HCT CO.,LTD
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REPORT

FCC Certification

Manufacture; **10, 9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, South Korea** **SOLiD. Inc.**	**Date of Issue : May 11, 2015** **Test Report No.: HCT-R-1411-F026-4** **Test Site: HCT CO., LTD.** **IC Recognition No.: 5944A-3**

FCC ID: **IC:** **APPLICANT:**	**W6UHM900I** **9354A-HM900I** **SOLiD, Inc.**
FCC/ IC Model Name:	**MRDU- 900I**
EUT Type:	**RDU (Remote Drive Unit)**
Frequency Ranges:	**929 MHz ~ 941 MHz**
Conducted Output Power:	**5 W (37 dBm)**
Date of Test :	**September 02, 2014 ~ September 14, 2014** **November 12, 2014(only Noise Figure test)** **January 27, 2015 (Only Emission Mask test)**
FCC Rules Part(s):	**CFR 47, Part 24 Subpart D, Part90**
IC Rules :	**RSS-Gen (Issue 3, December 2010) , 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 24, Part90 of the FCC Rules under normal use and maintenance.

Report prepared by : Yong Hyun Lee
Engineer of RF Team

Report approved by : Sang Jun Lee
Manager of RF Team

Report Revision

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1411-F026	November 26, 2014	- First Approval Report
HCT-R-1411-F026-1	December 15, 2014	- Revised FCC Rules. §24.235 => §24.135, §90.135 => §90.213, §24.238 => §24.133
HCT-R-1411-F026-2	January 28, 2015	- Added 'Mask G, Mask J' test result
HCT-R-1411-F026-3	February 11, 2015	- Added 'SRSP' Rules. SRSP-504, SRSP-506, SRSP-509
HCT-R-1411-F026-4	May 11, 2015	- Revised 'Nosie Figure' test procedures

Table of Contents

1. CLIENT INFORMATION

The EUT has been tested by request of

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

■ FCC ID: **W6UHM900I**

■ IC: **9354A-HM900I**

■ APPLICANT: **SOLiD, Inc.**

■ EUT Type: **RDU (Remote Drive Unit)**

■ Model: **MRDU- 900I**

■ Frequency Ranges: **929 MHz ~ 941 MHz**

■Conducted Output Power: **5 W (37 dBm)**

■ Antenna Gain(s) : **Manufacturer does not provide an antenna.**

■ FCC Rules Part(s): **CFR 47, Part 24 Subpart D, Part90**

■ IC Rules Part(s): **RSS-Gen (Issue3, December 2010), 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 Part 24 and Part90, RSS-GEN, RSS-131.

Description	Reference (FCC)	Reference (IC)	Results
Conducted RF Output Power	§2.1046; §24.132 §90.494; §90.635	RSS-131, Section 4.3 RSS-131, Section 6.2 SRSP-504, SRSP-506 SRSP-509	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, §24.133 §90.669	RSS-131, Section 4.4 RSS-131, Section 6.3 RSS-131, Section 6.4	Compliant
Radiated Spurious Emissions	§2.1053, §24.133 §90.669	-	Compliant
Frequency Stability	§2.1055, §24.135 §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
929 MHz - 930 MHz	iDEN(25 kHz), FSK(12.5 kHz)
935 MHz - 940 MHz	iDEN(25 kHz), FSK(12.5 kHz)
940 MHz - 941 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	07/05/2013	1151
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.

§ 24.132 Power and antenna height limits.

(a) Stations transmitting in the 901-902 MHz band are limited to 7 watts e.r.p. **(b)** Mobile stations transmitting in the 930-931 MHz and 940-941 MHz bands are limited to 7 watts e.r.p. **(c)** Base stations transmitting in the 930-931 MHz and 940-941 MHz bands are limited to 3500 watts e.r.p. per authorized channel and are unlimited in antenna height except as provided in paragraph (d) of this section **(d) (1)** MTA and regional base stations located between 200 kilometers (124 miles) and 80 kilometers (50 miles) from their licensed service area border are limited to the power levels in the following table:

Antenna HAAT in meters (feet) (see § 24.53 for HAAT HAAT calculation method)	Effective radiated power (e.r.p.) (watts)
183 (600) and below	3500
183 (600) to 208 (682)	3500 to 2584
208 (682) to 236 (775)	2584 to 1883
236 (775) to 268 (880)	1883 to 1372
268 (880) to 305 (1000)	1372 to 1000
305 (1000) to 346 (1137)	1000 to 729
346 (1137) to 394 (1292)	729 to 531
394 (1292) to 447 (1468)	531 to 387
447 (1468) to 508 (1668)	387 to 282
508 (1668) to 578 (1895)	282 to 206
578 (1895) to 656 (2154)	206 to 150
656 (2154) to 746 (2447)	150 to 109
746 (2447) to 848 (2781)	109 to 80
848 (2781) to 963 (3160)	80 to 58
963 (3160) to 1094 (3590)	58 to 42
1094 (3590) to 1244 (4080)	42 to 31
1244 (4080) to 1413 (4636)	31 to 22
Above 1413 (4636)	16

(2) For heights between the values listed in the table, linear interpolation shall be used to determine maximum e.r.p.

(e) MTA and regional base stations located less than 80 kilometers (50 miles) from the licensed service area border must limit their effective radiated power in accordance with the following formula:

PW = 0.0175 x dkm* * 6.6666 x hm* * −3.1997

PW is effective radiated power in watts

dkm is distance in kilometers

hm is antenna HAAT in meters; see § 24.53 for HAAT calculation method

(f) All power levels specified in this section are expressed in terms of the maximum power, averaged over a 100 millisecond interval, when measured with instrumentation calibrated in terms of an rms-equivalent voltage with a resolution bandwidth equal to or greater than the authorized bandwidth (g) Additionally, PCS stations will be subject to any power limits imposed by international agreements.

§ 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	

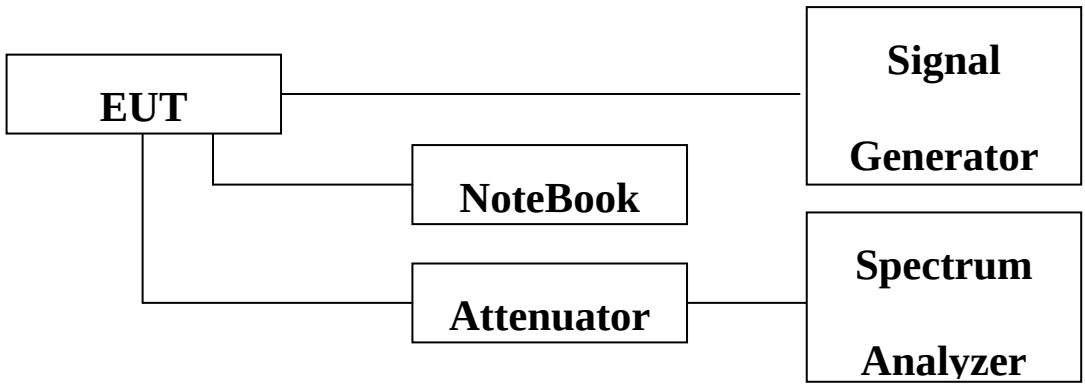
(c) All frequencies listed in this section may be used to provide one-way paging communications to persons eligible for licensing under subpart B or C of this part, representatives of Federal Government agencies, individuals, and foreign governments and their representatives. The provisions of § 90.173(b) 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
900 MHz Band	DL : -10 dBm	DL : 47 dB

IC Rules

Test Requirements:

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

SRSP-509

5. Technical Criteria

5.1 Stations transmitting in the 901-902 MHz band and all mobile stations in the 930-931 MHz and 940-941 MHz bands are limited to 7 watts effective radiated power (ERP) (11.5 watts EIRP).

5.2 In major urban areas (see Annex 1), and any other areas determined by a Regional or District

Office of the Department where there is intensive use of the 930-931 MHz and 940-941 MHz bands, base stations will be limited to 1600 watts ERP (2.6 kW EIRP) and an effective antenna height above average terrain (EHAAT) of 180 meters.

5.3 The effective height of the antenna above average terrain (EHAAT) is the average of the antenna heights above the average terrain (HAAT) for eight radials spaced every 45 degrees of azimuth starting with true north. The height of the antenna above average terrain (HAAT) is the height of the radiation centre of the antenna above the average elevation of the terrain between 3 to 16 km from the antenna.

5.4 A reduction in the above ERP is required for base station antenna heights in excess of 180 meters EHAAT as described in the table below. Notwithstanding the above, the ERP levels as specified in Section 5.2 may be maintained for the antenna main lobe provided that the ERP on the horizontal plane is reduced by the value given in the table below. This can be accomplished by such means as beam tilting.

Antenna height up to: (EHAAT) (meter)	180	210	240	270	300	360	400	>400
Power reduction: (dB)	0.0	2.9	4.1	5.1	6.0	7.6	8.5	9.0

5.5 In other areas of moderate spectrum usage (see Annex 1), or at any location outside those defined above in Section 5.2, the ERP may be up to a maximum of 2500 watts ERP (34 dBW) (4.1 kW EIRP).

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
[Downlink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
Part90	Low	929.0125	37.00	5.010
	Middle	935.0125	37.00	5.008
	High	939.9875	37.01	5.022
Part24	High	940.9875	37.04	5.057

FSK
[Downlink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
Part90	Low	929.0125	37.04	5.058
	Middle	935.0125	37.02	5.036
	High	939.9875	37.02	5.040
Part24	High	940.9875	36.99	5.005

Multi-channel Enhancer for IC

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

The same output power is transmit.

