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:
ADVANCED RF TECHNOLOGIES, INC

Address:
3116 WEST VANOWEN STREET, BURBANK, CA 91505, USA

Date of Issue:
May 23, 2017

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

Report No.: HCT-R-1704-F010-1

HCT FRN: 0005866421

ISED Registration Number: 5944A-5

FCC ID:	**N52-PSR-78-9533B**
IC:	**6416A-PSR789533B**
APPLICANT:	**ADVANCED RF TECHNOLOGIES, INC**

FCC/IC Model(s): PSR-78-9533B

EUT Type: REPEATER

Frequency Ranges :

	Downlink	Uplink
FirstNet + PS 700	758 ~ 775 MHz (for FCC) (768 ~ 769 MHz Guard band) 768 ~ 775 MHz (for ISED)	788 ~ 805 MHz (for FCC) (798 ~ 799 MHz Guard band) 798 ~ 805 MHz (for ISED)
PS 800	851 ~ 861 MHz	806 ~ 816 MHz

Conducted Output Power:

	Downlink	Uplink
FirstNet / PS 700 / FirstNet + PS 700	33 dBm	30 dBm
PS 800	33 dBm	30 dBm
FirstNet + PS 700 + PS 800	36 dBm (33 dBm + 33 dBm)	30 dBm

Date of Test: February 10, 2017 ~ May 23, 2017

FCC Rule Part(s): CFR 47 Part 2, Part 90

IC Rules: RSS-Gen (Issue 4, November 2014),
RSS-119 (Issue 12, May 2015), RSS-131 (Issue 3, January 2017)

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of 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-R-1704-F010	April 18, 2017	- First Approval Report
HCT-R-1704-F010-1	May 23, 2017	- Retest was performed as the frequency range was modified. - Revised the OBW test unit. - Revised the OBW test for PS 800 uplink input low channel. - Added the test result for PS 800 downlink in the section 8. - Added the correction factor table. - Added the test result in the section 10. - Added the rule part 90.543(e) compliane test results. - Retested the frequency stabiliity for PS 700.

Table of Contents

1. CLIENT INFORMATION

The EUT has been tested by request of

Company	ADVANCED RF TECHNOLOGIES, INC 3116 WEST VANOWEN STREET, BURBANK, CA 91505, USA

FCC ID: N52-PSR-78-9533B

IC: 6416A-PSR789533B

EUT Type: REPEATER

FCC/IC Model(s): PSR-78-9533B

Power Supply: 100 ~ 240 VAC

Frequency Ranges :

	Downlink	Uplink
FirstNet + PS 700	758 ~ 775 MHz (for FCC) (768 ~ 769 MHz Guard band) 768 ~ 775 MHz (for ISED)	788 ~ 805 MHz (for FCC) (798 ~ 799 MHz Guard band) 798 ~ 805 MHz (for ISED)
PS 800	851 ~ 861 MHz	806 ~ 816 MHz

Conducted Output Power:

	Downlink	Uplink
FirstNet / PS 700 / FirstNet + PS 700	33 dBm	30 dBm
PS 800	33 dBm	30 dBm
FirstNet + PS 700 + PS 800	36 dBm (33 dBm + 33 dBm)	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 D05 v01r01, RSS-GEN, RSS-119, RSS-131

FCC Rule Part(s): CFR 47 Part 2, Part 90

IC Rules: RSS-Gen (Issue 4, November 2014), RSS-119 (Issue 12, May 2015), RSS-131 (Issue 3, January 2017)

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 90, RSS-Gen, RSS-119, RSS-131.

Description	Reference (FCC)	Reference (IC)	Results
Conducted RF Output Power	§2.1046, §90.541, §90.542, §90.635	RSS-119, Section 5.4 RSS-131, Section 6.2	Compliant
Occupied Bandwidth	§2.1049	RSS-Gen, Sectin 6.6	Compliant
Out of Band Rejection	KDB 935210 D05 v01r01	-	Compliant
Noise Figure	§90.219(e)(2)	RSS-131, Section 6.4	Compliant
Emission Masks	§90.210	RSS-119, Section 5.5 RSS-119, Section 5.8	Compliant
Spurious Emissions at Antenna Terminals	§2.1051, §90.219(e)(3), §90.543	RSS-119, Section 5.8 RSS-131, Section 6.5	Compliant
Radiated Spurious Emissions	§2.1053	RSS-Gen, Section 7.1.2	Compliant
Frequency Stability	§2.1055; §90.213. §90.539	RSS-119, Section 5.3 RSS-131, Section 4.5	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.

All modulation modes were tested. Test results are only attached worst cases.

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.

	Downlink Freq.	Uplink Freq.	Modulation
FirstNet + PS 700	758 ~ 768 MHz (for FCC)	788 ~ 798 MHz (for FCC)	LTE (5 MHz)
	769 ~ 775 MHz (768 ~ 769 MHz Guard band) 768 ~ 775 MHz (for ISED)	799 ~805 MHz (798 ~ 799 MHz Guard band) 798 ~ 805 MHz (for ISED)	APCO 25
PS 800	851 ~ 861 MHz	806 ~ 816 MHz	

* 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	30.504
100	29.246
200	29.578
300	29.551
400	29.859
500	29.924
600	29.983
700	29.946
800	30.056
900	30.200
1000	30.263
2000	30.864
2600*	31.408
2700*	31.767
3000	32.243
4000	32.456
5000	30.504
6000	29.246

7000	33.210
8000	33.429
9000	34.210
10000	34.597
11000	35.485
12000	36.128
13000	37.014
14000	37.524
15000	38.070
16000	41.191
17000	41.070
18000	42.726
19000	41.312
20000	41.964
21000	42.616
22000	43.268
23000	43.920
24000	44.572
25000	45.225

3.3. MAXIMUM MEASUREMENT UNCERTAINTY

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
Noise Figure, Emission Masks	-	± 0.89 dB
Radiated Spurious Emissions	f ≤ 1 GHz f > 1 GHz	± 4.80 dB ± 6.07 dB

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	E4438C /Signal Generator	12/21/2016	Annual	MY42082646
Agilent	E4438C /Signal Generator	01/24/2017	Annual	US41460432
Agilent	N5182A /Signal Generator	03/29/2017	Annual	MY50141649
Agilent	N5182A /Signal Generator	01/23/2017	Annual	MY47070406
Agilent	N9020A / Signal Analyzer	07/04/2016	Annual	MY49100925
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	08/12/2016	Annual	09109
DEAYOUNG ENT	DFSS60 / AC Power Supply	04/05/2017	Annual	1003030-1
NANGYEUL CO., LTD.	NY-THR18750 / Temperature and Humidity Chamber	10/21/2016	Annual	NY-2009012201A
Innco system	MA4000-EP / Antenna Position Tower	N/A	N/A	N/A
Innco system	CT0800 / Turn Table	N/A	N/A	N/A
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
ETS	2090 / Controller(Turn table)	N/A	N/A	1646
Rohde&Schwarz	Loop Antenna	02/23/2016	Biennial	1513-175
Schwarzbeck	VULB 9160 / Trilog Antenna	10/14/2016	Biennial	9160-3368
Schwarzbeck	BBHA 9120D / Horn Antenna	12/11/2015	Biennial	9120D-1191
Rohde & Schwarz	FSP / Spectrum Analyzer	09/29/2016	Annual	836650/016
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/23/2016	Annual	101068-SZ
Wainwright Instruments	WHK1.2/15G-10EF / Highpass Filter	04/10/2017	Annual	4
Wainwright Instruments	WHK3.0/18G-10EF / Highpass Filter	06/24/2016	Annual	8
CERNEX	CBLU1183540 / Power Amplifier	01/25/2017	Annual	24614
CERNEX	CBL06185030 / Power Amplifier	01/25/2017	Annual	24615
CERNEX	CBL18265035 / Power Amplifier	07/11/2016	Annual	22966

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.

§ 90.541 Transmitting power and antenna height limits.

The transmitting power and antenna height of base, mobile, portable and control stations operating in the 769-775 MHz and 799-805 MHz frequency bands must not exceed the maximum limits in this section. Power limits are listed in effective radiated power (ERP).

(a) The transmitting power and antenna height of base stations must not exceed the limits given in paragraph (a) of §90.635.

§ 90.542 Broadband transmitting power limits.

(a) The following power limits apply to the 758-768/788-798 MHz band:

(1) Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth of 1 MHz or less must not exceed an ERP of 1000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section.

(2) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth of 1 MHz or less must not exceed an ERP of 2000 watts and an antenna height of 305 m HAAT,

except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts ERP in accordance with Table 2 of this section.

(3) Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.

(4) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section.

(5) Licensees of fixed or base stations transmitting a signal in the 758-768 MHz band at an ERP greater than 1000 watts must comply with the provisions set forth in paragraph (b) of this section.

(6) Control stations and mobile stations transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 30 watts ERP.

(7) Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

(8) For transmissions in the 758-768 MHz and 788-798 MHz bands, licensees may employ equipment operating in compliance with either of the following measurement techniques:

(i) The maximum composite transmit power shall be measured over any interval of continuous transmission using instrumentation calibrated in terms of 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, etc., so as to obtain a true maximum composite measurement for the emission in question over the full bandwidth of the channel.

(ii) A Commission-approved average power technique.

Table 1 to §90.542(a)—Permissible Power and Antenna Heights for Base and Fixed Stations in the 758-768 MHz Band Transmitting a Signal With an Emission Bandwidth of 1 MHz or Less

Antenna height (AAT) in meters (feet)	Effective radiated power (ERP) (watts)
Above 1372 (4500)	65
Above 1220 (4000) To 1372 (4500)	70
Above 1067 (3500) To 1220 (4000)	75
Above 915 (3000) To 1067 (3500)	100
Above 763 (2500) To 915 (3000)	140

Above 610 (2000) To 763 (2500)	200
Above 458 (1500) To 610 (2000)	350
Above 305 (1000) To 458 (1500)	600
Up to 305 (1000)	1000

Table 2 to §90.542(a)—Permissible Power and Antenna Heights for Base and Fixed Stations in the 758-768 MHz Band Transmitting a Signal With an Emission Bandwidth of 1 MHz or Less

Antenna height (AAT) in meters (feet)	Effective radiated power (ERP) (watts)
Above 1372 (4500)	130
Above 1220 (4000) To 1372 (4500)	140
Above 1067 (3500) To 1220 (4000)	150
Above 915 (3000) To 1067 (3500)	200
Above 763 (2500) To 915 (3000)	280
Above 610 (2000) To 763 (2500)	400
Above 458 (1500) To 610 (2000)	700
Above 305 (1000) To 458 (1500)	1200
Up to 305 (1000)	2000

Table 3 to §90.542(a)—Permissible Power and Antenna Heights for Base and Fixed Stations in the 758-768 MHz Band Transmitting a Signal With an Emission Bandwidth Greater Than 1 MHz

Antenna height (AAT) in meters (feet)	Effective radiated power (ERP) per MHz (watts/MHz)
Above 1372 (4500)	65
Above 1220 (4000) To 1372 (4500)	70
Above 1067 (3500) To 1220 (4000)	75
Above 915 (3000) To 1067 (3500)	100
Above 763 (2500) To 915 (3000)	140
Above 610 (2000) To 763 (2500)	200
Above 458 (1500) To 610 (2000)	350
Above 305 (1000) To 458 (1500)	600
Up to 305 (1000)	1000

Table 4 to §90.542(a)—Permissible Power and Antenna Heights for Base and Fixed Stations in the 758-768 MHz Band Transmitting a Signal With an Emission Bandwidth Greater Than 1 MHz

Antenna height (AAT) in meters (feet)	Effective radiated power (ERP) per MHz (watts/MHz)

Above 1372 (4500)	130
Above 1220 (4000) To 1372 (4500)	140
Above 1067 (3500) To 1220 (4000)	150
Above 915 (3000) To 1067 (3500)	200
Above 763 (2500) To 915 (3000)	280
Above 610 (2000) To 763 (2500)	400
Above 458 (1500) To 610 (2000)	700
Above 305 (1000) To 458 (1500)	1200
Up to 305 (1000)	2000

(b) For base and fixed stations operating in the 758-768 MHz band in accordance with the provisions of paragraph (a)(5) of this section, the power flux density that would be produced by such stations through a combination of antenna height and vertical gain pattern must not exceed 3000 microwatts per square meter on the ground over the area extending to 1 km from the base of the antenna mounting structure.

§ 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.

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

§ 90.219 Use of signal boosters.

(e) *Device Specifications.* In addition to the general rules for equipment certification in

§90.203(a)(2) and part 2, subpart J of this chapter, a signal booster must also meet the rules in this paragraph.

(1) The output power capability of a signal booster must be designed for deployments providing a radiated power not exceeding 5 Watts ERP for each retransmitted channel.

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.

Table 2 —Transmitter Output Power

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.

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 of (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 the output power of the EUT and record (Power measurement with a spectrum analyzer).

g) Remove the EUT from the measurement setup and using the same signal generator settings, repeat the power measurement on the input signal to the EUT and record as input power.

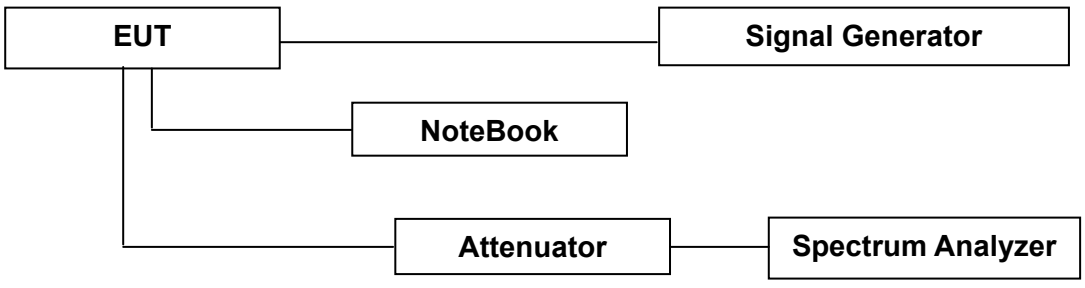
h) Repeat the procedure with the narrowband test signal.

i) Repeat the procedure for both test signals with input signal amplitude set to 3 dB above the AGC threshold level.

j) Repeat 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

Test Results:

Input Signal	Input Level (dBm)		Maximum Amp Gain	
	DL	UL	DL	UL
FirstNet / PS 700	-62	-65	95	95
PS 800	-62	-65	95	95

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)
700 LTE(5 MHz)_ AGC threshold	Low	760.50	33.13	2.056
	Middle	-	-	-
	High	765.50	33.46	2.218
700 LTE(5 MHz)_ +3dB above AGC threshold	Low	760.50	33.13	2.056
	Middle	-	-	-
	High	765.50	33.39	2.183
700 APCO 25 (6.25 kHz)_ AGC threshold	Low	769.003125	33.07	2.028
	Middle	772.000000	33.02	2.004
	High	774.996875	32.78	1.897
800 APCO 25 (6.25 kHz)_ AGC threshold	Low	851.003125	33.20	2.089
	Middle	856.000000	33.56	2.270
	High	860.996875	33.28	2.128

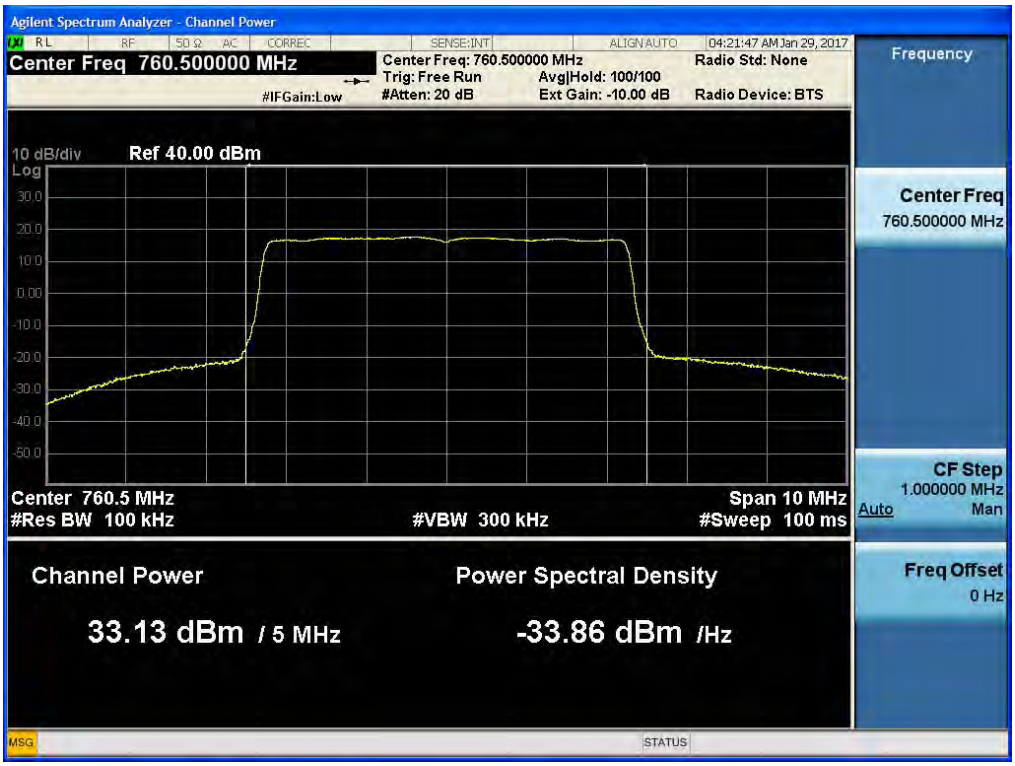
[Uplink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
700 LTE(5 MHz)_ AGC threshold	Low	790.50	29.99	0.998
	Middle	-	-	-
	High	795.50	30.38	1.091
700 LTE(5 MHz)_ +3dB above AGC threshold	Low	790.50	30.00	1.000
	Middle	-	-	-
	High	795.50	30.48	1.117
700 APCO 25 (6.25 kHz)_ AGC threshold	Low	799.003125	30.14	1.033
	Middle	802.000000	30.03	1.007
	High	804.996875	30.66	1.164
800 APCO 25 (6.25 kHz)_ AGC threshold	Low	806.003125	30.80	1.202
	Middle	811.000000	30.42	1.102
	High	815.996875	30.17	1.040

Single channel Enhancer Plots of RF Output Power

700 LTE(5 MHz)_DL

[AGC threshold Downlink - Low]



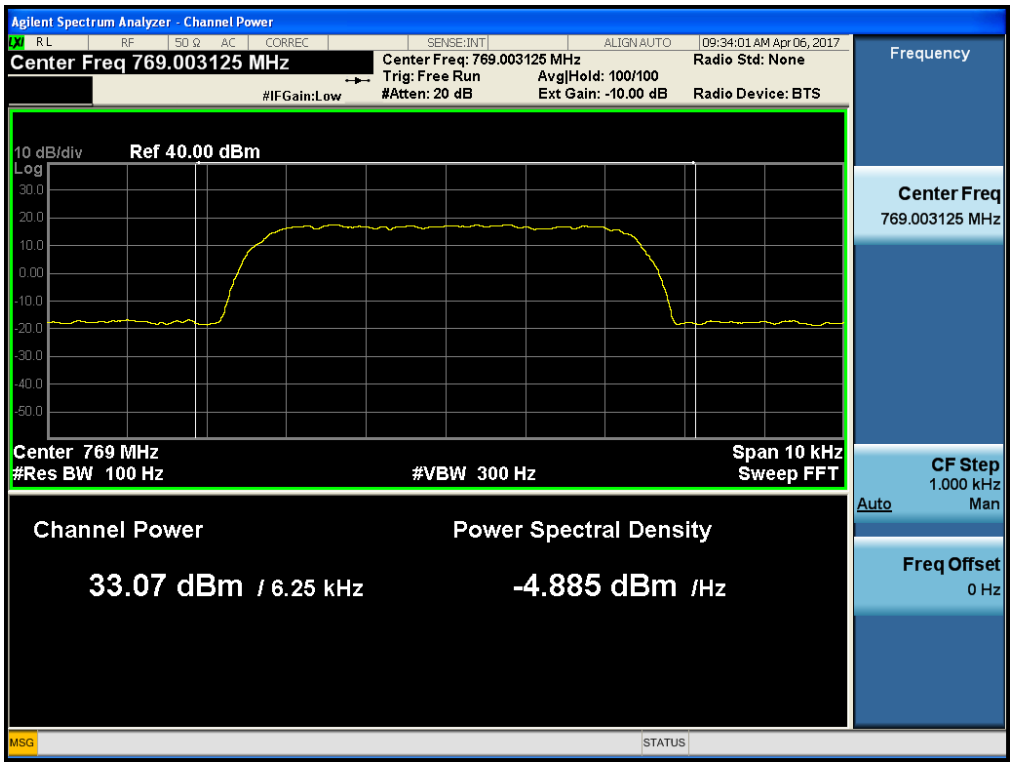
[AGC threshold Downlink - High]

