

# FCC MEASUREMENT AND TEST REPORT

For

## ZTE Corporation

ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen,  
Guangdong, China 518057

FCC ID: Q78-R8860EGU198B

Jun 10, 2011

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> GSM/UMTS Dual Mode Remote Radio Unit
<p>Test Engineer: <i>Bloom</i></p> <p>Report No.: FCC-2011-033</p> <p>Test Date: May ,10 – May 31, 2011</p> <p>Reviewed By: <i>Xie Yuming</i></p> <p>Prepared By: ZTE Corporation.</p> <p>ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong, China 518057, P.R.China Tel: +86-755-26770000 Fax: +86-755-26771999</p>	

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# TABLE OF CONTENTS

TABLE OF CONTENTS ..... 2

1 GENERAL INFORMATION ..... 6

    Product Description for Equipment Under Test (EUT) ..... 6

    Objective ..... 7

    Related Submittal(s)/Grant(s) ..... 7

    Test Methodology ..... 7

    Test Facility ..... 7

2 SYSTEM TEST CONFIGURATION ..... 8

    Description of Test Configuration ..... 8

3 UMTS OF TEST RESULTS ..... 9

3.1 TRANSMITTER OUTPUT POWER ..... 10

    Applicable Standard: FCC §2.1046 §24.232 ..... 10

    Test Equipment List and Details ..... 10

    Test Procedure ..... 10

    Environmental Conditions ..... 11

    Test Result: Pass ..... 11

    Test Mode: Transmitting UMTS ..... 11

    Test Data: ..... 11

3.2 RF EXPOSURE ..... 20

    Applicable standard: FCC §2.1091 and §1.1037 ..... 20

    Limit ..... 20

    Test Data ..... 20

3.3 MODULATION CHARACTERISTIC ..... 21

    Applicable Standard: FCC §2.1047 ..... 21

    Test Equipment List and Details ..... 21

    Test Procedure ..... 21

    Test Data Environmental Conditions ..... 21

    Test Result: Pass ..... 22

    Test Mode: Transmitting UMTS ..... 22

    Test Data: ..... 22

3.4 SPURIOUS RADIATED EMISSIONS ..... 24

    Applicable Standard: FCC CFR 47, §2.1053 ..... 24

    Test Equipment List and Details ..... 24

    Test Procedure ..... 25

    Test Results Summary: PASS ..... 25

    Environmental Conditions ..... 25

    Test data ..... 26

3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS ..... 27

    Applicable Standard: FCC§2.1051, §24.238 ..... 27

    Test Equipment List and Details ..... 27

    Test Procedure ..... 27

    Test Data Environmental Conditions ..... 28

    Test Result: Pass ..... 28

    Test Mode: Transmitting UMTS ..... 28

    Test Data: ..... 28

3.6 OCCUPIED BANDWIDTH ..... 65

    Applicable Standard: FCC §2.1049 §24.229 §24.238 ..... 65

    Test Equipment List and Details: ..... 65

    Test Procedure ..... 65

Environmental Conditions ..... 65

Test Result: Pass..... 66

Test Mode: Transmitting UMTS..... 66

Test Data..... 66

3.7 BAND EDGES..... 68

Applicable Standard: FCC §2.1051 §24.238..... 68

Test Equipment List and Details..... 68

Test Procedure..... 68

Test Data Environmental Conditions ..... 68

Test Result: Pass..... 69

Test Mode: Transmitting UMTS..... 69

Test Data..... 69

3.8 FREQUENCY STABILITY ..... 74

Applicable Standard: FCC § 2.1055 § 24.235..... 74

Test Equipment List and Details..... 74

Test Procedure..... 74

Environmental Conditions ..... 74

Test Result: Pass..... 75

Test Mode: Transmitting UMTS..... 75

Test Data..... 75

Frequency Stability Versus Temperature ..... 75

Frequency Stability Versus Voltage ..... 77

4 GSM OF TEST RESULTS ..... 79

4.1 TRANSMITTER OUTPUT POWER ..... 80

Applicable Standard: FCC §2.1046 §24.232 ..... 80

Test Equipment List and Details..... 80

Test Procedure..... 80

Environmental Conditions ..... 81

Test Result: Pass..... 81

Test Mode: Transmitting GSM ..... 81

Test Data:..... 81

4.2 RF EXPOSURE ..... 106

Applicable standard: FCC §2.1091 and §1.1037 ..... 106

Limit..... 106

Test Data..... 106

4.3 MODULATION CHARACTERISTIC..... 107

Applicable Standard: FCC §2.1047 ..... 107

Test Equipment List and Details..... 107

Test Procedure..... 107

Test Data Environmental Conditions ..... 107

Test Result: Pass..... 107

Test Mode: Transmitting GSM ..... 107

Test Data:..... 108

4.4 SPURIOUS RADIATED EMISSIONS..... 112

Applicable Standard: FCC CFR 47, §2.1053 ..... 112

Test Equipment List and Details..... 112

Test Procedure..... 113

Test Results Summary: PASS ..... 113

Environmental Conditions ..... 113

Test data ..... 114

4.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS..... 115

Applicable Standard: FCC§2.1051, §24.238..... 115

Test Equipment List and Details..... 115

Test Procedure..... 115

Test Data Environmental Conditions ..... 116

Test Result: Pass..... 116

Test Mode: Transmitting GSM ..... 116

Test Data:..... 116

4.6 OCCUPIED BANDWIDTH..... 141

    Applicable Standard: FCC§2.1049, §24.229, §24.238 ..... 141

    Test Equipment List and Details:..... 141

    Test Procedure..... 141

    Environmental Conditions ..... 141

    Test Result: Pass..... 142

    Test Mode: Transmitting GSM ..... 142

    Test Data..... 142

4.7 BAND EDGES..... 146

    Applicable Standard: FCC §2.1051 §24.238..... 146

    Test Equipment List and Details..... 146

    Test Procedure..... 146

    Test Data Environmental Conditions ..... 146

    Test Result: Pass..... 147

    Test Mode: Transmitting GSM ..... 147

    Test Data..... 147

4.8 FREQUENCY STABILITY ..... 154

    Applicable Standard: FCC § 2.1055 ..... 154

    Test Equipment List and Details..... 154

    Test Procedure..... 154

    Environmental Conditions ..... 155

    Test Result: Pass..... 155

    Test Mode: Transmitting GSM ..... 155

    Test Data..... 155

    Frequency Stability Versus Temperature ..... 155

    Frequency Stability Versus Voltage ..... 156

5 DUAL-MODE OF TEST RESULTS..... 158

5.1 TRANSMITTER OUTPUT POWER..... 159

    Applicable Standard: FCC §2.1046 §24.232 ..... 159

    Test Equipment List and Details..... 159

    Test Procedure..... 159

    Environmental Conditions ..... 160

    Test Result: Pass..... 160

    Test Mode: Transmitting 2GSMTRX and 2UMTS carriers and 4GSM TRX and 1UMTS carriers ..... 160

    Test Data:..... 160

5.2 RF EXPOSURE ..... 162

*Applicable standard:* FCC §2.1091 and §1.1037 ..... 162

*Limit*..... 162

*Test Data*..... 162

5.3 SPURIOUS RADIATED EMISSIONS..... 163

    Applicable Standard: FCC CFR 47, §2.1053 ..... 163

    Test Equipment List and Details..... 163

    Test Procedure..... 164

    Test Results Summary: PASS ..... 164

    Environmental Conditions ..... 164

    Test data ..... 165

5.4 SPURIOUS EMISSIONS AT ANTENNA TERMINALS..... 166

    Applicable Standard: FCC§2.1051, §24.238..... 166

- Test Equipment List and Details ..... 166
- Test Procedure..... 166
- Test Data Environmental Conditions ..... 167
- Test Result: Pass..... 167
- Test Mode: Transmitting 2GSMTRX and 2UMTS carriers and 4GSM TRX and 1UMTS carriers ..... 167
- Test Data:..... 167
- 5.5 BAND EDGES..... 174
  - Applicable Standard: FCC §2.1051 ..... 174
  - Test Equipment List and Details..... 174
  - Test Procedure..... 174
  - Test Data Environmental Conditions ..... 174
  - Test Result: Pass..... 175
  - Test Mode: Transmitting 2GSMTRX and 2UMTS carriers and 4GSM TRX and 1UMTS carriers ..... 175
  - Test Data..... 175
- 5.6 OCCUPIED BANDWIDTH..... 178
  - Applicable Standard: FCC §2.1049 §24.229 §24.238 ..... 178
  - Test Equipment List and Details:..... 178
  - Test Procedure..... 178
  - Environmental Conditions ..... 178
  - Test Result: Pass..... 179
  - Test Mode: Transmitting 2GSMTRX and 2UMTS carriers and 4GSM TRX and 1UMTS carriers ..... 179
  - Test Data..... 179

# 1 GENERAL INFORMATION

## Product Description for Equipment Under Test (EUT)

The ZTE Corporation's product, model number: ZXSDR R8860E GU198 or the "EUT" as referred to in this report is a dual-mode RF remote unit. It adopts the multi-carrier technology as its core technology and supports two radio systems: GSM and UMTS. R8860E GU198 can be used as an independent RRU for GSM or an independent RRU for UMTS, and it works with BBU to form the dual-mode base station.

### Technical specification:

Size: 370 mm × 320 mm × 197 mm (H x W x D)

Input voltage: -57~-37VDC

Frequency range: 1950MHz to 1990MHz,

Max RF output power: 49dBm, except GSM (8PSK modulation) :47dBm

Gain of the antenna: 18dBi

Modulation type of emission: UMTS 4 Carriers; GSM 6 TRX; 4 GSM TRX and 1 UMTS carriers or 2 GSM TRX and 2 UMTS carriers

Appearance of EUT:



## Objective

This Type approval report is prepared on behalf of ZTE Corporation in accordance with Part 2, Part 15, Part 24 of the Federal Communication Commissions rules.

## Related Submittal(s)/Grant(s)

No related submittal(s).

## Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, as well as the following parts:

Part 24 Wireless Communication Services

Applicable Standards: TIA EIA 137-A, TIA EIA 97-D, TIA/EIA 603-C, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

All radiated and conducted measurement was performed at ZTE Corporation Reliability Testing Center. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Test Facility

The Test site used by ZTE Corporation to collect test data is located in the 1/F, B2 Wing, ZTE plaza, Keji Road South, Shenzhen, Guangdong, 518057, P.R.China, Tel: 86-755-26771609, Fax: +86-755-26770347. Test site at ZTE Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 373926. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

# 2 SYSTEM TEST CONFIGURATION

## Description of Test Configuration

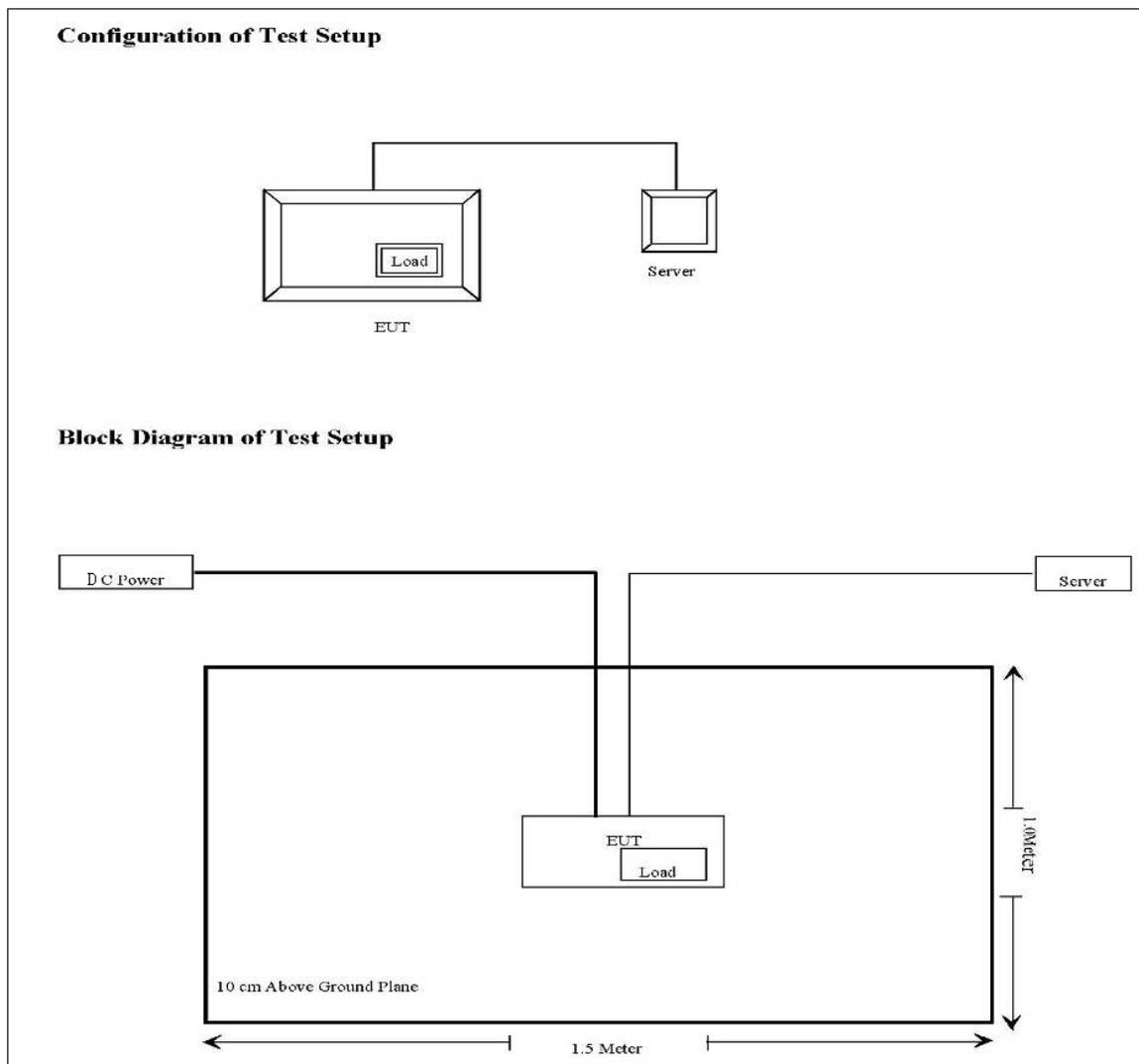
### Justification

The EUT was configured for testing according to TIA/EIA-603C.

The final qualification test was performed with EUT operating at normal mode.

### Equipment Modifications

ZTE Corporation has not done any modification on the EUT.



### 3 UMTS OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046 §24.232	Transmitter output Power	Compliant
§2.1091 §1.1037	RF Exposure	Compliant
§2.1047	Modulation Characteristic	Compliant
§2.1053	Spurious Radiated Emissions	Compliant
§2.1051, §24.238	Spurious Emissions AT Antenna Terminals	Compliant
§2.1049 §24.229 §24.238	Occupied Bandwidth	Compliant
§2.1051, §24.238	Band Edge	Compliant
§ 2.1055 § 24.235	Frequency stability	Compliant

# 3.1 TRANSMITTER OUTPUT POWER

## Applicable Standard: FCC §2.1046 §24.232

According to FCC §2.1046 & 24.232, the EIRP (equivalent isotropically radiated power) must not exceed 1640 Watts.

According to RSS-133, SRSP 510 5.1.1 the EIRP (equivalent isotropically radiated power) must not exceed 3280Watts/MHz for base station transmitters operating in the band of 1930 MHz to 1995MHz with the antenna height above average terrain up to 300 meters. If used in urban area, the limit should be 1640Watts/MHz.

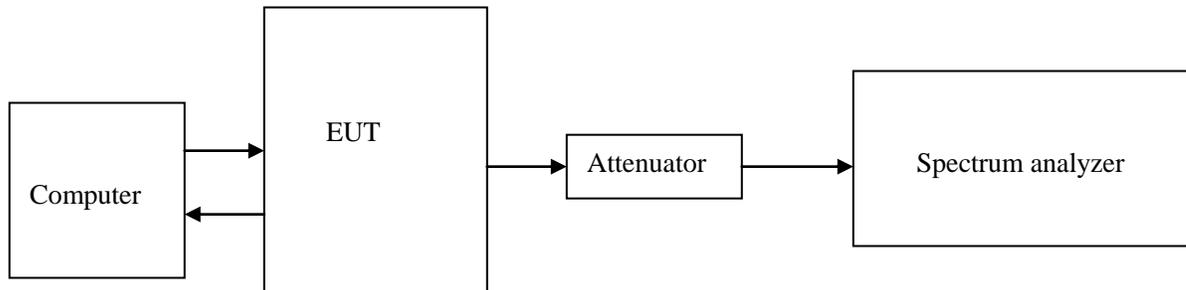
Note: EIRP= Max output Power+ Antenna gain- Cable Loss

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
DTS	DTS100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

**\*statement of traceability:** ZTE Corporation Reliability Testing Center attest that all calibration have been performed per the NVLAP requirements , traceable to NIST.

## Test Procedure



The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. External attenuation Loss is 40dB, Cable Loss is about 3dB.

## Environmental Conditions

Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

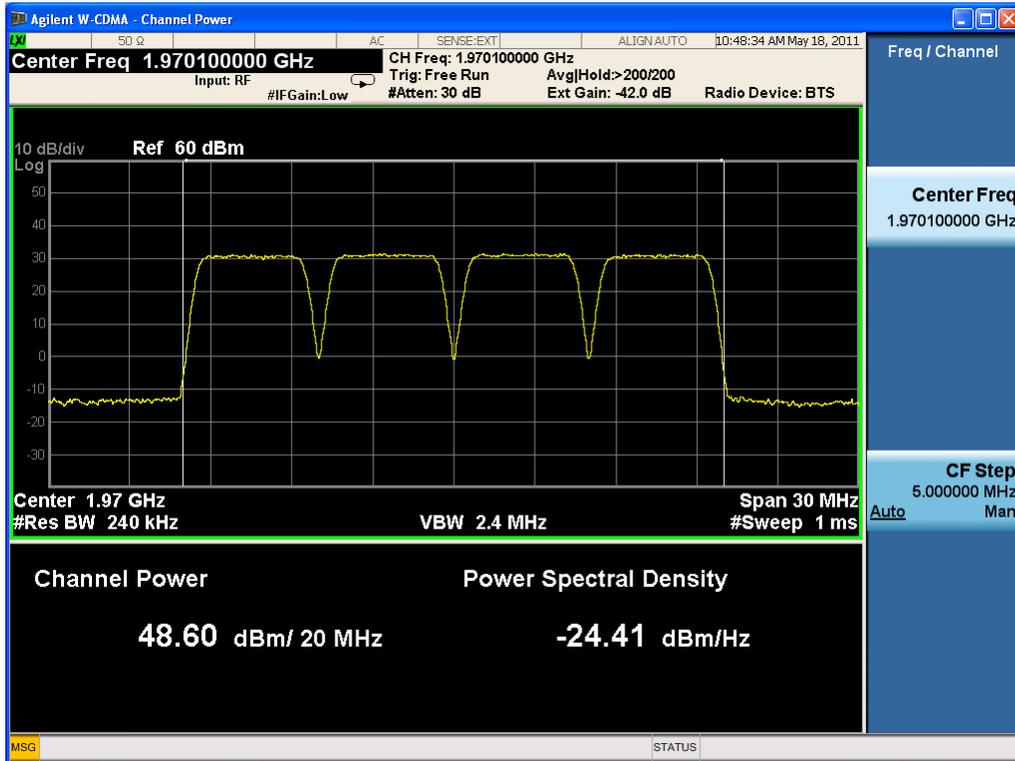
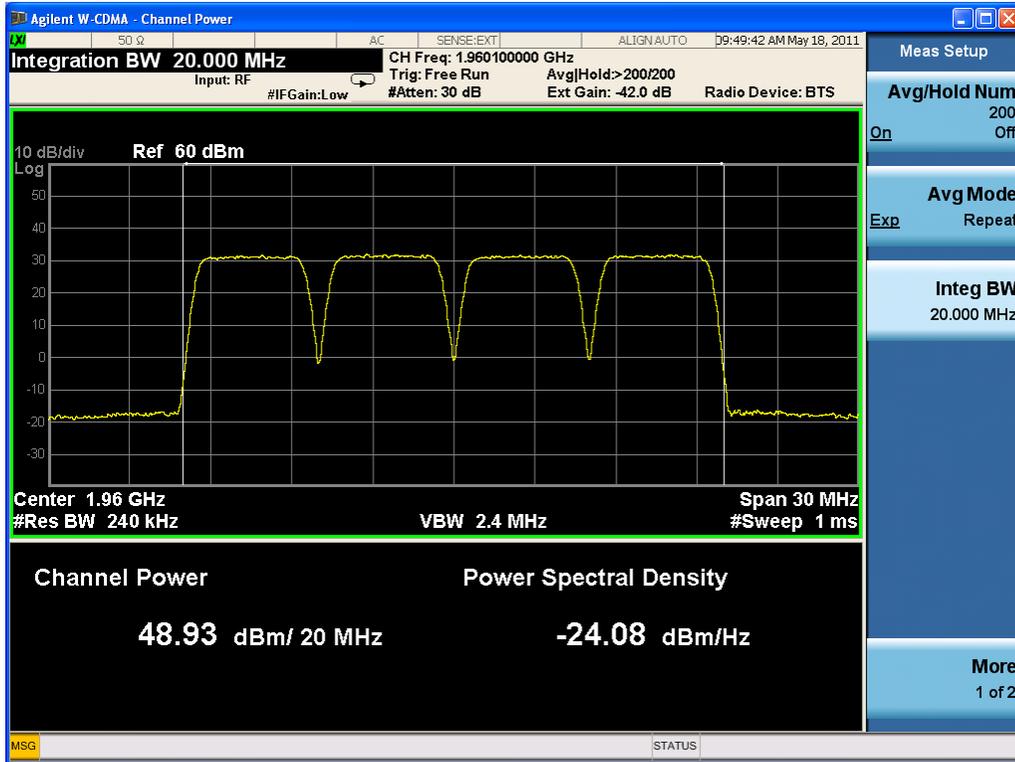
**Test Result:** Pass

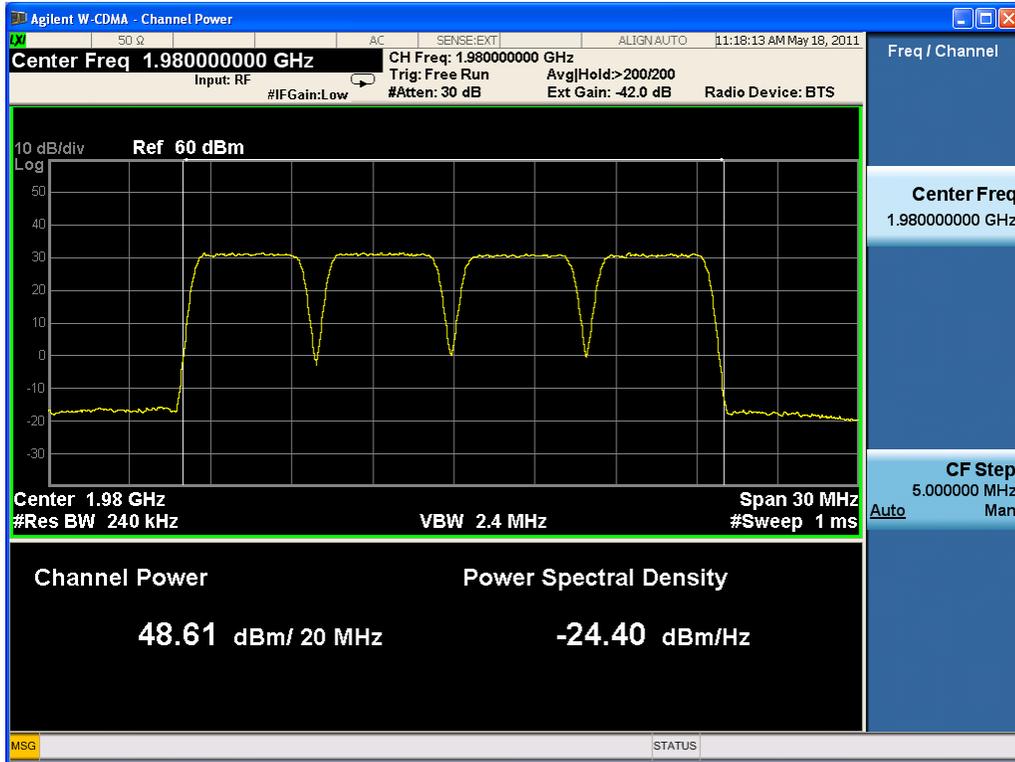
**Test Mode:** Transmitting UMTS

## Test Data:

### Four carriers

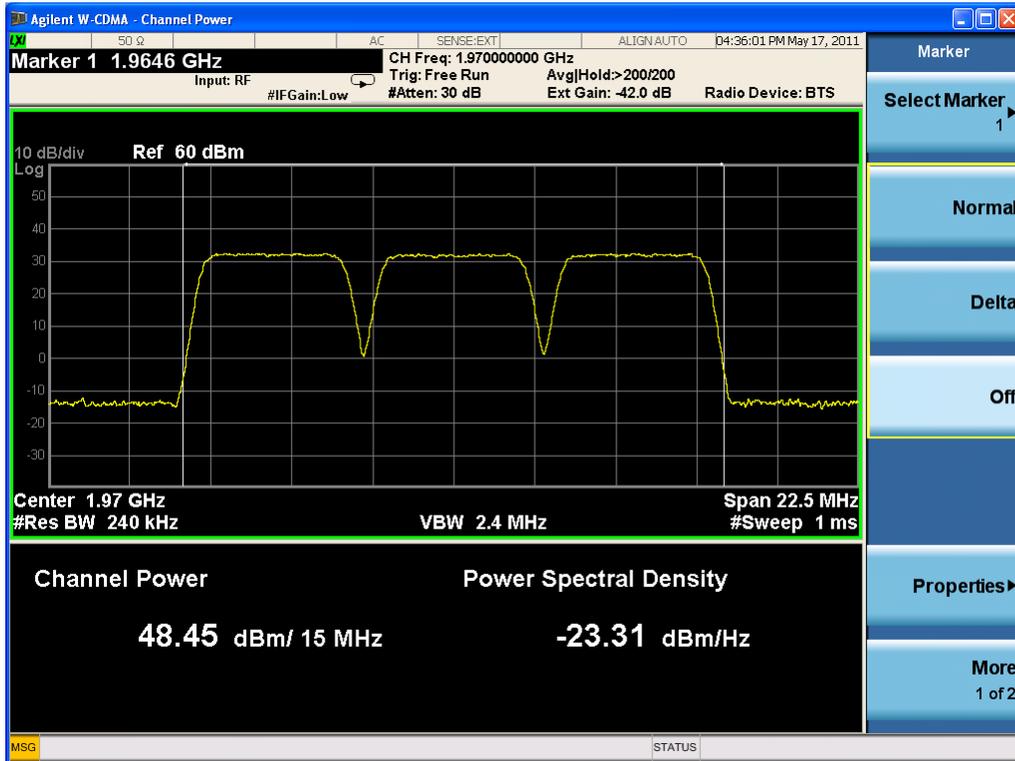
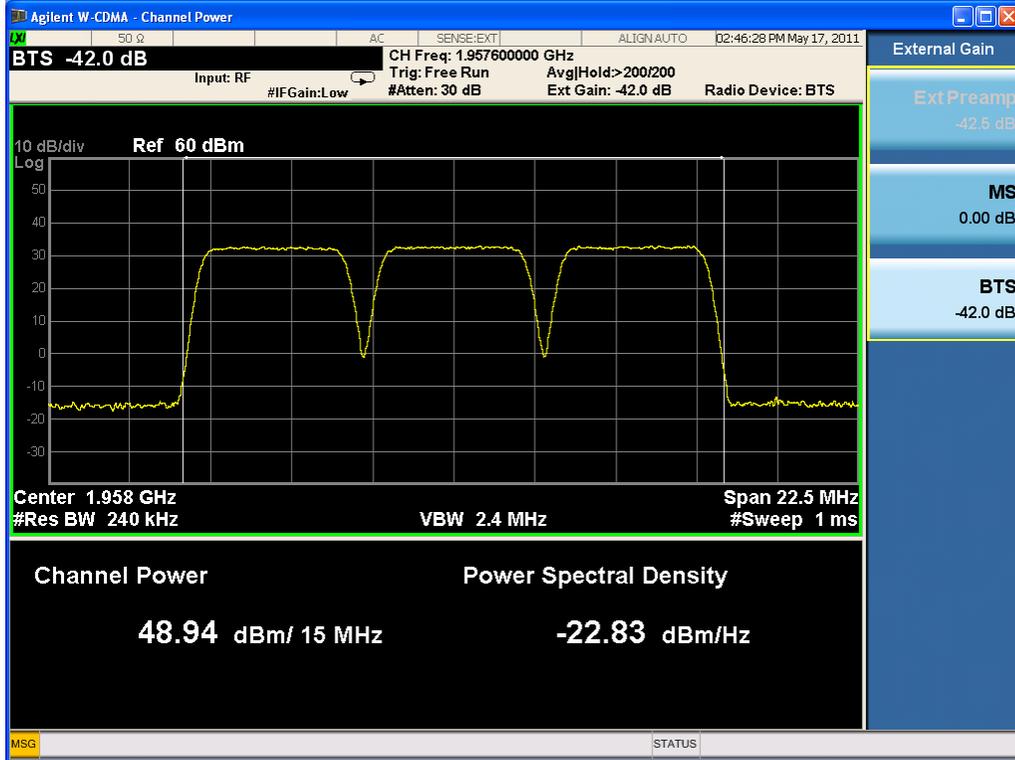
Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1960.1	1952.6/1957.6/1962.6/1967.6	48.93
1970.1	1962.6/1967.6/1972.6/1977.6	48.60
1979.9	1972.4/1977.4/1982.4/1987.4	48.61

