74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
TEL: +82-31-645-6300 FAX: +82-31-645-6401

FCC REPORT

FCC/IC Certification

FCC Applicant Name:
ADRF Korea, inc

IC Applicant Name:
Advanced RF Technologies, Inc

FCC Address:
5-5, Mojeon-Ri, Backsa-Myun, Icheon-City, Kyunggi-Do, Korea

IC Address:
3116 WEST VANOWEN STREET, BURBANK, CA 91505 U.S.A

Date of Issue:
May 20, 2015

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

Report No.: HCT-R-1502-F021-2

HCT FRN: 0005866421

IC Recognition No.: 5944A-3

FCC ID:	**N52-ADX-R-SMR**
IC:	**6416A-ADXRSMR**
FCC APPLICANT:	**ADRF Korea, inc**
IC APPLICANT:	**Advanced RF Technologies, Inc**

FCC/ IC Model(s):	ADX-R-SMR	
EUT Type:	DAS(Distributed Antenna System)	
Frequency Ranges:	SMR800:	Downlink : 851 MHz ~ 869 MHz Uplink : 806 MHz ~ 824 MHz
	SMR900:	Downlink : 929 MHz ~ 930 MHz(downlink only) 935 MHz ~ 940 MHz Uplink : 896 MHz ~ 901 MHz
Conducted Output Power:	1 W (30 dBm)	
Date of Test :	January 19, 2015 ~ February 09, 2015	
FCC Rules Part(s):	CFR 47, Part90	
IC Rules Part(s):	RSS-Gen (Issue 4, November 2014) , RSS-131 (Issue 2, July 2003)	

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 90 of the FCC Rules under normal use and maintenance.

Report prepared by
: Yong Hyun Lee
Test engineer of RF Team

Approved by
: Sang Jun Lee
Manager of RF Team

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1502-F021	February 13, 2015	- First Approval Report
HCT-R-1502-F021-1	February 25, 2015	- Add Uplink LTE 10 MHz - IC Modifications - Modify the page 19 : uplink power unit(W=>mW)
HCT-R-1502-F021-2	May 25, 2015	- Revise the frequency range 929-930 MHz (downlink only) and 935-940 MHz - Except for the LTE technology in the 806 MHz ~ 817 MHz / 851 MHz ~ 862 MHz

Table of Contents

1. CLIENT INFORMATION

The EUT has been tested by request of

Company (FCC)	ADRF Korea, inc 5-5, Mojeon-Ri, Backsa-Myun, Icheon-City, Kyunggi-Do, Korea
Company (IC)	Advanced RF Technologies, Inc 3116 WEST VANOWEN STREET, BURBANK, CA 91505 U.S.A
Contact Point	Attention/ E-Mail: HK Song/ hk4464@adrftech.com Tel./ H.P. : +82-31-637-4435/ +82-10-3191-4773

■ **FCC ID:** **N52-ADX-R-SMR**

■ **IC:** **6416A-ADXRSMR**

■ **FCC APPLICANT:** **ADRF Korea, inc**

■ **IC APPLICANT:** **Advanced RF Technologies, Inc**

■ **EUT Type:** **DAS(Distributed Antenna System)**

■ **Model:** **ADX-R-SMR**

■ **Frequency Ranges:**
SMR800: **Downlink : 851 MHz ~ 869 MHz**
Uplink : 806 MHz ~ 824 MHz
SMR900: **Downlink : 929 MHz ~ 930 MHz(downlink only)**
935 MHz ~ 940 MHz
Uplink : 896 MHz ~ 901 MHz

■ **Conducted Output Power:** **1 W (30 dBm)**

■ **Antenna Gain(s) :** **2 dBi**

■ **FCC Rules Part(s):** **CFR 47, Part90**

■ **IC Rules Part(s):** **RSS-Gen (Issue 4, November 2014) , RSS-131 (Issue 2, July 2003)**

■ **Measurement standard(s):** **ANSI/TIA-603-C-2004, KDB 971168 D01 v02r02, KDB 935210 D03 v02r01, RSS-131(Issue 2, July 2003)**

■ **Place of Tests:** **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. (IC Recognition No. : 5944A-3)**

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, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated February 28, 2014 (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 SUMMARY

3.1. STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part90, RSS-GEN, RSS-131.

Description	Reference (FCC)	Reference (IC)	Results
Conducted RF Output Power	§2.1046; §90.494; §90.635	RSS-131, Section 4.3 RSS-131, Section 6.2 SRSP-502, SRSP-504, SRSP-506	Compliant
Occupied Bandwidth	§2.1049	RSS-GEN, Section 4.6.1	Compliant
Passband Gain and Bandwidth & Out of Band Rejection	KDB 935210 D03 v02r01	RSS-131, Section 4.2 RSS-131, Section 6.1	Compliant
Noise Figure	§90.219	-	Compliant
Emission Masks	§90.210	-	Compliant
Spurious Emissions at Antenna Terminals	§2.1051, §90.691 §90.669	RSS-131, Section 4.4 RSS-131, Section 6.3 RSS-131, Section 6.4	Compliant
Radiated Spurious Emissions	§2.1053, §90.691 §90.669	-	Compliant
Frequency Stability	§2.1055, §90.213	RSS-131, Section 4.5 RSS-131, Section 6.5	Compliant

3.2. MODE OF OPERATION DURING THE TEST

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

During all testing, system components were manipulated within the confines of typical usage to maximize each emission.

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

Test Frequency & Modulation

Frequency	Modulation
851 MHz - 862 MHz, 806 MHz - 817 MHz	iDEN(25 kHz)
862 MHz - 869 MHz, 817 MHz - 824 MHz	LTE(5 MHz), iDEN(25 kHz)
929 MHz - 930 MHz	iDEN(25 kHz), FSK(12.5 kHz)
935 MHz - 940 MHz, 896 MHz - 901 MHz	iDEN(25 kHz), FSK(12.5 kHz)

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	Cal Interval	Calibration Date	Serial No.
Agilent	E4438C /Signal Generator	Annual	09/11/2014	MY42082646
Agilent	N5182A /Signal Generator	Annual	05/22/2014	MY47070230
Agilent	N1911A /Power Meter	Annual	01/15/2015	MY45100523
Agilent	N1921A/ Power Sensor	Annual	07/09/2014	MY45241059
NANGYEUL CO., LTD.	NY-THR18750/ Temperature and Humidity Chamber	Annual	10/29/2014	NY-2009012201A
Agilent	N9020A /Signal Analyzer	Annual	04/16/2014	US46220219
WEINSCHEL	67-30-33 / Fixed Attenuator	Annual	11/04/2014	BU5347
Weinschel	AF9003-69-31 / Step Attenuator	Annual	10/24/2014	11787
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
MITEQ	AMF-6D-001180-35-20P/AMP	Annual	09/04/2014	1081666
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	07/05/2013	1151
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	09/01/2014	147
Schwarzbeck	VULB 9160/TRILOG Antenna	Biennial	11/17/2014	3150

6. RF OUTPUT POWER

FCC Rules

Test Requirements:

§ 2.1046 Measurements required: RF power output:

§ 2.1046 (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8).The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

§ 2.1046 (b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone 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.

§ 2.1046 (c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

§ 90.494 Paging operations on shared channels in the 929–930 MHz band. (a) This section applies to licensing of paging stations on the shared (nonexclusive) channels in the 929–930 MHz band. The center frequencies of these channels are listed in paragraph (b) of this section. (b) The following frequencies are available to all eligible Part90 users for one-way paging systems on a shared basis only and will not be assigned for the exclusive use of any licensee.

929.0375	929.1625
929.0625	929.2625
929.0875	

(c) All frequencies listed in this section may be used to provide one-way paging communications to persons eligible for licensing under subpart B or C of this part, representatives of Federal Government agencies, individuals, and foreign governments and their representatives. The provisions of § 90.173(b) apply to all frequencies listed in this section. (d) Licensees on these frequencies may utilize any

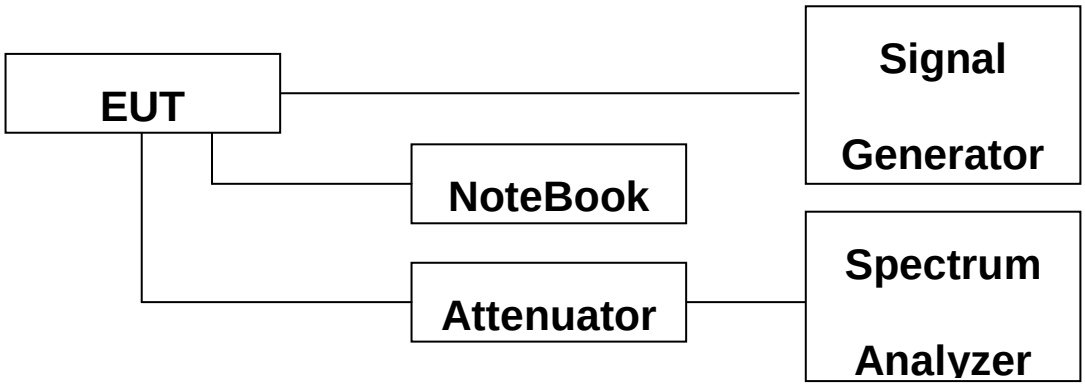
type of paging operation desired (tone only, tone-voice, digital, tactile, optical readout, etc.). (e) There shall be no minimum or maximum loading standards for these frequencies. (f) The effective radiated power for base stations providing paging service on the shared channels must not exceed 3500 watts.

§ 90.635 Power and antenna height limits. (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.

Antenna height (AAT) in meters (feet)	**Effective radiated power (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

Test Procedures:

As required by 47 CFR 2.1046, RF power output measurements were made at the RF output terminals using an attenuator and spectrum analyzer or power meter. This test was performed in all applicable modulations.



Block Diagram 1. RF Power Output Test Setup

Test Results:

Input Signal	Input Level (dBm)	Maximum Amp Gain
iDEN LTE 5 MHz FSK	DL : -16 dBm UL : -45 dBm	DL : 46 dB UL : 35 dB

IC Rules

Test Requirements:

SRSP-502

6.3 Technical Requirements

6.3.1 Radiated Power and Antenna Height Limits

Within the sharing and protection zones, the ERP will be subject to the limitations in tables C3 and C4 of Annex C. Outside the sharing and protection zones, the ERP shall be limited to that necessary to provide the required service as determined by the system requirements. Systems requiring an ERP greater than 125 watts may require additional justification and will be considered on a case-by-case basis by the local spectrum management office.

C3 Limits of Effective Radiated Power and Antenna Height for General Sharing Arrangements

Effective Radiated Power (ERP) is defined as the product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

C3.1 For base stations in Sharing Zones I (include Sectors 1 and 2) and III, and the Protection Zones, Table C3 lists the limits of Effective Radiated Power (ERP) corresponding to the Effective Antenna Height (EAH) ranges shown. In this case, Effective Antenna Height is calculated by subtracting the Assumed Average Terrain Elevation given in Table C5 from the antenna height above mean sea level.

Table C3 — Limits of Effective Radiated Power (ERP) Corresponding to Effective Antenna Heights of Base Stations in Sharing Zones I (including Sectors 1 and 2) and III, and the Protection Zones

Effective Antenna Height (EAH) in Metres	ERP Watts (Maximum)
Up to 153	500
Above 153 to 306	125
Above 306 to 458	40
Above 458 to 610	20
Above 610 to 915	10
Above 915 to 1067	6
Above 1067	5

C3.2 For base stations in Sharing Zone II, Table C4 lists the limits of Effective Radiated Power (ERP) corresponding to the antenna height above mean sea level (AMSL) ranges shown.

Table C4 — Limits of Effective Radiated Power (ERP) Corresponding to Antenna Heights Above Mean Sea Level of Base Stations in Sharing Zone II	
Antenna Height Above Mean Sea Level (AMSL) in Metres	**ERP Watts (Maximum)**
Up to 504	500
Above 504 to 610	350
Above 610 to 763	200
Above 763 to 915	140
Above 915 to 1067	100
Above 1067 to 1220	75
Above 1220 to 1372	70
Above 1372 to 1523	65
Above 1523	5

SRSP-504

4. Technical Considerations

4.1 In major urban areas (see Annex 2, section 1.1) and any other areas determined by a Regional or District office of the Department where there is, or there is forecast to be, intensive radio-paging use of the 929-932 MHz band, the ERP and antenna height for base stations will be limited to a maximum of 316 watts (25 dBW) and 180 metres above average terrain (AAT) respectively. The height of transmitting antenna above average terrain (AAT) is the height of the antenna structure plus the height of any building on which the structure may be mounted.

4.2 In other areas of moderate radio-paging use (see Annex 2, section 1.2), the ERP may be up to a maximum of 500 watts (27 dBW).

4.3 A reduction in ERP from those specified in paragraphs 4.1 and 4.2 are required for base station antenna heights in excess of 180 metres above average terrain (AAT) as described below in Table 1.

Table 1: Antenna Heights and Corresponding Power Reduction								
Antenna Height up to: (AAT) (metre)	180	210	240	270	300	360	400	In excess of 400 metres
Power reduction: (dB)	0.0	2.9	4.1	5.1	6.0	7.6	8.5	9.0

SRSP-506, Annex C

2. Limits of Effective Radiated Power and Antenna Height

2.1 Effective Radiated Power (ERP) is defined as the product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

2.2 For base stations in the Protection Zones and Sharing Zones I and III, Table A1 lists the limits of Effective Radiated Power (ERP) corresponding to the Effective Antenna Height (EAH) ranges shown. In this case, Effective Antenna Height is calculated by subtracting the Assumed Average Terrain Elevation given in Table A3 from the Antenna Height Above Mean Sea Level.

Table A1

Effective Antenna Height (EAH)		ERP
Meters	Feet	Watts (Maximum)
0 - 152	0 - 500	500
153 - 305	501 - 1000	125
306 - 457	1001 - 1500	40
458 - 609	1501 - 2000	20
610 - 762	2001 - 2500	10
763 - 914	2501 - 3000	10
915 - 1066	3001 - 3500	6
1067 - 1219	3501 - 4000	5
Above 1219	Above 4000	5

Limits of Effective Radiated Power (ERP) Corresponding to Effective Antenna Heights of Base Stations in the Protection Zones and Sharing Zones I and III.

2.3 For base stations in Sharing Zone II, Table A2 lists the limits of Effective Radiated Power (ERP) corresponding to the Antenna Height Above Mean Sea Level ranges shown.

Table A2

Antenna Height Above Mean Sea Level		ERP
Meters	Feet	Watts (Maximum)
0 - 503	0 - 1650	500
504 - 609	1651 - 2000	350
610 - 762	2001 - 2500	200
763 - 914	2501 - 3000	140
915 - 1066	3001 - 3500	100
1067 - 1219	3501 - 4000	75
1220 - 1371	4001 - 4500	70
1372 - 1523	4501 - 5000	65
Above 1523	Above 5000	05

RSS-131 6.2

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

Additional Power Back-off Condition for Multiple Carrier Operations:

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

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

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

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

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

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

Test Procedures: RSS-131 4.3

4.3.1 Multi-channel Enhancer

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

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

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

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

Raise the input level to the DUT while observing the output tone levels, Po1 and Po2, and the

intermodulation product levels, Po3 and Po4.

For enhancers rated 500 watts or less: Raise the input level to the DUT until the greater level of the intermodulation products at the enhancer output terminals, Po3 or Po4, equals -43 dBW.

For enhancers rated over 500 watts: Raise the input level to the DUT until the greater level of the intermodulation products at the enhancer output terminals, Po3 or Po4, is 67 dB below the level of either output tone level, Po1 or Po2.

Record all signal levels and their frequencies. Calculate the mean output power (Pmean) under this testing condition using Pmean = Po1 + 3 dB.

4.3.2 Single Channel Enhancer

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

Single channel Enhancer

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

The same output power is transmit.

iDEN 800
[Downlink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
IDEN	Low	851.0125	29.97	0.992
	Middle	860.0000	29.98	0.995
	High	868.9875	29.95	0.989
LTE 5 MHz	Middle	866.50	29.99	0.997

iDEN 900
[Downlink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
iDEN	929 MHz ~ 930 MHz Low	929.0125	29.94	0.986
	929 MHz ~ 930 MHz High	929.9875	29.93	0.983
	935 MHz ~ 940 MHz Low	935.0125	30.05	1.011
	935 MHz ~ 940 MHz High	939.9875	29.96	0.990

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
FSK	929 MHz ~ 930 MHz Low	929.0125	29.93	0.984
	929 MHz ~ 930 MHz High	929.9875	29.92	0.981
	935 MHz ~ 940 MHz Low	935.0125	30.00	0.999
	935 MHz ~ 940 MHz High	939.9875	29.90	0.977

iDEN 800
[Uplink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(mW)
IDEN	Low	806.0125	-10.07	0.098
	Middle	815.0000	-10.00	0.100
	High	823.9875	-10.16	0.096
LTE 5 MHz	Middle	821.50	-10.04	0.099

iDEN 900
[Uplink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(mW)
iDEN	Low	896.0125	-9.98	0.100
	Middle	898.5000	-10.05	0.099
	High	900.9875	-10.04	0.099

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(mW)
FSK	Low	896.0125	-9.87	0.103
	Middle	898.5000	-10.41	0.091
	High	900.9875	-9.77	0.105

Multi-channel Enhancer for IC

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

The same output power is transmit.

iDEN 800

[Downlink]

	Channel	Frequency (MHz)	Output Power	
			Po1(dBm)	Pmean(dBm)
Sinusoidal	Low	851.40	27.000	30.000
	Middle	860.00	27.001	30.001
	High	868.60	27.000	30.000

iDEN 900

[Downlink]

	Channel	Frequency (MHz)	Output Power	
			Po1(dBm)	Pmean(dBm)
Sinusoidal	Low	929.40	27.001	30.001
	Middle	935.40	26.999	29.999
	High	939.60	27.002	30.002

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

iDEN 800

[Downlink]

	1 Carrier (dBm)	3 Carrier (dBm)	Power Back-off (dB)
iDEN 800 MHz Band	29.99	25.28	4.71

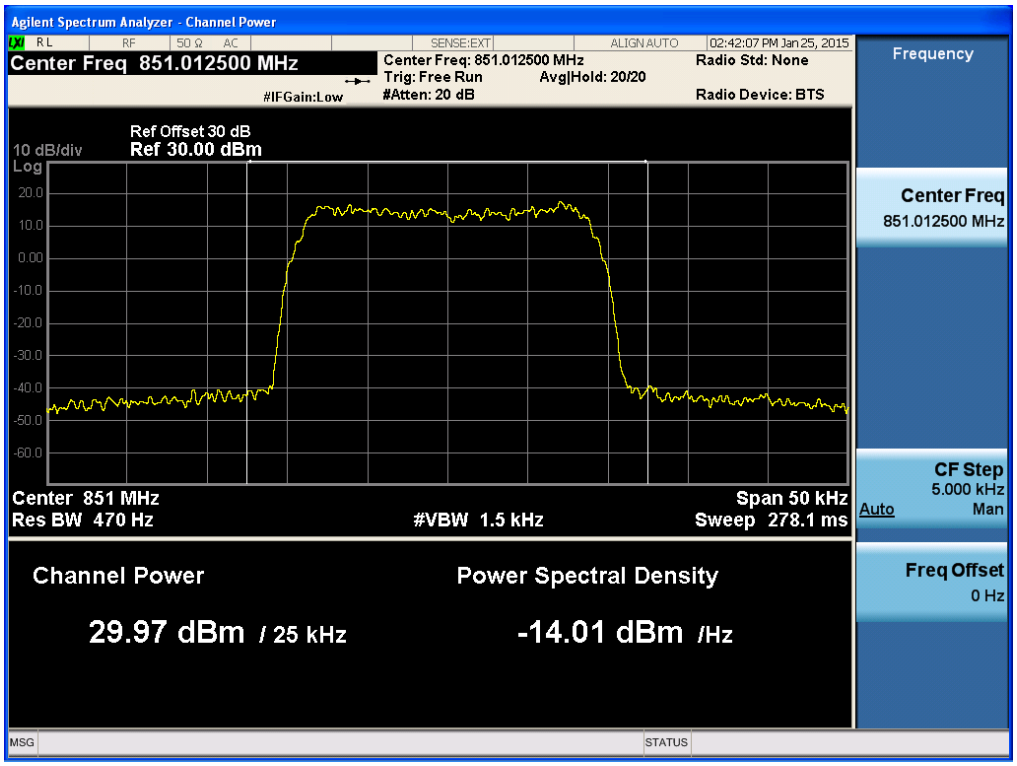
iDEN 900

[Downlink]

