HCT CO.,LTD.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
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FCC REPORT

FCC Certification

Applicant Name:
SAMSUNG Electronics Co.,Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
April 25, 2017

Test Site/Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-R-1704-F003-2

HCT FRN: 0005866421

FCC ID:	**A3LSLS-BU10B**
APPLICANT:	**SAMSUNG Electronics Co.,Ltd.**

FCC Model(s):	SLS-BU10B
EUT Type:	sFemto 2
Frequency of Operation:	DL 746 – 757 MHz, UL 776 – 787 MHz (Band 13) DL 2110 – 2180 MHz, UL 1710 – 1780 MHz (Band 66)
TX Output Power :	50 mW / path (Total 2 path = 100 mW)
FCC Rule Part(s):	FCC CFR 47 Part 2, 27.
Data of Test:	March 02, 2017 ~ April 11, 2017

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of FCC Part 27 of the FCC Rules under normal use and maintenance.

Report prepared by : Kyung Soo Kang
Engineer of Telecommunication testing center

Approved by : Jong Seok Lee
Manager of Telecommunication testing center

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Report Revision

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1704-F003	April 12, 2017	- First Approval Report
HCT-R-1704-F003-1	April 19, 2017	- Revised EUT Type
HCT-R-1704-F003-2	April 25, 2017	- Removed the FCC Rule part 24.

Result of Test

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1. GENERAL INFORMATION

1.1. CLIENT INFORMATION

Company	**Samsung Electronics Co., Ltd.**
Contact Point	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Contact person	**Name: Jong In KIM / Principal Research Engineer** **E-mail : jered.kim@samsung.com** **Tel: +82-31-279-3092** **Fax: +82-31-279-0476**

1.2. PRODUCT INFORMATION

EUT TYPE	sFemto 2
POWER SUPPLY	AC ADAPTER: 100 ~ 240 VAC
OPERATING FREQUENCY	DL 746 – 757 MHz, UL 776 – 787 MHz (Band 13) DL 2110 – 2180 MHz, UL 1710 – 1780 MHz (Band 66)
TX OUTPUT POWER	50 mW / path (Total 2 path = 100 mW)
CHANNEL BANDWIDTH	Band 13 : 10 MHz Band 66 : 10 MHz, 15 MHz, 20 MHz
MEASUREMENT STANDARDS	ANSI/TIA-603-C-2014, KDB 971168 D01 v02r02, KDB 935210 D02 v03r02, KDB 935210 D05 v01r01
MODULATION TYPE	QPSK, 16QAM, 64QAM
ANTENNA SPECIFICATION	Manufacturer: Samsung electronics Antenna type: PCB Embedded type Peak Gain :

Frequency [MHz]	Gain [dBi]	
	Path 0	Path 1
746 ~ 787	1.47	4.31
1710 ~ 1780	2.39	3.38
2110 ~ 2180	3.08	3.48

2. FACILITIES AND ACCREDITATIONS

2.1. FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661).

2.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

3. TEST SPECIFICATIONS

3.1. STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2, Part 27

SECTION	TEST ITEMS	RESULTS
§2.1046, §27.50(b)	Conducted Output Power	Compliant
§2.1049	Occupied Bandwidth	Compliant
§2.1051, §27.53(c)(f)	Spurious Emissions at Antenna Terminals	Compliant
§2.1051, §27.53(c)	Band edge	Compliant
§2.1053, §27.53(c)	Spurious Radiated Emissions.	Compliant
§2.1055(a)(1), §27.54	Frequency Stability over Temperature variation	Compliant
§2.1055(d), §27.54	Frequency stability over Voltage variation	Compliant

3.2. MODE OF OPERATION DURING THE TEST

The EUT is operated in a manner representative of the typical usage of the equipment.

During all testing, system components were manipulated within the confines of typical usage to maximize each emission. All Modulation (QPSK, 16QAM and 64QAM) modes were tested.

Test results are only attached worst cases.

3.3. MAXIMUM MEASUREMENTUNCERTAINTY

The value of the measurement uncertainty for the measurement of each parameter.
Coverage factor *k* = 2, Confidence levels of 95 %

Description	Condition	Uncertainty
Conducted RF Output Power	-	± 0.72 dB
Occupied Bandwidth	OBW ≤ 20 MHz	± 52 kHz
Passband Gain and Bandwidth & Out of Band Rejection	Gain 20 dB bandwidth	± 0.89 dB ± 0.58 MHz
Spurious Emissions at Antenna Terminals	-	± 1.08 dB
Radiated Spurious Emissions	f ≤ 1 GHz f > 1 GHz	± 4.80 dB ± 6.07 dB
Frequency Stability	-	± 1.22 x 10^{-6}

3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature :	**+ 15 ℃ to + 35 ℃**
Relative humidity:	**30 % to 60 %**
Air pressure	**860 mbar to 1 060 mbar**

4. TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Agilent	N9020A / Signal Analyzer	07/04/2016	Annual	MY49100925
H.P.	8493C / 10dB Attenuator	07/15/2016	Annual	07560
Agilent	8493C-010 / 10dB Attenuator	08/11/2016	Annual	76649
NANGYEUL CO., LTD.	NY-THR18750 / Temperature and Humidity Chamber	10/21/2016	Annual	NY-2009012201A
Innco system	MA4000-EP / Antenna Position Tower	N/A	N/A	N/A
Innco system	CT0800 / Turn Table	N/A	N/A	N/A
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
ETS	2090 / Controller(Turn table)	N/A	N/A	1646
Rohde&Schwarz	Loop Antenna	02/23/2016	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/15/2015	Biennial	255
Schwarzbeck	BBHA 9120D / Horn Antenna	12/11/2015	Biennial	9120D-1191
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	09/03/2015	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	09/29/2016	Annual	836650/016
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/23/2016	Annual	101068-SZ
Wainwright Instruments	WHKX10-900-1000-15000-40SS / Highpass Filter	08/04/2016	Annual	5
Wainwright Instruments	WHKX10-2700-3000-18000-40SS / High Pass Filter	08/11/2016	Annual	4
CERNEX	CBLU1183540 / Power Amplifier	01/25/2017	Annual	24614
CERNEX	CBL06185030 / Power Amplifier	01/25/2017	Annual	24615
CERNEX	CBL18265035 / Power Amplifier	07/11/2016	Annual	22966

5. CONDUCTED OUTPUT POWER

Test Requirements:

§ 2.1046 Measurements required: RF power output:

(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 § 2.1033(c)(8).The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

(b) For single sideband, independent sideband, and single channel, controlled carrier radio telephone transmitters, the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and as applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

§ 27.50 Power limits and duty cycle.

(b) The following power and antenna height limits apply to transmitters operating in the 746-758 MHz, 775-788 MHz and 805-806 MHz bands:

(4) Fixed and base stations transmitting a signal in the 746-757 MHz and 776-787 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section.

(5) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 746-757 MHz and 776-787 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section.

(c) The following power and antenna height requirements apply to stations transmitting in the 600 MHz band and the 698-746 MHz band:

(4) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section;

(5) Licensees, except for licensees operating in the 600 MHz downlink band, seeking to operate a fixed or base station located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal at an ERP greater than 1000 watts must:

(i) Coordinate in advance with all licensees authorized to operate in the 698-758 MHz, 775-788, and 805-806 MHz bands within 120 kilometers (75 miles) of the base or fixed station;

(ii) coordinate in advance with all regional planning committees, as identified in §90.527 of this chapter, with jurisdiction within 120 kilometers (75 miles) of the base or fixed station.

(d) The following power and antenna height requirements apply to stations transmitting 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:

(1) The power of each fixed or base station transmitting in the 1995-2000 MHz, 2110-2155 MHz, 2155-2180 MHz or 2180-2200 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 3280 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 3280 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

(2) The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

(3) A licensee operating a base or fixed station in the 2110-2155 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025-

2110 MHz band. A licensee operating a base or fixed station in the 2110-2180 MHz band utilizing power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with the following licensees authorized to operate within 120 kilometers (75 miles) of the base or fixed station operating in this band: All Broadband Radio Service (BRS) licensees authorized under this part in the 2155-2160 MHz band and all advanced wireless services (AWS) licensees authorized to operate on adjacent frequency blocks in the 2110-2180 MHz 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. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(5) Equipment employed must be authorized in accordance with the provisions of §24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. 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.

(6) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

(7) Fixed, mobile, and portable (hand-held) stations operating in the 2000-2020 MHz band are limited to 2 watts EIRP, except that the total power of any portion of an emission that falls within the 2000-2005 MHz band may not exceed 5 milliwatts. A licensee of AWS-4 authority may enter into private operator-to-operator agreements with all 1995-2000 MHz licensees to operate in 2000-2005 MHz at power levels above 5 milliwatts EIRP; except the total power of the AWS-4 mobile emissions may not exceed 2 watts EIRP.

(8) A licensee operating a base or fixed station in the 2180-2200 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with all AWS licensees authorized to operate on adjacent frequency blocks in the 2180-2200 MHz band.

(9) Fixed, mobile and portable (hand-held) stations operating in the 1915-1920 MHz band are limited to 300 milliwatts EIRP.

(10) A licensee operating a base or fixed station in the 1995-2000 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with all PCS G Block licensees authorized to operate on adjacent frequency blocks in the 1990-1995 MHz band within 120 kilometers of the base or fixed station operating in this band.

Test Procedures:

According to FCC §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 § 2.1033(c). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

1) The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The lost of the cables the test system is calibrated to correct the reading.
2) The spectrum analyzer was set to RMS Detector function and Average mode.
3) The resolution bandwidth of the spectrum analyzer was comparable to the emission bandwidth.
4) The conducted emission level is meaured at each antenna port and then summed mathmatically to determine the total emission level from the device. (100 m W = 50 mW x 2 Ports)

Note:

Maximum EIRP(= 17.89 dBm + 3.08 dBi = 20.97 dBm for Port 0

= 17.63 dBm + 3.48 dBi = 21.11 dBm for Port 1) is sufficient level to pass the limit.

Test Results:

700 MHz_LTE 10 MHz

Test Data at Output Port 0

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
751.00	17.36	0.054	17.16	0.052	17.12	0.052

Test Data at Output Port 1

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
751.00	17.29	0.054	17.41	0.055	17.42	0.055

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power		
	QPSK	16QAM	64QAM
	W	W	W
751.00	0.108	0.107	0.107

AWS 2100_LTE 10 MHz

Test Data at Output Port 0

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2115.00	17.29	0.054	17.55	0.057	17.25	0.053
2145.00	17.44	0.055	17.07	0.051	17.41	0.055
2175.00	17.59	0.057	17.77	0.060	17.52	0.056

Test Data at Output Port 1

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2115.00	17.35	0.054	16.99	0.050	17.35	0.054
2145.00	17.11	0.051	17.49	0.056	17.49	0.056
2175.00	17.43	0.055	17.35	0.054	17.62	0.058

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power		
	QPSK	16QAM	64QAM
	W	W	W
2115.00	0.108	0.107	0.107
2145.00	0.107	0.107	0.111
2175.00	0.113	0.114	0.114

AWS 2100_LTE 15 MHz

Test Data at Output Port 0

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2117.50	17.51	0.056	16.96	0.050	17.45	0.056
2145.00	17.45	0.056	17.01	0.050	17.29	0.054
2172.50	17.85	0.061	17.46	0.056	17.59	0.057

Test Data at Output Port 1

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2117.50	17.18	0.052	16.78	0.048	16.93	0.049
2145.00	17.04	0.051	16.71	0.047	16.93	0.049
2172.50	17.57	0.057	17.31	0.054	17.00	0.050

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power		
	QPSK	16QAM	64QAM
	W	W	W
2117.50	0.109	0.097	0.105
2145.00	0.106	0.097	0.103
2172.50	0.118	0.110	0.108

AWS 2100_LTE 20 MHz

Test Data at Output Port 0

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2120.00	17.33	0.054	17.17	0.052	17.40	0.055
2145.00	17.67	0.058	17.33	0.054	17.35	0.054
2170.00	17.83	0.061	17.75	0.060	17.89	0.062

Test Data at Output Port 1

Frequency (MHz)	Output Power					
	QPSK		16QAM		64QAM	
	dBm	W	dBm	W	dBm	W
2120.00	17.36	0.054	17.45	0.056	17.32	0.054
2145.00	17.52	0.056	17.28	0.053	17.26	0.053
2170.00	17.27	0.053	17.63	0.058	17.36	0.054

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power		
	QPSK	16QAM	64QAM
	W	W	W
2120.00	0.109	0.108	0.109
2145.00	0.115	0.108	0.108
2170.00	0.114	0.118	0.116

[Peak-to-Average Ratio]

700 MHz Test Data

LTE Bandwidth	Frequency (MHz)	PAR [dB]					
		QPSK		16QAM		64QAM	
		Port 0	Port 1	Port 0	Port 1	Port 0	Port 1
10 MHz	751.00	7.65	7.62	7.64	7.66	7.68	7.67

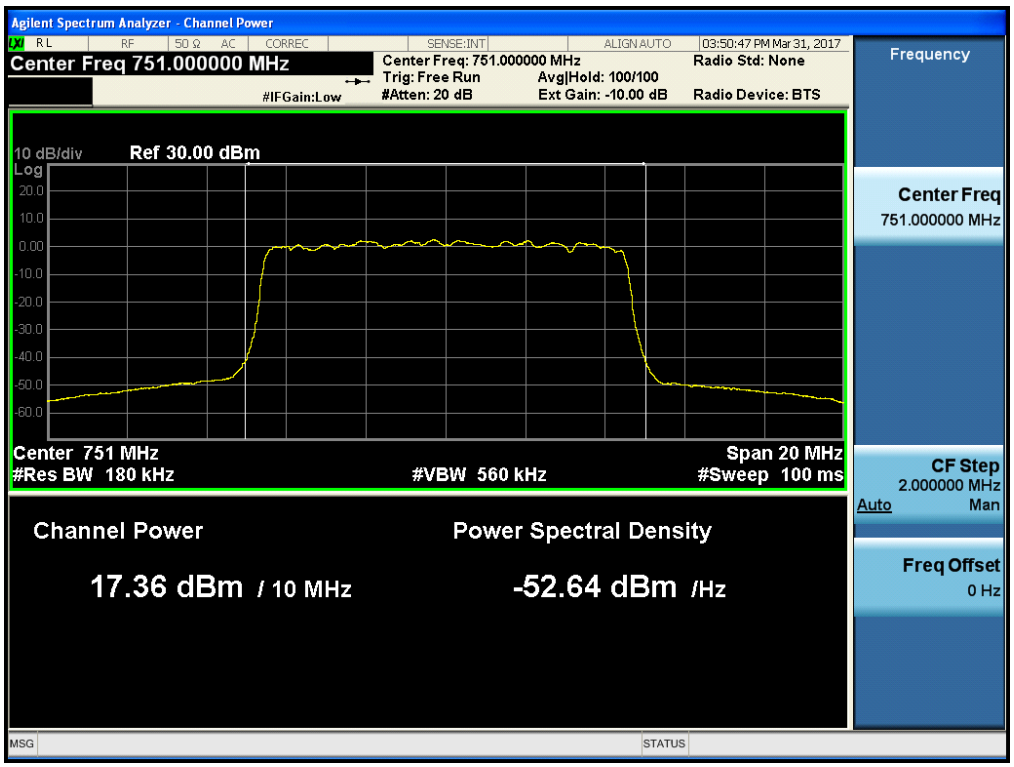
AWS 2100 Test Data

LTE Bandwidth	Frequency (MHz)	PAR [dB]					
		QPSK		16QAM		64QAM	
		Port 0	Port 1	Port 0	Port 1	Port 0	Port 1
10 MHz	2145.00	7.44	7.63	7.47	7.64	7.52	7.68
15 MHz		7.38	7.59	7.63	7.84	7.41	7.61
20 MHz		7.44	7.58	7.45	7.60	7.48	7.62

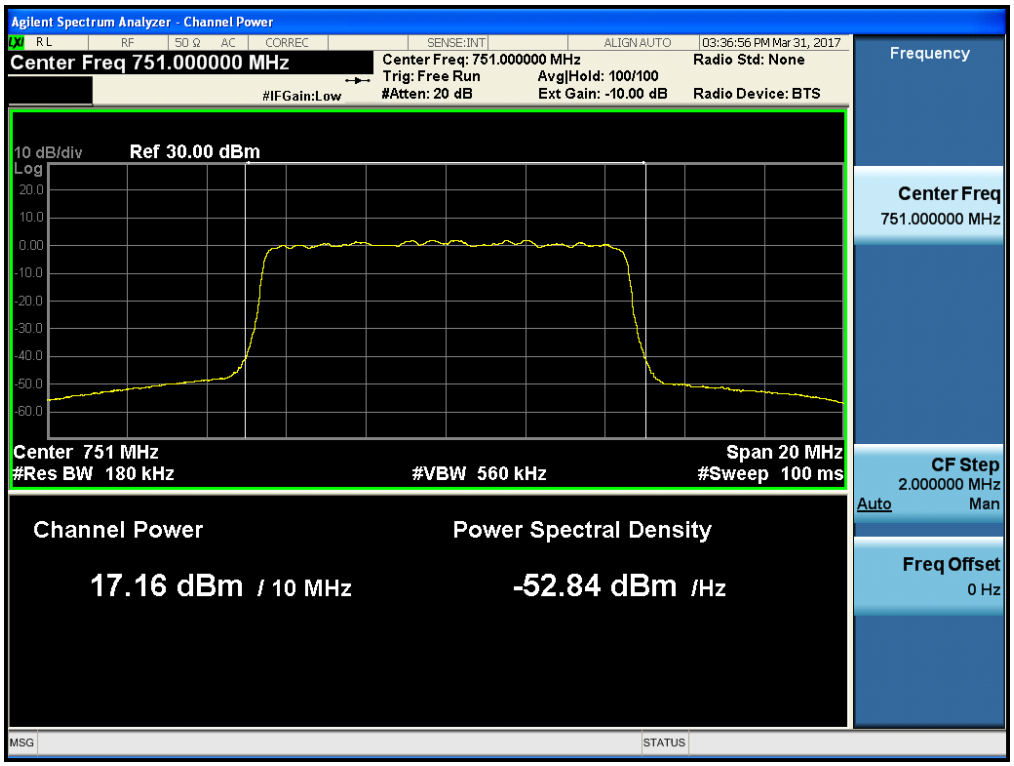
700 MHz_LTE 10 MHz

Plot Data for Output Port 0 (Conducted Output Power)

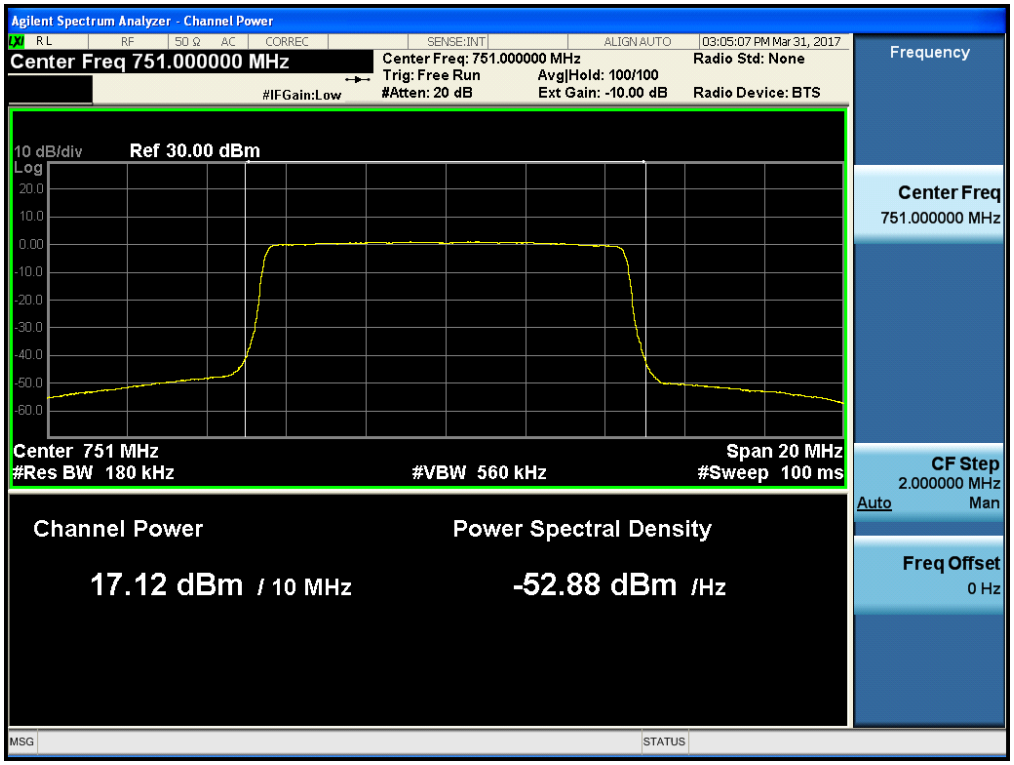
(QPSK Middle Channel)



(16QAM Middle Channel)



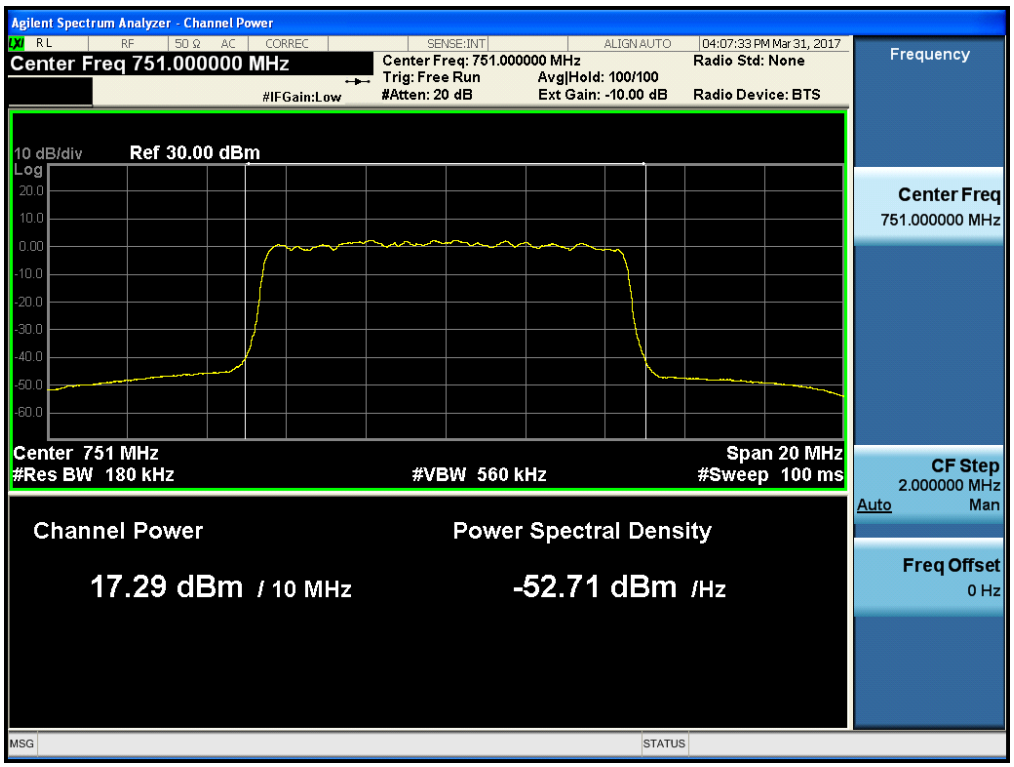
(64QAM Middle Channel)



