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CERTIFICATION DIVISION
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CERTIFICATE OF COMPLIANCE (ERM EVALUATION)

Manufacture;

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

SOLiD, Inc

Date of Issue : September 04, 2014

Test Report No.: HCT-R-1409-F003

Test Site: HCT CO.,LTD.

IC Recognition No.: 5944A-3

FCC ID:	**W6UNH1900P**
IC:	**9354A-NH1900P**
APPLICANT:	**SOLiD, Inc**

FCC/ IC Model Name:	**TR-HRDU-1900P**
Additional FCC/ IC Model Name:	**N20-HRDU-1900P**
EUT Type:	**HPRD (High Power Remote Drive Unit)**
Frequency Ranges:	**1930 MHz ~ 1995 MHz**
Conducted Output Power:	**25 W (44 dBm)**
Date of Test :	**August 18, 2014 ~ August 24, 2014**
FCC Rules Part(s):	**CFR 47, Part 24**
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 of the FCC Rules under normal use and maintenance.

Report prepared by : Yong Hyun Lee
Engineer of RF Team

Report approved by : Chang Seok Choi
Manager of RF Team

Report Revision

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1409-F003	September 04, 2014	- First Approval Report

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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

- **FCC ID:** **W6UNH1900P**
- **IC:** **9354A-NH1900P**
- **APPLICANT:** **SOLiD, Inc**
- **EUT Type:** **HPRD (High Power Remote Drive Unit)**
- **Model:** **TR-HRDU-1900P**
- **Additional Model:** **N20-HRDU-1900P**
- **Frequency Ranges:** **1930 MHz ~ 1995 MHz**
- **Conducted Output Power:** **25 W (44 dBm)**
- **Antenna Gain(s) :** **Manufacturer does not provide an antenna.**
- **FCC Rules Part(s):** **CFR Title 47 Part 24**
- **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 v02, 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, RSS-GEN, RSS-131.

Description	Reference (FCC)	Reference (IC)	Results
Conducted RF Output Power	§2.1046; §24.232	RSS-131, Section 4.3 RSS-131, Section 6.2	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
Spurious Emissions at Antenna Terminals	§2.1051, §24.238	RSS-131, Section 4.4 RSS-131, Section 6.3 RSS-131, Section 6.4	Compliant
Radiated Spurious Emissions	§2.1053, §24.238	-	Compliant
Frequency Stability	§2.1055, §24.235	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.

QPSK was only selected and tested since it's the worst case configuration among all here modulations (QPSK, 16QAM, 64QAM).

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	09/05/2013	MY42082646
Agilent	N5182A /Signal Generator	Annual	09/30/2013	MY50141649
Agilent	E4416A /Power Meter	Annual	10/16/2013	GB41291412
Agilent	E9327A/ Power Sensor	Annual	03/31/2014	MY4442009
NANGYEUL CO., LTD.	NY-THR18750/ Temperature and Humidity Chamber	Annual	10/30/2013	NY-2009012201A
Agilent	N9020A /Signal Analyzer	Annual	04/16/2014	US46220219
WEINSCHEL	67-30-33 / Fixed Attenuator	Annual	11/05/2013	BU5347
MCE / Weinschel	2-10 / Fixed Attenuator	Annual	10/28/2013	BR0554
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	09/12/2013	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	12/17/2012	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.

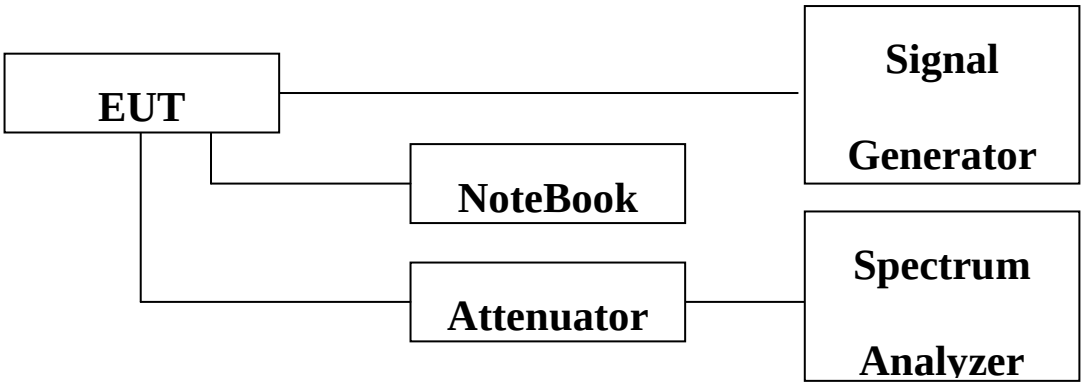
§ 24.232 Power and antenna height limits. (a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below. See §24.53 for HAAT calculation method.

Base station antenna heights may exceed 300 meters with a corresponding reduction in power; see Table 1 of this section.

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

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:

PCS Band

Input Signal	Input Level (dBm)	Maximum Amp Gain
CDMA	DL : -15 dBm	DL : 59 dB
WCDMA		
GSM		
LTE 5 MHz		

IC Rules

Test Requirements: 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.

PCS Band

[Downlink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
CDMA	Low	1931.25	43.91	24.587
	Middle	1962.50	44.00	25.119
	High	1993.75	43.81	24.060
CDMA EVDO	Low	1931.25	44.05	25.410
	Middle	1962.50	44.01	25.148
	High	1993.75	44.10	25.698
WCDMA	Low	1932.40	44.04	25.351
	Middle	1962.40	44.01	25.194
	High	1992.60	44.02	25.206

[Downlink]

	Channel	Frequency (MHz)	Output Power	
			(dBm)	(W)
GSM	Low	1930.40	44.01	25.154
	Middle	1962.40	44.07	25.545
	High	1994.60	43.98	25.003
GSM EDGE	Low	1930.40	43.91	24.615
	Middle	1962.40	44.00	25.096
	High	1994.60	43.95	24.848
LTE 5 MHz	Low	1932.50	43.84	24.210
	Middle	1962.50	44.17	26.110
	High	1992.50	43.86	24.328

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)
PCS	Low	1930.40	41.03	44.03
	Middle	1962.50	41.02	44.02
	High	1994.60	41.02	44.02

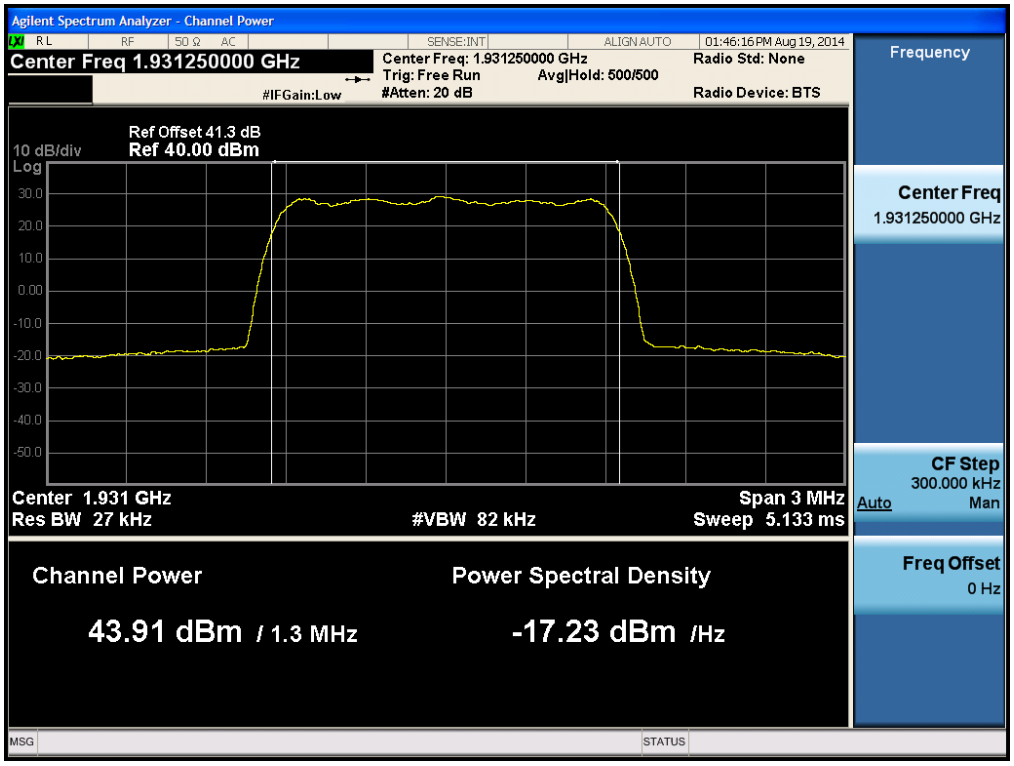
Additional Power Back-off Condition for Multiple Carrier Operations for IC

[Downlink]

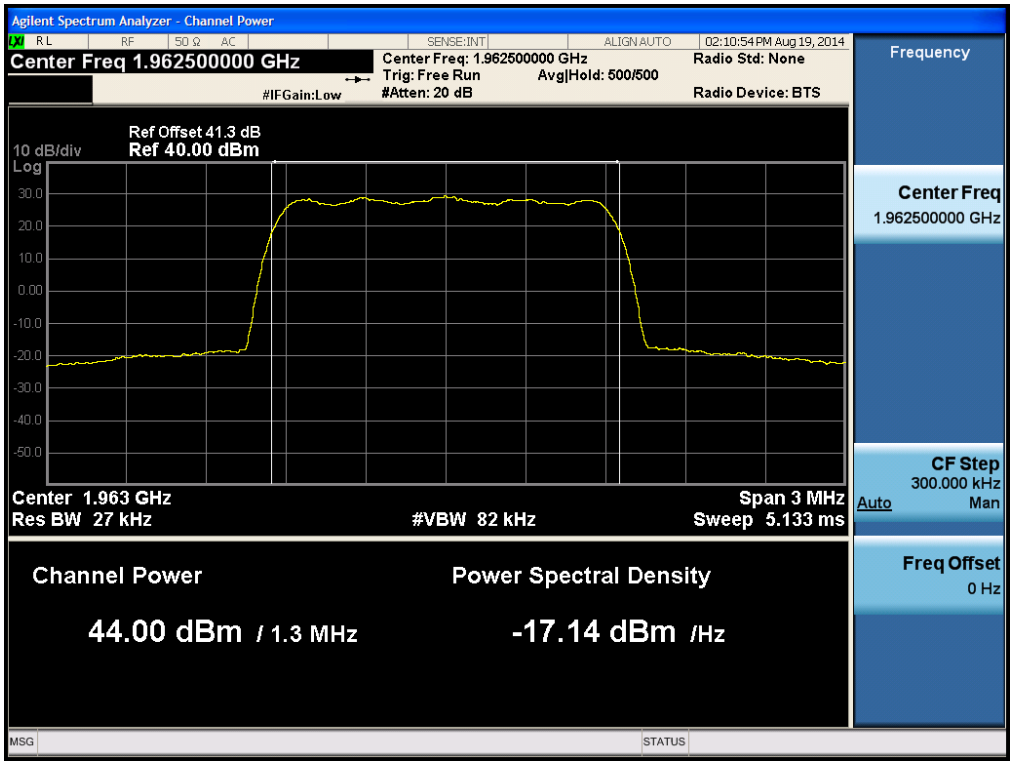
	1 Carrier (dBm)	3 Carrier (dBm)	Power Back-off (dB)
LTE 5 MHz	44.17	39.09	5.08

Single channel Enhancer Plots of RF Output Power

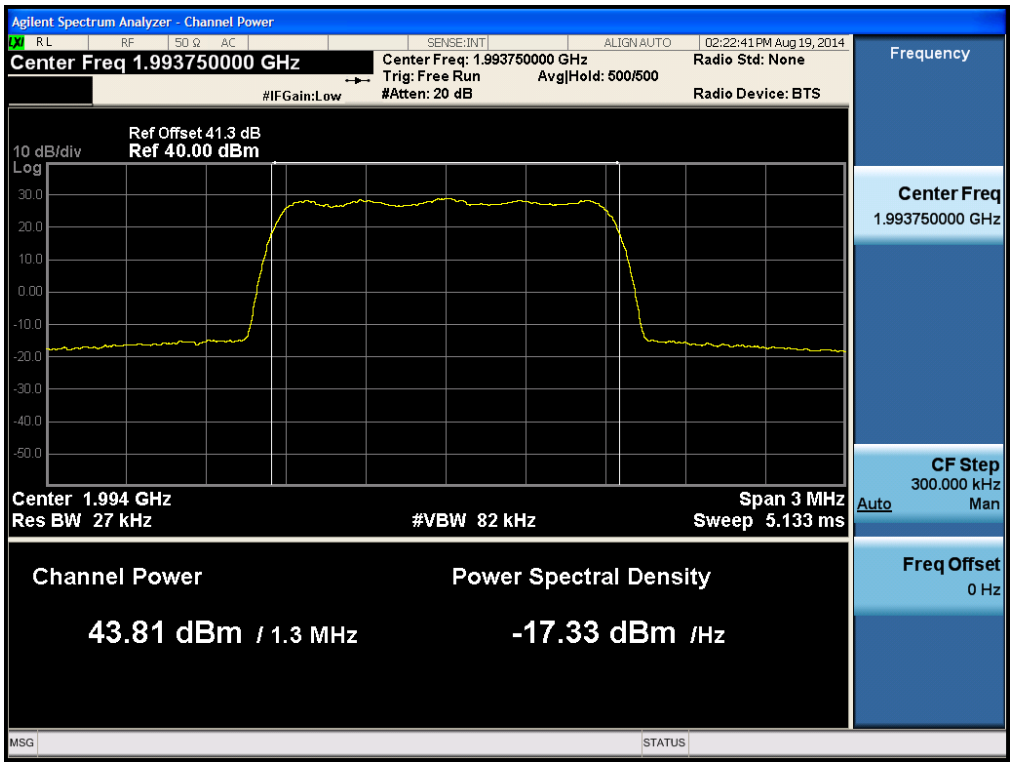
[CDMA Downlink Low]



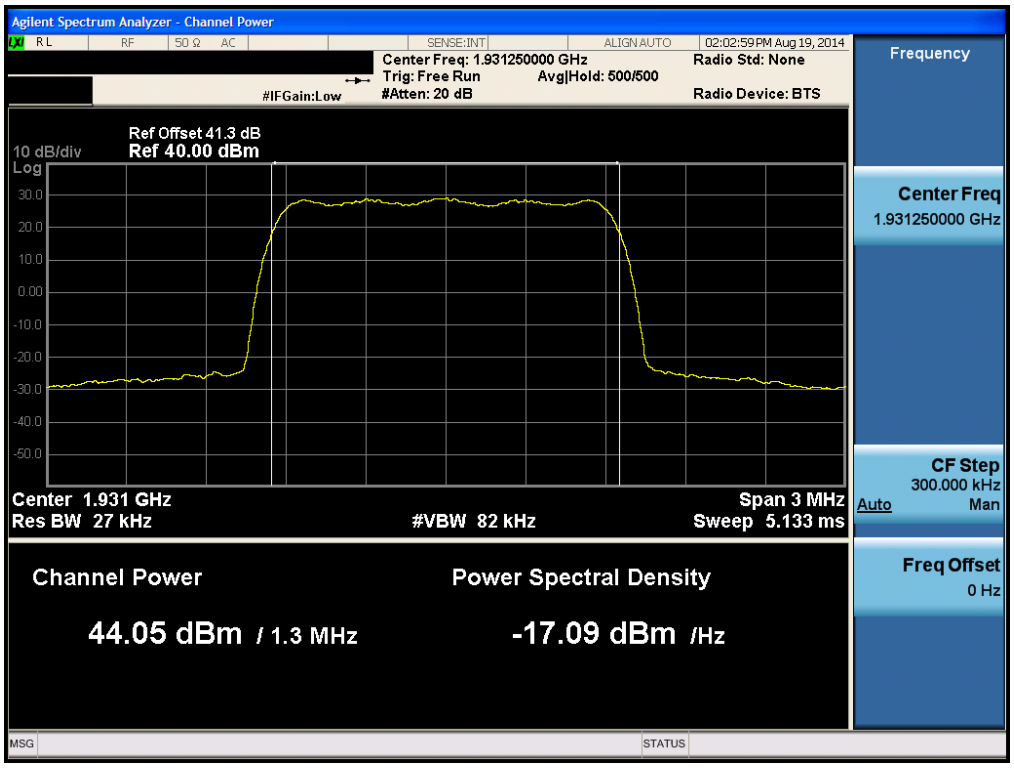
[CDMA Downlink Middle]



[CDMA Downlink High]



[CDMA EVDO Downlink Low]



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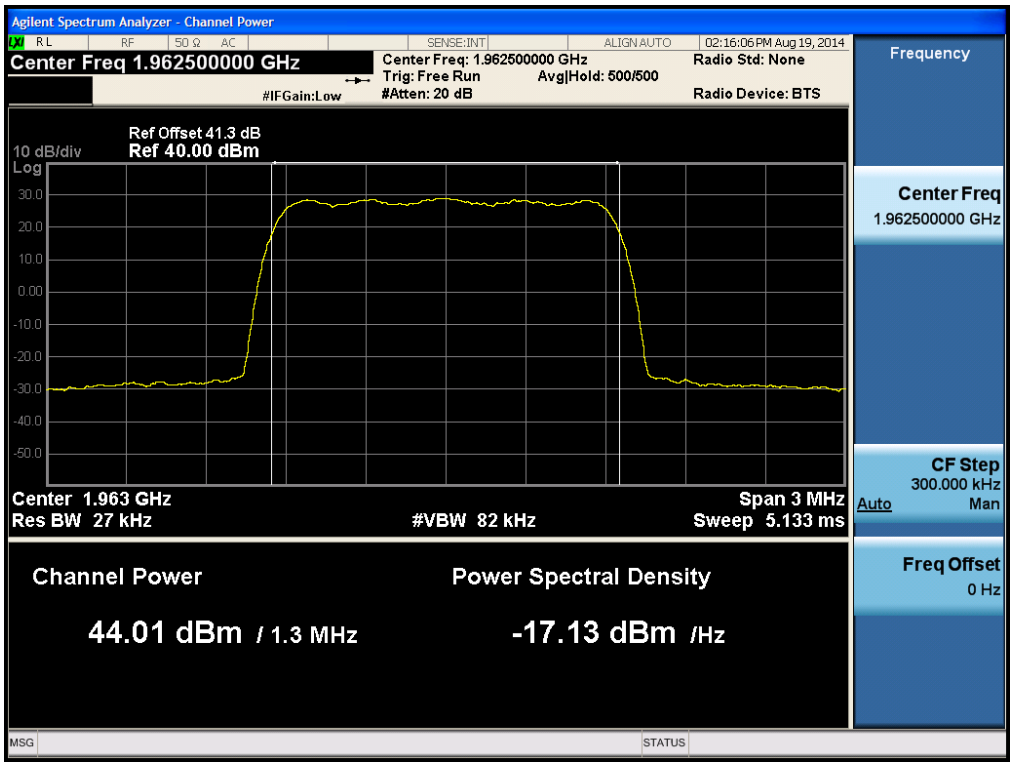
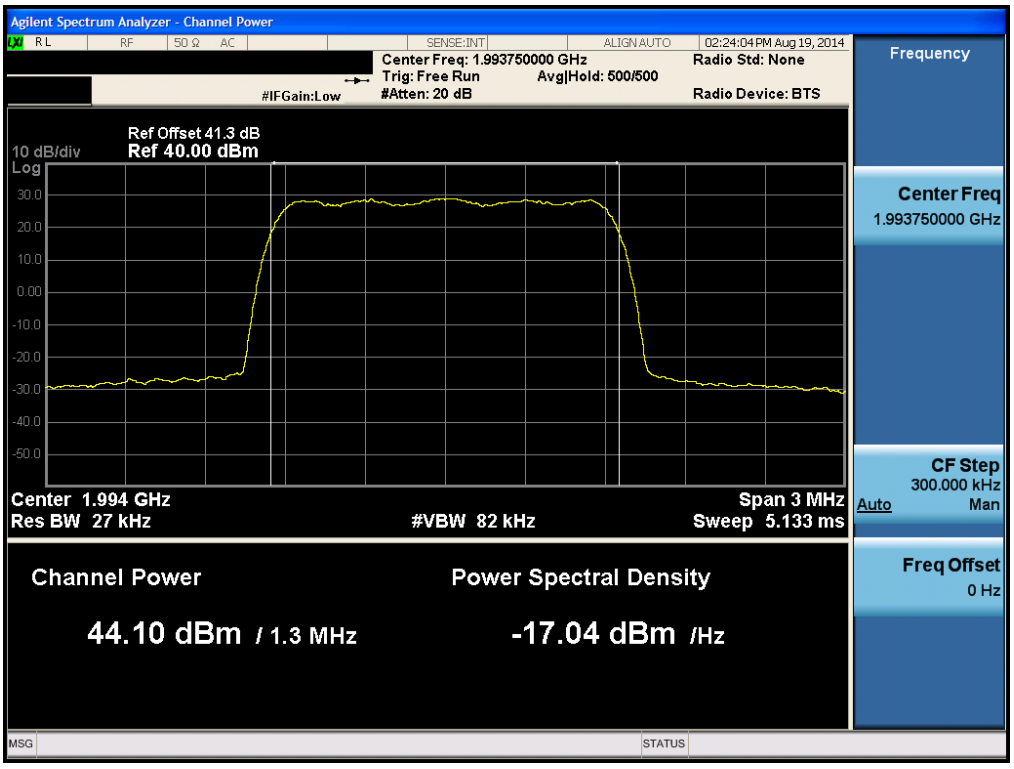


[CDMA EVDO Downlink High]



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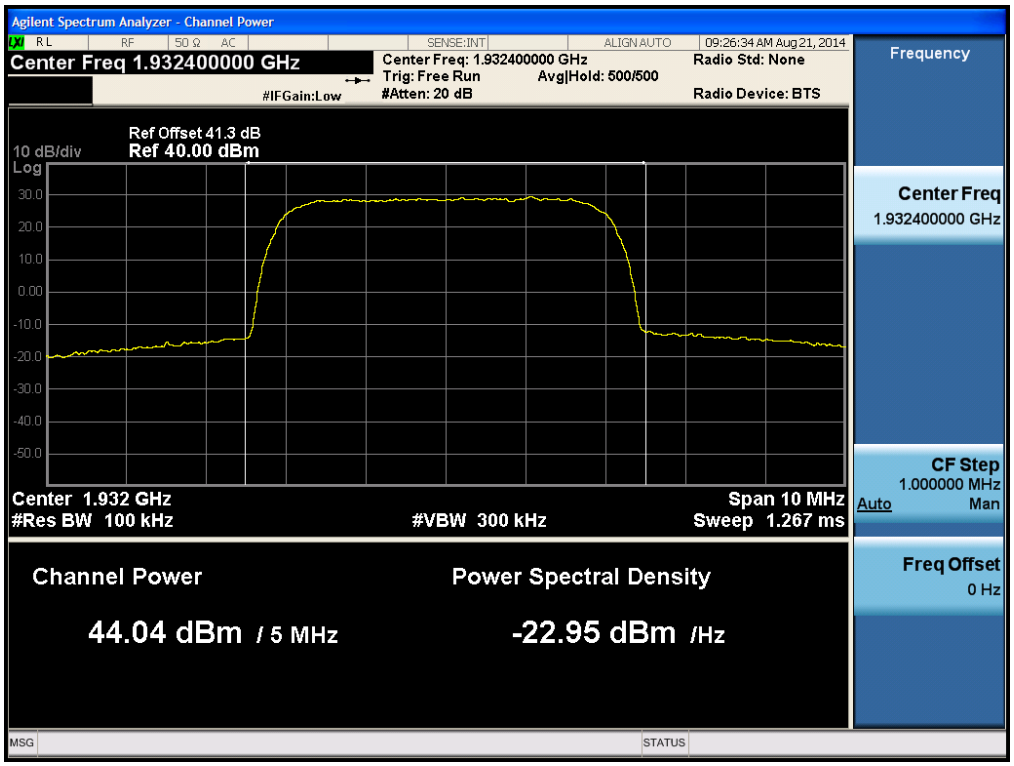
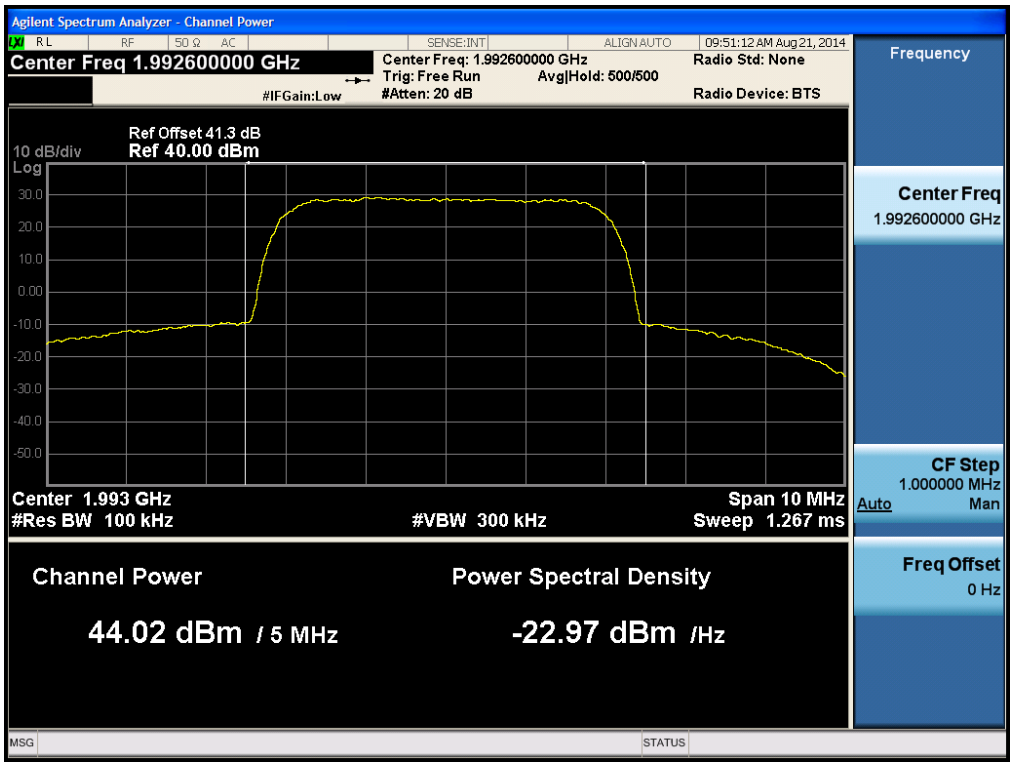
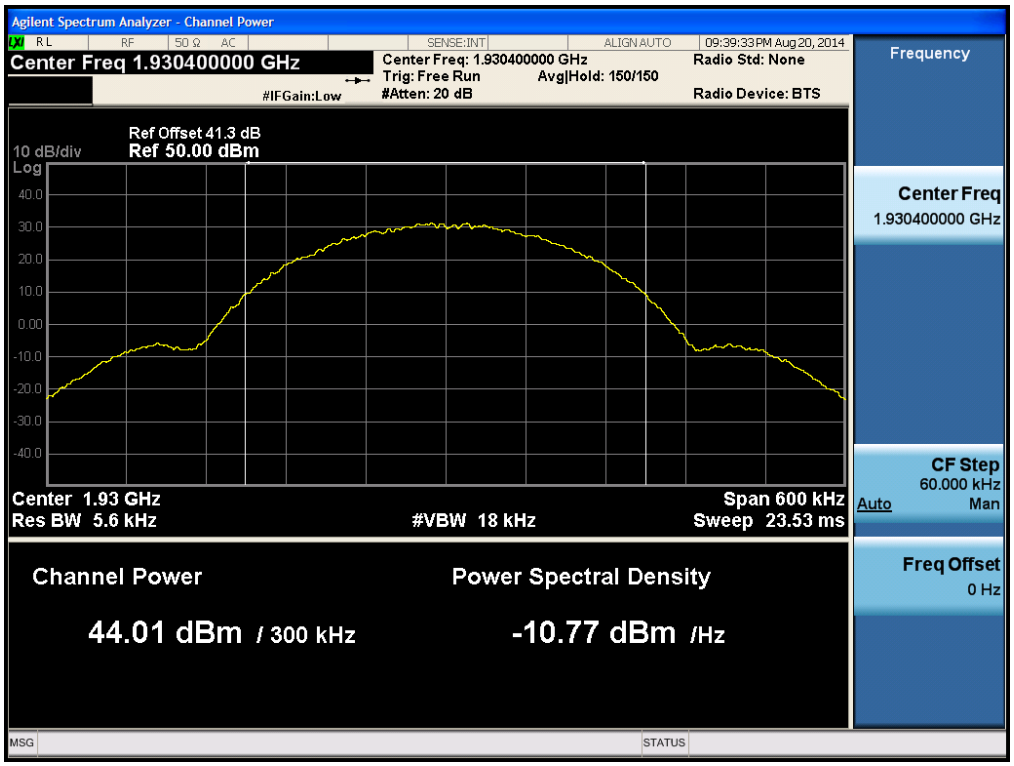