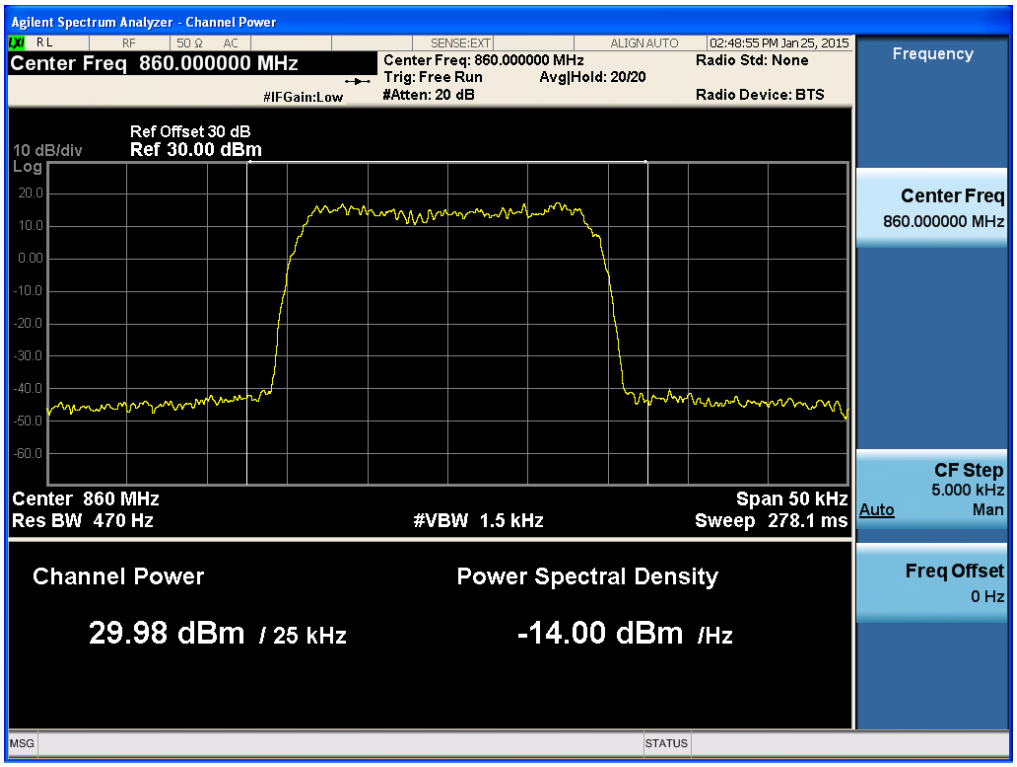
	1 Carrier (dBm)	3 Carrier (dBm)	Power Back-off (dB)
iDEN 900 MHz Band	30.05	25.23	4.82

Single channel Enhancer Plots of RF Output Power_Downlink
iDEN 800

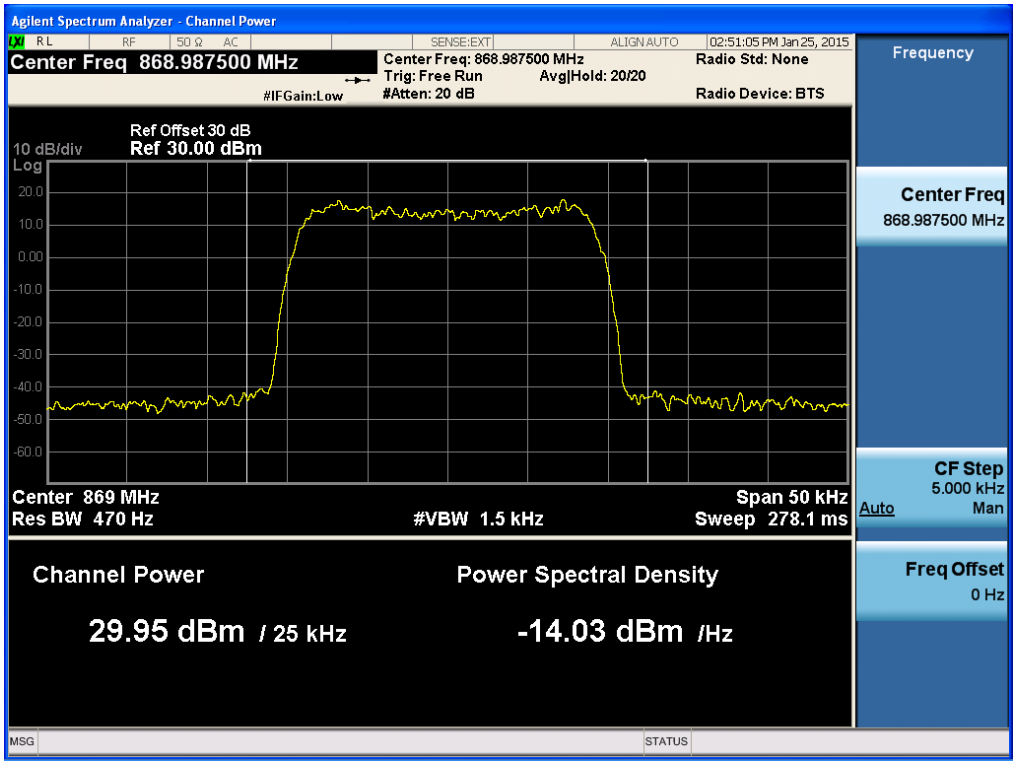
[iDEN Downlink Low]



[iDEN Downlink Middle]



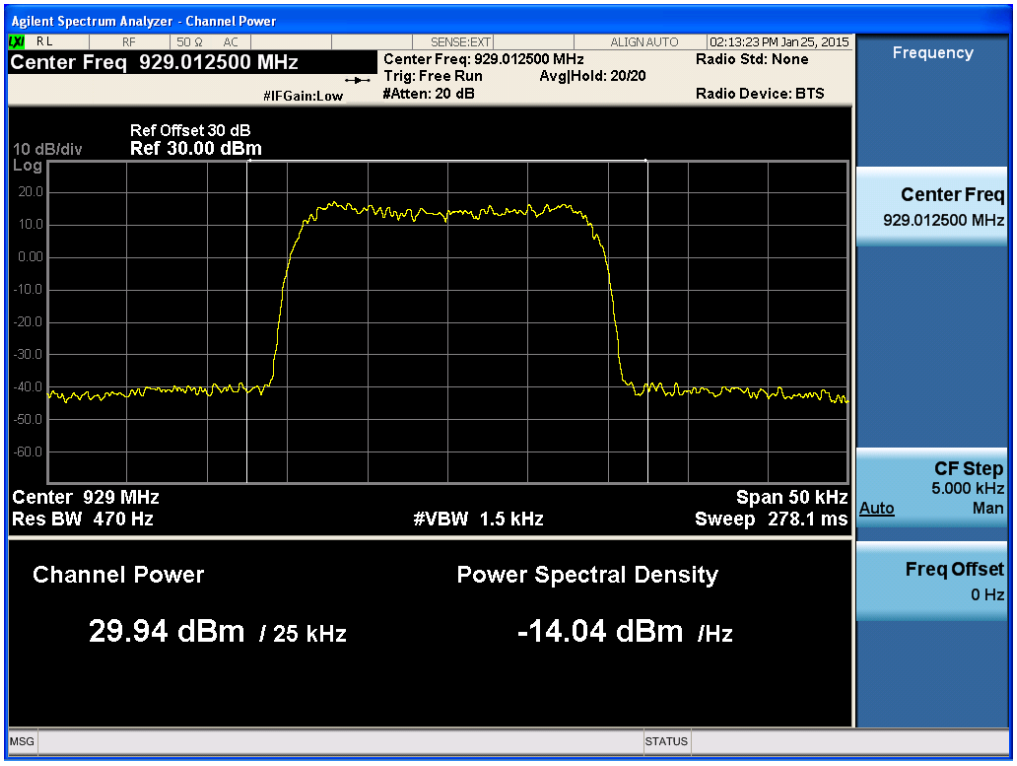
[iDEN Downlink High]



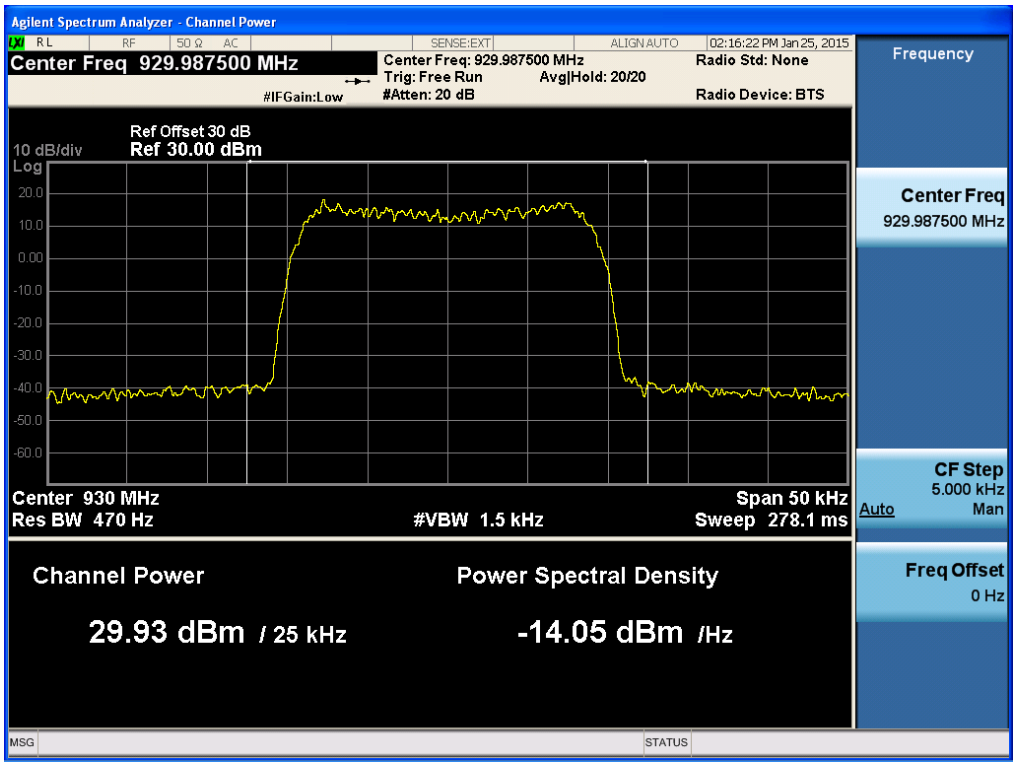
[LTE 5 MHz Downlink Middle]

iDEN 900

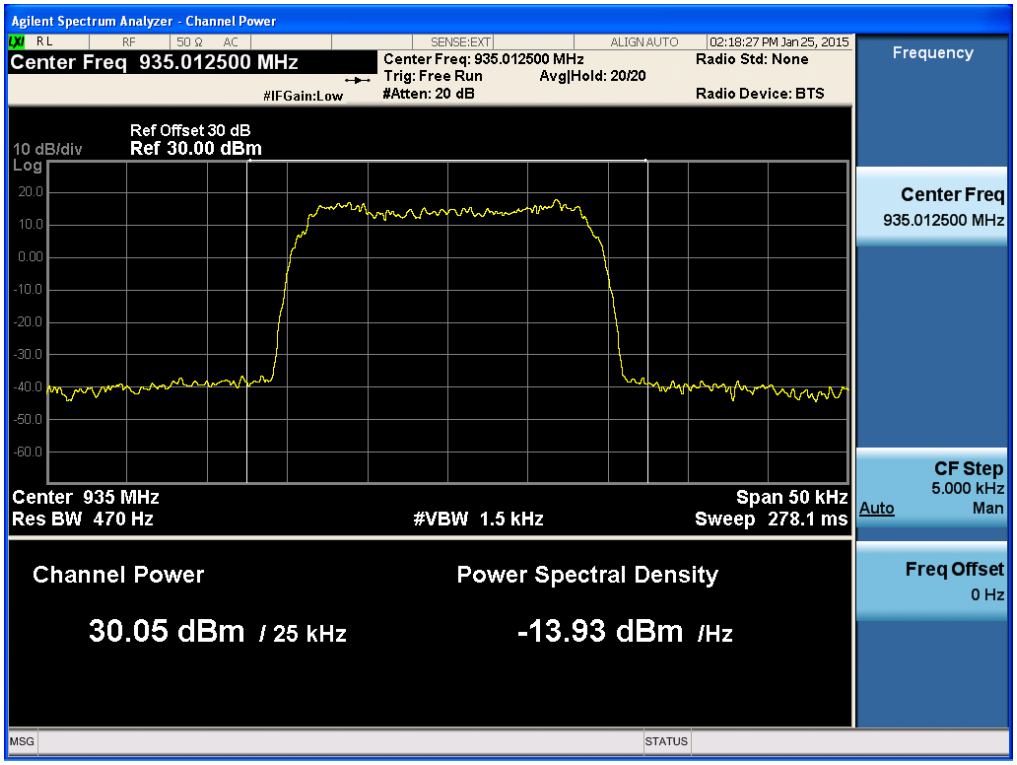
[iDEN 929 MHz ~ 930 MHz Low]



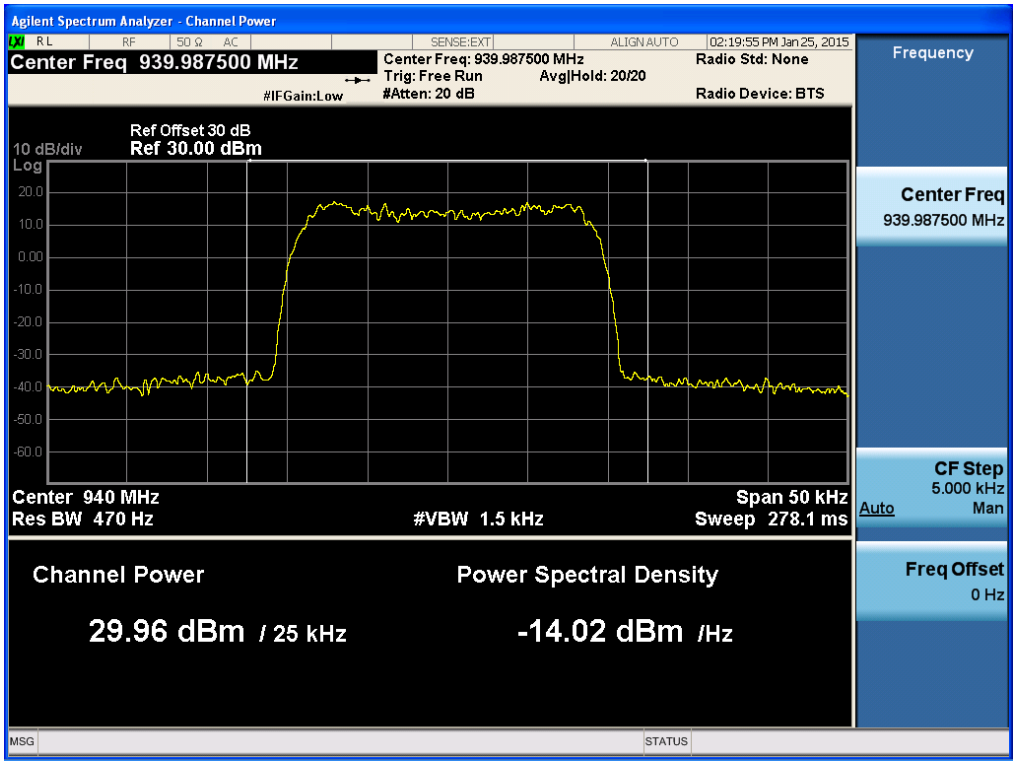
[iDEN 929 MHz ~ 930 MHz High]



[iDEN 935 MHz ~ 940 MHz Low]

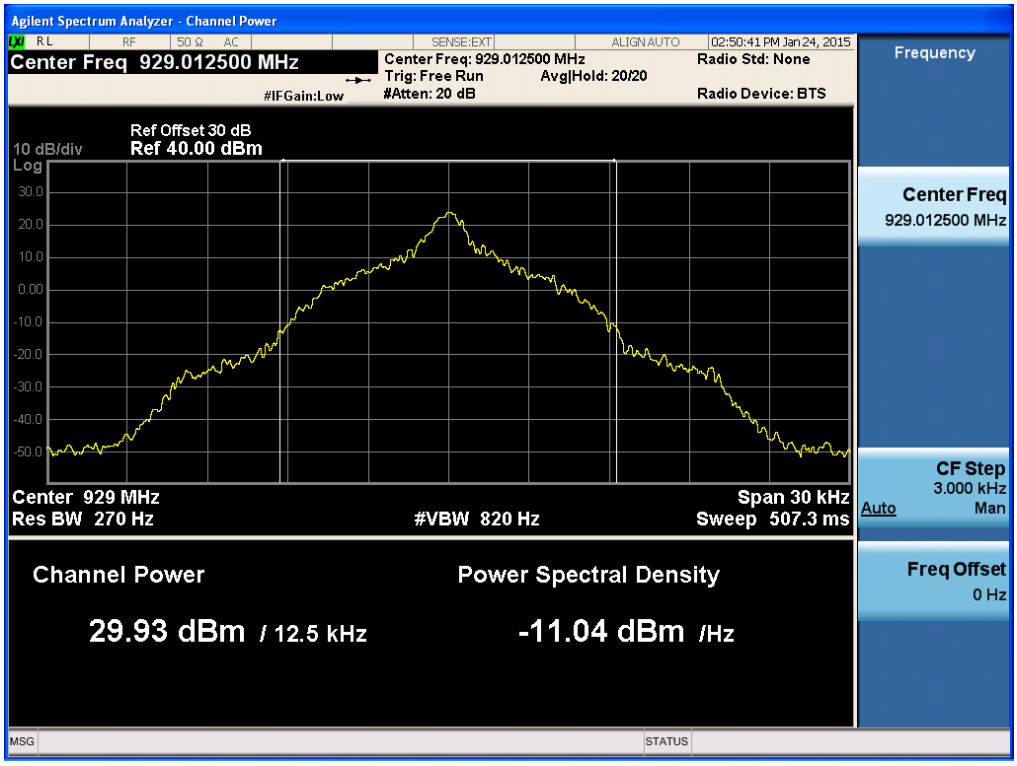


[iDEN 935 MHz ~ 940 MHz High]

