	18.85	18.79
		3	3	18.91	18.99	18.79
		6	0	18.68	18.73	18.53

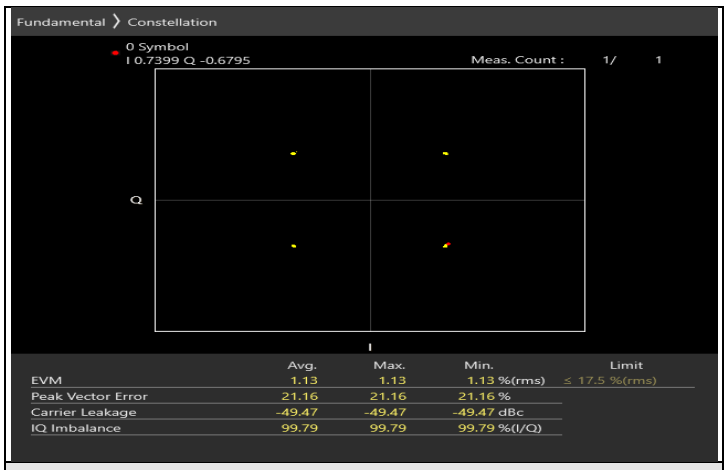
*ERP (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi) - 2.15

7.2 Modulation Characteristics

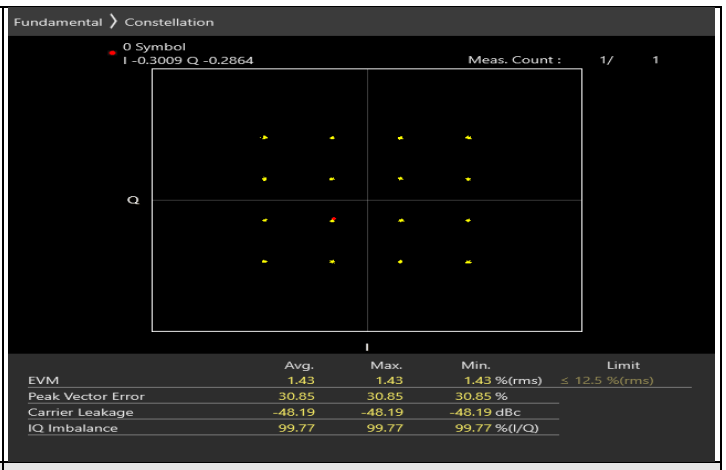
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 66% RH	Tested By:	Noah Chang

7.2.1 LTE Band 2

LTE Band 2, Channel Bandwidth: 20 MHz



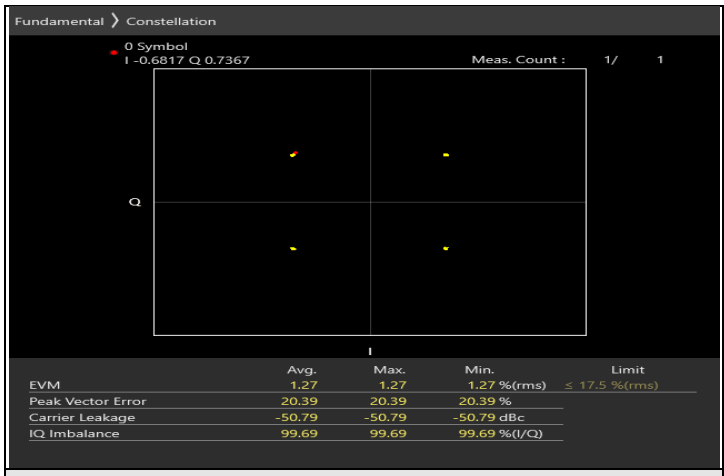
QPSK (1880MHz)



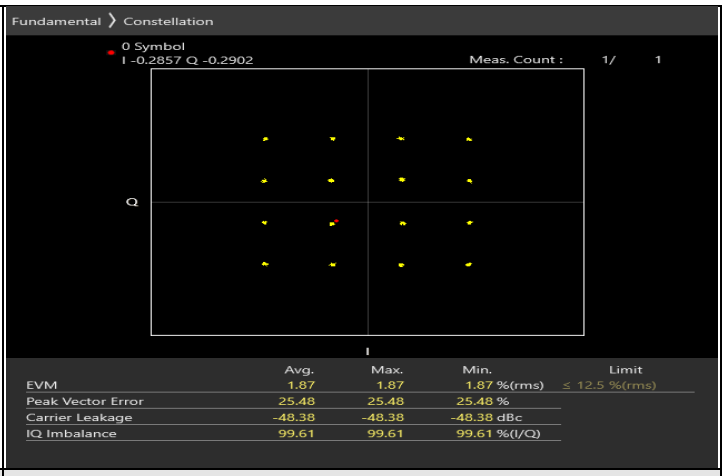
16QAM (1880MHz)

7.2.2 LTE Band 4

LTE Band 4, Channel Bandwidth: 20 MHz



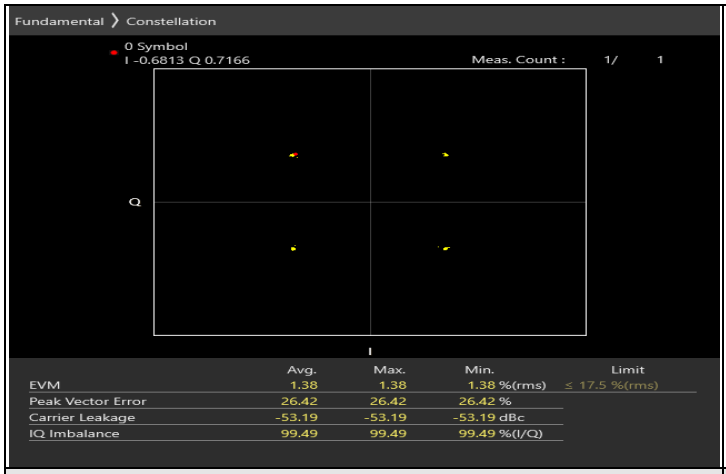
QPSK (1732.5MHz)



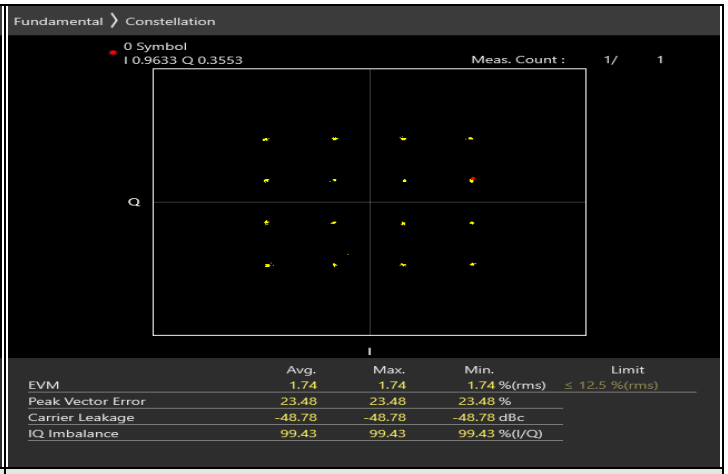
16QAM (1732.5MHz)

7.2.3 LTE Band 12

LTE Band 12, Channel Bandwidth: 10 MHz



QPSK (707.5MHz)



16QAM (707.5MHz)

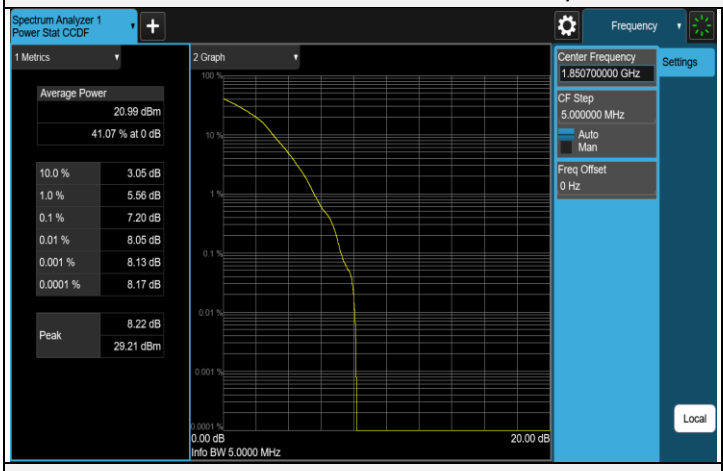
7.3 Peak to Average Ratio

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 66% RH	Tested By:	Noah Chang

7.3.1 LTE Band 2

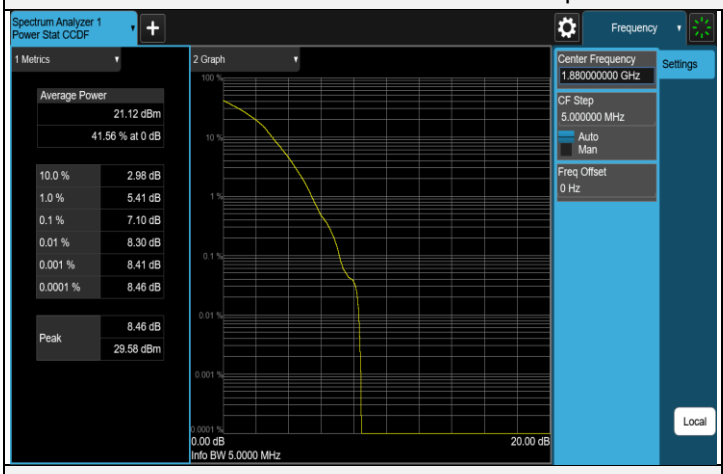
LTE Band 2, Channel Bandwidth: 1.4 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18607	1850.7	6.19	13	PASS
QPSK	18900	1880	5.92	13	PASS
QPSK	19193	1909.3	5.70	13	PASS
16QAM	18607	1850.7	7.20	13	PASS
16QAM	18900	1880	7.15	13	PASS
16QAM	19193	1909.3	6.91	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18607 (1850.7MHz)	

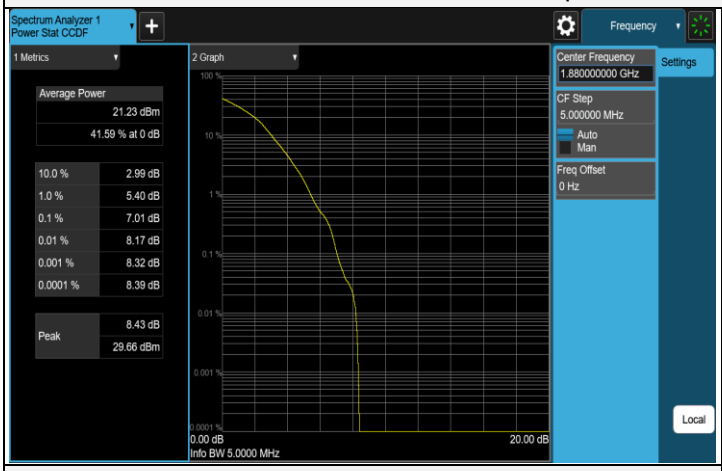
LTE Band 2, Channel Bandwidth: 3 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18615	1851.5	5.90	13	PASS
QPSK	18900	1880	5.87	13	PASS
QPSK	19185	1908.5	5.75	13	PASS
16QAM	18615	1851.5	7.06	13	PASS
16QAM	18900	1880	7.10	13	PASS
16QAM	19185	1908.5	6.94	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18900 (1880MHz)	

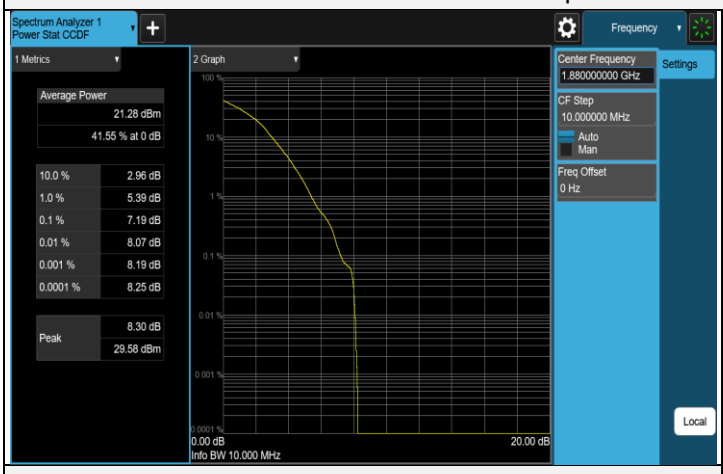
LTE Band 2, Channel Bandwidth: 5 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18625	1852.5	5.35	13	PASS
QPSK	18900	1880	5.78	13	PASS
QPSK	19175	1907.5	5.69	13	PASS
16QAM	18625	1852.5	6.92	13	PASS
16QAM	18900	1880	7.01	13	PASS
16QAM	19175	1907.5	6.87	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18900 (1880MHz)	

