HCT CO.,LTD

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FCC /IC REPORT

Certification

Applicant Name:
SOLiD, Inc.

Address:
10, 9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, South Korea

Date of Issue:
July 25, 2016

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

Report No.: HCT-R-1607-F019-1
HCT FRN: 0005866421
IC Recognition No.: 5944A-5

FCC ID:	**W6U1900PAWS13**
IC:	**9354A-1900PAWS13**
APPLICANT:	**SOLiD, Inc**

FCC/ IC Model(s):	LRDU_1900P_AWS13
EUT Type:	RDU(Remote Drive Unit)
Frequency Ranges:	1900PCS : 1 850 MHz ~1 915 MHz (Uplink) / 1 930 MHz ~1 995 MHz (Downlink)
	AWS13 : 1 710 MHz ~1 780 MHz (Uplink) / 2 110 MHz ~2 180 MHz (Downlink)
Conducted Output Power:	1900PCS : 0.5 W (27 dBm)
	AWS13 : 1 W (30 dBm)
Date of Test:	June 27, 2016 ~ July 14, 2016
FCC Rule Part(s):	CFR 47 Part 27
IC Rules :	RSS-Gen (Issue 4, November 2014), RSS-131 (Issue 2, July 2003)

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from thisequipment 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 the FCC / IC Rules under normal use and maintenance.

Report prepared by
: Kyung Soo Kang
Test Engineer of RF Team

Approved by
: Jong Seok Lee
Manager of RF Team

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1607-F019	July 15, 2016	- First Approval Report
HCT-R-1607-F019-1	July 25, 2016	- Revise the data table on page 63. - Revise the ANSI/TIA version.

Table of Contents

1. CLIENT INFORMATION

The EUT has been tested by request of

Company	SOLiD, Inc. 10, 9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, South Korea

FCC ID:	W6U1900PAWS13
IC:	9354A-1900PAWS13
EUT Type:	RDU(Remote Drive Unit)
FCC/ IC Model(s):	LRDU_1900P_AWS13
Frequency Ranges:	1900PCS : 1 850 MHz ~1 915 MHz (Uplink) / 1 930 MHz ~1 995 MHz (Downlink) AWS13 : 1 710 MHz ~1 780 MHz (Uplink) / 2 110 MHz ~2 180 MHz (Downlink)
Conducted Output Power:	1900PCS : 0.5 W (27 dBm) AWS13 : 1 W (30 dBm)
Antenna Gain(s):	Manufacturer does not provide an antenna.
Measurement standard(s):	ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02 KDB 935210 D02 v03r02, KDB 935210 D05 v01r01, RSS-GEN, RSS-131
FCC Rule Part(s):	CFR 47 Part 27
IC Rules Part(s):	RSS-Gen (Issue 4, November 2014), RSS-131 (Issue 2, July 2003)
Place of Tests:	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA(IC Recognition No. : 5944A-5)

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 27, RSS-GEN, RSS-131.

Description	Reference (FCC)	Reference (IC)	Results
Conducted RF Output Power	§2.1046; §27.50 §24.232	RSS-131, Section 4.3 RSS-131, Section 6.2 SRSP-510, SRSP-513	Compliant
Occupied Bandwidth	§2.1049	RSS-GEN, Section 4.6.1	Compliant
Passband Gain and Bandwidth & Out of Band Rejection	KDB 935210 D02 v03r02	RSS-131, Section 4.2 RSS-131, Section 6.1	Compliant
Spurious Emissions at Antenna Terminals	§2.1051, §27.53 §24.238	RSS-131, Section 4.4 RSS-131, Section 6.3 RSS-131, Section 6.4 SRSP-510	Compliant
Radiated Spurious Emissions	§2.1053, §27.53 §24.238	-	Compliant
Frequency Stability	§2.1055, §27.54	RSS-131, Section 4.5 RSS-131, Section 6.5	Compliant

3.2. MODE OF OPERATION DURING THE TEST

The EUT was 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.

The device does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports for radiated spurious emission testing.

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}

4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

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

5. TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Agilent	N5182A /Signal Generator	03/29/2016	Annual	MY50141649
Agilent	N5182A /Signal Generator	05/13/2016	Annual	MY47070230
Agilent	N9030A / Signal Analyzer	11/24/2015	Annual	MY49431210
Weinschel	67-30-33 / Fixed Attenuator	10/29/2015	Annual	BR5347
Weinschel	1506A / Power Divider	02/15/2016	Annual	MD793
DEAYOUNG ENT	DFSS60 / AC Power Supply	04/06/2016	Annual	1003030-1
AMETEK	XFR 60-20 / DC Power Supply	02/27/2016	Annual	1045A01016
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	08/26/2014	Biennial	9120D-1300
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	09/03/2015	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	10/05/2015	Annual	836650/016
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/23/2015	Annual	101068-SZ
Wainwright Instruments	WHKX10-2700-3000-18000-40SS / High Pass Filter	08/20/2015	Annual	4
CERNEX	CBLU1183540 / Power Amplifier	02/01/2016	Annual	24614
CERNEX	CBL06185030 / Power Amplifier	02/01/2016	Annual	24615
CERNEX	CBL18265035 / Power Amplifier	07/27/2015	Annual	22966

6. RF OUTPUT POWER

FCC Rules

Test Requirements:

§ 2.1046 Measurements required: RF power output:

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

§ 2.1046 (b) For single sideband, independent sideband, and single channel, controlled carrier Radio telephone transmitters, the procedure specified in paragraph (a) of this section shall beemployed 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.

§ 2.1046 (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.

§ 24.232 Power and antenna height limits. (a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below. See §24.53 for HAAT calculation method. Base station antenna heights may exceed 300 meters with a corresponding reduction in power; see Table 1 of this section.

The service area boundary limit and microwave protection criteria specified in §24.236 and §24.237 apply.

§ 27.50 Power limits and duty cycle.

(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:

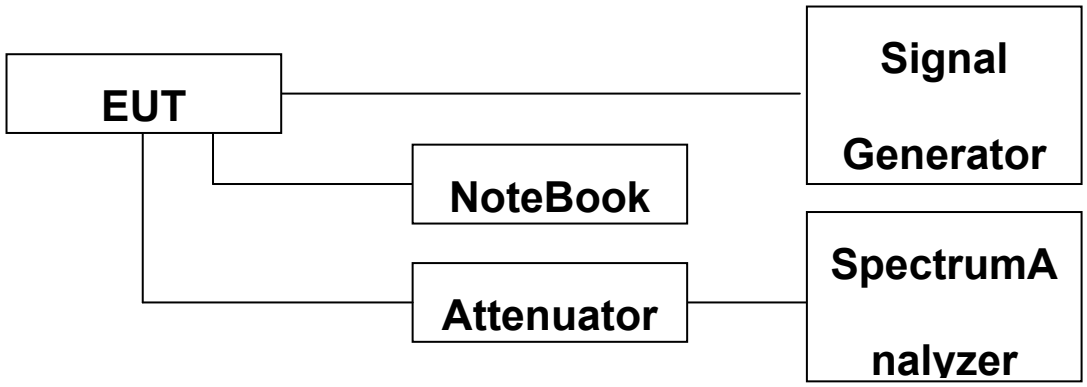
(i) An equivalent isotropically radiated power (EIRP) of 3280 watts when transmitting with an emission bandwidth of 1 MHz or less;
(ii) An EIRP of 3280 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.
(2) The power of each fixed or base station transmitting in the 1995-2000 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.

Test Procedures:

Measurements were in accordance with the test methods section 3.5.2 of KDB 935210 D05 v01r01.
a) Connect a signal generator to the input of the EUT.
b) Configure to generate the AWGN (broadband) test signal.
c) The frequency of the signal generator shall be set to the frequency f0 as determined from 3.3.
d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
f) Measure and record the output power of the EUT; use 3.5.3 or 3.5.4 for power measurement.

g) Remove the EUT from the measurement setup. Using the same signal generator settings, repeat the power measurement at the signal generator port, which was used as the input signal to the EUT, and record as the input power. EUT gain may be calculated as described in 3.5.5.
h) Repeat steps f) and g) with input signal amplitude set to 3 dB above the AGC threshold level.
i) Repeat steps e) to h) with the narrowband test signal.
j) Repeat steps e) to i) for all frequency bands authorized for use by the EUT.

Power measurement Method :
Guidance for performing input/output power measurements using a spectrum or signal analyzer is provided in 5.2 of KDB Publication 971168.



Block Diagram 1. RF Power Output Test Setup

IC Rules

Test Requirements:

SRSP-510

5. Technical Criteria

5.1 Radiated Power and Antenna Height Limits

5.1.1 Base Stations

For base stations with channel bandwidth equal to or less than 1 MHz, the maximum equivalent isotropically radiated power (e.i.r.p.) is limited to 3280 watts with an antenna height above average terrain (HAAT) up to 300 metres. Base stations operating in urban areas are limited to a maximum allowable e.i.r.p. of 1640 watts. Base station antenna heights above average terrain may exceed 300 metres with a corresponding reduction in e.i.r.p. according to the following table:

HAAT[5] (in metres)	Maximum e.i.r.p. (watts)
≤ 300	3280 or 1640[6]
≤ 500	1070
≤1000	490
≤1500	270
≤2000	160

For base stations with a channel bandwidth greater than 1 MHz, the maximum e.i.r.p. is limited to 3280 watts/MHz e.i.r.p. (i.e., no more than 3280 watts e.i.r.p. in any 1 MHz band segment) with an antenna height above average terrain (HAAT) up to 300 metres. Fixed or base stations operating in urban areas are limited to a maximum allowable e.i.r.p. of 1640 watts/MHz e.i.r.p. Base station antenna heights above average terrain may exceed 300 metres with a corresponding reduction in e.i.r.p. according to the following table:

HAAT[5] (in metres)	Maximum e.i.r.p. (watts per MHz)
≤ 300	3280 or 1640[6]
≤ 500	1070
≤1000	490
≤1500	270
≤2000	160

Base stations transmitting in the lower sub-band shall comply with the power limits set forth in section 5.1.2, i.e. the same as mobile stations.

5.1.2 Mobile Stations

Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication.

SRSP-513

5. Technical Criteria

5.1 Radiated Power and Antenna Height Limits

5.1.1 Fixed and Base Stations

5.1.1.2 For fixed and base stations operating within the frequency range 2110-2180 MHz with a channel bandwidth greater than 1 MHz, the maximum permissible e.i.r.p. is 1640 watts/MHz e.i.r.p. (i.e. no more than 1640 watts e.i.r.p. in any 1 MHz band segment) with an antenna height above average terrain (HAAT) up to 300 metres.

5.1.1.3 Fixed and base stations located in geographic areas at a distance greater than 26 km from large or medium population centres and transmitting within the frequency range 2110-2180 MHz, may increase their e.i.r.p. up to a maximum of 3280 watts/MHz (i.e. no more than 3280 watts e.i.r.p. in any 1 MHz band segment), with an antenna HAAT up to 300 metres.

Within 26 km of any large or medium population centre, fixed and base stations may operate at increased e.i.r.p. if more than 50% of the population within a particular sector's coverage 6 is located outside these large and medium population centres.

Fixed and base stations with increased e.i.r.p. must not be used to provide coverage to large and medium population centres. However, some incidental coverage of these large and medium population centres by stations with increased e.i.r.p. is permitted.

This provision also applies for fixed and base stations with a channel bandwidth equal to or less than 1 MHz (i.e. the e.i.r.p. may be increased up to a maximum of 3280 watts).

RSS-131 6.2

The manufacturer's output power rating Prated MUST NOT be greater than Pmean for all types ofenhancers.

Additional Power Back-off Condition for Multiple Carrier Operations:

An example of a single carrier operation is a band translator that incorporates an (IF) filter of apassband equal to one channel bandwidth. Another example of a single carrier operation is the useof an enhancer, before the connection to the antenna, to boost a low power transmitter (singlecarrier) to a higher power.

An example of a multiple carrier operation is the use of an enhancer to amplify off-air signals thatcontain the wanted carrier and two (or more) adjacent band carriers. If the enhancer passband iswide enough to pass more than the wanted channel bandwidth, the enhancer output stage will beloaded by the multiple carriers.

Examination: with 3 carrier signals (of assumed equal level), the peak voltage will be 3 times thesingle carrier voltage. The corresponding Peak Envelope Power (PEP) will be 3^2times greater than a single carrier or 9/4 = 2.25 times greater than 2 tones PEP. Therefore the permissible wanted signal operating point has to be backed off by 3.5 dB (i.e. **Ppermissible = Prated - 3.5 dB**).

Note 1: All enhancers will be classified in the Radio Equipment List (REL) for a single carrieroperation.

Note 2: For a multiple carrier operation, the rating must be reduced by 3.5 dB or more.

Note 3: If there are more than 3 carriers present at the amplifier input point, greater powerback-off may be required. This can be examined on a case-by-case basis.

Test Procedures: RSS-131 4.3

4.3.1 Multi-channel Enhancer

The following subscript "o" denotes a parameter at the enhancer output point.

Connect two signal generators to the input of the Device Under Test (DUT), via a proper impedance matching network (and preferably via a variable attenuator) so that the two input signals are equal sinusoids (and can be raised equally).

Connect a dummy load of suitable load rating to the enhancer output point. Connect also a spectrum analyser to this output point via a coupling network and attenuator, so that only a portion of the output signal is coupled to the spectrum analyser. The coupling attenuation shall be stated in the test report.

Set the two generator frequencies f1 and f2 such that they and their third-order intermodulationproduct frequencies, f3= 2f1-f2 and f4 = 2f2 - f1, are all within the passband of the DUT.

Raise the input level to the DUT while observing the output tone levels, Po1 and Po2, and theintermodulation product levels, Po3 and Po4.

For enhancers rated 500 watts or less: Raise the input level to the DUT until the greater level

ofthe intermodulation products at the enhancer output terminals, Po3 or Po4, equals -43 dBW.
For enhancers rated over 500 watts: Raise the input level to the DUT until the greater level ofthe intermodulation products at the enhancer output terminals, Po3 or Po4, is 67 dB below the level of either output tone level, Po1 or Po2.
Record all signal levels and their frequencies. Calculate the mean output power (Pmean) under this testing condition using Pmean = Po1 + 3 dB.

4.3.2 Single Channel Enhancer

A suitably modulated signal, representative of the technology for which certification is sought, isapplied to the input of the amplifier. The input power level is increased until the manufacturer'srated input power level is achieved or until a 2 dB increase in input level results in a 1 dB increase
in output level (i.e. compression begins). Record the output power in the 99% emission bandwidthusing any suitable means.

Test Results:

Input Signal	Input Level (dBm)	Maximum Amp Gain
AWS	-14 dBm	44 dB
1900 PCS	-14 dBm	41 dB

Single channel Enhancer

* Due to EUT's ALC function (Auto Level Control), even if input signal is increased,

The same output power is transmit.

[Downlink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
AWS Band_ LTE 5 MHz AGC threshold	Low	2112.50	30.19	1.046
	Middle	2145.00	30.28	1.067
	High	2177.50	30.19	1.044
AWS Band_ LTE 5 MHz +3dBm above the AGC threshold	Low	2112.50	30.18	1.042
	Middle	2145.00	30.38	1.092
	High	2177.50	30.27	1.065
AWS Band_ LTE 10 MHz AGC threshold	Low	2115.00	30.07	1.015
	Middle	2145.00	30.16	1.037
	High	2175.00	30.44	1.106
AWS Band_ LTE 10 MHz +3dBm above the AGC threshold	Low	2115.00	30.41	1.099
	Middle	2145.00	30.34	1.082
	High	2175.00	30.43	1.105
AWS Band_ LTE 20 MHz AGC threshold	Low	2120.00	30.36	1.087
	Middle	2145.00	30.42	1.101
	High	2170.00	30.17	1.039
AWS Band_ LTE 20 MHz +3dBm above the AGC threshold	Low	2120.00	30.76	1.191
	Middle	2145.00	30.09	1.022
	High	2170.00	30.52	1.126

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
AWS Band_ CDMA AGC threshold	Low	2111.25	30.32	1.077
	Middle	2145.00	30.09	1.021
	High	2178.75	30.50	1.122
AWS Band_ CDMA +3dBm above the AGC threshold	Low	2111.25	30.19	1.045
	Middle	2145.00	30.23	1.055
	High	2178.75	30.43	1.105
AWS Band_ WCDMA AGC threshold	Low	2112.50	30.05	1.012
	Middle	2145.00	30.35	1.084
	High	2177.50	30.18	1.042
AWS Band_ WCDMA +3dBm above the AGC threshold	Low	2112.50	30.42	1.102
	Middle	2145.00	30.51	1.125
	High	2177.50	30.32	1.076

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
1900 PCS Band_ LTE 5 MHz AGC threshold	Low	1932.50	27.23	0.528
	Middle	1962.50	27.19	0.524
	High	1992.50	27.17	0.522
1900 PCS Band_ LTE 5 MHz +3dBm above the AGC threshold	Low	1992.50	27.49	0.561
	Middle	1992.50	27.08	0.511
	High	1992.50	27.10	0.513
1900 PCS Band_ LTE 10 MHz AGC threshold	Low	1935.00	27.39	0.549
	Middle	1960.00	27.26	0.532
	High	1990.00	27.31	0.539
1900 PCS Band_ LTE 10 MHz +3dBm above the AGC threshold	Low	1935.00	27.59	0.574
	Middle	1960.00	27.16	0.520
	High	1990.00	27.23	0.529
1900 PCS Band_ LTE 20 MHz AGC threshold	Low	1940.00	27.20	0.525
	Middle	1962.50	27.26	0.532
	High	1985.00	27.33	0.541
1900 PCS Band_ LTE 20 MHz +3dBm above the AGC threshold	Low	1940.00	27.40	0.549
	Middle	1962.50	27.17	0.521
	High	1985.00	27.17	0.521

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
1900 PCS Band_ CDMA AGC threshold	Low	1931.25	27.48	0.559
	Middle	1962.50	27.48	0.560
	High	1993.75	27.41	0.551
1900 PCS Band_ CDMA +3dBm above the AGC threshold	Low	1931.25	27.23	0.528
	Middle	1962.50	27.37	0.546
	High	1993.75	27.28	0.535
1900 PCS Band_ WCDMA AGC threshold	Low	1932.50	27.07	0.509
	Middle	1962.50	27.06	0.508
	High	1992.50	27.06	0.509
1900 PCS Band_ WCDMA +3dBm above the AGC threshold	Low	1932.50	27.12	0.515
	Middle	1962.50	27.51	0.563
	High	1992.50	27.48	0.560

Multi-channel Enhancer for IC

* Due to EUT's ALC function (Auto Level Control), even if input signal is increased,

The same output power is transmit.

[Downlink]

	Channel	Frequency (MHz)	Output Power	
			Po1(dBm)	Pmean(dBm)
AWS Band	Low	2110.40	27.298	30.298
	Middle	2145.00	27.154	30.154
	High	2179.60	27.140	30.140
1900 PCS Band	Low	2110.40	24.214	27.214
	Middle	2145.00	24.344	27.344
	High	2179.60	24.014	27.014

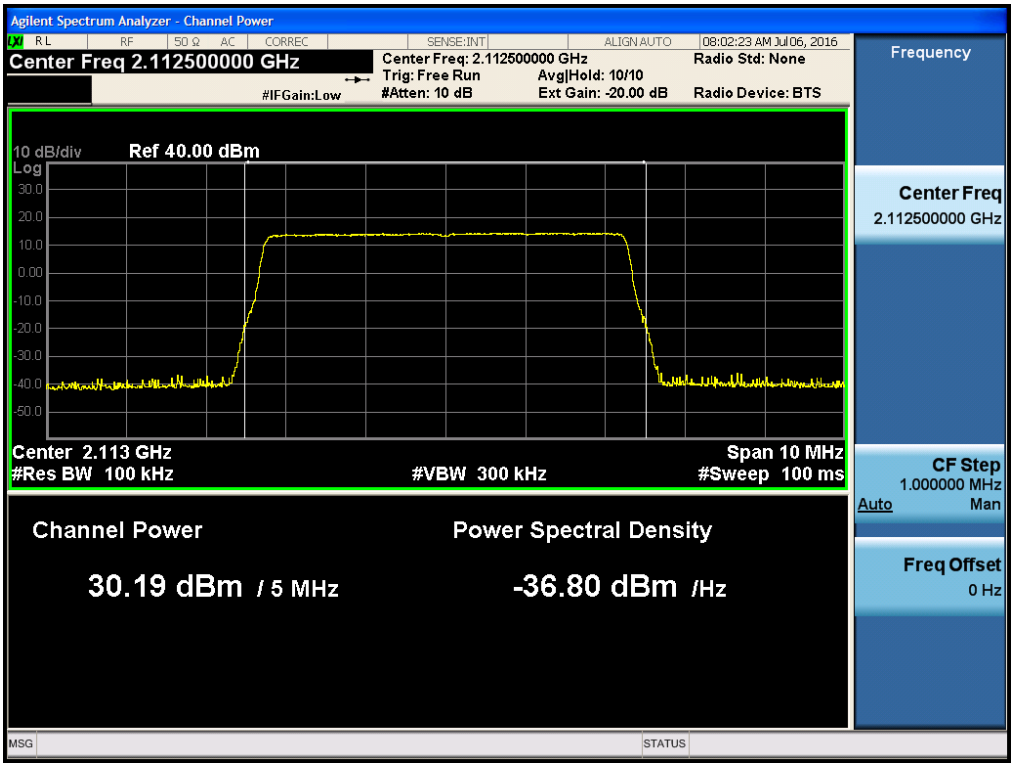
Additional Power Back-off Condition for Multiple Carrier Operations for IC

[Downlink]

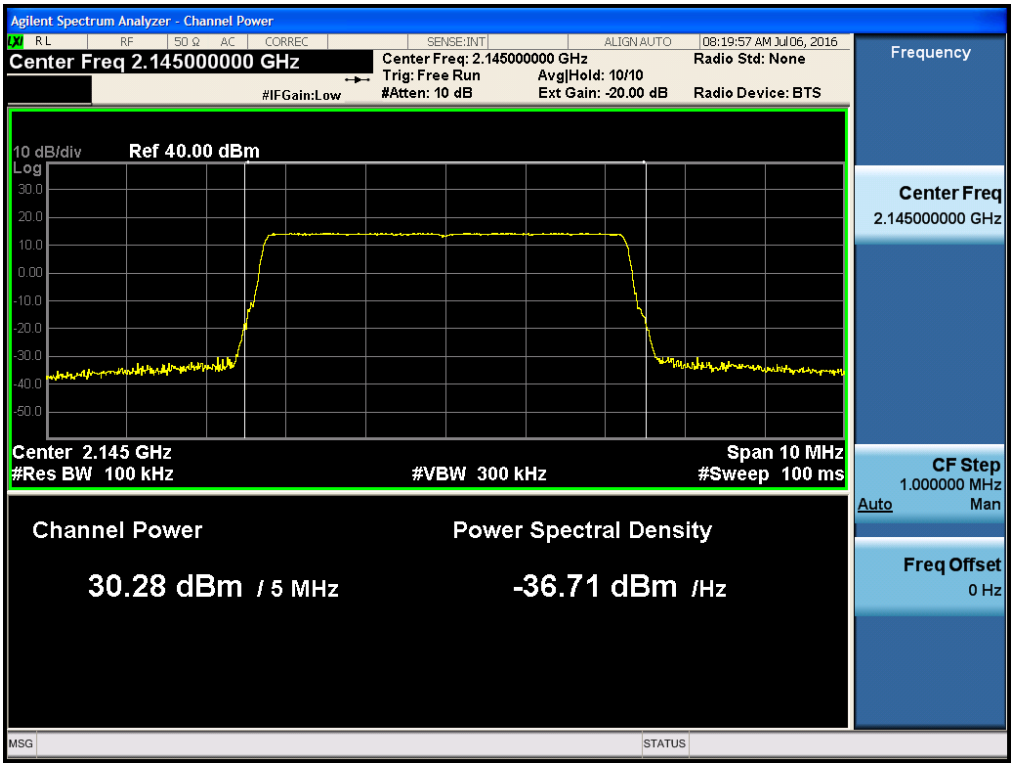
	1 Carrier (dBm)	3 Carrier (dBm)	Power Back-off (dB)
AWS Band	30.28	25.62	4.66
1900 PCS Band	27.19	22.41	4.78

Plots of RF Output Power for AWS Band LTE 5MHz

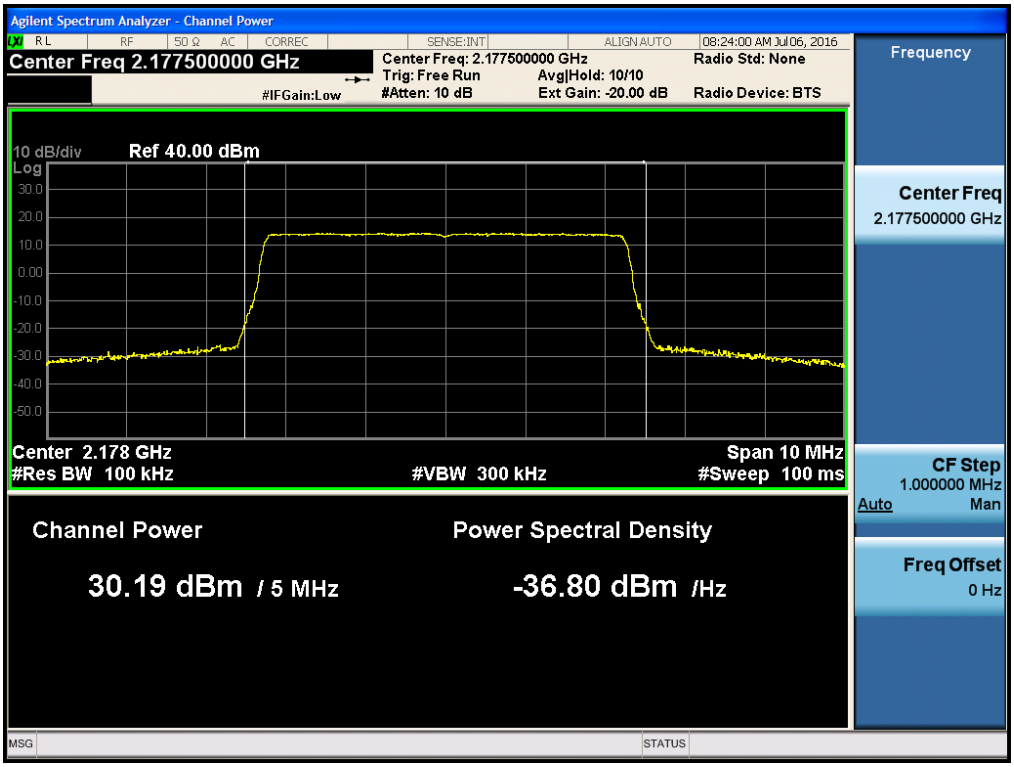
[AGC threshold Downlink Low]



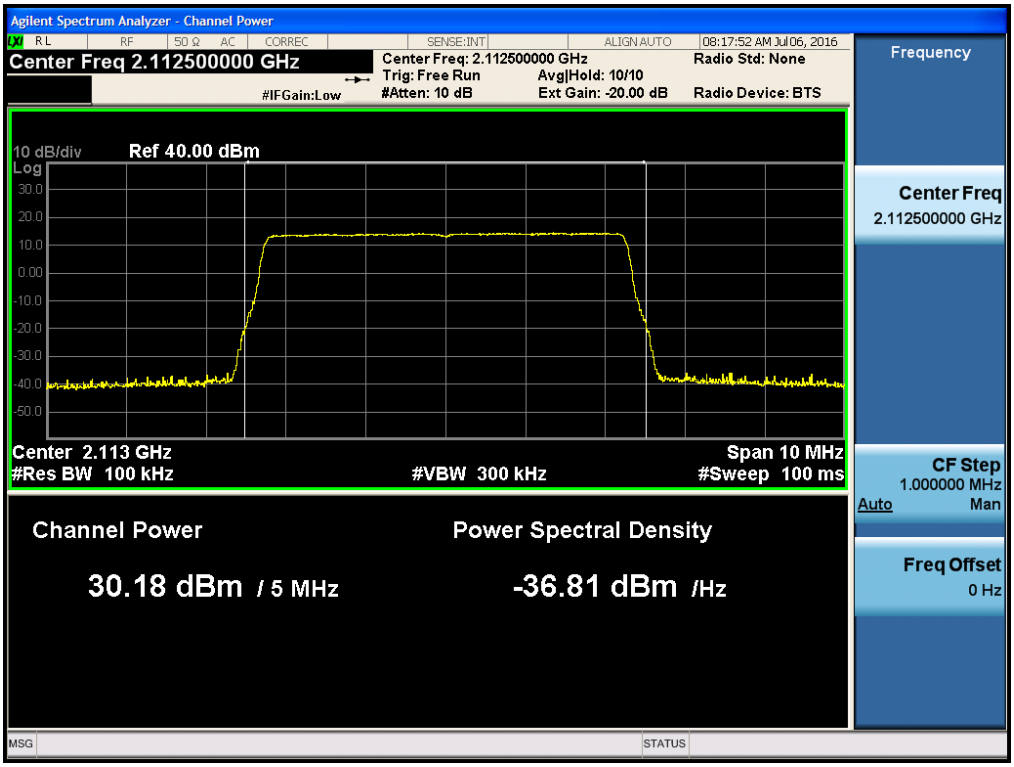
[AGC threshold Downlink Middle]



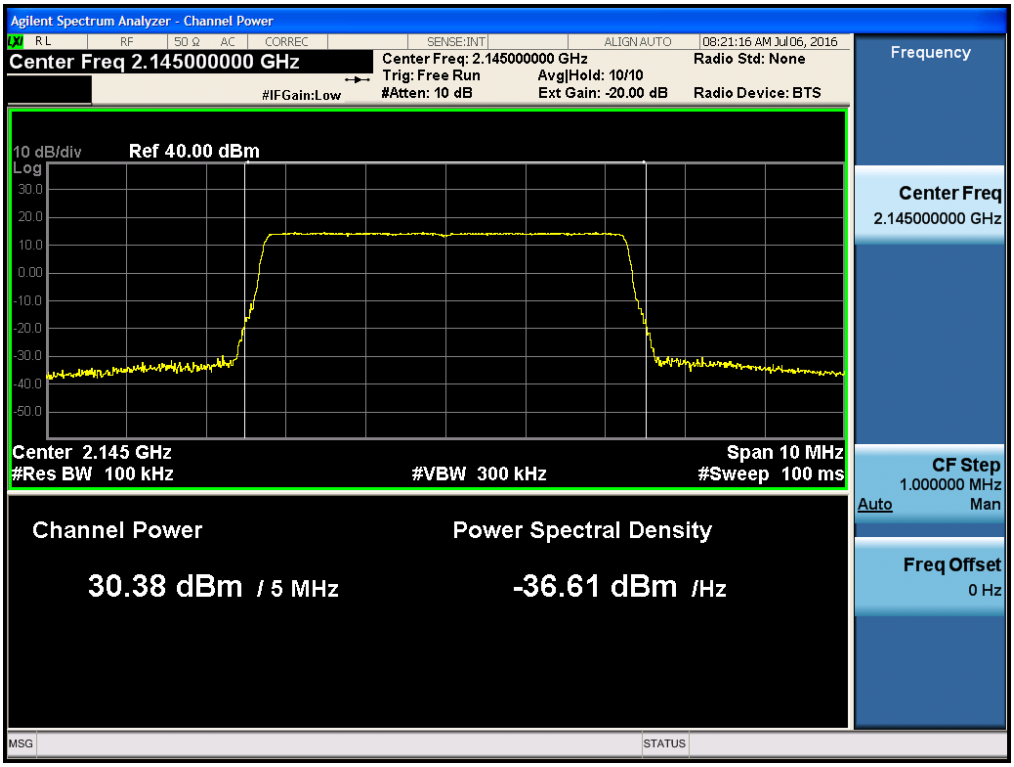
[AGC threshold Downlink High]



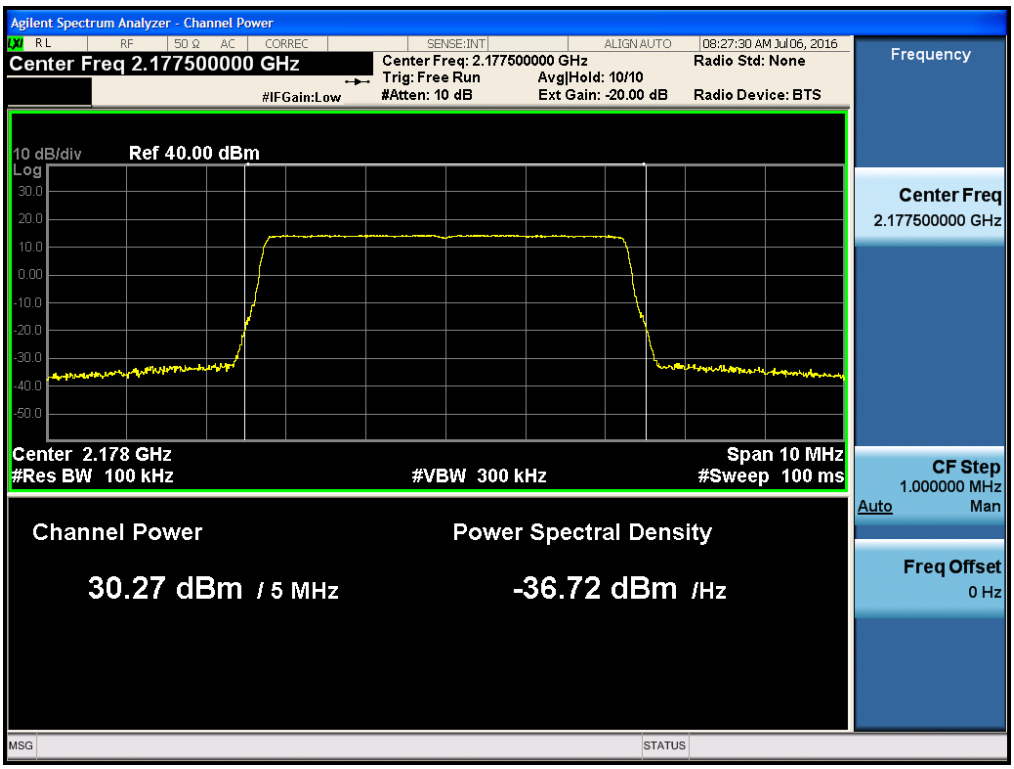
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