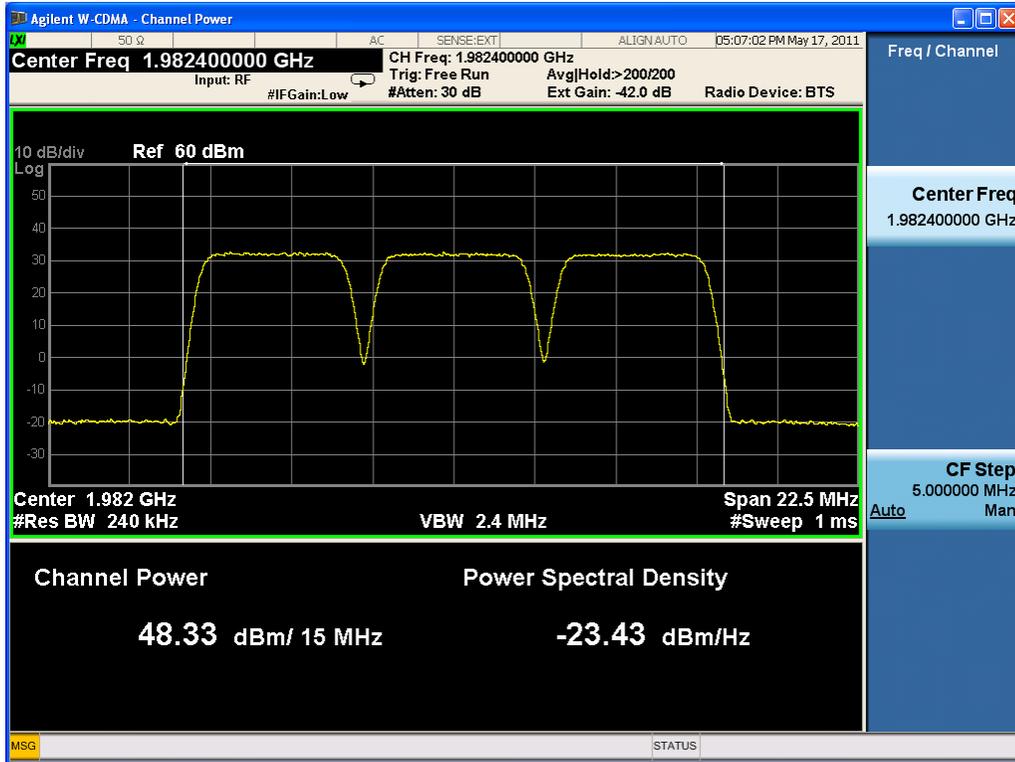




**Three carriers**

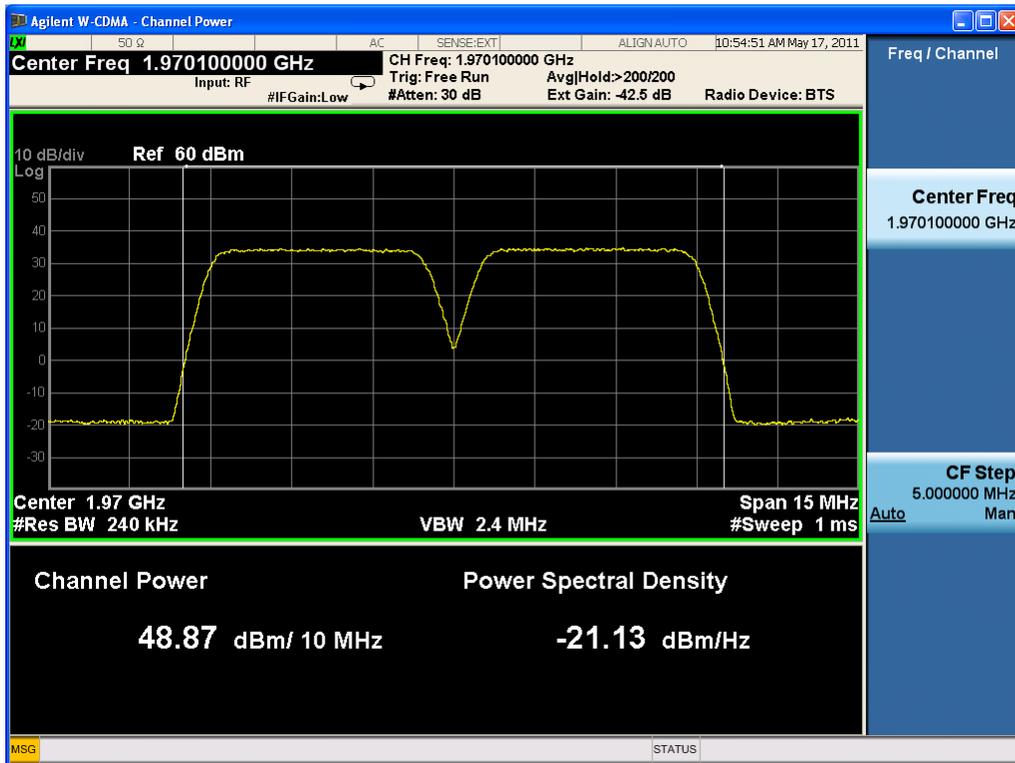
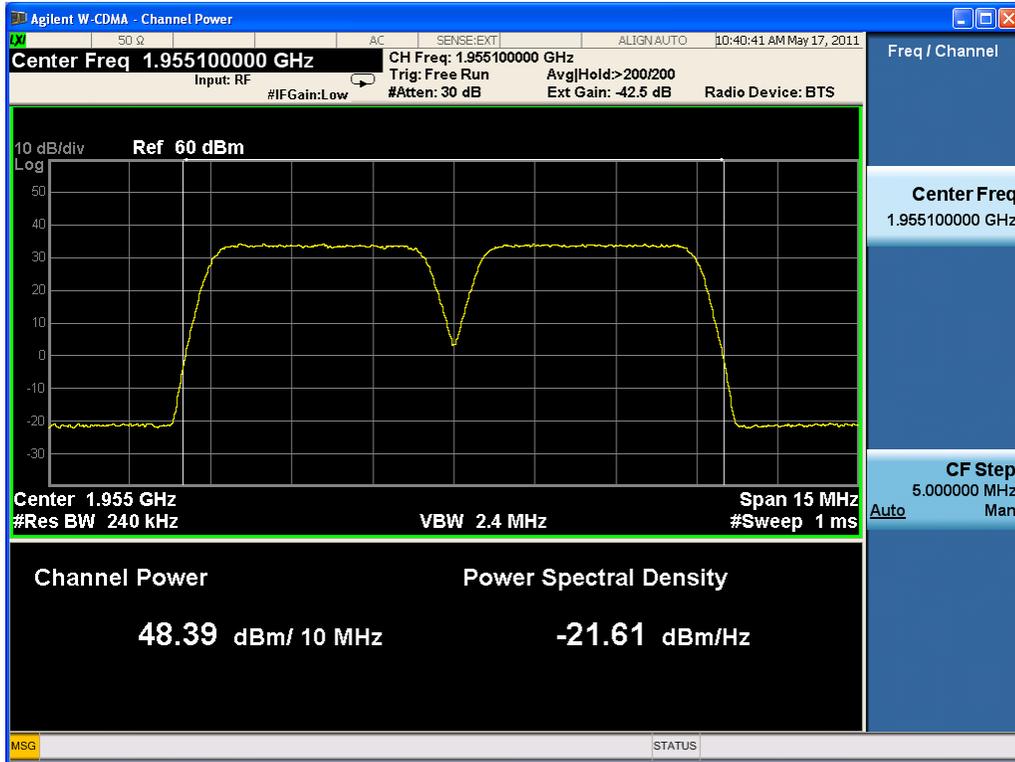
Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1957.6	1952.6/1957.6/1962.6	48.94
1970	1965/1970/1975	48.45
1982.4	1977.4/1982.4/1987.4	48.33

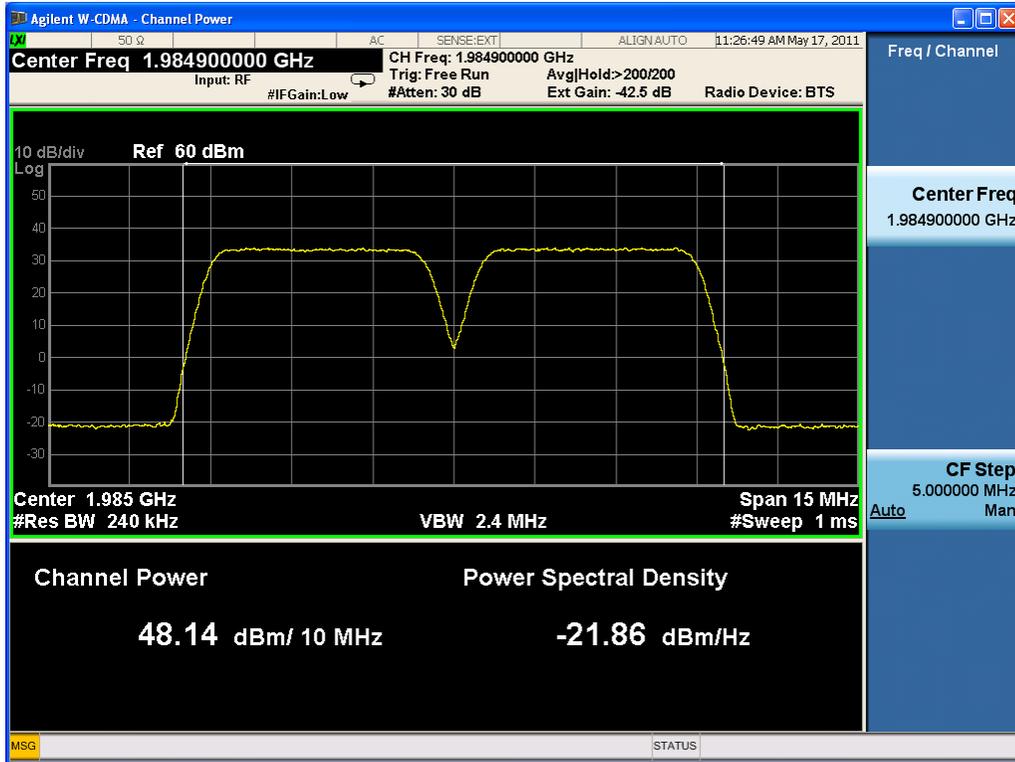




**Two carriers**

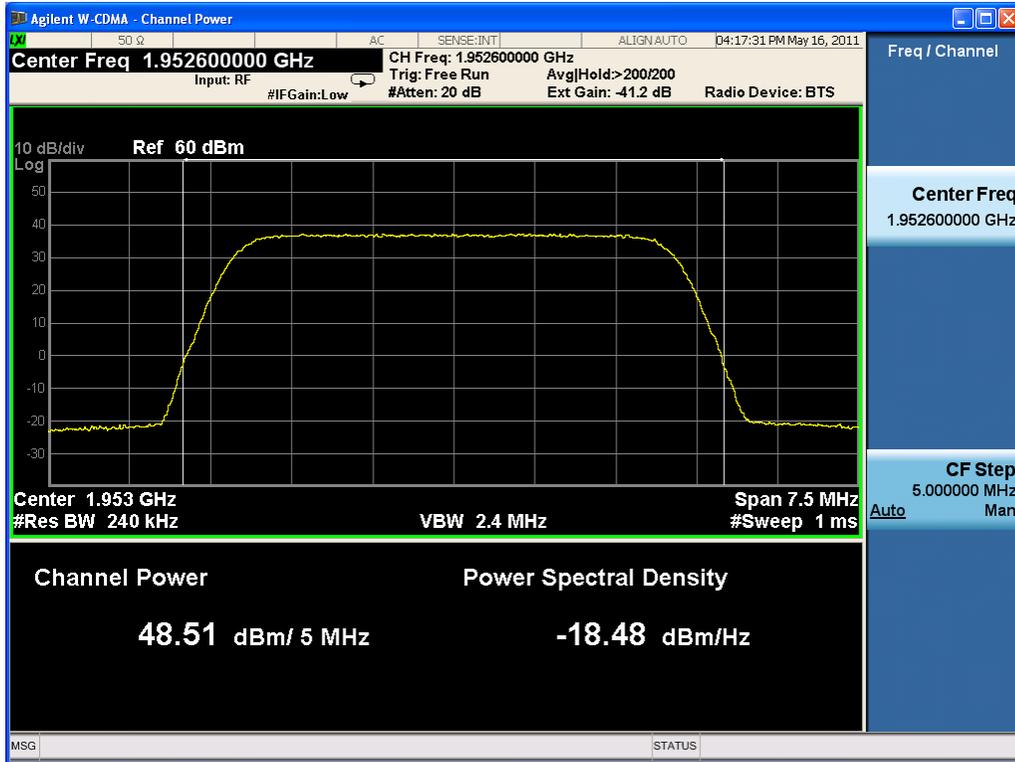
Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1955.1	1952.6/1957.6	48.39
1970.1	1967.6/1972.6	48.87
1984.9	1982.4/1987.4	48.14

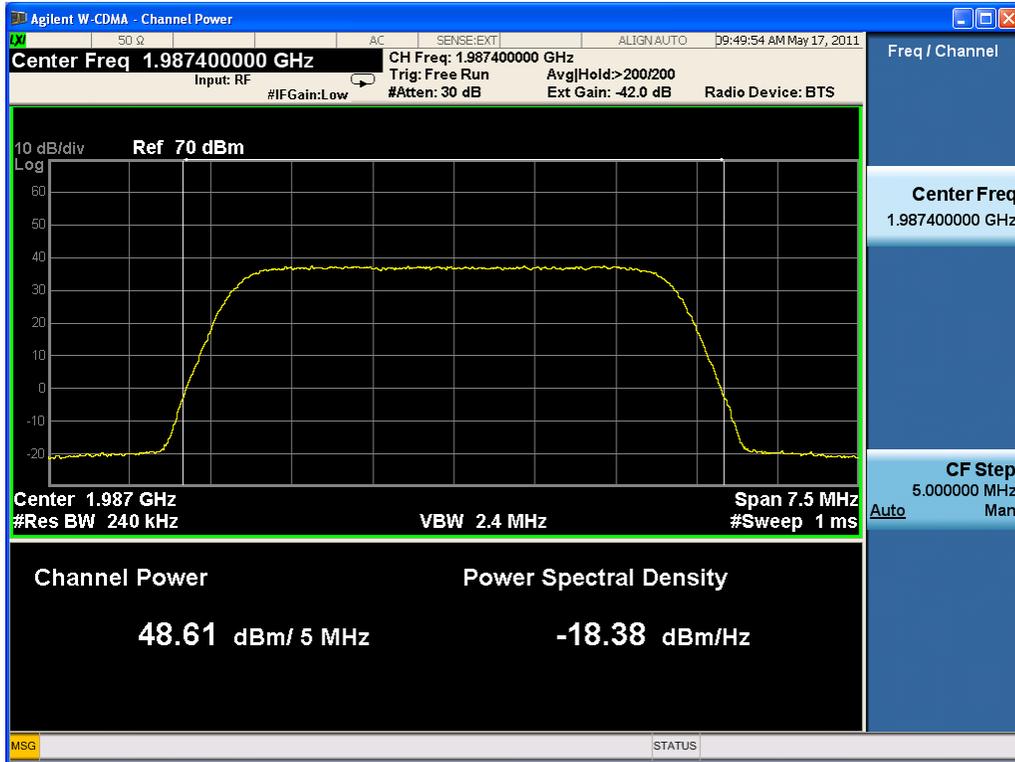




**One carrier**

Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1952.6	1952.6	48.51
1970	1970	48.40
1987.4	1987.4	48.61





# 3.2 RF EXPOSURE

**Applicable standard:** FCC §2.1091 and §1.1037

## Limit

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated. Limits for Maximum Permissible Exposure (MPE)

<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

## Test Data

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = EIRP / 4\pi R^2$$

Where: S = power density

EIRP = equivalent isotropically radiated power=ERP+2.15dB

R = distance to the center of radiation of the antenna=[(ERP+2.15 dB)/ 4πS]<sup>1/2</sup>

Maximum EIRP, In general, the effective radiated power (EIRP) of base transmitters and cellular repeaters must not exceed 1640 Watts.

Frequency is between 1500MHz and 100,000MHz, and the Maximum S=1.0mW/cm<sup>2</sup>, so R=3.61m.

This equipment should be installed and operated with minimum distance 3.61m between the radiator& your body.

**Test Result:** pass

## 3.3 MODULATION CHARACTERISTIC

**Applicable Standard:** FCC §2.1047

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
DTS	DTS100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

**\*statement of traceability:** ZTE Corporation Reliability Testing Center attest that all calibration have been performed per the NVLAP requirements , traceable to NIST.

### Test Procedure

UMTS digital mode is used by EUT.

### Test Data Environmental Conditions

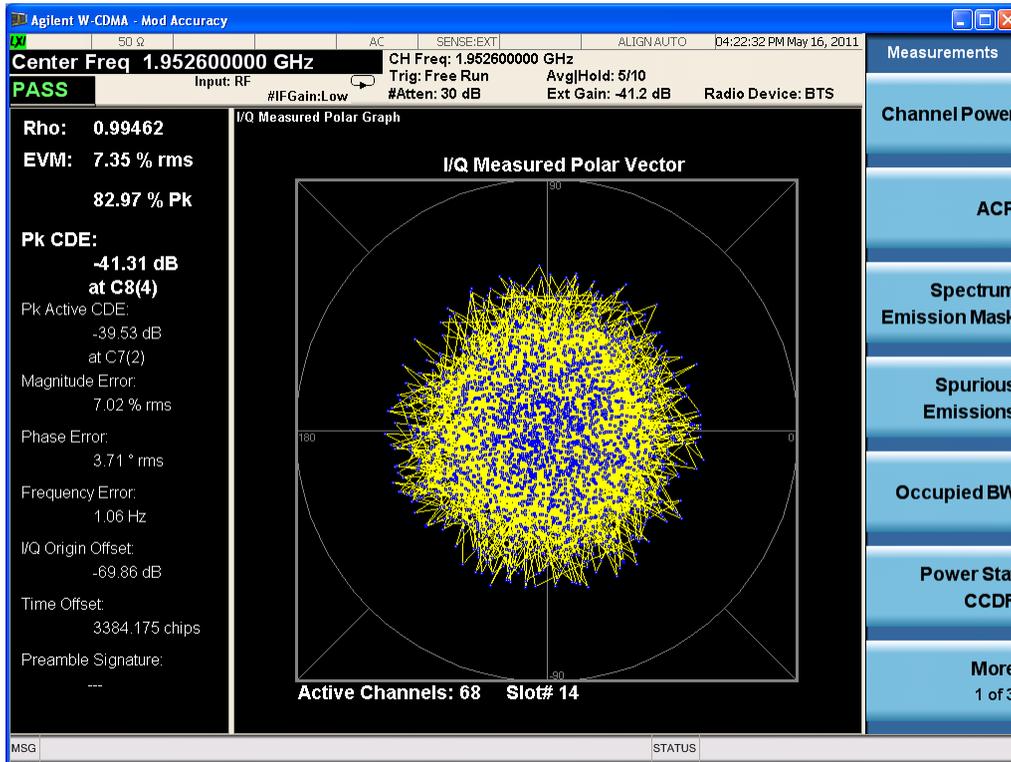
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

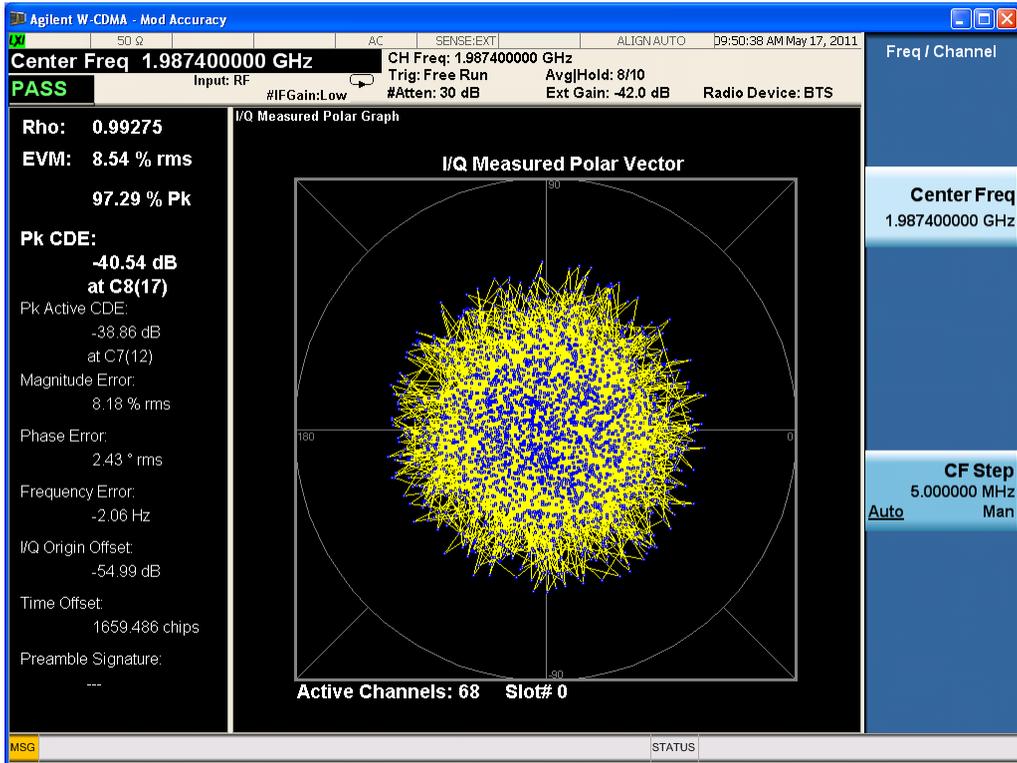
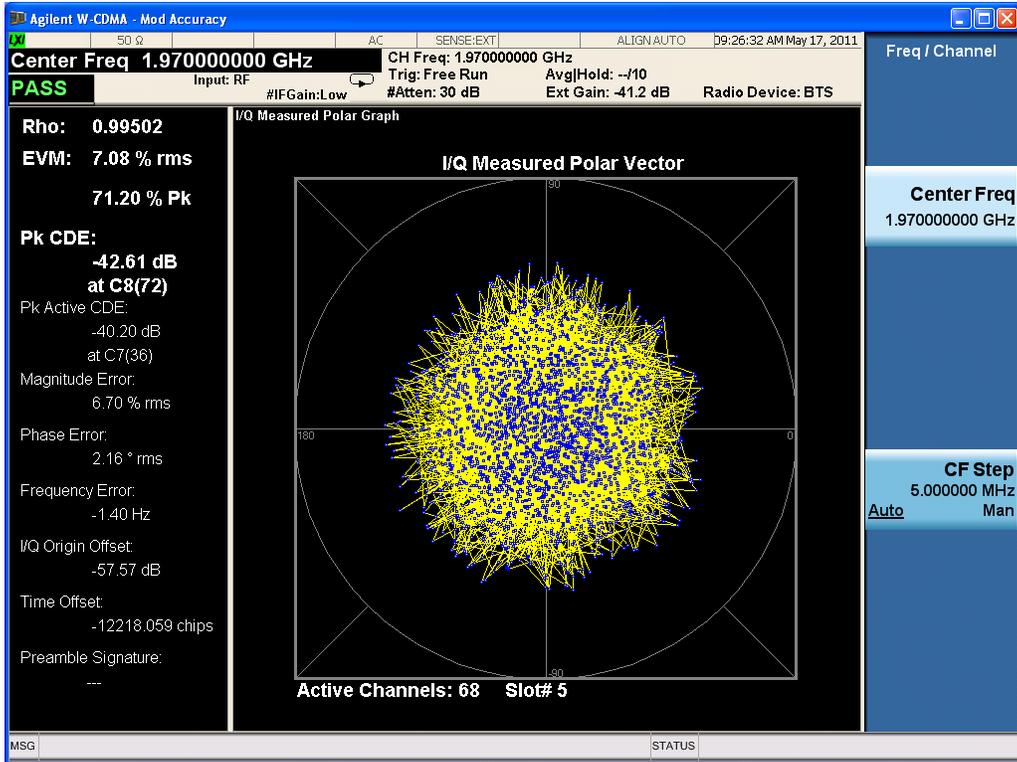
**Test Result:** Pass

**Test Mode:** Transmitting UMTS

**Test Data:**

Frequency (MHz)	Rho
1952.6	0.99462
1970	0.99502
1987.4	0.99275





# 3.4 SPURIOUS RADIATED EMISSIONS

**Applicable Standard:** FCC CFR 47, §2.1053

## Test Equipment List and Details

Manufacturer	Equipment	Model	Serial Number	Last Cal.	Cal. Interval
Albatross	Anechoic Chamber	3m Site	A00017354	2010-6-30	1 year
R&S	EMI Test Receiver	ESI26	100058	2010-10-29	1 year
R&S	Log periodic Antenna	HL562	100022	2010-8-5	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906 TX	100032	2010-8-5	1 year

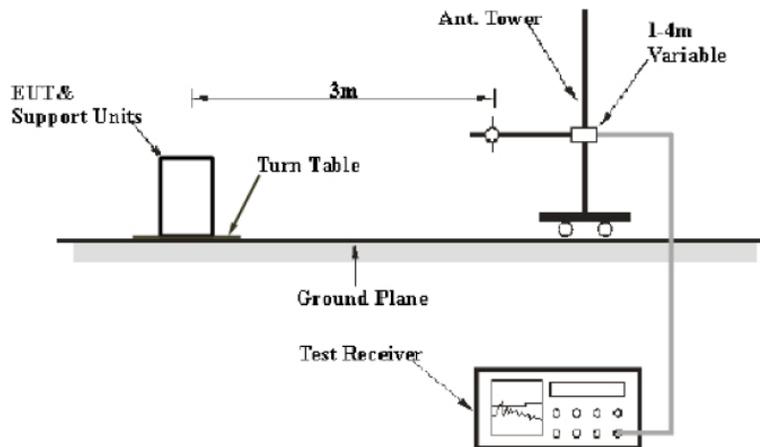
**\*statement of traceability:** ZTE Corporation Testing lab attest that all calibration have been performed per the NVLAP requirements, traceable to NIST.

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiated emissions measurement at the EMC lab of ZTE Corp. is 3.6dB.

### EUT Setup



The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with the FCC part 2.1053. The specification used was the FCC 2.1053 limits.

## Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TX pwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = 43 + 10 Lg P (power out in Watts)

The resolution bandwidth of the spectrum analyzer was set at 100KHz for 30MHz to 1GHz scanning, set at 1MHz or 3MHz for 1GHz to 20GHz scanning.

## Test Results Summary: PASS

## Environmental Conditions

Temperature:	26°C
Relative Humidity:	60 %
ATM Pressure:	1009 mbar

## Test data

Indicated		Table	Test Antenna		Substituted		Cable Loss (dB)	Effective radiated power (dBm)	Dipole Antenna	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (GHz)	Amp. (dBuV)	Angle Degree	Height(M)	Polar H/V	Level (dBm)	Antenna Gain Correction						
57.214429	46.6	360.00	1	V	-20.6	-29.52	0.5	-50.62	2.15	-52.77	-13	39.77
220.501002	45.37	39.00	1	V	-52.7	1.42	1.2	-52.48	2.15	-54.63	-13	41.63
992.224449	43.07	360.00	1	V	-53.04	-2.59	2.7	-58.33	2.15	-60.48	-13	47.48
1360.72144	47.8	299.80	1	V	-55.99	4.25	3.1	-54.84	2.15	-56.99	-13	43.99
1985.97194	90.34	205.50	1	V	-17.18	6.55	3.7	-14.33	2.15	-16.48	-13	3.48
2959.91984	60.51	205.50	1	V	-41.23	7.95	4.6	-37.88	2.15	-40.03	-13	27.03
218.557114	49.74	69.50	2	H	-49.65	1.23	1.2	-49.62	2.15	-51.77	-13	38.77
636.492986	38.29	0.70	2	H	-62.6	-1.09	2.1	-65.79	2.15	-67.94	-13	54.94
986.392786	43.98	224.60	1	H	-48.02	-4.1	2.7	-54.82	2.15	-56.97	-13	43.97
1384.76954	47.54	69.50	2	H	-58.56	4.25	3.1	-57.41	2.15	-59.56	-13	46.56
1989.97996	82.65	38.70	1	H	-23.95	6.55	3.7	-21.1	2.15	-23.25	-13	10.25
2799.5992	60.9	136.90	1	H	-43.21	7.95	4.5	-39.76	2.15	-41.91	-13	28.91

### Radiation emission spurious below 3GHz

Indicated		Table	Test Antenna		Substituted		Cable Loss (dB)	Effective radiated power (dBm)	Dipole Antenna	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (GHz)	Amp. (dBuV)	Angle Degree	Height(M)	Polar H/V	Level (dBm)	Antenna Gain Correction						
3969.93988	54.74	187.20	2	V	-51.35	7.75	5.3	-48.9	2.15	-51.05	-13	38.05
5557.11423	48.28	324.40	2	V	-58.35	9.05	6.4	-55.7	2.15	-57.85	-13	44.85
5965.93186	68.88	243.00	1	V	-34.6	9.05	6.7	-32.25	2.15	-34.4	-13	21.4
10282.5651	58.64	360.00	1	V	-50.18	11.35	8.9	-47.73	2.15	-49.88	-13	36.88
14529.0581	63.12	243.00	1	V	-50.13	9.15	11	-51.98	2.15	-54.13	-13	41.13
3969.93988	56.8	189.00	2	H	-46.6	7.75	5.3	-44.15	2.15	-46.3	-13	33.3
5597.19439	48.23	51.90	2	H	-50.38	9.05	6.4	-47.73	2.15	-49.88	-13	36.88
5965.93186	67.5	168.50	1	H	-31.11	9.05	6.7	-28.76	2.15	-30.91	-13	17.91
10178.3567	58.47	359.20	1	H	-50.47	11.35	8.9	-48.02	2.15	-50.17	-13	37.17
14503.006	63.05	51.90	2	H	-42.27	9.15	11	-44.12	2.15	-46.27	-13	33.27

### Radiation emission spurious above 3GHz

# 3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

**Applicable Standard:** FCC§2.1051, §24.238

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified.

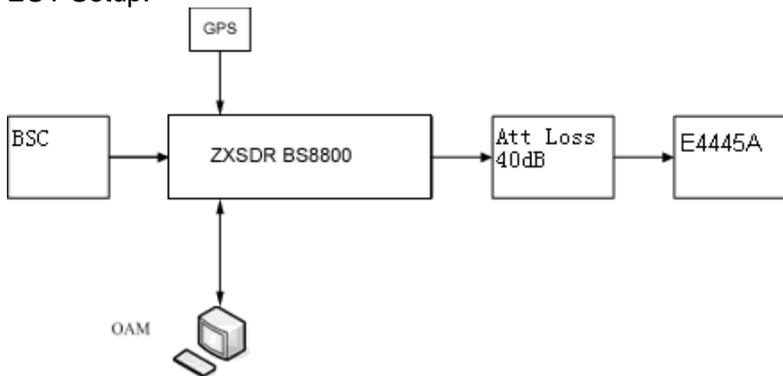
## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
DST	DST100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

**\*statement of traceability:** ZTE Corporation Reliability Testing Center attest that all calibration have been performed per the NVLAP requirements, traceable to NIST.

## Test Procedure

EUT Setup:



REMARKS: Attenuator loss (dB)=40dB, Cable Loss (dB)=3dB.

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1 kHz for 9KHz to 150KHz scanning, set at 10KHz for 150KHz to 30MHz scanning, set at 100KHz for 30MHz to 1GHz scanning, set at 1MHz or 3MHz for 1GHz to 22GHz scanning. Sufficient scans were

taken to show any out of band emissions up to 10th harmonic.

