REPORT No.: SZ15090021W02

FCC RF TEST REPORT

APPLICANT	:	Observa Telecom
PRODUCT NAME	:	LTE Cat 4 USB Dongle
MODEL NAME	:	QX610C
TRADE NAME	:	QX610C
BRAND NAME	:	Observa Mobile
FCC ID	:	2AFTXQX610C
STANDARD(S)	:	47 CFR Part 24, Subpart E 47 CFR Part 27, Subpart M
ISSUE DATE	:	2015-10-08

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2015-10-08	First edition

TEST REPORT DECLARATION

Applicant	Observa Telecom
Applicant Address	c/ Monte Esquinza, 28 1º Drcha Madrid P.C.28010 SPAIN
Manufacturer	Observa Telecom
Manufacturer Address	c/ Monte Esquinza, 28 1º Drcha Madrid P.C.28010 SPAIN
Product Name	LTE Cat 4 USB Dongle
Model Name	QX610C
Brand Name	Observa Mobile
HW Version	1.0
SW Version	1.0
Test Standards	47 CFR Part 24, Subpart E 47 CFR Part 27, Subpart M
Test Date	2015-9-10 to 2015-9-25
Test Result	PASS

Tested by : Zou Jian
Zou Jian(Test Engineer)

Reviewed by : Peng Huarui
Peng Huarui(RF Manager)

Approved by : Zeng Dexin
Zeng Dexin(Chief Engineer)

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type	LTE Cat 4 USB Dongle
Serial No.	(n.a, marked #1 by test site)
Hardware Version.....	1.0
Software Version	1.0
Applicant	Observa Telecom
	c/ Monte Esquinza, 28 1°Drcha Madrid P.C.28010 SPAIN
Manufacturer	Observa Telecom
	c/ Monte Esquinza, 28 1°Drcha Madrid P.C.28010 SPAIN
Modulation Type	LTE Band 2: QPSK, 16QAM
	LTE Band 7: QPSK, 16QAM
Tx Frequency Range.....	LTE Band 2: 1850MHz ~1910MHz
	LTE Band 7: 2502.5MHz ~ 2567.5MHz
Rx Frequency Range	LTE Band 2: 1930MHz ~ 1990MHz
	LTE Band 7: 2622.5MHz ~ 2687.5MHz
Emission Designator	1M10G7D (LTE Band 2, QPSK, BW 1.4MHz)
	1M10W7D (LTE Band 2, 16QAM, BW 1.4MHz)
	2M72G7D (LTE Band 2, QPSK, BW 3MHz)
	2M72W7D (LTE Band 2, 16QAM, BW 3MHz)
	4M52G7D (LTE Band 2, QPSK, BW 5MHz)
	4M52 W7D (LTE Band 2, 16QAM, BW 5MHz)
	8M98G7D (LTE Band 2, QPSK, BW 10MHz)
	8M98W7D (LTE Band 2, 16QAM, BW 10MHz)
	13M46G7D (LTE Band 2, QPSK, BW 15MHz)
	13M47W7D (LTE Band 2, 16QAM, BW 15MHz)
	17M97G7D (LTE Band 2, QPSK, BW 20MHz)
	17M93W7D (LTE Band 2, 16QAM, BW 20MHz)
	4M52G7D (LTE Band 7, QPSK, BW 5MHz)
	4M52W7D (LTE Band 7, 16QAM, BW 5MHz)
	8M99G7D (LTE Band 7, QPSK, BW 10MHz)
	8M99W7D (LTE Band 7, 16QAM, BW 10MHz)
	13M48G7D (LTE Band 7, QPSK, BW 15MHz)
	13M48W7D (LTE Band 7, 16QAM, BW 15MHz)
	17M95G7D (LTE Band 7, QPSK, BW 20MHz)
	17M98W7D (LTE Band 7, 16QAM, BW 20MHz)
Antenna Type	PIFA Antenna

Power Supply..... 5V DC Power

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2 and Part 24, Part 27 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 24 (10-1-09 Edition)	Personal Communications Services
3	47 CFR Part 27	Miscellaneous Wireless Communications Services

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	2.1046	Transmitter Conducted Output Power	PASS
2	24.232(d), 27.50(d)(5)	Occupied Bandwidth	PASS
3	2.1049, 24.238, 27.53(g)	Frequency Stability	PASS
4	2.1055, 24.235	Peak to Average Radio	PASS
5	2.1051,2.1057 24.238, 27.53(g)	Conducted Spurious Emissions	PASS
6	2.1051, 2.1057, 24.238, 27.53(g)(h), 27.53(m)(4)	Band Edge	PASS
7	22.913, 24.232, 27.50(d)(4)	Equivalent Isotropic Radiated Power	PASS
8	2.1053, 2.1057, 24.238, 27.53(g)	Radiated Spurious Emissions	PASS

1.3 Facilities and Accreditations

1.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China 518101. The test site is constructed in conformance with the requirements of TIA/EIA 603.D: 2010, ANSI C63.4: 2009 and CISPR Publication 22: 2010. The FCC registration number is 695796.

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106

2. 47 CFR PART 2, PART 24E & 27M REQUIREMENTS

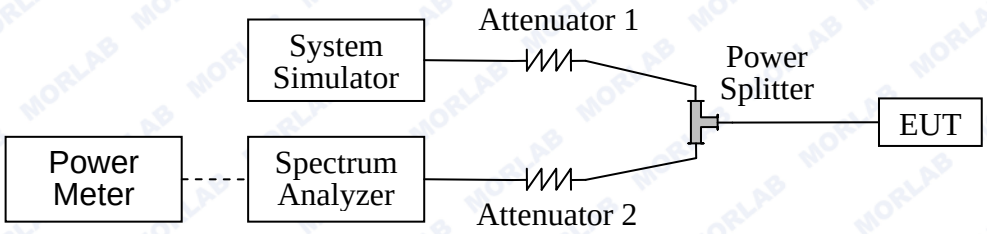
2.1 Transmitter Conducted Output Power

2.1.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

2.1.2 Test Description

Test Setup:



The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Rohde& Schwarz	CMW500	1201.0002k50/124534/wk	2015.02.26	2016.02.25
Spectrum Analyzer	Rohde& Schwarz	FSL	10246	2015.02.26	2016.02.25
Spectrum Analyzer	Agilent	E4445A	MY44200685	2015.02.26	2016.02.25
Power Meter	Agilent	E4418B	GB43318055	2015.02.26	2016.02.25
Power Meter	Agilent	E4418B	GB43318055	2015.02.26	2016.02.25
Power Sensor	Agilent	8482A	MY41091706	2015.02.26	2016.02.25
Power Splitter	Weinschel	1506A	NW521	2015.02.26	2016.02.25
Attenuator 1	Resnet	20dB	(n.a.)	2015.02.26	2016.02.25
Attenuator 2	Resnet	3dB	(n.a.)	2015.02.26	2016.02.25

2.1.3 Test Results

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 2	20MHz	L 18700	1860	QPSK	1	0	21.53
					1	49	22.03
					1	99	20.79
					50	0	20.48
					50	25	20.15
					50	49	20.03
					100	0	20.68
				16-QAM	1	0	20.48
					1	49	20.28
					1	99	20.5
					50	0	20.06
					50	25	20.11
					50	49	20.09
					100	0	19.55
		M 18900	1880	QPSK	1	0	21.55
					1	49	21.57
					1	99	21.34
					50	0	20.46
					50	25	20.41
					50	49	20.43
					100	0	20.73
				16-QAM	1	0	20.96
					1	49	20.53
					1	99	20.63
					50	0	20.07
					50	25	20.15
					50	49	20.19
					100	0	19.37
		H 19100	1900	QPSK	1	0	21.12
					1	49	21.48
					1	99	21.68
					50	0	20.41
					50	25	20.69
					50	49	20.76
					100	0	20.88
				16-QAM	1	0	20.15
					1	49	20.42
					1	99	20.25
					50	0	20.04
					50	25	19.98
					50	49	20.08
					100	0	19.29

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 2	15MHz	L 18675	1857.5	QPSK	1	0	21.45
					1	37	21.39
					1	74	21.47
					36	0	20.48
					36	18	20.67
					36	35	20.48
					75	0	20.71
				16-QAM	1	0	20.51
					1	37	20.43
					1	74	20.61
					36	0	20.09
					36	18	20.15
					36	35	20.14
					75	0	19.59
		M 18900	1880	QPSK	1	0	21.36
					1	37	21.42
					1	74	21.66
					36	0	20.22
					36	18	20.49
					36	35	20.53
					75	0	20.5
				16-QAM	1	0	20.55
					1	37	20.79
					1	74	20.86
					36	0	20.08
					36	18	20.18
					36	35	20.14
					75	0	19.38
		H 19125	1902.5	QPSK	1	0	21.09
					1	37	21.47
					1	74	21.39
					36	0	20.48
					36	18	20.71
					36	35	20.64
					75	0	20.51
				16-QAM	1	0	20.78
					1	37	20.59
					1	74	20.67
					36	0	20.19
					36	18	20.16
					36	35	20.17
					75	0	19.67

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 2	10MHz	L 18650	1855	QPSK	1	0	21.68
					1	24	21.59
					1	49	21.64
					25	0	20.67
					25	12	20.80
					25	24	20.58
					50	0	20.45
				16-QAM	1	0	20.53
					1	24	20.61
					1	49	20.63
					25	0	20.18
					25	12	20.16
					25	24	20.09
					50	0	19.69
		M 18900	1880	QPSK	1	0	21.43
					1	24	21.45
					1	49	21.22
					25	0	20.41
					25	12	20.55
					25	24	20.44
					50	0	20.54
				16-QAM	1	0	20.88
					1	24	20.57
					1	49	20.74
					25	0	20.21
					25	12	20.19
					25	24	20.16
					50	0	19.4
		H 19150	1905	QPSK	1	0	21.58
					1	24	21.64
					1	49	21.71
					25	0	20.79
					25	12	20.71
					25	24	20.64
					50	0	20.54
				16-QAM	1	0	20.64
					1	24	20.68
					1	49	20.71
					25	0	20.17
					25	12	20.16
					25	24	20.20
					50	0	19.67

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 2	5MHz	L 18625	1852.5	QPSK	1	0	21.72
					1	12	21.71
					1	24	21.5
					12	0	20.69
					12	6	20.73
					12	11	20.68
					25	0	20.48
				16-QAM	1	0	20.96
					1	12	21.16
					1	24	20.89
					12	0	20.30
					12	6	20.28
					12	11	20.26
					25	0	19.38
		M 18900	1880	QPSK	1	0	21.41
					1	12	21.59
					1	24	21.45
					12	0	20.57
					12	6	20.51
					12	11	20.56
					25	0	20.53
				16-QAM	1	0	20.09
					1	12	20.03
					1	24	20.25
					12	0	19.87
					12	6	19.69
					12	11	19.89
					25	0	19.43
		H 19175	1907.5	QPSK	1	0	21.42
					1	12	21.56
					1	24	21.38
					12	0	20.64
					12	6	20.51
					12	11	20.61
					25	0	20.50
				16-QAM	1	0	20.64
					1	12	20.51
					1	24	20.54
					12	0	20.10
					12	6	20.16
					12	11	20.08
					25	0	19.41

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 2	3MHz	L 18615	1851.5	QPSK	1	0	21.69
					1	7	21.59
					1	14	21.48
					8	0	20.57
					8	4	20.54
					8	7	20.60
					15	0	20.53
				16-QAM	1	0	20.61
					1	7	20.51
					1	14	20.50
					8	0	20.15
					8	4	20.14
					8	7	20.04
					15	0	19.42
		M 18900	1880	QPSK	1	0	21.68
					1	7	21.61
					1	14	21.57
					8	0	20.58
					8	4	20.53
					8	7	20.61
					15	0	20.55
				16-QAM	1	0	20.54
					1	7	20.68
					1	14	20.61
					8	0	20.18
					8	4	20.13
					8	7	20.15
					15	0	19.53
		H 19185	1908.5	QPSK	1	0	21.49
					1	7	21.64
					1	14	21.53
					8	0	20.51
					8	4	20.64
					8	7	20.59
					15	0	20.53
				16-QAM	1	0	20.49
					1	7	20.68
					1	14	20.71
					8	0	20.29
					8	4	20.18
					8	7	20.22
					15	0	19.61

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 2	1.4MHz	L 18607	1850.7	QPSK	1	0	21.32
					1	2	21.24
					1	5	21.28
					3	0	21.45
					3	1	21.36
					3	2	21.37
					6	0	20.32
				16-QAM	1	0	20.65
					1	2	20.62
					1	5	20.63
					3	0	20.15
					3	1	20.29
					3	2	20.25
					6	0	19.34
		M 18900	1880	QPSK	1	0	21.43
					1	2	21.42
					1	5	21.42
					3	0	21.5
					3	1	21.47
					3	2	21.49
					6	0	20.48
				16-QAM	1	0	20.5
					1	2	20.45
					1	5	20.43
					3	0	20.05
					3	2	20.04
					3	5	20.06
					6	0	19.3
		H 19193	1909.3	QPSK	1	0	21.53
					1	2	21.23
					1	5	21.53
					3	0	21.61
					3	1	21.59
					3	2	21.44
					6	0	20.66
				16-QAM	1	0	20.17
					1	2	19.91
					1	5	19.74
					3	0	19.31
					3	1	19.25
					3	2	19.26
					6	0	19.56

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 7	20MHz	L 20850	2510	QPSK	1	0	19.75
					1	49	19.21
					1	99	19.51
					50	0	18.11
					50	25	18.10
					50	49	17.94
					100	0	17.98
				16-QAM	1	0	18.44
					1	49	18.11
					1	99	18.01
					50	0	17.59
					50	25	17.56
					50	49	17.60
					100	0	16.68
		M 21100	2535	QPSK	1	0	20.08
					1	49	20.25
					1	99	20.74
					50	0	18.66
					50	25	19.25
					50	49	19.18
					100	0	18.85
				16-QAM	1	0	18.87
					1	49	19.14
					1	99	19.72
					50	0	19.20
					50	25	18.91
					50	49	18.93
					100	0	17.65
		H 21350	2560	QPSK	1	0	20.72
					1	49	20.78
					1	99	20.99
					50	0	19.39
					50	25	19.25
					50	49	19.02
					100	0	19.24
				16-QAM	1	0	19.51
					1	49	19.55
					1	99	19.90
					50	0	19.51
					50	25	19.43
					50	49	19.34
					100	0	17.81

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 7	15MHz	L 20825	2507.5	QPSK	1	0	19.61
					1	37	19.67
					1	74	19.69
					36	0	18.48
					36	18	18.67
					36	35	18.57
					75	0	17.96
				16-QAM	1	0	18.89
					1	37	18.80
					1	74	18.69
					36	0	18.34
					36	18	18.28
					36	35	18.21
					75	0	16.62
		M 21100	2535	QPSK	1	0	19.97
					1	37	20.21
					1	74	20.64
					36	0	18.82
					36	18	19.34
					36	35	19.42
					75	0	19.08
				16-QAM	1	0	18.95
					1	37	19.42
					1	74	19.52
					36	0	19.05
					36	18	19.07
					36	35	18.94
					75	0	18.87
		H 21375	2562.5	QPSK	1	0	20.70
					1	37	20.68
					1	74	20.83
					36	0	19.58
					36	18	19.64
					36	35	19.65
					75	0	19.22
				16-QAM	1	0	19.12
					1	37	19.35
					1	74	19.64
					36	0	19.08
					36	18	19.03
					36	35	18.94
					75	0	19.61

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 7	10MHz	L 20800	2505	QPSK	1	0	19.95
					1	24	19.40
					1	49	19.43
					25	0	18.47
					25	12	18.51
					25	24	18.50
					50	0	18.36
				16-QAM	1	0	18.48
					1	24	18.46
					1	49	18.53
					25	0	18.18
					25	12	18.16
					25	24	18.09
					50	0	17.00
		M 21100	2535	QPSK	1	0	20.28
					1	24	20.04
					1	49	20.53
					25	0	19.16
					25	12	19.25
					25	24	19.29
					50	0	19.23
				16-QAM	1	0	18.80
					1	24	18.69
					1	49	18.90
					25	0	18.25
					25	12	18.20
					25	24	18.21
					50	0	17.96
		H 21400	2565	QPSK	1	0	20.52
					1	24	20.59
					1	49	20.67
					25	0	19.58
					25	12	19.53
					25	24	19.61
					50	0	19.29
				16-QAM	1	0	19.65
					1	24	19.53
					1	49	19.54
					25	0	19.05
					25	12	19.08
					25	24	19.11
					50	0	17.97

Band	Band Width	Channel	Freq.(MHz)	Modulation	RB Configuration		Average Power (dBm)
					RB Size	RB Offset	
LTE Band 7	5MHz	L 20775	2502.5	QPSK	1	0	19.90
					1	12	19.83
					1	24	19.89
					12	0	18.74
					12	6	18.91
					12	11	18.95
					25	0	18.44
				16-QAM	1	0	18.60
					1	12	18.64
					1	24	18.66
					12	0	18.21
					12	6	18.20
					12	11	18.09
					25	0	17.06
		M 21100	2535	QPSK	1	0	20.19
					1	12	19.99
					1	24	20.22
					12	0	19.10
					12	6	19.21
					12	11	19.18
					25	0	19.14
				16-QAM	1	0	18.78
					1	12	18.69
					1	24	18.91
					12	0	18.34
					12	6	18.23
					12	11	18.20
					25	0	17.91
		H 21425	2567.5	QPSK	1	0	20.73
					1	12	20.82
					1	24	21.04
					12	0	19.93
					12	6	19.99
					12	11	19.81
					25	0	19.28
				16-QAM	1	0	19.32
					1	12	19.46
					1	24	19.54
					12	0	19.08
					12	6	19.04
					12	11	19.11
					25	0	17.73

2.2 Occupied Bandwidth

2.2.1 Definition

According to FCC section 2.1049 and 27.53(g), the occupied bandwidth 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 percent of the total mean power radiated by a given emission. Occupied bandwidth is also known as the 99% emission bandwidth.