[+3dB above the AGC threshold Downlink - Low]

[+3dB above the AGC threshold Downlink - High]

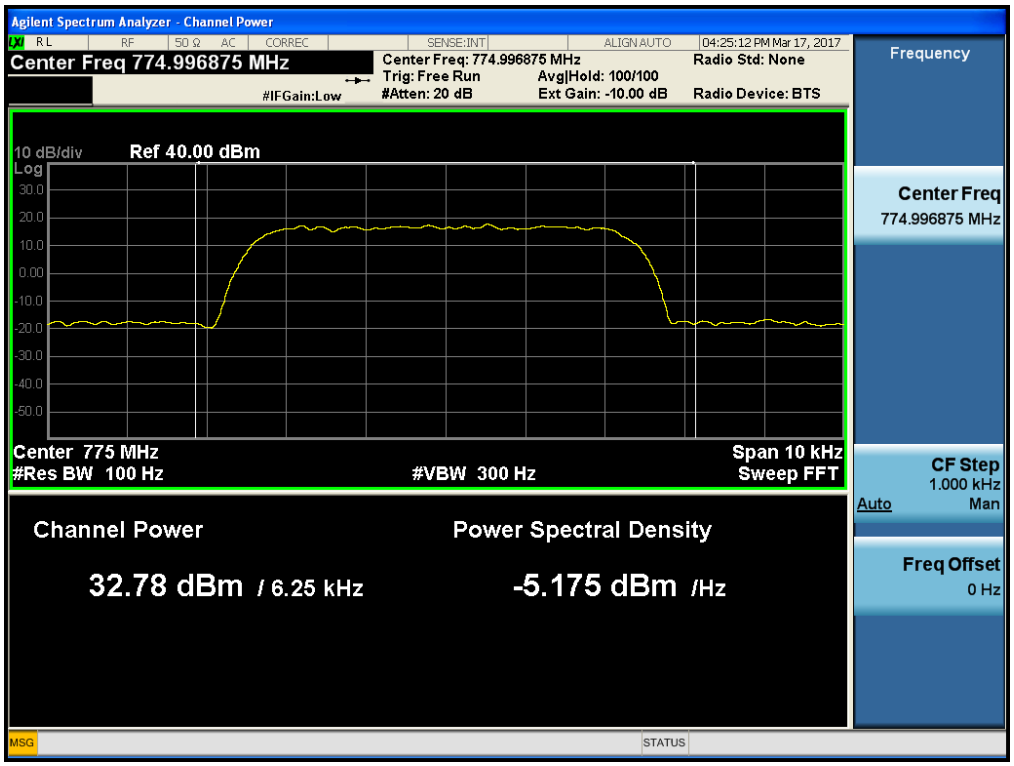
700 APCO 25(6.25 kHz)_DL

[AGC threshold Downlink - Low]



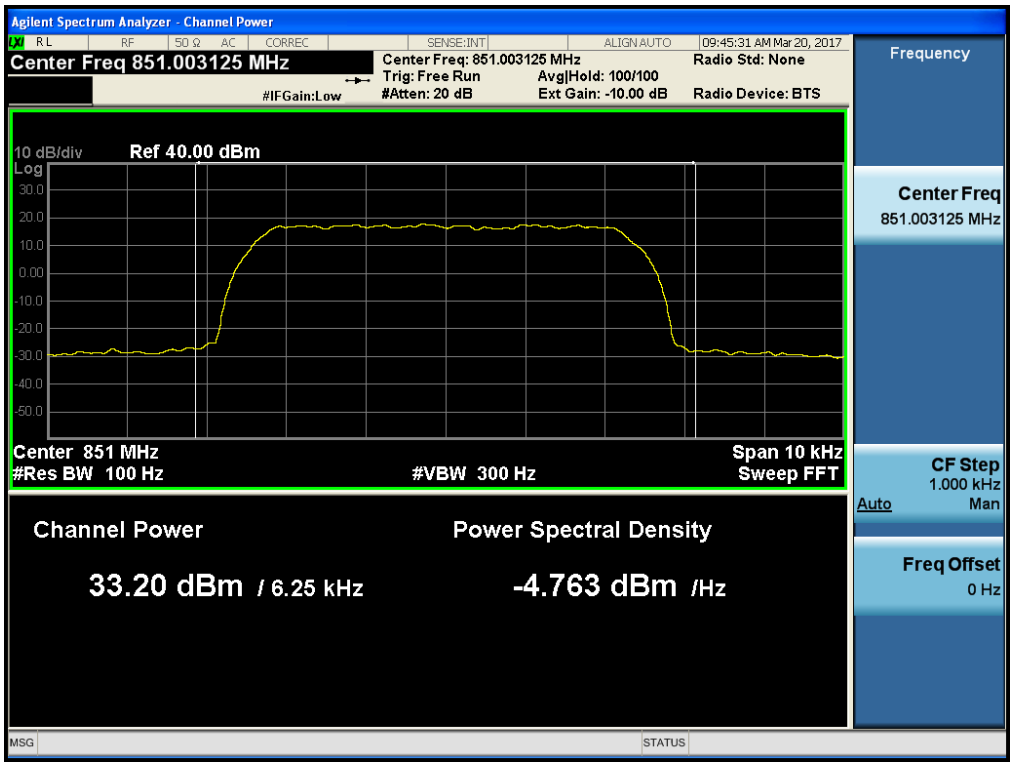
[AGC threshold Downlink - Middle]

[AGC threshold Downlink - High]

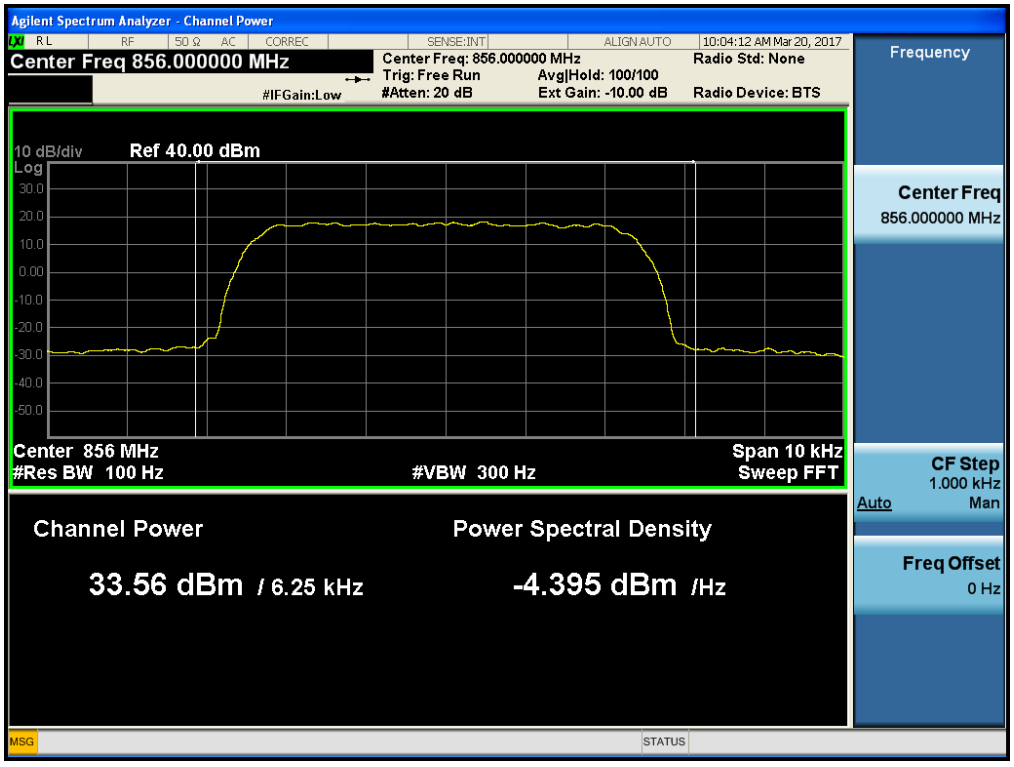


800 APCO 25(6.25 kHz)_DL

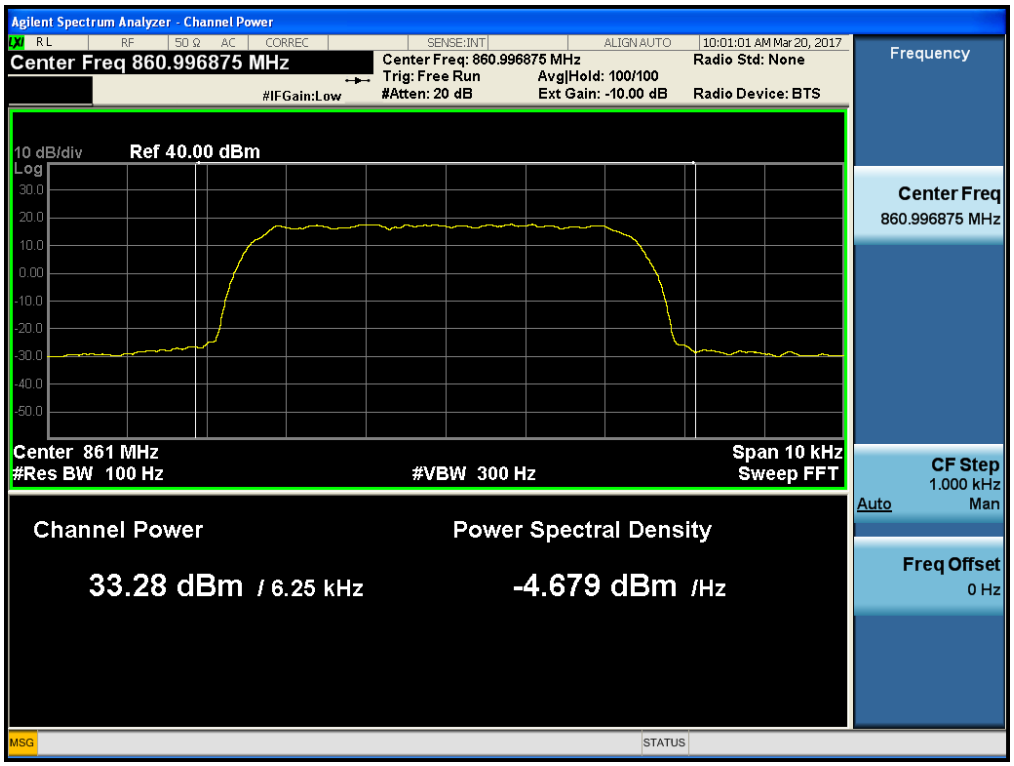
[AGC threshold Downlink - Low]



[AGC threshold Downlink - Middle]

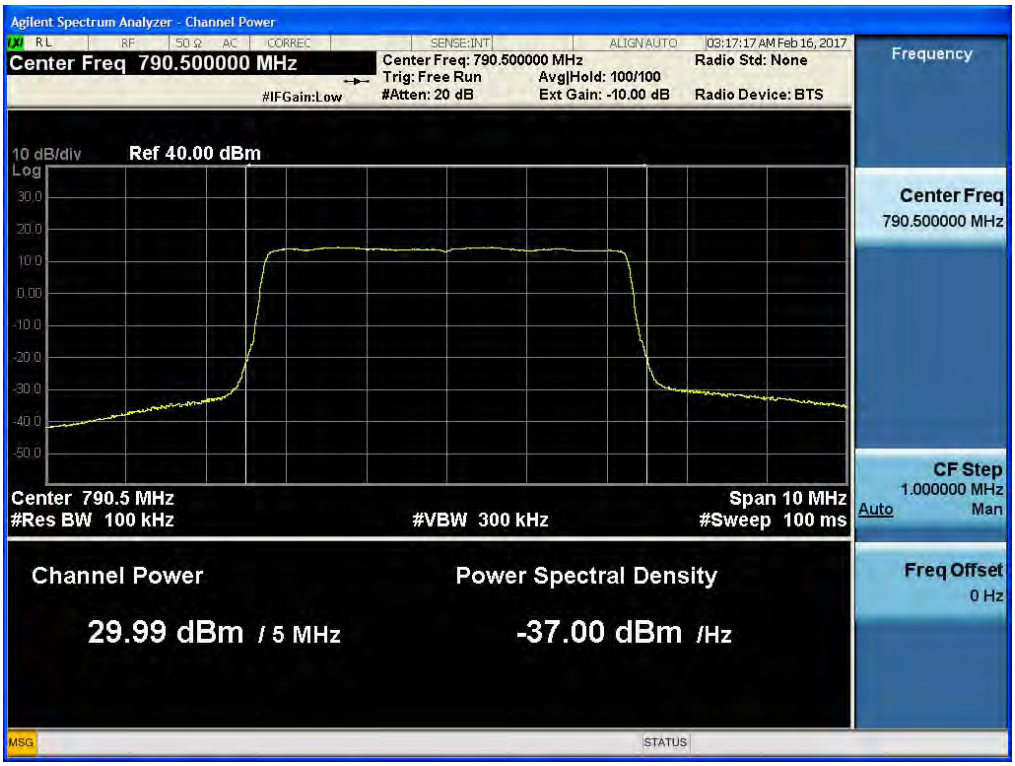


[AGC threshold Downlink - High]



700 LTE(5 MHz)_UL

[AGC threshold Uplink - Low]



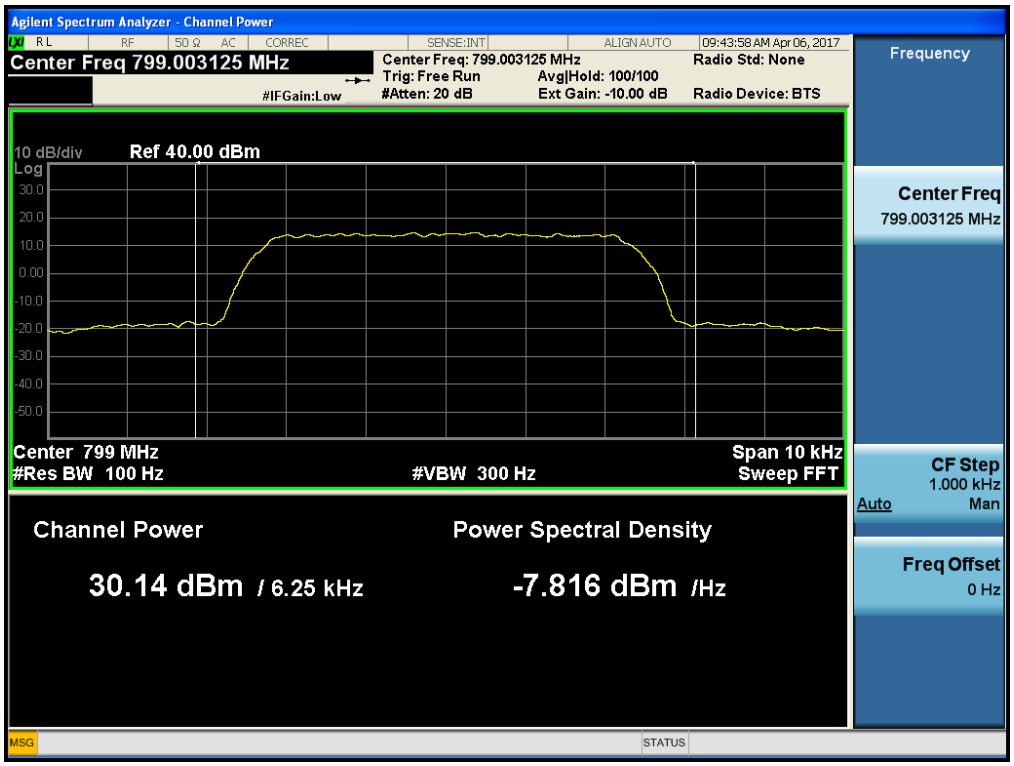
[AGC threshold Uplink - High]

[+3dB above the AGC threshold Uplink - Low]

[+3dB above the AGC threshold Uplink - High]

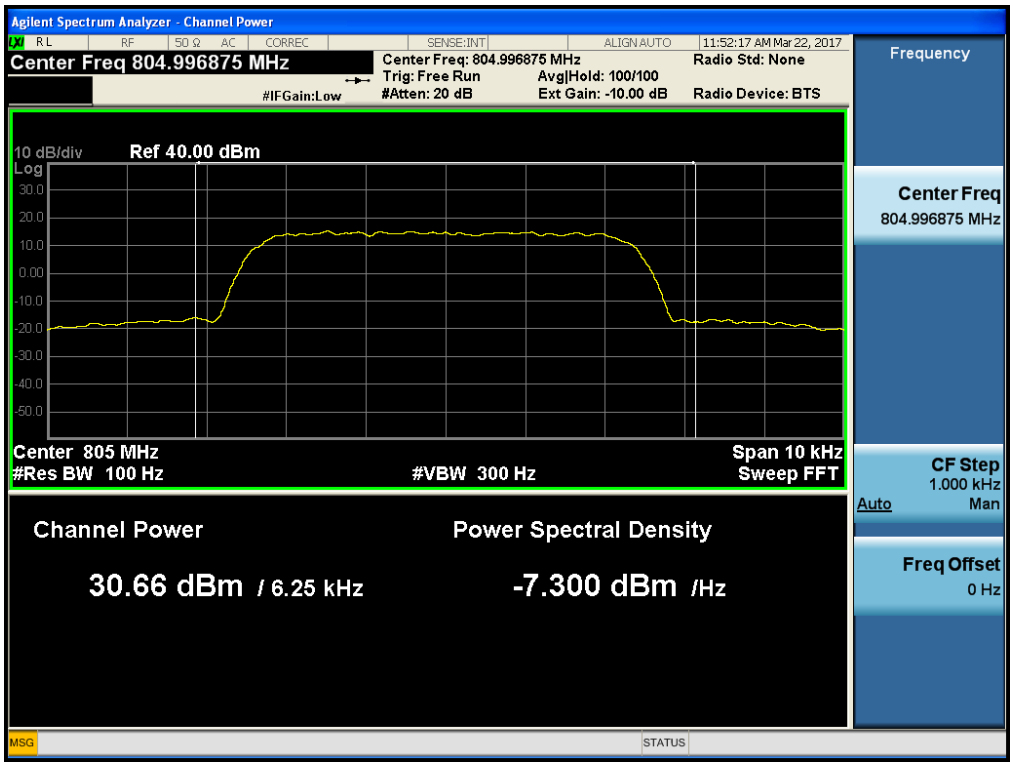
700 APCO 25(6.25 kHz)_UL

[AGC threshold Uplink - Low]



