HCT CO.,LTD
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
TEL: +82-31-645-6300 FAX: +82-31-645-6401

FCC /ISED 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:
February 6, 2018
Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
Report No.: HCT-RF-1801-FI005-R1

ISED Registration No.: 5944A-5

FCC ID:	**W6UNHR850IC**
IC:	**9354A-NHR850IC**
APPLICANT:	**SOLiD, Inc.**

FCC/ IC Model:	N20-R-HRDU-850IC
EUT Type:	ALLIANCE_N20
Frequency Ranges:	862 ~ 894 MHz (Downlink)
Conducted Output Power:	20 W (43 dBm, Downlink)
Date of Test:	November 01, 2017 ~ February 6, 2018
FCC Rule Part(s):	CFR 47 Part 2, Part 22, Part 90
IC Rules :	RSS-Gen (Issue 4, November 2014), RSS-119 (Issue 12, May 2015) RSS-131 (Issue 3, May 2017), RSS-132 (Issue3, January 2013)

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
Engineer of Telecommunication testing center

Approved by : Jong Seok Lee
Manager of Telecommunication testing center

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1801-FI005	January 30, 2018	- First Approval Report
HCT-RF-1801-FI005-R1	February 6, 2018	- Re-test 857 MHz ~ 861.9MHz band spurious emission for LTE 5 MHz and 10 MHz low channel (77 page, 90 page)

Table of Contents

1. CLIENT INFORMATION

The EUT has been tested by request of

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

FCC ID:	W6UNHR850IC
IC:	9354A-NHR850IC
EUT Type:	ALLIANCE_N20
FCC/ IC Model:	N20-R-HRDU-850IC
Power Supply:	120VAC, 50Hz / DC -48V
Frequency Ranges:	862 ~ 894 MHz (Downlink)
Conducted Output Power:	20 W (43 dBm, Downlink)
Antenna Gain(s):	Manufacturer does not provide an antenna.
Measurement standard(s):	ANSI/TIA-603-E-2016, KDB 971168 D01 v03, KDB 935210 D05 v01r02, RSS-Gen, RSS-119, RSS-131,RSS-132
FCC Rule Part(s):	CFR 47 Part 2, Part 22, Part 90
IC Rules Part(s):	RSS-Gen (Issue 4, November 2014), RSS-119 (Issue 12, May 2015) RSS-131 (Issue 3, May 2017), RSS-132 (Issue3, January 2013)
Place of Tests:	HCT CO., LTD. 74, Seoicheon-ro 578beon-gil, Majang -myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA (ISED Registration Number : 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 2, Part 22, Part 90, RSS-Gen, RSS-119, RSS-131, RSS-132.

Description	Reference (FCC)	Reference (IC)	Results
Conducted RF Output Power	§2.1046, §22.913 §90.635	RSS-119, Section 5.4 RSS-132, Section 5.4 SRSP-503, Section 5.1	Compliant
Occupied Bandwidth	§2.1049	RSS-Gen, Section 6.6	Compliant
Input-versus-output Spectrum	-	RSS-131, Section 5.2.2	Compliant
Out of Band Rejection & Mean Output Power and Zone Enhancer Gain	KDB 935210 D05 v01r02	RSS-131, Section 5.2.1 RSS-131, Section 5.2.3	Compliant
Noise Figure	§90.219	RSS-131, Section 6.4	Compliant
Spurious Emissions at Antenna Terminals	§2.1051, §22.917 §90.691	RSS-131, Section 6.5 RSS-132, Section 5.5	Compliant
Radiated Spurious Emissions	§2.1053, §22.917 §90.691	RSS-Gen, Section 7.1.2	Compliant
Frequency Stability	§2.1055, §22.355 §90.213	RSS-119, Section 5.3 RSS-132, Section 5.3	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.

* Note: This EUT is supported power supply both of AC and DC. Test results are only attached worst cases.
* The tests results in plots are already including the actual value of loss for the attenuator and cable combination. Please check correction factors below table.

▣ Correction Factor

Freq(MHz)	Factor(dB)
30	29.974
100	28.716
200	29.477
300	29.021
400	29.329
500	29.394
600	29.453
700	29.416
800	29.676
900	29.870
1000	29.733
2000	30.334
3000	30.878
4000	31.237
5000	31.713
6000	31.926
7000	32.680
8000	32.899
9000	33.680
10000	34.067
11000	34.955
12000	35.598
13000	36.484
14000	36.994
15000	37.540
16000	40.661
17000	40.540
18000	42.312
19000	40.782
20000	41.434
21000	42.086
22000	42.738
23000	43.390
24000	44.042
25000	44.695

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
Input-versus-output Spectrum		
Out of Band Rejection & Mean Output Power and Zone Enhancer Gain	Gain 20 dB bandwidth	± 0.89 dB ± 0.58 MHz
Noise Figure	-	± 0.89 dB
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	03/29/2017	Annual	MY50141649
Agilent	N5182A /Signal Generator	01/19/2018	Annual	MY47070406
Agilent	N9020A / Spectrum Analyzer	09/15/2017	Annual	MY46471250
Weinschel	67-30-33 / Fixed Attenuator	02/09/2017	Annual	CC7264
Weinschel	2-10 / 10 dB Attenuator	02/22/2017	Annual	BR0554
Agilent	11636A / Power Divider	08/01/2017	Annual	09109
DEAYOUNG ENT	DFSS60 / AC Power Supply	04/05/2017	Annual	1003030-1
NANGYEUL CO., LTD.	NY-THR18750 / Temperature and Humidity Chamber	10/21/2017	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	04/19/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	08/28/2017	Biennial	1300
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/25/2017	Biennial	BBHA9170124
Rohde & Schwarz	FSP / Spectrum Analyzer	09/06/2017	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/27/2017	Annual	101068-SZ
Wainwright Instruments	WHKX10-2700-3000-18000-40SS / High Pass Filter	08/01/2017	Annual	4
CERNEX	CBLU1183540 / Power Amplifier	09/22/2017	Annual	24614
CERNEX	CBL06185030 / Power Amplifier	01/03/2018	Annual	24615
CERNEX	CBL18265035 / Power Amplifier	01/10/2018	Annual	22966

6. RF OUTPUT POWER

FCC Rules

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.

§22.913 Effective radiated power limits.

Licensees in the Cellular Radiotelephone Service are subject to the effective radiated power (ERP) limits and other requirements in this Section. See also §22.169.

(a) *Maximum ERP*. The ERP of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.

(1) Except as described in paragraphs (a)(2), (3), and (4) of this section, the ERP of base stations and repeaters must not exceed—

(i) 500 watts per emission; or

(ii) 400 watts/MHz (PSD) per sector.

(d) Power measurement. Measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB. Power measurements for base transmitters and repeaters must be made in accordance with either of the following:

(1) A Commission-approved average power technique (see FCC Laboratory's Knowledge Database); or

(2) For purposes of this section, peak transmit power must be measured over an 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.

§90.635 Limitations on power and antenna height

(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Table—Equivalent Power and Antenna Heights for Base Stations in the 851-869 MHz and 935-940 MHz Bands Which Have a Requirement for a 32 km (20 mi) Service Area Radius

Antenna height (ATT) meters (feet)	Effective radiated power (watts)
Above 1,372 (4,500)	65
Above 1,220 (4,000) to 1,372 (4,500)	70
Above 1,067 (3,500) to 1,220 (4,000)	75
Above 915 (3,000) to 1,067 (3,500)	100
Above 763 (2,500) to 915 (3,000)	140
Above 610 (2,000) to 763 (2,500)	200
Above 458 (1,500) to 610 (2,000)	350
Above 305 (1,000) to 458 (1,500)	600
Up to 305 (1,000)	1,000

IC Rules

Test Requirements:

RSS-119

5. Transmitter and Receiver Specifications

5.4 Transmitter Output Power

The output power shall be within ±1 dB of the manufacturer’s rated power listed in the equipment specifications.

The transmitter output power limits set forth in Table 2 will come into force upon the publication of Issue 12 of this standard and will apply to newly certified equipment.

Frequency Bands (MHz)	Transmitter Output Power (W)	
	Base/Fixed Equipment	Mobile Equipment
27.41-28 and 29.7-50	300	30
72-76	No limit	1
138-174	110	60
217-218 and 219-220	110	30
220-222	See SRSP-512 for ERP limit	50
406.1-430 and 450-470	110	60
768-776 and 798-806	See SRSP-511 for ERP limit	30 3 W ERP for portable equipment
806-821/851-866 and 821-824/866-869	110	30
896-901/935-940	110	60
929-930/931-932	110	30
928-929/952-953 and 932-932.5/941-941.5	110	30
932.5-935/941.5-944	110	30

RSS-131

6. Equipment standard specifications for zone enhancers working with equipment certified under RSS-119

6.2 Output power

The output power of the zone enhancer shall comply with the transmitter output power of the equipment with which it is to be used (as specified in RSS-119) and shall be within ± 1.0 dB of the zone enhancer manufacturer's rated output power.

RSS-132

5. Transmitter Standard Specifications

5.4 Transmitter Output Power and Equivalent Isotropically Radiated Power

The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts. Refer to SRSP-503 for base station e.i.r.p. limits.

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

SRSP-503

5. Technical Criteria

5.1 Power and Antenna Height Limitations

5.1.1 Base stations for digital systems are limited to 1640 watts maximum equivalent isotropically radiated power (EIRP) with an antenna height above average terrain (HAAT) up to 150 m, except in urban areasFootnote 3 where they are limited to a maximum allowable EIRP of 820 watts.

5.1.2 Base stations for analogue systems are limited to 820 watts maximum EIRP with an antenna height above average terrain (HAAT) up to 150 m, except in urban areas where they are limited to a maximum allowable EIRP of 164 watts.

5.1.3 The maximum EIRP shall be 11.5 watts for mobile stations.

5.1.4 The EIRP and antenna height shall be limited to that necessary to provide the required service as governed by the system requirements.

5.1.5 A reduction in EIRP from that specified in paragraphs 5.1.1 and 5.1.2 is required for base stations with antenna height above average terrain (HAAT) in excess of 150 m as follows:
EIRPreduction= 20log10HAAT/150
In the above formula, the EIRP reduction is measured in dB and the HAAT is measured in metres.

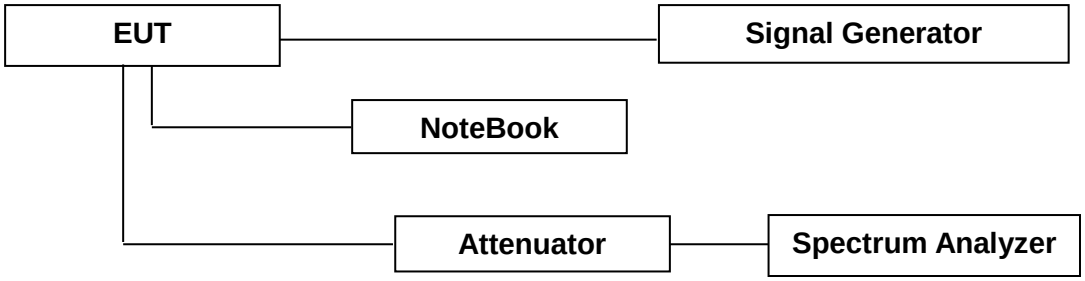
Test Procedures:

Measurements were in accordance with the test methods section 3.5.2 of KDB 935210 D05 v01r02.

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 D01 v03.



Block Diagram 1. RF Power Output Test Setup

Test Results:

Input Signal	Input Level	Maximum Amp Gain
800	-22 dBm	65 dB

*Note: Due to EUT's ALC function (Auto Level Control), even if input signal is increased, the same output power is transmit.

[Downlink]

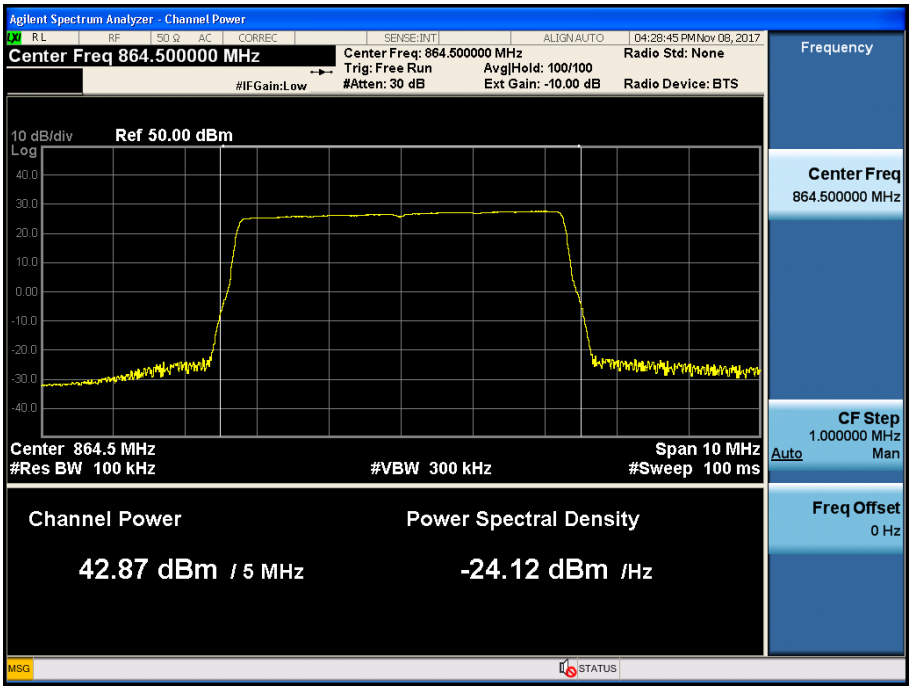
	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
800 Band_ LTE 5 MHz AGC threshold	Low	864.50	42.87	19.364
	Middle	878.00	42.82	19.143
	High	891.50	42.94	19.679
800 Band_ LTE 5 MHz +3 dB above the AGC threshold	Low	864.50	42.86	19.320
	Middle	878.00	42.87	19.364
	High	891.50	42.89	19.454
800 Band_ LTE 10 MHz AGC threshold	Low	867.00	42.89	19.454
	Middle	878.00	42.97	19.815
	High	889.00	42.90	19.498
800 Band_ LTE 10 MHz +3 dB above the AGC threshold	Low	867.00	43.01	19.999
	Middle	878.00	43.12	20.512
	High	889.00	43.01	19.999

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
800 Band_ WCDMA AGC threshold	Low	864.50	42.87	19.364
	Middle	878.00	42.93	19.634
	High	891.50	42.84	19.231
800 Band_ WCDMA +3 dB above the AGC threshold	Low	864.50	42.89	19.454
	Middle	878.00	42.92	19.588
	High	891.50	42.80	19.055
800 Band_ CDMA AGC threshold	Low	863.25	42.93	19.634
	Middle	878.00	42.86	19.320
	High	892.75	42.85	19.275
800 Band_ CDMA +3 dB above the AGC threshold	Low	863.25	42.86	19.320
	Middle	878.00	42.82	19.143
	High	892.75	42.84	19.231

*Note: We have done CDMA and 1xEVDO modulation test in technology. Test results are only attached worst cases.

Plots of RF Output Power for 800 Band LTE 5 MHz

[AGC threshold Downlink Low]



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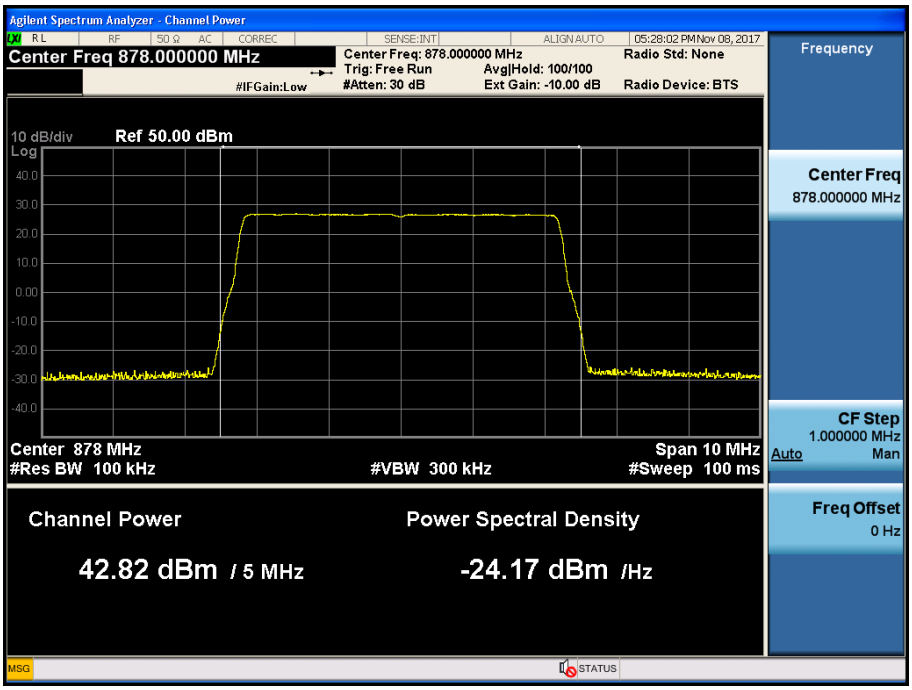

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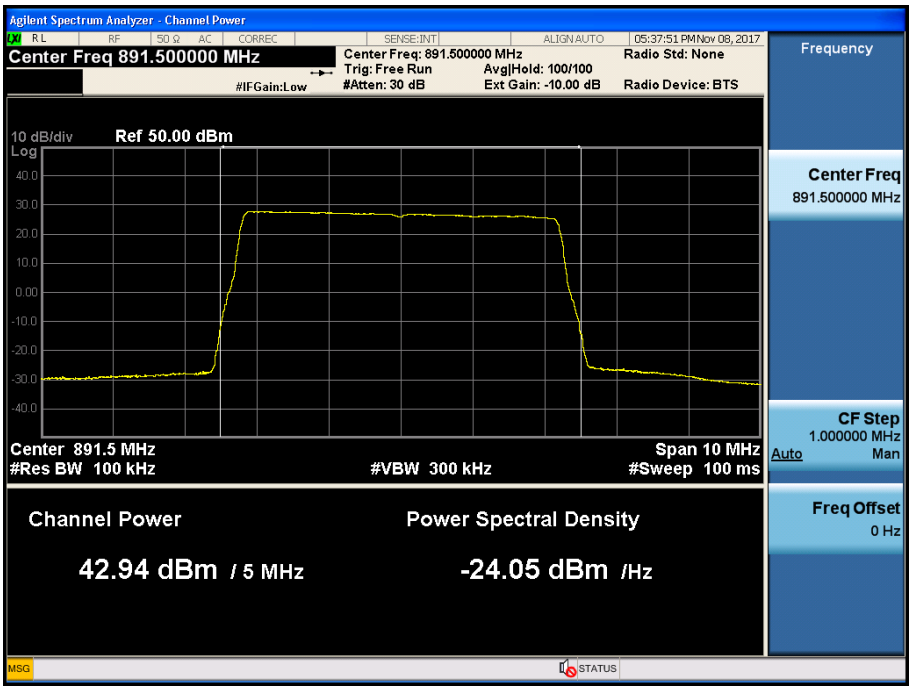
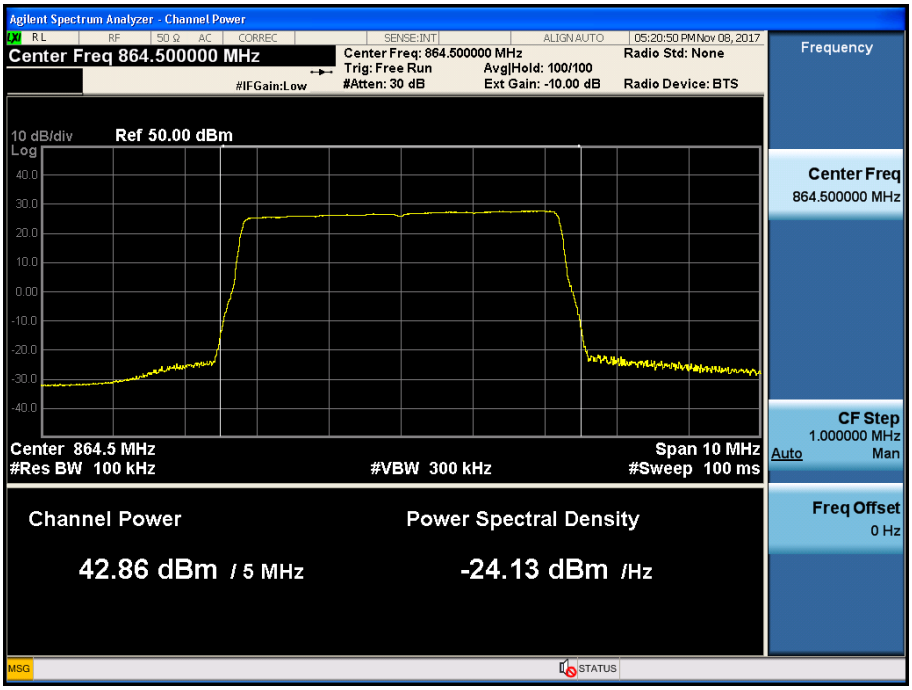


[+3 dB above AGC threshold Downlink Low]



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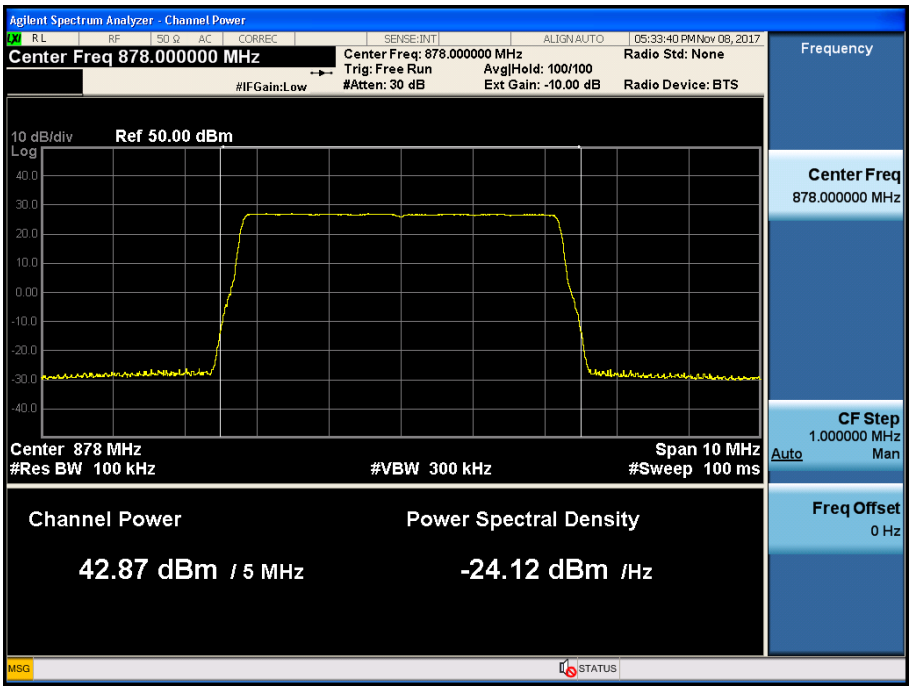

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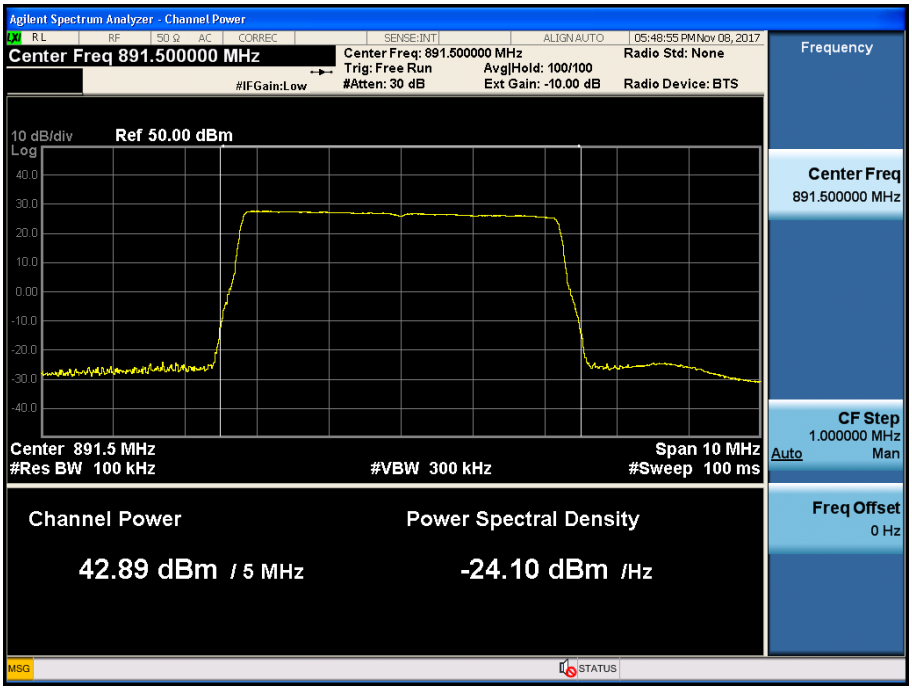

Plots of RF Output Power for 800 Band LTE 10 MHz

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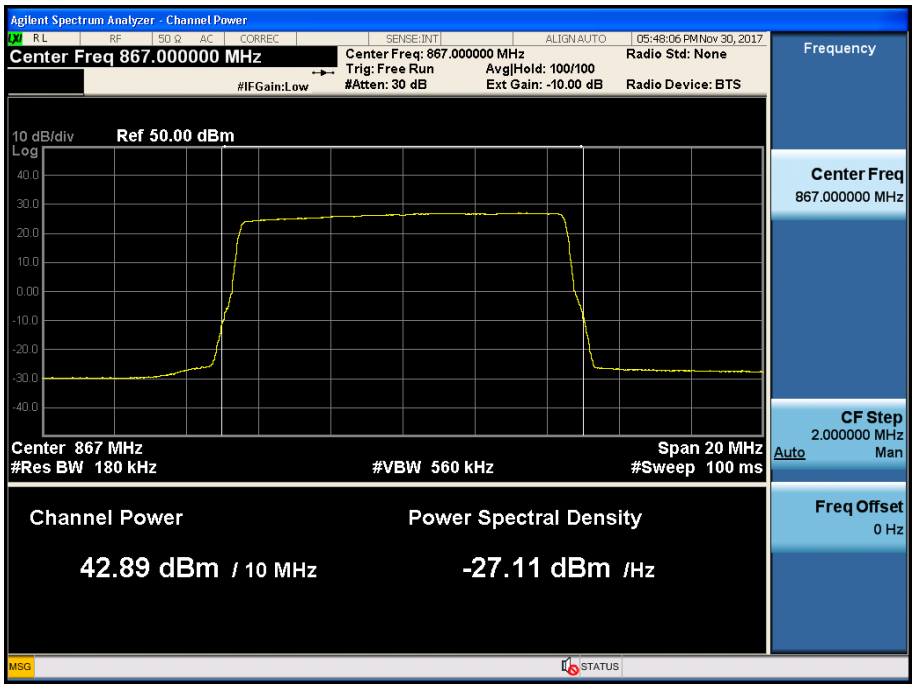