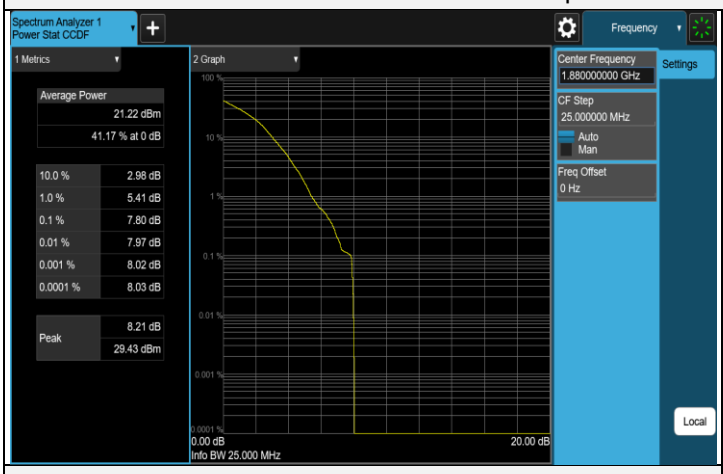
LTE Band 2, Channel Bandwidth: 10 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18650	1855	5.77	13	PASS
QPSK	18900	1880	5.91	13	PASS
QPSK	19150	1905	5.61	13	PASS
16QAM	18650	1855	6.95	13	PASS
16QAM	18900	1880	7.19	13	PASS
16QAM	19150	1905	6.90	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18900 (1880MHz)	

LTE Band 2, Channel Bandwidth: 15 MHz

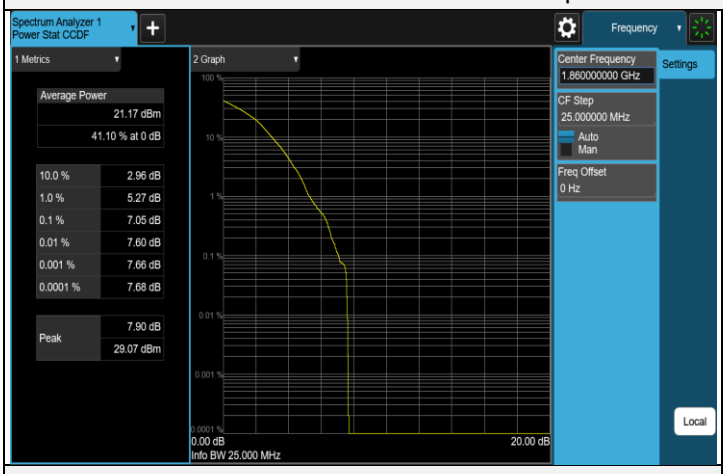
Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18675	1857.5	5.71	13	PASS
QPSK	18900	1880	5.87	13	PASS
QPSK	19125	1902.5	5.36	13	PASS
16QAM	18675	1857.5	6.99	13	PASS
16QAM	18900	1880	7.80	13	PASS
16QAM	19125	1902.5	6.37	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18900 (1880MHz)	

LTE Band 2, Channel Bandwidth: 20 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18700	1860	5.64	13	PASS
QPSK	18900	1880	5.80	13	PASS
QPSK	19100	1900	5.29	13	PASS
16QAM	18700	1860	7.05	13	PASS
16QAM	18900	1880	7.05	13	PASS
16QAM	19100	1900	6.48	13	PASS

Spectrum Plot of Worst Value

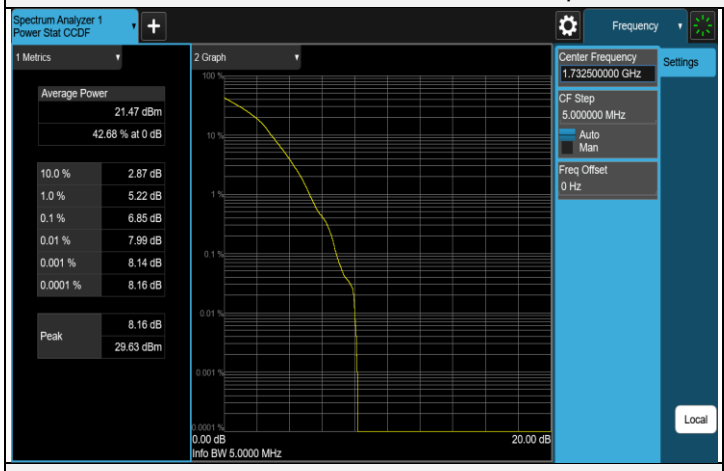


16QAM CH 18700 (1860MHz)

7.3.2 LTE Band 4

LTE Band 4, Channel Bandwidth: 1.4 MHz

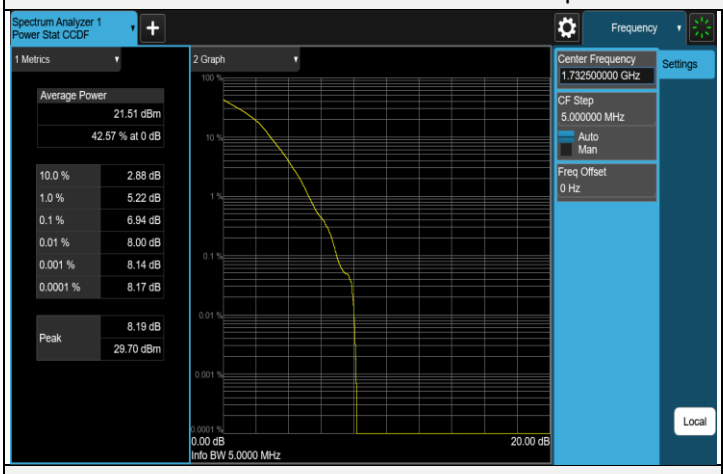
Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	19957	1710.7	5.69	13	PASS
QPSK	20175	1732.5	5.73	13	PASS
QPSK	20393	1754.3	5.61	13	PASS
16QAM	19957	1710.7	6.57	13	PASS
16QAM	20175	1732.5	6.85	13	PASS
16QAM	20393	1754.3	6.64	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 20175 (1732.5MHz)	

LTE Band 4, Channel Bandwidth: 3 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	19965	1711.5	5.46	13	PASS
QPSK	20175	1732.5	5.74	13	PASS
QPSK	20385	1753.5	5.53	13	PASS
16QAM	19965	1711.5	6.60	13	PASS
16QAM	20175	1732.5	6.94	13	PASS
16QAM	20385	1753.5	6.73	13	PASS

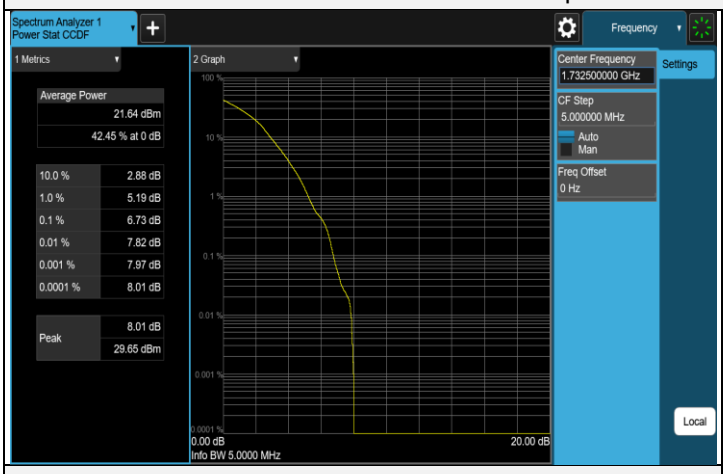
Spectrum Plot of Worst Value



16QAM CH 20175 (1732.5MHz)

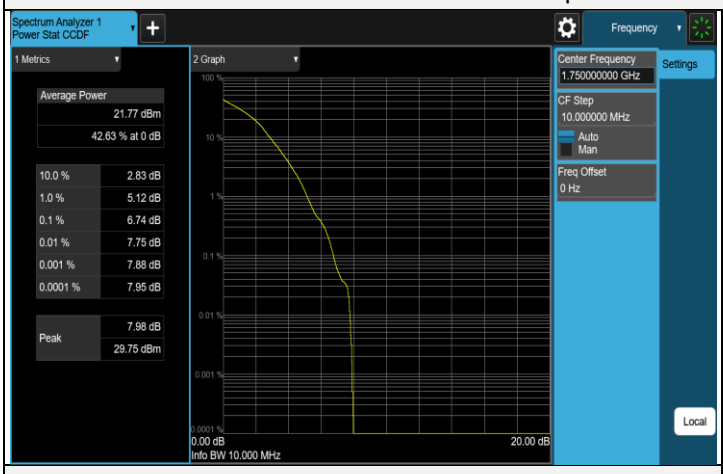
LTE Band 4, Channel Bandwidth: 5 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	19975	1712.5	5.35	13	PASS
QPSK	20175	1732.5	5.62	13	PASS
QPSK	20375	1752.5	5.56	13	PASS
16QAM	19975	1712.5	6.46	13	PASS
16QAM	20175	1732.5	6.73	13	PASS
16QAM	20375	1752.5	6.65	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 20175 (1732.5MHz)	

LTE Band 4, Channel Bandwidth: 10 MHz

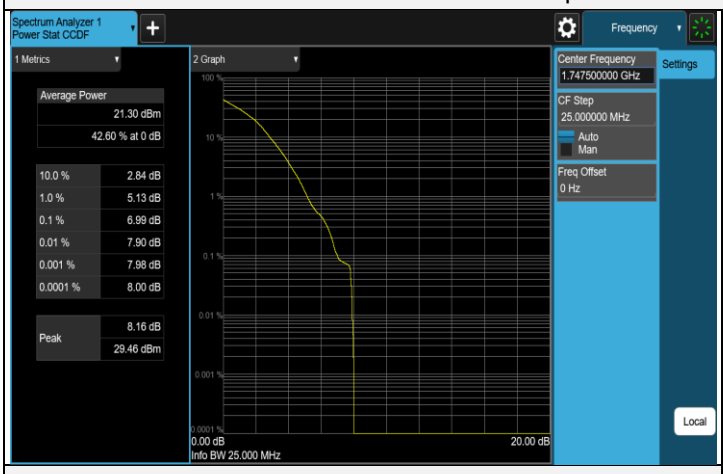
Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	20000	1715	5.47	13	PASS
QPSK	20175	1732.5	5.53	13	PASS
QPSK	20350	1750	5.67	13	PASS
16QAM	20000	1715	6.47	13	PASS
16QAM	20175	1732.5	6.72	13	PASS
16QAM	20350	1750	6.74	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 20350 (1750MHz)	

LTE Band 4, Channel Bandwidth: 15 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	20025	1717.5	5.37	13	PASS
QPSK	20175	1732.5	5.63	13	PASS
QPSK	20325	1747.5	5.58	13	PASS
16QAM	20025	1717.5	6.47	13	PASS
16QAM	20175	1732.5	6.63	13	PASS
16QAM	20325	1747.5	6.99	13	PASS

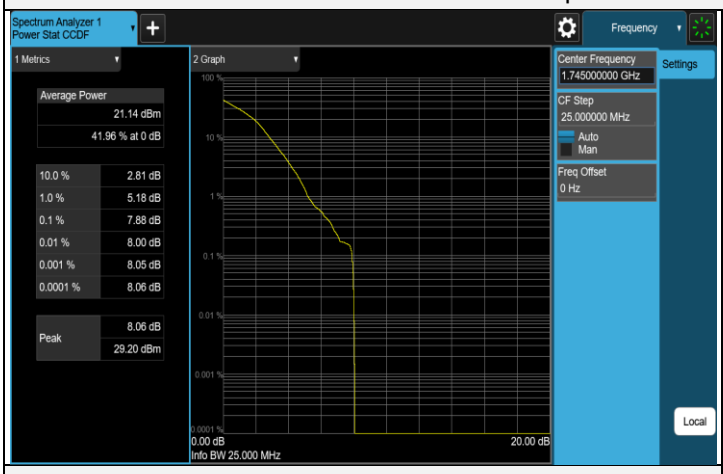
Spectrum Plot of Worst Value



16QAM CH 20325 (1747.5MHz)

LTE Band 4, Channel Bandwidth: 20 MHz

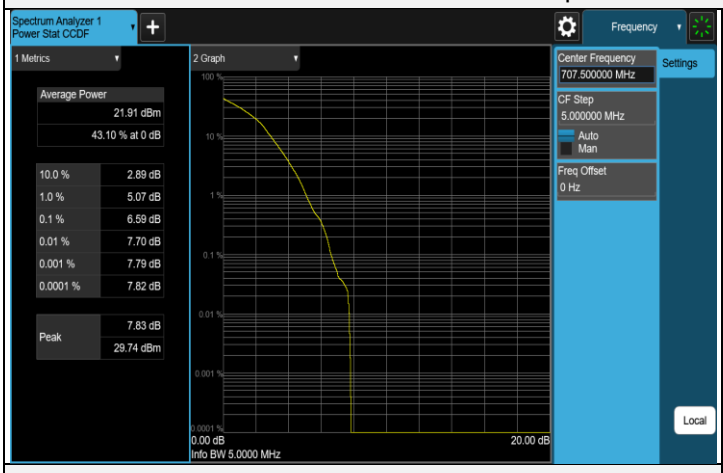
Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	20050	1720	5.45	13	PASS
QPSK	20175	1732.5	5.47	13	PASS
QPSK	20300	1745	5.76	13	PASS
16QAM	20050	1720	6.39	13	PASS
16QAM	20175	1732.5	6.48	13	PASS
16QAM	20300	1745	7.88	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 20300 (1745MHz)	