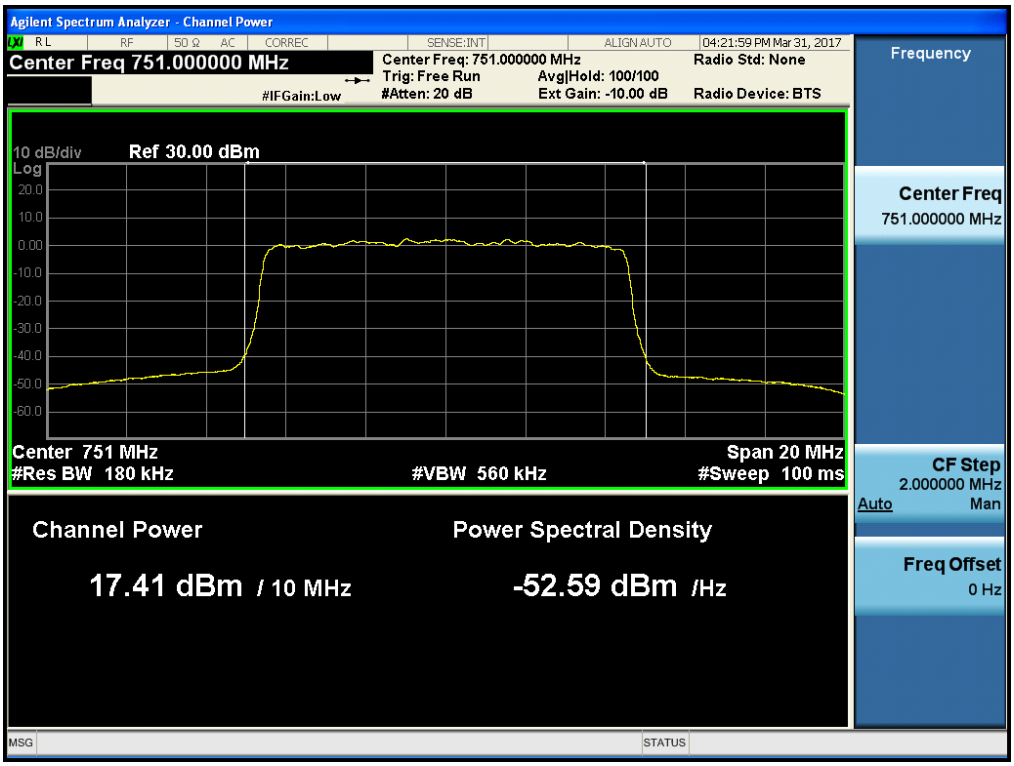
700 MHz_LTE 10 MHz

Plot Data for Output Port 1 (Conducted Output Power)

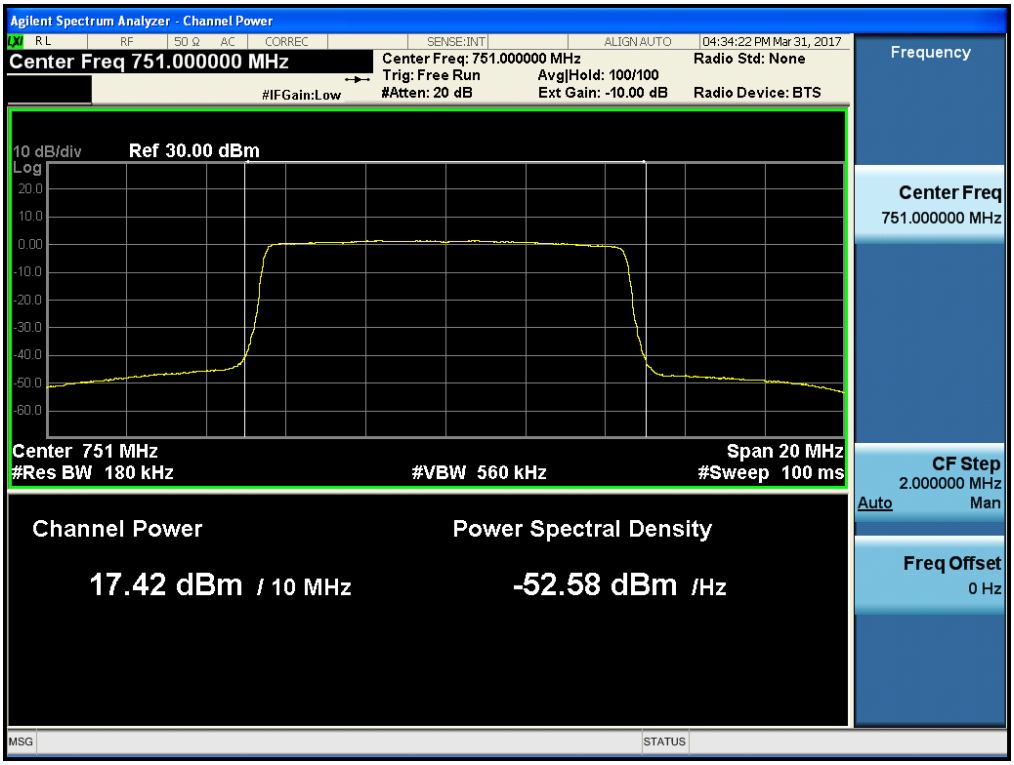
(QPSK Middle Channel)



(16QAM Middle Channel)



(64QAM Middle Channel)



AWS 2100_LTE 10 MHz

Plot Data for Output Port 0 (Conducted Output Power)

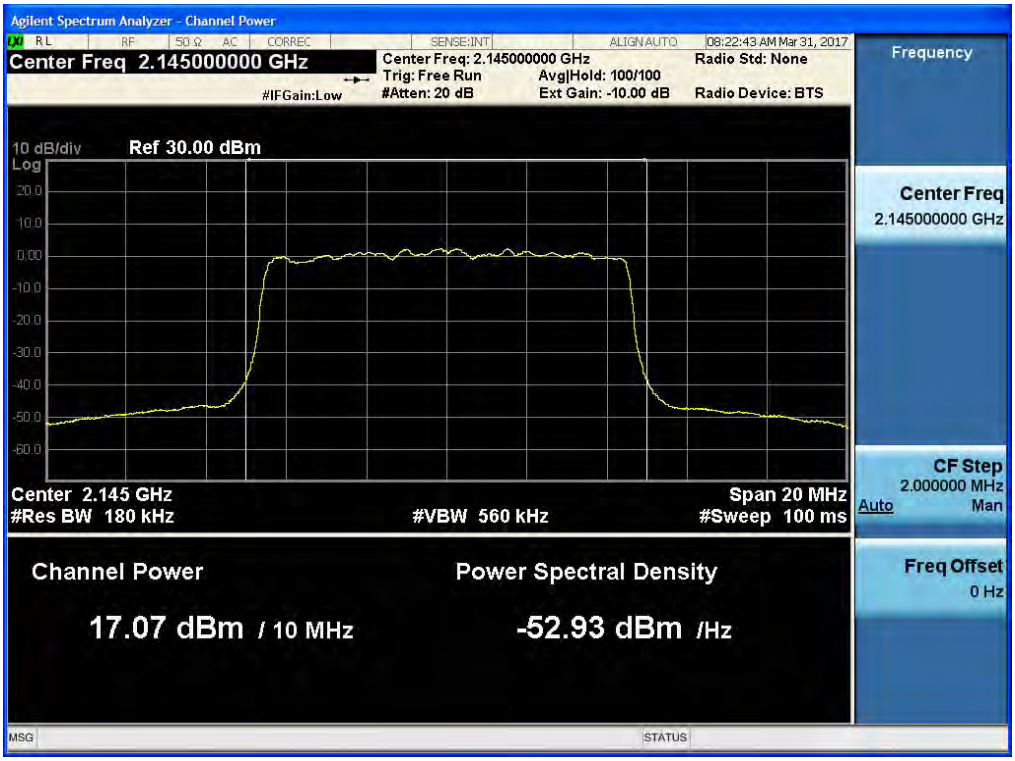
(QPSK Low Channel)

(QPSK Middle Channel)

(QPSK High Channel)

(16QAM Low Channel)

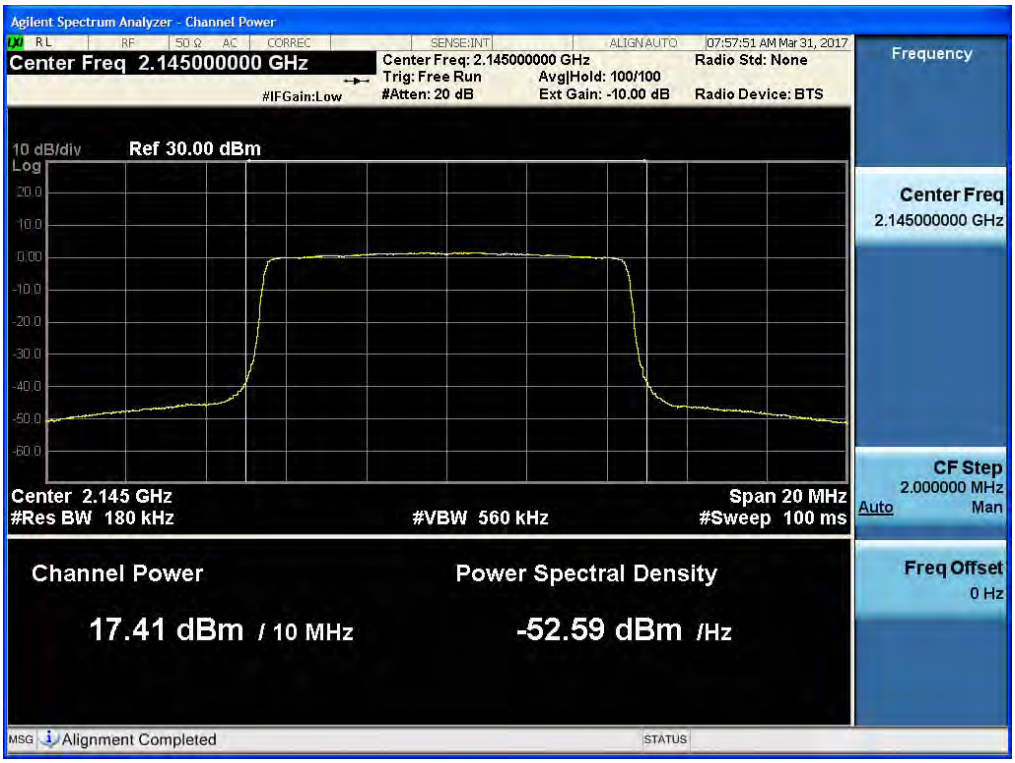
(16QAM Middle Channel)



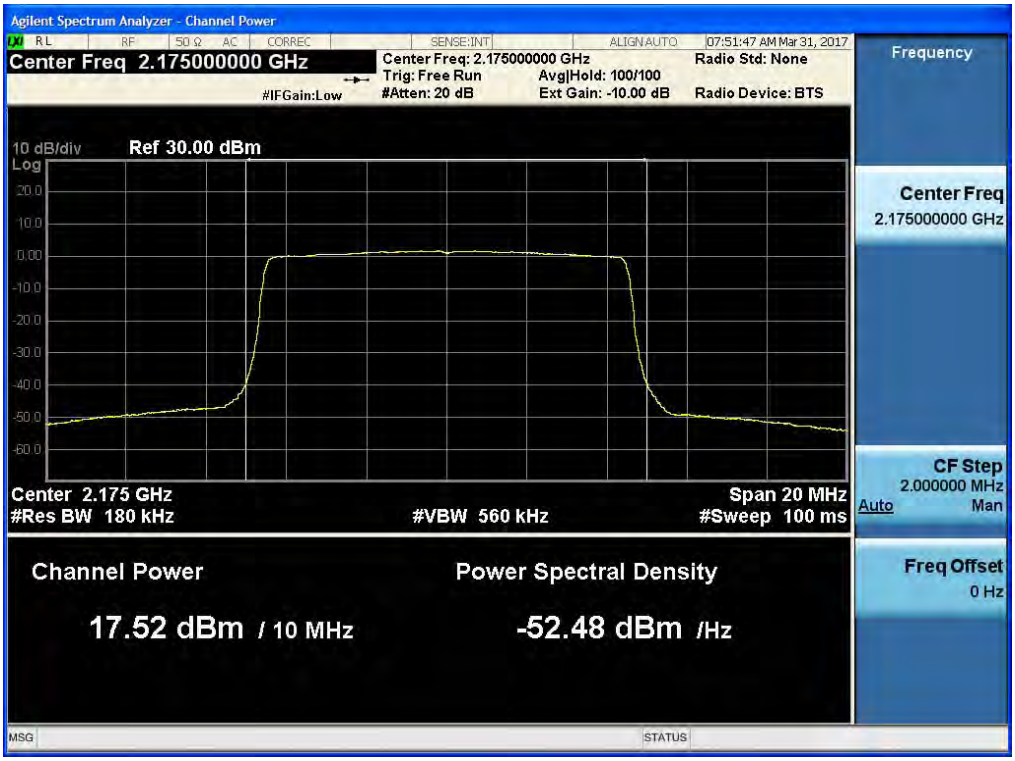
(16QAM High Channel)

(64QAM Low Channel)

(64QAM Middle Channel)



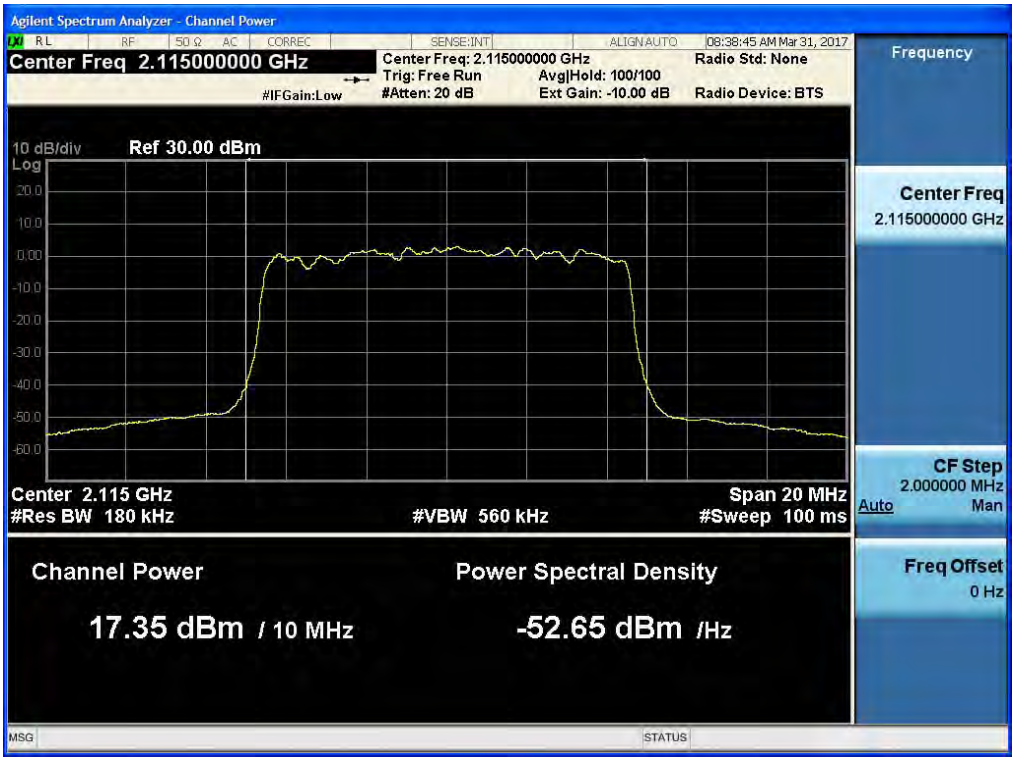
(64QAM High Channel)



AWS 2100_LTE 10 MHz

Plot Data for Output Port 1 (Conducted Output Power)

(QPSK Low Channel)



(QPSK Middle Channel)

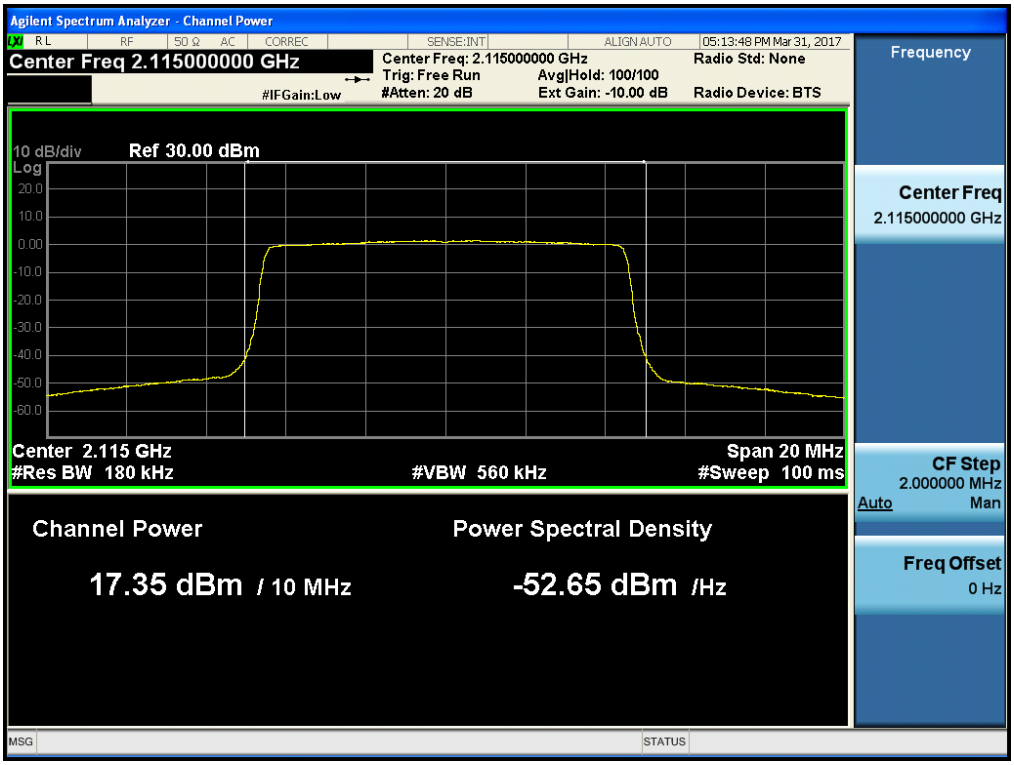
(QPSK High Channel)

(16QAM Low Channel)

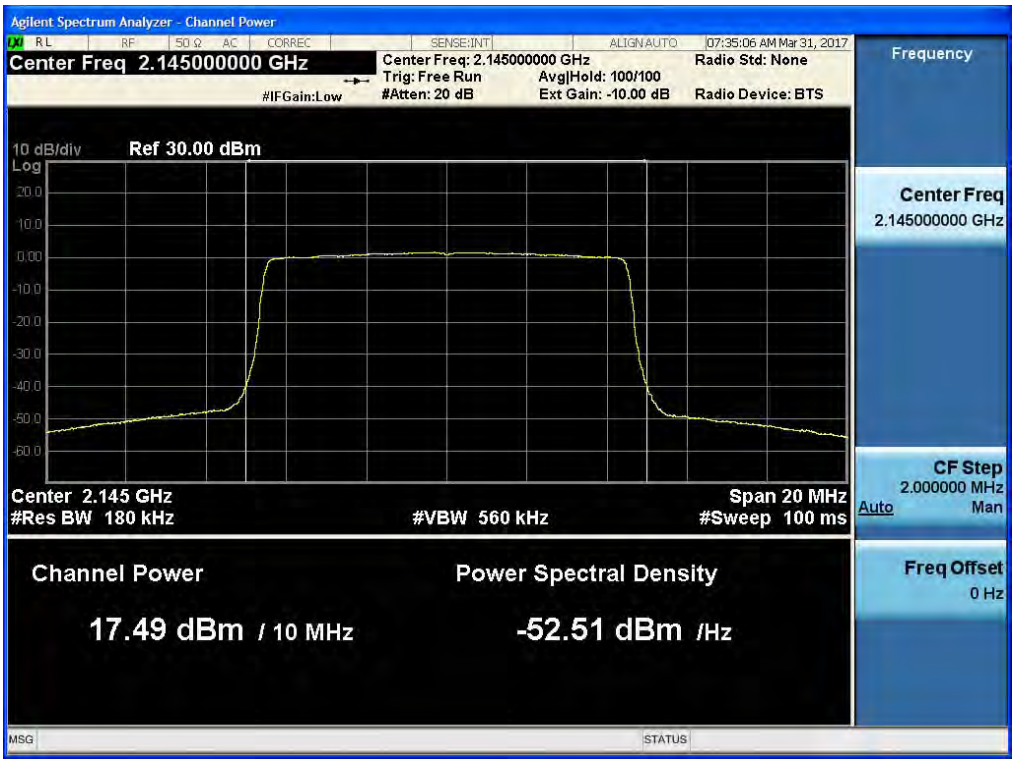
(16QAM Middle Channel)

(16QAM High Channel)

(64QAM Low Channel)



(64QAM Middle Channel)



(64QAM High Channel)