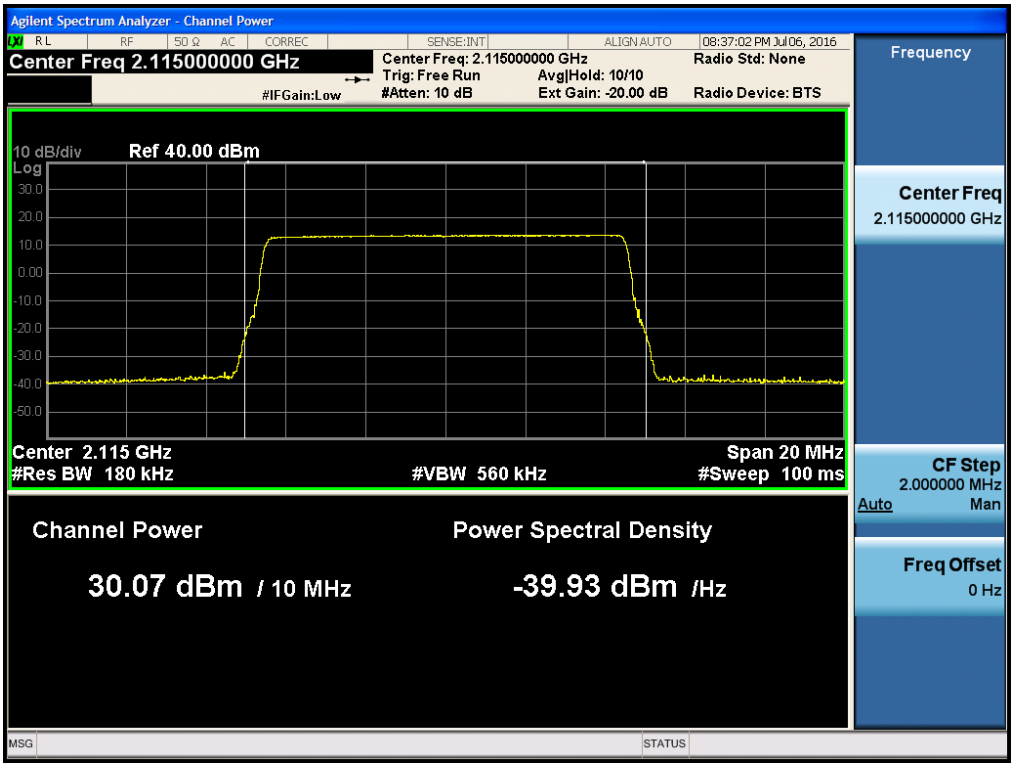


[+3dBm above AGC threshold Downlink High]

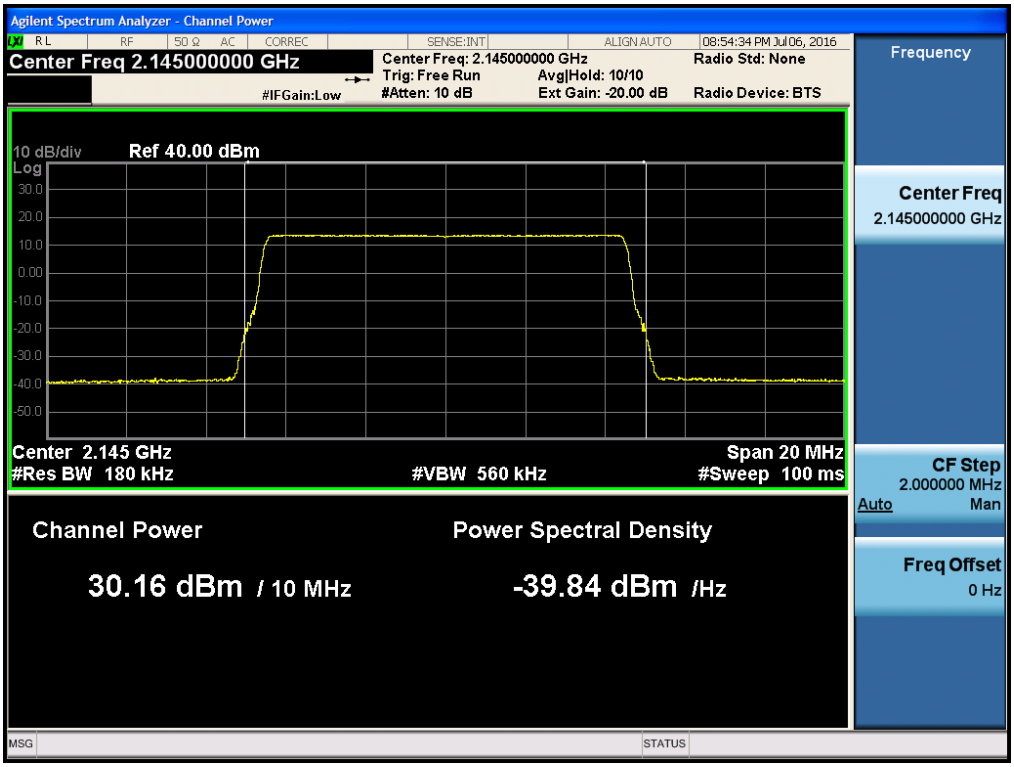


Plots of RF Output Power for AWS Band LTE 10MHz

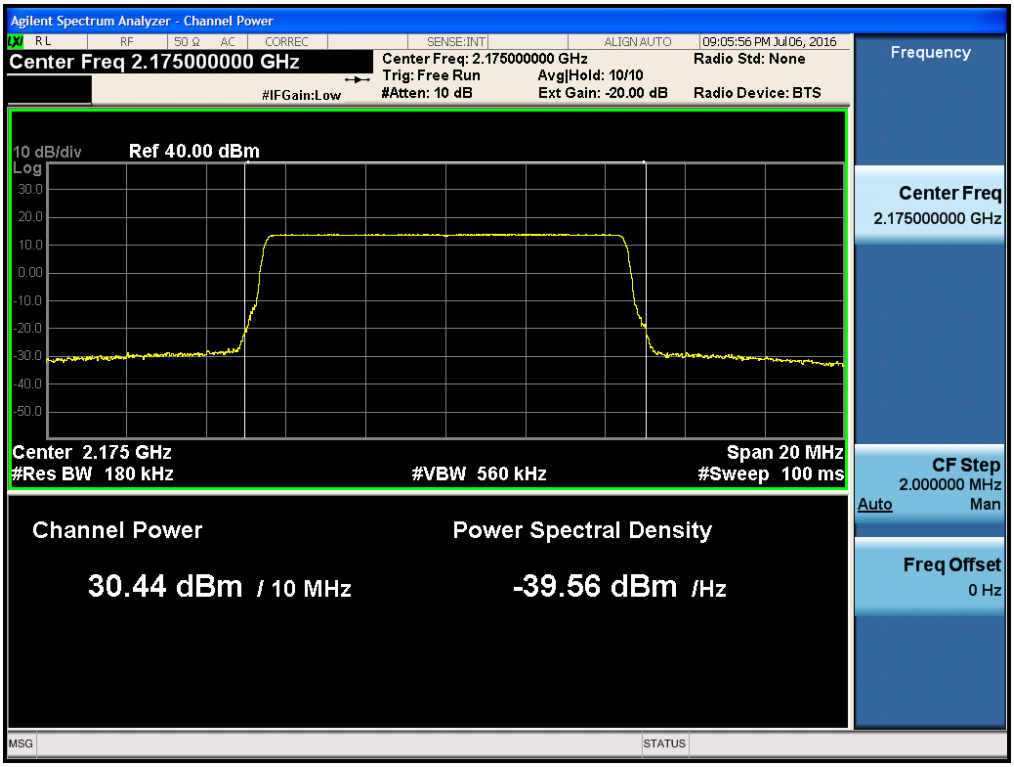
[AGC threshold Downlink Low]



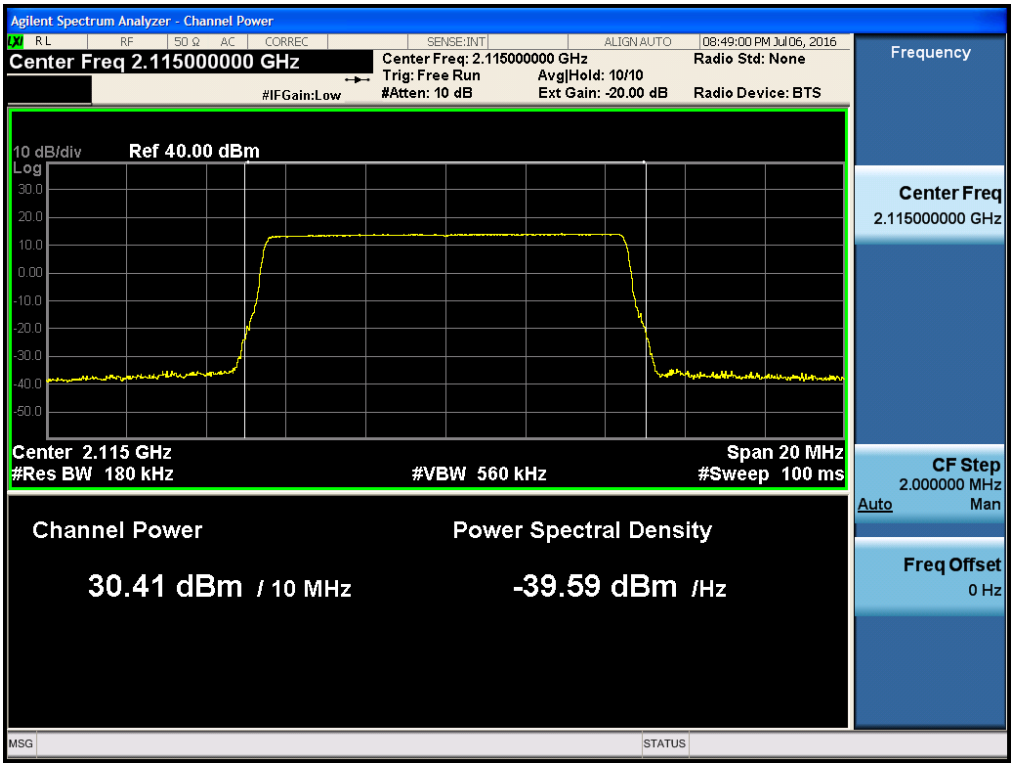
[AGC threshold Downlink Middle]



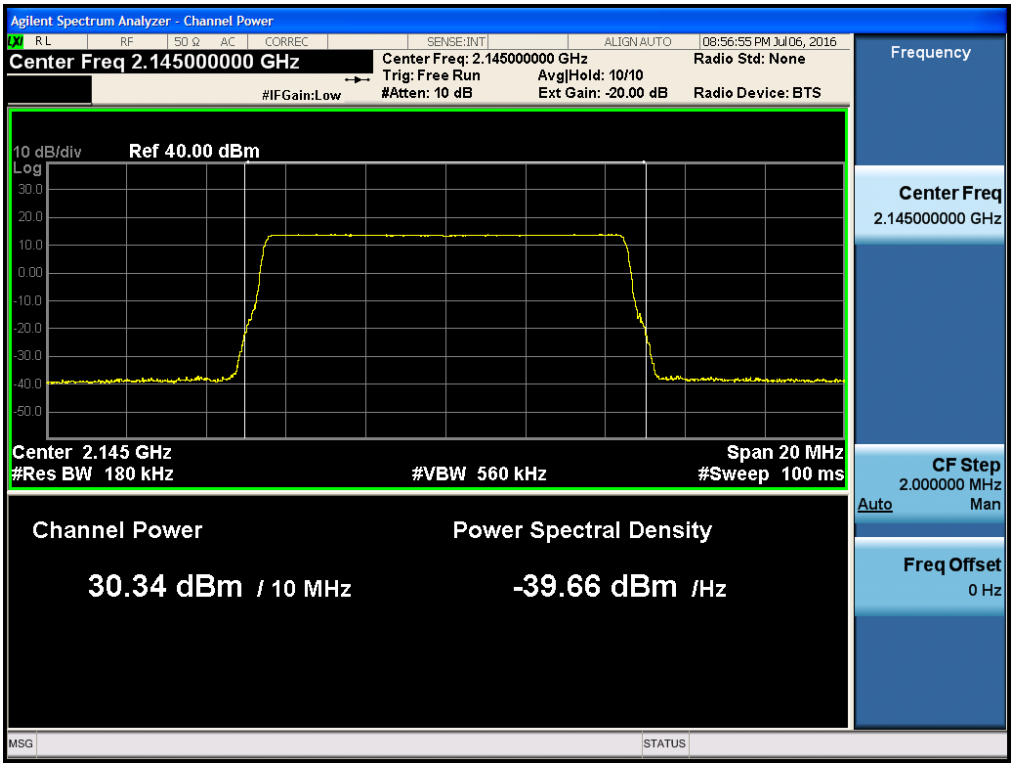
[AGC threshold Downlink High]



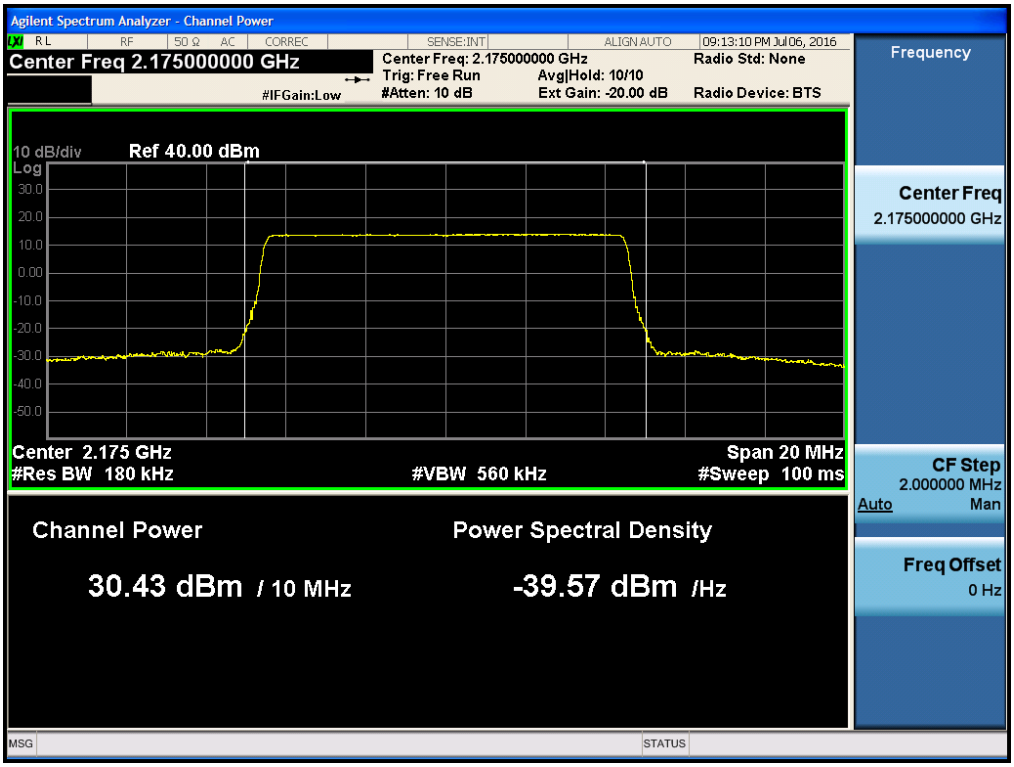
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

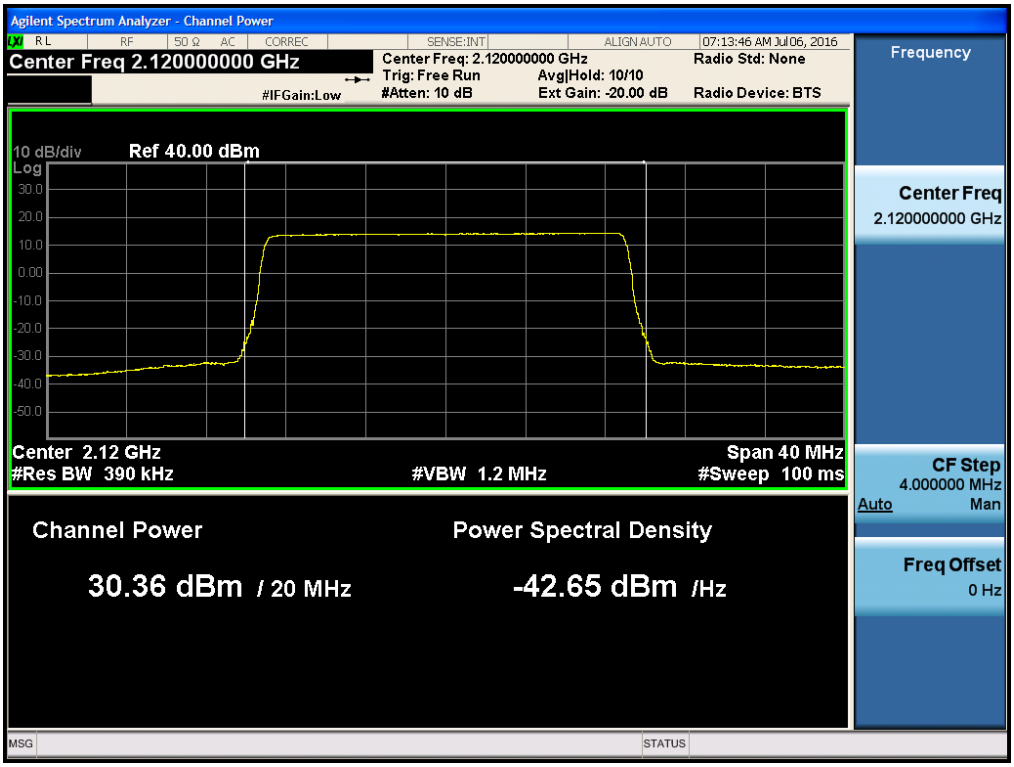


[+3dBm above AGC threshold Downlink High]

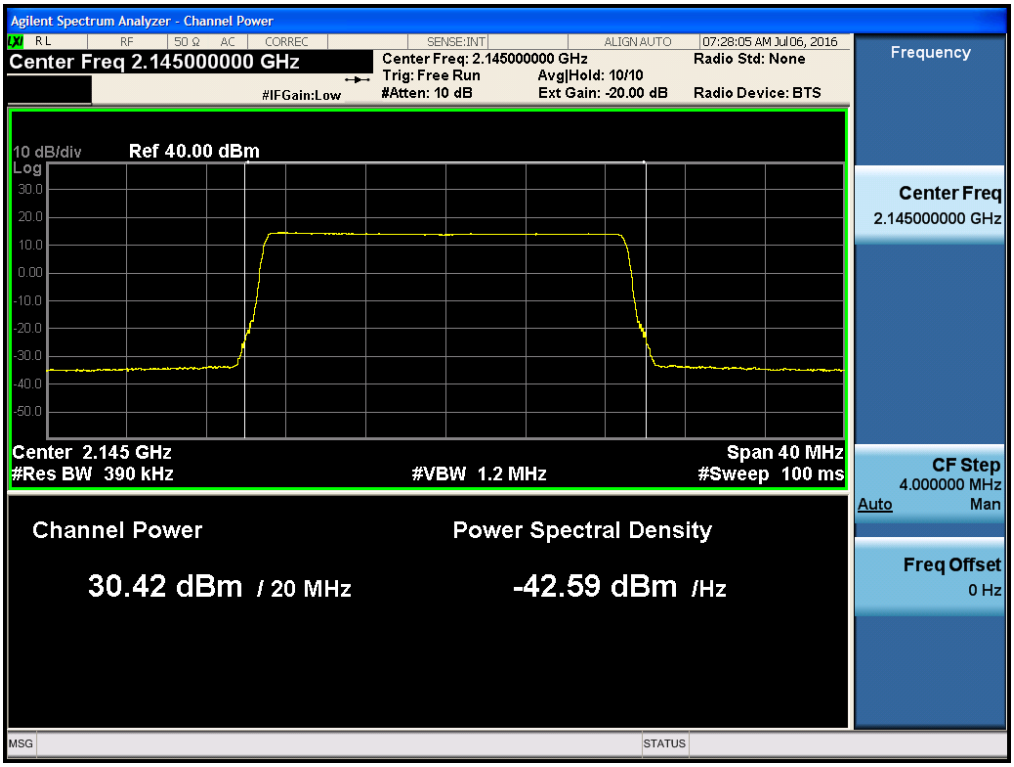


Plots of RF Output Power for AWS Band LTE 20MHz

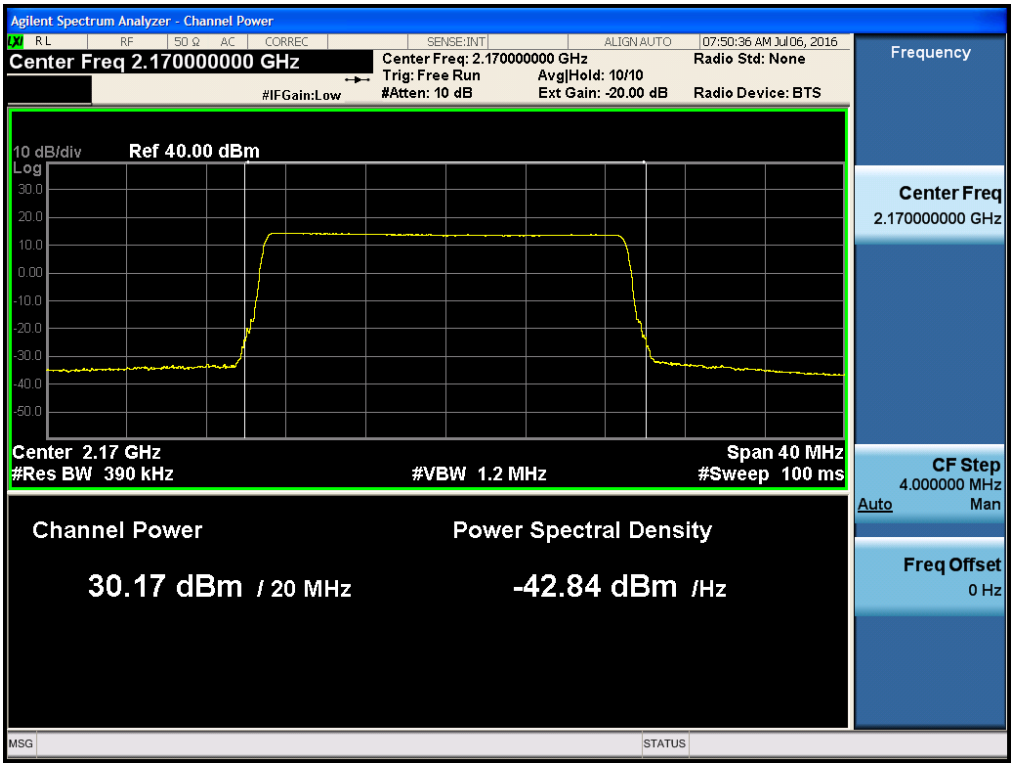
[AGC threshold Downlink Low]



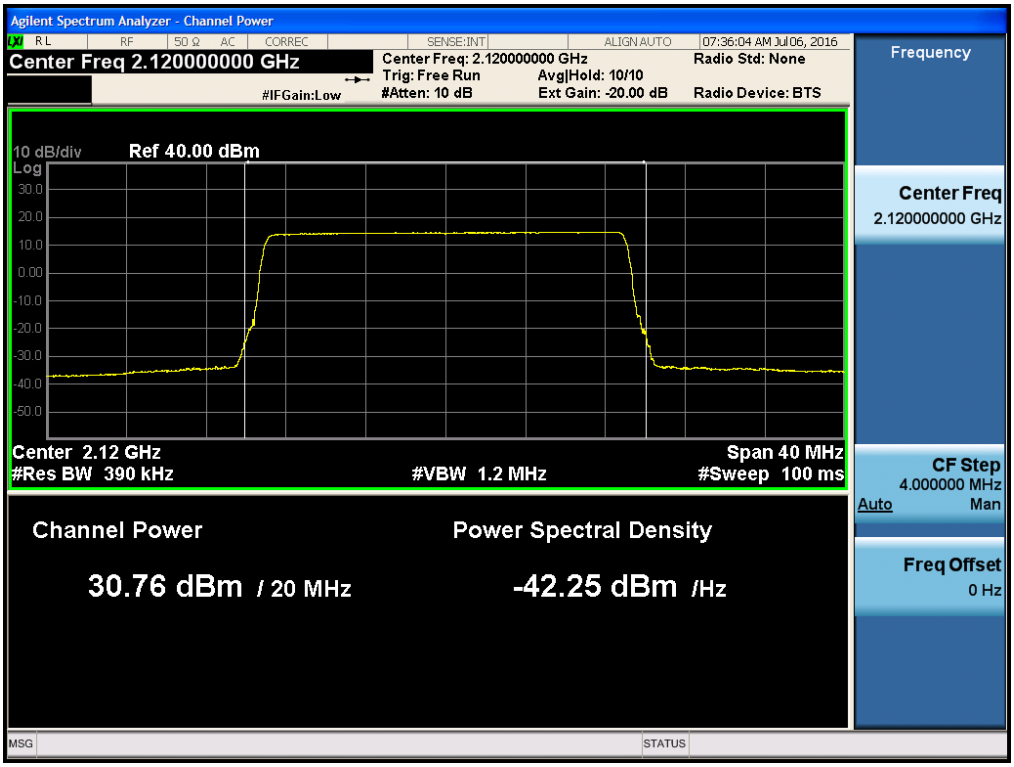
[AGC threshold Downlink Middle]



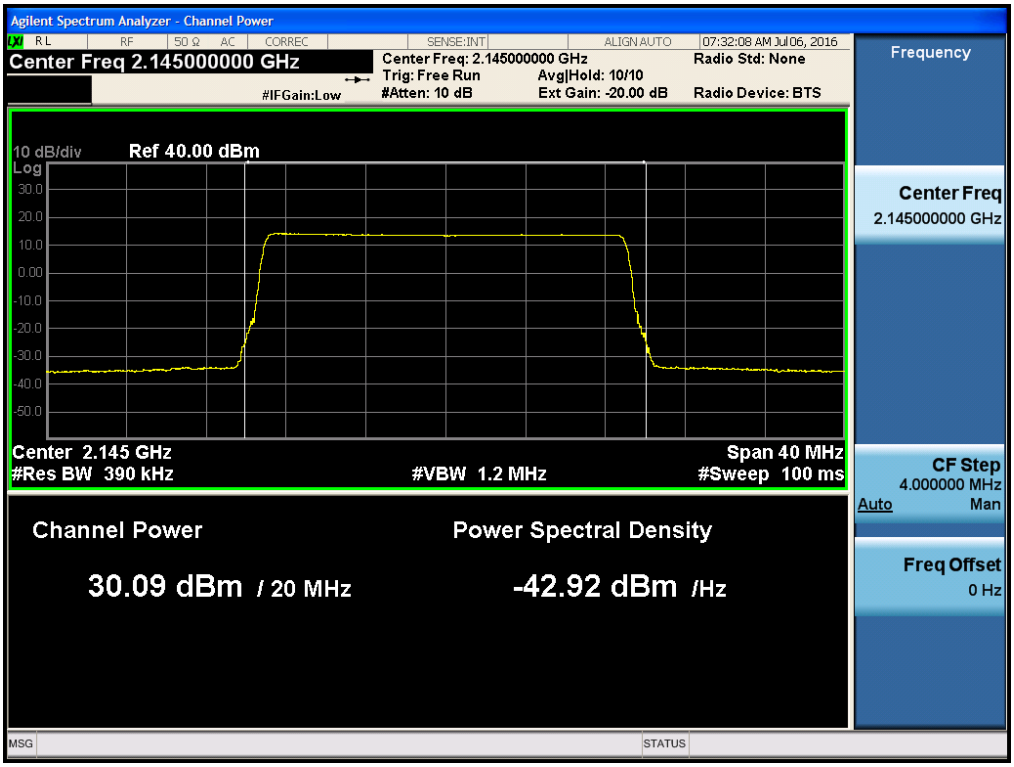
[AGC threshold Downlink High]



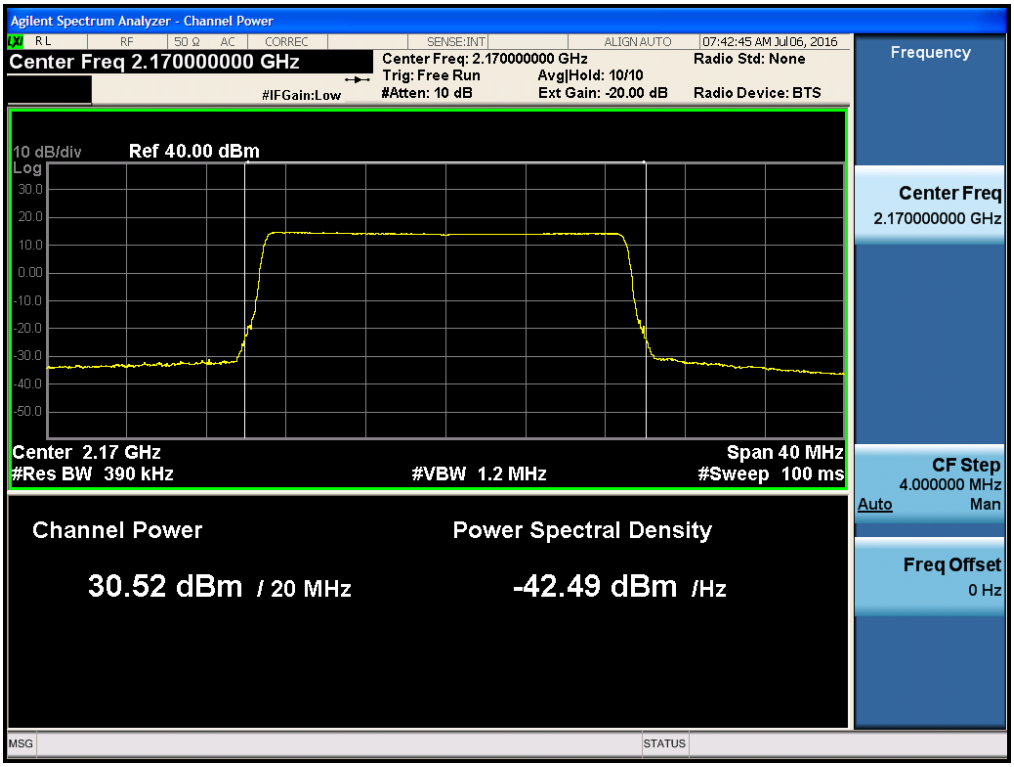
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

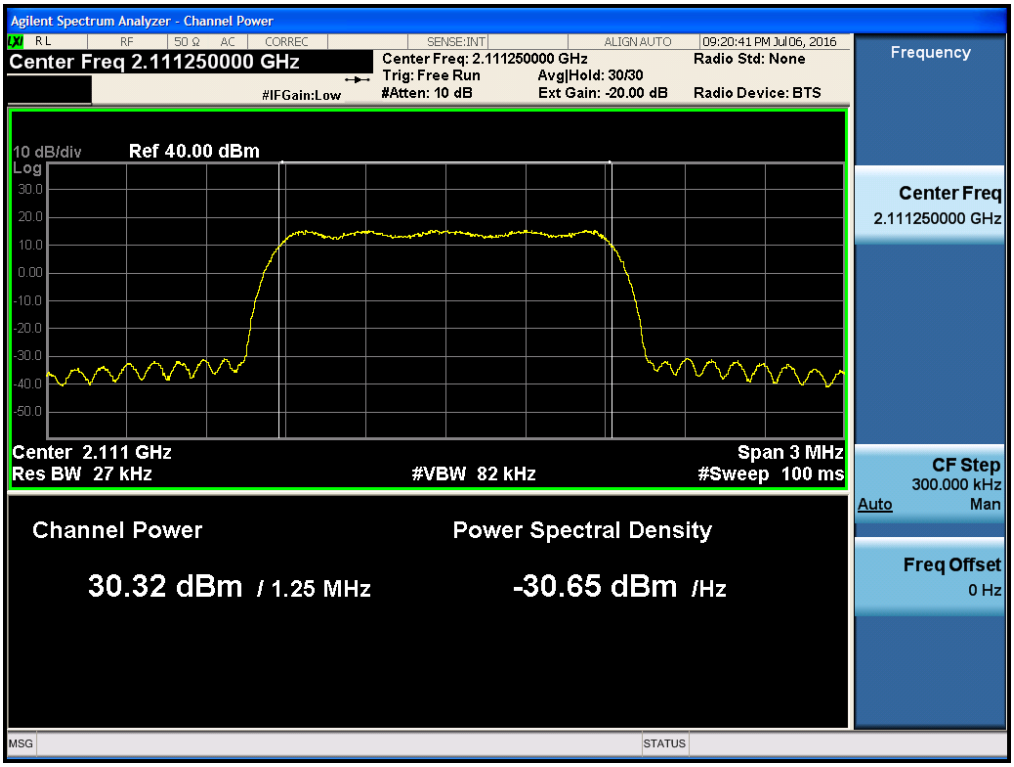


[+3dBm above AGC threshold Downlink High]