2.2.2 Test Description

See section 2.1.2 of this report.

2.2.3 Test Results

LTE Band 2

Low channel:

Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	1.1038	1.0963	18615	1851.5	2.7187	2.7082
Channel Bandwidth: 1.4MHz				**Channel Bandwidth: 3MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	1.322	1.299	18615	1851.5	3.017	3.015

Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	4.5183	4.5208	18650	1855.0	8.9696	8.9825
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	5.046	5.019	18650	1855.0	9.896	9.952

Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	13.440	13.468	18700	1860.0	17.912	17.932
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	14.66	14.69	18700	1860.0	19.50	19.69

Middle channel:

Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	1.0995	1.1025	18900	1880.0	2.7129	2.7215
Channel Bandwidth: 1.4MHz				**Channel Bandwidth: 3MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	1.292	1.304	18900	1880.0	2.992	3.020

Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	4.5168	4.5142	18900	1880.0	8.9803	8.9795
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	4.986	5.021	18900	1880.0	9.991	9.814

Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	13.455	13.451	18900	1880.0	17.888	17.931
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	14.73	14.72	18900	1880.0	19.32	19.46

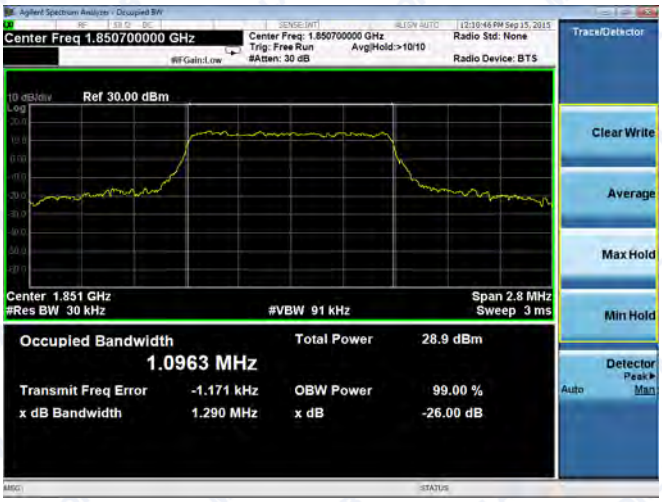
High channel:

Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
19192	1909.2	1.1090	1.0996	19184	1908.4	2.7143	2.7075
Channel Bandwidth: 1.4MHz				**Channel Bandwidth: 3MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
19192	1909.2	1.284	1.302	19184	1908.4	2.997	3.009

Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
19175	1907.5	4.5107	4.5216	19150	1905.0	8.9683	8.9570
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
19175	1907.5	4.994	4.994	19150	1905.0	9.873	9.900

Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
19125	1902.5	13.451	13.462	19100	1900.0	17.967	17.929
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
19125	1902.5	14.80	14.69	19100	1900.0	19.61	19.57

Low channel:

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

Spectrum Plot of Worst Value

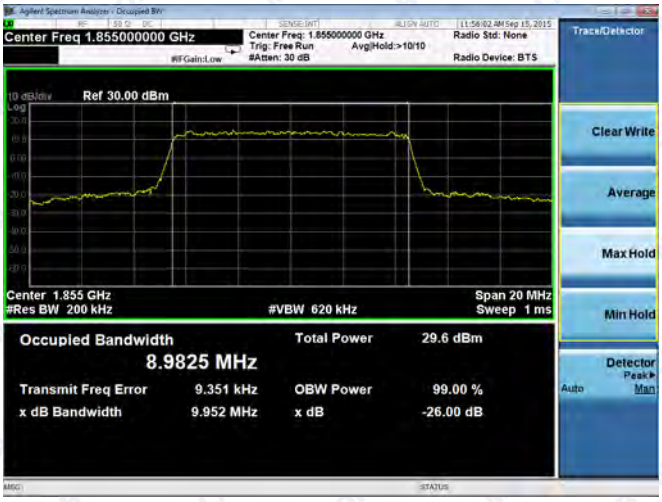
5MHz/QPSK

5MHz/16QAM

Spectrum Plot of Worst Value

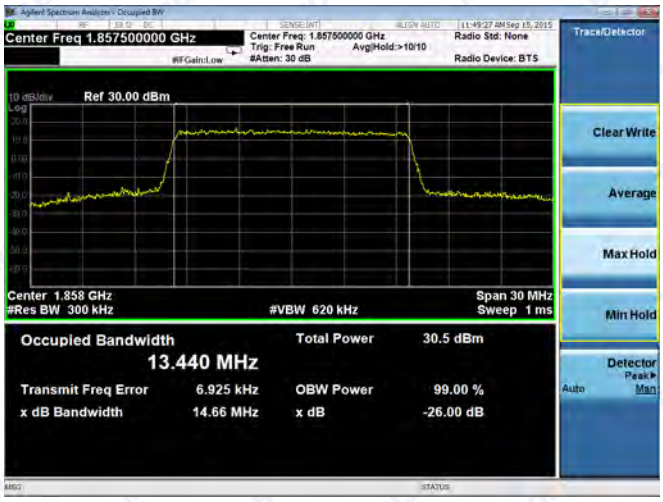
10MHz/QPSK

10MHz/16QAM



Spectrum Plot of Worst Value

15MHz/QPSK



15MHz/16QAM

Spectrum Plot of Worst Value

20MHz/QPSK

20MHz/16QAM

Middle channel:

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

Spectrum Plot of Worst Value

5MHz/QPSK

5MHz/16QAM

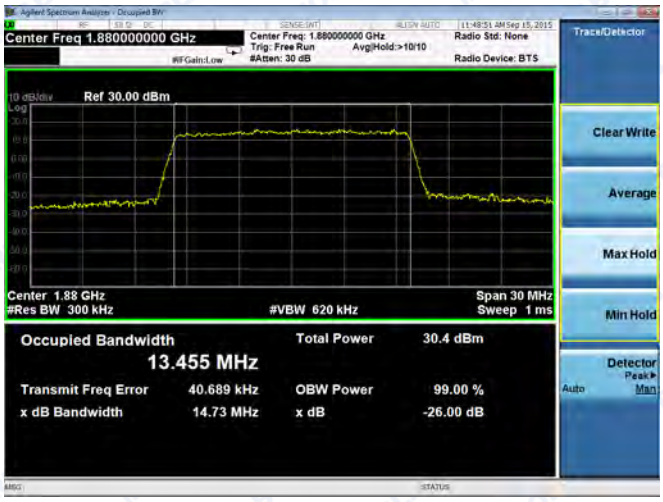
Spectrum Plot of Worst Value

10MHz/QPSK

10MHz/16QAM

Spectrum Plot of Worst Value

15MHz/QPSK



15MHz/16QAM

Spectrum Plot of Worst Value

20MHz/QPSK

20MHz/16QAM

High channel:

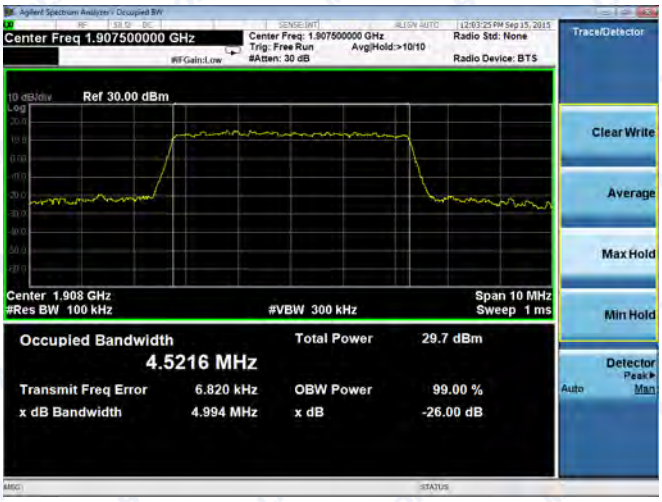
Spectrum Plot of Worst Value	
1.4MHz/QPSK	**1.4MHz/16QAM**
	

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

Spectrum Plot of Worst Value

5MHz/QPSK

5MHz/16QAM



Spectrum Plot of Worst Value

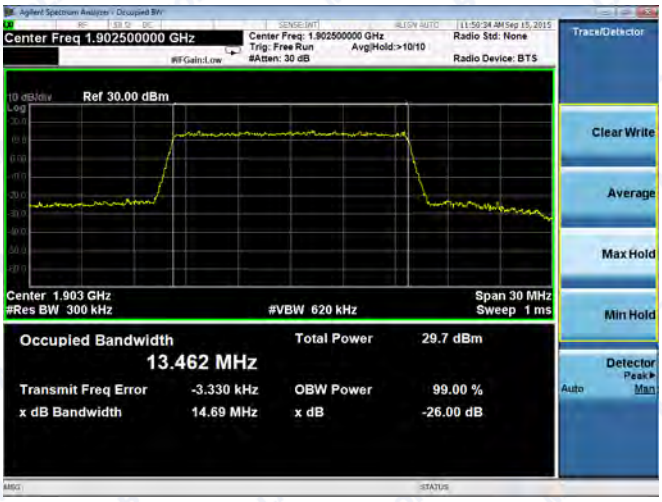
10MHz/QPSK

10MHz/16QAM

Spectrum Plot of Worst Value

15MHz/QPSK

15MHz/16QAM



Spectrum Plot of Worst Value

20MHz/QPSK

A

20MHz/16QAM

LTE Band 7

Low channel:

Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
20775	2502.5	4.5251	4.5244	20800	2505.0	8.9802	8.9875
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
20775	2502.5	5.058	5.032	20800	2505.0	9.937	9.877

Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
20825	2507.5	13.439	13.476	20850	2510.0	17.948	17.944
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
20825	2507.5	14.75	14.72	20850	2510.0	19.47	19.60

Middle channel:

Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
21100	2535.0	4.5236	4.5232	21100	2535.0	8.9935	8.9813
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
21100	2535.0	4.983	5.027	21100	2535.0	9.988	9.832

Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
21100	2535.0	13.481	13.468	21100	2535.0	17.949	17.976
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
21100	2535.0	14.83	14.70	21100	2535.0	19.43	19.52

High channel:

Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
21425	2567.5	4.5133	4.5223	21400	2565.0	8.9706	8.9648
Channel Bandwidth: 5MHz				**Channel Bandwidth: 10MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
21425	2567.5	5.005	5.012	21400	2565.0	9.950	9.895

Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	99% Bandwidth (MHz)		Channel	Frequency (MHz)	99% Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
21375	2562.5	13.425	13.444	21350	2560.0	17.870	17.862
Channel Bandwidth: 15MHz				**Channel Bandwidth: 20MHz**			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Channel	Frequency (MHz)	26dB Bandwidth(MHz)	
		QPSK	16QAM			QPSK	16QAM
21375	2562.5	14.63	14.67	21350	2560.0	19.54	19.47

Low channel:

Spectrum Plot of Worst Value	
5MHz/QPSK	**5MHz/16QAM**
	
Spectrum Plot of Worst Value	
10MHz/QPSK	**10MHz/16QAM**
	

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

Middle channel:

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

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

High channel:

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

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

2.3 Frequency Stability

2.3.1 Requirement

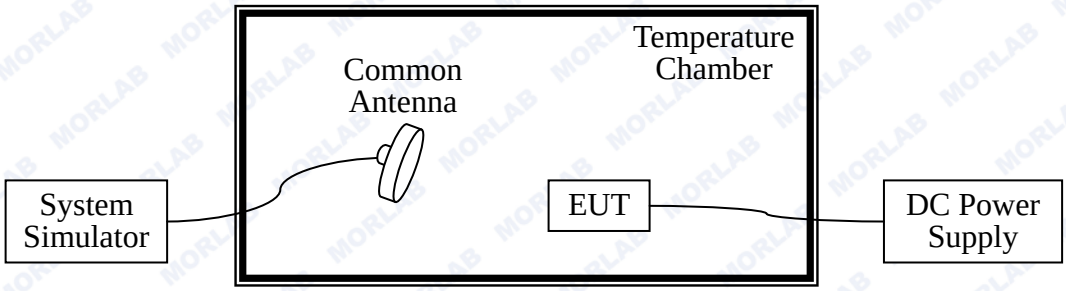
According to FCC section 2.1055 and FCC section 27.54, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.

(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.3.2 Test Description

Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power. A call is established between the EUT and the SS via a Common Antenna.

Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Rohde& Schwarz	CMW500	1201.0002k50/124534/wk	2015.02.26	2016.02.25
DC Power Supply	Good Will	GPS-3030DD	EF920938	2015.02.26	2016.02.25
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2015.02.26	2016.02.25

2.3.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.2VDC and 3.45VDC, which are specified by the applicant; the normal temperature here used is 20°C. The frequency deviation limit is ±2.5ppm.

The testing was performed using one RB and Bandwidth setting for each band.

LTE Band 2 – QPSK - Channel 18900 – Frequency 1880.0MHz – RB 6/0 Limit: 1880.0MHz*1ppm=1880.0Hz				
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Fre. Dev. (Hz)**	**Result**
100	5	-30	6.2	PASS
100		-20	-14.17	
100		-10	7.55	
100		0	6.5	
100		+10	8.28	
100		+20	9.63	
100		+30	9.28	
100		+40	-12.94	
100		+50	6.55	
115	5.25	+20	8.46	
85	4.75	+20	7.28	

TE Band 7 – QPSK - Channel 21100 – Frequency 2535MHz – RB 25/0 Limit: 2535MHz*2.5ppm=6337.5Hz				
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Fre. Dev. (Hz)**	**Result**
100	5	-30	9.72	PASS
100		-20	-9.47	
100		-10	10.21	
100		0	12.1	
100		+10	13.39	
100		+20	13.46	
100		+30	10.15	
100		+40	15.5	
100		+50	-7.29	
115	5.25	+20	8.96	
85	4.75	+20	10.81	

2.4 Peak to Average Radio

2.4.1 Requirement

According to FCC section 24.235, the peak to average ratio (PAR) of the transmission may not exceed 13dB.

2.4.2 Test Description

See section 2.1.2 of this report.