7.3.3 LTE Band 12

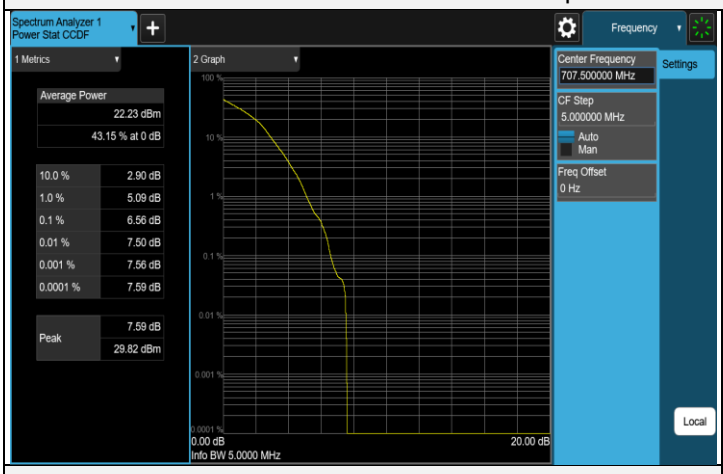
LTE Band 12, Channel Bandwidth: 1.4 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	23017	699.7	5.77	13	PASS
QPSK	23095	707.5	5.47	13	PASS
QPSK	23173	715.3	5.31	13	PASS
16QAM	23017	699.7	6.50	13	PASS
16QAM	23095	707.5	6.59	13	PASS
16QAM	23173	715.3	6.50	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 23095 (707.5MHz)	

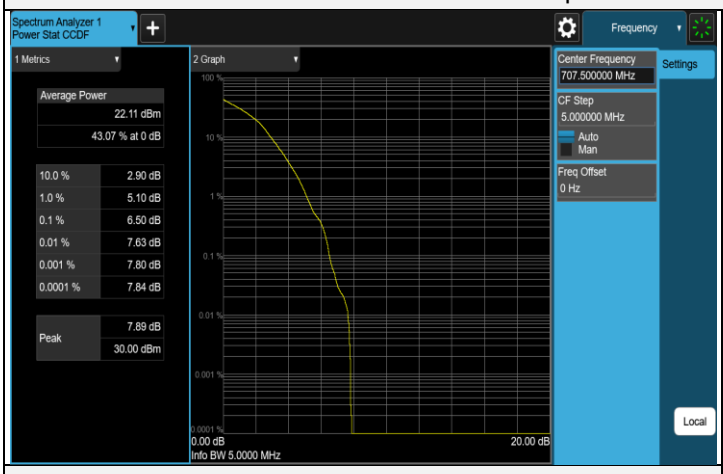
LTE Band 12, Channel Bandwidth: 3 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	23025	700.5	5.40	13	PASS
QPSK	23095	707.5	5.40	13	PASS
QPSK	23165	714.5	5.38	13	PASS
16QAM	23025	700.5	6.45	13	PASS
16QAM	23095	707.5	6.56	13	PASS
16QAM	23165	714.5	6.51	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 23095 (707.5MHz)	

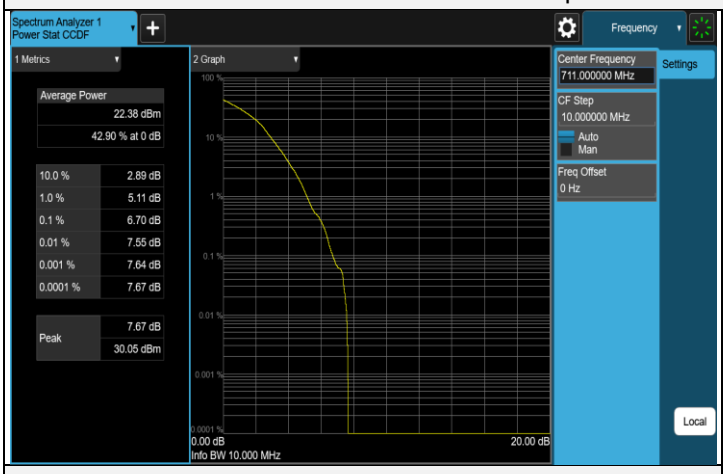
LTE Band 12, Channel Bandwidth: 5 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	23035	701.5	5.37	13	PASS
QPSK	23095	707.5	5.40	13	PASS
QPSK	23155	713.5	5.35	13	PASS
16QAM	23035	701.5	6.42	13	PASS
16QAM	23095	707.5	6.50	13	PASS
16QAM	23155	713.5	6.41	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 23095 (707.5MHz)	

LTE Band 12, Channel Bandwidth: 10 MHz

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	23060	704	5.36	13	PASS
QPSK	23095	707.5	5.44	13	PASS
QPSK	23130	711	5.48	13	PASS
16QAM	23060	704	6.62	13	PASS
16QAM	23095	707.5	6.58	13	PASS
16QAM	23130	711	6.70	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 23130 (711MHz)	

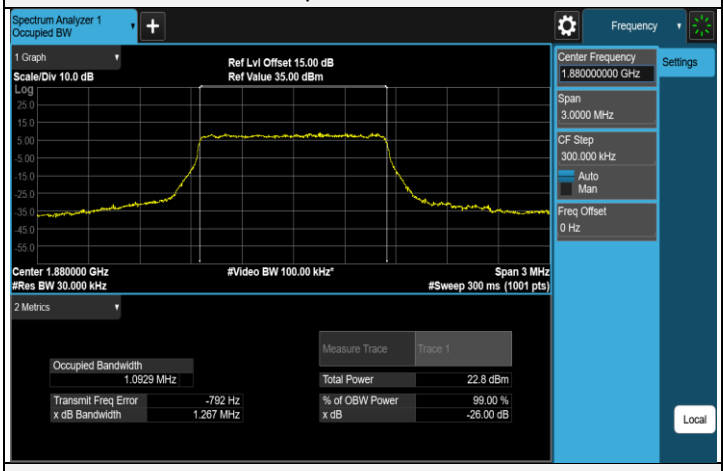
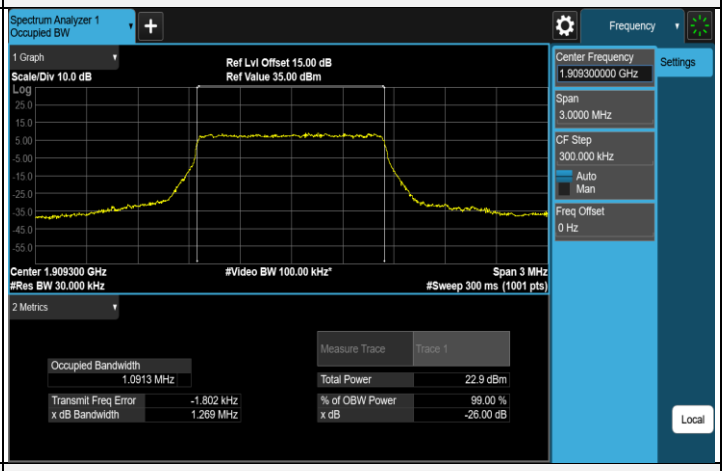
7.4 Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 66% RH	Tested By:	Noah Chang

7.4.1 LTE Band 2

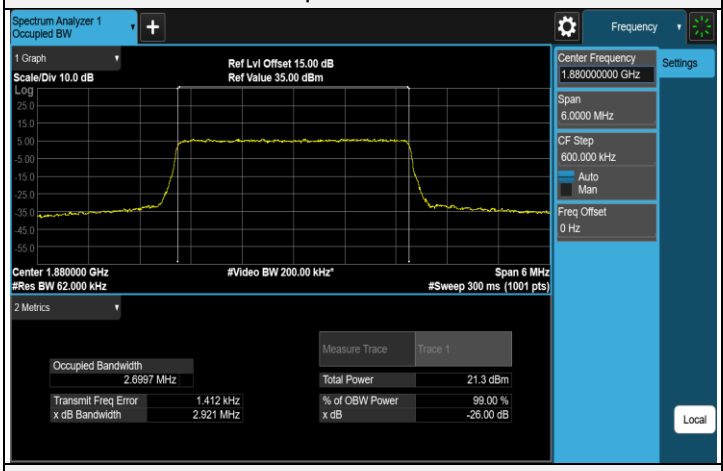
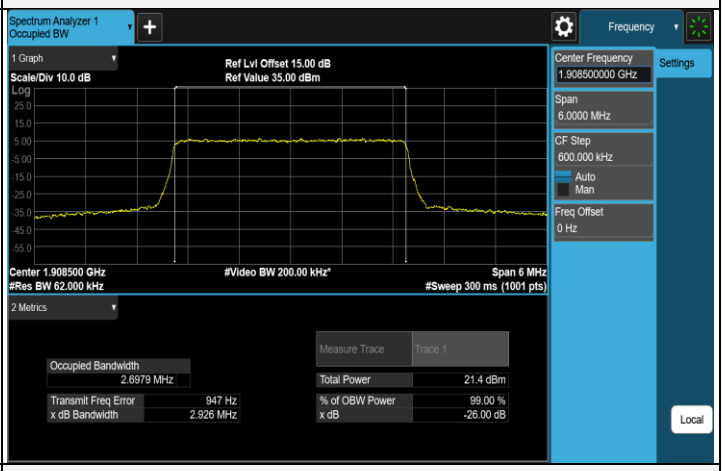
LTE Band 2, Channel Bandwidth: 1.4 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	18607	1850.7	1.0878	1.250
QPSK	18900	1880	1.0929	1.267
QPSK	19193	1909.3	1.0913	1.269
16QAM	18607	1850.7	1.0885	1.255
16QAM	18900	1880	1.0895	1.253
16QAM	19193	1909.3	1.0893	1.251

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 18900 (1880MHz)	QPSK CH 19193 (1909.3MHz)

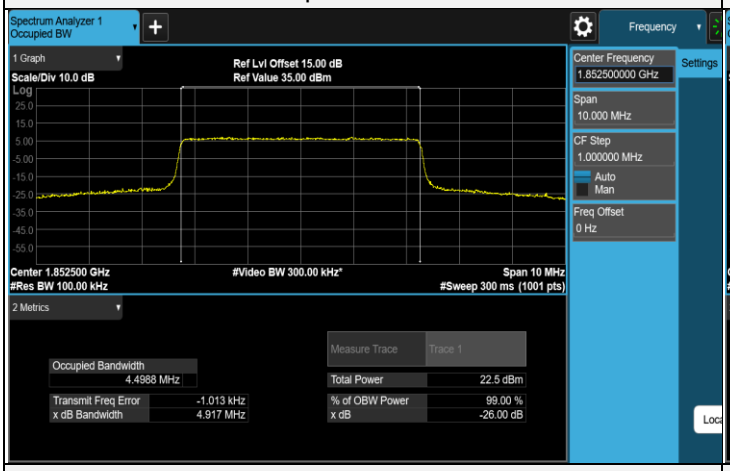
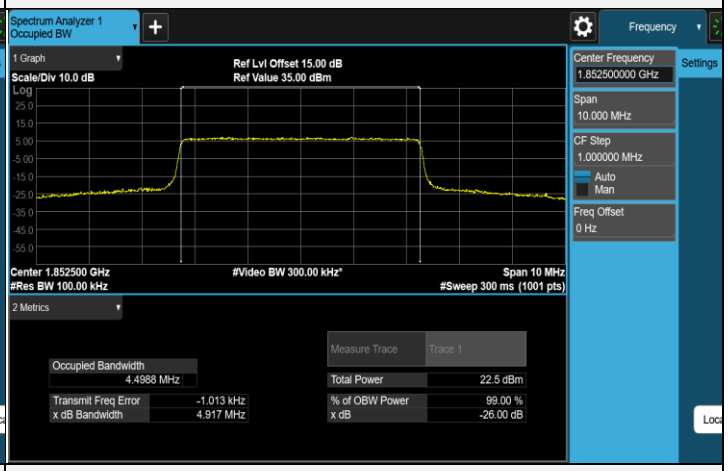
LTE Band 2, Channel Bandwidth: 3 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	18615	1851.5	2.6988	2.904
QPSK	18900	1880	2.6987	2.915
QPSK	19185	1908.5	2.6943	2.911
16QAM	18615	1851.5	2.6968	2.909
16QAM	18900	1880	2.6997	2.921
16QAM	19185	1908.5	2.6979	2.926