[Downlink]

	Channel	Frequency (MHz)	Output Power	
			Po1(dBm)	Pmean(dBm)
Part90	Low	929.40	34.003	37.003
	Middle	935.40	34.000	37.000
	High	939.60	34.003	37.003
Part24	High	940.60	34.003	37.003

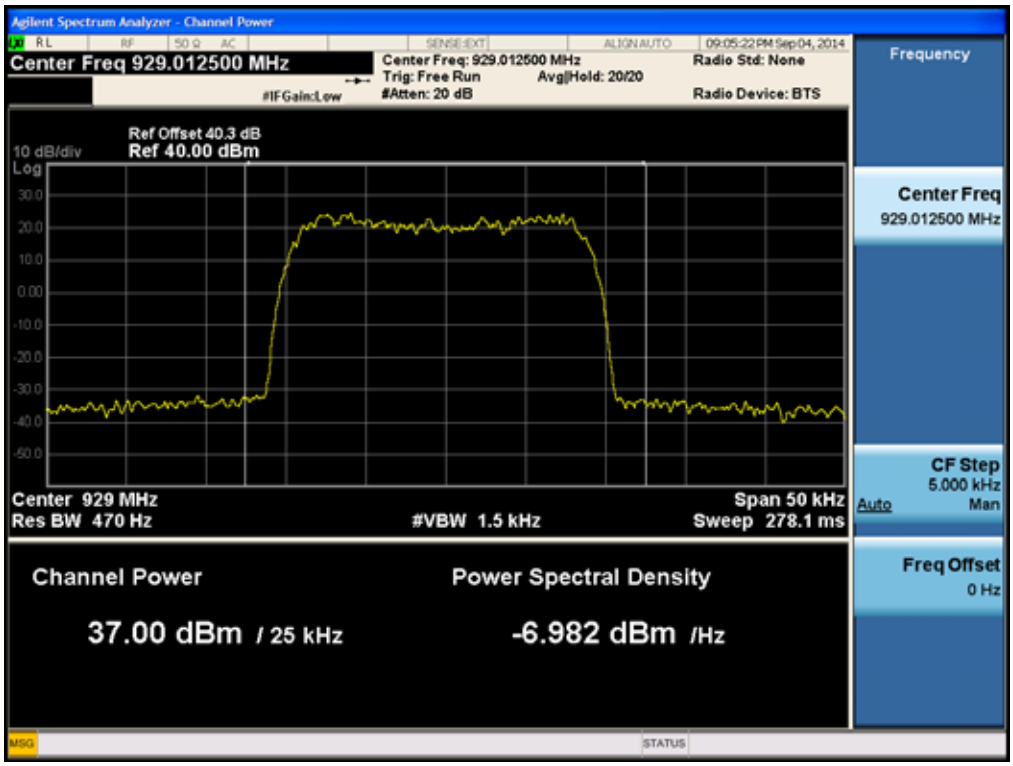
Additional Power Back-off Condition for Multiple Carrier Operations for IC

[Downlink]

	1 Carrier (dBm)	3 Carrier (dBm)	Power Back-off (dB)
900 MHz Band	37.03	32.35	4.68

Single channel Enhancer Plots of RF Output Power
iDEN

[Part90 Downlink Low]



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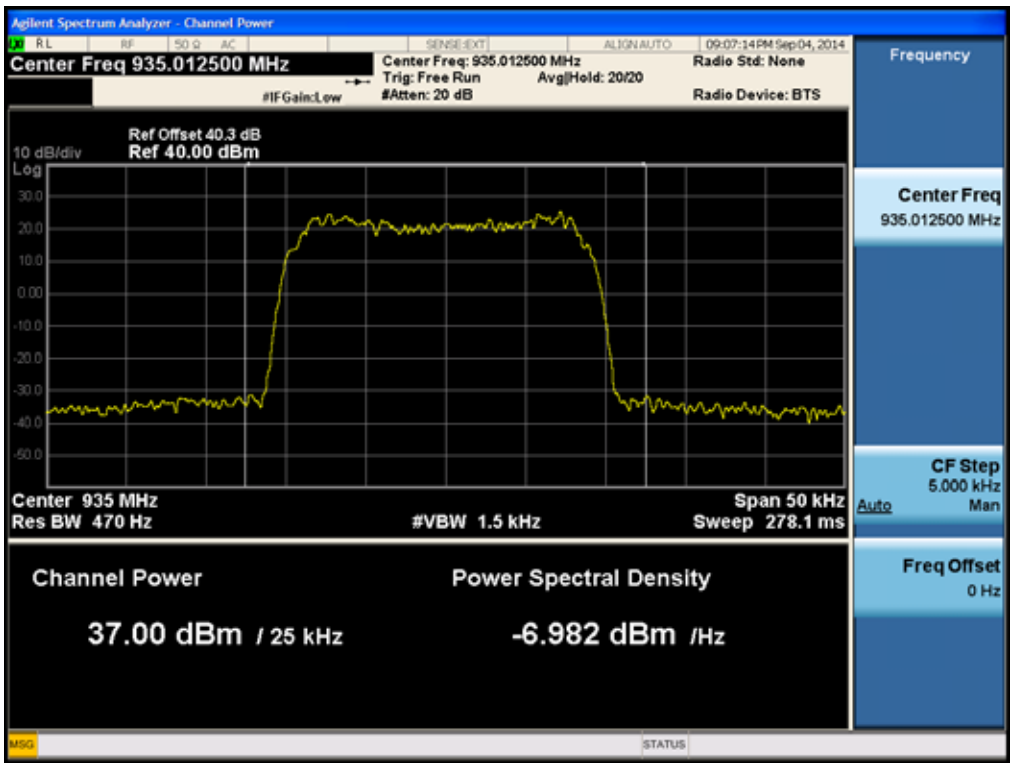

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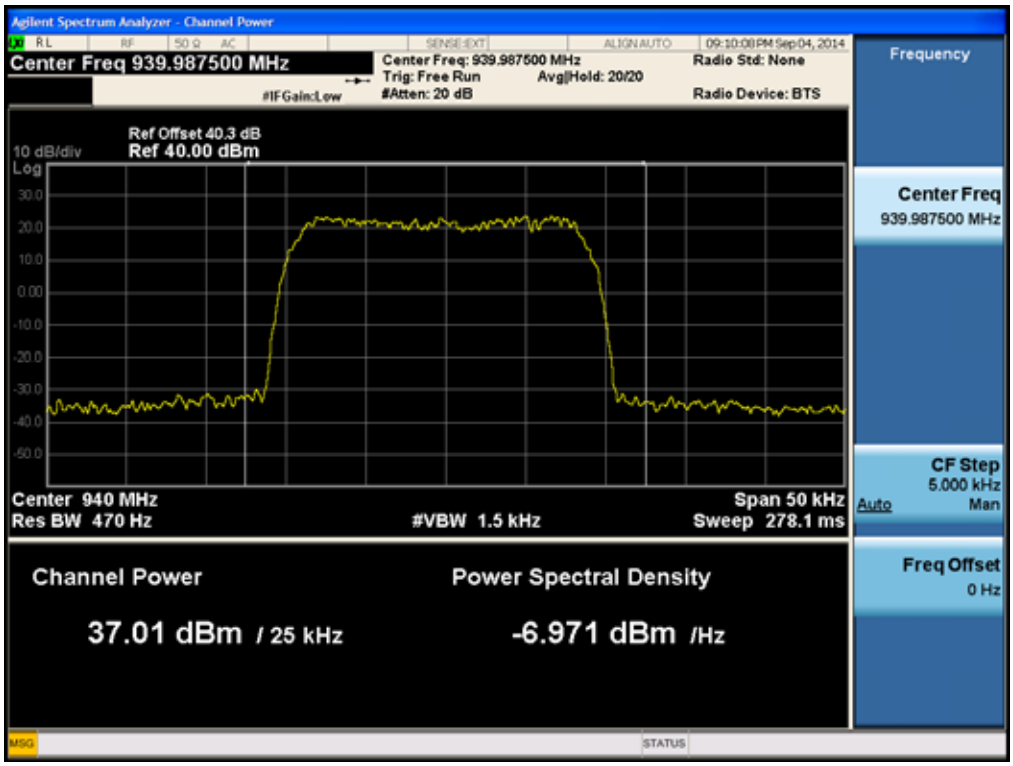

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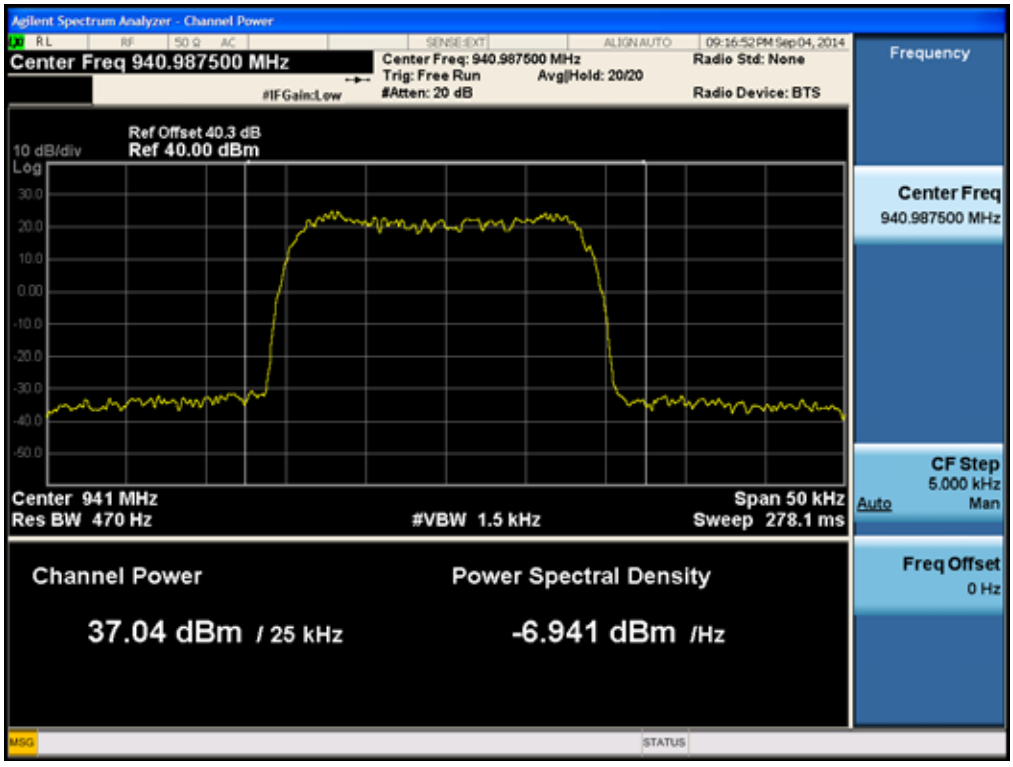
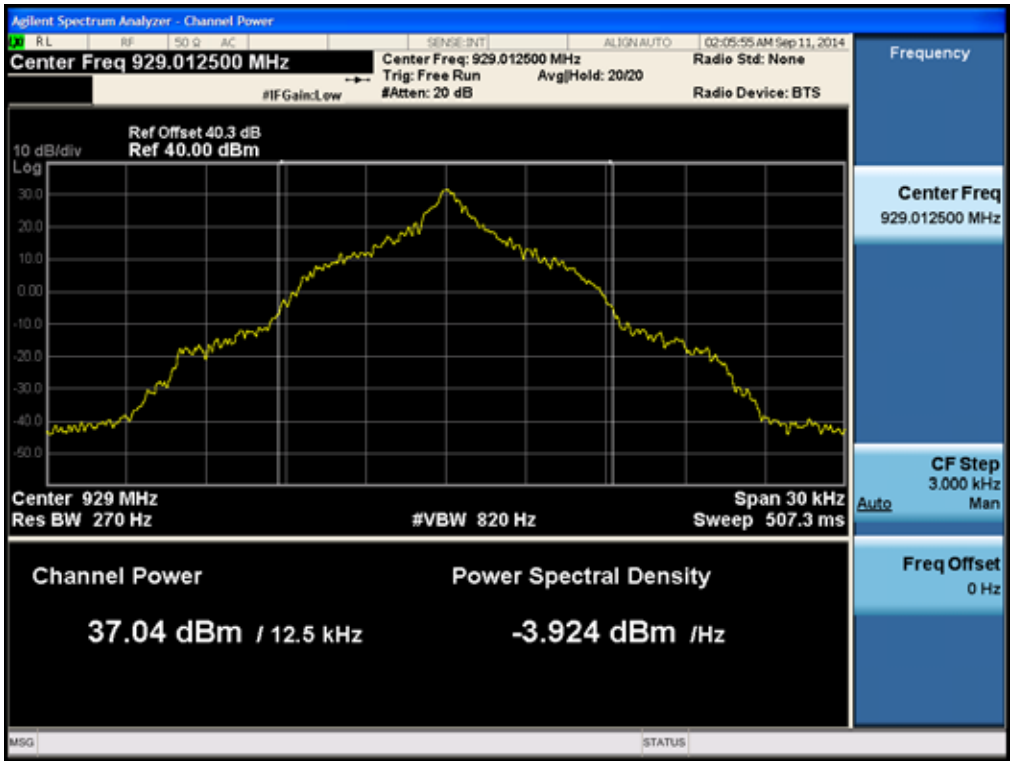