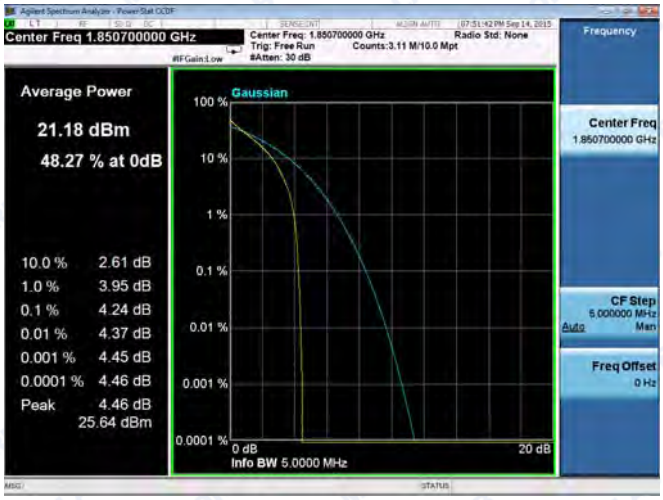
2.4.3 Test Result

Record the maximum PAPR level associated with a probability of 0.1%.

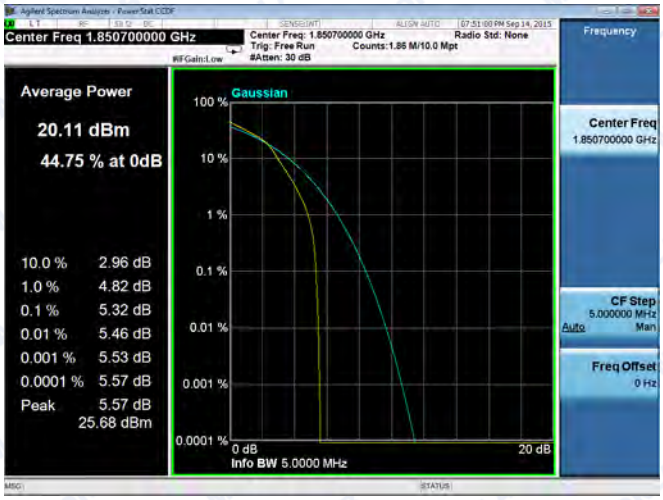
LTE Band 2 Low channel							
Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	4.24	5.32	18615	1851.5	4.47	5.46

Spectrum Plot of Worst Value (Low channel)

1.4MHz/QPSK

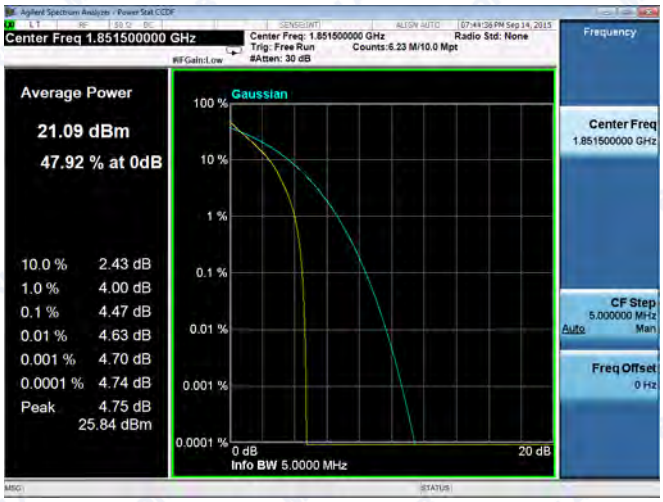


1.4MHz/16QAM

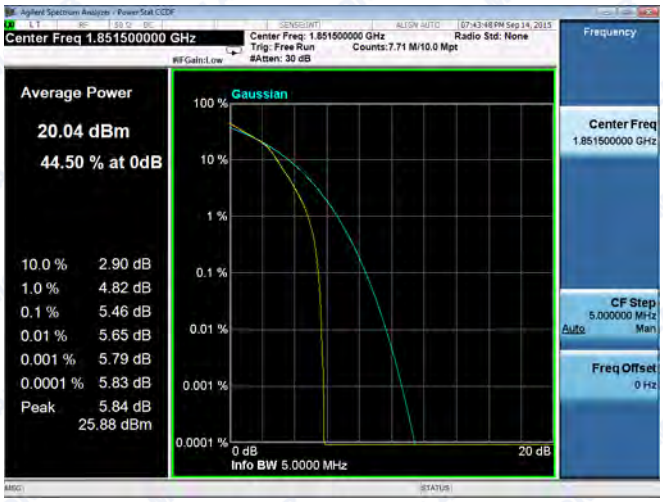


Spectrum Plot of Worst Value

3MHz/QPSK



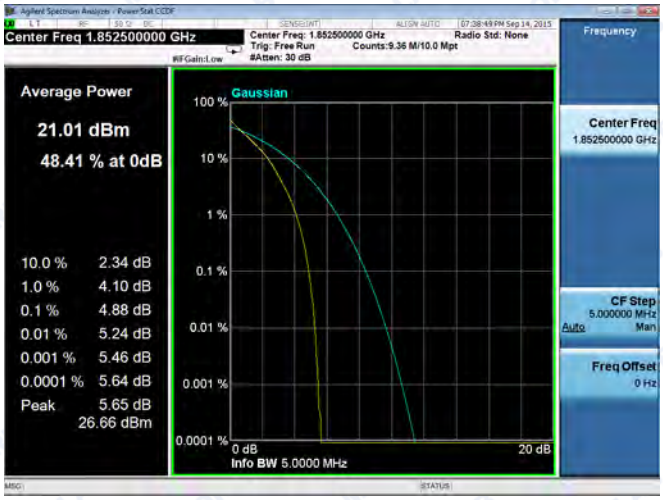
3MHz/16QAM



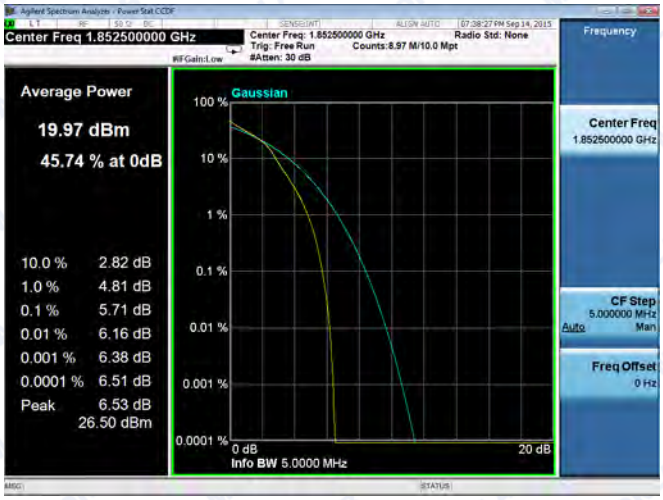
LTE Band 2 Low channel							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	4.88	5.71	18650	1855.0	4.60	5.92

Spectrum Plot of Worst Value

5MHz/QPSK

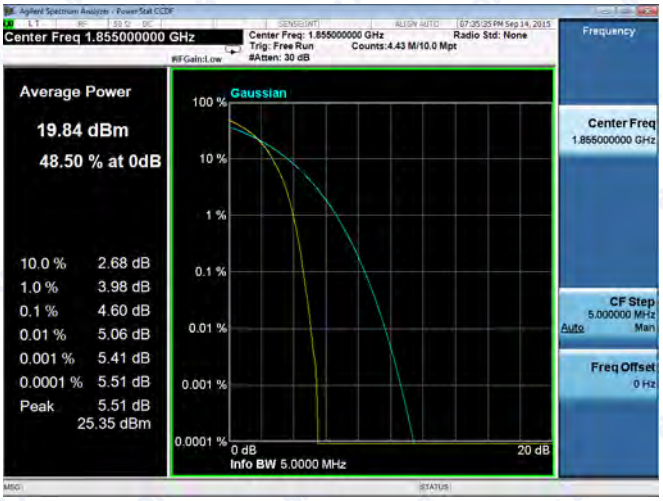


5MHz/16QAM

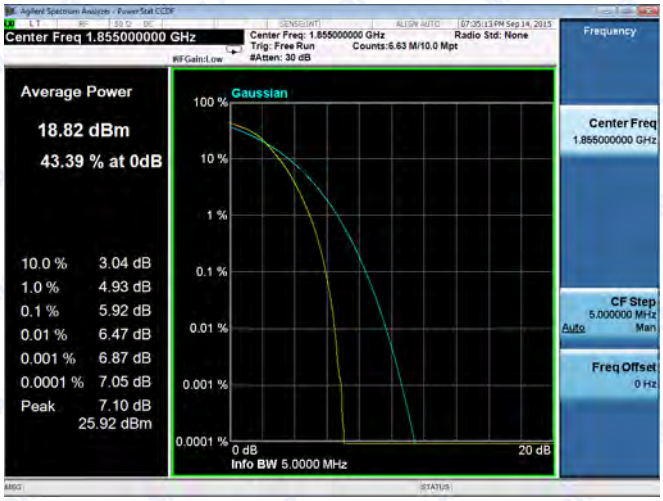


Spectrum Plot of Worst Value

10MHz/QPSK



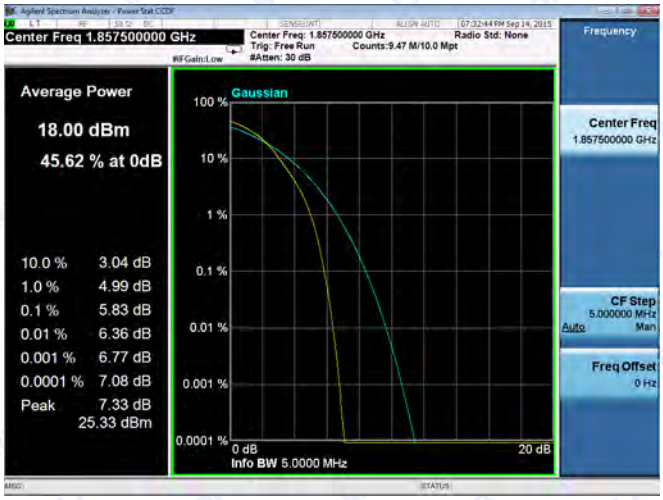
10MHz/16QAM



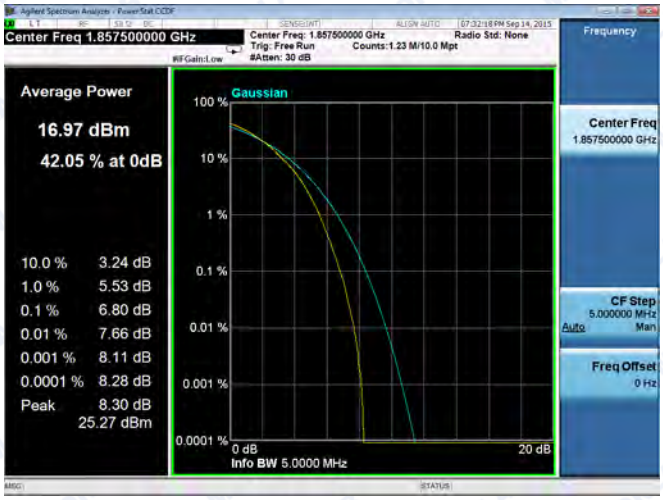
LTE Band 2 Low channel							
Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	5.83	6.80	18700	1860.0	6.44	7.18

Spectrum Plot of Worst Value

15MHz/QPSK

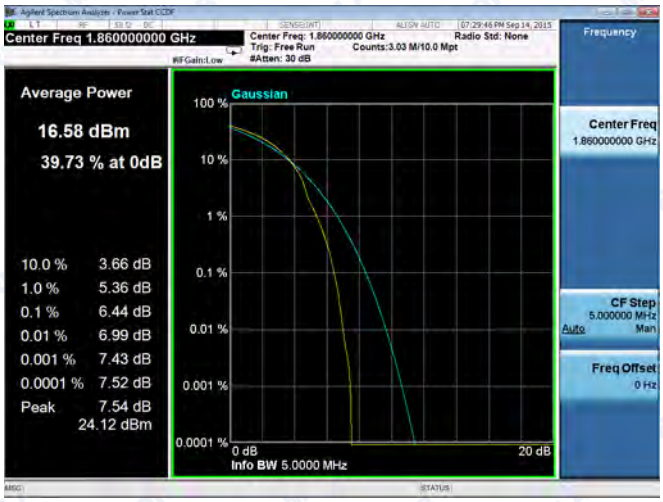


15MHz/16QAM

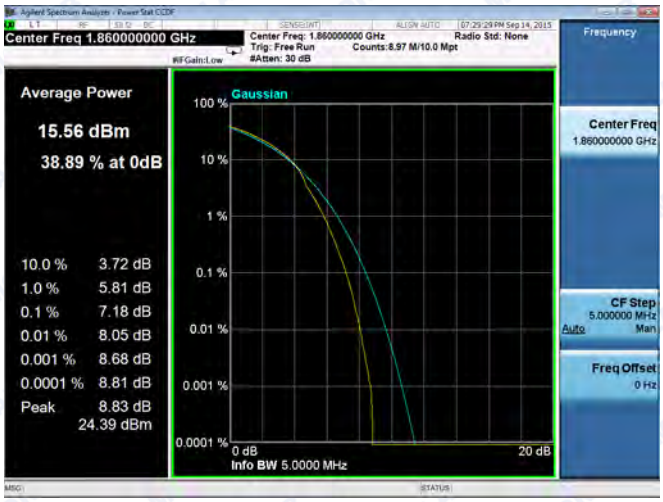


Spectrum Plot of Worst Value

20MHz/QPSK



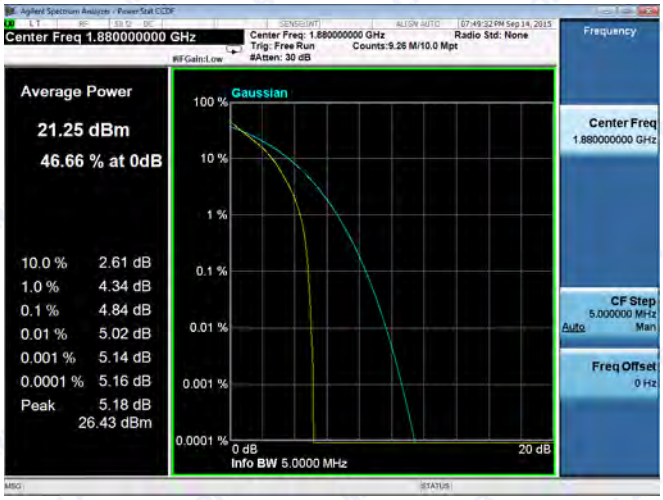
20MHz/16QAM



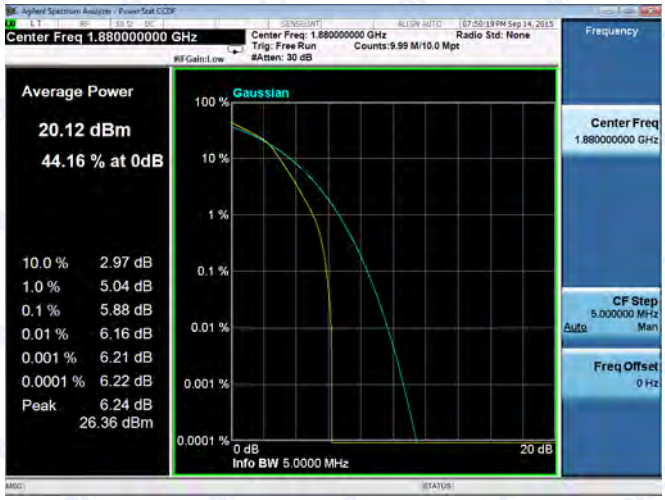
LTE Band 2 Middle channel							
Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	4.84	5.88	18900	1880.0	4.99	6.01