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 18900 (1880MHz)	16QAM CH 19185 (1908.5MHz)

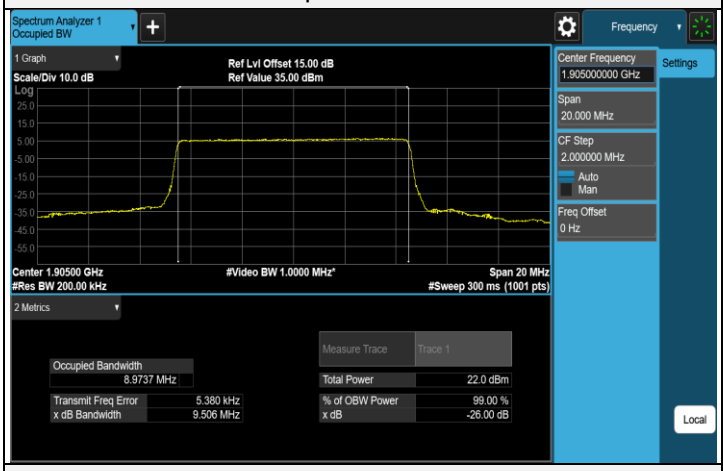
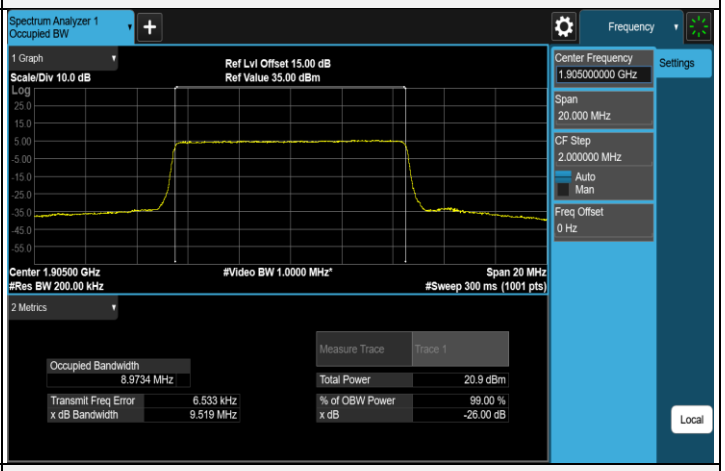
LTE Band 2, Channel Bandwidth: 5 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	18625	1852.5	4.4678	4.673
QPSK	18900	1880	4.4906	4.841
QPSK	19175	1907.5	4.4911	4.828
16QAM	18625	1852.5	4.4988	4.917
16QAM	18900	1880	4.4906	4.816
16QAM	19175	1907.5	4.4880	4.810

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 18625 (1852.5MHz)	16QAM CH 18625 (1852.5MHz)

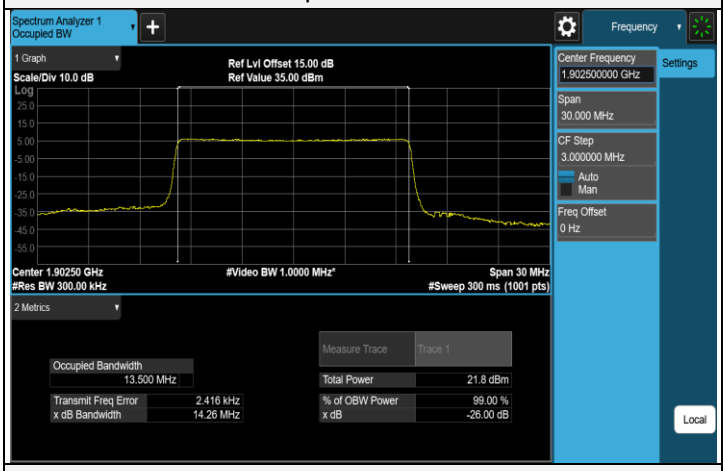
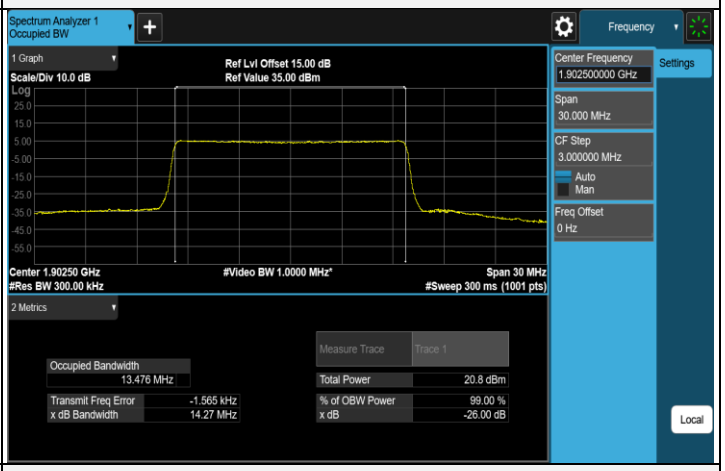
LTE Band 2, Channel Bandwidth: 10 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	18650	1855	8.9396	9.487
QPSK	18900	1880	8.9708	9.518
QPSK	19150	1905	8.9737	9.506
16QAM	18650	1855	8.9383	9.490
16QAM	18900	1880	8.9678	9.499
16QAM	19150	1905	8.9734	9.519

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 19150 (1905MHz)	16QAM CH 19150 (1905MHz)

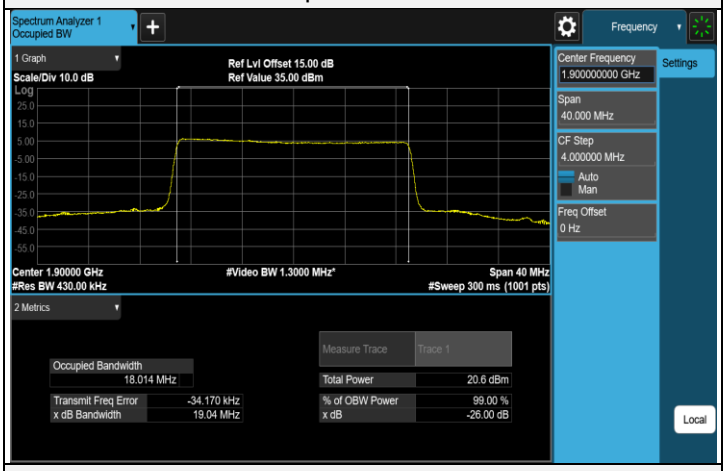
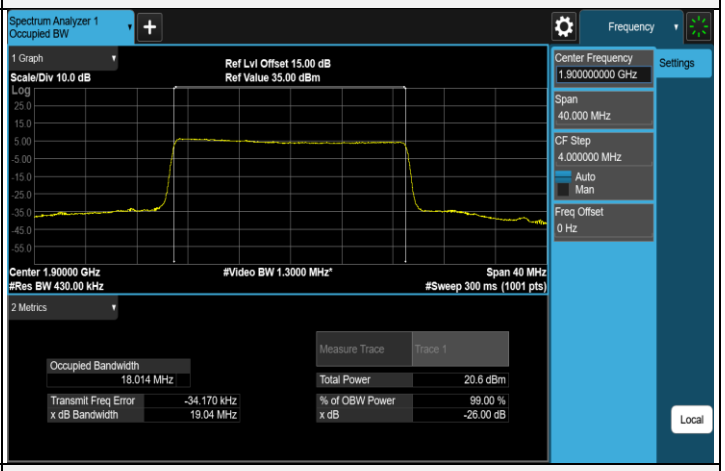
LTE Band 2, Channel Bandwidth: 15 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	18675	1857.5	13.3916	14.199
QPSK	18900	1880	13.4525	14.224
QPSK	19125	1902.5	13.4996	14.261
16QAM	18675	1857.5	13.3786	14.205
16QAM	18900	1880	13.4526	14.238
16QAM	19125	1902.5	13.4755	14.268

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 19125 (1902.5MHz)	16QAM CH 19125 (1902.5MHz)

LTE Band 2, Channel Bandwidth: 20 MHz

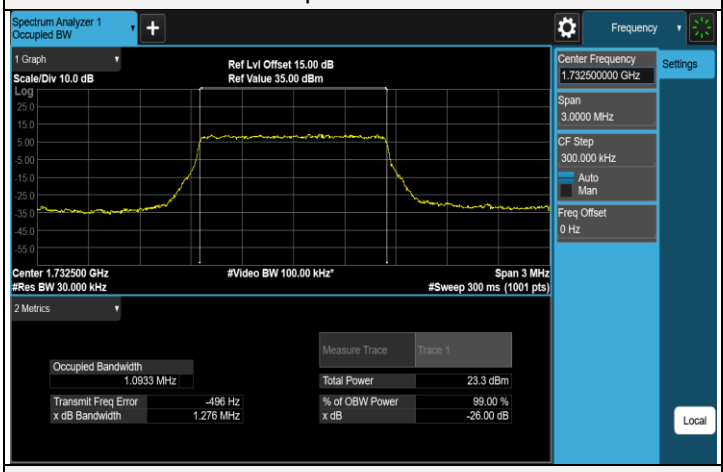
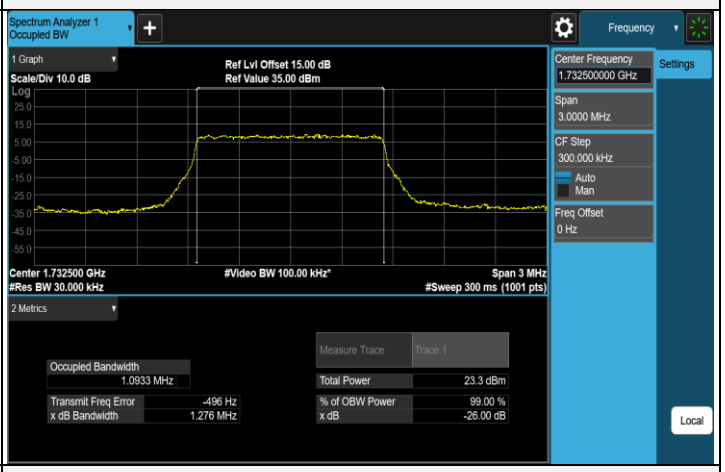
Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	18700	1860	17.8612	18.971
QPSK	18900	1880	17.9483	19.011
QPSK	19100	1900	18.0011	19.029
16QAM	18700	1860	17.8645	18.953
16QAM	18900	1880	17.9640	19.015
16QAM	19100	1900	18.0136	19.036

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 19100 (1900MHz)	16QAM CH 19100 (1900MHz)

7.4.2 LTE Band 4

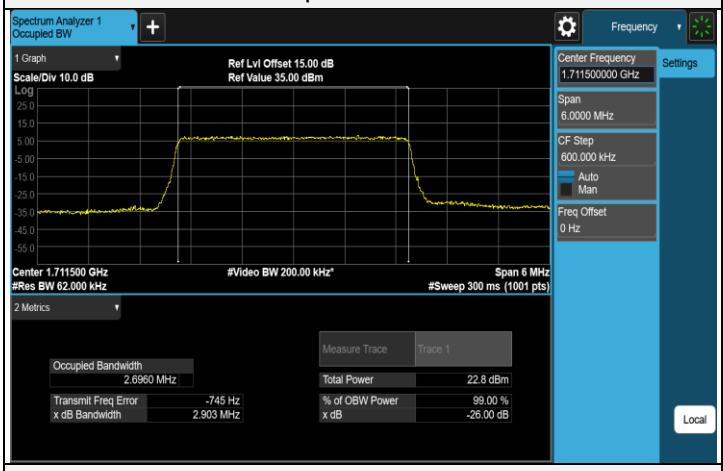
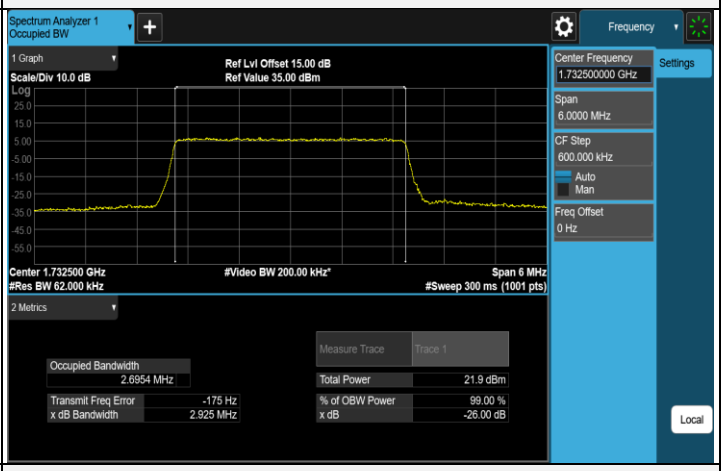
LTE Band 4, Channel Bandwidth: 1.4 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	19957	1710.7	1.0871	1.252
QPSK	20175	1732.5	1.0933	1.276
QPSK	20393	1754.3	1.0914	1.263
16QAM	19957	1710.7	1.0889	1.261
16QAM	20175	1732.5	1.0893	1.258
16QAM	20393	1754.3	1.0883	1.253