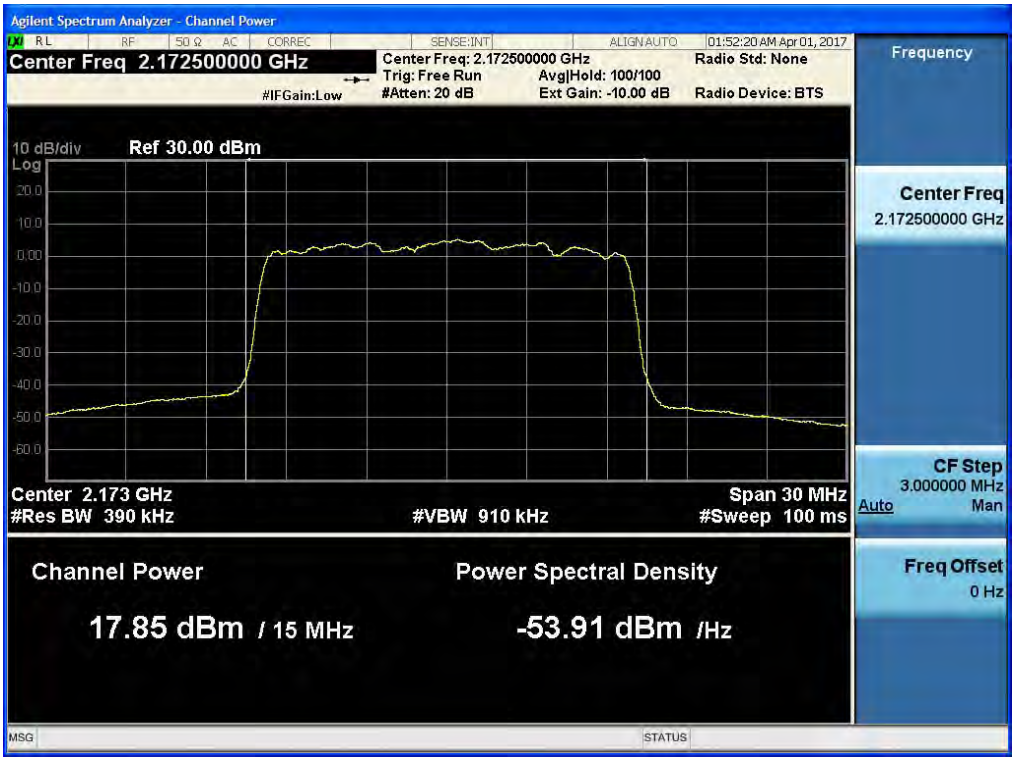
AWS 2100_LTE 15 MHz

Plot Data for Output Port 0 (Conducted Output Power)

(QPSK Low Channel)

(QPSK Middle Channel)

(QPSK High Channel)



(16QAM Low Channel)

(16QAM Middle Channel)

(16QAM High Channel)

(64QAM Low Channel)

(64QAM Middle Channel)

(64QAM High Channel)

AWS 2100_LTE 15 MHz

Plot Data for Output Port 1 (Conducted Output Power)

(QPSK Low Channel)

(QPSK Middle Channel)

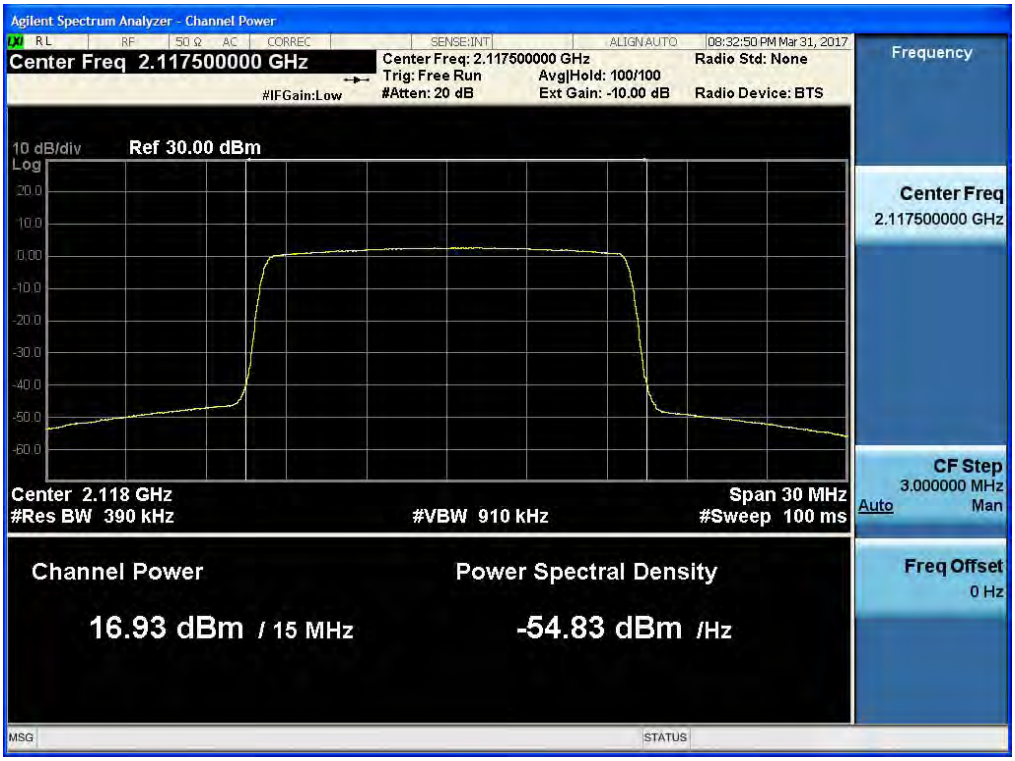
(QPSK High Channel)

(16QAM Low Channel)

(16QAM Middle Channel)

(16QAM High Channel)

(64QAM Low Channel)



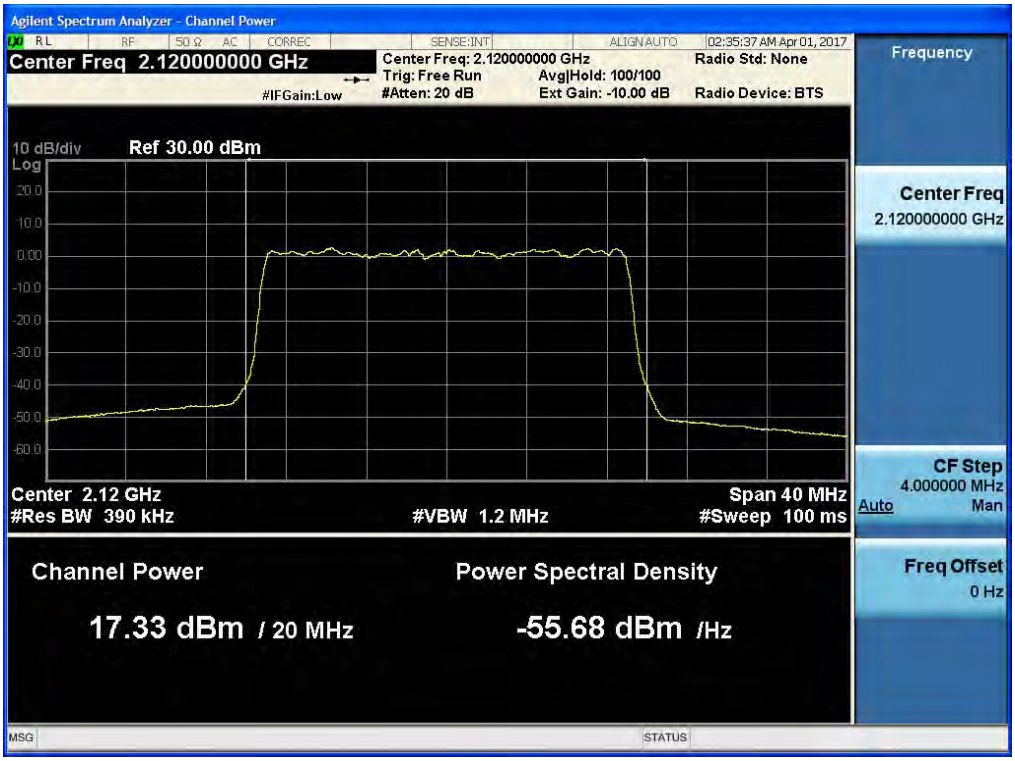
(64QAM Middle Channel)

(64QAM High Channel)

AWS 2100_LTE 20 MHz

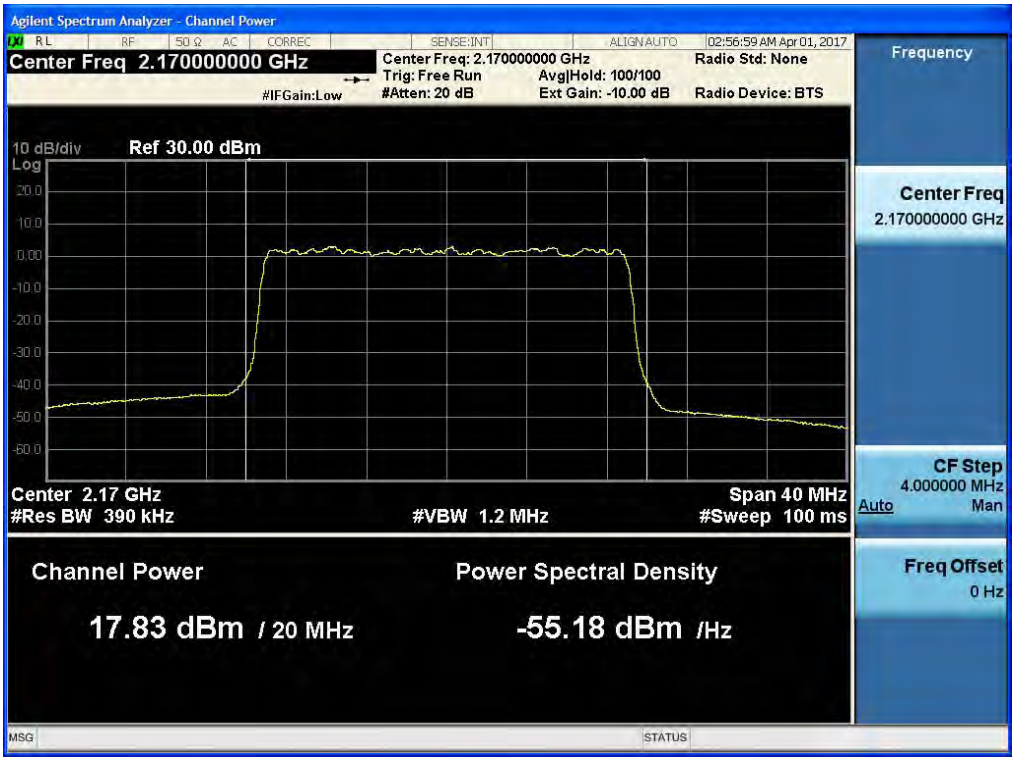
Plot Data for Output Port 0 (Conducted Output Power)

(QPSK Low Channel)



(QPSK Middle Channel)

(QPSK High Channel)

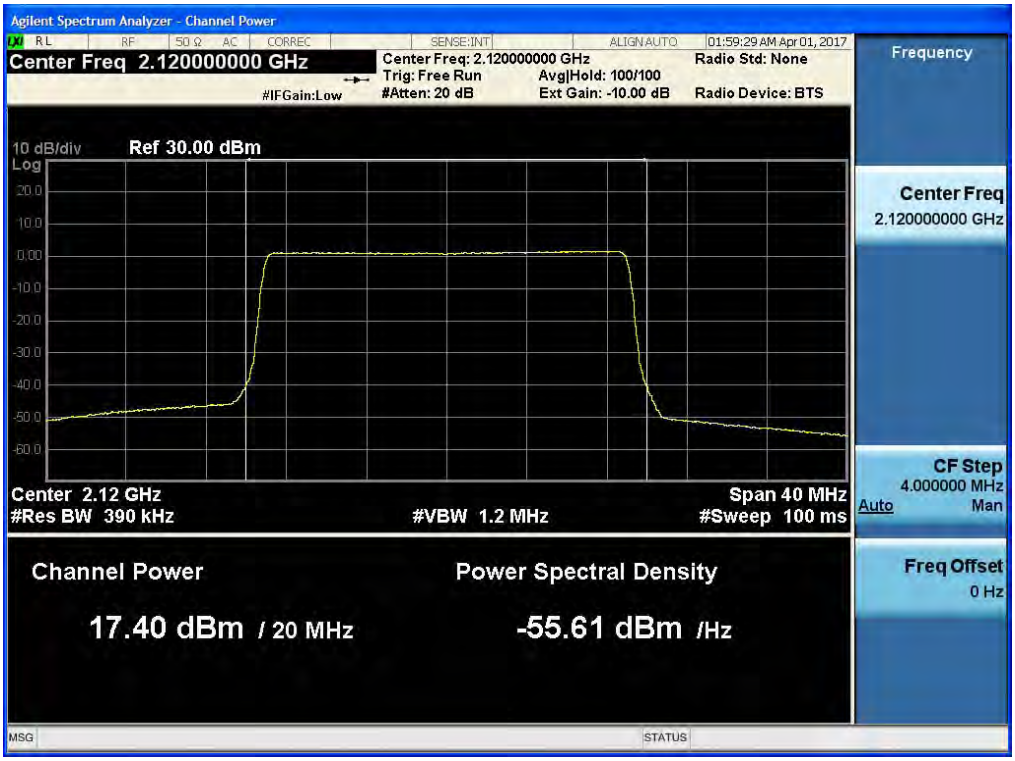


(16QAM Low Channel)

(16QAM Middle Channel)

(16QAM High Channel)

(64QAM Low Channel)



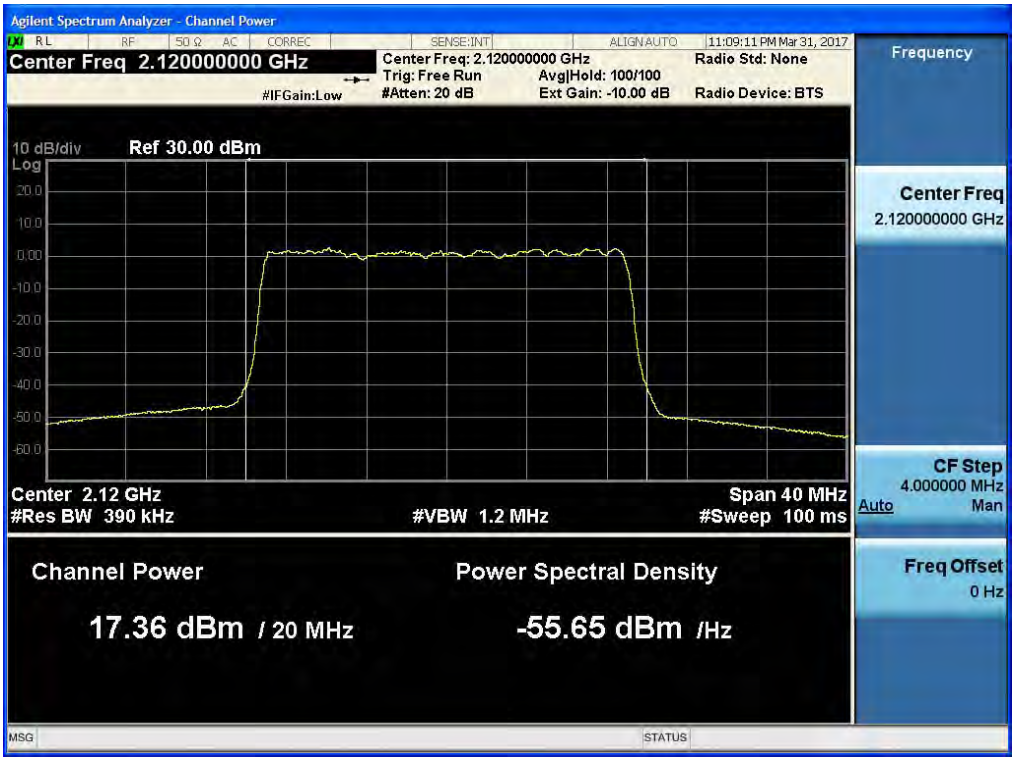
(64QAM Middle Channel)

(64QAM High Channel)

AWS 2100_LTE 20 MHz

Plot Data for Output Port 1 (Conducted Output Power)

(QPSK Low Channel)



(QPSK Middle Channel)

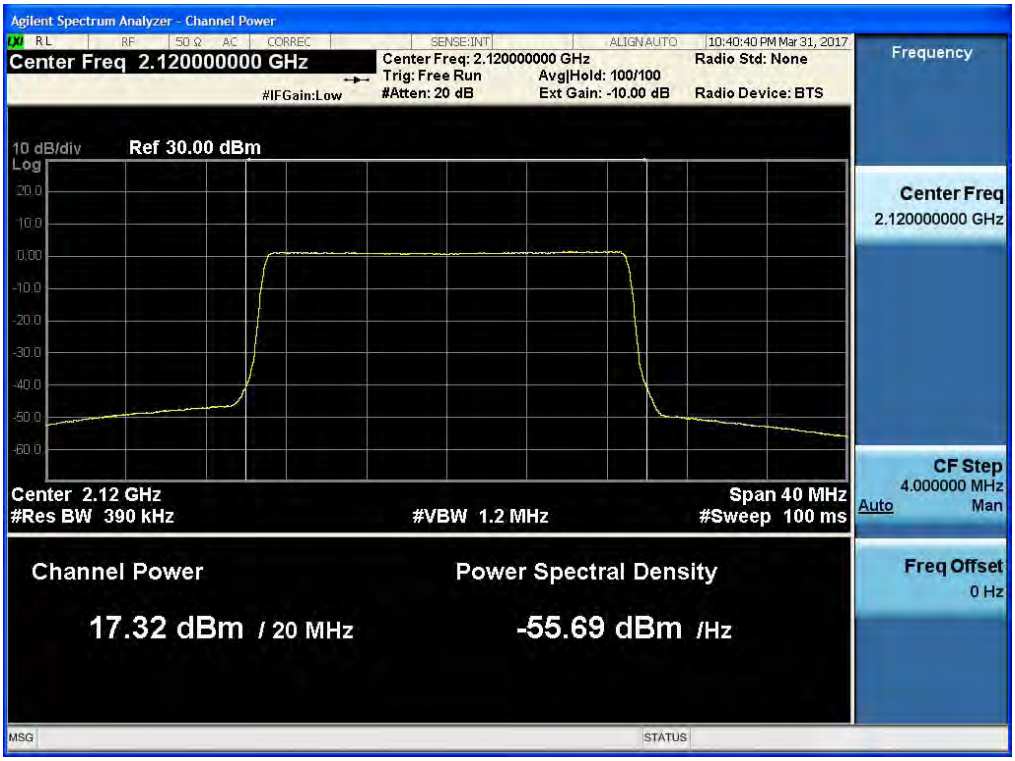
(QPSK High Channel)

(16QAM Low Channel)

(16QAM Middle Channel)

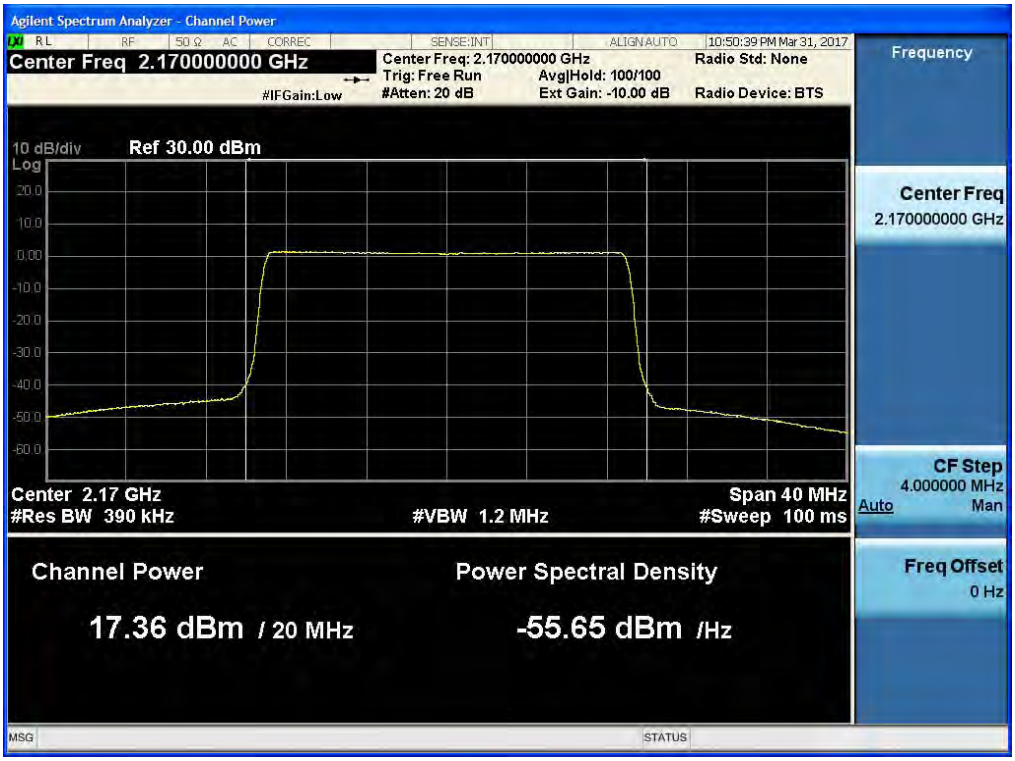
(16QAM High Channel)

(64QAM Low Channel)



(64QAM Middle Channel)

(64QAM High Channel)



[Peak-to-Average Ratio]

700 MHz Test Plots for Output Port 0

QPSK Mid Channel

LTE_10 MHz Bandwidth

16QAM Mid Channel

LTE_10 MHz Bandwidth

64QAM Mid Channel

LTE_10 MHz Bandwidth

700 MHz Test Plots for Output Port 1

QPSK Mid Channel

LTE_10 MHz Bandwidth

16QAM Mid Channel

LTE_10 MHz Bandwidth

64QAM Mid Channel

LTE_10 MHz Bandwidth

AWS 2100 Test Plots for Output Port 0

QPSK Mid Channel

LTE_10 MHz Bandwidth	LTE_15 MHz Bandwidth

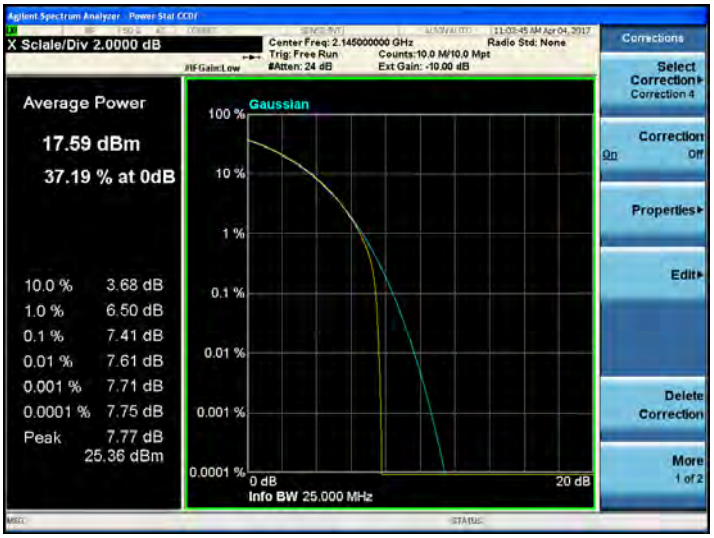
LTE_20 MHz Bandwidth

16QAM Mid Channel

LTE_10 MHz Bandwidth	LTE_15 MHz Bandwidth

LTE_20 MHz Bandwidth

64QAM Mid Channel

LTE_10 MHz Bandwidth	LTE_15 MHz Bandwidth
	

LTE_20 MHz Bandwidth

PCS 1900 Test Plots for Output Port 1

QPSK Mid Channel

LTE_10 MHz Bandwidth	LTE_15 MHz Bandwidth

LTE_20 MHz Bandwidth

16QAM Mid Channel

LTE_10 MHz Bandwidth	LTE_15 MHz Bandwidth

LTE_20 MHz Bandwidth

64QAM Mid Channel

LTE_10 MHz Bandwidth	LTE_15 MHz Bandwidth

LTE_20 MHz Bandwidth

6. OCCUPIED BANDWIDTH

Test Requirements:

§ 2.1049 Measurements required: Occupied bandwidth.