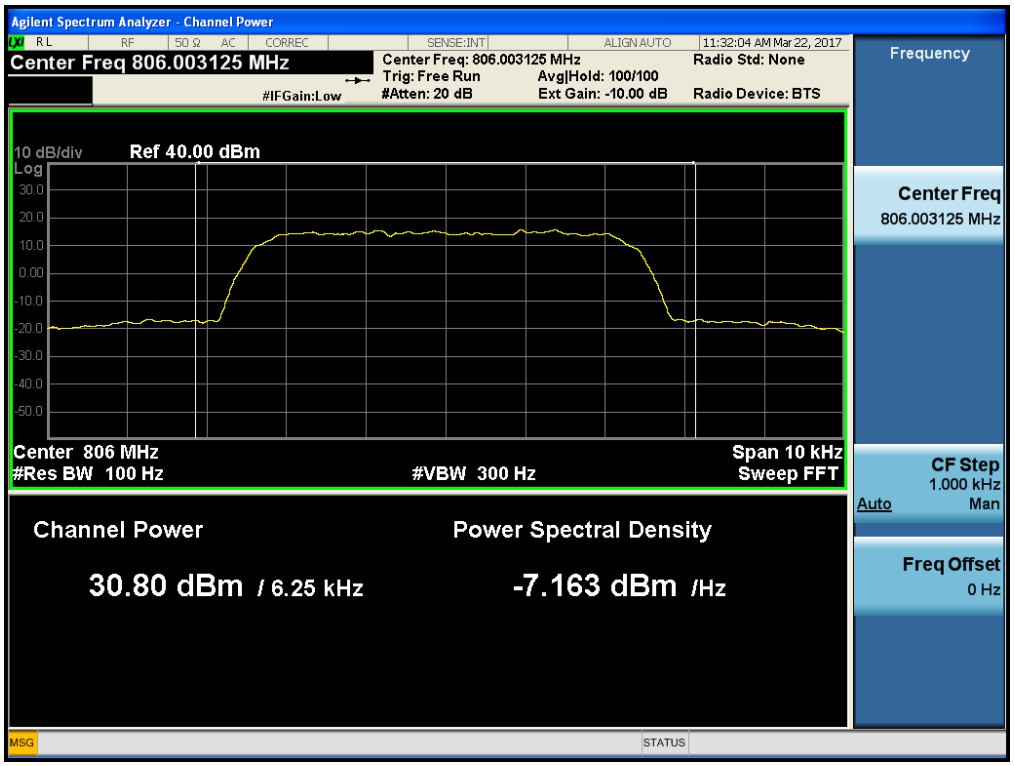
[AGC threshold Uplink - Middle]

[AGC threshold Uplink - High]

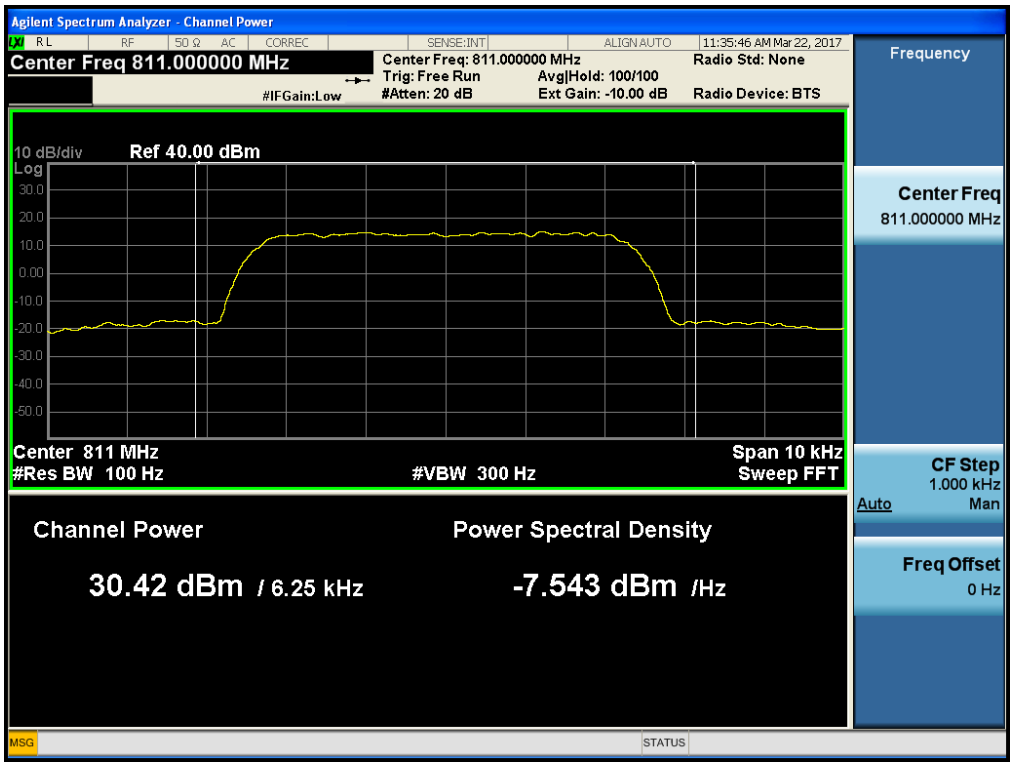


800 APCO 25(6.25 kHz)_UL

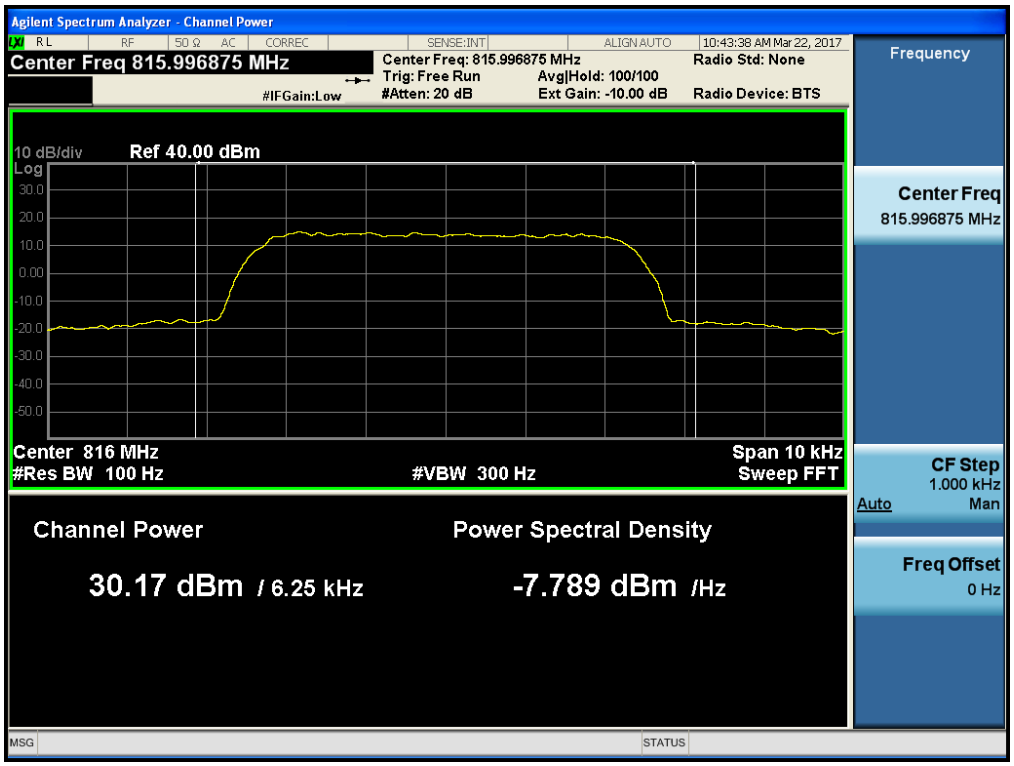
[AGC threshold Uplink - Low]



[AGC threshold Uplink - Middle]



[AGC threshold Uplink - High]



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 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.

Test Results:

Input Signal	Input Level (dBm)		Maximum Amp Gain	
	DL	UL	DL	UL
FirstNet / PS 700	-62	-65	95	95
PS 800	-62	-65	95	95

[Downlink Output]

	Channel	Frequency (MHz)	OBW (MHz)
700 LTE(5 MHz) AGC threshold	Low	760.50	4.5004
	Middle	-	-
	High	765.50	4.4990
700 LTE(5 MHz) +3dB above AGC threshold	Low	760.50	4.4984
	Middle	-	-
	High	765.50	4.5007
	Channel	**Frequency (MHz)**	**OBW (kHz)**
700 APCO 25 (6.25 kHz) AGC threshold	Low	769.003125	4.839
	Middle	772.000000	4.850
	High	774.996875	4.803
800 APCO 25 (6.25 kHz) AGC threshold	Low	851.003125	4.842
	Middle	856.000000	4.834
	High	860.996875	4.791

[Downlink Input]

	Channel	Frequency (MHz)	OBW (MHz)
700 LTE(5 MHz) AGC threshold	Low	760.50	4.5114
	Middle	-	-
	High	765.50	4.5154
	Channel	**Frequency (MHz)**	**OBW (kHz)**
700 APCO 25 (6.25 kHz) AGC threshold	Low	769.003125	4.828
	Middle	772.000000	4.813
	High	774.996875	4.844
800 APCO 25 (6.25 kHz) AGC threshold	Low	851.003125	4.846
	Middle	856.000000	4.843
	High	860.996875	4.836

[Uplink Output]

	Channel	Frequency (MHz)	OBW (MHz)
700 LTE(5 MHz) AGC threshold	Low	790.50	4.4884
	Middle	-	-
	High	795.50	4.4885
700 LTE(5 MHz) +3dB above AGC threshold	Low	790.50	4.4876
	Middle	-	-
	High	795.50	4.4893
	Channel	**Frequency (MHz)**	**OBW (kHz)**
700 APCO 25 (6.25 kHz) AGC threshold	Low	799.003125	4.825
	Middle	802.000000	4.852
	High	804.996875	4.864
800 APCO 25 (6.25 kHz) AGC threshold	Low	806.003125	4.845
	Middle	811.000000	4.856
	High	815.996875	4.815

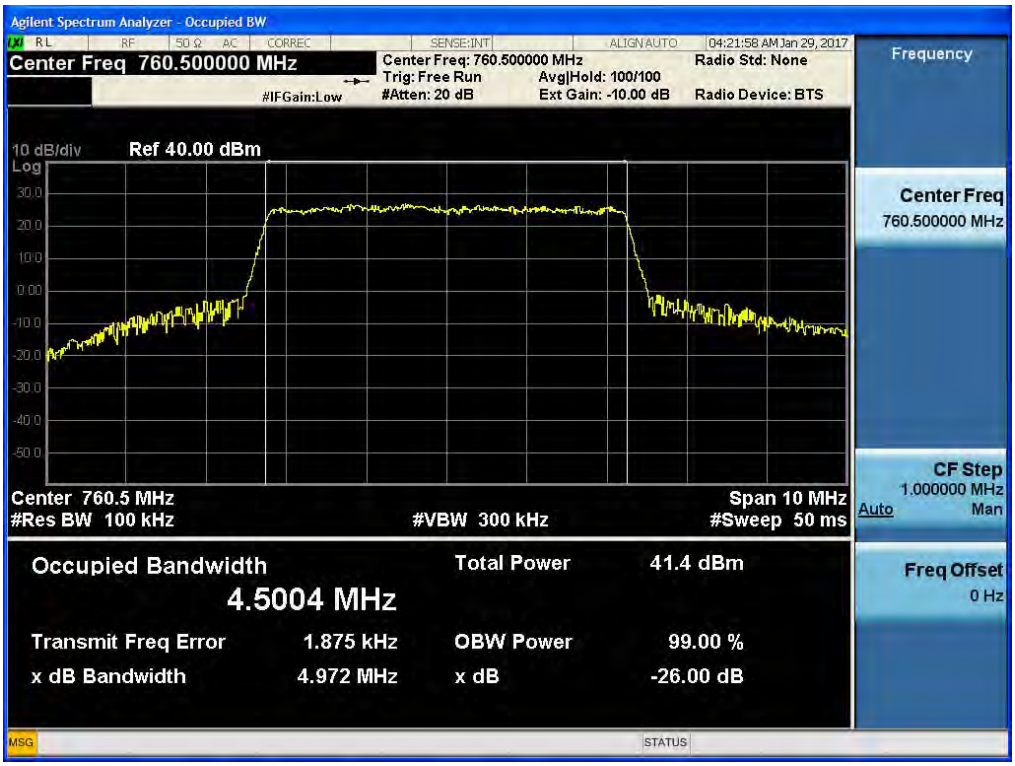
[Uplink Input]

	Channel	Frequency (MHz)	OBW (MHz)
700 LTE(5 MHz) AGC threshold	Low	790.50	4.5149
	Middle	-	-
	High	795.50	4.5131
	Channel	**Frequency (MHz)**	**OBW (kHz)**
700 APCO 25 (6.25 kHz) AGC threshold	Low	799.003125	4.844
	Middle	802.000000	4.835
	High	804.996875	4.834
800 APCO 25 (6.25 kHz) AGC threshold	Low	806.003125	4.844
	Middle	811.000000	4.855
	High	815.996875	4.845

Plots of Occupied Bandwidth

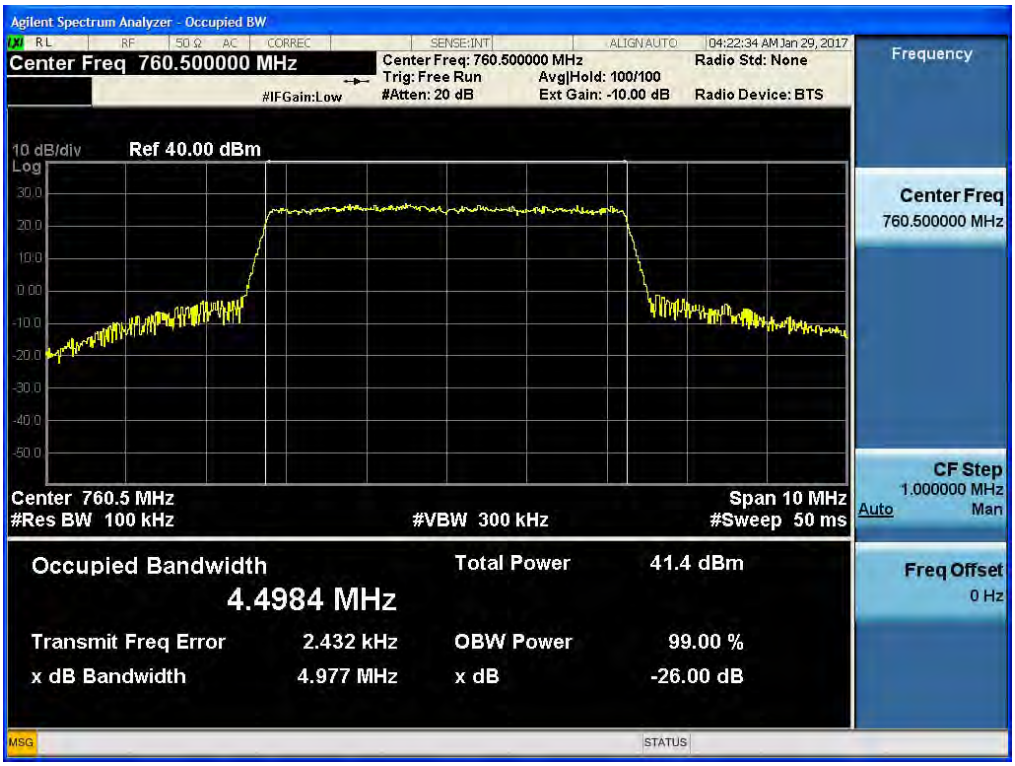
700 LTE(5 MHz)_DL_Output

[AGC threshold Downlink – Low]

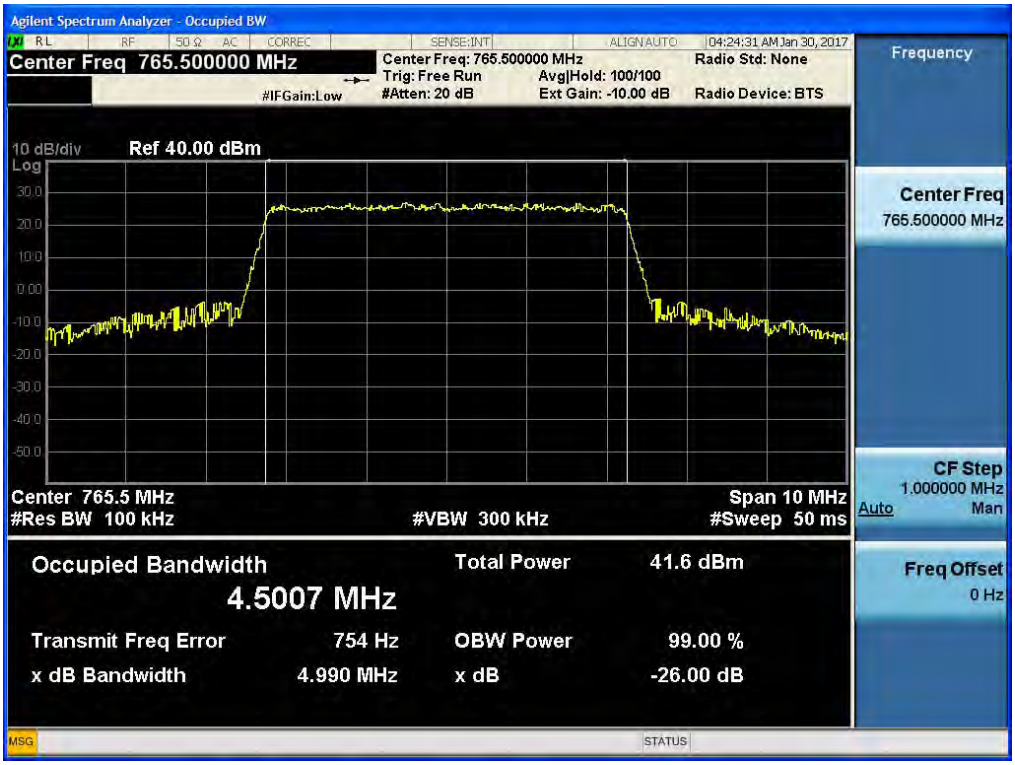


[AGC threshold Downlink - High]

[+3dB above the AGC threshold Downlink - Low]

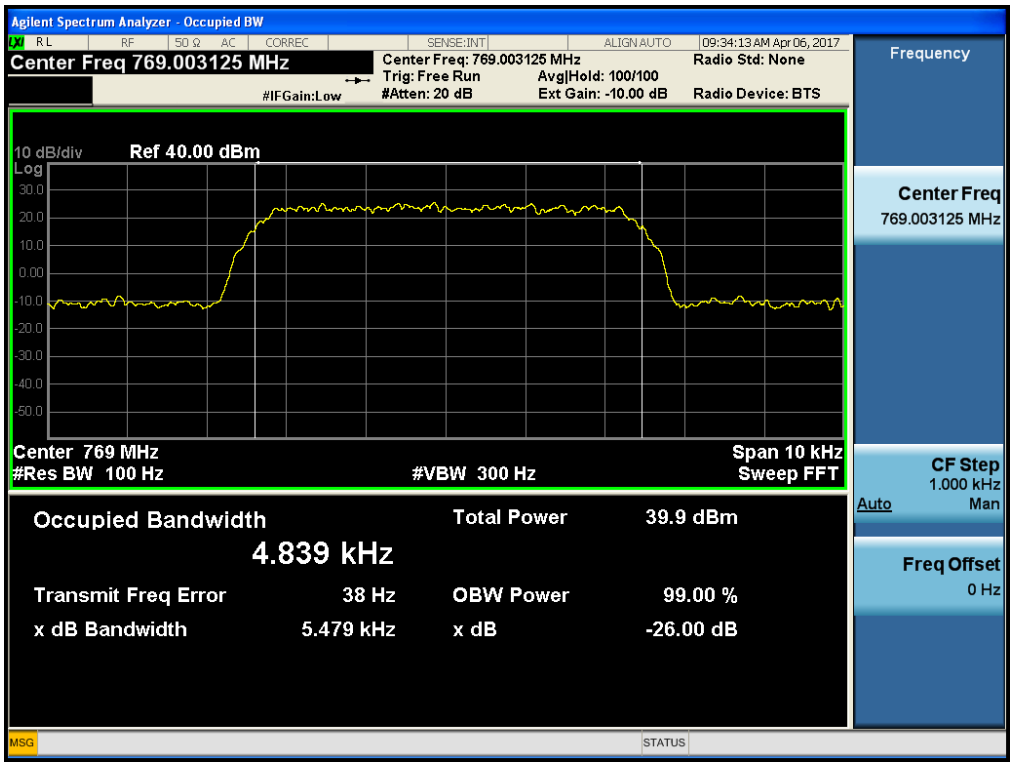


[+3dB above the AGC threshold Downlink - High]