FSK

[Part90 Paging Downlink Low]



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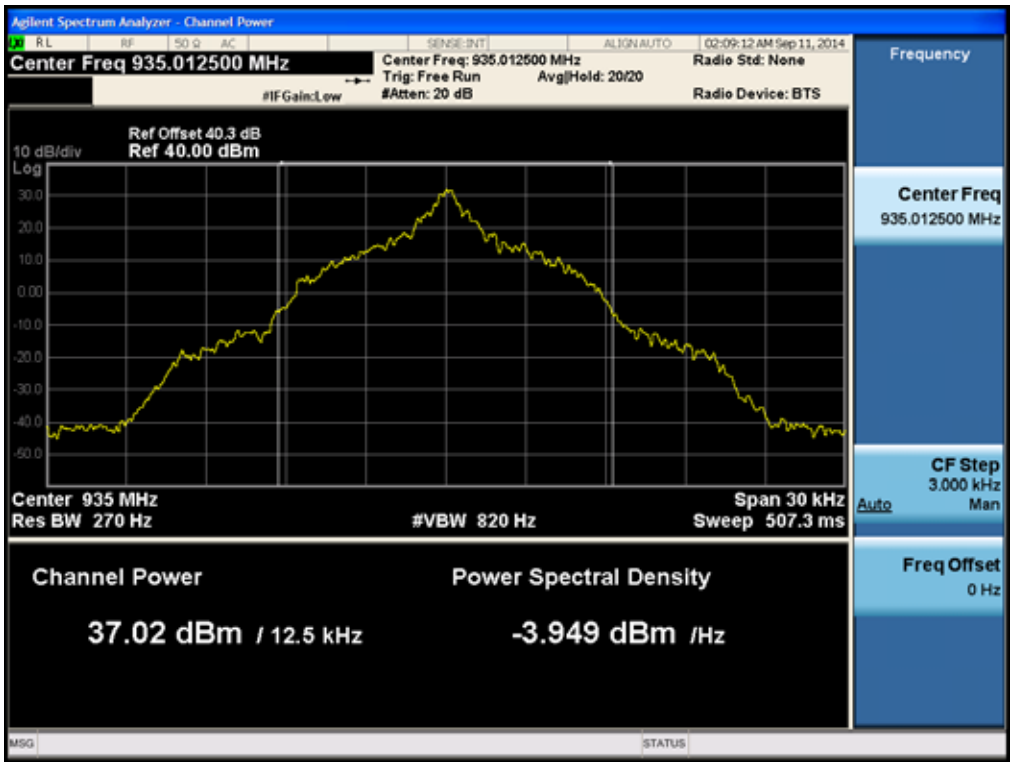

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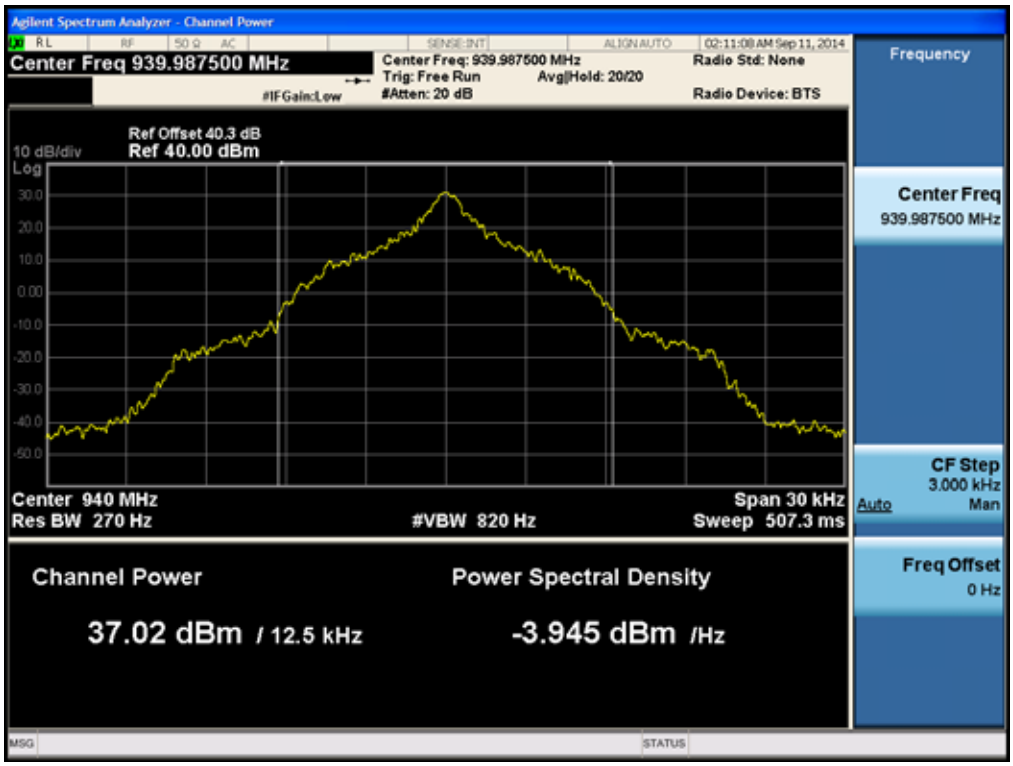

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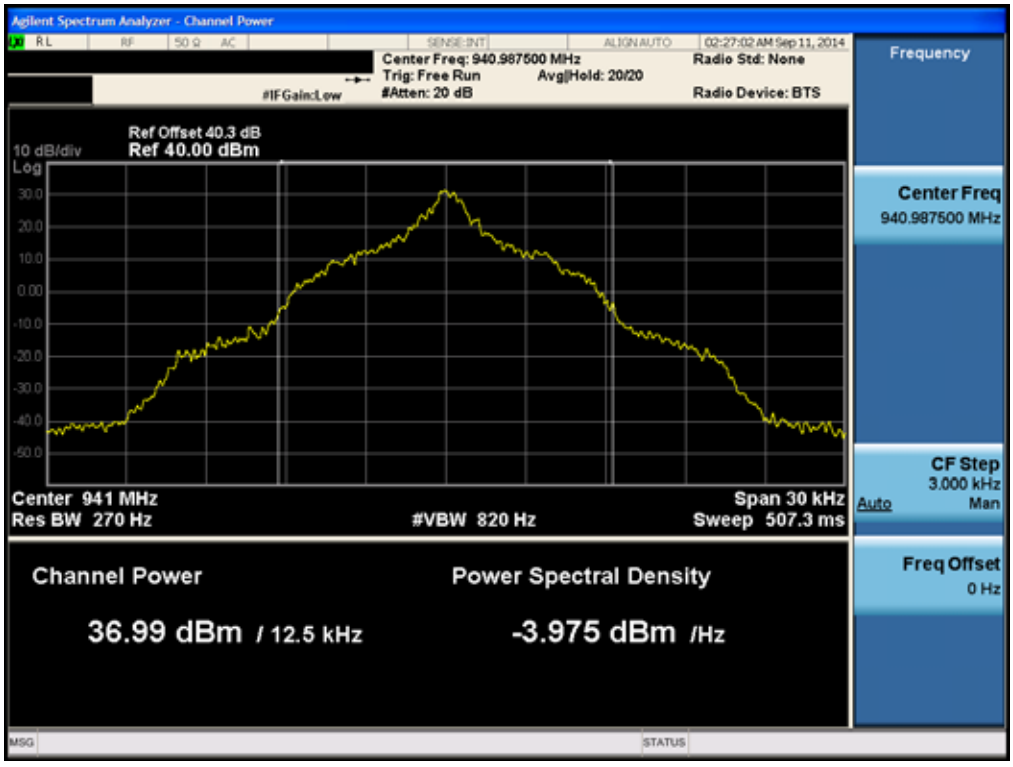
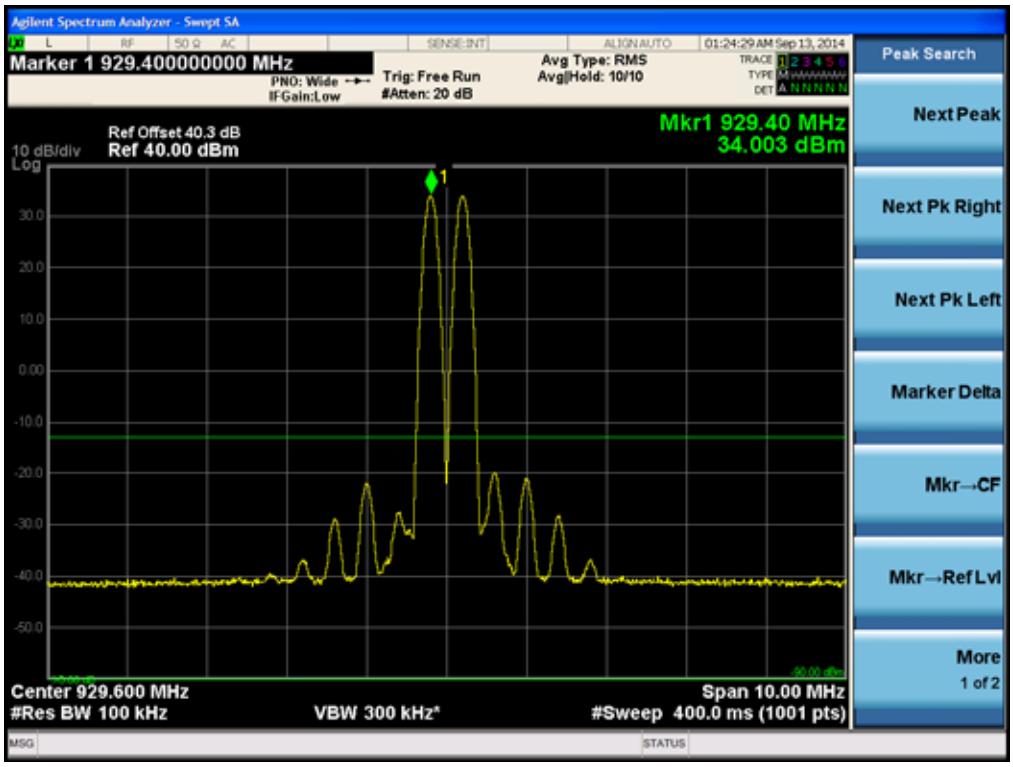