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 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

Test Procedures:

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. The EUT was connected to a spectrum analyzer enabled with an occupied bandwidth function via its antenna port. Measurements were performed to determine the occupied bandwidth in accordance with FCC Part 2.1049. The occupied bandwidth was measured from the fundamental emission at the bottom, middle and top channels. The occupied bandwidth was measured using the built in occupied bandwidth function of the spectrum analyzer. It was set to measure the bandwidth where 99% of the signal power was contained. The analyzer automatically configures the measurement bandwidths to make an accurate measurement based on the channel bandwidth and channel spacing of the EUT.

Test Results:

700 MHz_LTE 10 MHz

Test Data at Output Port 0

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
751.00	8.9120	8.9461	8.9286

Test Data at Output Port 1

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
751.00	8.9119	8.9351	8.9221

AWS 2100_LTE 10 MHz

Test Data at Output Port 0

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2115.00	8.9041	8.9385	8.9276
2145.00	8.9161	8.9347	8.9363
2175.00	8.9069	8.9341	8.9348

Test Data at Output Port 1

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2115.00	8.9086	8.9412	8.9313
2145.00	8.8969	8.9284	8.9300
2175.00	8.9116	8.9354	8.9359

AWS 2100_LTE 15 MHz

Test Data at Output Port 0

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2117.50	13.434	13.397	13.403
2145.00	13.437	13.402	13.409
2172.50	13.415	13.391	13.385

Test Data at Output Port 1

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2117.50	13.439	13.397	13.404
2145.00	13.417	13.405	13.388
2172.50	13.450	13.410	13.406

AWS 2100_LTE 20 MHz

Test Data at Output Port 0

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2120.00	17.973	17.967	17.970
2145.00	17.964	17.964	17.959
2170.00	17.945	17.964	17.934

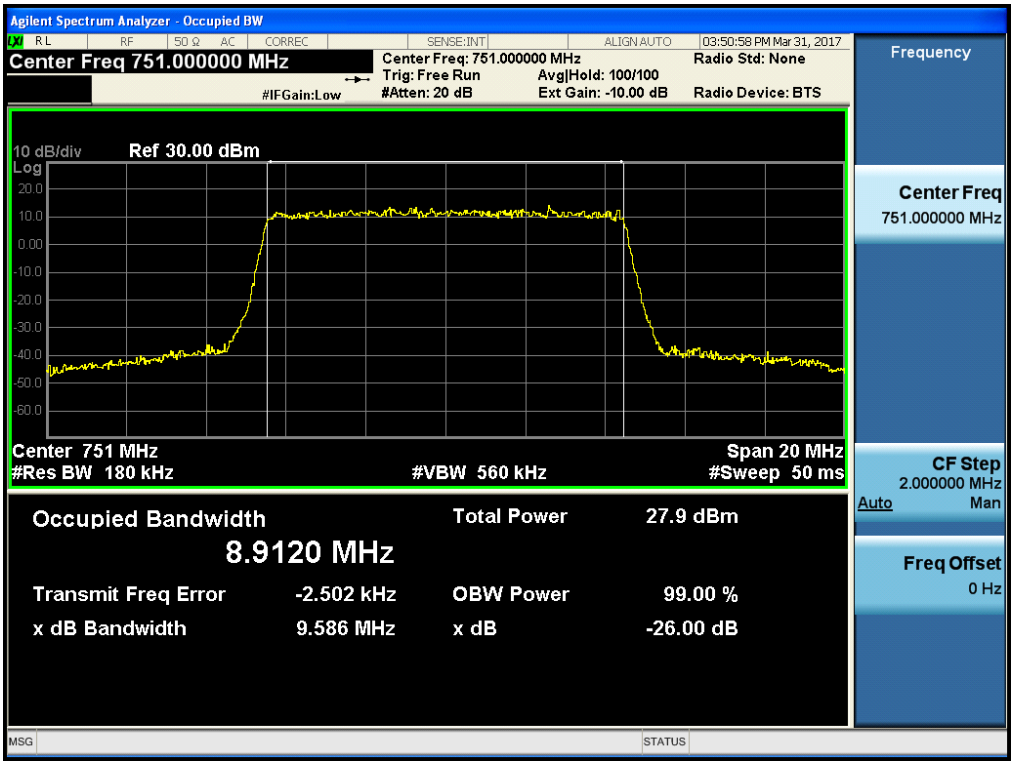
Test Data at Output Port 1

Frequency (MHz)	Occupied Bandwidth (MHz)		
	QPSK	16QAM	64QAM
2120.00	17.977	17.971	17.961
2145.00	17.974	17.969	17.954
2170.00	17.957	17.953	17.952

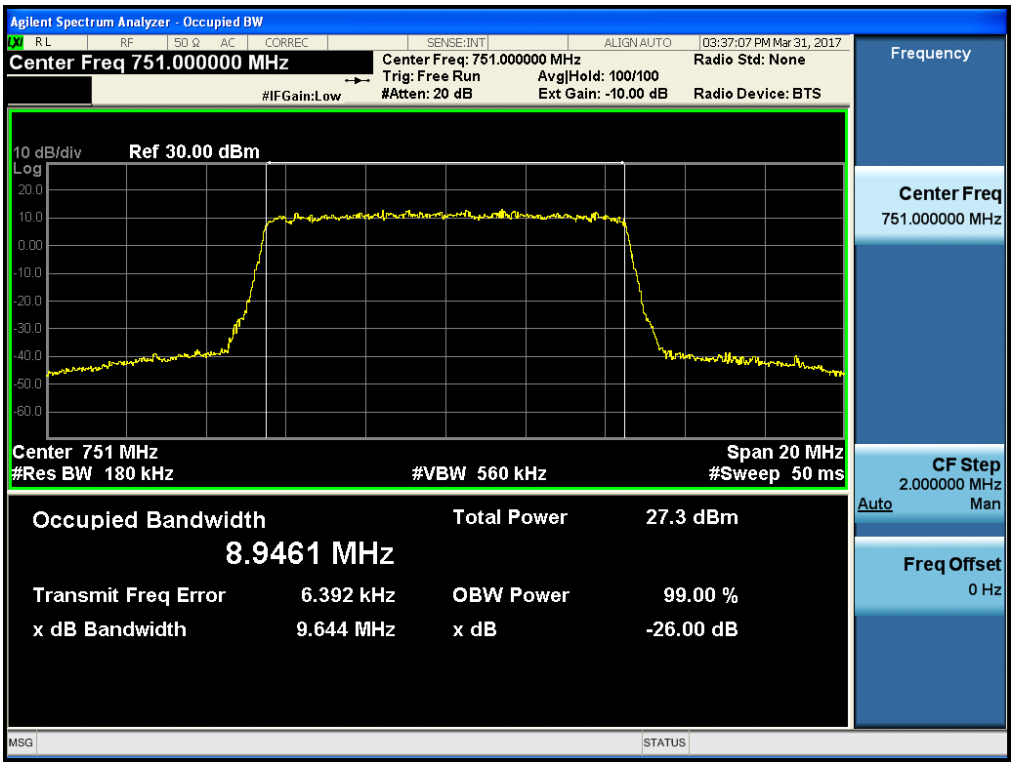
700 MHz_LTE 10 MHz

Test Plot at Output Port 0

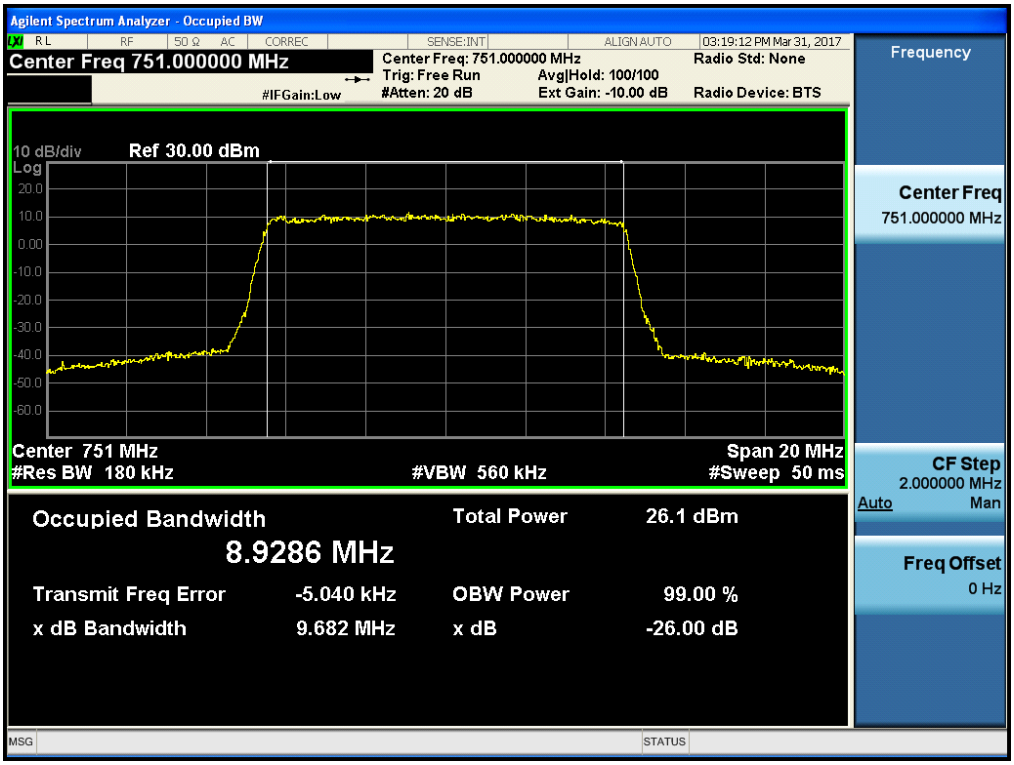
(QPSK Middle Channel)



(16QAM Middle Channel)



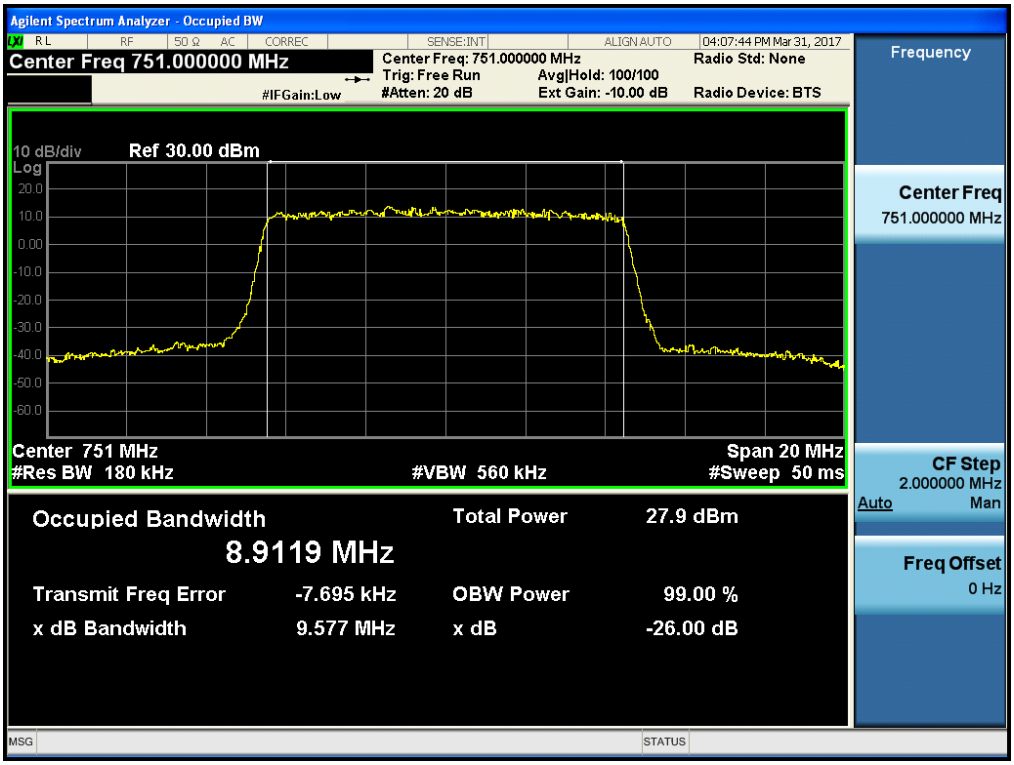
(64QAM Middle Channel)



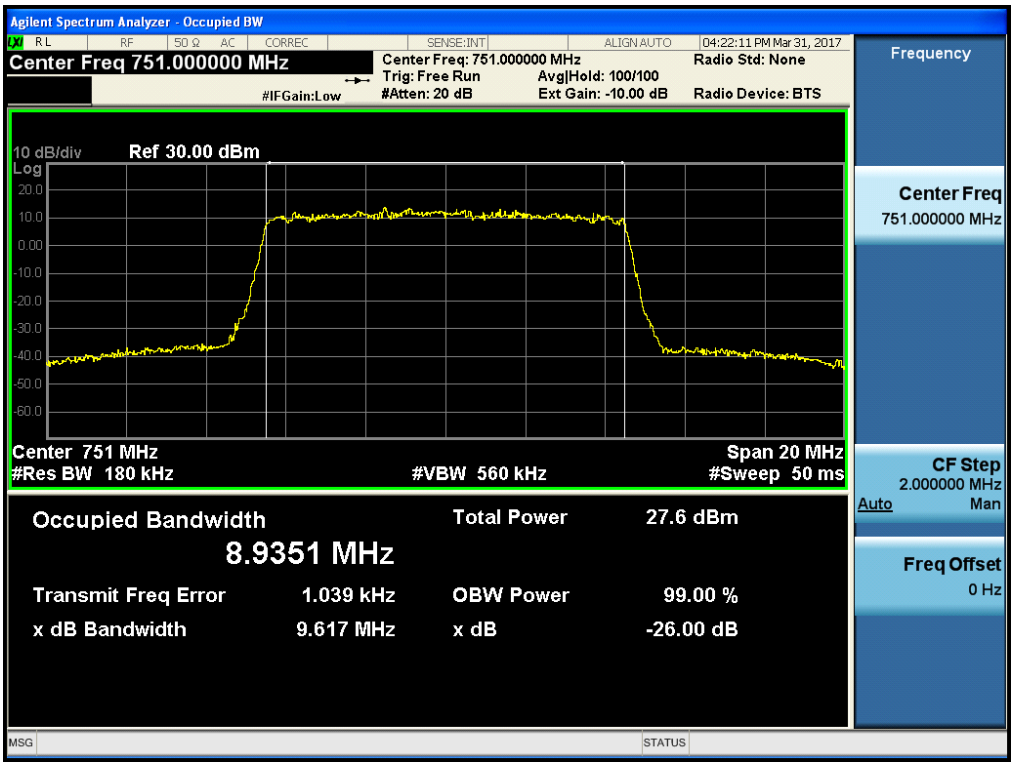
700 MHz_LTE 10 MHz

Test Plot at Output Port 1

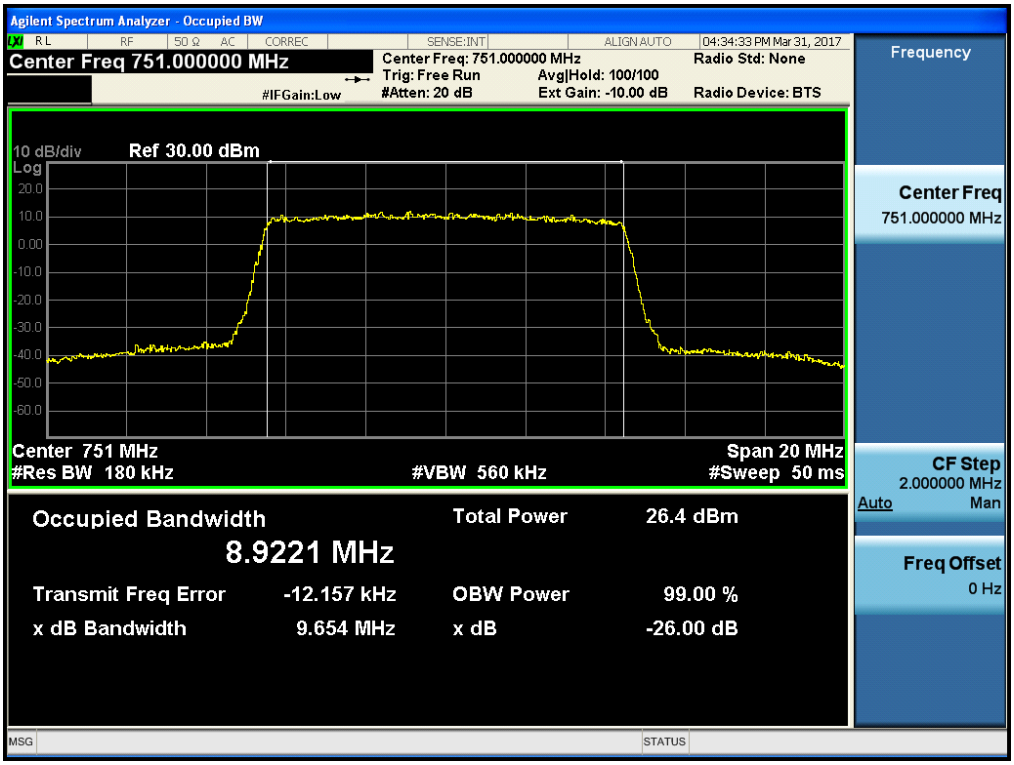
(QPSK Middle Channel)



(16QAM Middle Channel)



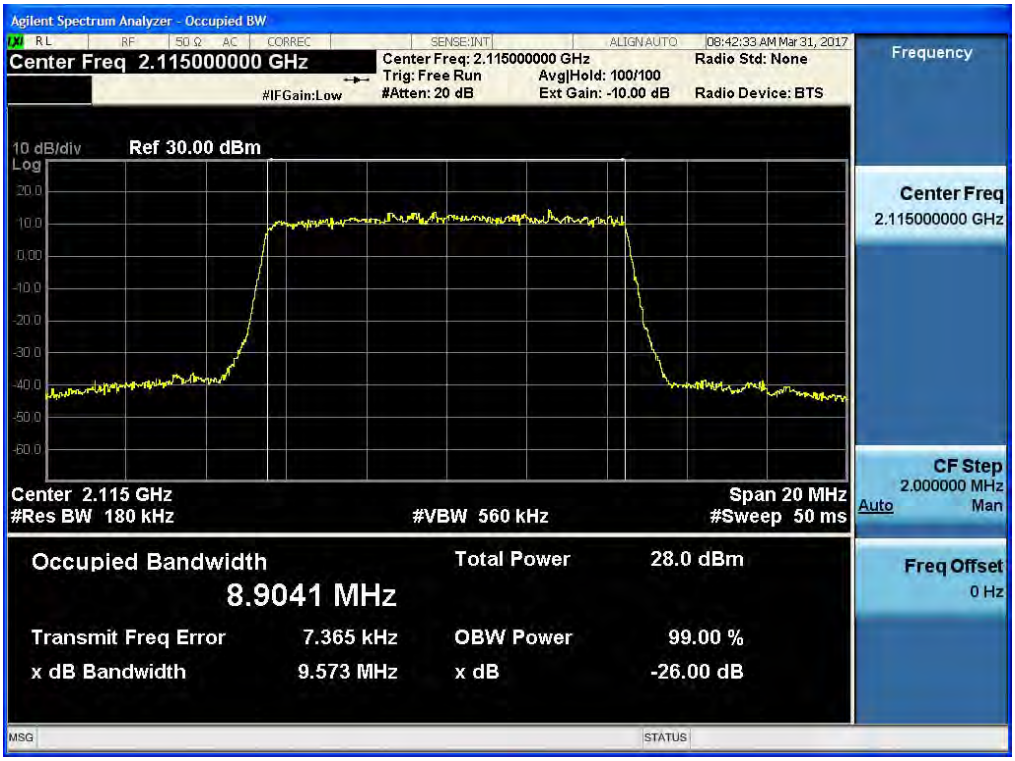
(64QAM Middle Channel)