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 20175 (1732.5MHz)	QPSK CH 20175 (1732.5MHz)

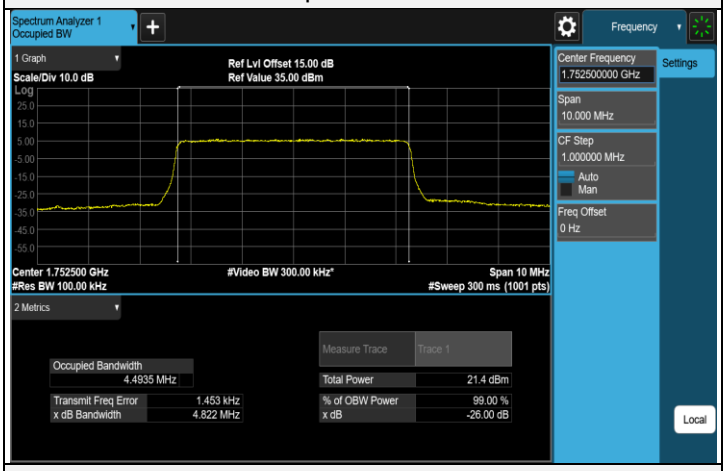
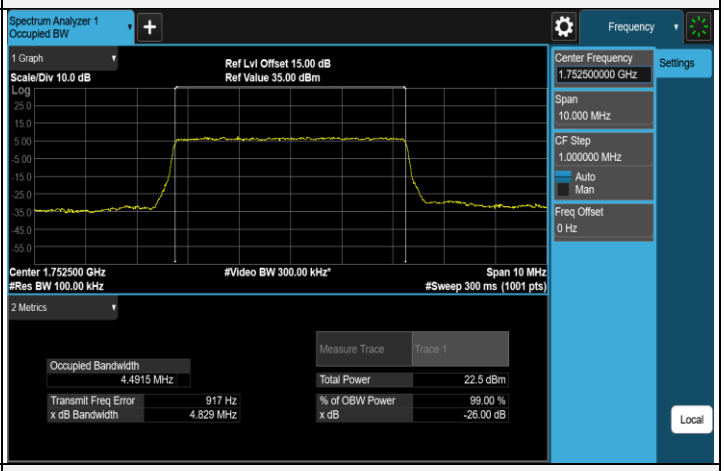
LTE Band 4, Channel Bandwidth: 3 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	19965	1711.5	2.6960	2.903
QPSK	20175	1732.5	2.6957	2.907
QPSK	20385	1753.5	2.6943	2.899
16QAM	19965	1711.5	2.6926	2.908
16QAM	20175	1732.5	2.6954	2.925
16QAM	20385	1753.5	2.6950	2.925

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 19965 (1711.5MHz)	16QAM CH 20175 (1732.5MHz)

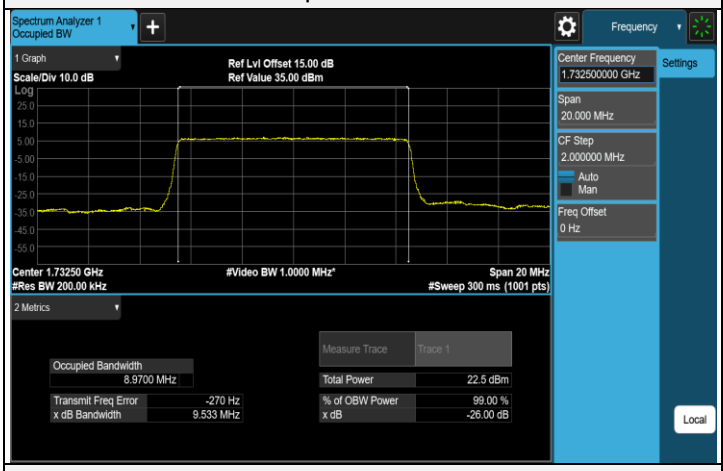
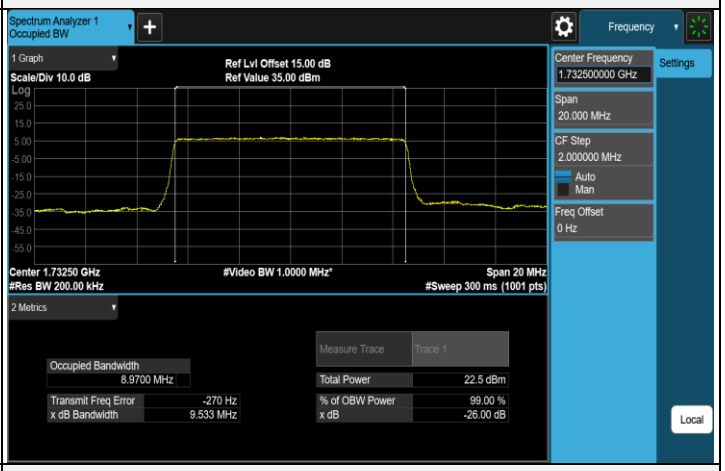
LTE Band 4, Channel Bandwidth: 5 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	19975	1712.5	4.4932	4.828
QPSK	20175	1732.5	4.4910	4.812
QPSK	20375	1752.5	4.4915	4.829
16QAM	19975	1712.5	4.4884	4.816
16QAM	20175	1732.5	4.4900	4.819
16QAM	20375	1752.5	4.4935	4.822

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 20375 (1752.5MHz)	QPSK CH 20375 (1752.5MHz)

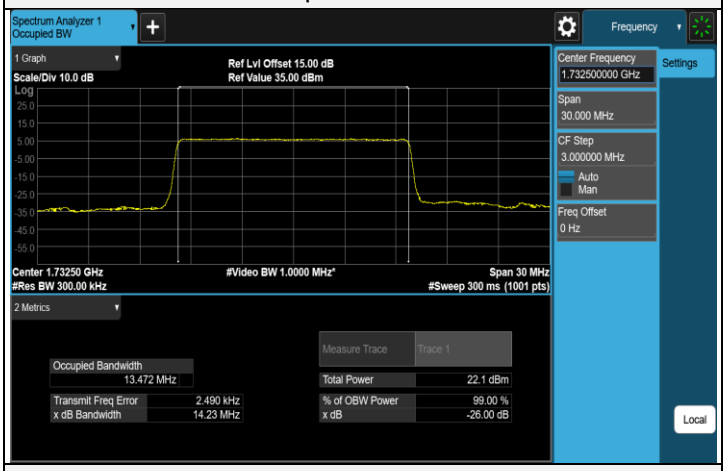
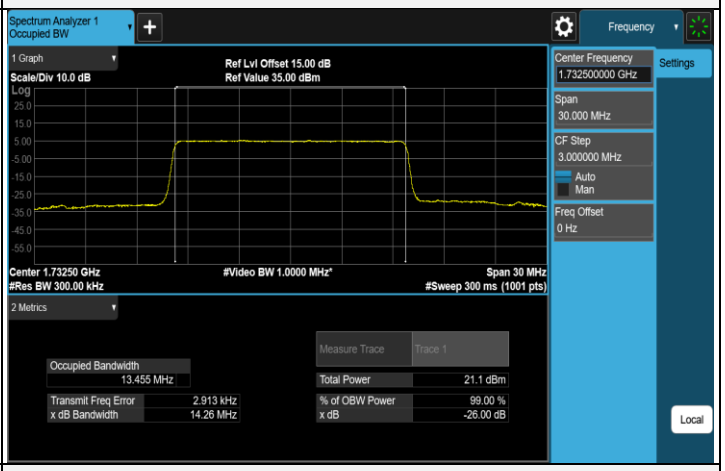
LTE Band 4, Channel Bandwidth: 10 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	20000	1715	8.9693	9.531
QPSK	20175	1732.5	8.9700	9.533
QPSK	20350	1750	8.9695	9.528
16QAM	20000	1715	8.9614	9.515
16QAM	20175	1732.5	8.9668	9.523
16QAM	20350	1750	8.9665	9.516

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 20175 (1732.5MHz)	QPSK CH 20175 (1732.5MHz)

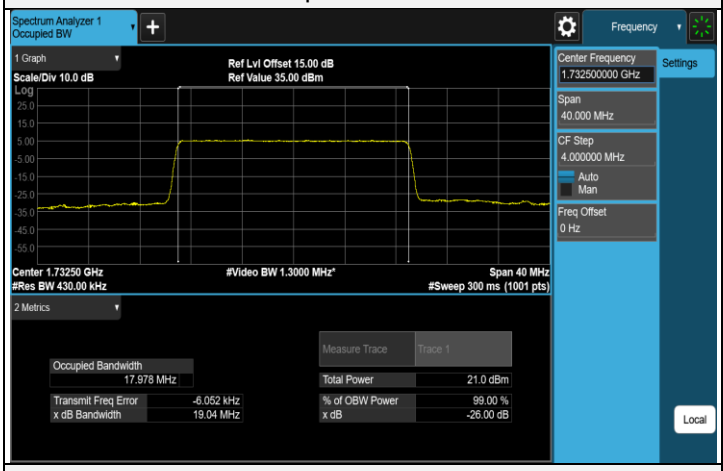
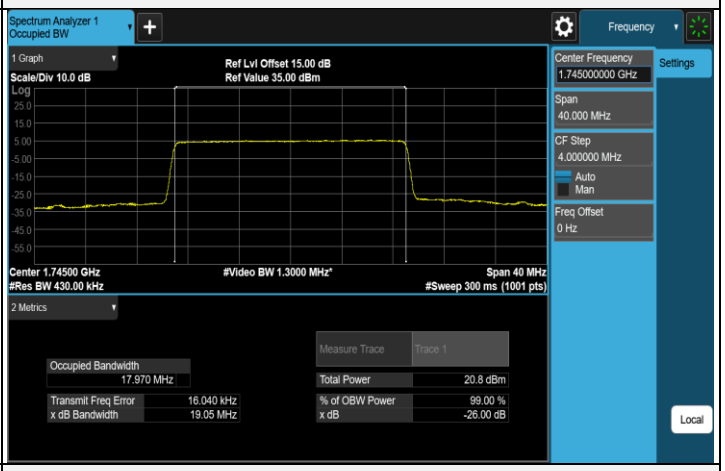
LTE Band 4, Channel Bandwidth: 15 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	20025	1717.5	13.4535	14.243
QPSK	20175	1732.5	13.4725	14.234
QPSK	20325	1747.5	13.4576	14.236
16QAM	20025	1717.5	13.4420	14.242
16QAM	20175	1732.5	13.4554	14.261
16QAM	20325	1747.5	13.4526	14.252

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 20175 (1732.5MHz)	16QAM CH 20175 (1732.5MHz)

LTE Band 4, Channel Bandwidth: 20 MHz

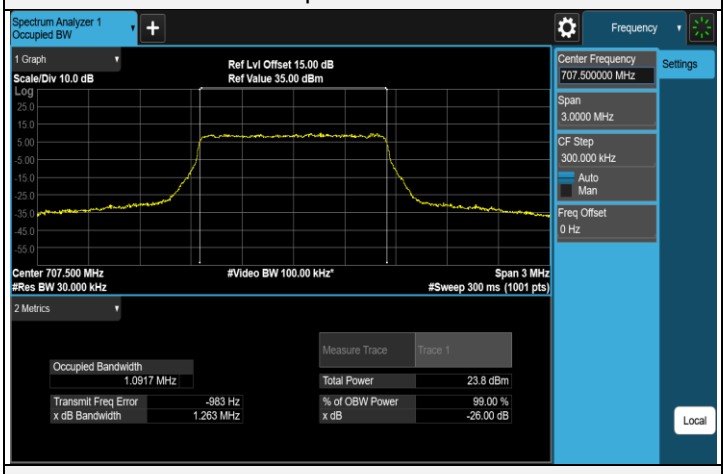
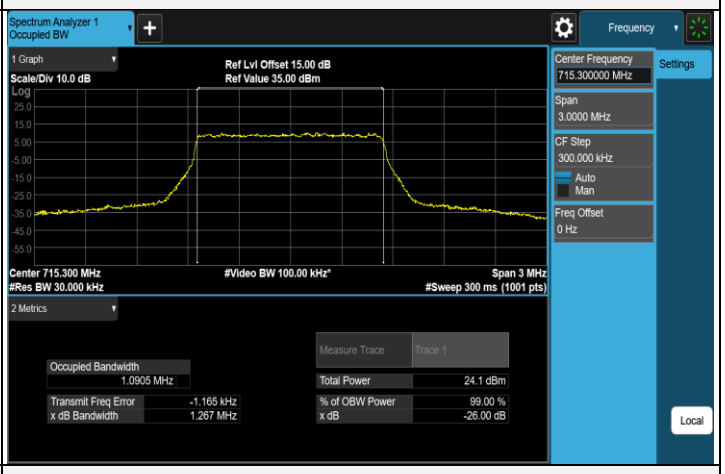
Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	20050	1720	17.9350	19.047
QPSK	20175	1732.5	17.9626	19.045
QPSK	20300	1745	17.9488	19.022
16QAM	20050	1720	17.9546	19.042
16QAM	20175	1732.5	17.9780	19.036
16QAM	20300	1745	17.9698	19.048