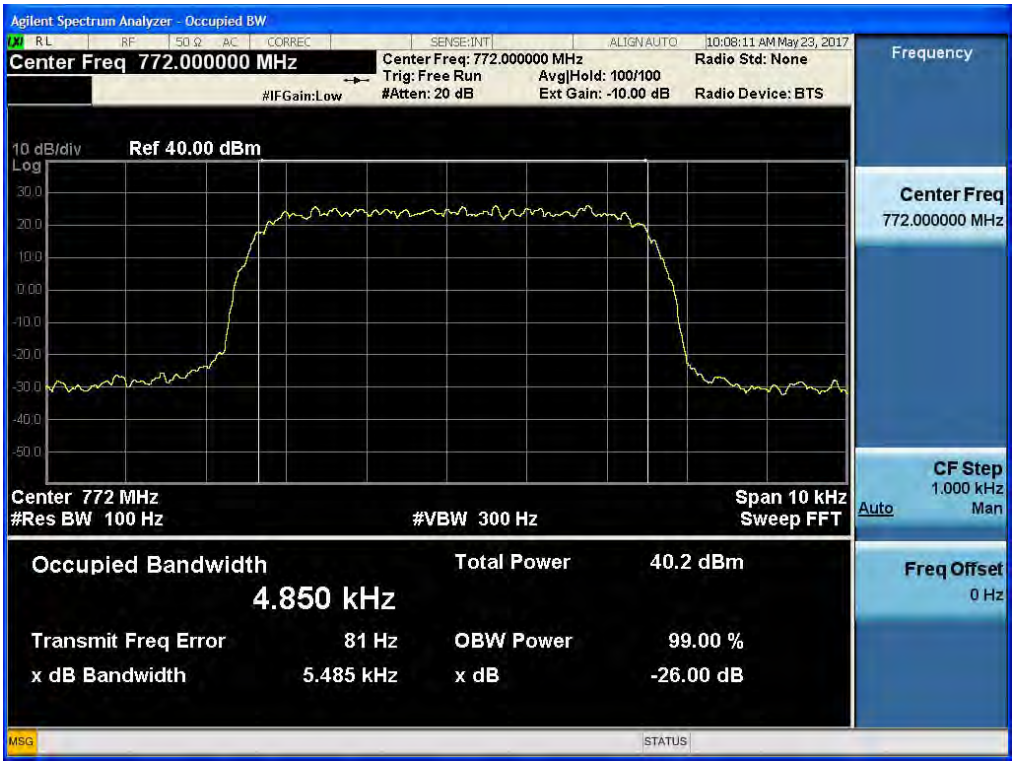


700 APCO 25(6.25 kHz)_DL_Output

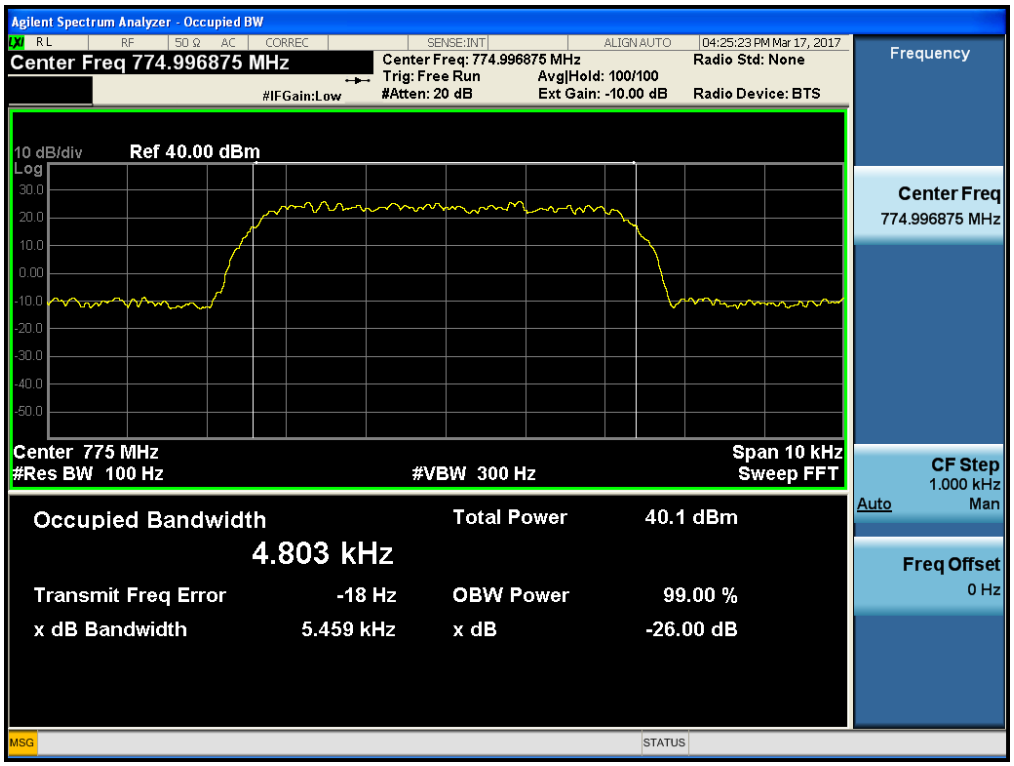
[AGC threshold Downlink – Low]



[AGC threshold Downlink - Middle]

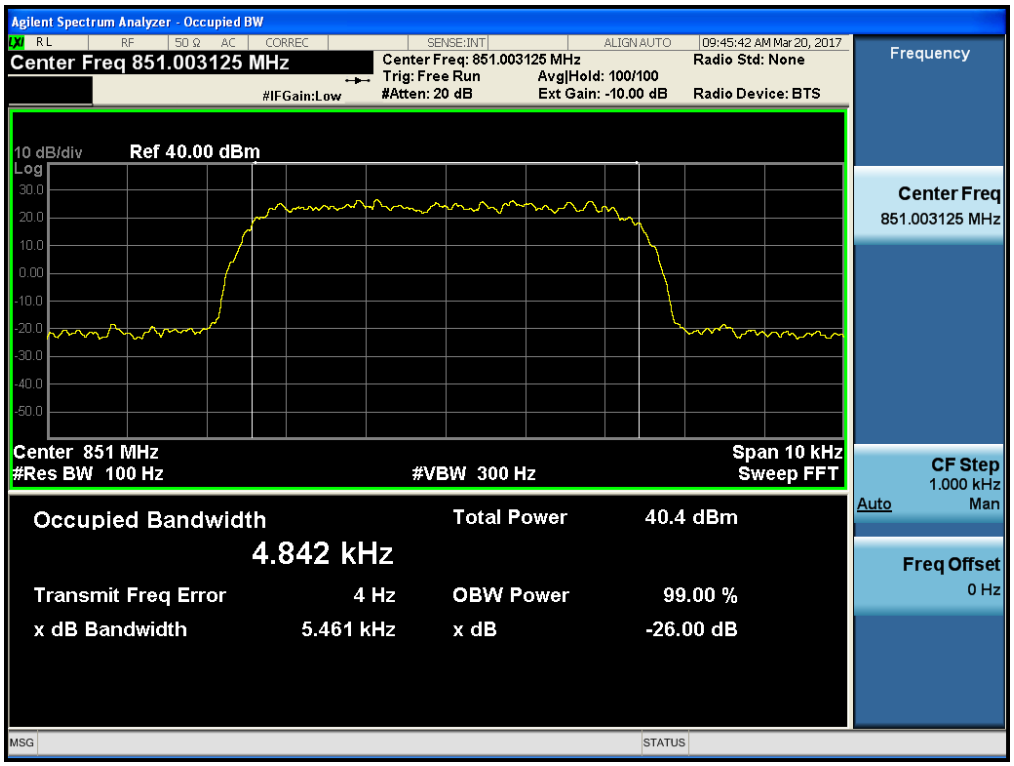


[AGC threshold Downlink - High]

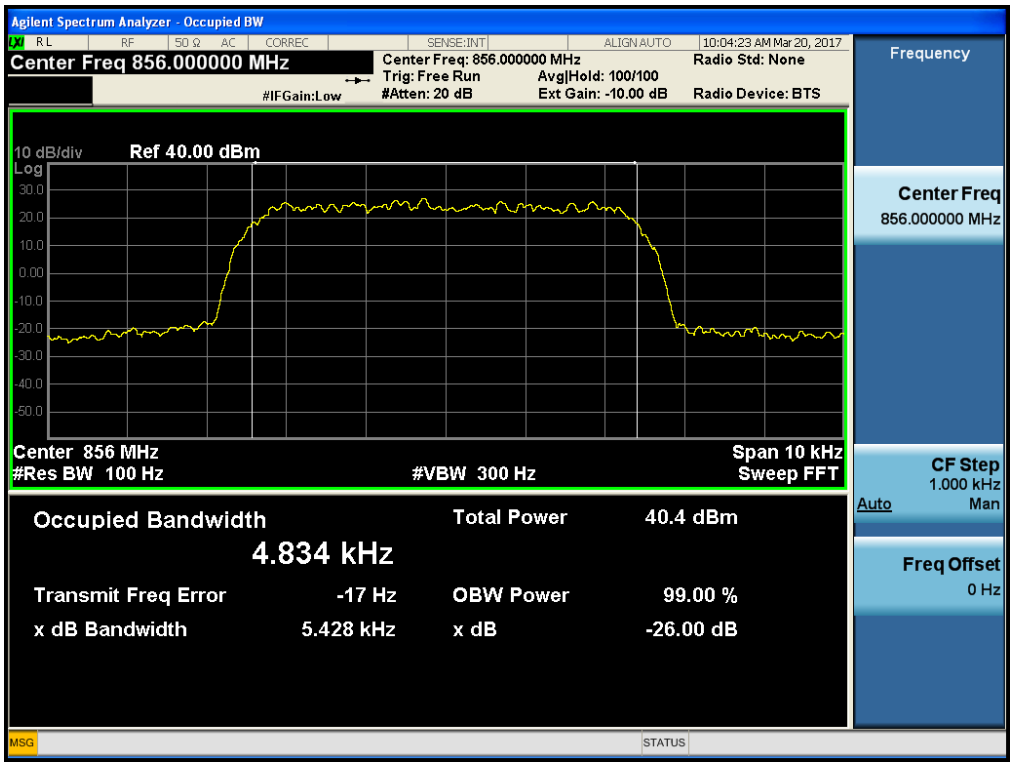


800 APCO 25(6.25 kHz)_DL_Output

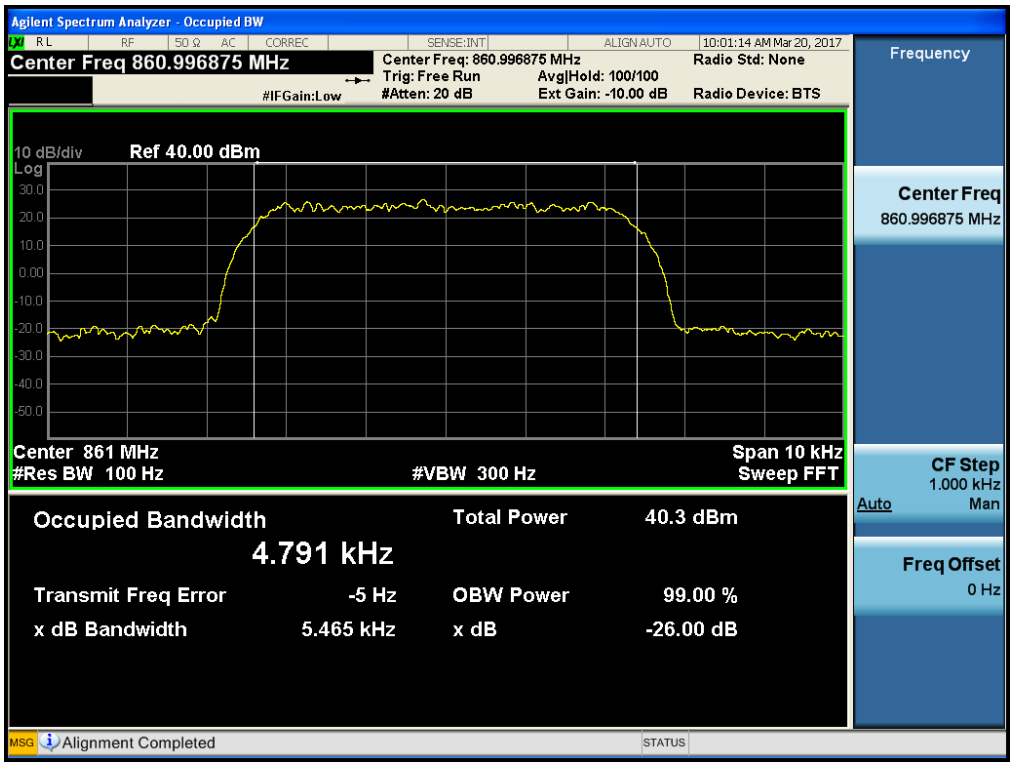
[AGC threshold Downlink – Low]



[AGC threshold Downlink - Middle]

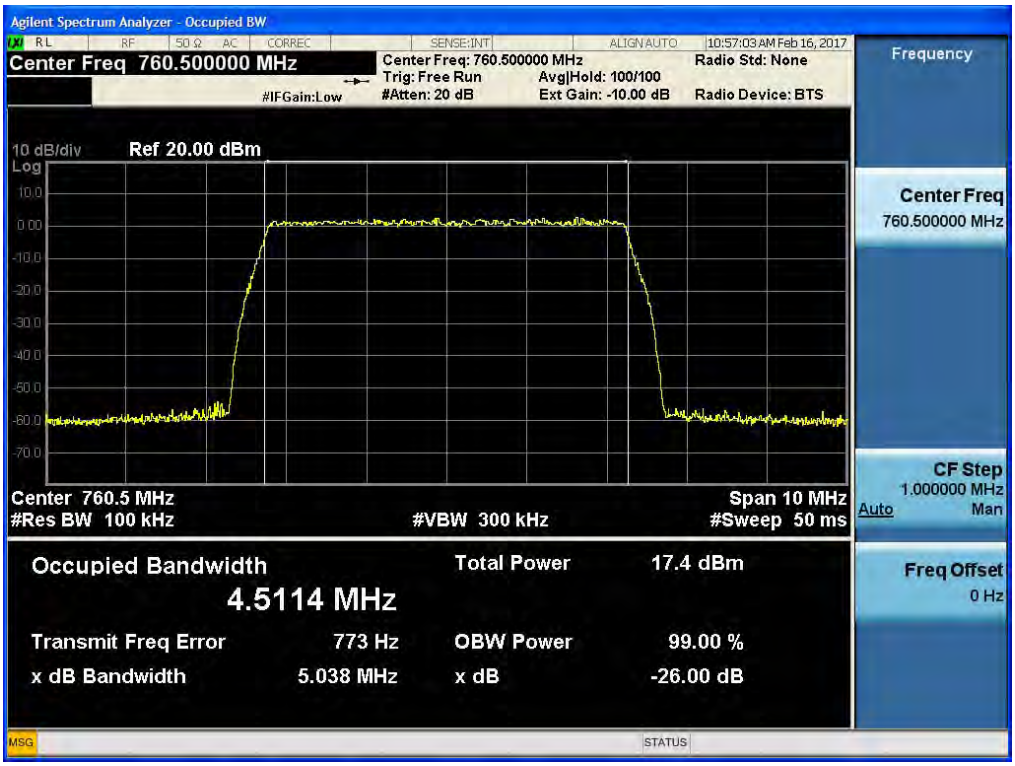


[AGC threshold Downlink - High]

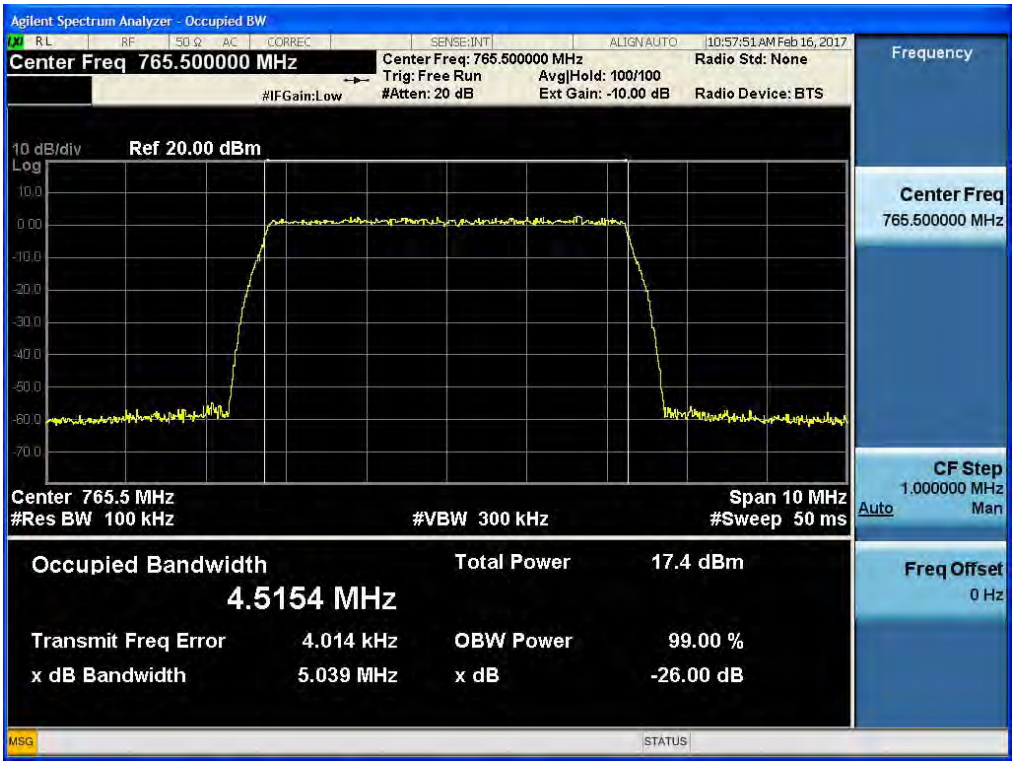


700 LTE(5 MHz)_DL_Input

[AGC threshold Downlink – Low]

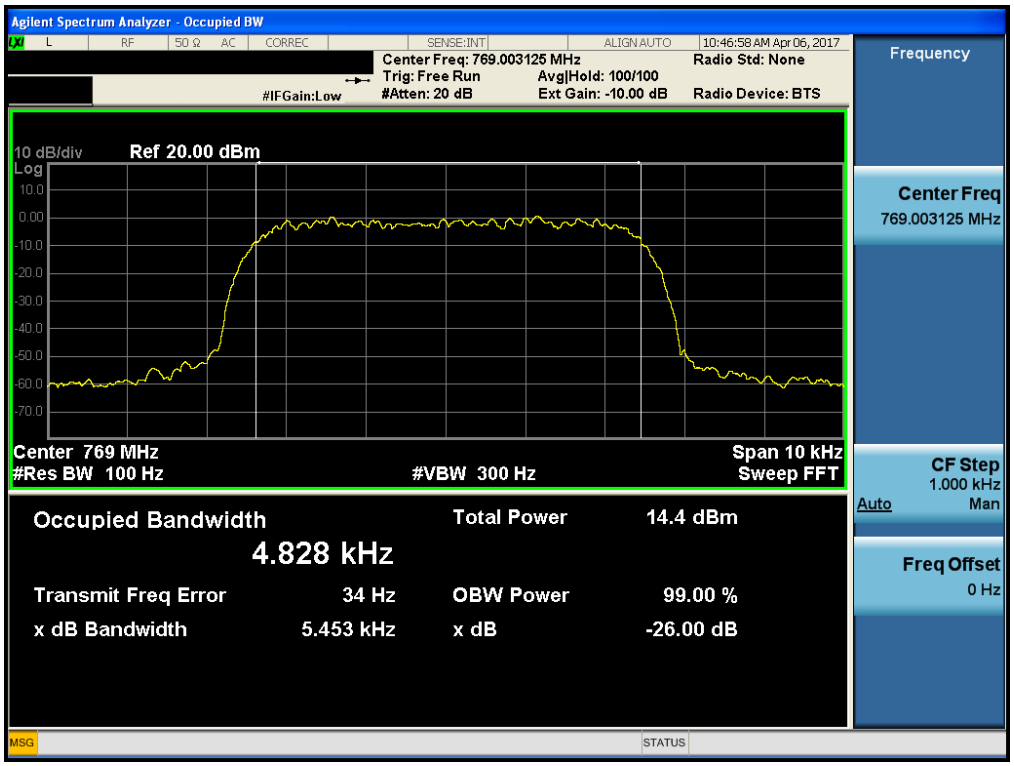


[AGC threshold Downlink - High]