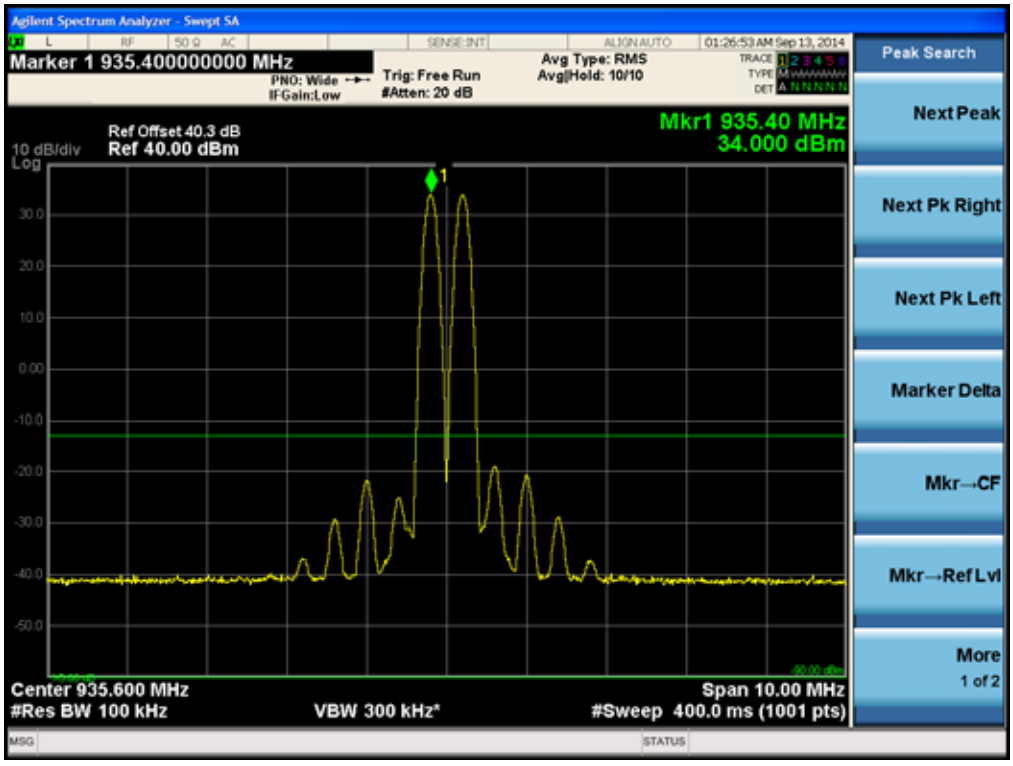
Multi-channel Enhancer for IC

900 MHz Band

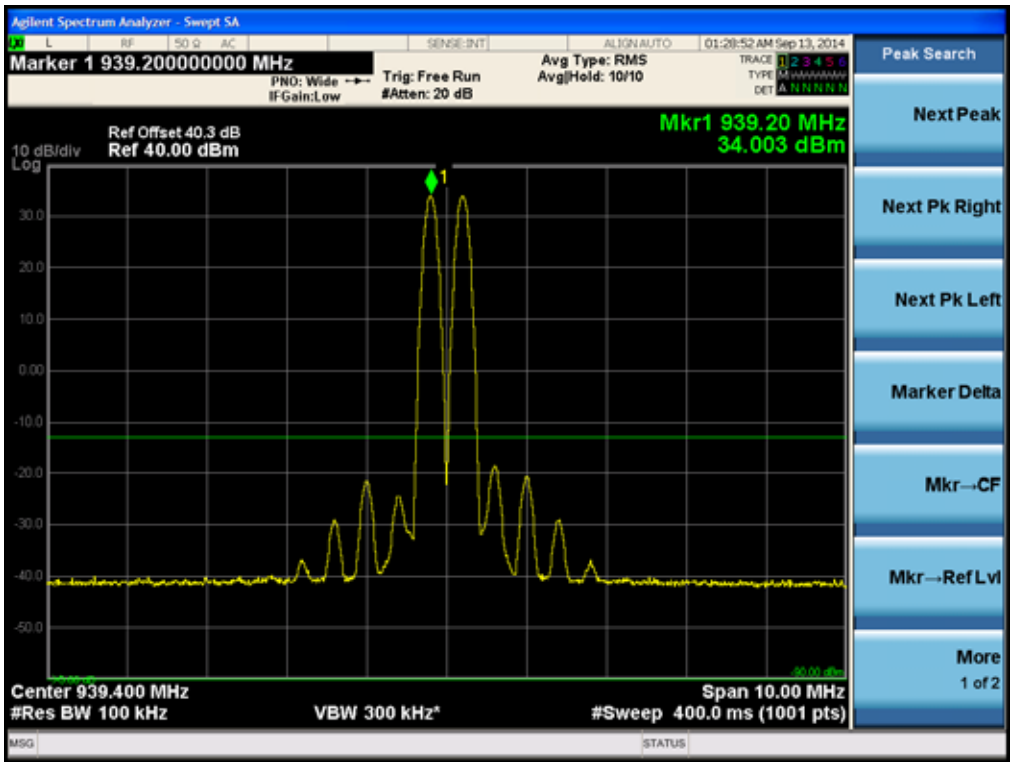
[Part90 Downlink Low]



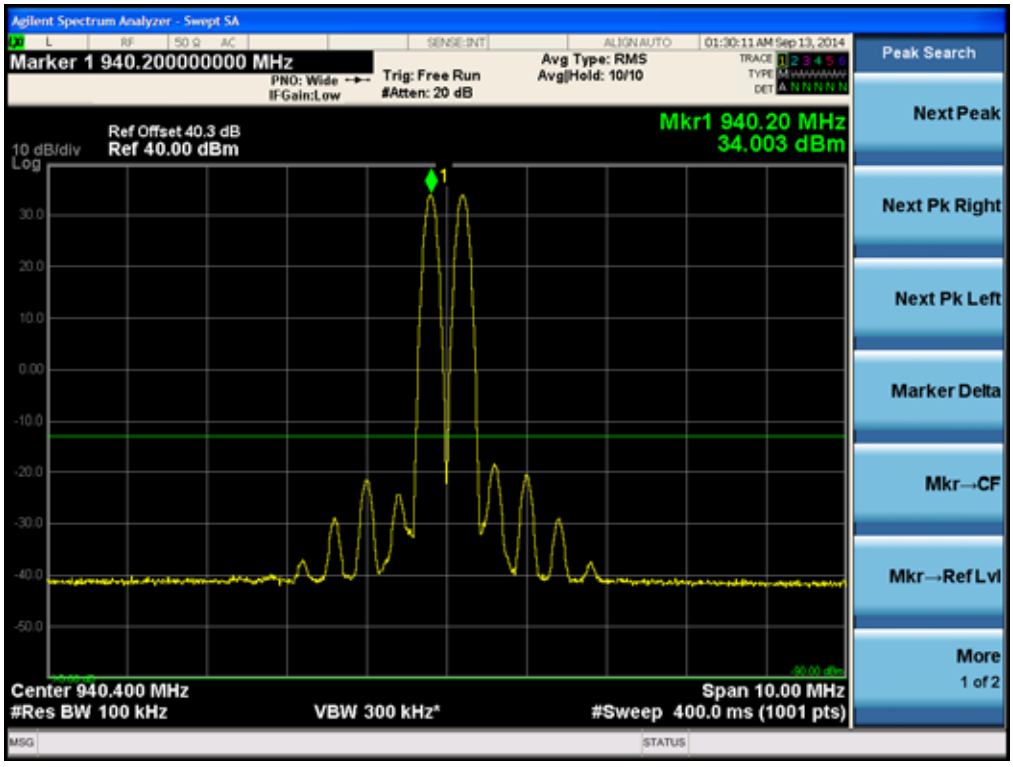
[Part90 Downlink Middle]



[Part90 Downlink High]

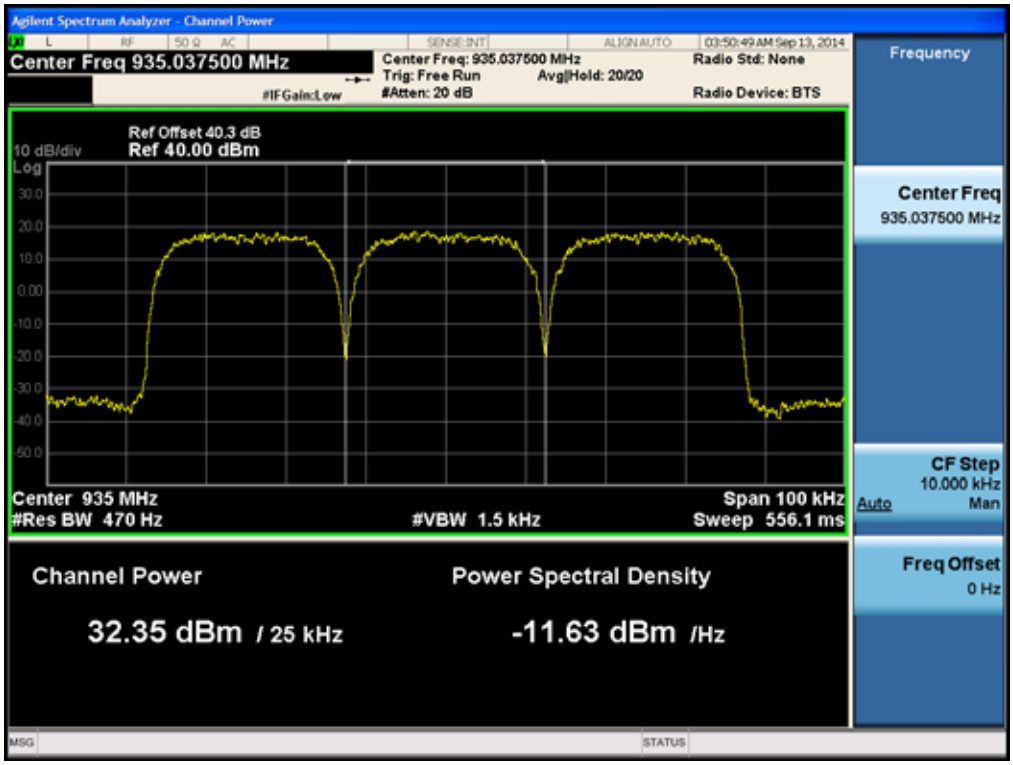


[Part24 Downlink High]



Power Back-off for IC

[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
900 MHz Band	DL : -10 dBm	DL : 47 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

[Downlink Output]

	Channel	Frequency (MHz)	OBW (kHz)
Part90	Low	929.0125	18.296
	Middle	935.0125	18.322
	High	939.9875	18.308
Part24	High	940.9875	18.238

[Downlink Input]

	Channel	Frequency (MHz)	OBW (kHz)
Part90	Low	929.0125	18.313
	Middle	935.0125	18.235
	High	939.9875	18.268
Part24	High	940.9875	18.111

FSK

[Downlink Output]