### Test Data Environmental Conditions

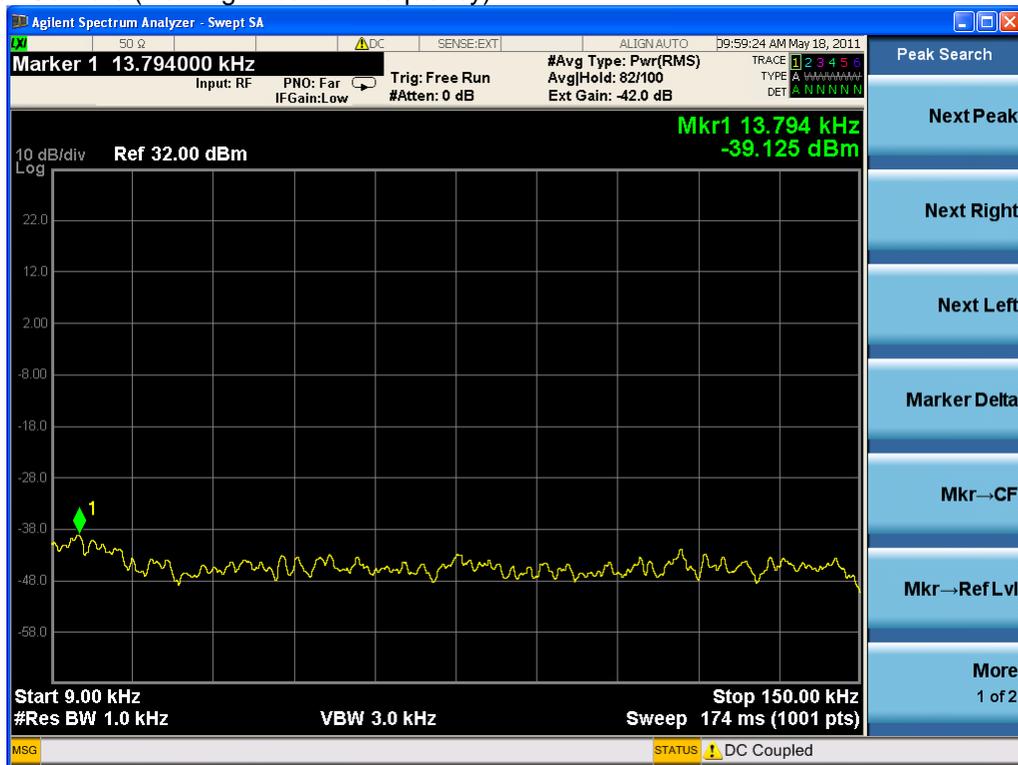
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

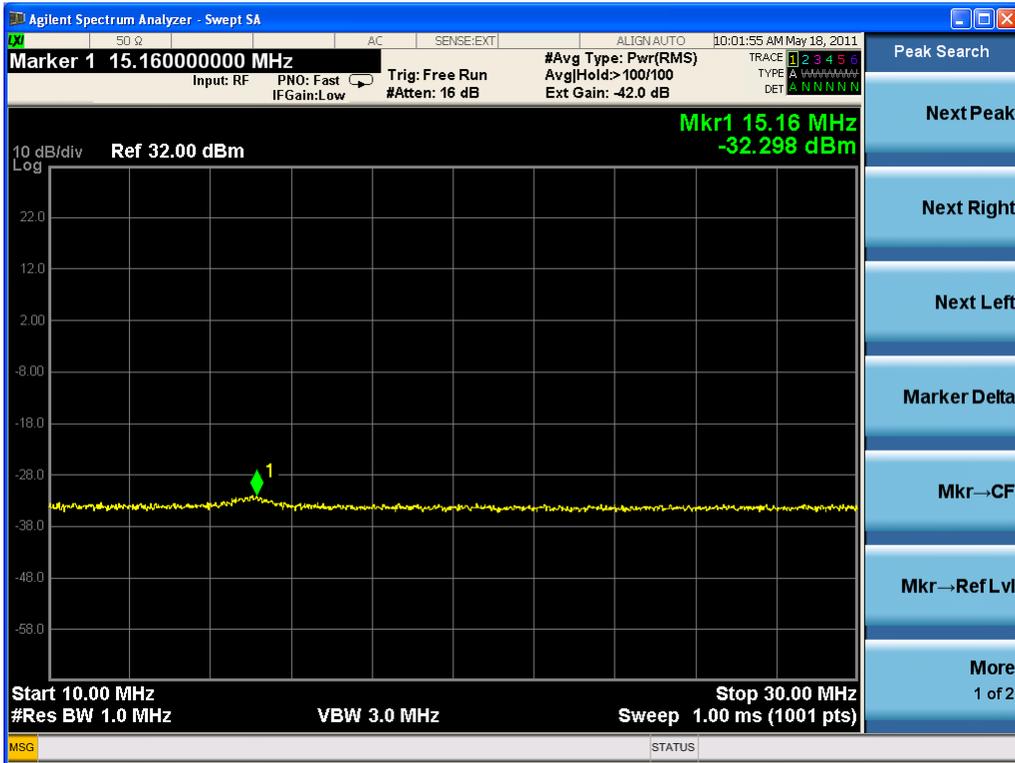
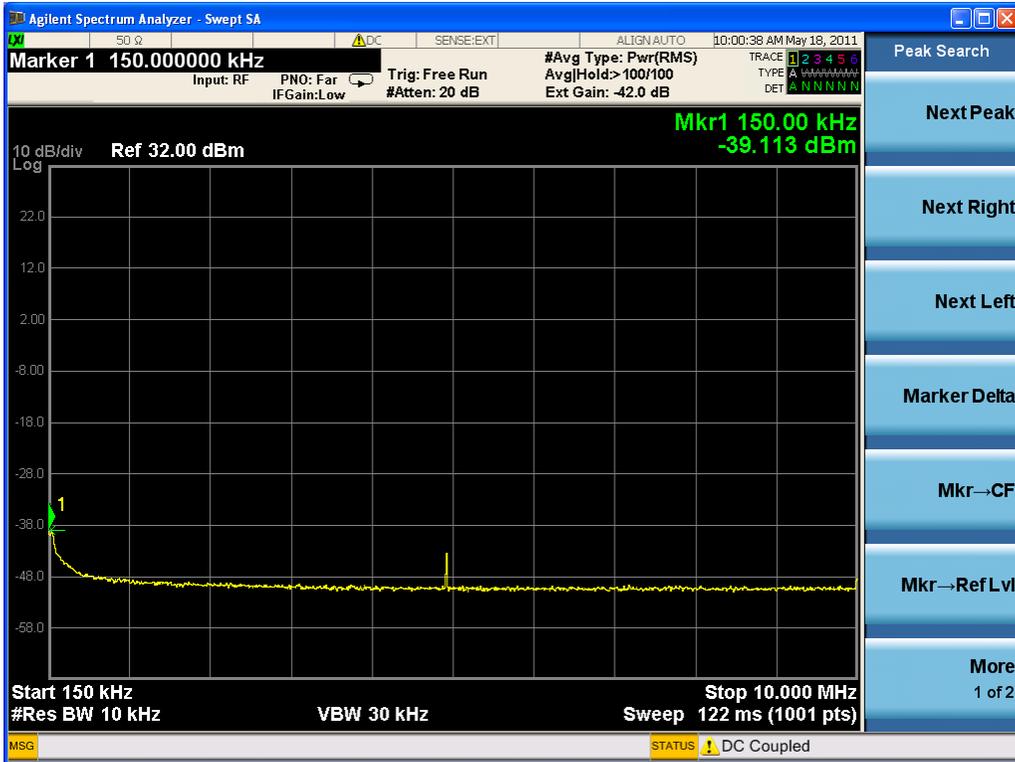
**Test Result:** Pass

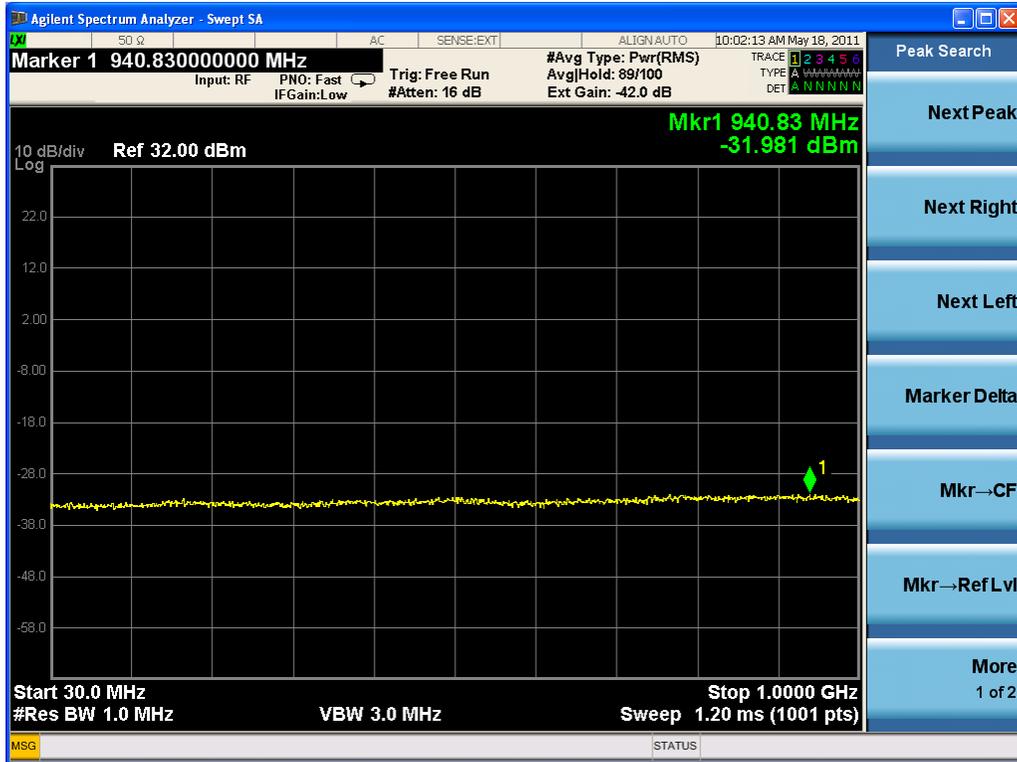
**Test Mode:** Transmitting UMTS

**Test Data:**

Four Carriers (working in bottom frequency)

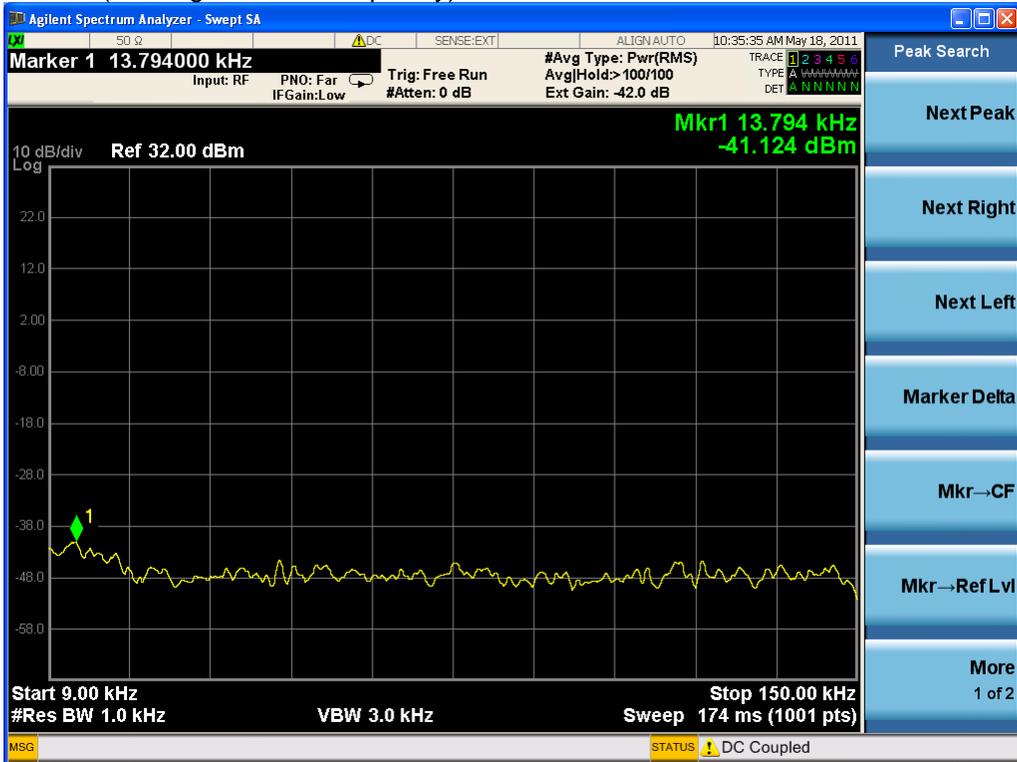


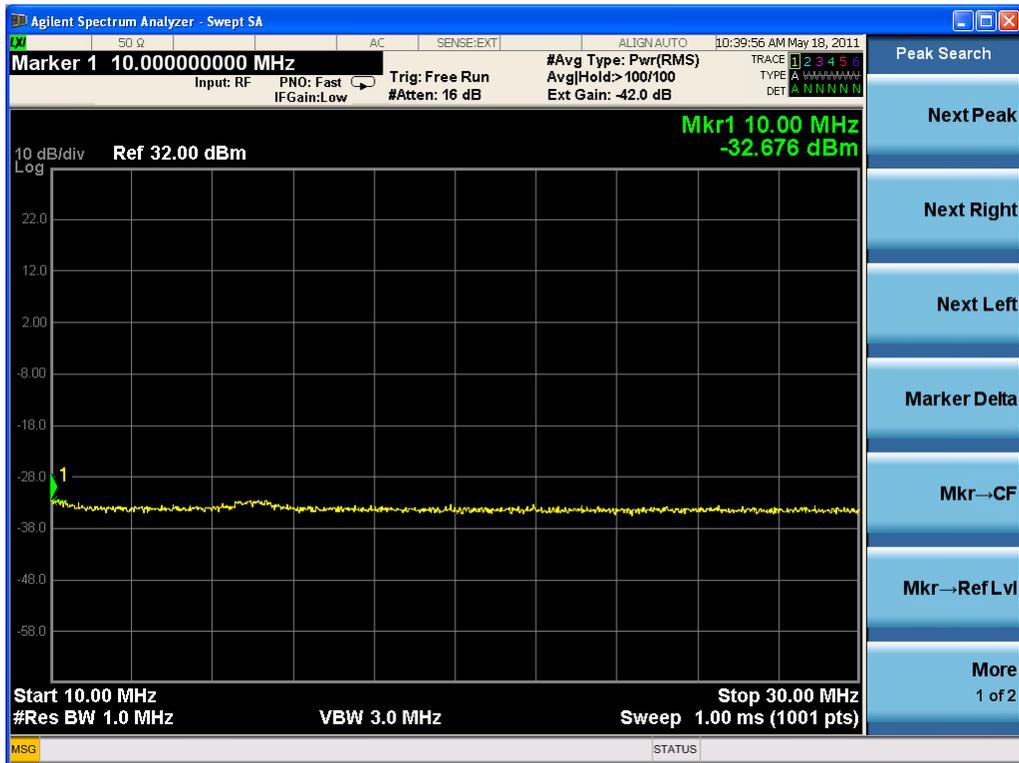
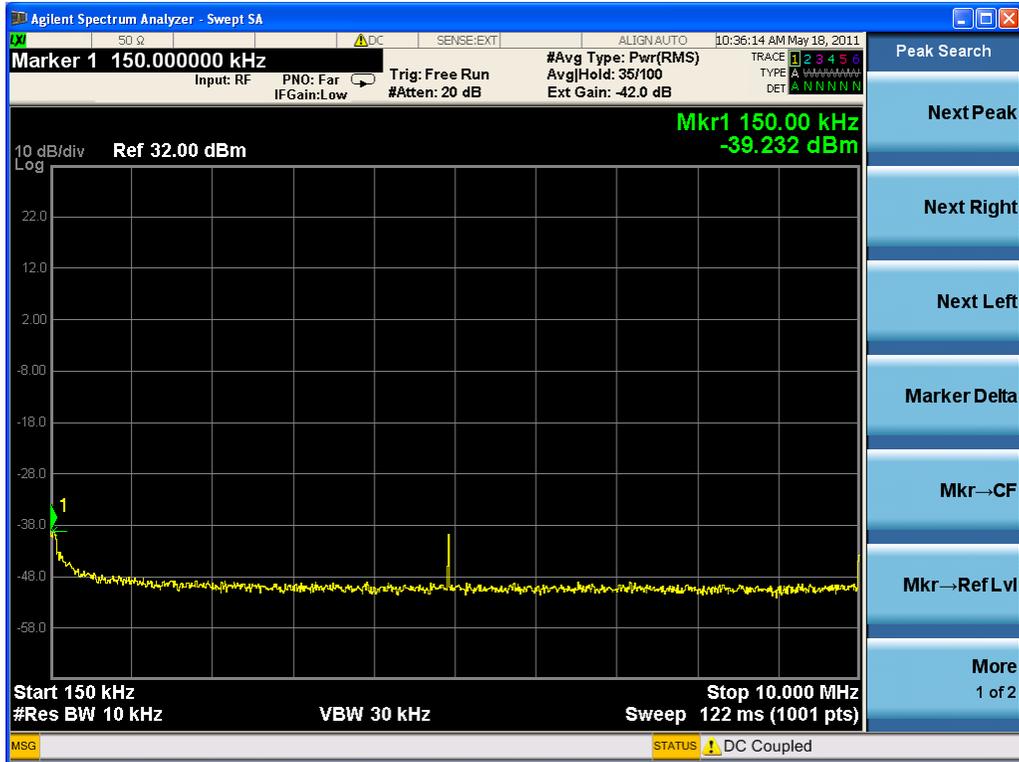


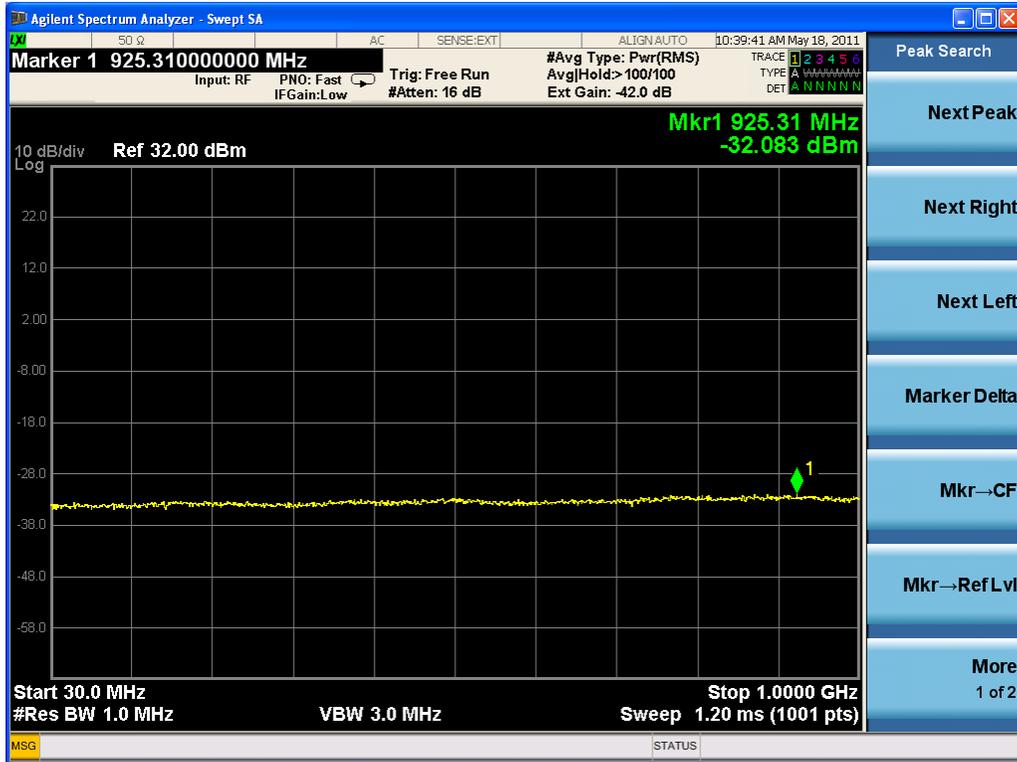




Four carriers (working in middle frequency)

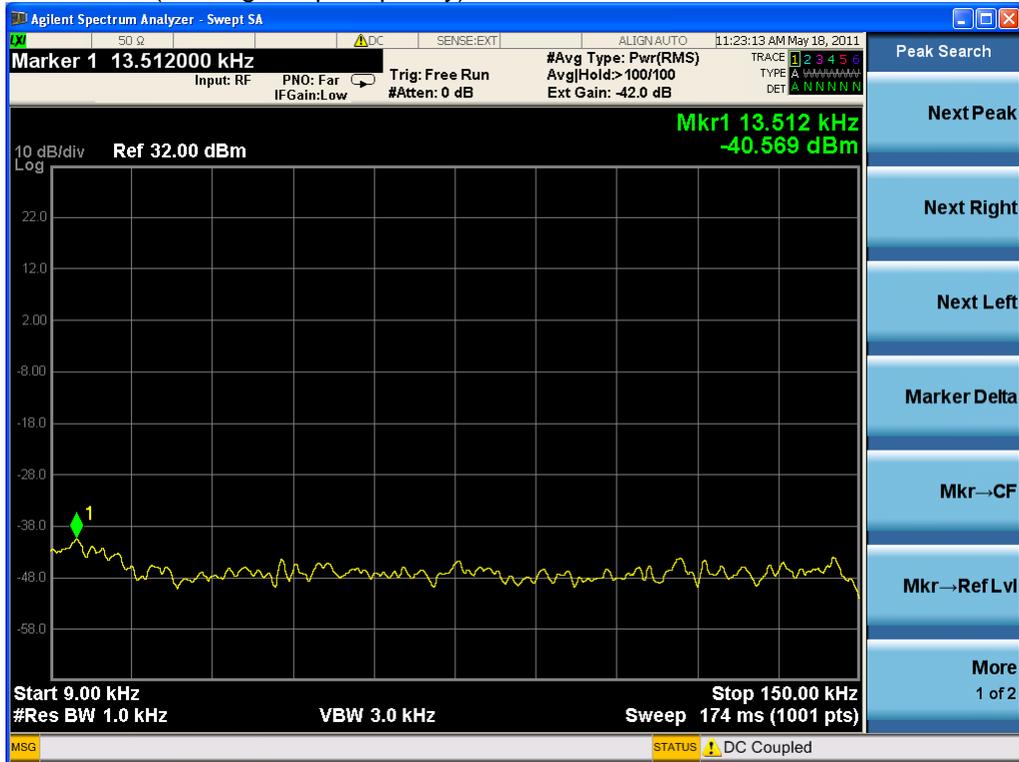


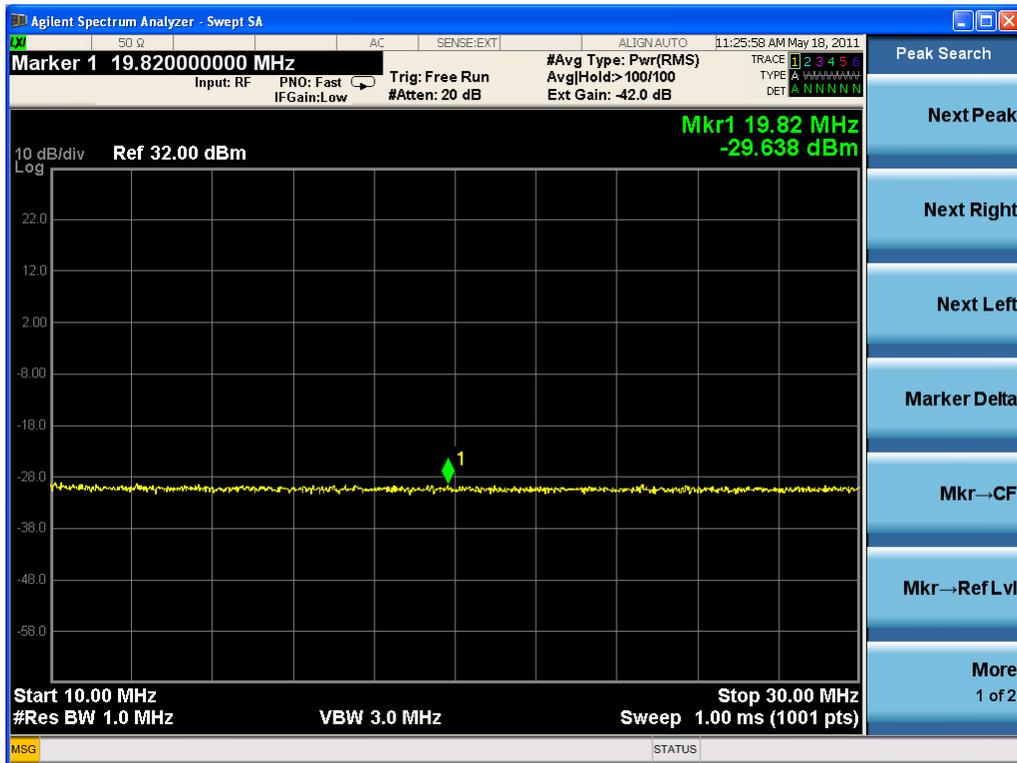
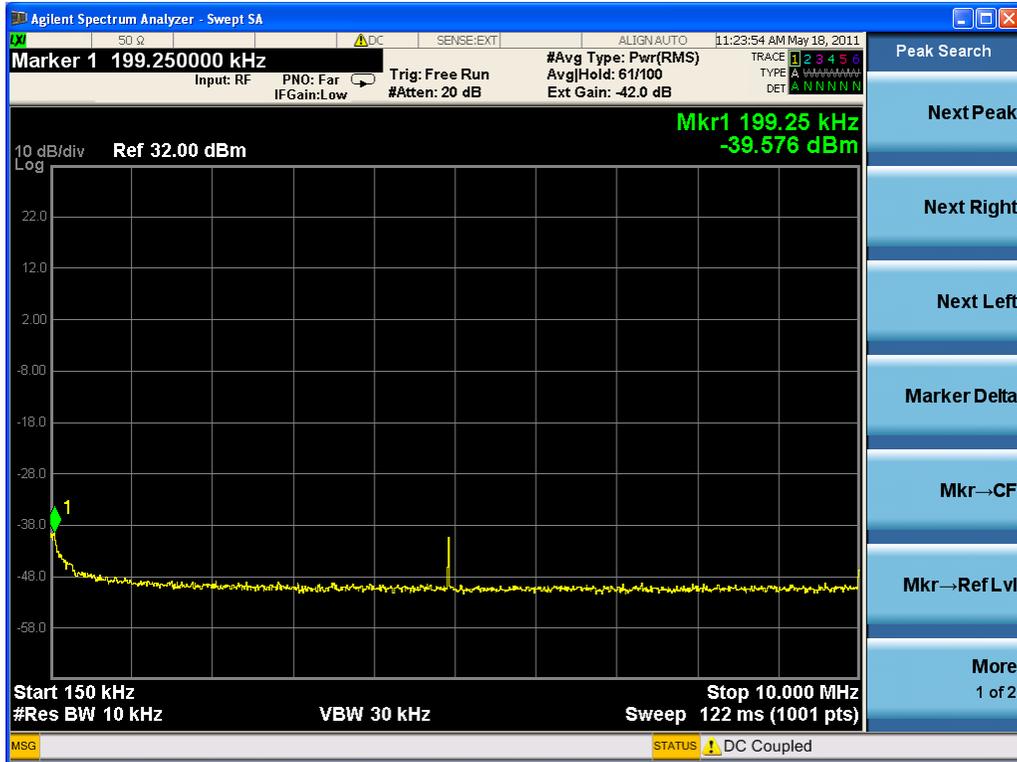


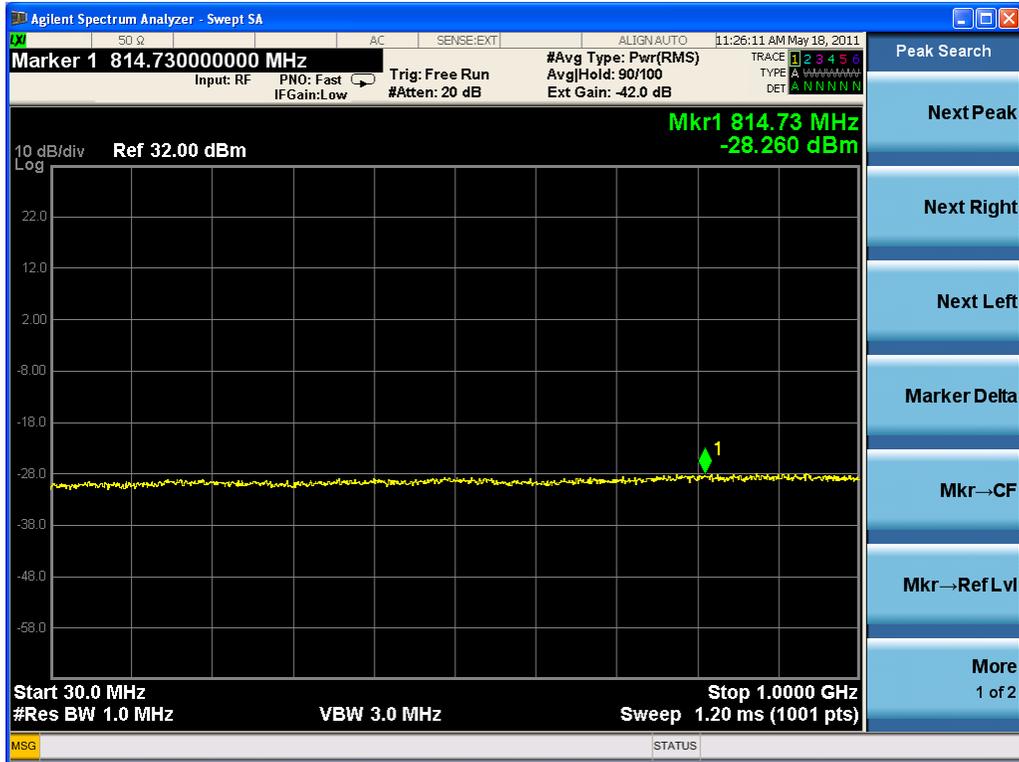




Four Carriers (working in top frequency)