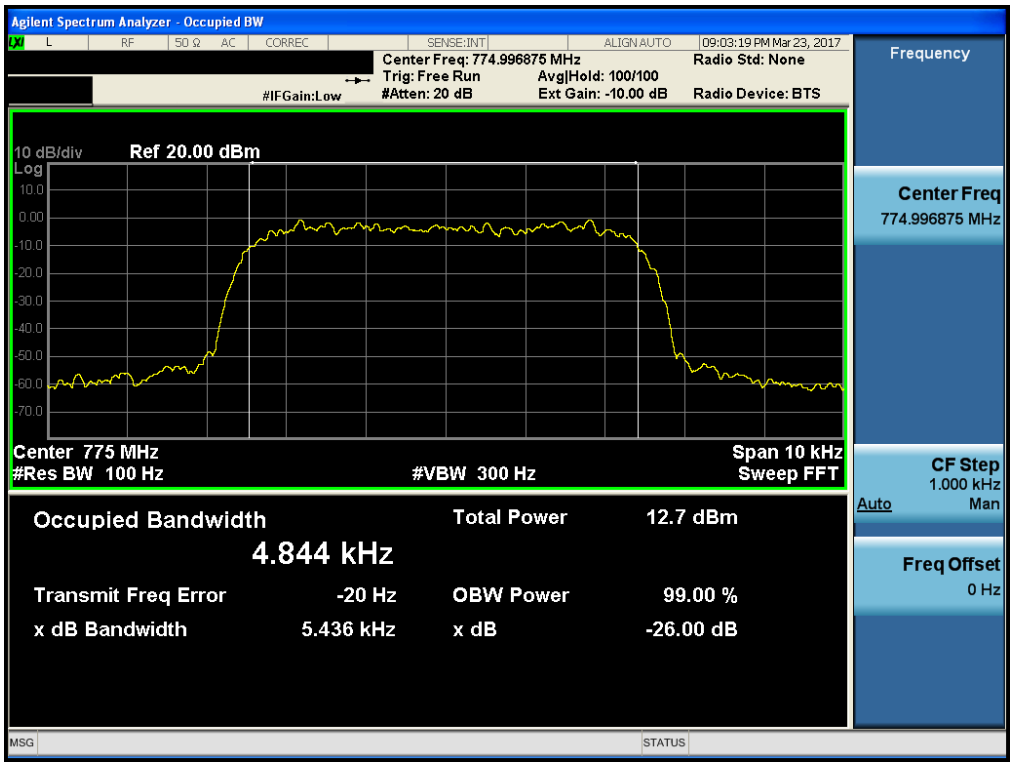
700 APCO 25(6.25 kHz)_DL_Input

[AGC threshold Downlink – Low]



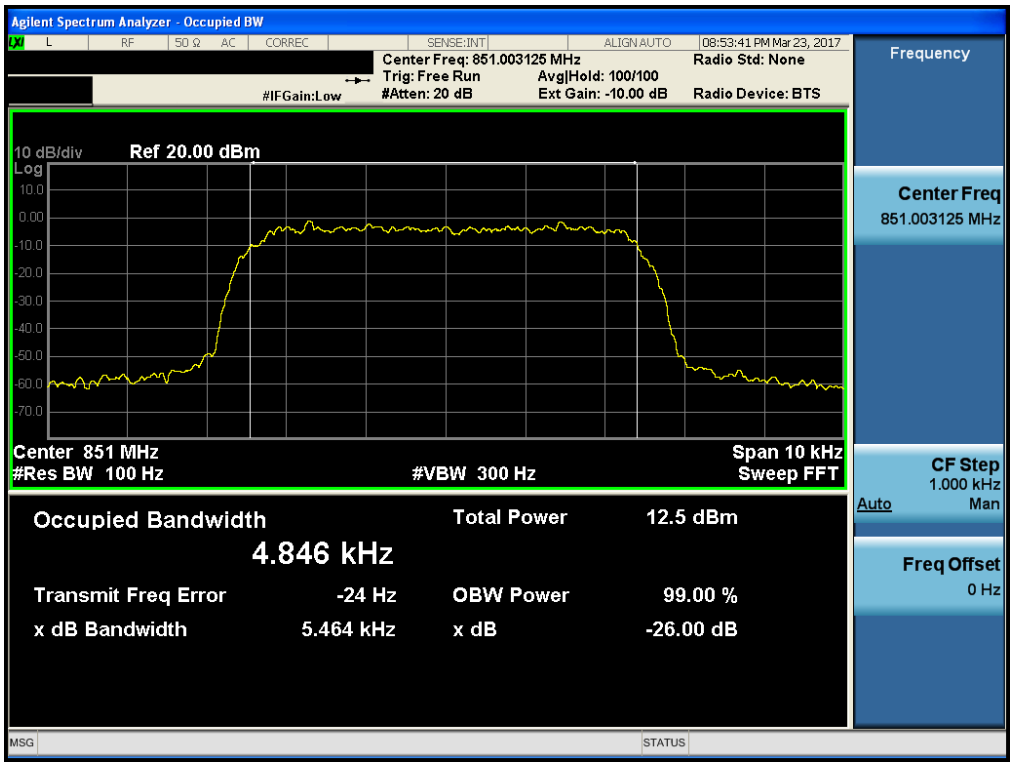
[AGC threshold Downlink - Middle]

[AGC threshold Downlink - High]

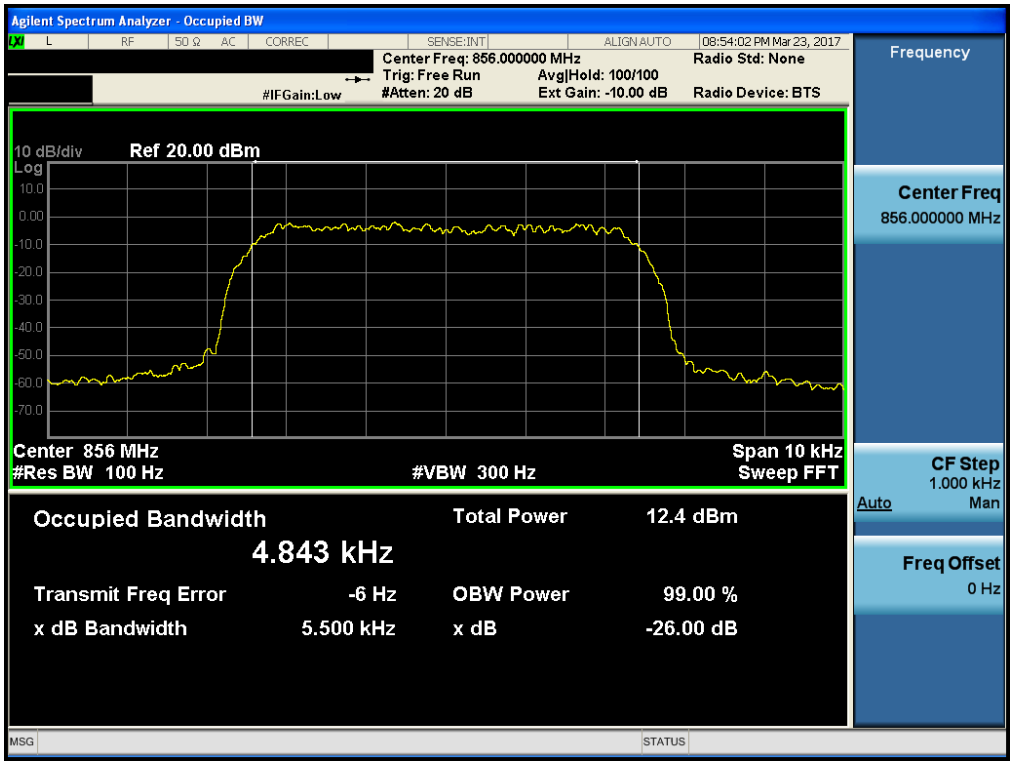


800 LTE(6.25 kHz)_DL_Input

[AGC threshold Downlink – Low]



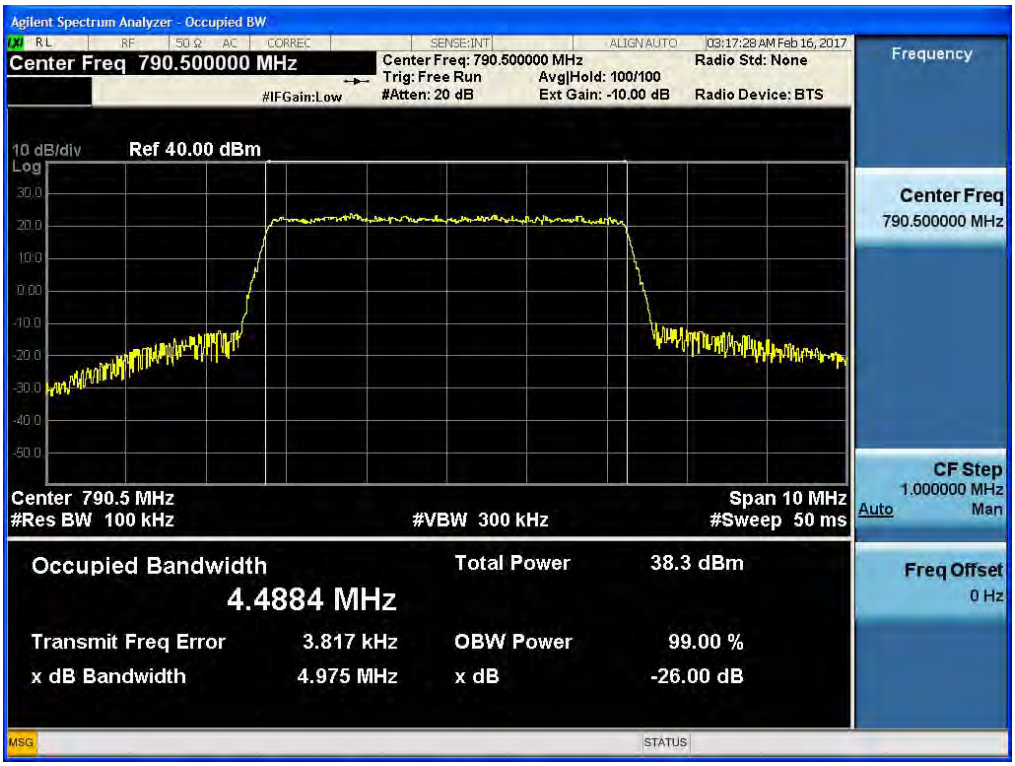
[AGC threshold Downlink - Middle]



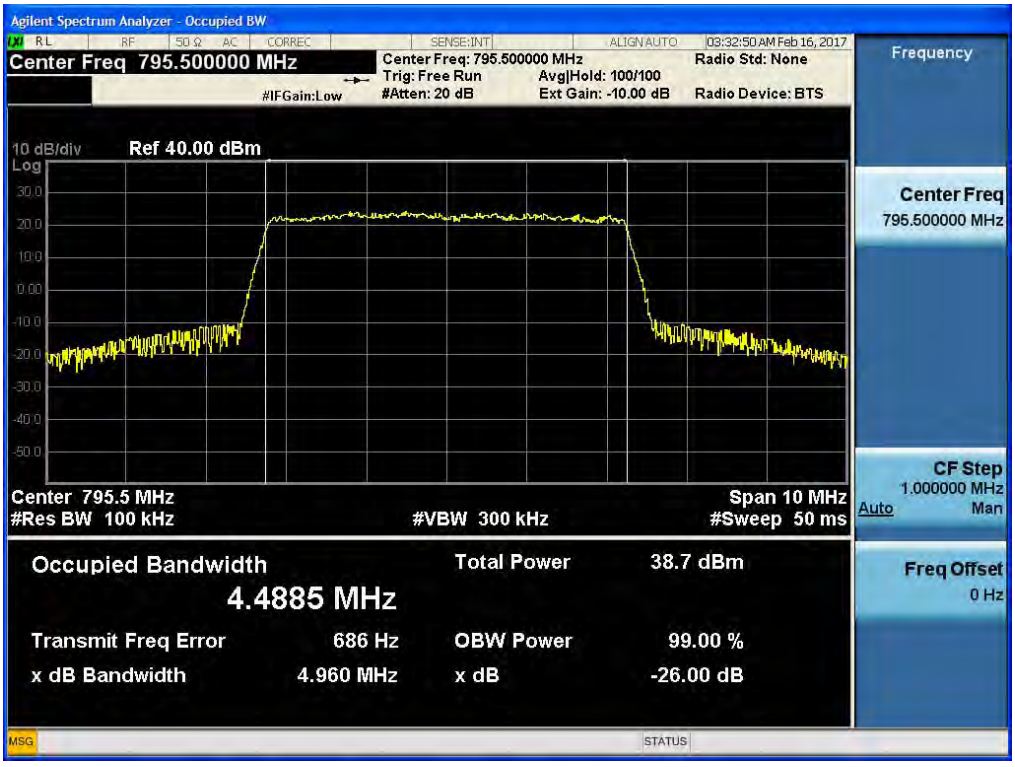
[AGC threshold Downlink - High]

700 LTE(5 MHz)_UL_Output

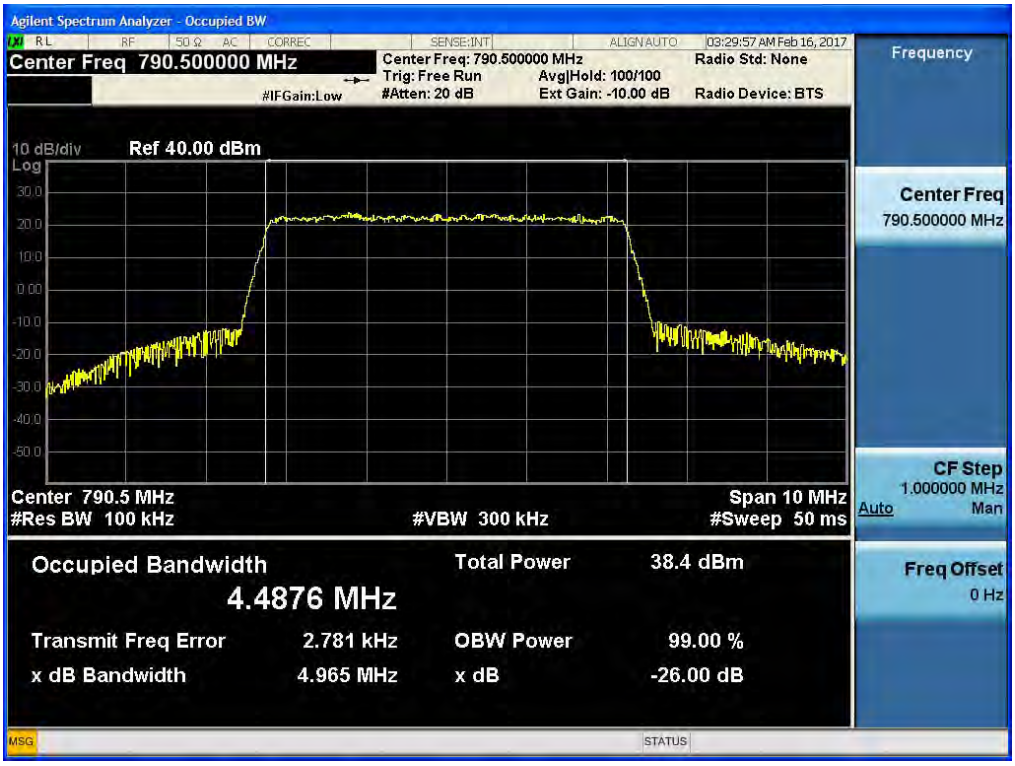
[AGC threshold Uplink – Low]



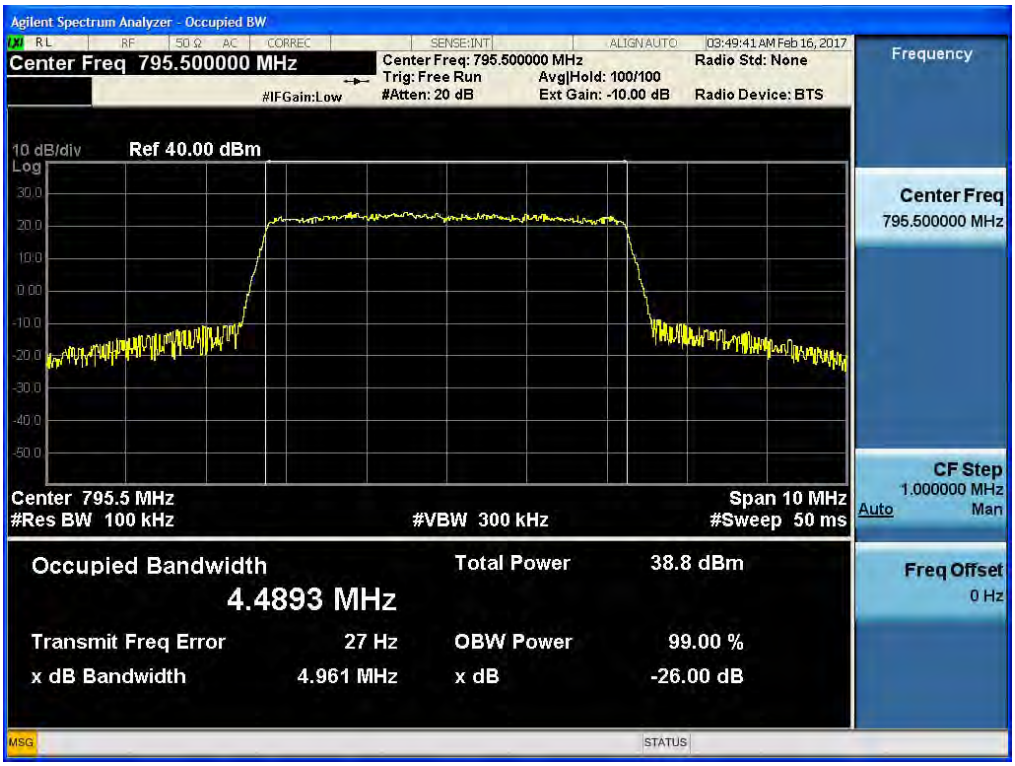
[AGC threshold Uplink - High]



[+3dB above the AGC threshold Uplink - Low]

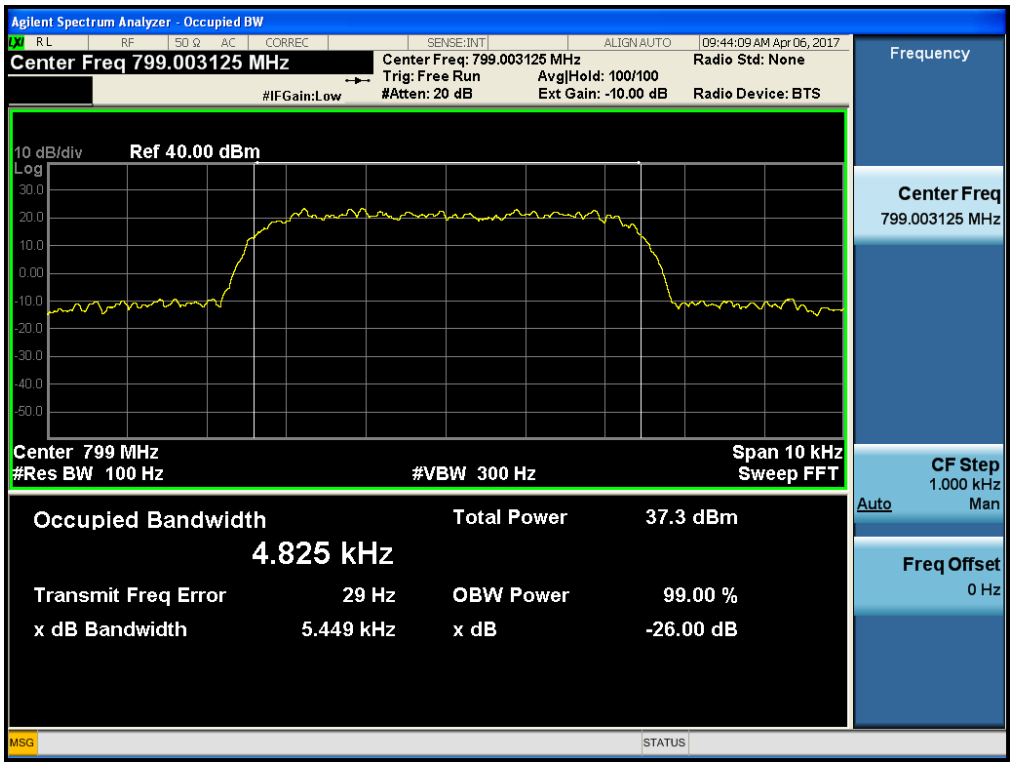


[+3dB above the AGC threshold Uplink - High]