Spectrum Plot of Worst Value

1.4MHz/QPSK

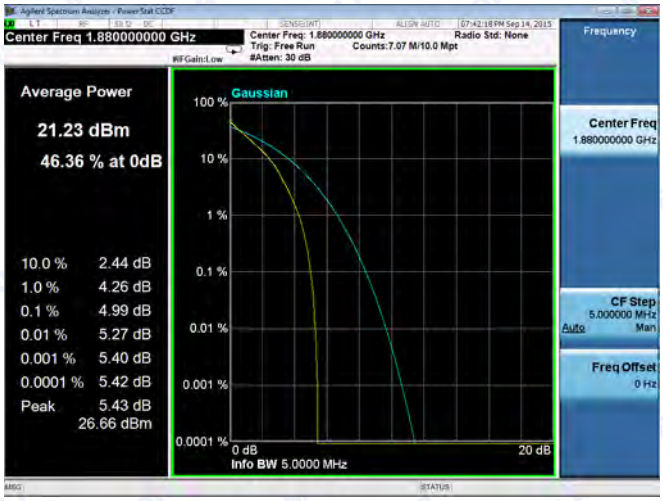


1.4MHz/16QAM

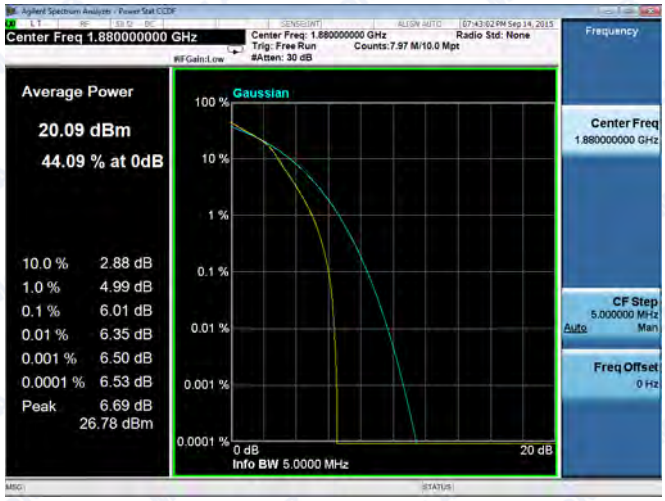


Spectrum Plot of Worst Value

3MHz/QPSK



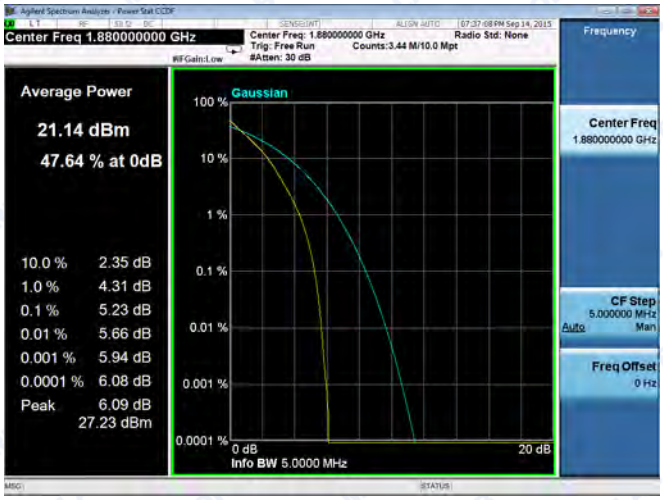
3MHz/16QAM



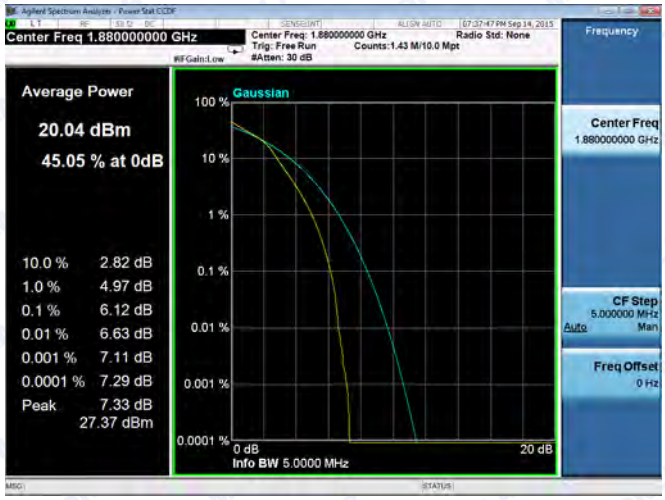
LTE Band 2 Middle channel							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	5.23	6.12	18900	1880.0	4.60	6.06

Spectrum Plot of Worst Value

5MHz/QPSK

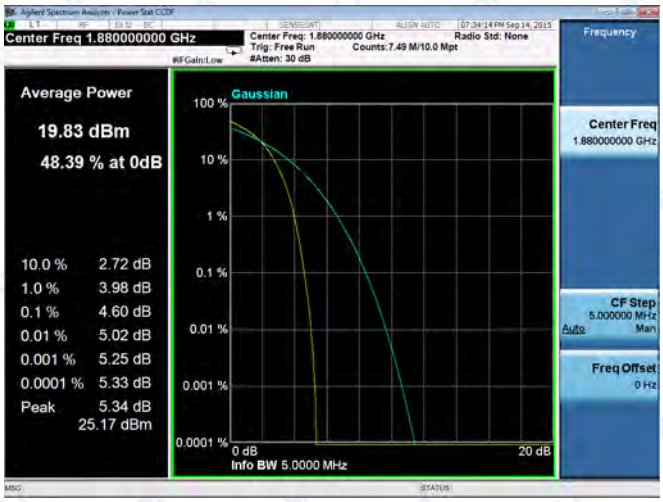


5MHz/16QAM

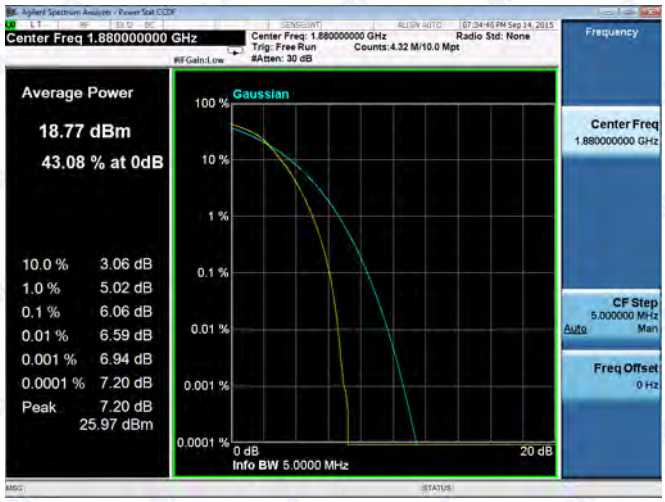


Spectrum Plot of Worst Value

10MHz/QPSK



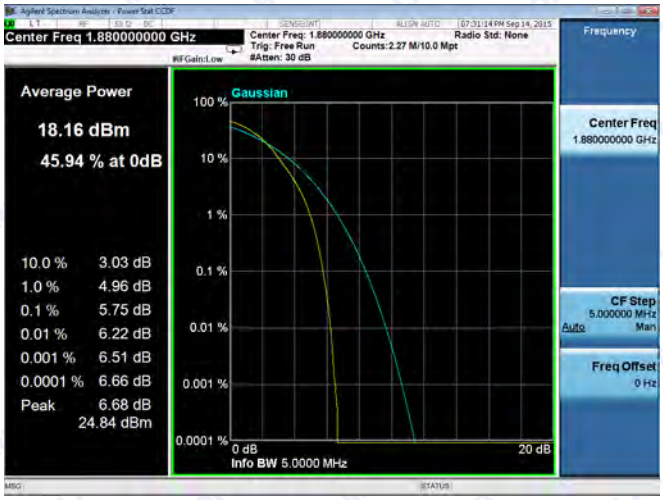
10MHz/16QAM



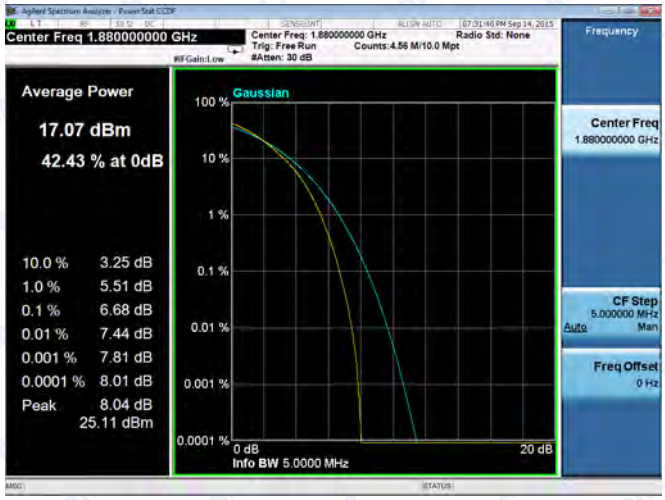
LTE Band 2 Middle channel							
Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
18900	1880.0	5.75	6.68	18900	1880.0	6.46	7.13

Spectrum Plot of Worst Value

15MHz/QPSK

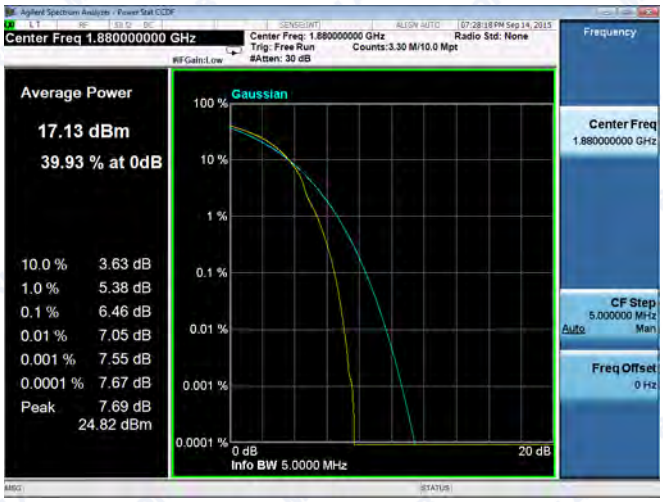


15MHz/16QAM

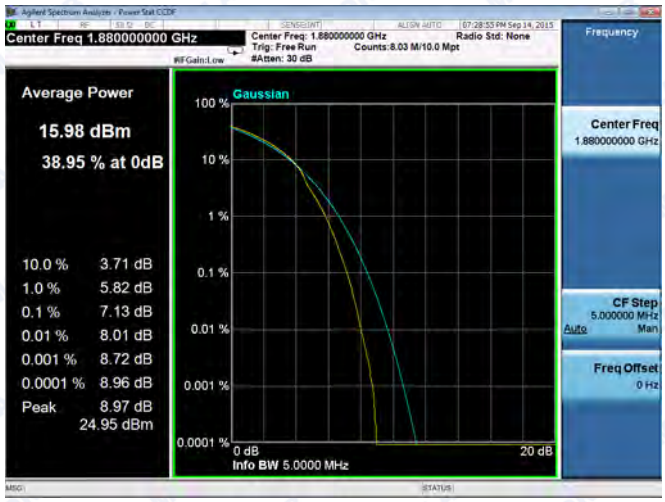


Spectrum Plot of Worst Value

20MHz/QPSK



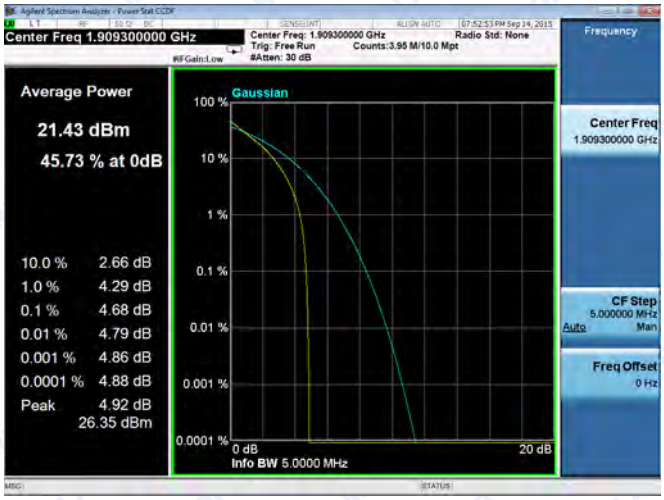
20MHz/16QAM



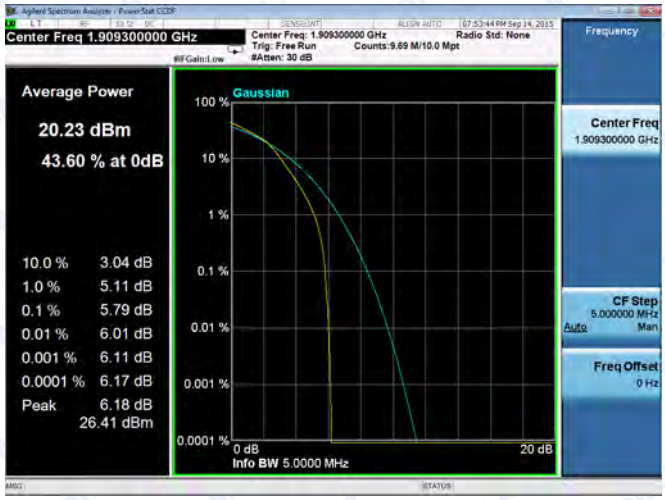
LTE Band 2 High channel							
Channel Bandwidth: 1.4MHz				Channel Bandwidth: 3MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19193	1909.3	4.68	5.79	19185	1908.5	4.94	5.94

Spectrum Plot of Worst Value

1.4MHz/QPSK

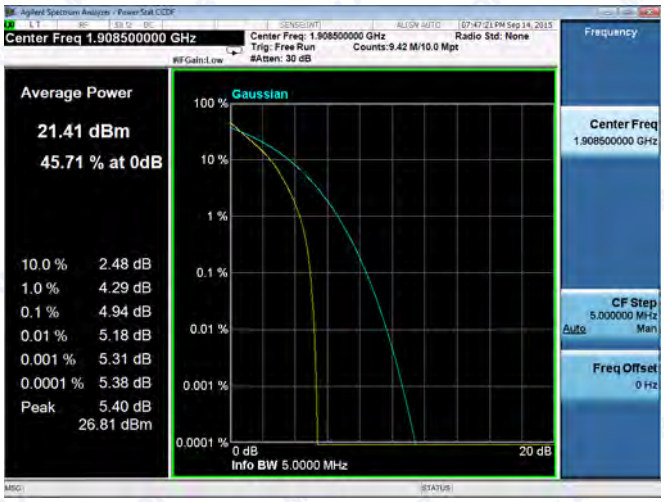


1.4MHz/16QAM

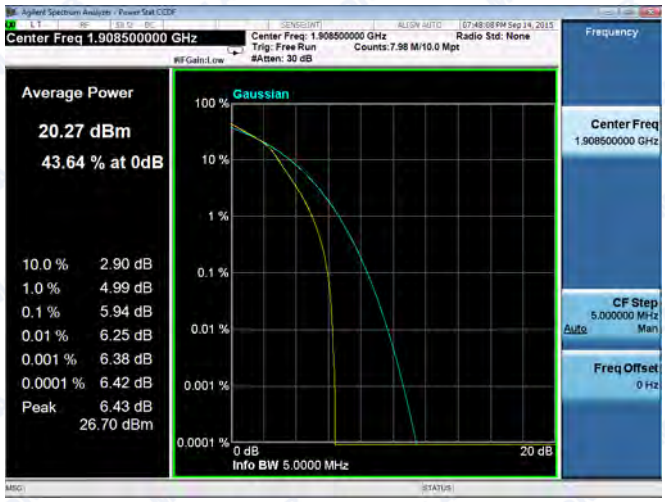


Spectrum Plot of Worst Value

3MHz/QPSK



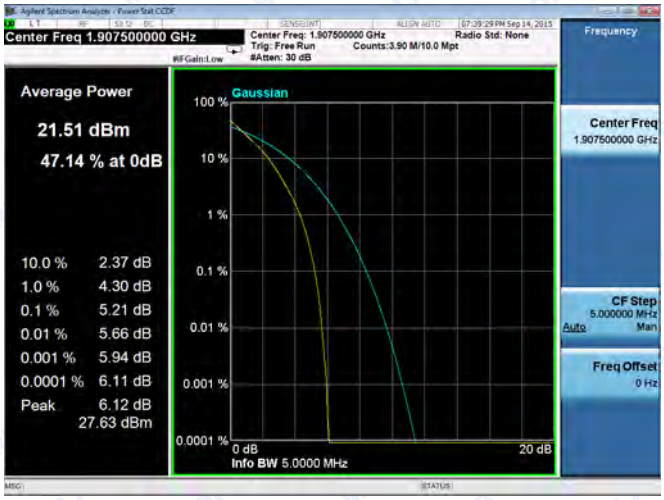
3MHz/16QAM



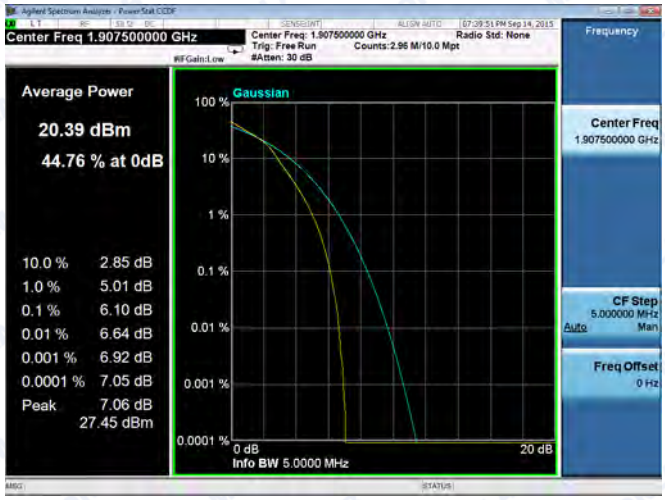
LTE Band 2 High channel							
Channel Bandwidth: 5MHz				Channel Bandwidth: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19175	1907.5	5.21	6.10	19150	1905.0	4.62	6.12