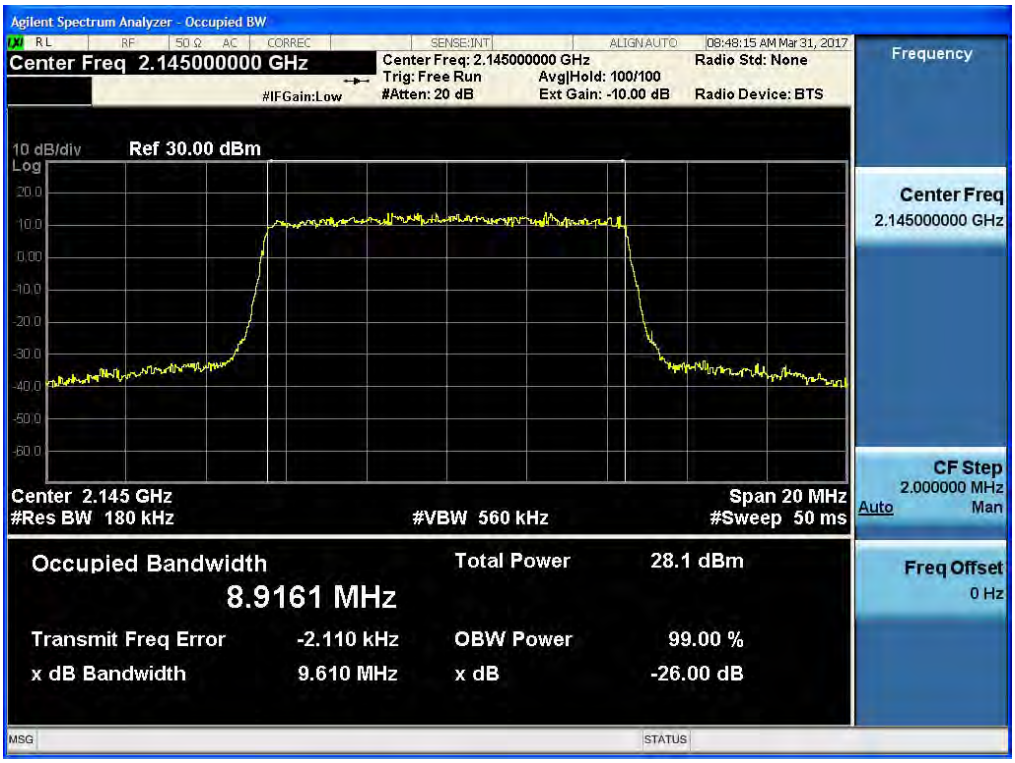
AWS 2100_LTE 10 MHz

Test Plot at Output Port 0

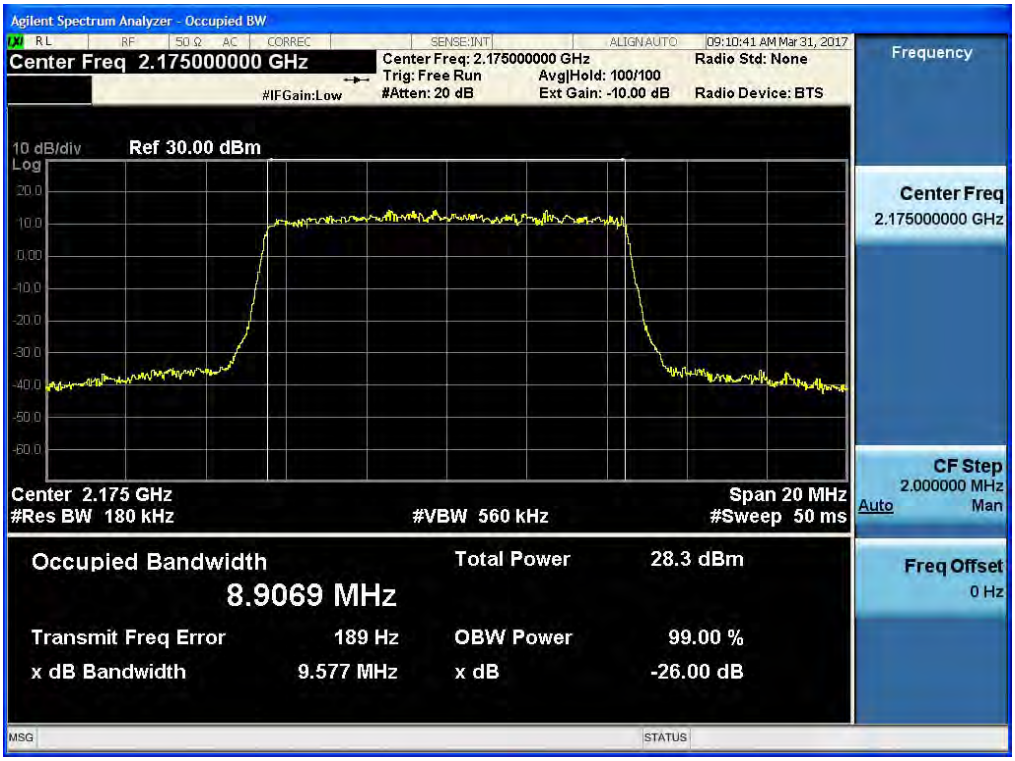
(QPSK Low Channel)



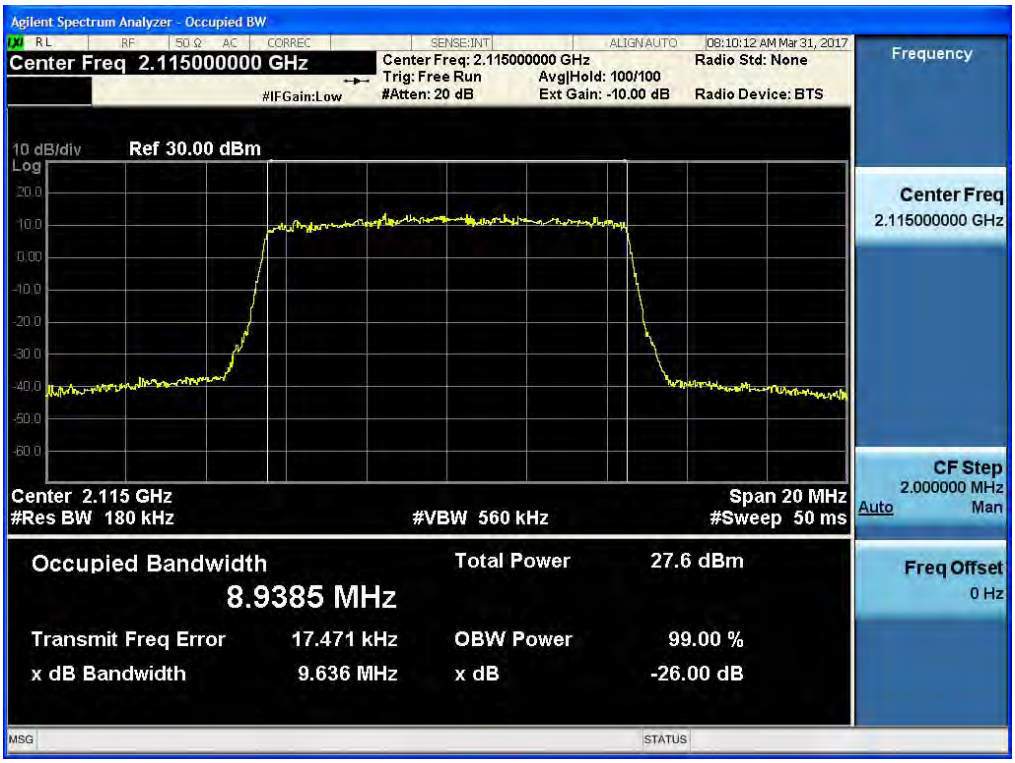
(QPSK Middle Channel)



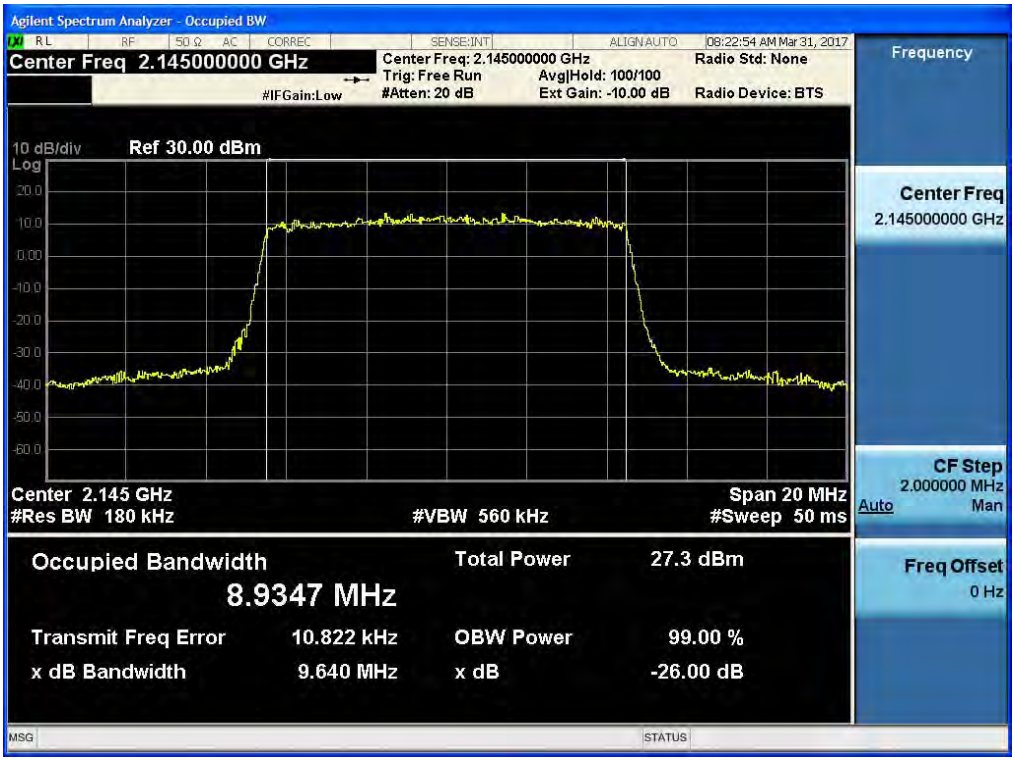
(QPSK High Channel)



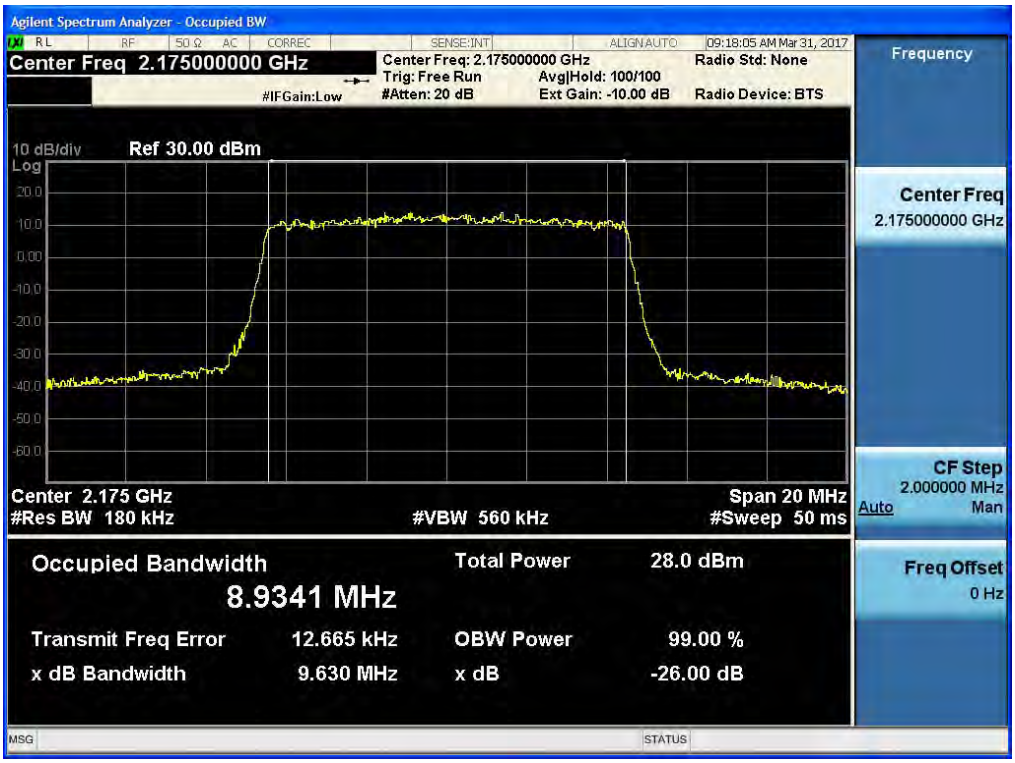
(16QAM Low Channel)



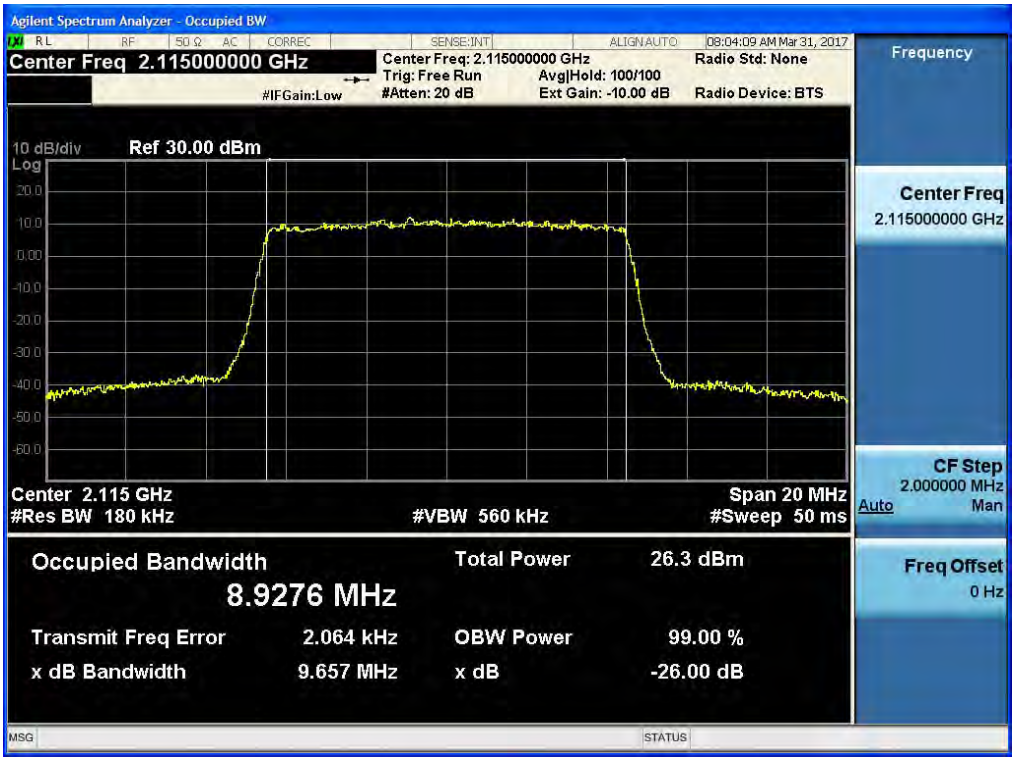
(16QAM Middle Channel)



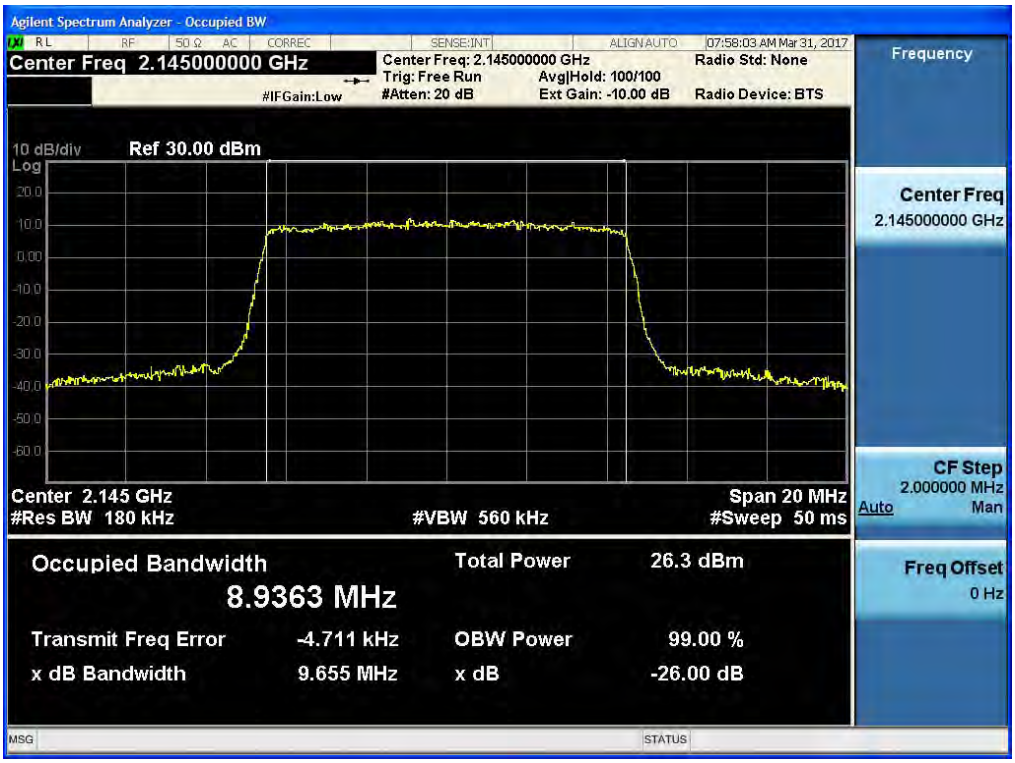
(16QAM High Channel)



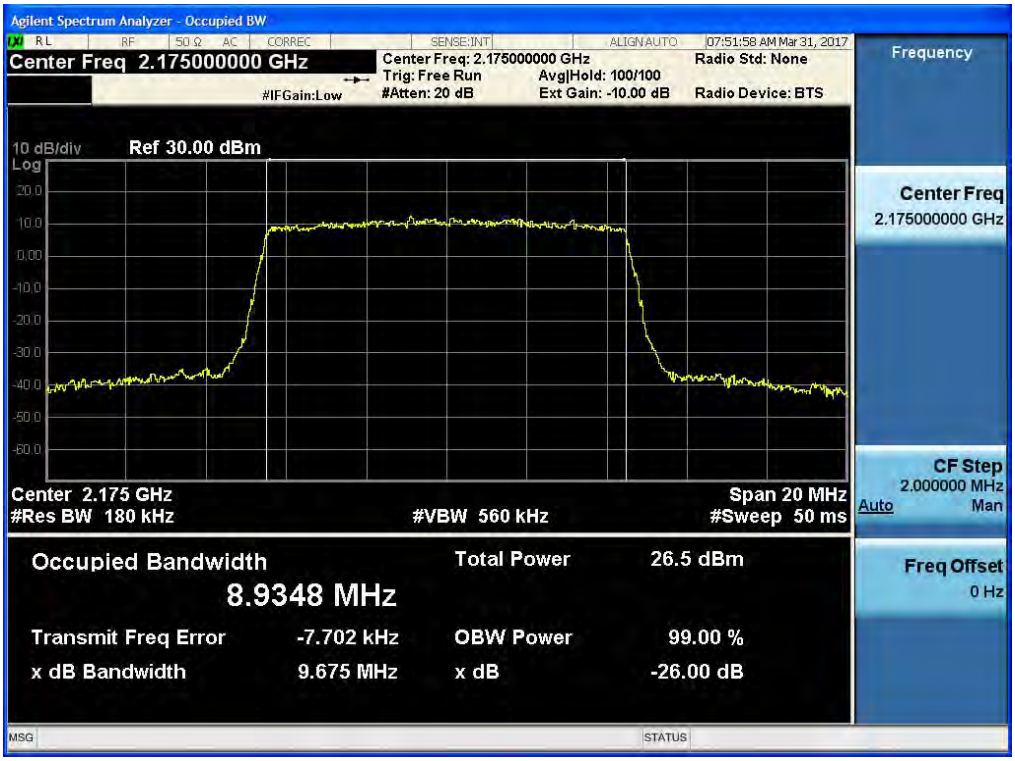
(64QAM Low Channel)



(64QAM Middle Channel)



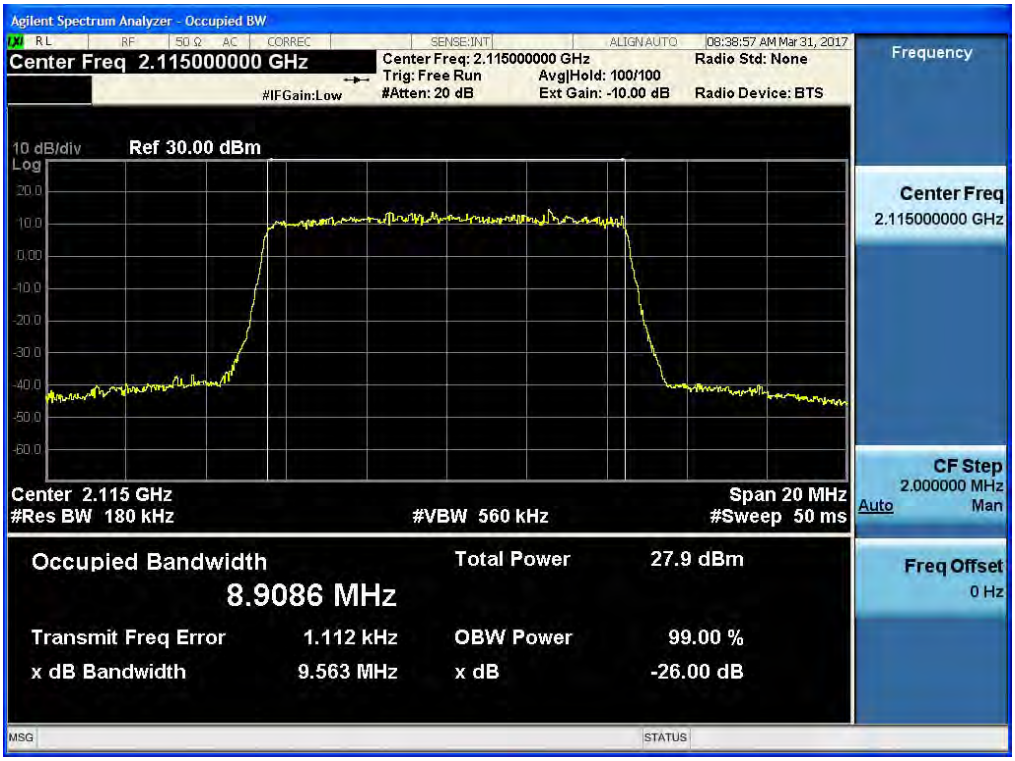
(64QAM High Channel)