[WCDMA Downlink Middle]

[WCDMA Downlink High]



[GSM Downlink Low]



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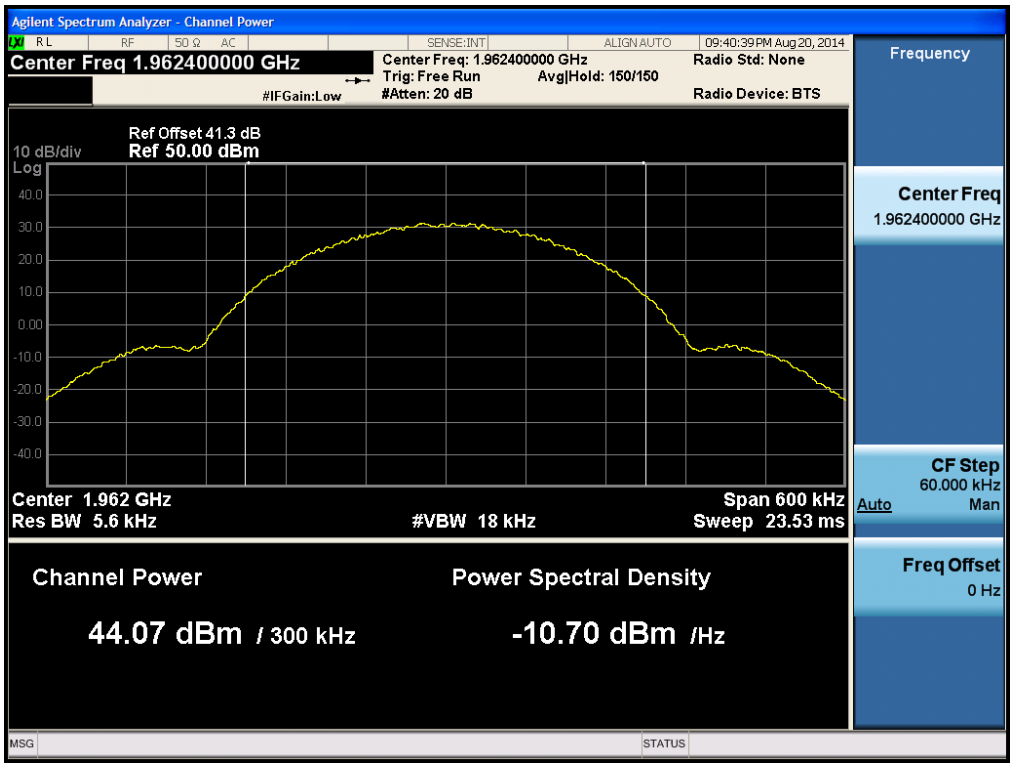

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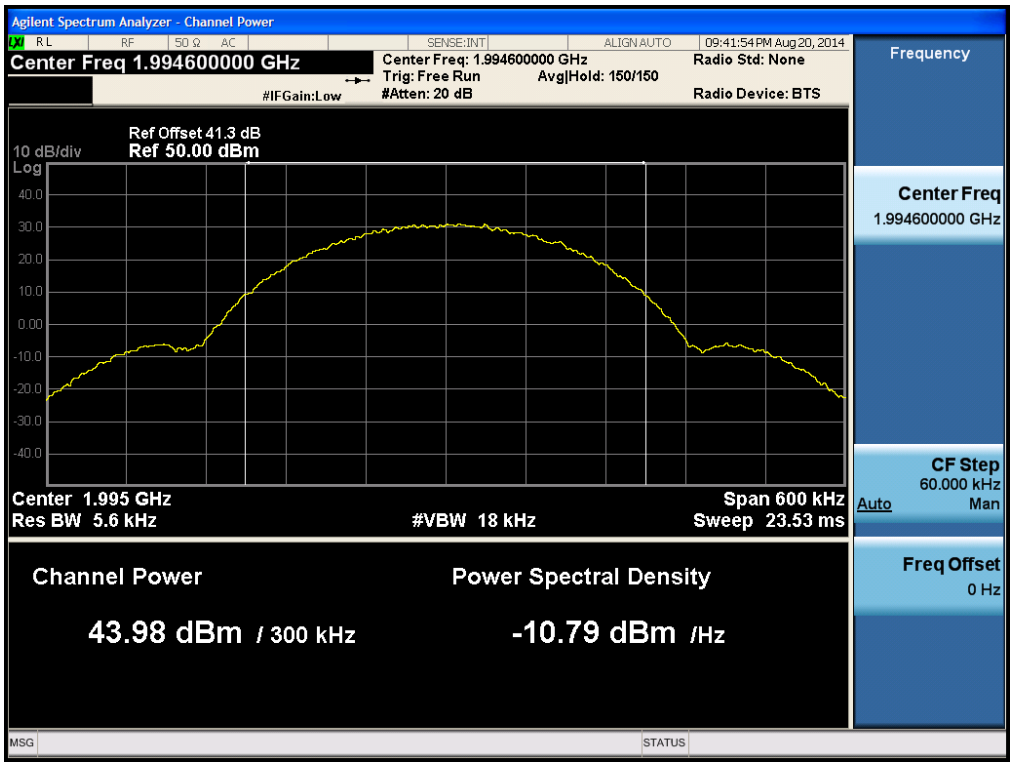
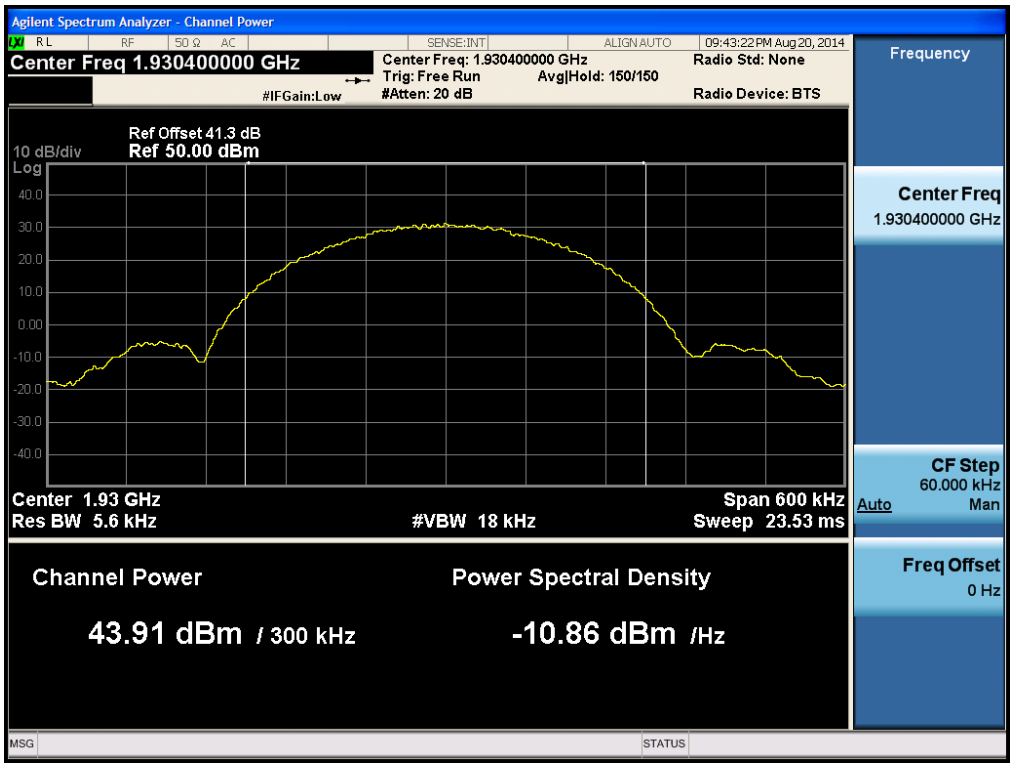


[GSM EDGE Downlink Low]



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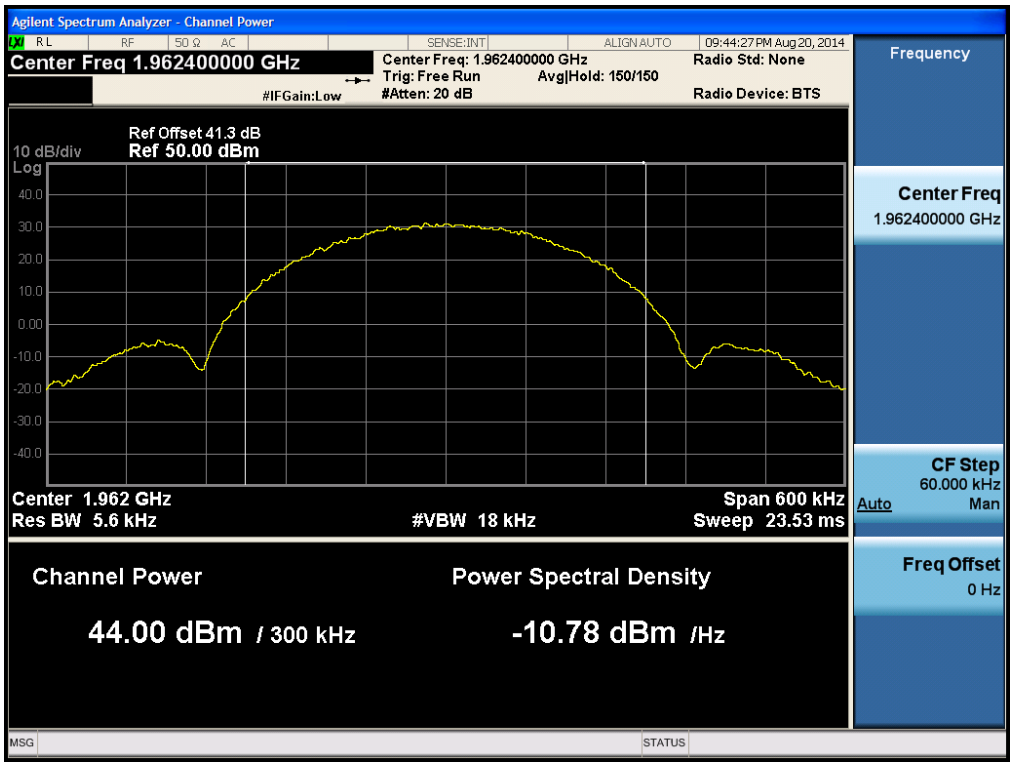

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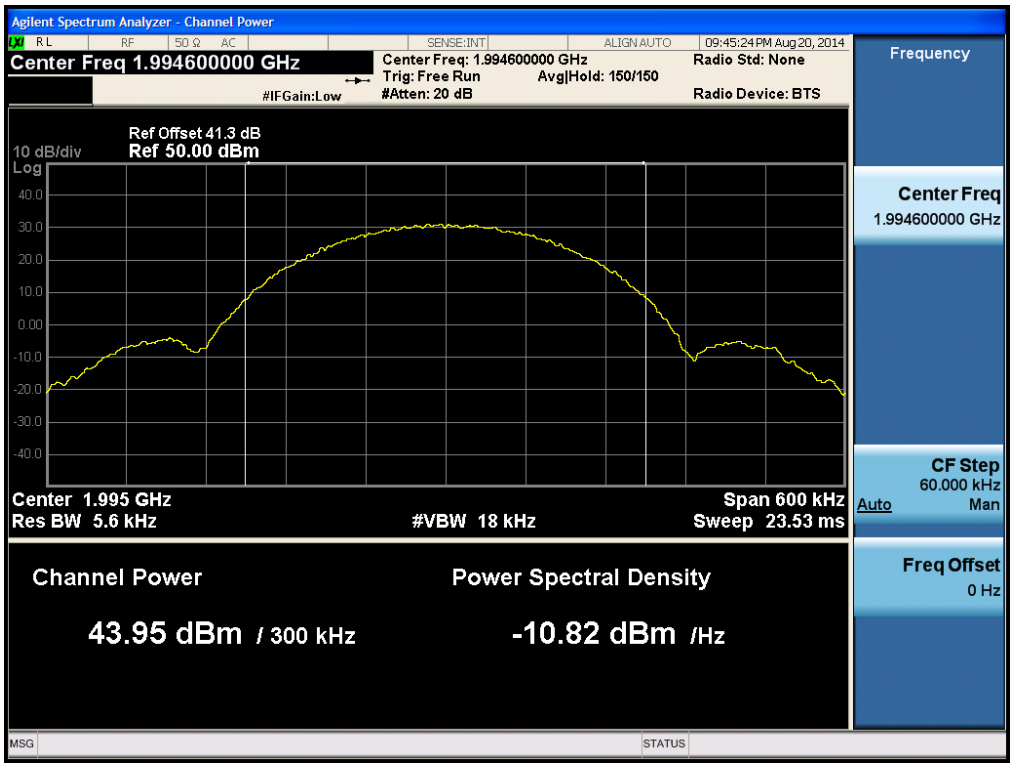
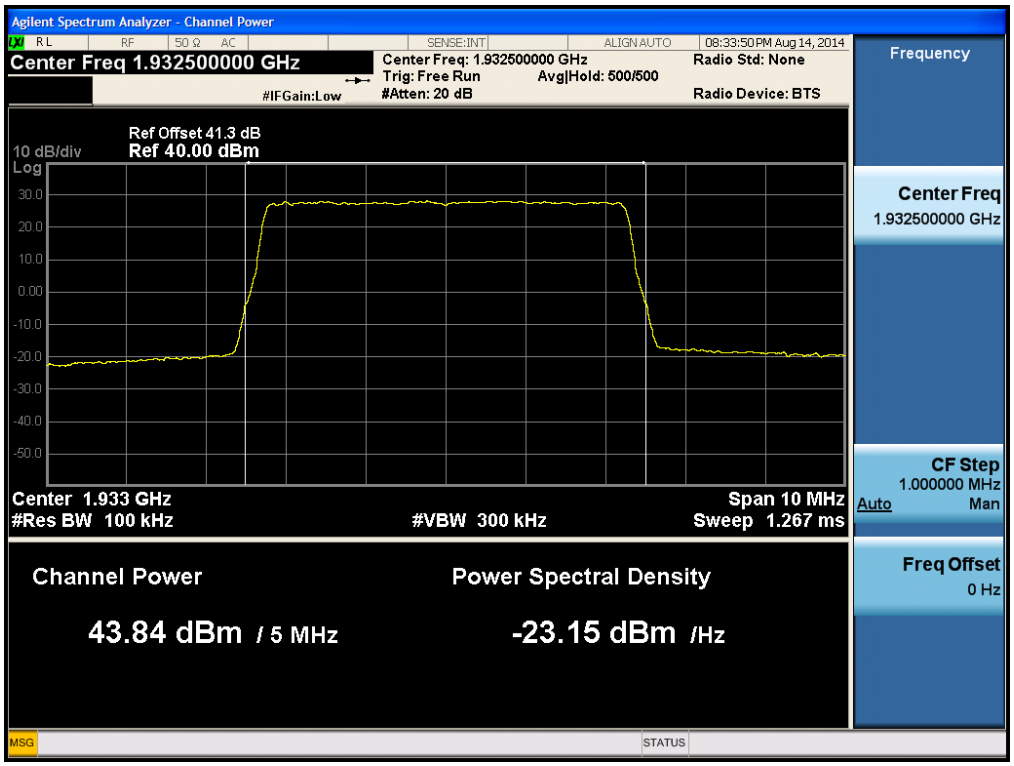


[LTE Downlink 5 MHz Low]



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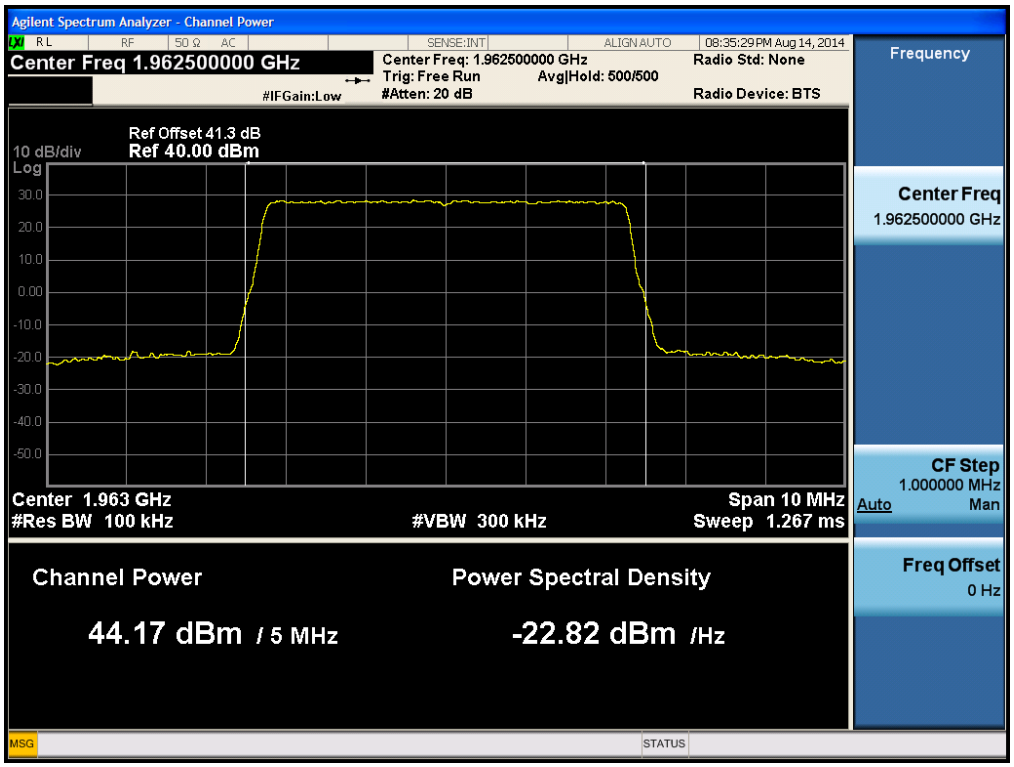

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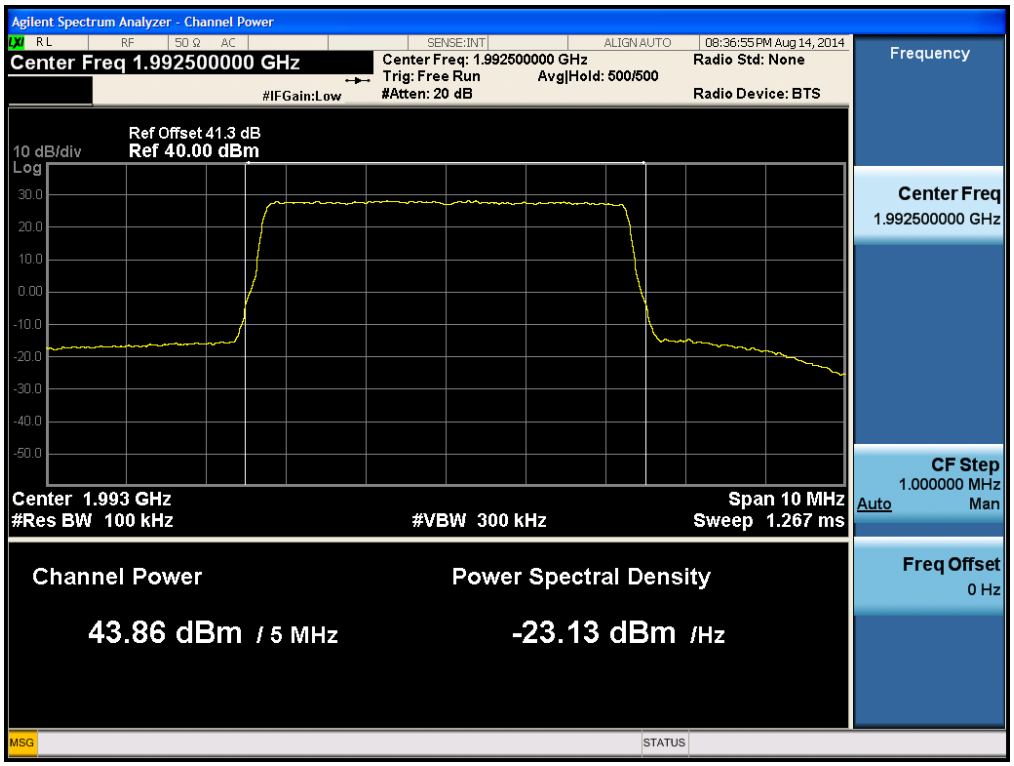
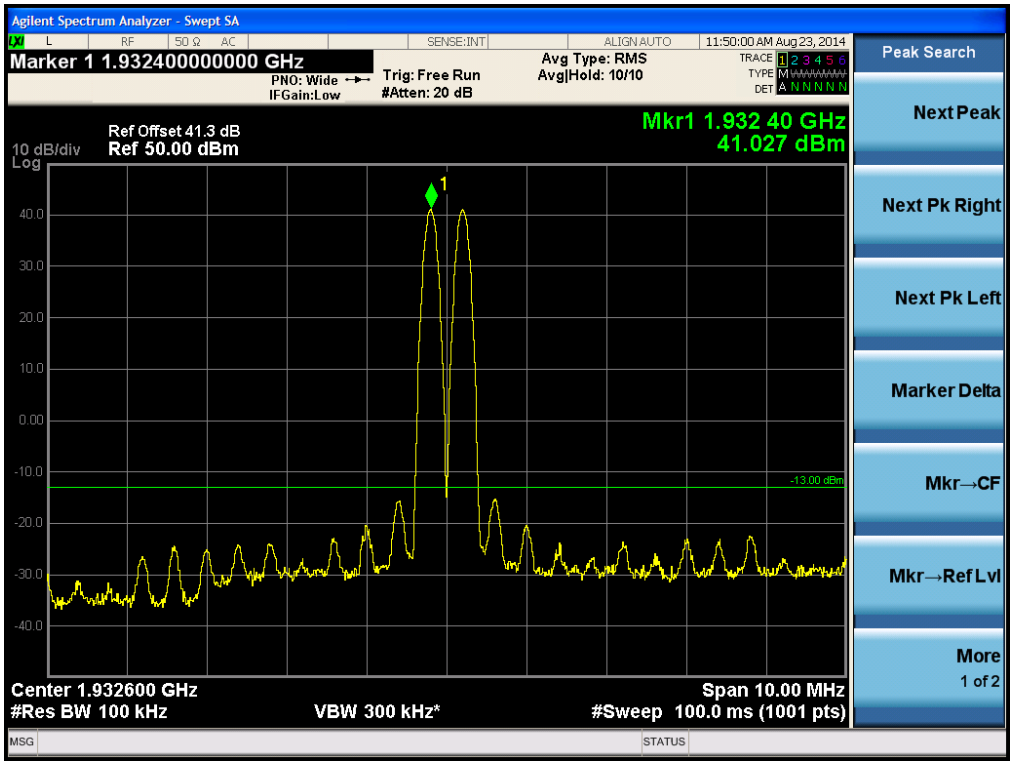