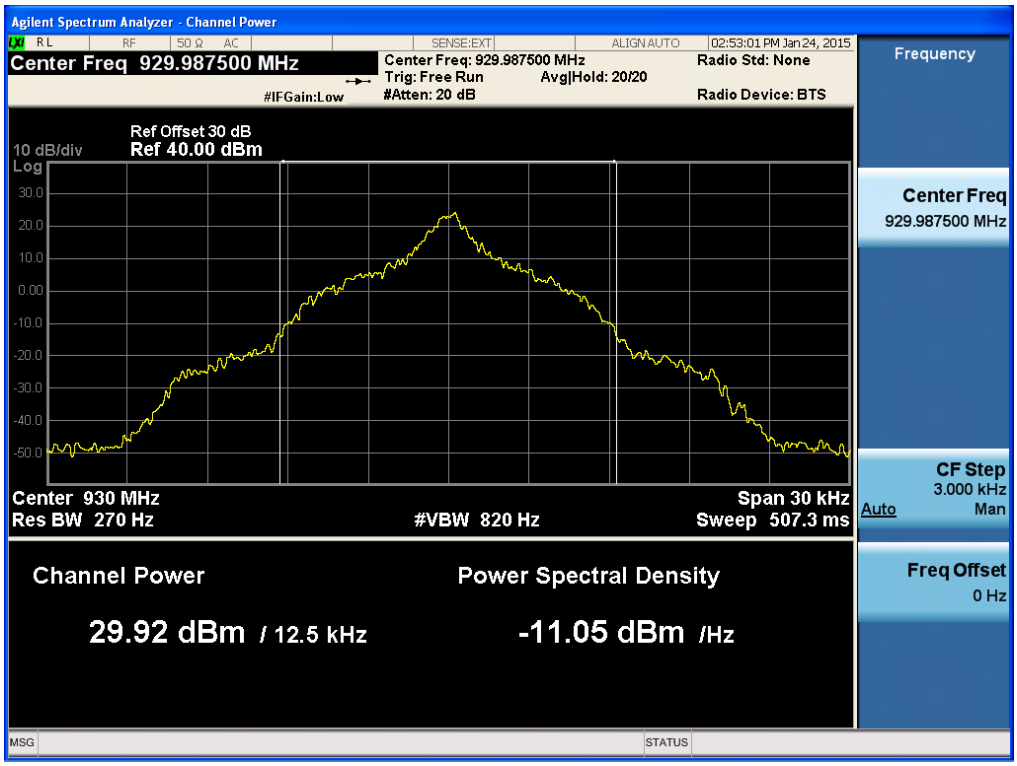


FSK

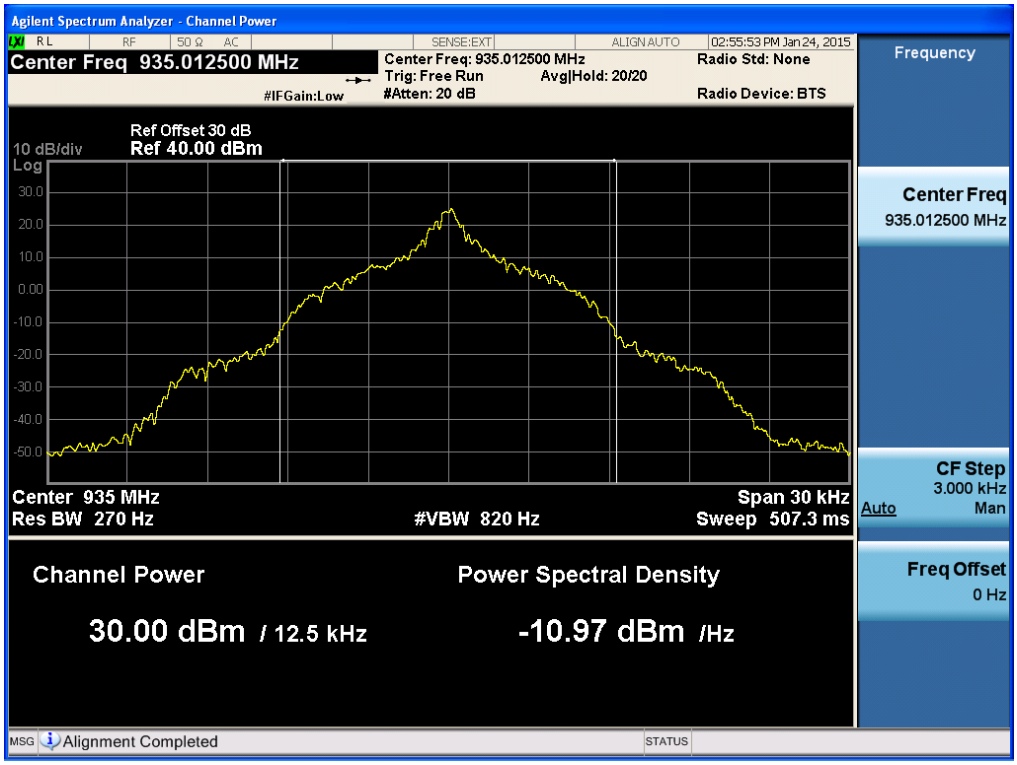
[FSK 929 MHz ~ 930 MHz Low]



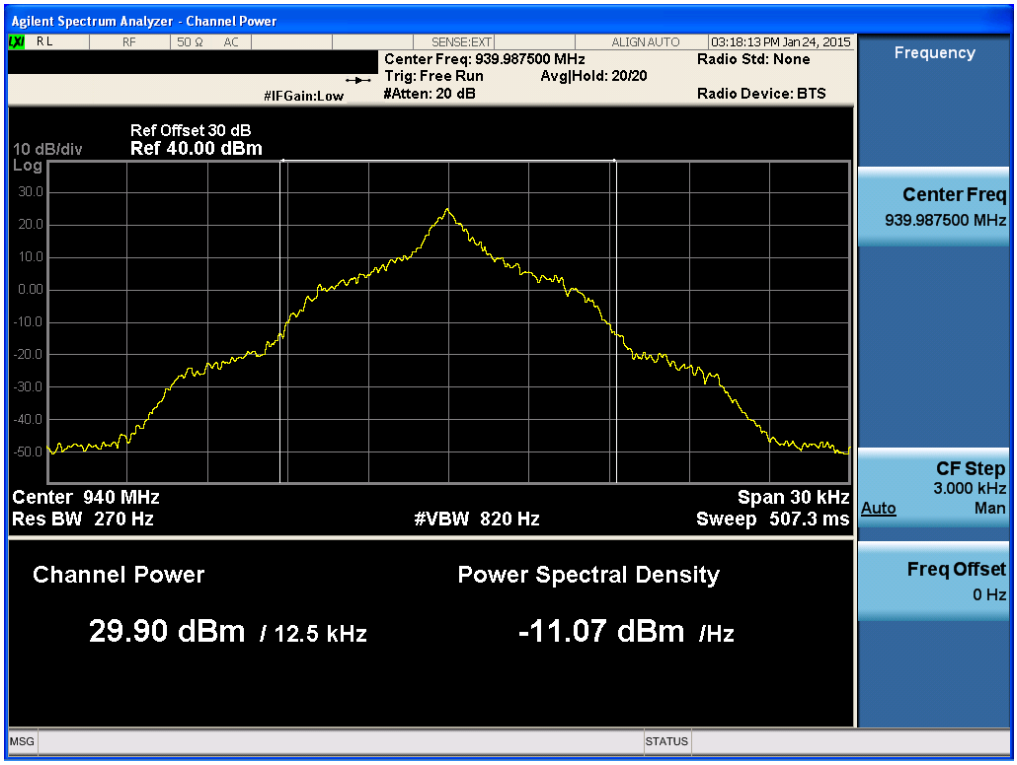
[FSK 929 MHz ~ 930 MHz High]



[FSK 935 MHz ~ 940 MHz Low]

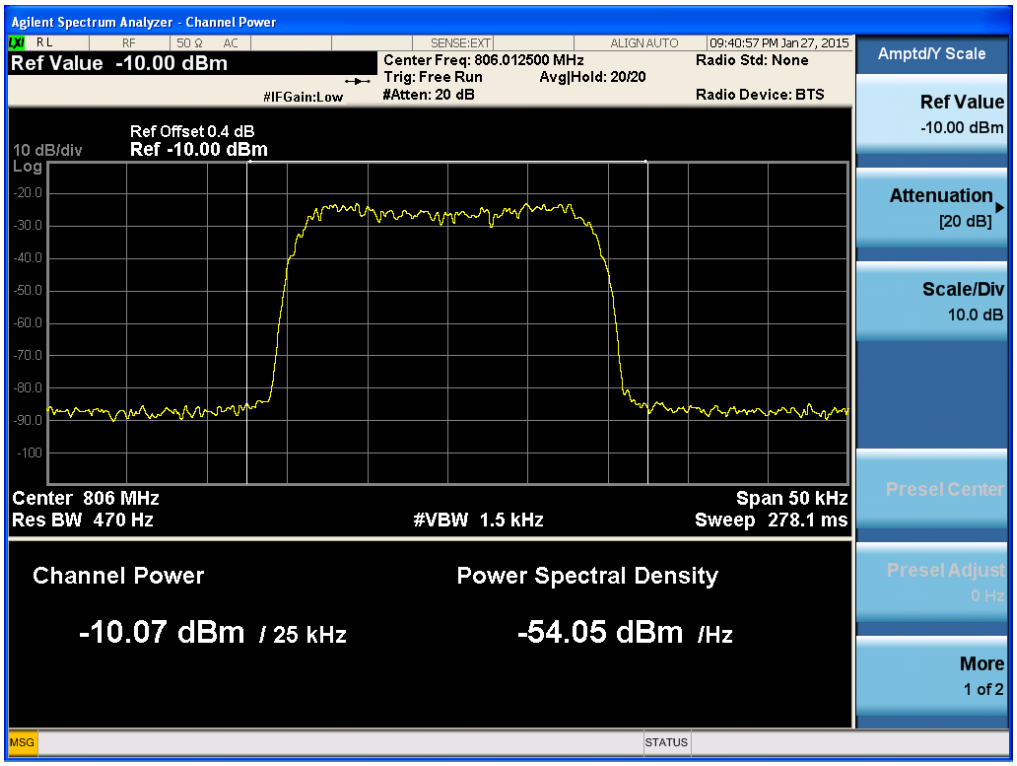


[FSK 935 MHz ~ 940 MHz High]

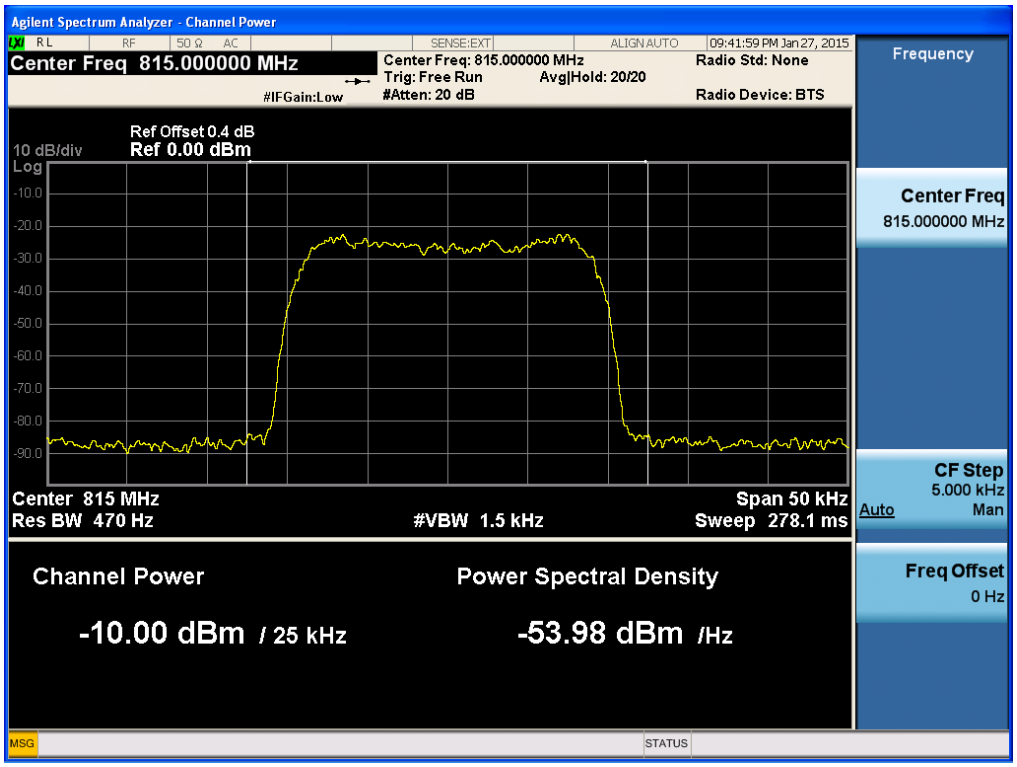


Single channel Enhancer Plots of RF Output Power _Uplink
iDEN 800

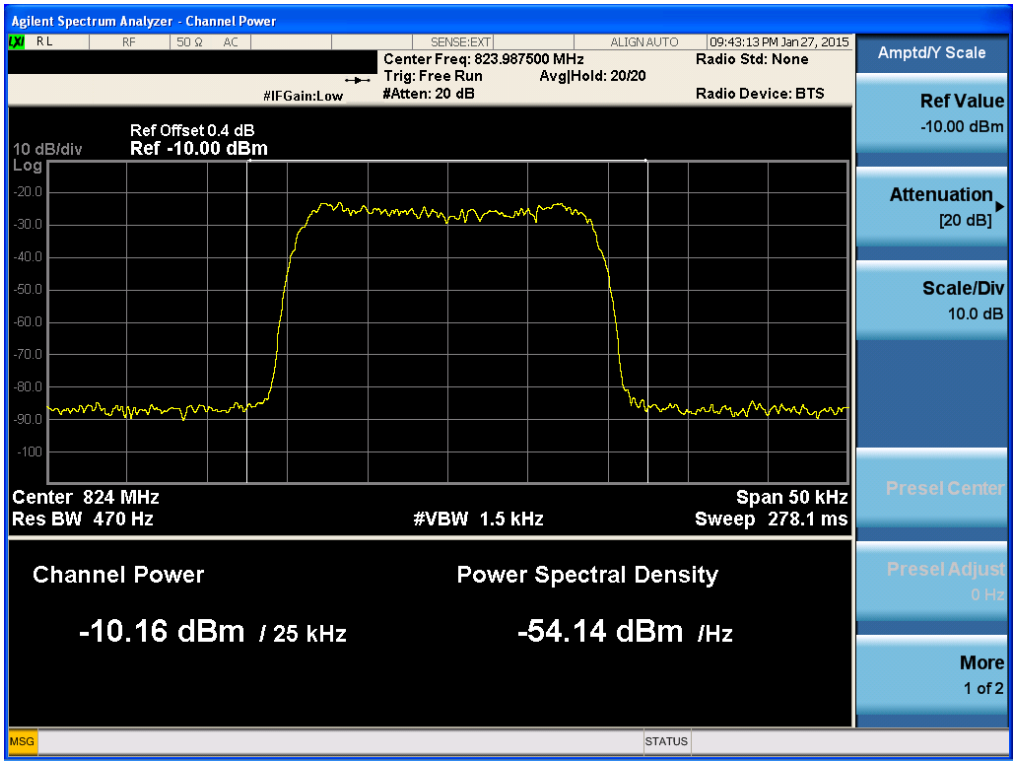
[IDEN Uplink Low]



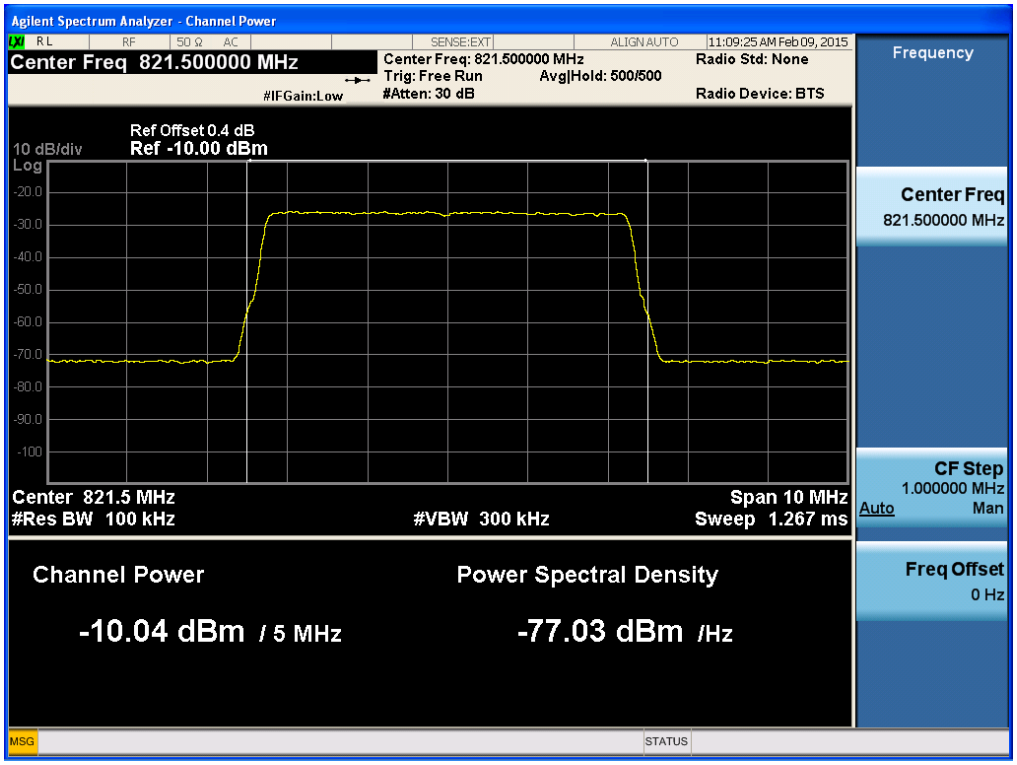
[IDEN Uplink Middle]



[IDEN Uplink High]

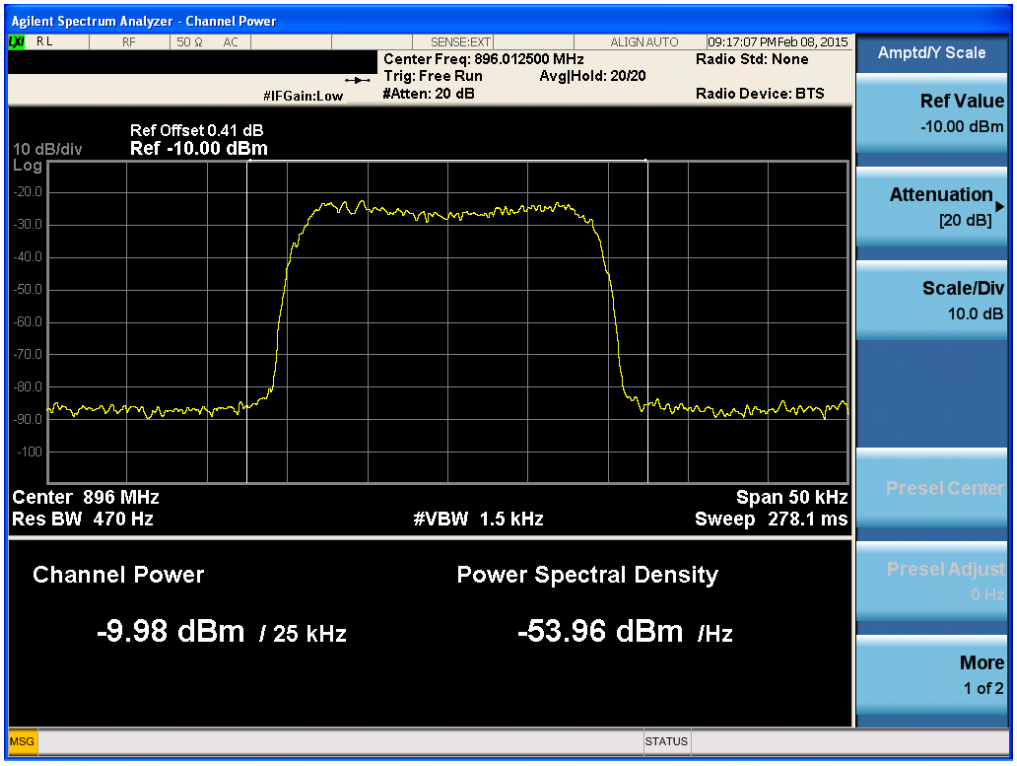


[LTE 5 MHz Uplink Middle]