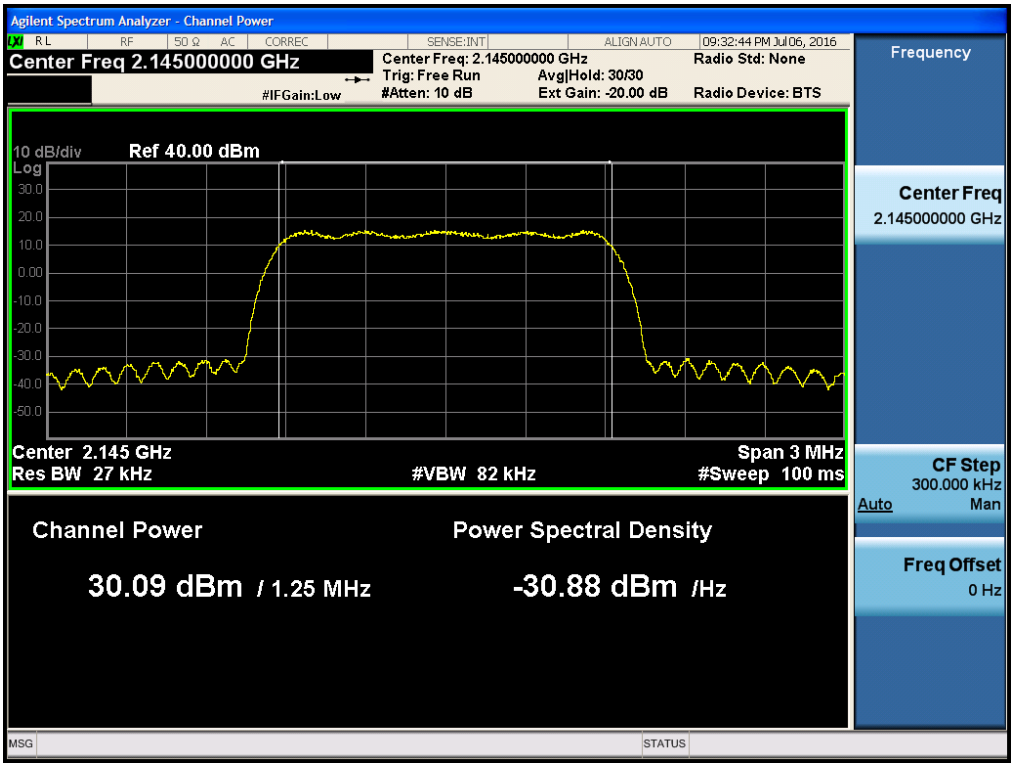


Plots of RF Output Power for AWS Band CDMA

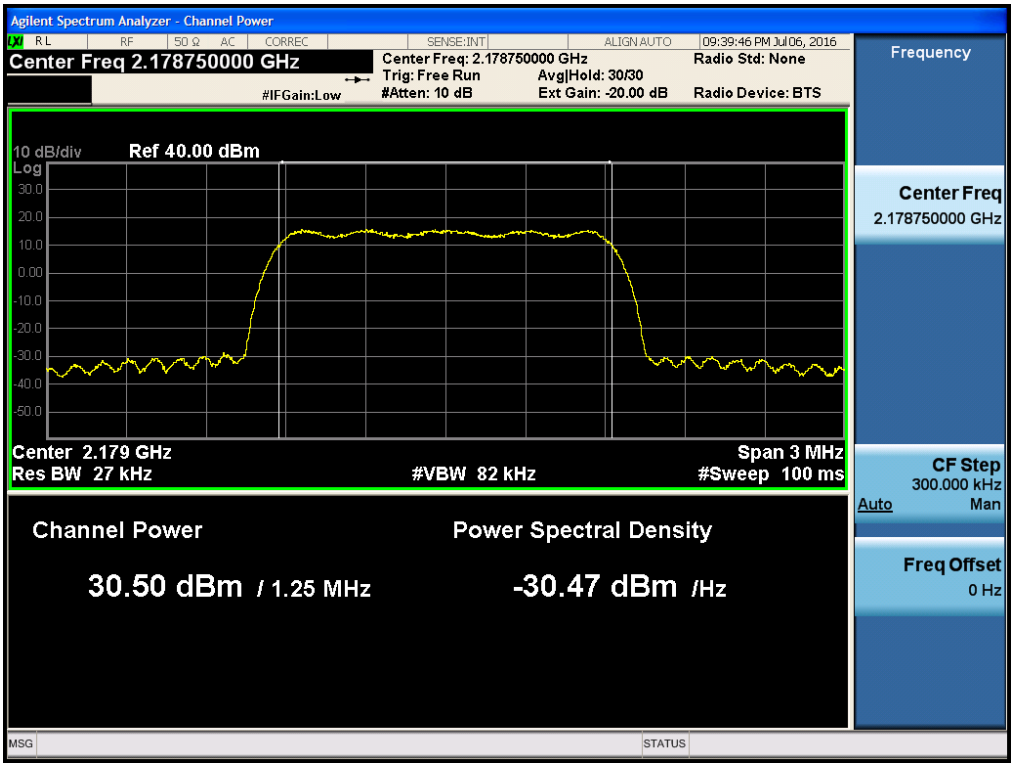
[AGC threshold Downlink Low]



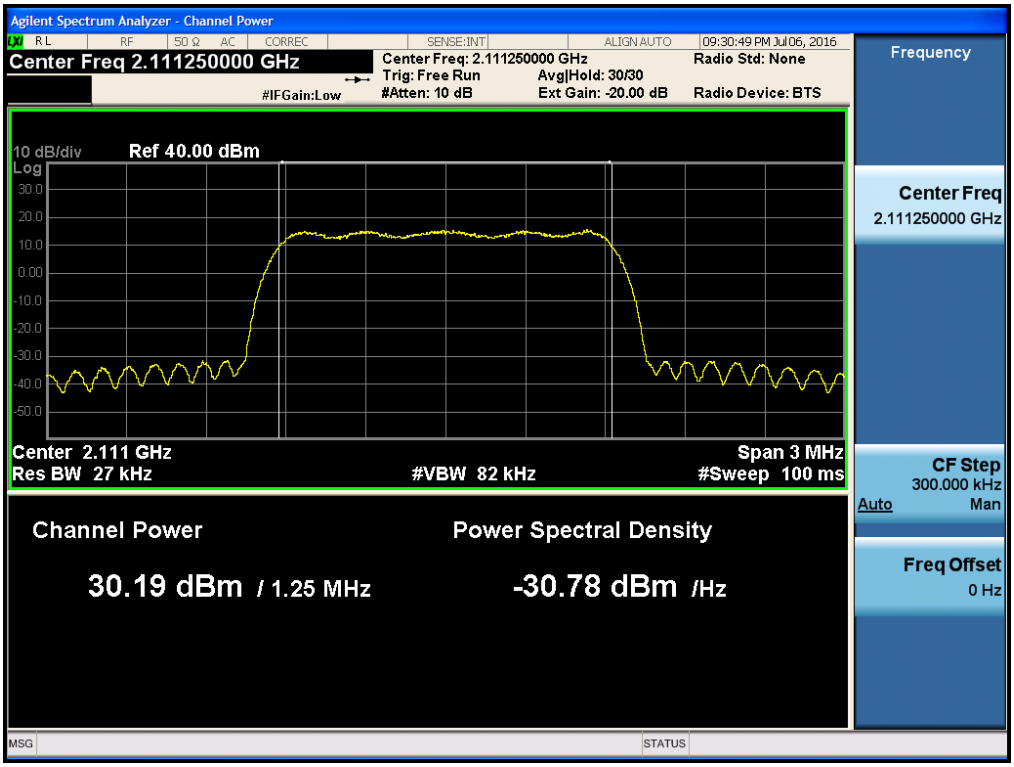
[AGC threshold Downlink Middle]



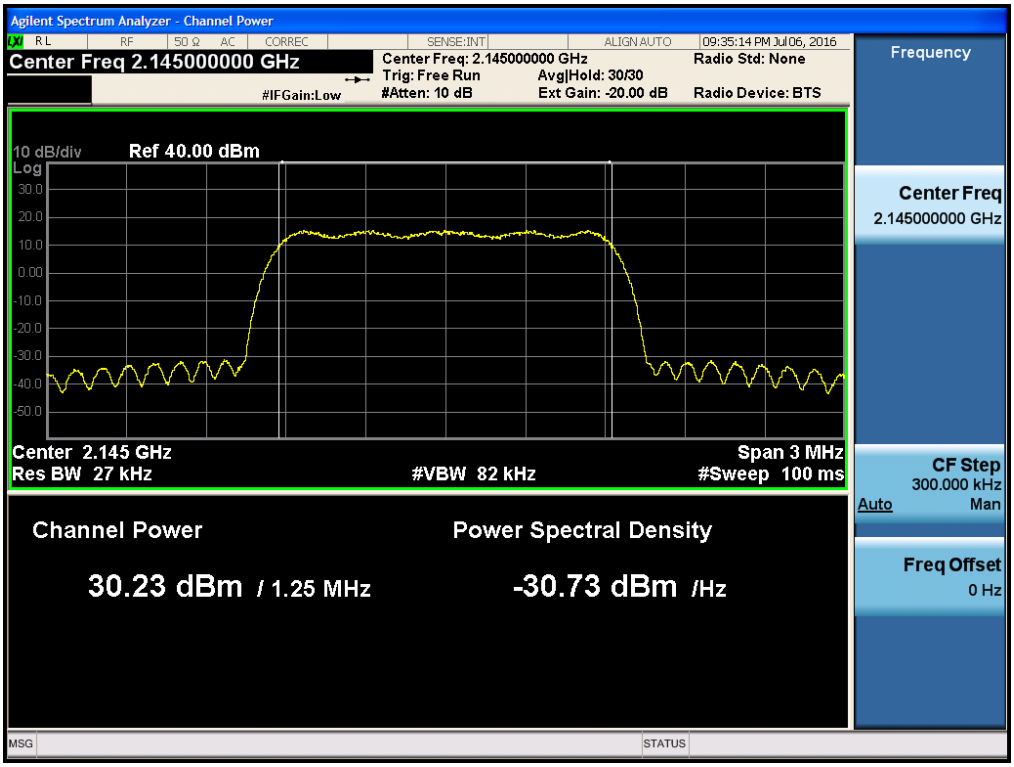
[AGC threshold Downlink High]



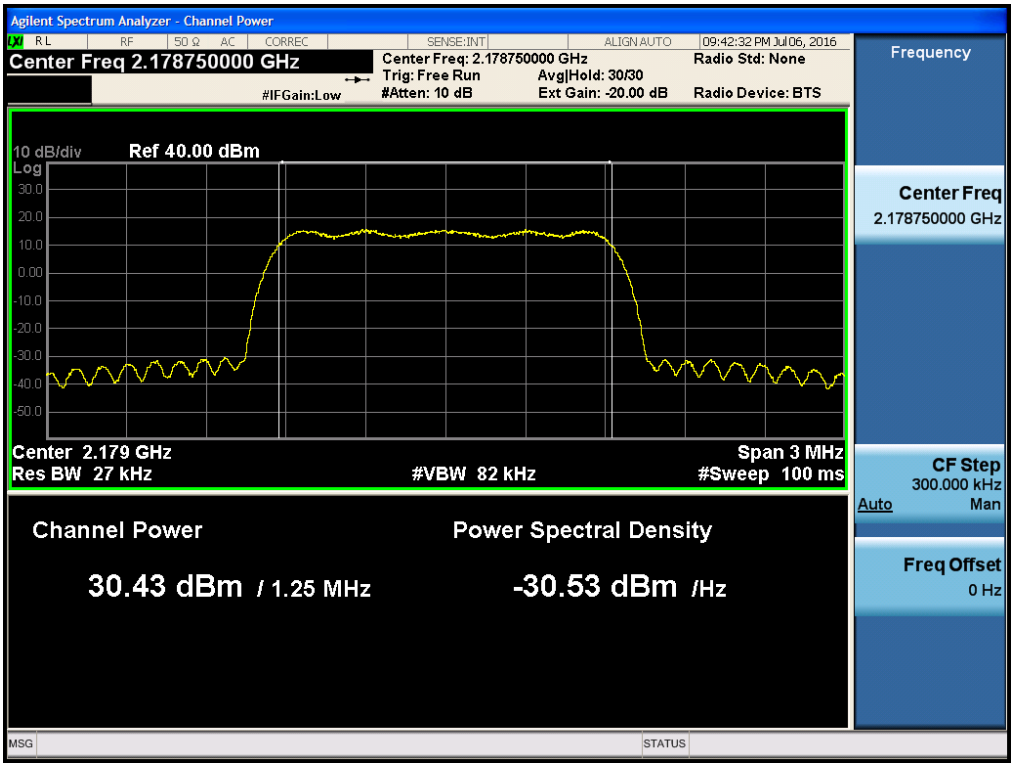
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

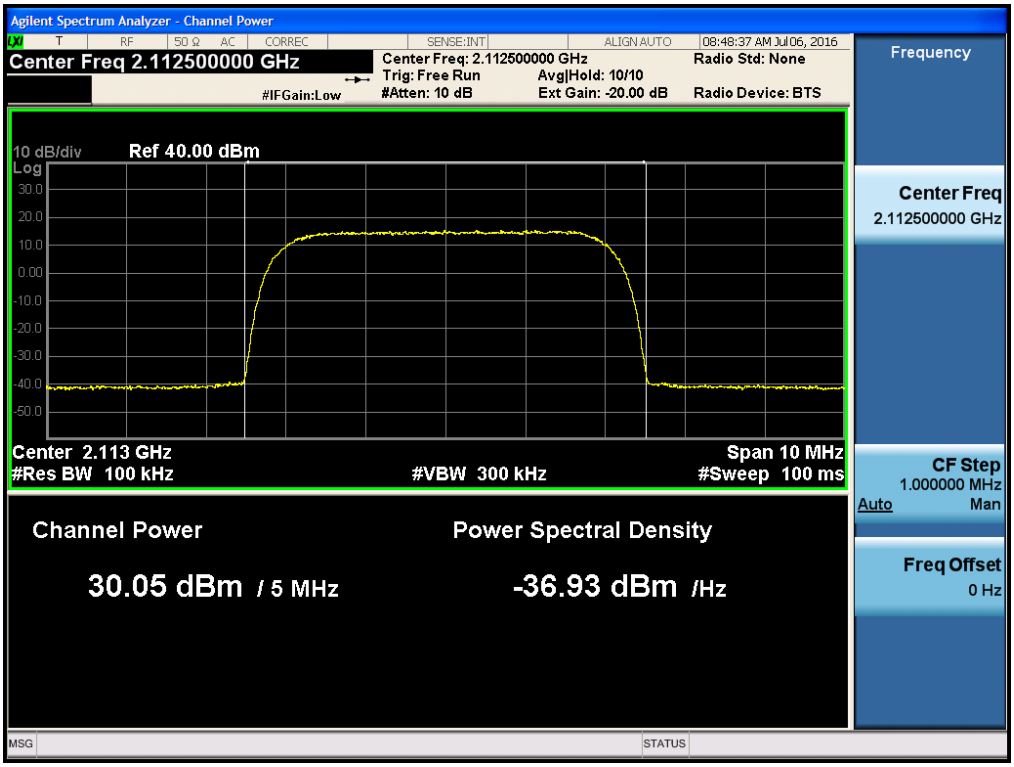


[+3dBm above AGC threshold Downlink High]

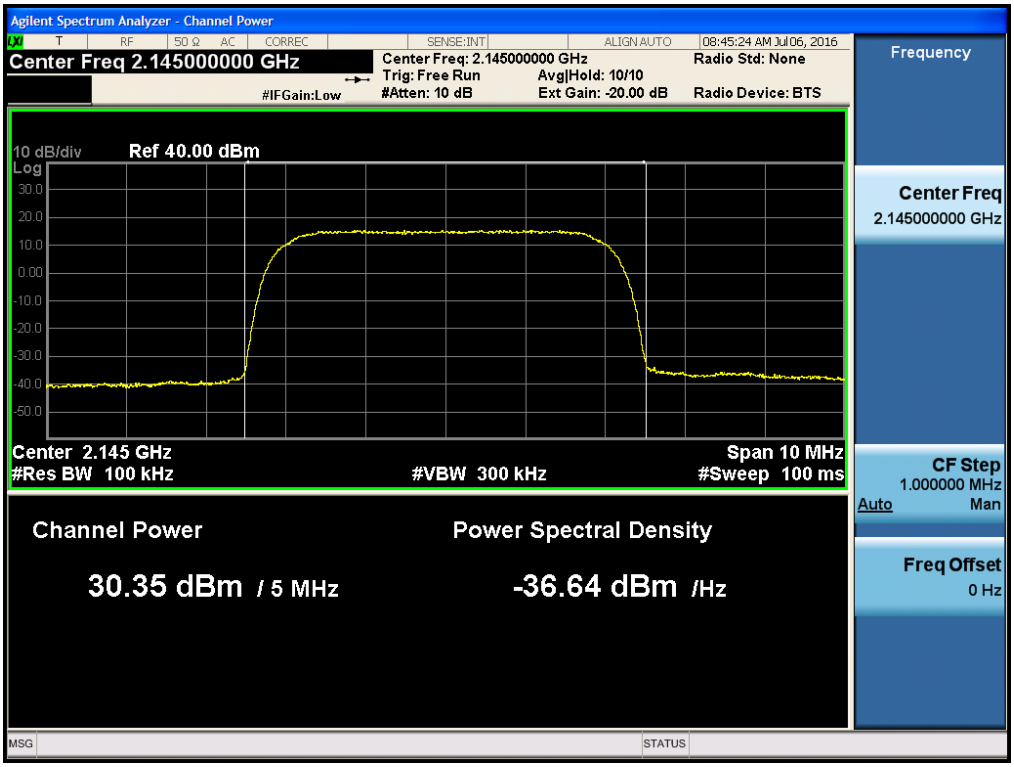


Plots of RF Output Power for AWS Band WCDMA

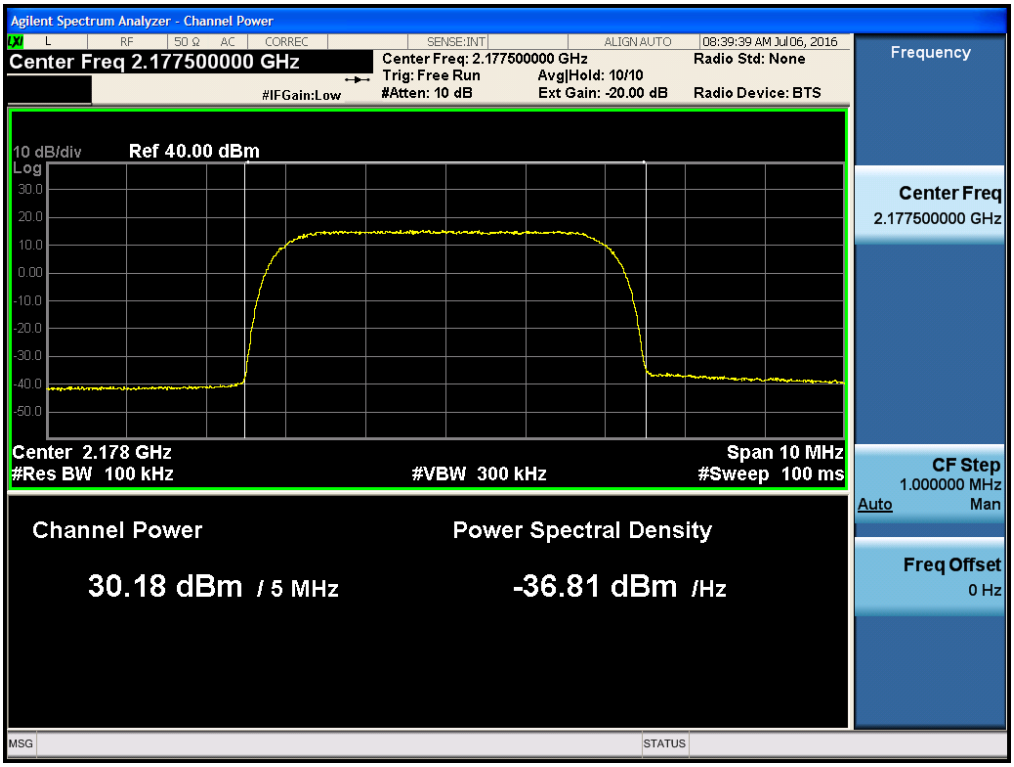
[AGC threshold Downlink Low]



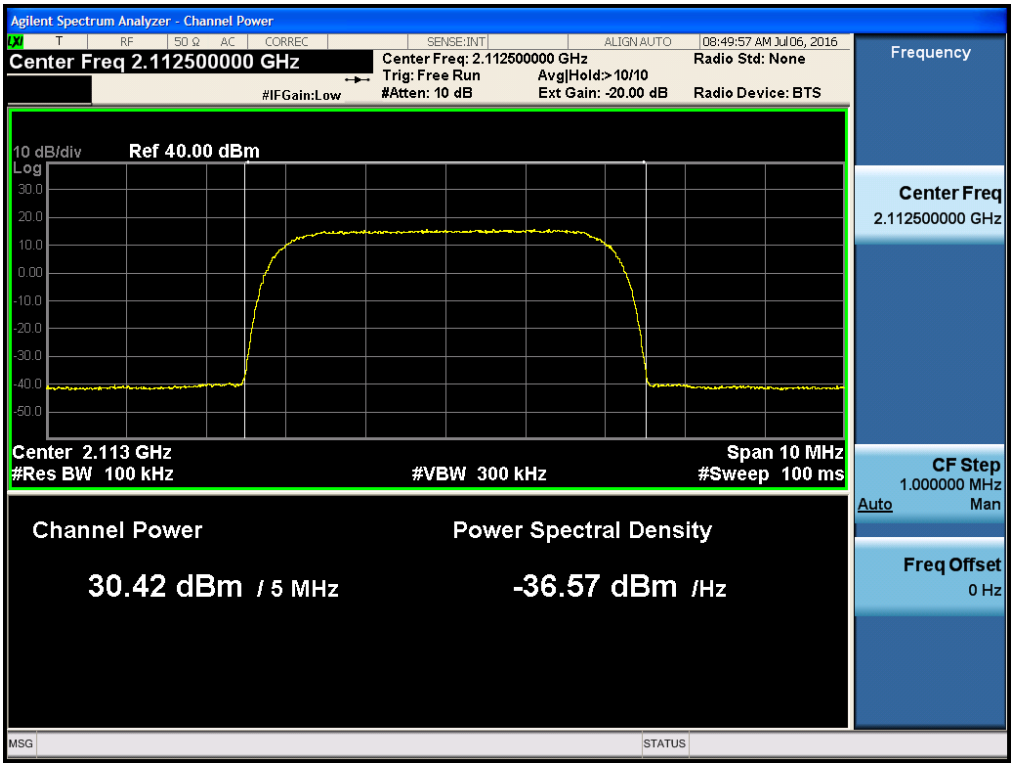
[AGC threshold Downlink Middle]



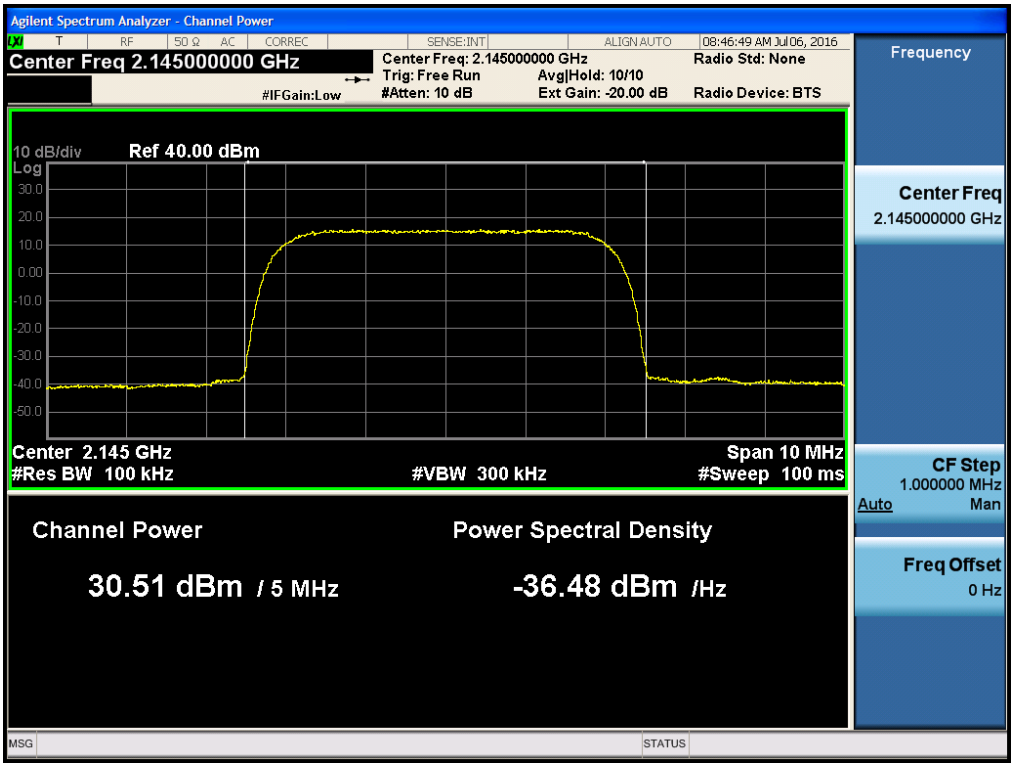
[AGC threshold Downlink High]



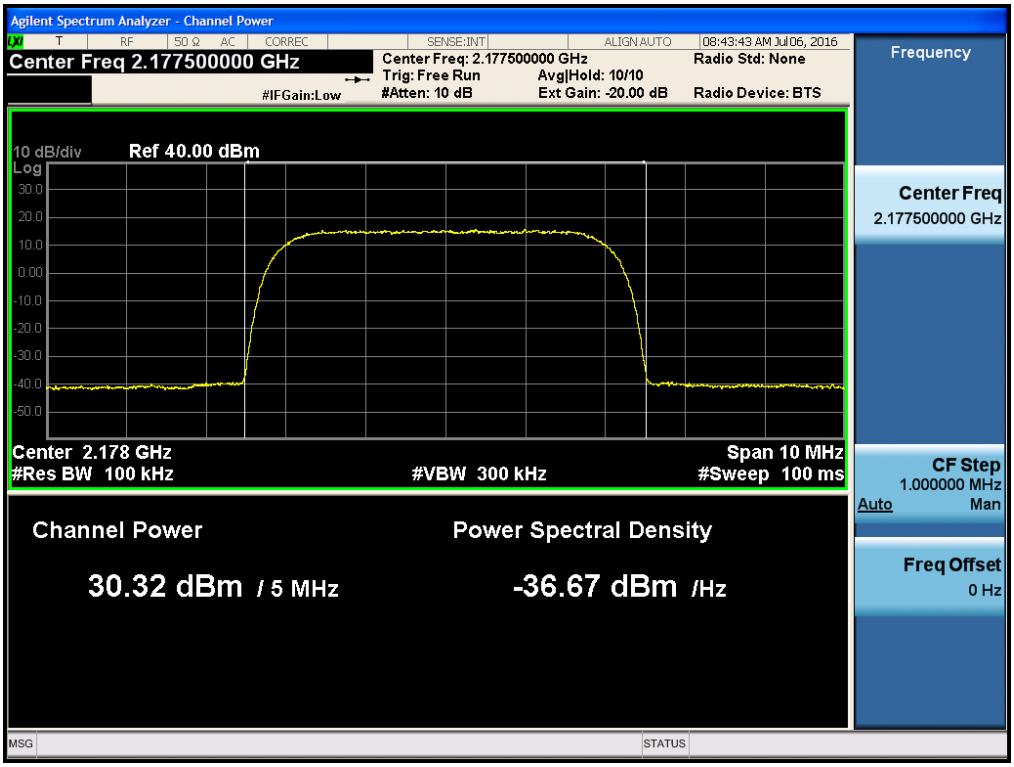
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

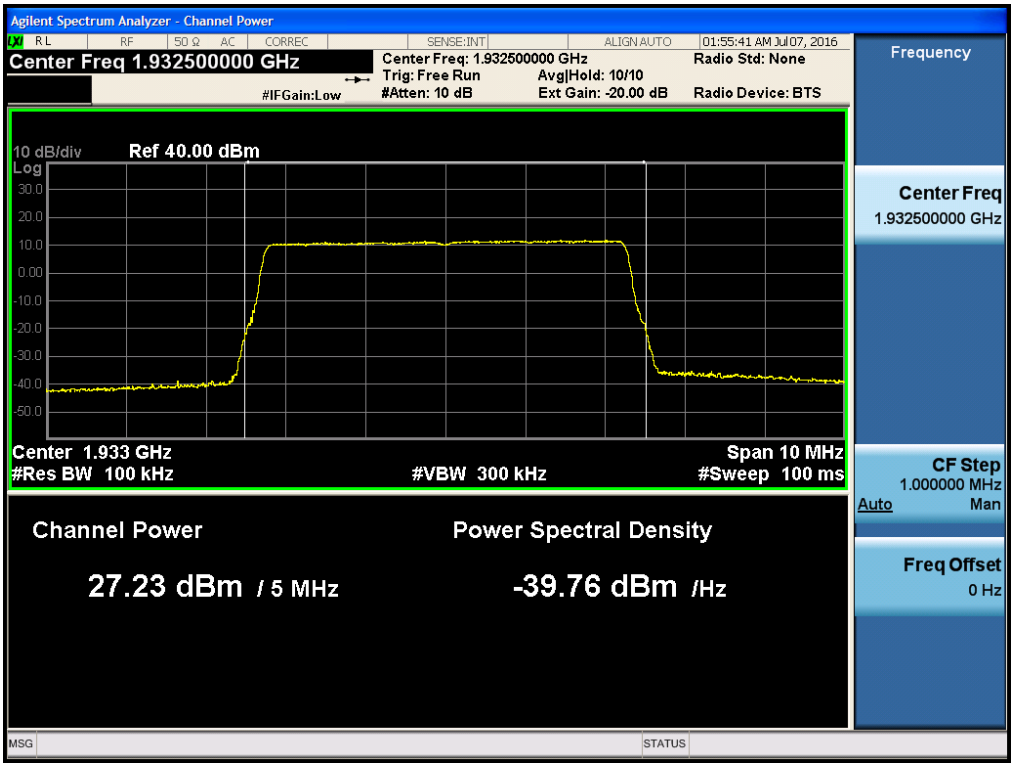


[+3dBm above AGC threshold Downlink High]

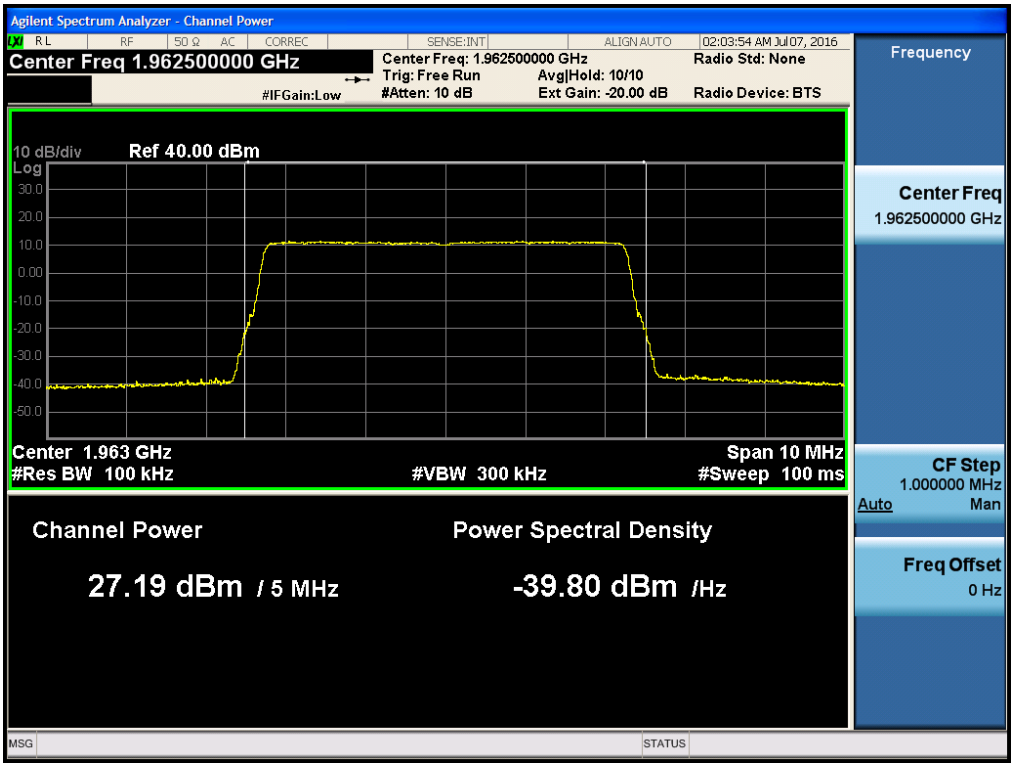


Plots of RF Output Power for 1900 PCS Band LTE 5MHz

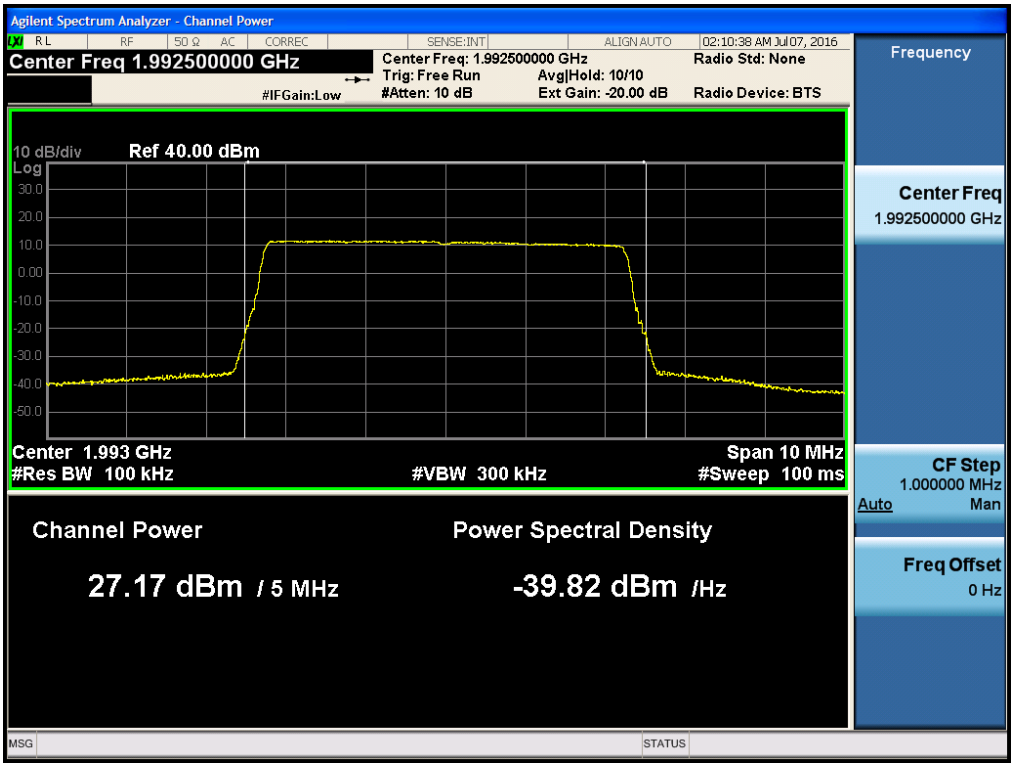
[AGC threshold Downlink Low]



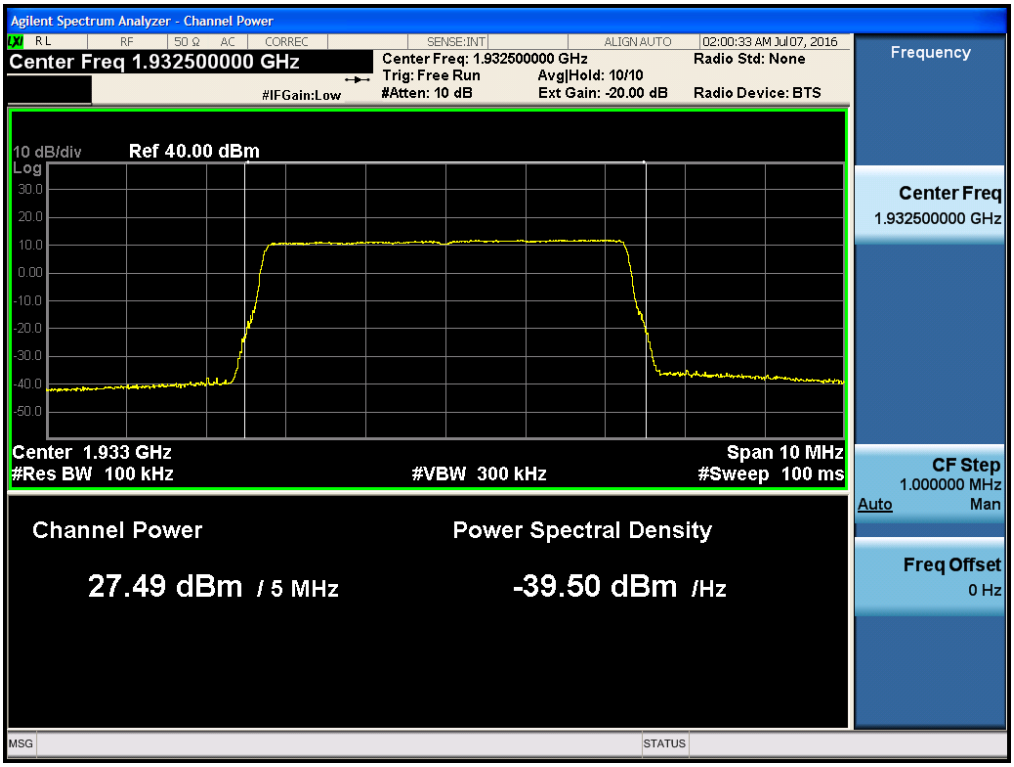
[AGC threshold Downlink Middle]