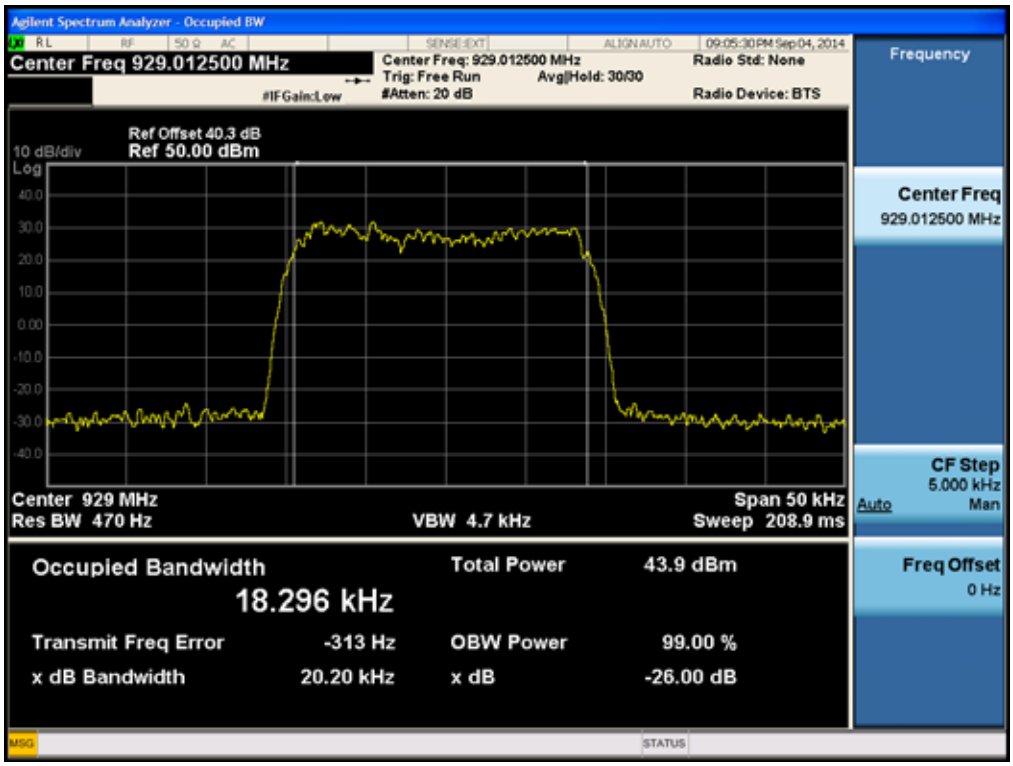
	Channel	Frequency (MHz)	OBW (kHz)
Part90	Low	929.0125	8.288
	Middle	935.0125	8.395
	High	939.9875	8.510
Part24	High	940.9875	8.227

[Downlink Input]

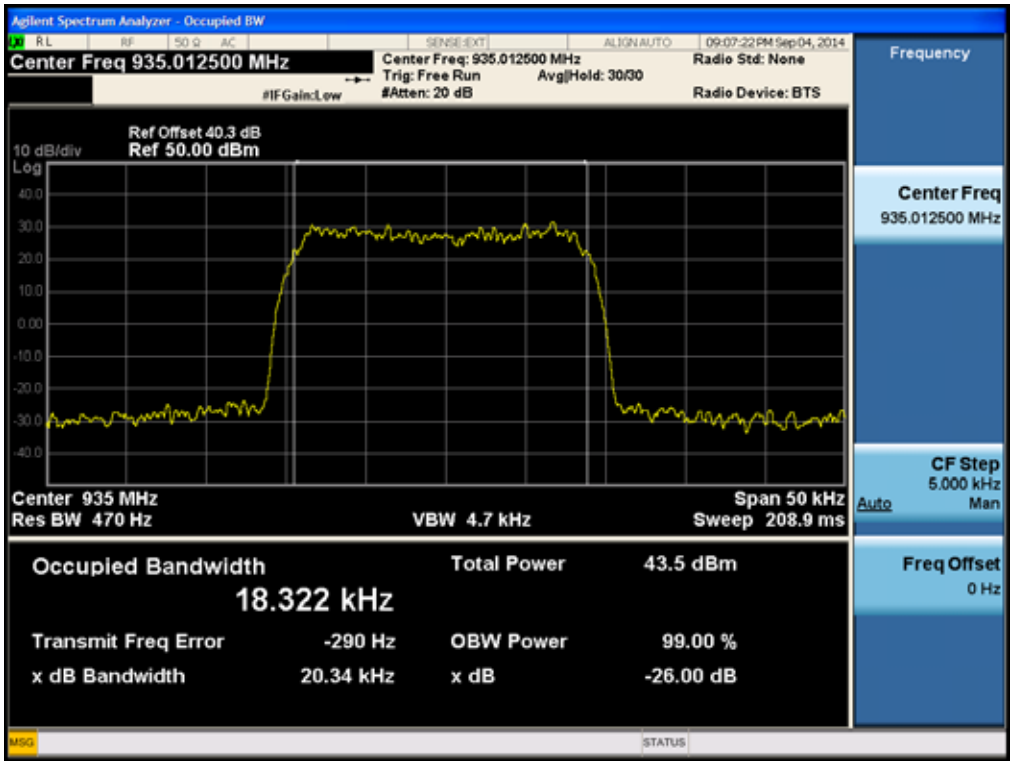
	Channel	Frequency (MHz)	OBW (kHz)
Part90	Low	929.0125	8.258
	Middle	935.0125	8.224
	High	939.9875	8.314
Part24	High	940.9875	8.386

Plots of Occupied Bandwidth
iDEN

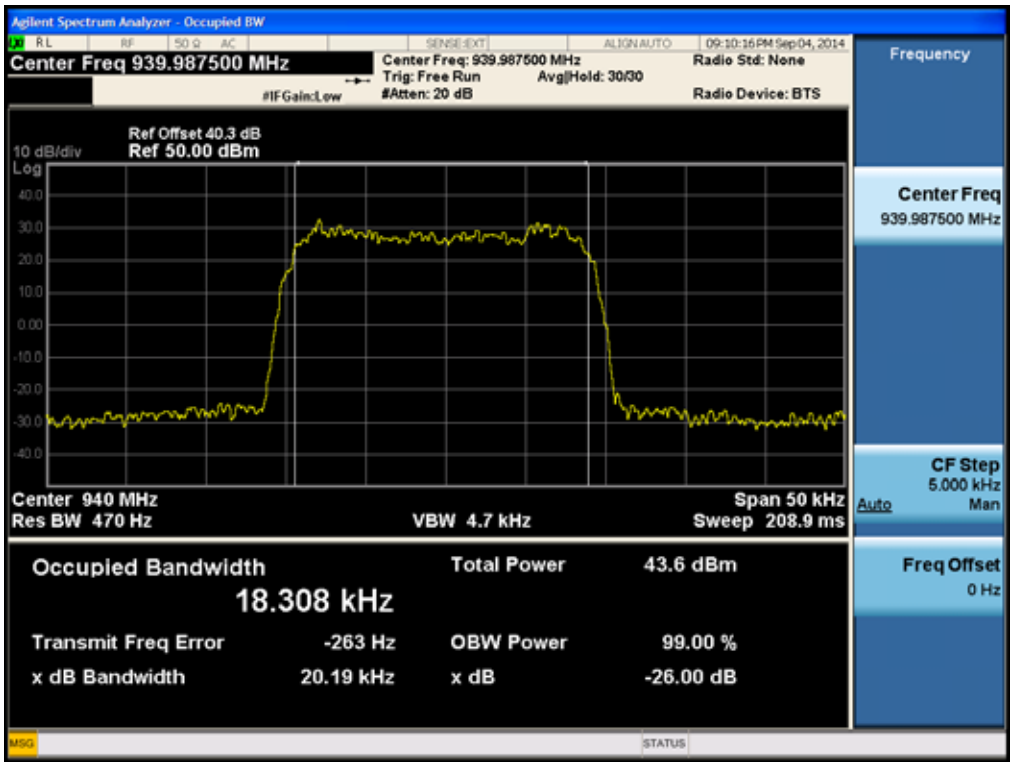
[Part90 Output Downlink Low]



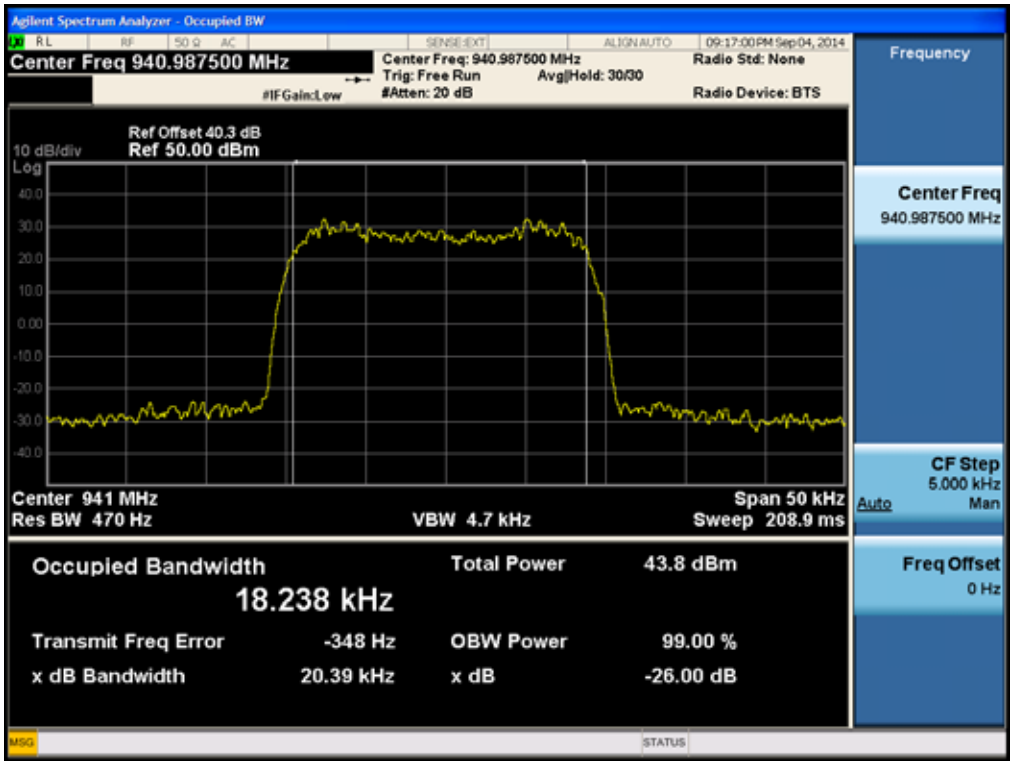
[Part90 Output Downlink Middle]