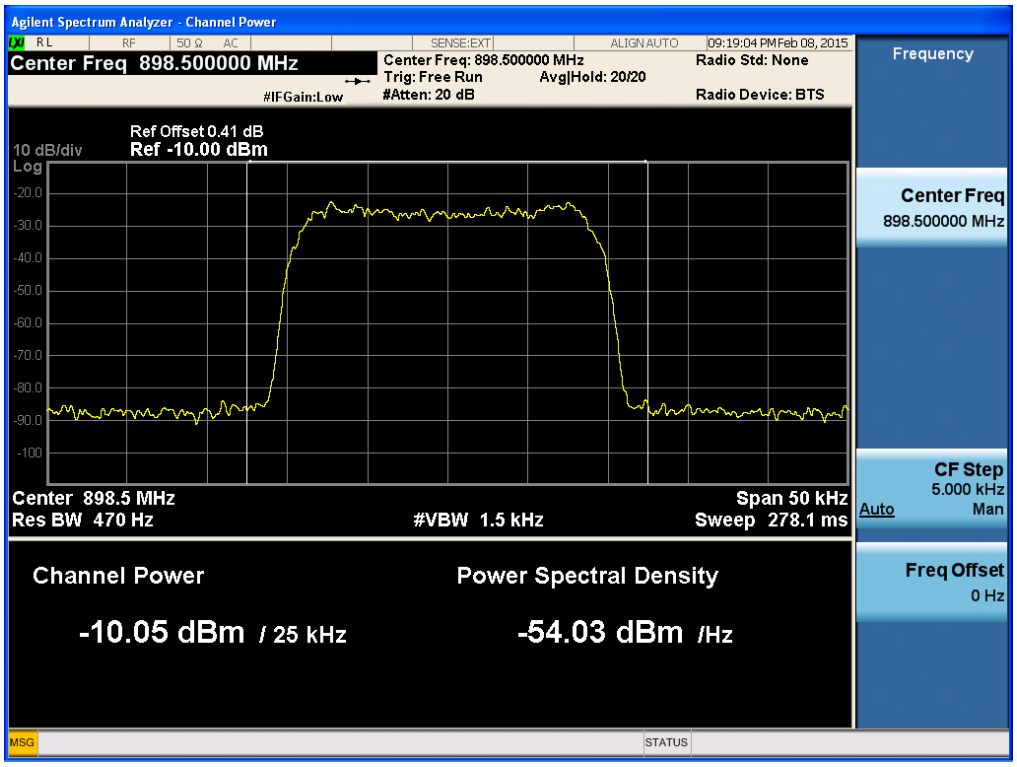


iDEN 900

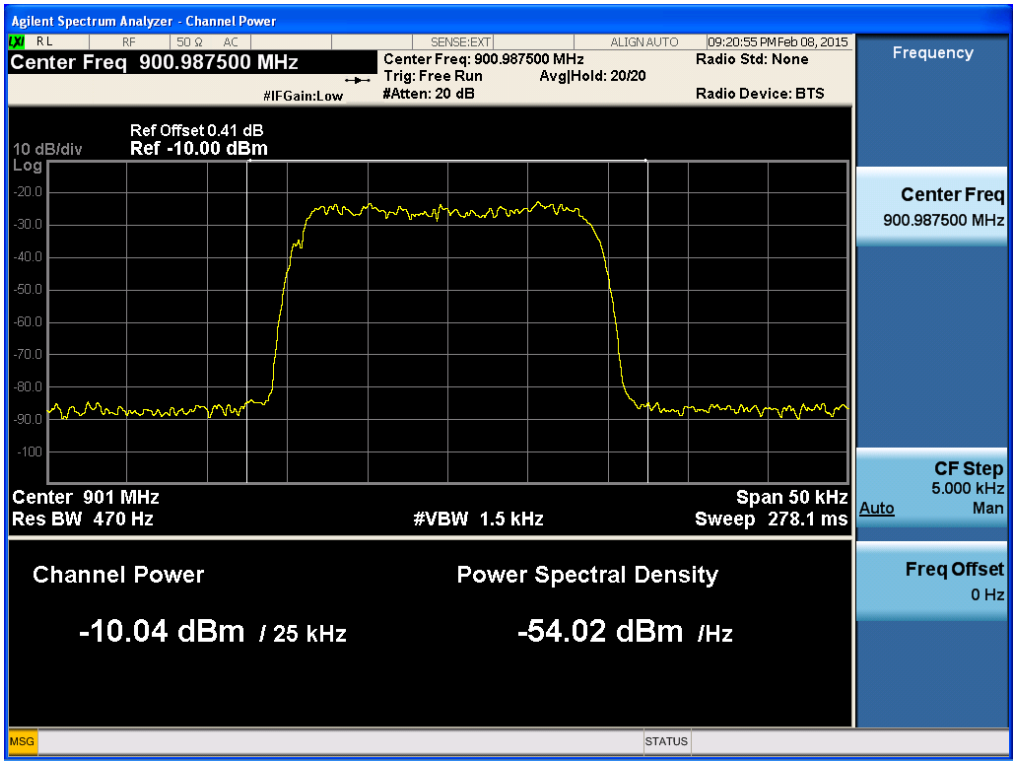
[IDEN Uplink Low]



[IDEN Uplink Middle]

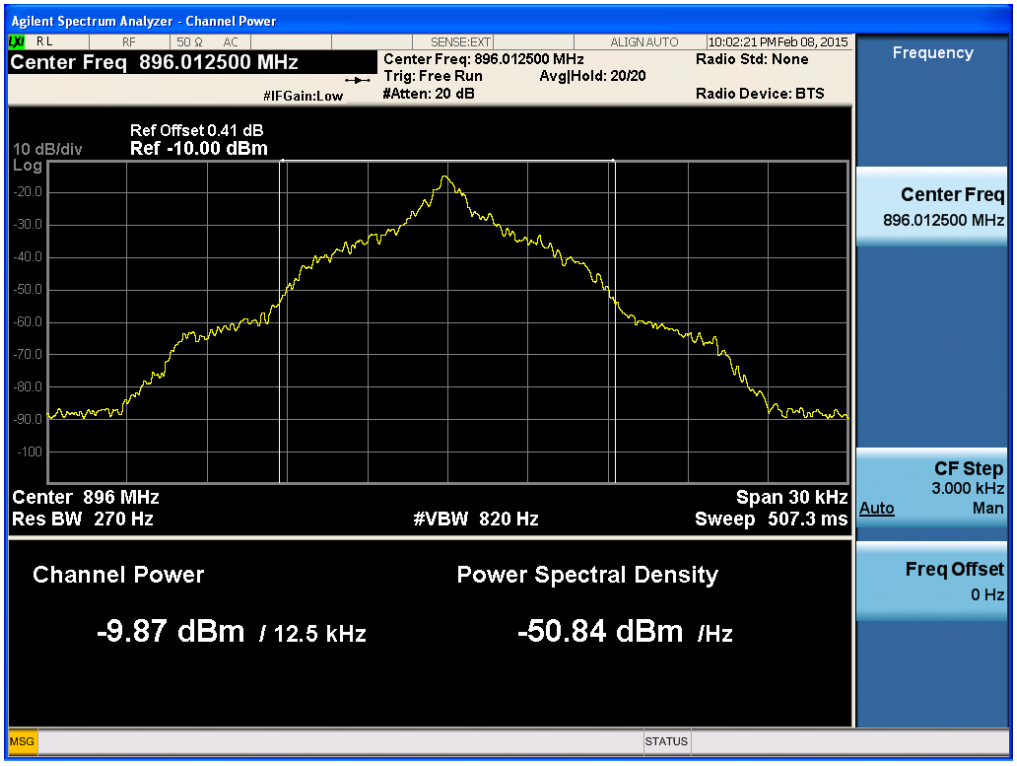


[IDEN Uplink High]

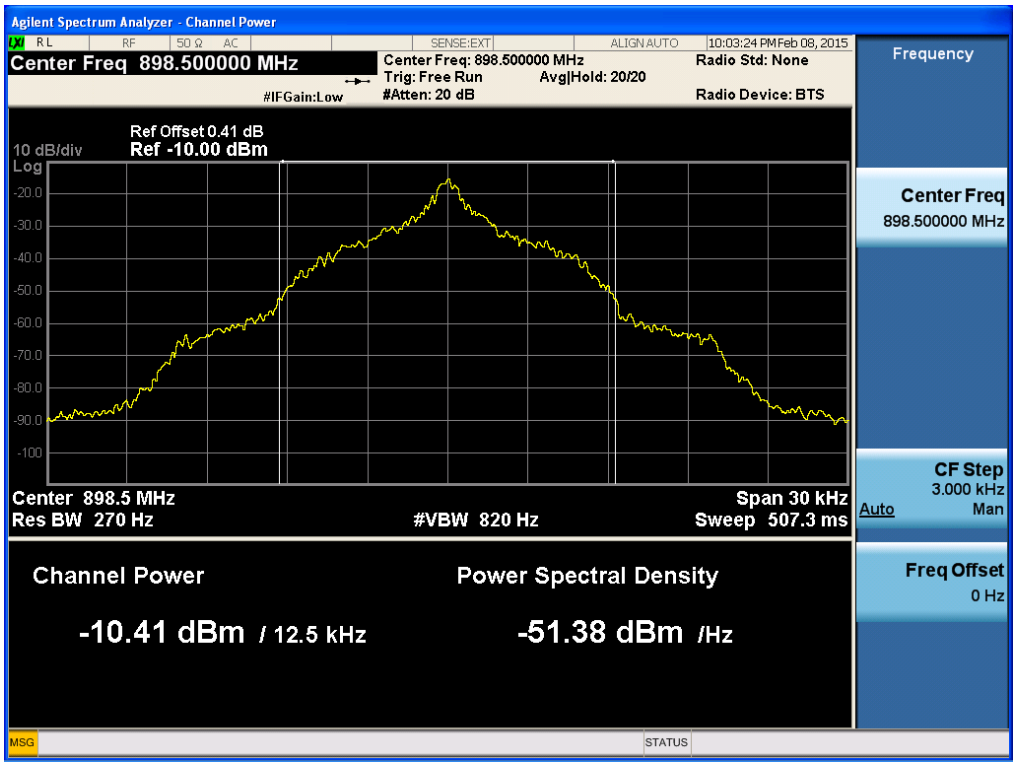


FSK

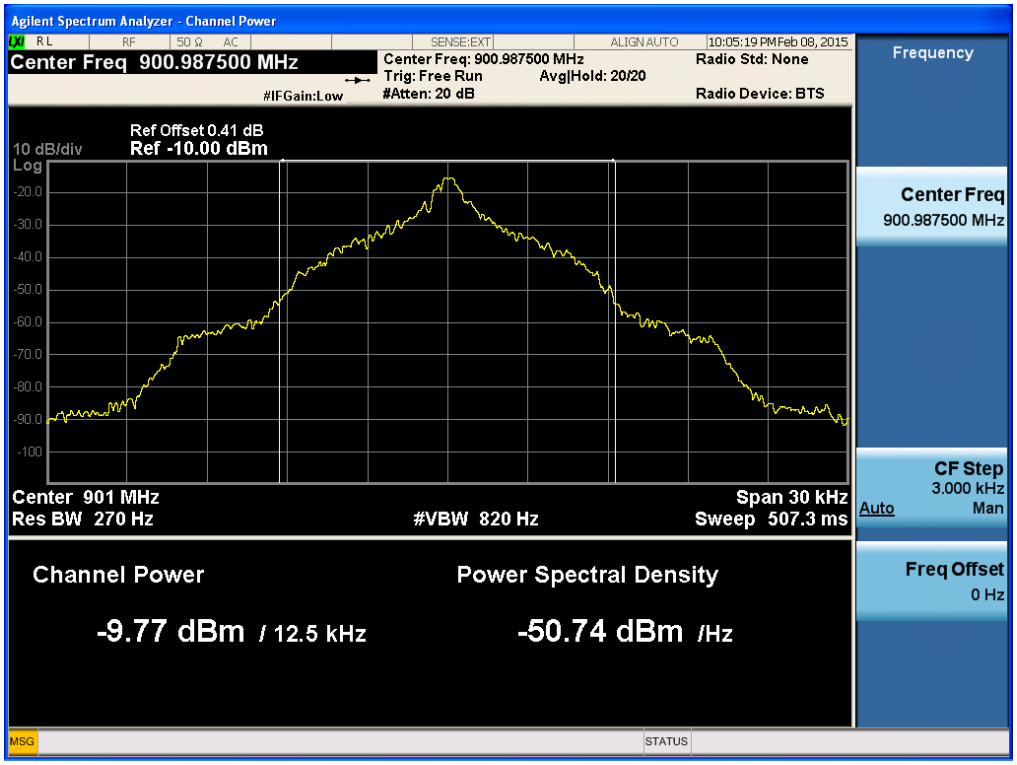
[FSK Uplink Low]



[FSK Uplink Middle]



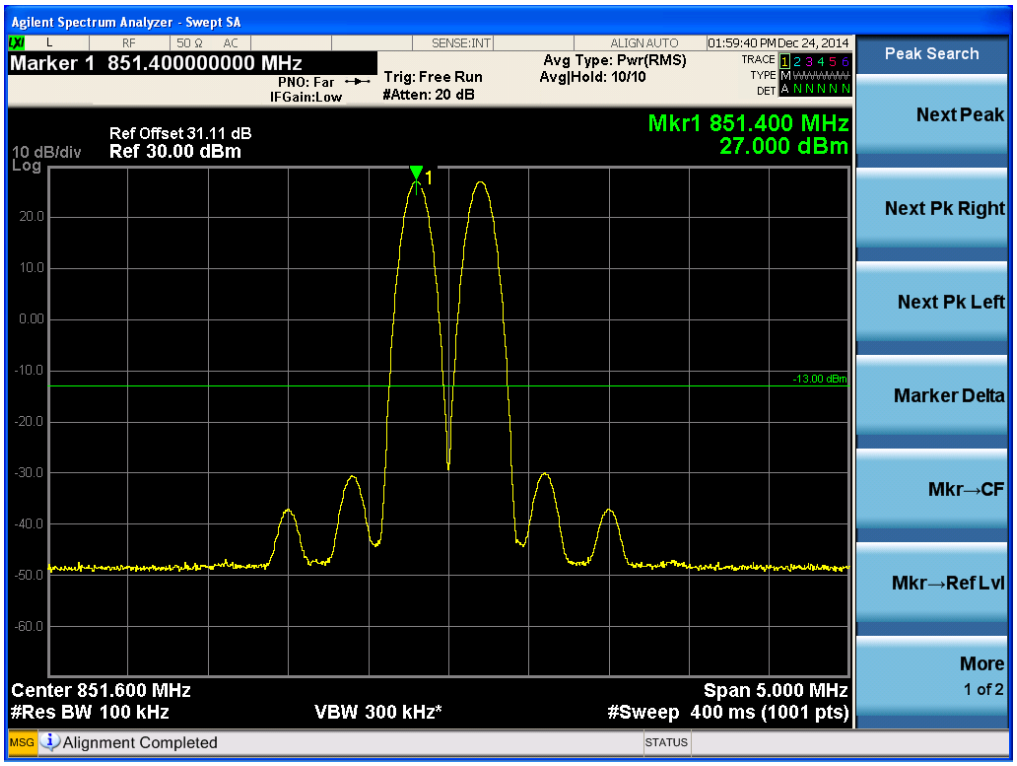
[FSK Uplink High]



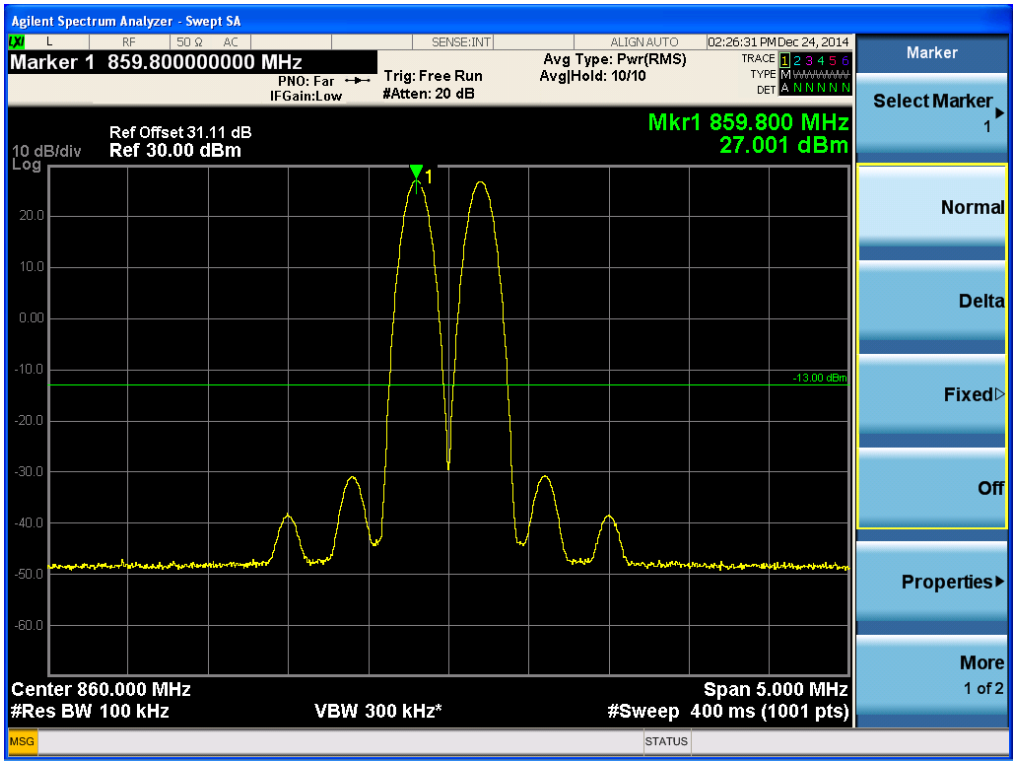
Multi-channel Enhancer for IC

iDEN 800

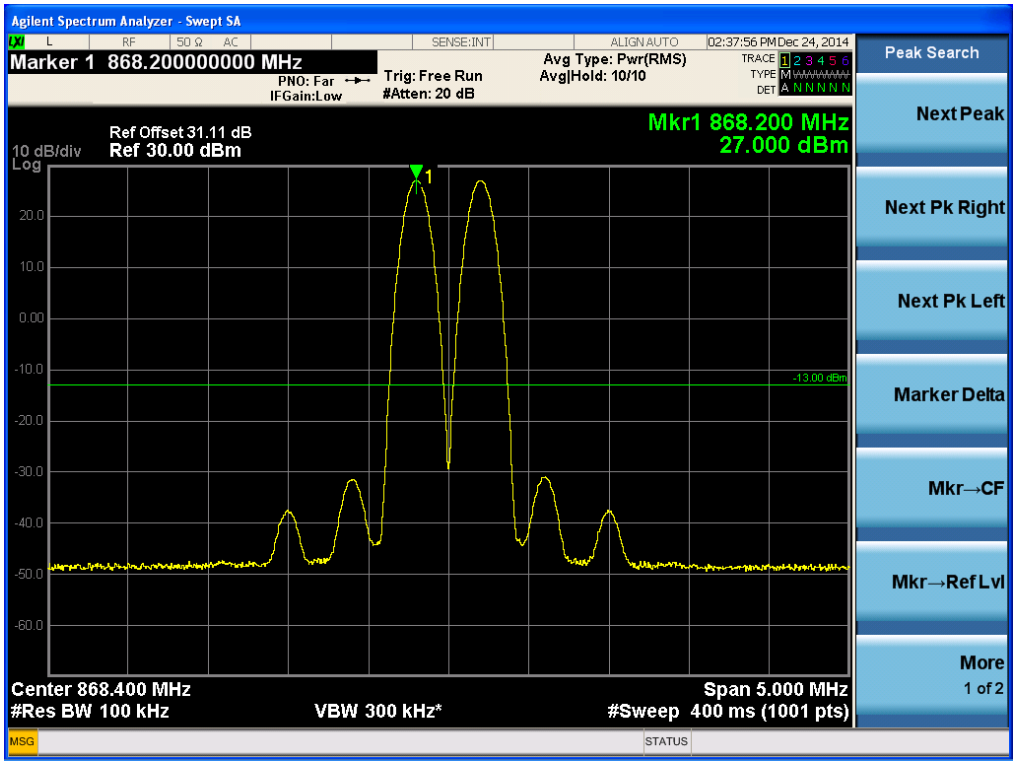
[Downlink Low]



[Downlink Middle]