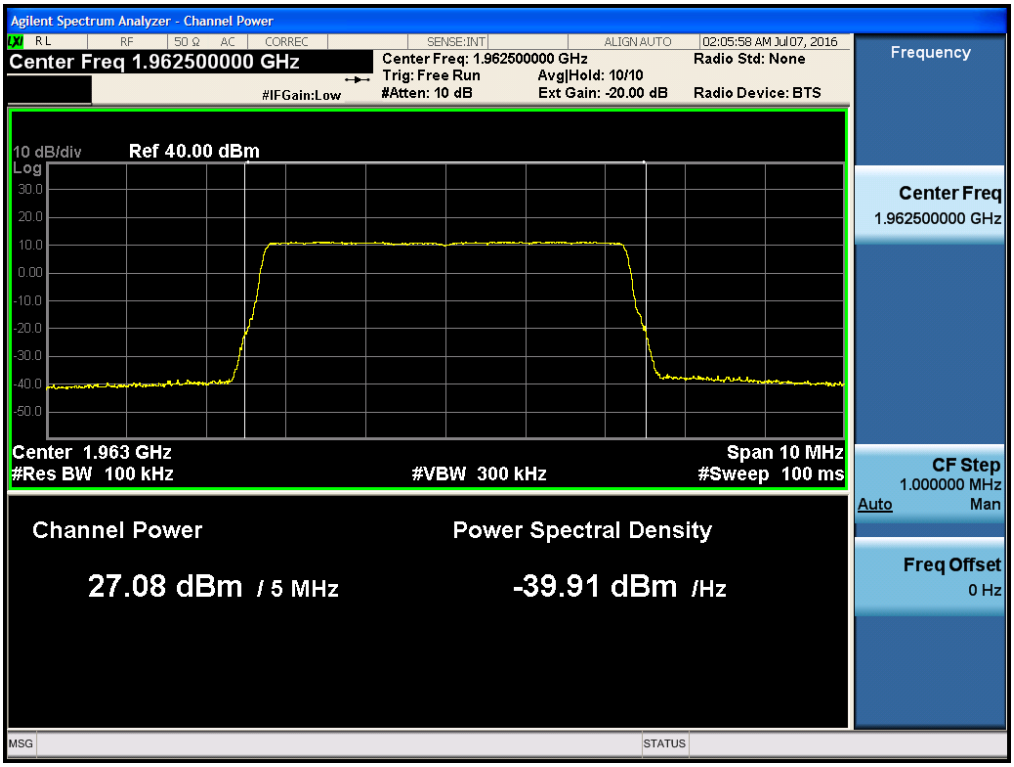
[AGC threshold Downlink High]



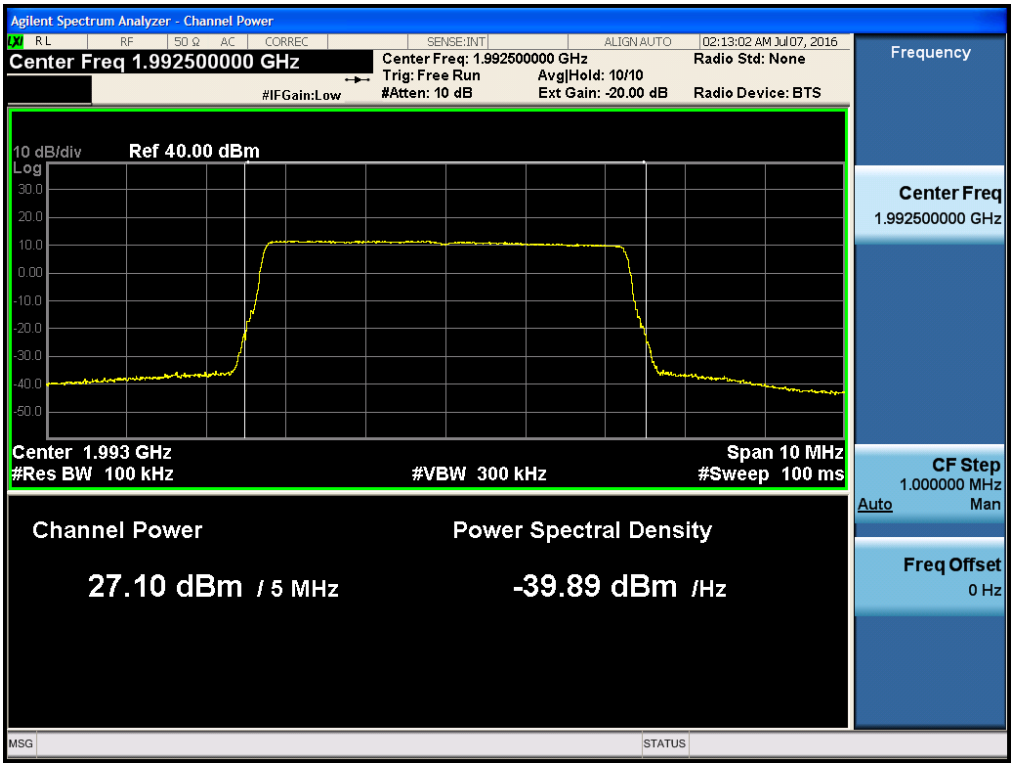
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

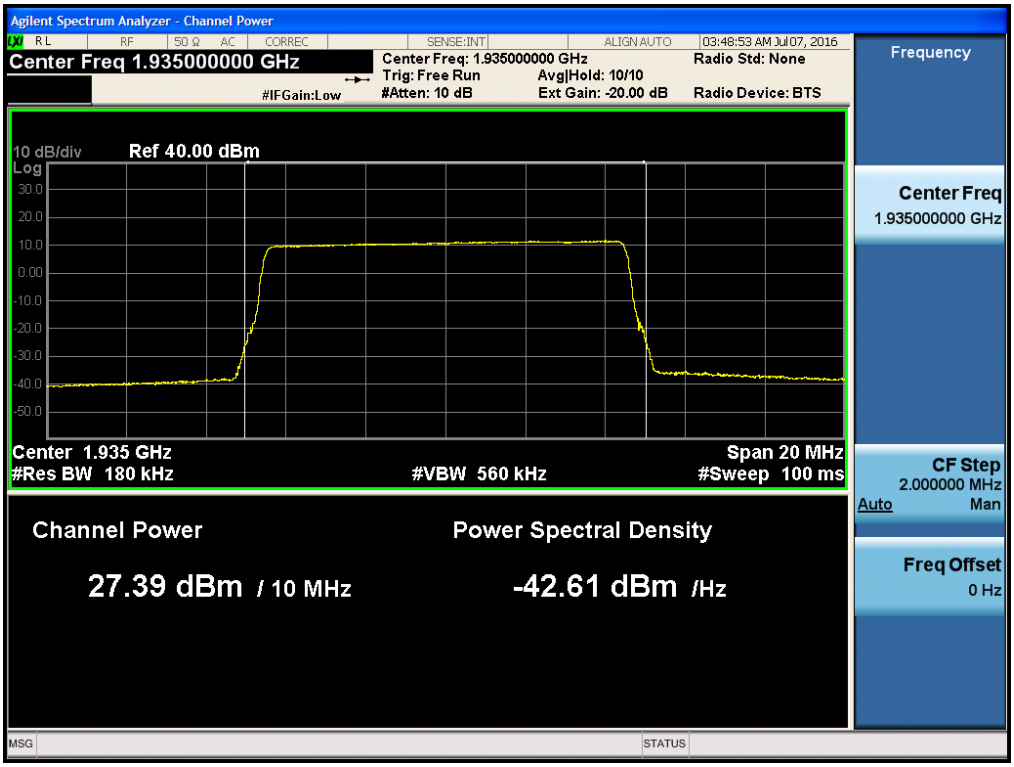


[+3dBm above AGC threshold Downlink High]

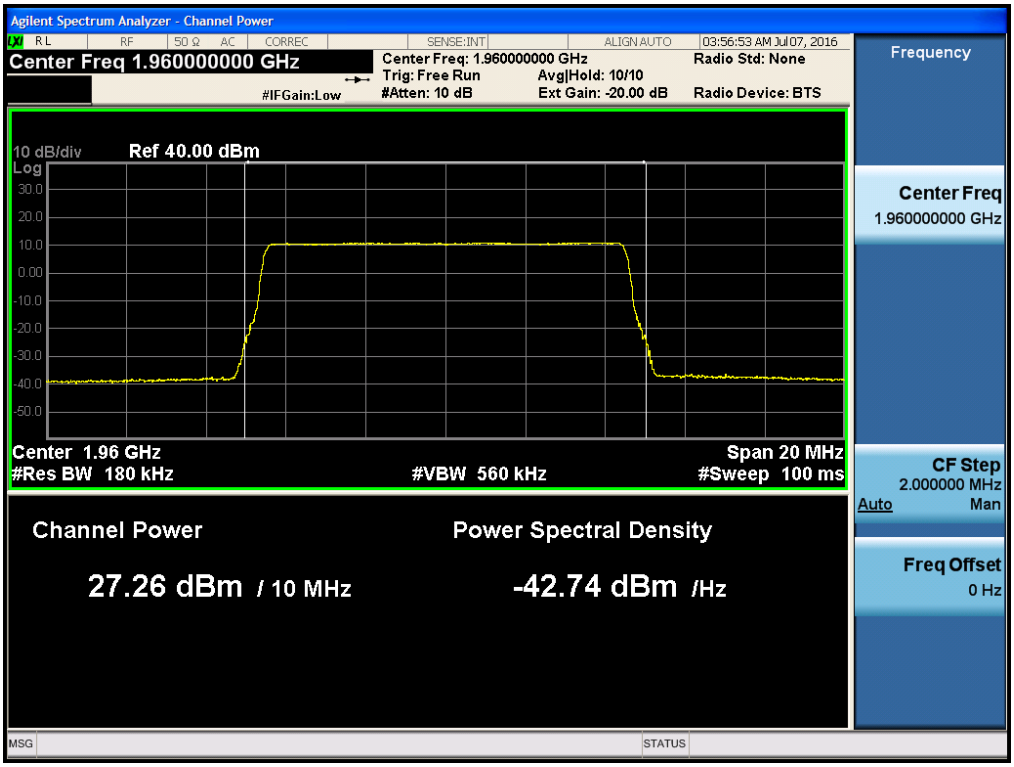


Plots of RF Output Power for 1900 PCS Band LTE 10MHz

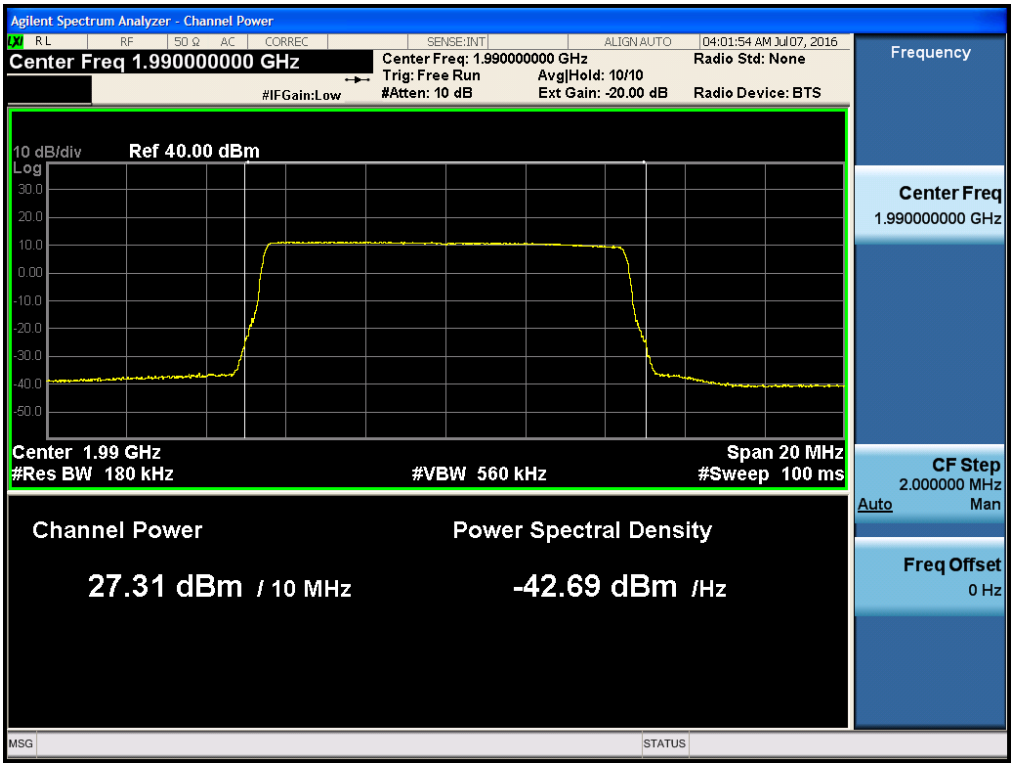
[AGC threshold Downlink Low]



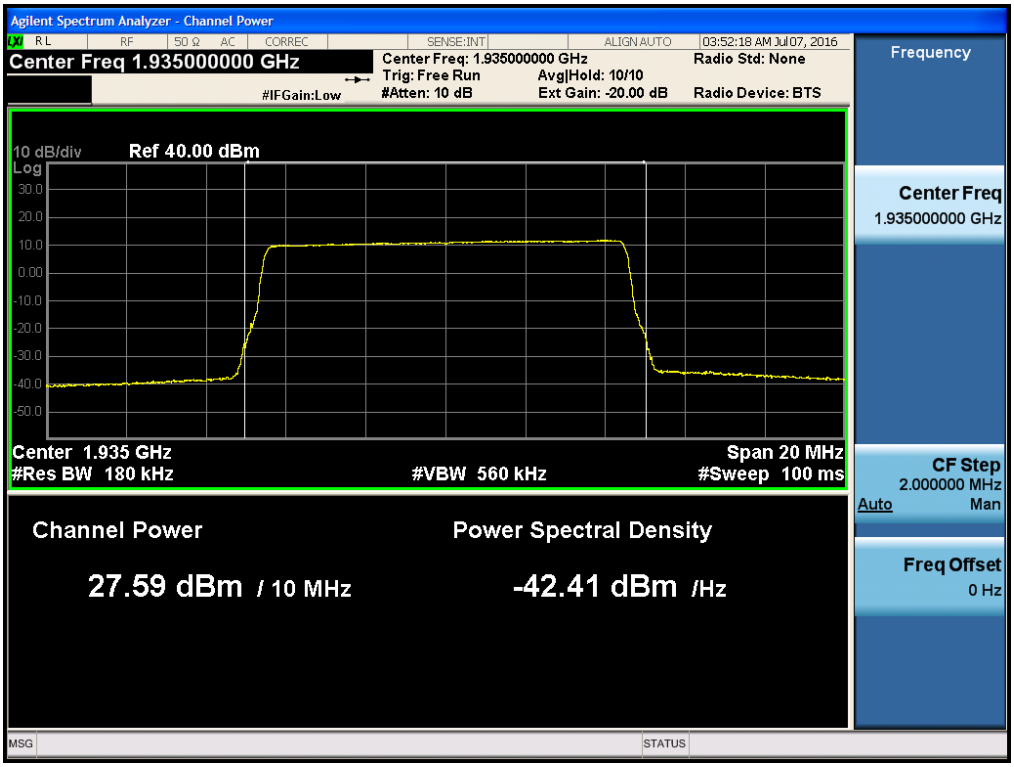
[AGC threshold Downlink Middle]



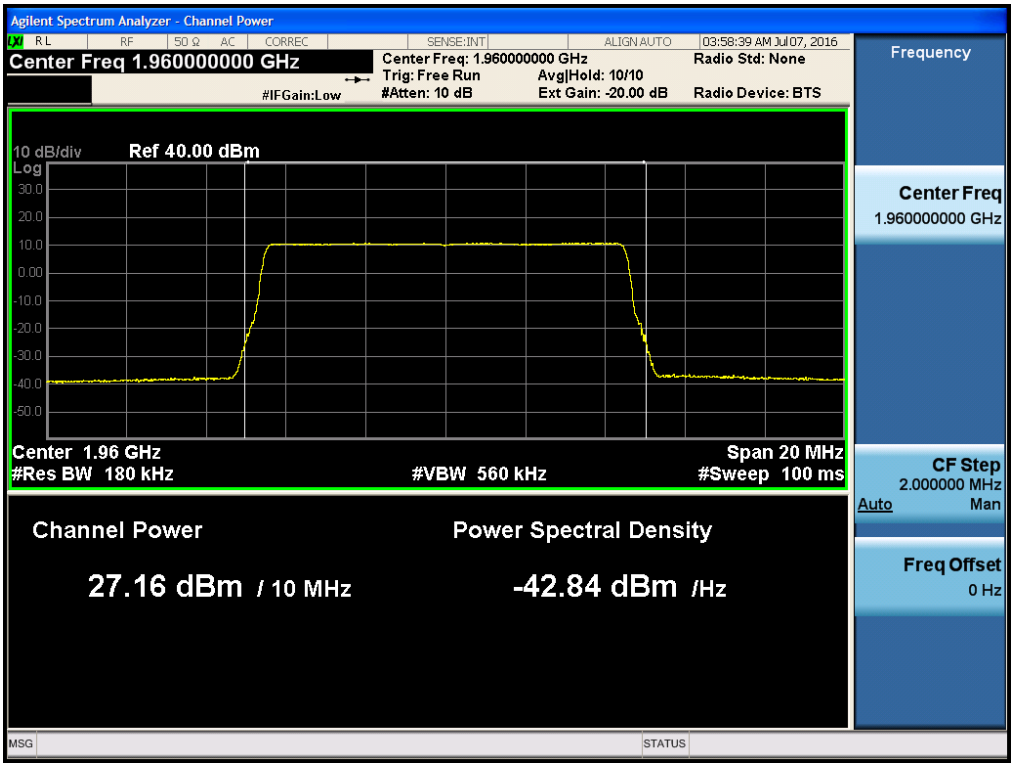
[AGC threshold Downlink High]



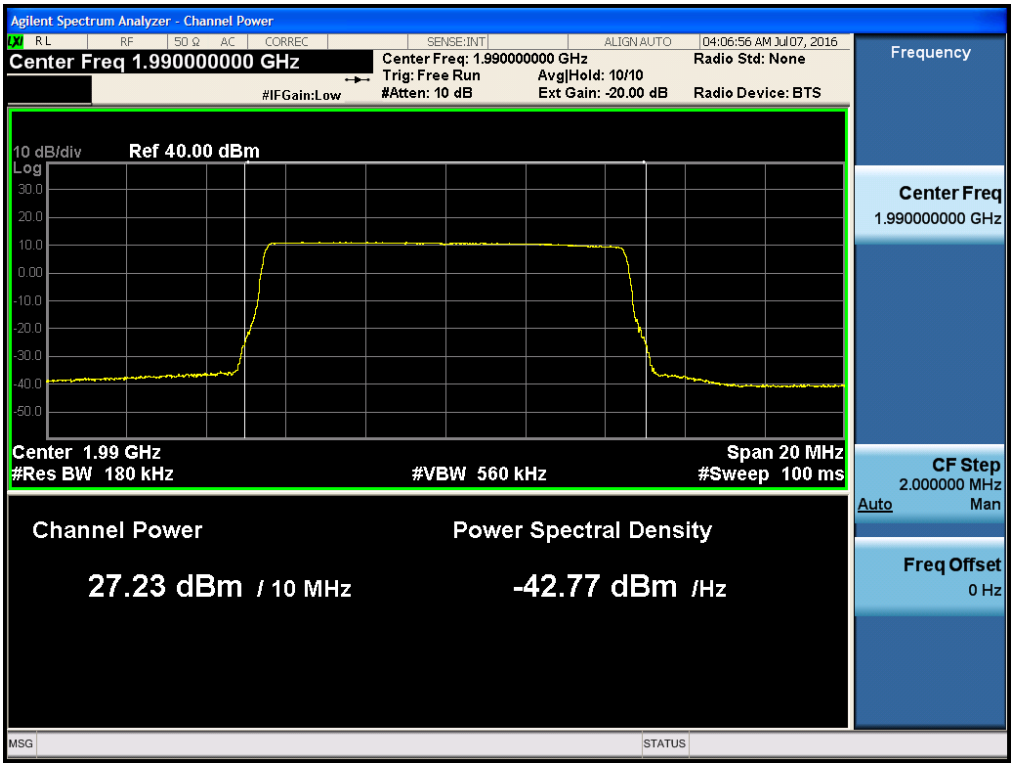
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

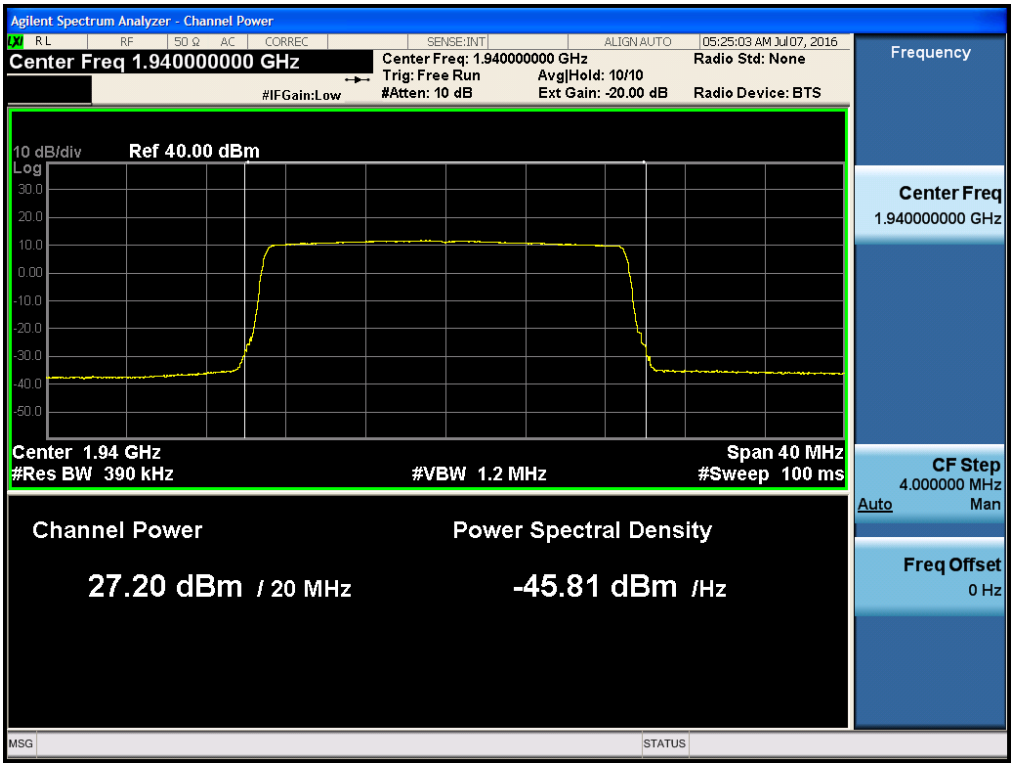


[+3dBm above AGC threshold Downlink High]

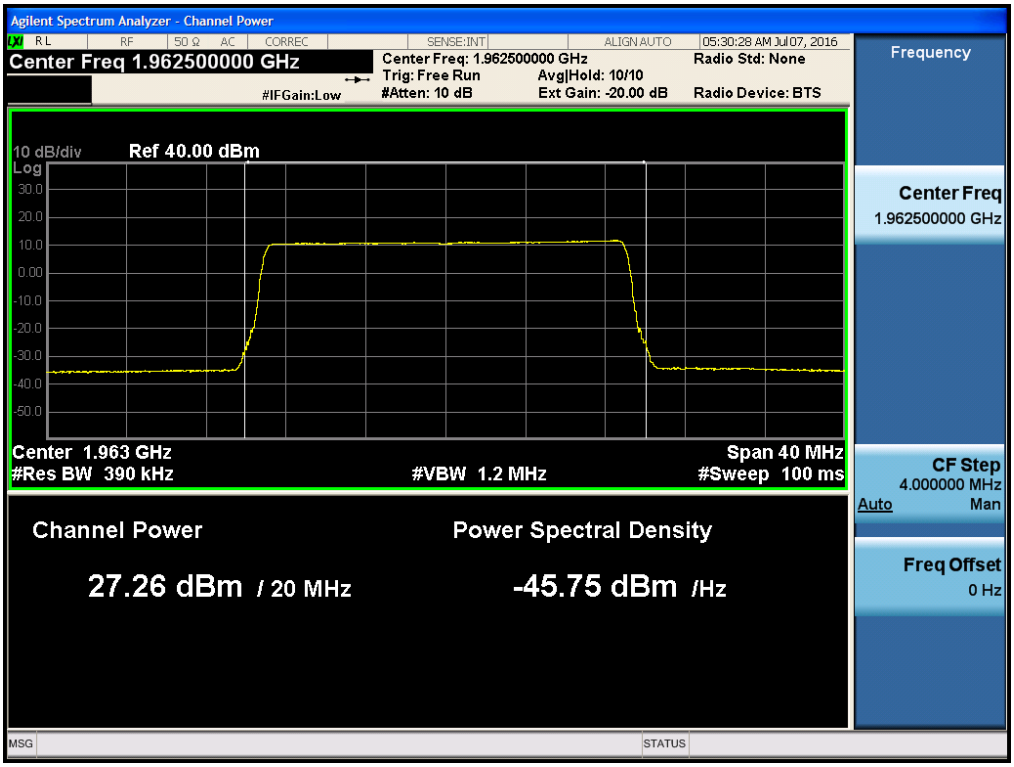


Plots of RF Output Power for 1900 PCS Band LTE 20MHz

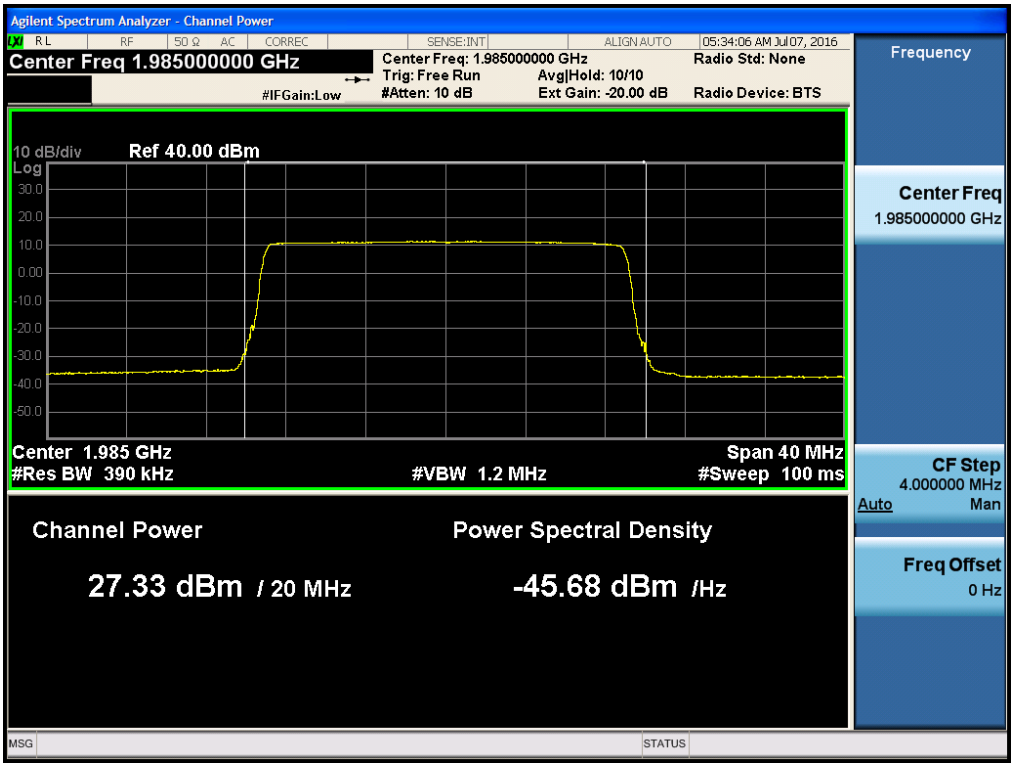
[AGC threshold Downlink Low]



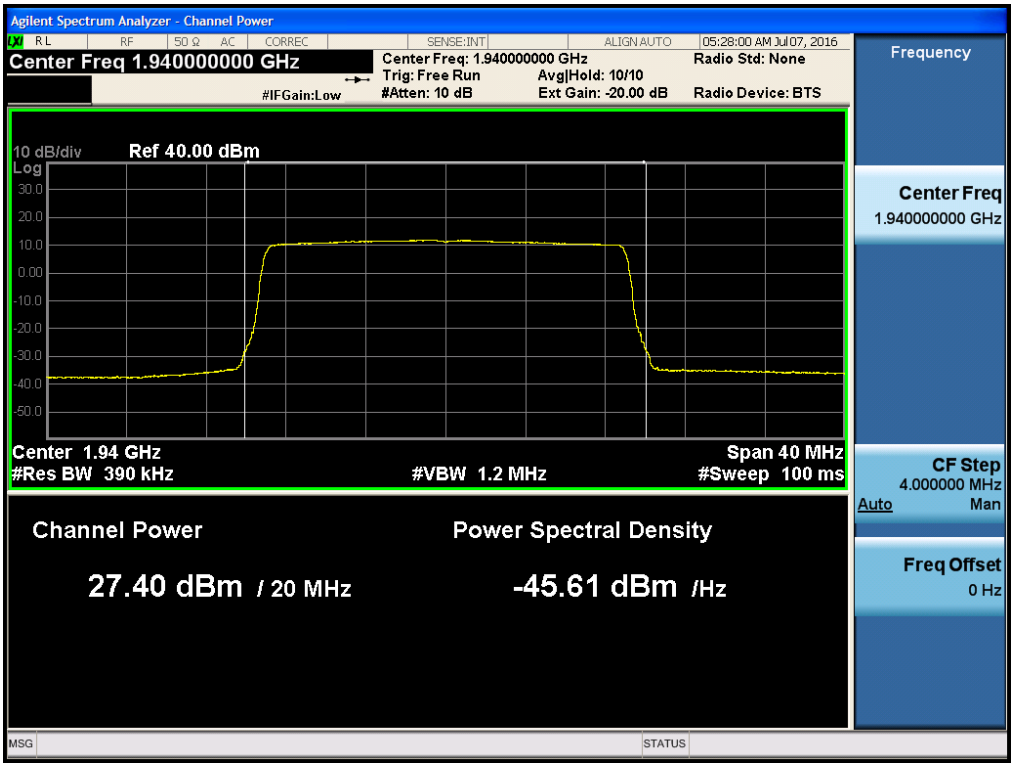
[AGC threshold Downlink Middle]



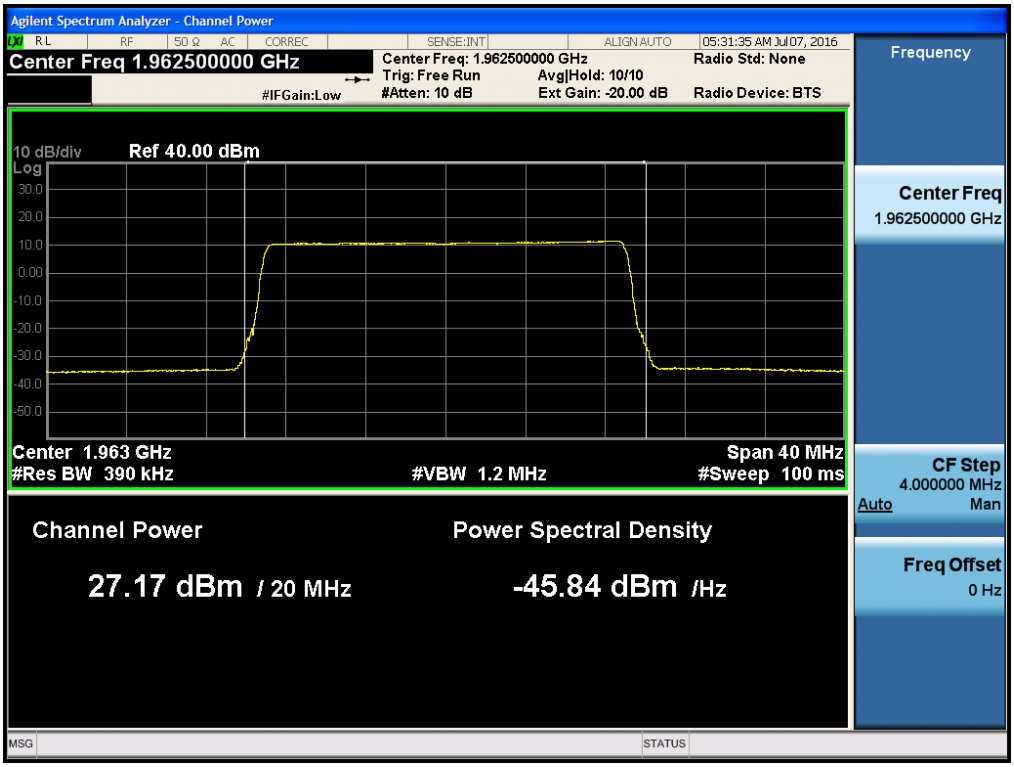
[AGC threshold Downlink High]



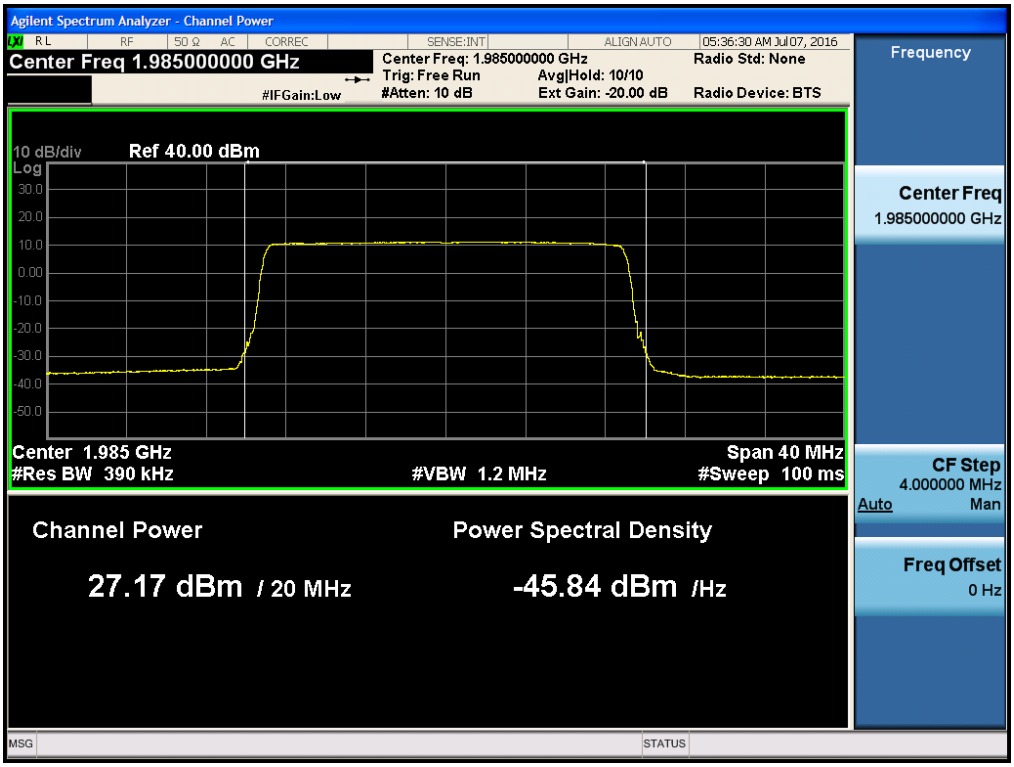
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