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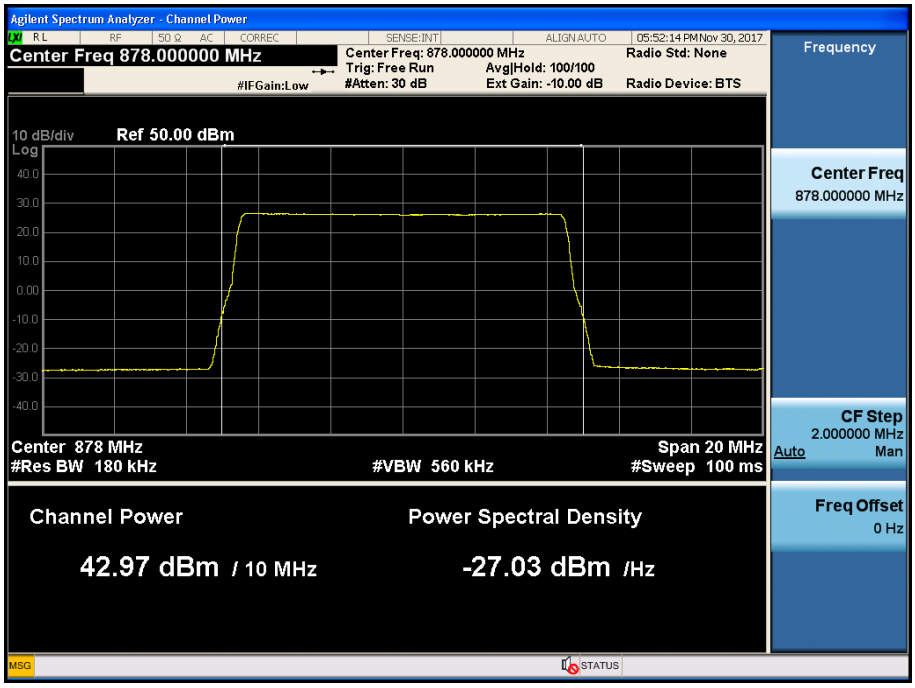

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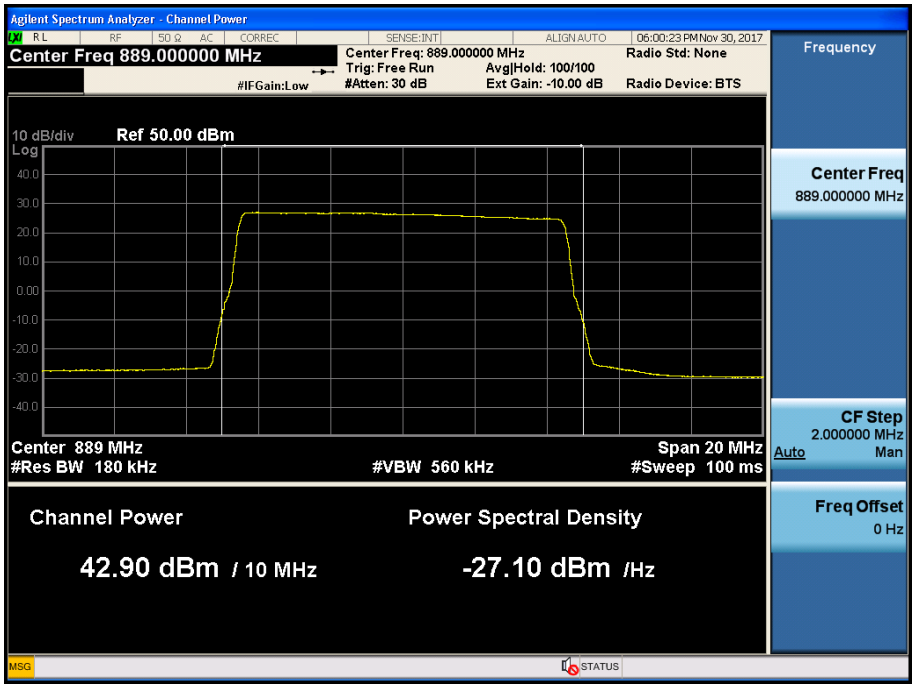

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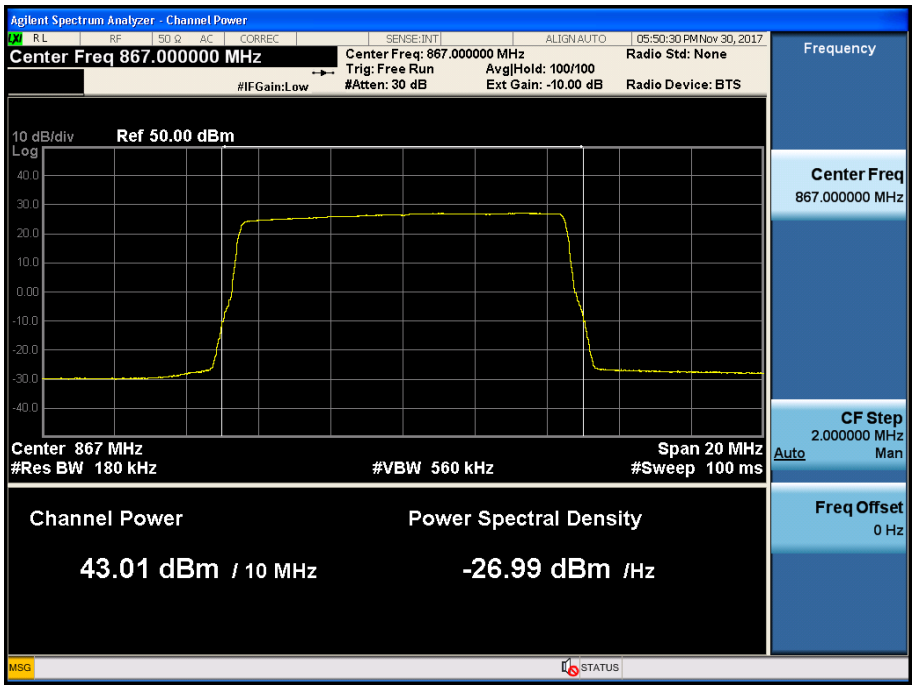

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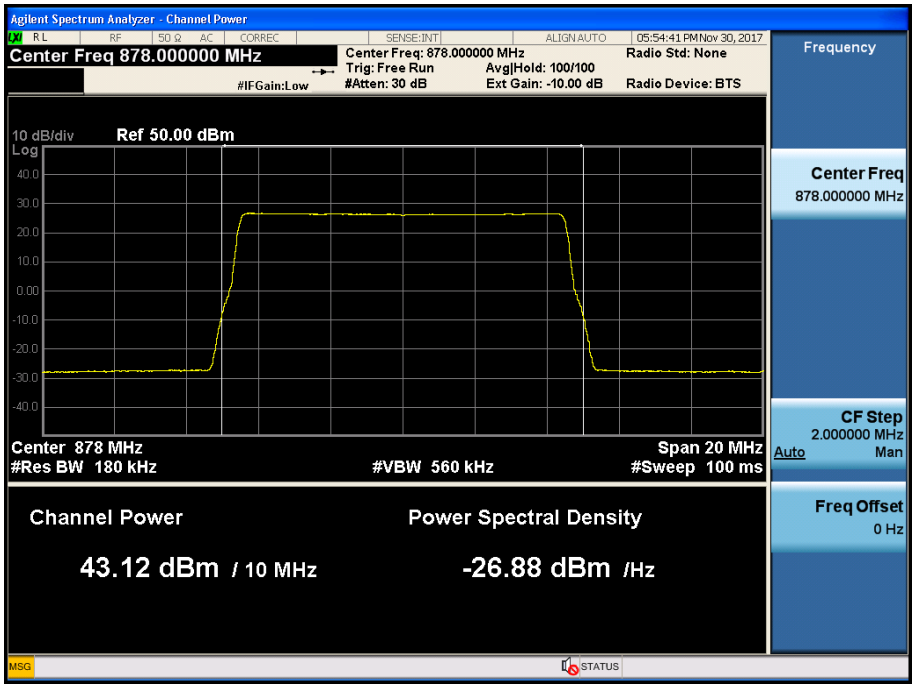
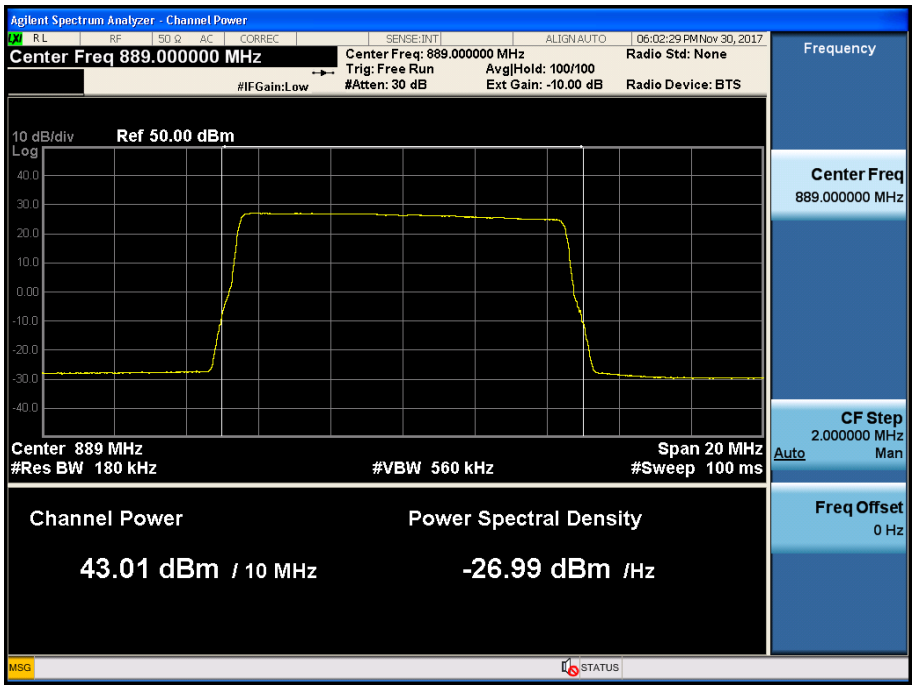
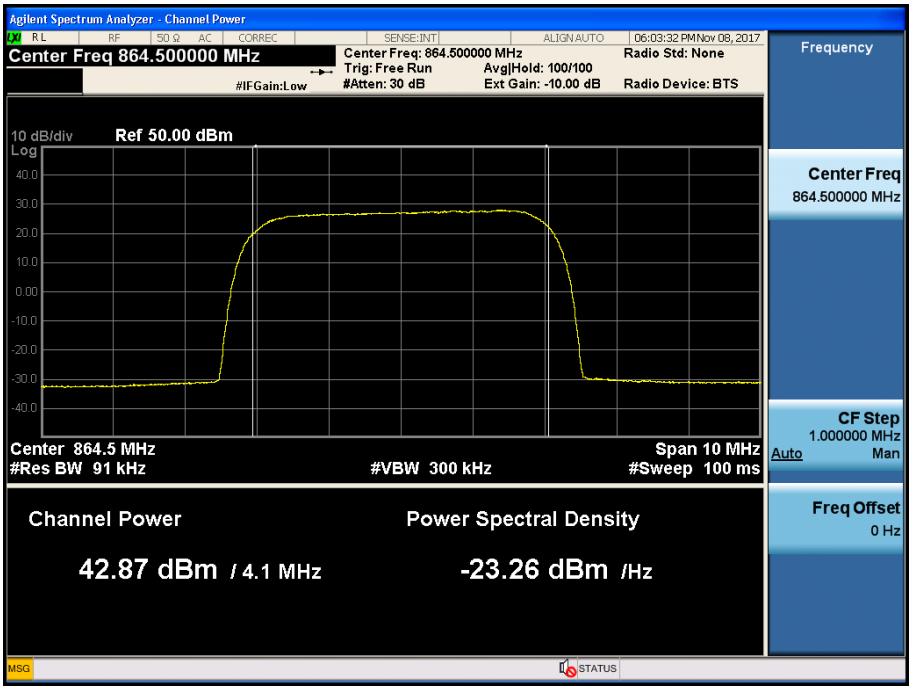


[+3 dB above AGC threshold Downlink High]



Plots of RF Output Power for 800 Band WCDMA

[AGC threshold Downlink Low]



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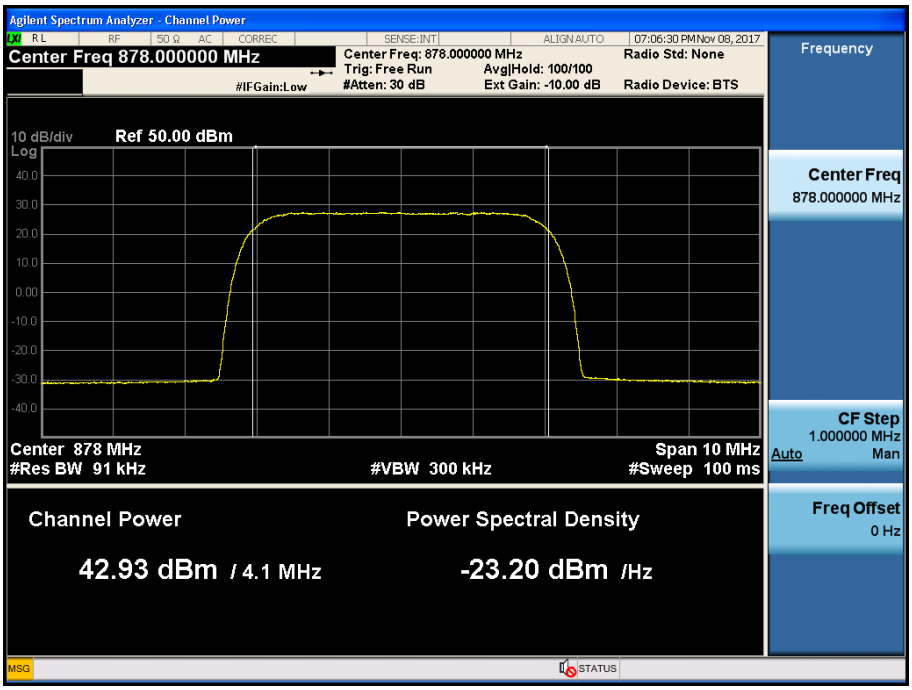
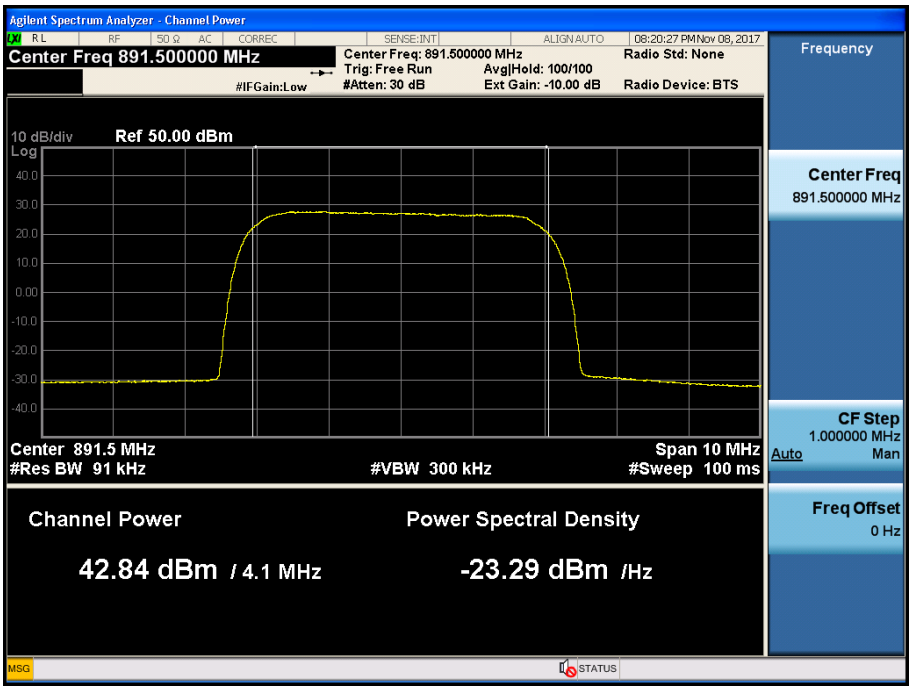
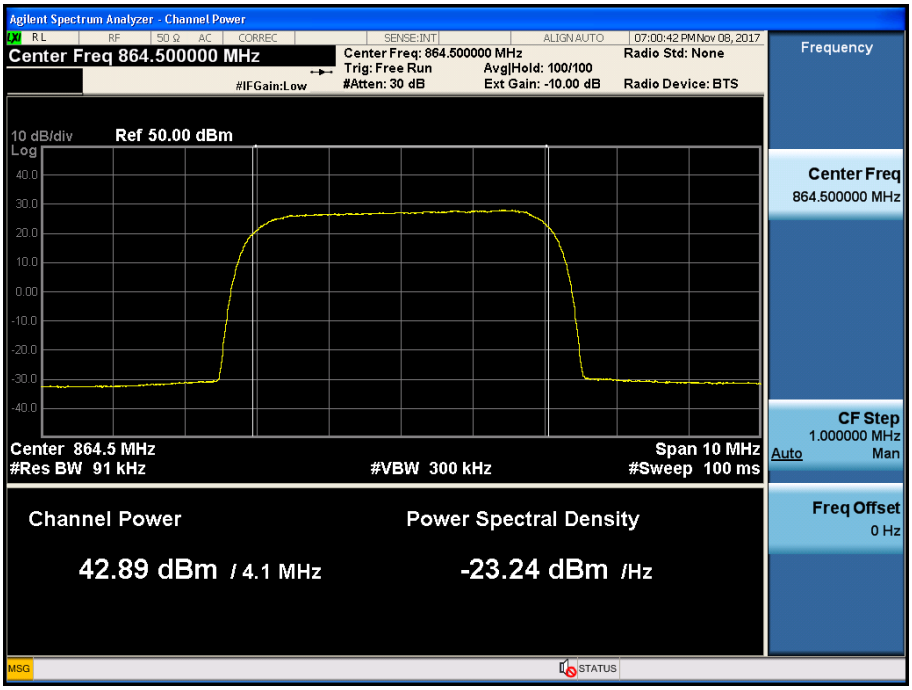


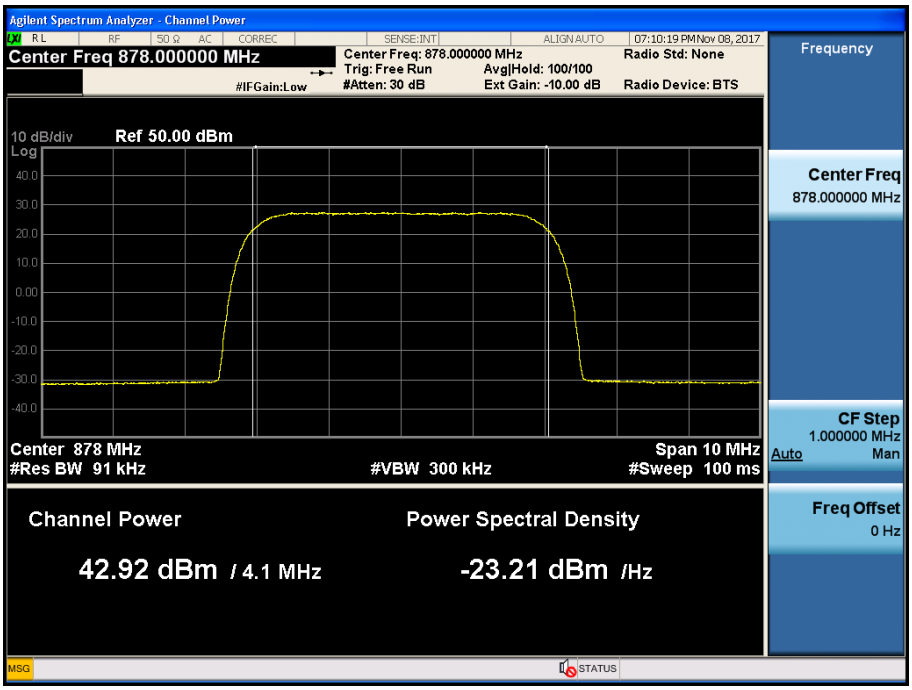
[AGC threshold Downlink High]



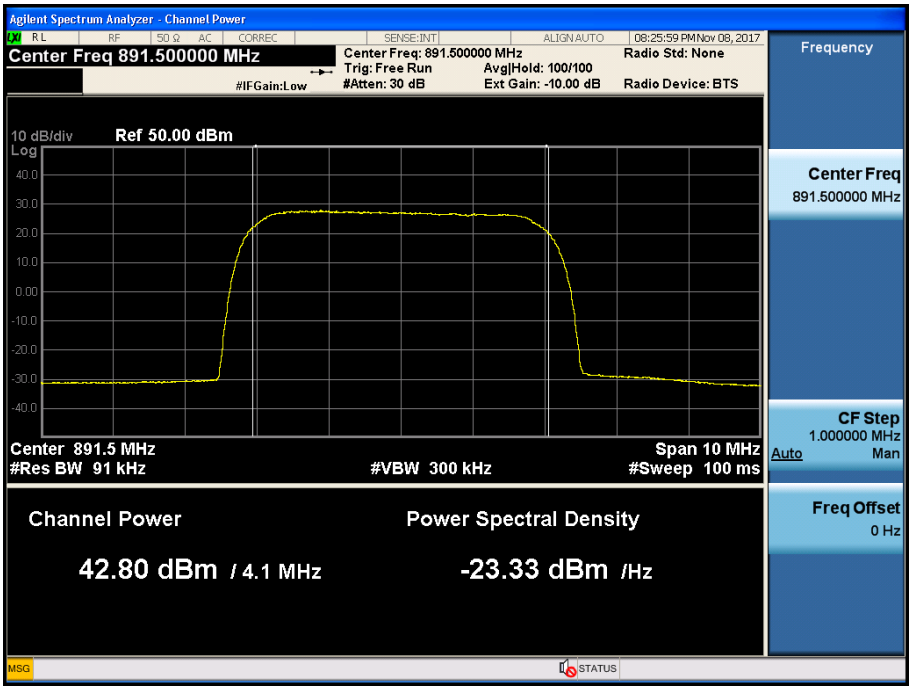
[+3 dB above AGC threshold Downlink Low]



[+3 dB above AGC threshold Downlink Middle]

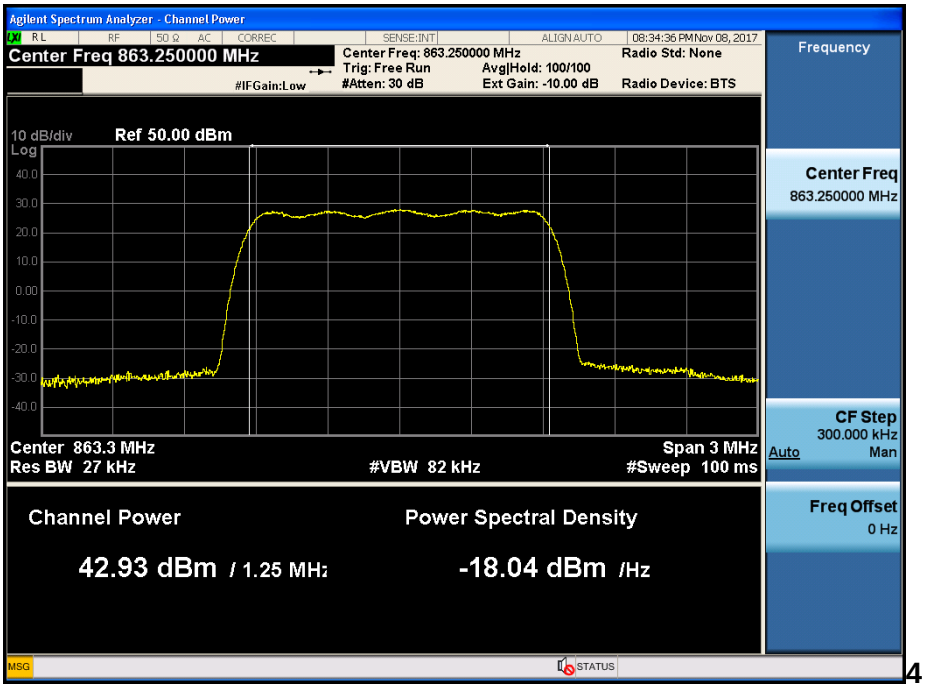


[+3 dB above AGC threshold Downlink High]

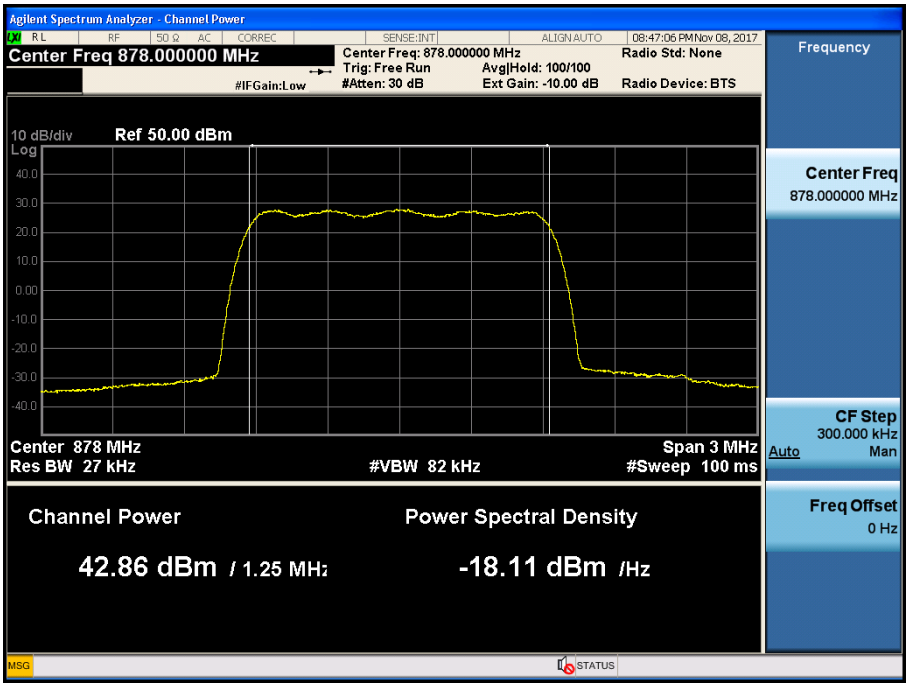


Plots of RF Output Power for 800 Band CDMA

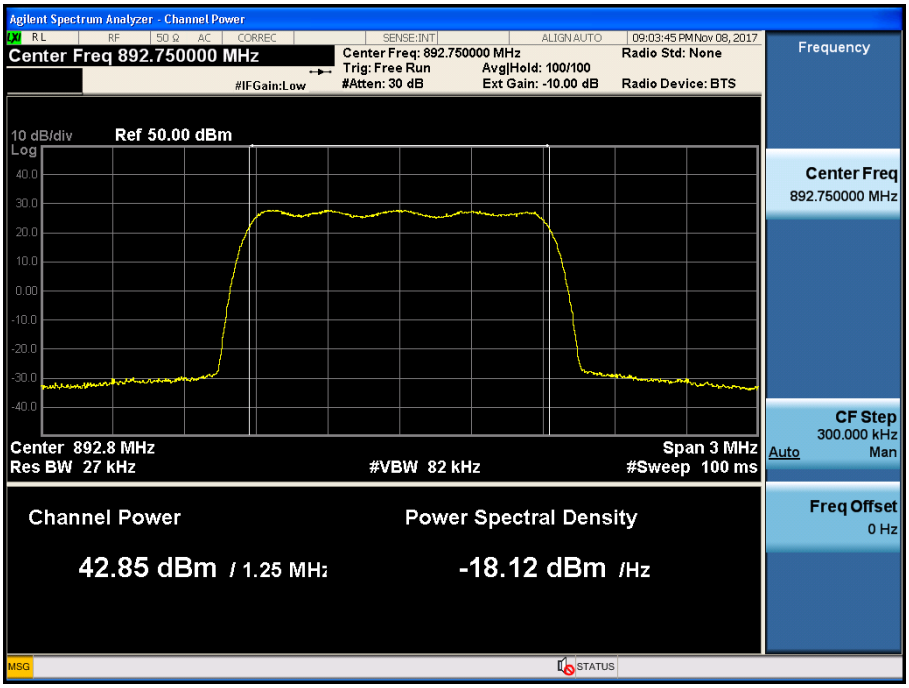
[AGC threshold Downlink Low]