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 20175 (1732.5MHz)	16QAM CH 20300 (1745MHz)

7.4.3 LTE Band 12

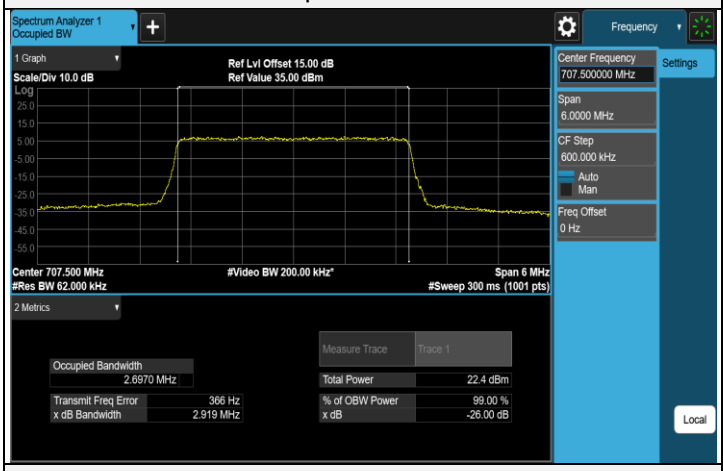
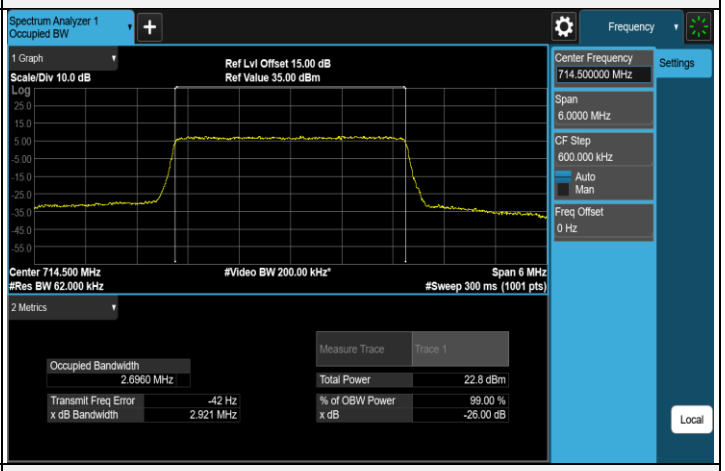
LTE Band 12, Channel Bandwidth: 1.4 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	23017	699.7	1.0867	1.256
QPSK	23095	707.5	1.0917	1.263
QPSK	23173	715.3	1.0905	1.267
16QAM	23017	699.7	1.0885	1.257
16QAM	23095	707.5	1.0895	1.259
16QAM	23173	715.3	1.0897	1.255

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 23095 (707.5MHz)	QPSK CH 23173 (715.3MHz)

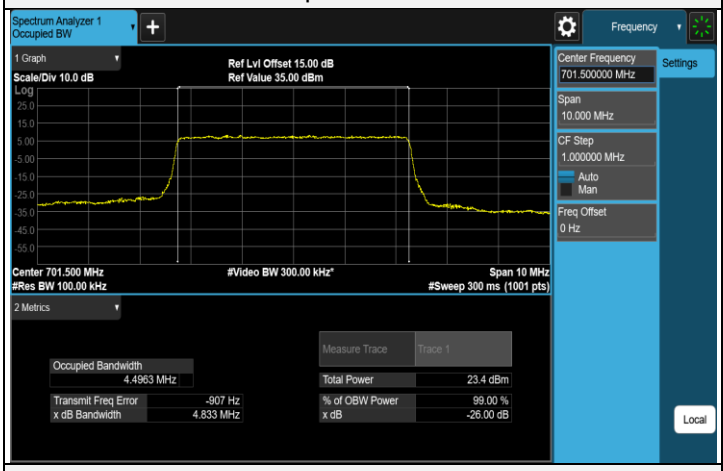
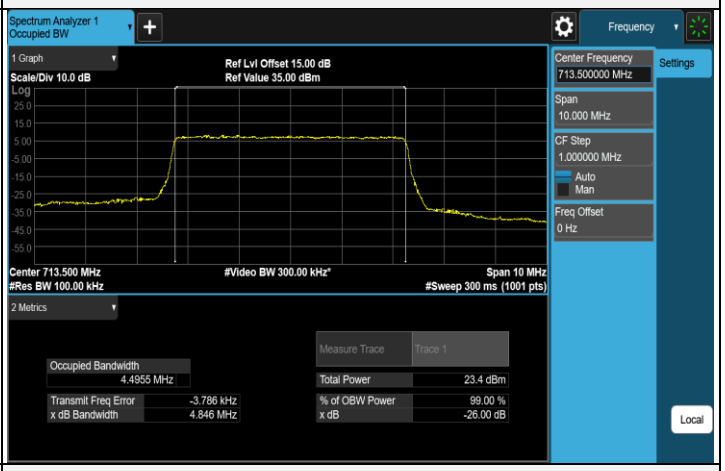
LTE Band 12, Channel Bandwidth: 3 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	23025	700.5	2.6950	2.908
QPSK	23095	707.5	2.6957	2.914
QPSK	23165	714.5	2.6957	2.915
16QAM	23025	700.5	2.6948	2.914
16QAM	23095	707.5	2.6970	2.919
16QAM	23165	714.5	2.6960	2.921

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

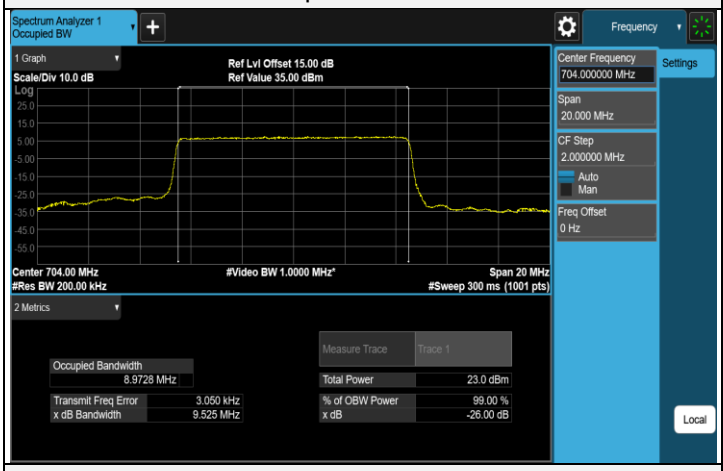
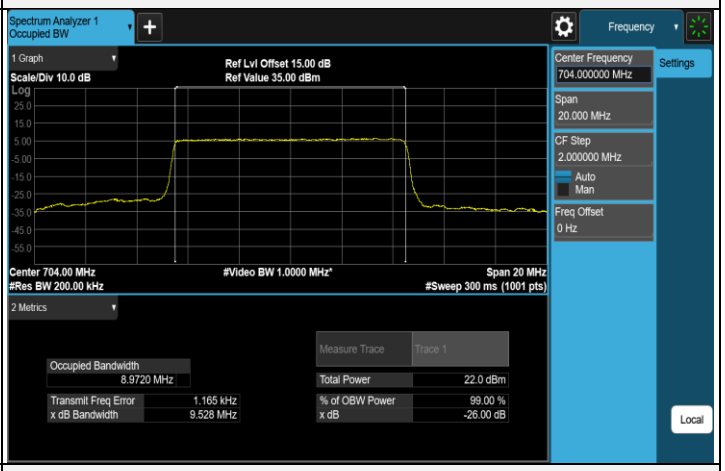
LTE Band 12, Channel Bandwidth: 5 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	23035	701.5	4.4963	4.833
QPSK	23095	707.5	4.4944	4.812
QPSK	23155	713.5	4.4955	4.846
16QAM	23035	701.5	4.4911	4.814
16QAM	23095	707.5	4.4923	4.813
16QAM	23155	713.5	4.4930	4.805

Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 23035 (701.5MHz)	QPSK CH 23155 (713.5MHz)

LTE Band 12, Channel Bandwidth: 10 MHz

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	23060	704	8.9728	9.525
QPSK	23095	707.5	8.9701	9.526
QPSK	23130	711	8.9674	9.520
16QAM	23060	704	8.9720	9.528
16QAM	23095	707.5	8.9645	9.512
16QAM	23130	711	8.9624	9.519

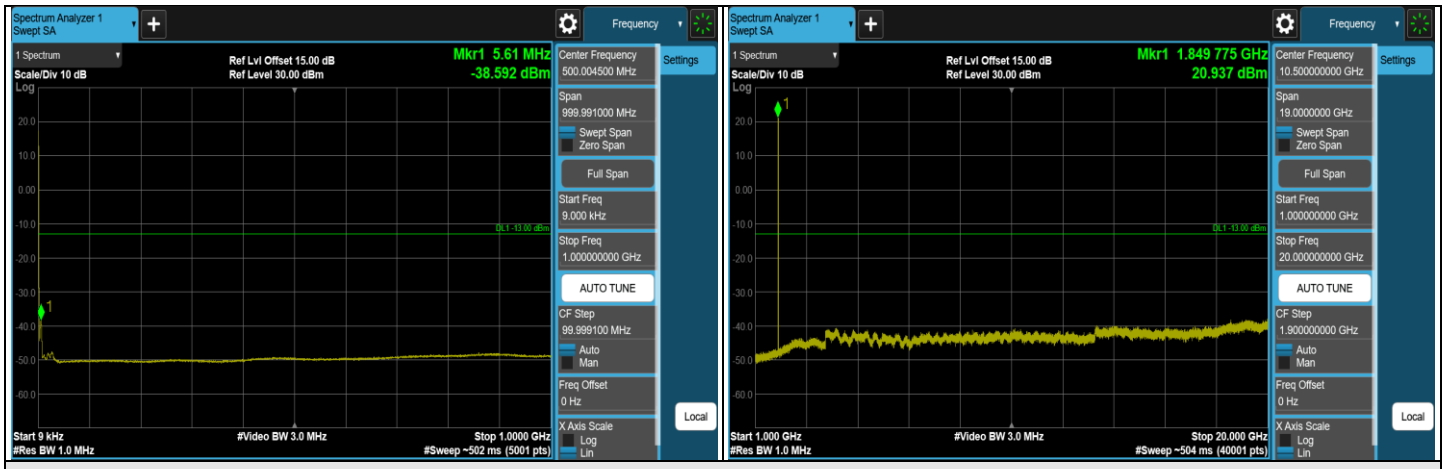
Spectrum Plot of Worst Value	
Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 23060 (704MHz)	16QAM CH 23060 (704MHz)

7.5 Conducted Spurious Emissions

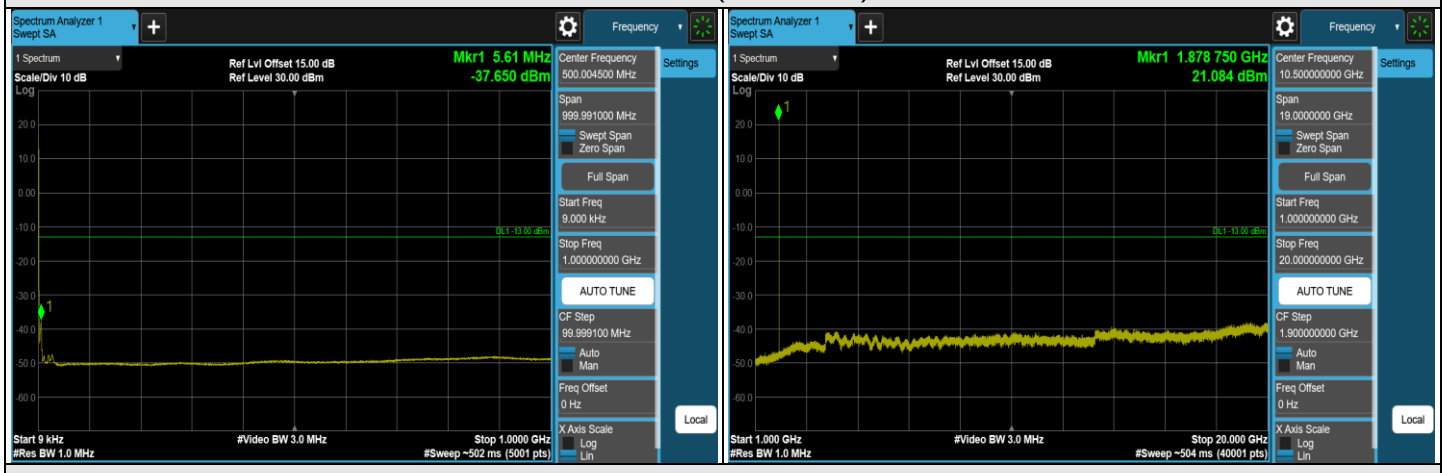
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 66% RH	Tested By:	Noah Chang