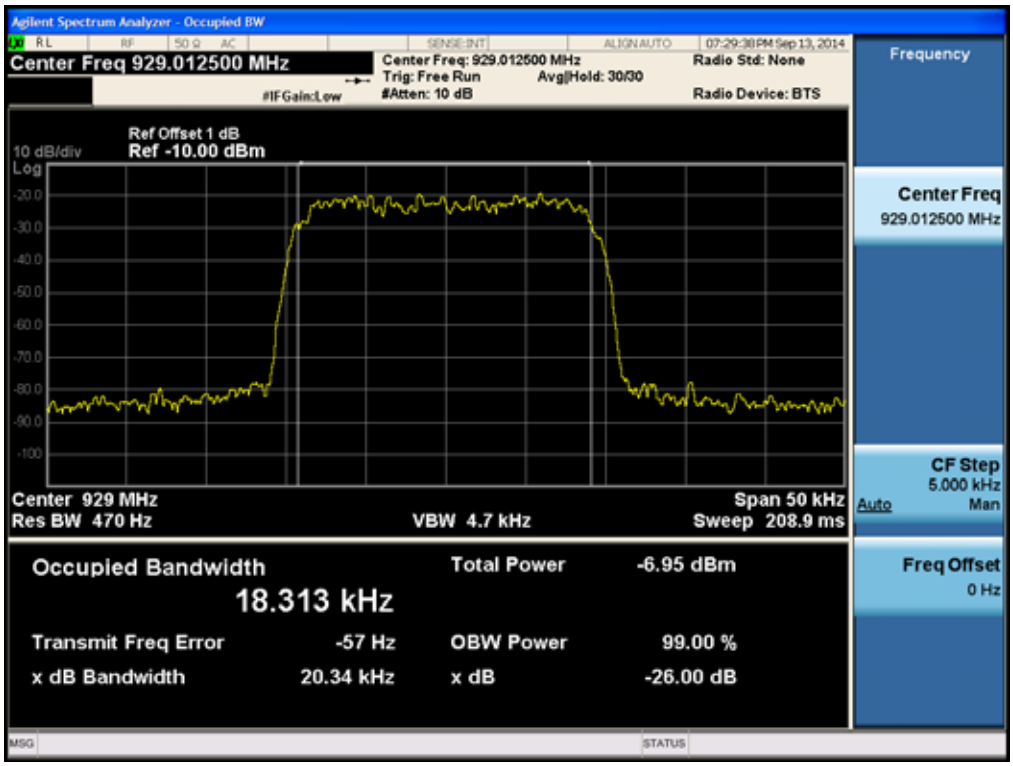
[Part90 Output Downlink High]



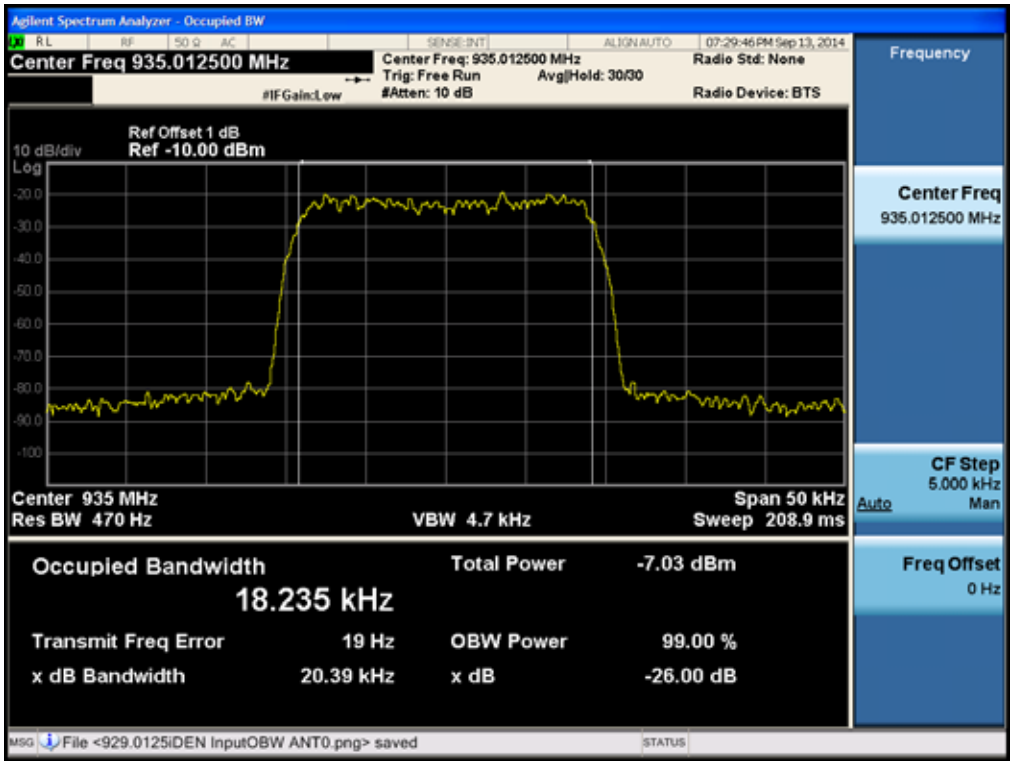
[Part24 Output Downlink High]



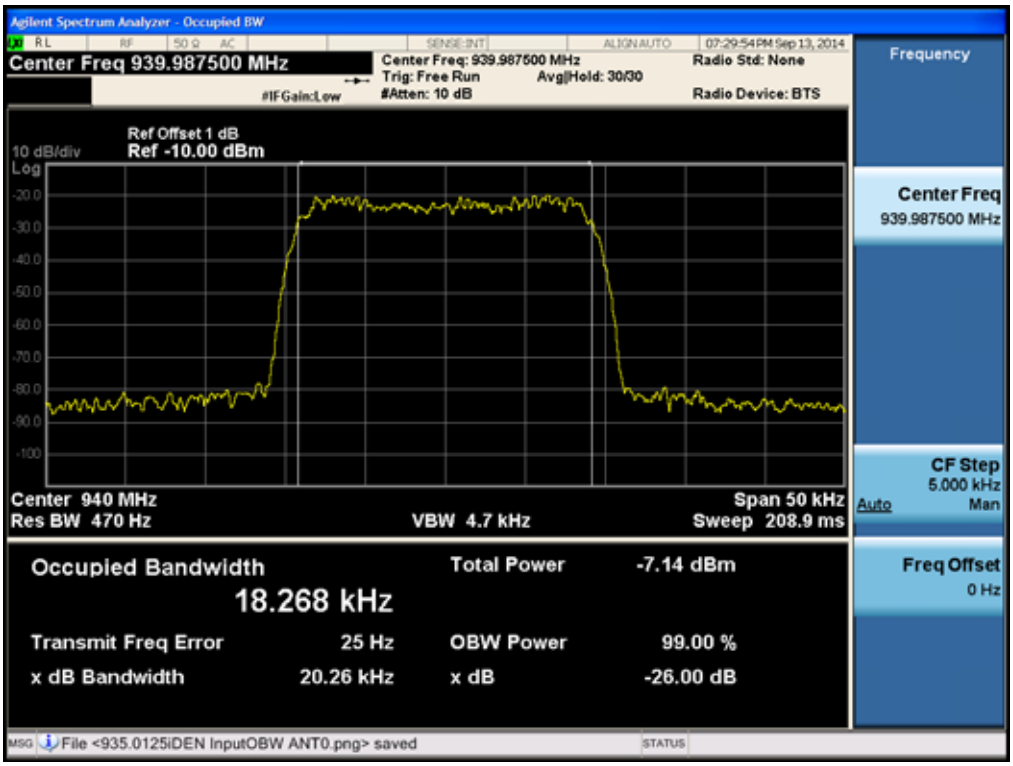
[Part90 Input Downlink Low]



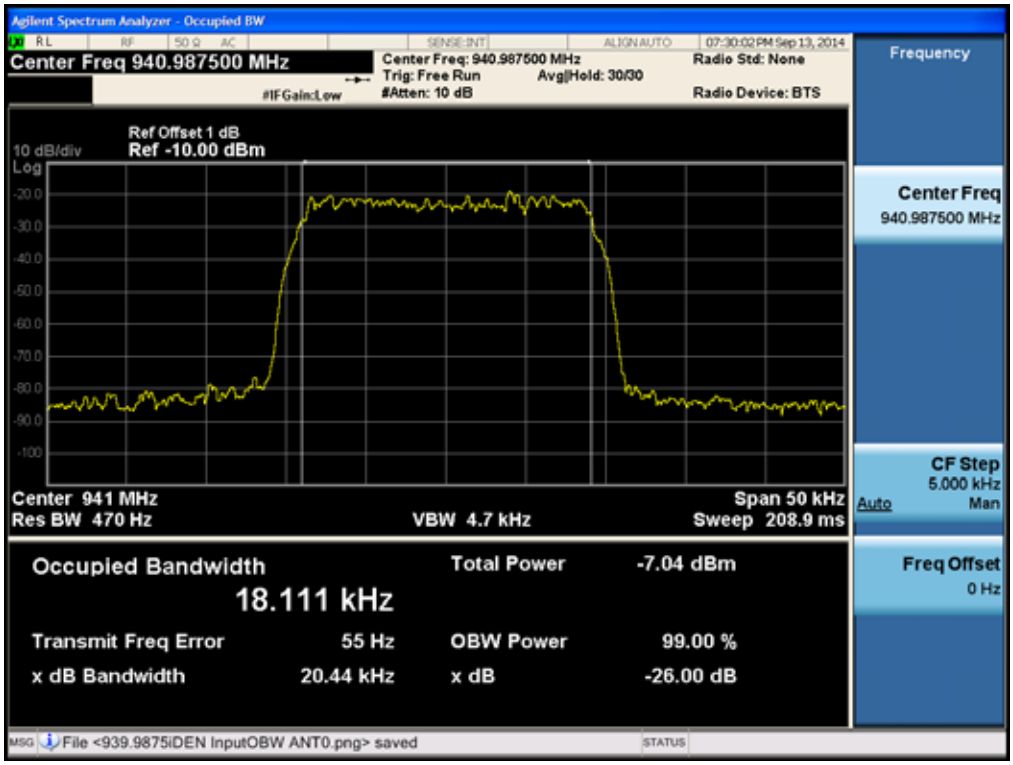
[Part90 Input Downlink Middle]



[Part90 Input Downlink High]

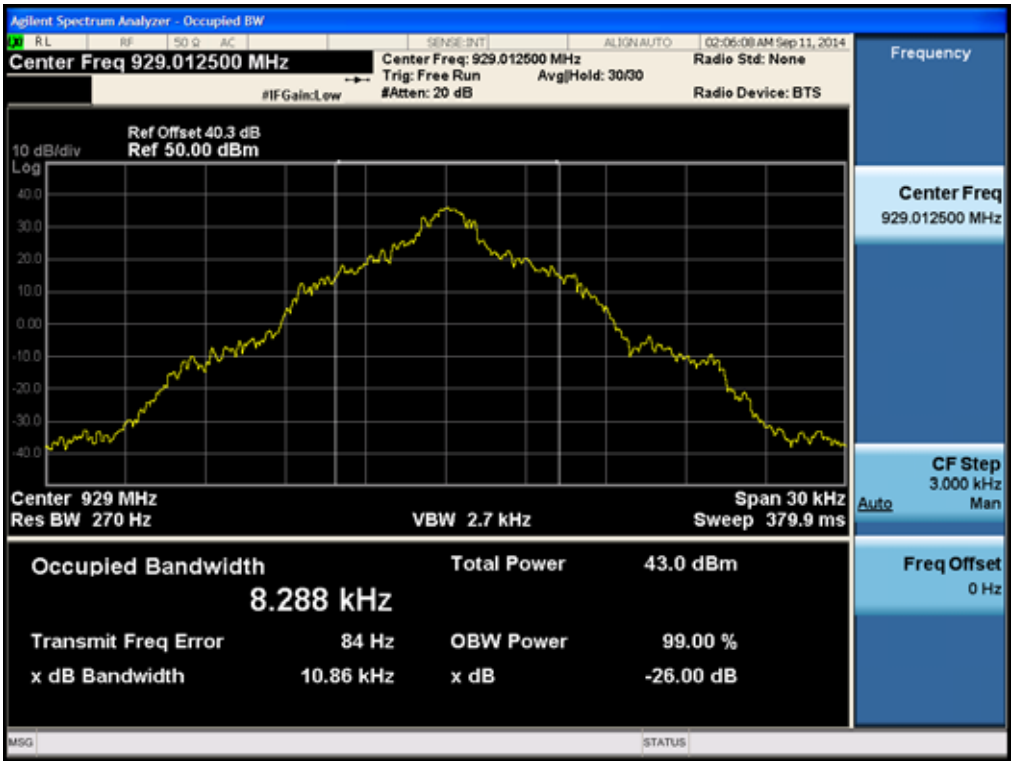


[Part24 Input Downlink High]