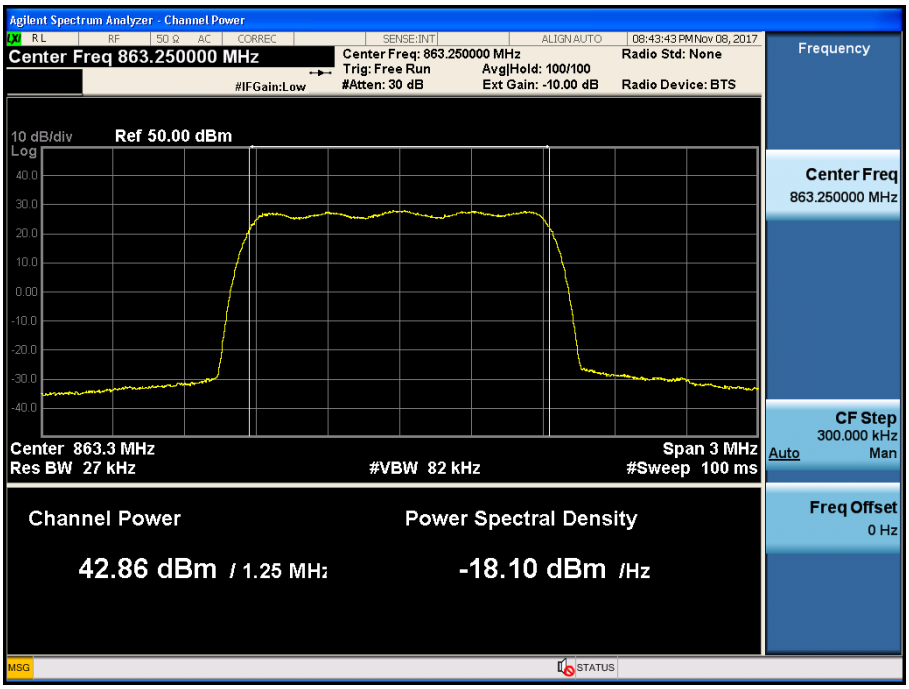
[AGC threshold Downlink Middle]



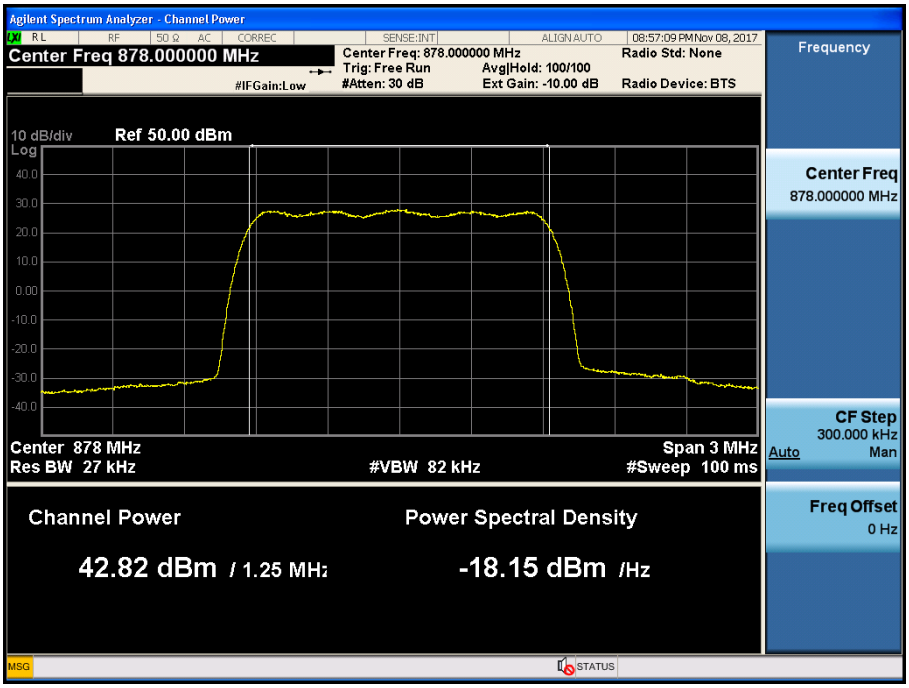
[AGC threshold Downlink High]



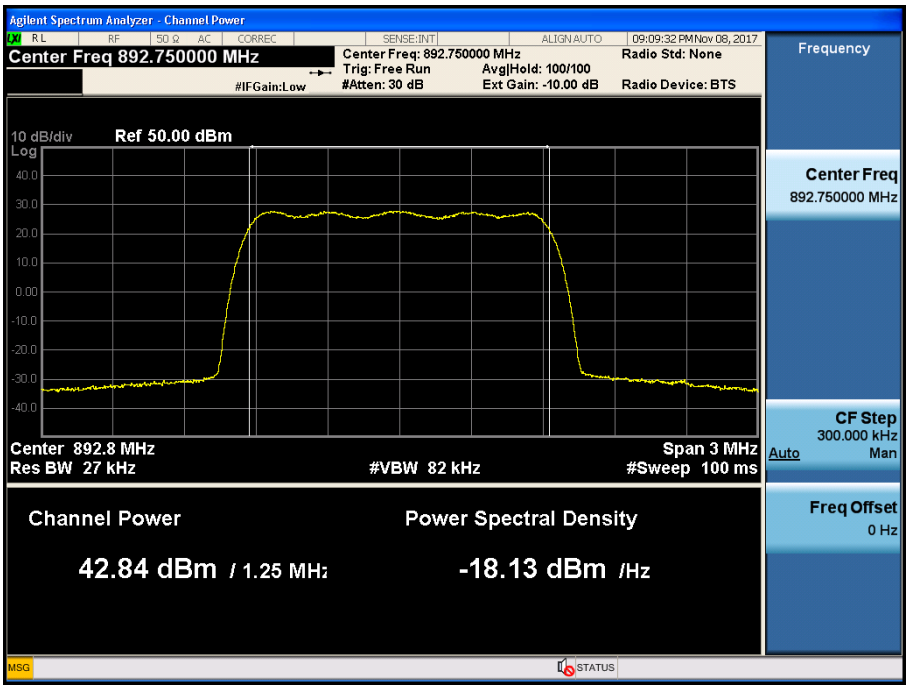
[+3 dB above AGC threshold Downlink Low]



[+3 dB above AGC threshold Downlink Middle]



[+3 dB above AGC threshold Downlink High]



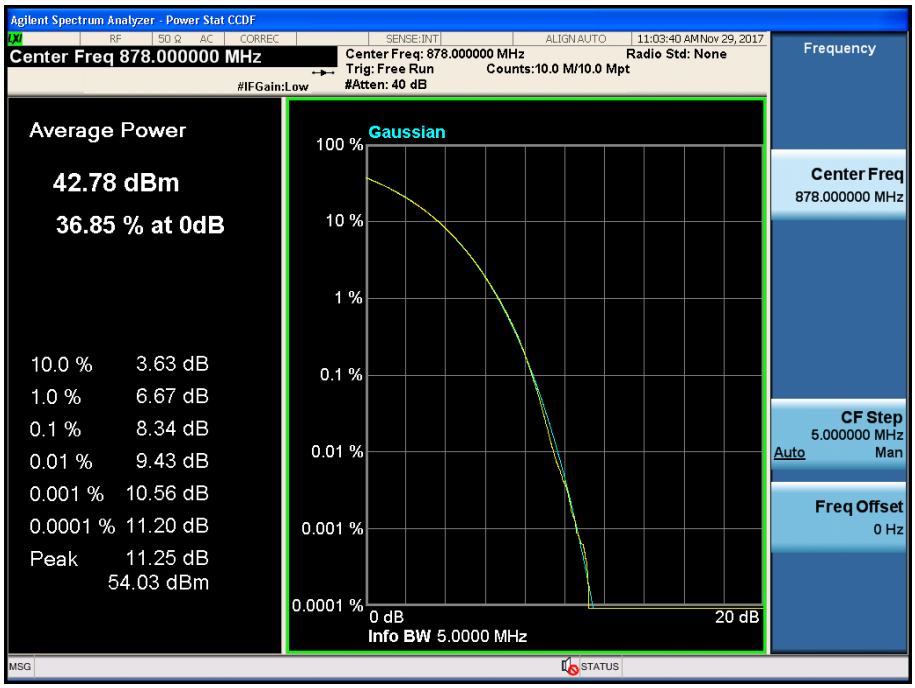
Peak-to-Average Ratio (PAR)

	Channel	Frequency (MHz)	PAR (dB)
LTE 5 MHz AGC threshold	Middle	878.00	8.34
LTE 5 MHz +3 dB above the AGC threshold	Middle	878.00	8.20
LTE 10 MHz AGC threshold	Middle	878.00	8.35
LTE 10 MHz +3 dB above the AGC threshold	Middle	878.00	8.34
WCDMA AGC threshold	Middle	878.00	4.44
WCDMA +3 dB above the AGC threshold	Middle	878.00	4.44
CDMA AGC threshold	Middle	878.00	7.91
CDMA +3 dB above the AGC threshold	Middle	878.00	7.83

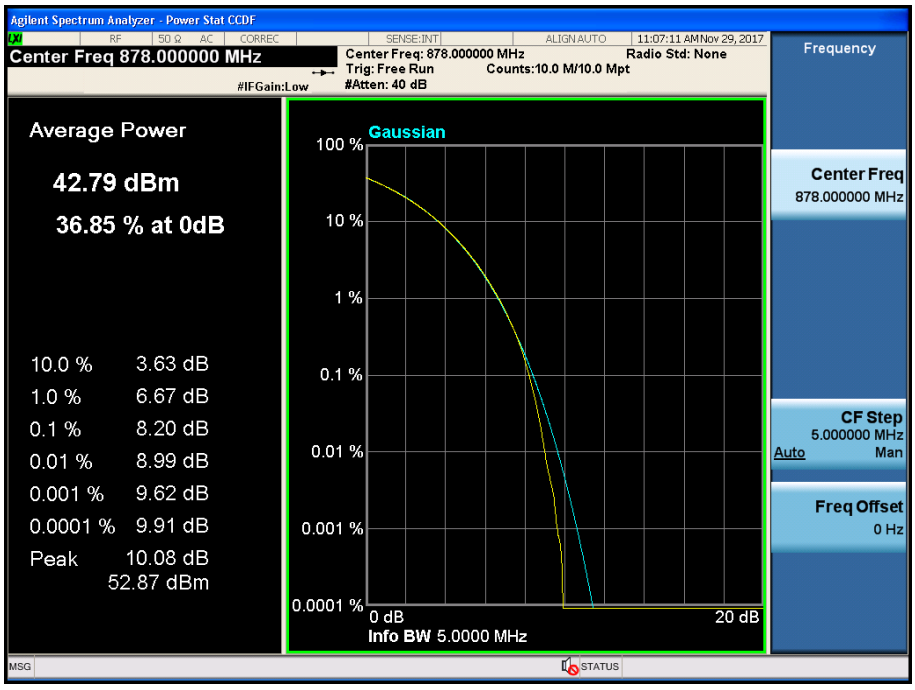
*Note: We have done CDMA and 1xEVDO modulation test in technology. Test results are only attached worst cases.

Plots of Peak-to-Average Ratio for 800 Band LTE 5MHz

[AGC threshold Downlink Middle]

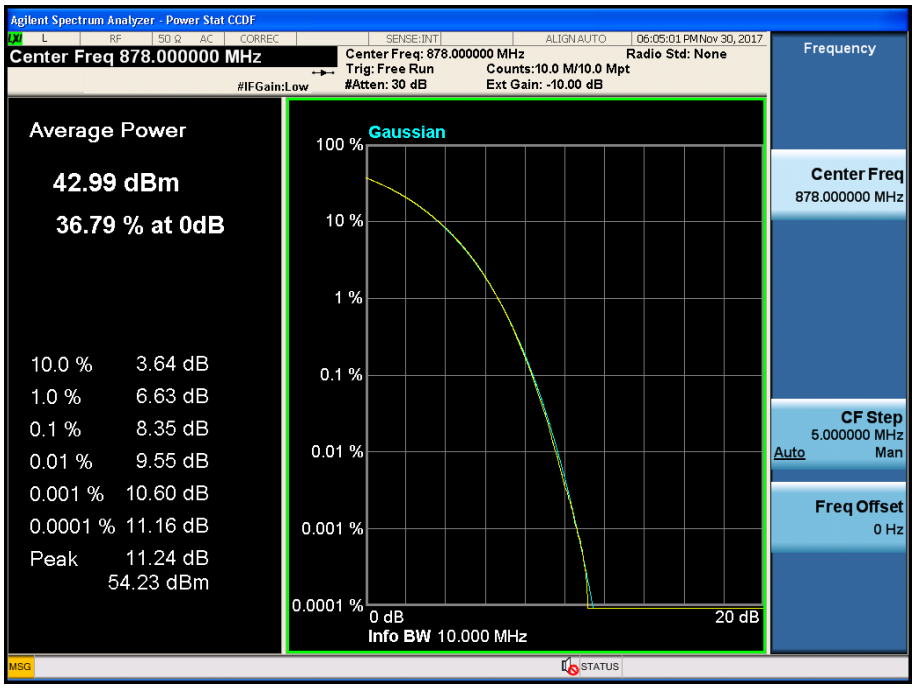


[+3 dB above AGC threshold Downlink Middle]

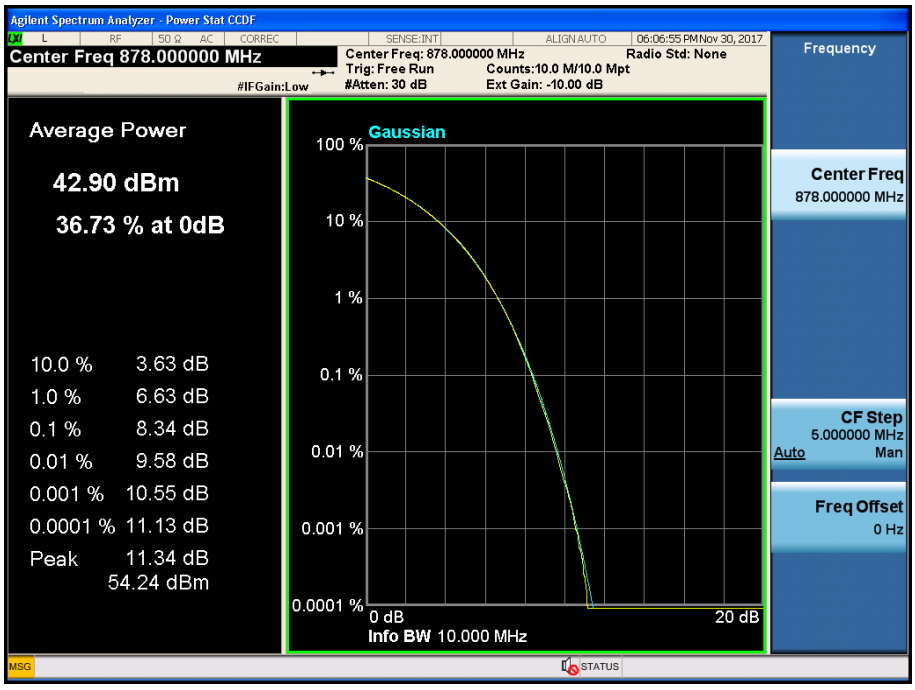


Plots of Peak-to-Average Ratio for 800 Band LTE 10MHz

[AGC threshold Downlink Middle]

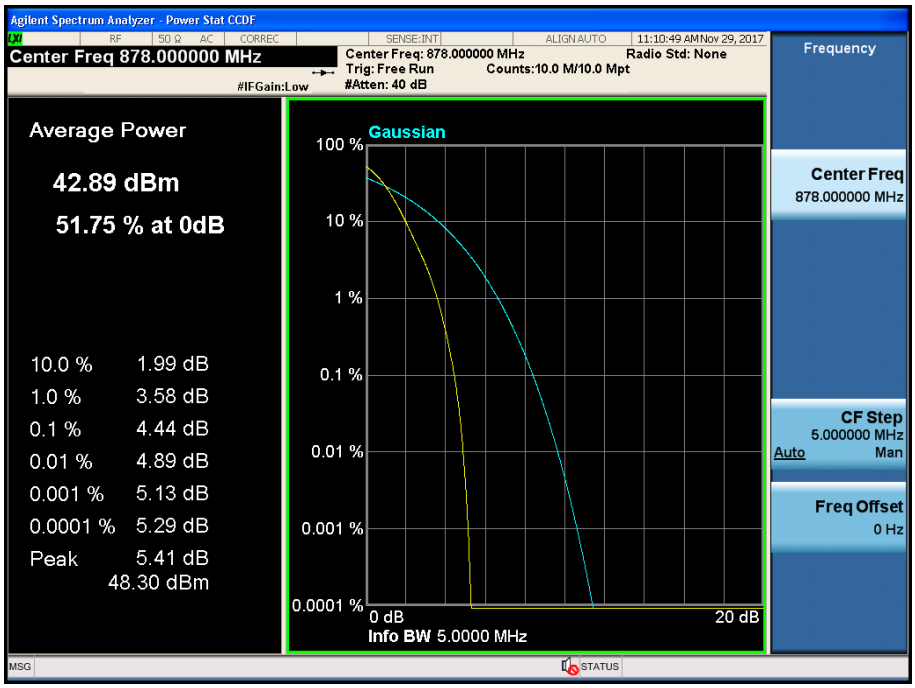


[+3 dB above AGC threshold Downlink Middle]

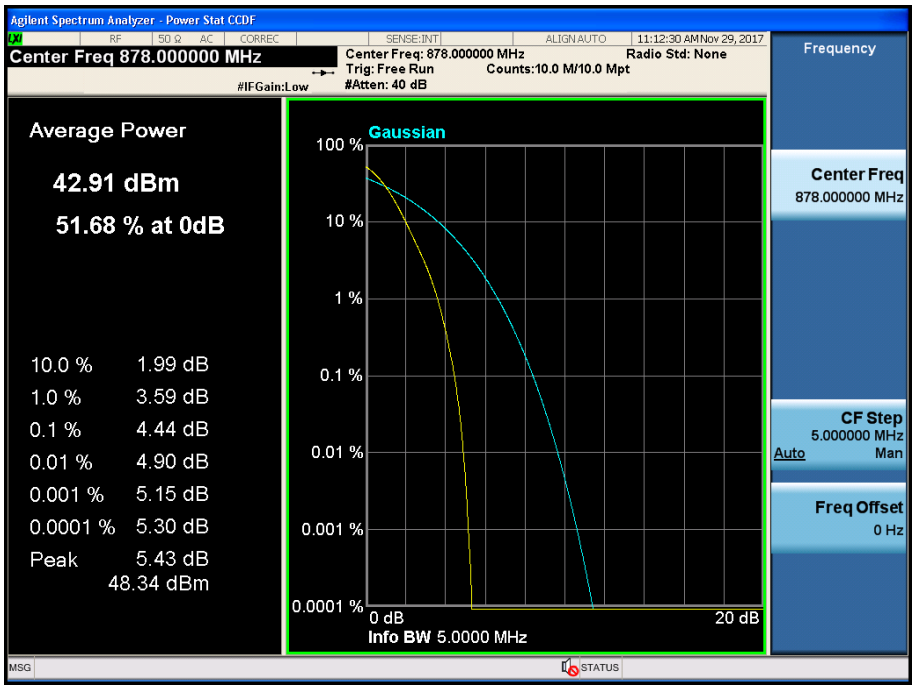


Plots of Peak-to-Average Ratio for 800 Band WCDMA

[AGC threshold Downlink Middle]

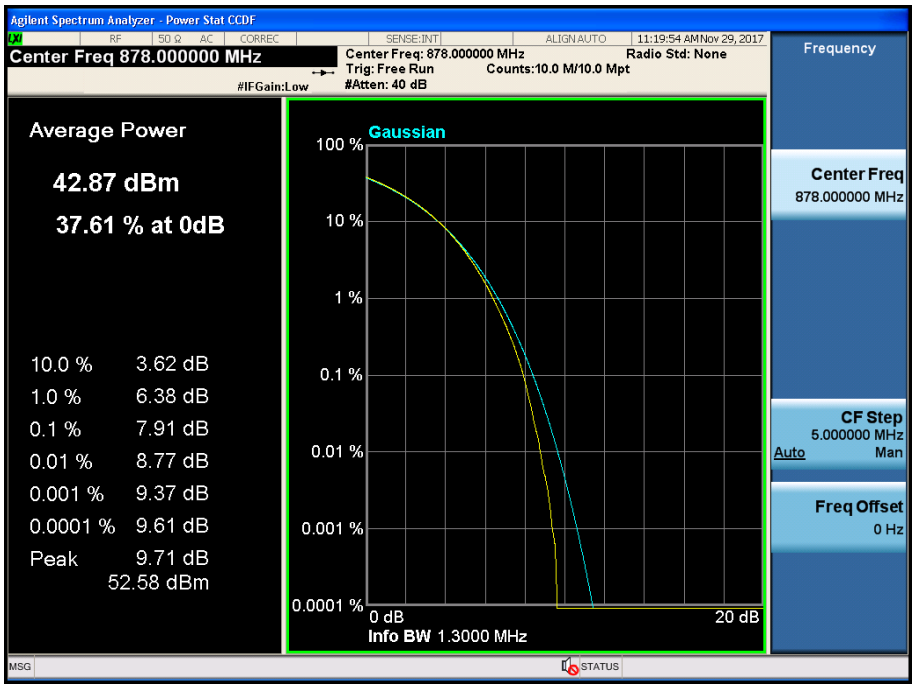


[+3 dB above AGC threshold Downlink Middle]

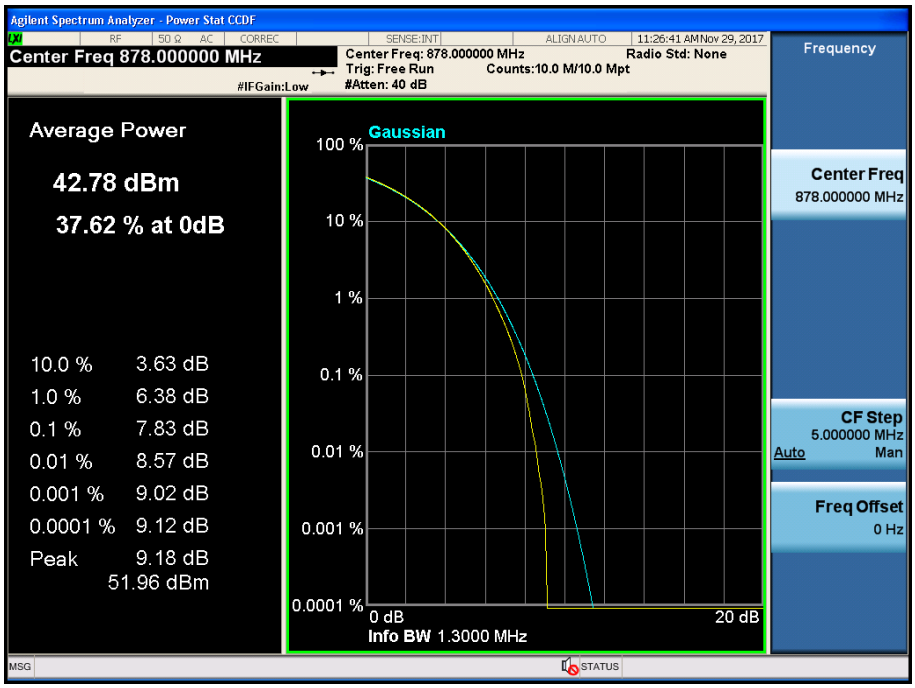


Plots of Peak-to-Average Ratio for 800 Band CDMA

[AGC threshold Downlink Middle]



[+3 dB above AGC threshold Downlink Middle]



7. OCCUPIED BANDWIDTH

FCC Rules

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.

IC Rules

Test Requirements:

RSS-Gen

6 Technical Requirements

6.6 Occupied Bandwidth

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:

Measurements were in accordance with the test methods section 3.4 of KDB 935210 D05 v01r02 and section 4.2 of KDB 971168 D01 v03.

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 emission bandwidth (EBW) or alternatively, the OBW.

f) The nominal RBW shall be in the range of 1 % to 5 % of the anticipated OBW, and the VBW shall be $\geq 3 \times$ 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.

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) Determine the reference value: Allow the trace to stabilize. Set the spectrum analyzer marker to the highest amplitude level of the displayed trace (this is the reference value) and record the associated frequency as f0.

l) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the −26 dB down amplitude. The 26 dB EBW (alternatively OBW) is the positive frequency difference between the two markers. If the spectral envelope crosses the −26 dB down amplitude at multiple points, the lowest or highest frequency shall be selected as the frequencies that are the furthest removed from the center frequency at which the spectral envelope crosses the −26 dB down amplitude point.

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

n) Compare the spectral plot of the input signal (determined from step m) to the output signal (determined from step l) 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.

o) Repeat the procedure [steps e) to n)] with the input signal amplitude set to 3 dB above the AGC threshold.

p) Repeat steps e) to o) with the signal generator set to the narrowband signal.

q) Repeat steps e) to p) for all frequency bands authorized for use by the EUT.

RSS-GEN

6 Technical Requirements

6.6 Occupied Bandwidth

- 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 3×RBW.

Note: Video averaging is not permitted.

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum

until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth.

Test Results:

[Downlink Output_800 BAND]

	Channel	Frequency (MHz)	OBW (MHz)
800 Band _ LTE 5 MHz AGC threshold	Low	864.50	4.5089
	Middle	878.00	4.3950
	High	891.50	4.3880
800 Band _ LTE 5 MHz +3 dB above the AGC threshold	Low	864.50	4.3852
	Middle	878.00	4.3930
	High	891.50	4.3892
800 Band _ LTE 10 MHz AGC threshold	Low	867.00	8.9542
	Middle	878.00	9.0090
	High	889.00	8.9860
800 Band _ LTE 10 MHz +3 dB above the AGC threshold	Low	867.00	8.9560
	Middle	878.00	9.0059
	High	889.00	8.9703
800 Band_ WCDMA AGC threshold	Low	864.50	4.1709
	Middle	878.00	4.1783
	High	891.50	4.1776
800 Band_ WCDMA +3 dB above the AGC threshold	Low	864.50	4.1699
	Middle	878.00	4.1747
	High	891.50	4.1704

	Channel	Frequency (MHz)	OBW (MHz)
800 Band_ CDMA AGC threshold	Low	863.25	1.2636
	Middle	878.00	1.2660
	High	892.75	1.2634
800 Band_ CDMA +3 dB above the AGC threshold	Low	863.25	1.2663
	Middle	878.00	1.2630
	High	892.75	1.2596

*Note: We have done CDMA and 1xEVDO modulation test in technology. Test results are only attached worst cases.