Spectrum Plot of Worst Value

5MHz/QPSK

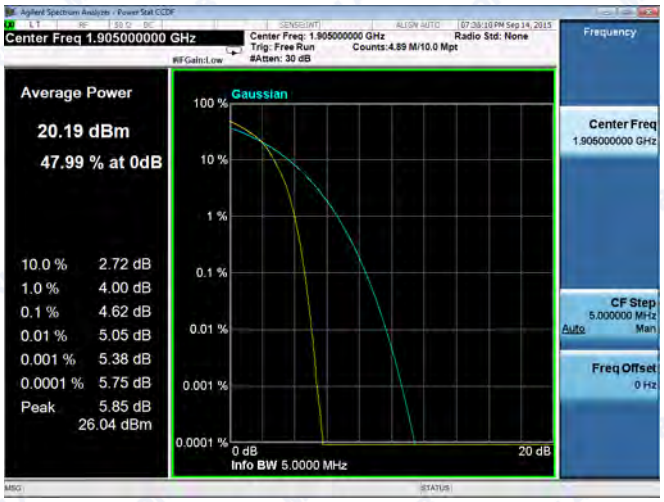


5MHz/16QAM

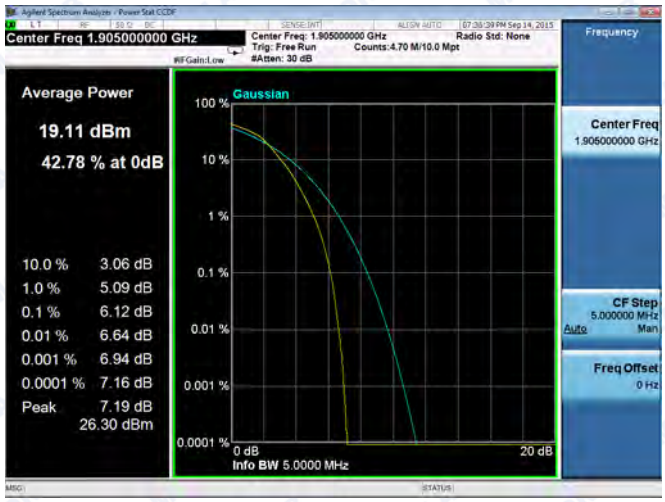


Spectrum Plot of Worst Value

10MHz/QPSK



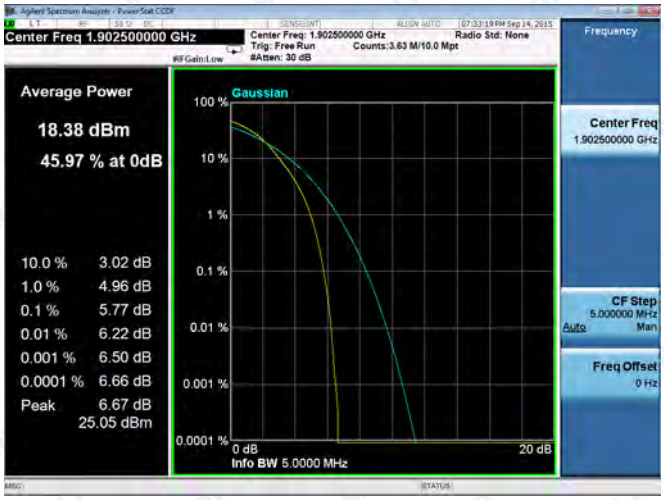
10MHz/16QAM



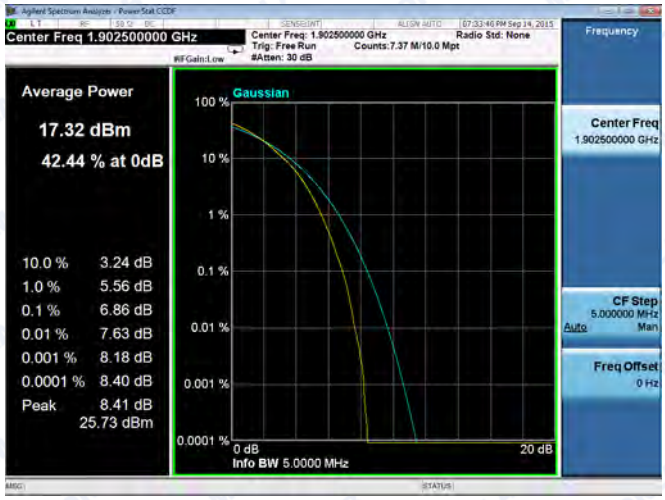
LTE Band 2 High channel							
Channel Bandwidth: 15MHz				Channel Bandwidth: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19125	1902.5	5.77	6.86	19100	1900.0	6.45	7.13

Spectrum Plot of Worst Value

15MHz/QPSK

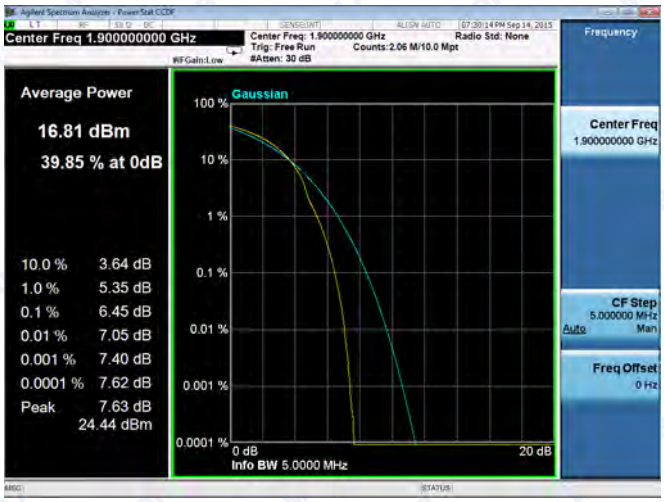


15MHz/16QAM

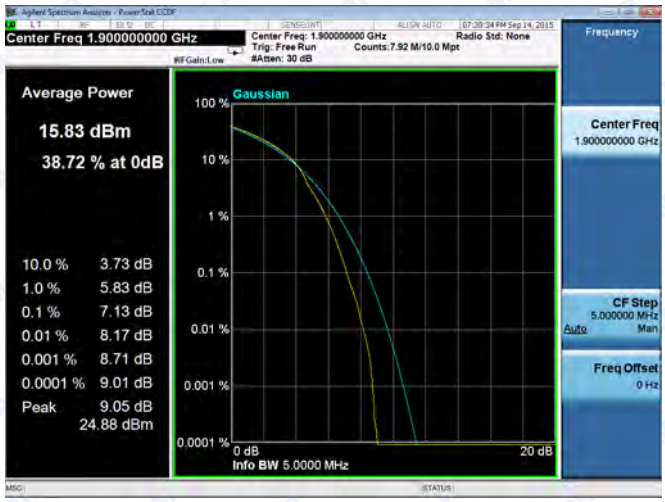


Spectrum Plot of Worst Value

20MHz/QPSK



20MHz/16QAM



2.5 Conducted Spurious Emissions

2.5.1 Test Requirement

According to FCC section 2.1051 and 27.53(g), 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. This calculated to be -13dBm.

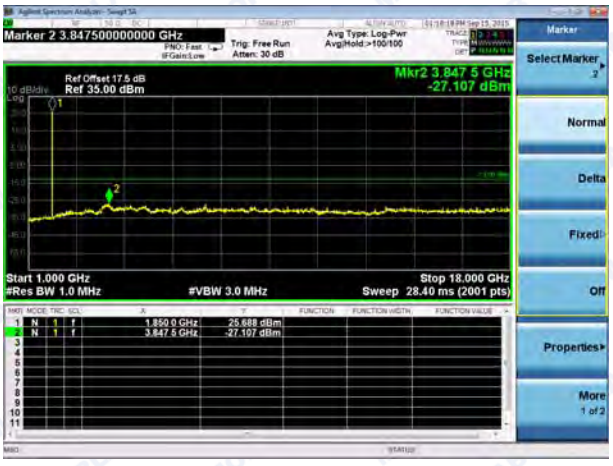
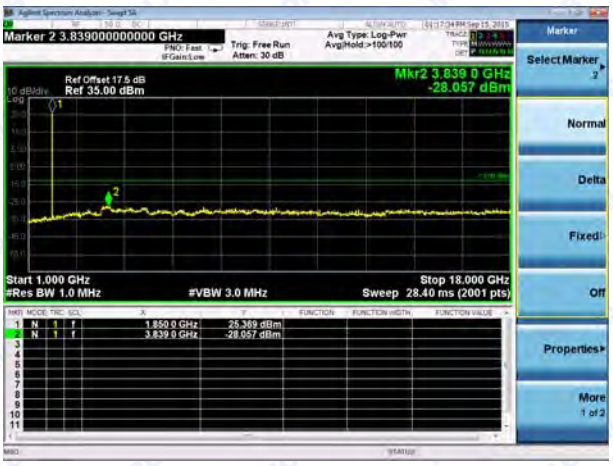
2.5.2 Test Procedure

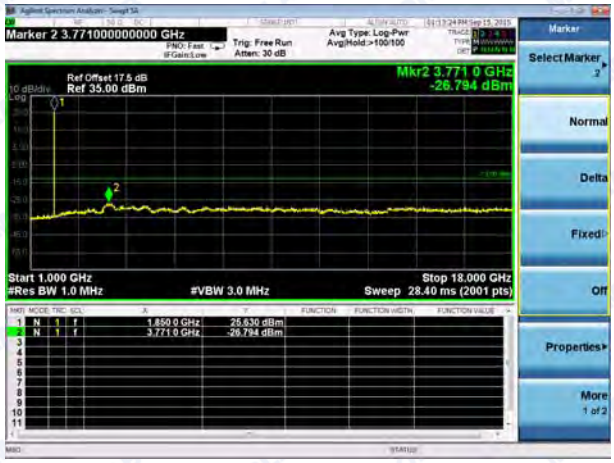
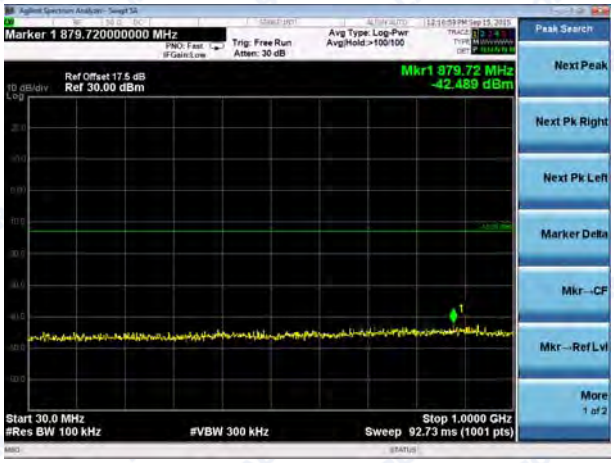
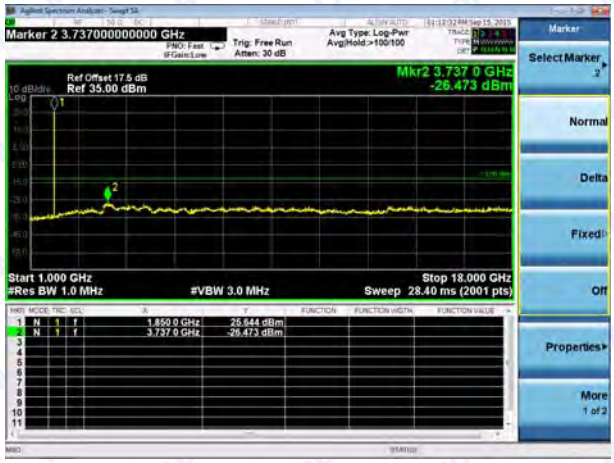
See section 2.1.2 of this report.

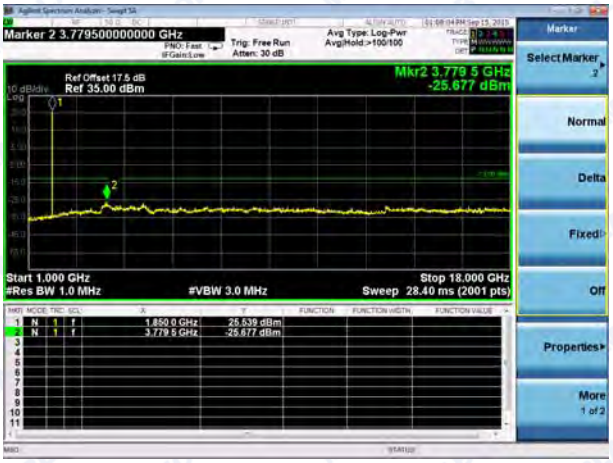
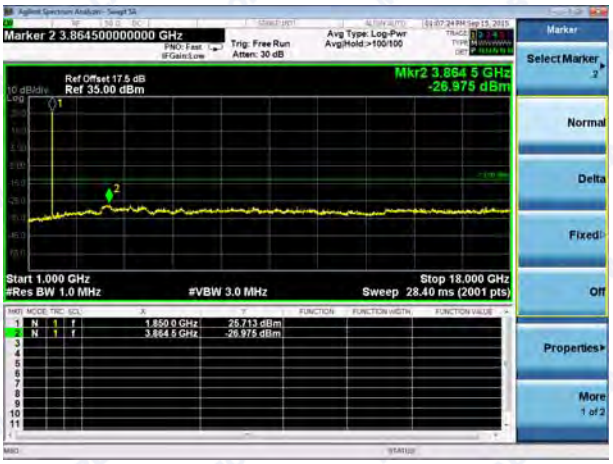
Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