7.5.1 LTE Band 2

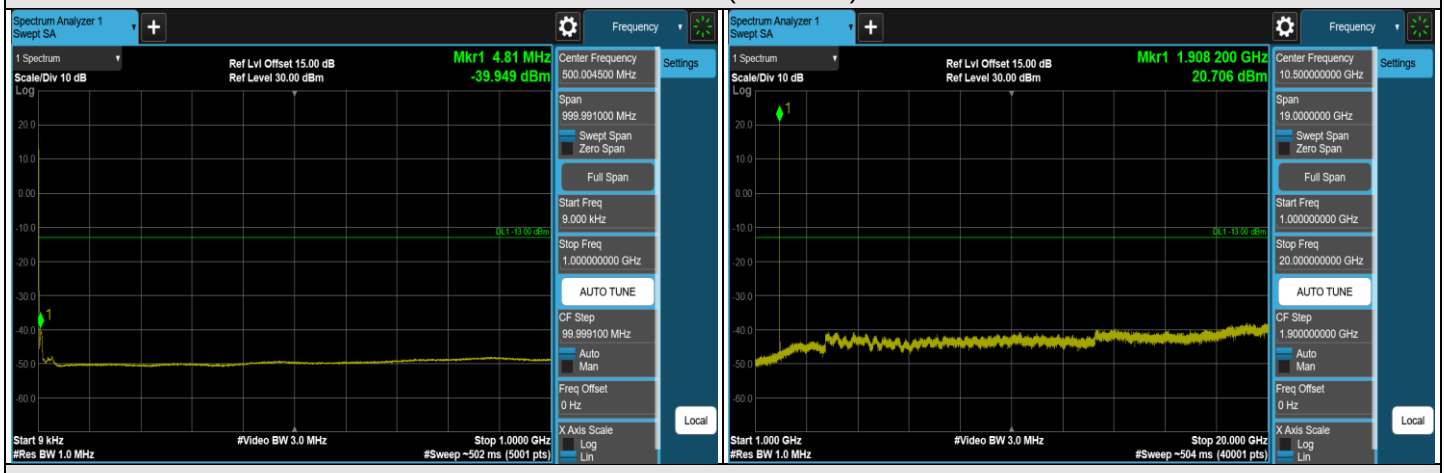
LTE Band 2, Channel Bandwidth: 1.4 MHz



CH 18607 (1850.7MHz)

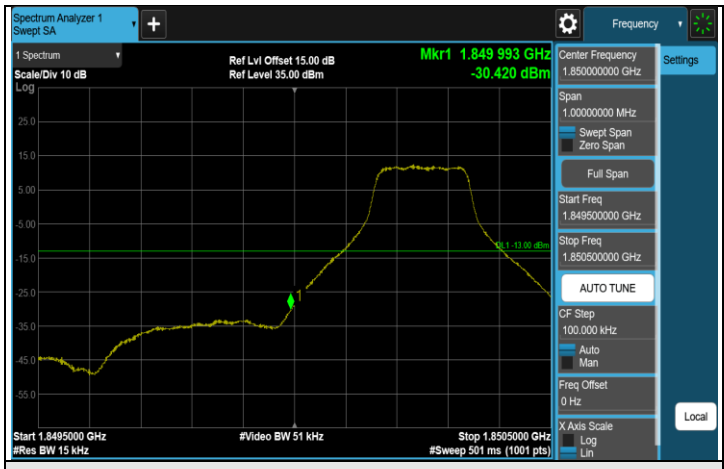


CH 18900 (1880MHz)

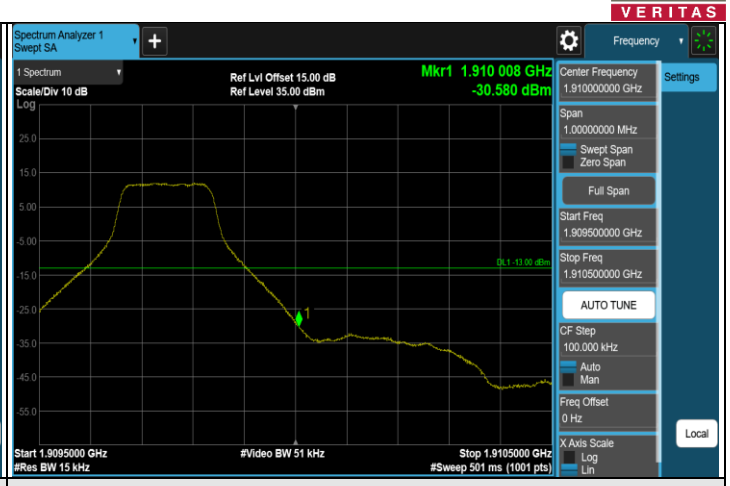


CH 19193 (1909.3MHz)

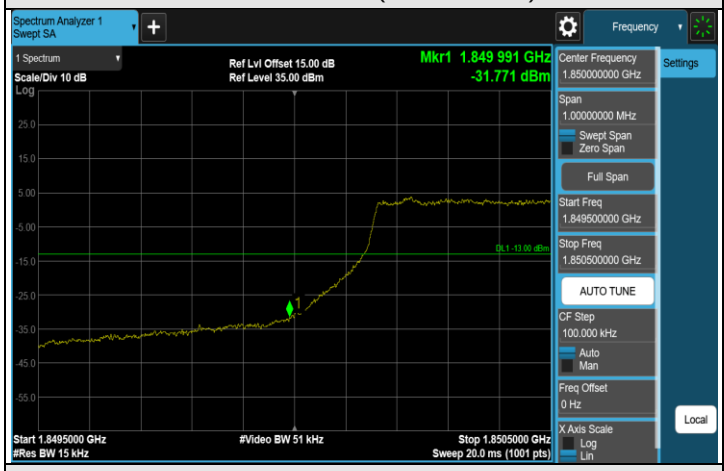
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



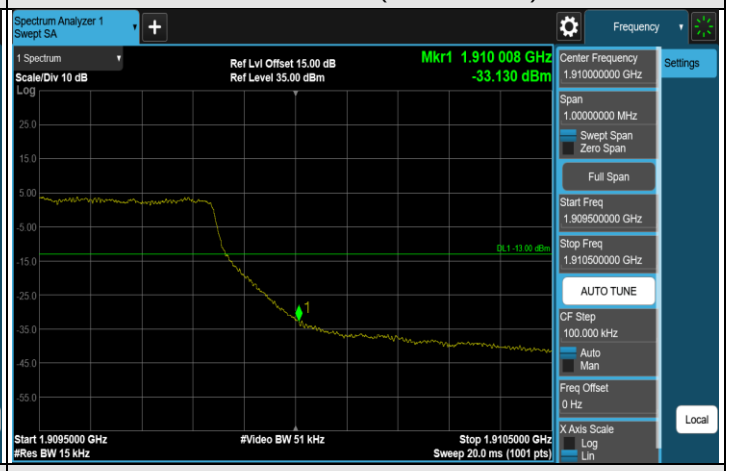
1RB CH 18607 (1850.7 MHz)



1RB CH 19193 (1909.3 MHz)

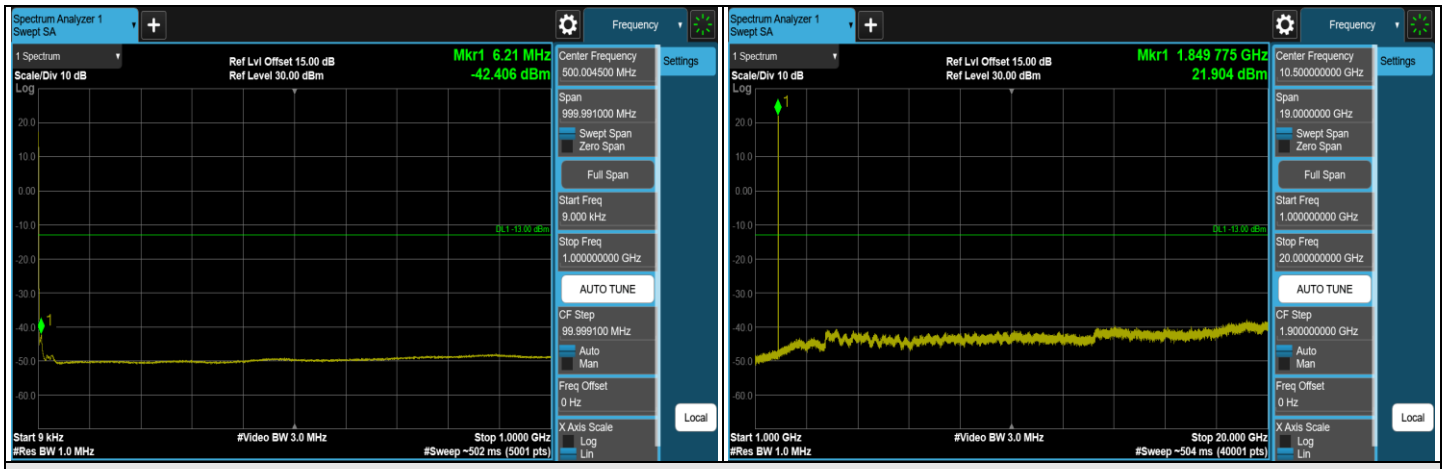


FULL CH 18607 (1850.7 MHz)

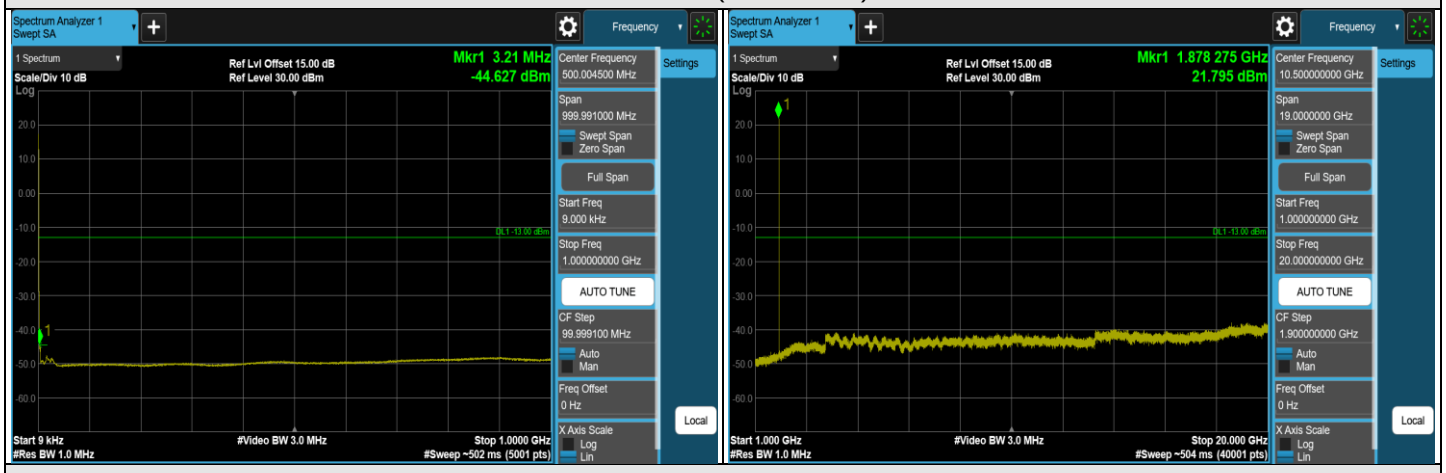


FULL CH 19193 (1909.3 MHz)