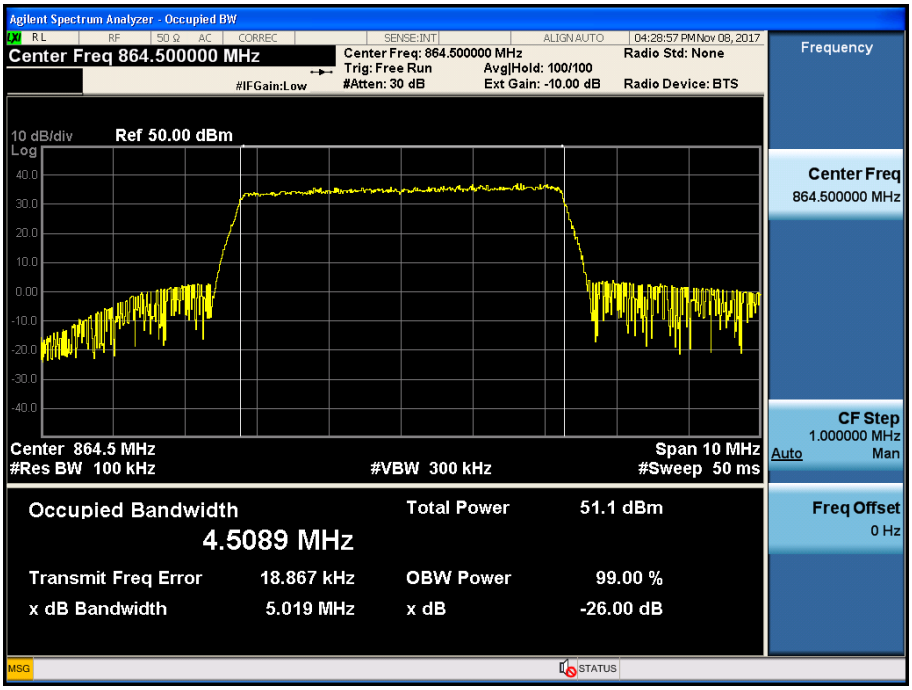
[Downlink Input_800 BAND]

	Channel	Frequency (MHz)	OBW (MHz)
800 Band_ LTE 5 MHz AGC threshold	Low	864.50	4.5114
	Middle	878.00	4.5118
	High	891.50	4.5121
800 Band_ LTE 10 MHz AGC threshold	Low	867.00	9.0033
	Middle	878.00	9.0007
	High	889.00	9.0003
800 Band_ CDMA AGC threshold	Low	864.50	4.1808
	Middle	878.00	4.1787
	High	891.50	4.1774
800 Band_ WCDMA AGC threshold	Low	863.25	1.2614
	Middle	878.00	1.2634
	High	892.75	1.2642

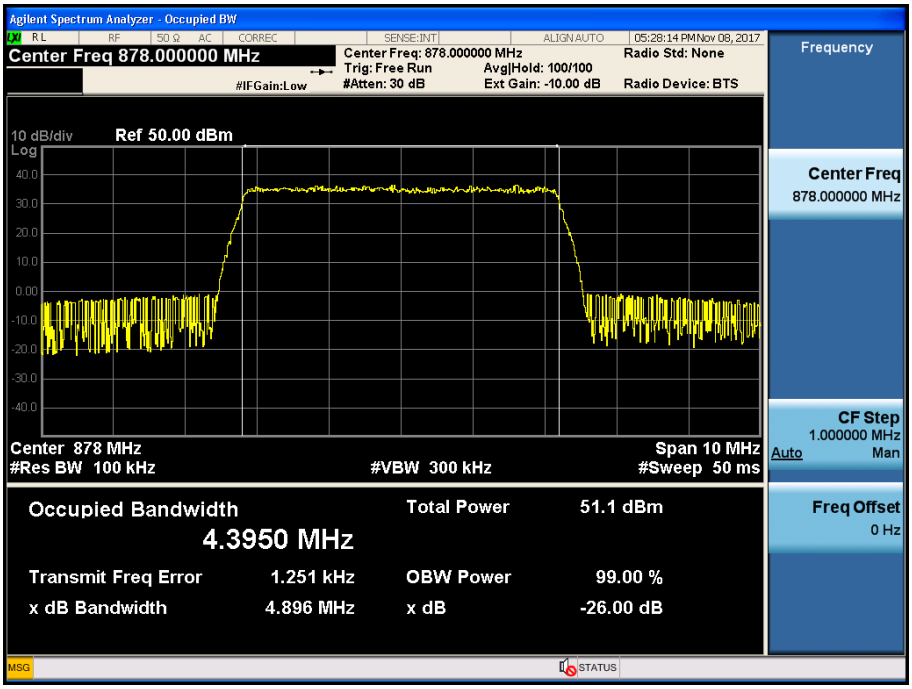
*Note: We have done CDMA and 1xEVDO modulation test in technology. Test results are only attached worst cases.

Plots of Occupied Bandwidth_800 BAND LTE 5 MHz

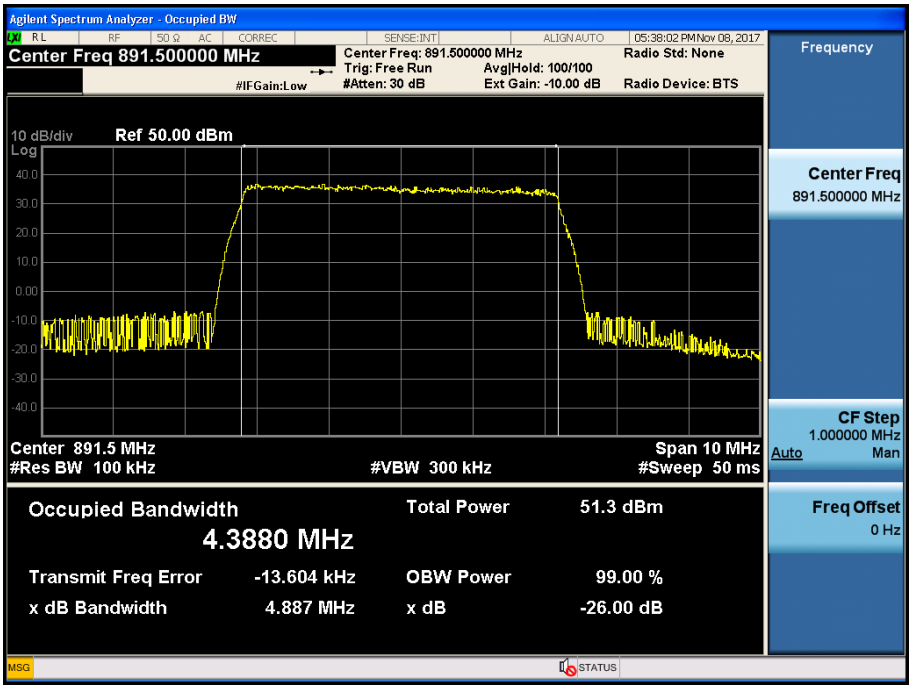
[AGC threshold Output Downlink Low]



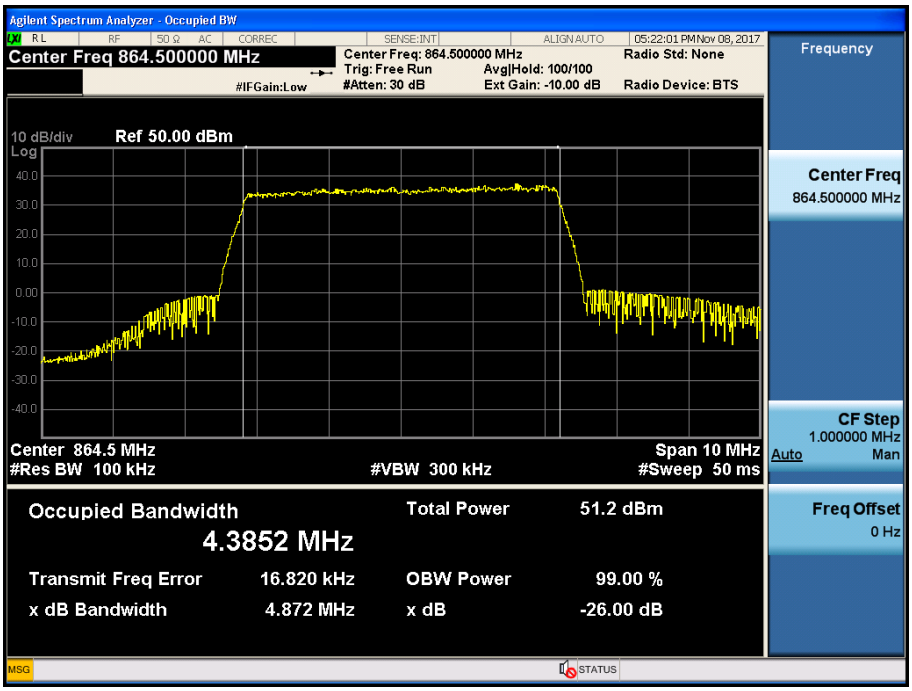
[AGC threshold Output Downlink Middle]



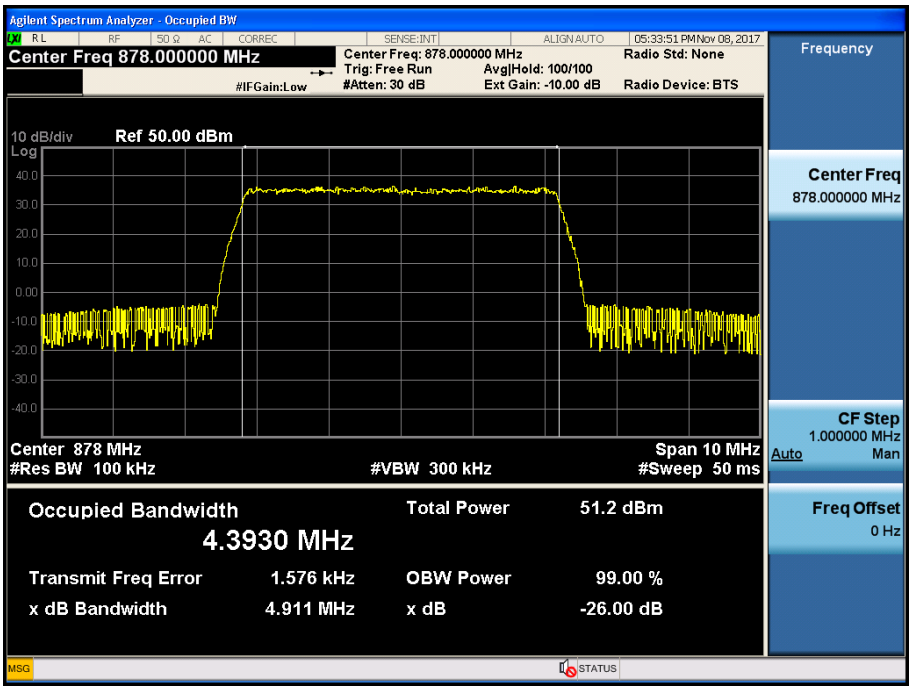
[AGC threshold Output Downlink High]



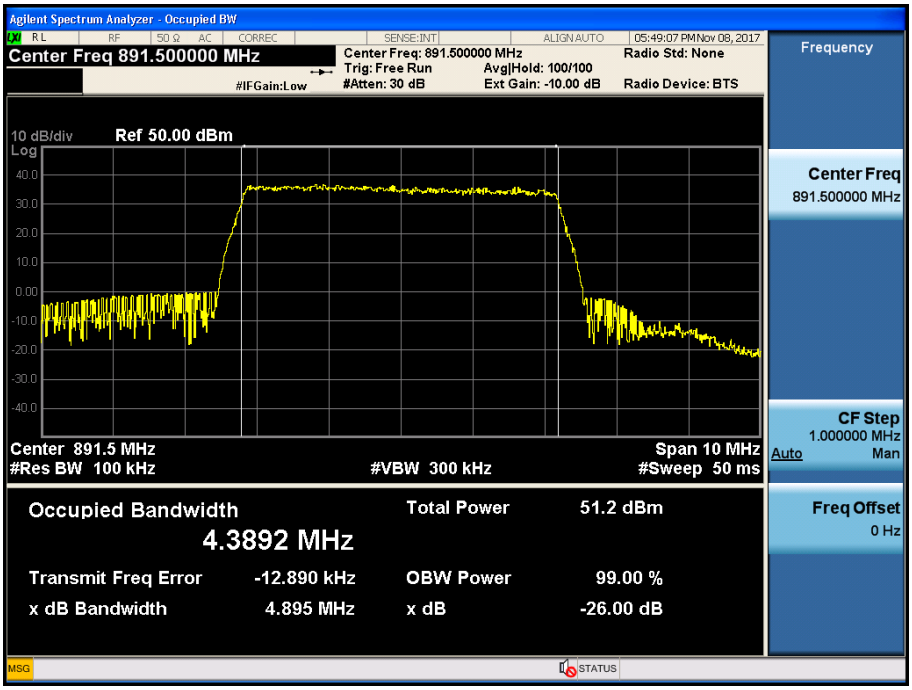
[+3 dB above AGC threshold Output Downlink Low]



[+3 dB above AGC threshold Output Downlink Middle]

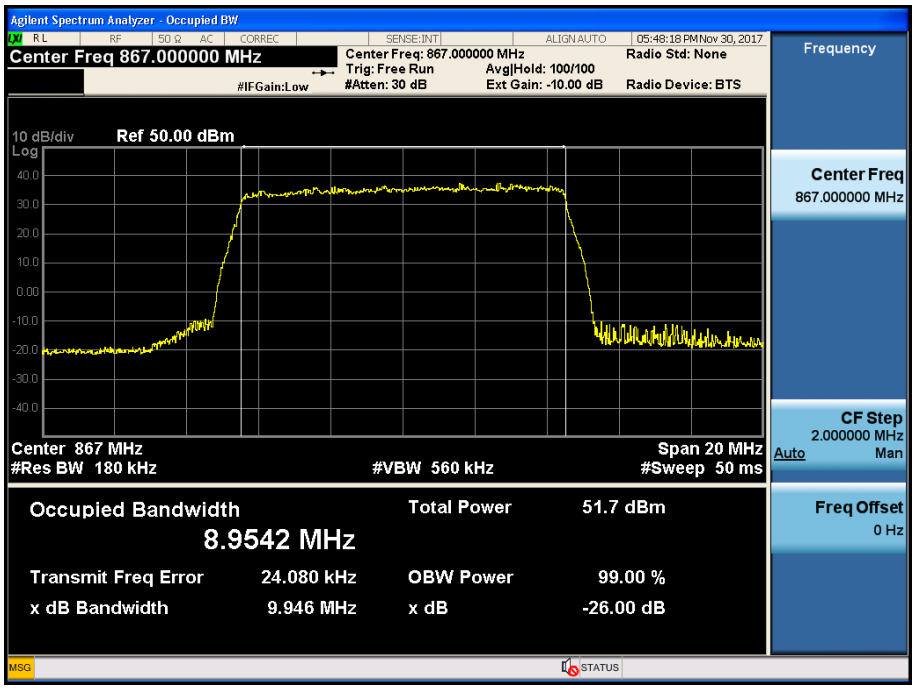


[+3 dB above AGC threshold Output Downlink High]

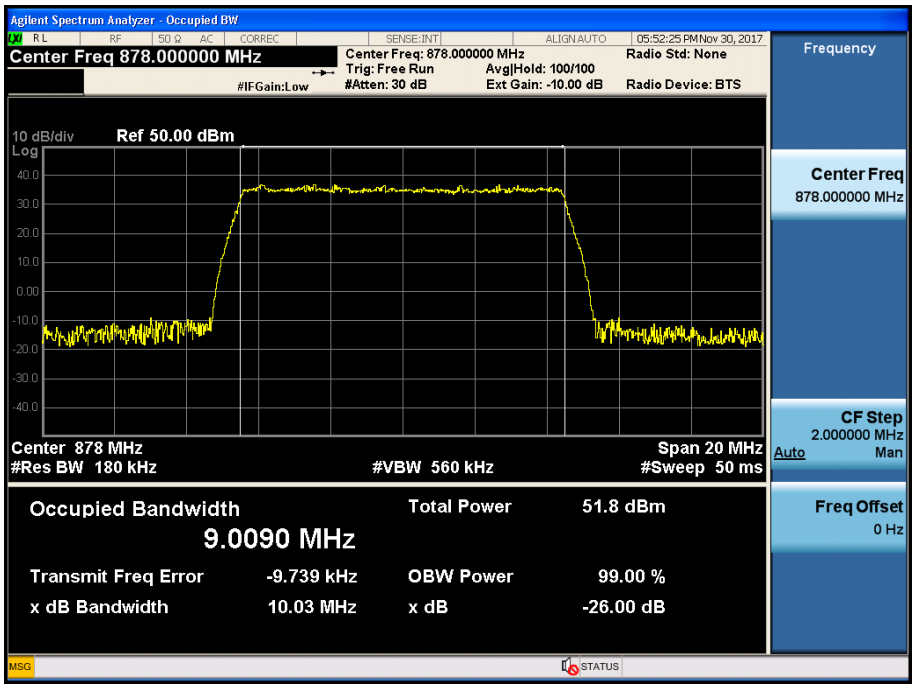


Plots of Occupied Bandwidth_800 BAND LTE 10 MHz

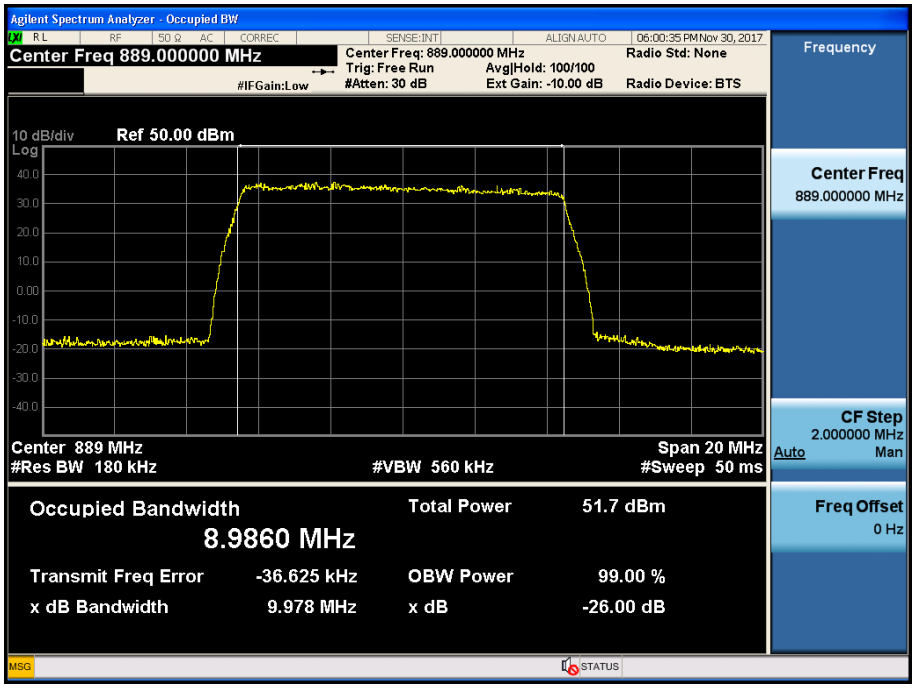
[AGC threshold Output Downlink Low]



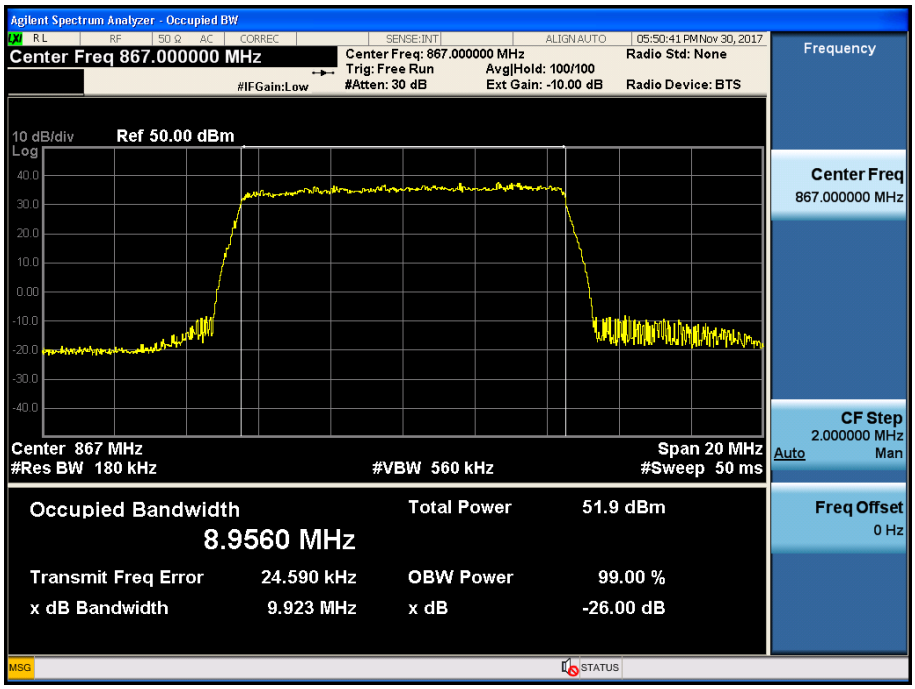
[AGC threshold Output Downlink Middle]



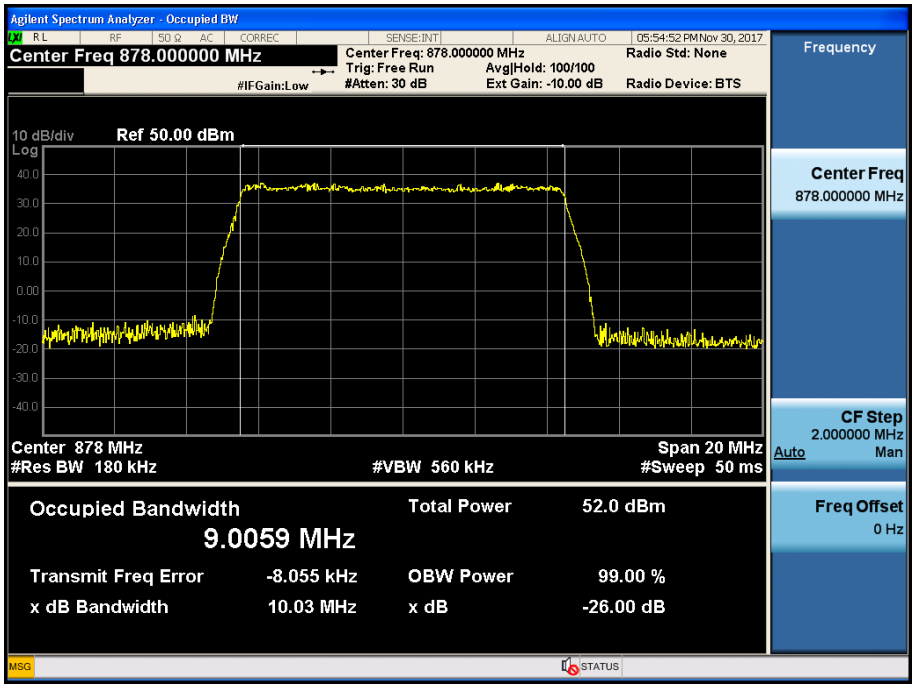
[AGC threshold Output Downlink High]



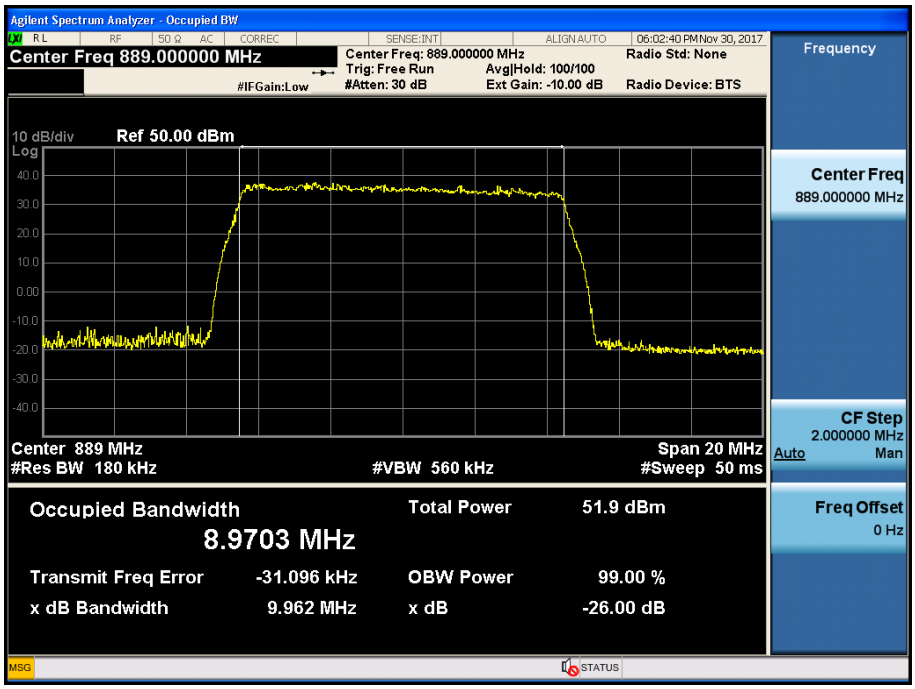
[+3 dB above AGC threshold Output Downlink Low]



[+3 dB above AGC threshold Output Downlink Middle]

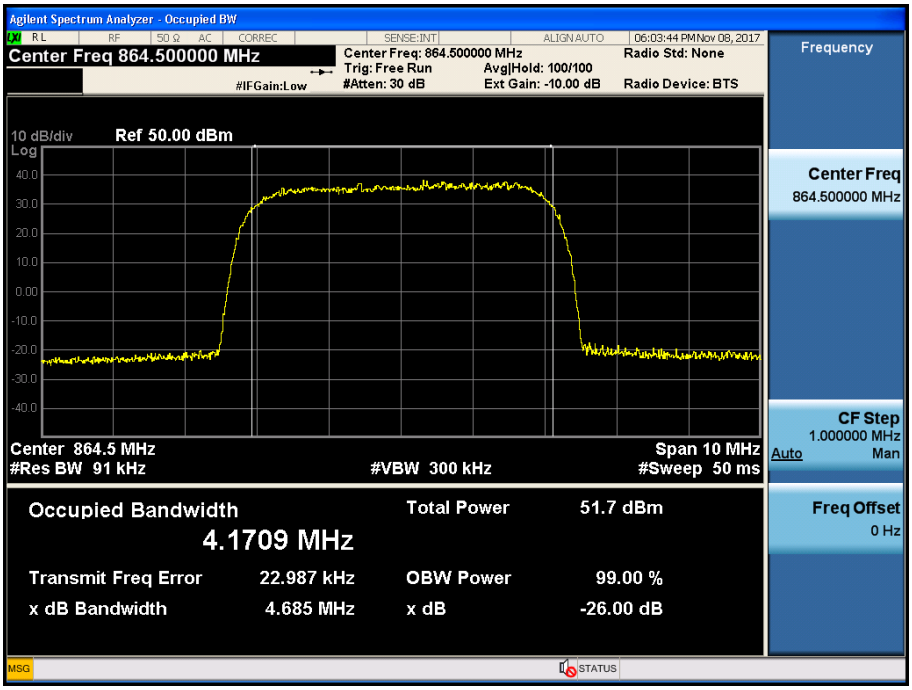


[+3 dB above AGC threshold Output Downlink High]