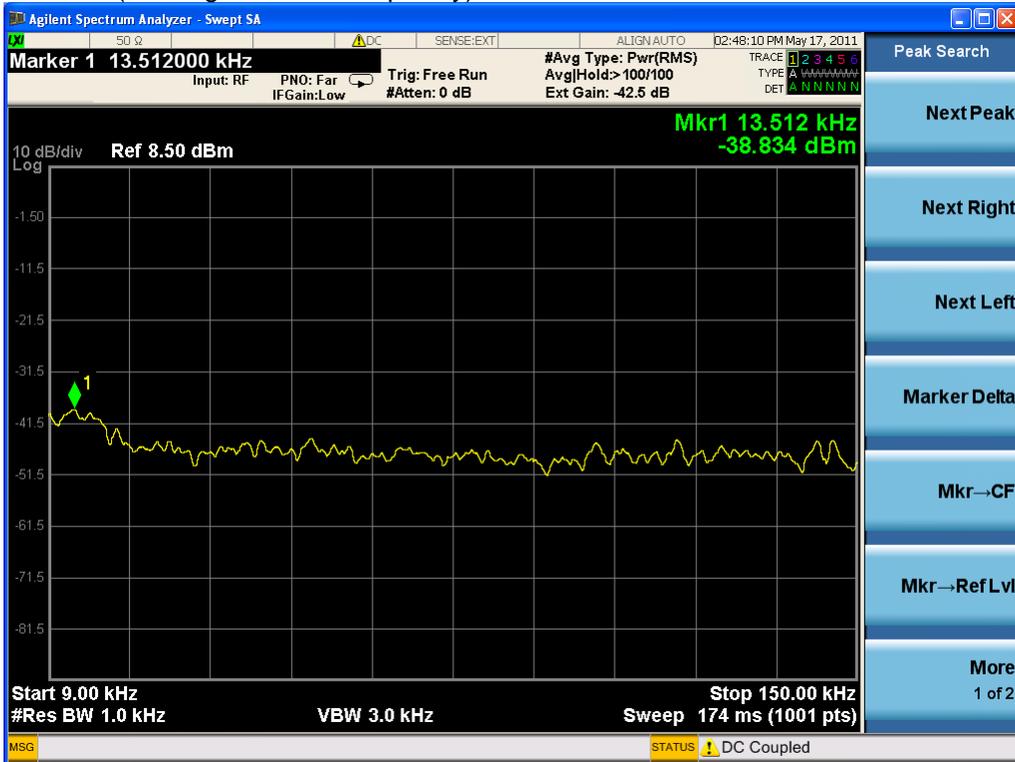


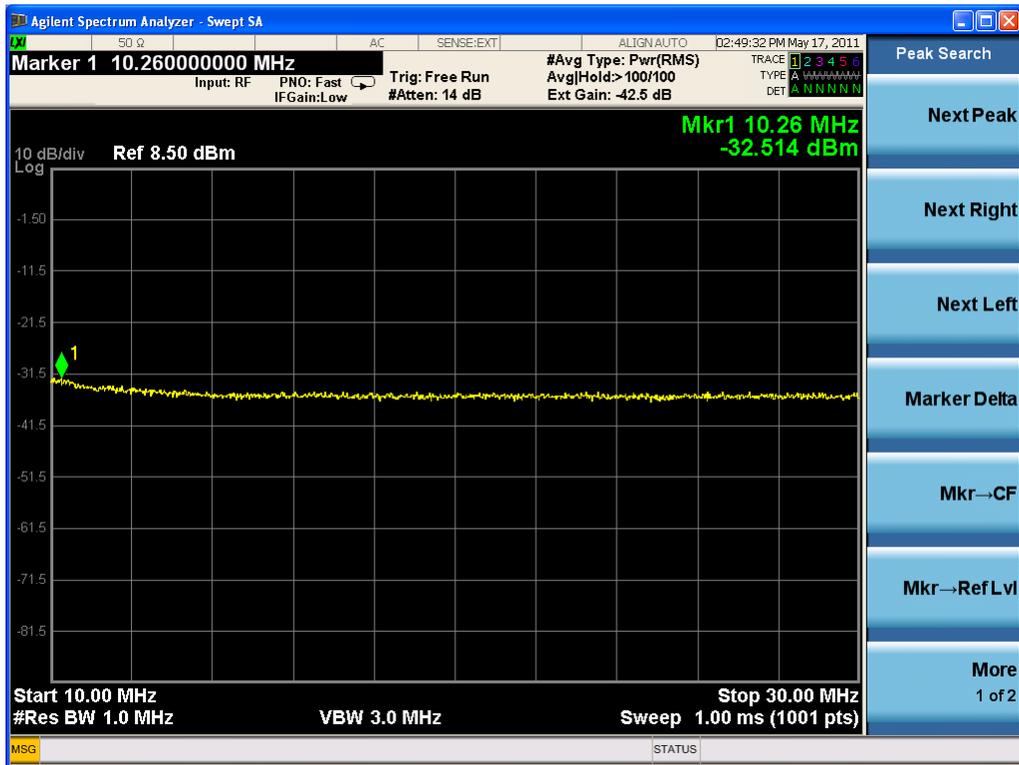




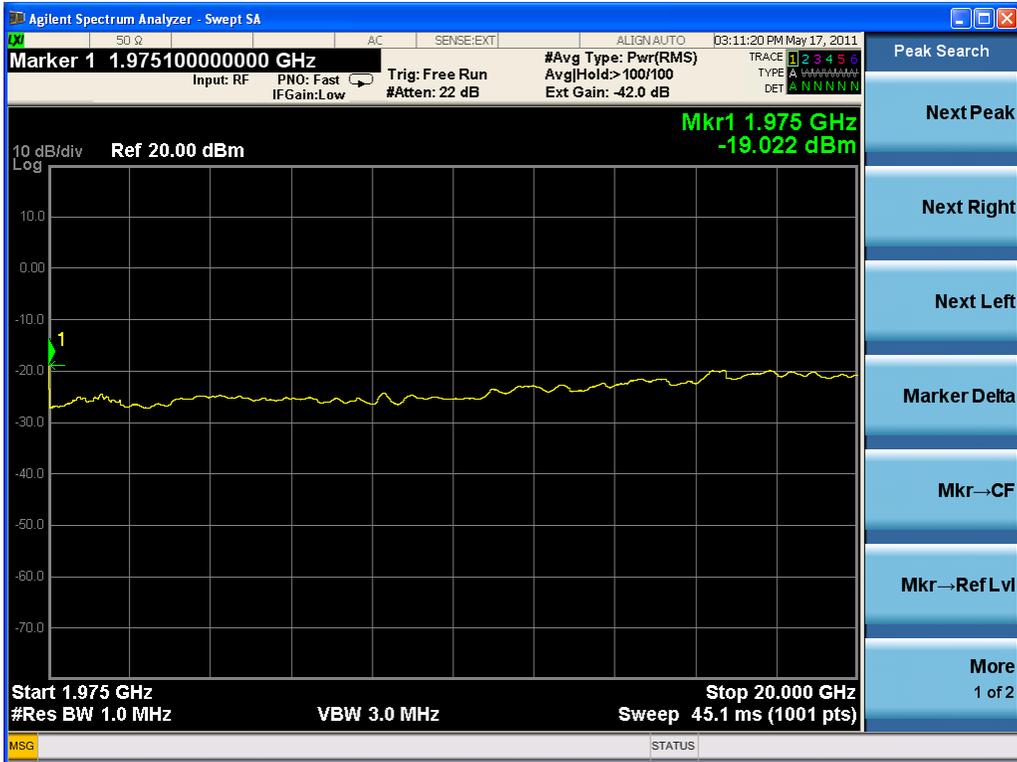


Three carriers (working in bottom frequency)

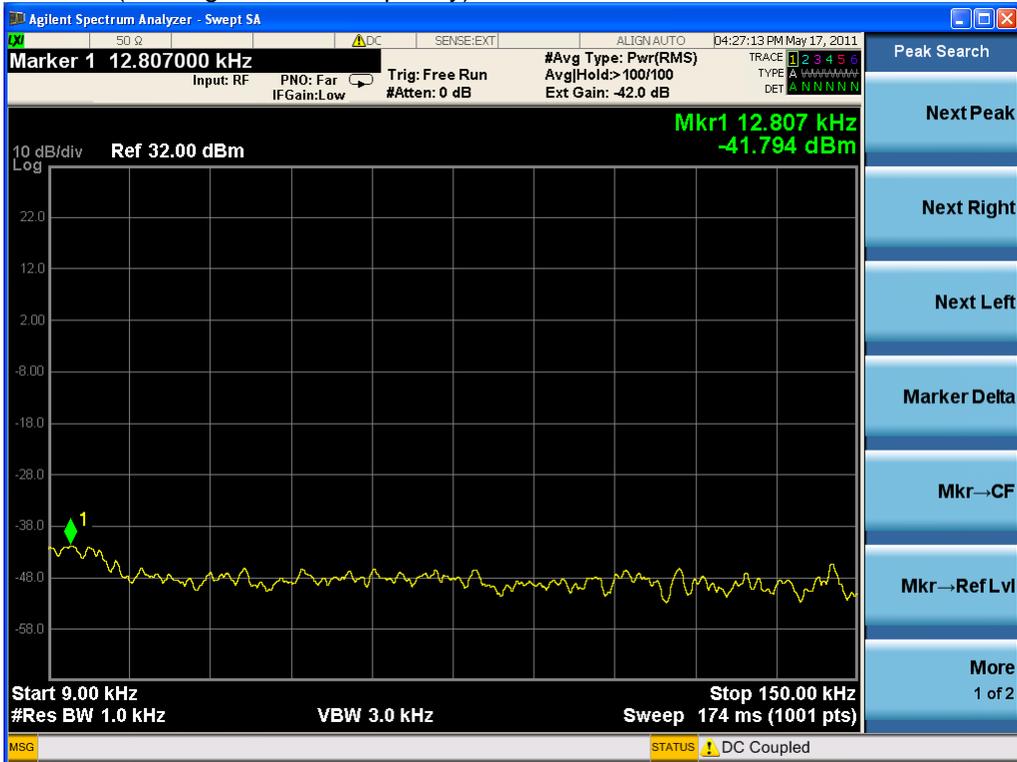


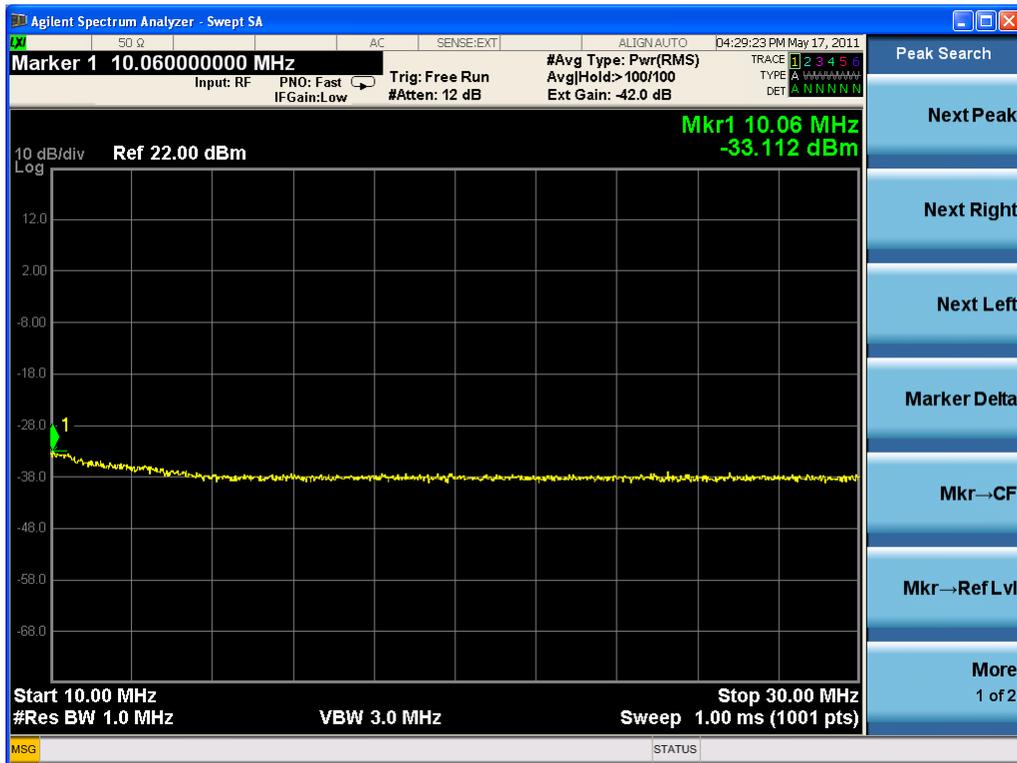
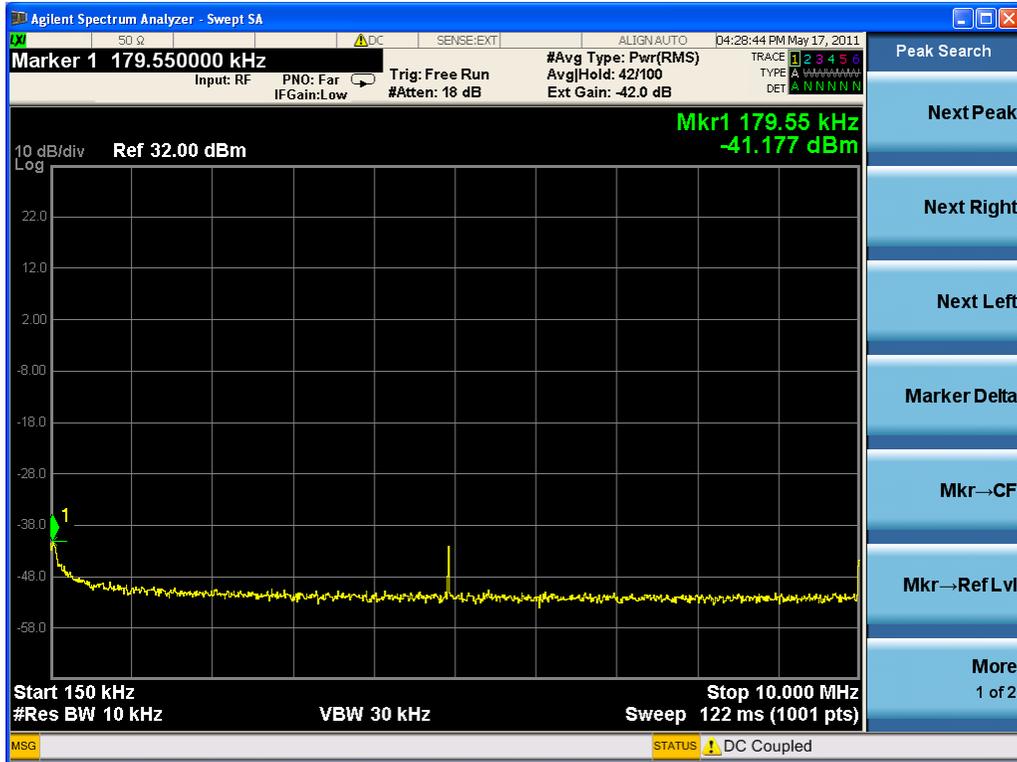


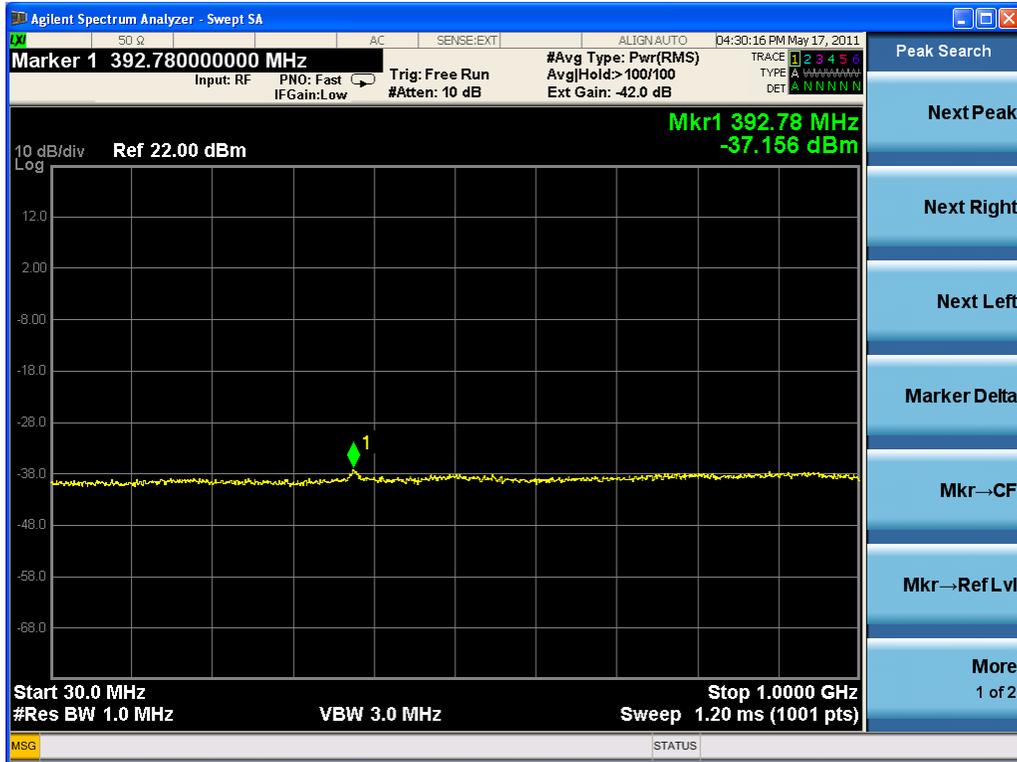


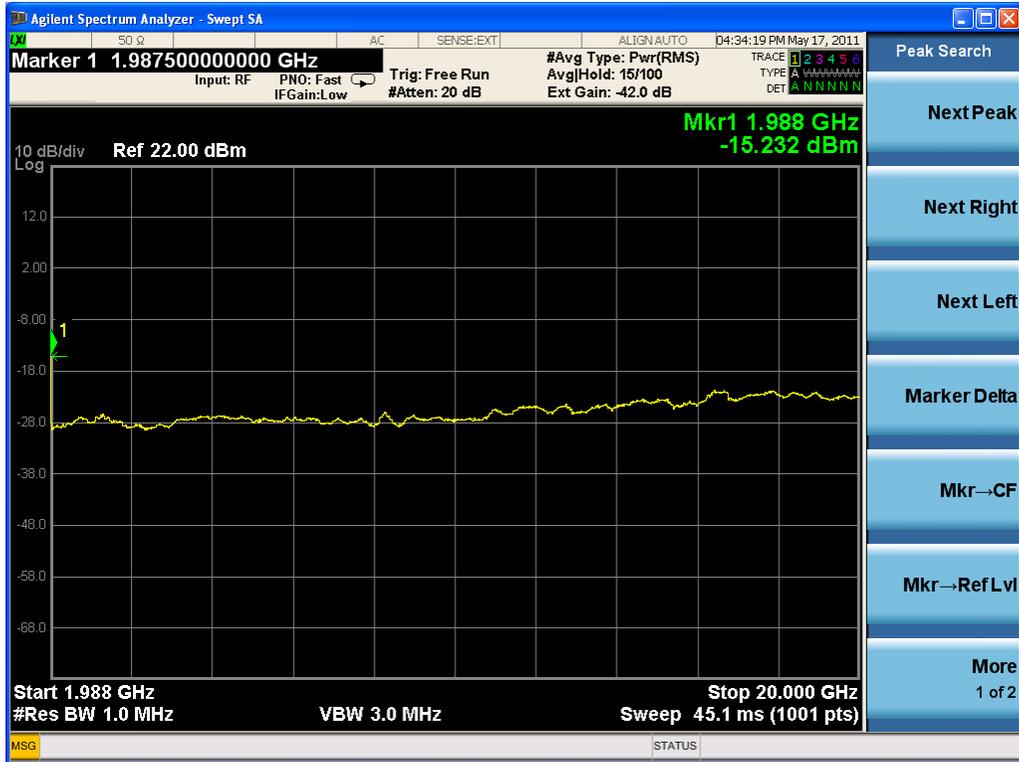


Three carriers (working in middle frequency)

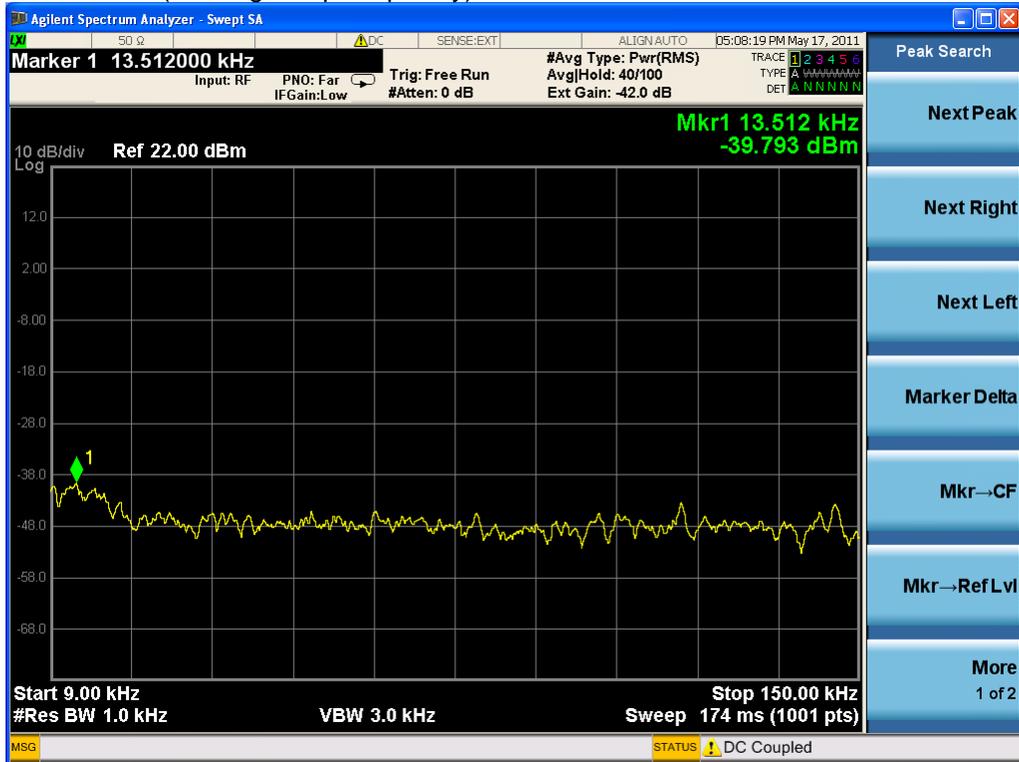


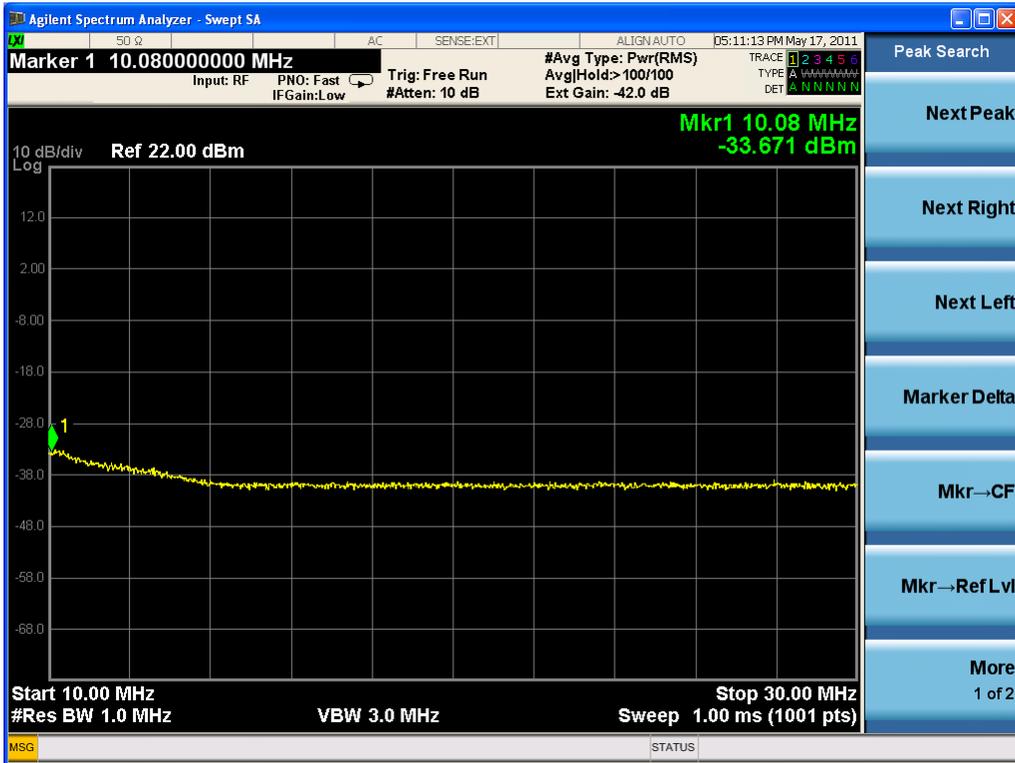
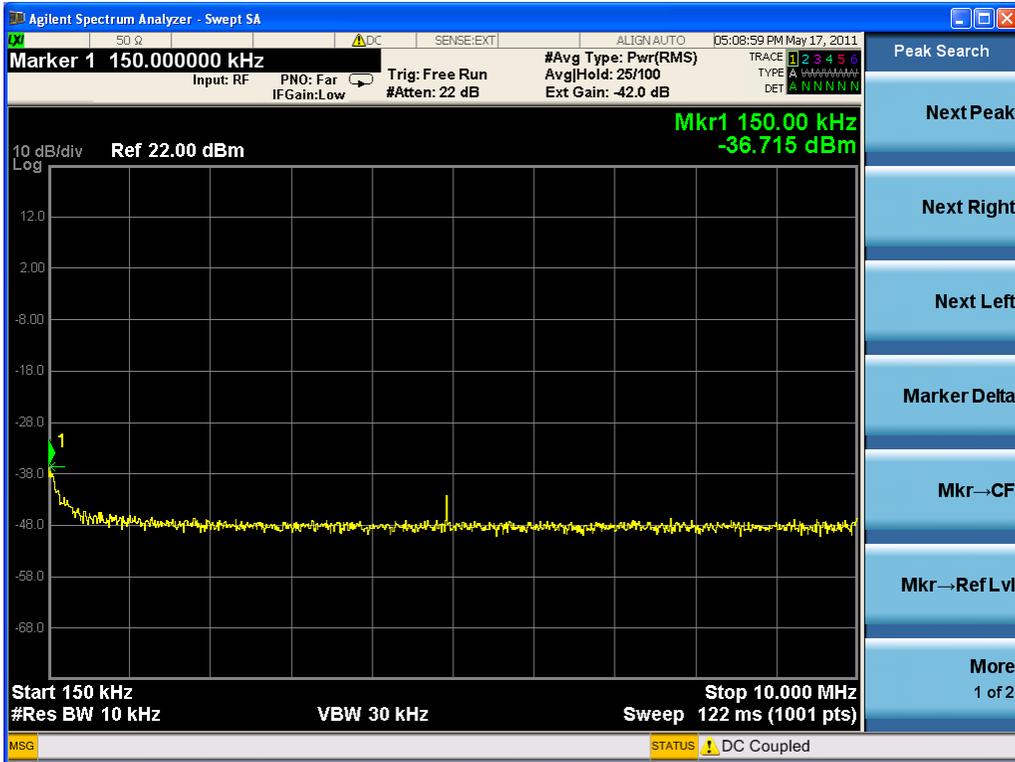


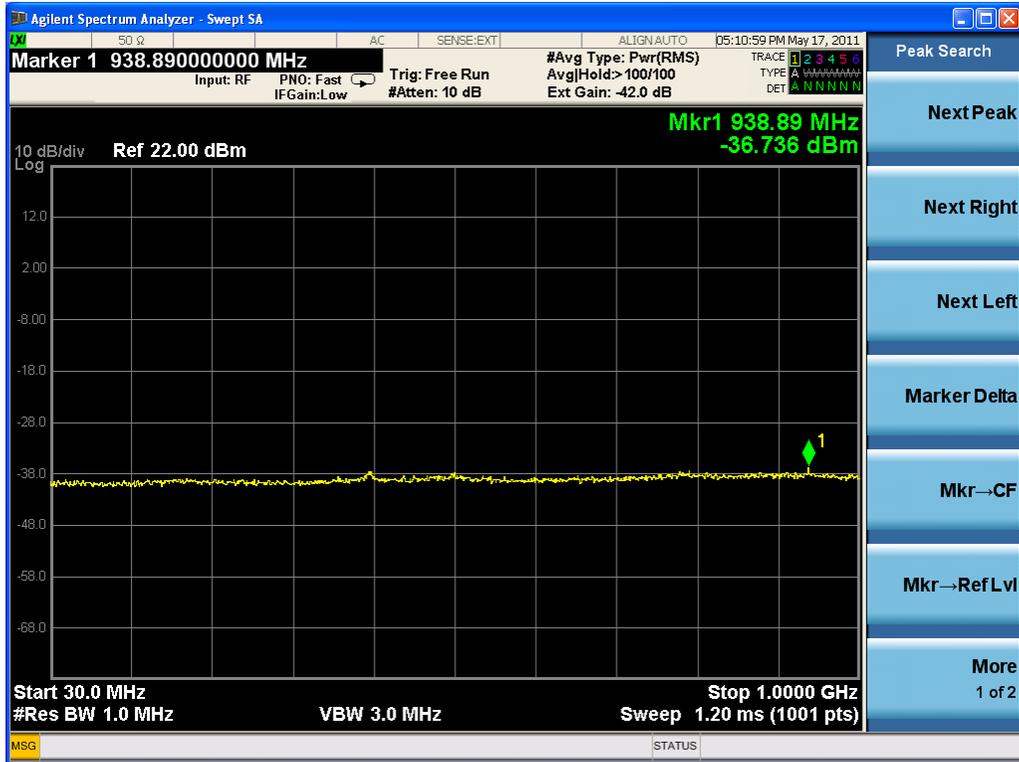




Three carriers (working in top frequency)