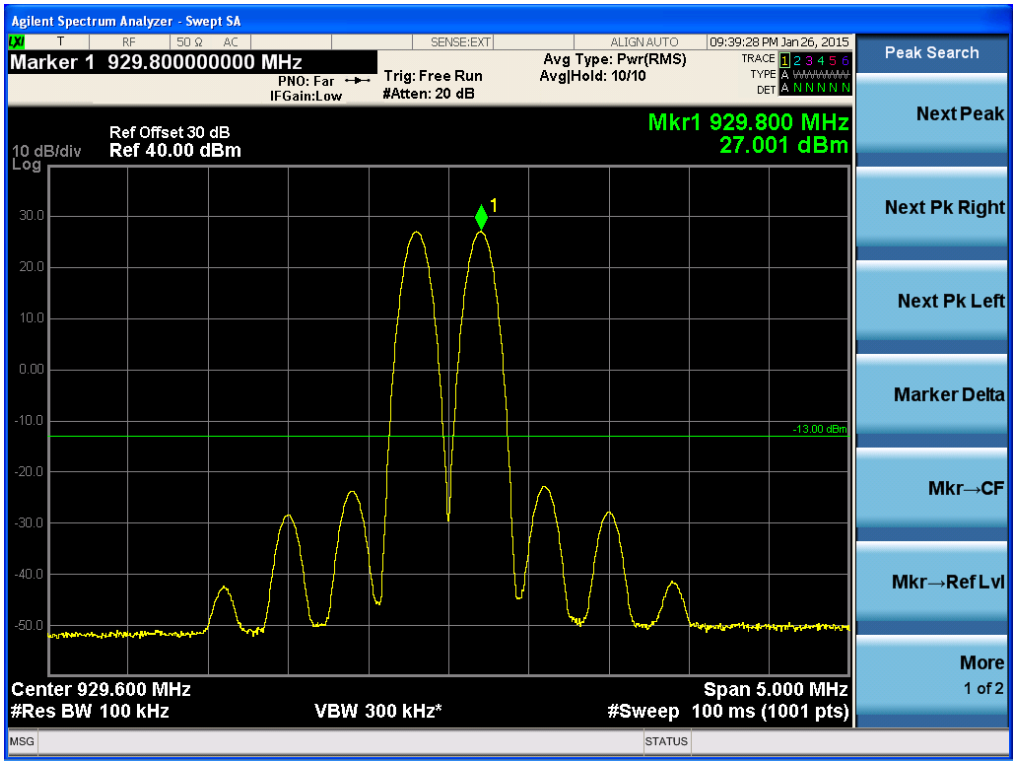


[Downlink High]

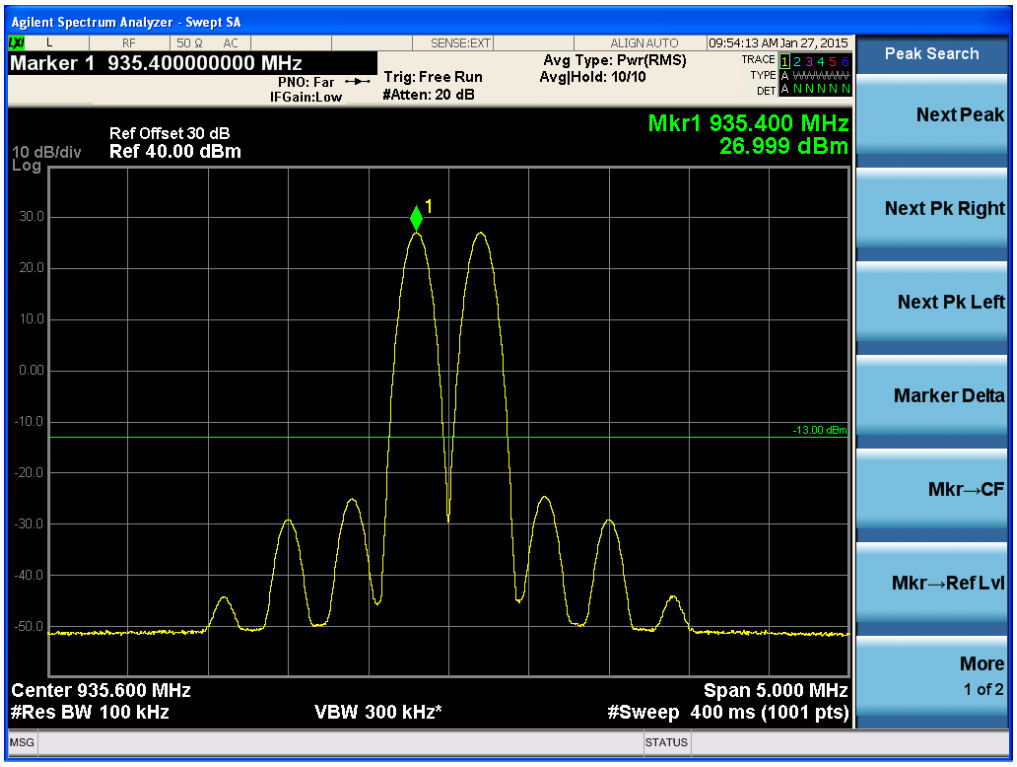


iDEN 900

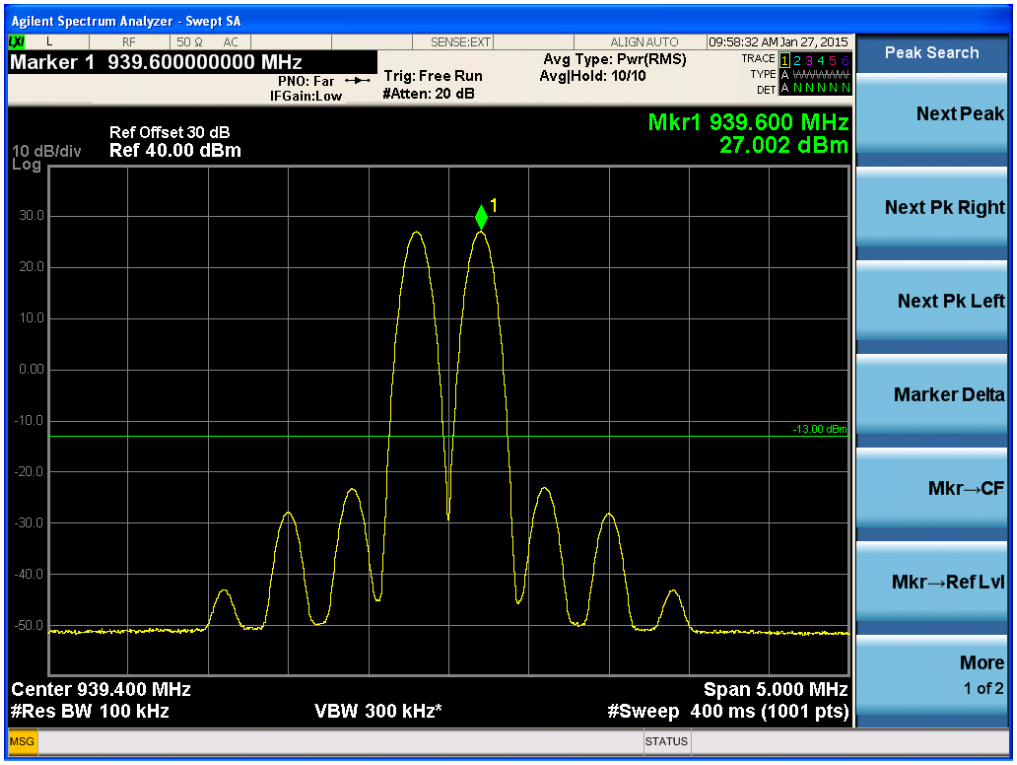
[Downlink Low]



[Downlink Middle]



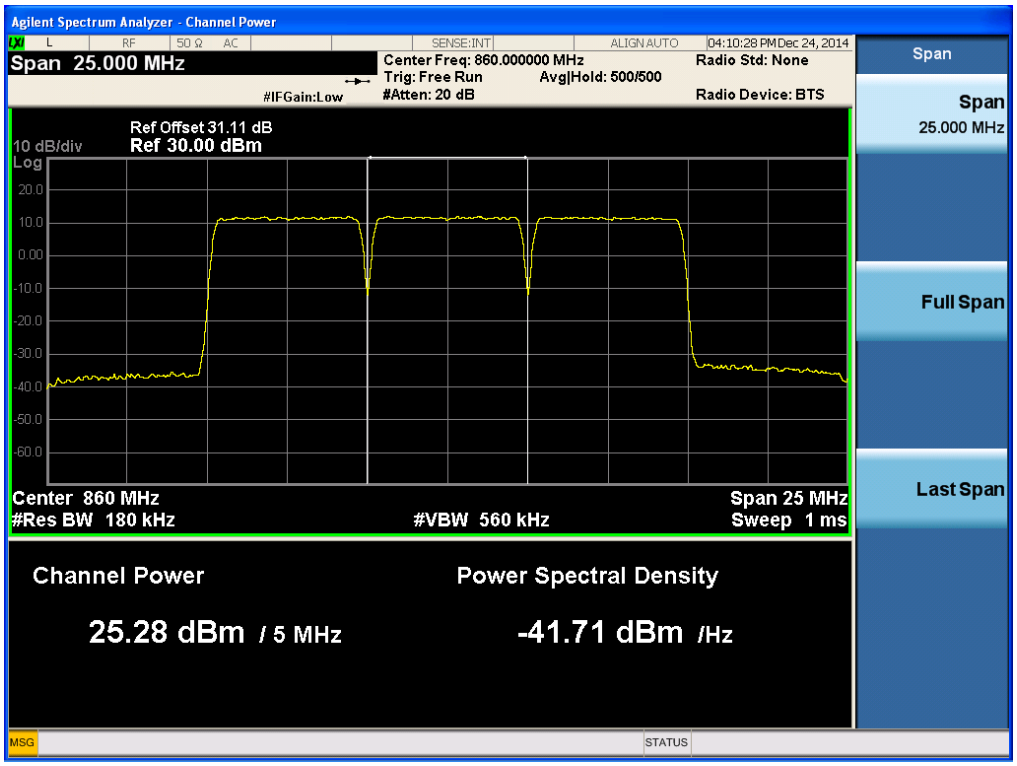
[Downlink High]



Power Back-off for IC

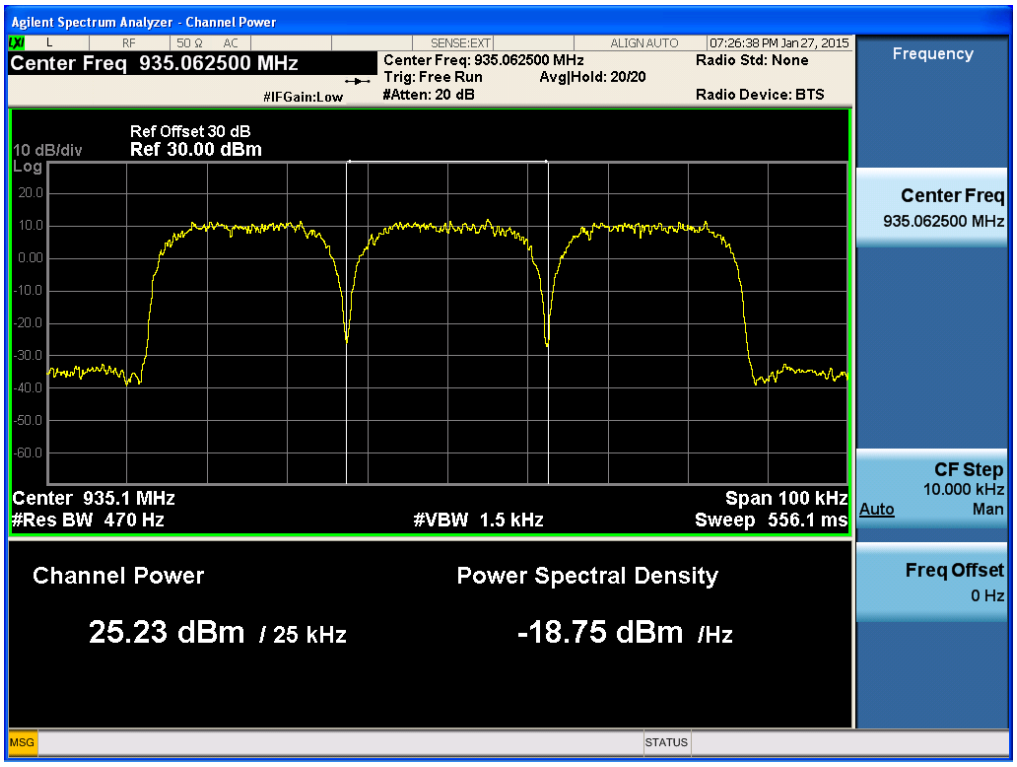
iDEN 800

[3 Carrier]



iDEN 900

[3 Carrier]



7. OCCUPIED BANDWIDTH

FCC Rules

Test Requirement(s): § 2.1049 Measurements required: Occupied bandwidth:

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

Test Procedures: As required by 47 CFR 2.1049, *occupied bandwidth measurements* were made with a Spectrum Analyzer connected to the RF ports for both Uplink and Downlink The modulation characteristics of signal generator's carrier was measured first at a maximum RF level prescribed by the OEM. The signal generator was then connected to either the Uplink or Downlink input at the appropriate RF level. The resulting modulated signal through the EUT was measured and compared against the original signal.

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

Input Signal	Input Level (dBm)	Maximum Amp Gain
iDEN LTE 5 MHz FSK	DL : -16 dBm UL : -45 dBm	DL : 46 dB UL : 35 dB

IC Rules

Test Requirements: RSS-GEN 4.6.1

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

Test Procedures: RSS-GEN 4.6.1

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 shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth.

Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual.

The trace data points are recovered and directly summed in linear 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. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

iDEN 800

[Downlink Output]

	Channel	Frequency (MHz)	OBW (kHz)
iDEN	Low	851.0125	18.261
	Middle	860.0000	18.283
	High	868.9875	18.108

	Channel	Frequency (MHz)	OBW (MHz)
LTE 5 MHz	Middle	866.50	4.519

iDEN 800

[Downlink Input]

	Channel	Frequency (MHz)	OBW (kHz)
iDEN	Low	851.0125	18.224
	Middle	860.0000	18.105
	High	868.9875	18.117

	Channel	Frequency (MHz)	OBW (MHz)
LTE 5 MHz	Middle	866.50	4.522

iDEN 900

[Downlink Output]

	Channel	Frequency (MHz)	OBW (kHz)
iDEN	929 MHz ~ 930 MHz Low	929.0125	18.287
	929 MHz ~ 930 MHz High	929.9875	18.151
	935 MHz ~ 940 MHz Low	935.0125	18.149
	935 MHz ~ 940 MHz High	939.9875	18.349

iDEN 900

[Downlink Input]

	Channel	Frequency (MHz)	OBW (kHz)
iDEN	929 MHz ~ 930 MHz Low	929.0125	18.176
	929 MHz ~ 930 MHz High	929.9875	18.169
	935 MHz ~ 940 MHz Low	935.0125	18.283
	935 MHz ~ 940 MHz High	939.9875	18.149

FSK

[Downlink Output]

	Channel	Frequency (MHz)	OBW (kHz)
FSK	929 MHz ~ 930 MHz Low	929.0125	8.095
	929 MHz ~ 930 MHz High	929.9875	8.425
	935 MHz ~ 940 MHz Low	935.0125	8.329
	935 MHz ~ 940 MHz High	939.9875	8.257

[Downlink Input]

	Channel	Frequency (MHz)	OBW (kHz)
FSK	929 MHz ~ 930 MHz Low	929.0125	8.489
	929 MHz ~ 930 MHz High	929.9875	8.074
	935 MHz ~ 940 MHz Low	935.0125	8.144
	935 MHz ~ 940 MHz High	939.9875	8.131

iDEN 800
[Uplink Output]

	Channel	Frequency (MHz)	OBW (kHz)
iDEN	Low	806.0125	18.191
	Middle	815.0000	18.176
	High	823.9875	18.124

	Channel	Frequency (MHz)	OBW (MHz)
LTE 5 MHz	Middle	821.50	4.520

iDEN 800
[Uplink Input]

	Channel	Frequency (MHz)	OBW (kHz)
iDEN	Low	806.0125	18.347
	Middle	815.0000	18.299
	High	823.9875	18.410

	Channel	Frequency (MHz)	OBW (MHz)
LTE 5 MHz	Middle	821.50	4.512

iDEN 900

[Uplink Output]

	Channel	Frequency (MHz)	OBW (kHz)
iDEN	Low	896.0125	18.209
	Middle	898.5000	18.185
	High	900.9875	18.290

iDEN 900

[Uplink Input]

	Channel	Frequency (MHz)	OBW (kHz)
iDEN	Low	896.0125	18.264
	Middle	898.5000	18.289
	High	900.9875	18.269

FSK

[Uplink Output]

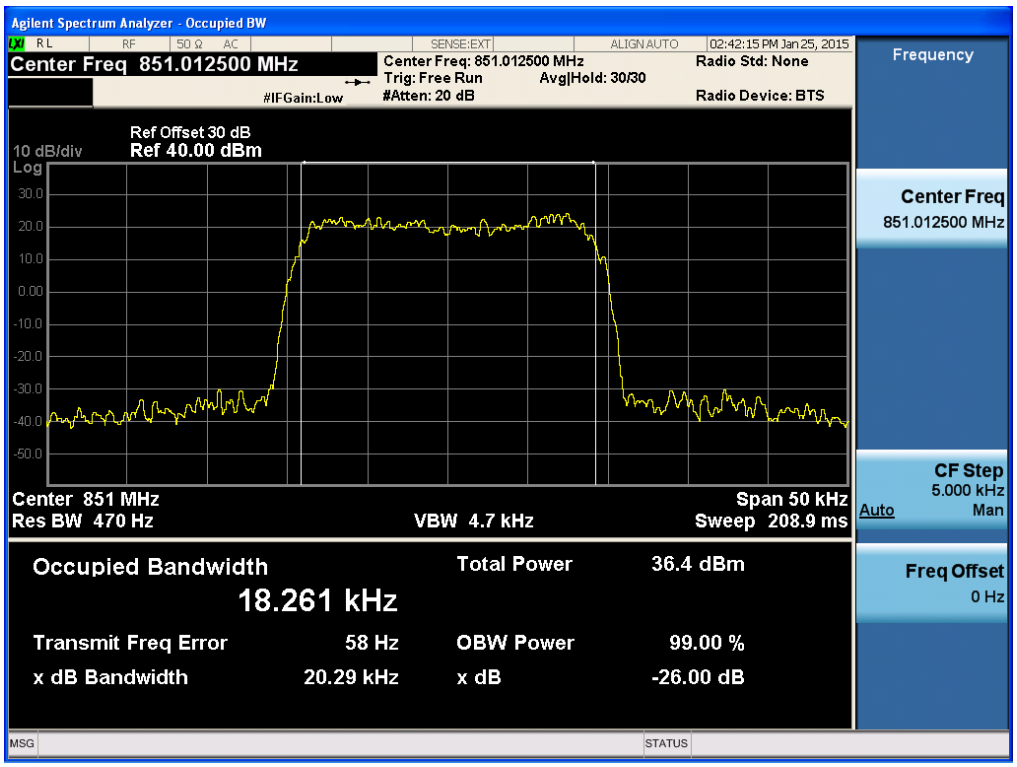
	Channel	Frequency (MHz)	OBW (kHz)
FSK	Low	896.0125	8.247
	Middle	898.5000	8.217
	High	900.9875	8.227

[Uplink Input]

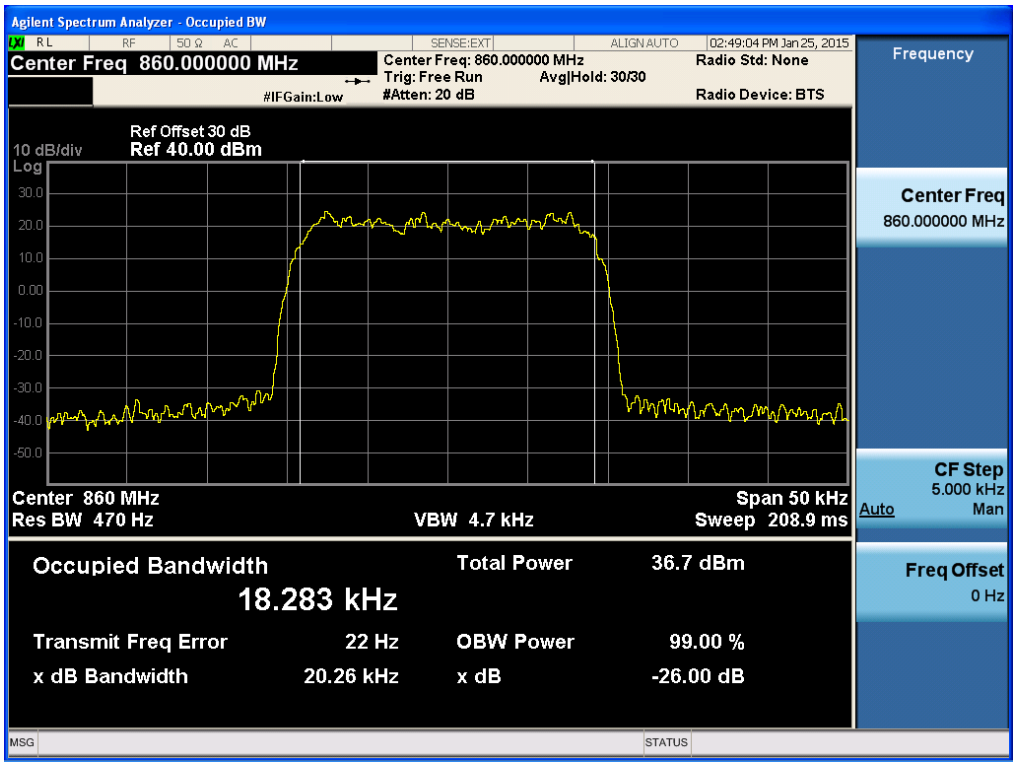
	Channel	Frequency (MHz)	OBW (kHz)
FSK	Low	896.0125	8.444
	Middle	898.5000	8.361
	High	900.9875	8.374