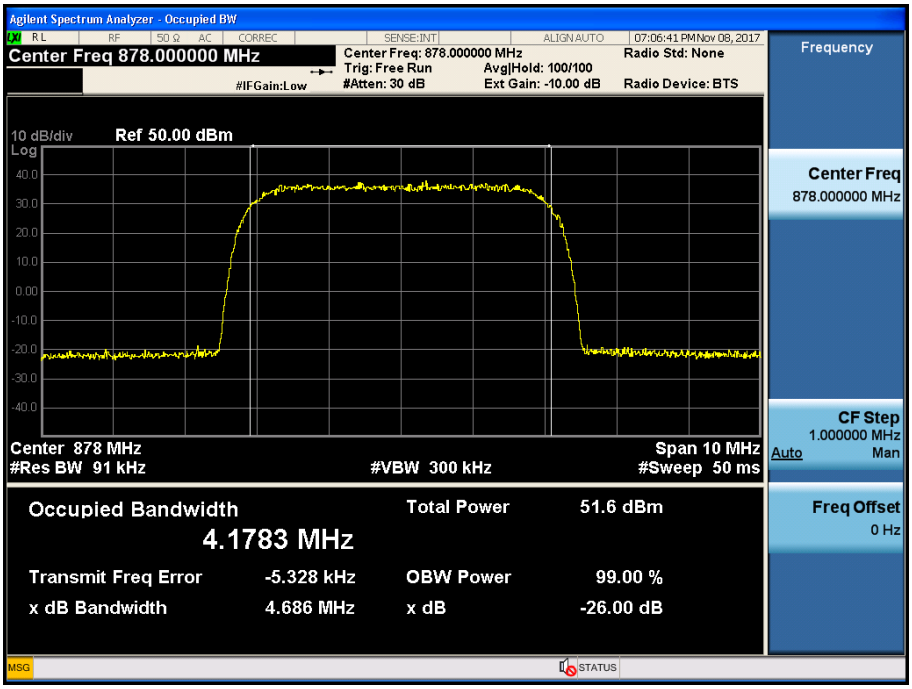


Plots of Occupied Bandwidth_800 BAND WCDMA

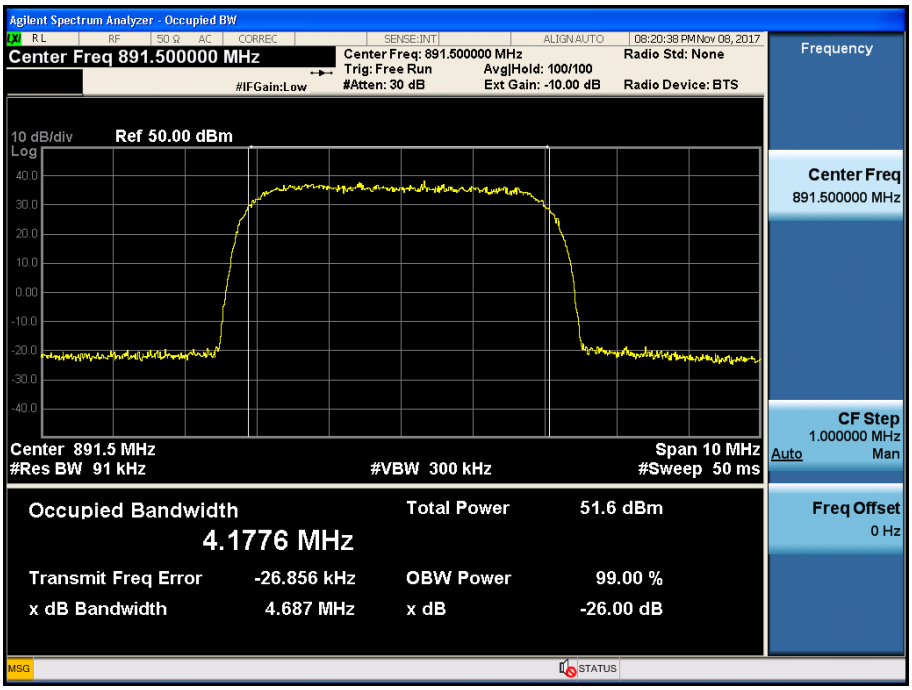
[AGC threshold Output Downlink Low]



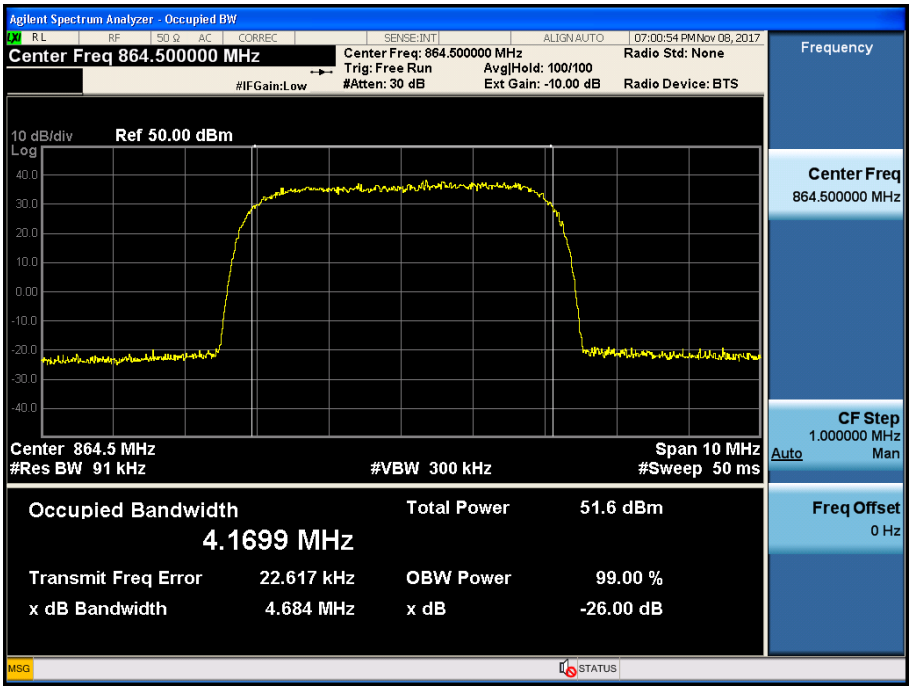
[AGC threshold Output Downlink Middle]



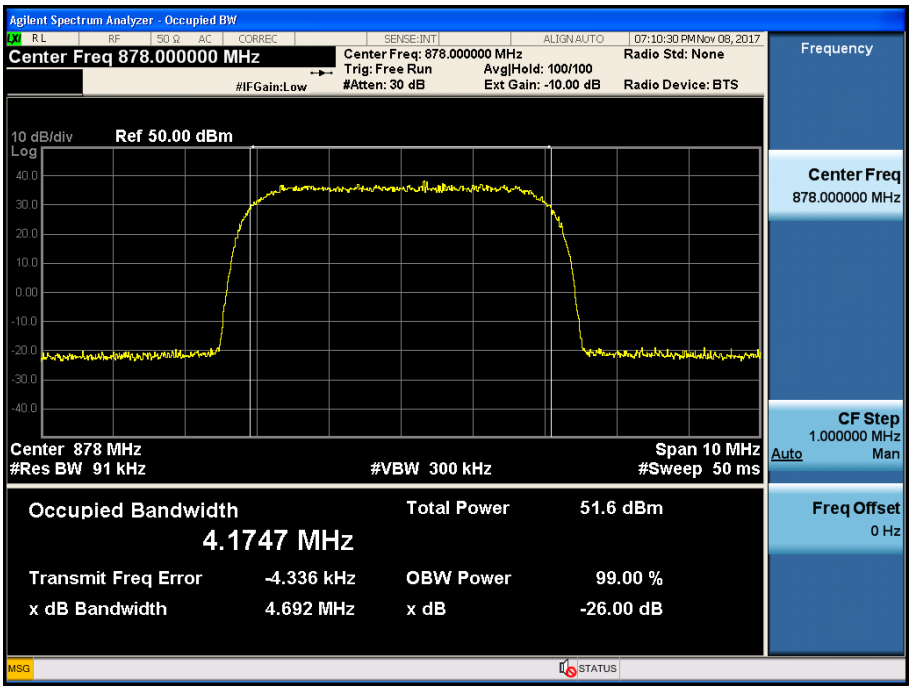
[AGC threshold Output Downlink High]



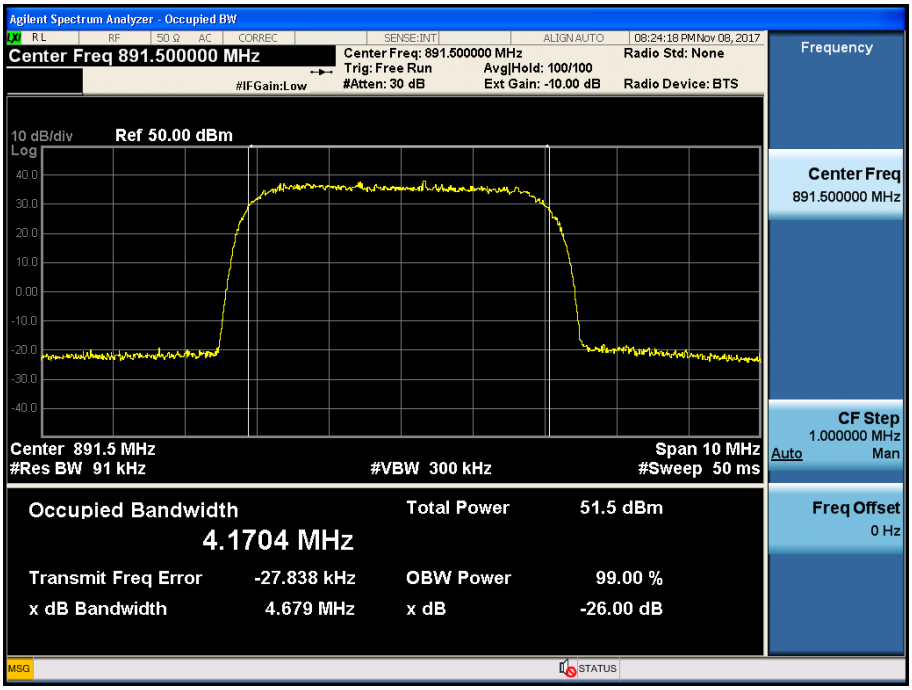
[+3 dB above AGC threshold Output Downlink Low]



[+3 dB above AGC threshold Output Downlink Middle]

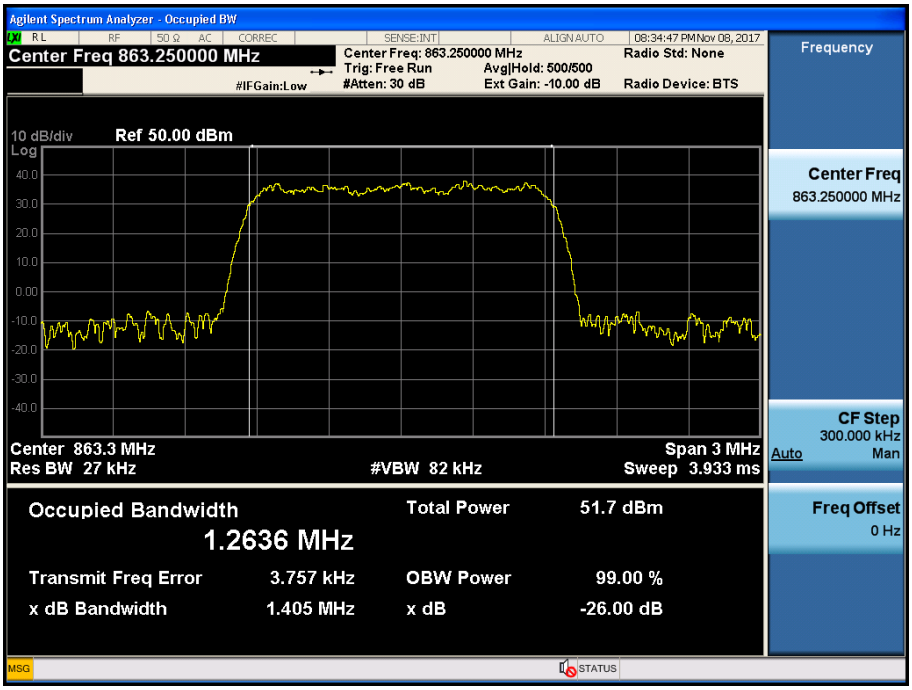


[+3 dB above AGC threshold Output Downlink High]

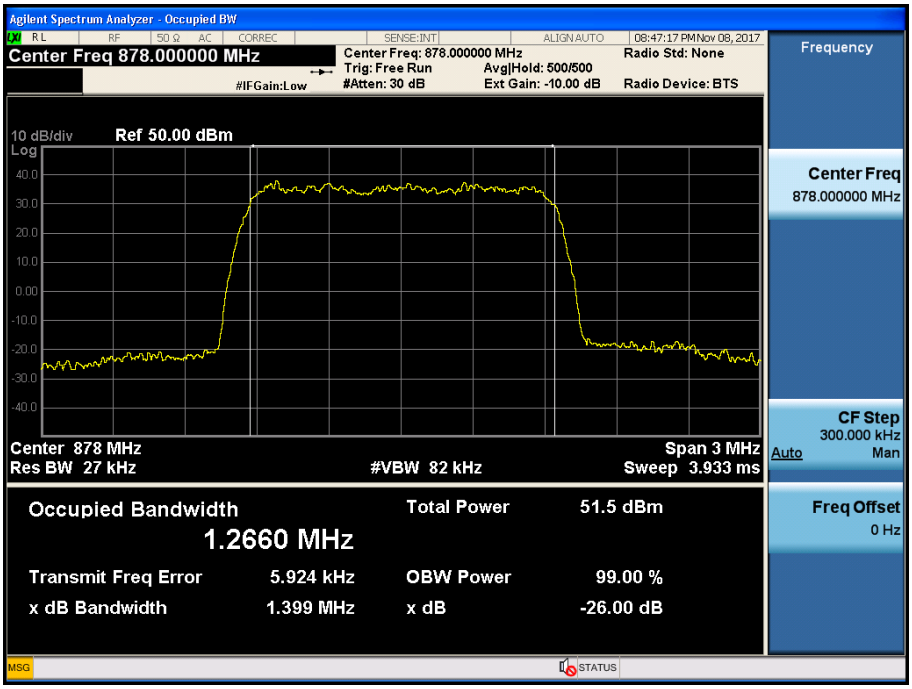


Plots of Occupied Bandwidth_ 800 BAND CDMA

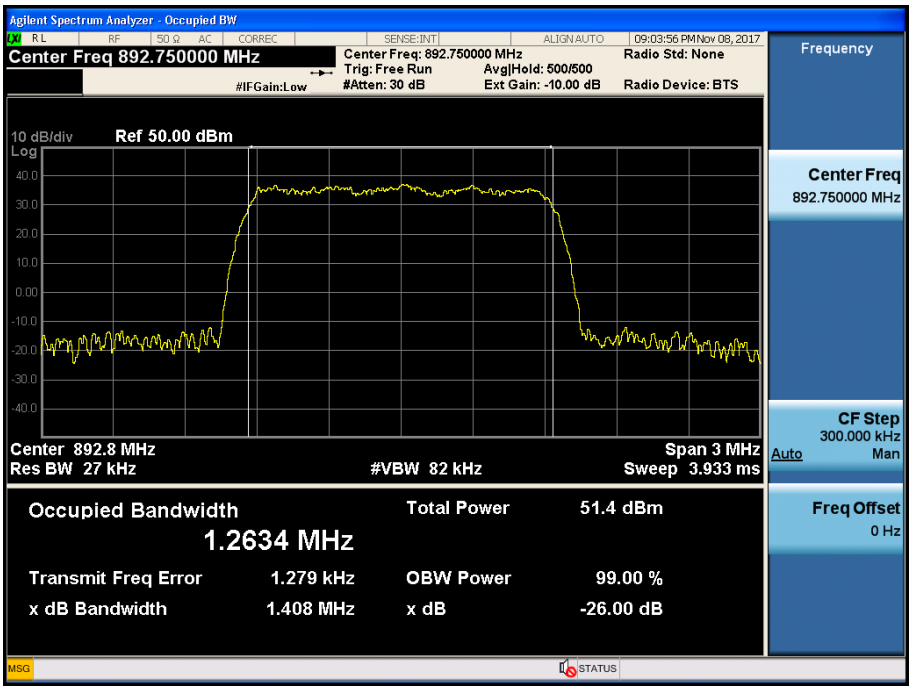
[AGC threshold Output Downlink Low]



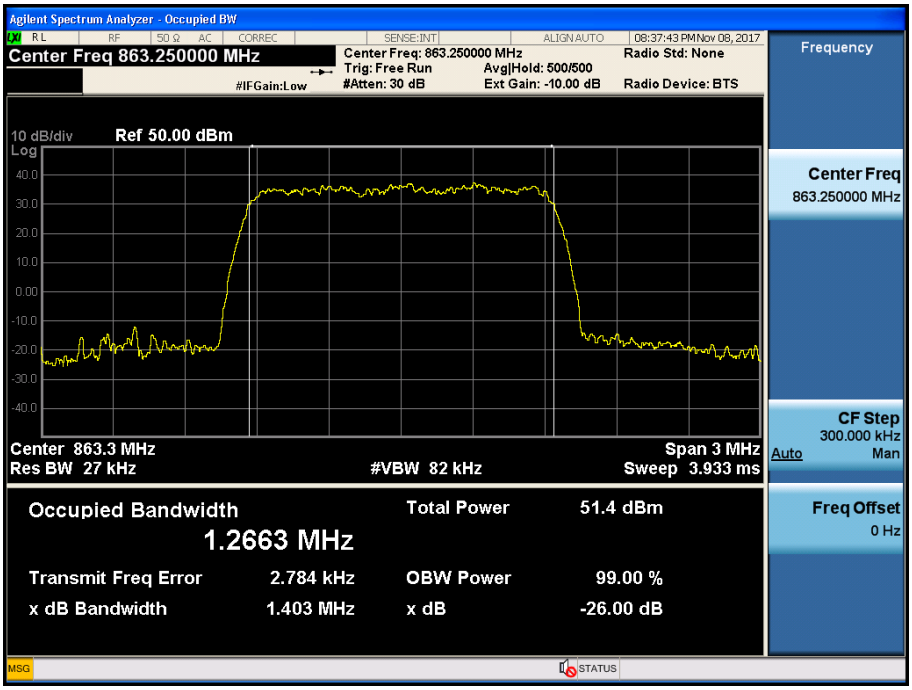
[AGC threshold Output Downlink Middle]



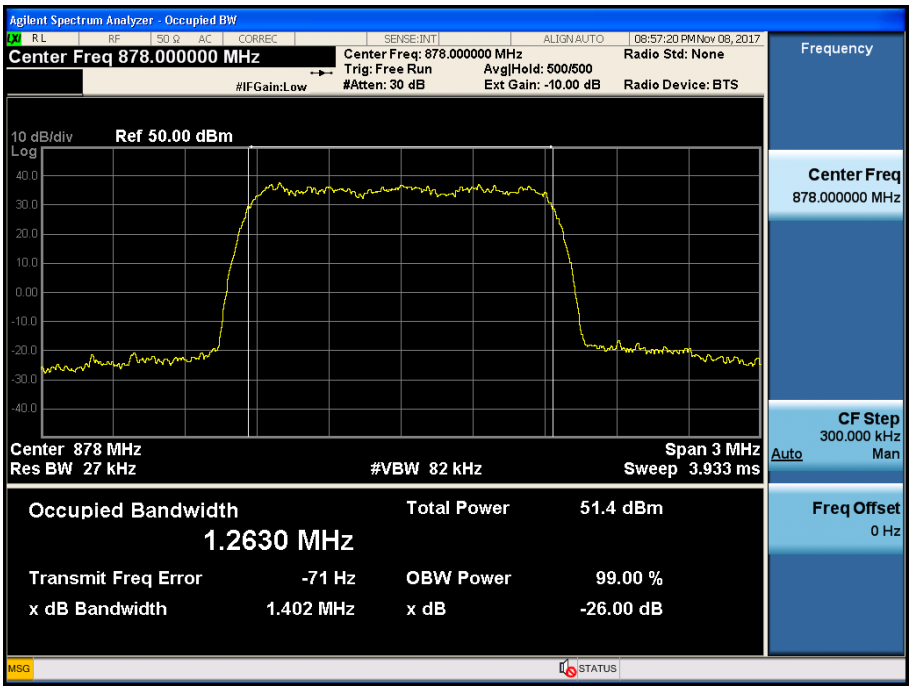
[AGC threshold Output Downlink High]



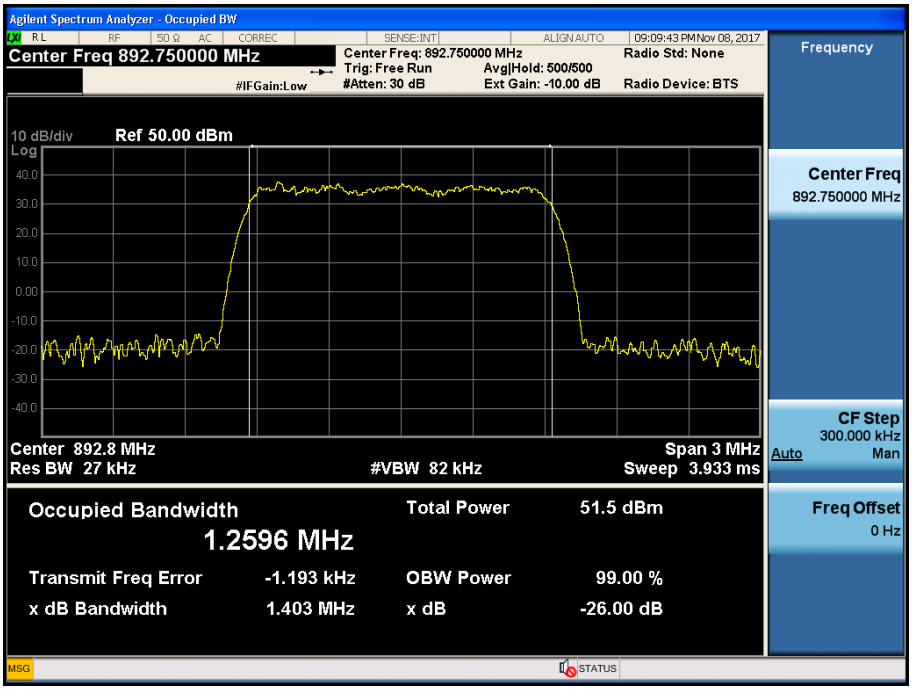
[+3 dB above AGC threshold Output Downlink Low]



[+3 dB above AGC threshold Output Downlink Middle]

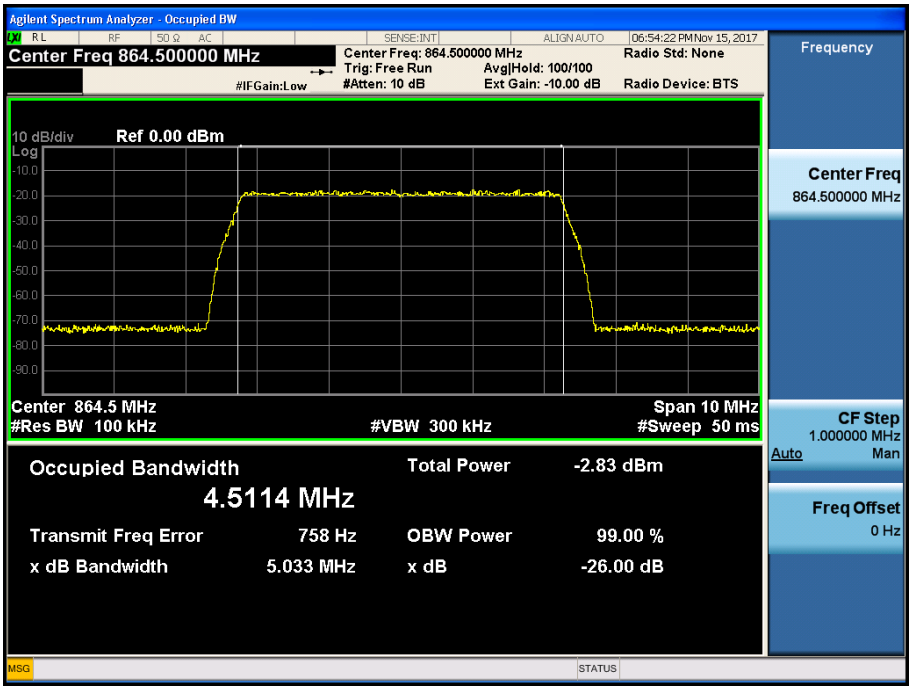


[+3 dB above AGC threshold Output Downlink High]



Plots of Occupied Bandwidth_800 BAND LTE 5 MHz

[AGC threshold Input Downlink Low]



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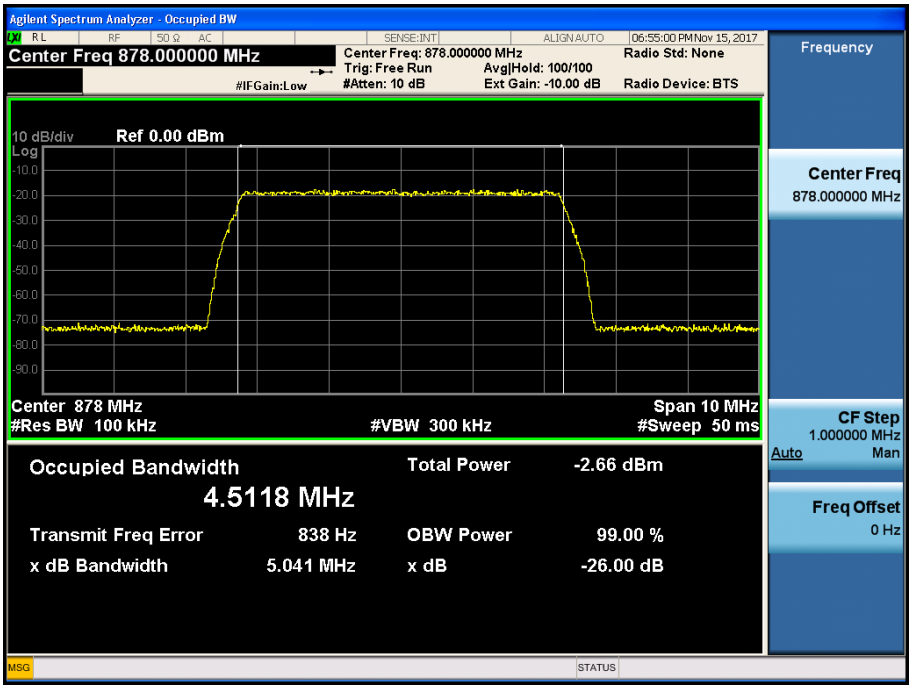