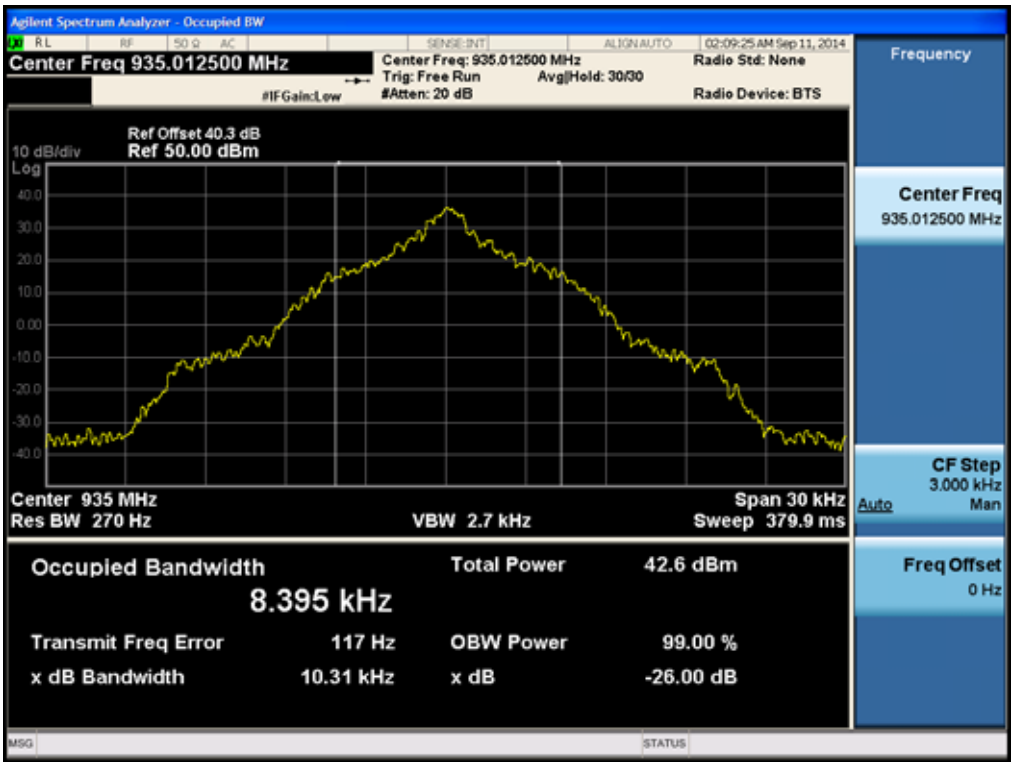


FSK

[Part90 Output Paging Downlink Low]

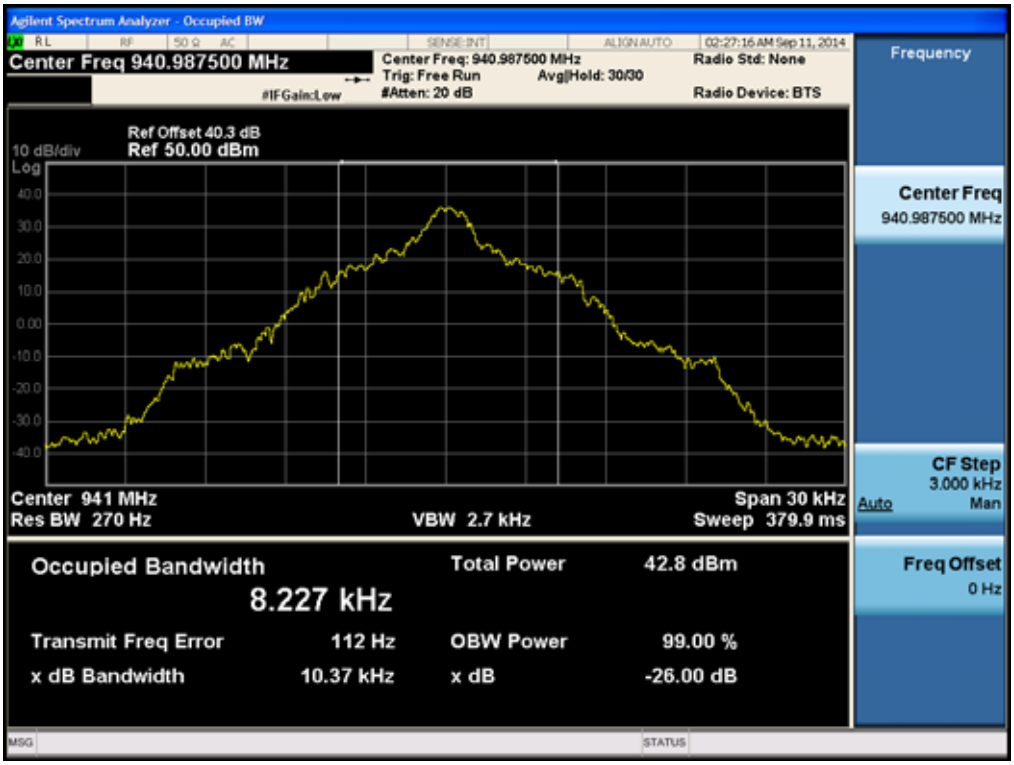


[Part90 Output Paging Downlink Middle]

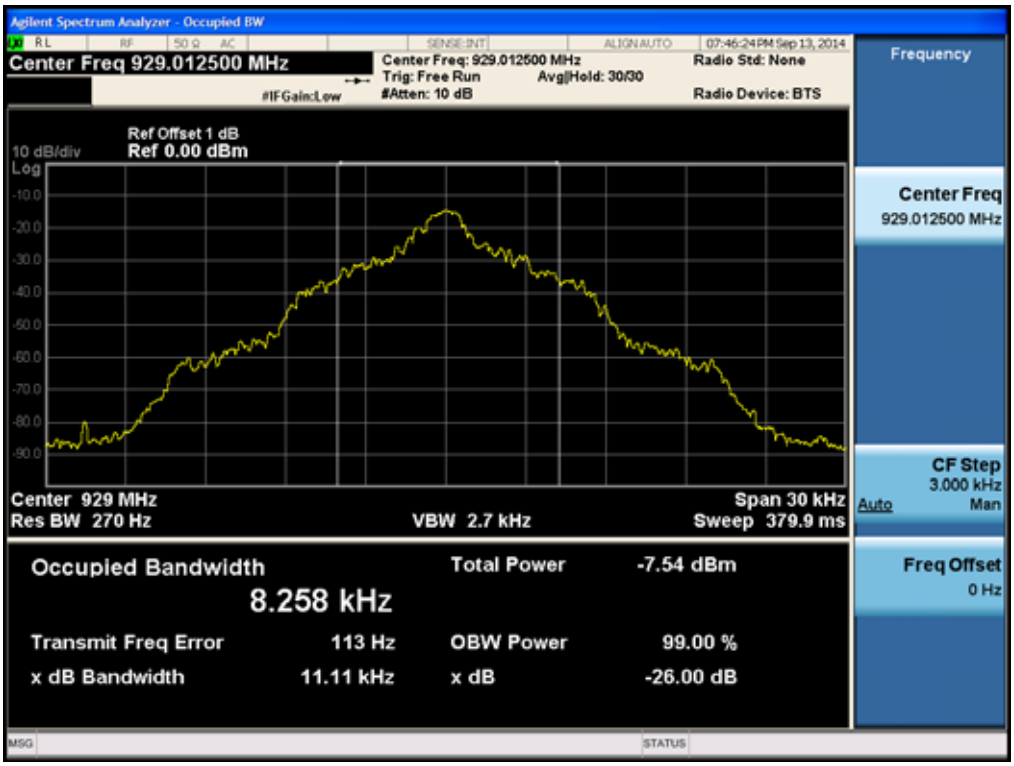


[Part90 Output Paging Downlink High]

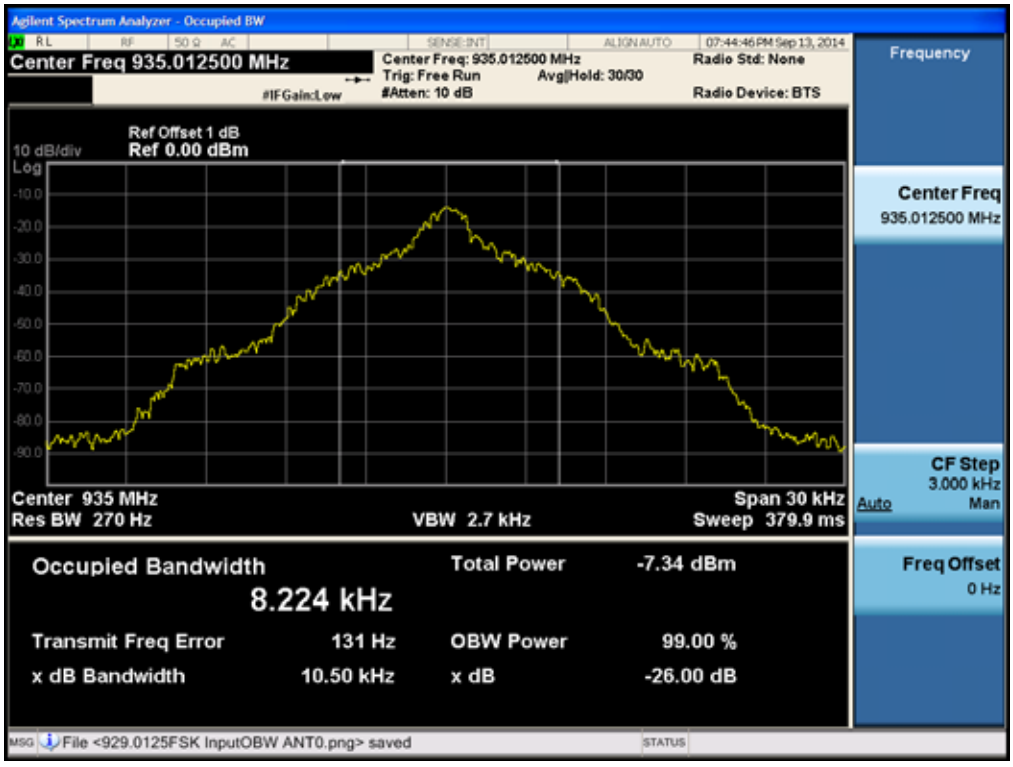
[Part24Output Paging Downlink High]