Multi-channel Enhancer for IC

[PCS Downlink Low]



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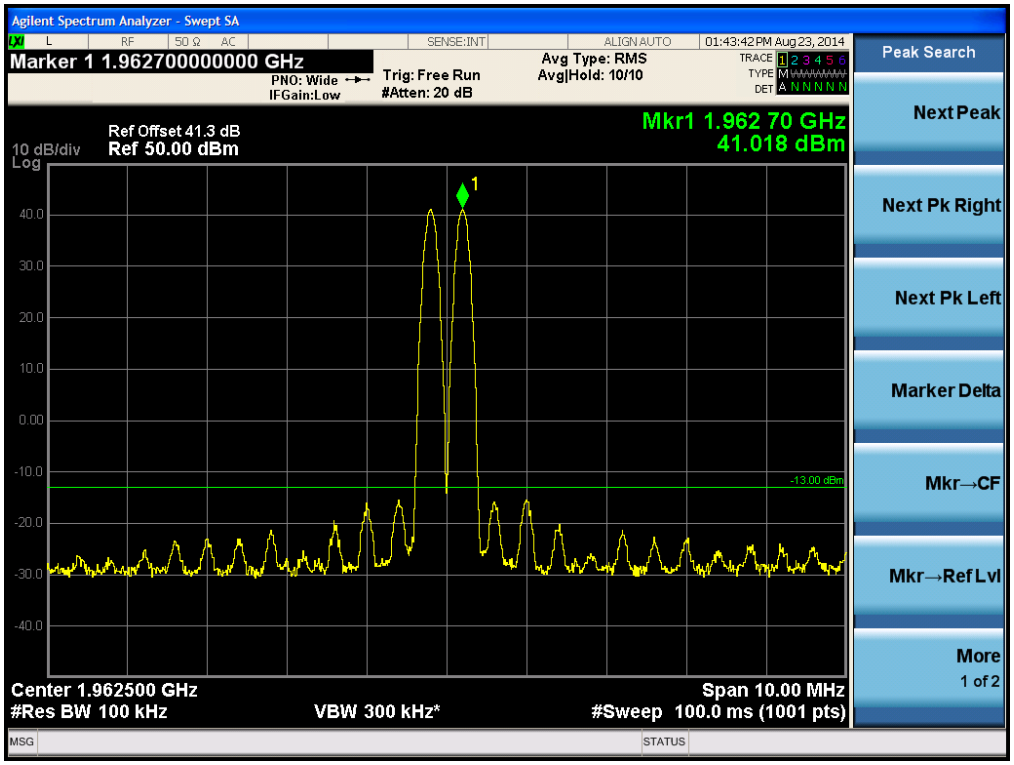

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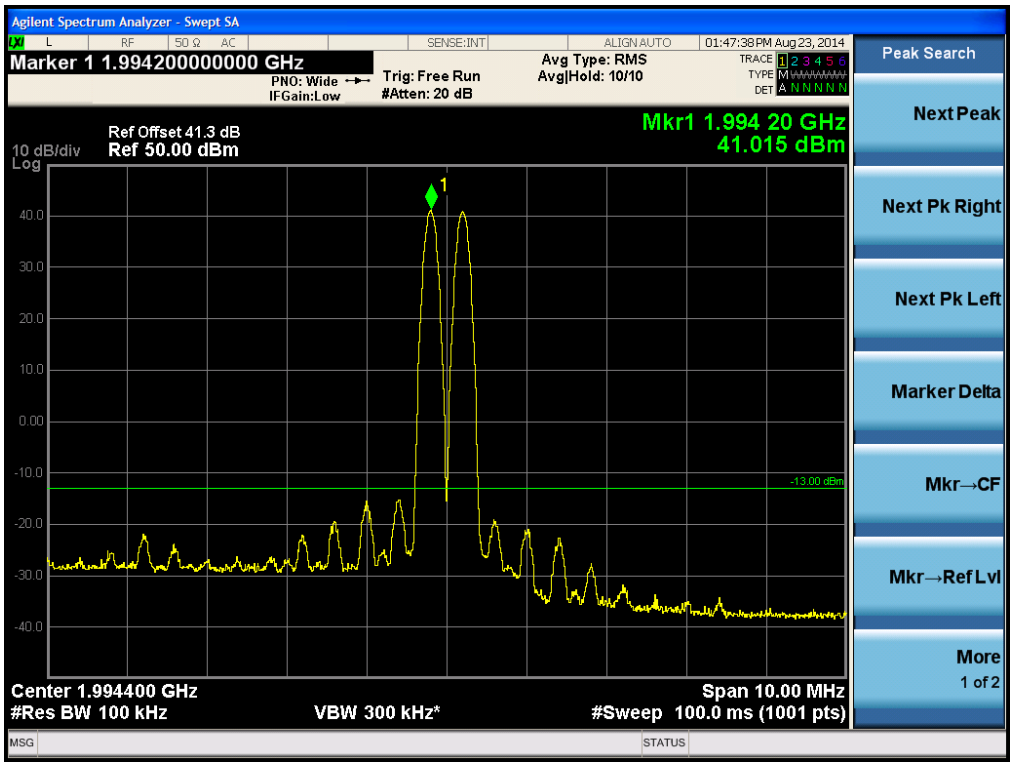
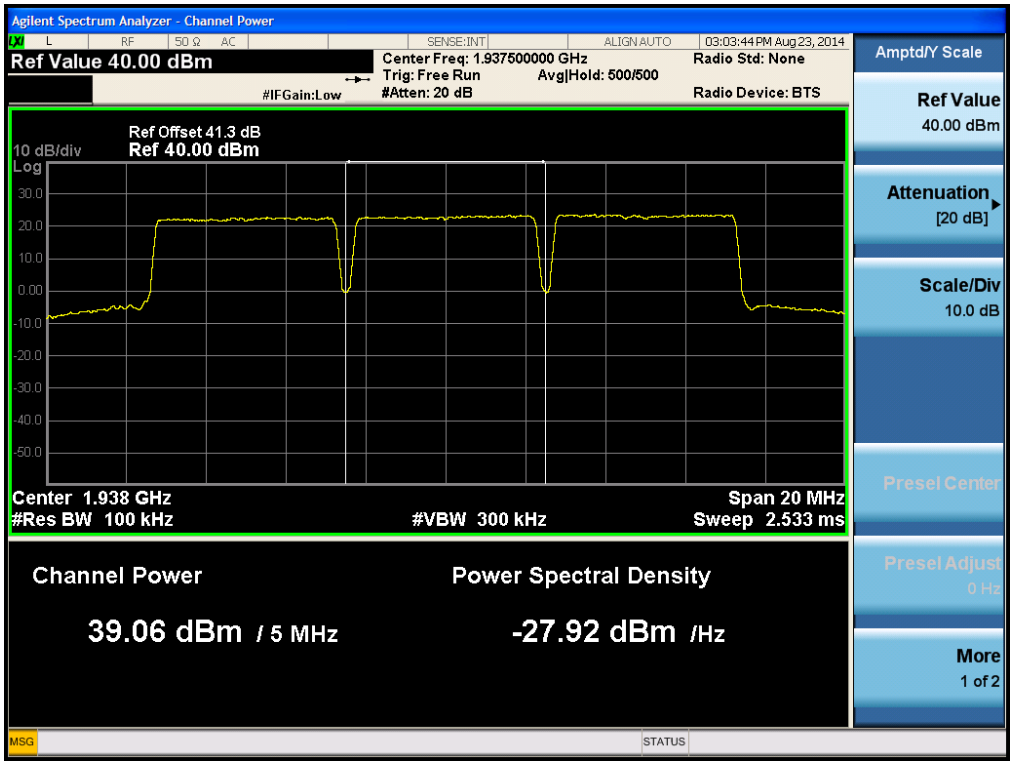
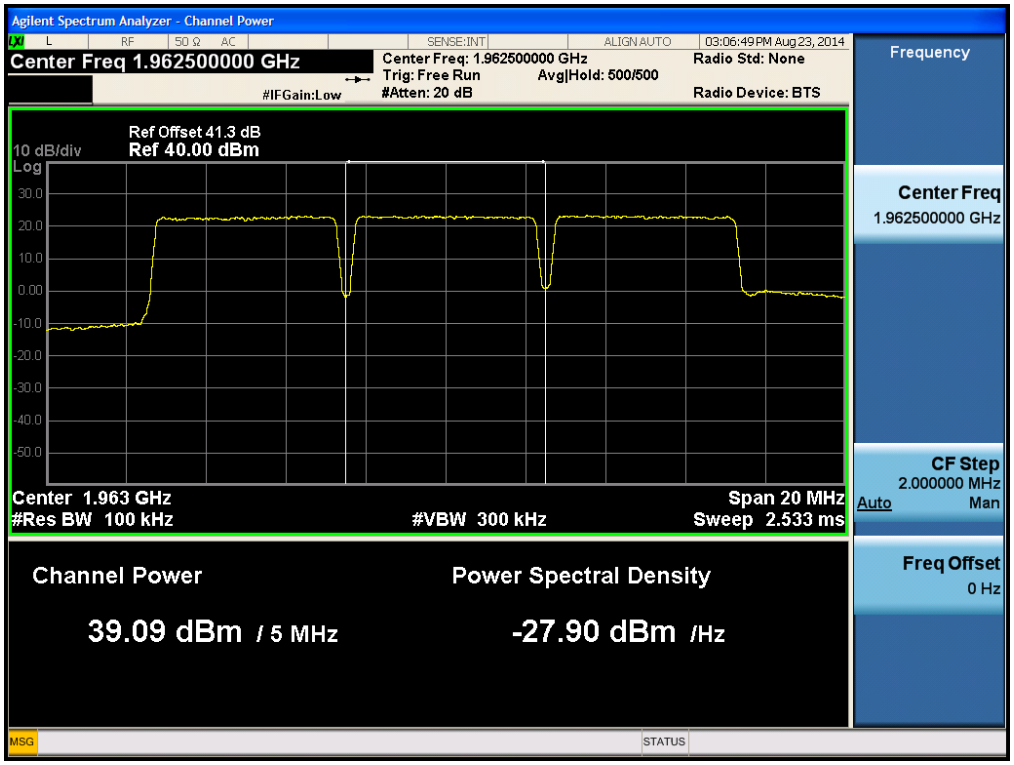


Power Back-off for IC

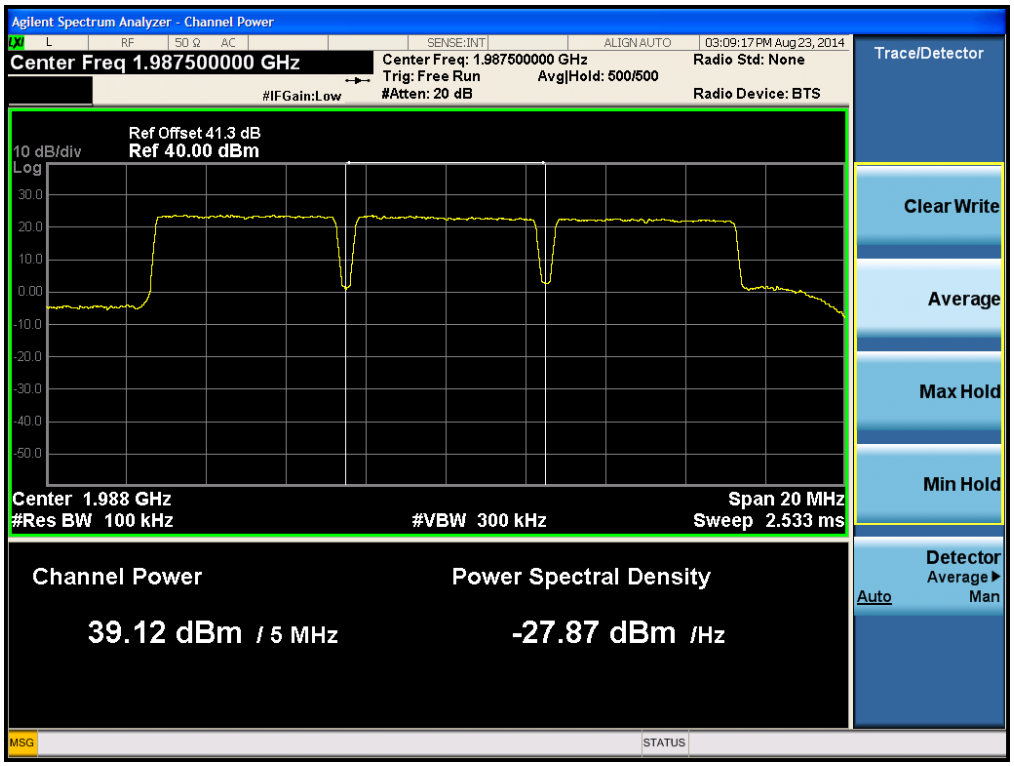
[PCS Downlink 3 Carrier Low]



[PCS Downlink 3 Carrier Middle]



[PCS Downlink 3 Carrier High]



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.

PCS Band

Input Signal	Input Level (dBm)	Maximum Amp Gain
CDMA	DL : -15 dBm	DL : 59 dB
WCDMA		
GSM		
LTE 5 MHz		

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.

PCS Band

[Downlink Output]

	Channel	Frequency (MHz)	OBW (MHz)
CDMA	Low	1931.25	1.267
	Middle	1962.50	1.261
	High	1993.75	1.263
CDMA EVDO	Low	1931.25	1.262
	Middle	1962.50	1.263
	High	1993.75	1.261
WCDMA	Low	1932.40	4.113
	Middle	1962.40	4.157
	High	1992.60	4.145

[Downlink Input]

	Channel	Frequency (MHz)	OBW (MHz)
CDMA	Low	1931.25	1.262
	Middle	1962.50	1.263
	High	1993.75	1.258
CDMA EVDO	Low	1931.25	1.261
	Middle	1962.50	1.265
	High	1993.75	1.263
WCDMA	Low	1932.40	4.105
	Middle	1962.40	4.130
	High	1992.60	4.123

[Downlink Output]

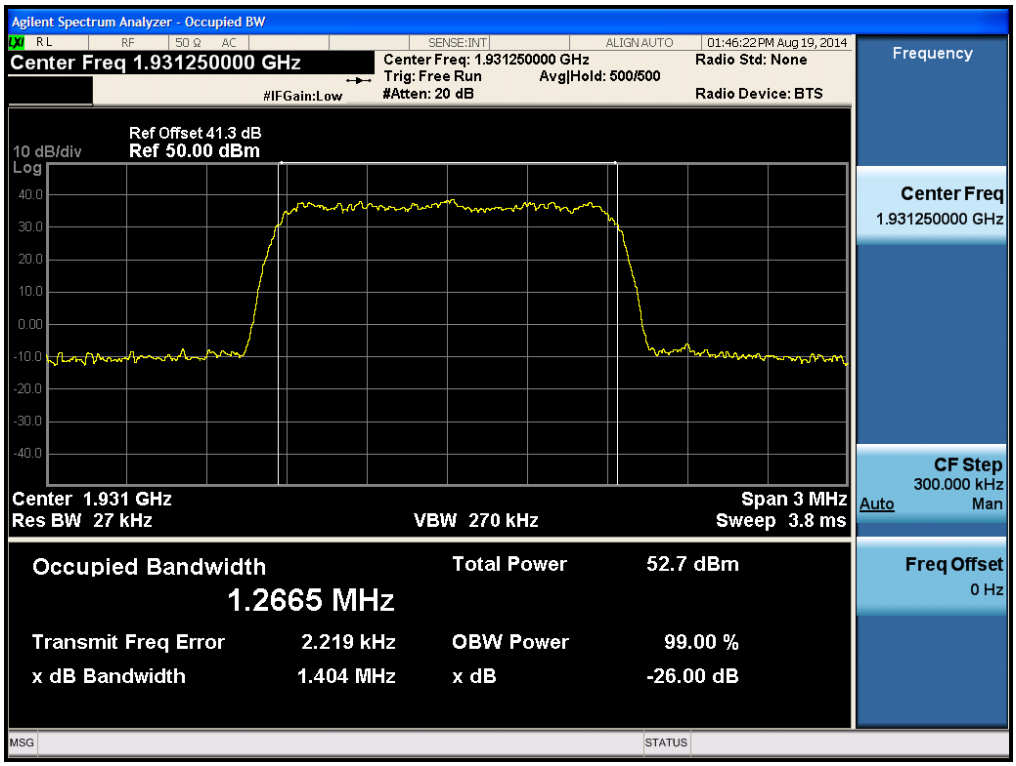
	Channel	Frequency (MHz)	OBW (MHz)
GSM	Low	1930.40	245.3
	Middle	1962.40	246.7
	High	1994.60	246.3
GSM EDGE	Low	1930.40	245.0
	Middle	1962.40	242.9
	High	1994.60	242.6
LTE 5 MHz	Low	1932.50	4.520
	Middle	1962.50	4.511
	High	1992.50	4.518

[Downlink Input]

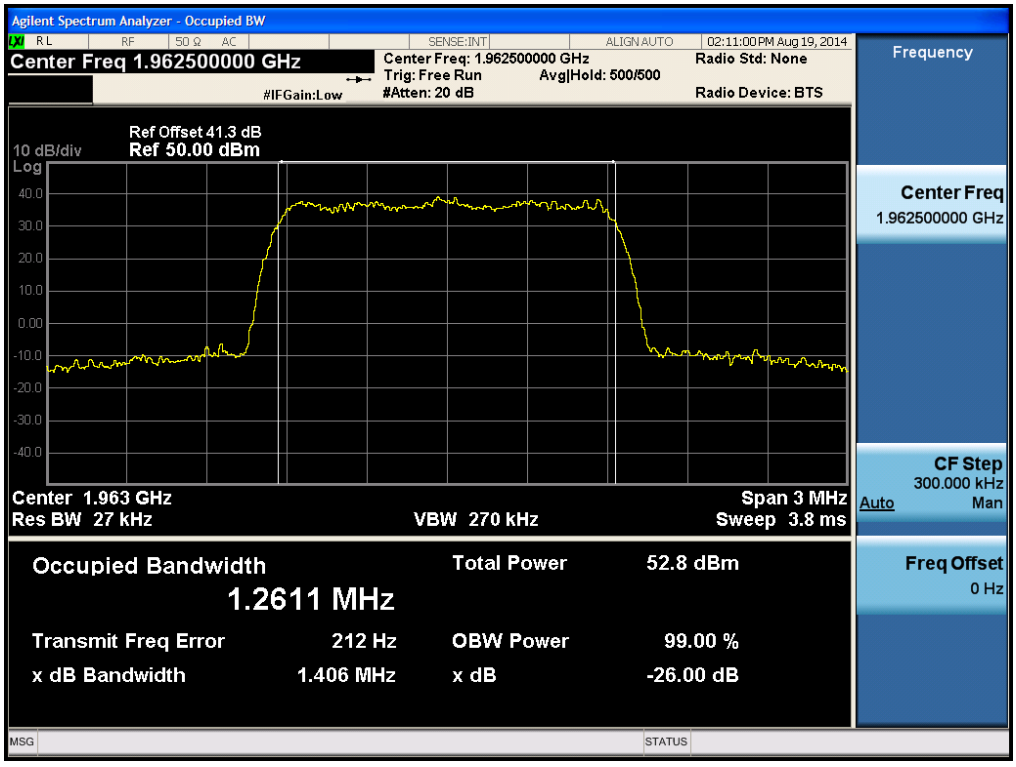
	Channel	Frequency (MHz)	OBW (MHz)
GSM	Low	1930.40	244.4
	Middle	1962.40	246.1
	High	1994.60	246.0
GSM EDGE	Low	1930.40	245.3
	Middle	1962.40	245.3
	High	1994.60	245.4
LTE 5 MHz	Low	1932.50	4.519
	Middle	1962.50	4.515
	High	1992.50	4.525

Plots of Occupied Bandwidth

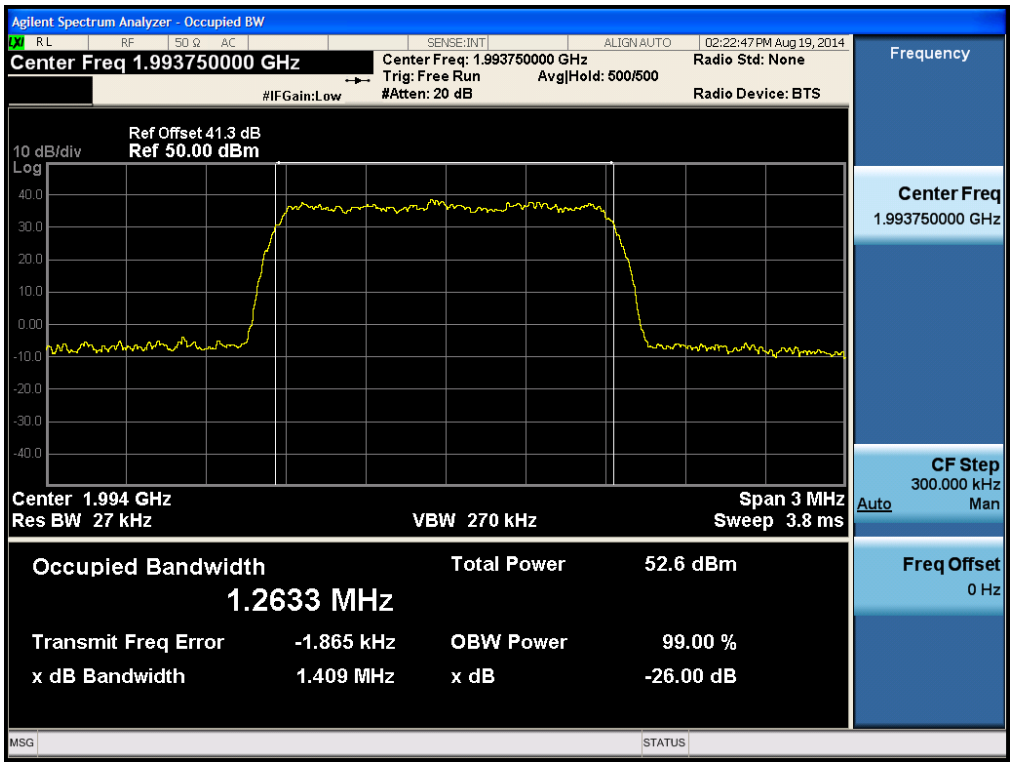
[Output CDMA Downlink Low]



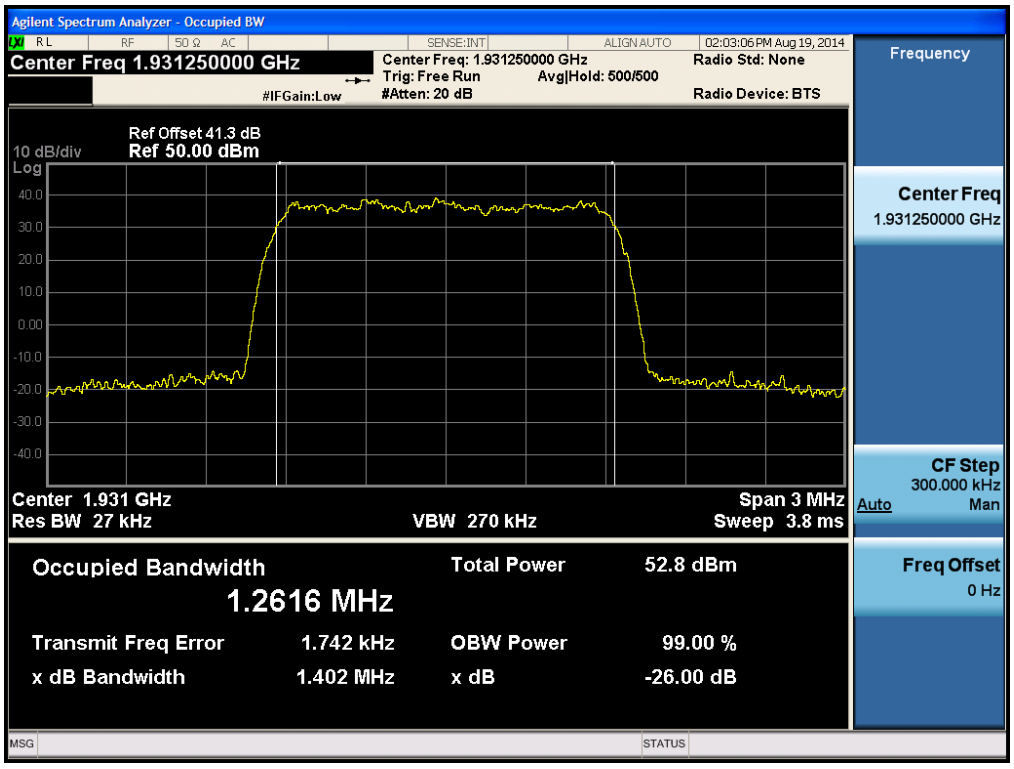
[Output CDMA Downlink Middle]