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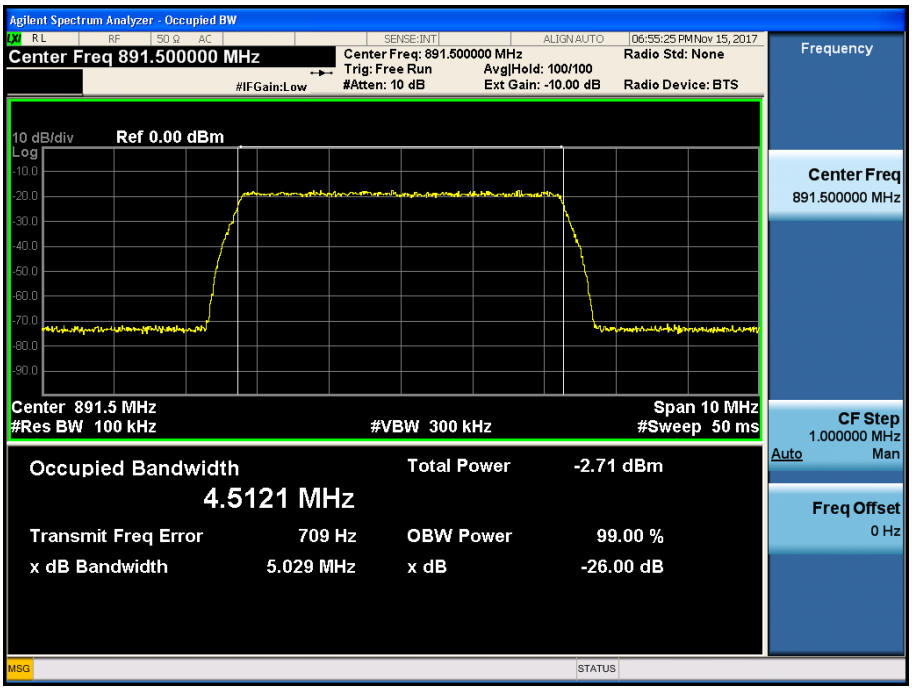
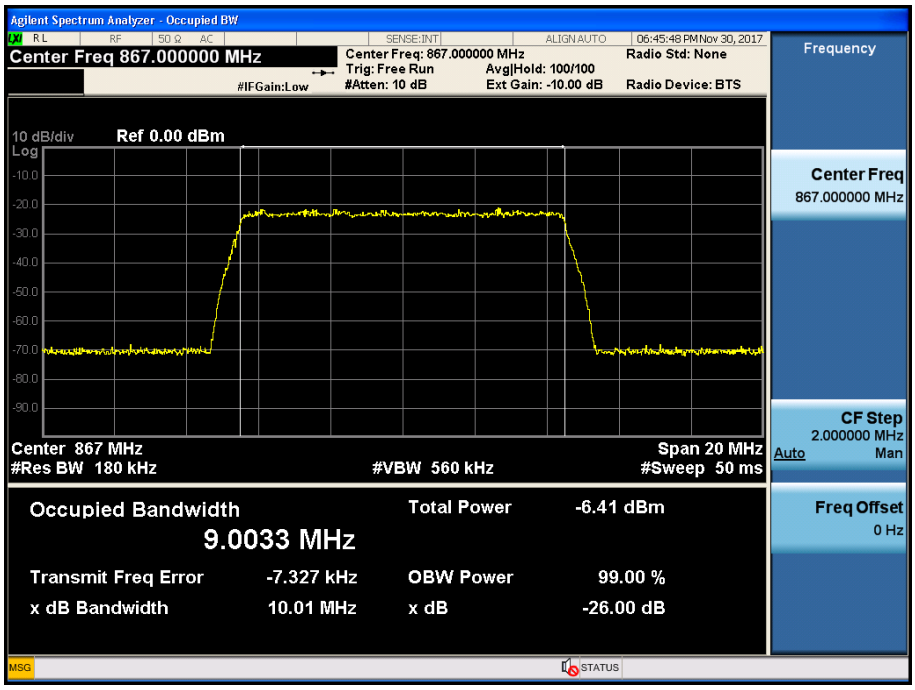
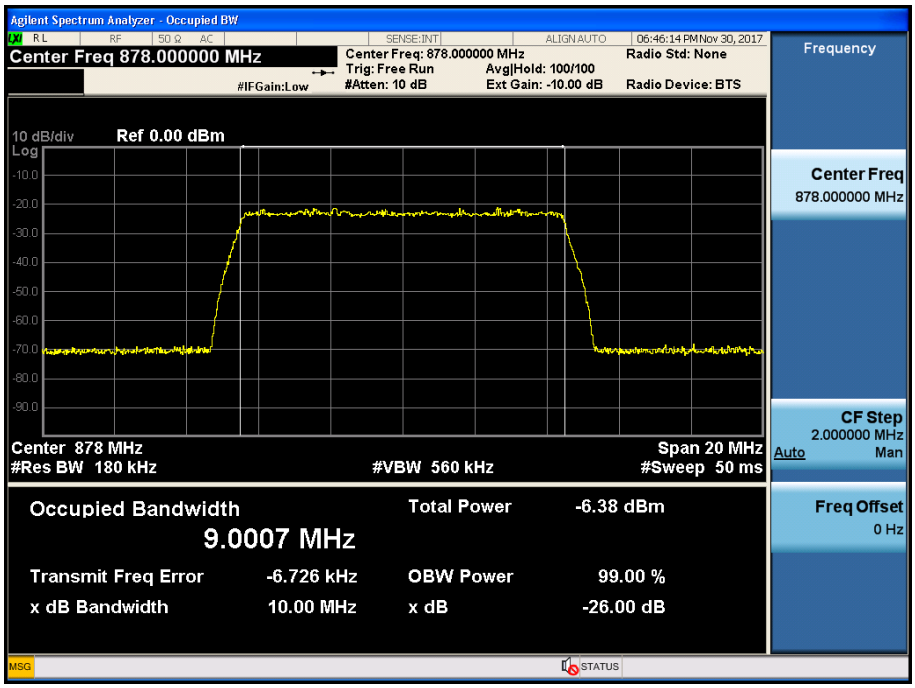


Plots of Occupied Bandwidth_800 BAND LTE 10 MHz

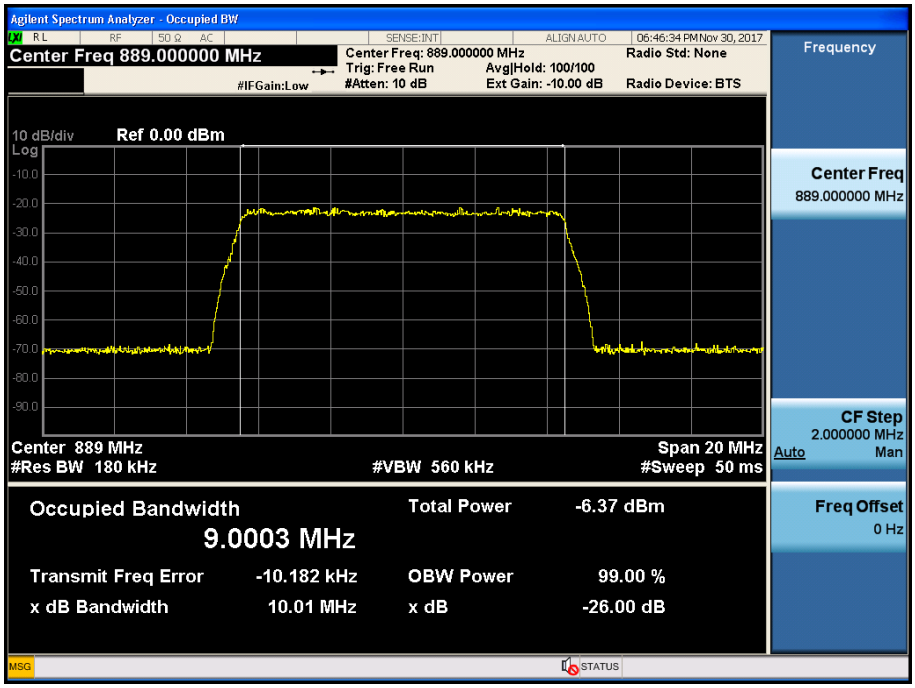
[AGC threshold Input Downlink Low]



[AGC threshold Input Downlink Middle]

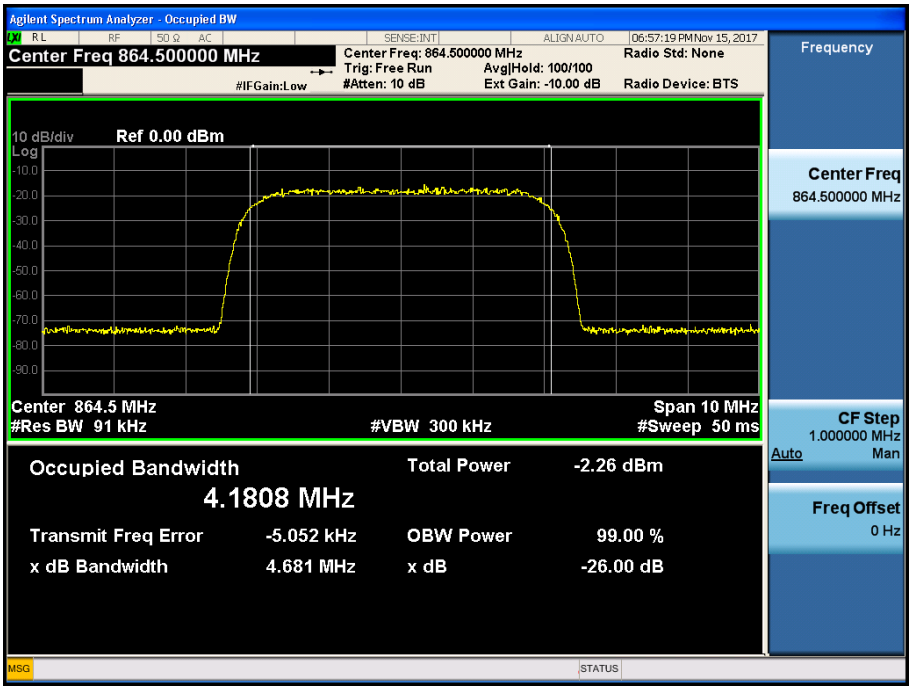


[AGC threshold Input Downlink High]

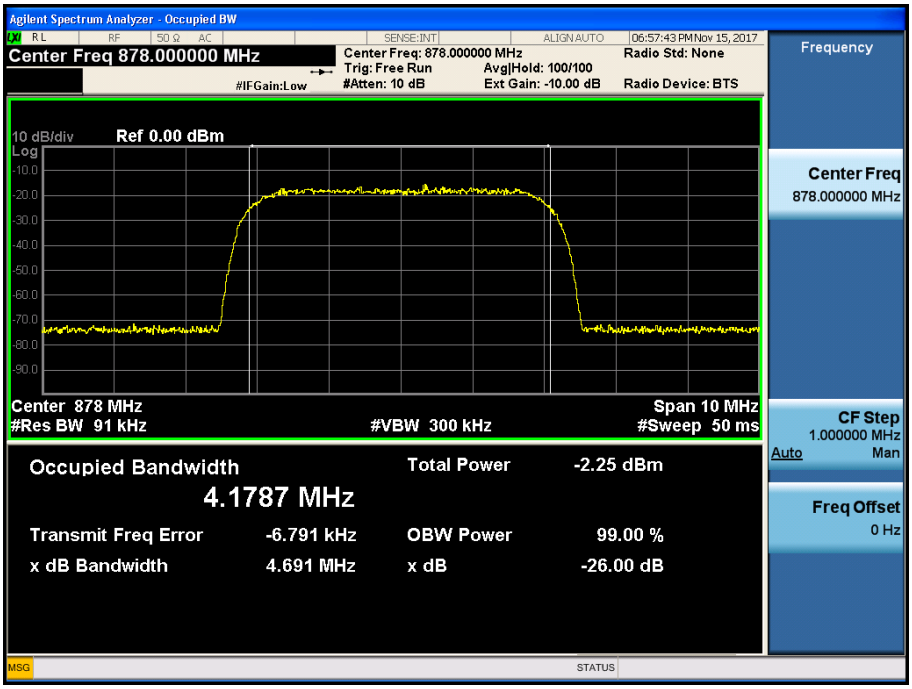


Plots of Occupied Bandwidth_800 BAND WCDMA

[AGC threshold Input Downlink Low]



[AGC threshold Input Downlink Middle]



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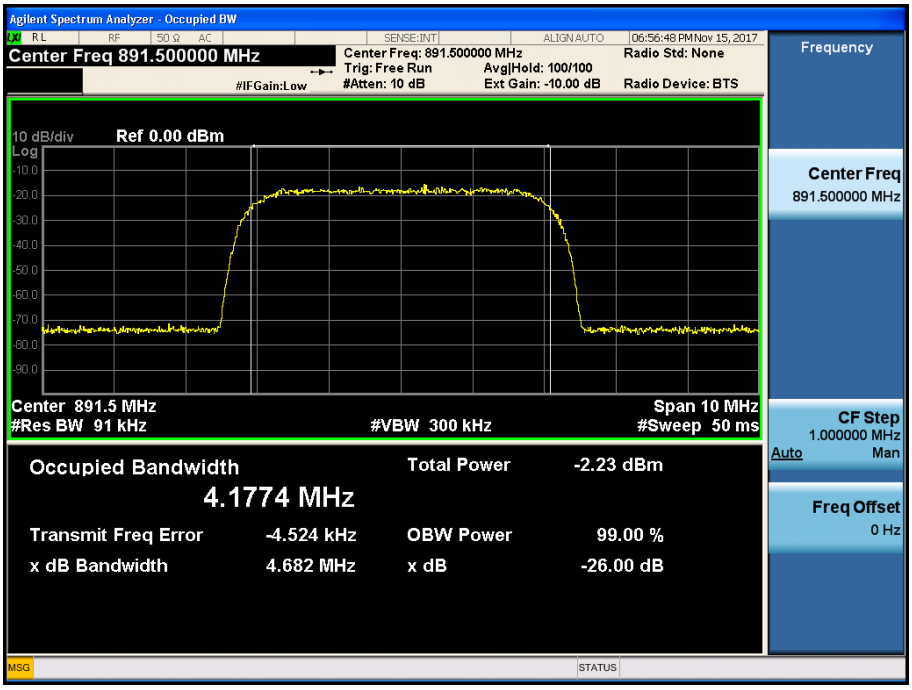
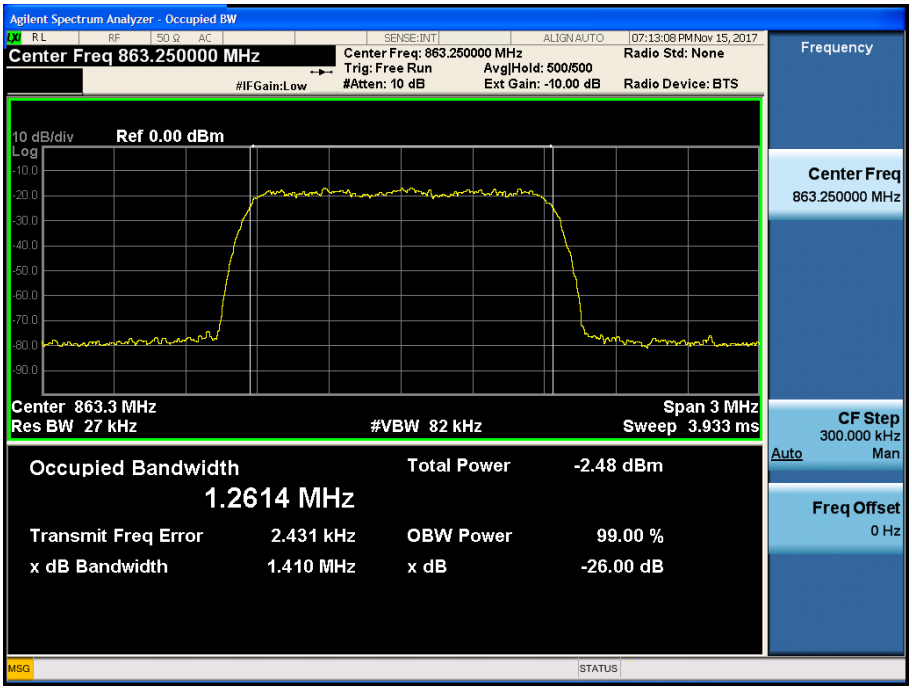


Plots of Occupied Bandwidth_800 BAND CDMA

[AGC threshold Input Downlink Low]



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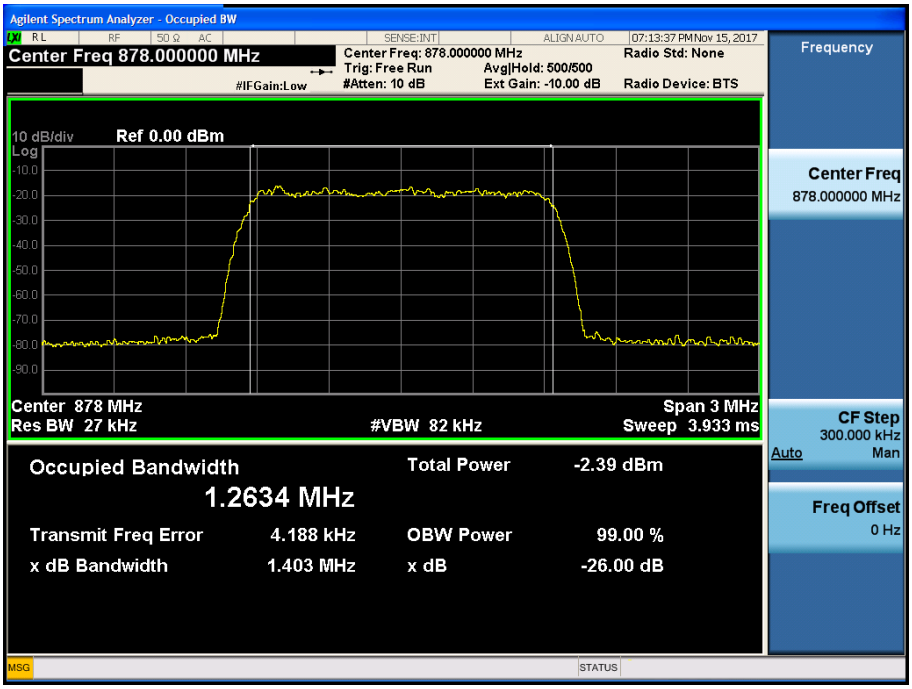
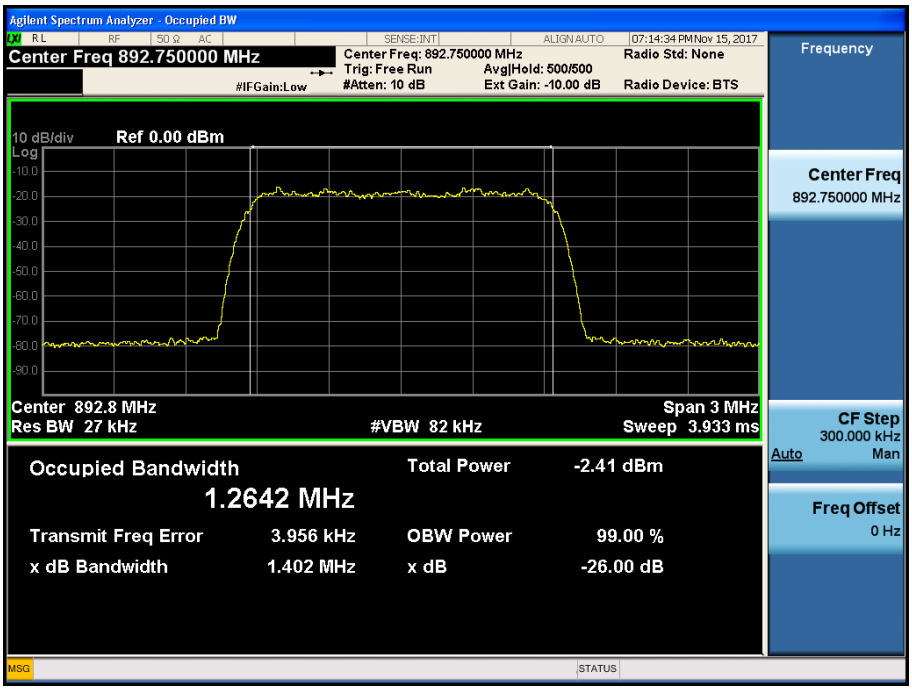


[AGC threshold Input Downlink High]



8. INPUT VERSUS OUTPUT SPECTRUM

IC Rules

Test Requirements:

RSS-131

5. Equipment standard specifications for zone enhancers working with equipment certified in RSSs listed in section 1 except RSS-119

5.2 Industrial Zone Enhancers

5.2.2 Input-versus-output spectrum

The spectral growth of the 26 dB bandwidth of the output signal shall be less than 5% of the input signal spectrum.

Test Procedures:

RSS-GEN

6 Technical Requirements

6.6 Occupied Bandwidth

The emission bandwidth (X dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated X dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3 x the resolution bandwidth.

Note: We tested using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 26 dB.

Test Results:

[Downlink Output]

	Channel	Input 26 dB bandwidth (MHz)	AGC threshold output		+3 dB above the AGC threshold output	
			26 dB bandwidth (MHz)	Spectral growth (%)	26 dB bandwidth (MHz)	Spectral growth (%)
LTE 5 MHz	Low	5.033	5.019	-0.28	4.872	-3.20
	Middle	5.041	4.896	-2.88	4.911	-2.58
	High	5.029	4.887	-2.82	4.895	-2.66
LTE 10 MHz	Low	10.01	9.946	-0.64	9.923	-0.87
	Middle	10.00	10.03	0.30	10.03	0.30
	High	10.01	9.978	-0.32	9.962	-0.48
WCDMA	Low	4.681	4.685	0.09	4.684	0.06
	Middle	4.691	4.686	-0.11	4.692	0.02
	High	4.682	4.687	0.11	4.679	-0.06
CDMA	Low	1.410	1.405	-0.35	1.403	-0.50
	Middle	1.403	1.399	-0.29	1.402	-0.07
	High	1.402	1.408	0.43	1.403	0.07

*** Plots of results are the same as Section 7.**

9. OUT OF BAND REJECTION & MEAN OUTPUT POWER AND ZONE ENHANCER GAIN

FCC Rules

Test Requirements:

KDB 935210 D05 v01r02

Out of Band Rejection – Testing for rejection of out of band signals. Alternatively, filter freq. response plots are acceptable.

IC Rules

Test Requirements:

RSS-131

5. Equipment standard specifications for zone enhancers working with equipment certified in RSSs listed in section 1 except RSS-119

5.2 Industrial Zone Enhancers

5.2.1 Out-of-band rejection

The gain-versus-frequency response and the 20 dB bandwidth of the zone enhancer shall be reported. The zone enhancer shall reject amplification of other signals outside the passband of the zone enhancer.

5.2.3 Mean output power and zone enhancer gain

The zone enhancer gain shall not exceed the nominal gain by more than 1.0 dB. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.

Test Procedures:

Measurements were in accordance with the test methods section 3.3, 4.3 of KDB 935210 D05 v01r02.

3.3 EUT out-of-band rejection

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

b) Configure a swept CW signal with the following parameters:

1) Frequency range = ± 250 % of the passband, for each applicable CMRS band

2) Level = a sufficient level to affirm that the out-of-band rejection is > 20 dB above the noise floor and will not engage the AGC during the entire sweep.

3) Dwell time = approx. 10 ms.

4) Number of points = SPAN/(RBW/2).

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

d) Set the span of the spectrum analyzer to the same as the frequency range of the signal generator.

e) Set the resolution bandwidth of the spectrum analyzer to be 1 % to 5 % of the passband and

the video bandwidth shall be set to ≥ 3 × RBW.

f) Set the detector to Peak Max-Hold and wait for the spectrum analyzer's spectral display to fill.

g) Place a marker to the peak of the frequency response and record this frequency as f_0.

h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the −20 dB down amplitude to determine the 20 dB bandwidth. Capture the frequency response of the EUT.

i) Capture the frequency response of the EUT.

j) Repeat for all frequency bands applicable for use by the EUT.

4.3 PLMRS device out-of-band rejection

Adjust the internal gain control of the EUT to the maximum gain for which equipment certification is sought.

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

b) Configure a swept CW signal with the following parameters:

1) Frequency range = ± 250 % of the manufacturer's specified pass band.

2) The CW amplitude will be 3 dB below the AGC threshold (see 4.2), and shall not activate the AGC threshold throughout the test.

3) Dwell time = approx. 10 ms.

4) Frequency step = 50 kHz.

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

d) Set the resolution bandwidth of the spectrum analyzer between 1 % and 5 % of the manufacturer's pass band with the video bandwidth set to 3 × RBW.

e) Set the detector to Peak and the trace to Max-Hold.

f) After the trace is completely filled, place a marker at the peak amplitude, which is designated as f_0, and with two additional markers (use the marker-delta method) at the 20 dB bandwidth.

g) Capture the frequency response plot and for inclusion in the test report.

Test Results:

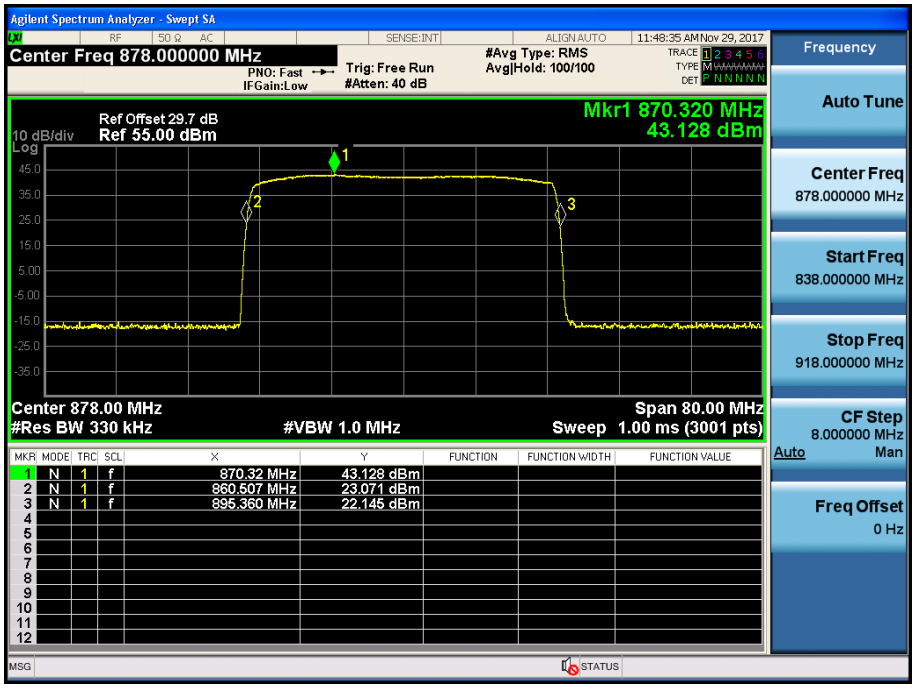
The EUT complies with the requirements of this section.

Input Signal	Input Level	Maximum Amp Gain
800 MHz	-22 dBm	65 dB

[Downlink_800 BAND]

	20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
800 Band	860.507 MHz ~ 895.360 MHz	43.128	65.128

Plots of Out of Band Rejection & Mean Output Power and Zone Enhancer Gain



10. NOISE FIGURE

FCC Rules

Test Requirements:

§ 90.219 Use of signal boosters:

(e) (2) The noise figure of a signal booster must not exceed 9 dB in either direction.