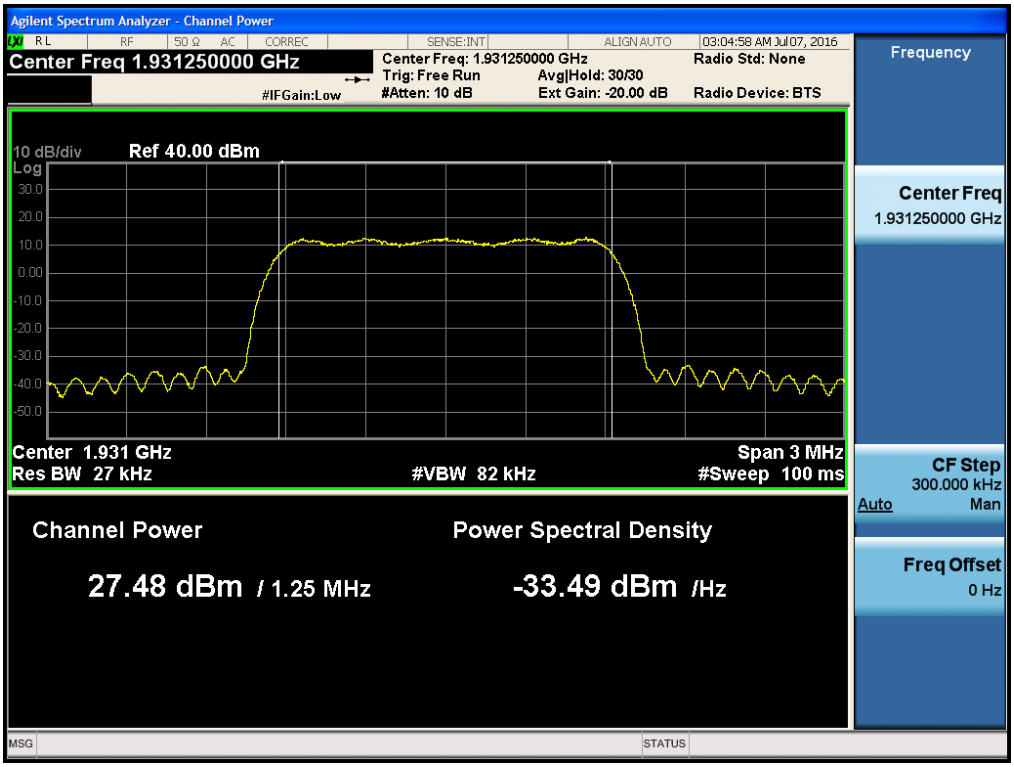


[+3dBm above AGC threshold Downlink High]

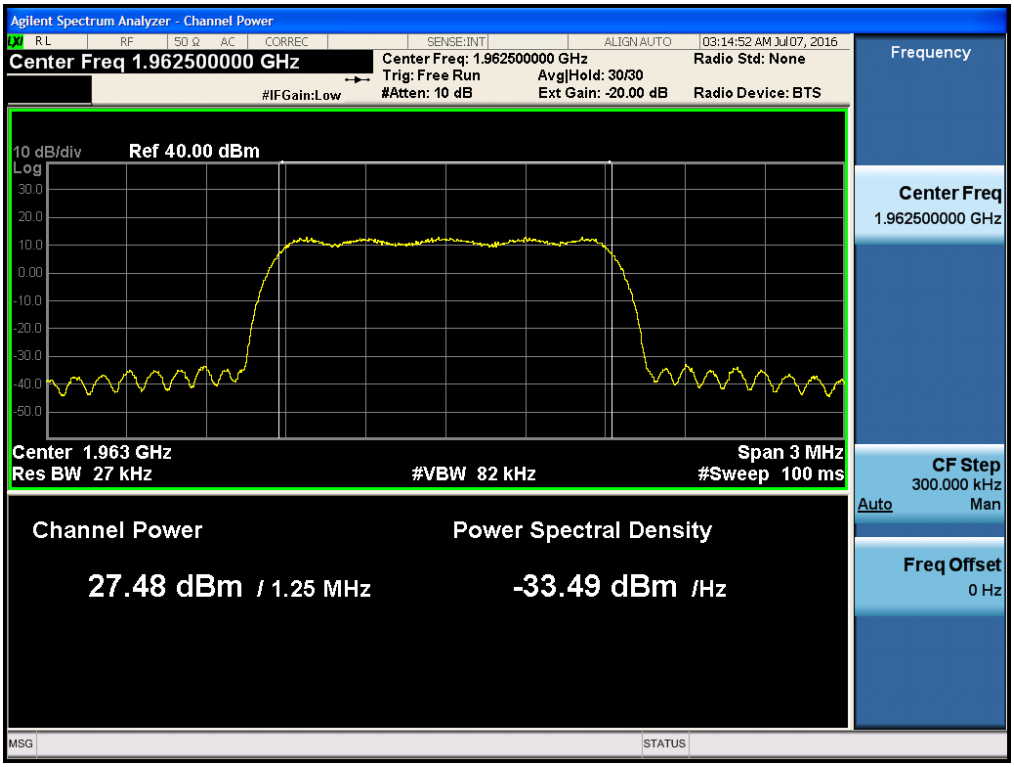


Plots of RF Output Power for 1900 PCS Band CDMA

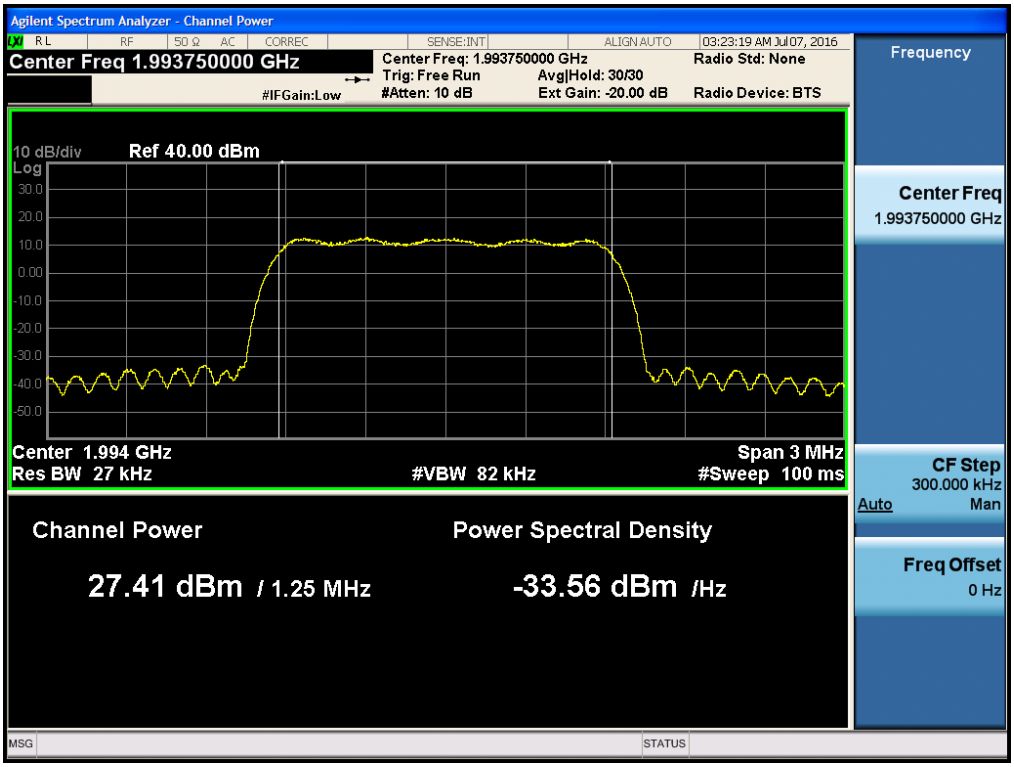
[AGC threshold Downlink Low]



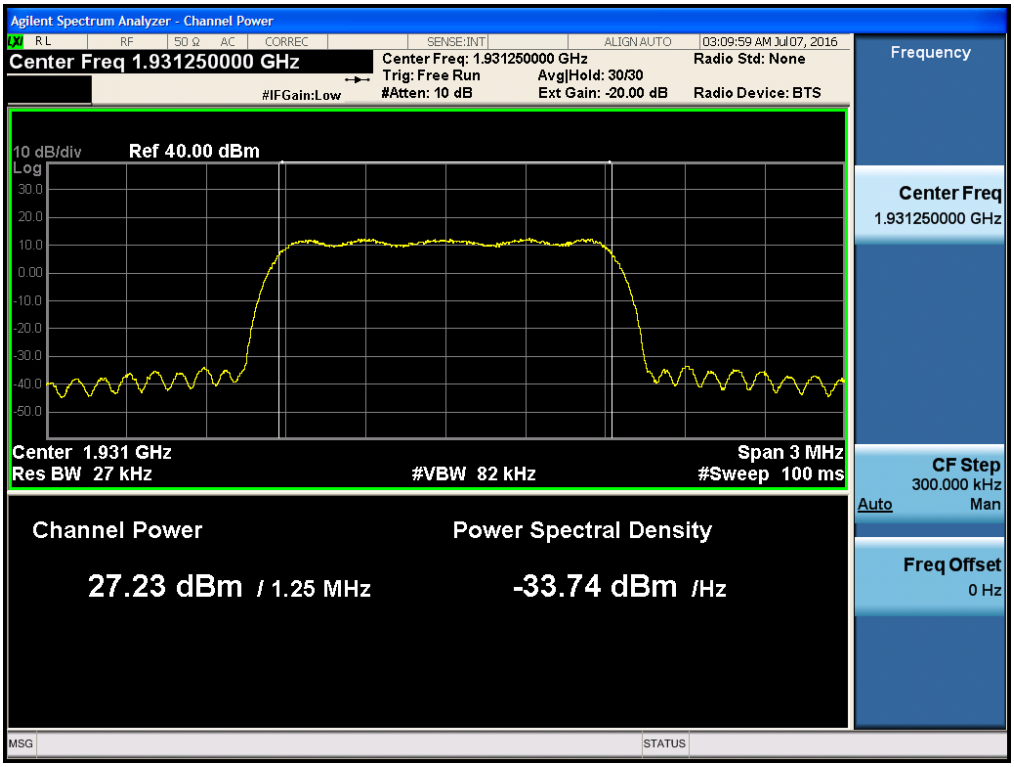
[AGC threshold Downlink Middle]



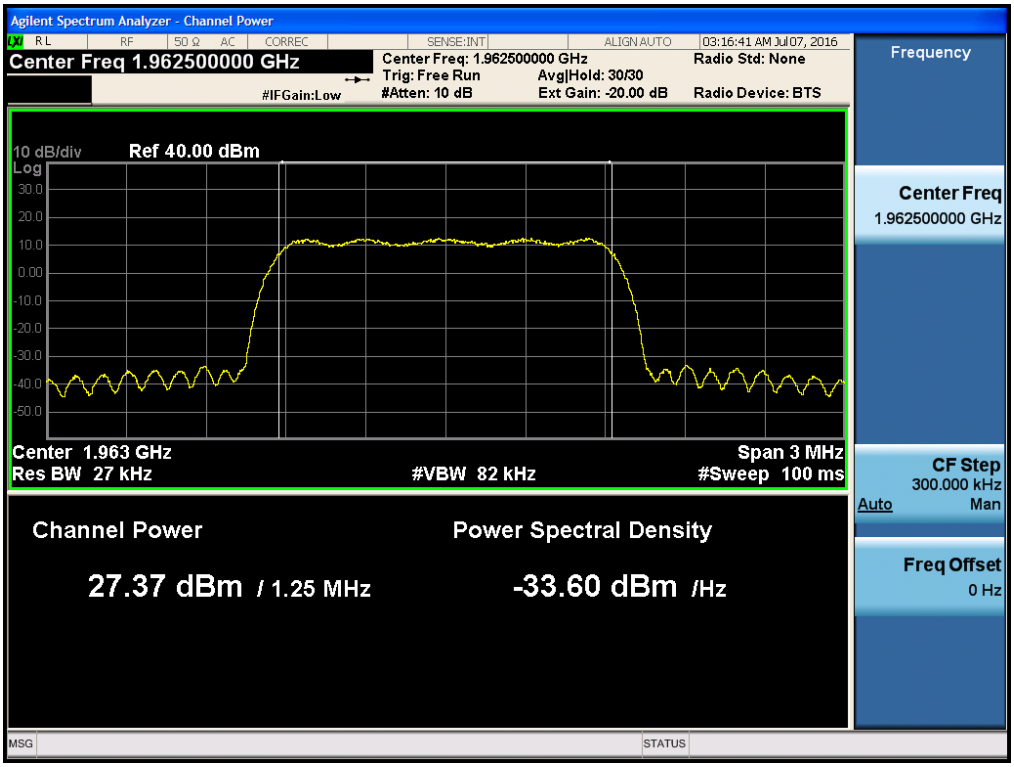
[AGC threshold Downlink High]



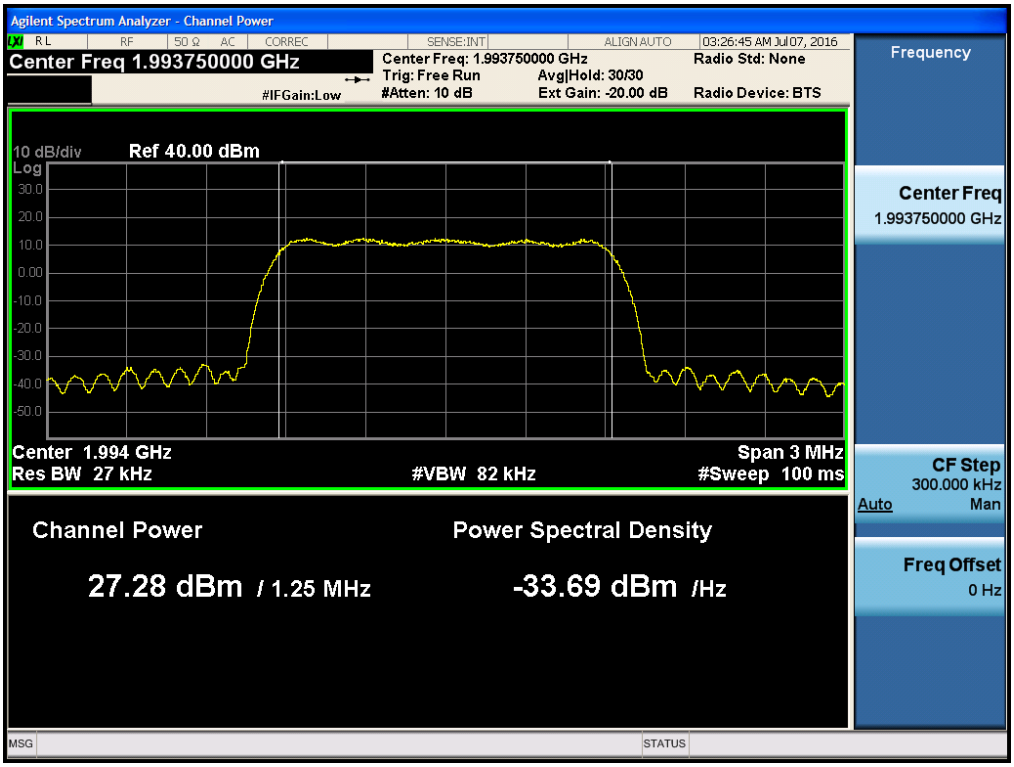
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

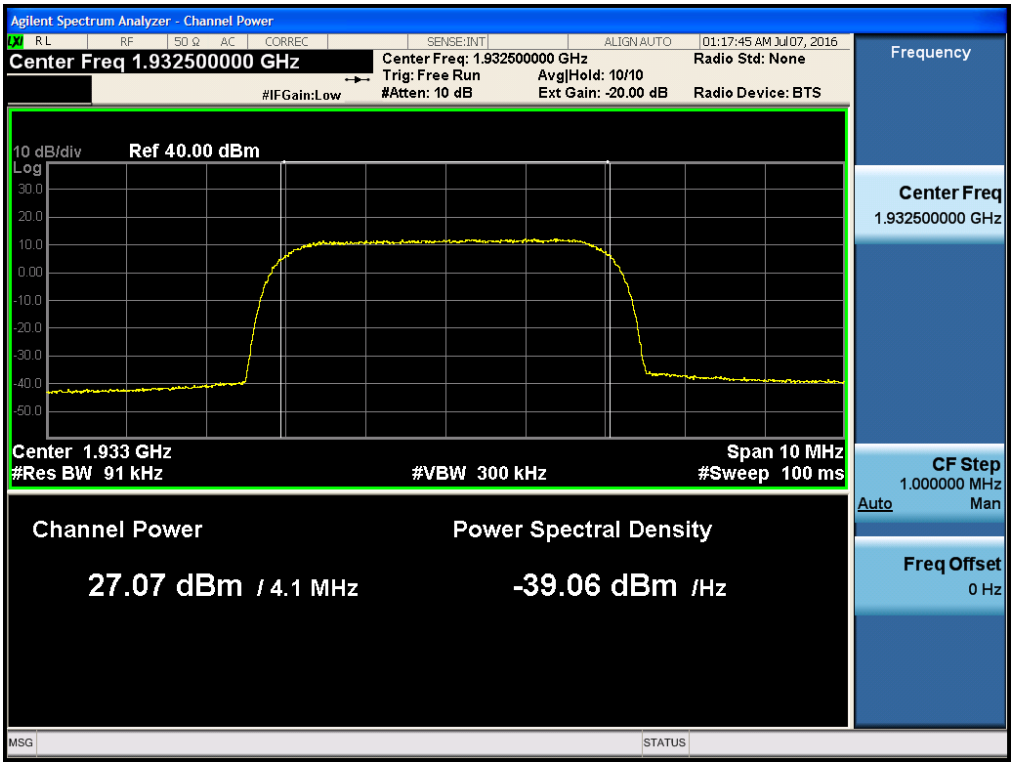


[+3dBm above AGC threshold Downlink High]

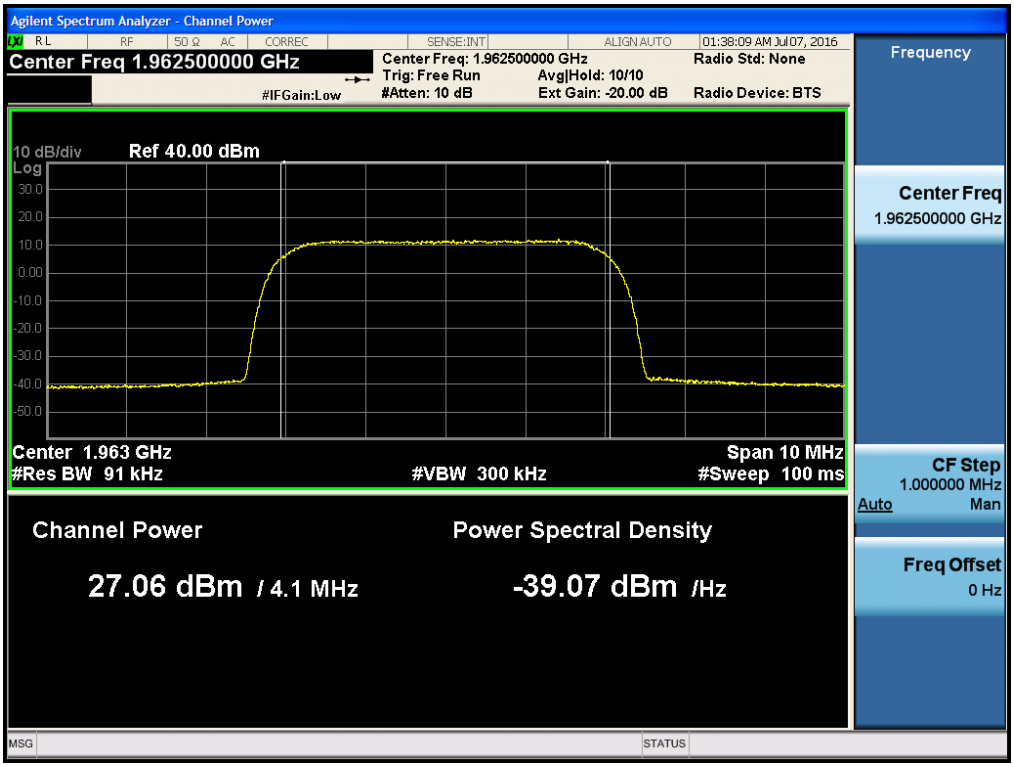


Plots of RF Output Power for 1900 PCS Band WCDMA

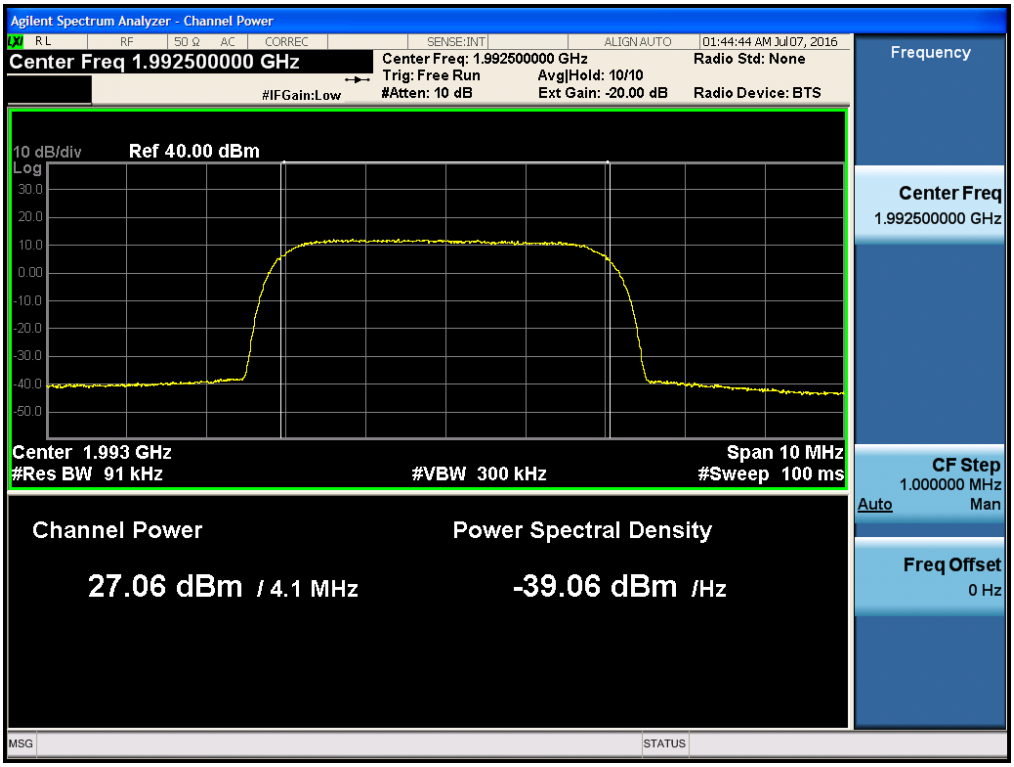
[AGC threshold Downlink Low]



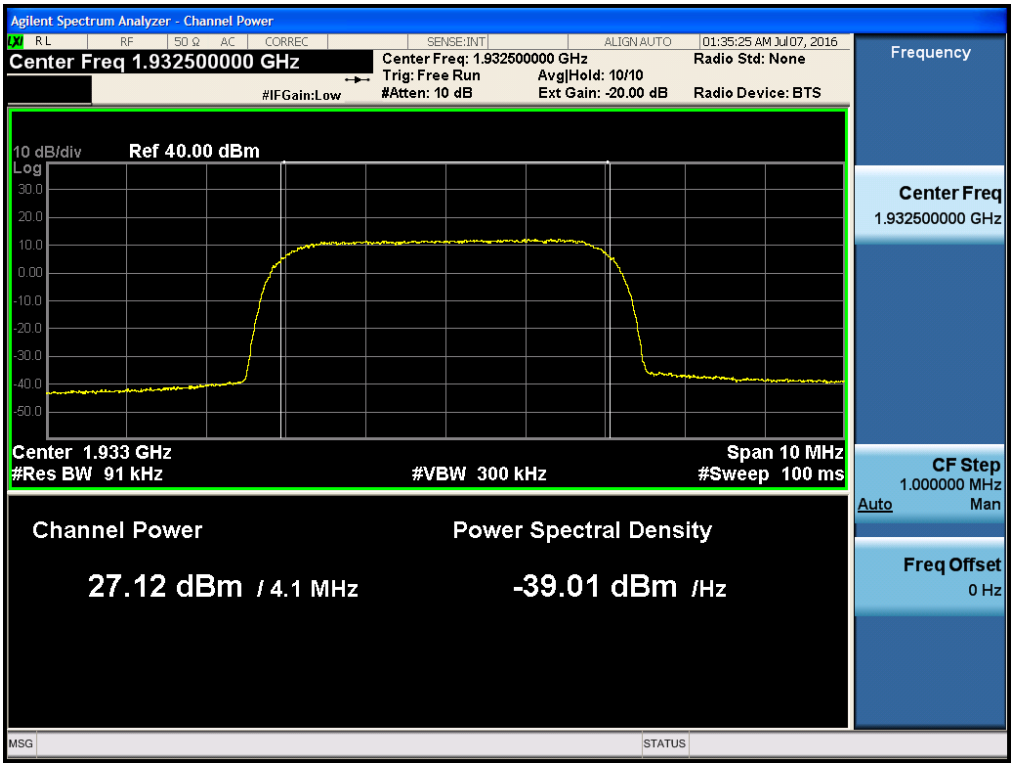
[AGC threshold Downlink Middle]



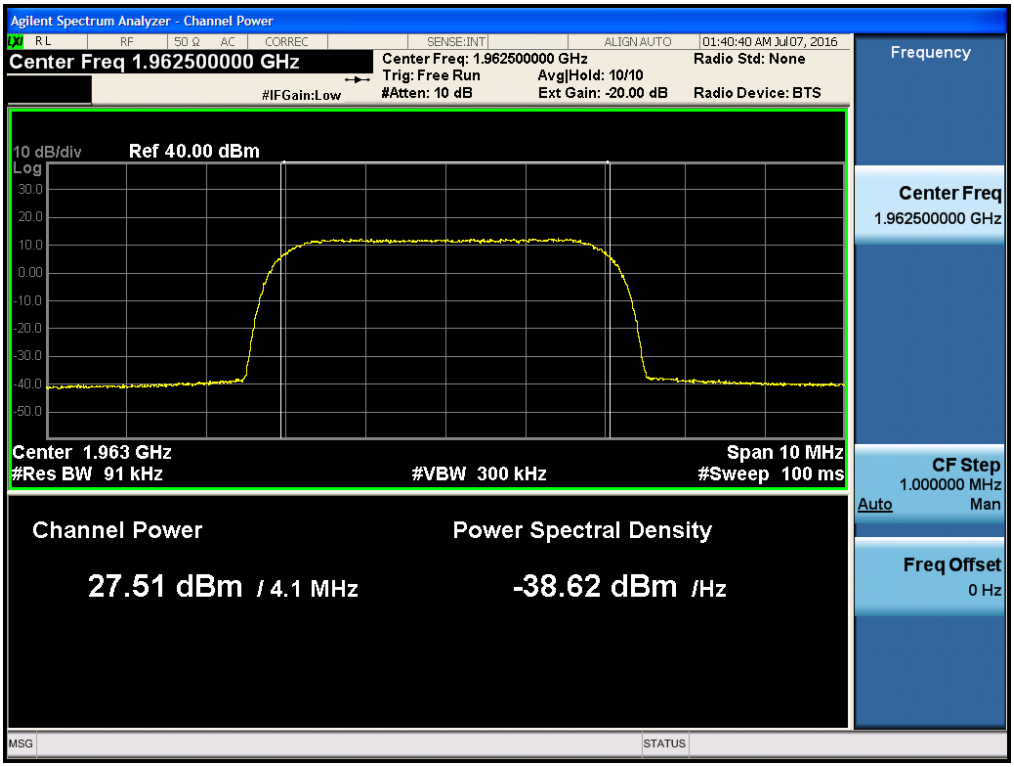
[AGC threshold Downlink High]



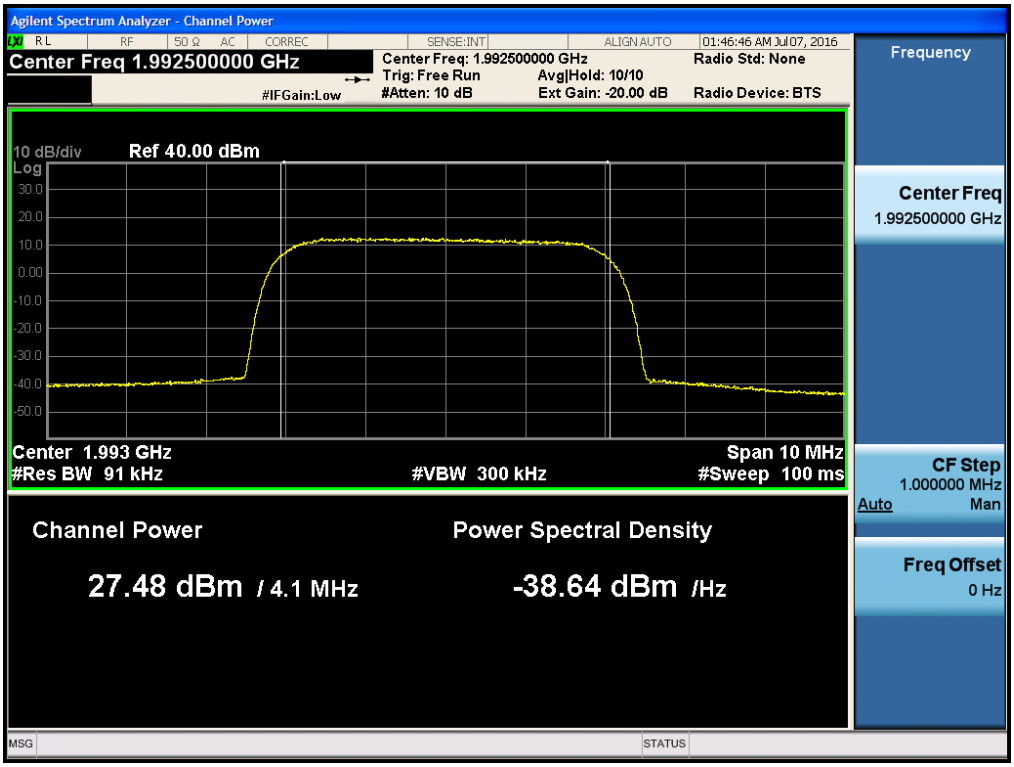
[+3dBm above AGC threshold Downlink Low]



[+3dBm above AGC threshold Downlink Middle]

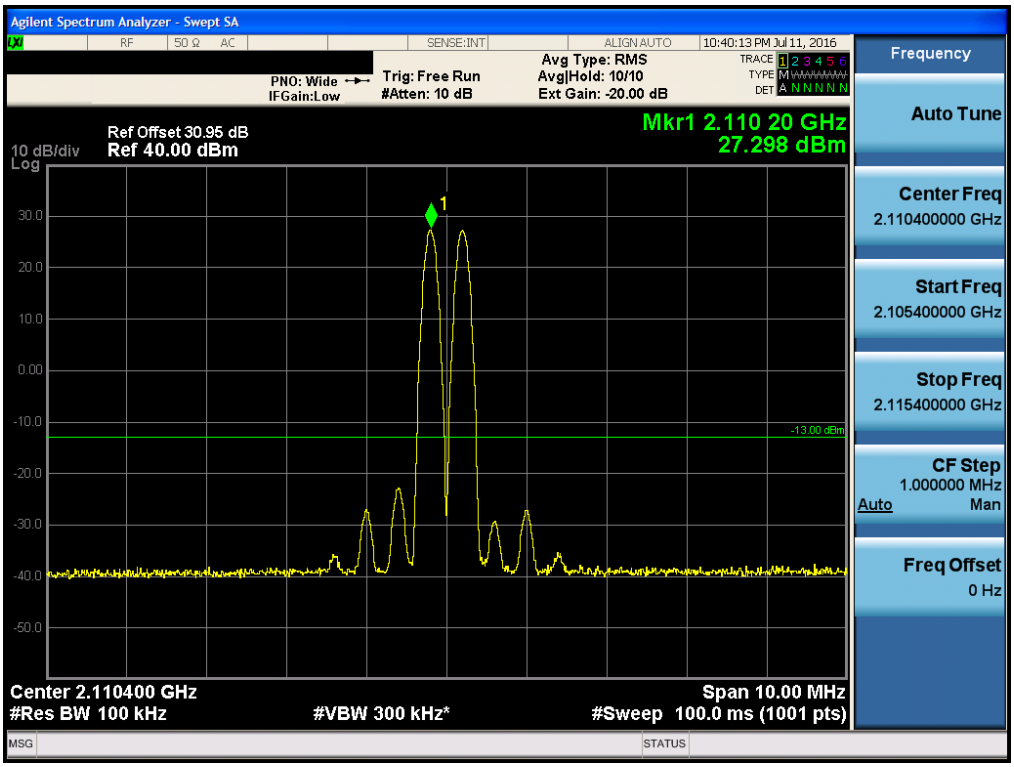


[+3dBm above AGC threshold Downlink High]