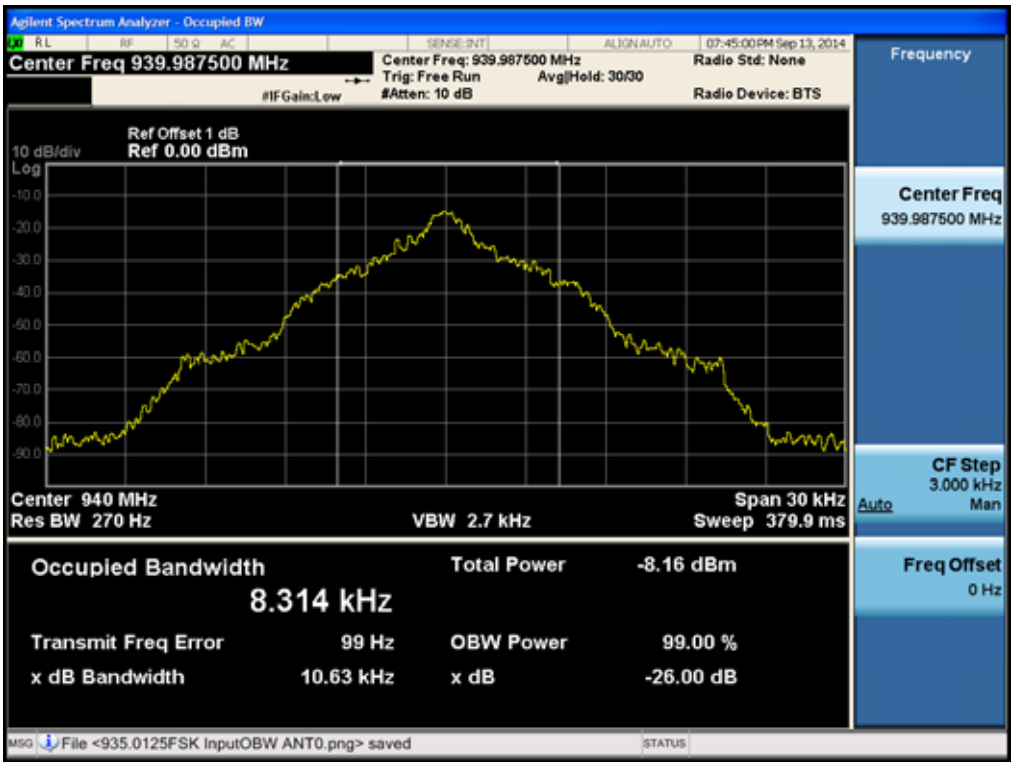
[Part90 Input Paging Downlink Low]



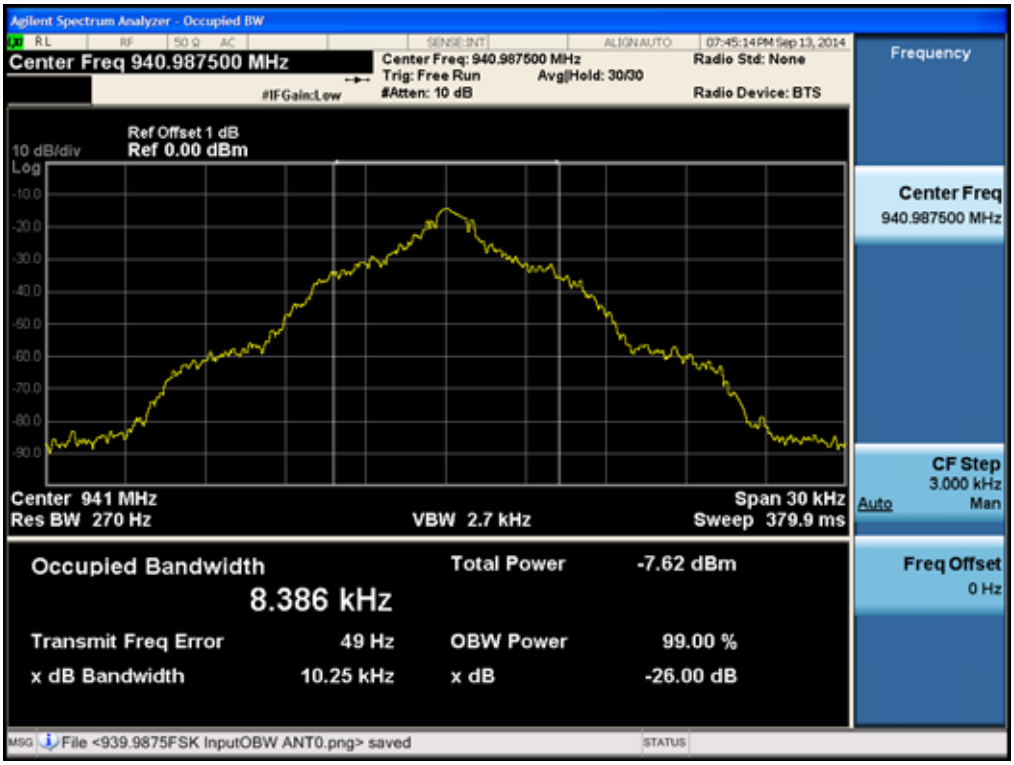
[Part90 Input Paging Downlink Middle]



[Part90 Input Paging Downlink High]



[Part24 Input Paging Downlink High]



8. PASSBAND GAIN AND BANDWIDTH & OUT OF BAND REJECTION

FCC Rules

Test Requirement(s): KDB 935210 D03 v02r01

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

Test Procedures: A modulated carrier generated by the signal generator carrier was connected to either the Uplink or Downlink RF port at a maximum level as determined by the spectrum analyzer was connected to either the Uplink or Downlink port depending on the circuitry being measured. Signal generator sweep from the frequency more lower than the operating frequency to the frequency more higher than it, find the product band filter characteristic

IC Rules

Test Requirements: RSS-131 6.1

The passband gain shall not exceed the nominal gain by more than 1.0 dB. The 20 dB bandwidth shall not exceed the nominal bandwidth that is stated by the manufacturer. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.

Test Procedures: RSS-131 4.2

Adjust the internal gain control of the equipment under test to the nominal gain for which equipment certification is sought.

With the aid of a signal generator and spectrum analyzer, measure the 20 dB bandwidth of the amplifier (i.e. at the point where the gain has fallen by 20 dB). Measure the gain-versus-frequency response of the amplifier from the midband frequency f0 of the passband up to at least f0 + 250% of the 20 dB bandwidth. Signal generator sweep from the frequency more lower than the low frequency -250% to the frequency more higher than high frequency +250%.

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

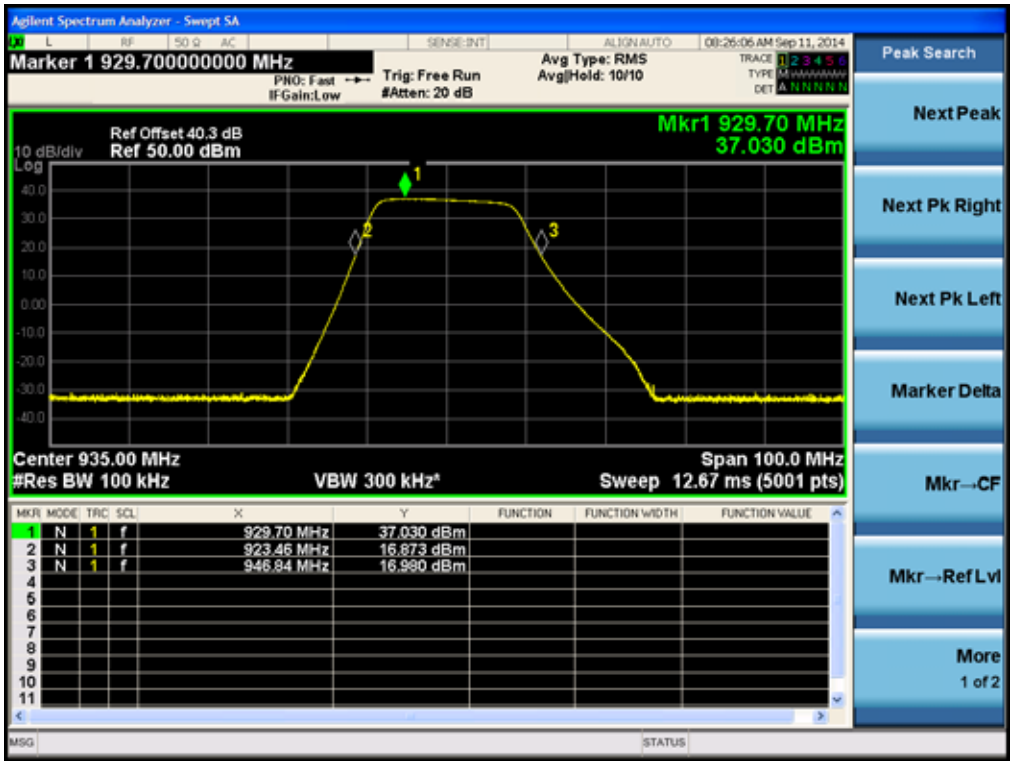
Input Level (dBm) Input Signal : Sinusoidal	Maximum Amp Gain
DL : -10 dBm	DL : 47 dB

[Downlink]

20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
923.46 ~ 946.84	37.03	47.03

Plots of Passband Gain and Bandwidth & Out of Band Rejection

[900 MHz Band Downlink]



9. NOISE FIGURE

FCC Rules

Test Requirement(s):

§ 90.219 Use of signal boosters:

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

Test Procedures:

The EUT was tested using Agilent Application Note 57-1,

'The direct noise measurement method'

1. GAIN measurement
   EUT in the maximum gain of the repeater state.
   The signal generator was connected to RF input port at a maximum level as determined by the spectrum analyzer was connected to RF output port depending on the circuitry being measured.
   EUT GAIN = Output signal level – Input signal level
2. Output Noise level measurement
   EUT in the maximum gain of the repeater state.
   Without input signal.
   Spectrum analyzer was connected to RF output port
   Measured to Noise power.

NF=NP-G-BCF+PNAD

NF=NP-G-60+174

NF=NP-G+114

NF=Noise Figure(dB)

NP=Noise power(dBm/MHz)

G=Maximum gain

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

PNAD=Noise Power Density=174 dBm/Hz

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

Input Signal	Maximum Amp Gain
Without input signal	DL : 47 dB

Noise Figure = -58.499-47+114 = 8.501 dB

Plots of Noise power

[900 MHz Band Downlink]