Plots of Occupied Bandwidth_Downlink
iDEN 800

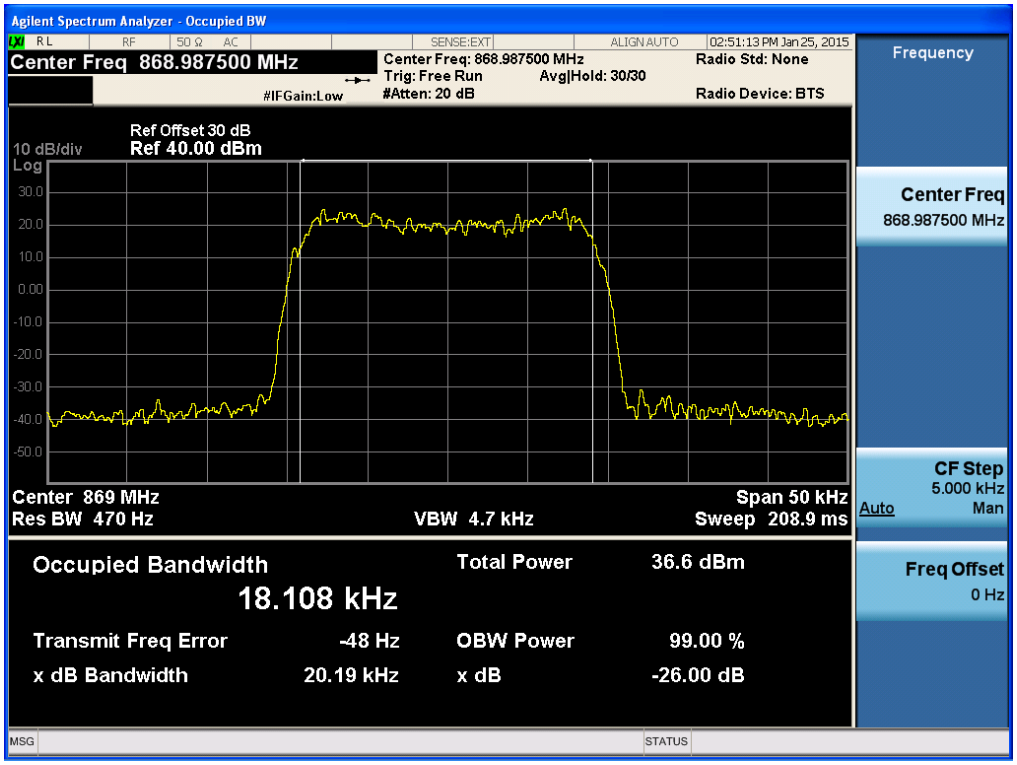
[iDEN Output Low]



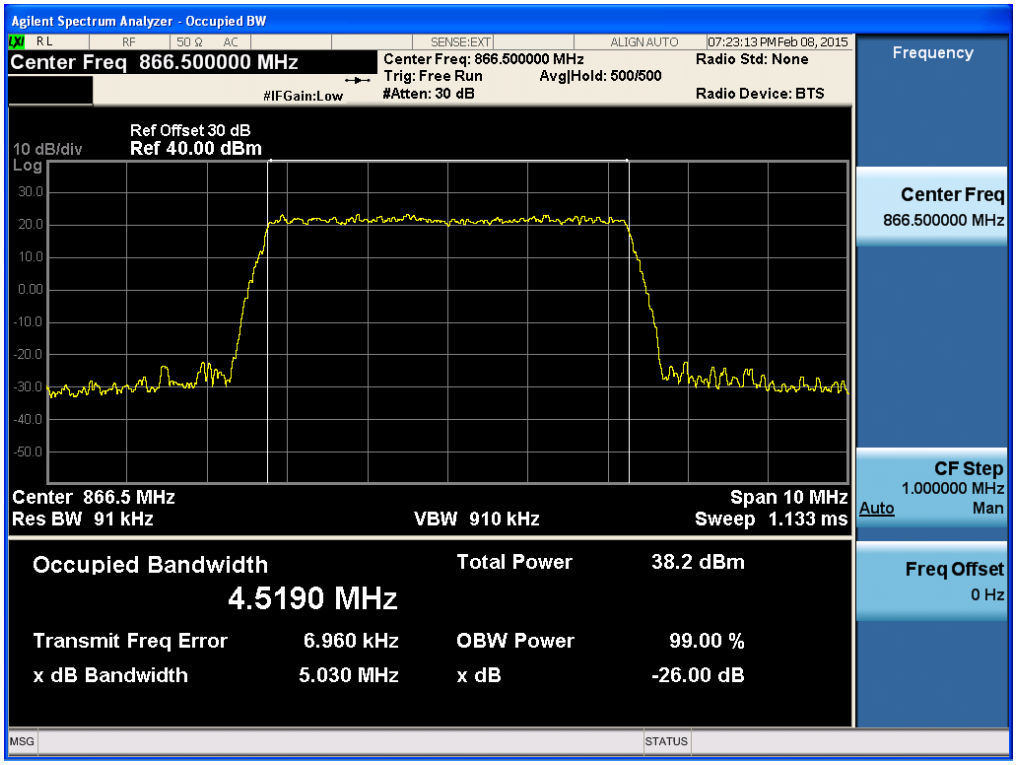
[iDEN Output Middle]



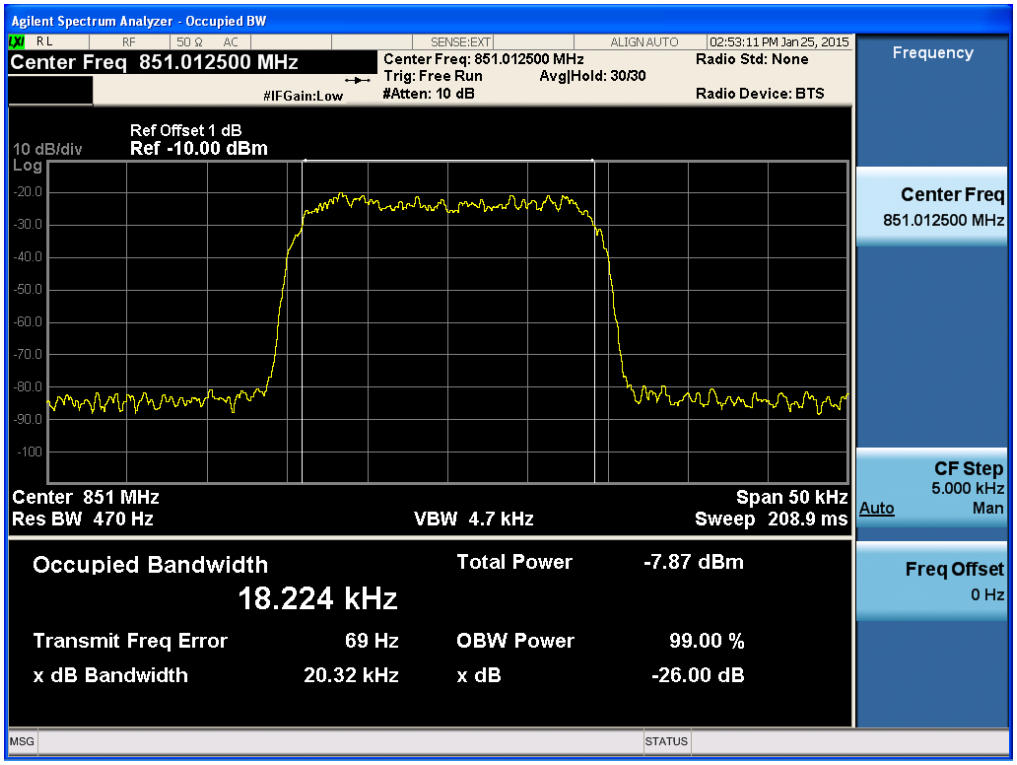
[iDEN Output High]



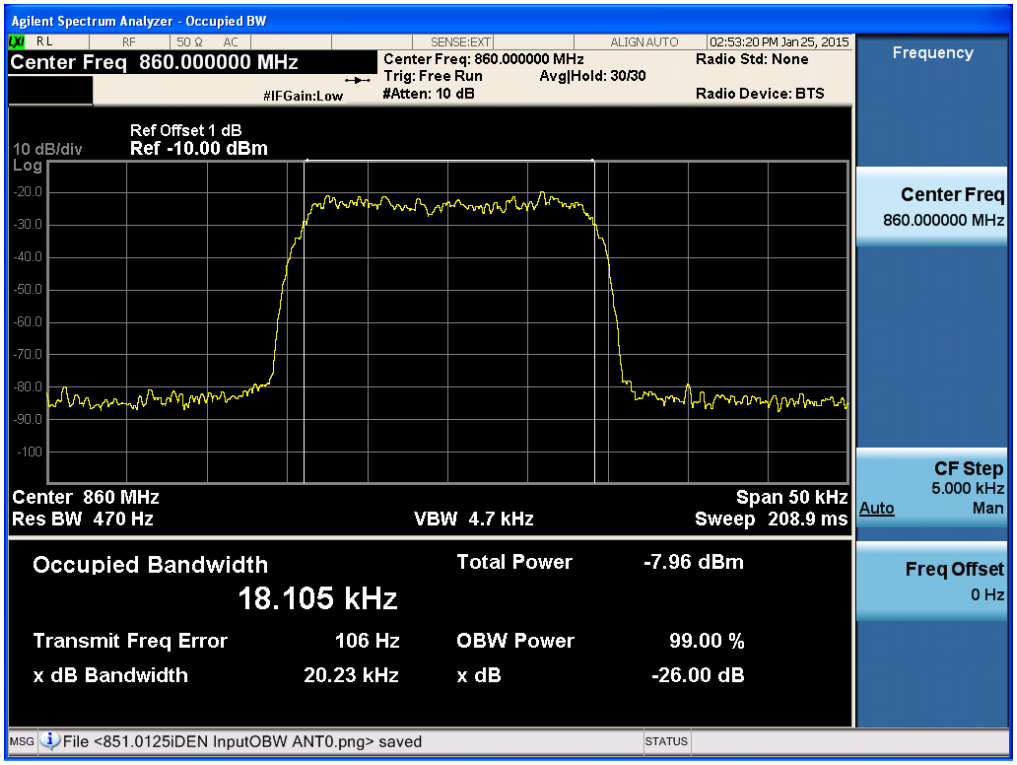
[LTE 5 MHz Output]



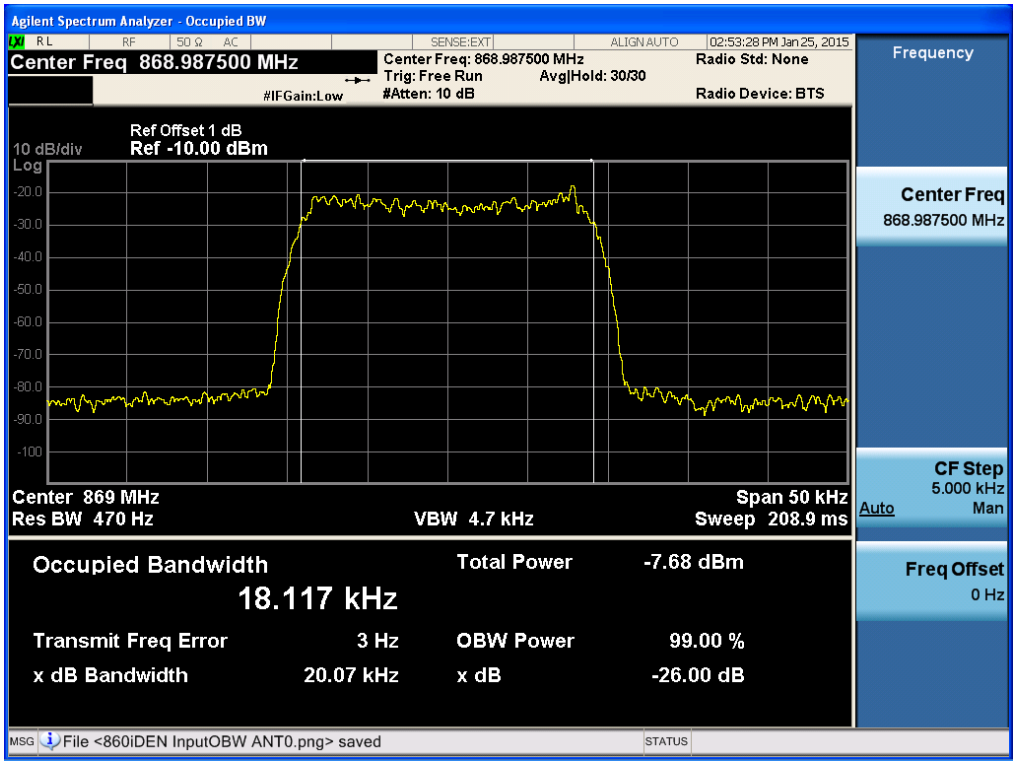
[iDEN Input Low]



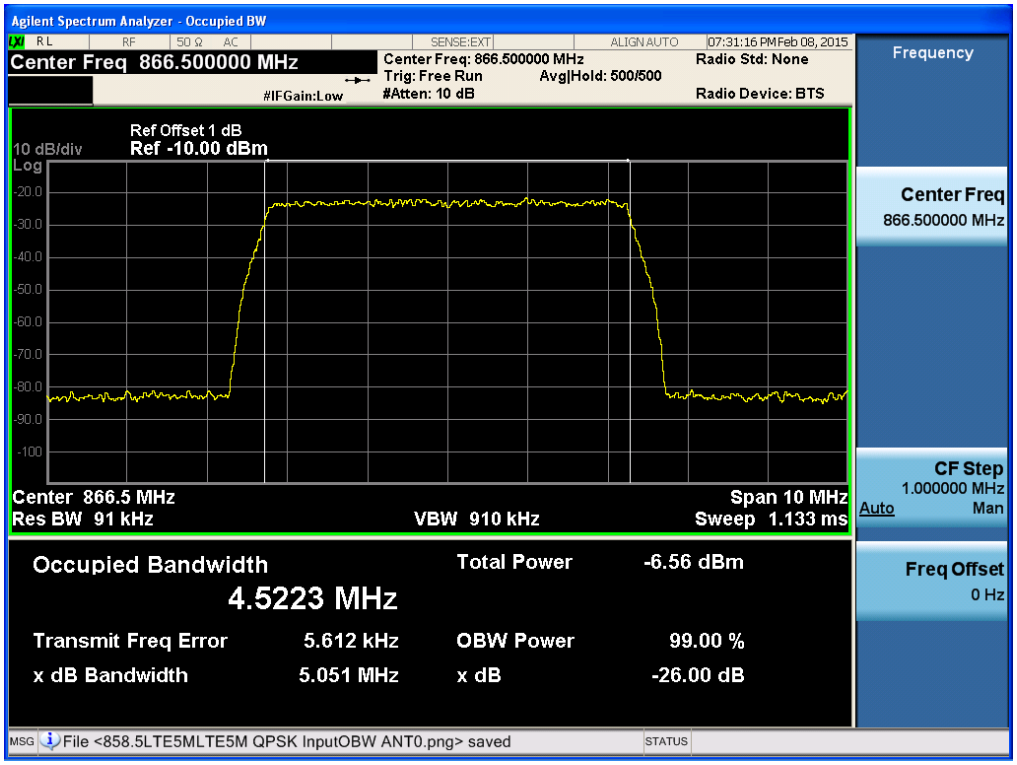
[iDEN Input Middle]



[iDEN Input High]

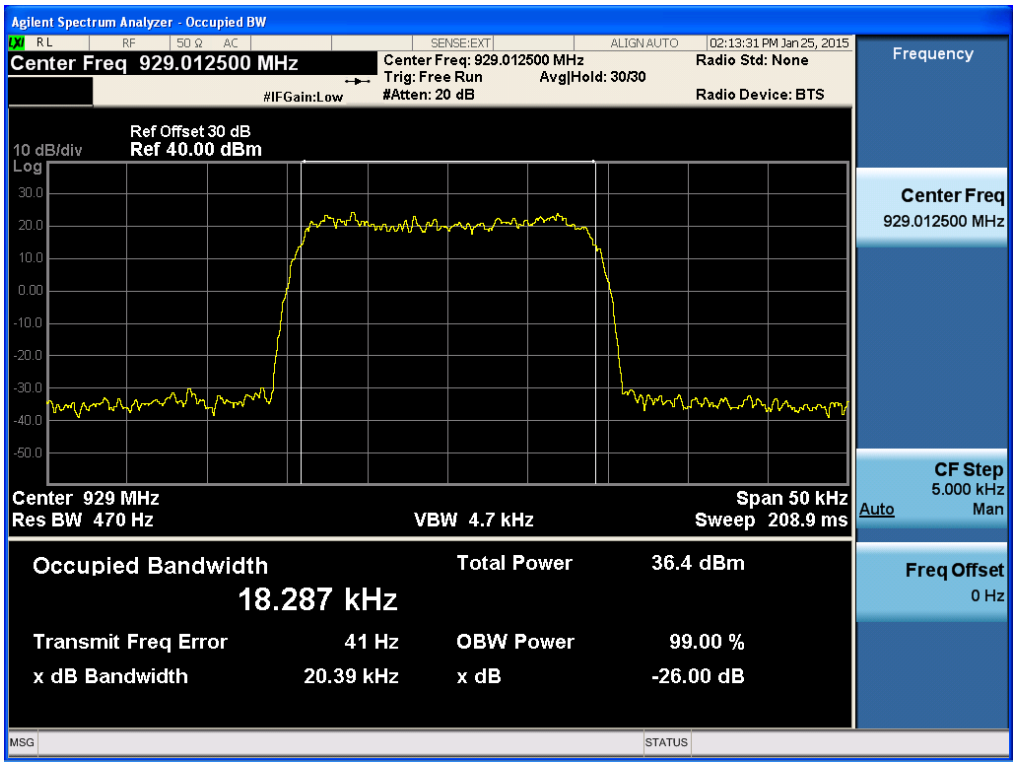


[LTE 5 MHz Input]