IC Rules

Test Requirements:

RSS-131

6. Equipment standard specifications for zone enhancers working with equipment certified under RSS-119

6.4 Noise

The ERP of noise within the passband should not exceed −43 dBm in a 10 kHz measurement bandwidth.

The ERP of noise in spectrum more than 1 MHz outside of the passband should not exceed −70 dBm in a 10 kHz measurement bandwidth.

The noise figure of a zone enhancer shall not exceed 9 dB in either direction.

Test Procedures:

The EUT was tested using Agilent Application Note 57-1, ‘The direct noise measurement method”

1. GAIN measurement

EUT in the maximum gain of the repeater state.

The signal generator was connected to RF input port at a maximum level as determined by the spectrum analyzer was connected to RF output port depending on the circuitry being measured.

EUT GAIN = Output signal level – Input signal level

2. Output Noise level measurement

EUT in the maximum gain of the repeater state.

Without input signal.

Spectrum analyzer was connected to RF output port

Measured to Noise power.

NF=NP-G-BCF-PNAD

NF=NP-G-60+174

NF=NP-G+114

NF=Noise Figure(dB)

NP=Noise power(dBm/MHz)

G=Maximum gain

BCF=Bandwidth Correction Factor=10log(1 MHz/1 Hz)=60

PNAD=Noise Power Density=-174 dBm/Hz

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

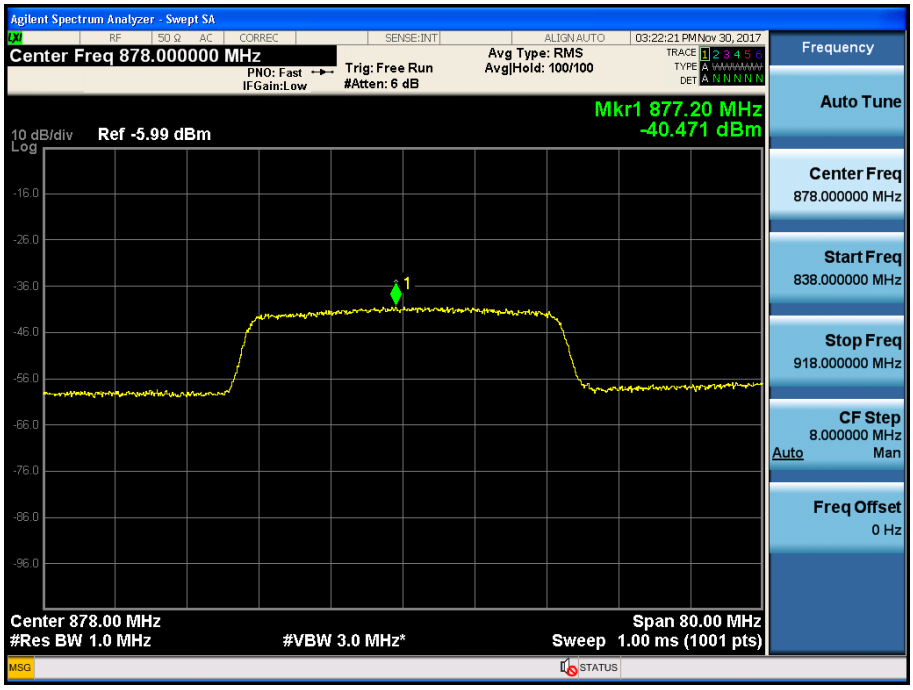
Input Signal	Input Level (dBm)	Maximum Amp Gain
VHF	Without input signal	65

*** Note:** The Maximum Amp Gain value is sum of RU and HeadEnd gain.

Noise Figure = - 40.471 - 65 + 114 = 8.529 dB

Plots of Noise power

[Downlink]



11. SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINAL

FCC Rules

Test Requirements:

§ 2.1051 Measurements required: Spurious emissions at antenna terminals:

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows:

(1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.

(c) Alternative out of band emission limit. Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.

(d) Interference caused by out of band emissions. If any emission from a transmitter operating in

this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

§ 90.691 Emission mask requirements for EA-based systems

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 $Log_{10}(f/6.1)$ decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + $10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

IC Rules

Test Requirements:

RSS-131

6.5 Equipment standard specifications for zone enhancers working with equipment certified under RSS-119

6.5 Spurious emissions

The spurious emissions of a zone enhancer shall not exceed −13 dBm in any 100 kHz measurement bandwidth.

RSS-132

5. Transmitter Standard Specifications

5.5 Transmitter Unwanted Emissions

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

i. In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 $log_{10}p$ (watts).

ii. After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the

power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 $\log_{10}$ p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

Test Procedures:

Measurements were in accordance with the test methods section 3.6 and 4.7 of KDB 935210 D05 v01r02.

3.6.1 General

Refer to the applicable rule part(s) for specified limits on unwanted (out-of-band/out-of-block and spurious) emissions.

Spurious emissions shall be measured using a single test signal sequentially tuned to the low, middle, and high channels or frequencies within each authorized frequency band of operation.

Out-of-band/out-of-block emissions (including intermodulation products) shall be measured under each of the following two stimulus conditions:

a) two adjacent test signals sequentially tuned to the lower and upper frequency band/block edges;

b) a single test signal, sequentially tuned to the lowest and highest frequencies or channels within the frequency band/block under examination.

NOTE—Single-channel boosters that cannot accommodate two simultaneous signals within the passband may be excluded from the test stipulated in step a).

3.6.2 Out-of-band/out-of-block emissions conducted measurements

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

If the signal generator is not capable of generating two modulated carriers simultaneously, then two discrete signal generators can be connected with an appropriate combining network to support this two-signal test.

b) Set the signal generator to produce two AWGN signals as previously described (e.g., 4.1 MHz OBW).

c) Set the center frequencies such that the AWGN signals occupy adjacent channels, as defined by industry standards such as 3GPP or 3GPP2, at the upper edge of the frequency band or block under test.

d) Set the composite power levels such that the input signal is just below the AGC threshold (see 3.2), but not more than 0.5 dB below. The composite power can be measured using the procedures provided in KDB Publication 971168, but it will be necessary to expand the power integration bandwidth so as to include both of the transmit channels. Alternatively, the composite power can be measured using an average power meter as described in KDB Publication 971168.

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as

necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band (typically 1 % of the EBW or 100 kHz or 1 MHz)

g) Set the VBW = 3 × RBW.

h) Set the detector to power averaging (rms) detector.

i) Set the Sweep time = auto-couple.

j) Set the spectrum analyzer start frequency to the upper block edge frequency, and the stop frequency to the upper block edge frequency plus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively.

k) Trace average at least 100 traces in power averaging (rms) mode.

l) Use the marker function to find the maximum power level.

m) Capture the spectrum analyzer trace of the power level for inclusion in the test report.

n) Repeat steps k) to m) with the composite input power level set to 3 dB above the AGC threshold.

o) Reset the frequencies of the input signals to the lower edge of the frequency block or band under test.

p) Reset the spectrum analyzer start frequency to the lower block edge frequency minus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively, and the stop frequency to the lower band or block edge frequency.

q) Repeat steps k) to n).

r) Repeat steps a) to q) with the signal generator configured for a single test signal tuned as close as possible to the block edges.

s) Repeat steps a) to r) with the narrowband test signal.

t) Repeat steps a) to s) for all authorized frequency bands or blocks used by the EUT.

3.6.3 Spurious emissions conducted measurements

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

b) Set the signal generator to produce the broadband test signal as previously described (i.e., 4.1 MHz OBW AWGN).

c) Set the center frequency of the test signal to the lowest available channel within the frequency band or block.

d) Set the EUT input power to a level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band of operation (e.g., reference bandwidth is typically 100 kHz or 1 MHz).

g) Set the VBW ≥ 3 × RBW.

h) Set the Sweep time = auto-couple.
i) Set the spectrum analyzer start frequency to the lowest RF signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part.
The number of measurement points in each sweep must be ≥ (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.2
j) Select the power averaging (rms) detector function.
k) Trace average at least 10 traces in power averaging (rms) mode.
l) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report.
m) Reset the spectrum analyzer start frequency to the upper band/block edge frequency plus 100 kHz or 1 MHz, as specified in the applicable rule part, and the spectrum analyzer stop frequency to 10 times the highest frequency of the fundamental emission (see § 2.1057). The number of measurement points in each sweep must be ≥ (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.
n) Trace average at least 10 traces in power averaging (rms) mode.
o) Use the peak marker function to identify the highest amplitude level over each of the measured frequency ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report; also provide tabular data, if required.
p) Repeat steps i) to o) with the input test signals firstly tuned to a middle band/block frequency/channel, and then tuned to a high band/block frequency/channel.
q) Repeat steps b) to p) with the narrowband test signal.
r) Repeat steps b) to q) for all authorized frequency bands/blocks used by the EUT.

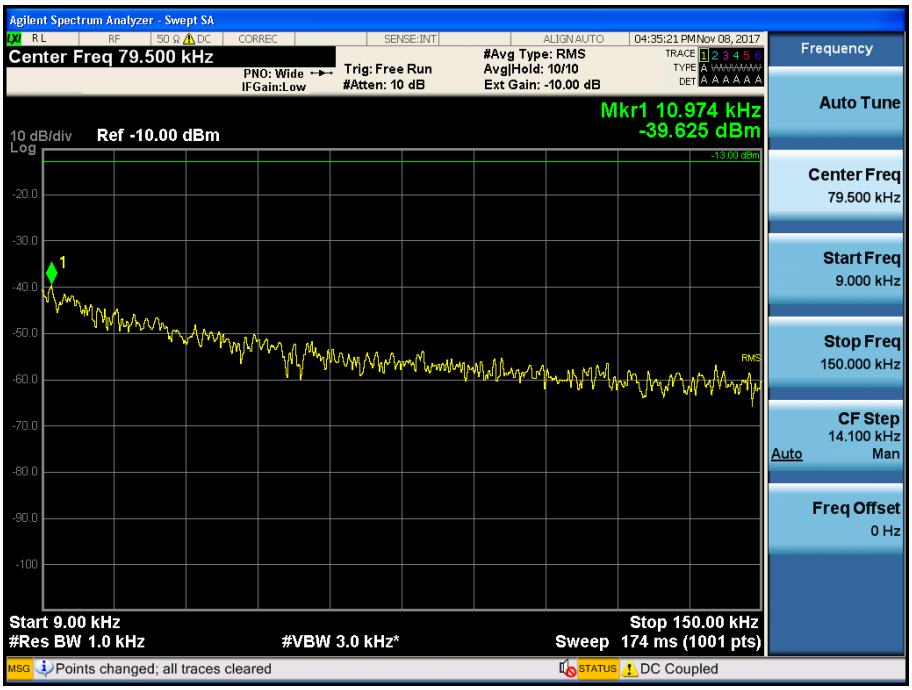
Notes:

1. In 9 KHz-150 KHz and 150 KHz-30 MHz bands, RBW was reduced to 1% and 10% of the reference bandwidth for measuring unwanted emission level(typically, 100KHz if the authorized frequency band is below 1GHz) and power was integrated.(1% = +20 dB, 10% = +10 dB)
2. We have done CDMA and 1xEVDO modulation test in technology. Test results are only attached worst cases.

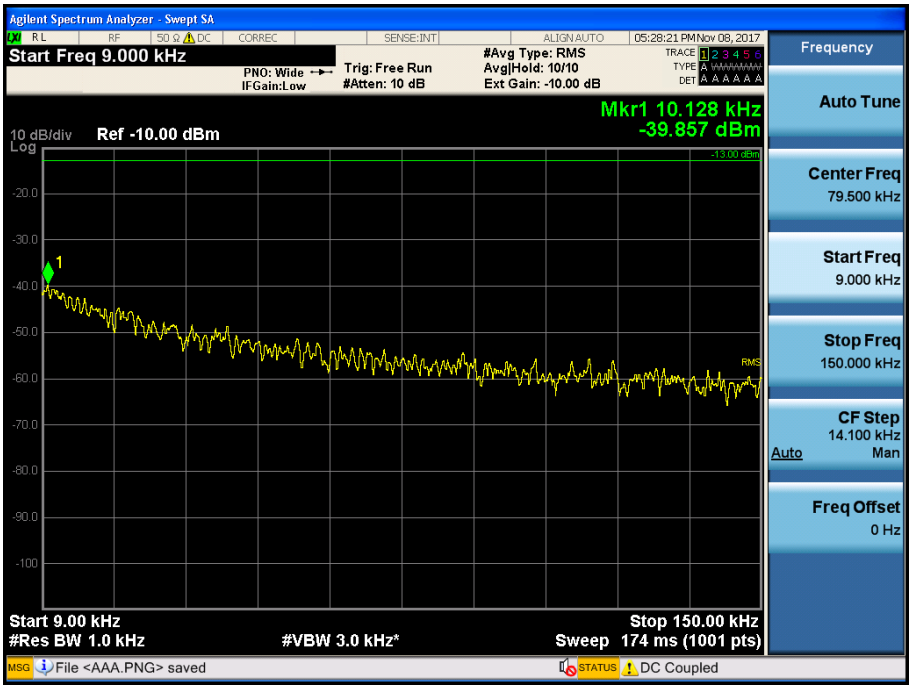
Single channel Enhancer Plots of Spurious Emission for 800 BAND LTE 5 MHz

Conducted Spurious Emissions (9 kHz – 150 kHz)

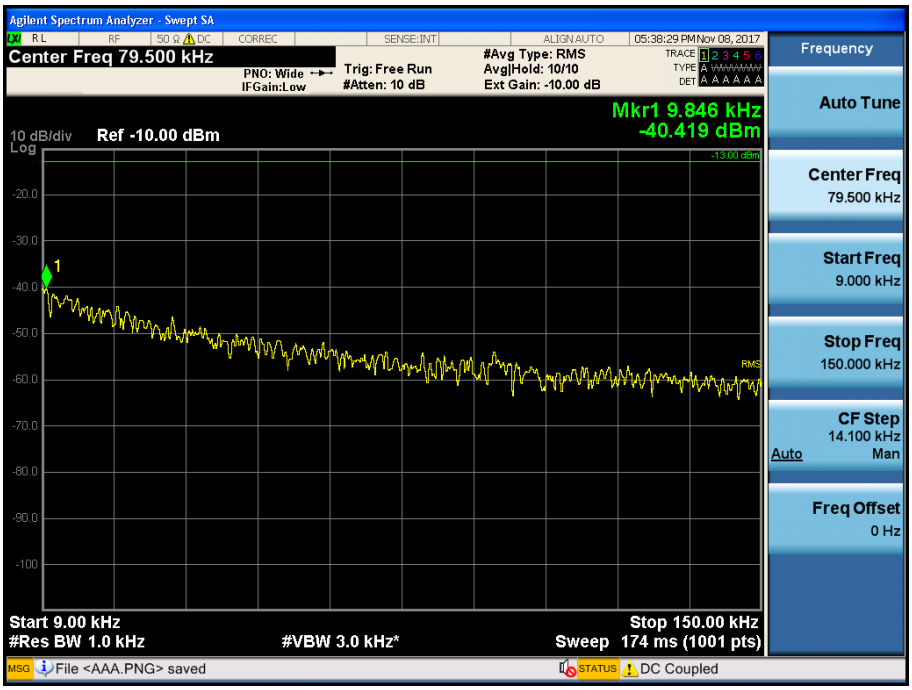
[Downlink Low]



[Downlink Middle]

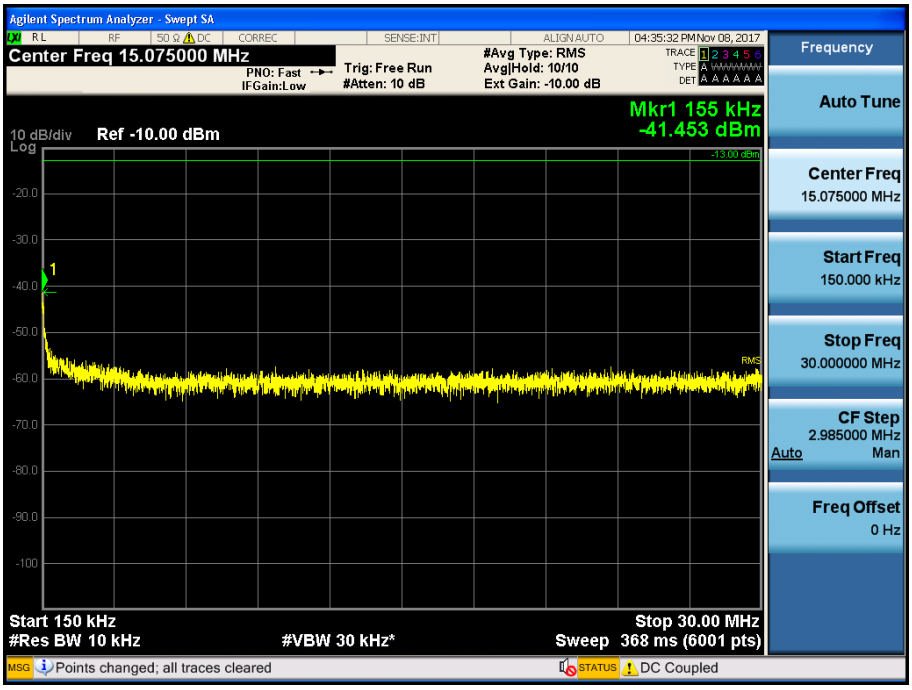


[Downlink High]



Conducted Spurious Emissions (150 kHz – 30 MHz)

[Downlink Low]



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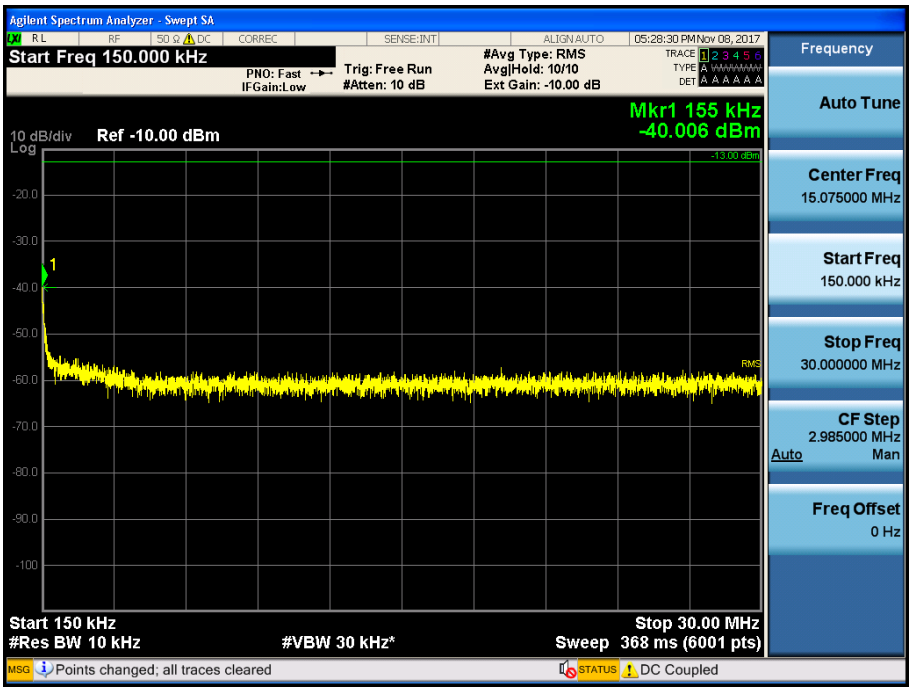
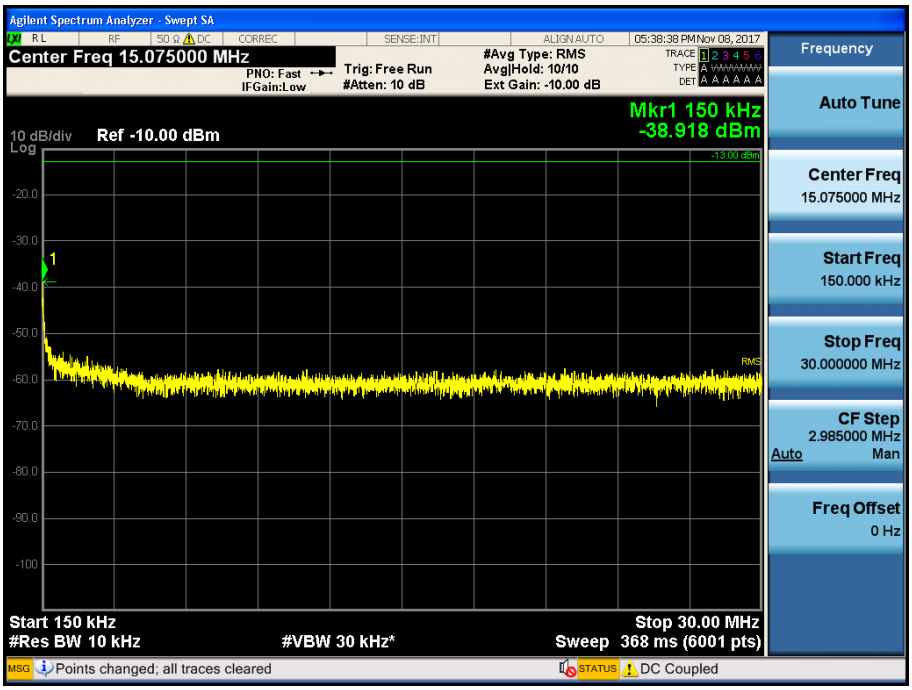
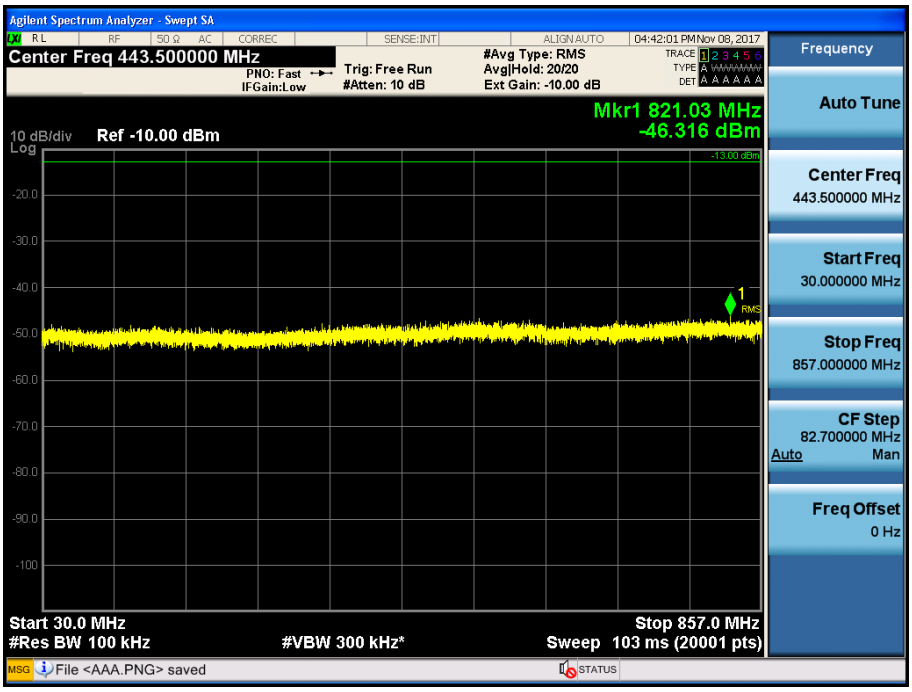


[Downlink High]

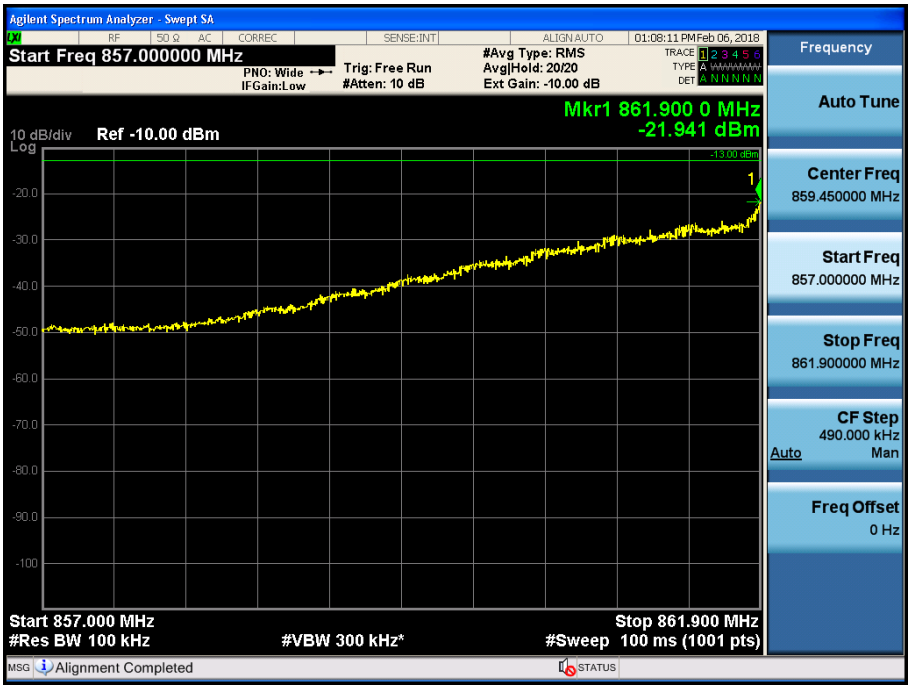


Conducted Spurious Emissions (30 MHz – 1 GHz)

[Downlink Low_30 MHz ~ 857 MHz]

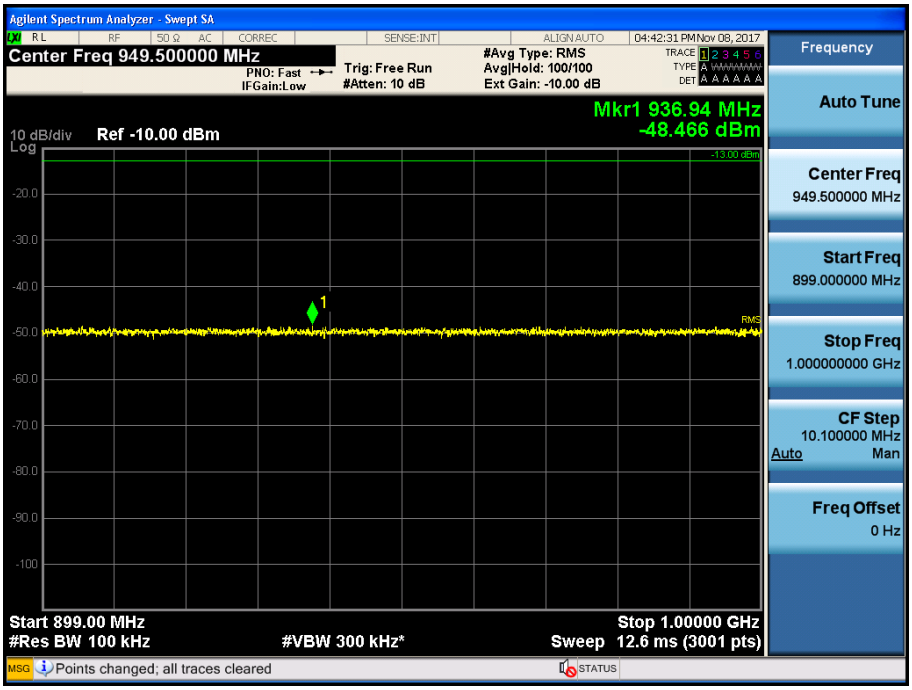


[Downlink Low_857 MHz ~ 861.9 MHz]