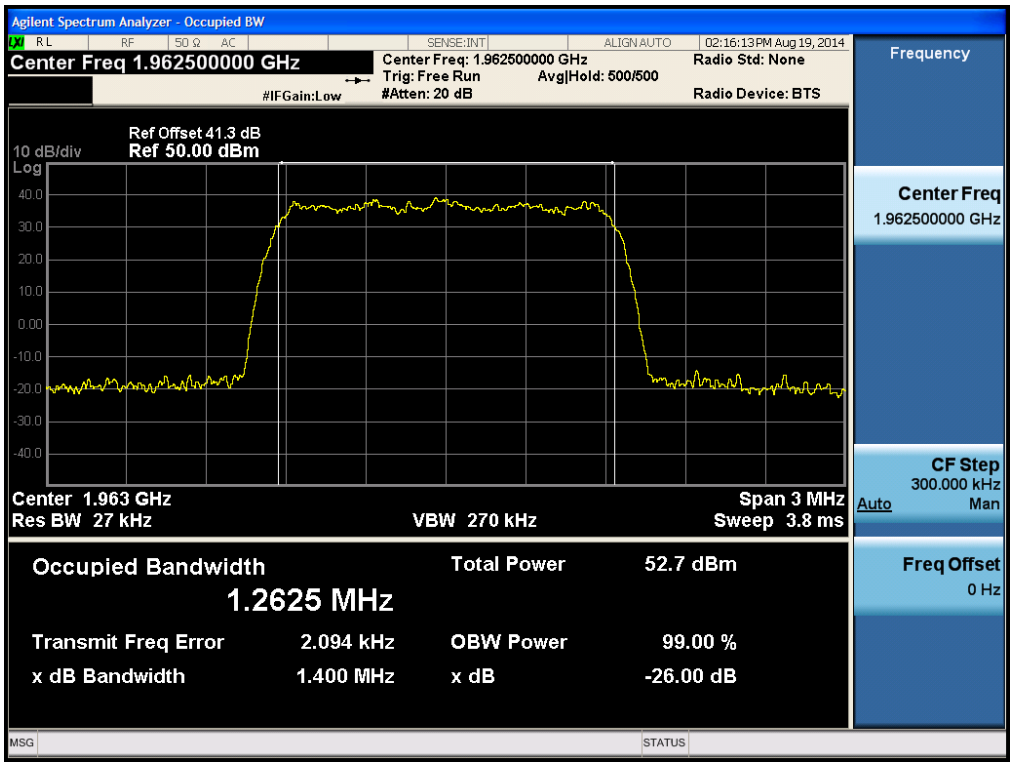
[Output CDMA Downlink High]



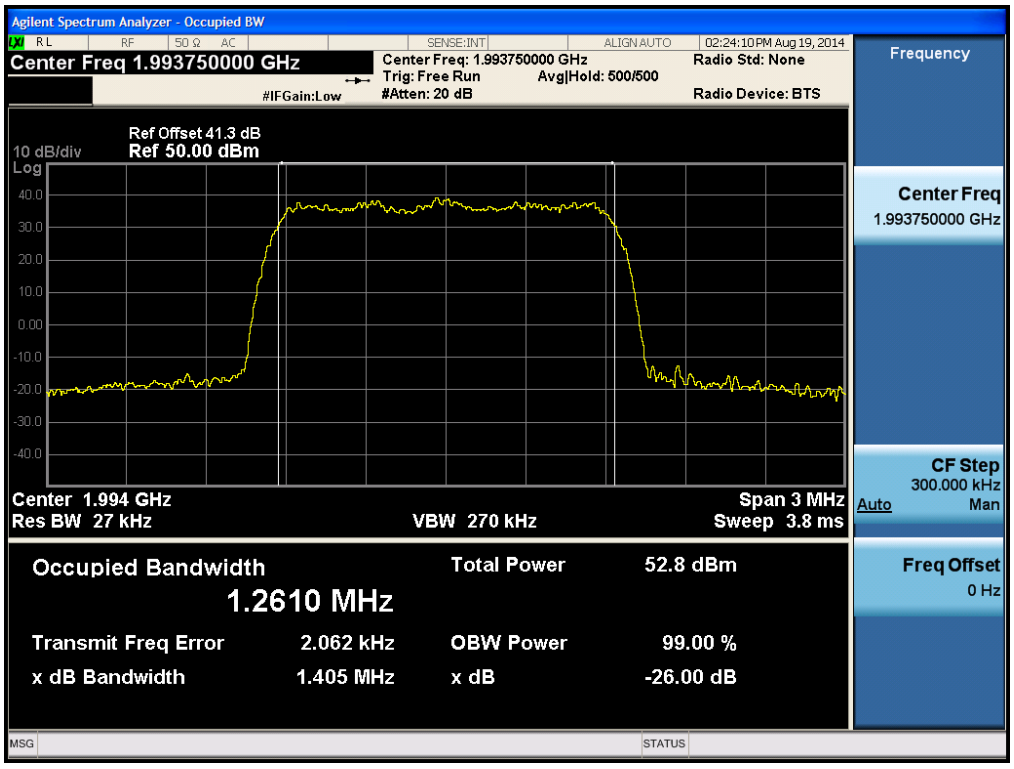
[Output CDMA EVDO Downlink Low]



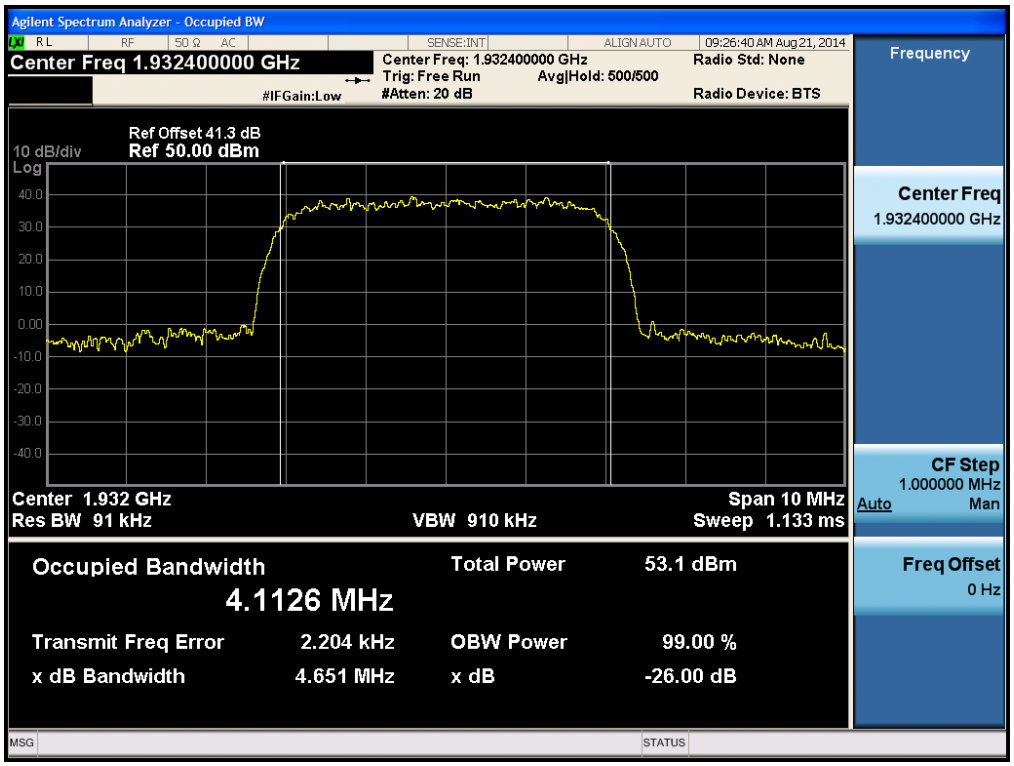
[Output CDMA EVDO Downlink Middle]



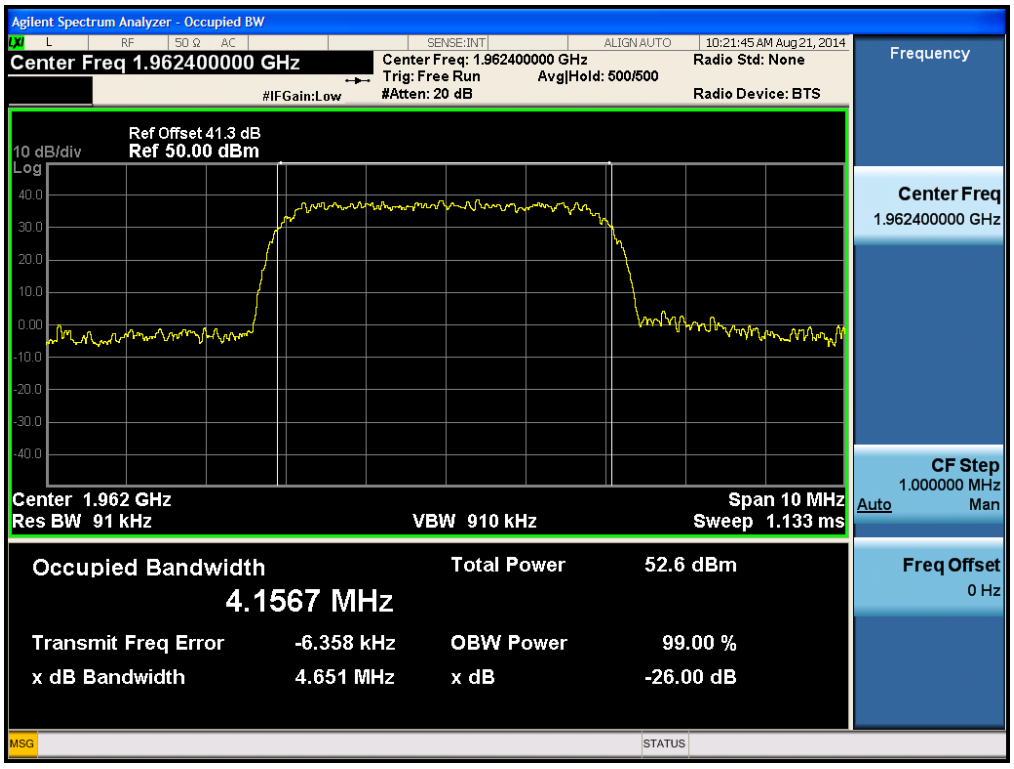
[Output CDMA EVDO Downlink High]



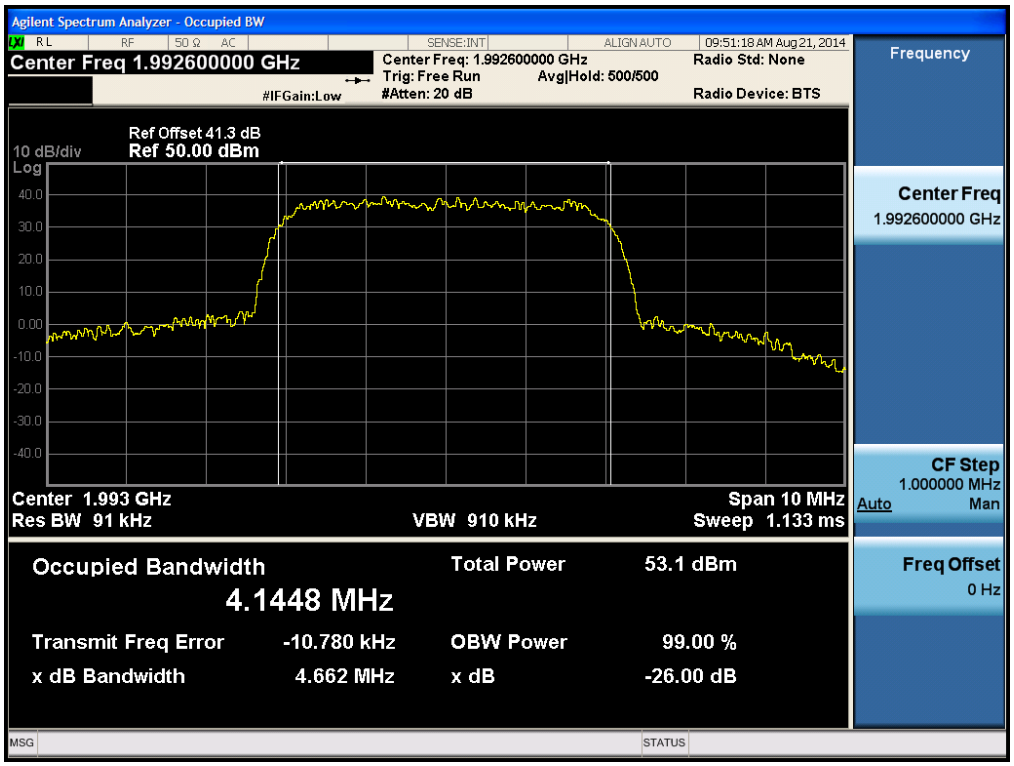
[Output WCDMA Downlink Low]



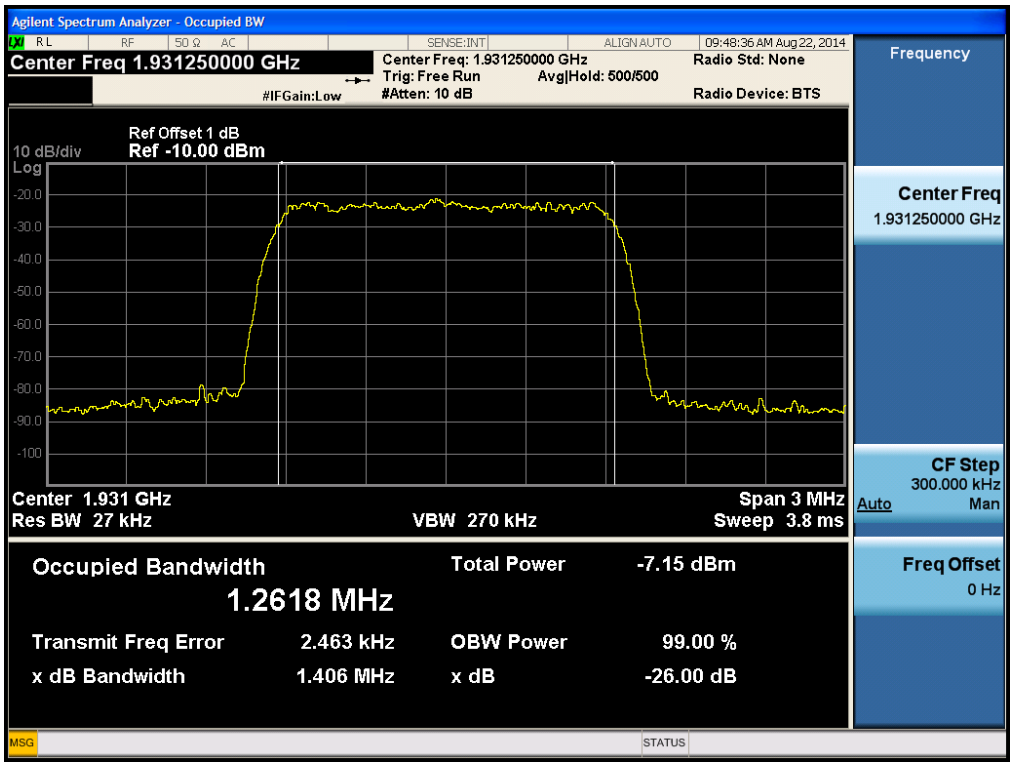
[Output WCDMA Downlink Middle]



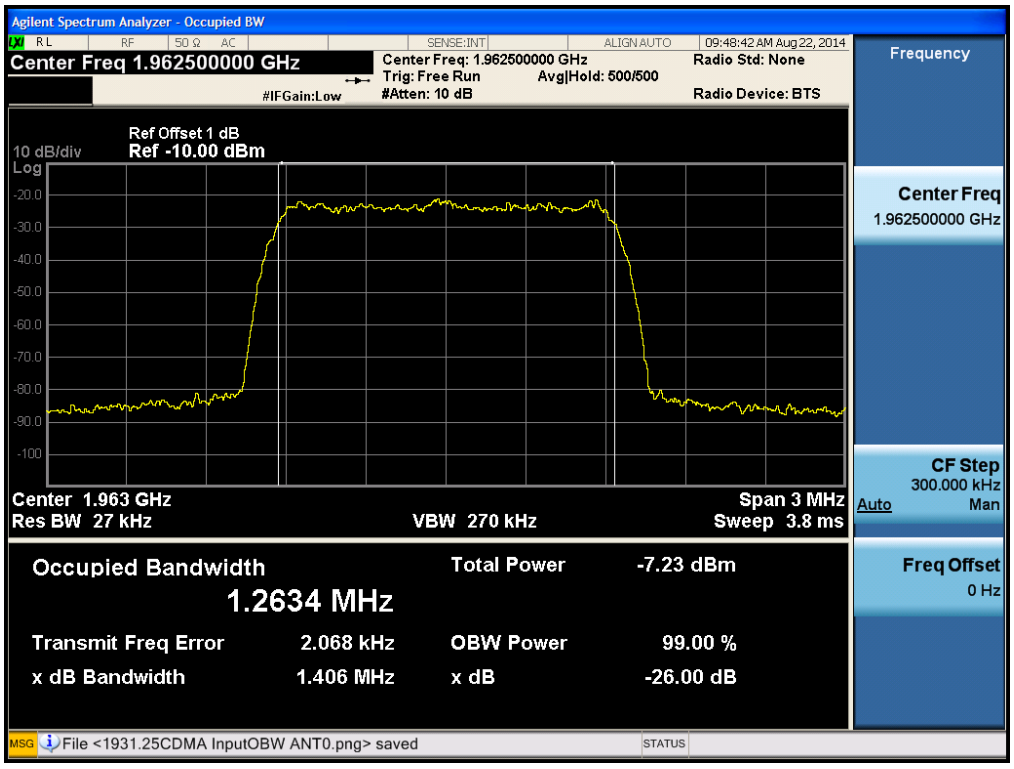
[Output WCDMA Downlink High]



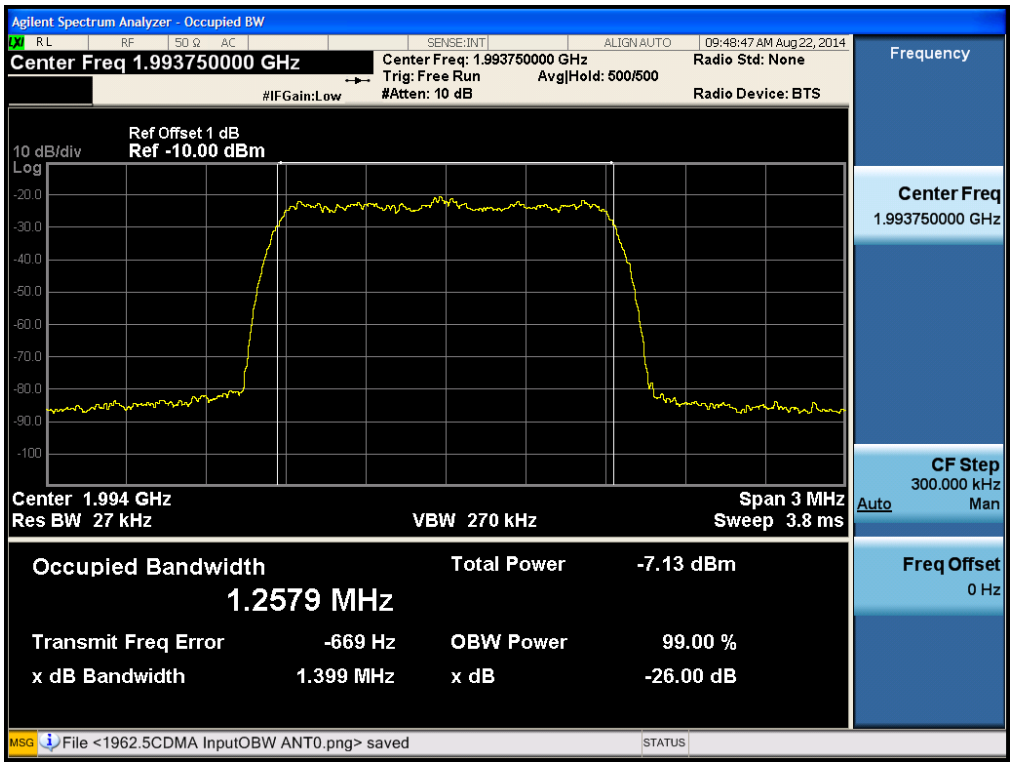
[Input CDMA Downlink Low]



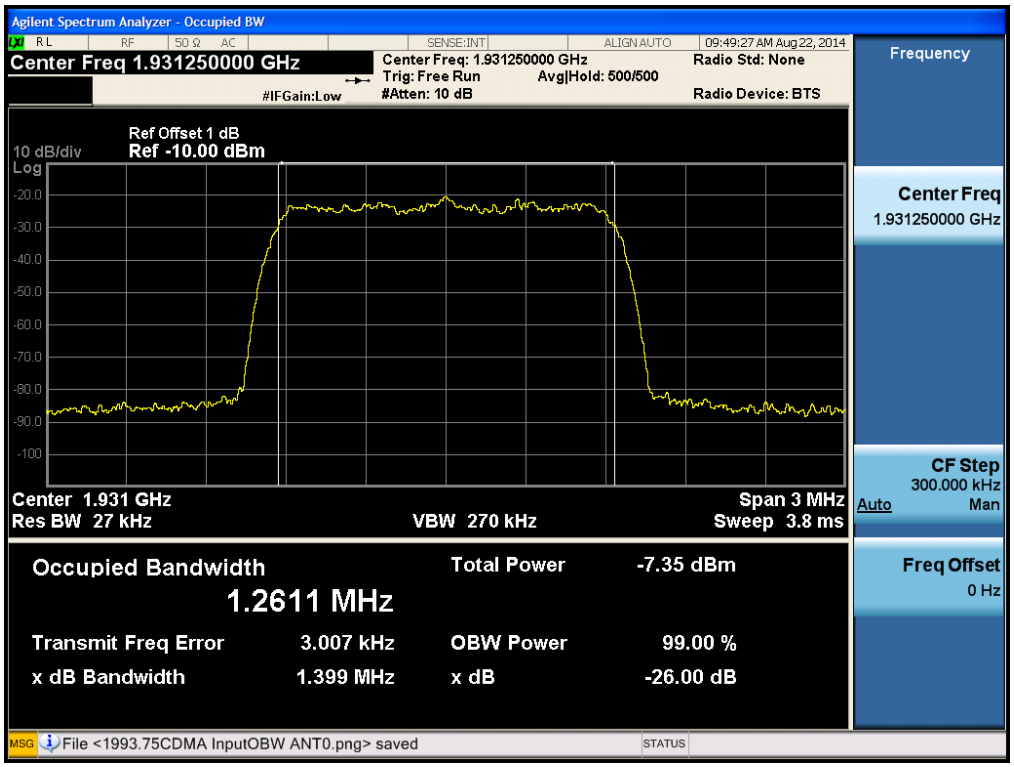
[Input CDMA Downlink Middle]



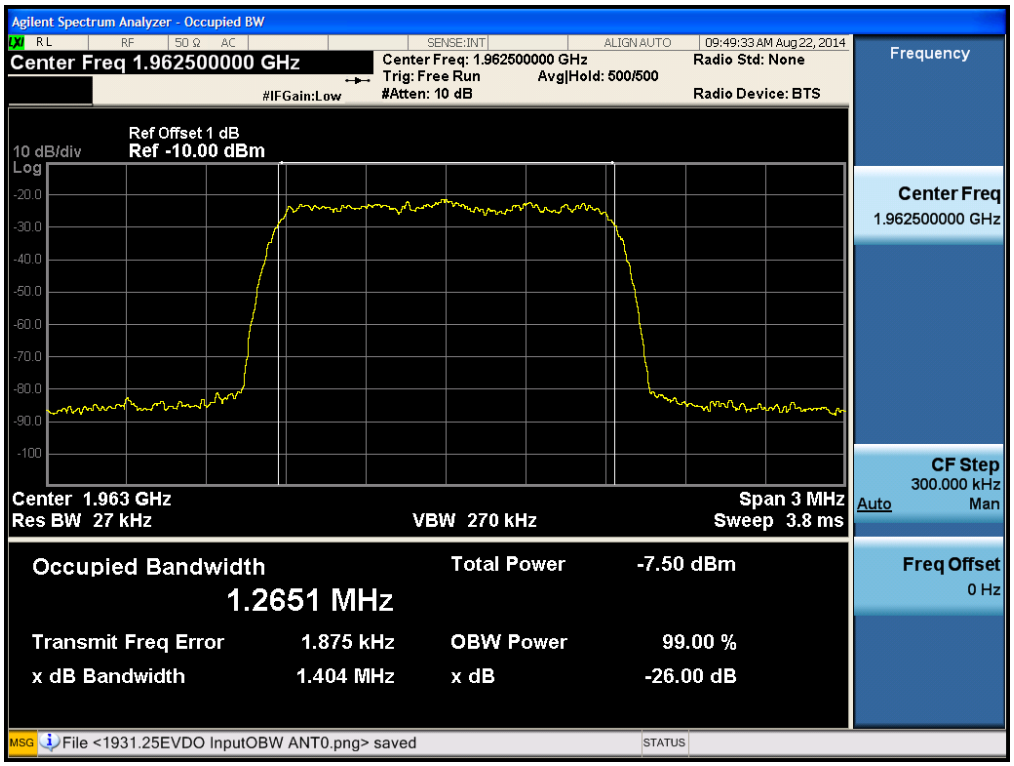
[Input CDMA Downlink High]