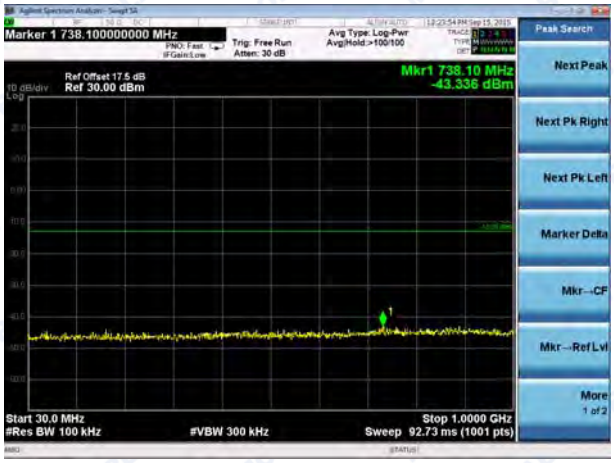
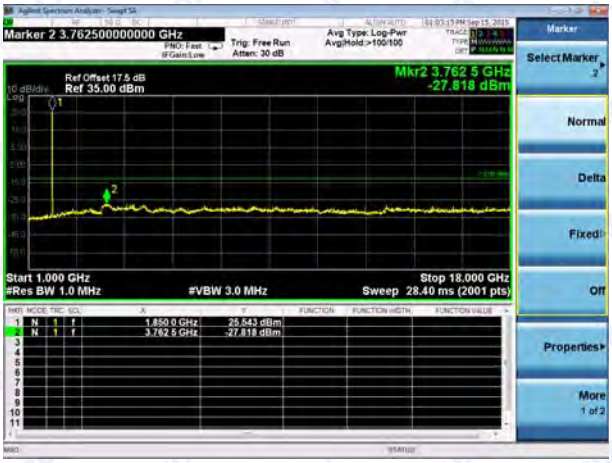
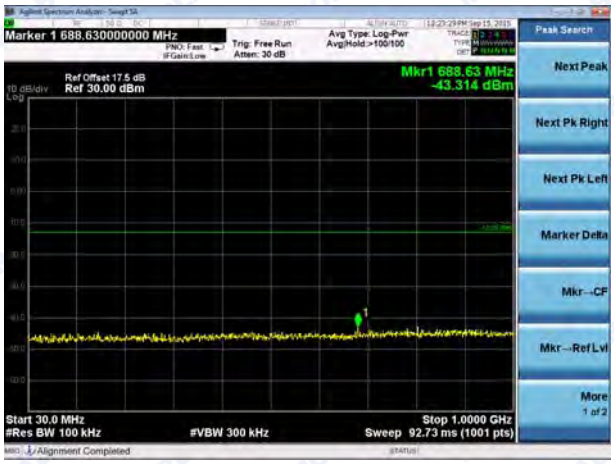
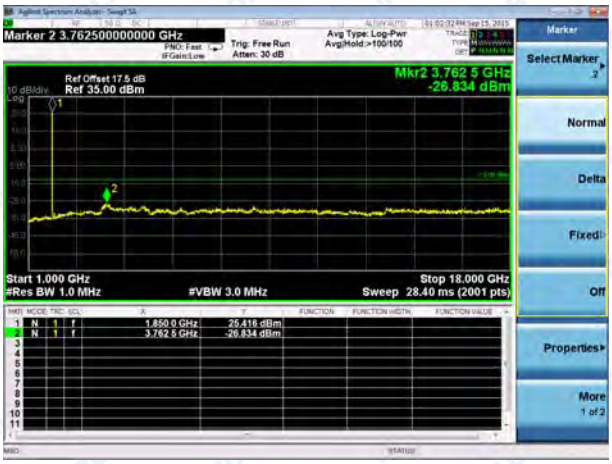
2.5.3 Test Result

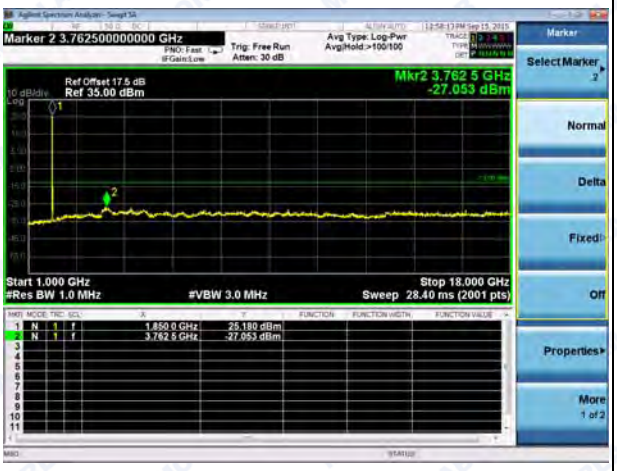
Compliant. See attached pots.

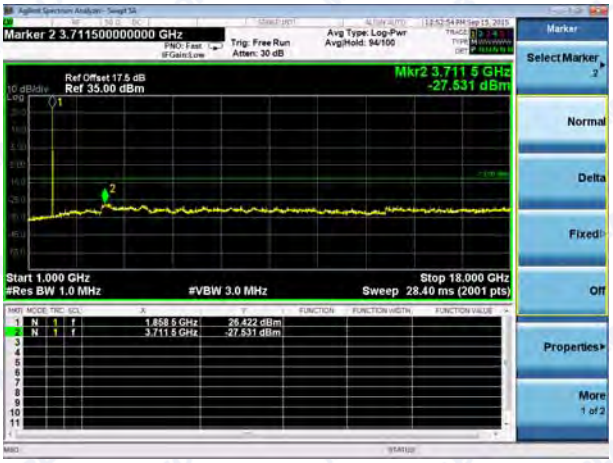
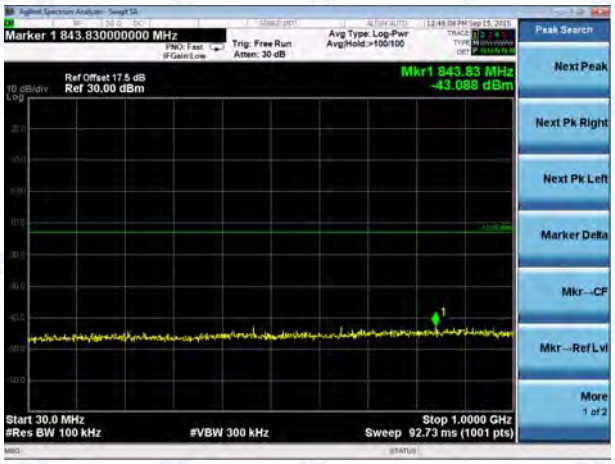
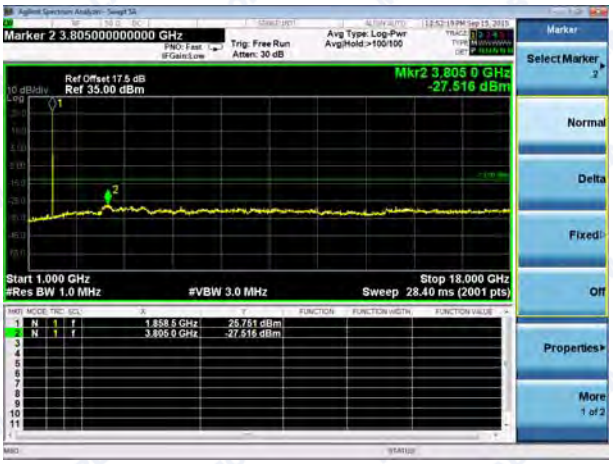
LTE Band 2 1.4MHz BW Low Channel	
QPSK	
	
16QAM	
	

LTE Band 2 3MHz BW Low Channel	
QPSK	
	
16QAM	
	

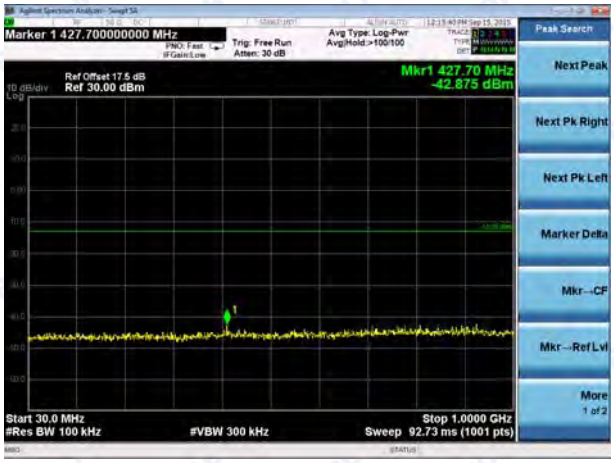
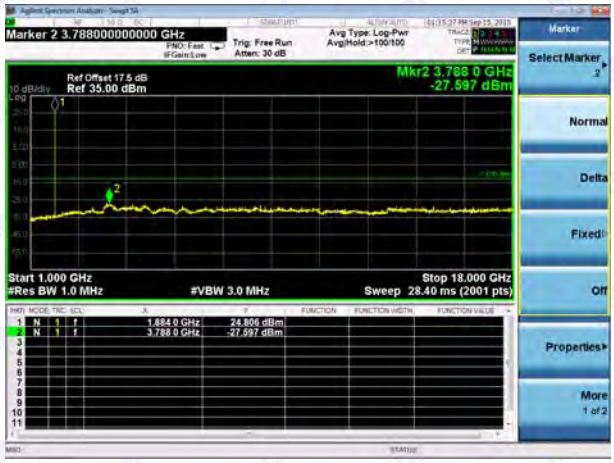
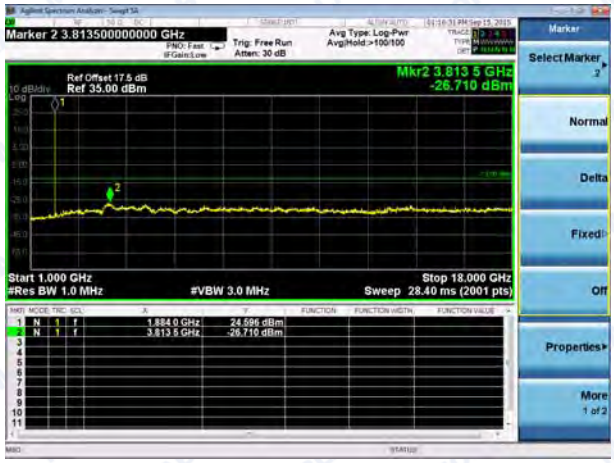
LTE Band 2 5MHz BW Low Channel
QPSK
 
16QAM
 

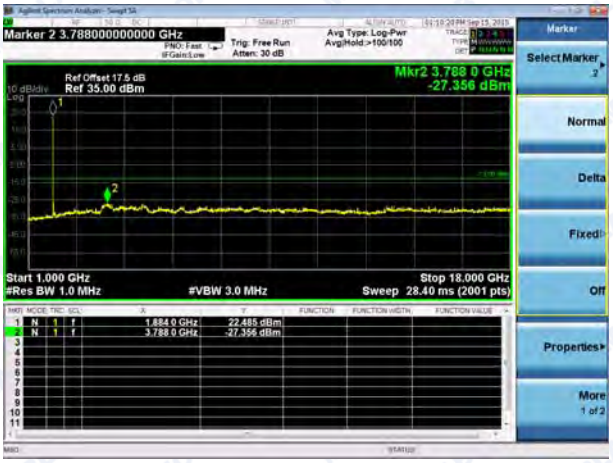
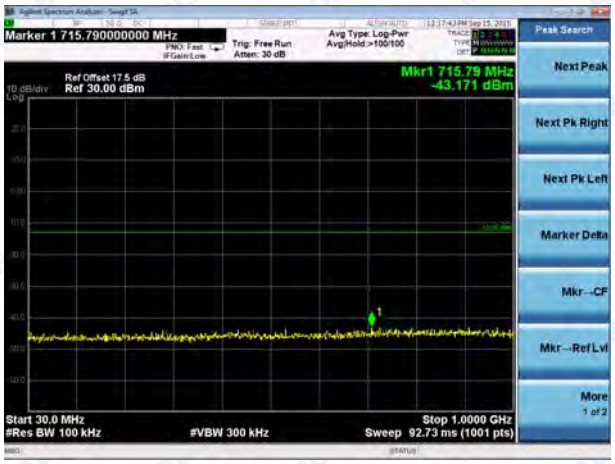
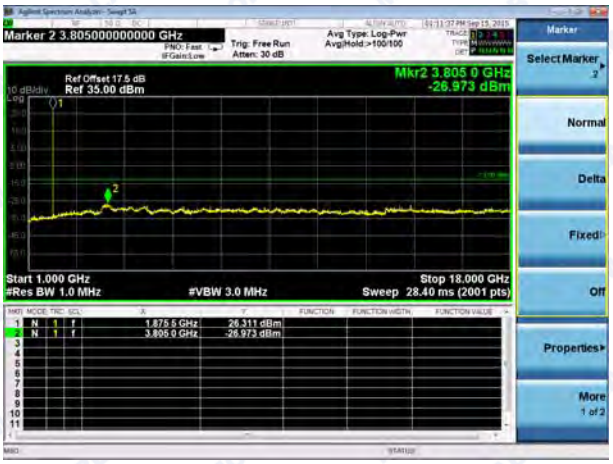
LTE Band 2 10MHz BW Low Channel	
QPSK	
	
16QAM	
	

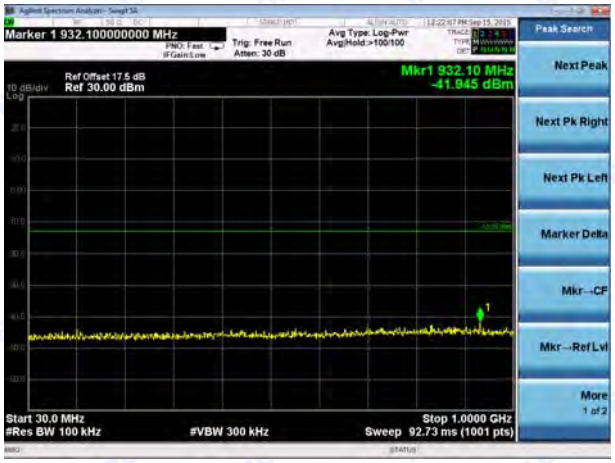
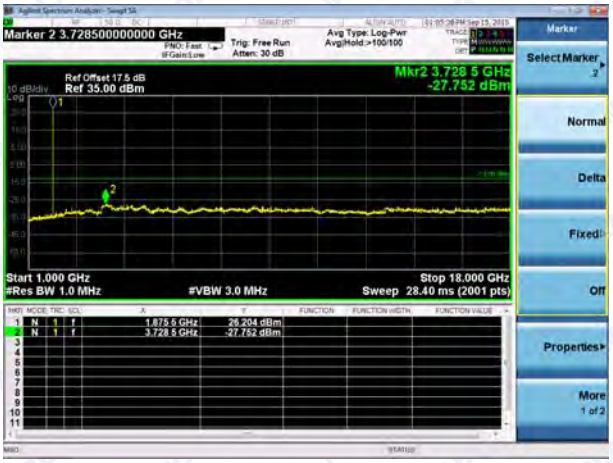
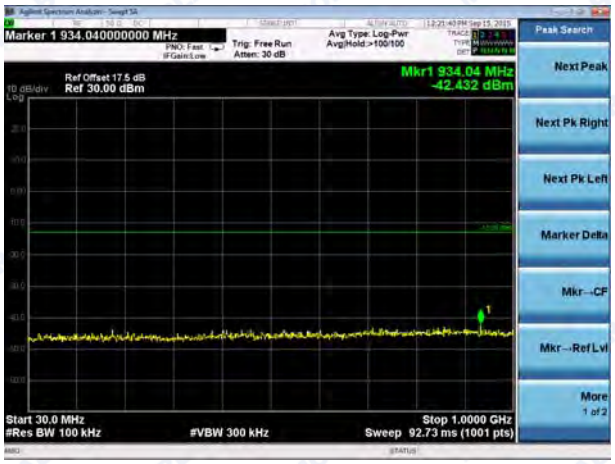
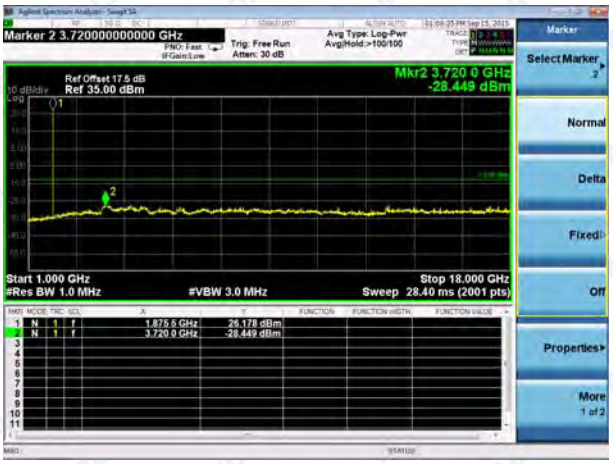
LTE Band 2 15MHz BW Low Channel	
QPSK	
	