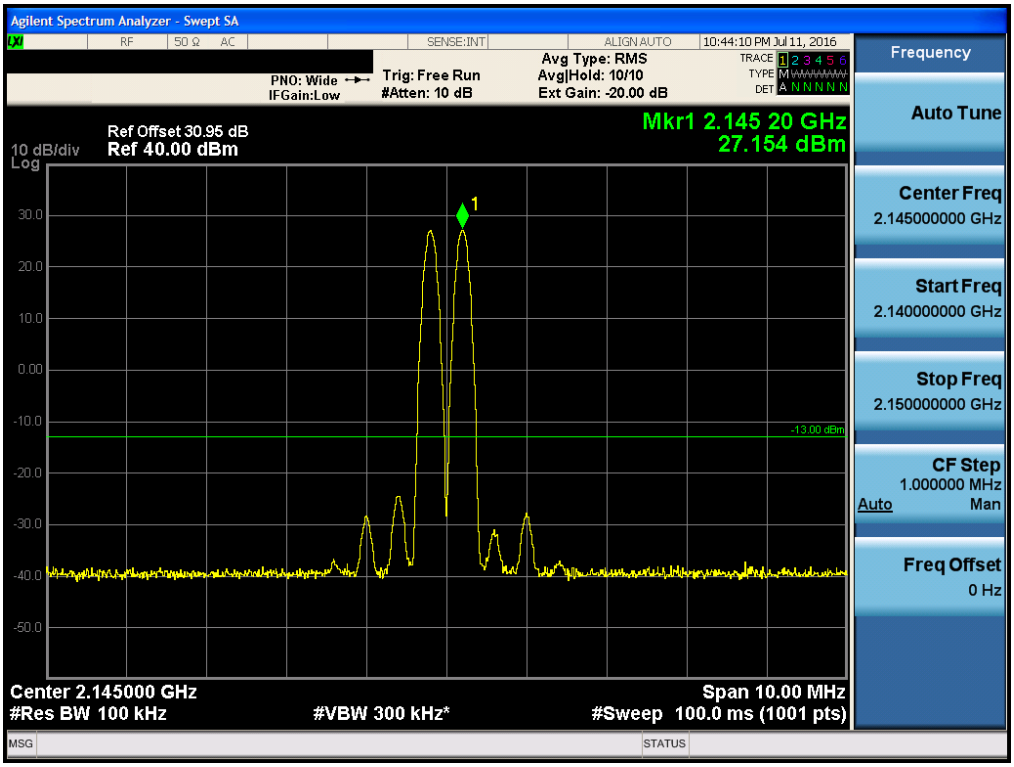


Multi-channel Enhancer for IC_ AWS BAND

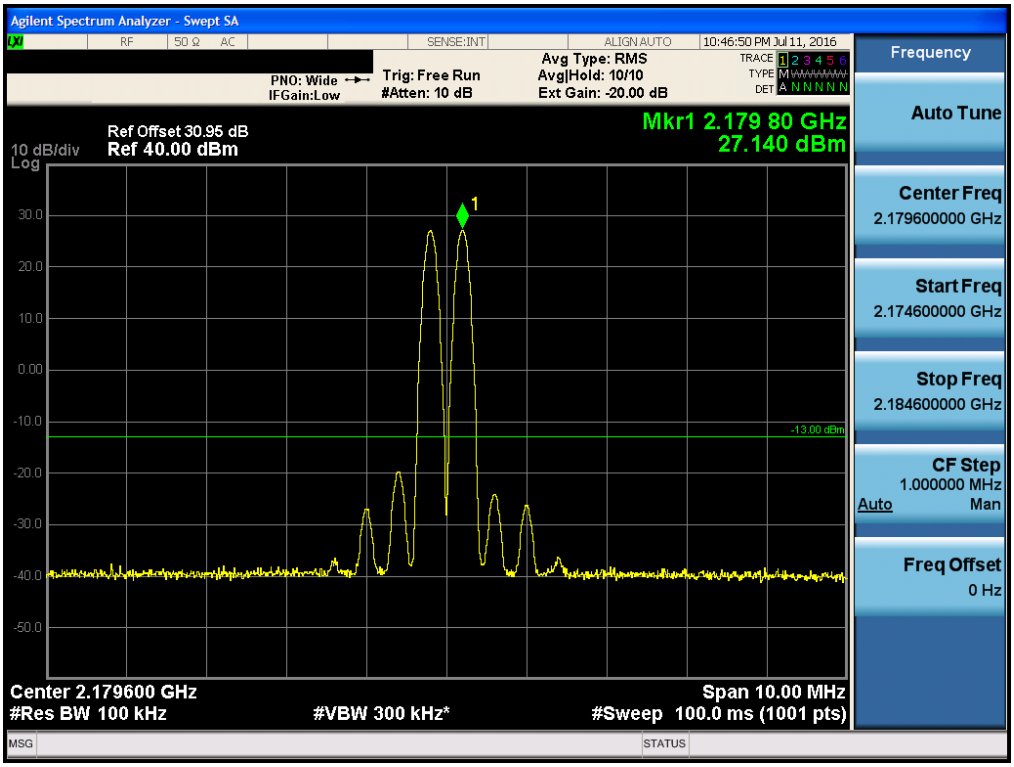
[Downlink Low]



[Downlink Middle]

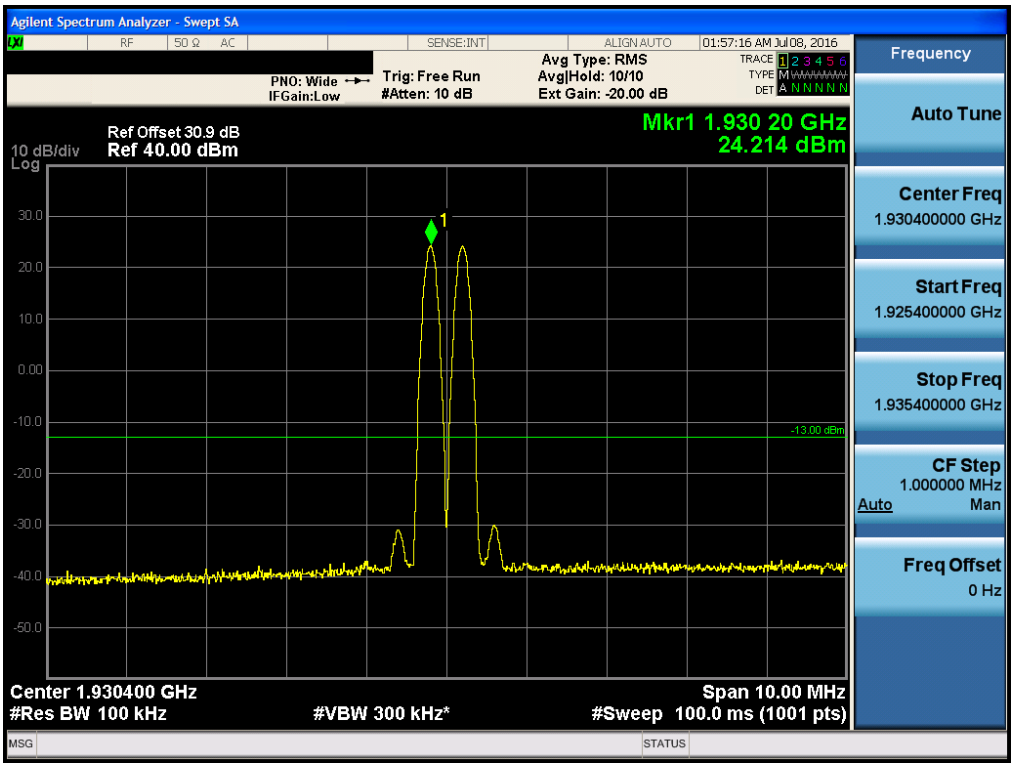


[Downlink High]

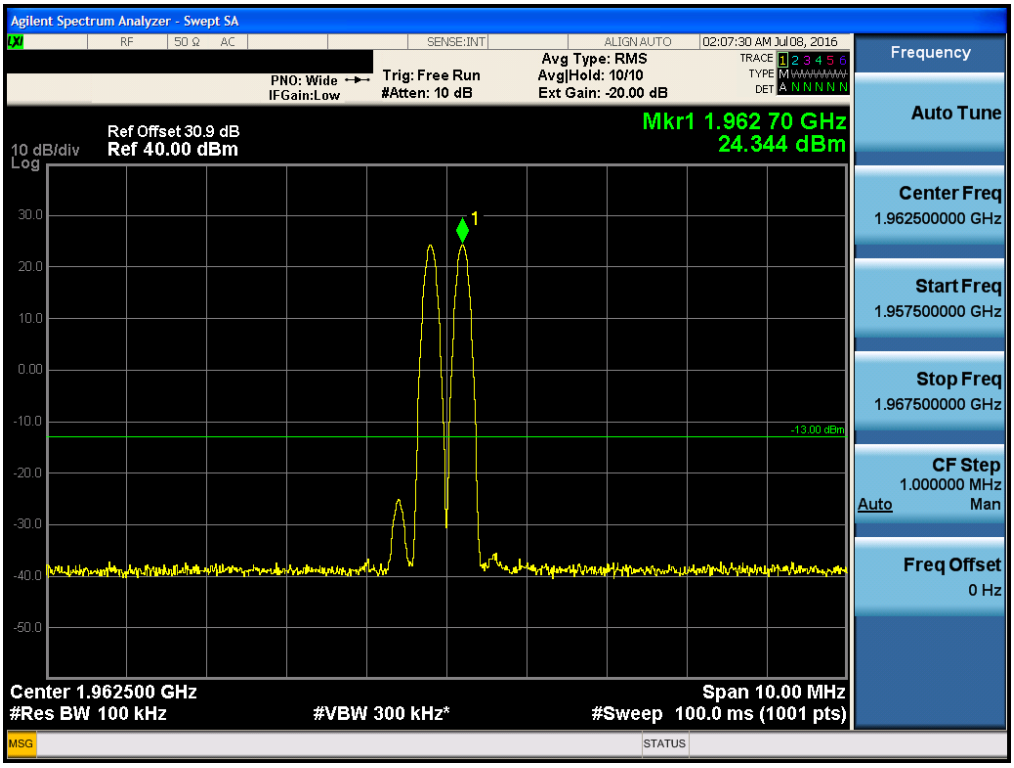


Multi-channel Enhancer for IC_ 1900 PCS BAND

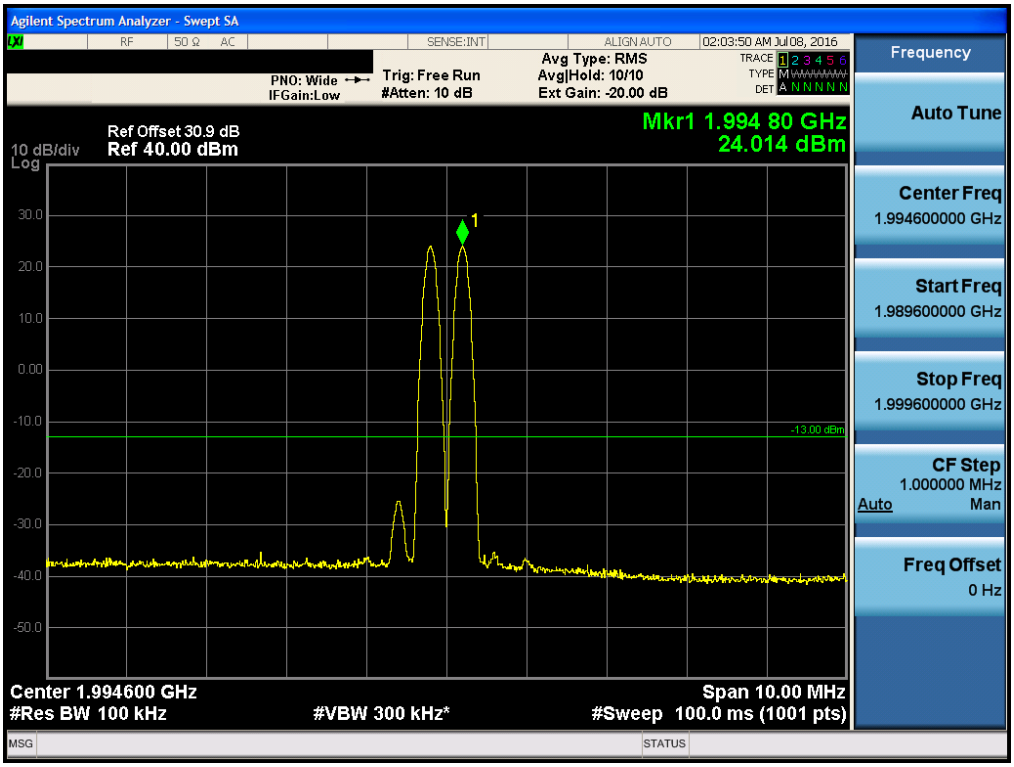
[Downlink Low]



[Downlink Middle]

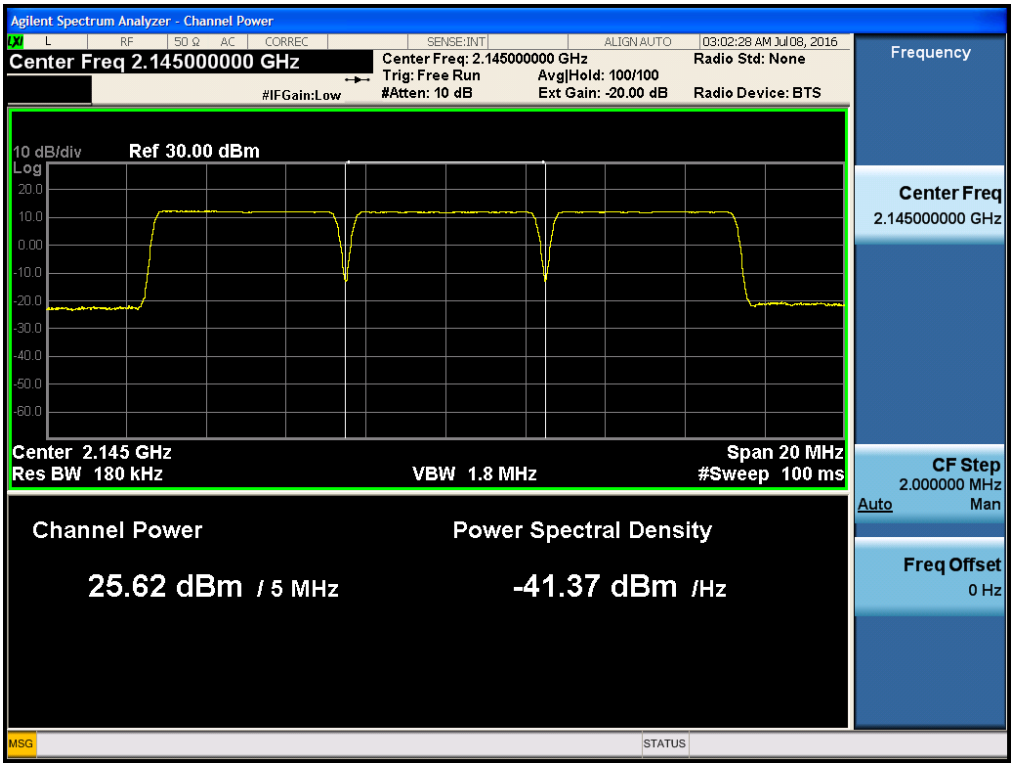


[Downlink High]



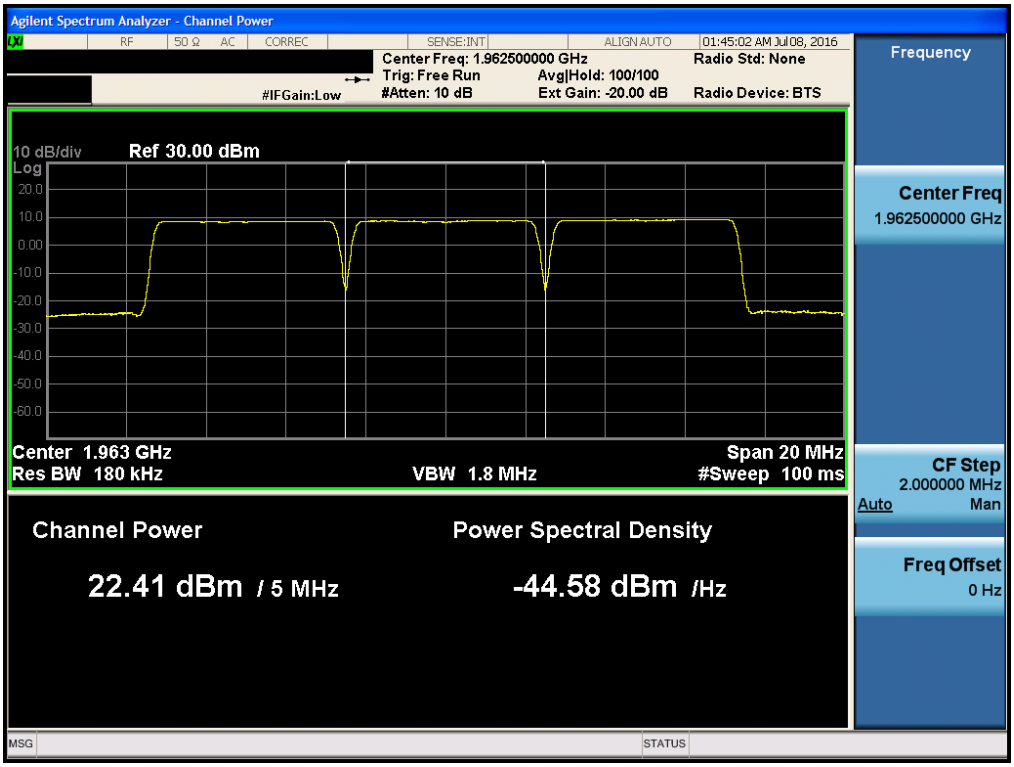
*** Power Back-off for IC_ AWS BAND**

[Downlink 3 Carrier Middle]



*** Power Back-off for IC_ 1900 PCS BAND**

[Downlink 3 Carrier Middle]



7. OCCUPIED BANDWIDTH

FCC Rules

Test Requirement(s): § 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:

Measurements were in accordance with the test methods section 3.4 of KDB 935210 D05 v01r01 and section 4.2 of KDB 971168 D01 v02r02.

Test is 99% OBW measured and used.

a) Connect a signal generator to the input of the EUT.

b) Configure the signal generator to transmit the AWGN signal.

c) Configure the signal amplitude to be just below the AGC threshold level (see 3.2), but not more than 0.5 dB below.

d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.

e) Set the spectrum analyzer center frequency to the center frequency of the operational band under test. The span range of the spectrum analyzer shall be between 2 times to 5 times the OBW.

f) The nominal resolution bandwidth (RBW) shall be in the range of 1% to 5 % of the anticipated OBW, and the VBW shall be ≥ 3 × RBW.

g) Set the reference level of the instrument as required to preclude the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope must be more than [10 log (OBW / RBW)] below the reference level.

NOTE—Steps f) and g) may require iteration to enable adjustments within the specified tolerances.

h) The noise floor of the spectrum analyzer at the selected RBW shall be at least 36 dB below the reference level.

i) Set spectrum analyzer detection function to positive peak.

j) Set the trace mode to max hold.

k) Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

l) Repeat steps e) to k) with the input signal connected directly to the spectrum analyzer (i.e., input signal measurement).

m) Compare the spectral plot of the input signal (determined from step l) to the output signal (determined from step k) to affirm that they are similar (in passband and rolloff characteristic features and relative spectral locations), and include plot(s) and descriptions in test report.

n) Repeat for all frequency bands authorized for use by the EUT.

IC Rules

Test Requirements: RSS-GEN 6.6

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99 % emission bandwidth, as calculated or measured.

Test Procedures: RSS-GEN 6.6

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

Video averaging is not permitted. A peak,or peak hold, maybe used in place ofthesamplingdetector as thismayproducea wider bandwidththan theactual bandwidth(worst-casemeasurement).Use of peak hold maybenecessaryto determine the occupied bandwidth if the device isnot transmittingcontinuously.

The trace data points arerecoveredand are directlysummed in linear power levelterms.Therecovered amplitude data points, beginningat the lowestfrequency, are placed in arunningsum until 0.5%ofthe total is reachedandthat frequencyrecorded. The process is repeatedfor thehighestfrequencydata points (startingat thehighest frequency,at theright sideofthe span,andgoingdown in frequency). This frequencyis thenrecorded.

The difference between thetwo recorded frequencies is the99% occupied bandwidth.

Test Results: The EUT complies with the requirements of this section.

Input Signal	Input Level (dBm)	Maximum Amp Gain
AWS	-14 dBm	44 dB
1900 PCS	-14 dBm	41 dB

[Downlink Output_AWS BAND]

	Channel	**Frequency (MHz)**	**OBW (MHz)**
AWS Band_ LTE 5 MHz AGC threshold	Low	2112.50	4.5114
	Middle	2145.00	4.5168
	High	2177.50	4.5133
AWS Band_ LTE 5 MHz +3dBm above the AGC threshold	Low	2112.50	4.5126
	Middle	2145.00	4.5136
	High	2177.50	4.5117
AWS Band_ LTE 10 MHz AGC threshold	Low	2115.00	8.9867
	Middle	2145.00	9.0030
	High	2175.00	8.9968
AWS Band_ LTE 10 MHz +3dBm above the AGC threshold	Low	2115.00	8.9877
	Middle	2145.00	9.0111
	High	2175.00	8.9991

	Channel	Frequency (MHz)	OBW (MHz)
AWS Band_ LTE 20 MHz AGC threshold	Low	2120.00	18.003
	Middle	2145.00	18.018
	High	2170.00	18.026
AWS Band_ LTE 20 MHz +3dBm above the AGC threshold	Low	2120.00	18.003
	Middle	2145.00	18.022
	High	2170.00	18.048
AWS Band_ CDMA AGC threshold	Low	2111.25	1.2762
	Middle	2145.00	1.2739
	High	2178.75	1.2746
AWS Band_ CDMA +3dBm above the AGC threshold	Low	2111.25	1.2746
	Middle	2145.00	1.2683
	High	2178.75	1.2729
AWS Band_ WCDMA AGC threshold	Low	2112.50	4.1860
	Middle	2145.00	4.1913
	High	2177.50	4.1792
AWS Band_ WCDMA +3dBm above the AGC threshold	Low	2112.50	4.1770
	Middle	2145.00	4.1836
	High	2177.50	4.1789

[Downlink Output_1900 PCS BAND]

	Channel	Frequency (MHz)	OBW (MHz)
1900 PCS Band_ LTE 5 MHz AGC threshold	Low	1932.50	4.5164
	Middle	1962.50	4.5073
	High	1992.50	4.5045
1900 PCS Band_ LTE 5 MHz +3dBm above the AGC threshold	Low	1932.50	4.5134
	Middle	1962.50	4.5113
	High	1992.50	4.5029
1900 PCS Band_ LTE 10 MHz AGC threshold	Low	1935.00	8.978
	Middle	1962.50	9.007
	High	1990.00	8.977
1900 PCS Band_ LTE 10 MHz +3dBm above the AGC threshold	Low	1935.00	8.986
	Middle	1962.50	9.000
	High	1990.00	8.981

	Channel	Frequency (MHz)	OBW (MHz)
1900 PCS Band_ LTE 20 MHz AGC threshold	Low	1940.00	17.938
	Middle	1962.50	18.059
	High	1985.00	17.936
1900 PCS Band_ LTE 20 MHz +3dBm above the AGC threshold	Low	1940.00	17.947
	Middle	1962.50	18.059
	High	1985.00	17.926
1900 PCS Band_ CDMA AGC threshold	Low	1931.25	1.2796
	Middle	1962.50	1.2765
	High	1993.75	1.2766
1900 PCS Band_ CDMA +3dBm above the AGC threshold	Low	1931.25	1.2711
	Middle	1962.50	1.2753
	High	1993.75	1.2716
1900 PCS Band_ WCDMA AGC threshold	Low	1932.50	4.175
	Middle	1962.50	4.183
	High	1992.50	4.168
1900 PCS Band_ WCDMA +3dBm above the AGC threshold	Low	1932.50	4.188
	Middle	1962.50	4.183
	High	1992.50	4.174

[Downlink Input_AWS BAND]

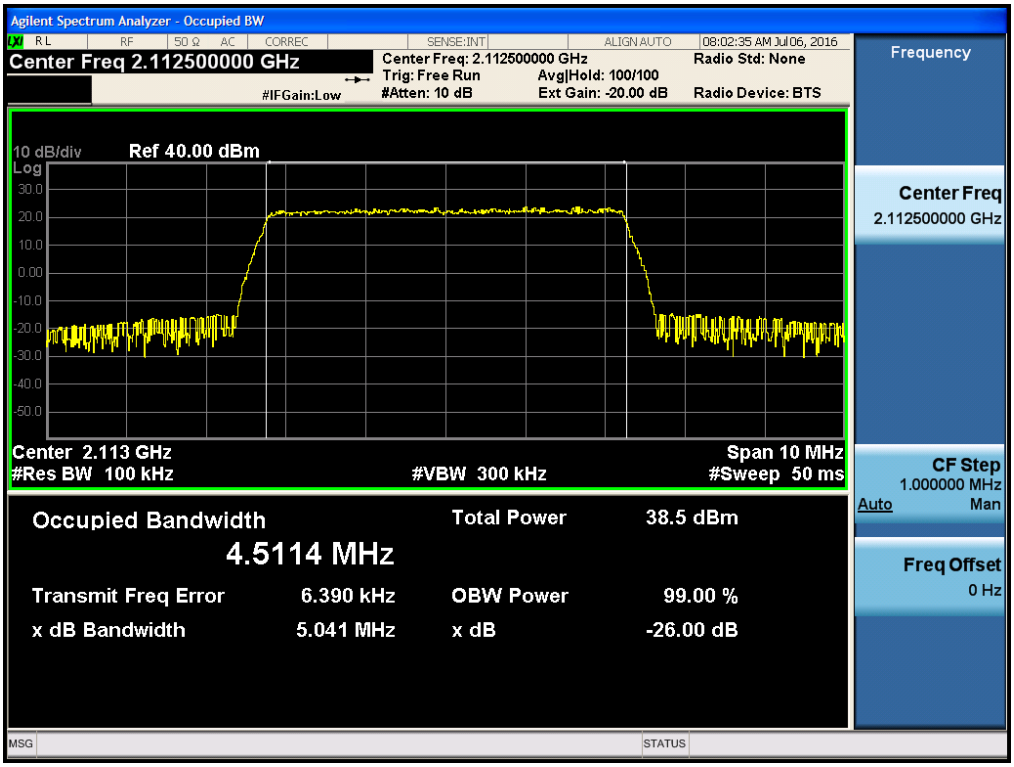
	Channel	Frequency (MHz)	OBW (MHz)
AWS Band_ LTE 5 MHz AGC threshold	Low	2112.50	4.5247
	Middle	2145.00	4.5217
	High	2177.50	4.5222
AWS Band_ LTE 10 MHz AGC threshold	Low	2115.00	9.0342
	Middle	2145.00	9.0326
	High	2175.00	9.0236
AWS Band_ LTE 20 MHz AGC threshold	Low	2120.00	18.012
	Middle	2145.00	18.059
	High	2170.00	18.042
AWS Band_ CDMA AGC threshold	Low	2111.25	1.2764
	Middle	2145.00	1.2731
	High	2178.75	1.2754
AWS Band_ WCDMA AGC threshold	Low	2111.25	4.1901
	Middle	2145.00	4.1910
	High	2178.75	4.1982

[Downlink Input_1900 PCS BAND]

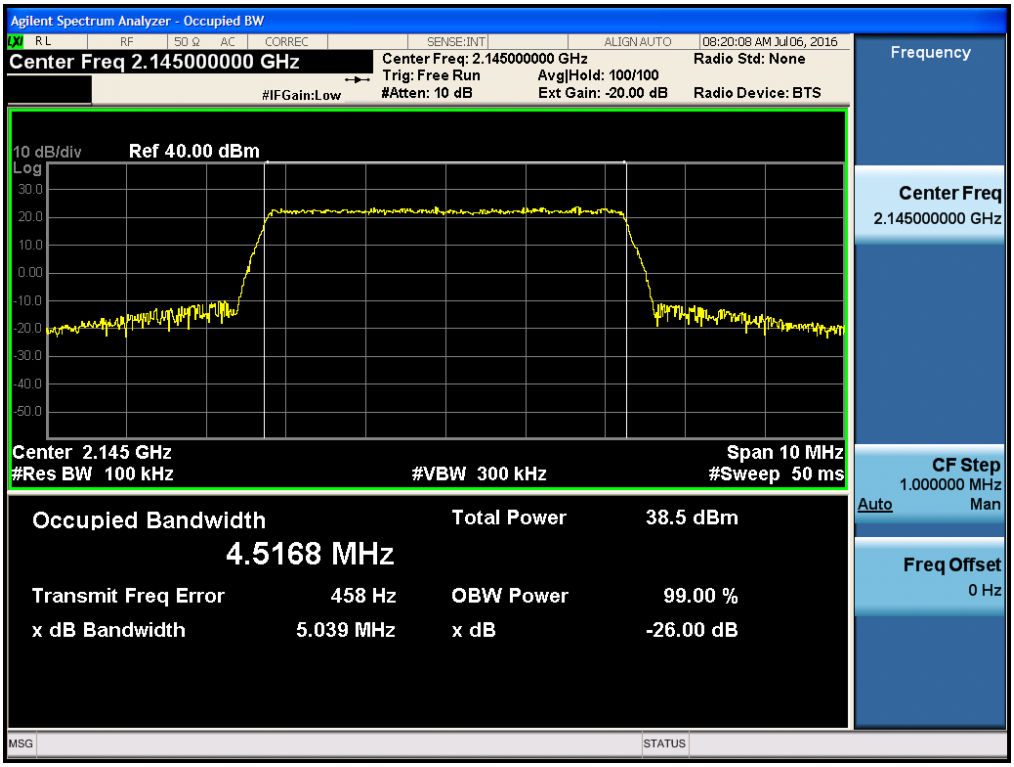
	Channel	Frequency (MHz)	OBW (MHz)
1900 PCS Band_ LTE 5 MHz AGC threshold	Low	1932.50	4.5070
	Middle	1962.50	4.5109
	High	1992.50	4.5038
1900 PCS Band_ LTE 10 MHz AGC threshold	Low	1935.00	9.000
	Middle	1962.50	9.009
	High	1990.00	9.019
1900 PCS Band_ LTE 20 MHz AGC threshold	Low	1940.00	18.007
	Middle	1962.50	18.016
	High	1985.00	18.039
1900 PCS Band_ CDMA AGC threshold	Low	1931.25	1.2766
	Middle	1962.50	1.2752
	High	1993.75	1.2725
1900 PCS Band_ WCDMA AGC threshold	Low	1932.50	4.170
	Middle	1962.50	4.196
	High	1992.50	4.183

Plots of Occupied Bandwidth_AWS BAND LTE 5MHz

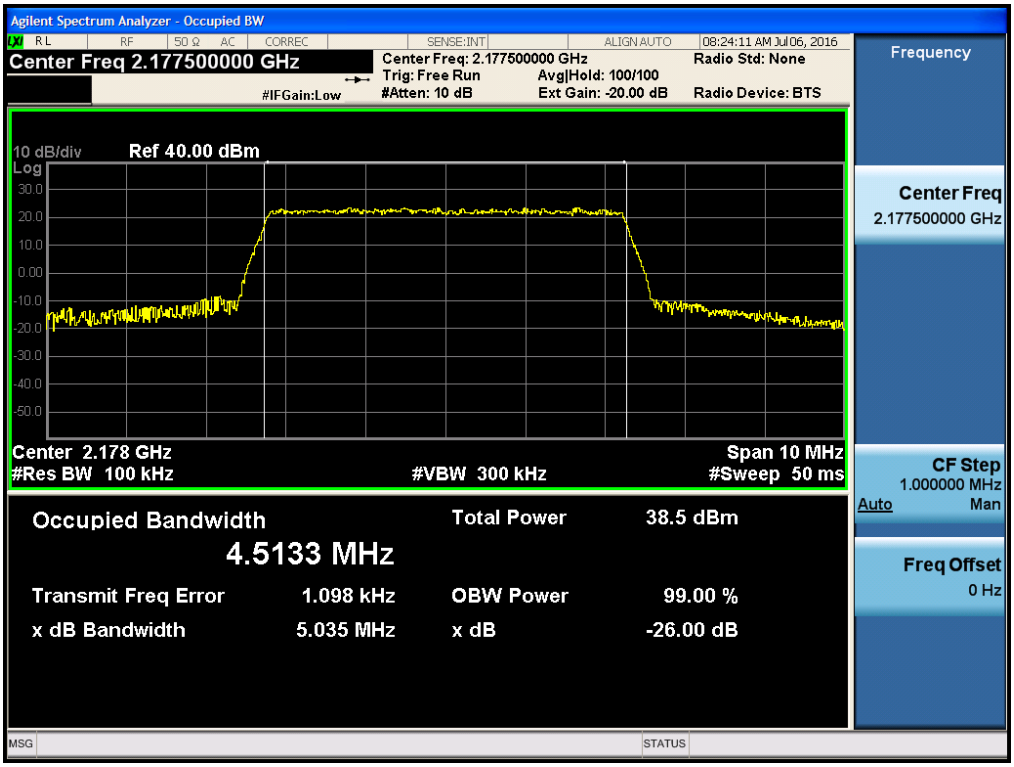
[AGC threshold Output Downlink Low]



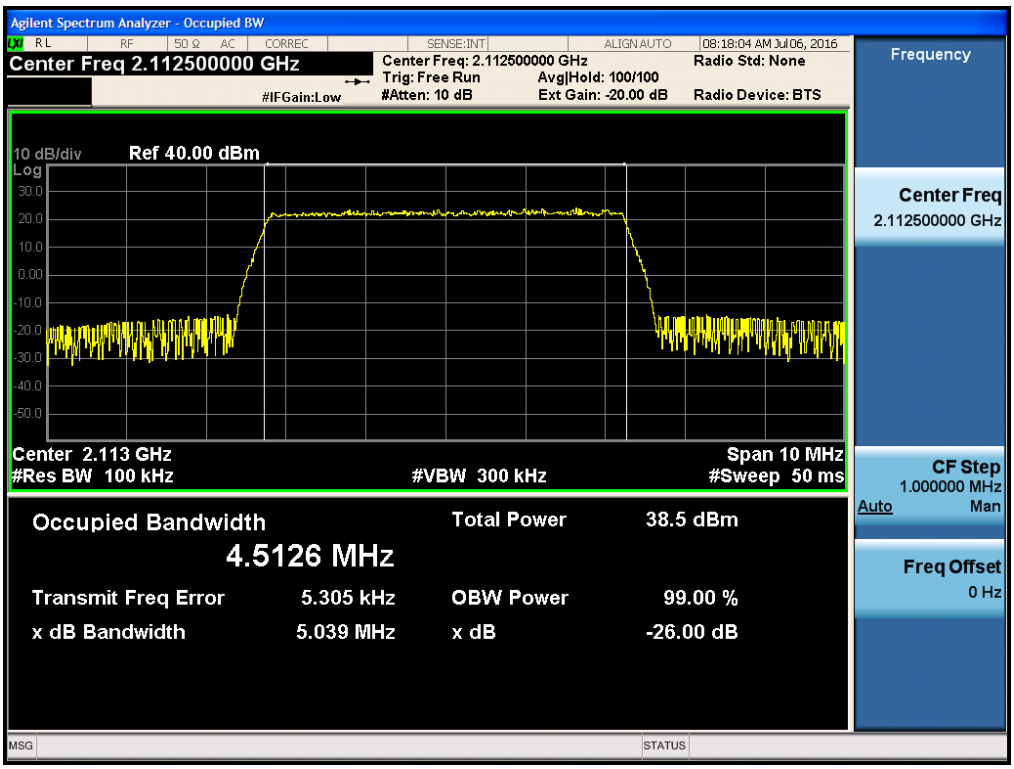
[AGC threshold Output Downlink Middle]