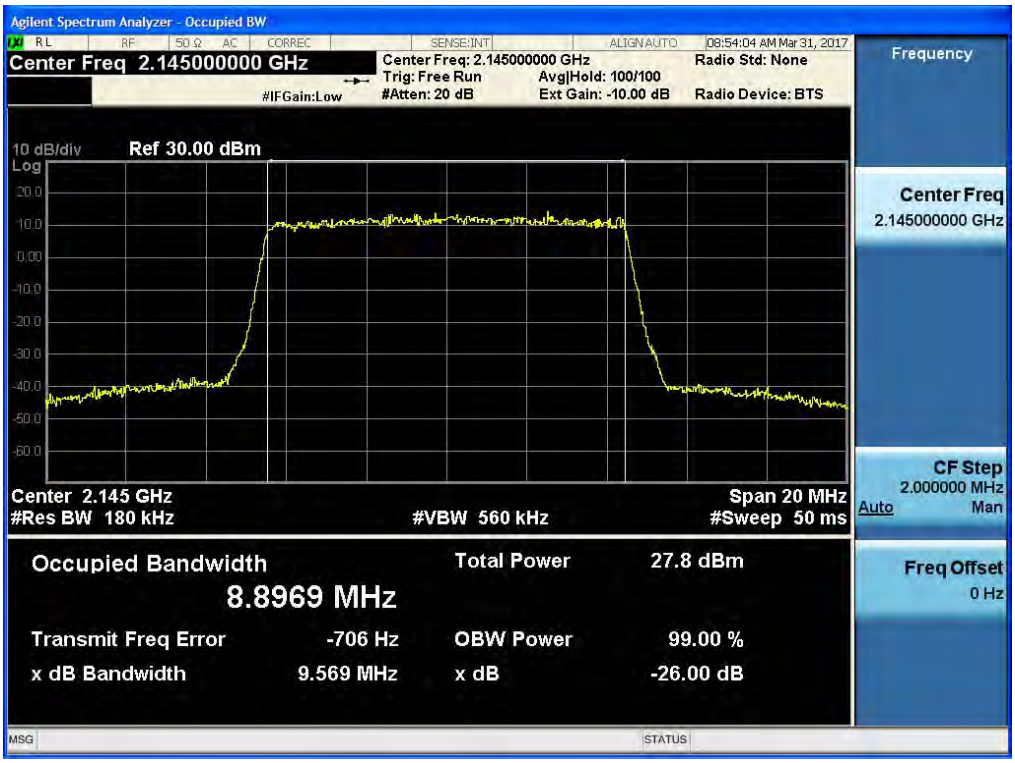
AWS 2100_LTE 10 MHz

Test Plot at Output Port 1

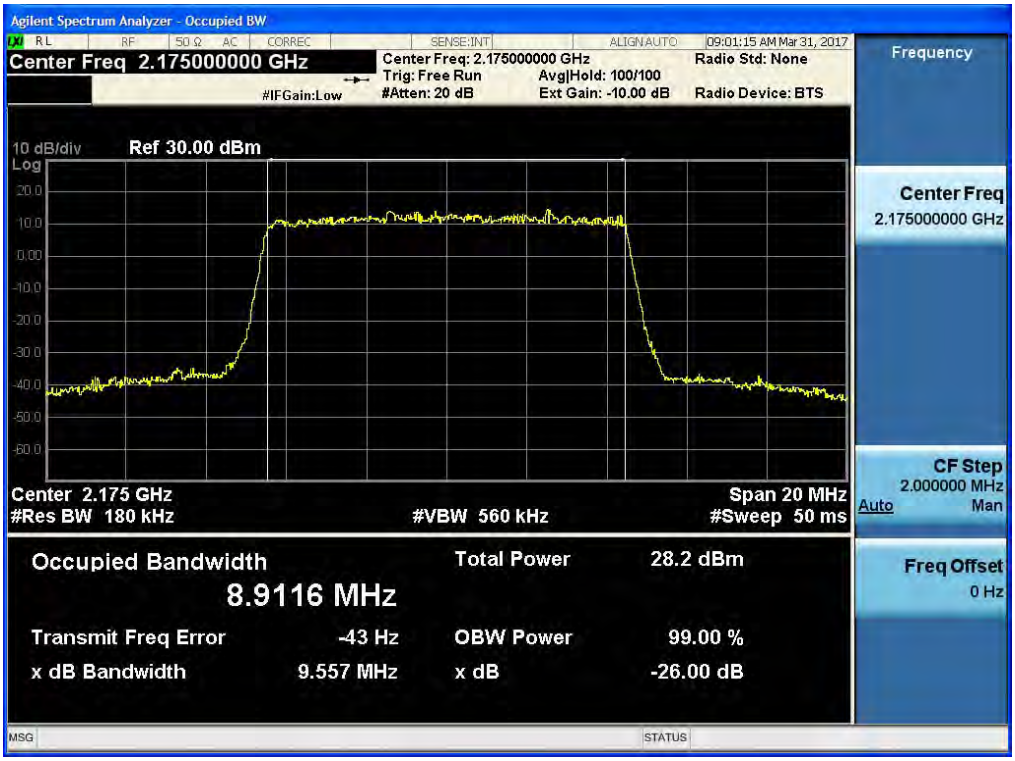
(QPSK Low Channel)



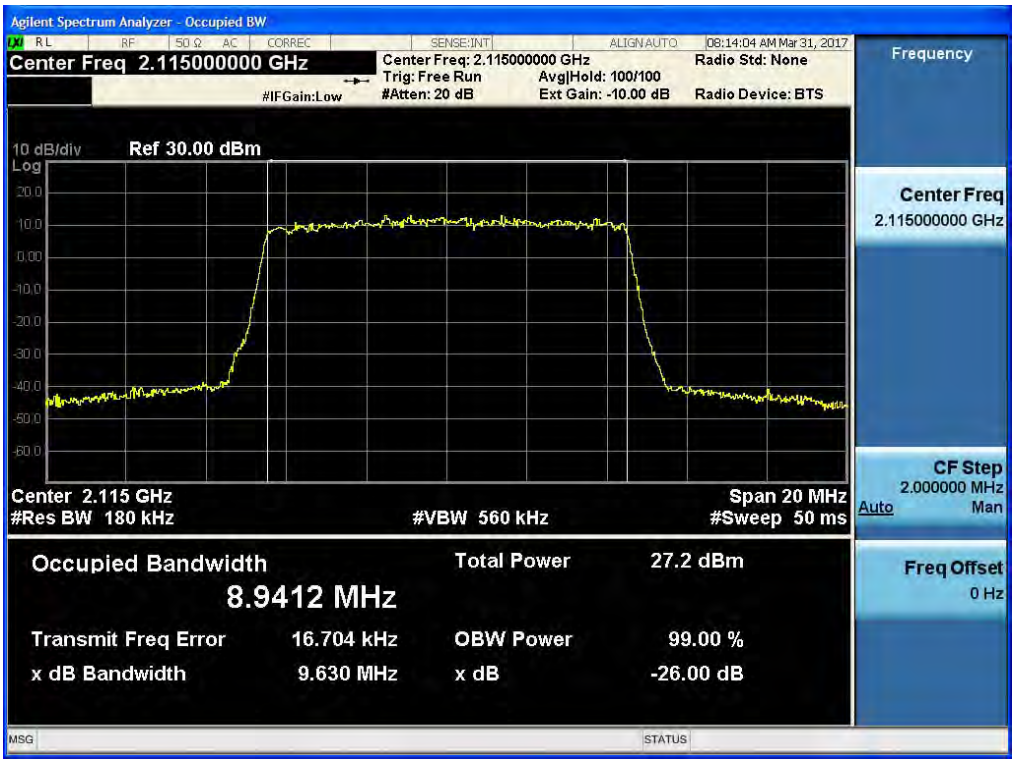
(QPSK Middle Channel)



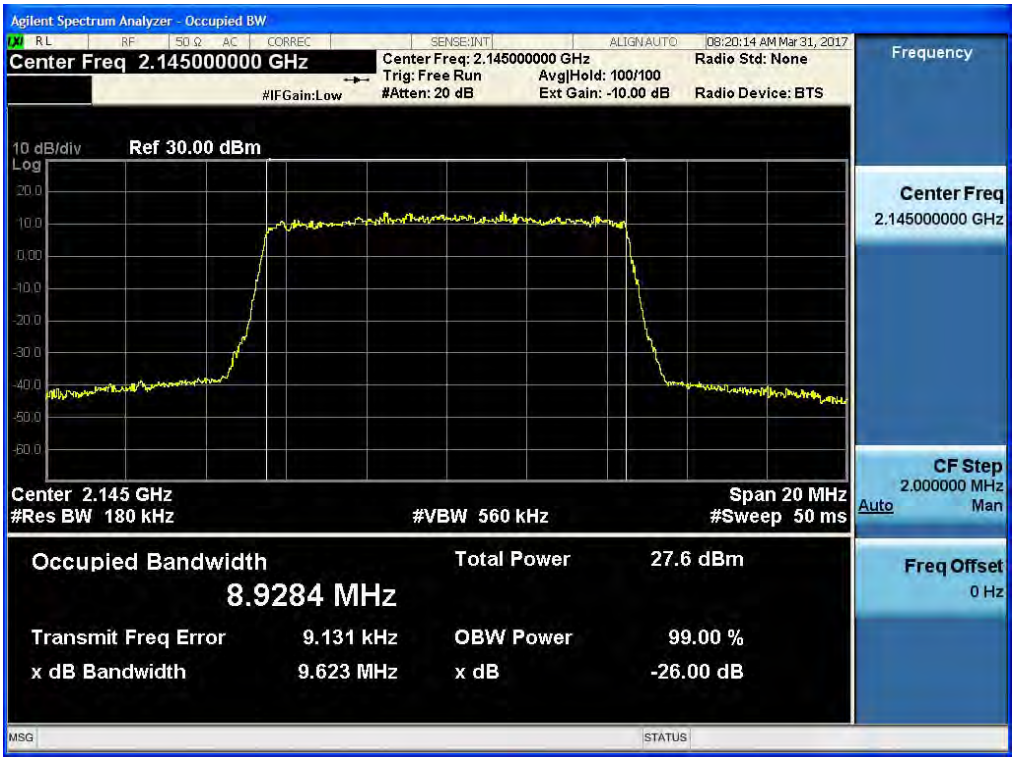
(QPSK High Channel)



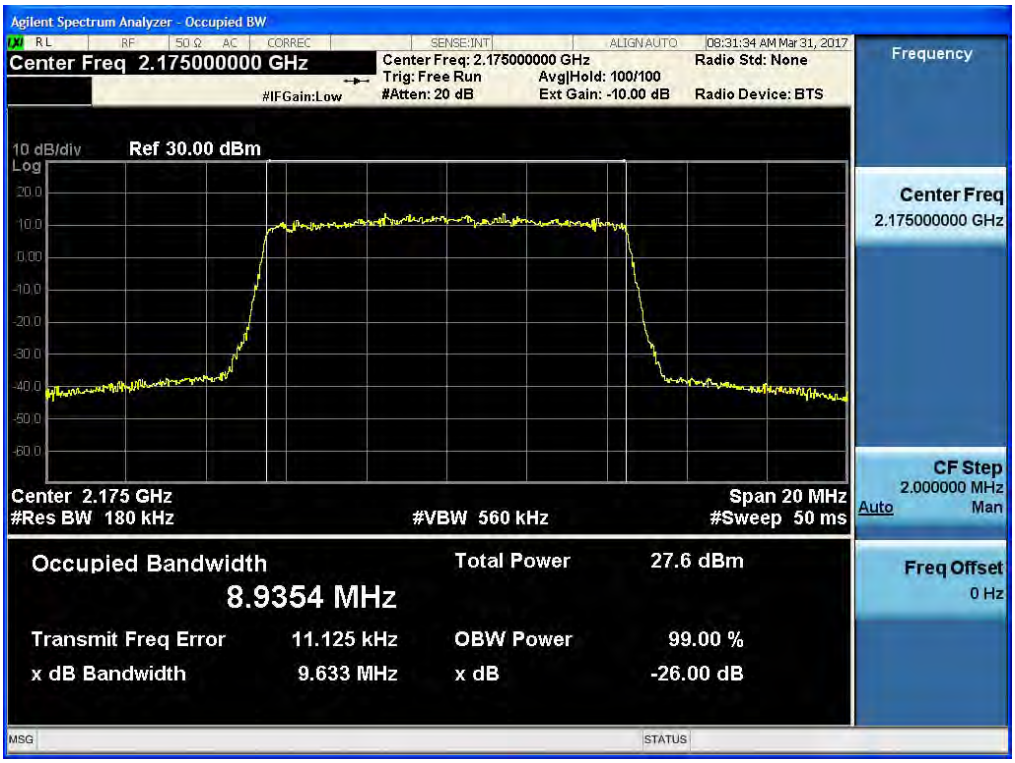
(16QAM Low Channel)



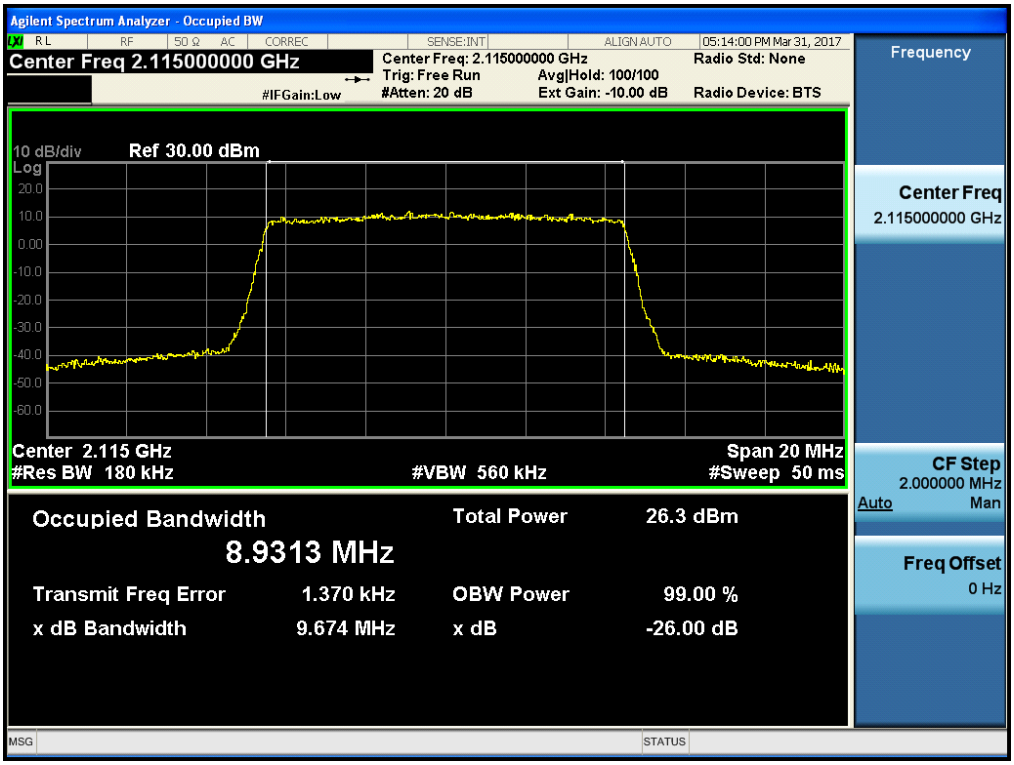
(16QAM Middle Channel)



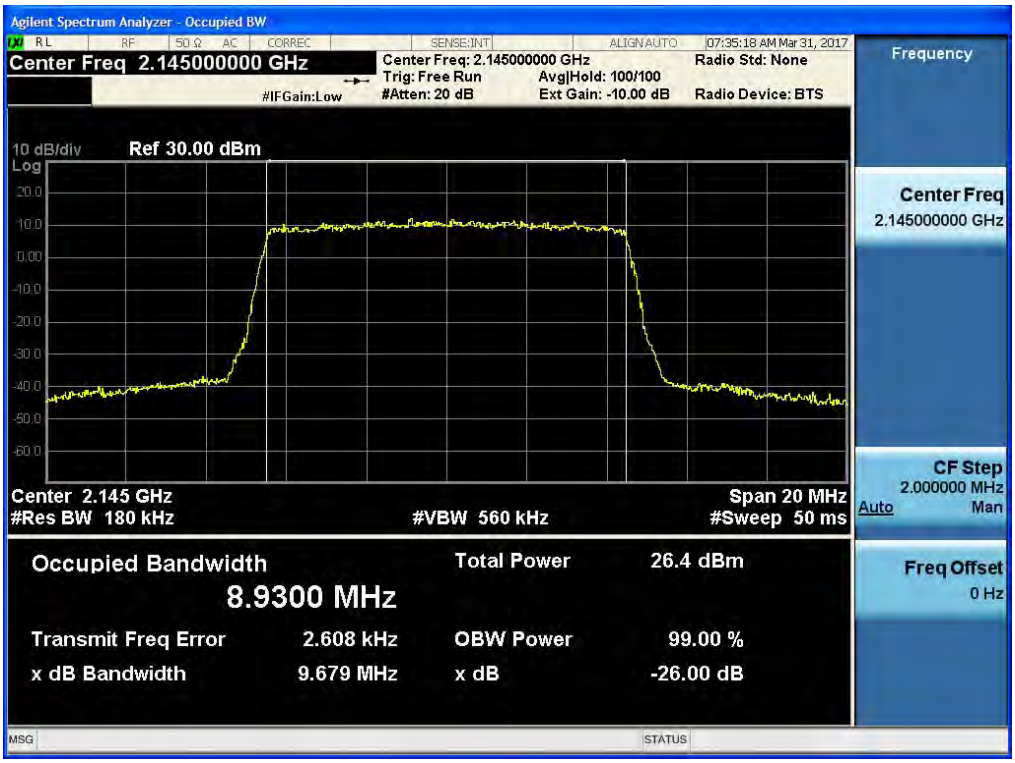
(16QAM High Channel)



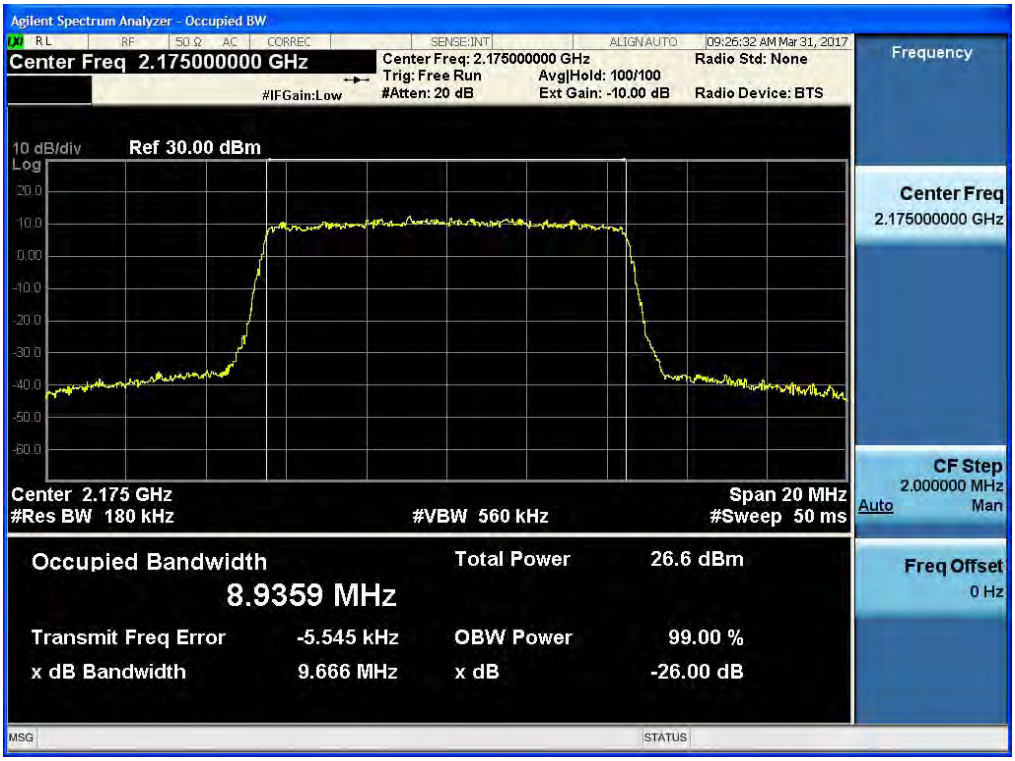
(64QAM Low Channel)



(64QAM Middle Channel)



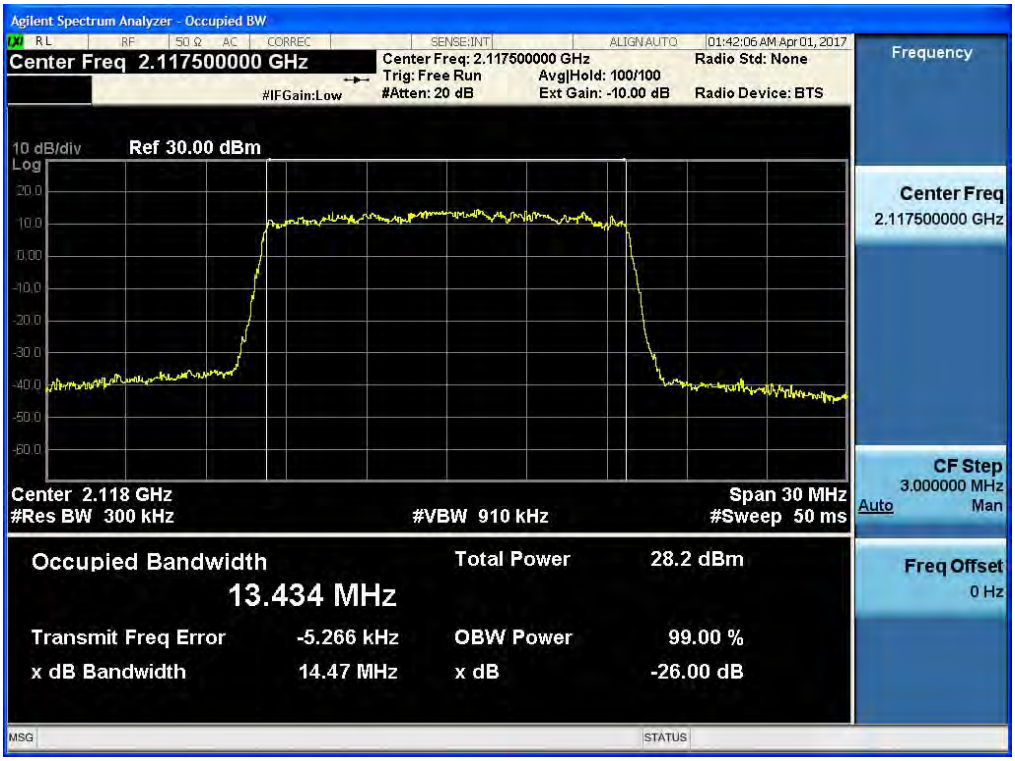
(64QAM High Channel)