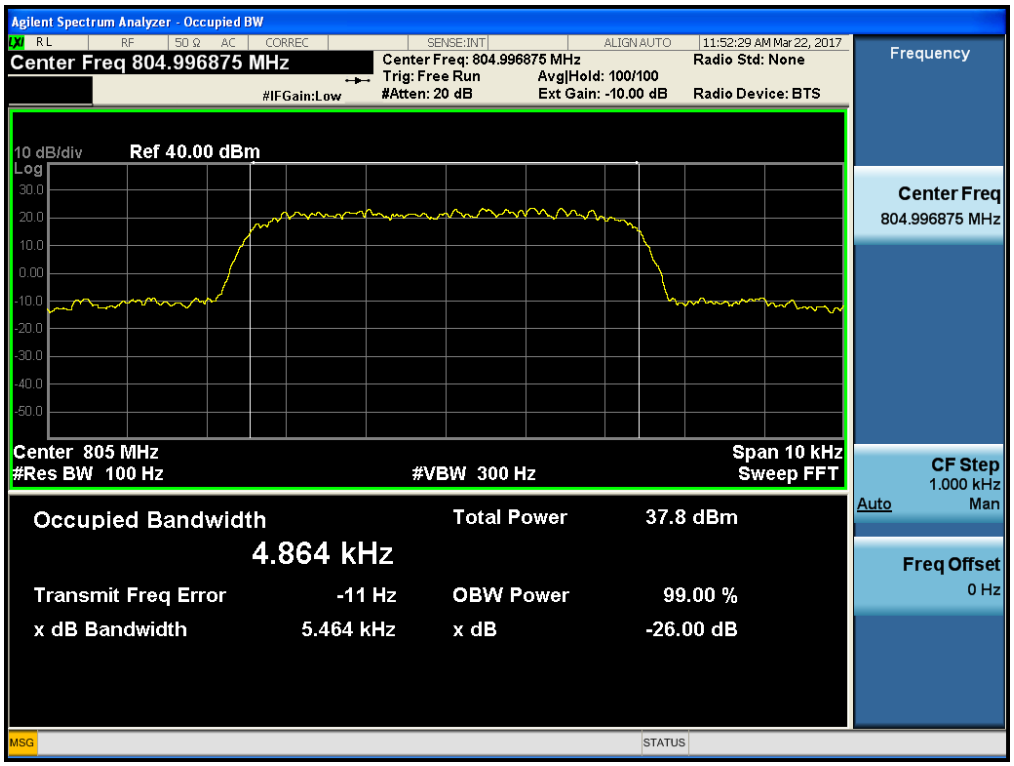
700 APCO 25(6.25 kHz)_UL_Output

[AGC threshold Uplink – Low]



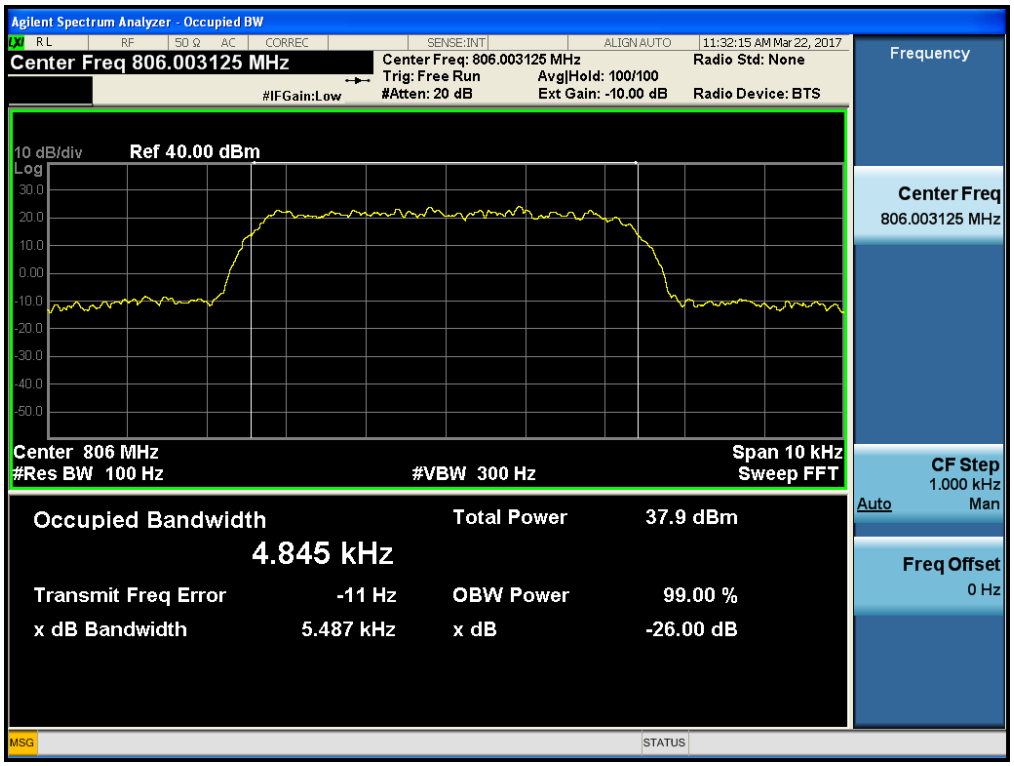
[AGC threshold Uplink - Middle]

[AGC threshold Uplink - High]

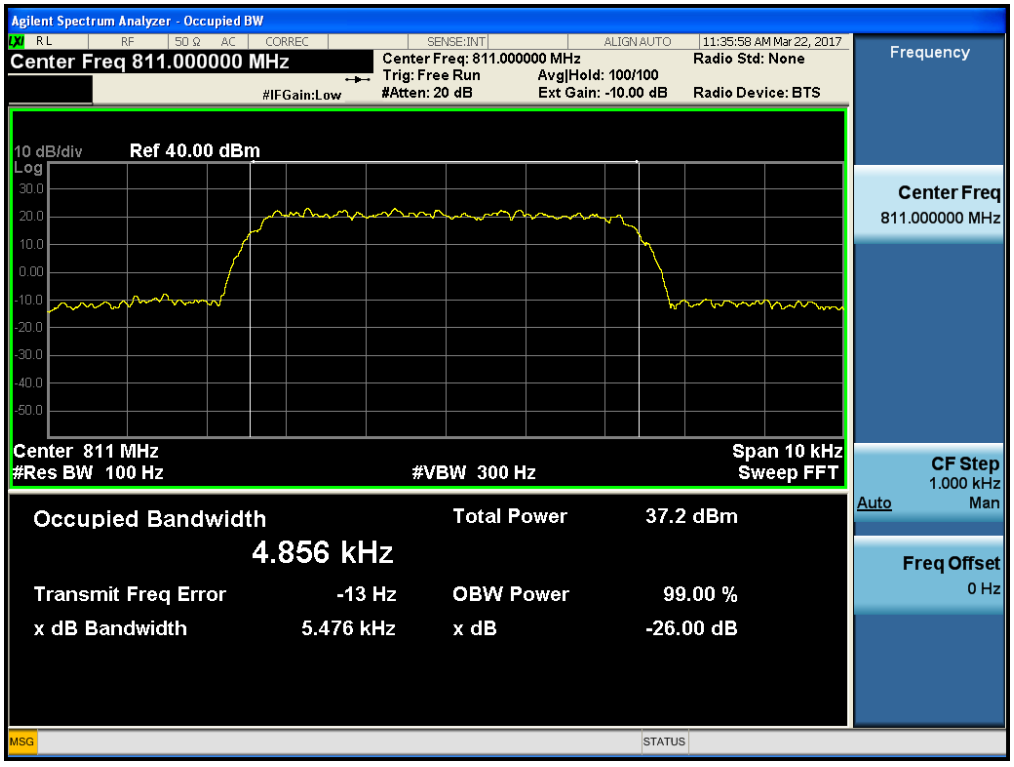


800 APCO 25(6.25 kHz)_UL_Output

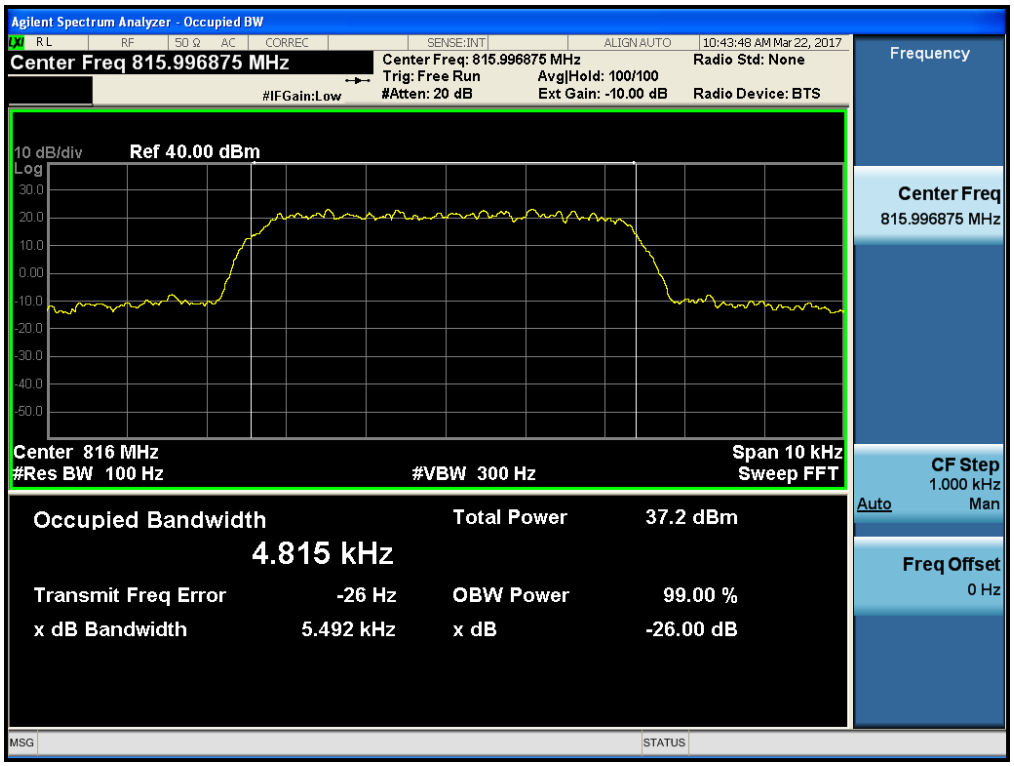
[AGC threshold Uplink – Low]



[AGC threshold Uplink - Middle]

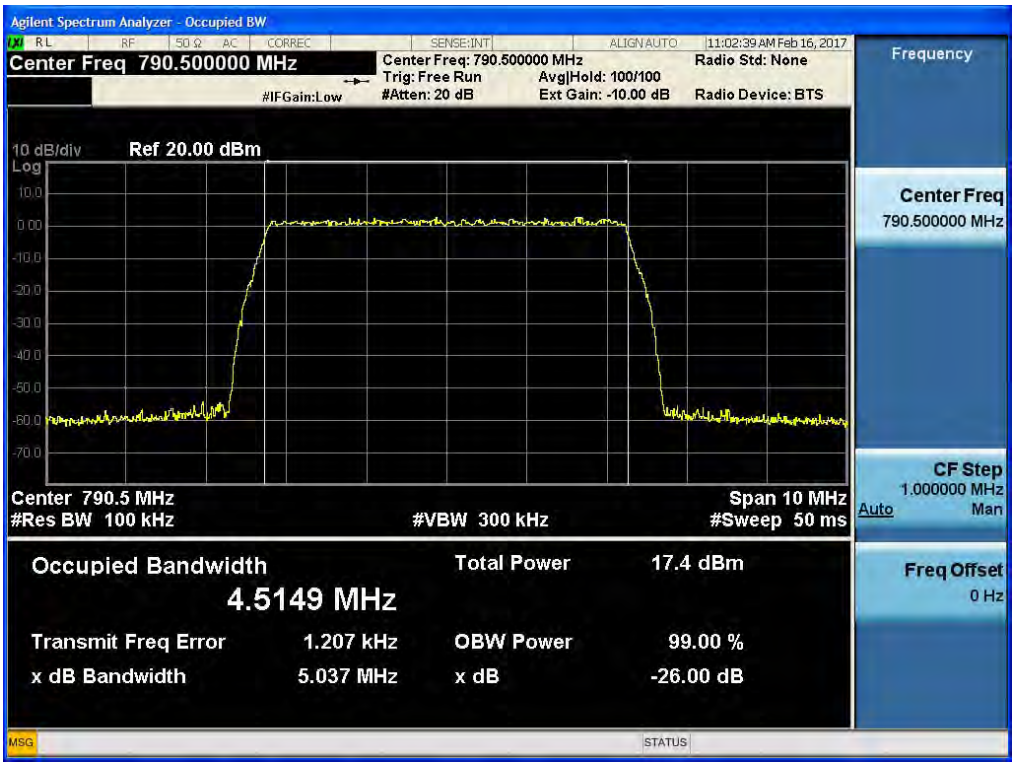


[AGC threshold Uplink - High]

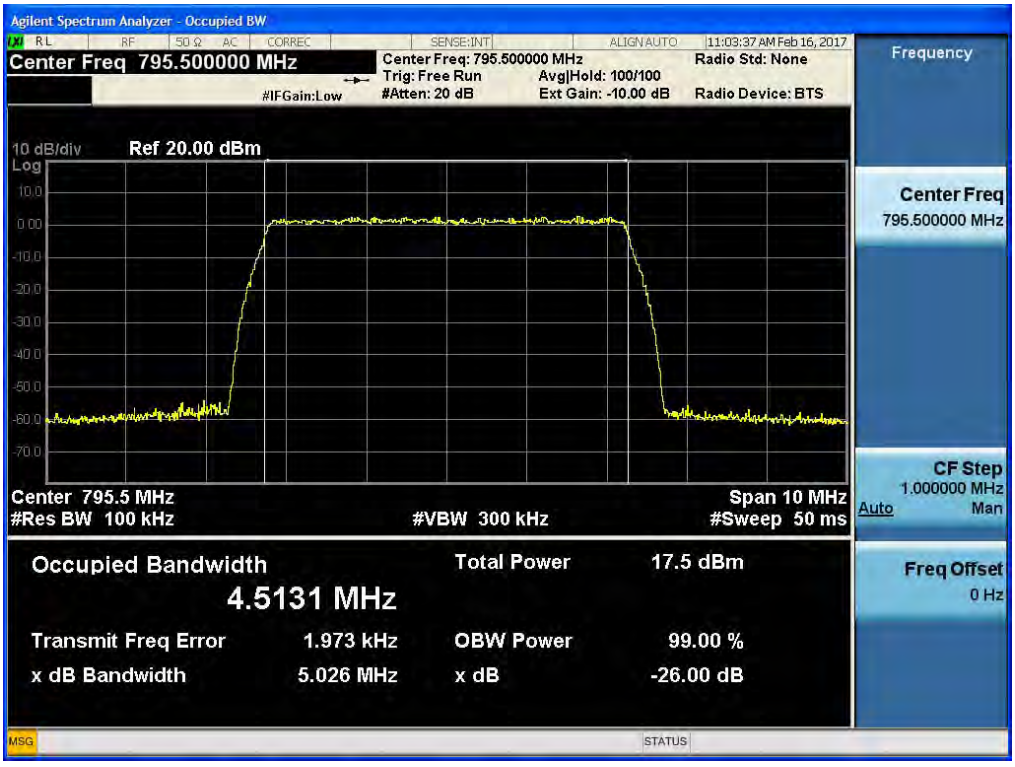


700 LTE(5 MHz)_UL_Input

[AGC threshold Uplink – Low]

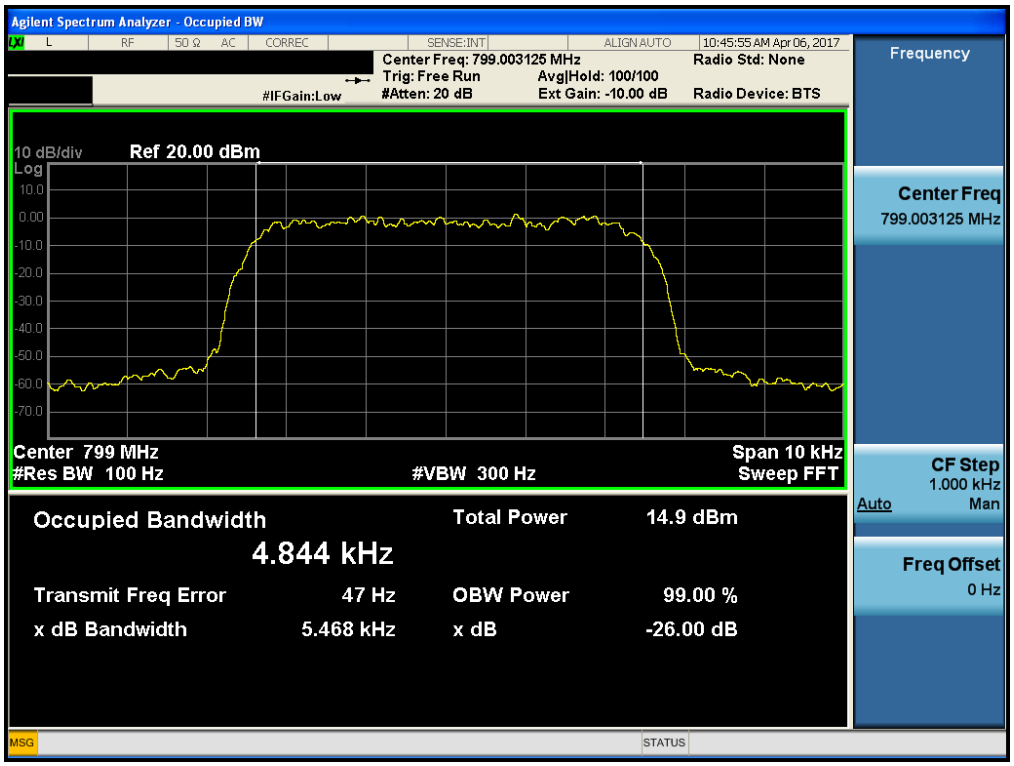


[AGC threshold Uplink - High]