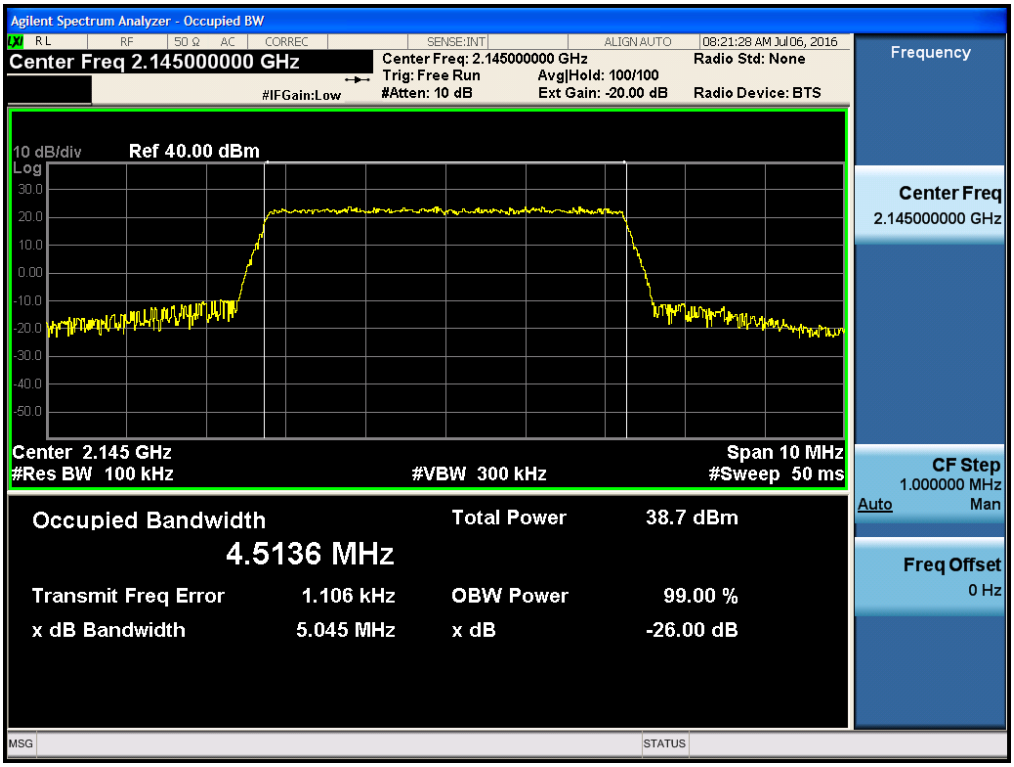
[AGC threshold Output Downlink High]



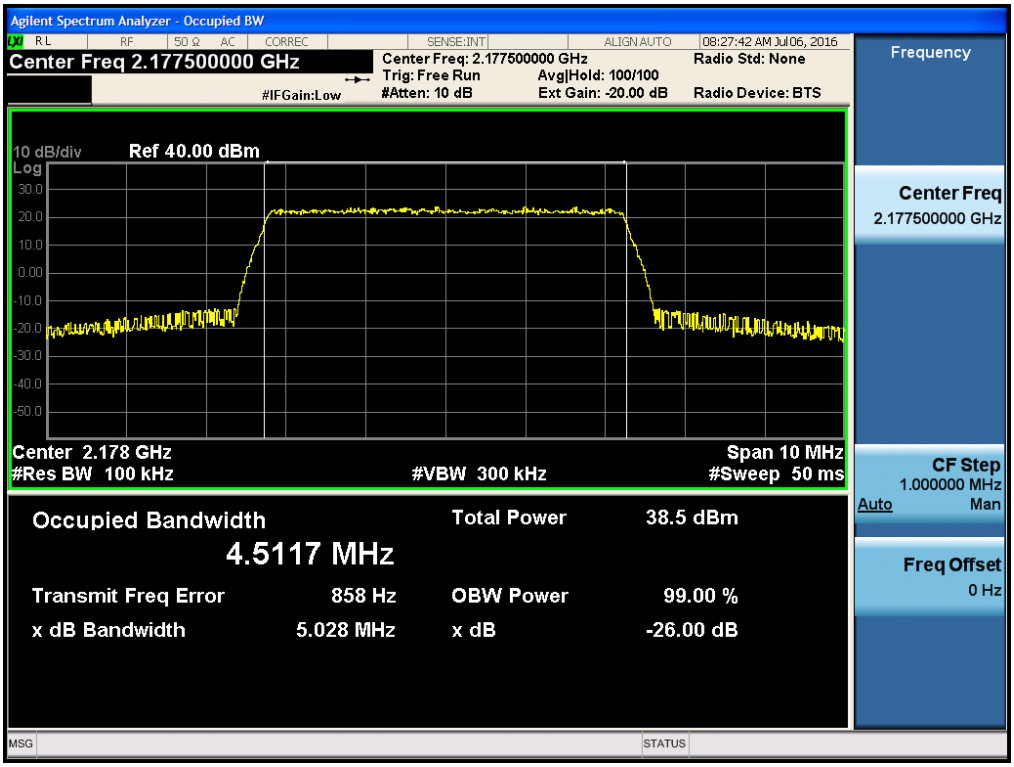
[+3dBmabove AGC threshold Output Downlink Low]



[+3dBm above AGC threshold Output Downlink Middle]

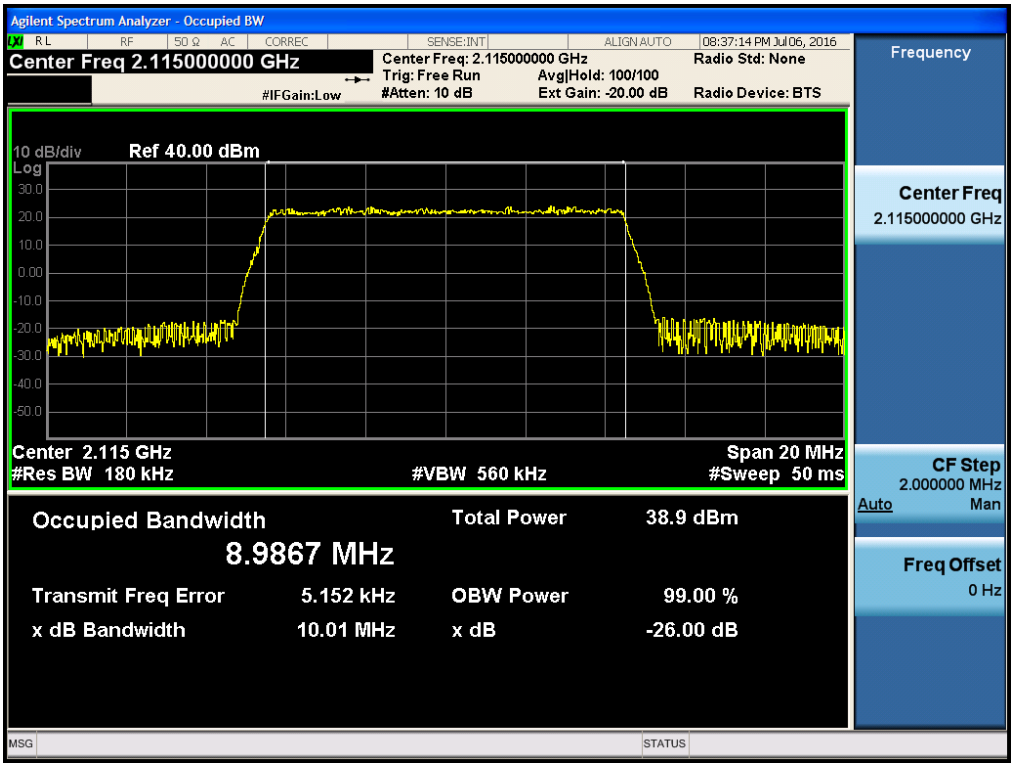


[+3dBm above AGC threshold Output Downlink High]

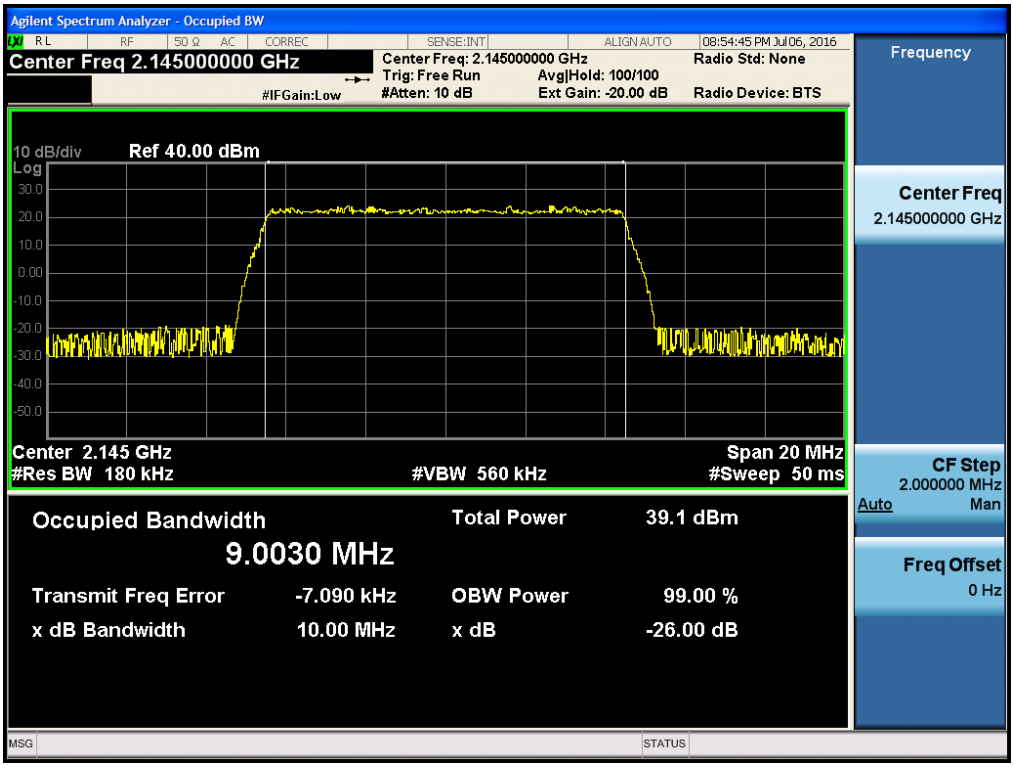


Plots of Occupied Bandwidth_ AWS BAND LTE 10MHz

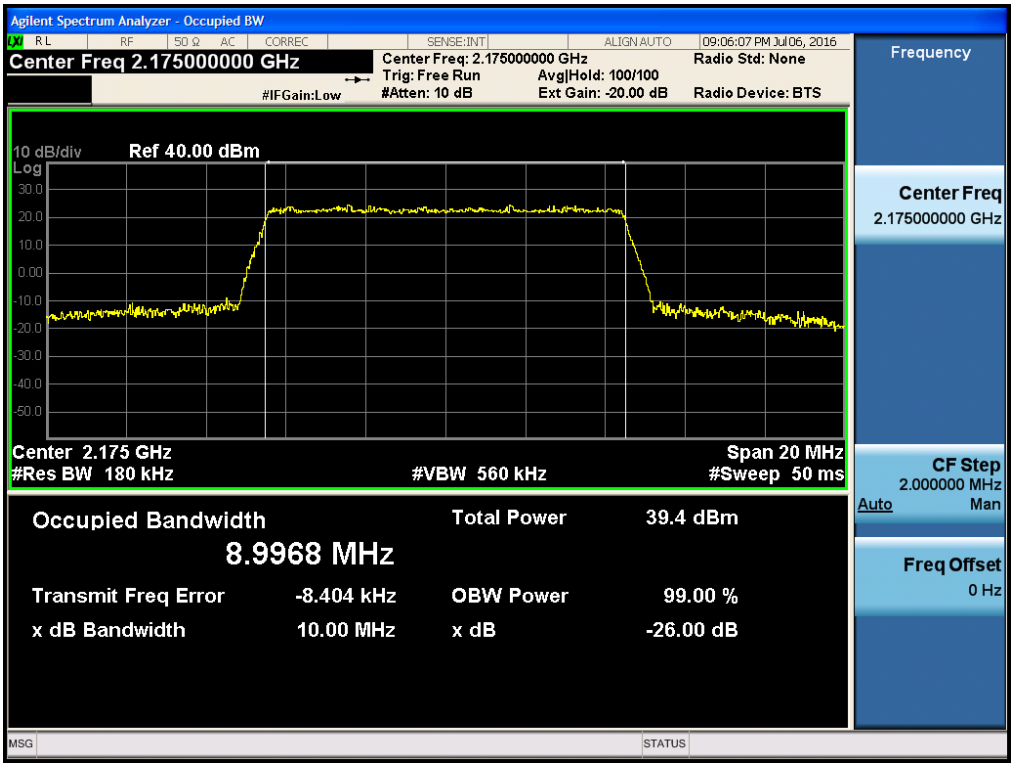
[AGC threshold Output Downlink Low]



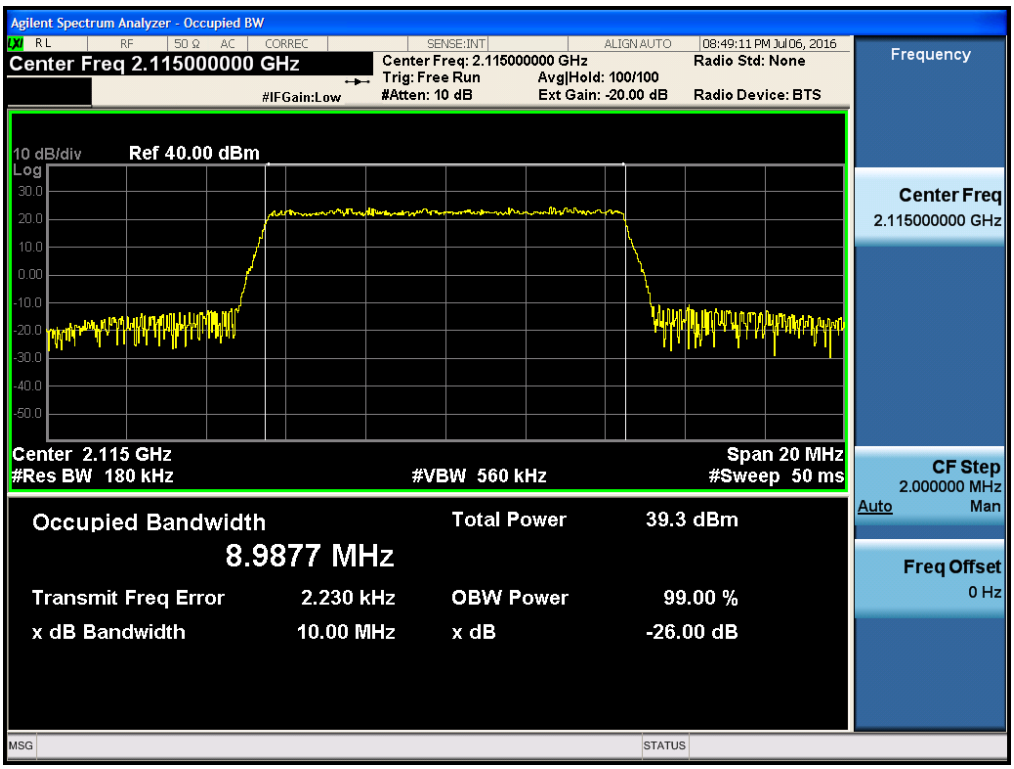
[AGC threshold Output Downlink Middle]



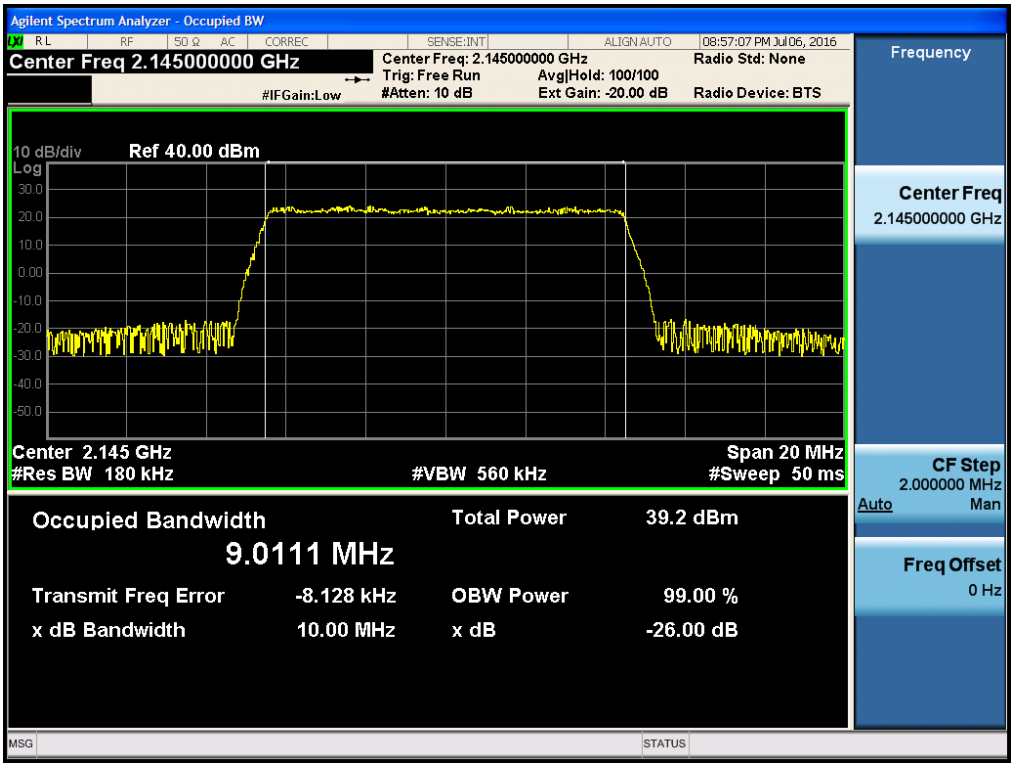
[AGC threshold Output Downlink High]



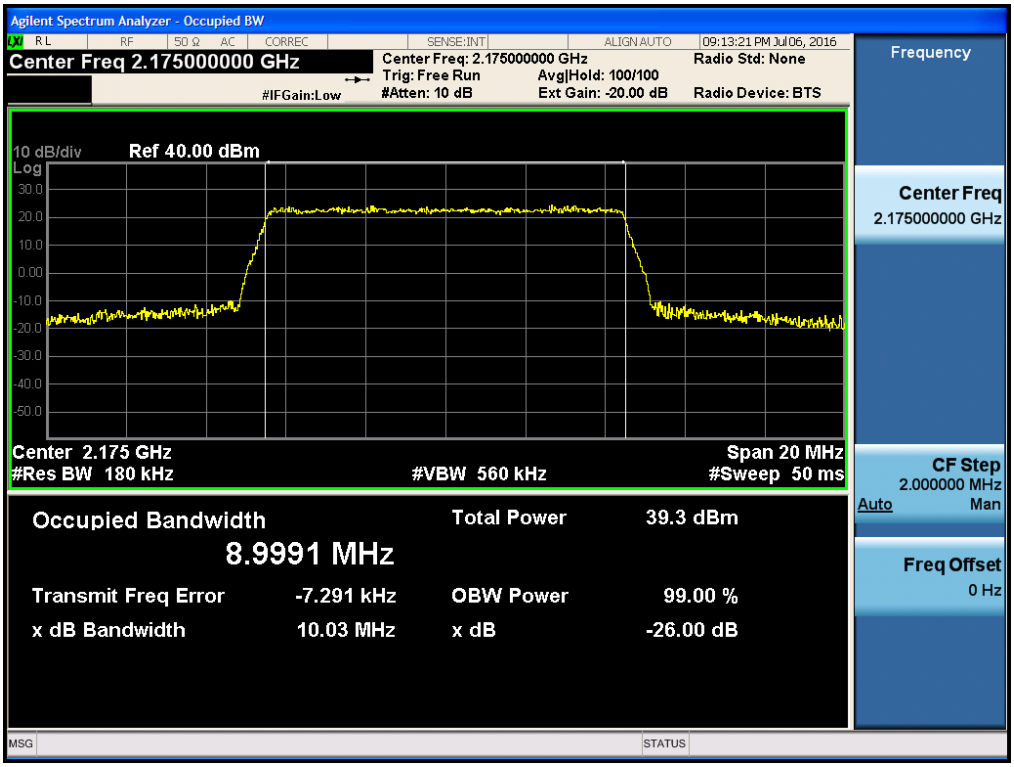
[+3dBmabove AGC threshold Output Downlink Low]



[+3dBm above AGC threshold Output Downlink Middle]

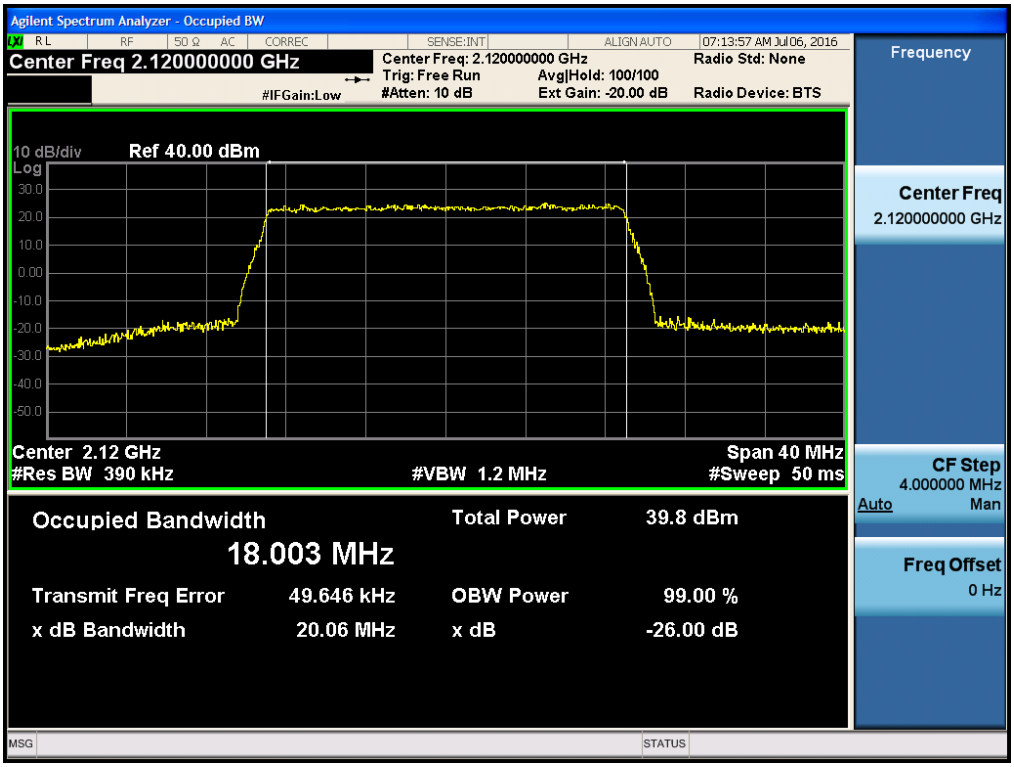


[+3dBm above AGC threshold Output Downlink High]

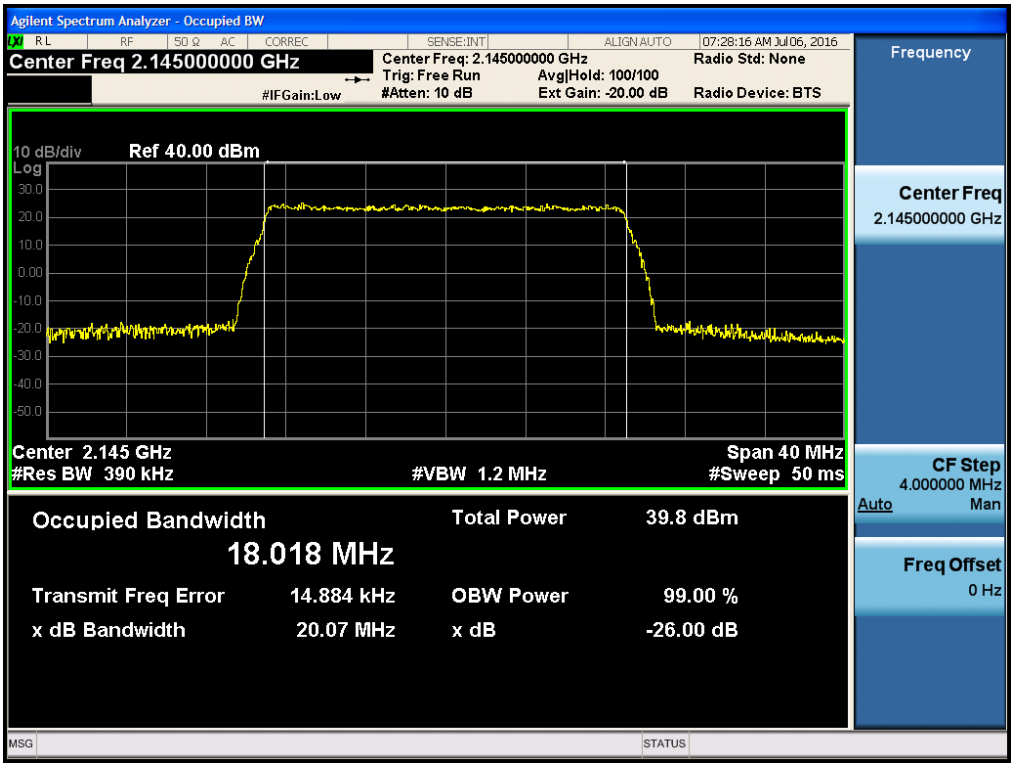


Plots of Occupied Bandwidth_ AWS BAND LTE 20MHz

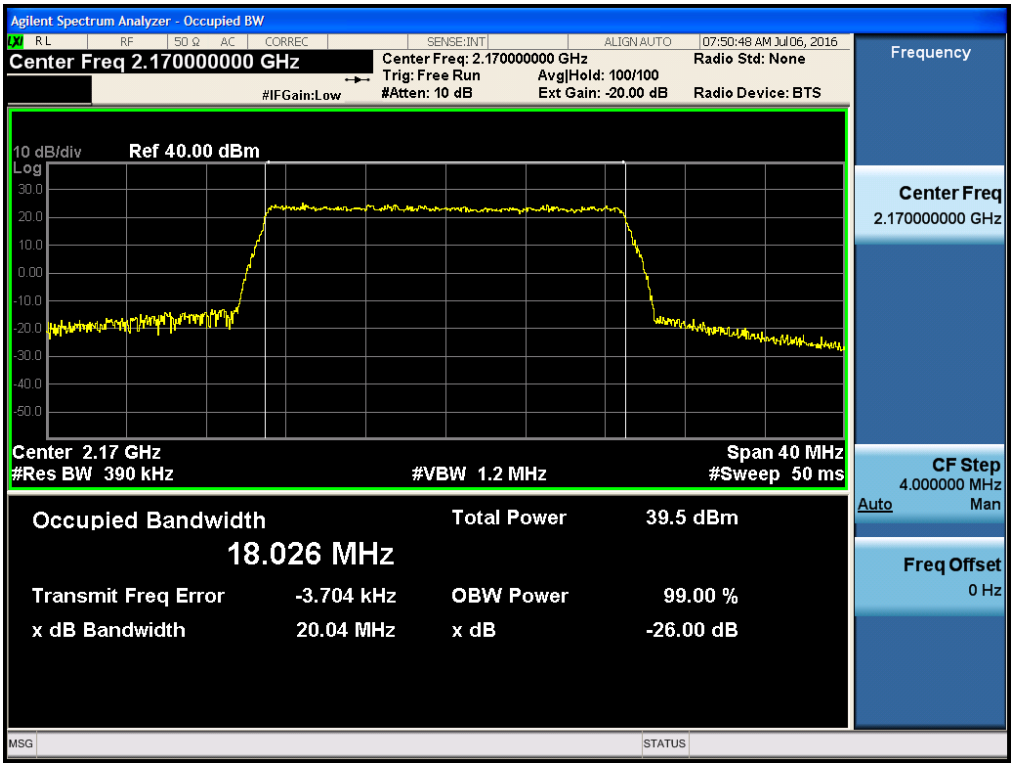
[AGC threshold Output Downlink Low]



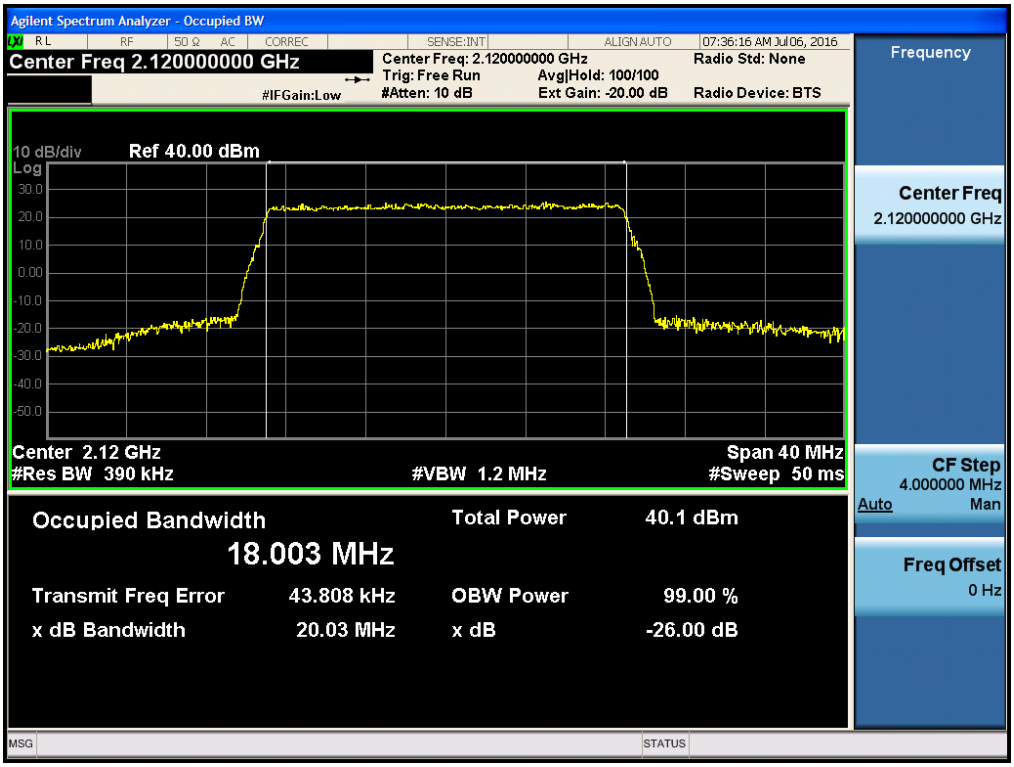
[AGC threshold Output Downlink Middle]



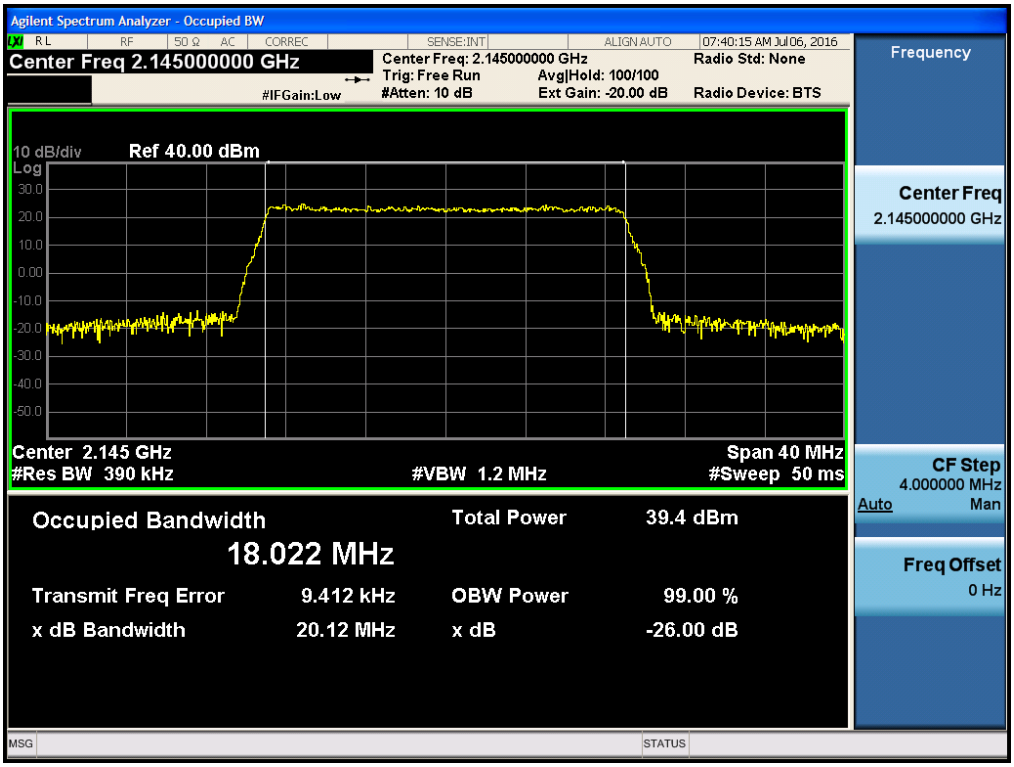
[AGC threshold Output Downlink High]