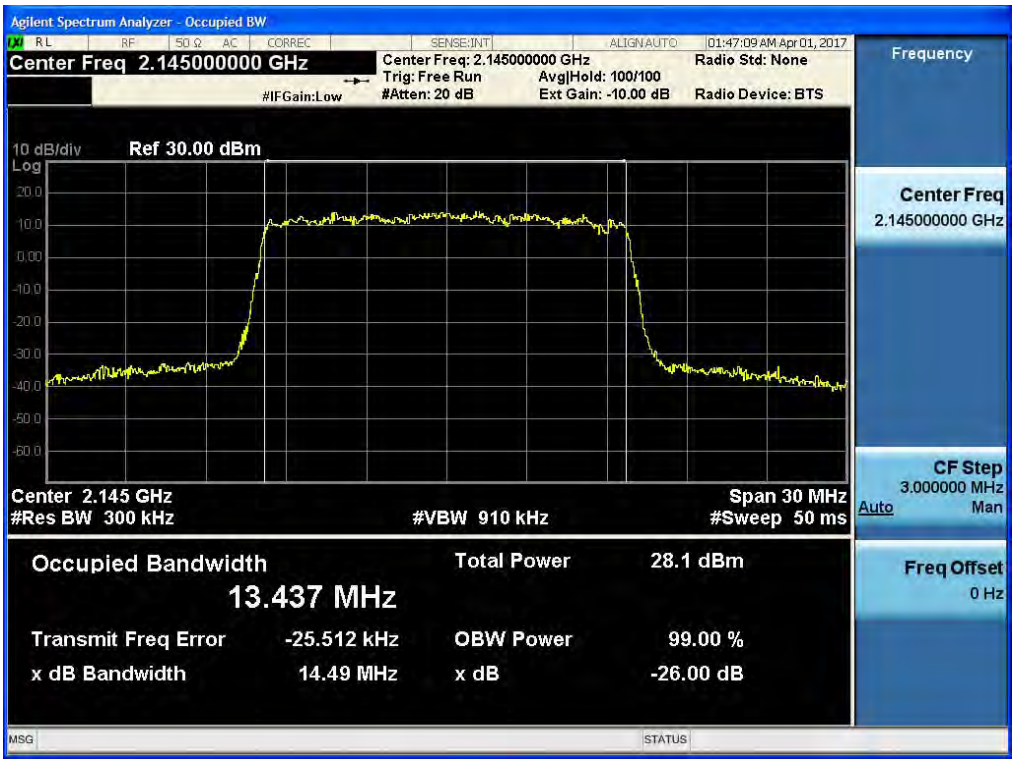
AWS 2100_LTE 15 MHz

Test Plot at Output Port 0

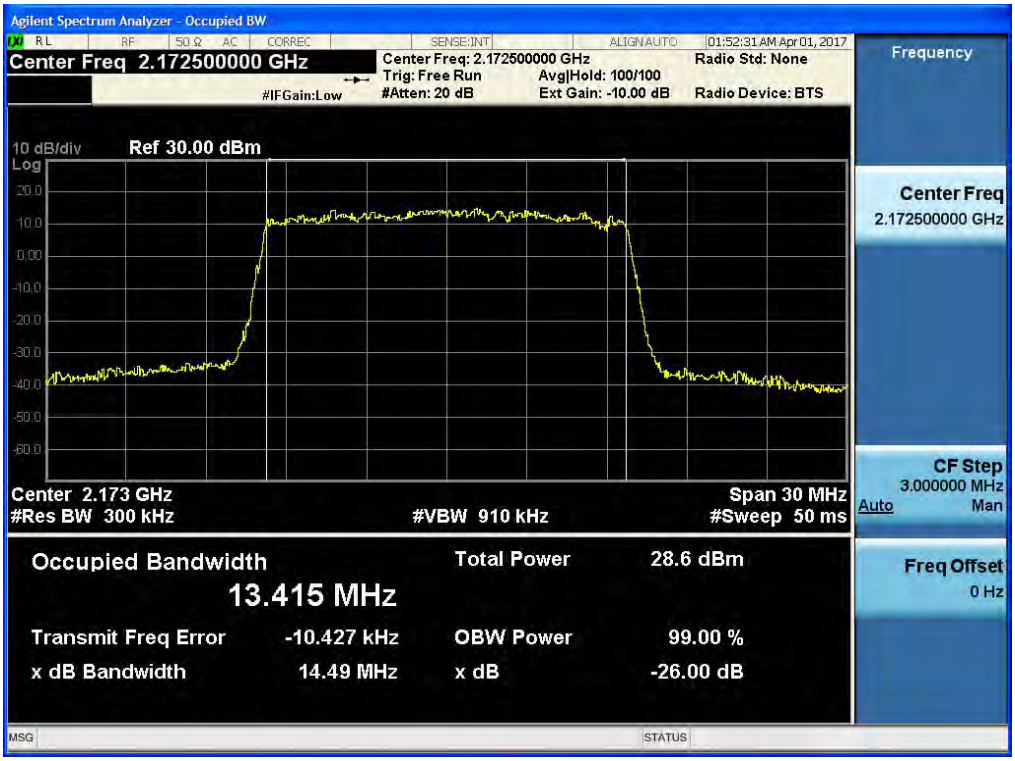
(QPSK Low Channel)



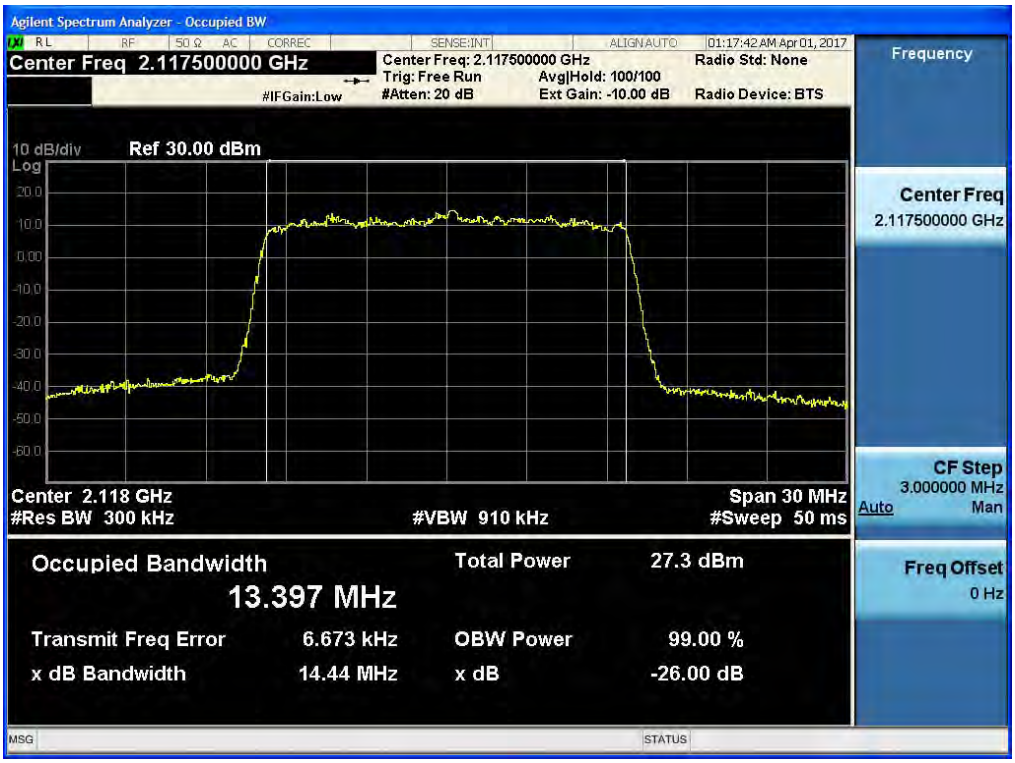
(QPSK Middle Channel)



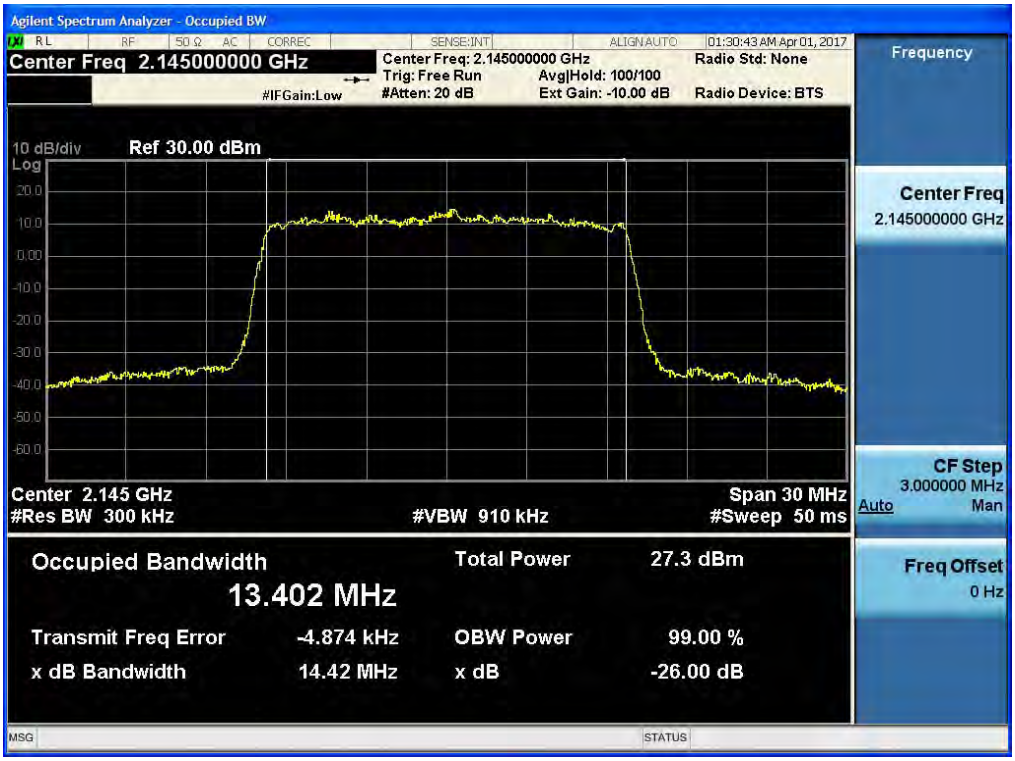
(QPSK High Channel)



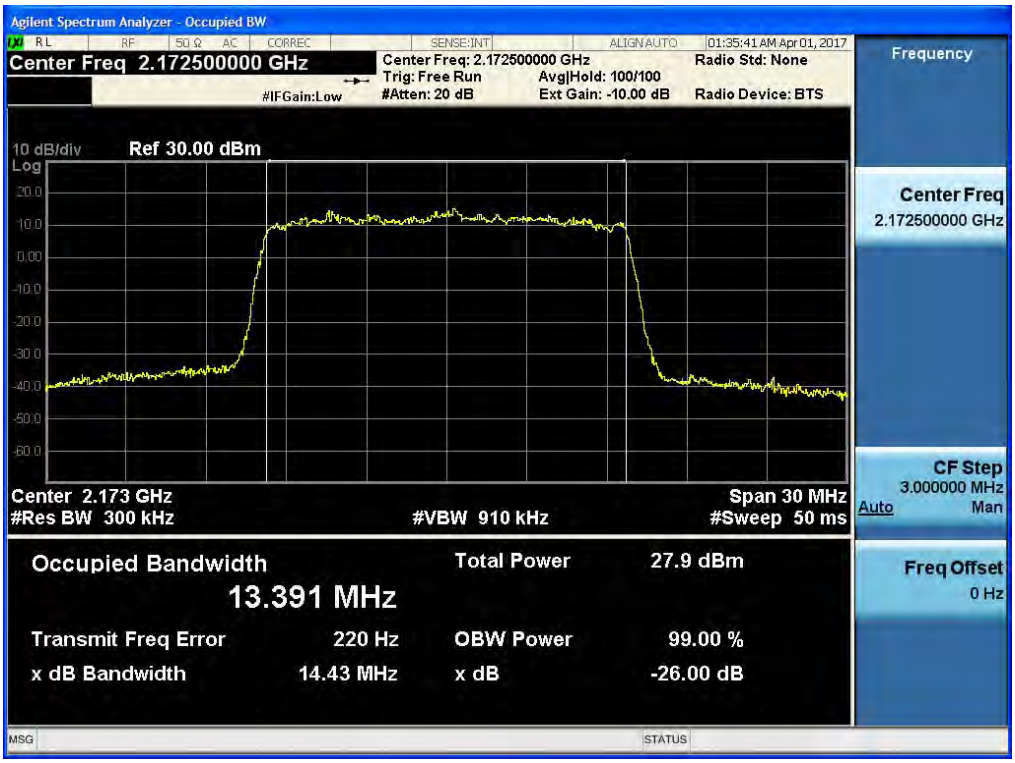
(16QAM Low Channel)



(16QAM Middle Channel)



(16QAM High Channel)



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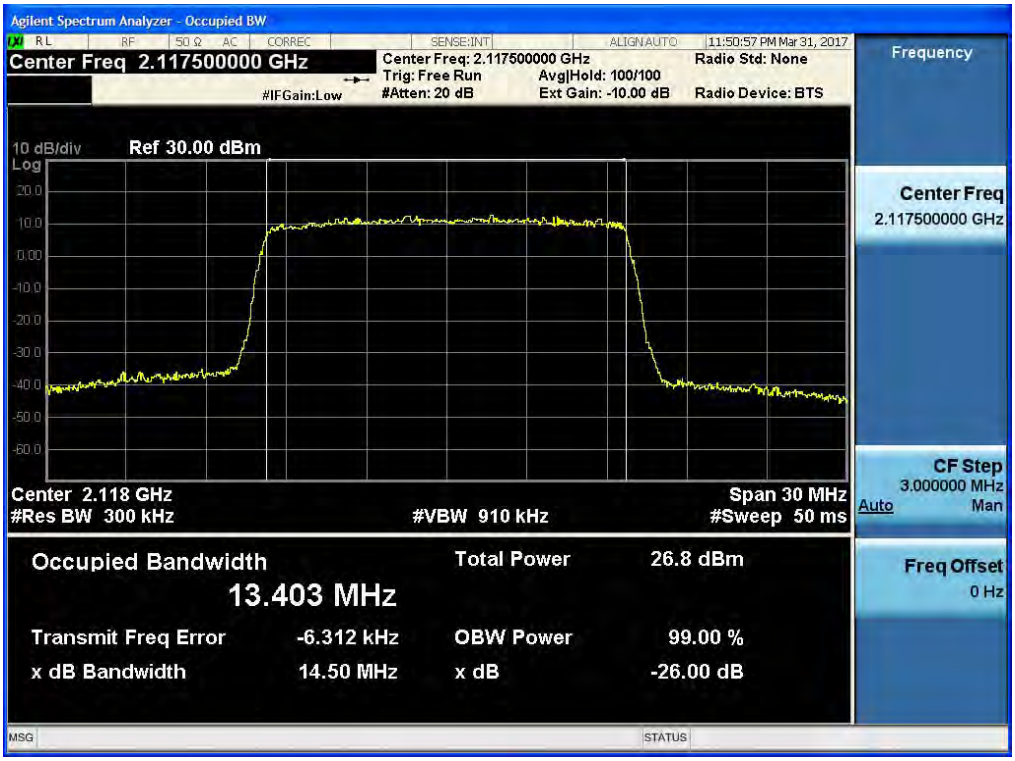

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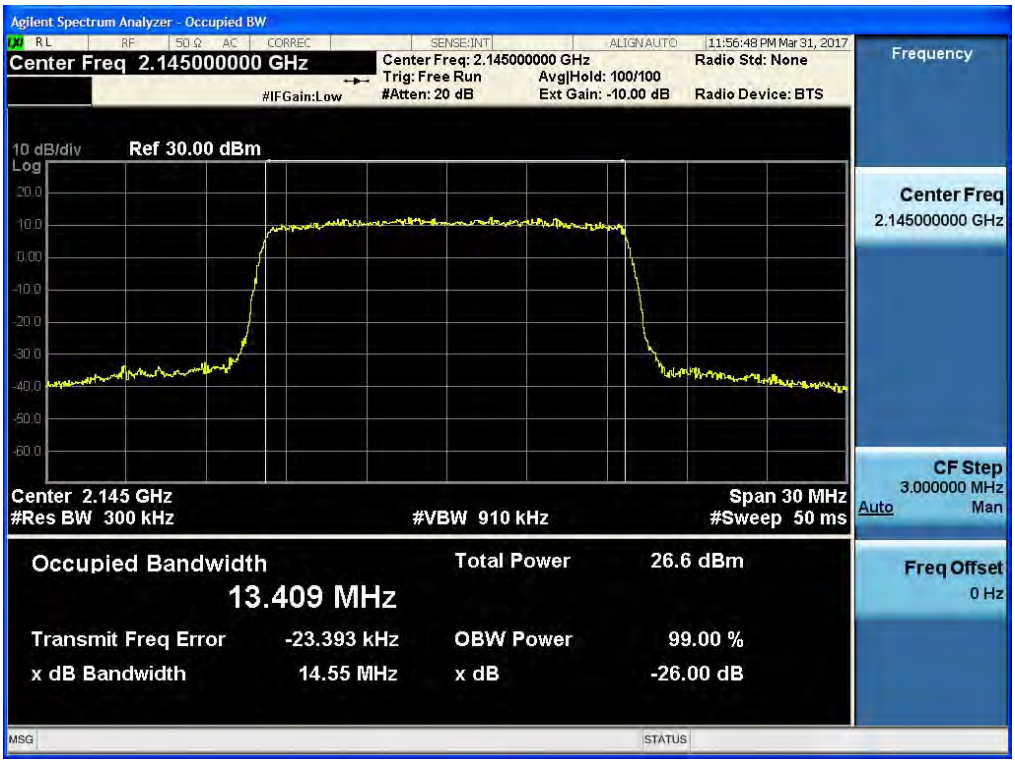

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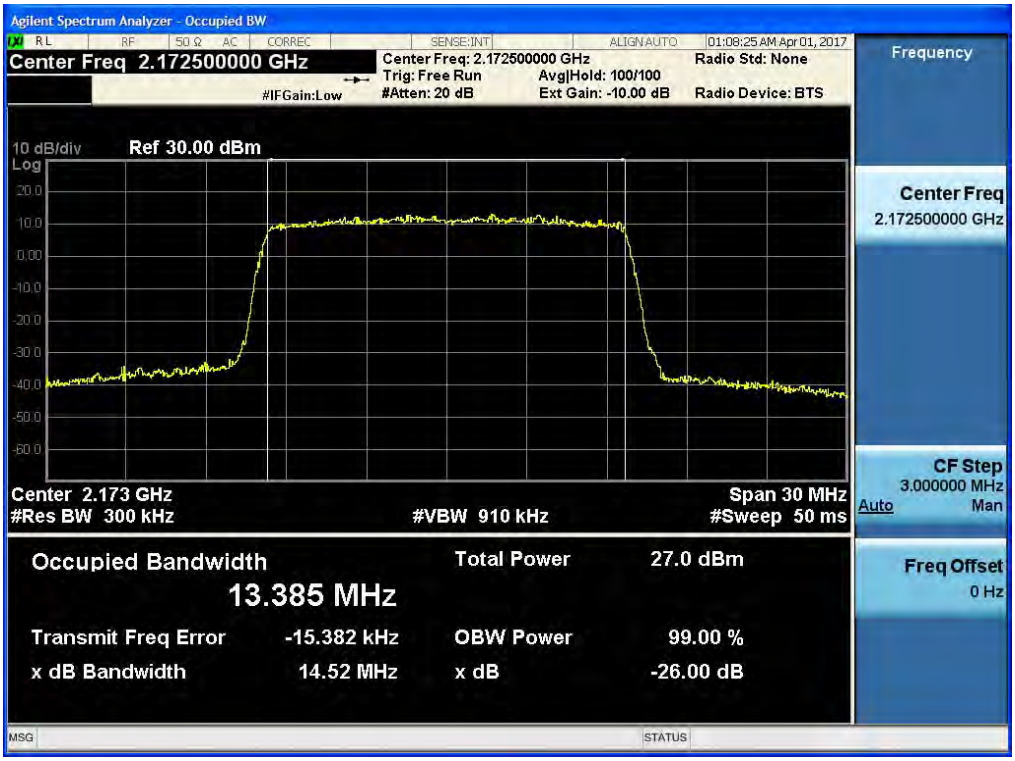
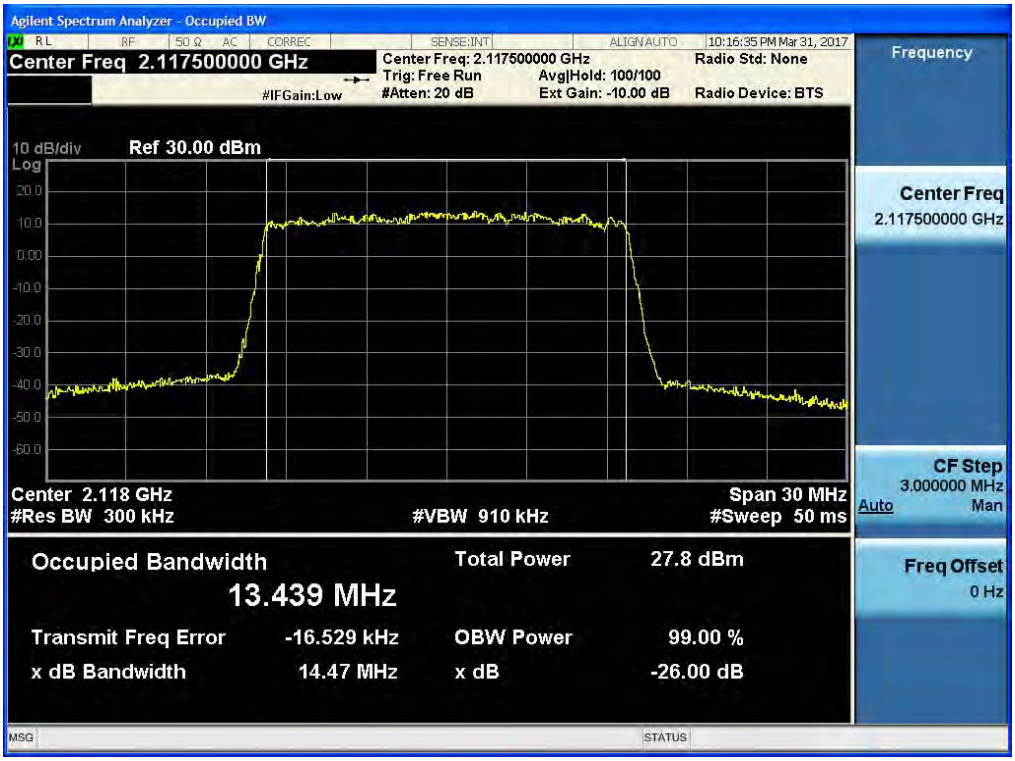