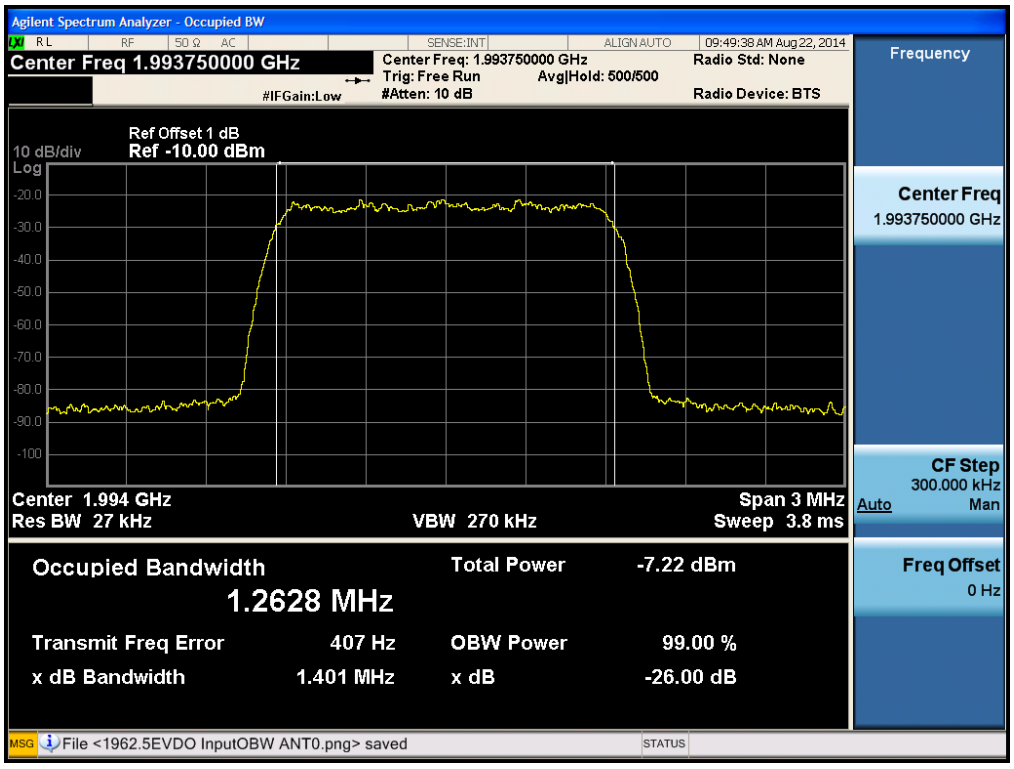
[Input CDMA EVDO Downlink Low]



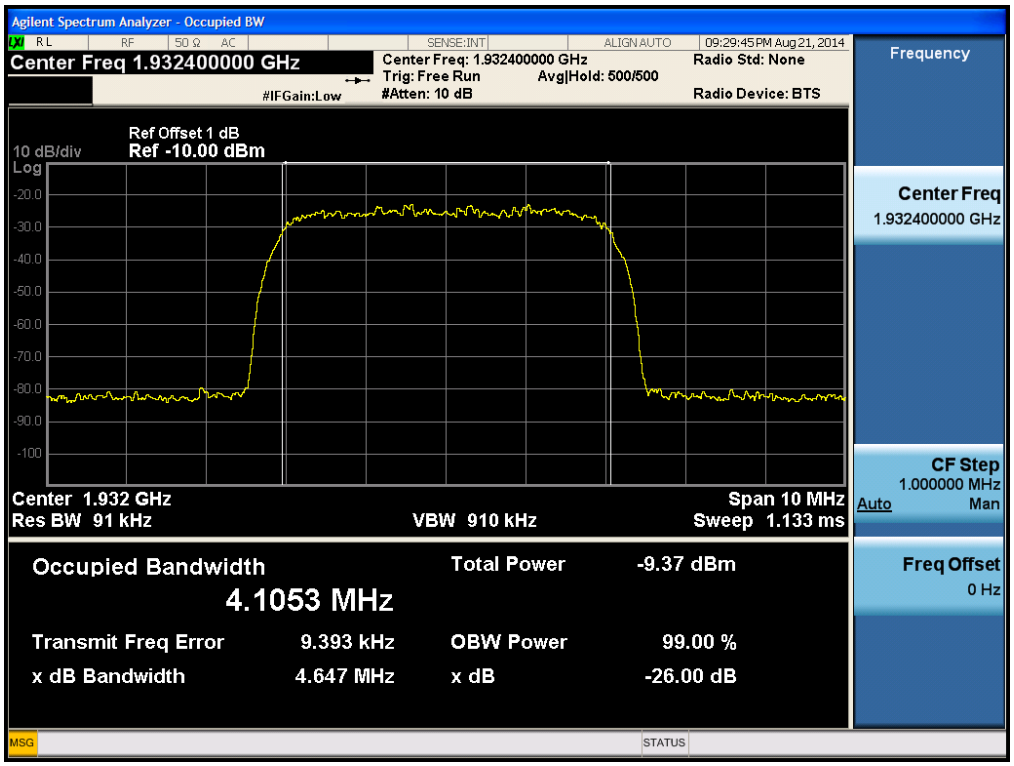
[Input CDMA EVDO Downlink Middle]



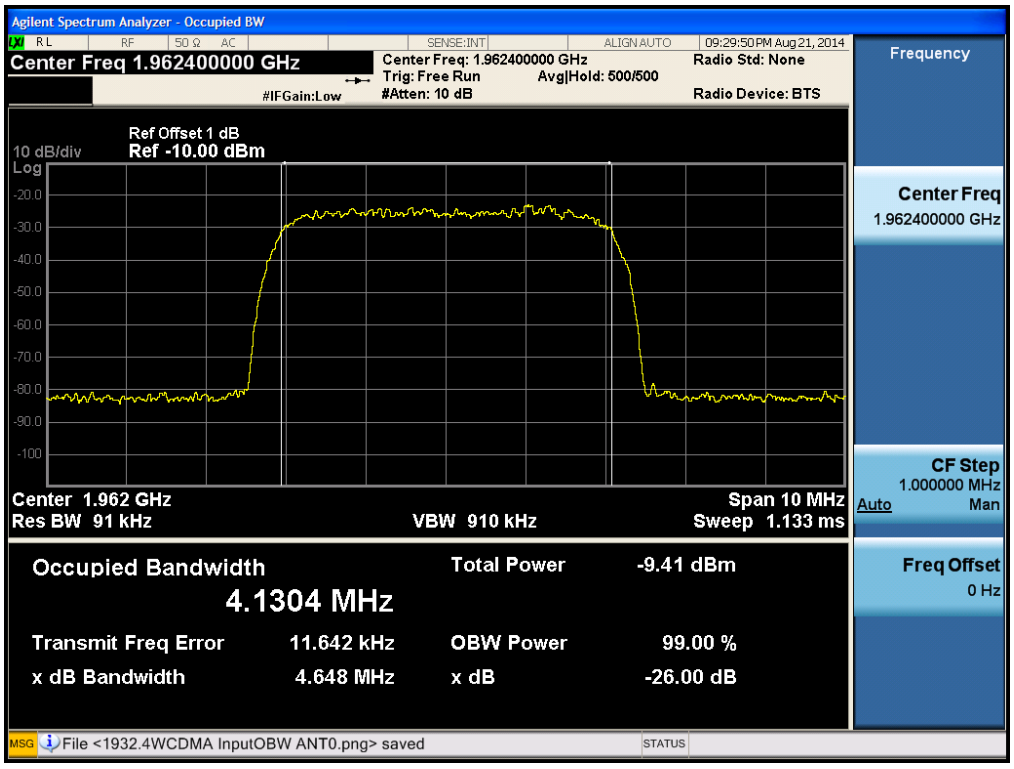
[Input CDMA EVDO Downlink High]



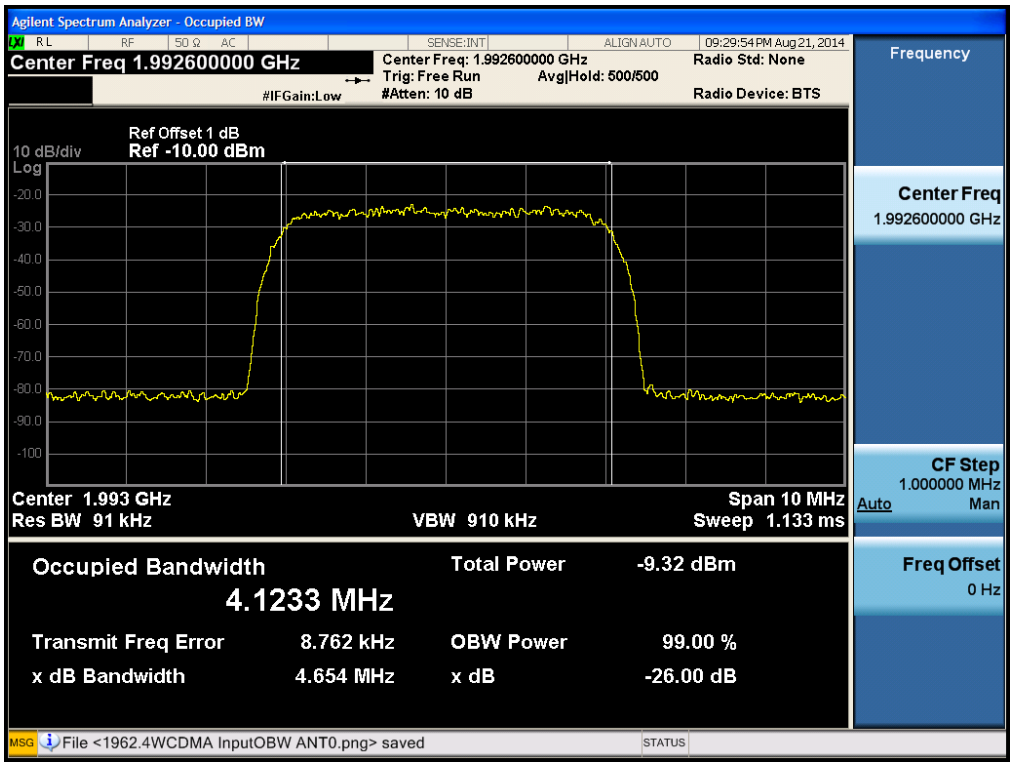
[Input WCDMA Downlink Low]



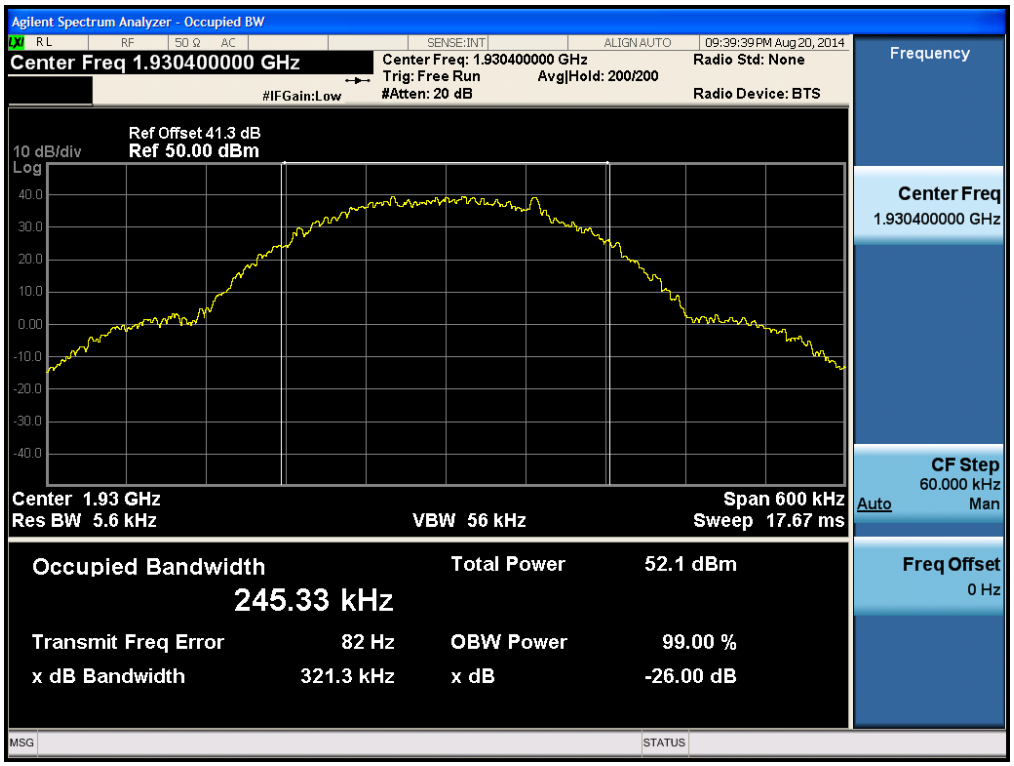
[Input WCDMA Downlink Middle]



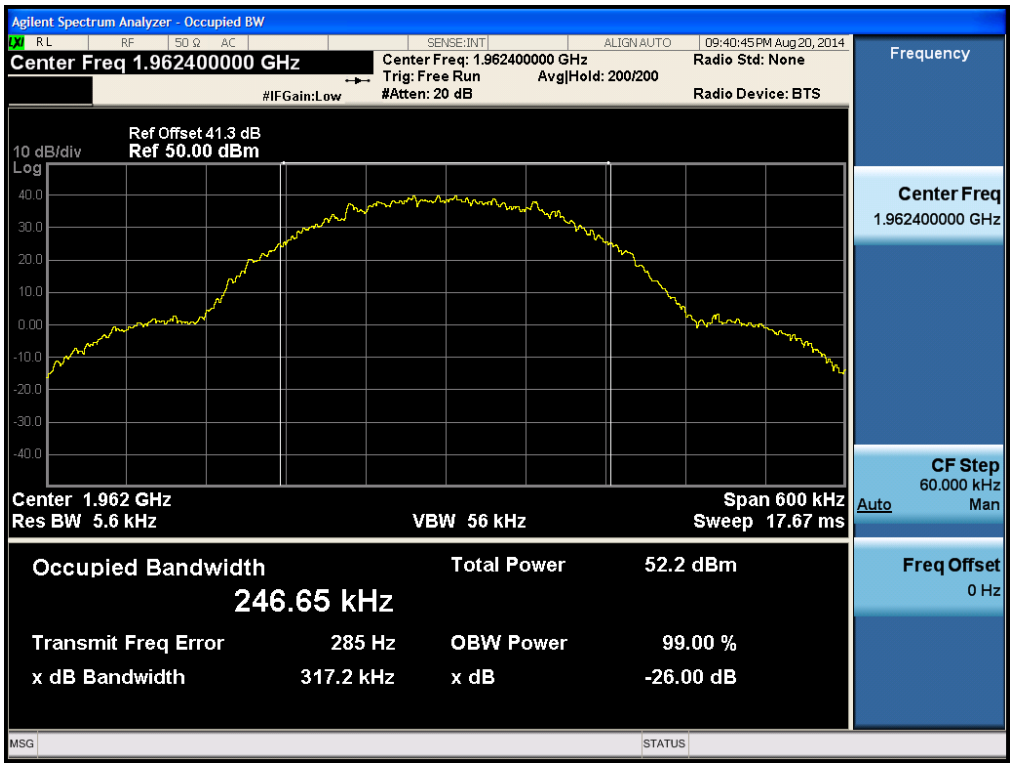
[Input WCDMA Downlink High]



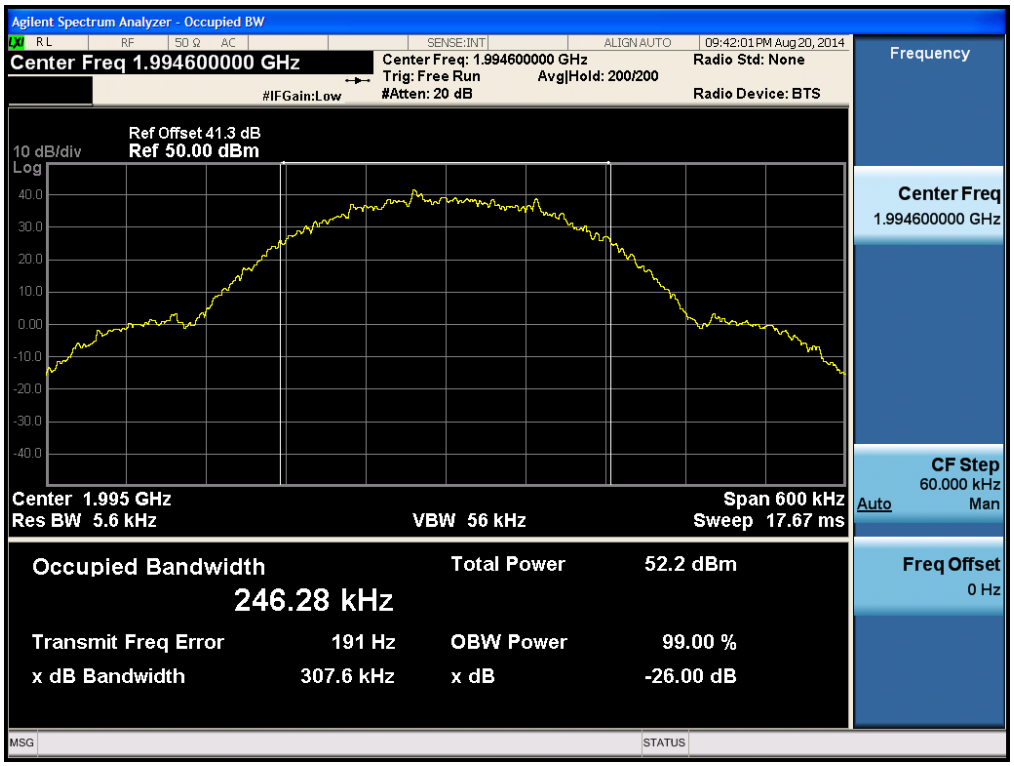
[Output GSM Downlink Low]



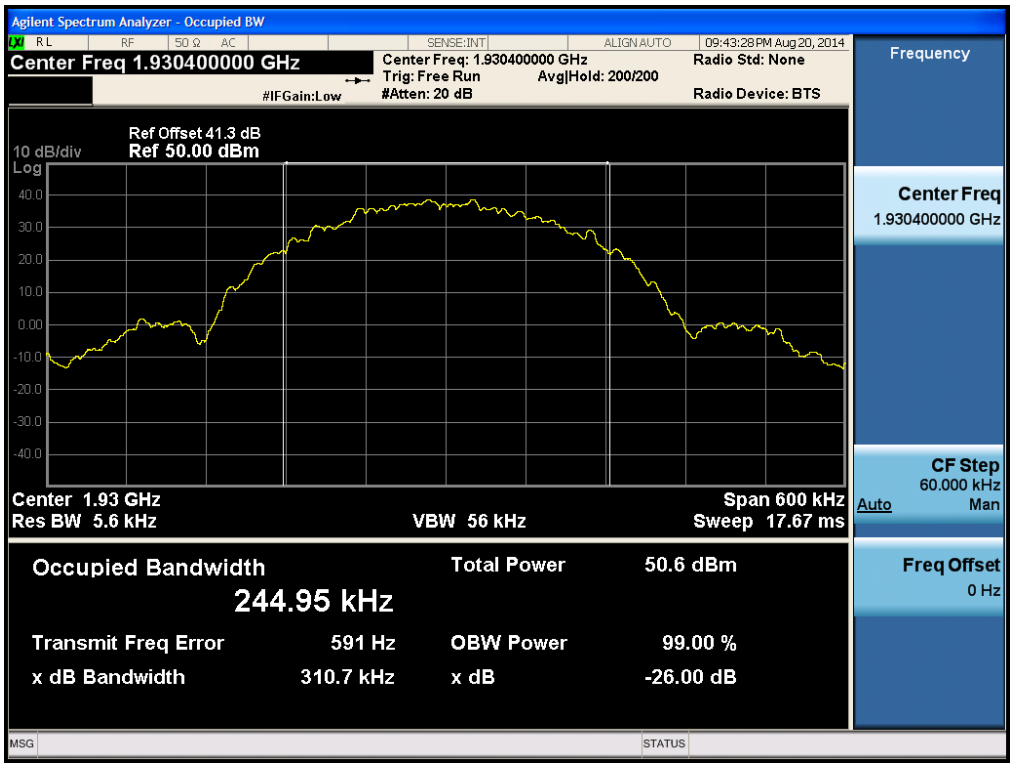
[Output GSM Downlink Middle]



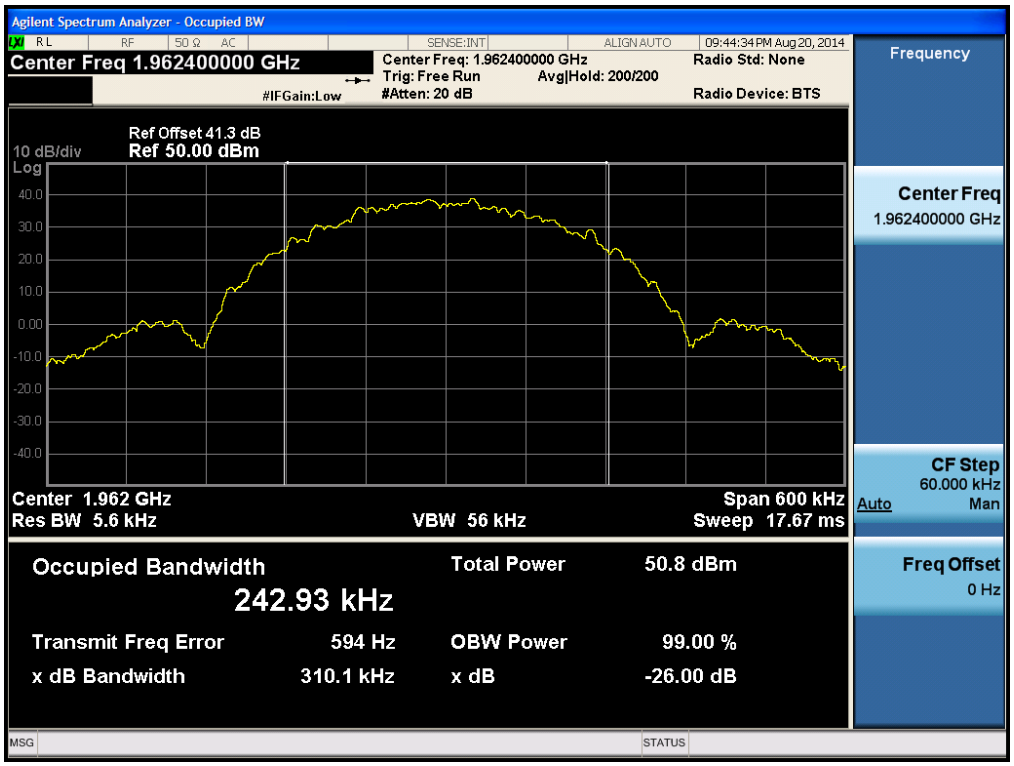
[Output GSM Downlink High]



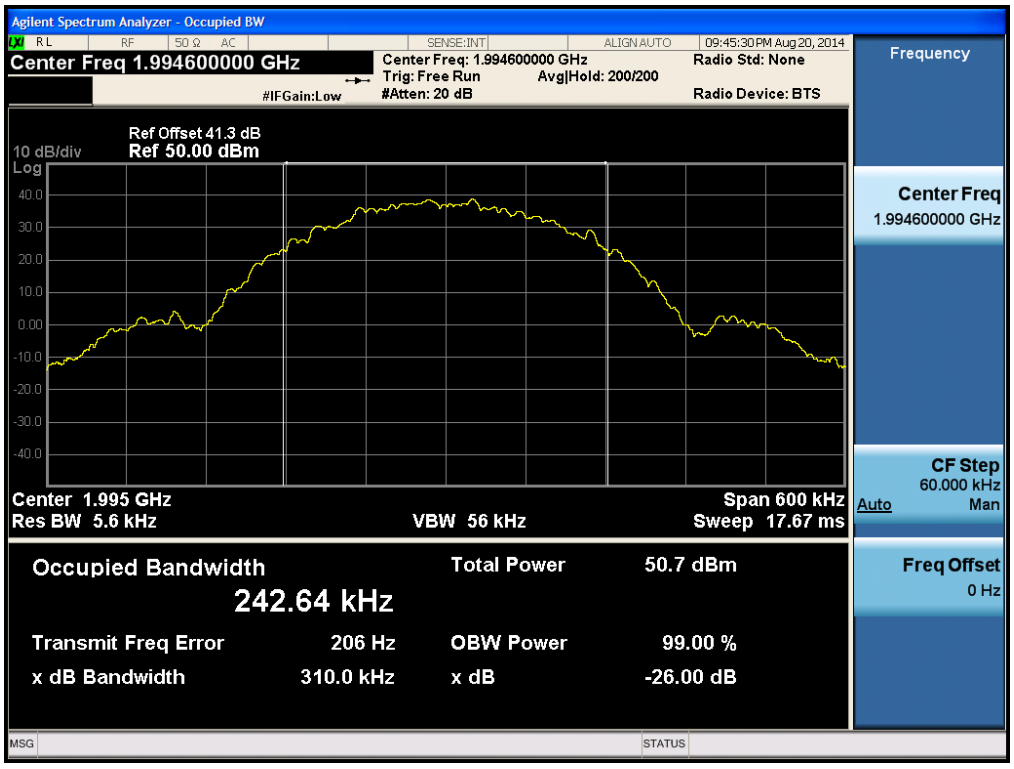
[Output GSM EDGE Downlink Low]