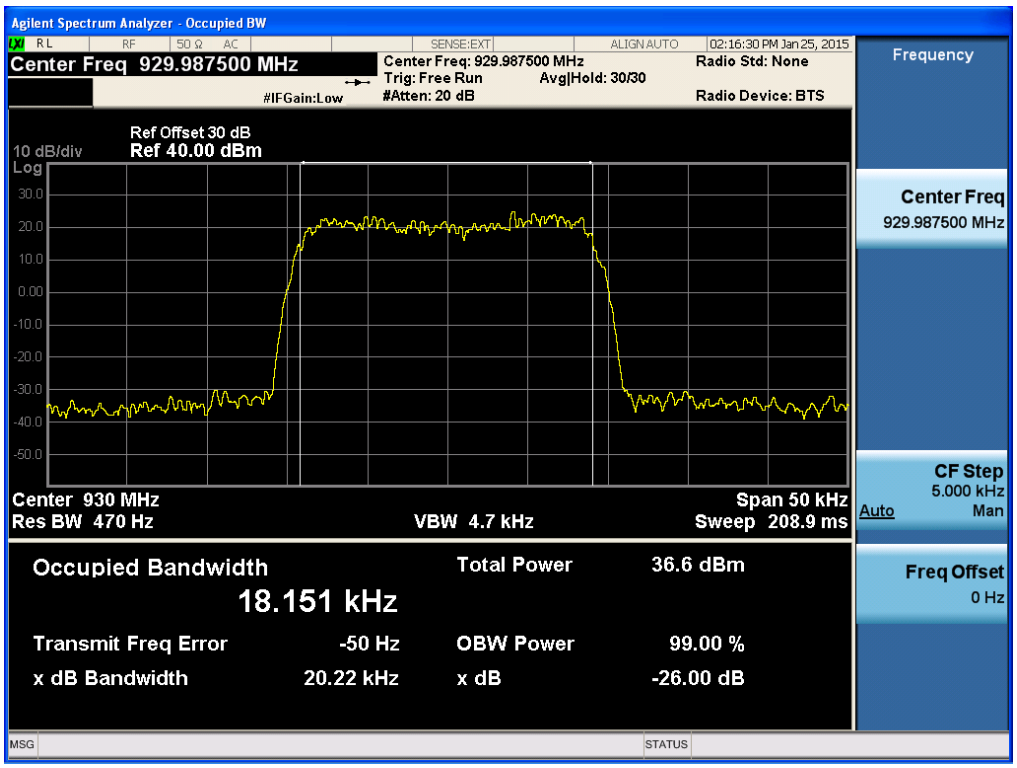


iDEN 900

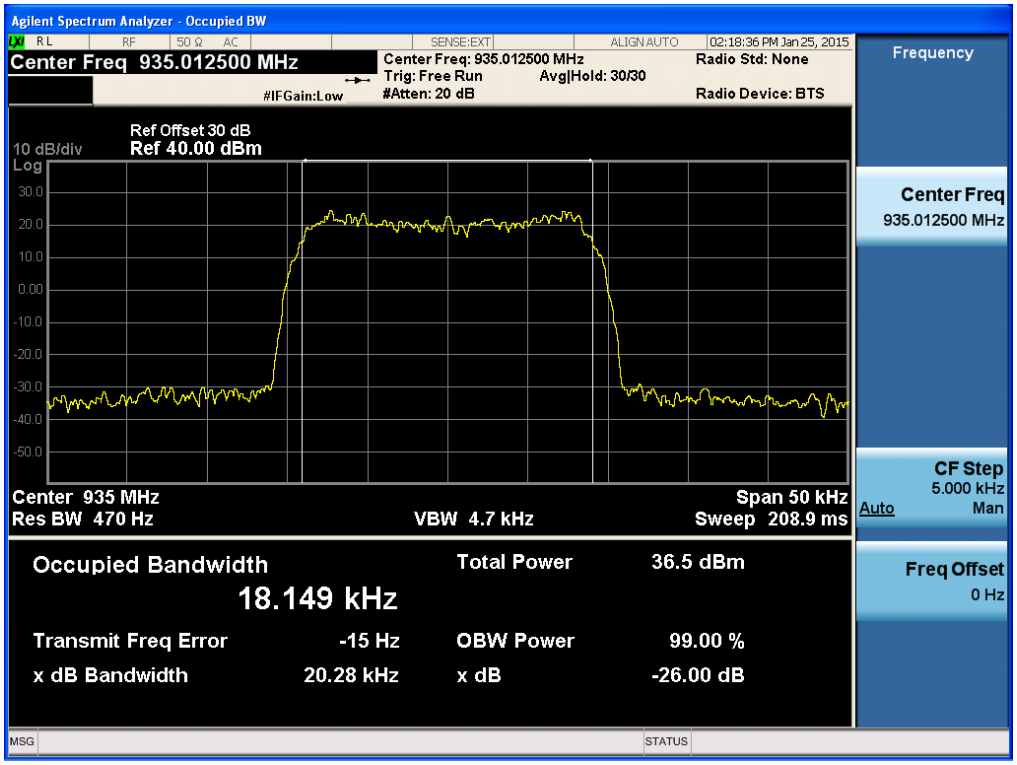
[iDEN Output 929 MHz ~ 930 MHz Low]



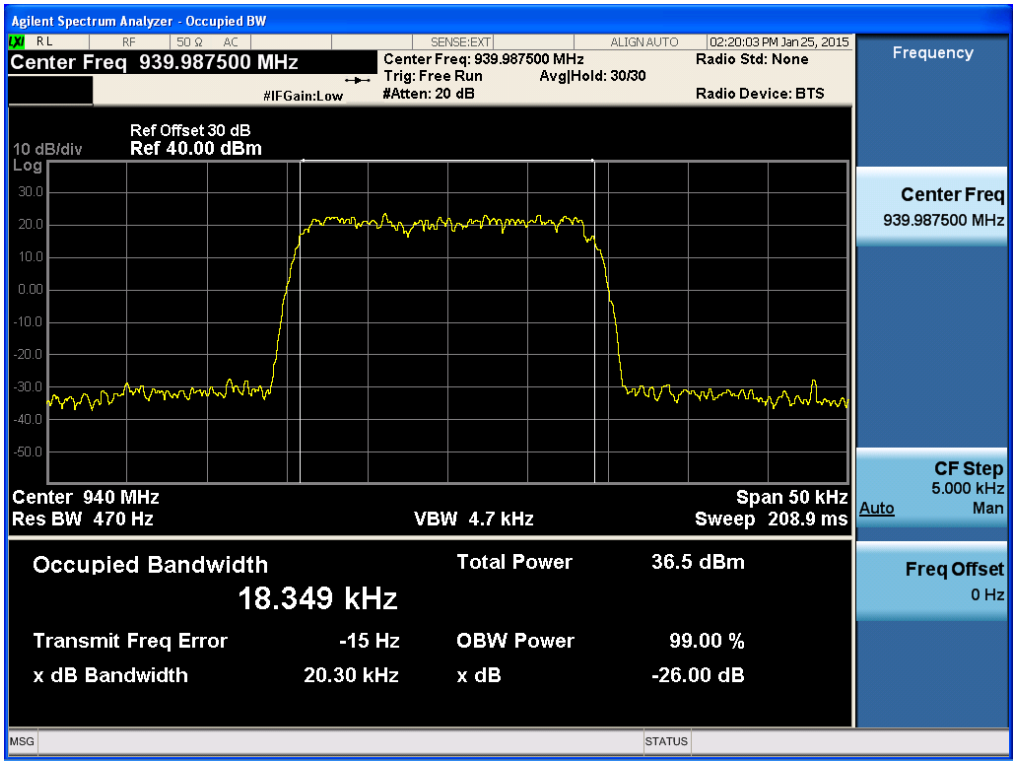
[iDEN Output 929 MHz ~ 930 MHz High]



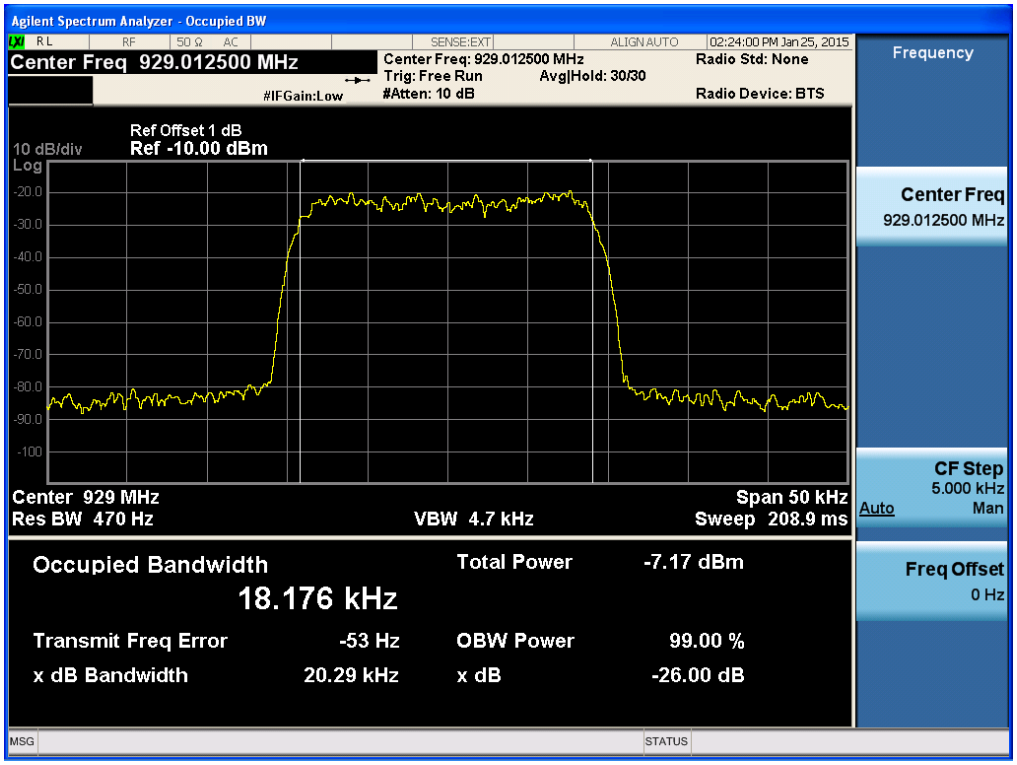
[iDEN Output 935 MHz ~ 940 MHz Low]



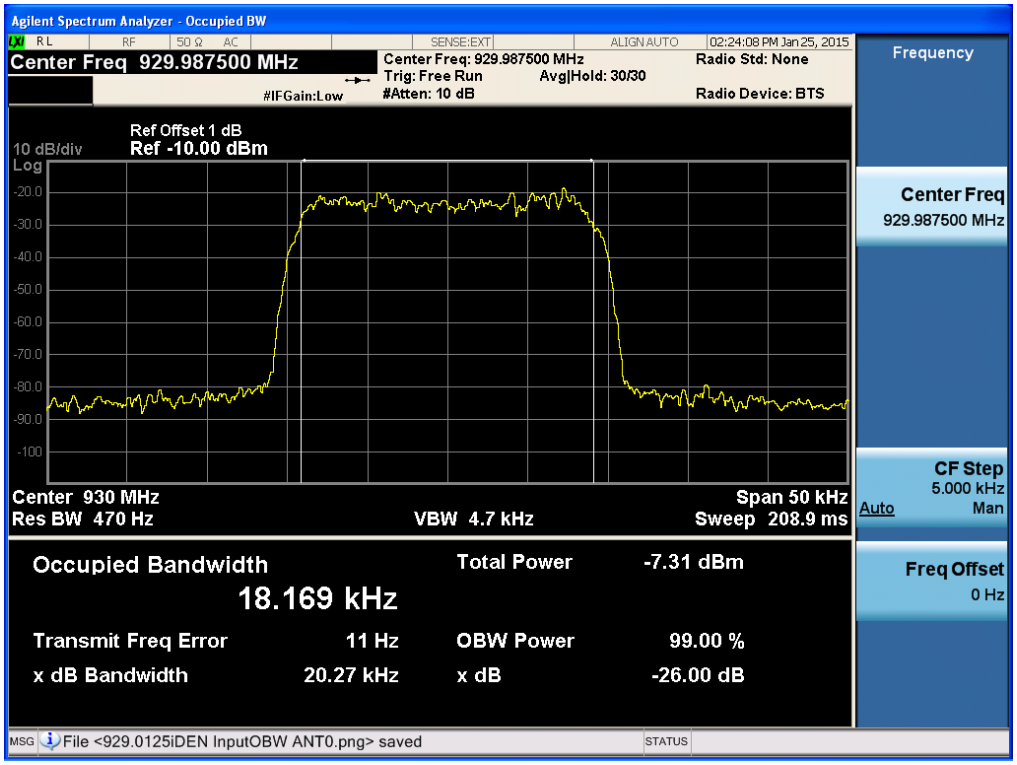
[iDEN Output 935 MHz ~ 940 MHz High]



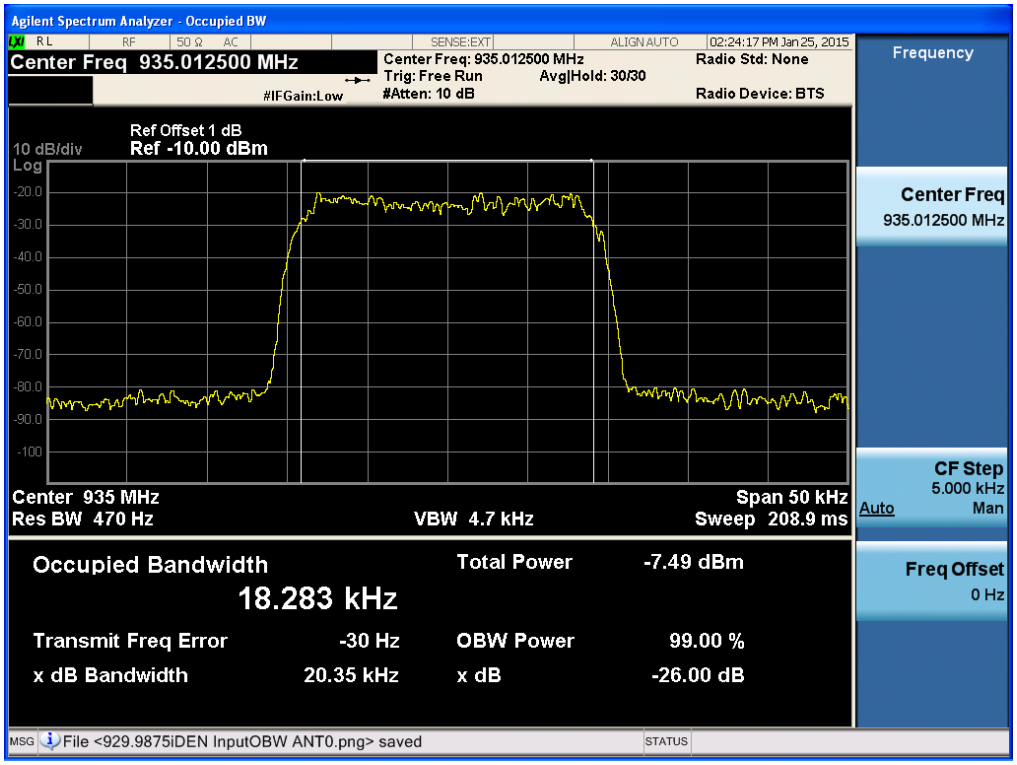
[IDEN Input 929 MHz ~ 930 MHz Low]



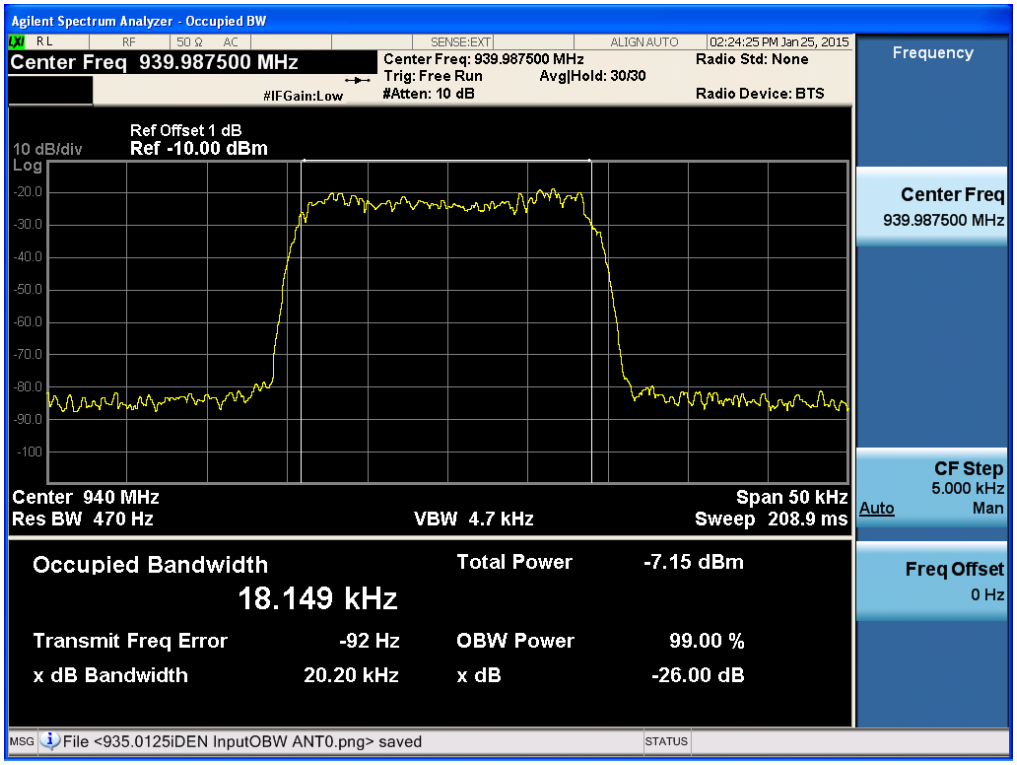
[IDEN Input 929 MHz ~ 930 MHz High]



[IDEN Input 935 MHz ~ 940 MHz Low]

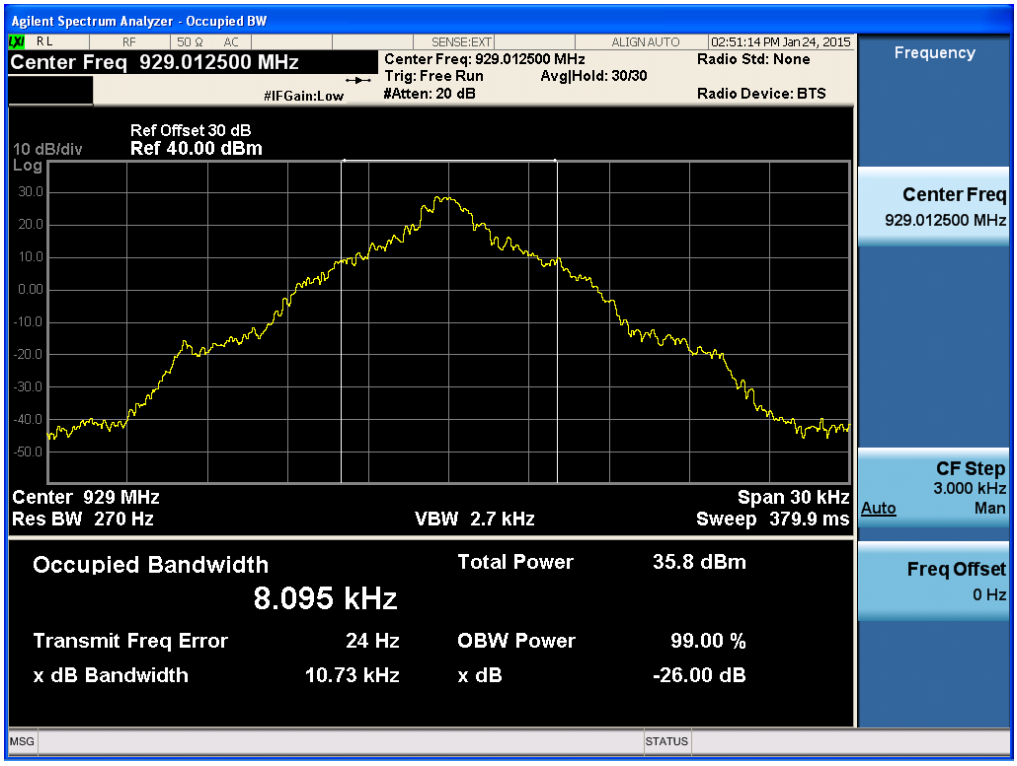


[Part 90 Input 935 MHz ~ 940 MHz High]