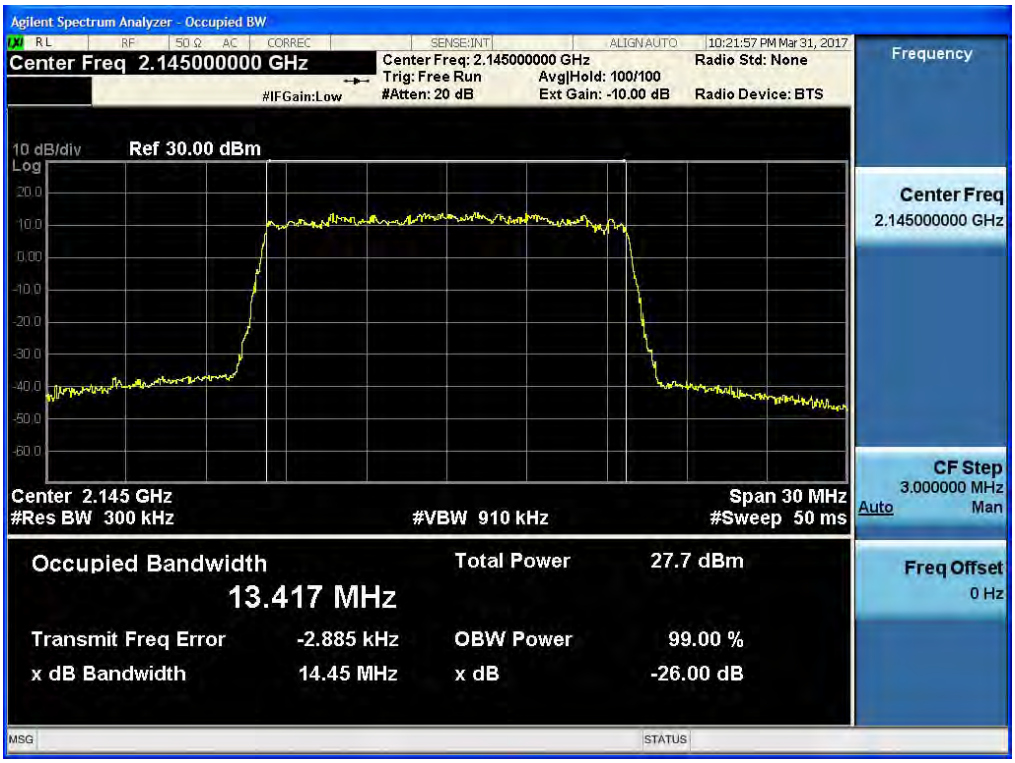
AWS 2100_LTE 15 MHz

Test Plot at Output Port 1

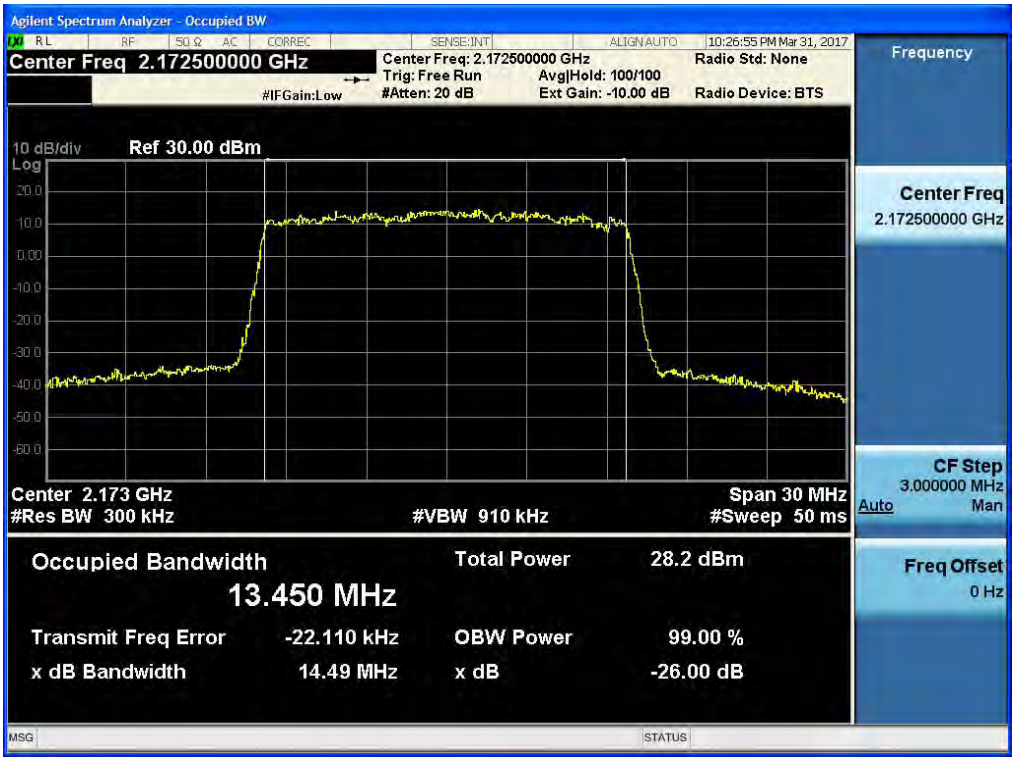
(QPSK Low Channel)



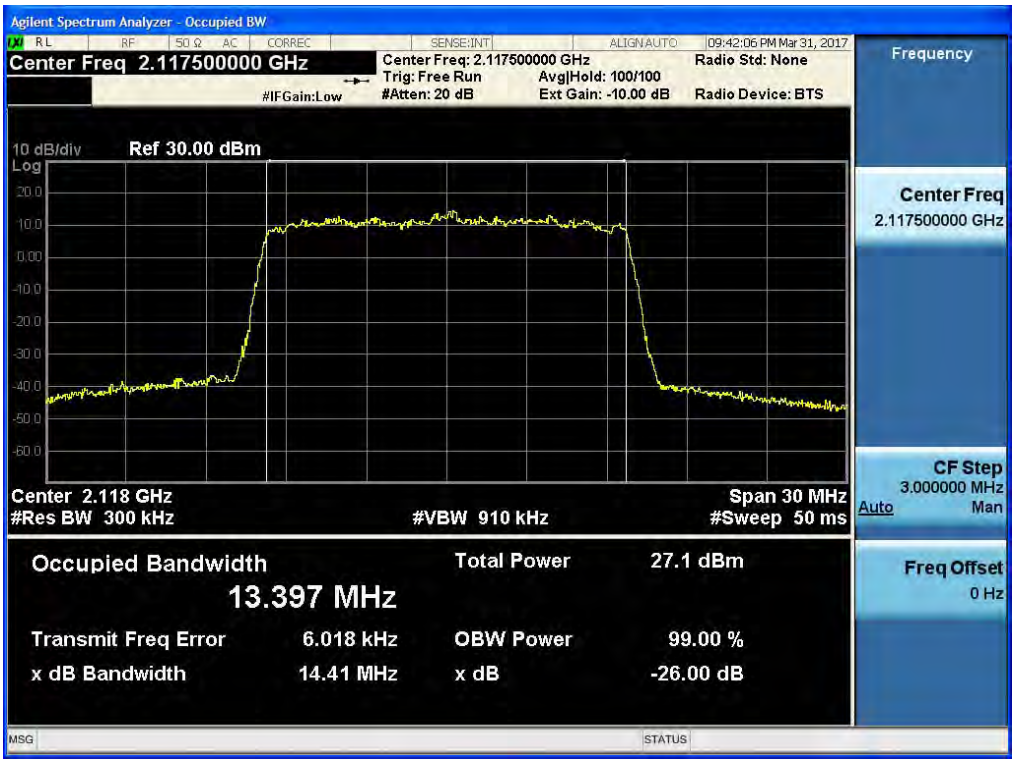
(QPSK Middle Channel)



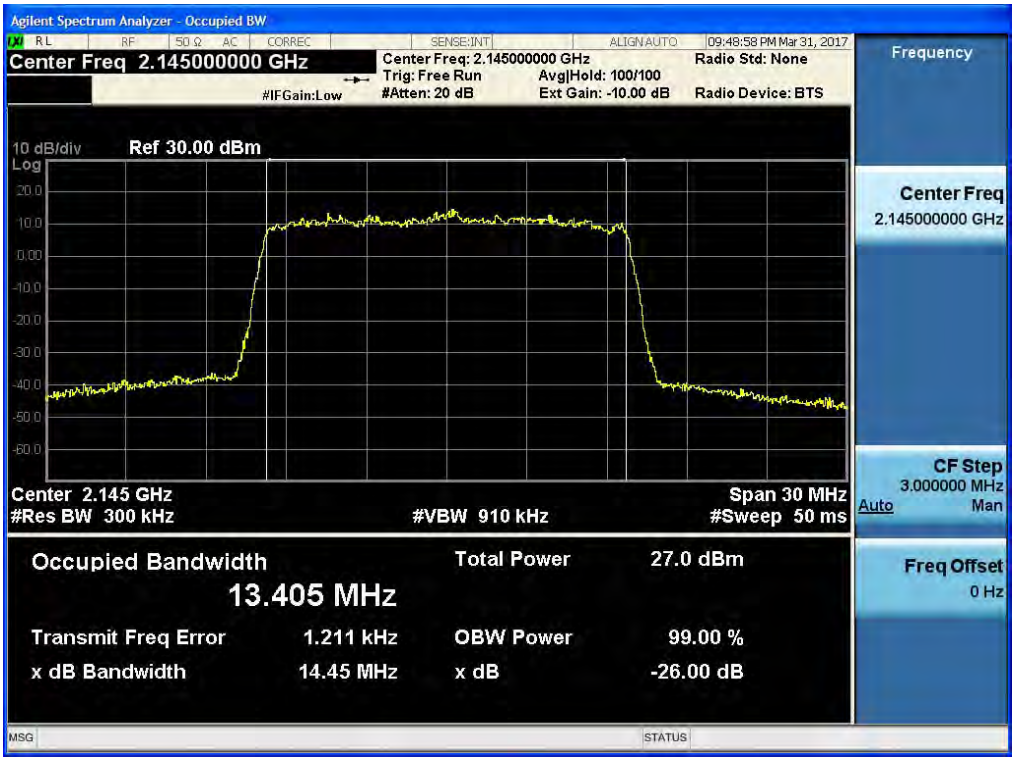
(QPSK High Channel)



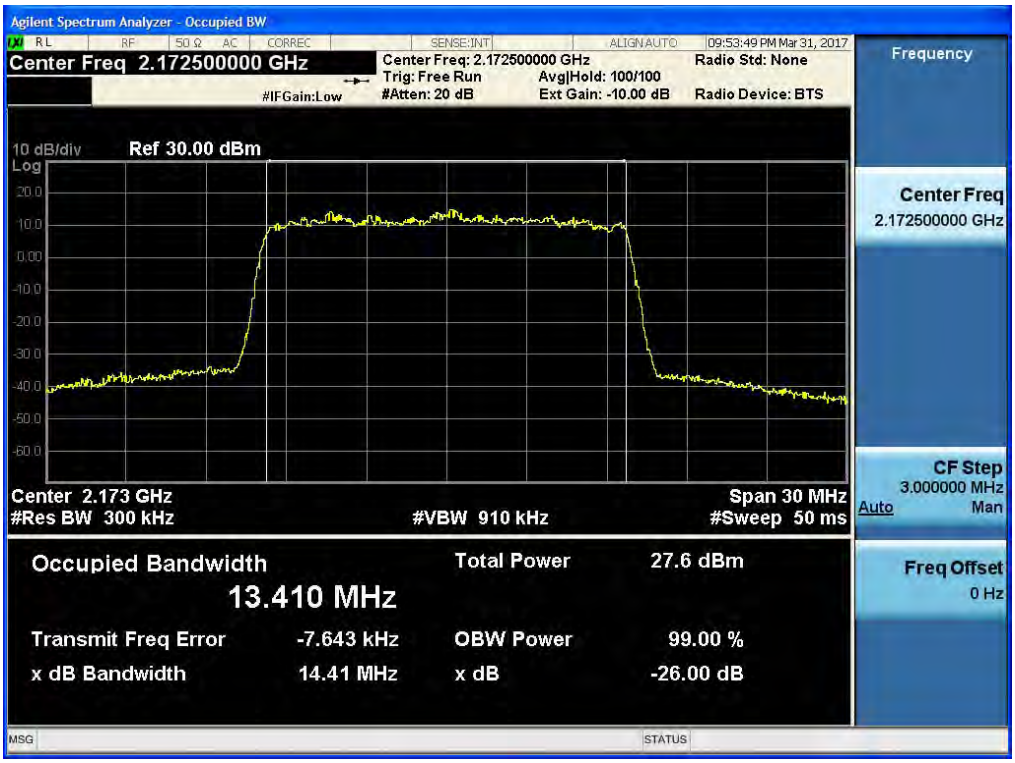
(16QAM Low Channel)



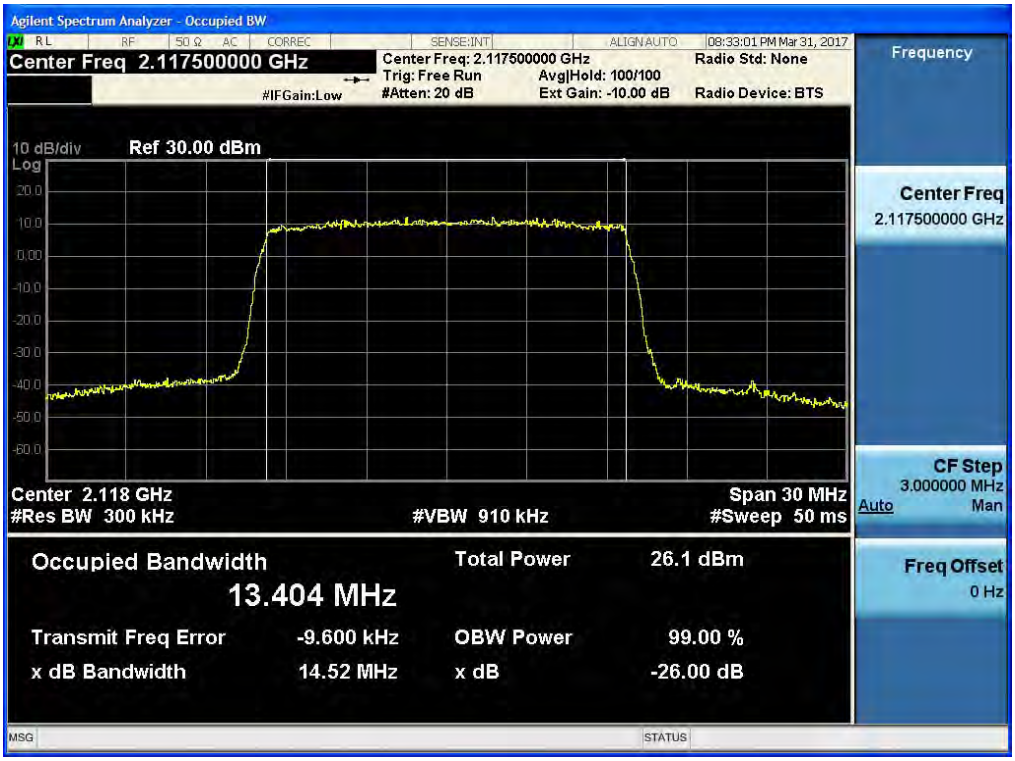
(16QAM Middle Channel)



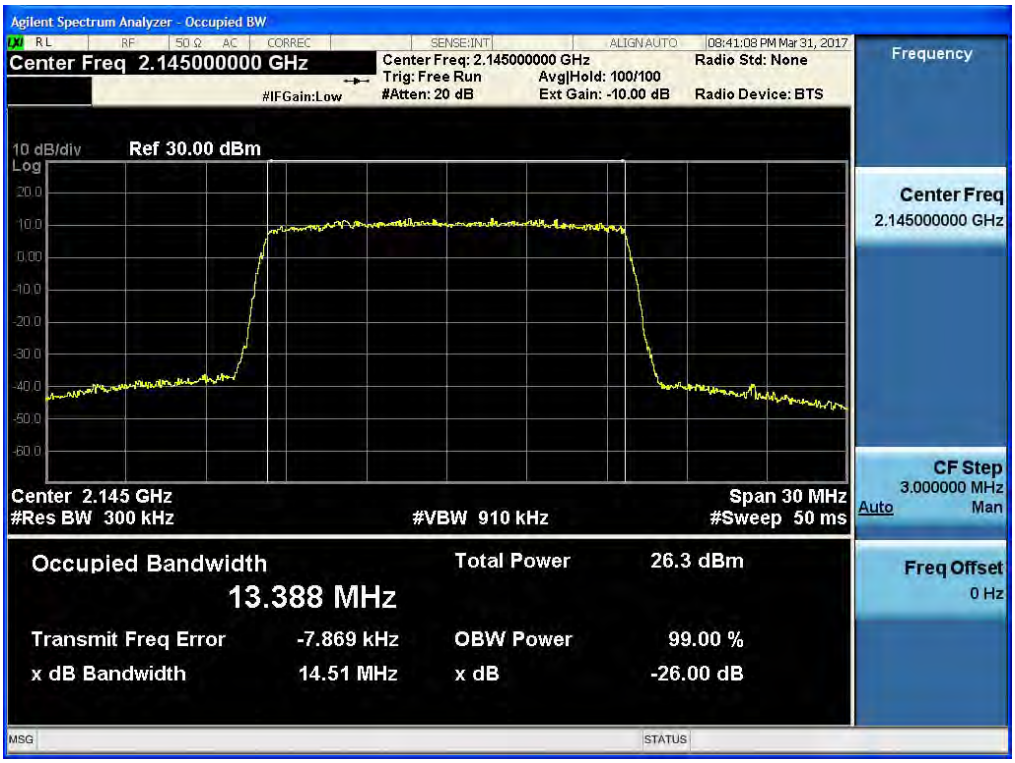
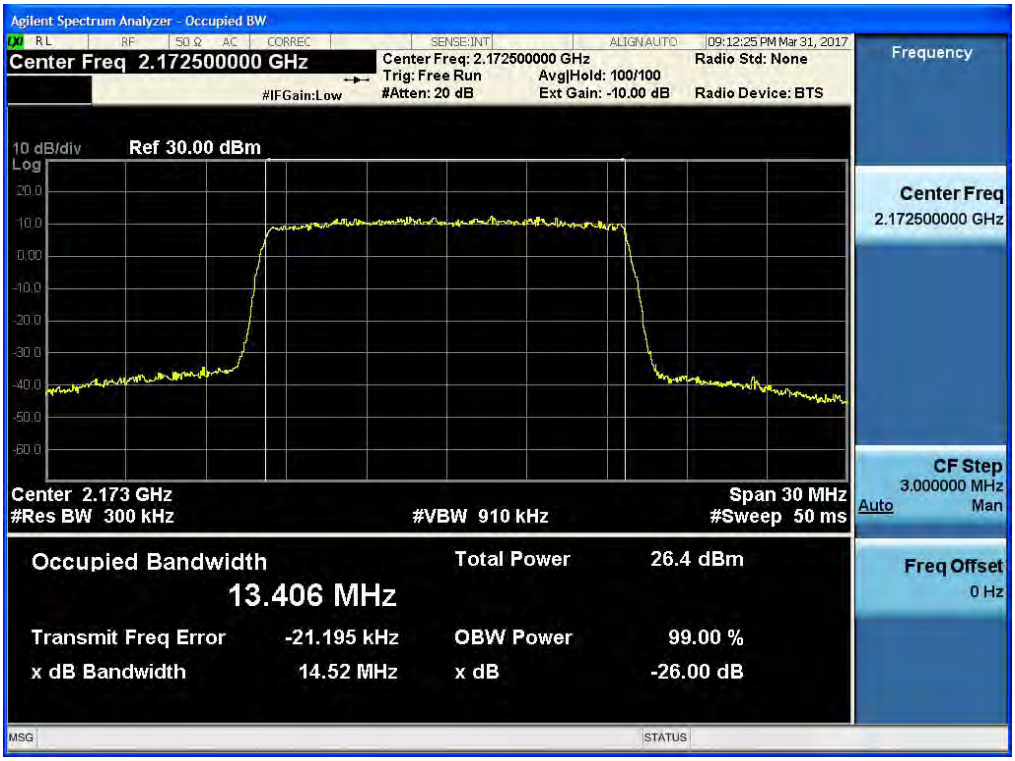
(16QAM High Channel)



(64QAM Low Channel)



(64QAM Middle Channel)



(64QAM High Channel)