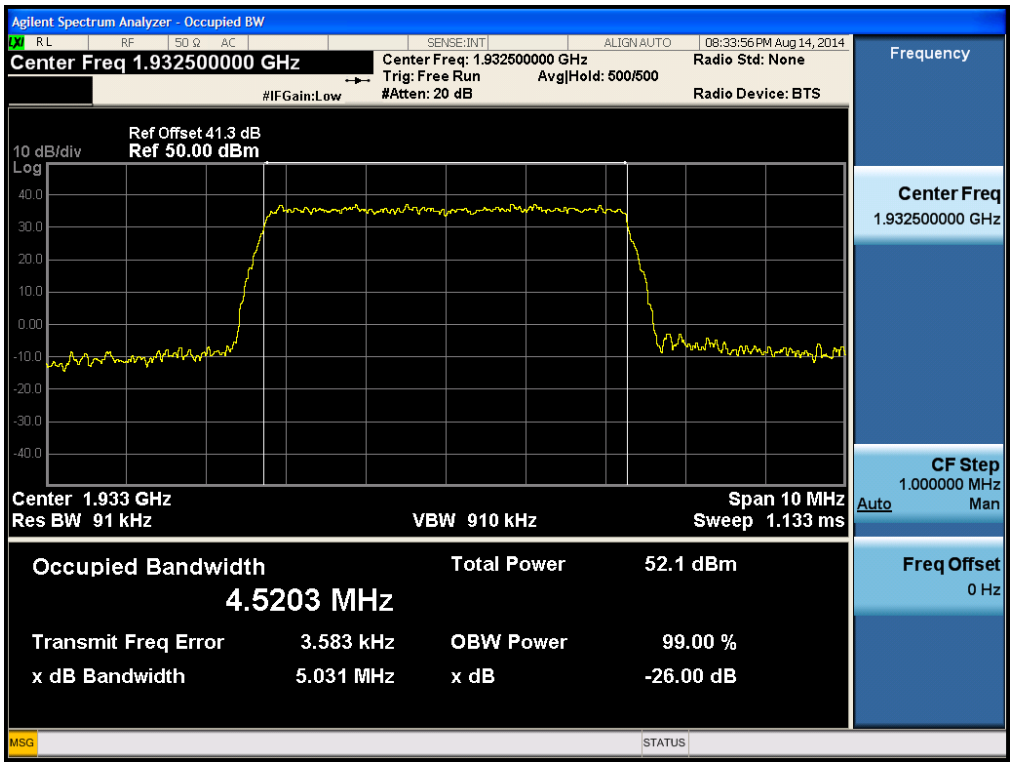
[Output GSM EDGE Downlink Middle]



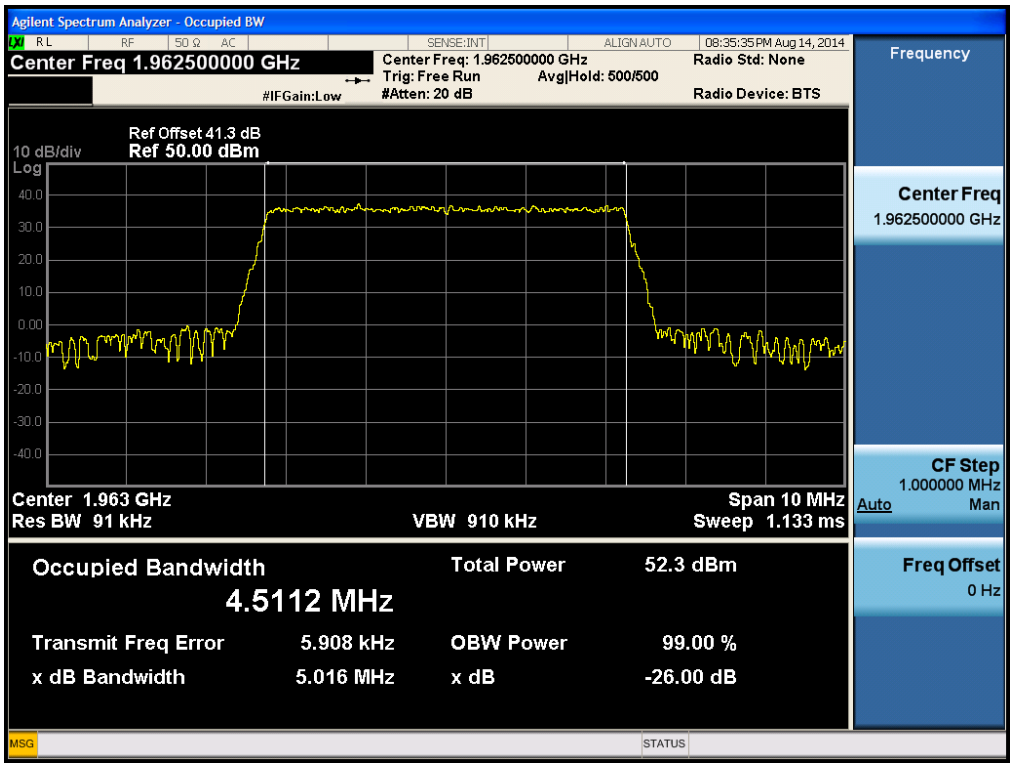
[Output GSM EDGE Downlink High]



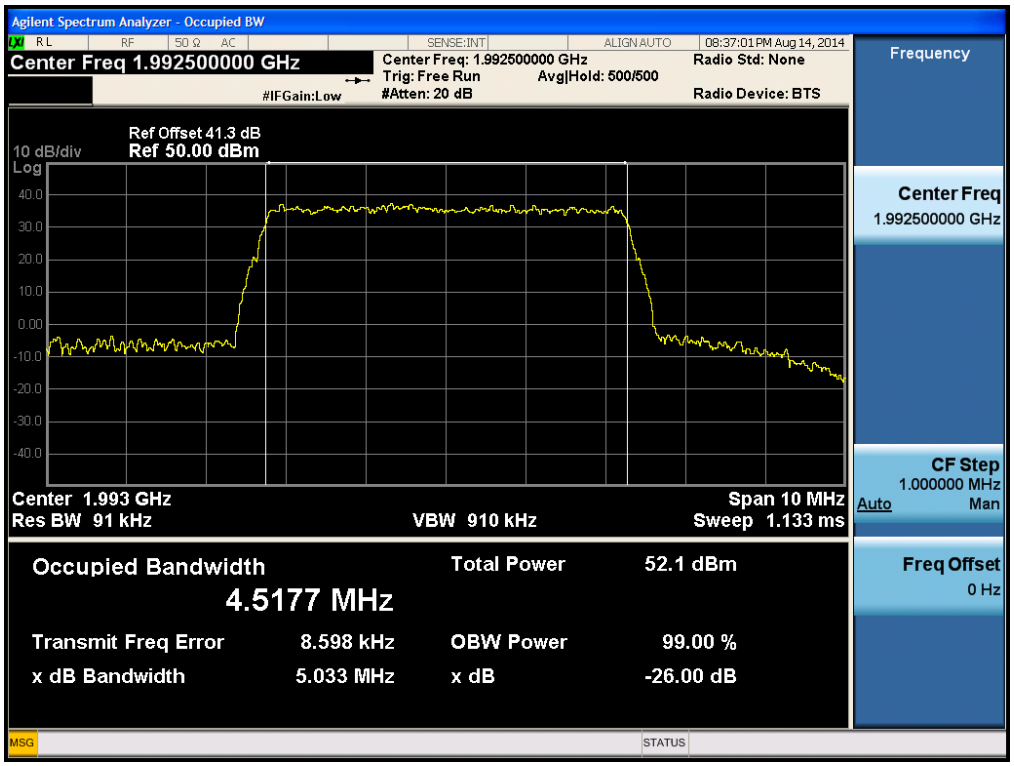
[Output LTE Downlink 5 MHz Low]



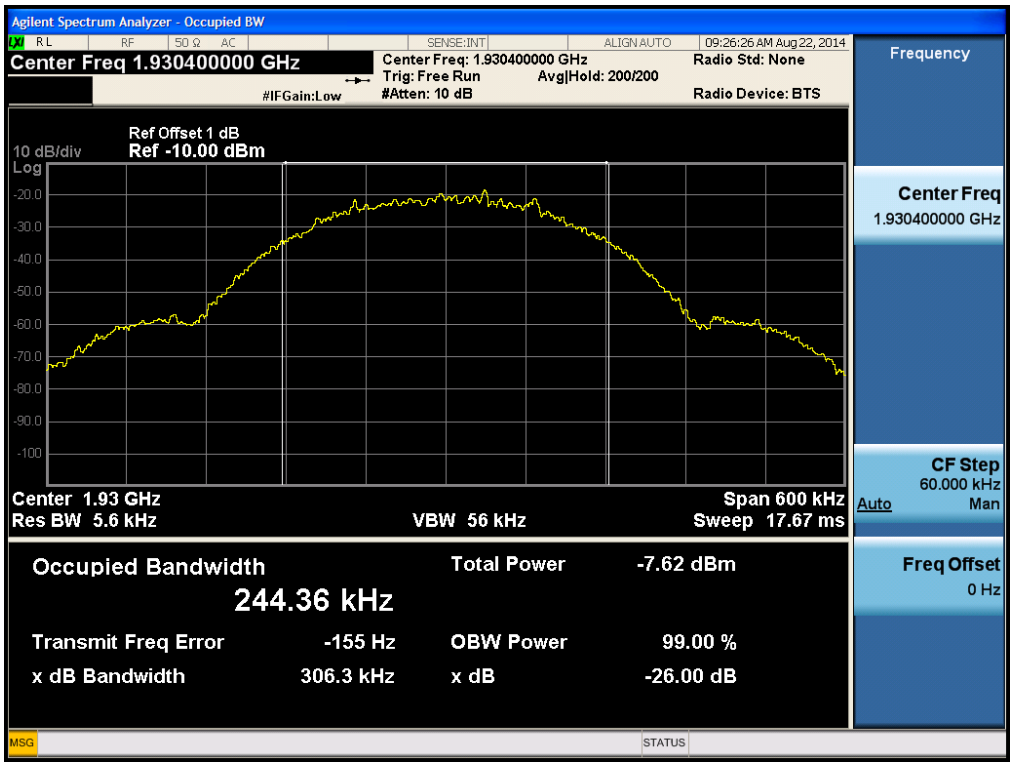
[Output LTE Downlink 5 MHz Middle]



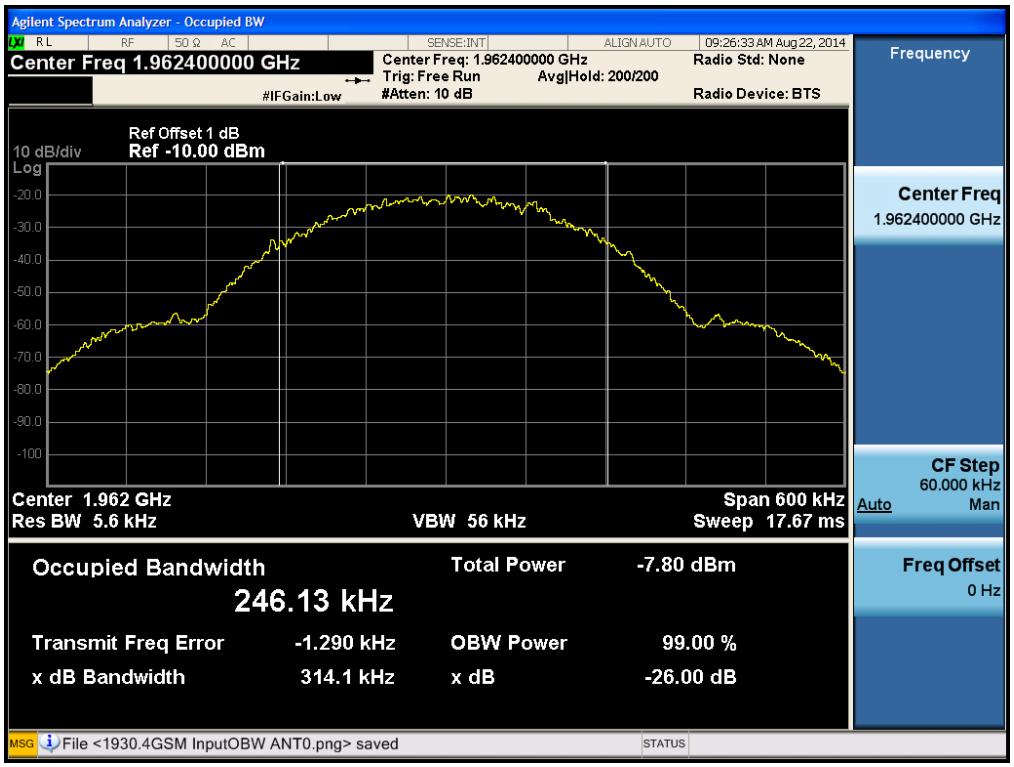
[Output LTE Downlink 5 MHz High]



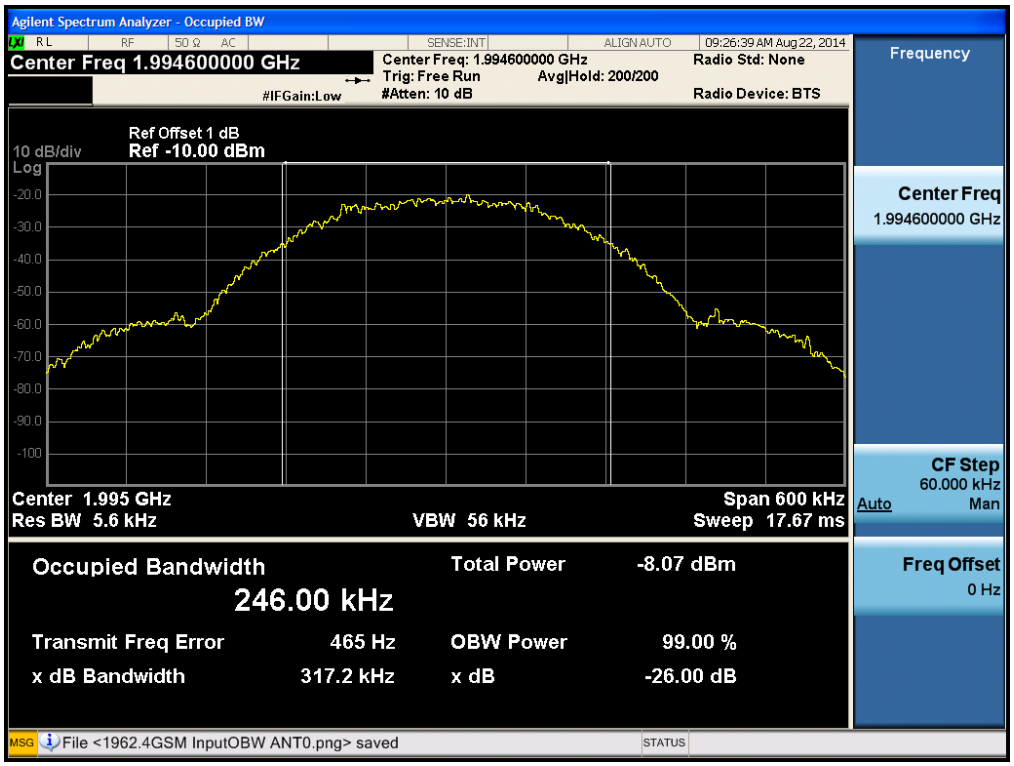
[Input GSM Downlink Low]



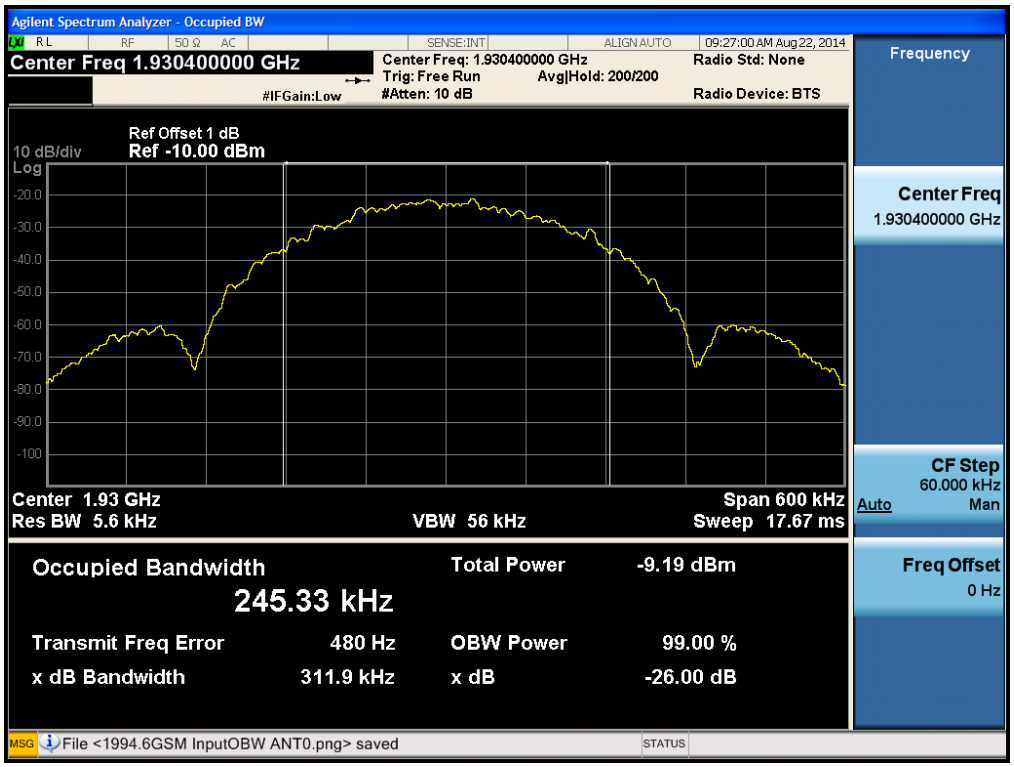
[Input GSM Downlink Middle]



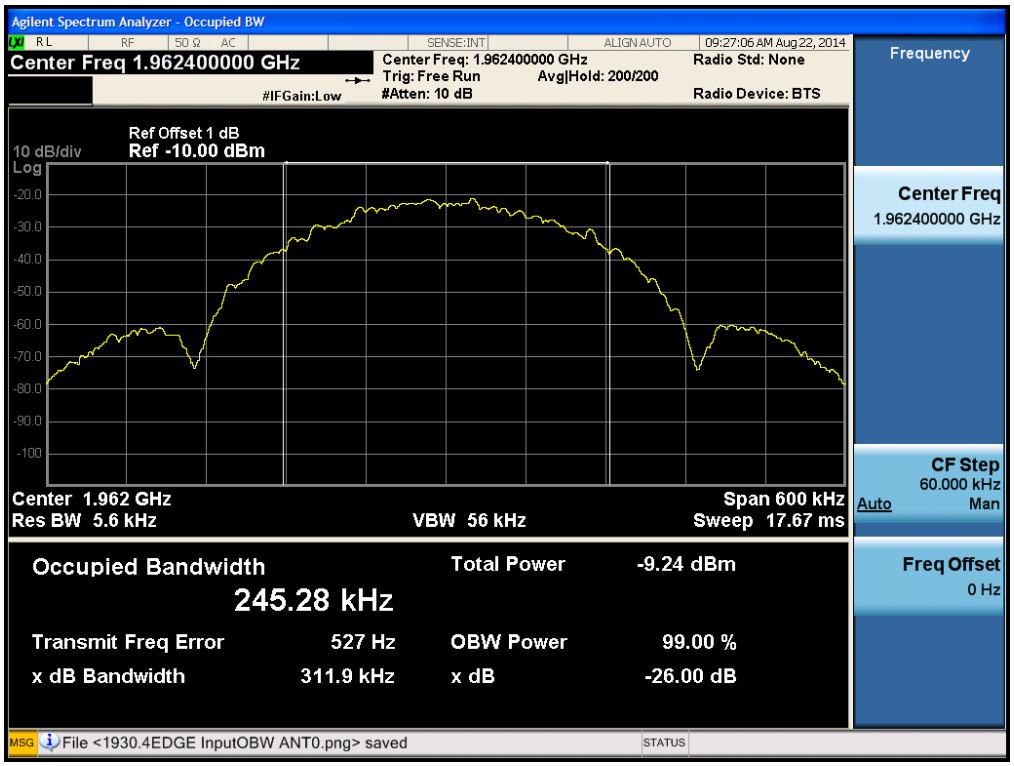
[Input GSM Downlink High]



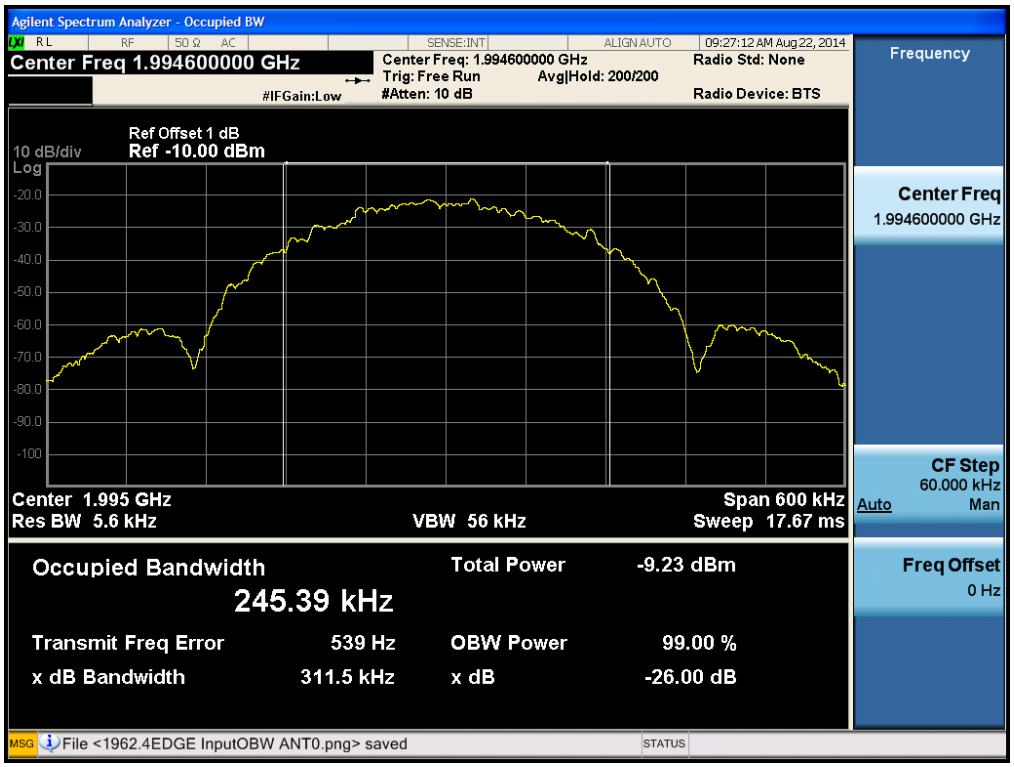
[Input GSM EDGE Downlink Low]



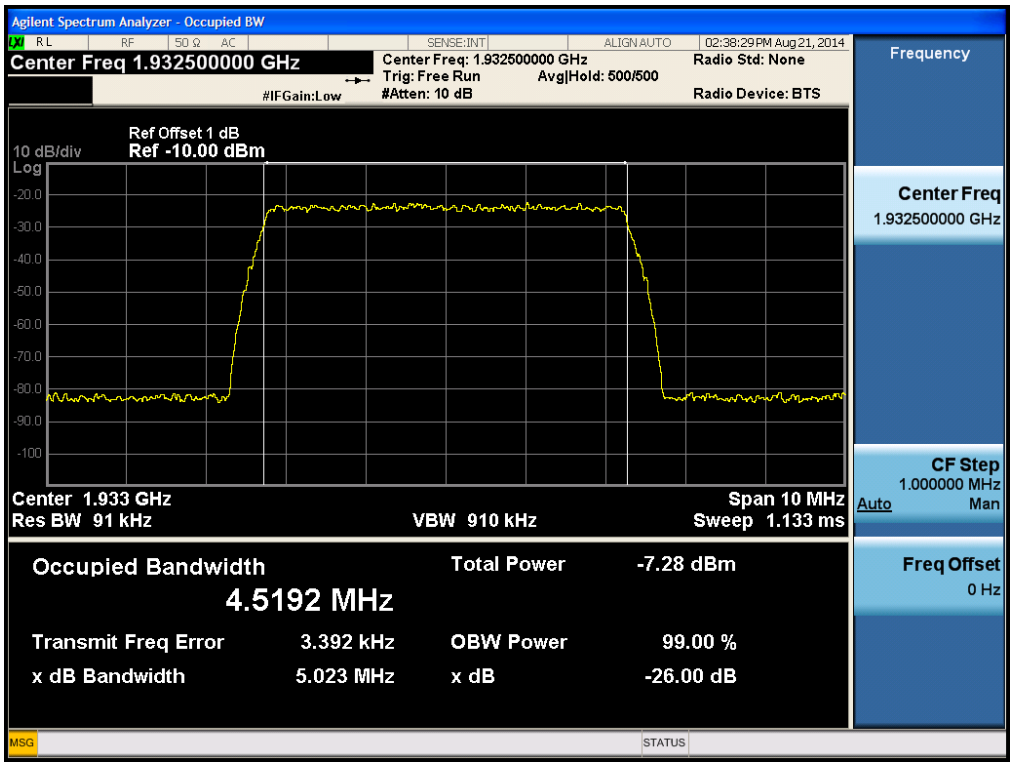
[Input GSM EDGE Downlink Middle]