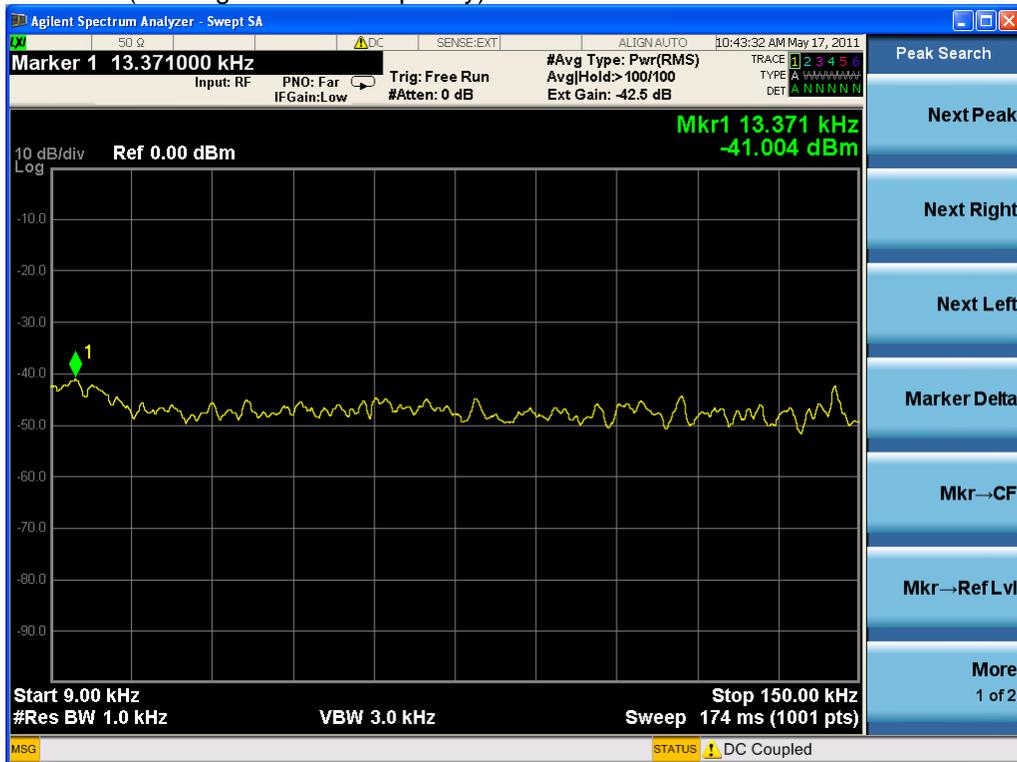


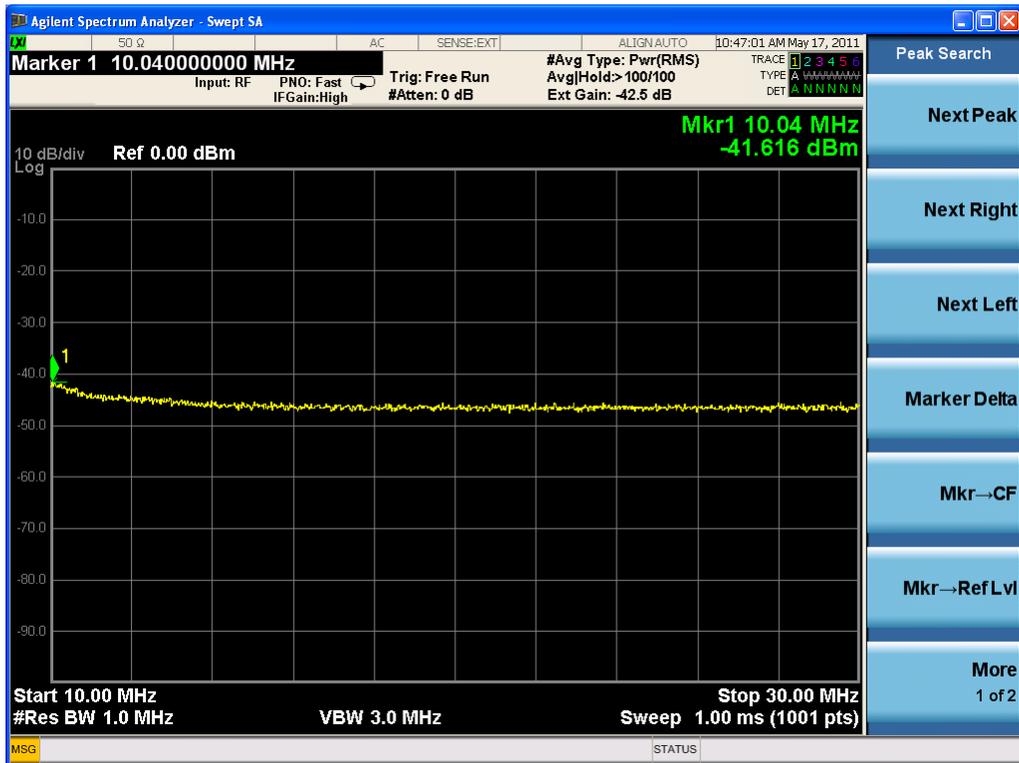
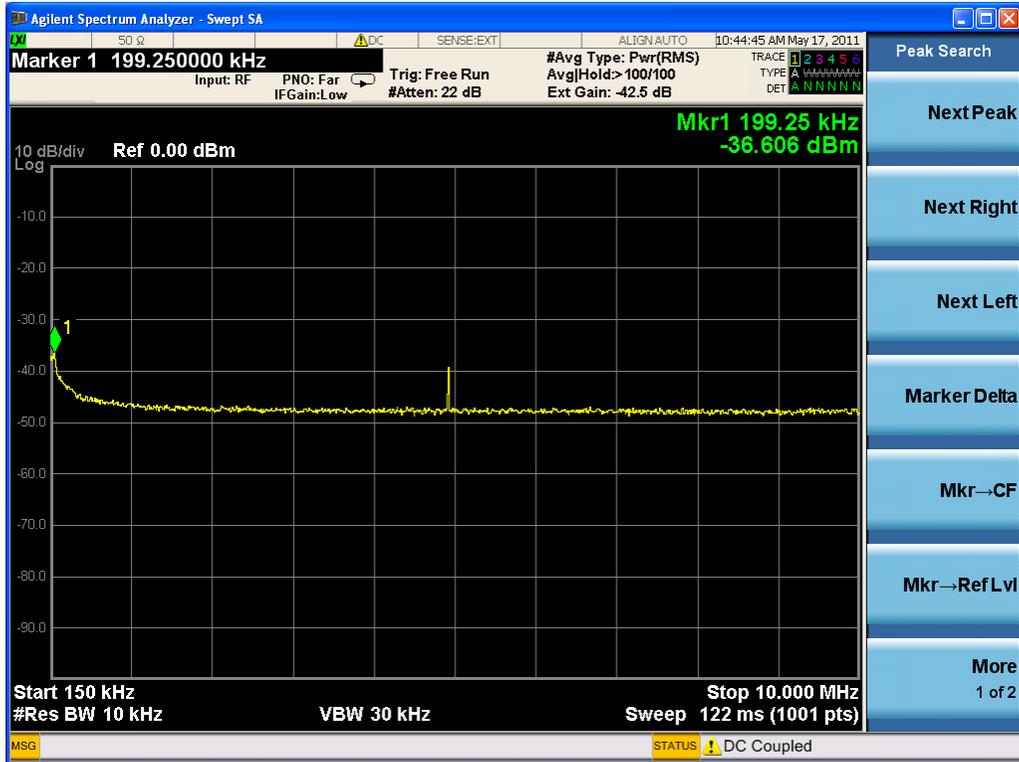


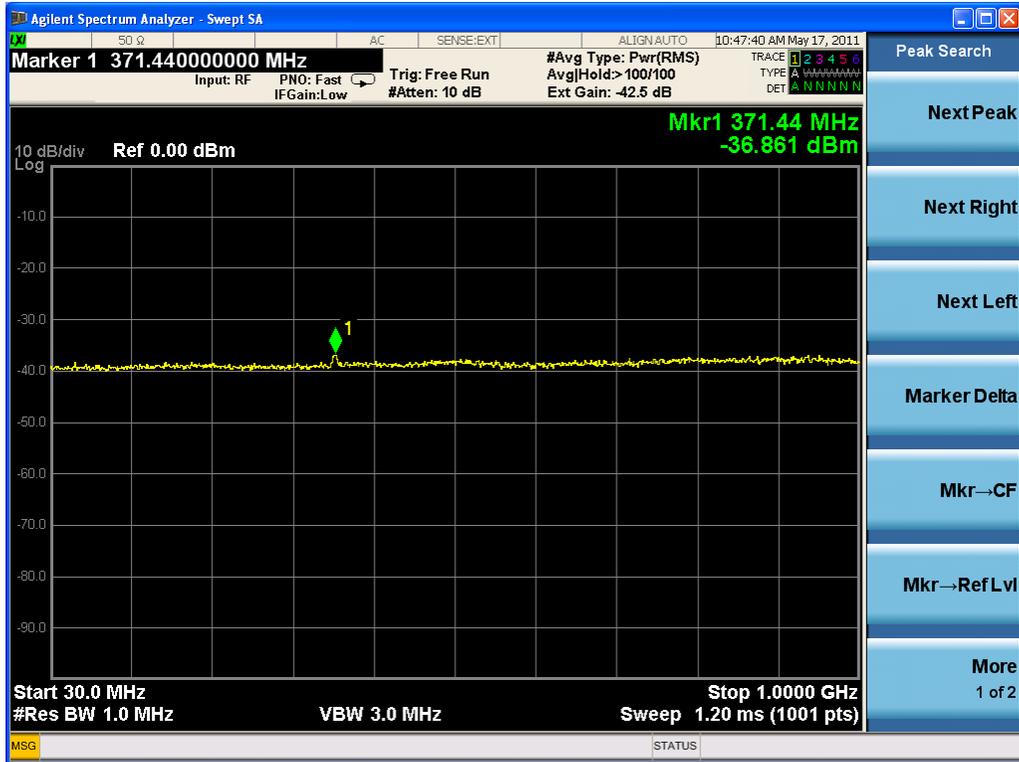




Two carrier (working in bottom frequency)

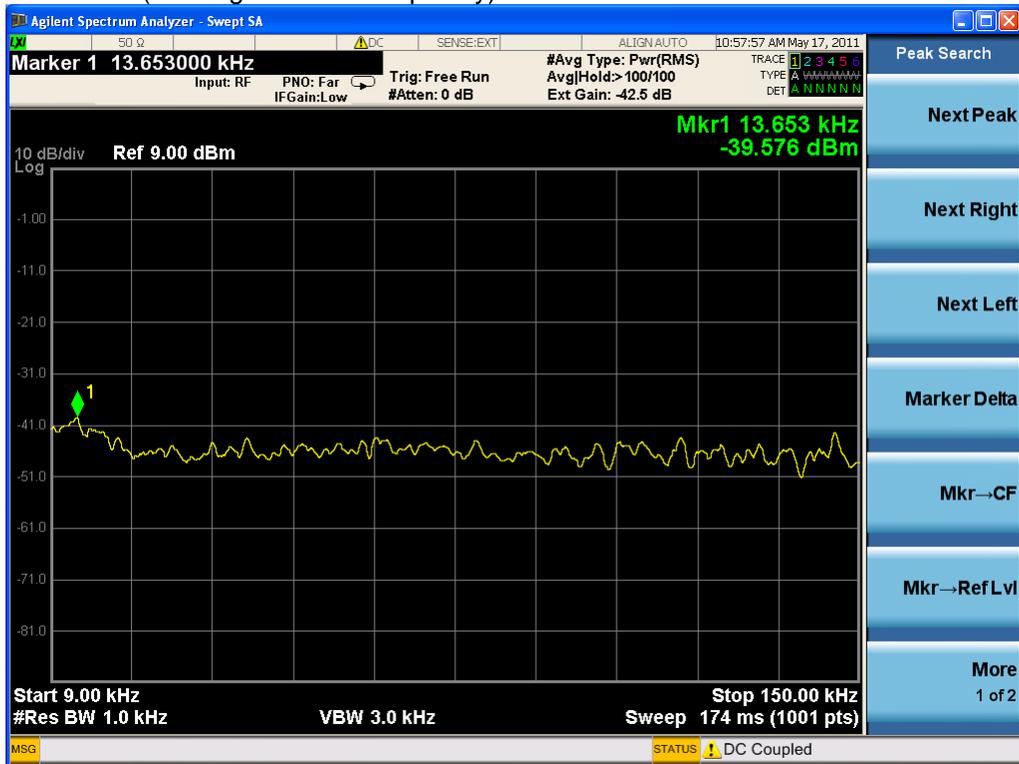


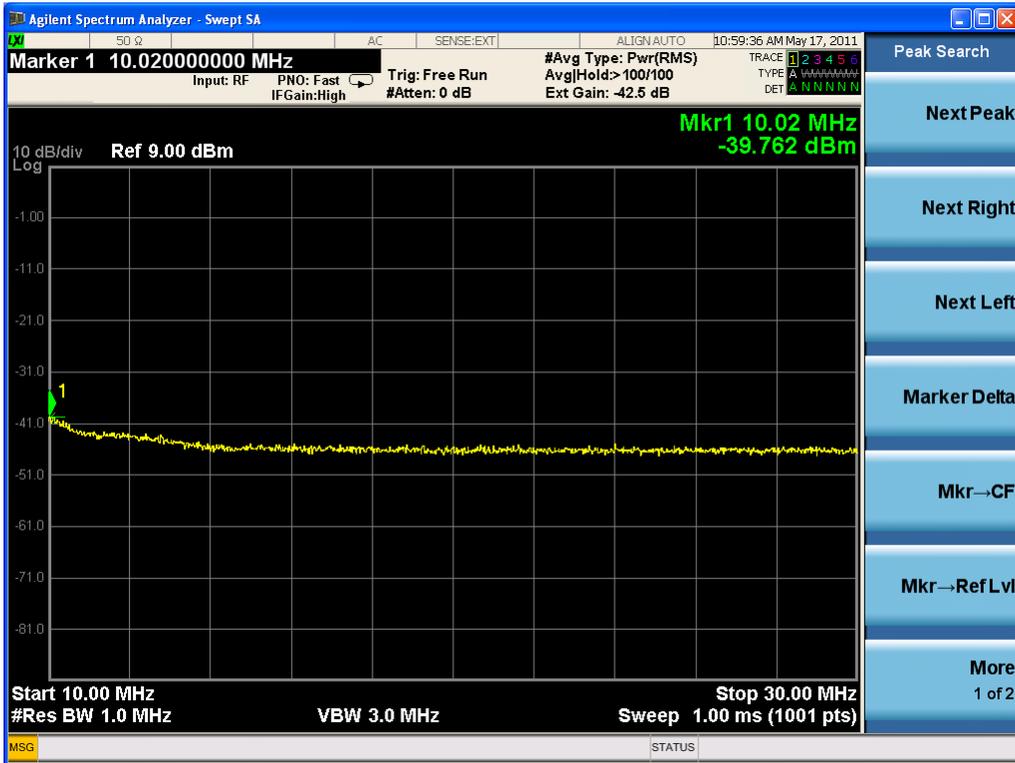
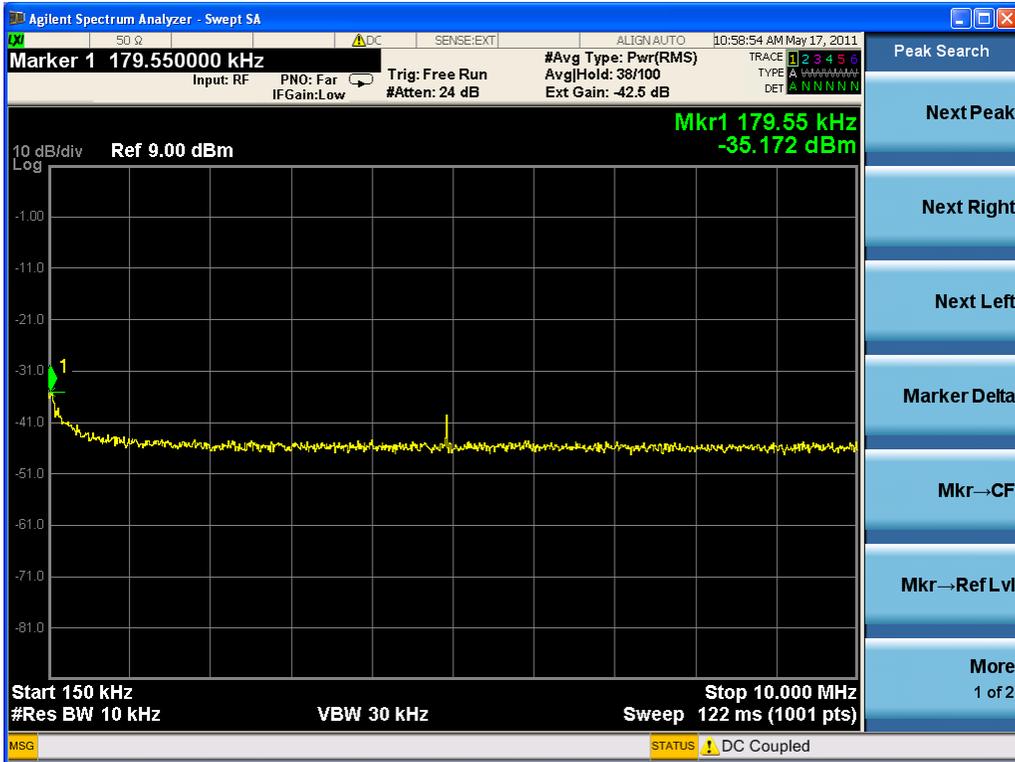


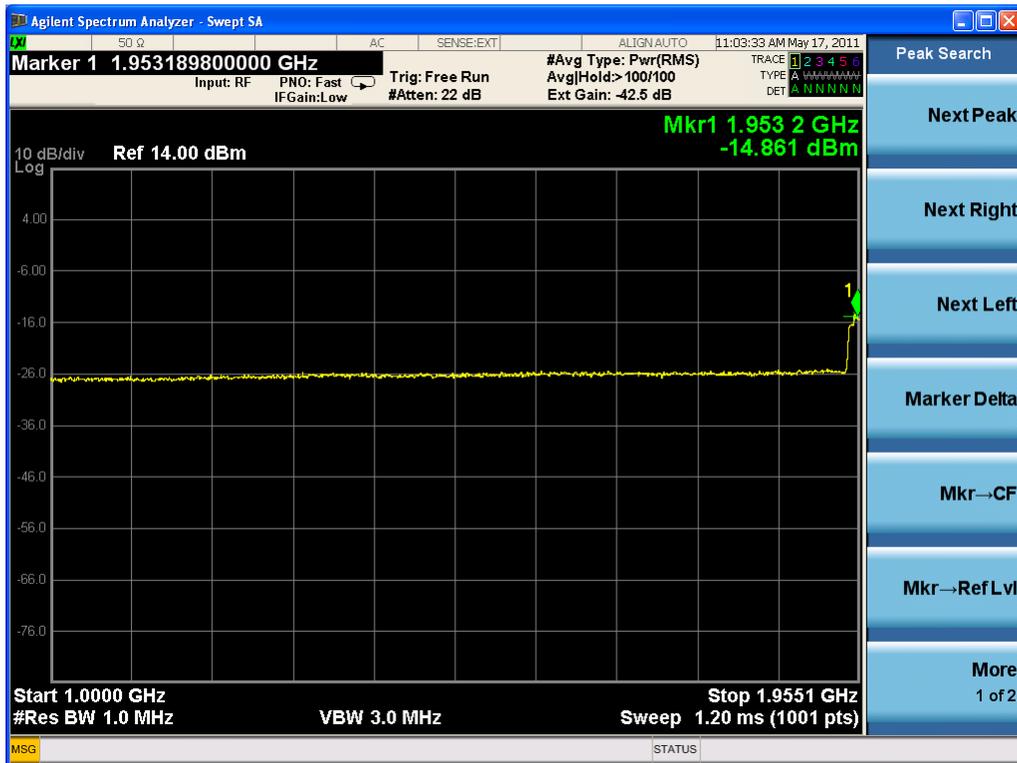
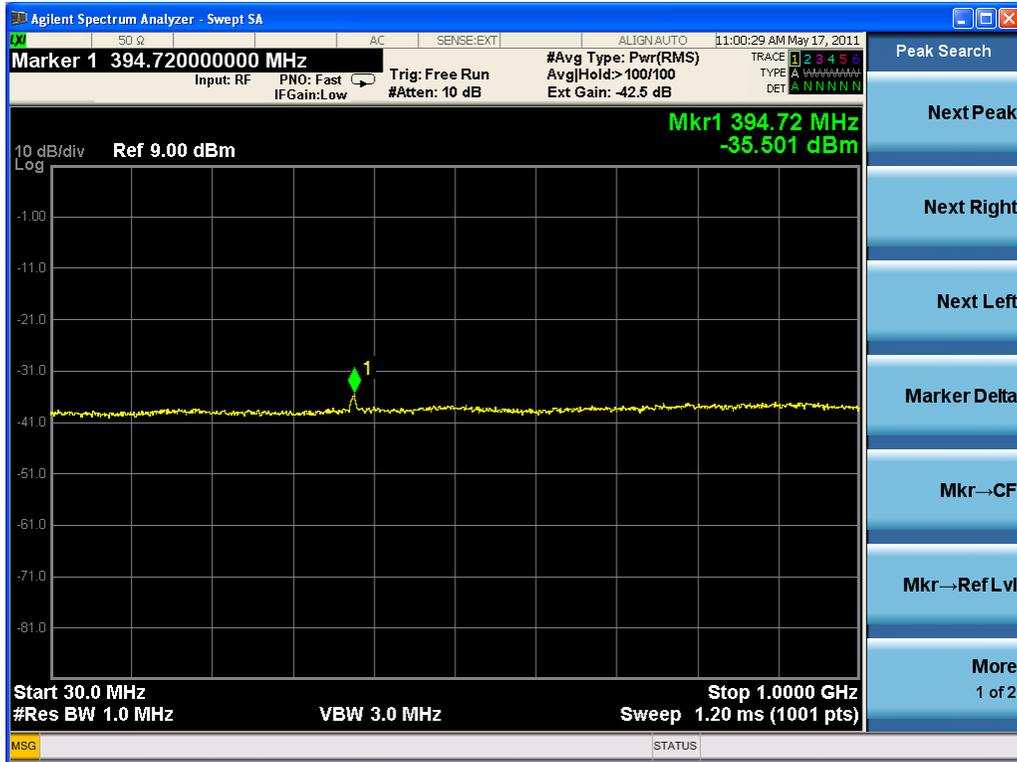




Two carriers (working in middle frequency)

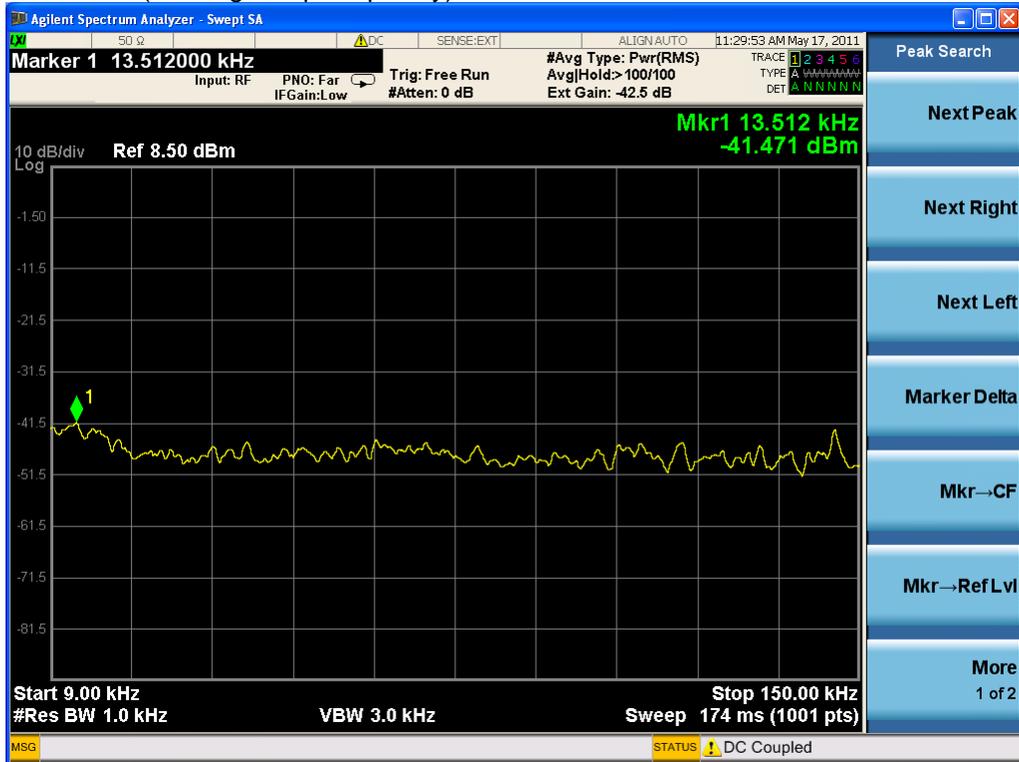


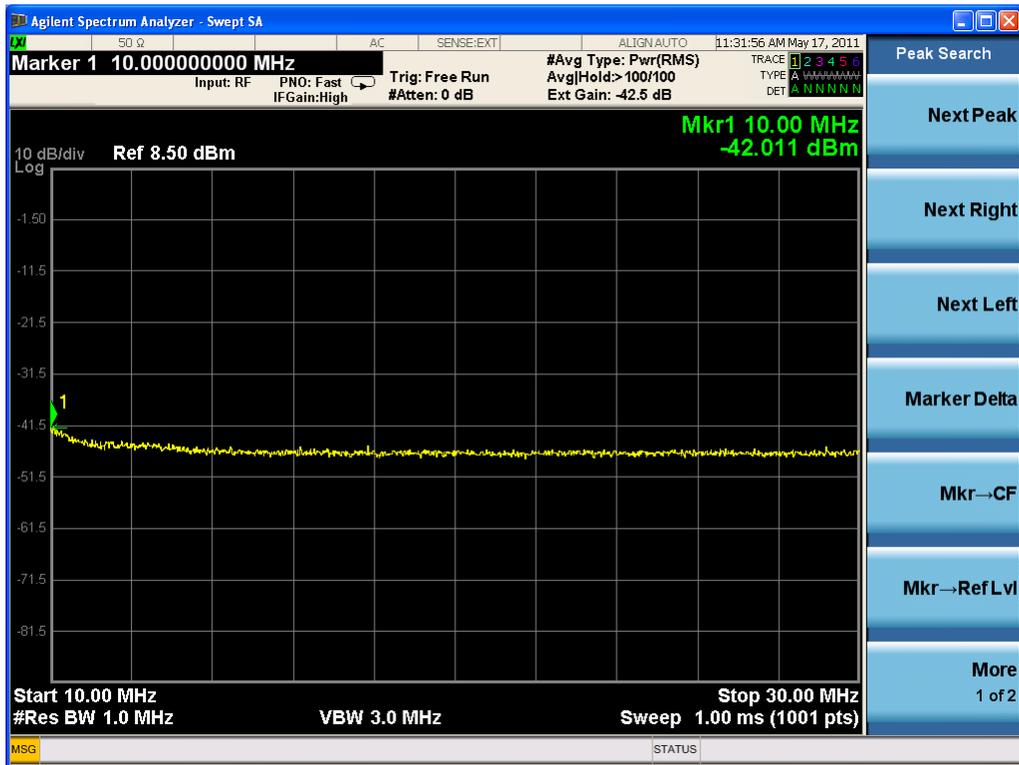


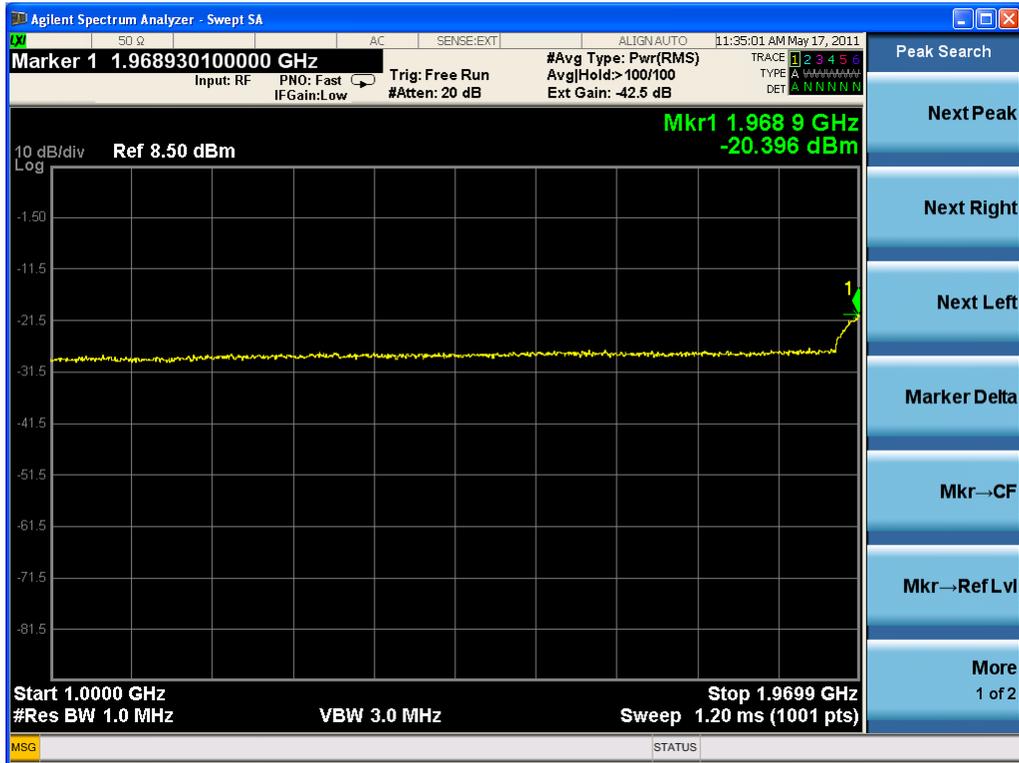
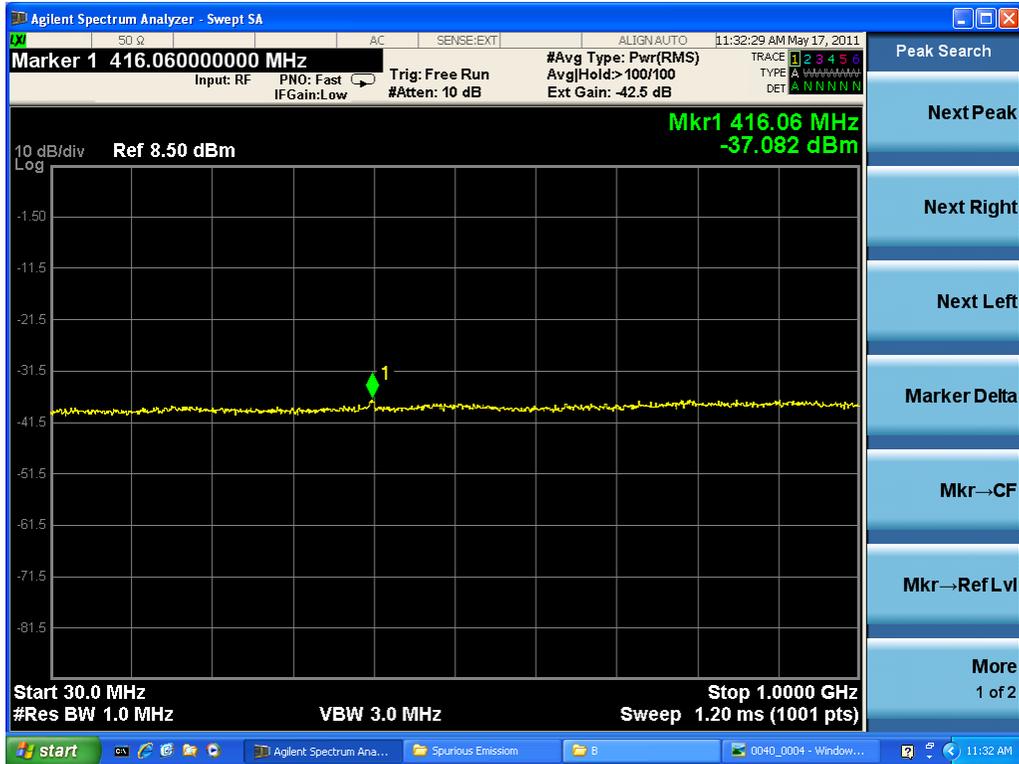




Two carriers (working in top frequency)