16QAM	
	

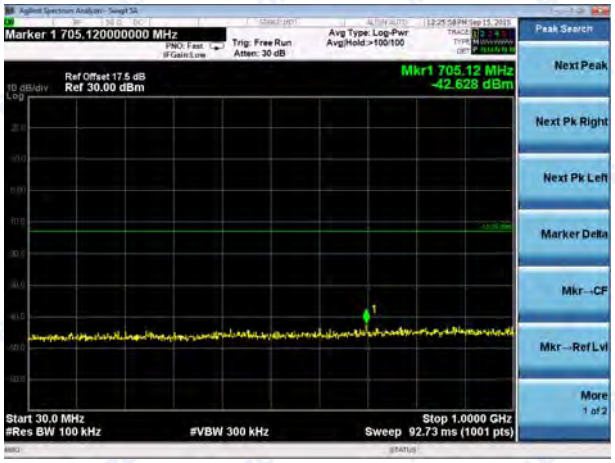
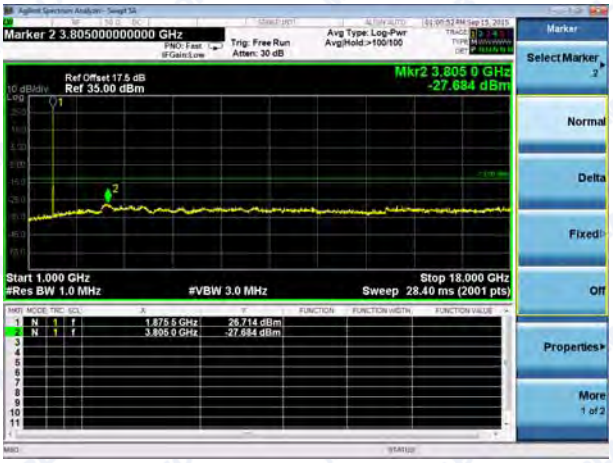
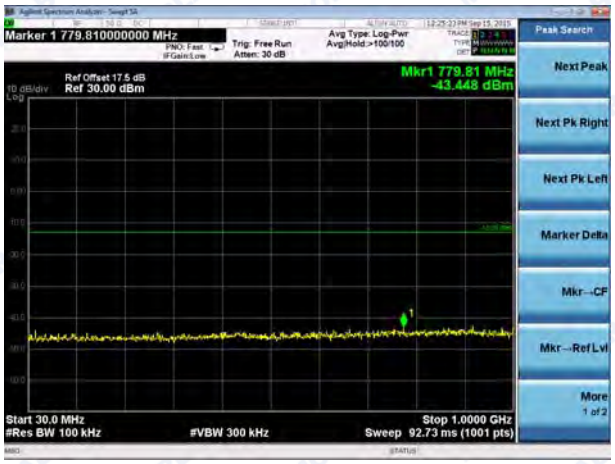
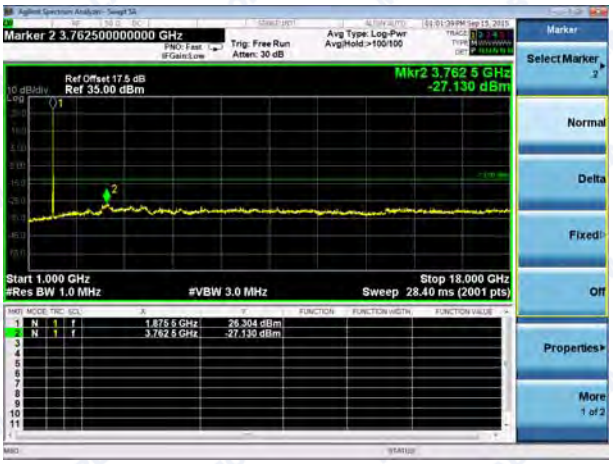
LTE Band 2 20MHz BW Low Channel	
QPSK	
	
16QAM	
	

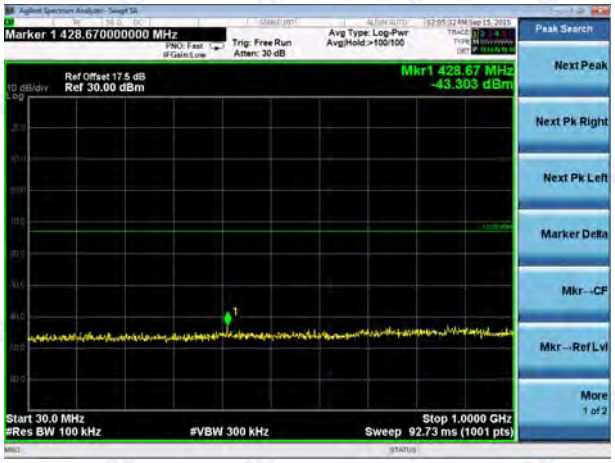
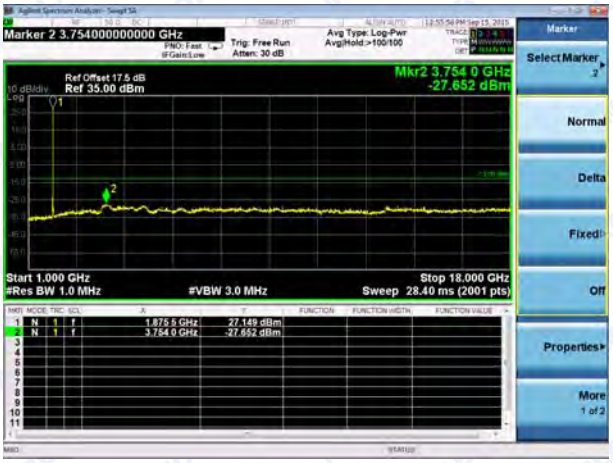
Middle channel:

LTE Band 2 1.4MHz BW Mid Channel	
QPSK	
	
16QAM	
	

LTE Band 2 3MHz BW Mid Channel	
QPSK	
	
16QAM	
	

LTE Band 2 5MHz BW Mid Channel	
QPSK	
	
16QAM	
	

LTE Band 2 10MHz BW Mid Channel	
QPSK	
	
16QAM	
	

LTE Band 2 15MHz BW Mid Channel	
QPSK	
	
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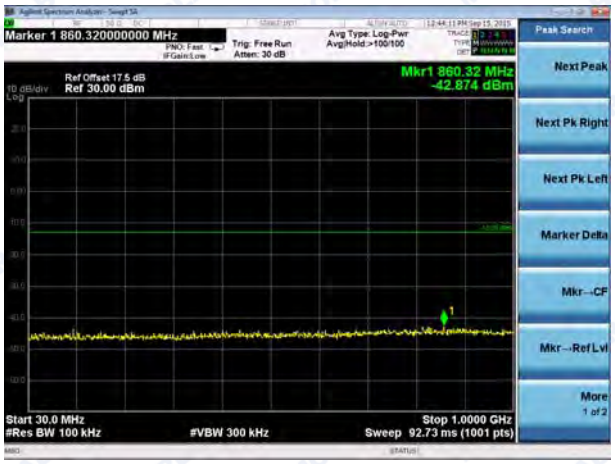
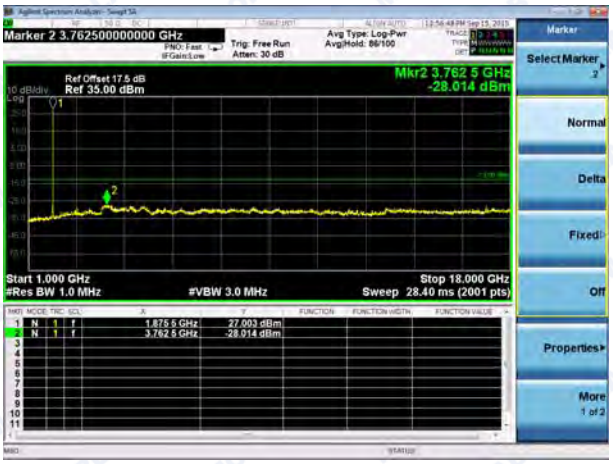
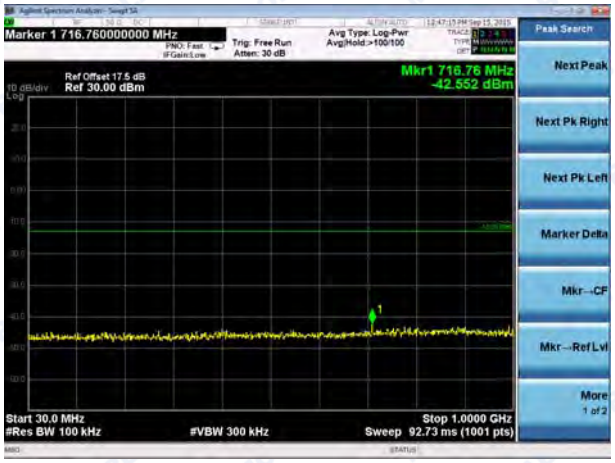
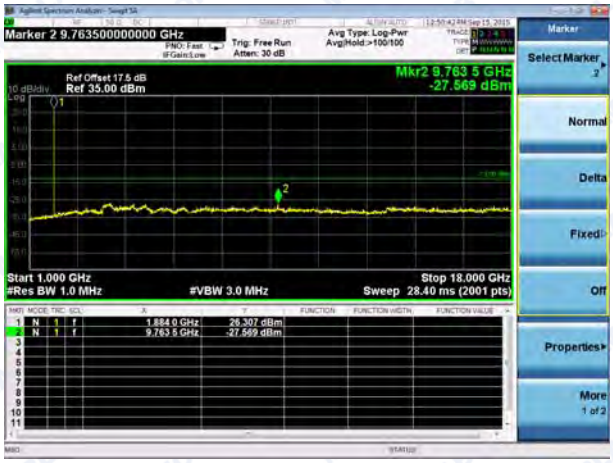
	

LTE Band 2 20MHz BW Mid Channel	
QPSK	
	
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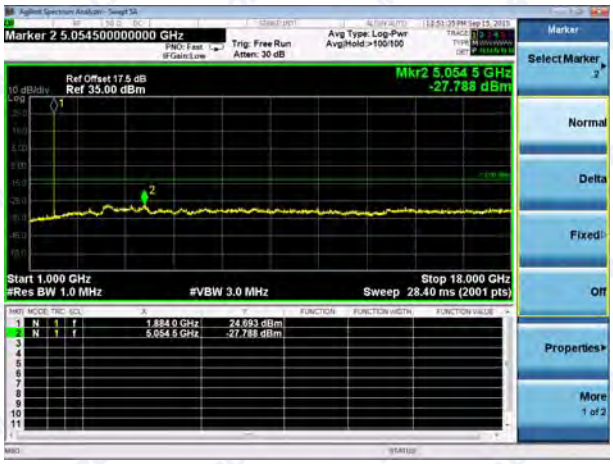
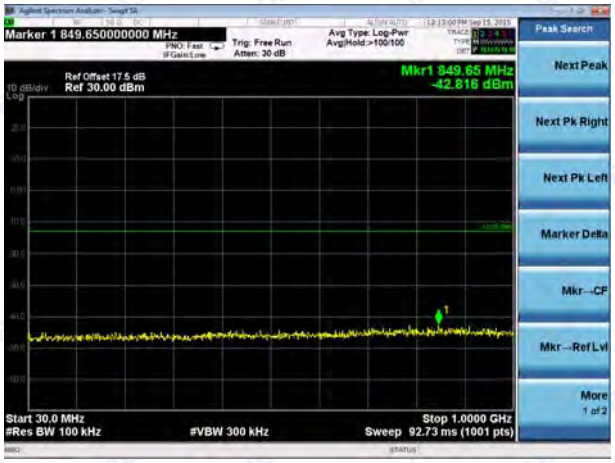
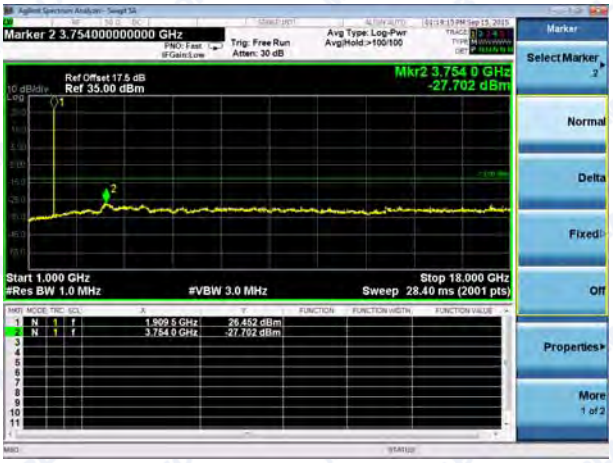
	

LTE Band 2 1.4MHz BW High Channel	
QPSK	
	
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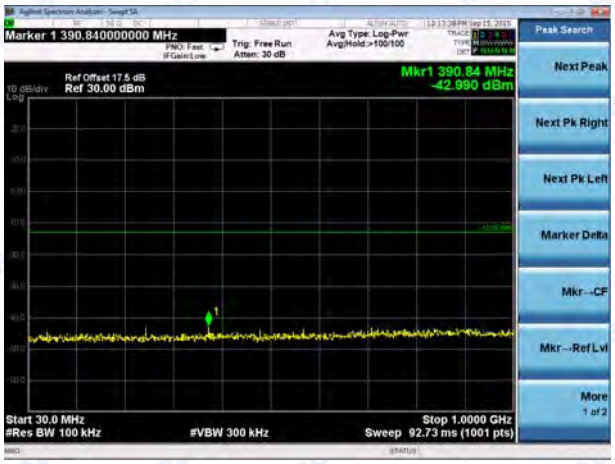
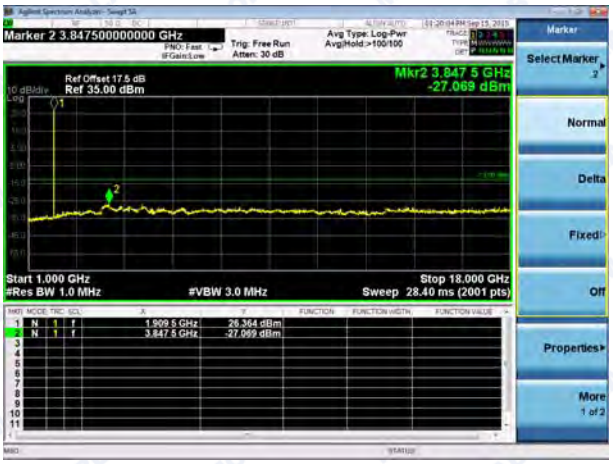
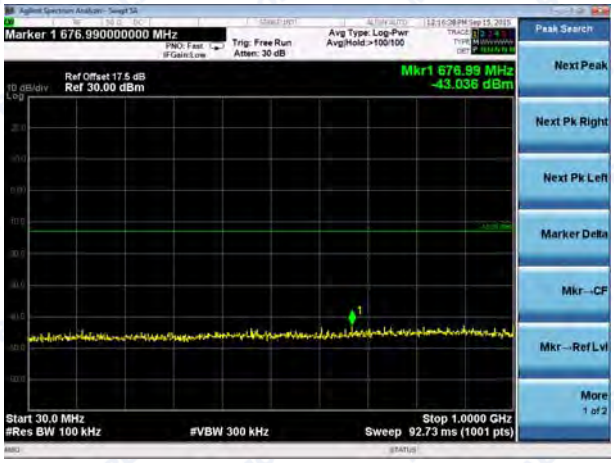
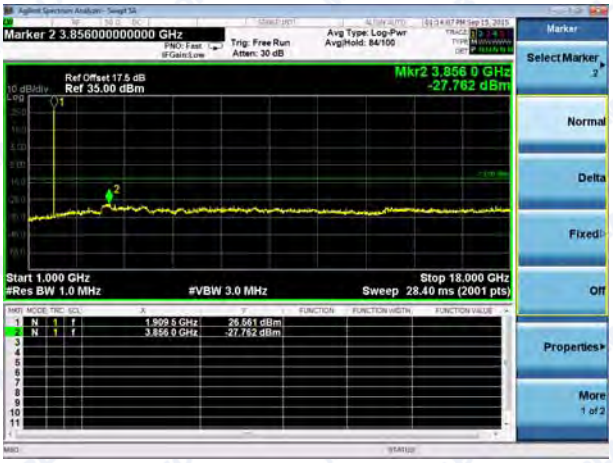
	