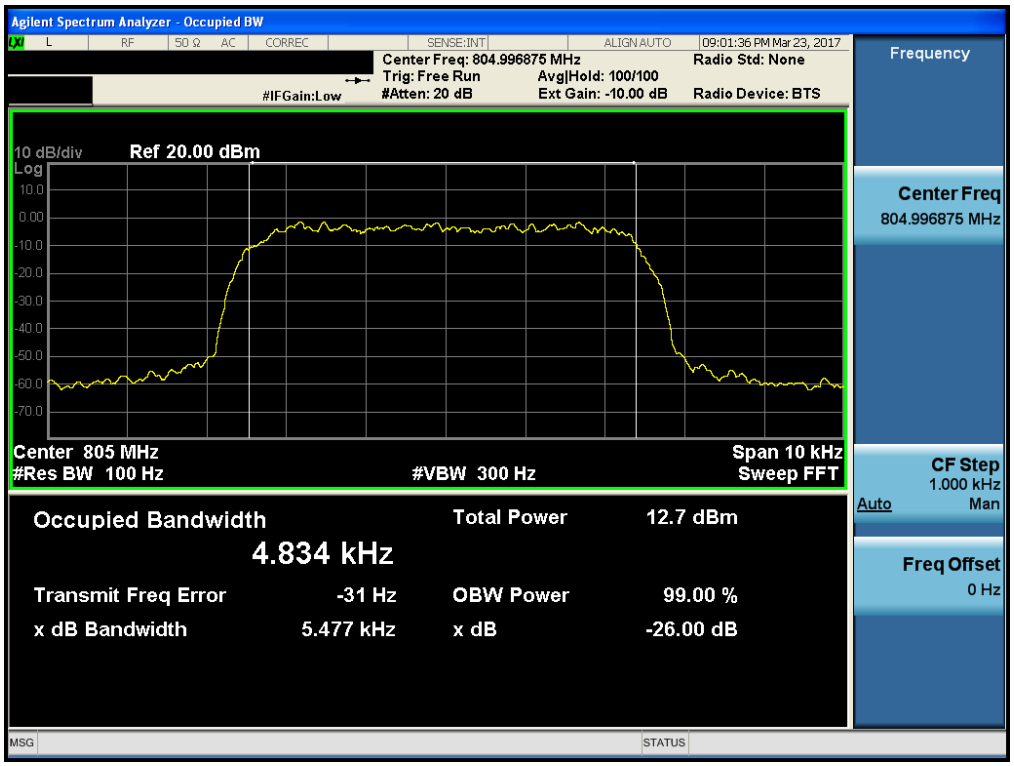
700 APCO 25(6.25 kHz)_UL_Input

[AGC threshold Uplink – Low]



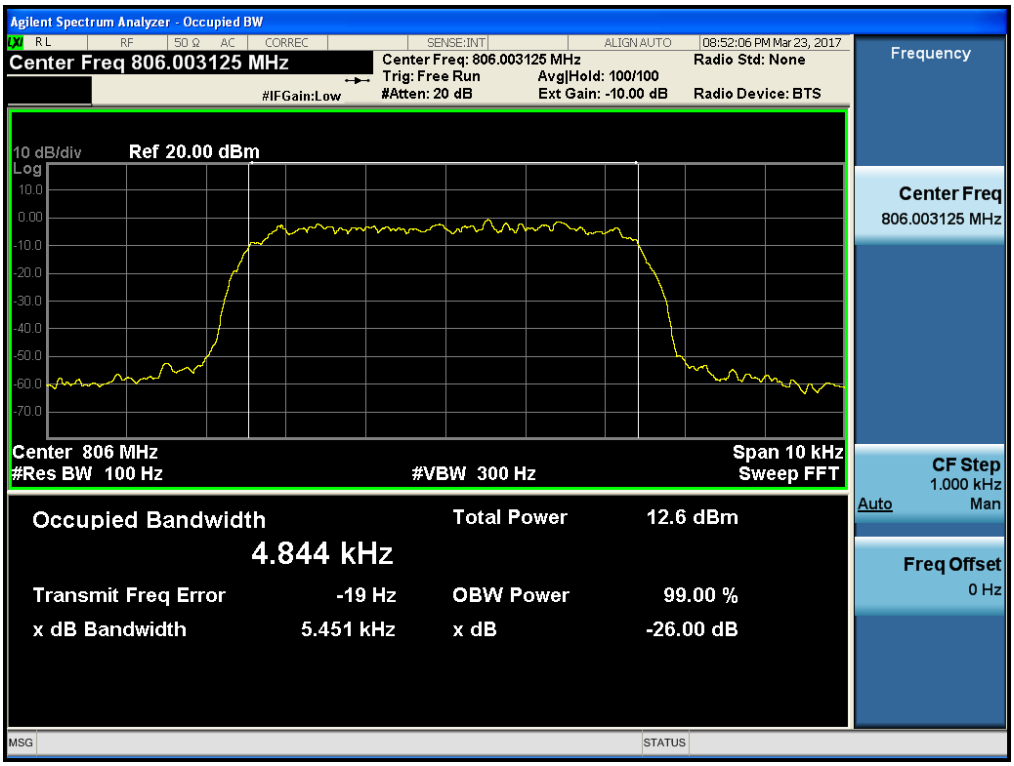
[AGC threshold Uplink - Middle]

[AGC threshold Uplink - High]



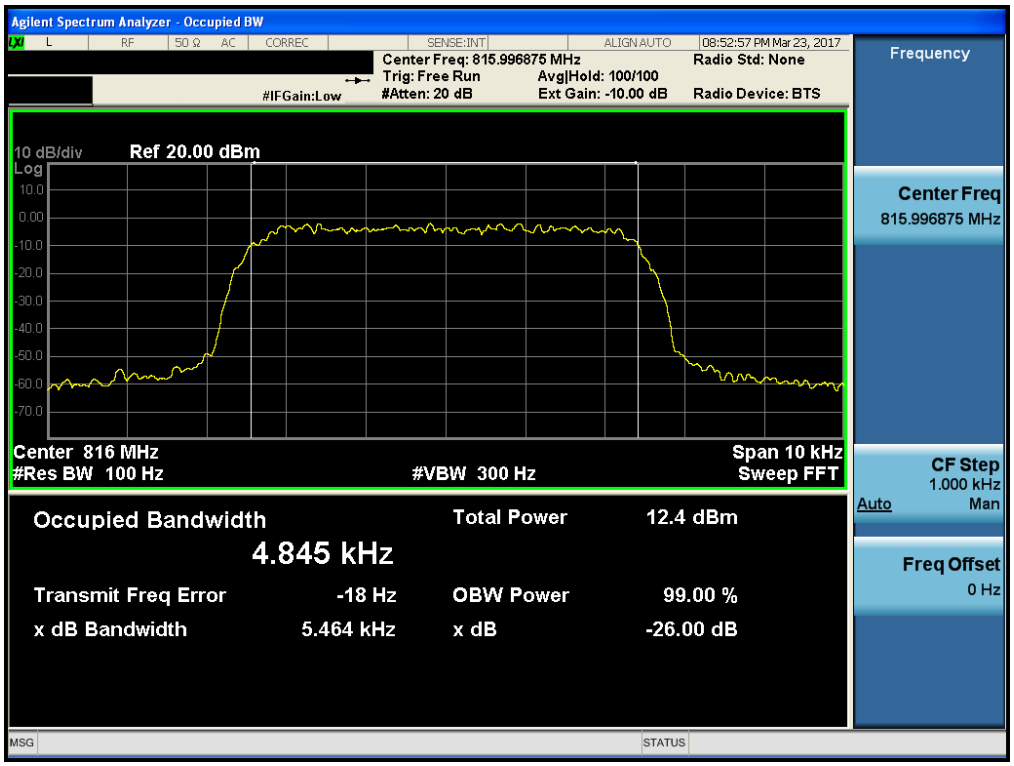
800 APCO 25(6.25 kHz)_UL_Input

[AGC threshold Uplink – Low]



[AGC threshold Uplink - Middle]

[AGC threshold Uplink - High]



8. OUT OF BAND REJECTION

FCC/IC Rules

Test Requirements:

KDB 935210 D05 v01r01

Out of Band Rejection – Test for rejection of out of band signals. Filter freq. response plots are acceptable.

Test Procedures:

Measurements were in accordance with the test methods section 3.3, 4.3 of KDB 935210 D05 v01r01.

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 from the center of the passband.

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 f0.

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.

4.3 PLMRS device out-of-band rejection

Adjust the internal gain control of the equipment under test 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:

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

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

e) Dwell time = approx. 10 ms.

f) Frequency step = 50 kHz.

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

h) 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.

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

j) After the trace is completely filled, place a marker at the peak amplitude, which is designated as f0, and with two additional markers (use the marker-delta method) at the 20 dB bandwidth (i.e., at the points where the gain has fallen by 20 dB).

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

Test Results:

Input Signal	Input Level (dBm)		Maximum Amp Gain	
	DL	UL	DL	UL
FirstNet / PS 700	-62	-65	95	95
PS 800	-62	-65	95	95

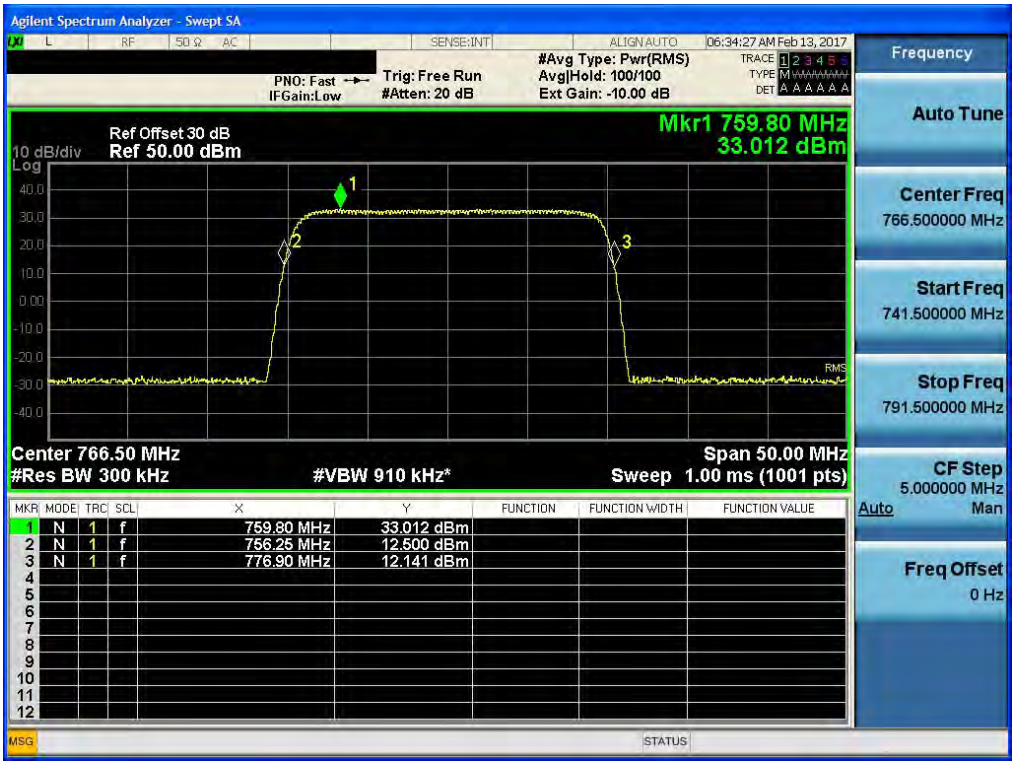
FirstNet + PS 700

[Downlink]

20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
756.25 ~ 776.90	33.012	95.012

Plots of Out of Band Rejection

[FirstNet + PS 700 Downlink]



***This device Downlink amplifies FirstNet and PS 700 together.**

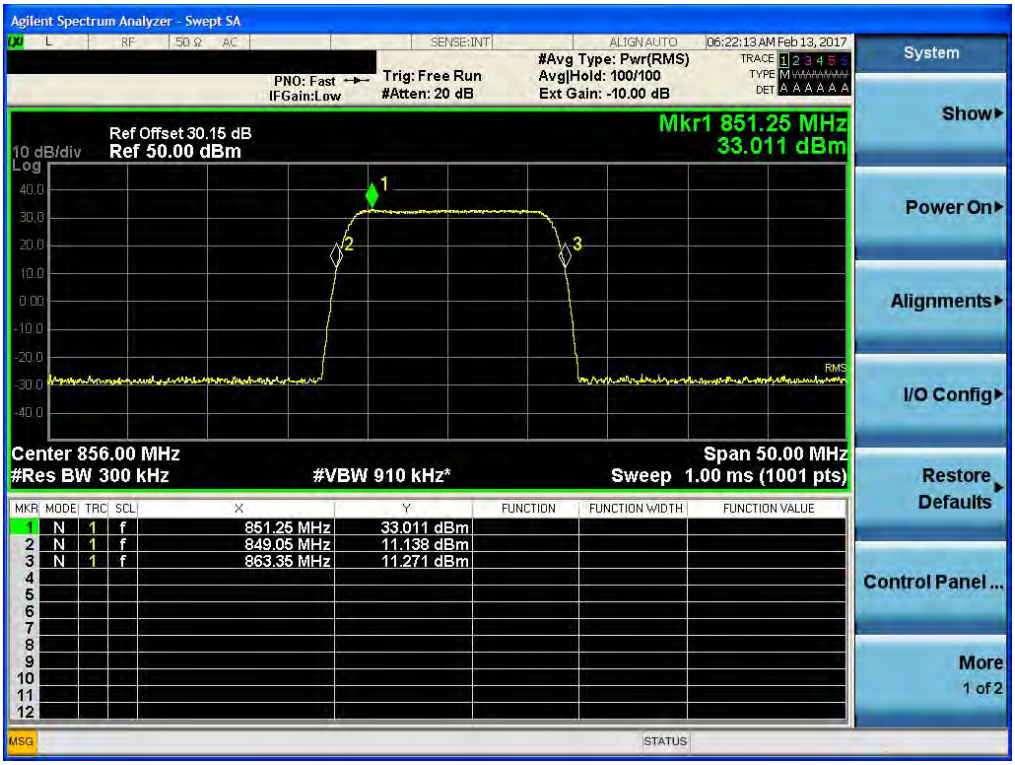
PS 800

[Downlink]

20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
849.05 ~ 863.35	33.011	95.011

Plots of Out of Band Rejection

[FirstNet + PS 700 Downlink]



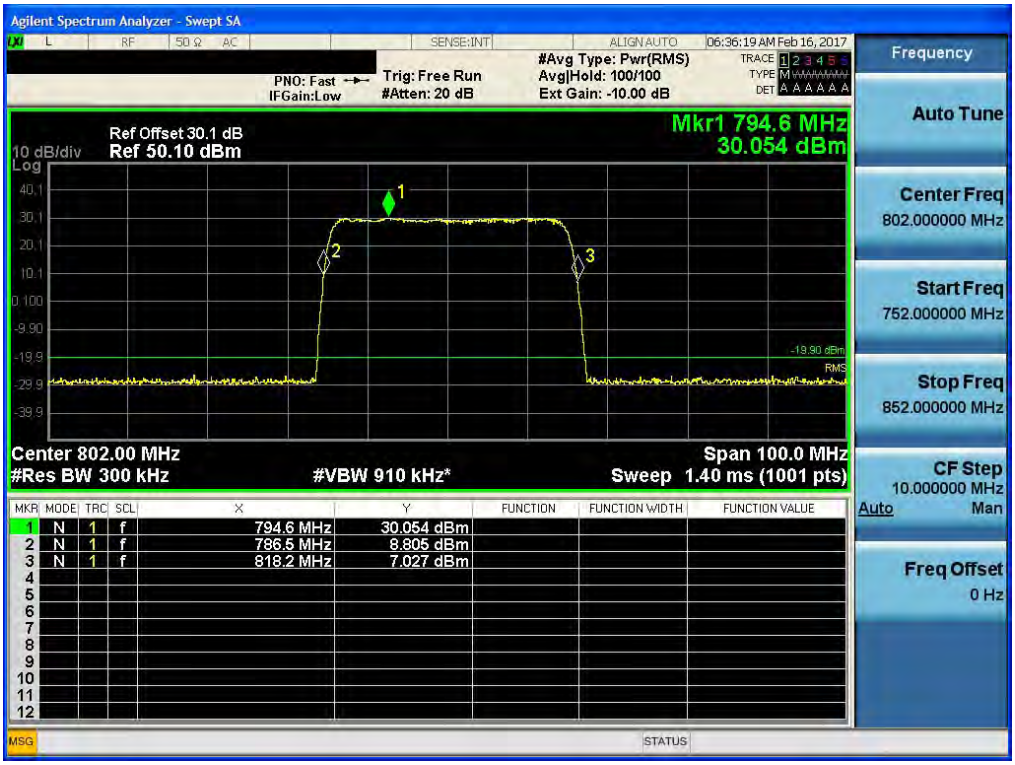
FirstNet + PS 700 + PS 800

[Uplink]

20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
786.50 ~ 818.20	30.054	95.054

Plots of Out of Band Rejection

[FirstNet + PS 700 + PS 800 Uplink]



***This device Uplink amplifies FirstNet and PS 700, PS800 together.**

9. 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 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:

Input Signal	Input Level (dBm)		Maximum Amp Gain	
	DL	UL	DL	UL
FirstNet / PS 700	Without input signal		95	95
PS 800			95	95

FirstNet + PS 700

Downlink : Noise Figure = - 34.081 – 95 + 114 = -15.081 dB

Uplink: Noise Figure = - 34.746 – 95 + 114 = - 15.746 dB

PS 800

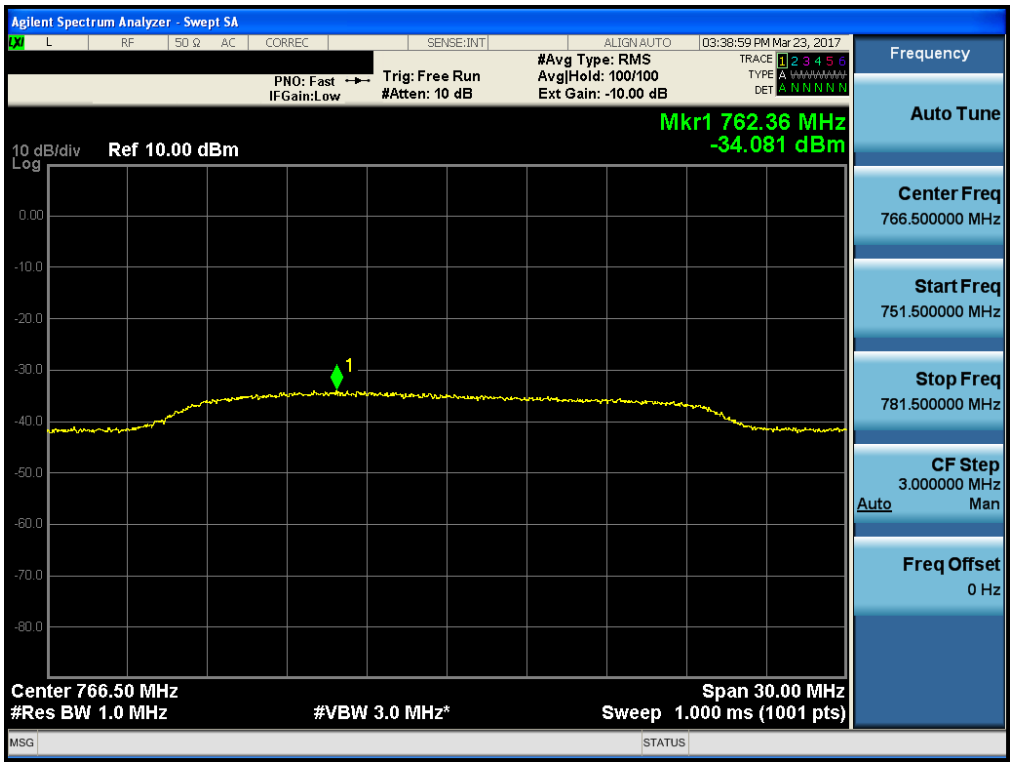
Downlink : Noise Figure = - 36.685 – 95 + 114 = -17.685 dB