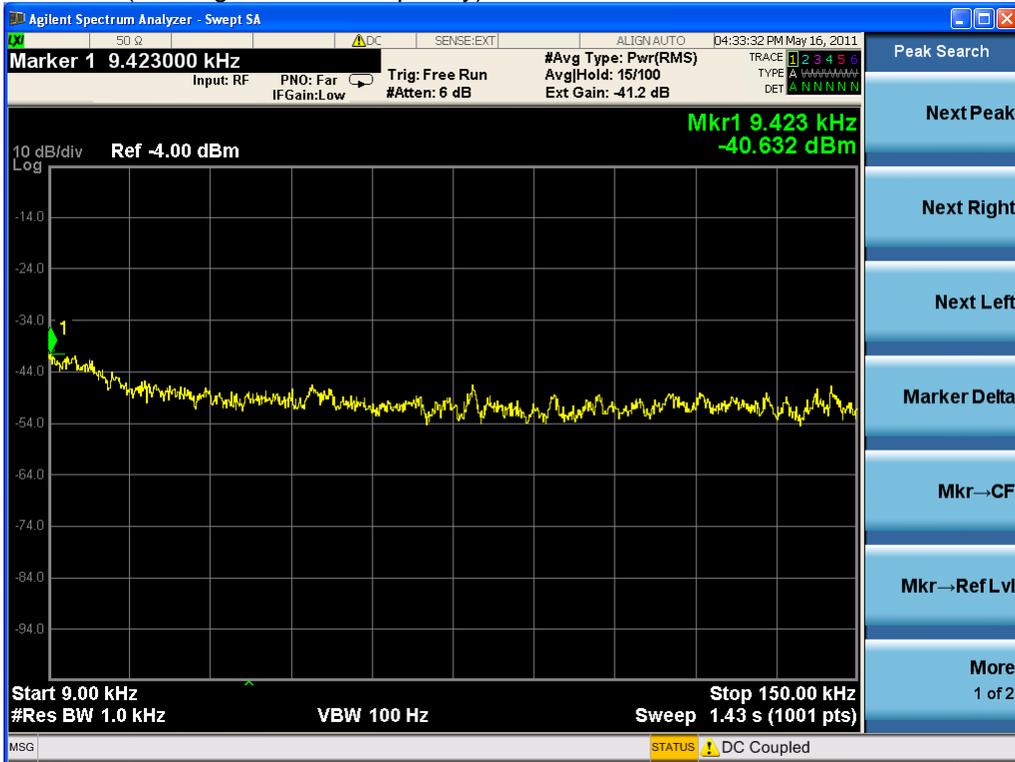


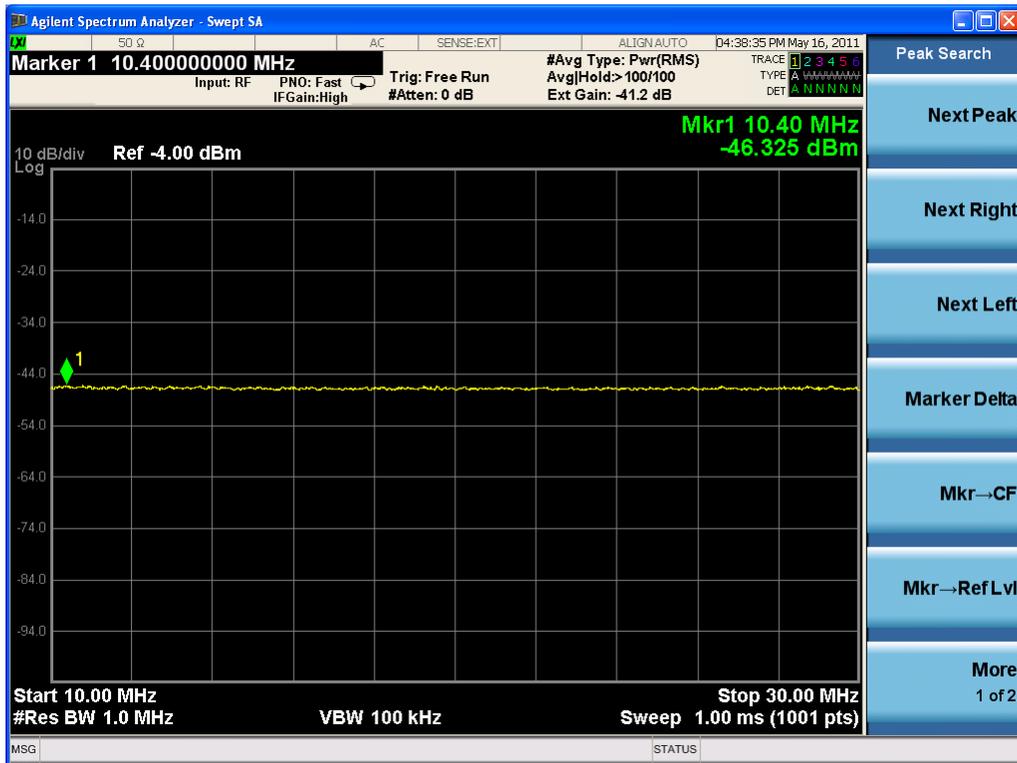


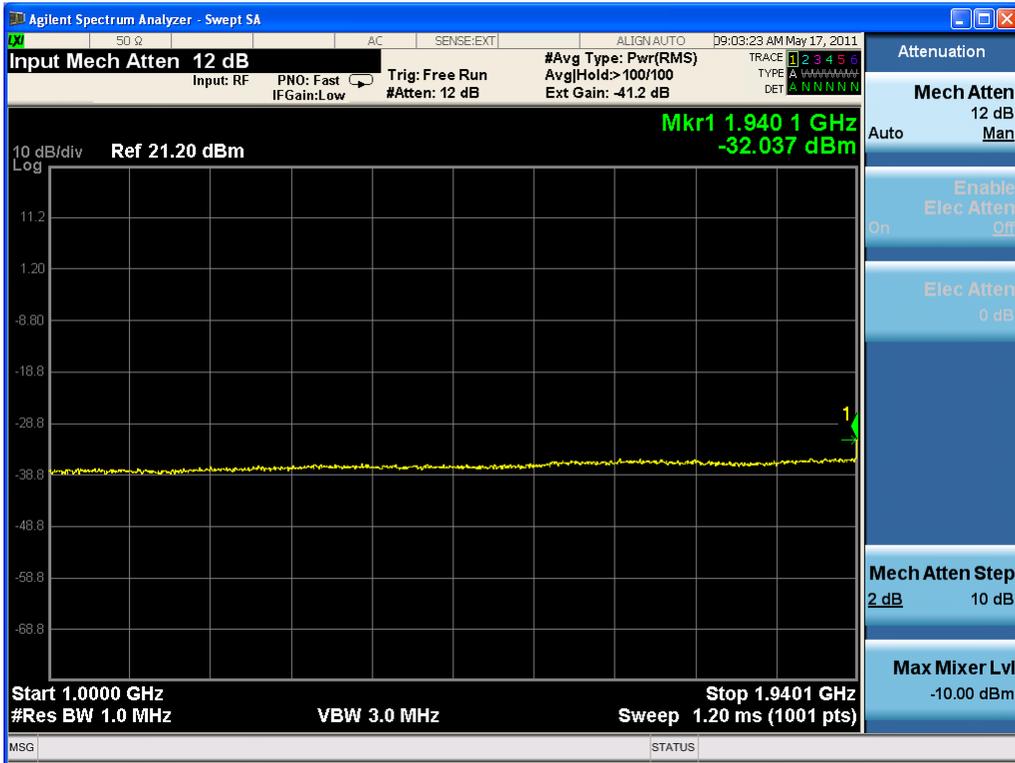




One carrier (working in bottom frequency)

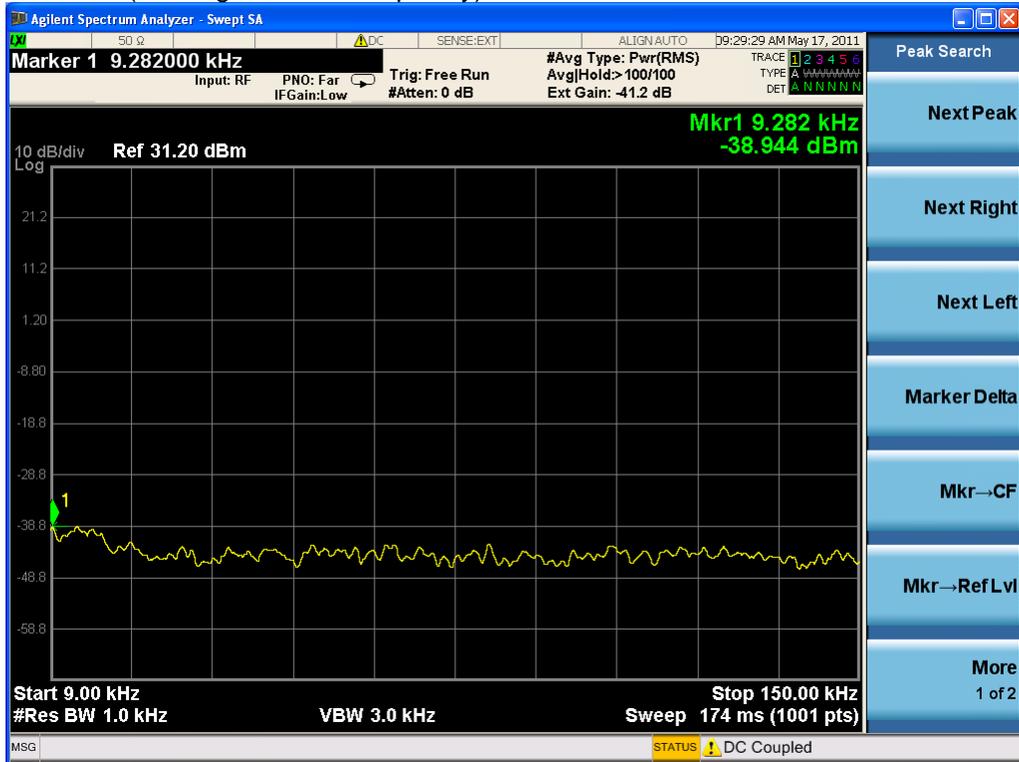


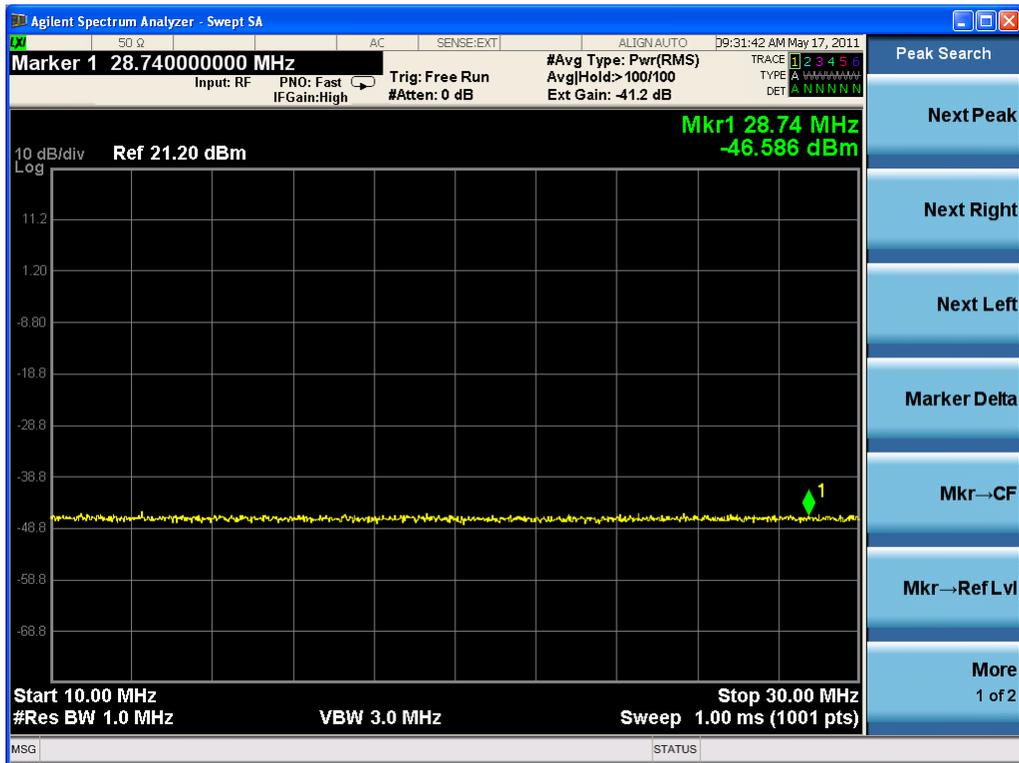
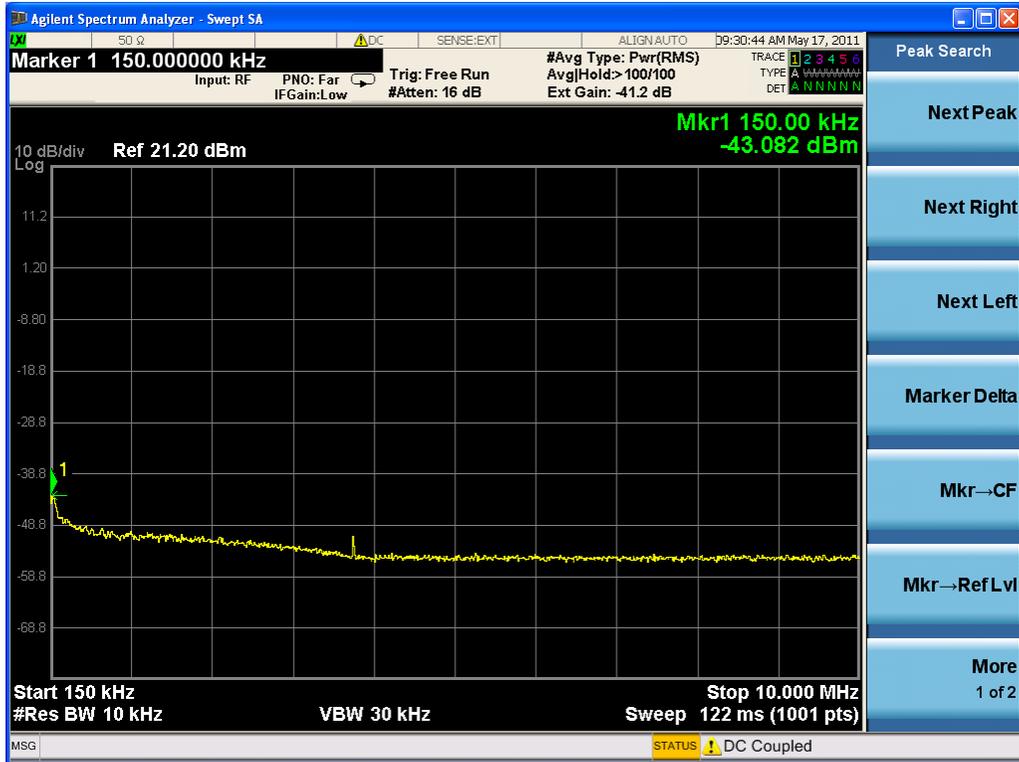


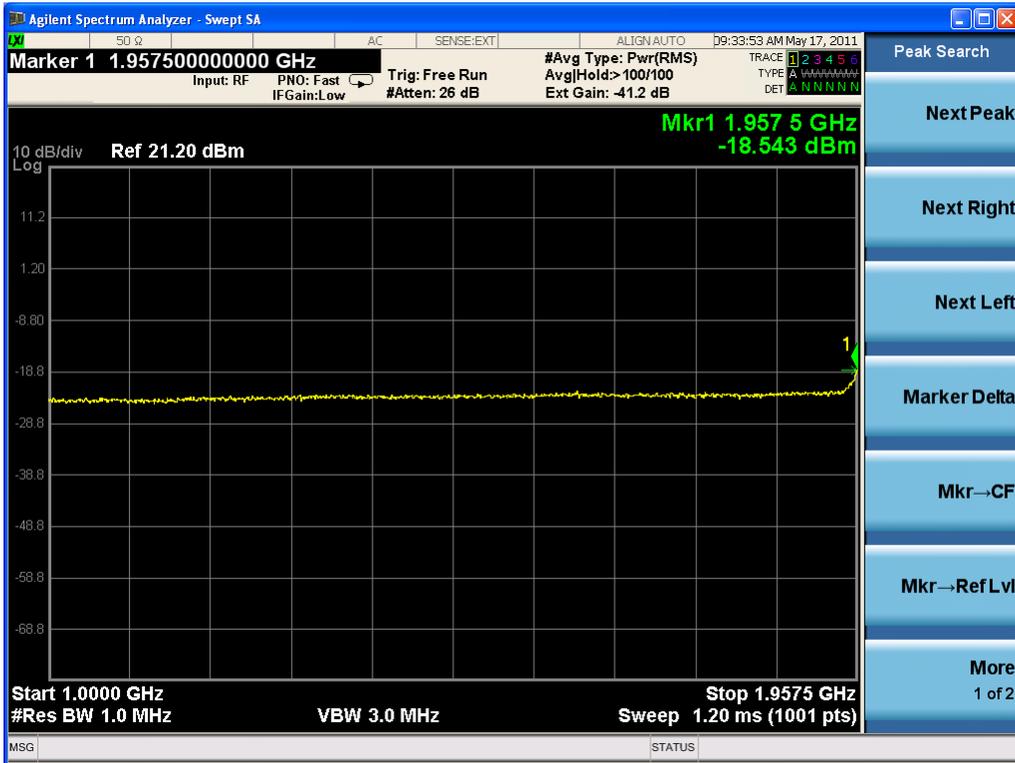
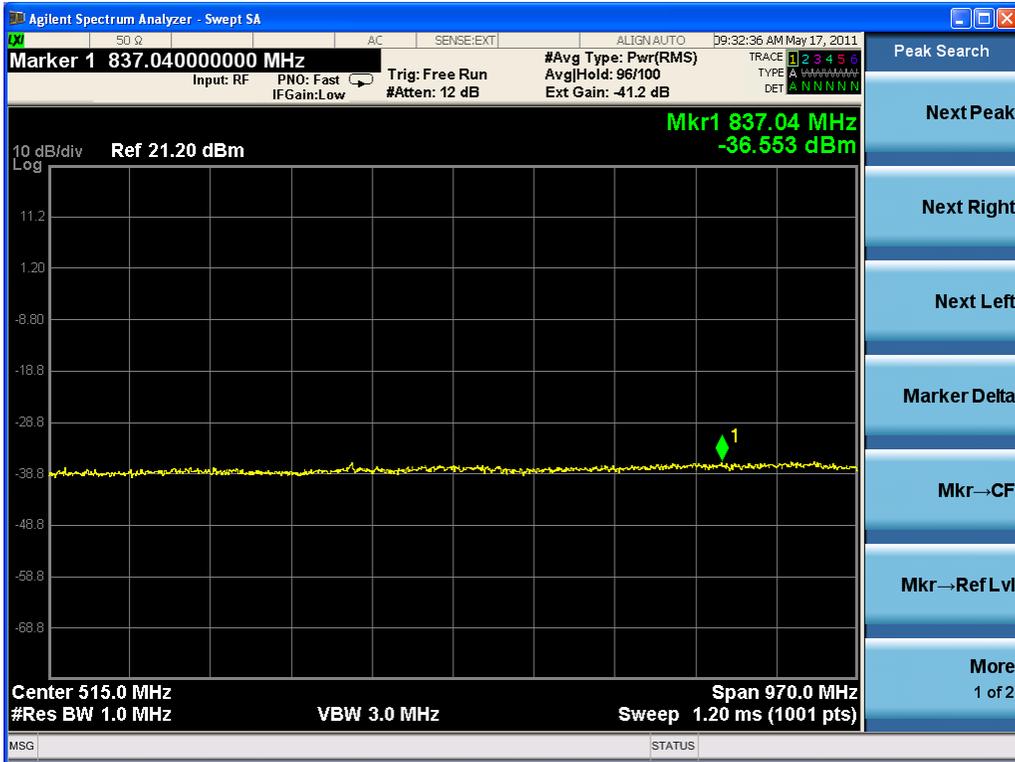


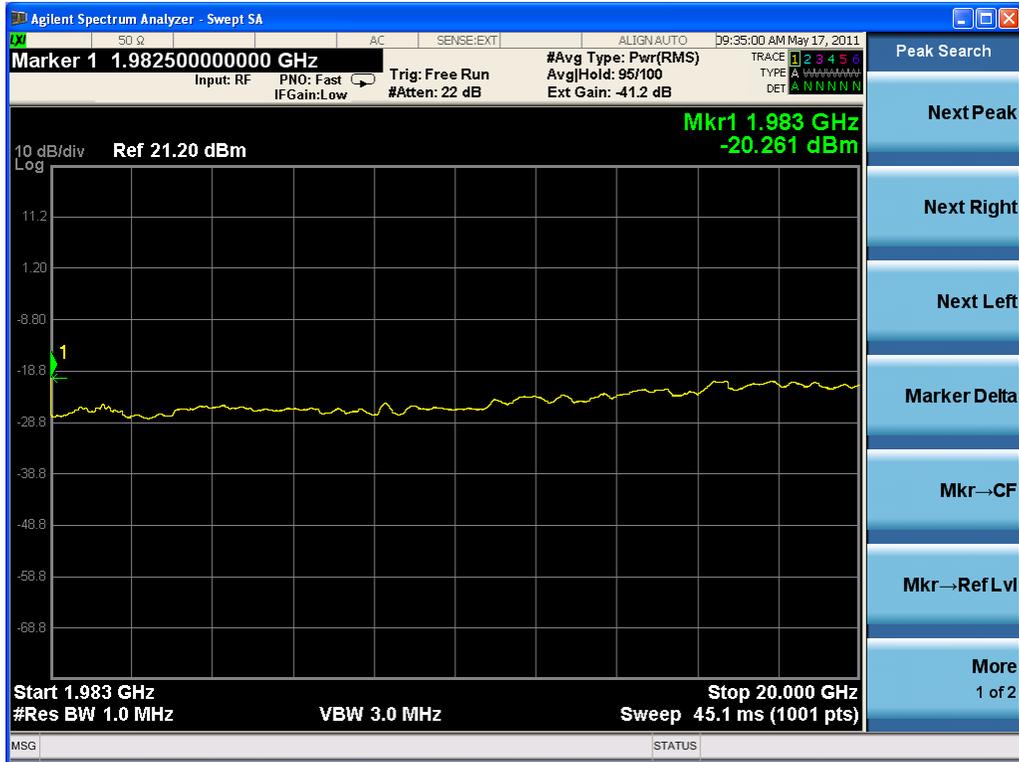


One carrier (working in middle frequency)

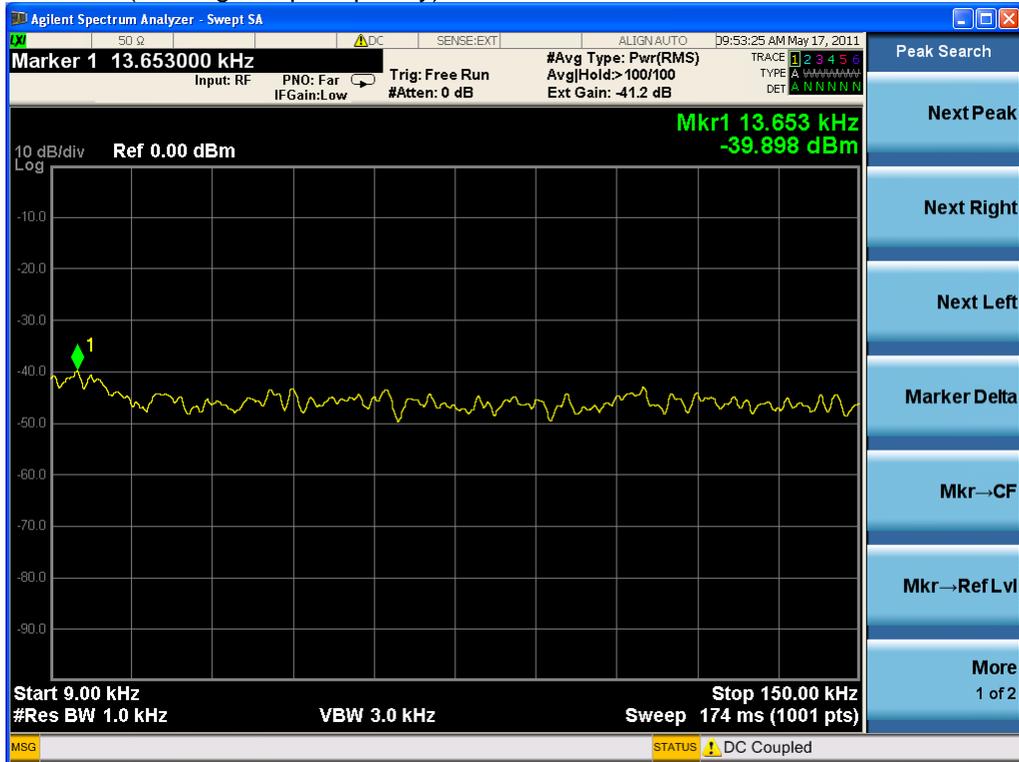


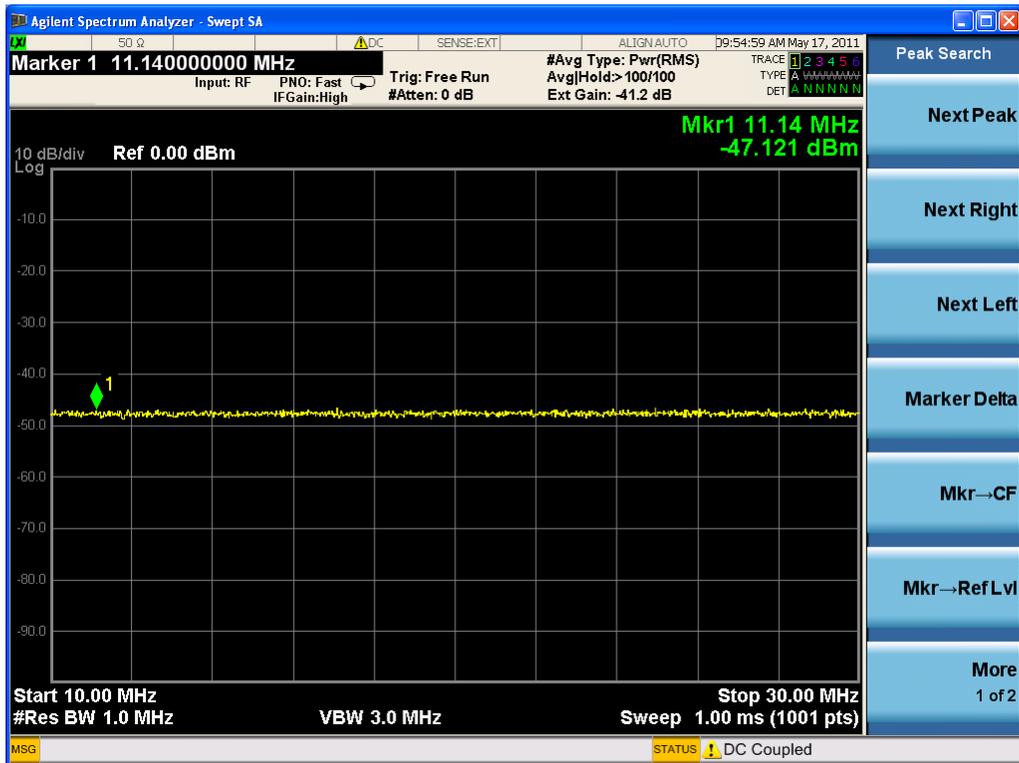
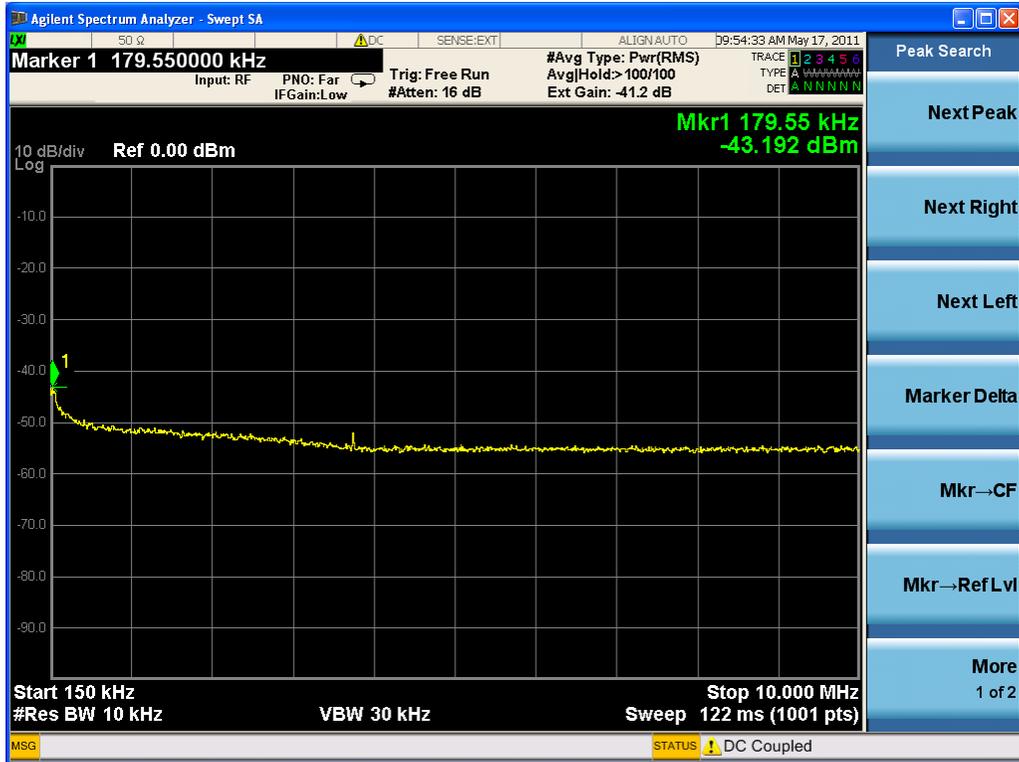


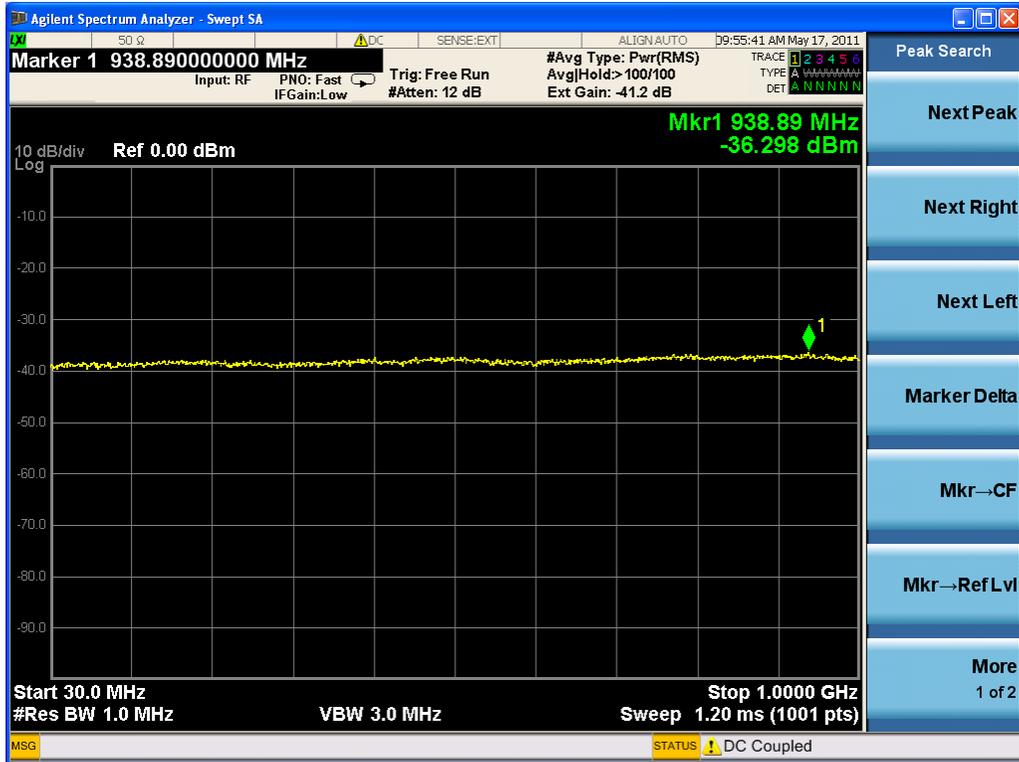




One carrier (working in top frequency)









## 3.6 OCCUPIED BANDWIDTH

**Applicable Standard:** FCC §2.1049 §24.229 §24.238

### Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
DST	DST100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

**\*statement of traceability:** ZTE Corporation Reliability Testing Center attest that all calibration have been performed per the NVLAP requirements , traceable to NIST.