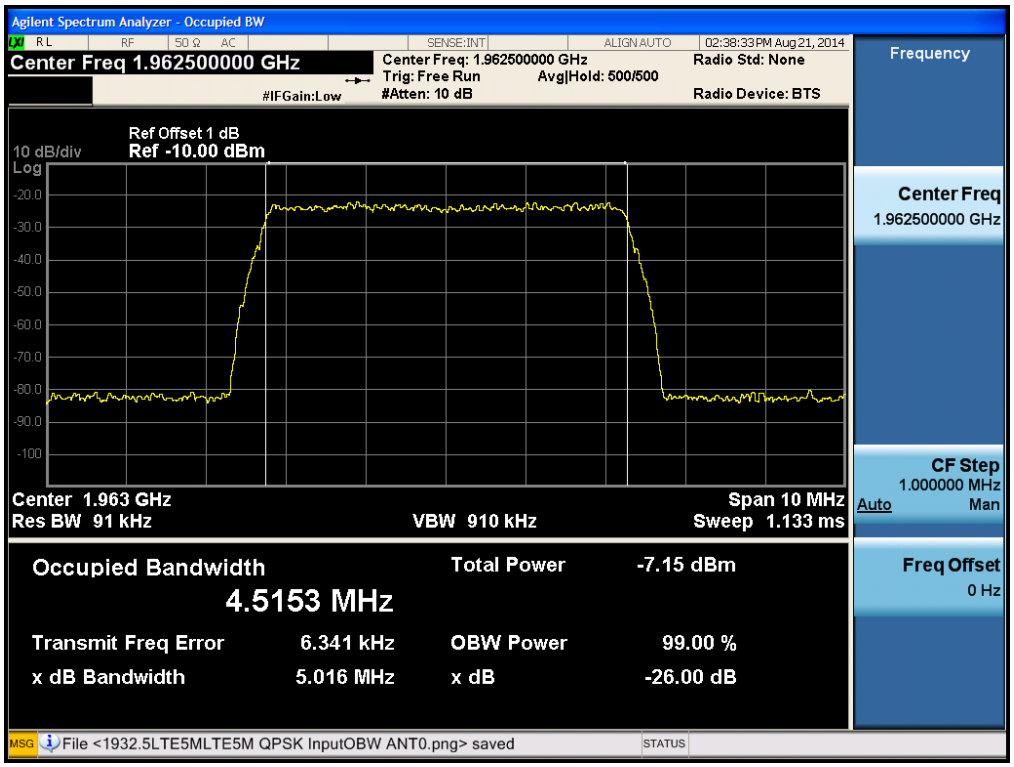
[Input GSM EDGE Downlink High]



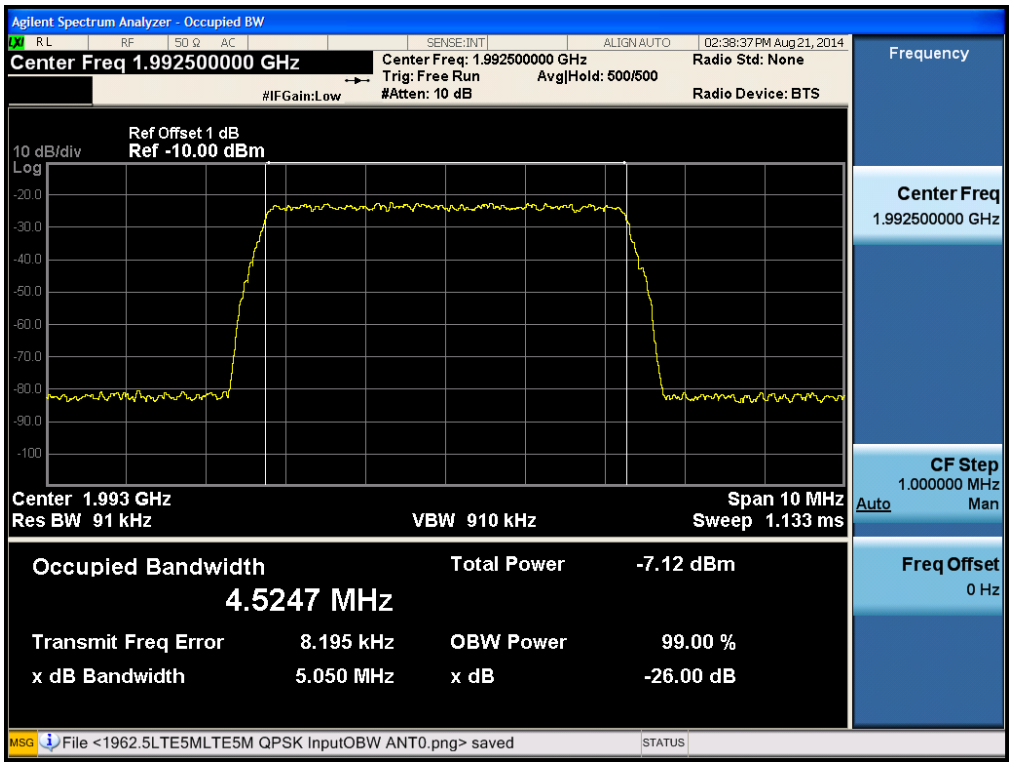
[Input LTE Downlink 5 MHz Low]



[Input LTE Downlink 5 MHz Middle]



[Input LTE Downlink 5 MHz 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.

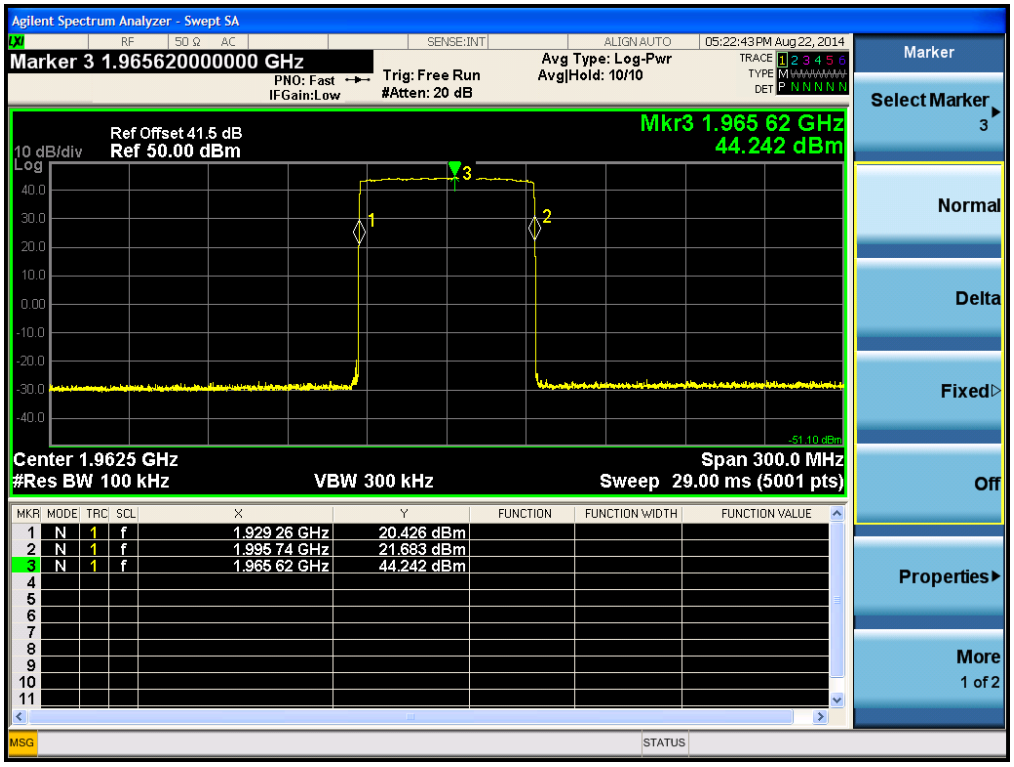
Input Level (dBm) Input Signal : Sinusoidal	Maximum Amp Gain
DL : -15 dBm	DL : 59 dB

[Downlink]

20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
1929.26 ~ 1965.62	44.24	58.24

Plots of Passband Gain and Bandwidth & Out of Band Rejection

[PCS Downlink]



9. SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINAL

FCC Rules

Test Requirement(s): § 2.1051 Measurements required: Spurious emissions at antenna terminals:

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

§ 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

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

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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

(d) Interference caused by out of band emissions. If any emission from a transmitter operating in this service results in interference to users of another radio service, the

FCC may require a greater attenuation of that emission than specified in this section.

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.

The spectrum was investigated from 9 kHz to the 26.5 of the carrier.

Test Results: The EUT complies with the requirements of this section. There were no Detectable Spurious emissions for this EUT.

IC Rules

Test Requirement(s): RSS-131 6.4

Spurious emissions of zone enhancers and translators shall be suppressed as much as possible.

Spurious emissions shall be attenuated below the rated power of the enhancer by at least:

43 + 10 Log10(Prated in watts), or 70 dB, whichever is less stringent.

Note: If the minimum standard is not met, check to see if the input signal generators have a high harmonic content.

Test Procedures: RSS-131 4.4

4.4.1 Multi-channel Enhancer

The spurious emissions of the equipment under test shall be measured using the two-tone method in section 4.3.1, with the two tones Po1 and Po2 set to the required levels. Using a spectrum analyser with a resolution bandwidth set at 100 kHz, search for spurious emissions from 30 MHz to at least 5 times the highest RF passband frequency. The search may omit the band that contains the test tones and intermodulation products.

4.4.2 Single channel Enhancer

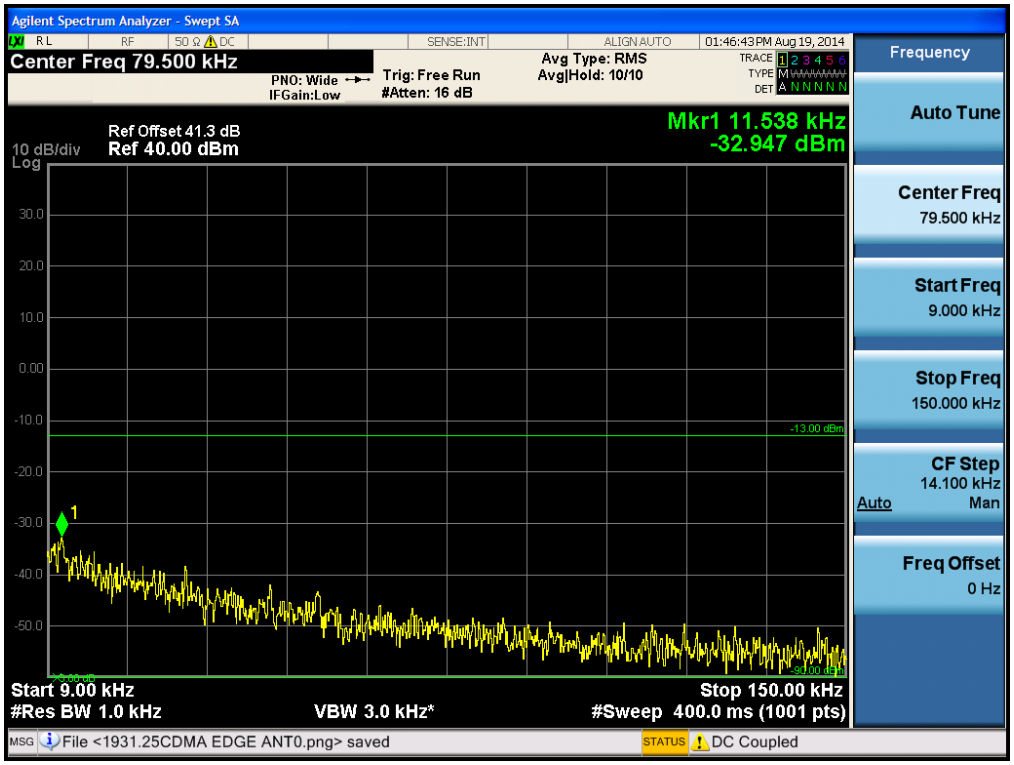
The enhancer shall be operated as described in section 4.3.2 during the search for spurious emissions.

Using a spectrum analyser with a resolution bandwidth set at 100 kHz, search for spurious emissions from 30 MHz to at least 5 times the highest RF passband frequency. The search may omit the band that contains the input signal.

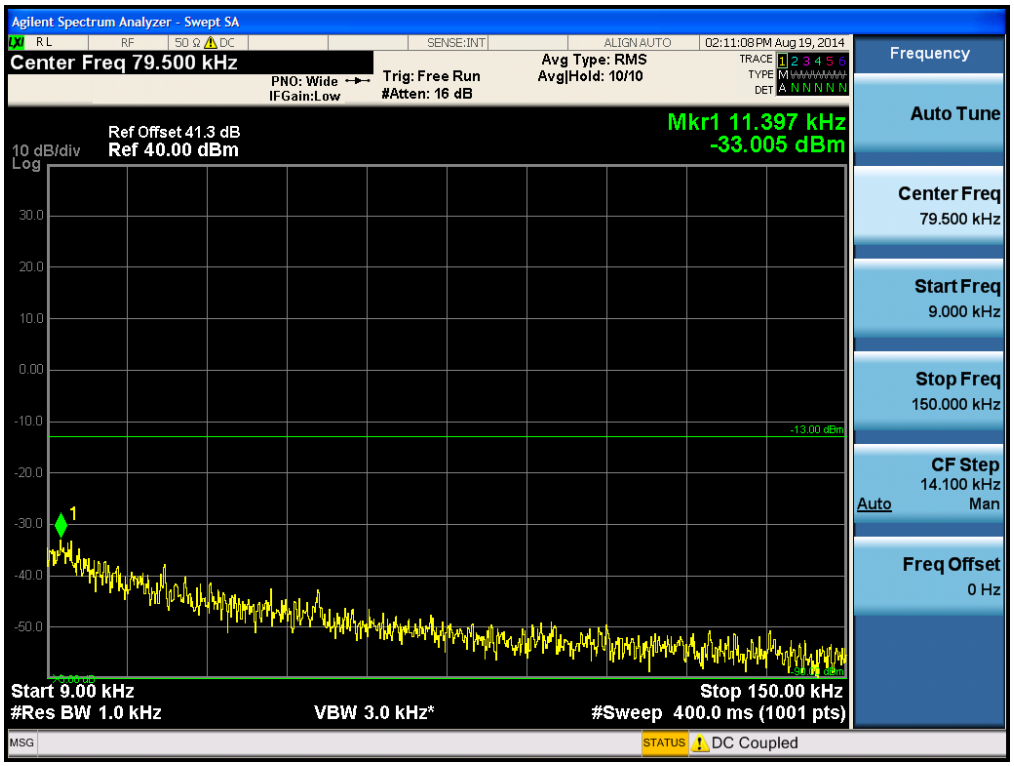
Single channel Enhancer Plots of Spurious Emission

Conducted Spurious Emissions (9 kHz – 150 kHz)

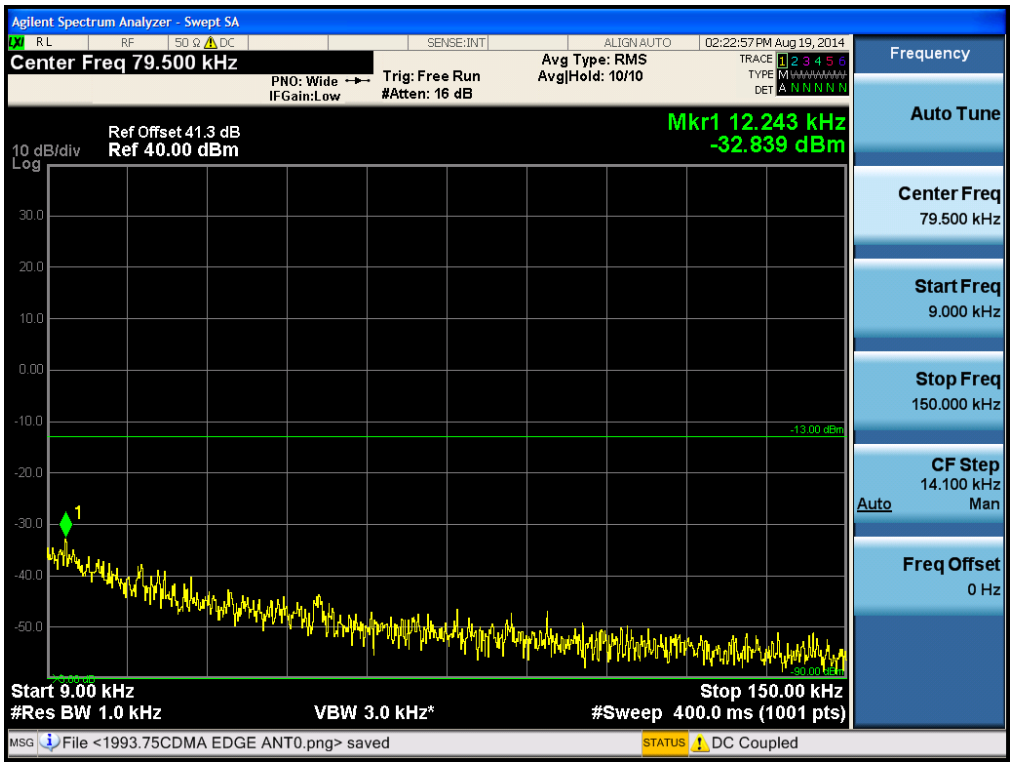
[CDMA Downlink Low]



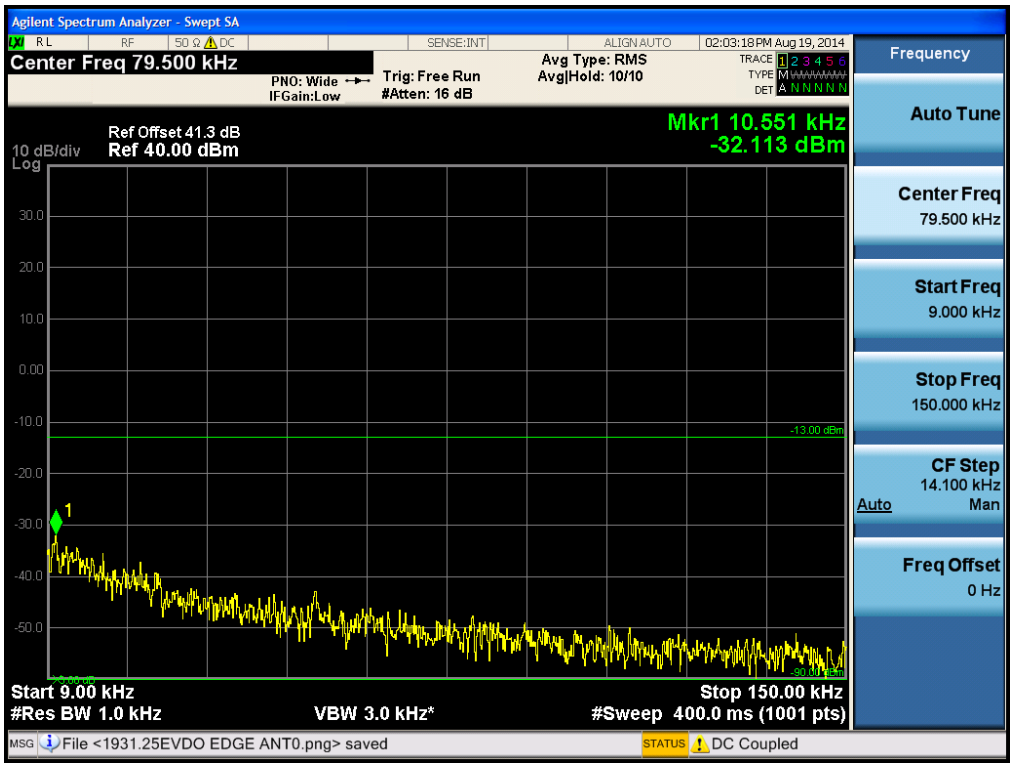
[CDMA Downlink Middle]



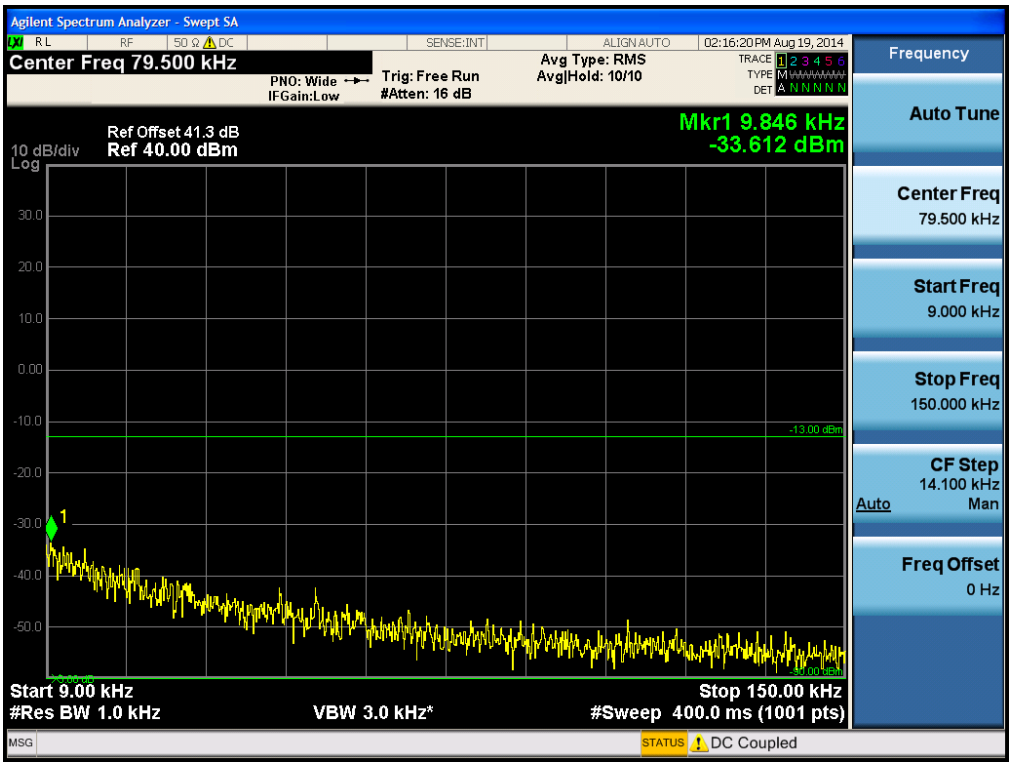
[CDMA Downlink High]



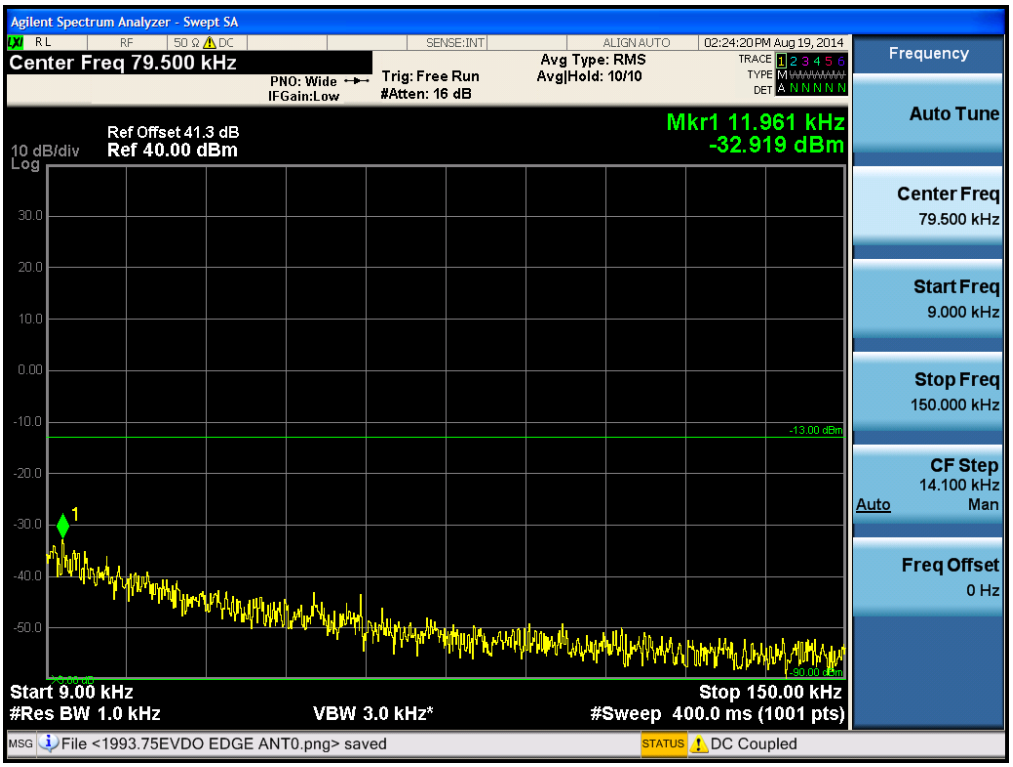
[CDMA EVDO Downlink Low]



[CDMA EVDO Downlink Middle]



[CDMA EVDO Downlink High]



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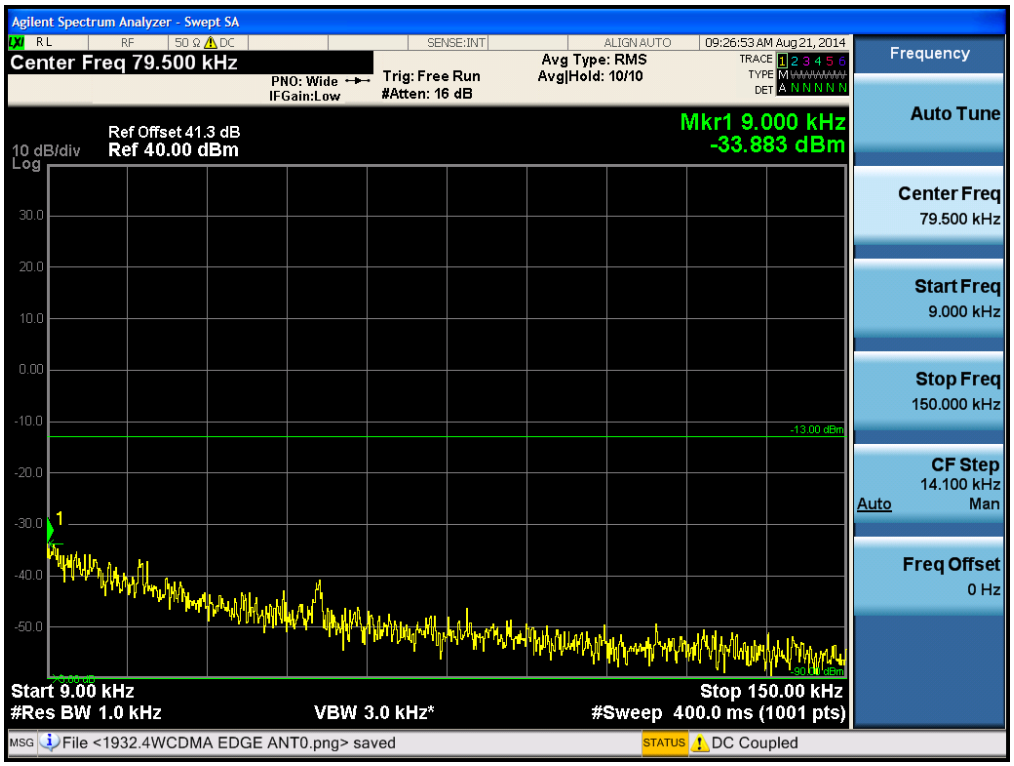