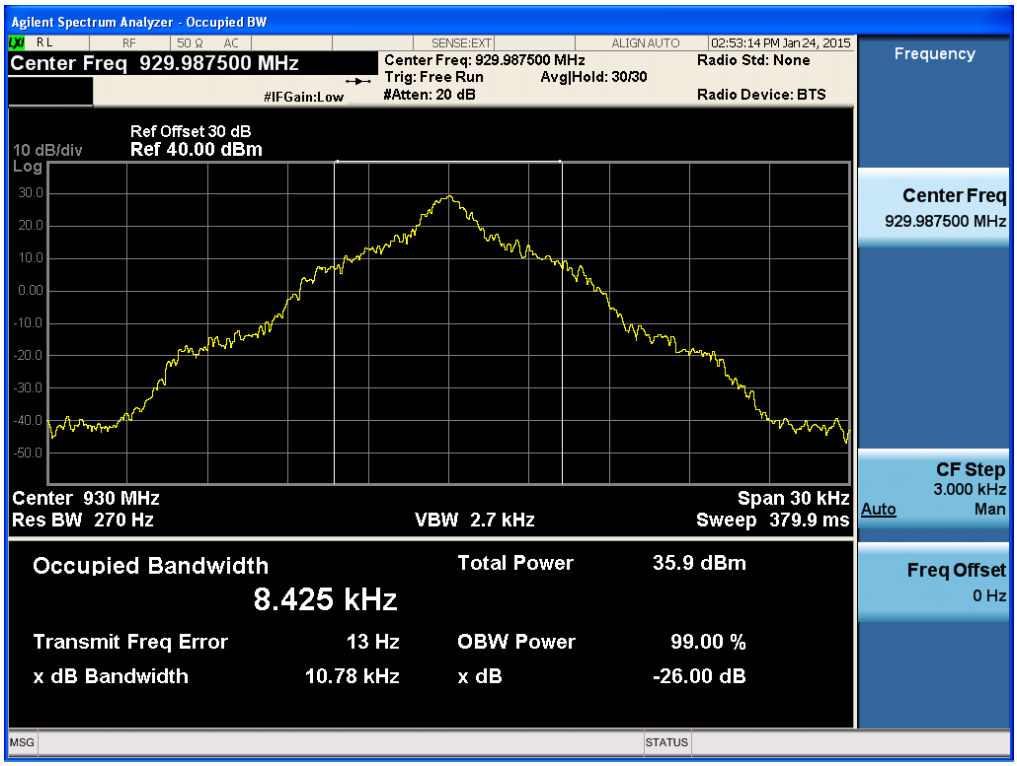


FSK

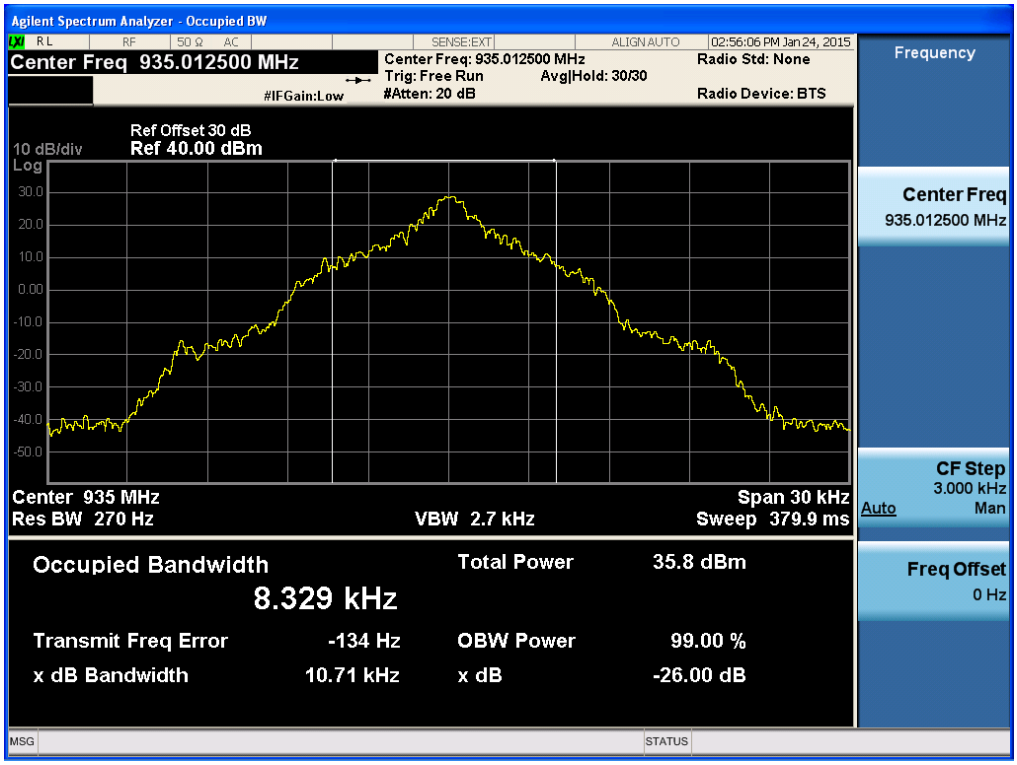
[FSK Output 929 MHz ~ 930 MHz Low]



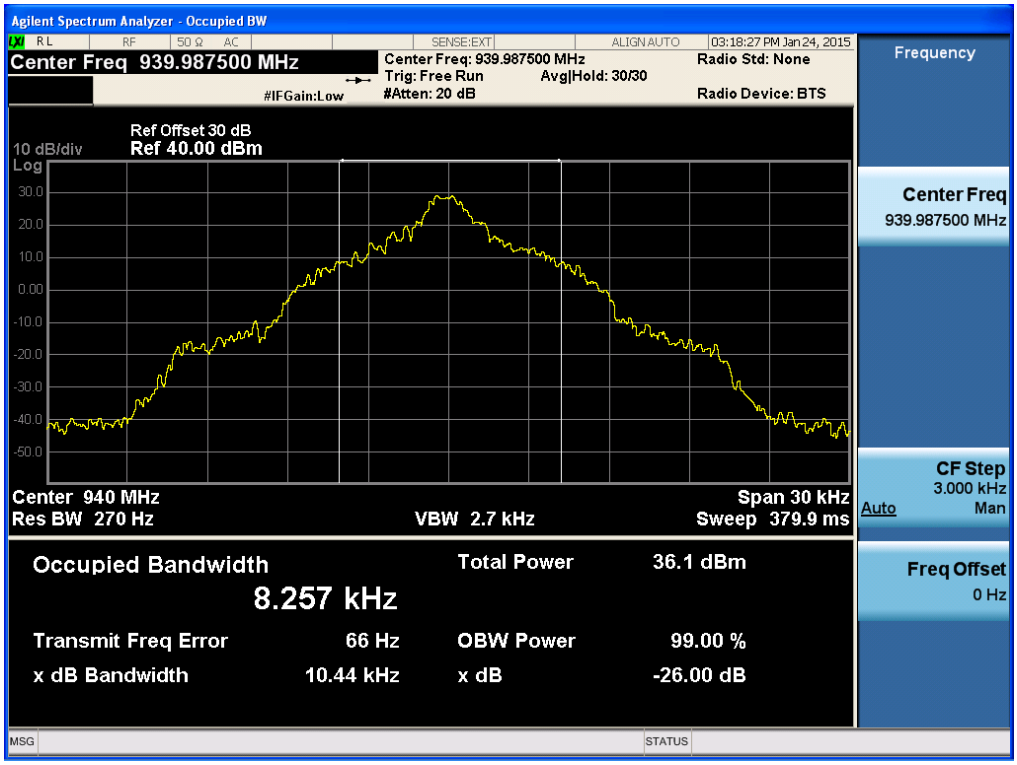
[FSK Output 929 MHz ~ 930 MHz High]



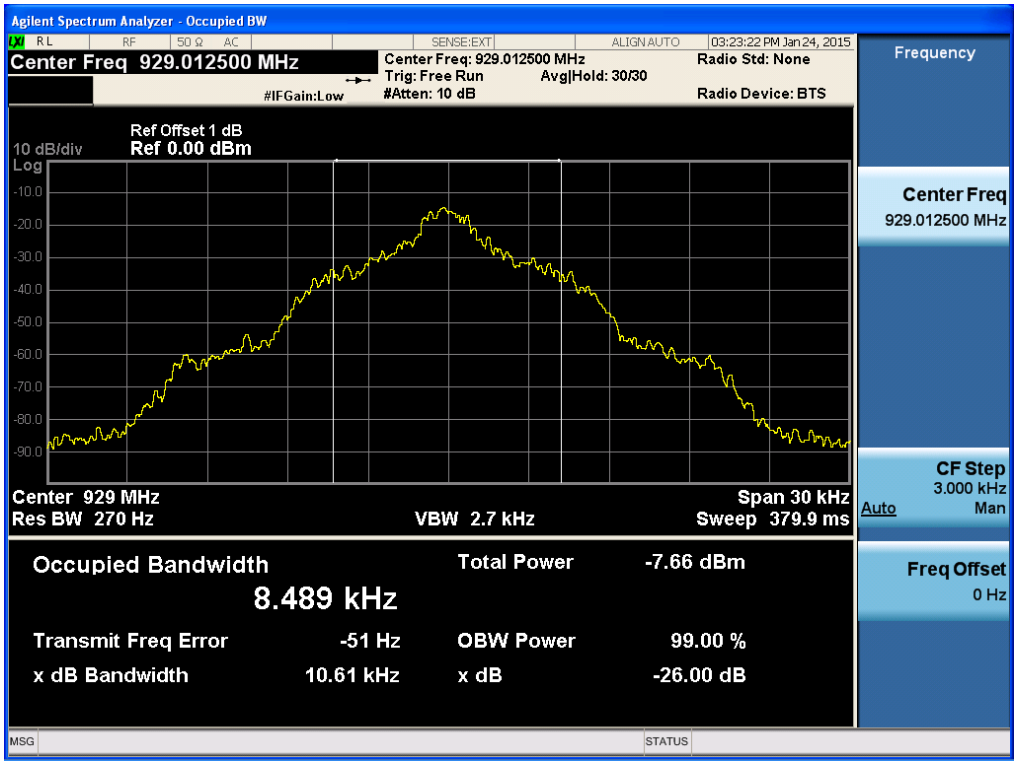
[FSK Output 935 MHz ~ 940 MHz Low]



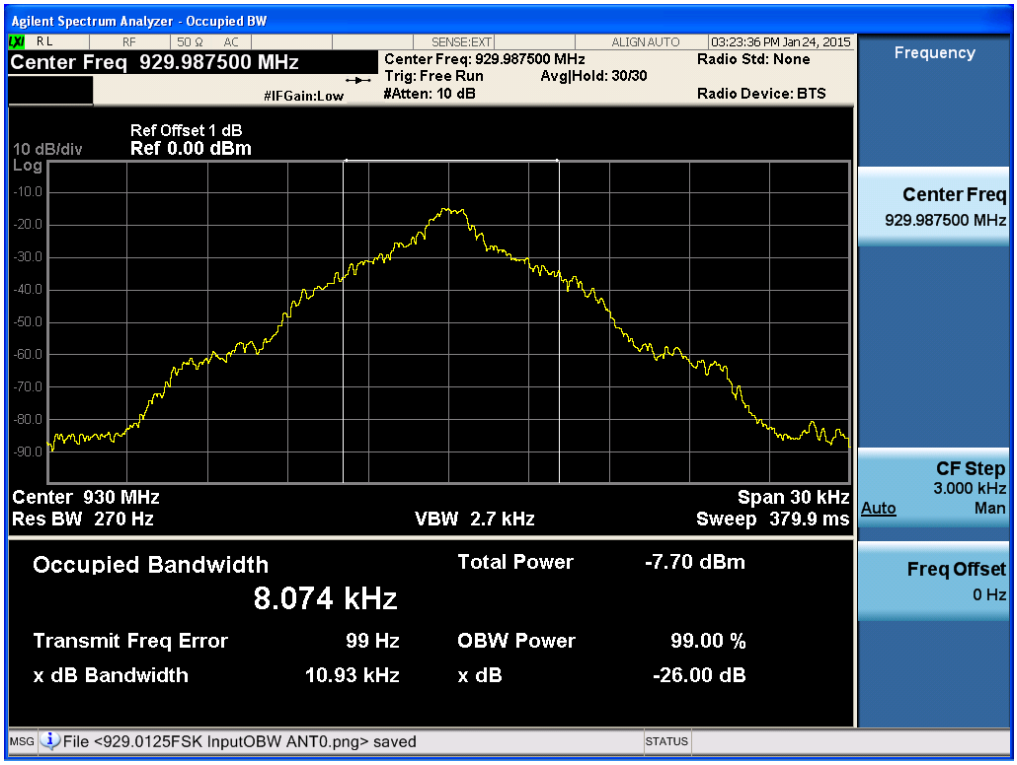
[FSK Output 935 MHz ~ 940 MHz High]



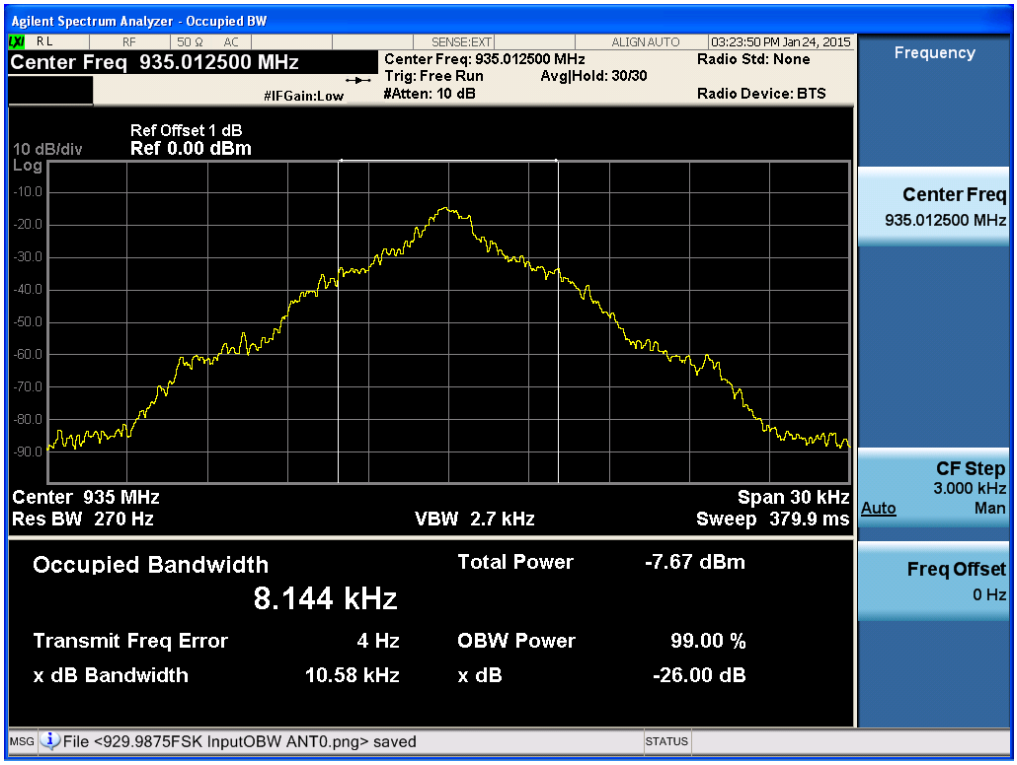
[FSK Input 929 MHz ~ 930 MHz Low]



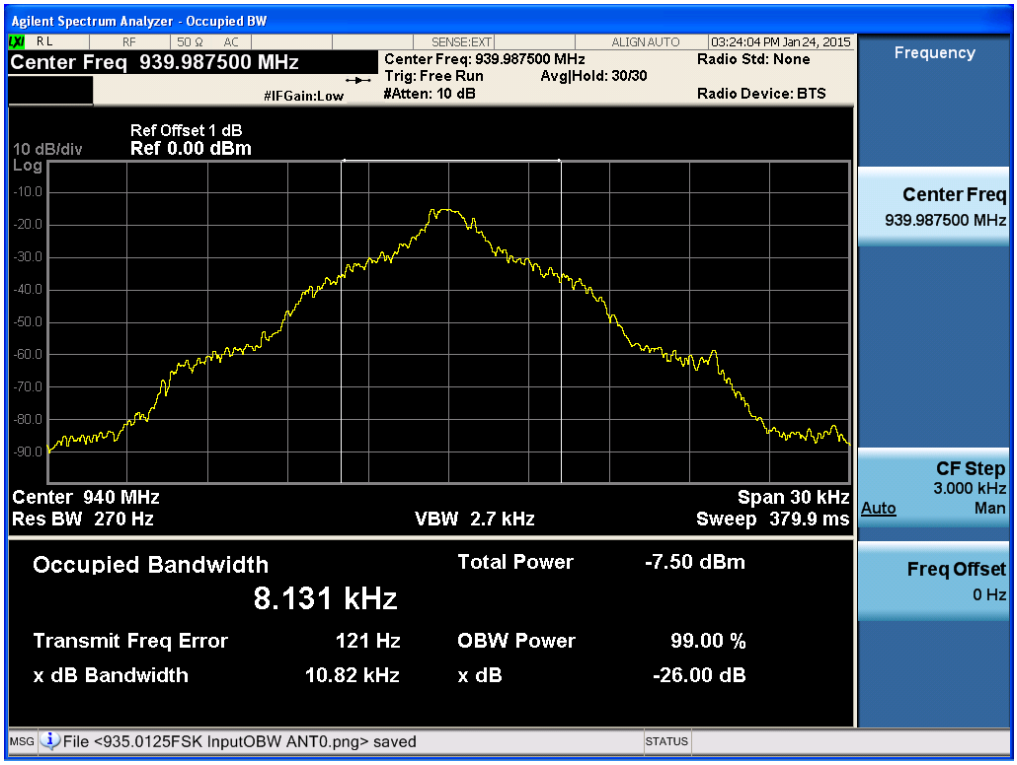
[FSK Input 929 MHz ~ 930 MHz High]



[FSK Input 935 MHz ~ 940 MHz Low]

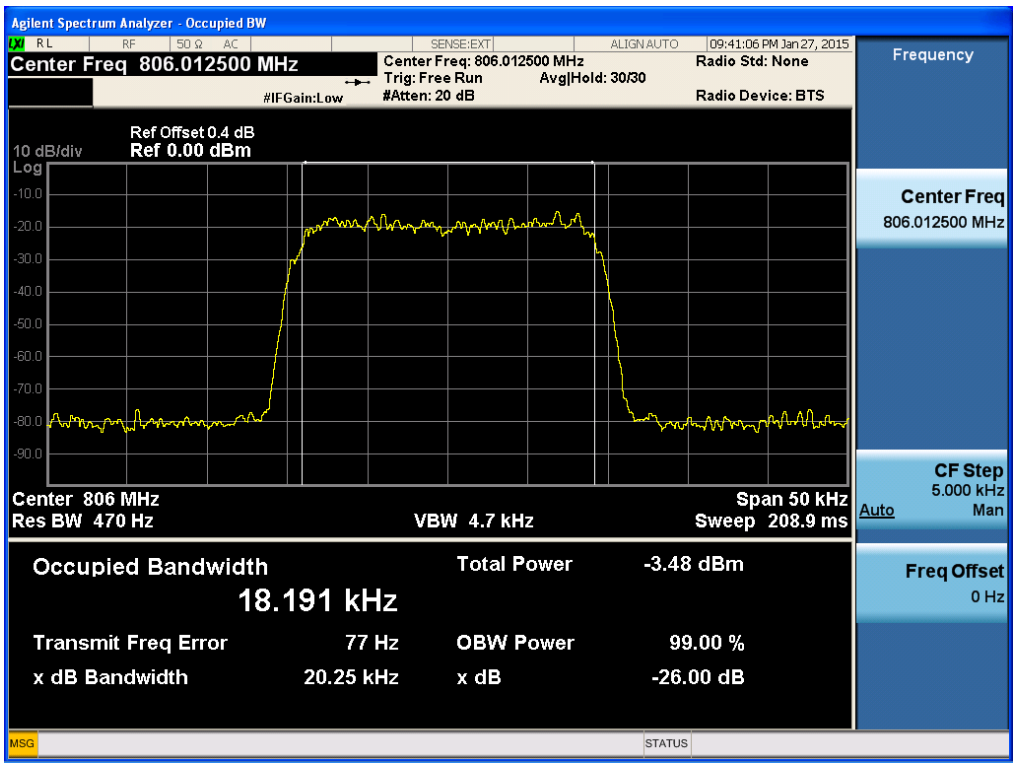


[Part 90 Input 935 MHz ~ 940 MHz High]



Plots of Occupied Bandwidth_Uplink
iDEN 800

[iDEN Output Low]



[iDEN Output Middle]