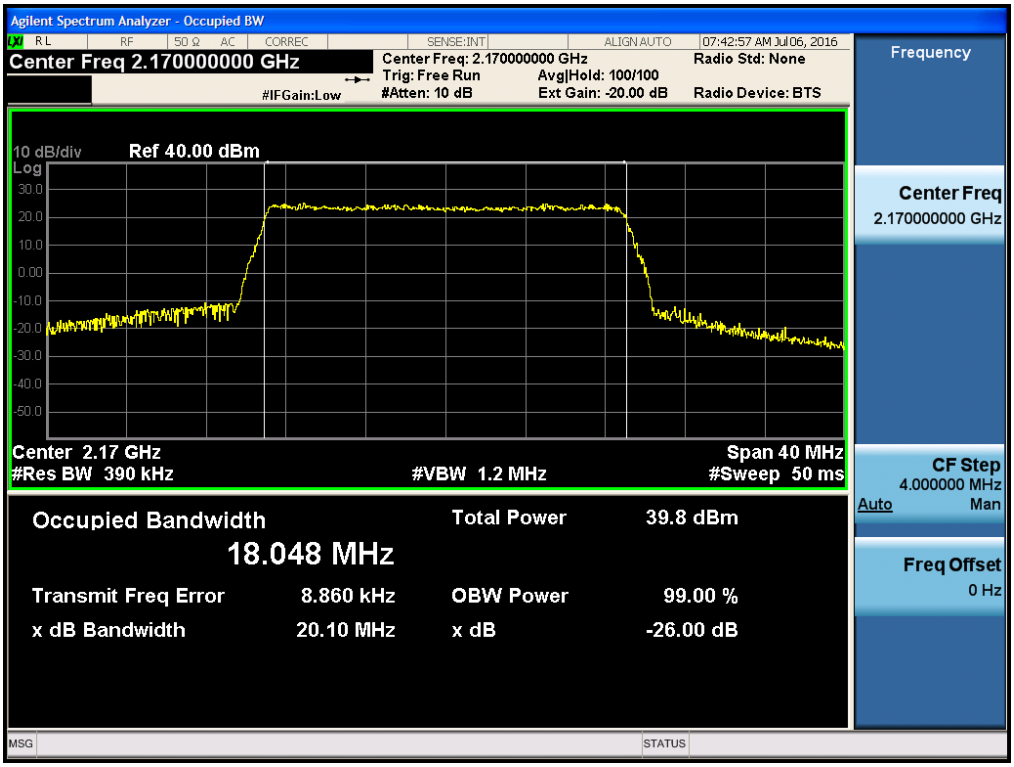
[+3dBmabove AGC threshold Output Downlink Low]



[+3dBm above AGC threshold Output Downlink Middle]

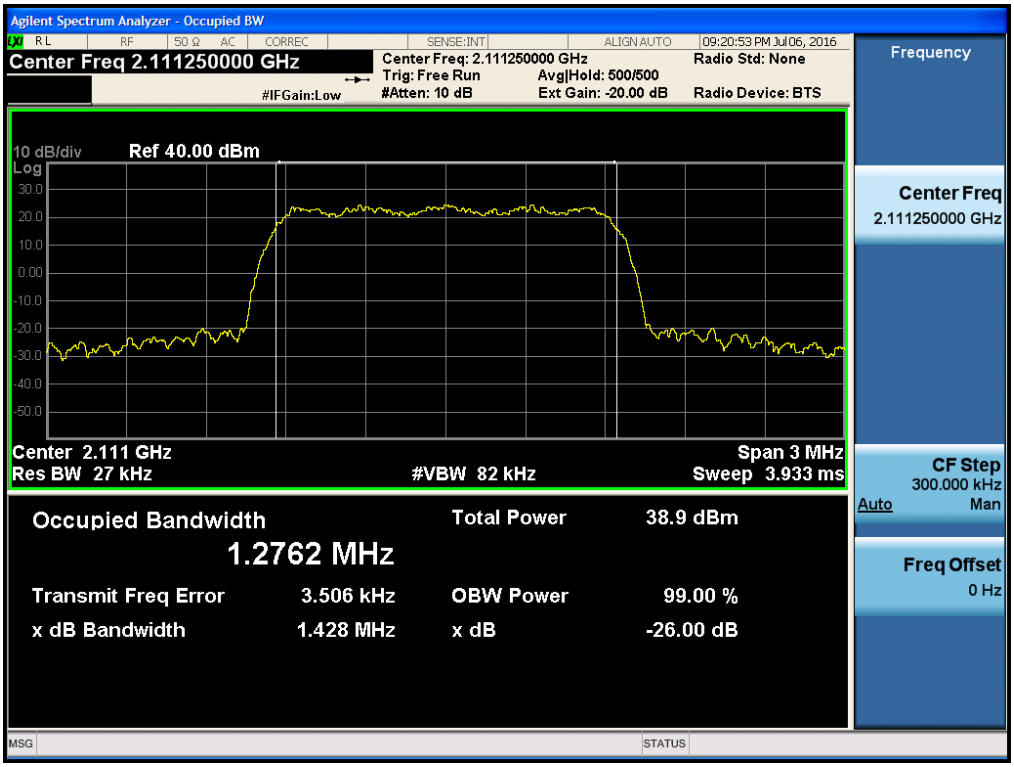


[+3dBm above AGC threshold Output Downlink High]

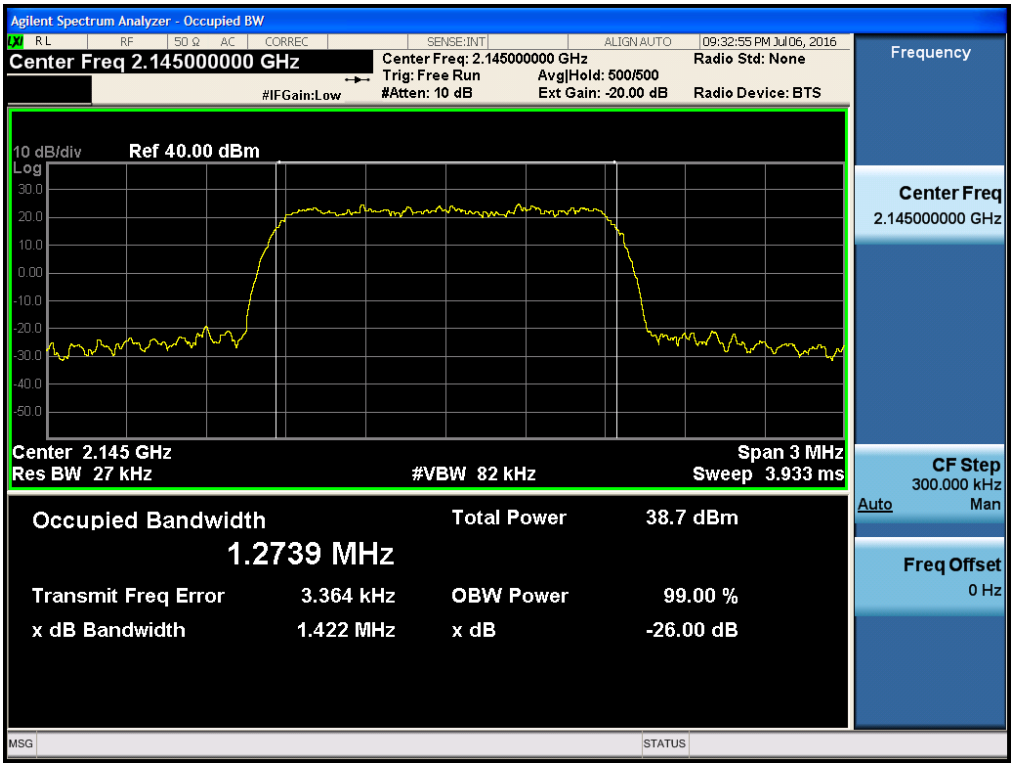


Plots of Occupied Bandwidth_ AWS BAND CDMA

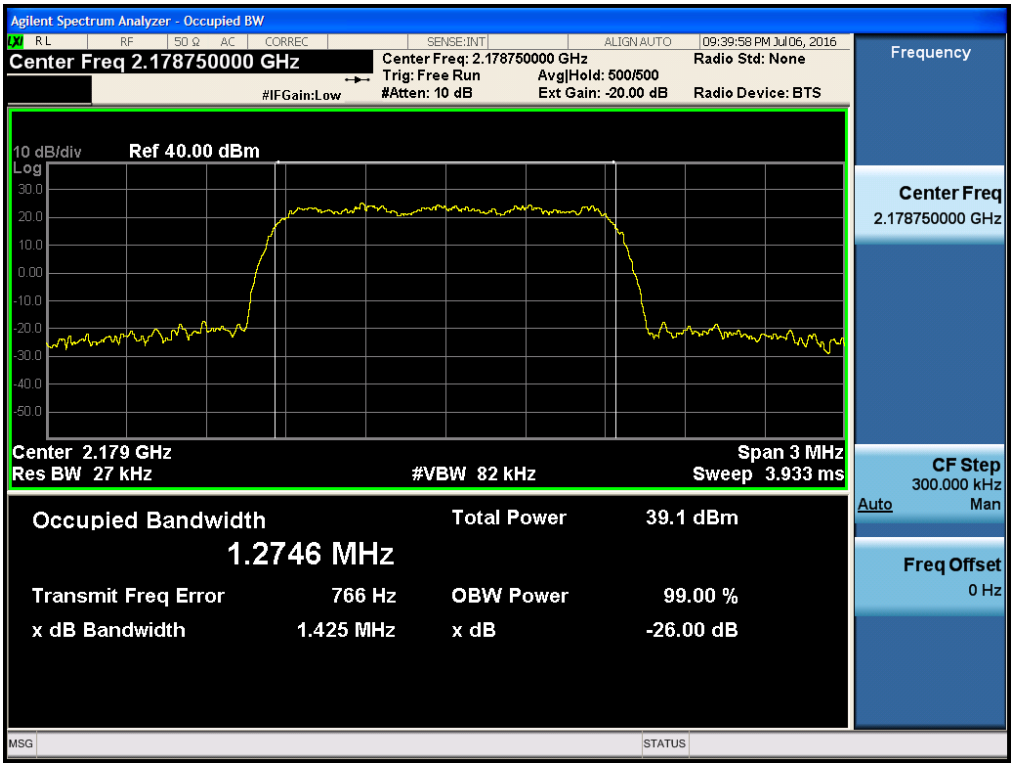
[AGC threshold Output Downlink Low]



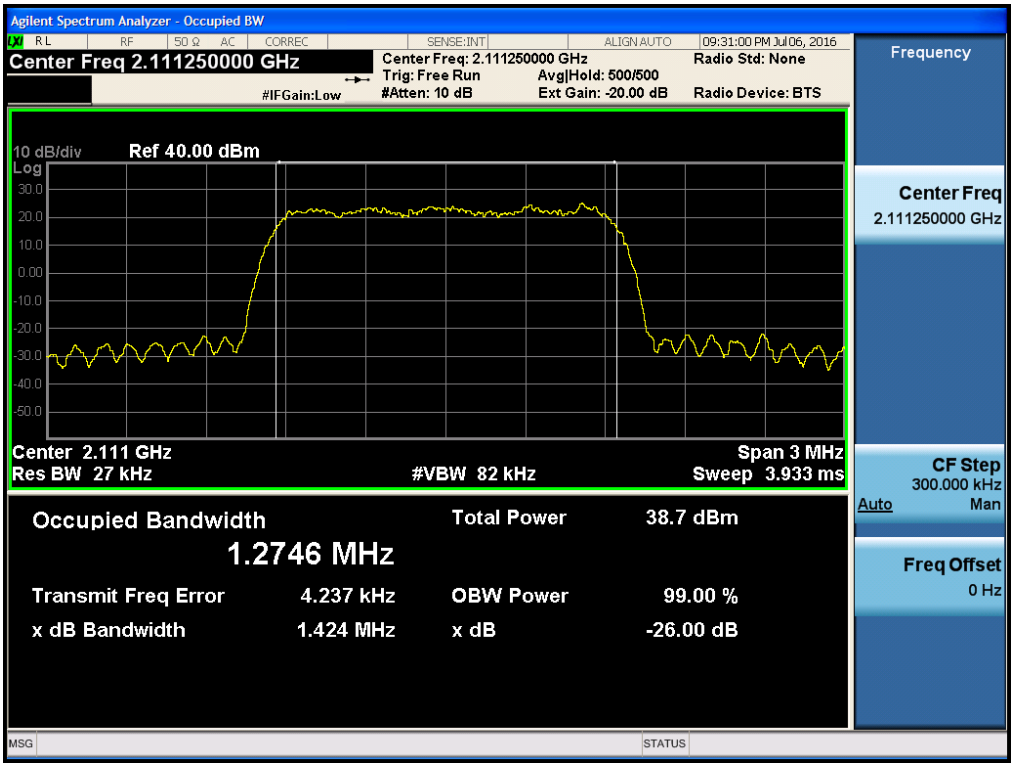
[AGC threshold Output Downlink Middle]



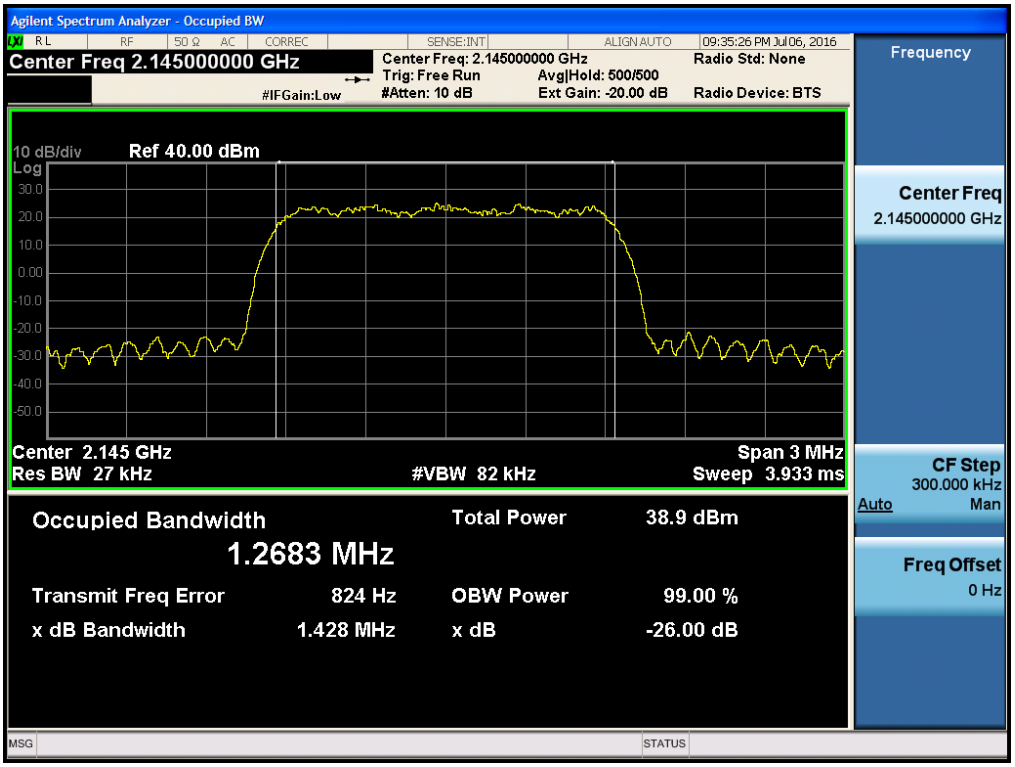
[AGC threshold Output Downlink High]



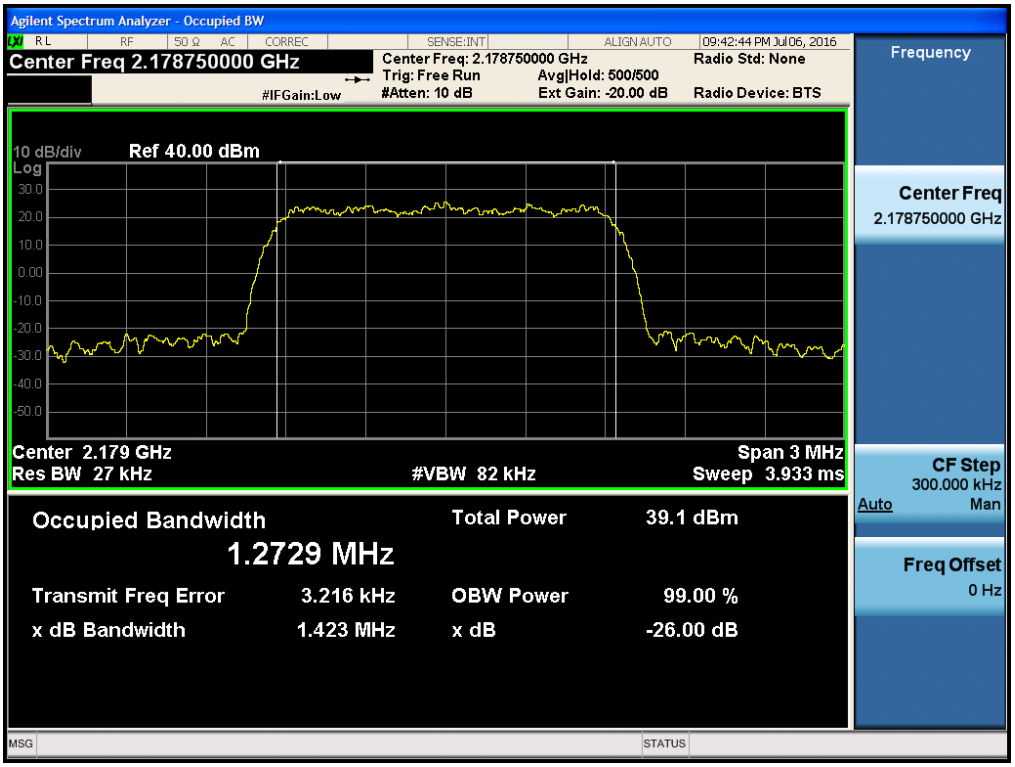
[+3dBmabove AGC threshold Output Downlink Low]



[+3dBm above AGC threshold Output Downlink Middle]

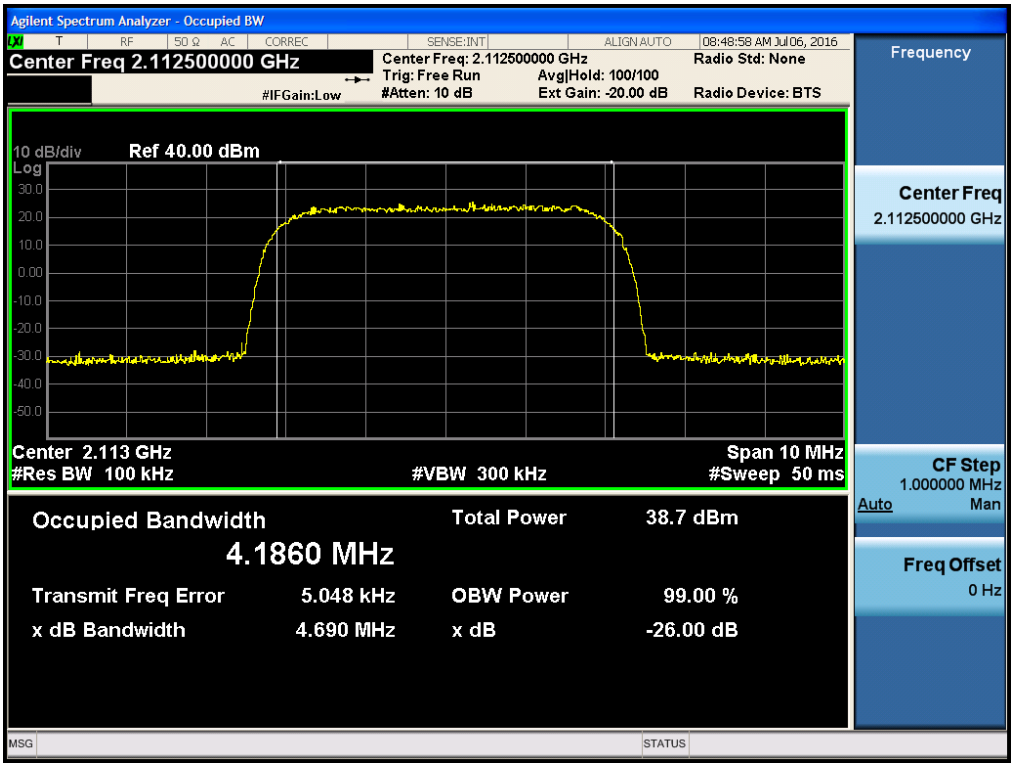


[+3dBm above AGC threshold Output Downlink High]

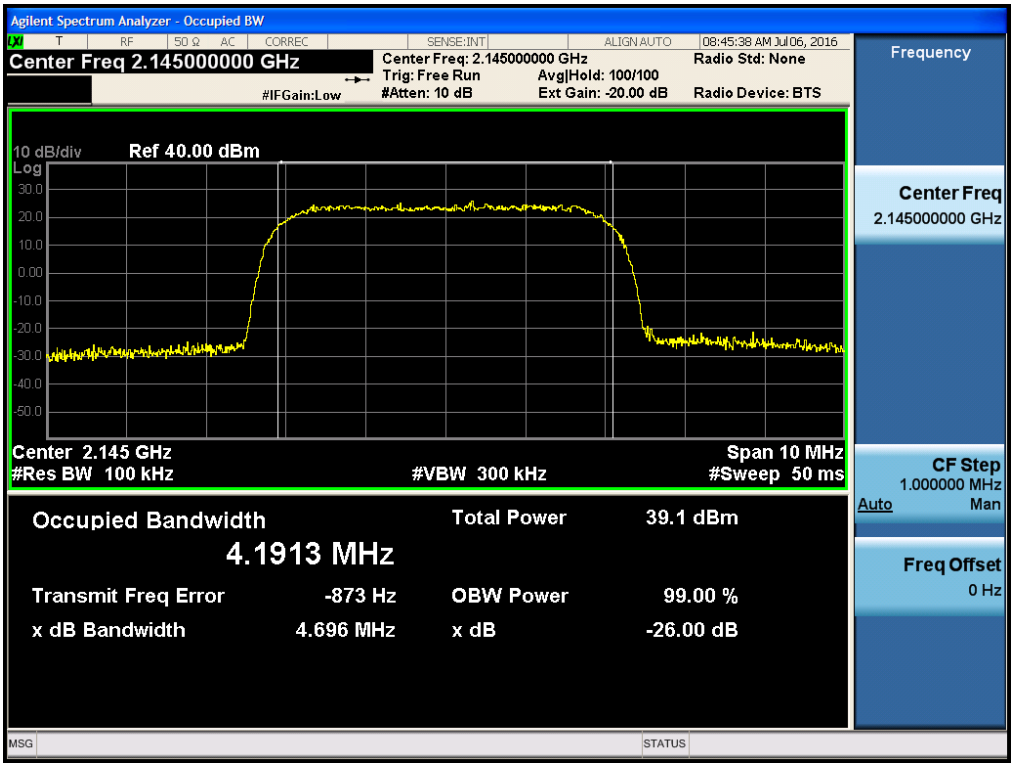


Plots of Occupied Bandwidth_AWS BAND WCDMA

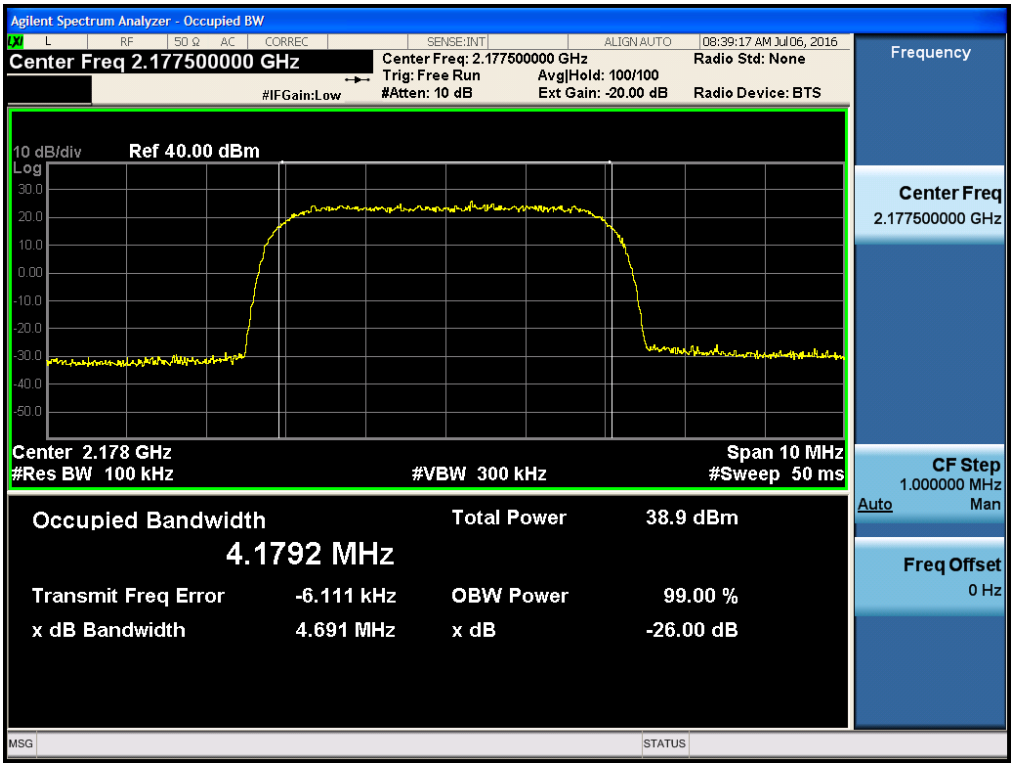
[AGC threshold Output Downlink Low]



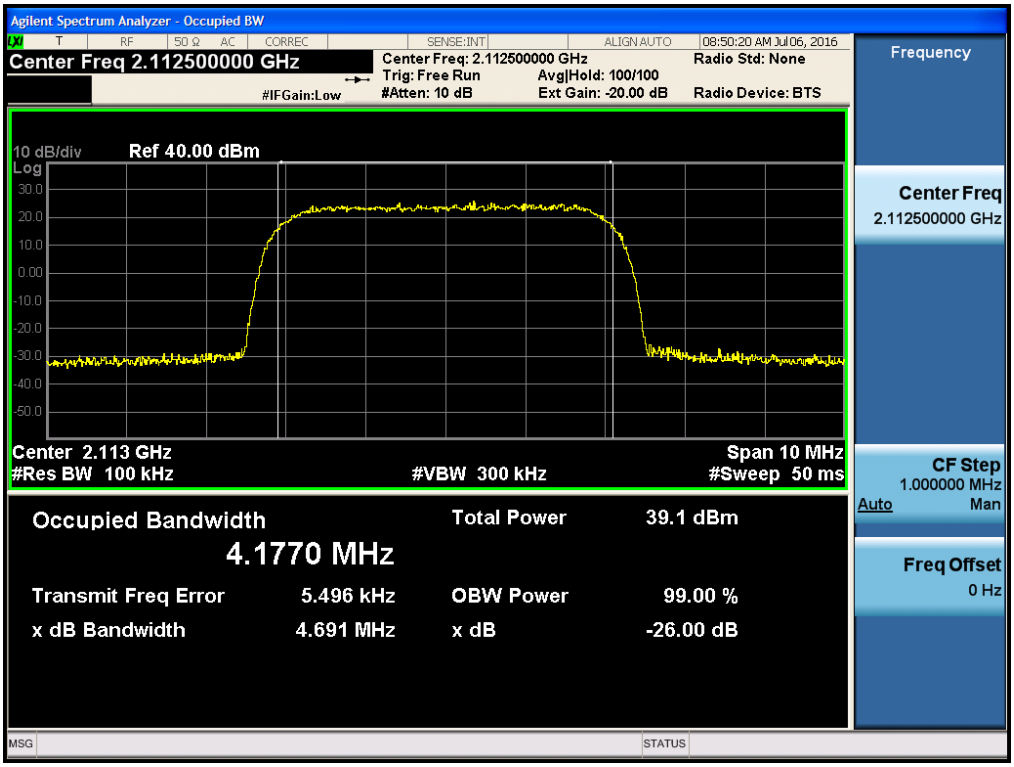
[AGC threshold Output Downlink Middle]



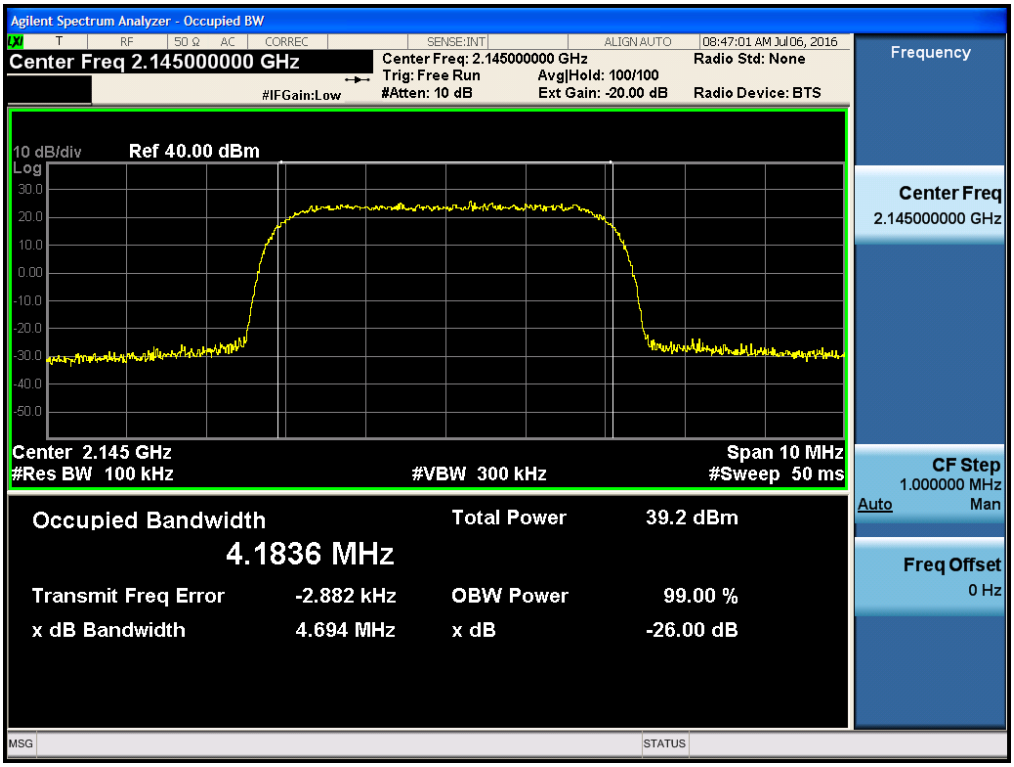
[AGC threshold Output Downlink High]



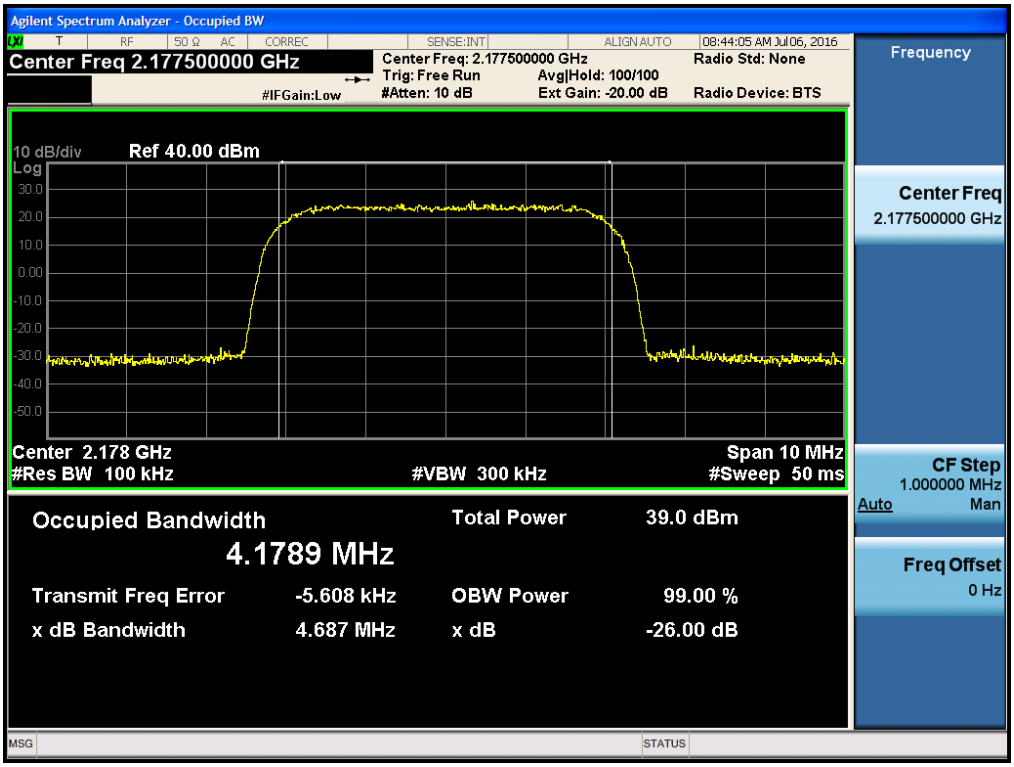
[+3dBmabove AGC threshold Output Downlink Low]



[+3dBm above AGC threshold Output Downlink Middle]

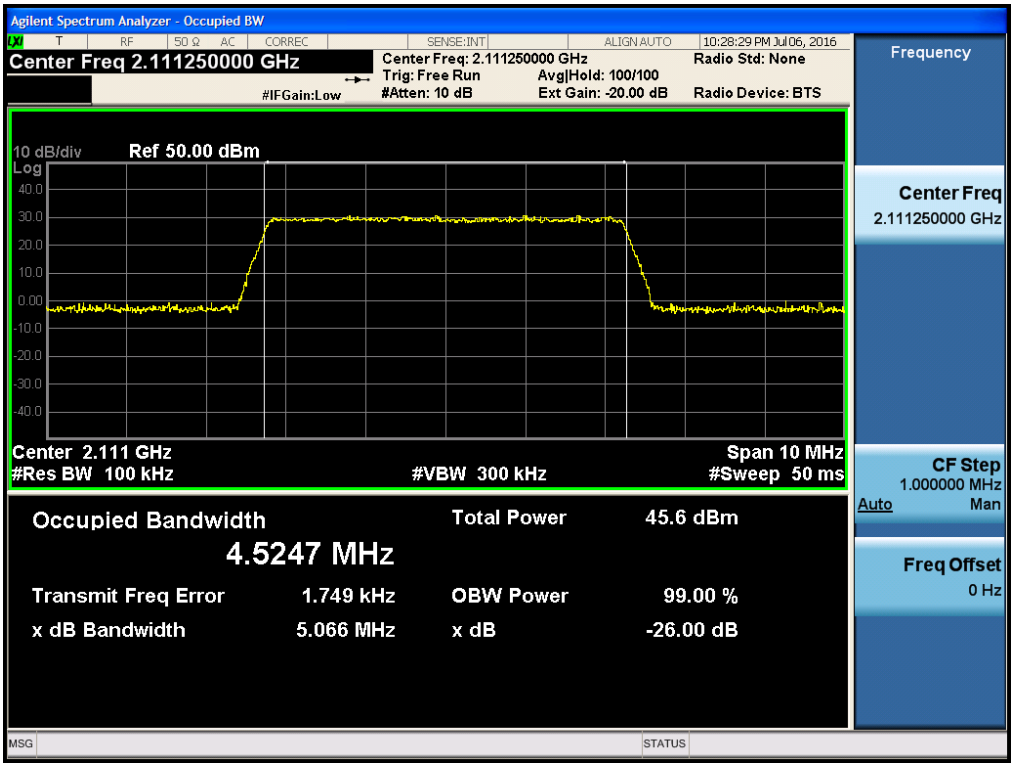


[+3dBm above AGC threshold Output Downlink High]



Plots of Occupied Bandwidth_AWS BAND LTE 5MHz

[AGC threshold Input Downlink Low]



[AGC threshold Input Downlink Middle]