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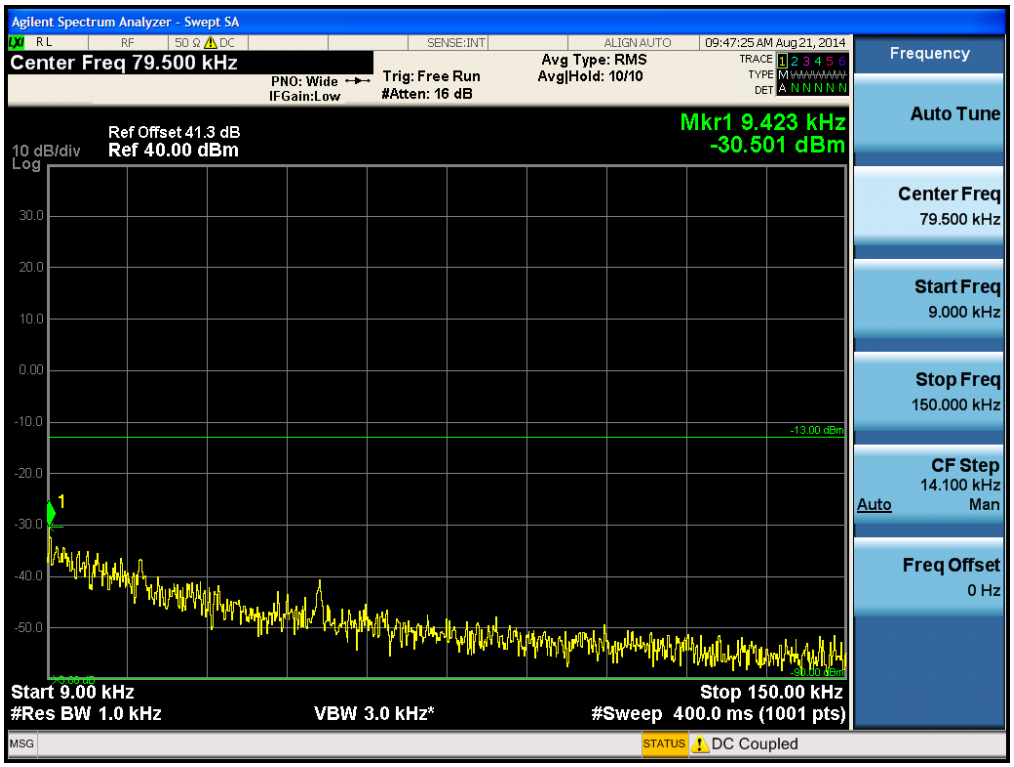

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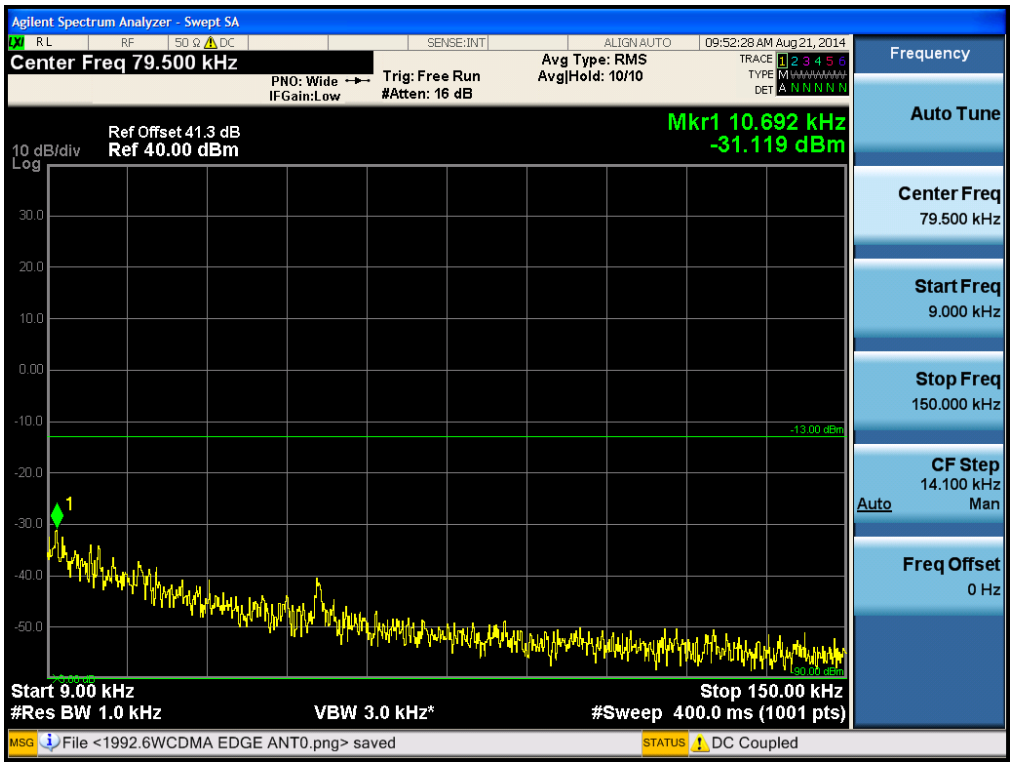

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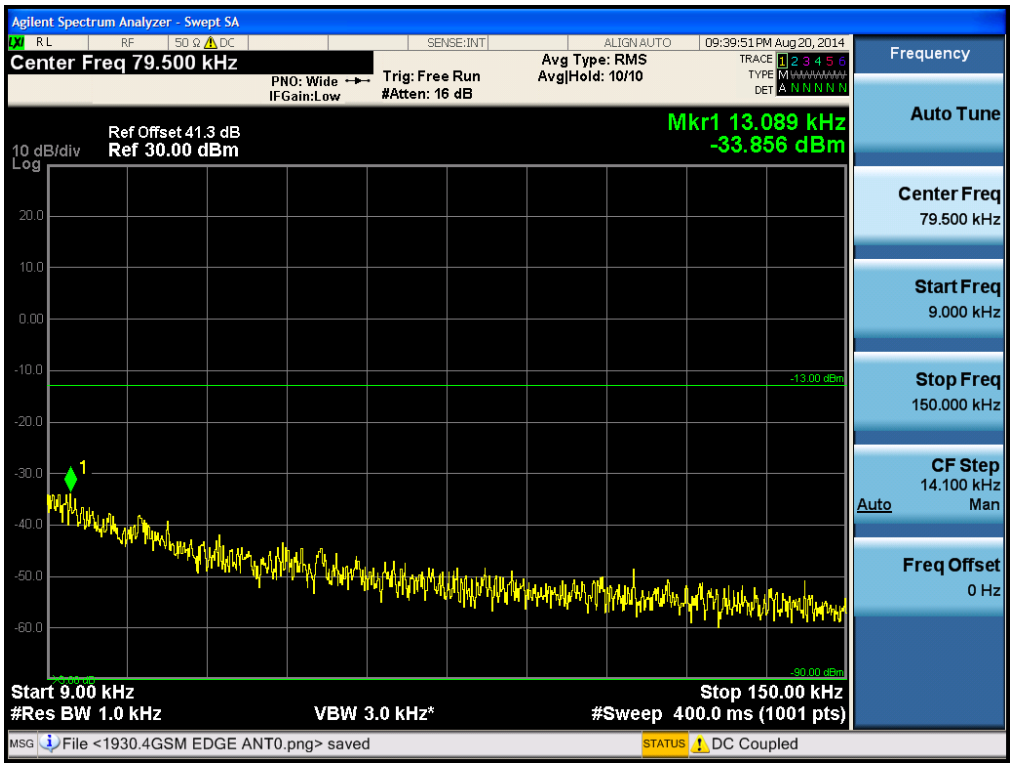

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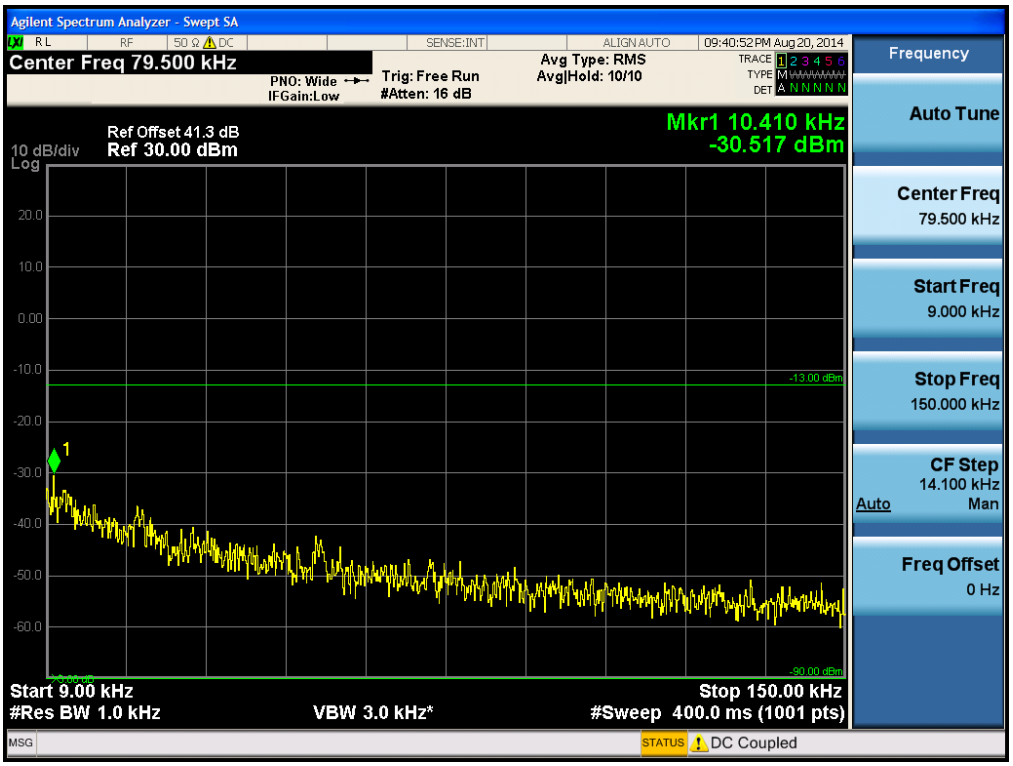

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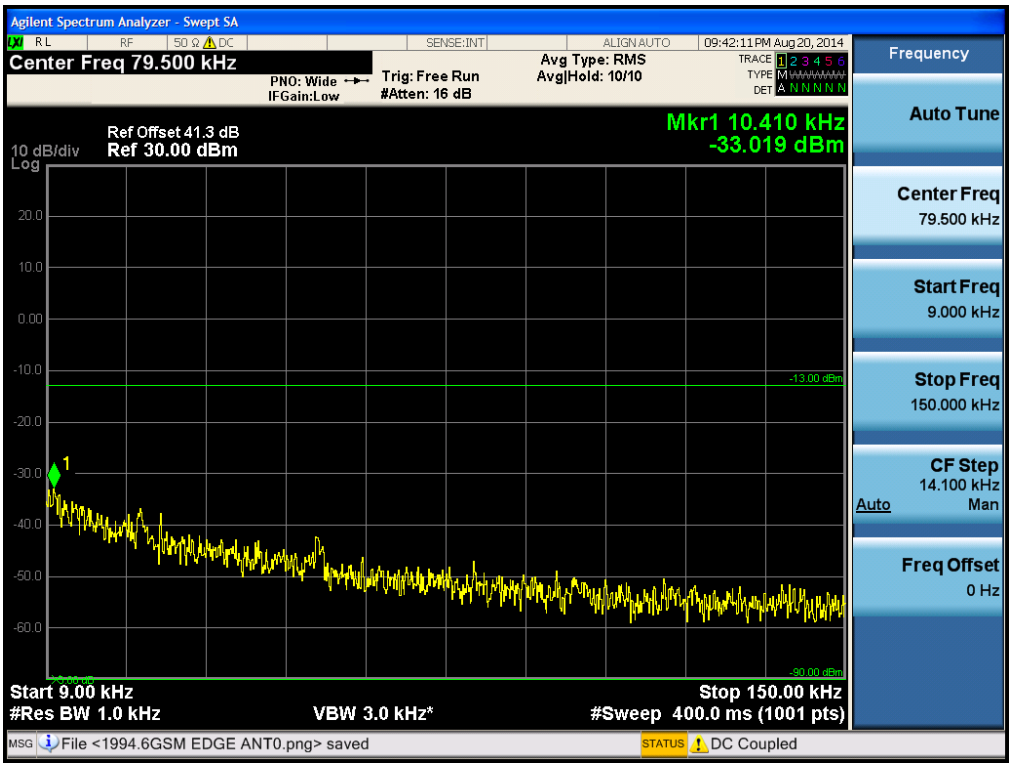

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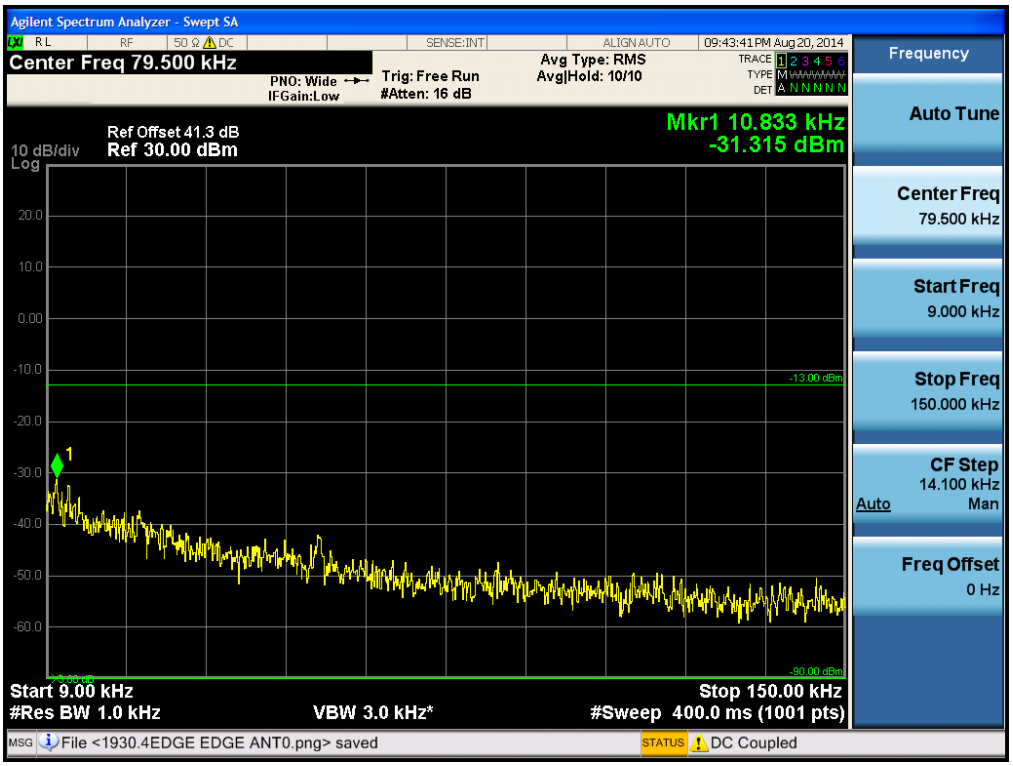

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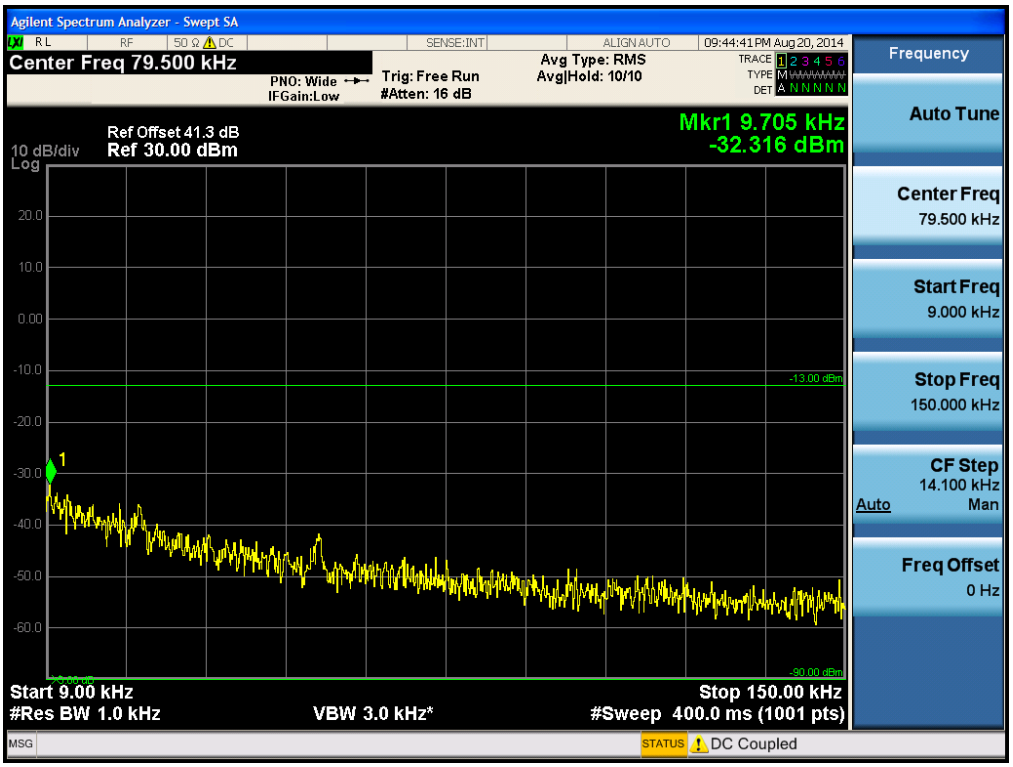

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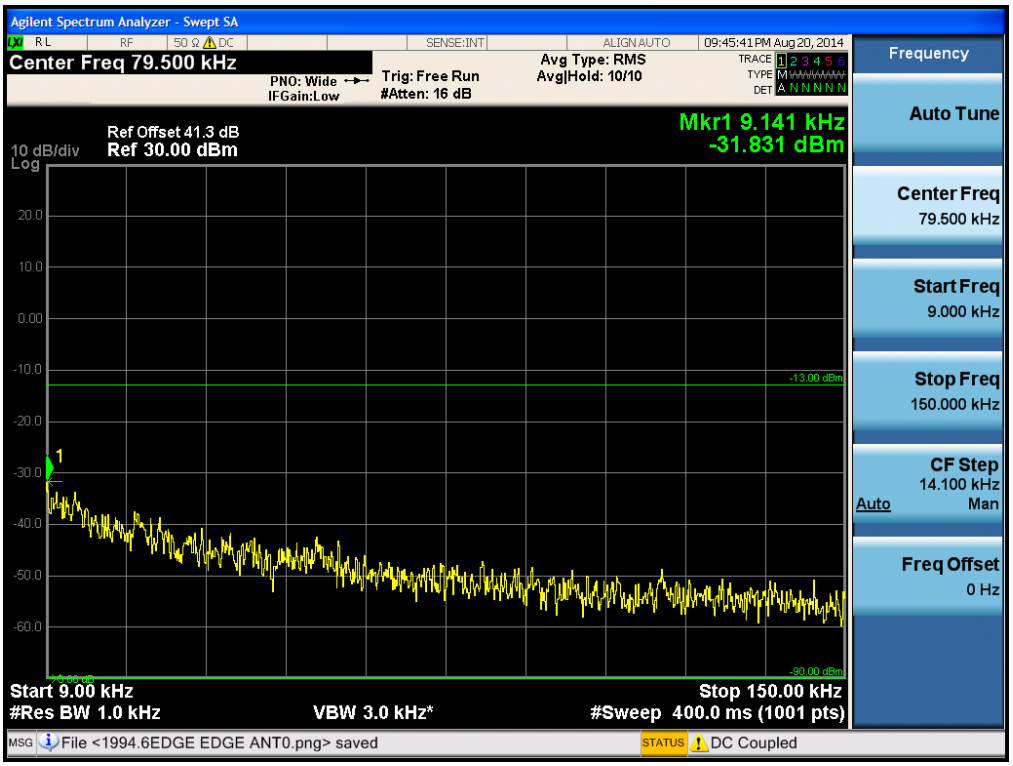

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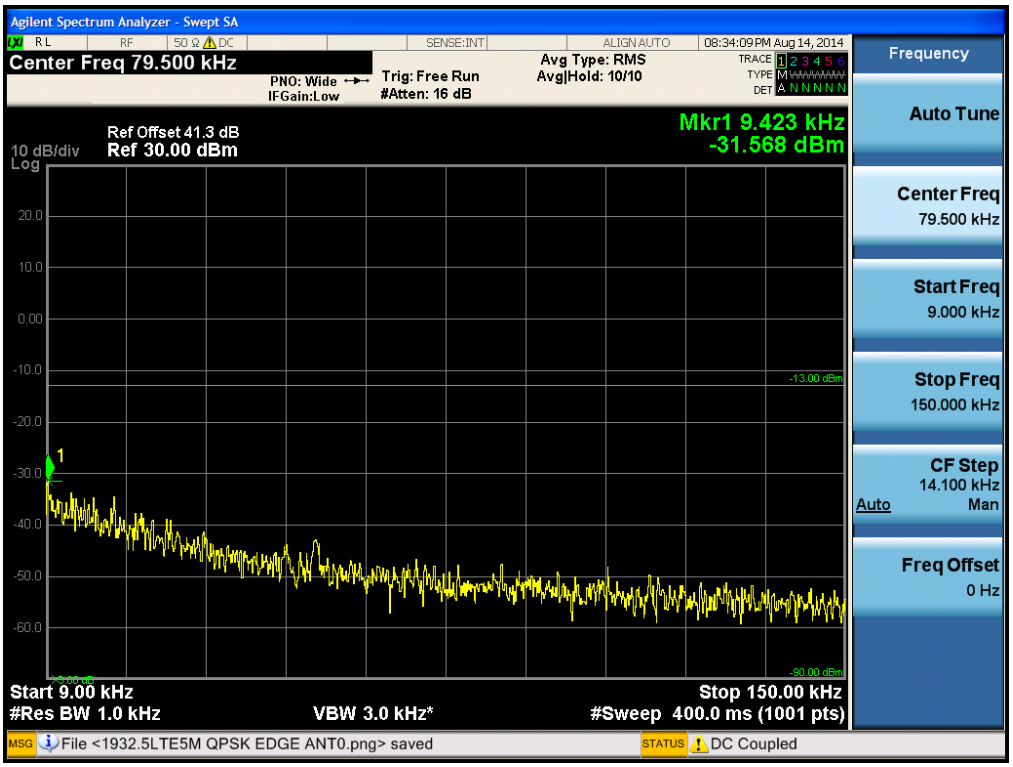

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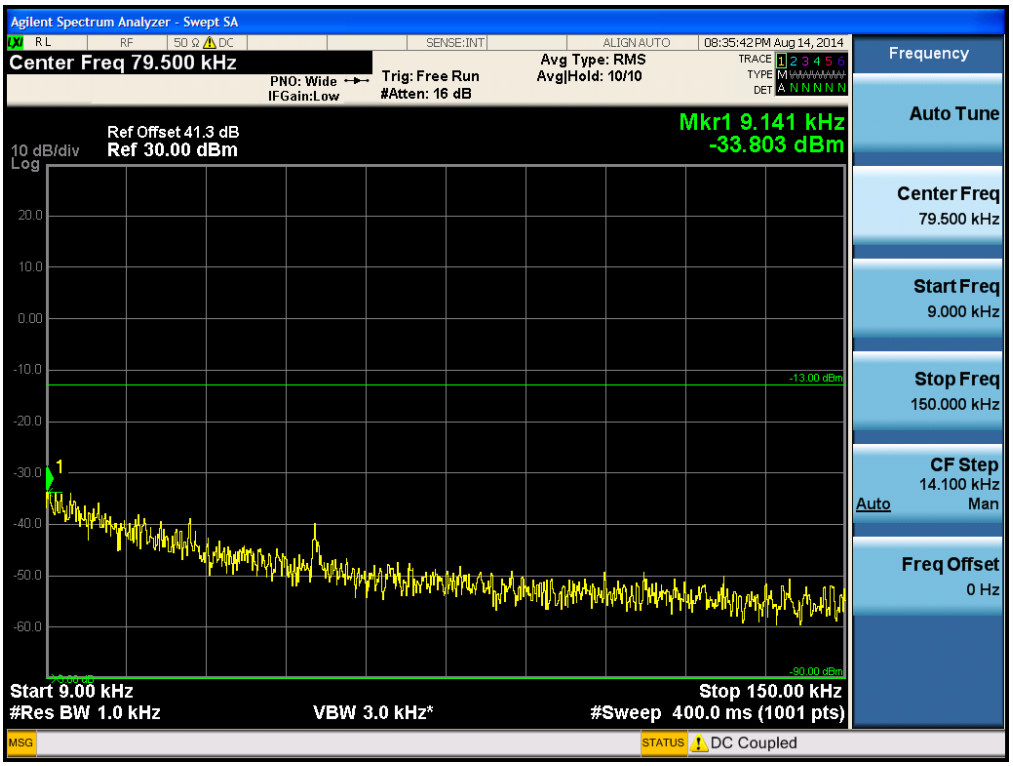

[LTE Downlink 5 MHz High]