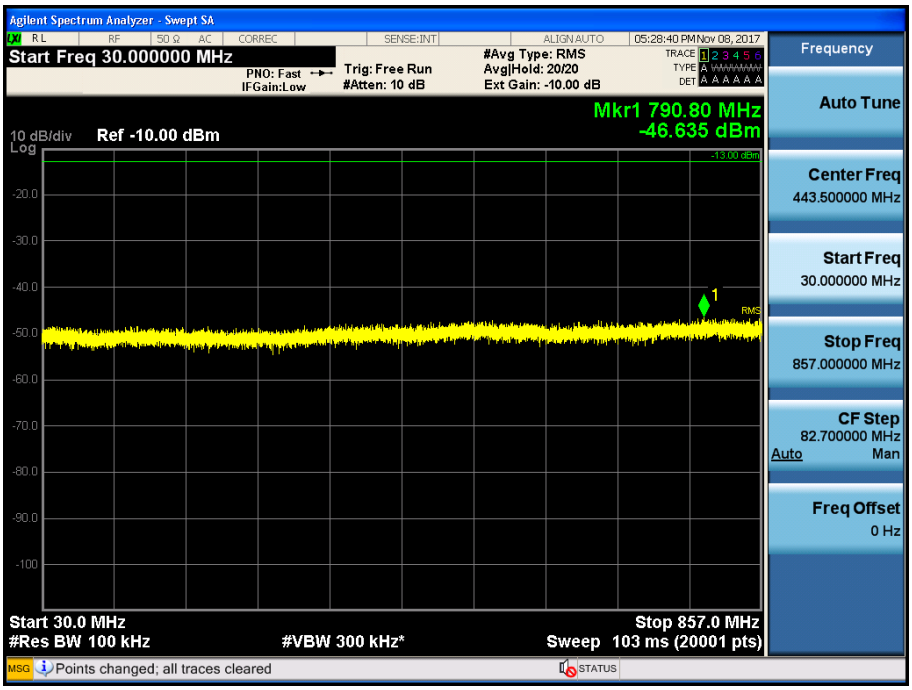


[Downlink Low_894.1 MHz ~ 899 MHz]

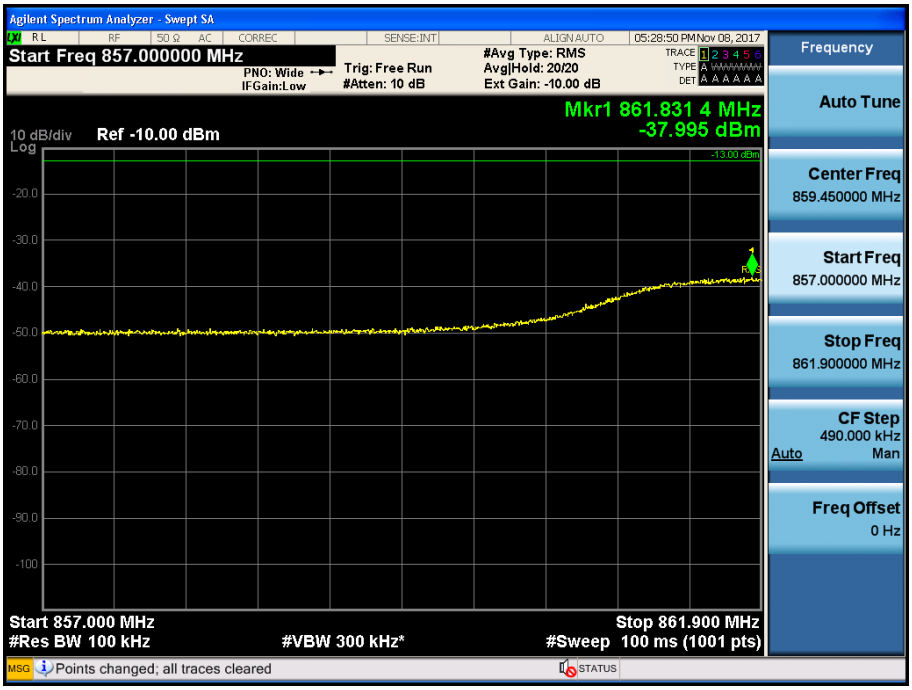
[Downlink Low_899 MHz ~ 1 GHz]



[Downlink Middle_30 MHz ~ 857 MHz]

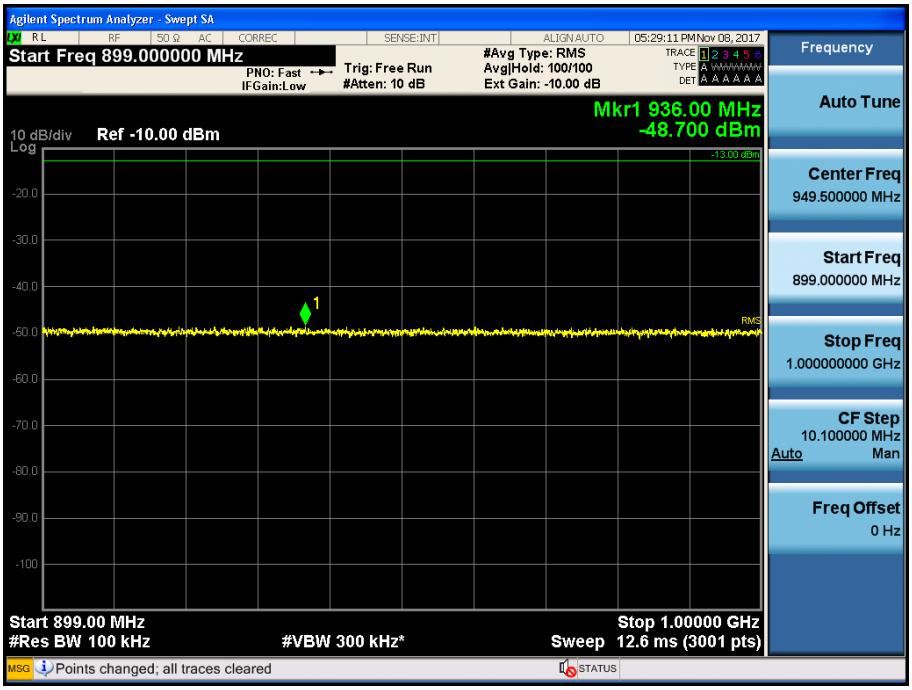


[Downlink Middle_857 MHz ~ 861.9 MHz]

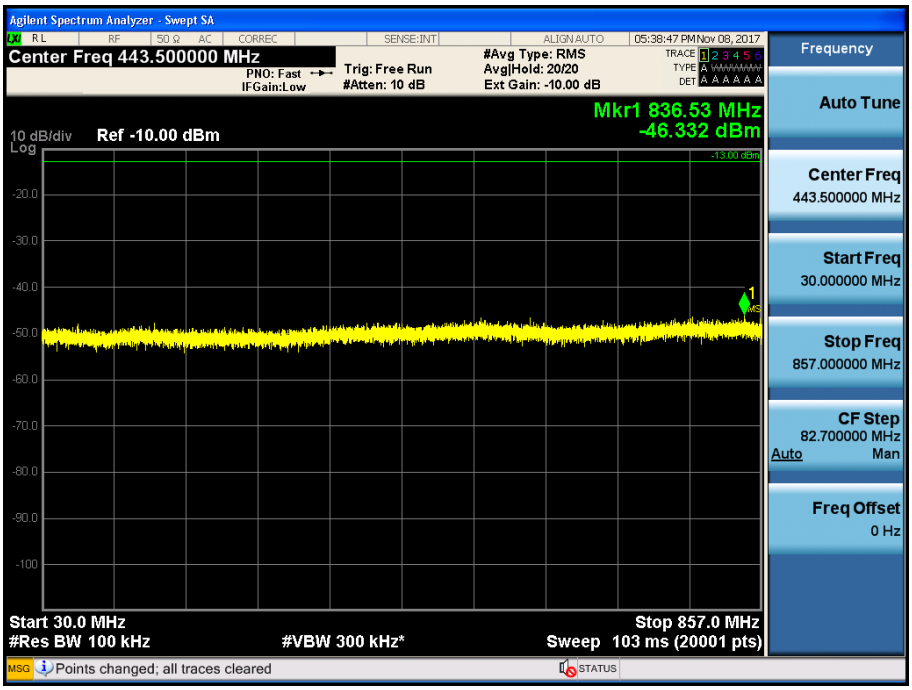


[Downlink Middle_894.1 MHz ~ 899 MHz]

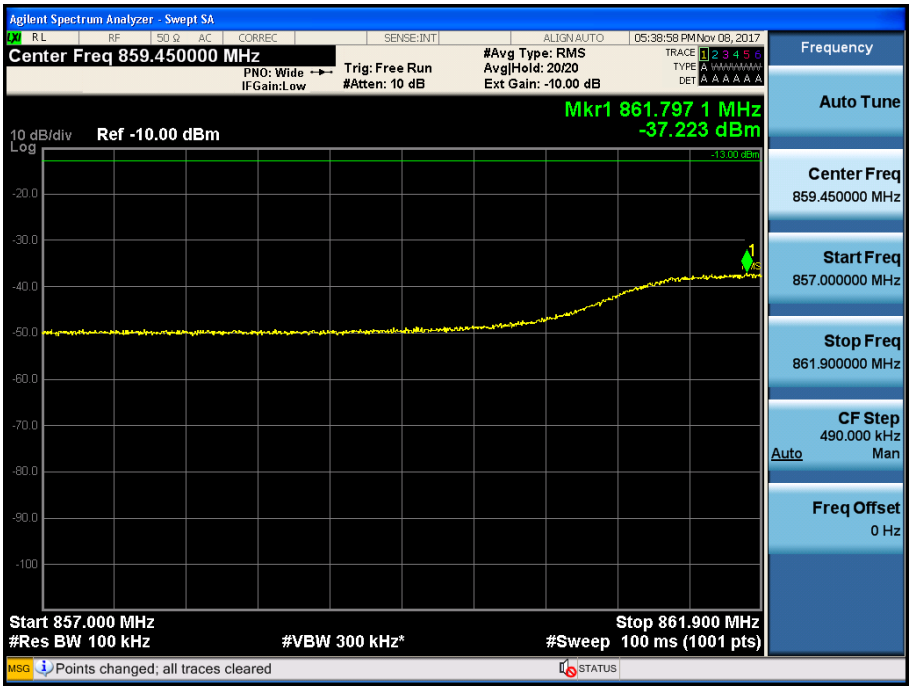
[Downlink Middle_899 MHz ~ 1 GHz]



[Downlink High_30 MHz ~ 857 MHz]

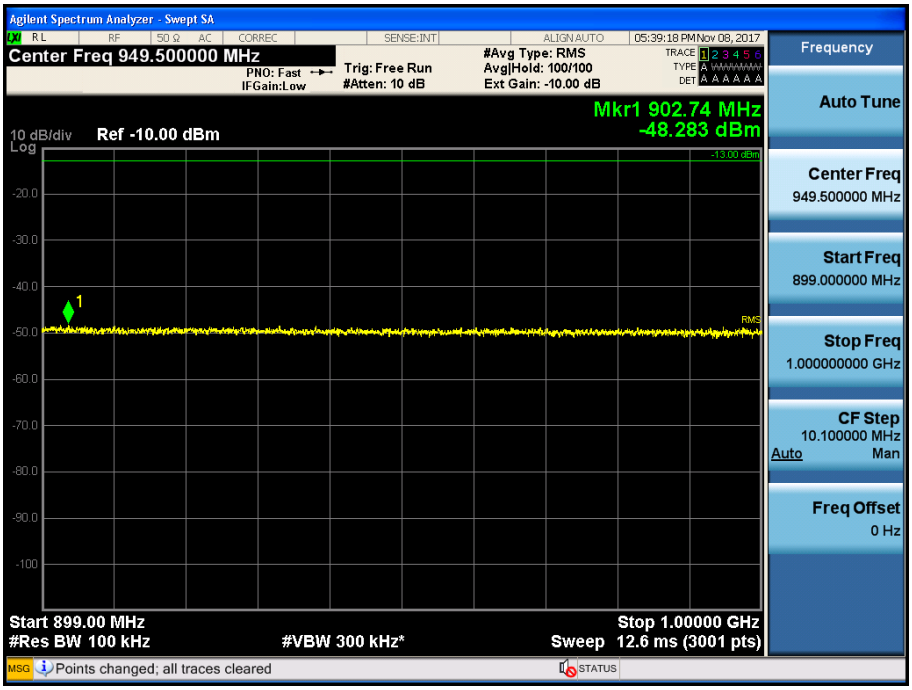


[Downlink High_857 MHz ~ 861.9 MHz]



[Downlink High_894.1 MHz ~ 899 MHz]

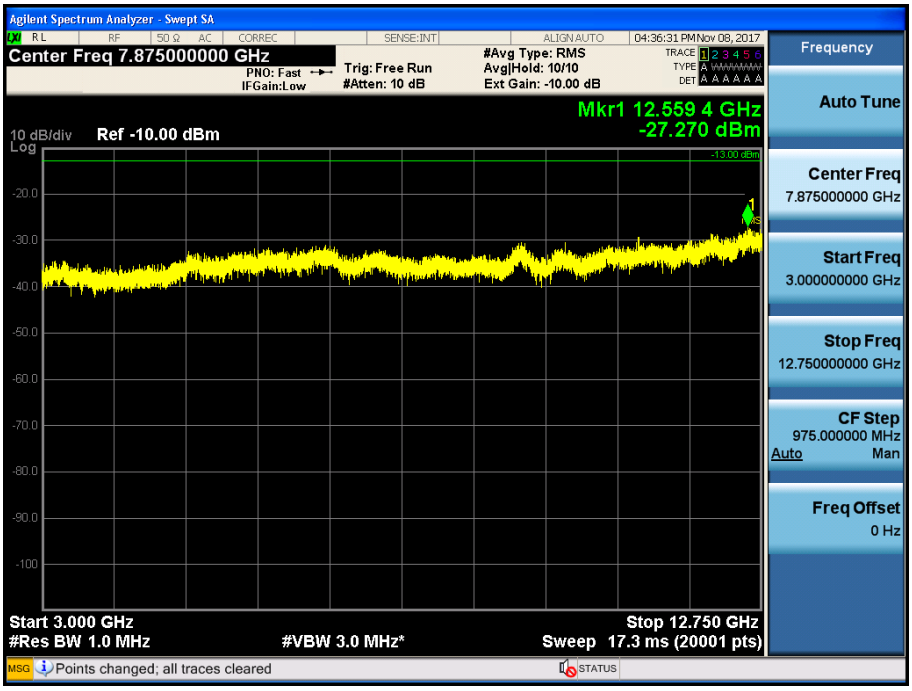
[Downlink High_899 MHz ~ 1 GHz]



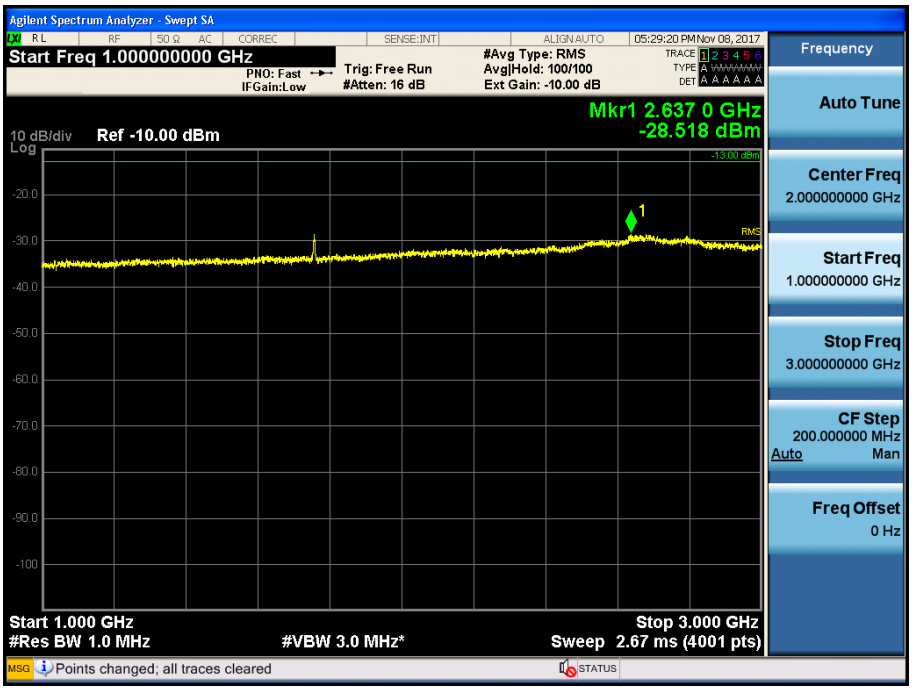
Conducted Spurious Emissions (1 GHz – 12.75 GHz)

[Downlink Low_1 GHz ~ 3 GHz]

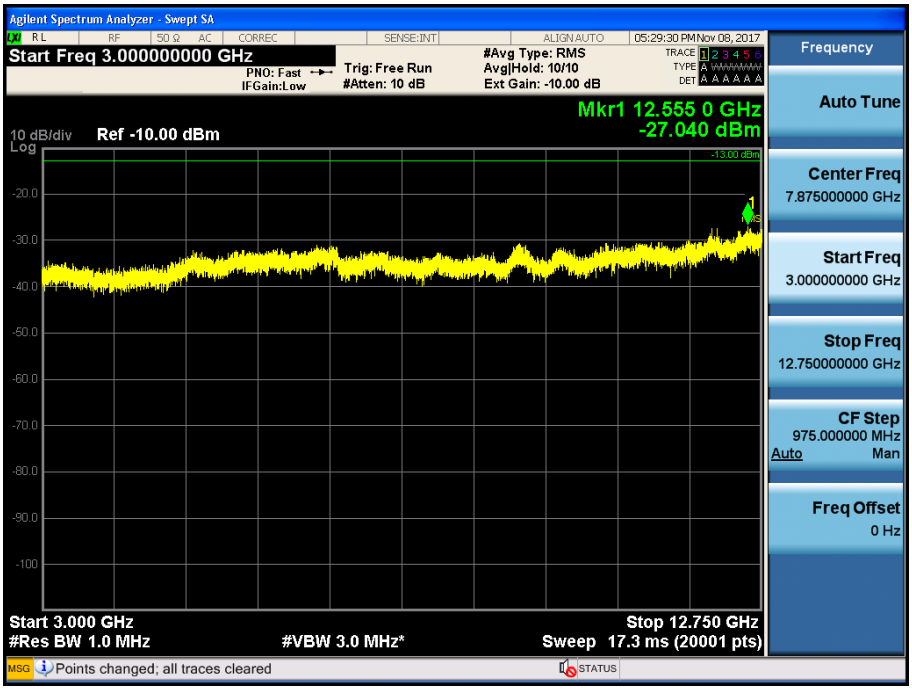
[Downlink Low_3 GHz ~ 12.75 GHz]



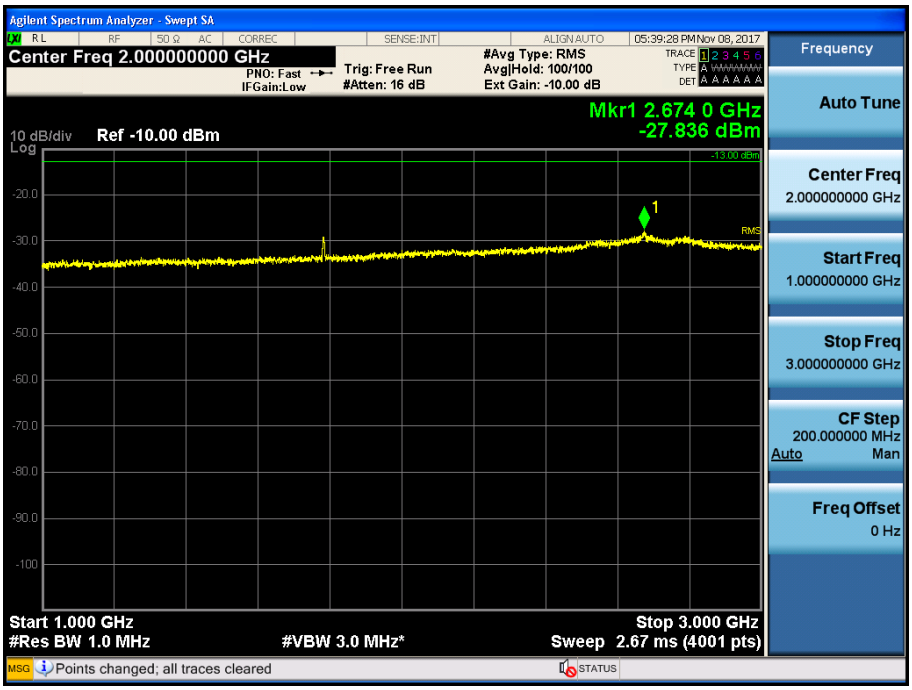
[Downlink Middle_1 GHz ~ 3 GHz]



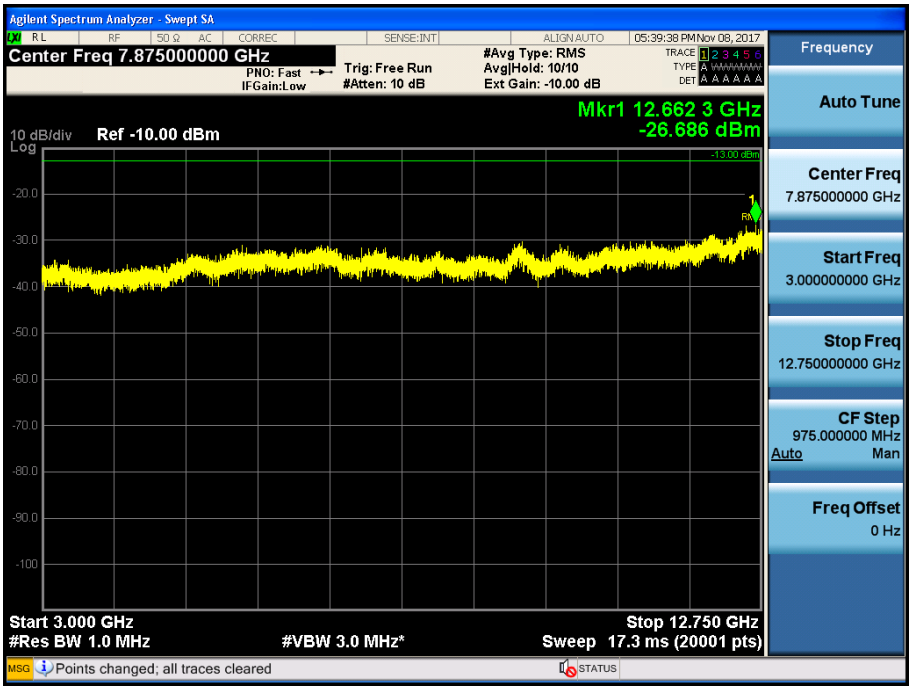
[Downlink Middle_3 GHz ~ 12.75 GHz]



[Downlink High_1 GHz ~ 3 GHz]



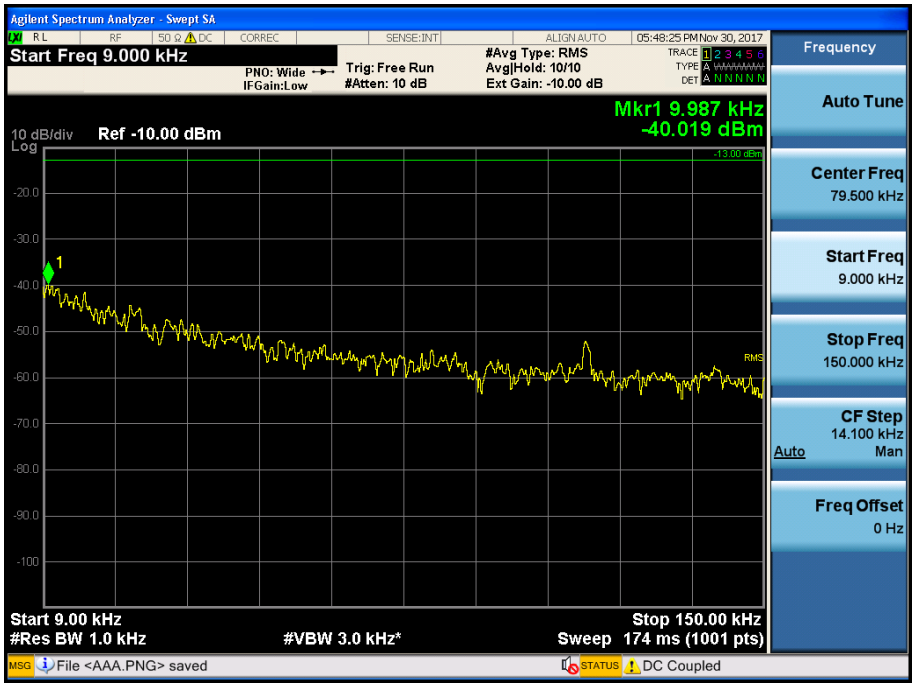
[Downlink High_3 GHz ~ 12.75 GHz]



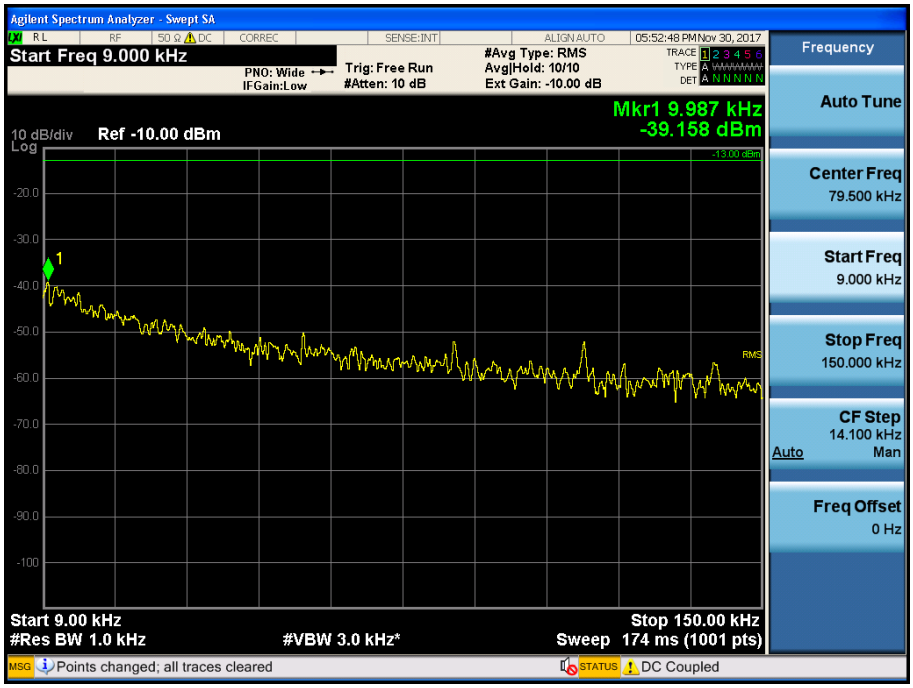
Single channel Enhancer Plots of Spurious Emission for 800 BAND LTE 10 MHz

Conducted Spurious Emissions (9 kHz – 150 kHz)

[Downlink Low]



[Downlink Middle]



[Downlink High]