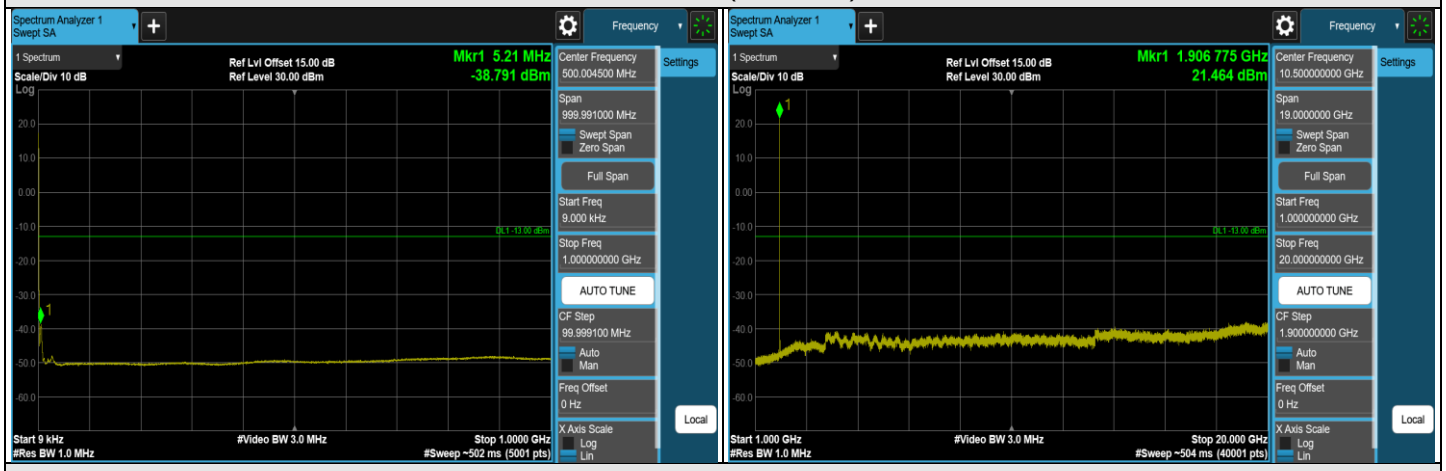
LTE Band 2, Channel Bandwidth: 3 MHz



CH 18615 (1851.5MHz)

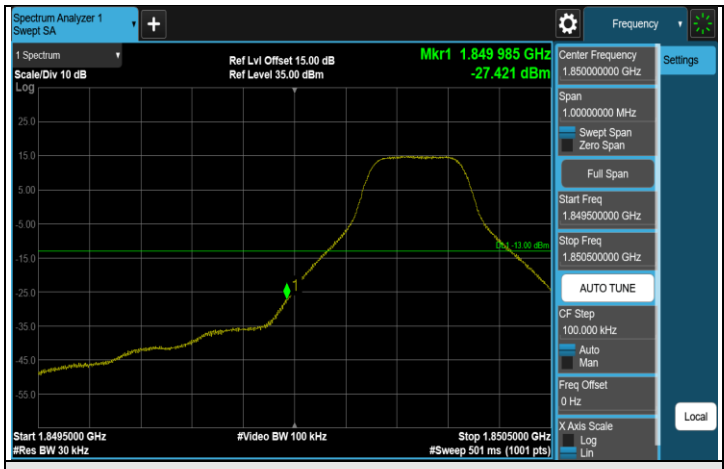


CH 18900 (1880MHz)

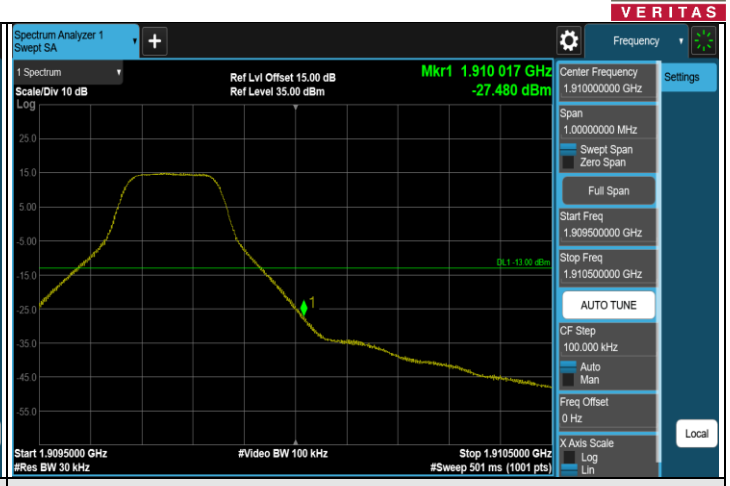


CH 19185 (1908.5MHz)

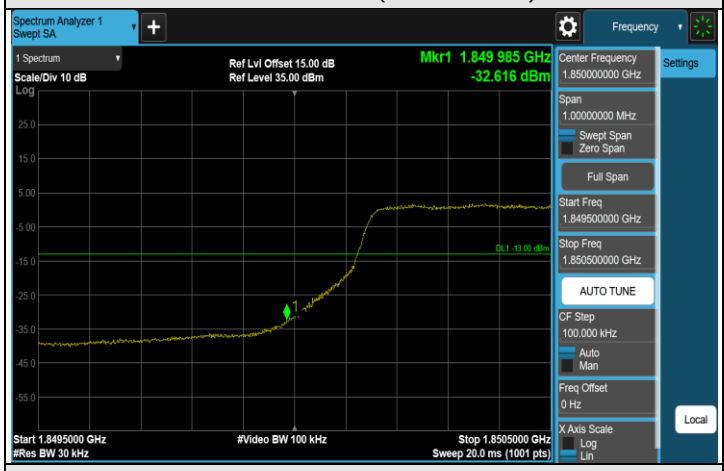
Note: The signal at 9 kHz is IF signal from spectrum analyzer.



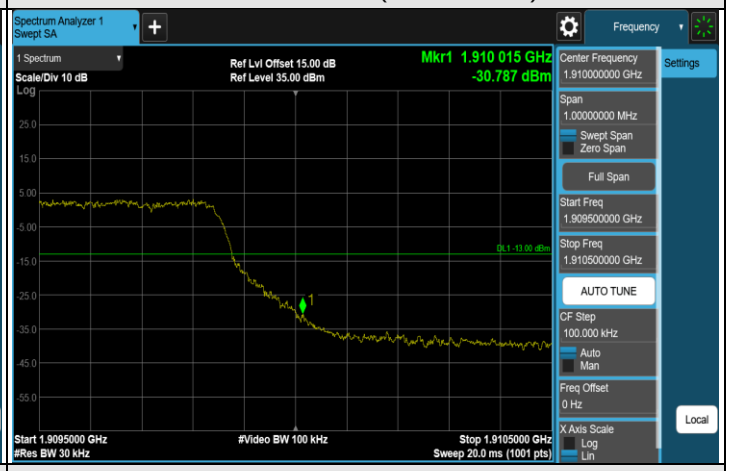
1RB CH 18615 (1851.5 MHz)



1RB CH 19185 (1908.5 MHz)

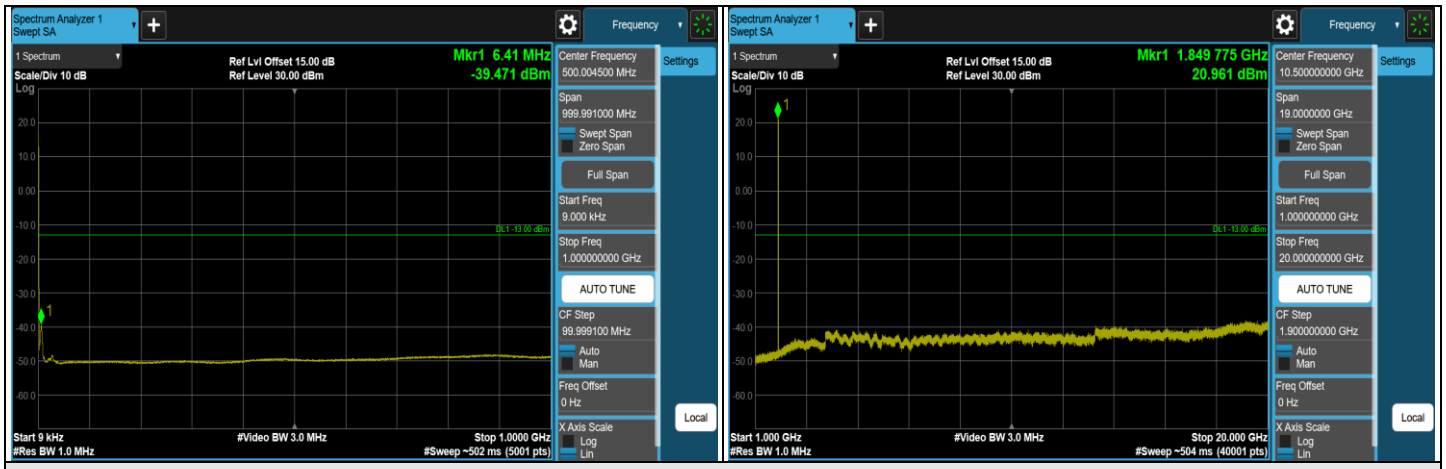


FULL CH 18615 (1851.5 MHz)

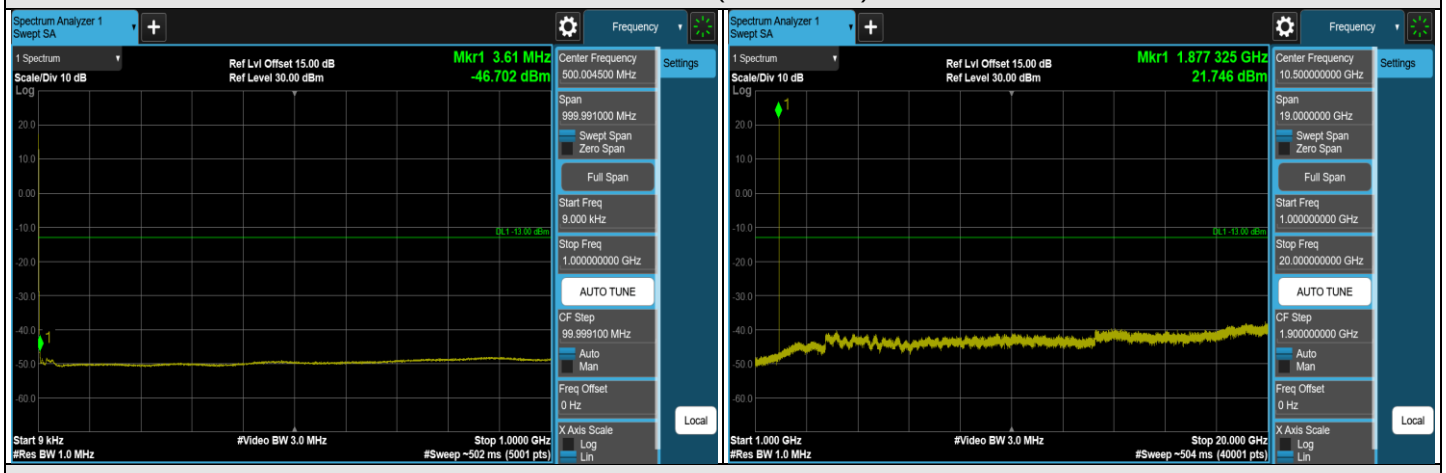


FULL CH 19185 (1908.5 MHz)

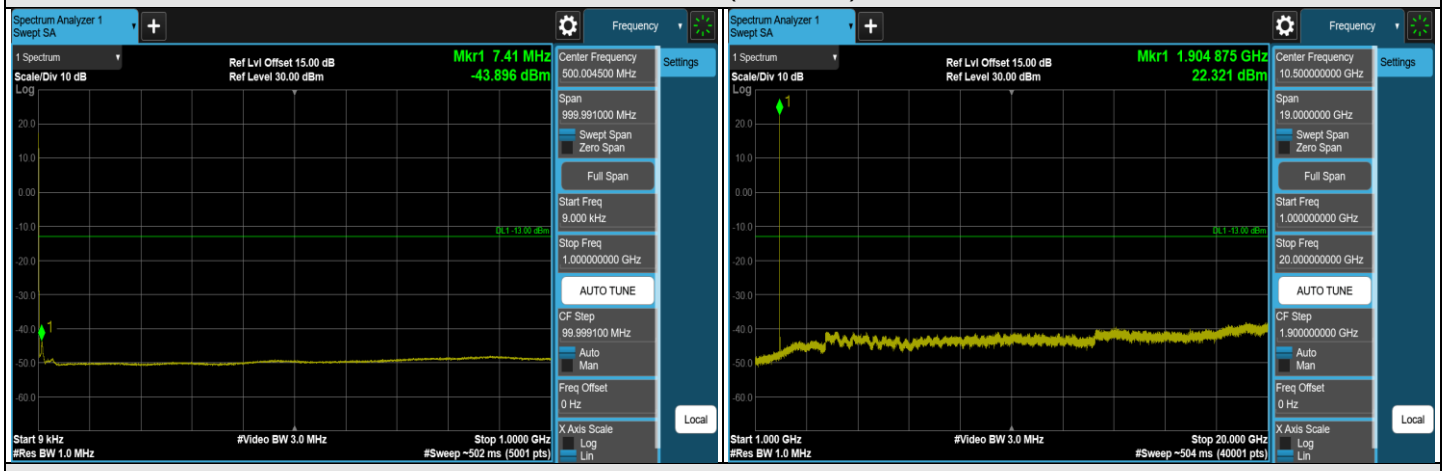
LTE Band 2, Channel Bandwidth: 5 MHz



CH 18625 (1852.5MHz)



CH 18900 (1880MHz)



CH 19175 (1907.5MHz)

Note: The signal at 9 kHz is IF signal from spectrum analyzer.