LTE Band 2 3MHz BW High Channel	
QPSK	
	
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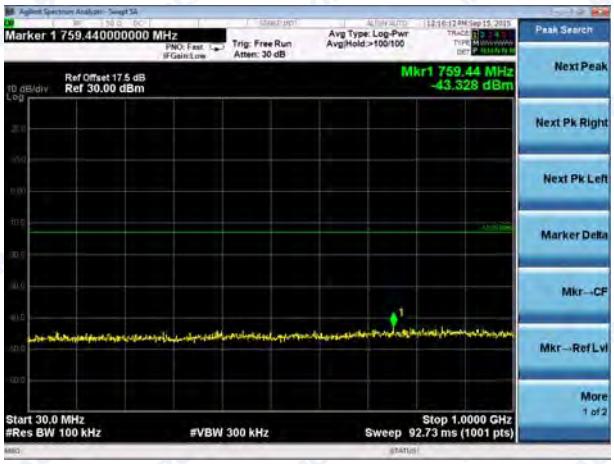
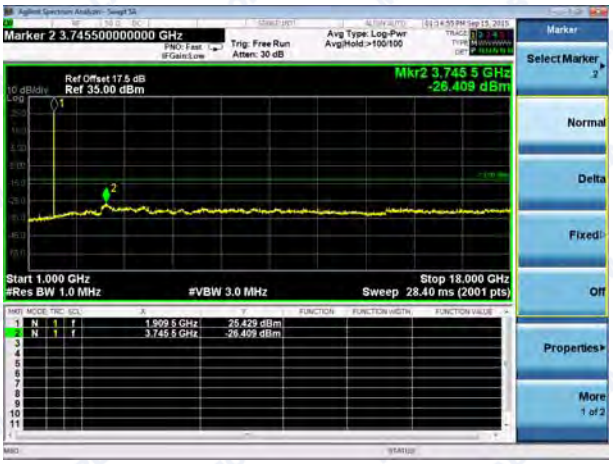
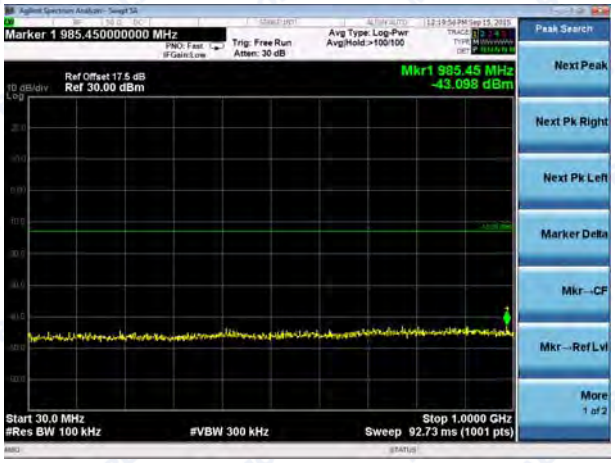
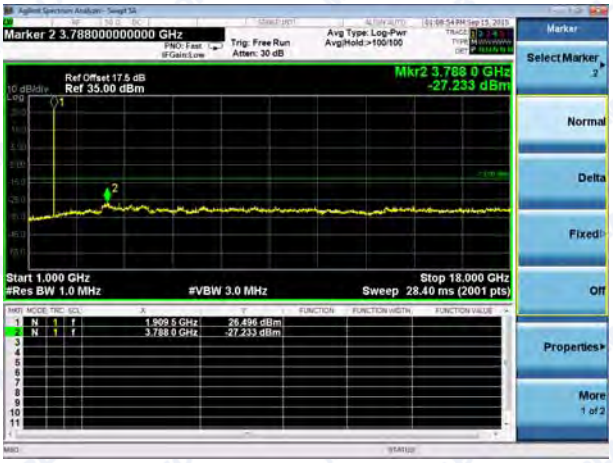
	

LTE Band 2 5MHz BW High Channel	
QPSK	
	
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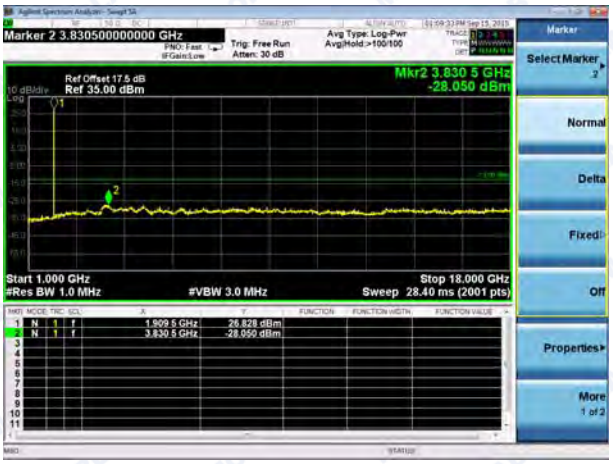
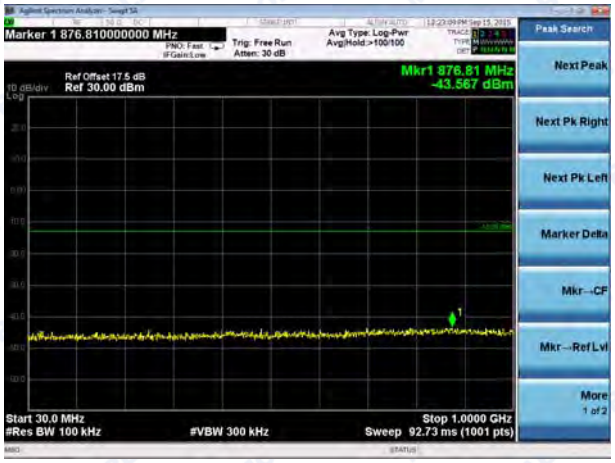
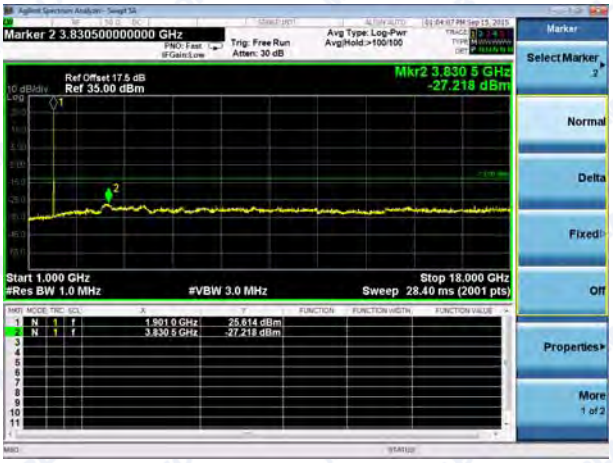
	

LTE Band 2 10MHz BW High Channel	
QPSK	
	
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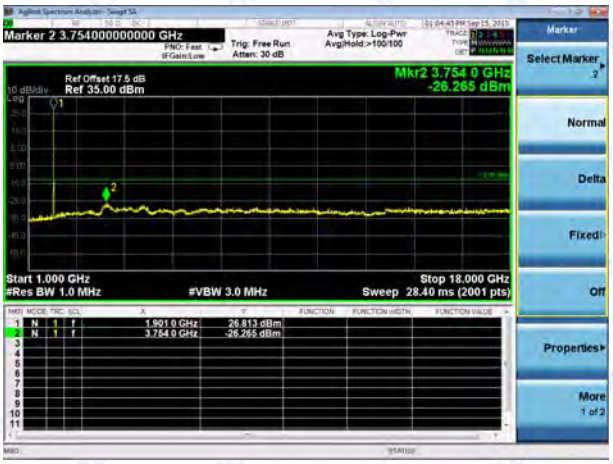
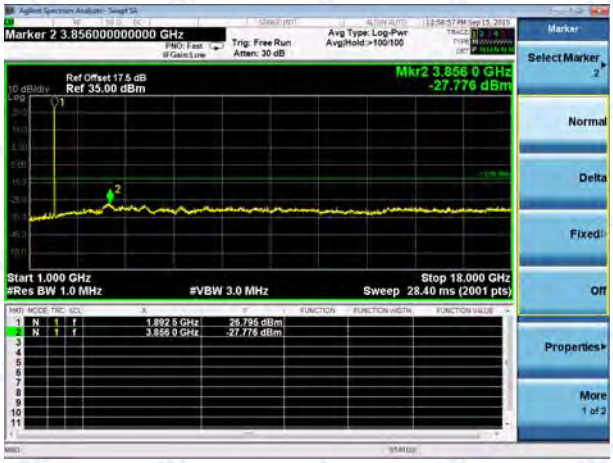
	

LTE Band 2 15MHz BW High Channel	
QPSK	
	
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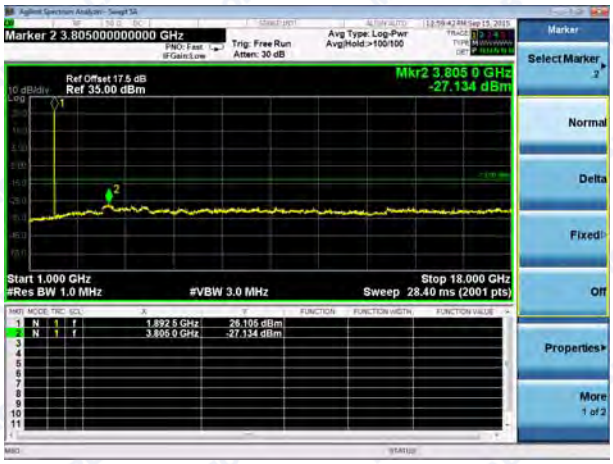
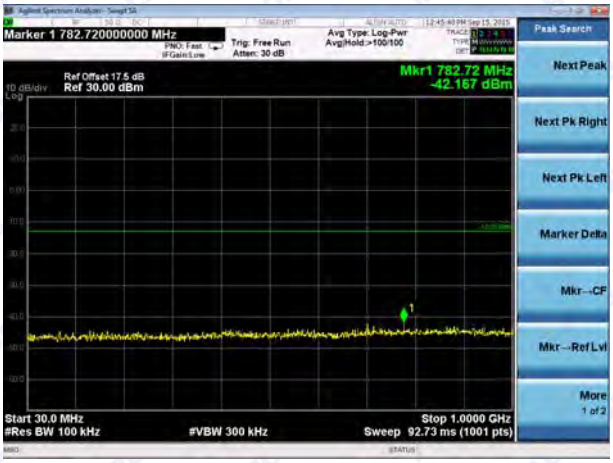
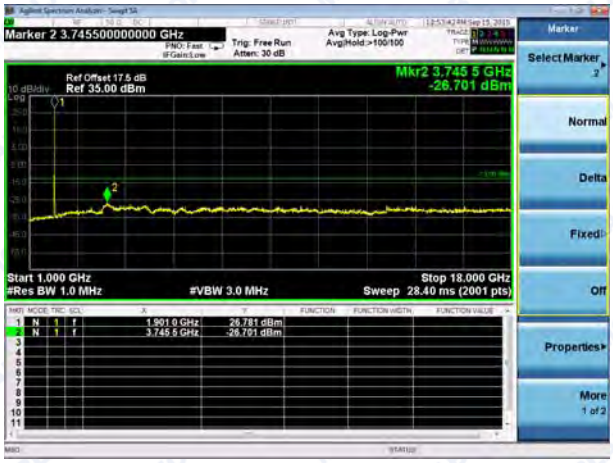
	

LTE Band 2 20MHz BW High Channel	
QPSK	
	
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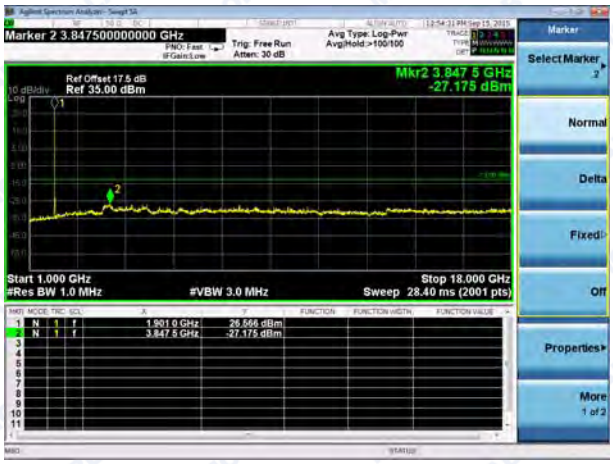
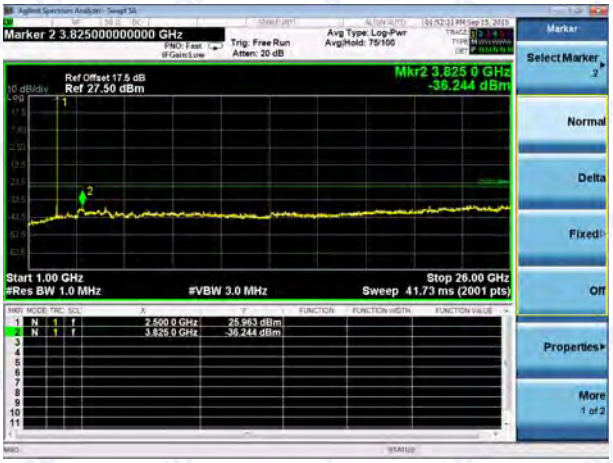
	

LTE Band 7 5MHz BW Low Channel	
QPSK	
	
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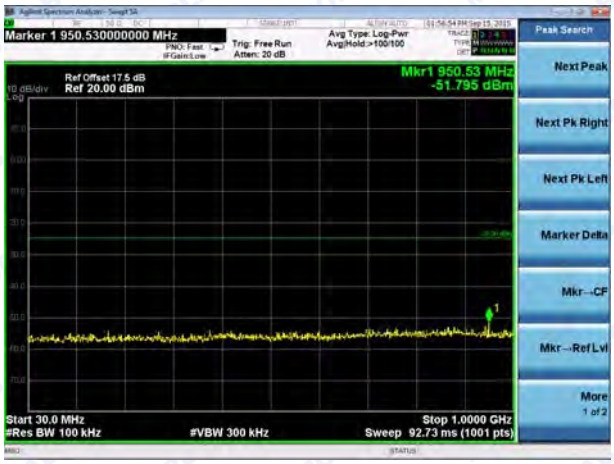
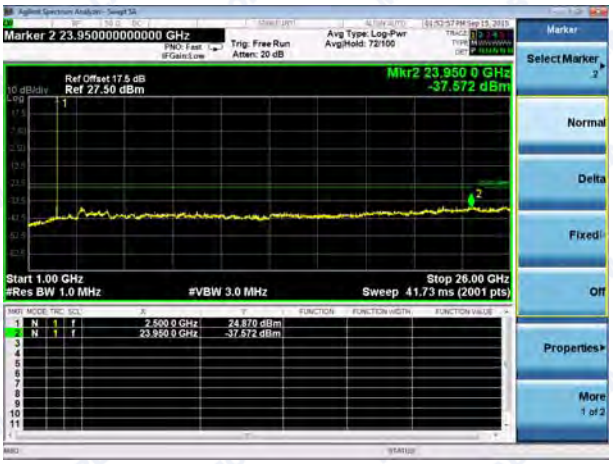
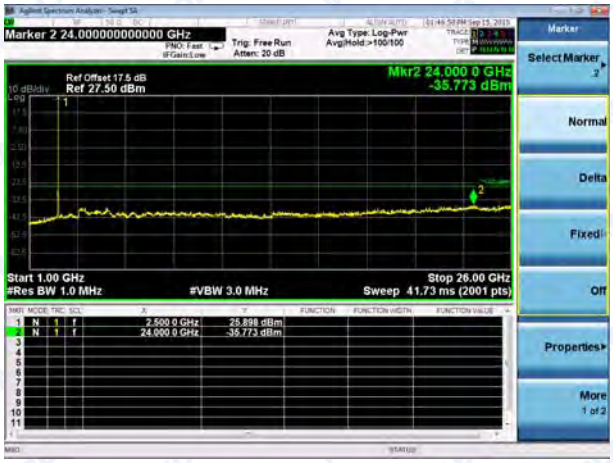
	

LTE Band 7 10MHz BW Low Channel	
QPSK	
	
16QAM