Uplink: Noise Figure = - 35.224 – 95 + 114 = - 16.224 dB

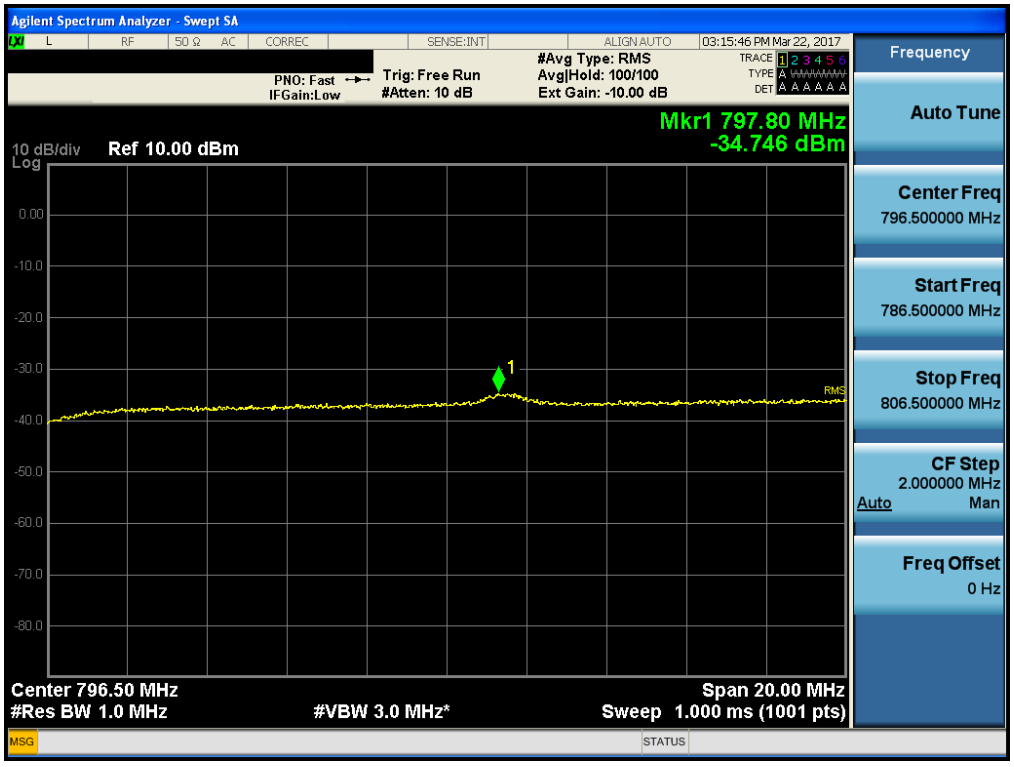
Plots of Noise power

FirstNet + PS 700

[Downlink]

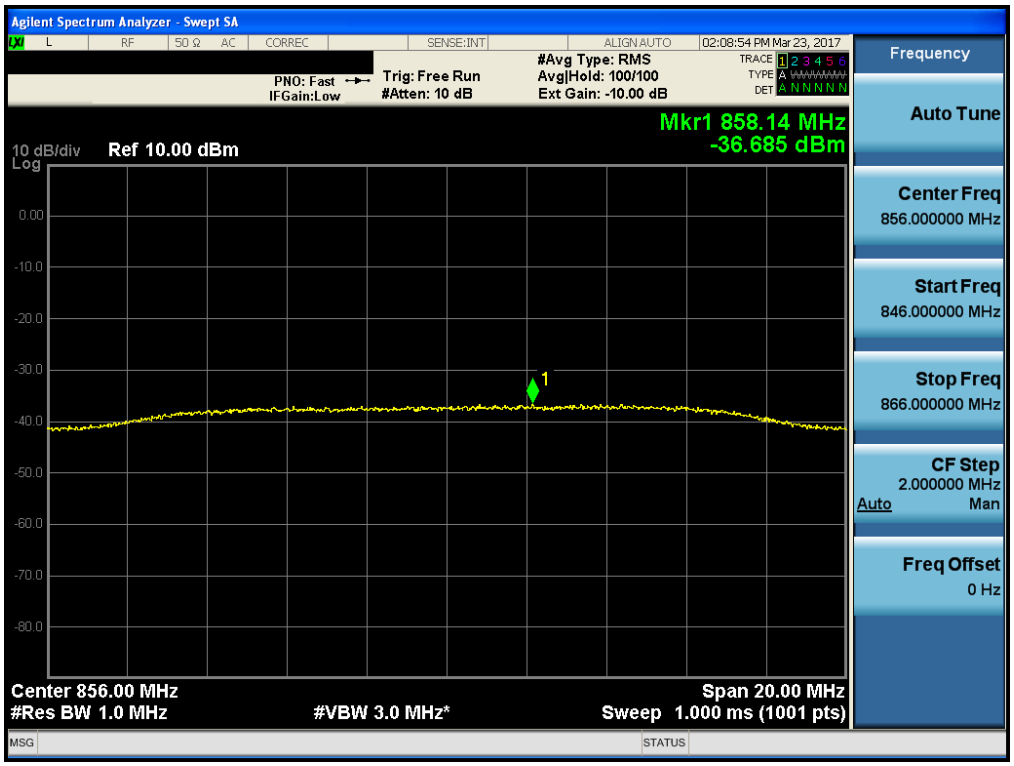


[Uplink]

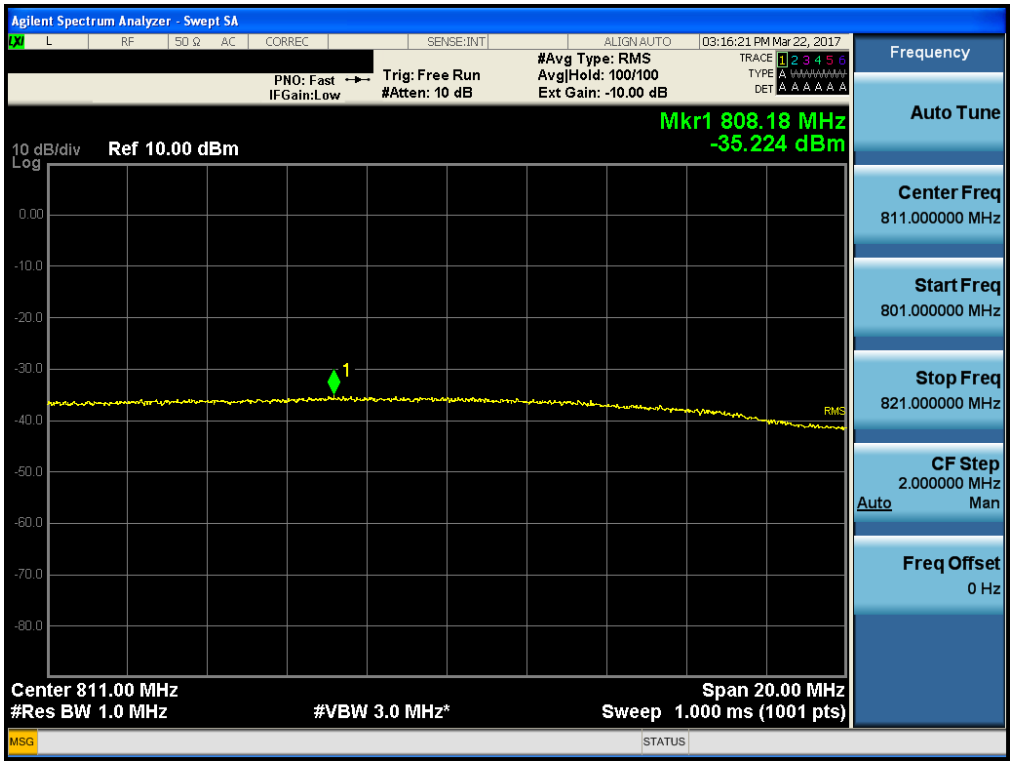


PS 800

[Downlink]



[Uplink]



10. EMISSION MASKS

FCC Rules

Test Requirements:

§ 90.210 Emission masks:

Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (o) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere in this part, the table in this section specifies the emission masks for equipment operating under this part.

APPLICABLE EMISSION MASKS

Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
Below 25	A or B	A or C
25-50	B	C
72-76	B	C
150-174	B, D, or E	C, D or E
150 paging only	B	C
220-222	F	F
421-512[2 5]	B, D, or E	C, D, or E
450 paging only	B	G
806-809/851-854	B	H
809-824/854-869	B	G
896-901/935-940	I	J
902-928	K	K
929-930	B	G
4940-4990 MHz	L or M	L or M
5850-5925		
All other bands	B	C

(c) *Emission Mask C.* For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz, but not more than 10 kHz: At least 83 log (f_d/5) dB;

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: At least 29 log (f_d^2/11) dB or 50 dB, whichever is the lesser attenuation;

(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

(4) In the 1427-1432 MHz band, licensees are encouraged to take all reasonable steps to ensure that unwanted emissions power does not exceed the following levels in the 1400-1427 MHz band:

(i) For stations of point-to-point systems in the fixed service: −45 dBW/27 MHz.

(ii) For stations in the mobile service: −60 dBW/27 MHz.

(g) *Emission Mask G.* For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but no more than 250 percent of the authorized bandwidth: At least 116 log (f_d/6.1) dB, or 50 + 10 log (P) dB, or 70 dB, whichever is the lesser attenuation;

(2) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

(h) *Emission Mask H.* For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of 4 kHz or less: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 4 kHz, but no more than 8.5 kHz: At least 107 log (f_d/4) dB;

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 8.5 kHz, but no more than 15 kHz: At least 40.5 log (f_d/1.16) dB;

(4) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 15 kHz, but no more than 25 kHz: At least 116 log (f_d/6.1) dB;

(5) On any frequency removed from the center of the authorized bandwidth by more than 25 kHz: At least 43 + 10 log (P) dB.

IC Rules

Test Requirements:

RSS-119

5. Transmitter and Receiver Specifications

5.5 Channel Bandwidth, Authorized Bandwidth, Occupied Bandwidth and Spectrum Masks

For the purpose of this document, channel bandwidth is the channel width in which the equipment is designed to operate.

The maximum permissible occupied bandwidth shall not exceed the authorized bandwidth specified in Table 3 for the equipment's frequency band. The authorized bandwidth is defined as the maximum width of the band of frequencies used to derive spectrum masks and is not necessarily equivalent to the bandwidth found on radio and spectrum licences.

The channel bandwidths, authorized bandwidths and spectrum masks are given in Table 3 for equipment having an output power greater than 120 mW. For equipment with an output power that does not exceed 120 mW, Section 5.10 applies.

Table 3 — Channel Bandwidths, Authorized Bandwidths and Spectrum Masks

Frequency Band (MHz)	Related SRSP for Channelling Plan and ERP	Channel Bandwidth (kHz)	Authorized Bandwidth (kHz)	Spectrum Masks for Equipment With Audio Filter	Spectrum Masks for Equipment Without Audio Filter
27.41-28 and 29.7-50	N/A	20	20	B	C
72-76	N/A	20	20	B	C
138-144, 148-149.9 and 150.05-174	SRSP-500	30	20	B	C
		15	11.25	D	D
		7.5	6	E	E
217-218 and 219-220	N/A	12.5	11.25	D or I	D or J
220-222	SRSP-512	5	4	F	F
406.1-430 and 450-470	SRSP-501	25	20 22	B Y	C (G) Y
		12.5	11.25	D	D
		6.25	6	E	E
768-776 and 798-806	SRSP-511	6.25 12.5	Footnote2	See Section 5.8.9	See Section 5.8.9

		25 50			
806-821/851-866 and 821-824/866-869	SRSP- 502	25	20 22	B Y	G Y
		12.5	11.25	D	D
		6.25	6	E	E
896-901/935-940	SRSP-506	12.5	13.6	I	J (G)
929-930 and 931-932	SRSP-504 (for paging)	25	20	B	G
928-929/952-953 and 932-932.5/941-941.5	SRSP-505	25	20	B	G
		12.5	11.25	D	D
932.5-935/941.5-944	SRSP- 507	25	20	B	G
		12.5	11.25	D	D

Footnote2 : Provided that the ACP requirements in Section 5.8.9.1 are met, any authorized bandwidth that does not exceed the channel bandwidth can be used.

5.5.4 The bands 768-776 MHz and 798-806 MHz are designated for use by public safety services. See SRSP-511 for channel assignments.

Transmitters using digital modulation shall be capable of having a minimum data rate of 4.8 kbps per 6.25 kHz bandwidth or one voice channel per 12.5 kHz bandwidth.

5.8 Transmitter Unwanted Emissions

The spectrum plots of the unwanted emissions shall comply with the masks specified in Table 3. Descriptions of these permissible emission masks are given in the sections that follow.

The term *displacement frequency*, f_d, used in these sections refers to the difference between the channel frequency and the emission component frequency expressed in kilohertz, and *p* is the transmitter output power in Watts.

5.8.3 Emission Mask D for Transmitters Equipped With or Without an Audio Low-Pass Filter

The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 7.

Table 7 — Emission Mask D		
Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
$5.625 < f_d \leq 12.5$	$7.27(f_d - 2.88)$	Specified in Section 4.2.2

Table 7 — Emission Mask D		
Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
f_d > 12.5	Whichever is the lesser: 70 or 50 + 10 $\log_{10}$(p)	Specified in Section 4.2.2

5.8.4 Emission Mask E for Transmitters Equipped With or Without an Audio Low-Pass Filter

The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 8.

Table 8 — Emission Mask E		
Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
3 <f_d ≤ 4.6	Whichever is the lesser: 30 + 16.67(f_d−3) or 55 + 10 $\log_{10}$(p)	Specified in Section 4.2.2
f_d > 4.6	Whichever is the lesser: 57 or 55 + 10 $\log_{10}$(p)	Specified in Section 4.2.2

5.8.6 Emission Mask G for Transmitters not Equipped With an Audio Low-Pass Filter

The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 10.

Table 10 — Emission Mask G		
Displacement Frequency, f_d(kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
10 < f_d ≤ 50	Whichever is the lesser: 70 or 116 $\log_{10}$(f_d/6.11) or 50 + 10 $\log_{10}$(p)	300
f_d > 50	43 + 10 $\log_{10}$(p)	Specified in Section 4.2.1

Test Procedures:

Measurements were in accordance with the test methods section 4.4 of KDB 935210 D05 v01r01.

4.4 Input-versus-output signal comparison

Compliance with the emission mask of the EUT output shall be measured for the public safety service signal types as specified in 4.1.

Refer to the applicable regulatory requirements (e.g., § 90.210) for emission mask specifications.

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

b) Configure the signal generator to transmit the appropriate test signal associated with the public safety emission designation (see Table 1).

c) Configure the signal level to be just below the AGC threshold (see results from 4.2).

d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.
e) Set the spectrum analyzer center frequency to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between 2 times to 5 times the EBW (or OBW).
f) The nominal resolution bandwidth (RBW) shall 300 Hz for 16K0F3E and 100 Hz for all other emissions types.
g) Set the reference level of the spectrum analyzer to accommodate the maximum input amplitude level.
h) Set spectrum analyzer detection mode to peak, and trace mode to max hold.
i) Allow the trace to fully stabilize.
j) Confirm that the signal is contained within the appropriate emissions mask.
k) Use the marker function to determine the maximum emission level and record the associated frequency as f0.
l) Capture the emissions mask plot for inclusion in the test report (output signal spectra).
m) Measure the EUT input signal power (signal generator output signal) directly from the signal generator using power measurement guidance provided in KDB Publication 971168 (input signal spectra).
n) Compare the spectral plot of the output signal (determined in step k), to the input signal (determined in step l) to affirm they are similar (in passband and rolloff characteristic features and relative spectral locations).
o) Repeat the procedure for both test signals with the input signal amplitude set 3 dB above the AGC threshold.
p) Repeat steps b) to n) for all authorized operational bands and emissions types (see applicable regulatory specifications, e.g., §90.210).
q) Include all accumulated spectral plots depicting EUT input signal and EUT output signal in the test report and note any observed dissimilarities.

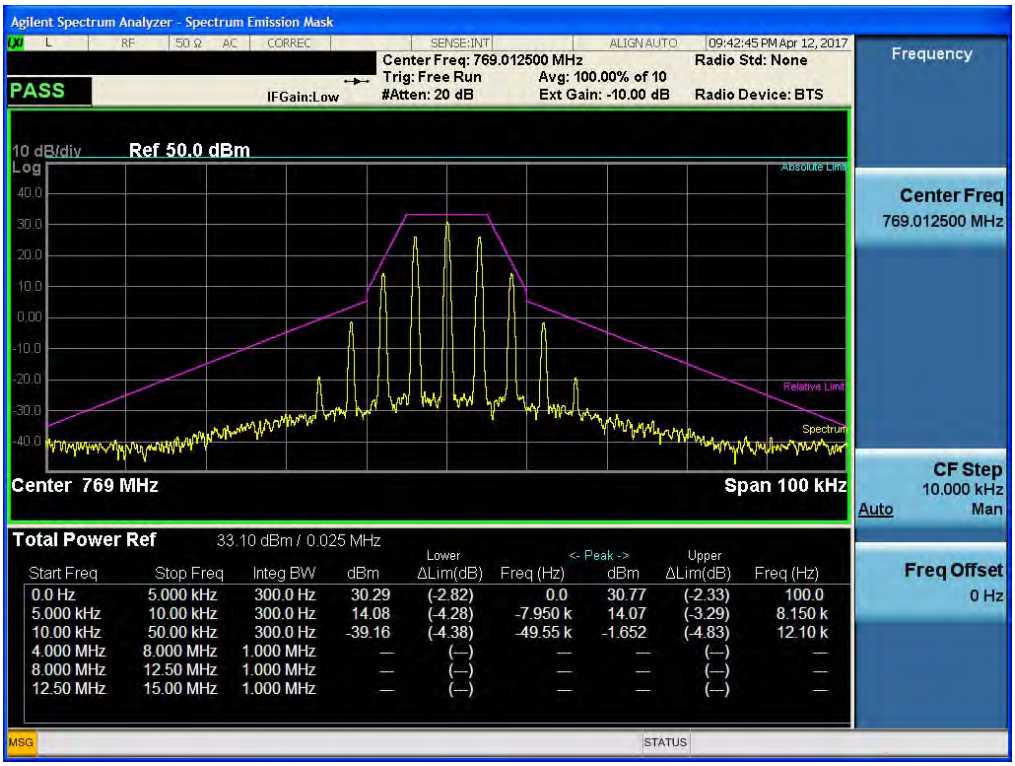
Test Results:

Input Signal	Input Level (dBm)		Maximum Amp Gain	
	DL	UL	DL	UL
FirstNet / PS 700	-62	-65	95	95
PS 800	-62	-65	95	95

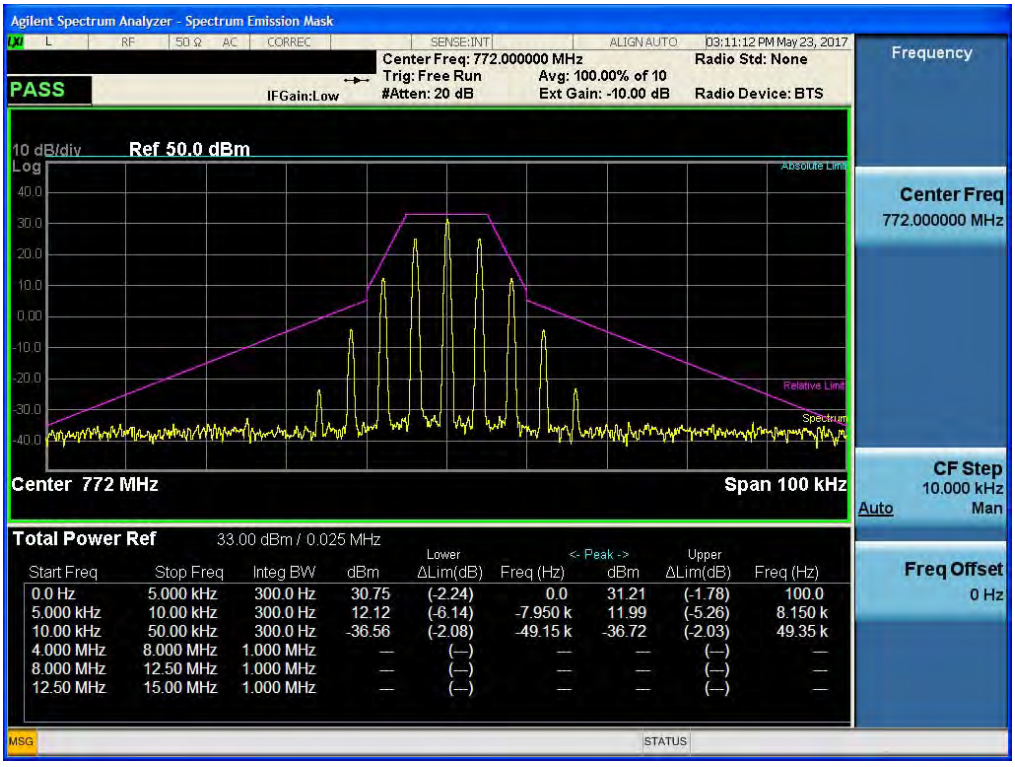
Plots of Emission Mask

700 APCO 25_Downlink

[Downlink Emission Mask C – Low, 25 kHz]



[Downlink Emission Mask C – Middle, 25 kHz]



[Downlink Emission Mask C – High, 25 kHz]