### Test Procedure

The RF out of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. The resolution bandwidth of the spectrum analyzer was set at 1% of the span or higher and 99%Power bandwidth was recorded.

### Environmental Conditions

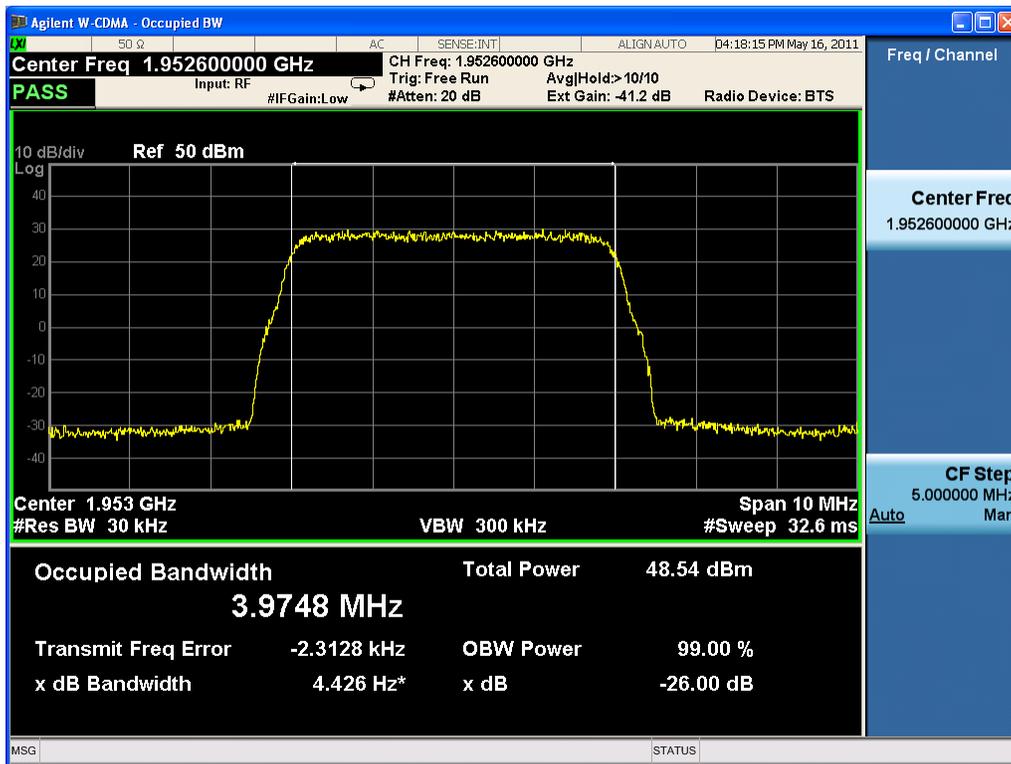
Temperature:	20 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

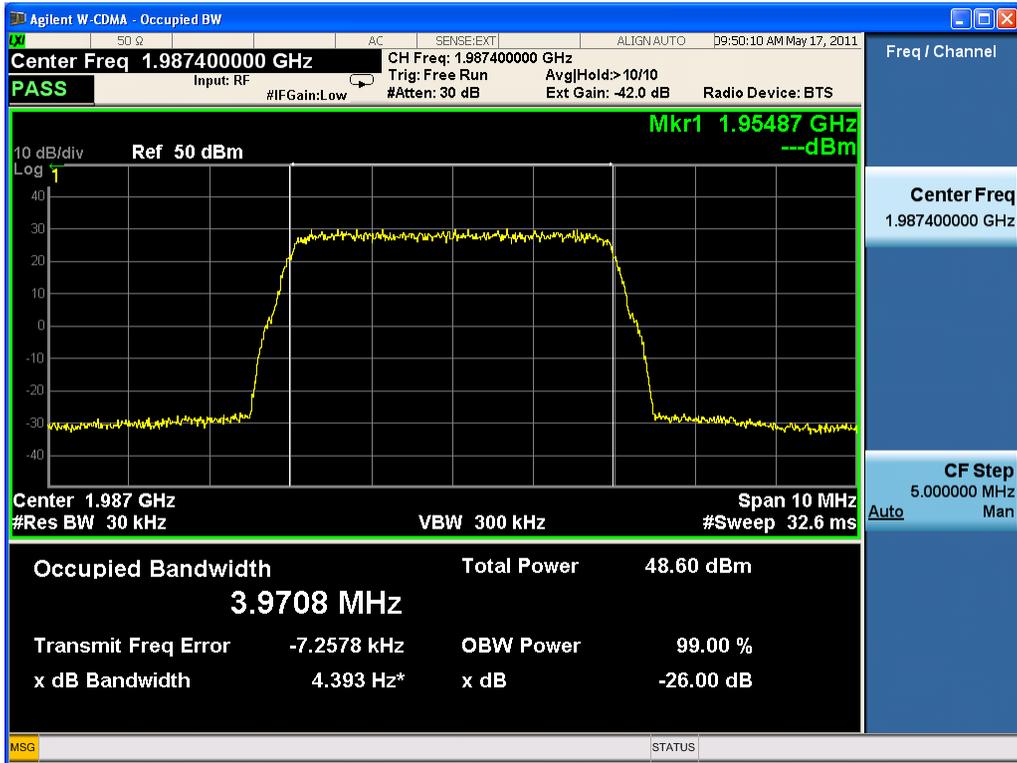
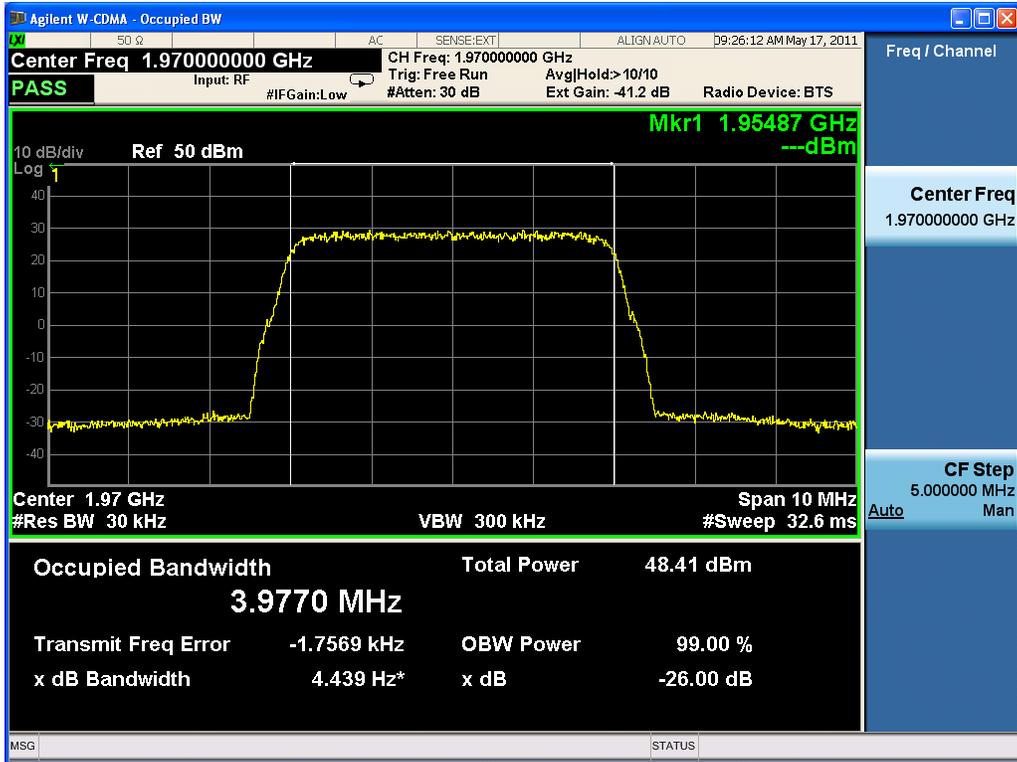
## Test Result: Pass

## Test Mode: Transmitting UMTS

## Test Data

Frequency (MHz)	99% Power Bandwidth (MHz)	Limit (MHz)
1952.6/1970/1987.4	3.9748/3.9770/3.9708	<4.2





## 3.7 BAND EDGES

### Applicable Standard: FCC §2.1051 §24.238

According to §2.1051 and §24.238, 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. The limit (dBm) should  $< P - (43 + 10 \log(P)) = -13 \text{dBm}$ .

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
DST	DST100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

**\*statement of traceability:** ZTE Corporation Reliability Testing Center attest that all calibration have been performed per the NVLAP requirements , traceable to NIST.

### Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.

### Test Data Environmental Conditions

Temperature:	20 °C
Relative Humidity:	53%
ATM Pressure:	1009mbar

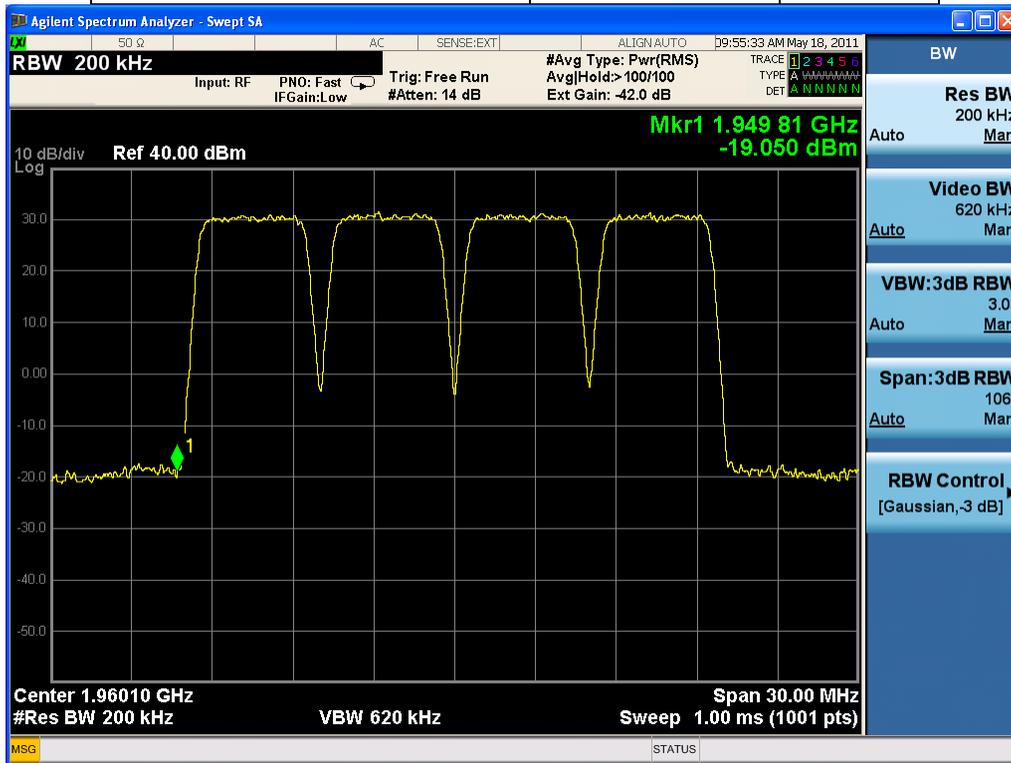
# Test Result: Pass

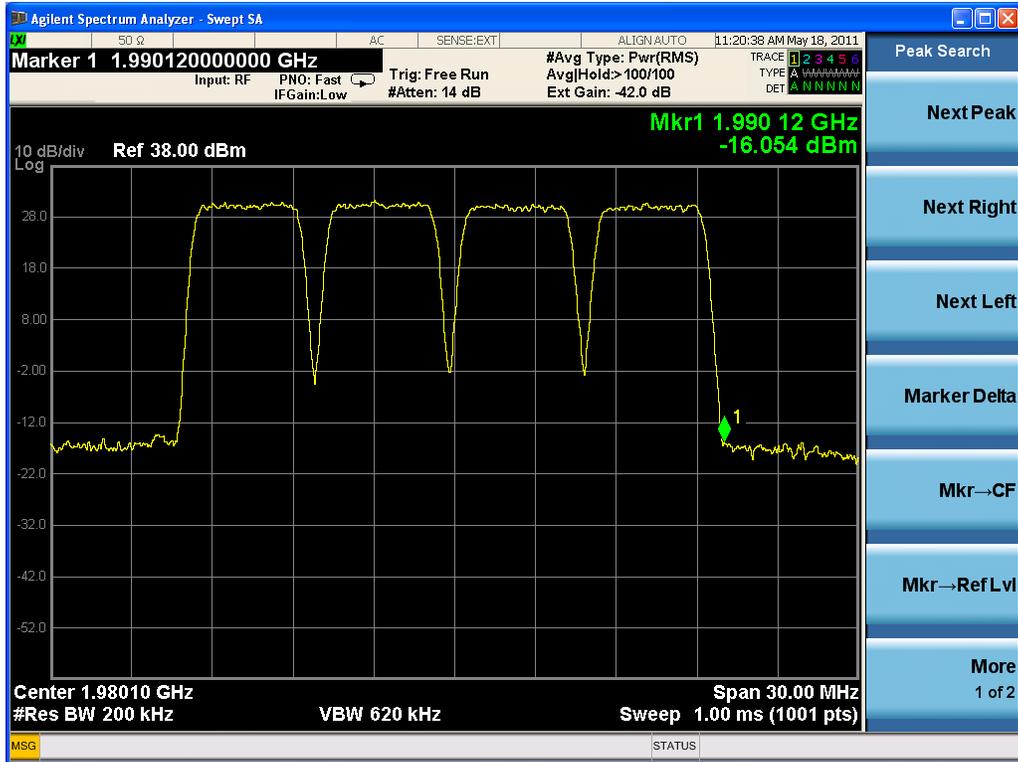
## Test Mode: Transmitting UMTS

## Test Data

Four carriers

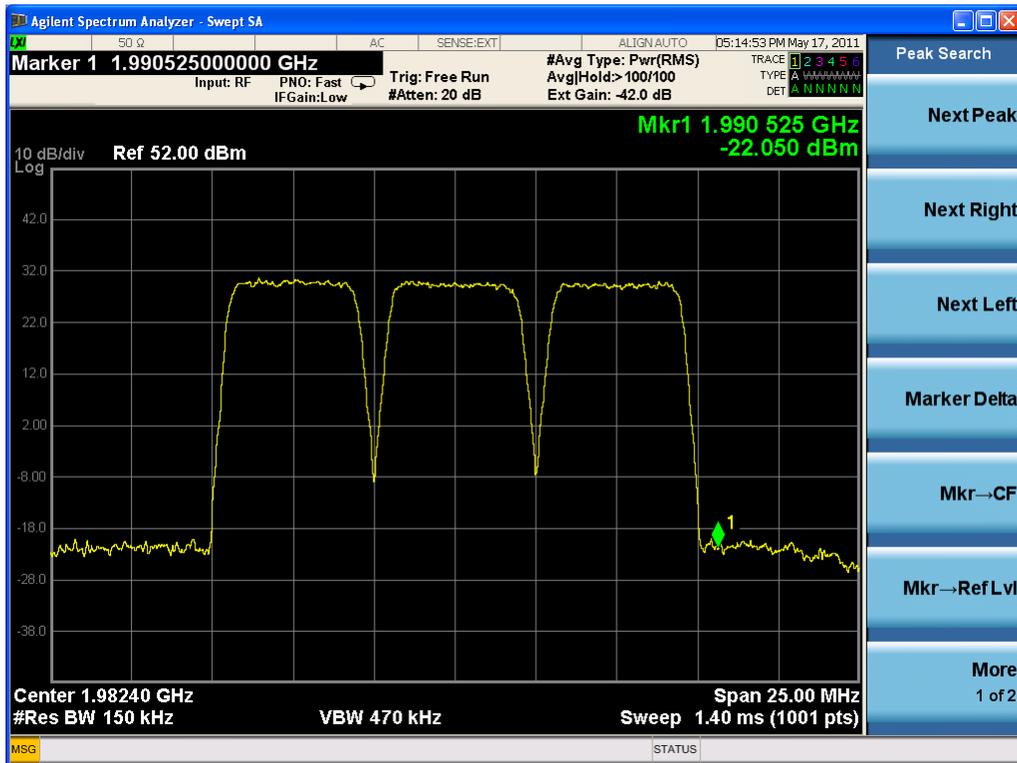
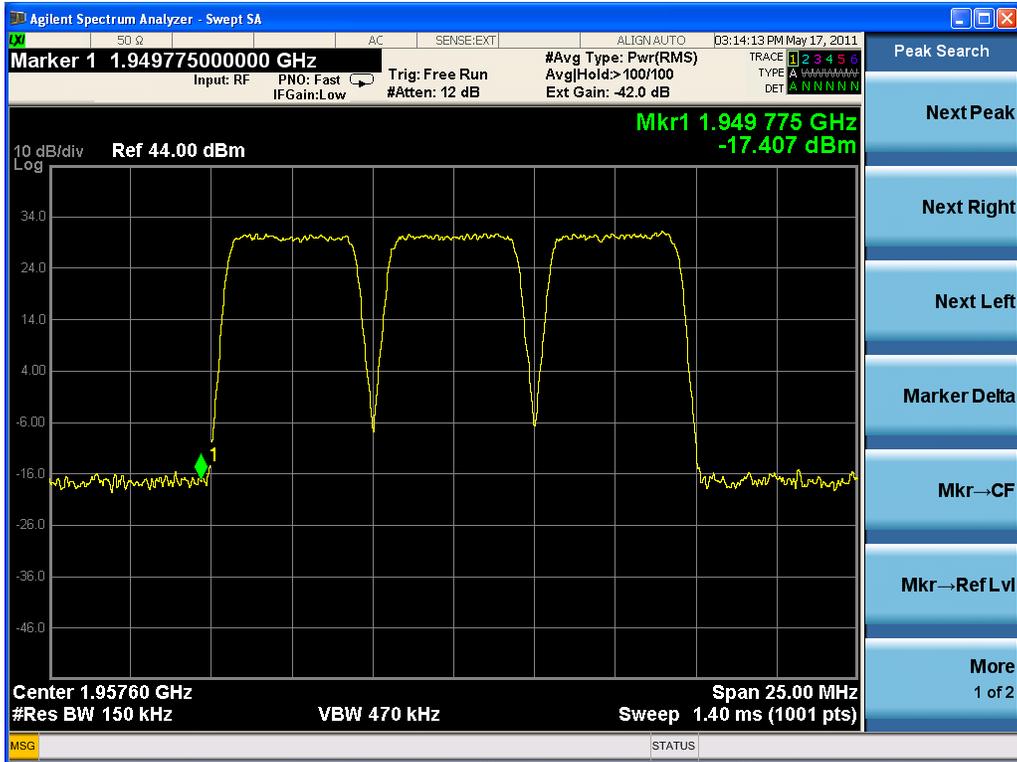
Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1952.6/1957.6/1962.6/1967.6	-19.050	-13.00
1972.4/1977.4/1982.4/1987.4	-16.054	-13.00





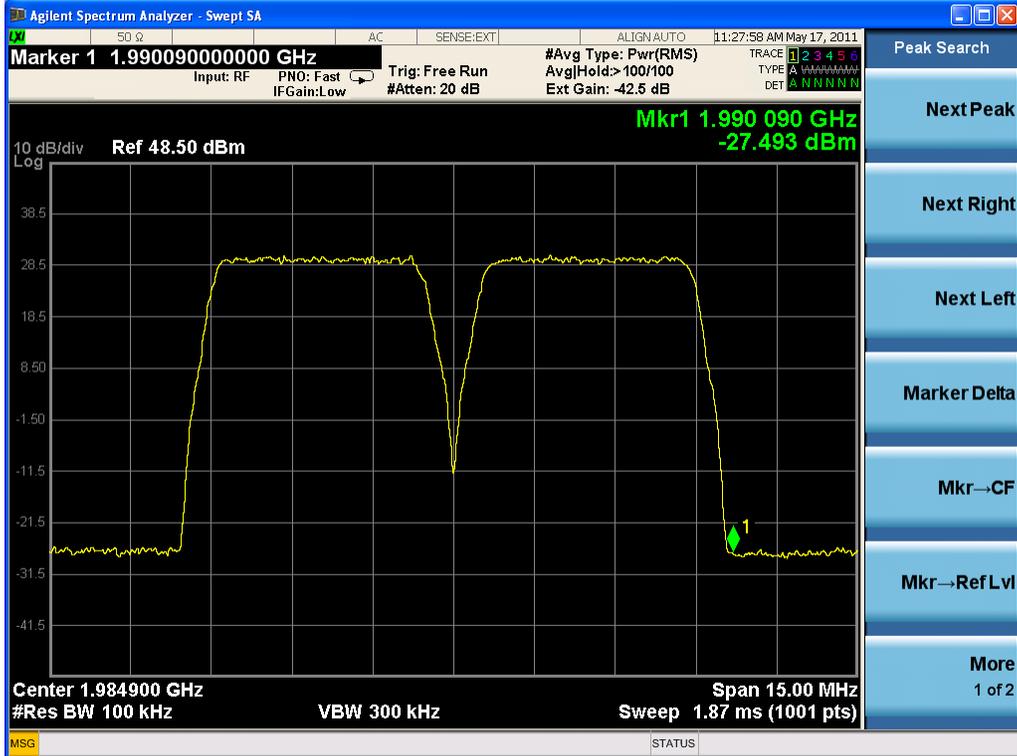
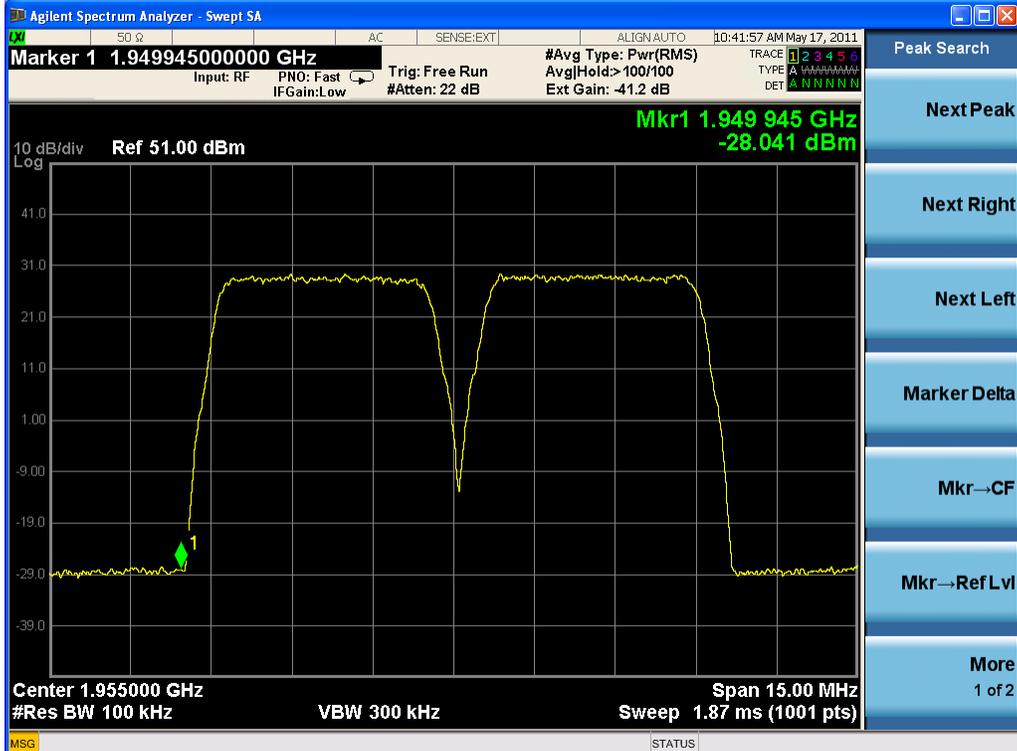
Three carriers

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1952.6/1957.6/1962.6	-17.407	-13.00
1977.4/1982.4/1987.4	-22.050	-13.00



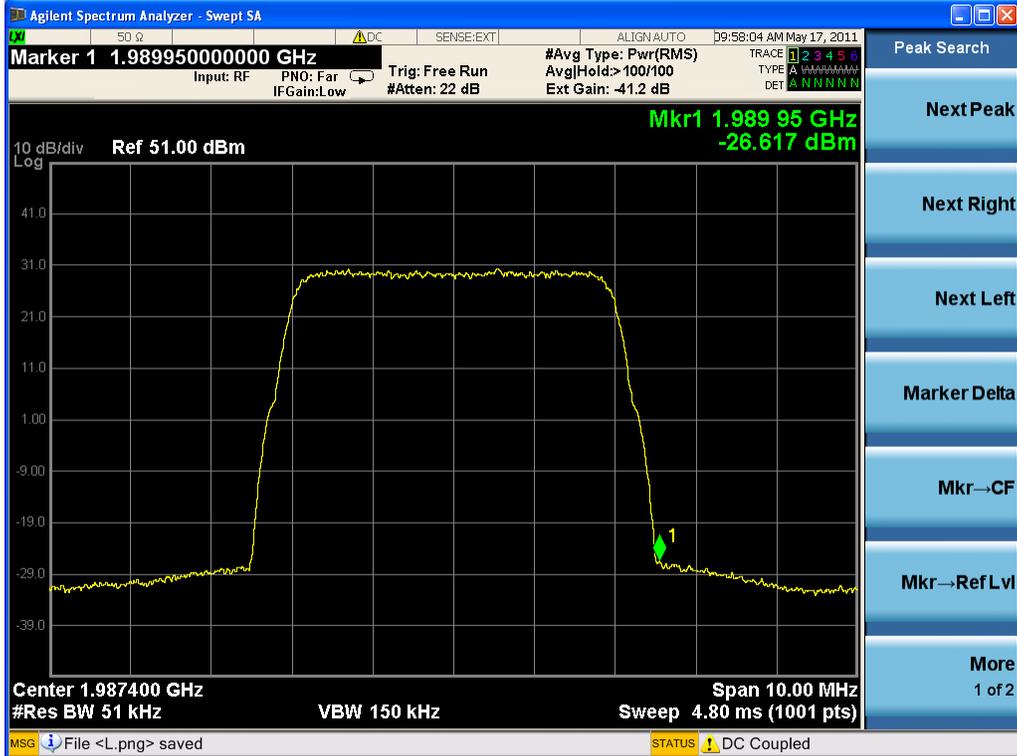
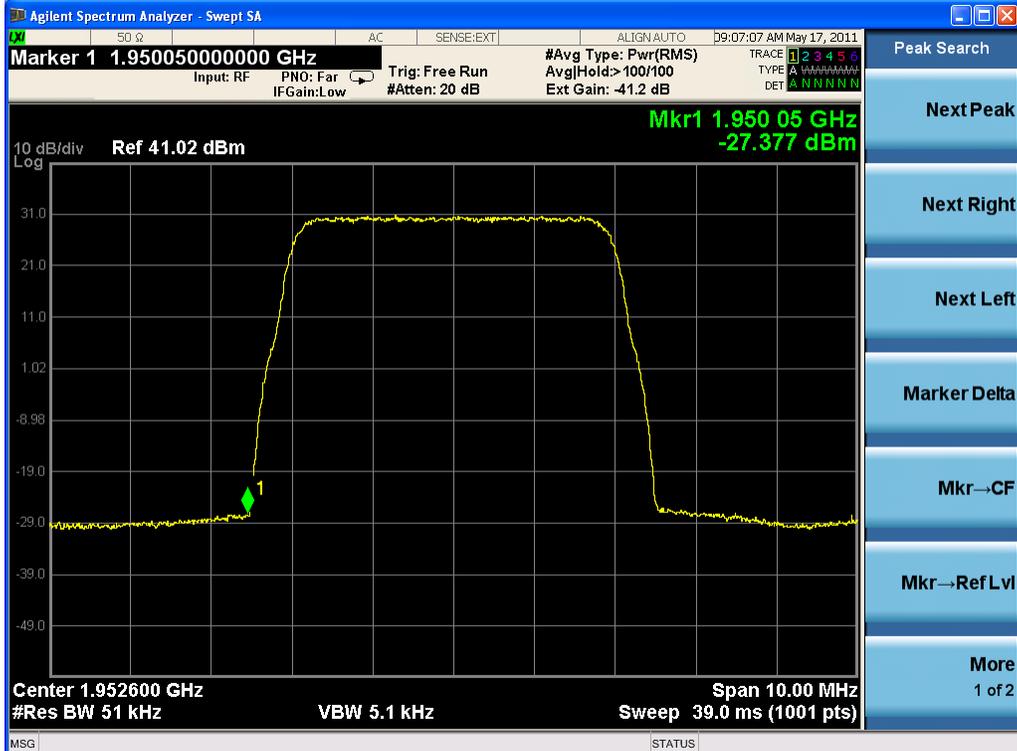
Two carriers

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1952.6/1957.6	-28.041	-13.00
1982.4/1987.4	-27.493	-13.00



One carrier

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1952.6	-27.377	-13.00
1987.4	-26.617	-13.00



## 3.8 FREQUENCY STABILITY

### Applicable Standard: FCC § 2.1055 § 24.235

Requirements: FCC § 2.1055 (a)(d) .The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
GZ-ESPEC	Temperature Chamber	EW0470	06113028	2011-1-26	2012-1-26
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
DST	DST100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

**\*statement of traceability:** ZTE Corporation Reliability Testing Center attest that all calibration have been performed per the NVLAP requirements , traceable to NIST.

### Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 150 minutes, the frequency output was recorded from the counter.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

### Environmental Conditions

Normal condition:	25° C
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Relative Humidity:	54%
ATM Pressure:	1011 mbar

**Test Result:** Pass

**Test Mode:** Transmitting UMTS

## Test Data

### Frequency Stability Versus Temperature

Frequency Stability vs. Temperature(1950-1990M)					
Temperature °C	Power Supplied VDC	Frequency Measure Error Hz	Error ppm	Limit ppm	Result
<b>B(1950.2MHz)</b>					
-40	-48	2.09	0.001	0.02	PASS
-30	-48	0.82	0.000	0.02	PASS
-20	-48	-11.2	-0.006	0.02	PASS
-10	-48	4.9	0.003	0.02	PASS
0	-48	-3.01	-0.002	0.02	PASS
10	-48	-3.95	-0.002	0.02	PASS
20	-48	2.92	0.001	0.02	PASS
30	-48	-2.47	-0.001	0.02	PASS
40	-48	2.06	0.001	0.02	PASS
50	-48	3.13	0.002	0.02	PASS
55	-48	-4.24	-0.002	0.02	PASS
<b>M(1970MHz)</b>					
-40	-48	3.90	0.002	0.02	PASS
-30	-48	4.32	0.002	0.02	PASS
-20	-48	2.69	0.001	0.02	PASS
-10	-48	-3.26	-0.002	0.02	PASS
0	-48	-2.66	-0.001	0.02	PASS
10	-48	-4.70	-0.002	0.02	PASS

20	-48	-2.44	-0.001	0.02	PASS
30	-48	-3.07	-0.002	0.02	PASS
40	-48	-4.19	-0.002	0.02	PASS
50	-48	3.30	0.002	0.02	PASS
55	-48	-3.49	-0.002	0.02	PASS
<b>T(1987.4MHz)</b>					
-40	-48	-4.86	-0.002	0.02	PASS
-30	-48	2.28	0.001	0.02	PASS
-20	-48	-4.14	-0.002	0.02	PASS
-10	-48	-2.69	-0.001	0.02	PASS
0	-48	-3.78	-0.002	0.02	PASS
10	-48	-4.15	-0.002	0.02	PASS
20	-48	3.32	0.002	0.02	PASS
30	-48	-3.97	-0.002	0.02	PASS
40	-48	-4.02	-0.002	0.02	PASS
50	-48	2.20	0.001	0.02	PASS
55	-48	-1.82	-0.001	0.02	PASS

## Frequency Stability Versus Voltage

<b>Frequency Stability vs. Voltage (1950-1990M)</b>					
<b>B(1950.2M)</b>					
<b>Voltage Vac</b>	<b>Temperature</b>	<b>Frequency Measure Error Hz</b>	<b>Error ppm</b>	<b>Limit ppm</b>	<b>Result</b>
-37	20	-8.00	-0.004	0.02	PASS
-39	20	-9.12	-0.005	0.02	PASS
-41	20	8.49	0.004	0.02	PASS
-43	20	6.35	0.003	0.02	PASS
-45	20	-8.03	-0.004	0.02	PASS
-47	20	8.12	0.004	0.02	PASS
-49	20	-9.10	-0.005	0.02	PASS
-51	20	-6.43	-0.003	0.02	PASS
-53	20	0.21	0.000	0.02	PASS
-55	20	5.37	0.003	0.02	PASS
-57	20	-7.62	-0.004	0.02	PASS
-59	20	-3.00	-0.002	0.02	PASS
-61	20	-5.72	-0.003	0.02	PASS
-62	20	-8.75	-0.004	0.02	PASS
<b>T(1970M)</b>					
-37	20	-8.14	-0.004	0.02	PASS
-39	20	-6.49	-0.003	0.02	PASS
-41	20	-7.81	-0.004	0.02	PASS
-43	20	-5.59	-0.003	0.02	PASS
-45	20	-5.72	-0.003	0.02	PASS
-47	20	-11.29	-0.006	0.02	PASS
-49	20	8.69	0.004	0.02	PASS
-51	20	-8.22	-0.004	0.02	PASS
-53	20	-5.76	-0.003	0.02	PASS
-55	20	-5.49	-0.003	0.02	PASS
-57	20	-9.14	-0.005	0.02	PASS
-59	20	-5.77	-0.003	0.02	PASS
-61	20	-10.73	-0.005	0.02	PASS
-62	20	9.06	0.005	0.02	PASS
<b>T(1987.4M)</b>					
-37	20	-9.12	-0.005	0.02	PASS
-39	20	-5.33	-0.003	0.02	PASS
-41	20	-8.5	-0.004	0.02	PASS
-43	20	-8.65	-0.004	0.02	PASS
-45	20	-11.73	-0.006	0.02	PASS

-47	20	-6.3	-0.003	0.02	PASS
-49	20	-3.64	-0.002	0.02	PASS
-51	20	7.03	0.004	0.02	PASS
-53	20	5.74	0.003	0.02	PASS
-55	20	-10.63	-0.005	0.02	PASS
-57	20	-6.91	-0.003	0.02	PASS
-59	20	-9.26	-0.005	0.02	PASS
-61	20	-7.9	-0.004	0.02	PASS
-62	20	11.9	0.006	0.02	PASS

## 4 GSM OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046 §24.232	Transmitter output Power	Compliant
§2.1091 §1.1037	RF Exposure	Compliant
§2.1047	Modulation Characteristic	Compliant
§2.1053	Spurious Radiated Emissions	Compliant
§2.1051, §24.238	Spurious Emissions AT Antenna Terminals	Compliant
§2.1049 §24.229 §24.238	Occupied Bandwidth	Compliant
§2.1051, §24.238	Band Edge	Compliant
§ 2.1055 § 24.235	Frequency stability	Compliant

# 4.1 TRANSMITTER OUTPUT POWER

## Applicable Standard: FCC §2.1046 §24.232

According to FCC §2.1046 & 24.232, the EIRP (equivalent isotropically radiated power) must not exceed 1640 Watts.

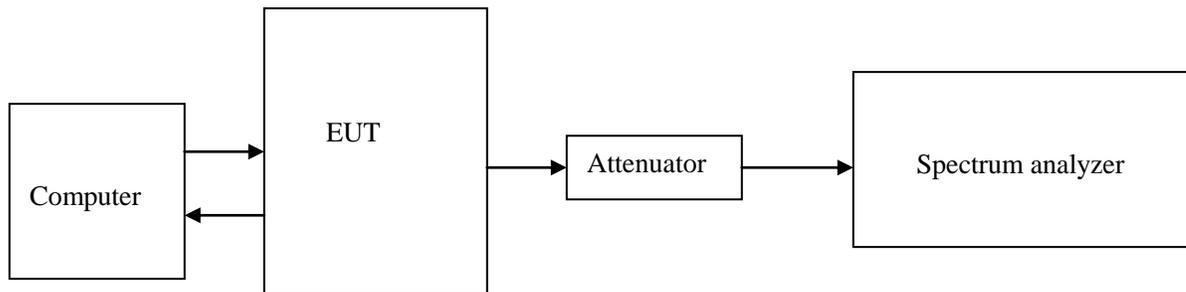
According to RSS-133, SRSP 510 5.1.1 the EIRP (equivalent isotropically radiated power) must not exceed 3280Watts/MHz for base station transmitters operating in the band of 1930 MHz to 1995MHz with the antenna height above average terrain up to 300 meters. If used in urban area, the limit should be 1640Watts/MHz.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
DTS	DTS100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

**\*statement of traceability:** ZTE Corporation Reliability Testing Center attest that all calibration have been performed per the NVLAP requirements, traceable to NIST.

## Test Procedure



The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. External attenuation Loss is 40dB, Cable Loss is about 3dB

## Environmental Conditions

Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

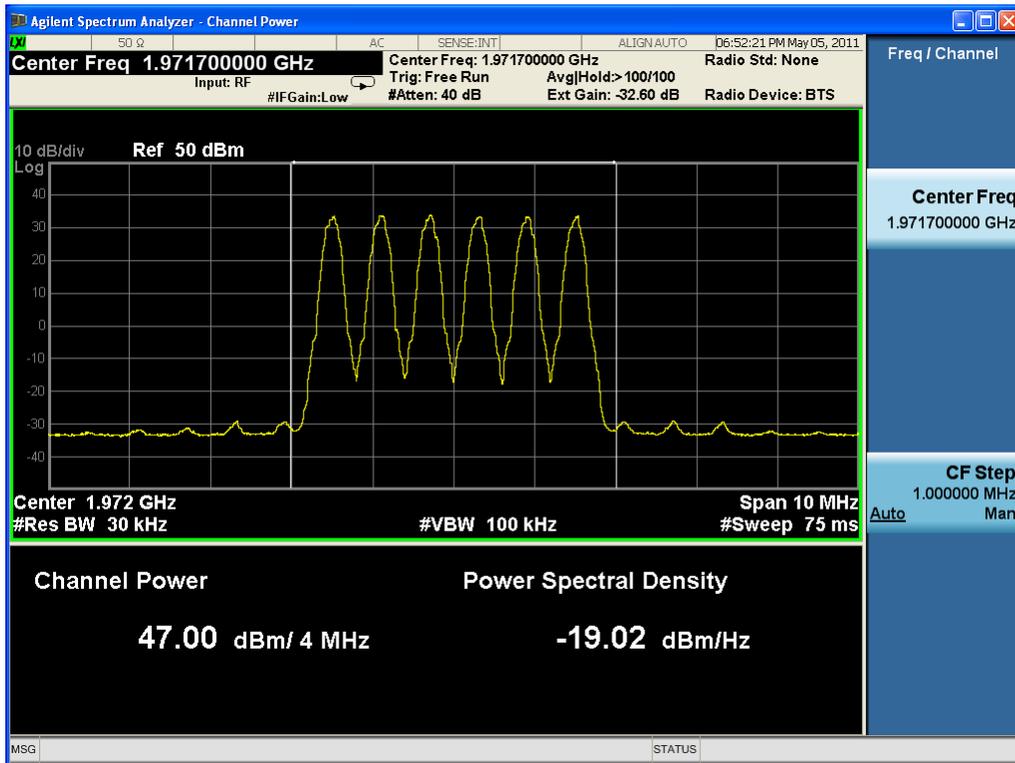
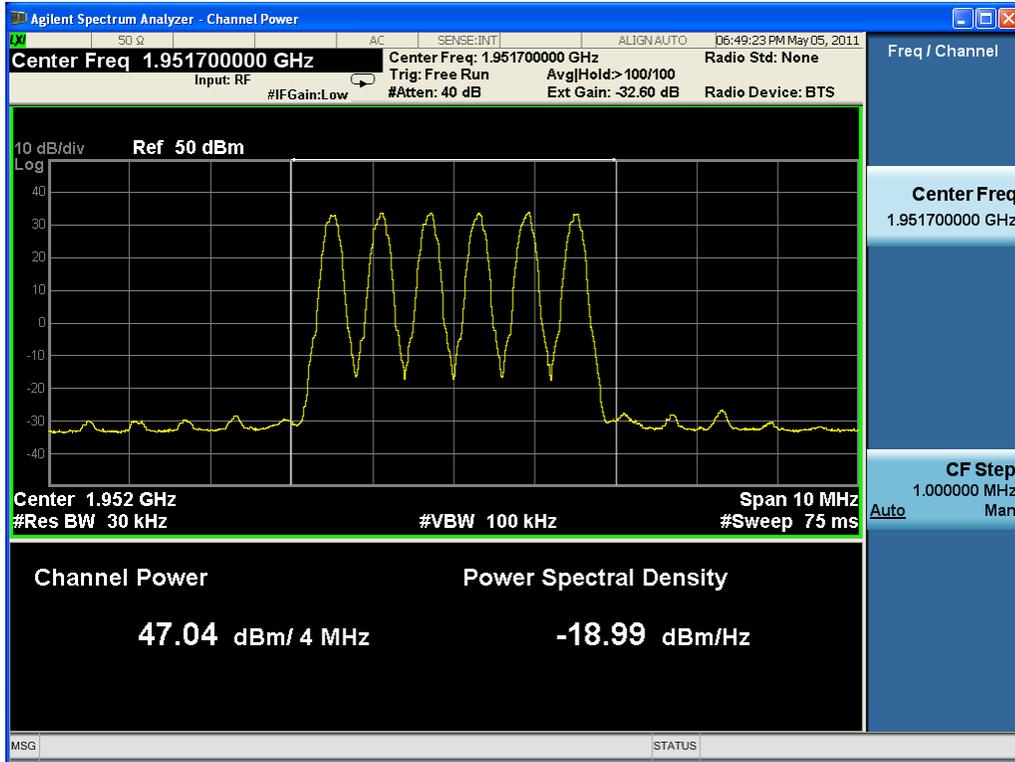
**Test Result:** Pass

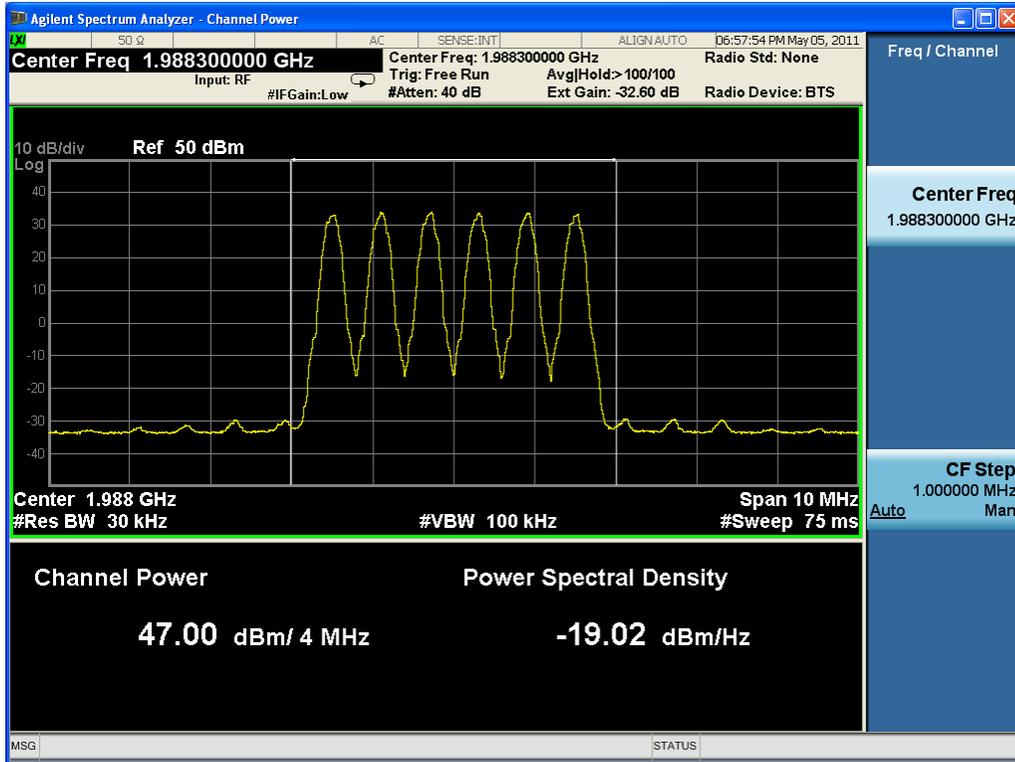
**Test Mode:** Transmitting GSM

## Test Data:

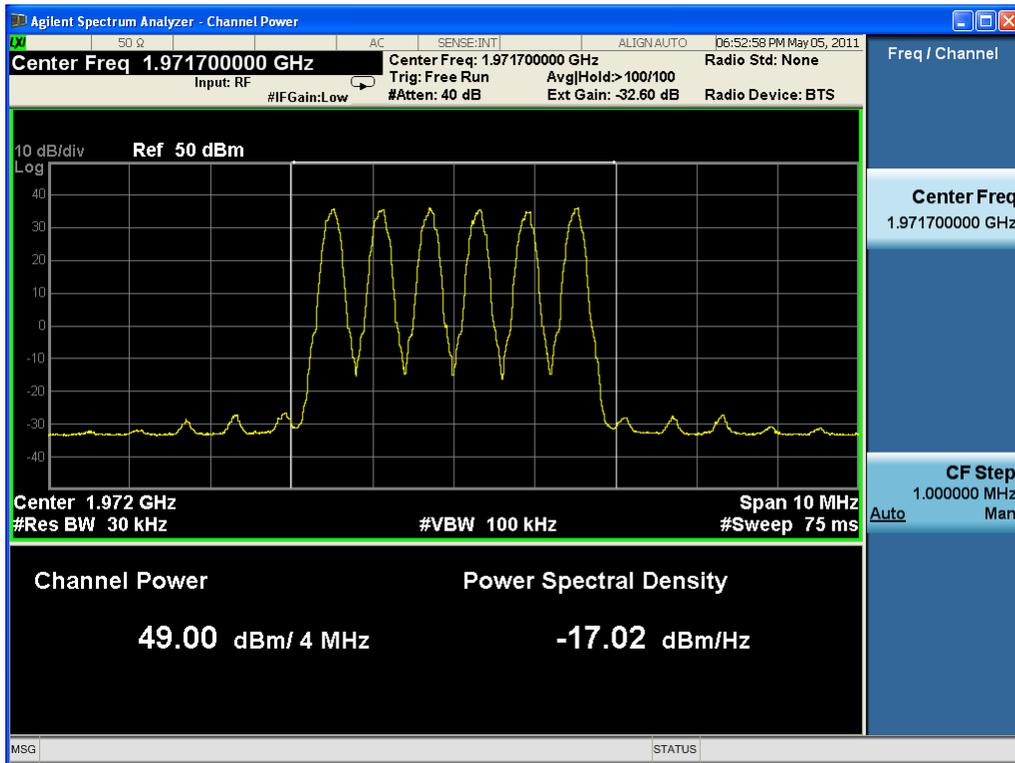
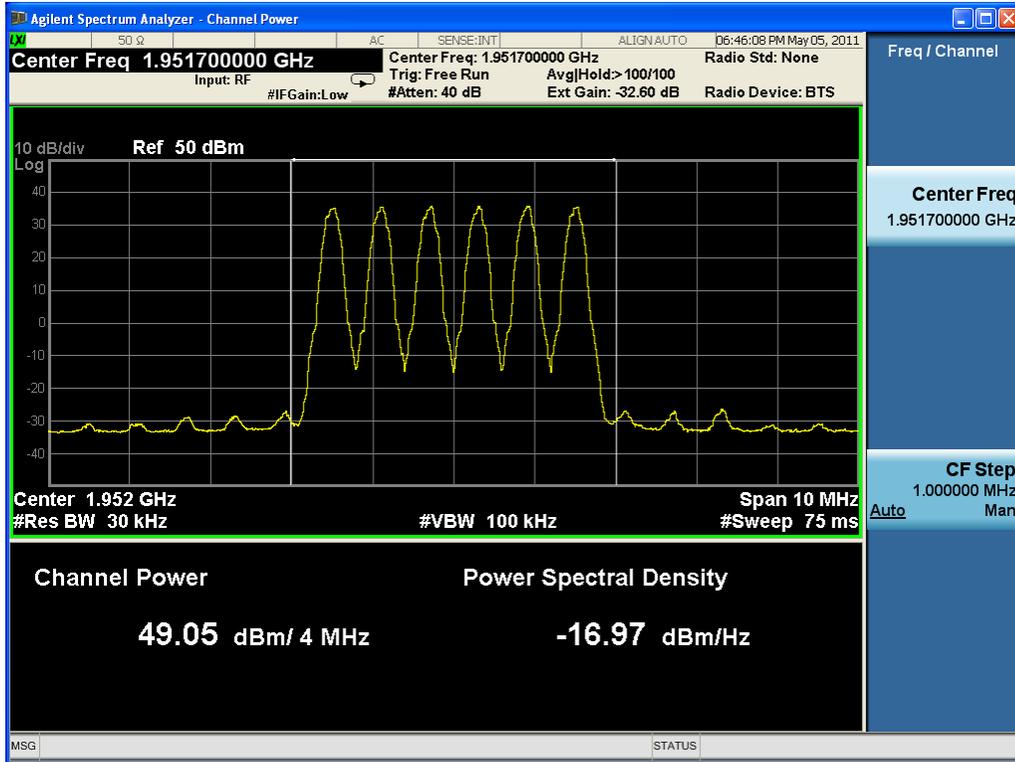
### Six carriers

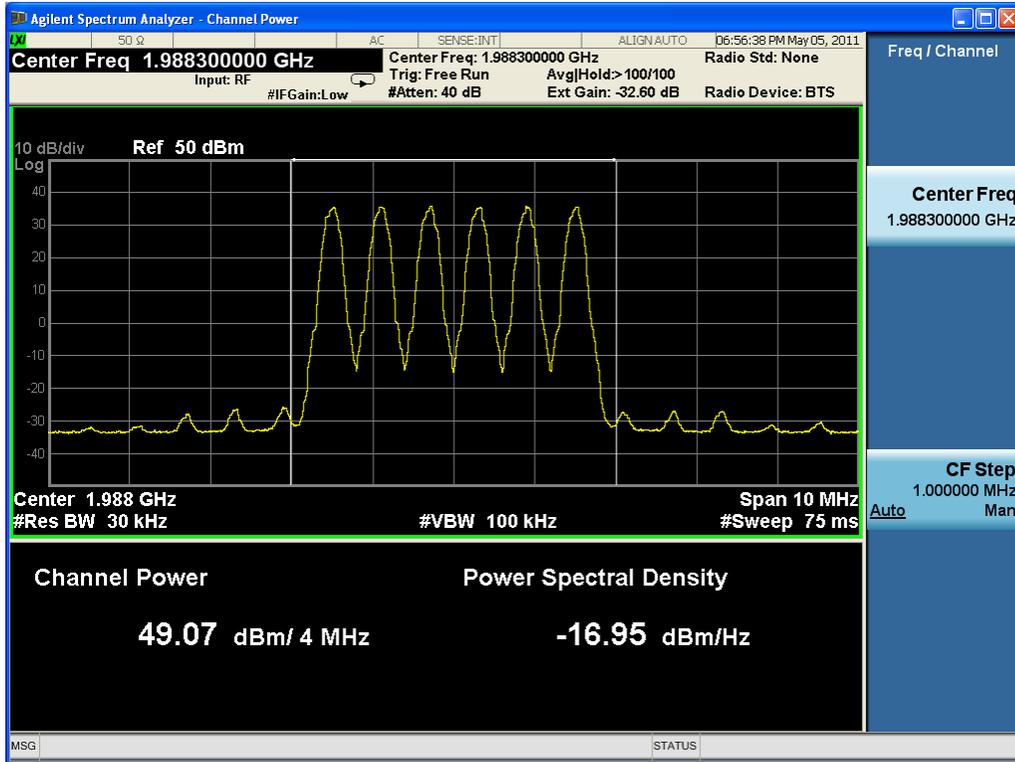
Modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
8PSK	1951.7	1950.2/1950.8/1951.4/1952/1952.6/1953.2	47.04
	1971.7	1970.2/1970.8/1971.4/1972/1972.6/1973.2	47.00
	1988.3	1986.8/1987.4/1988/1988.6/1989.2/1989.8	47.00





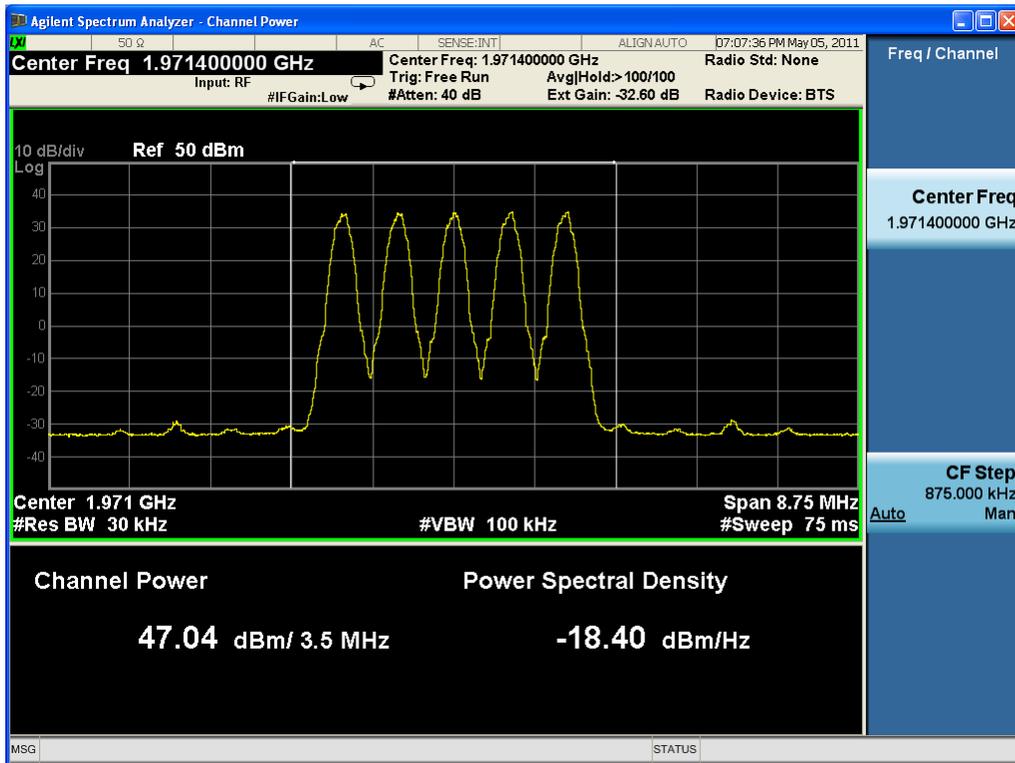
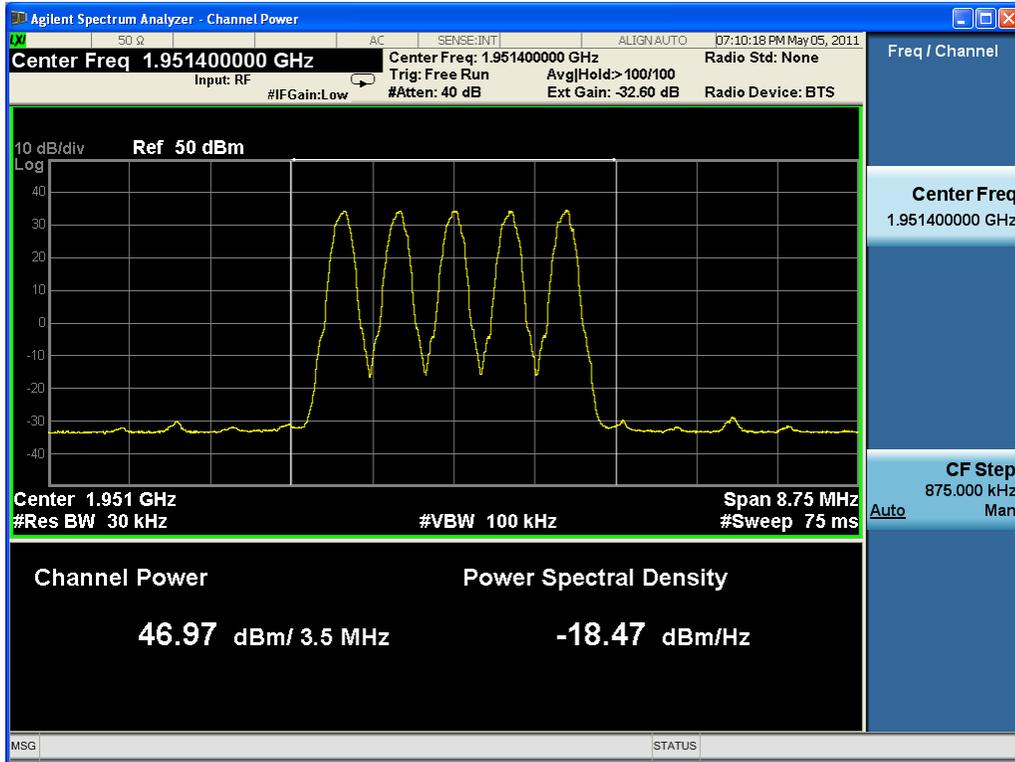
Modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
GMSK	1951.7	1950.2/1950.8/1951.4/1952/1952.6/1953.2	49.05
	1971.7	1970.2/1970.8/1971.4/1972/1972.6/1973.2	48.00
	1988.3	1986.8/1987.4/1988/1988.6/1989.2/1989.8	49.07

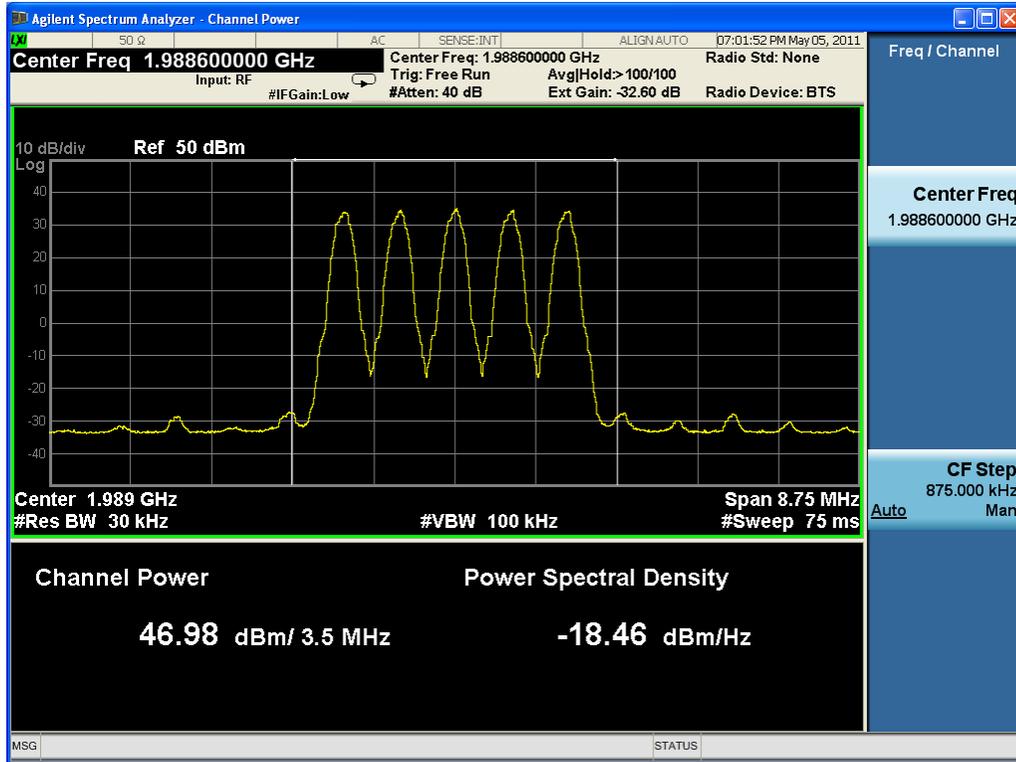




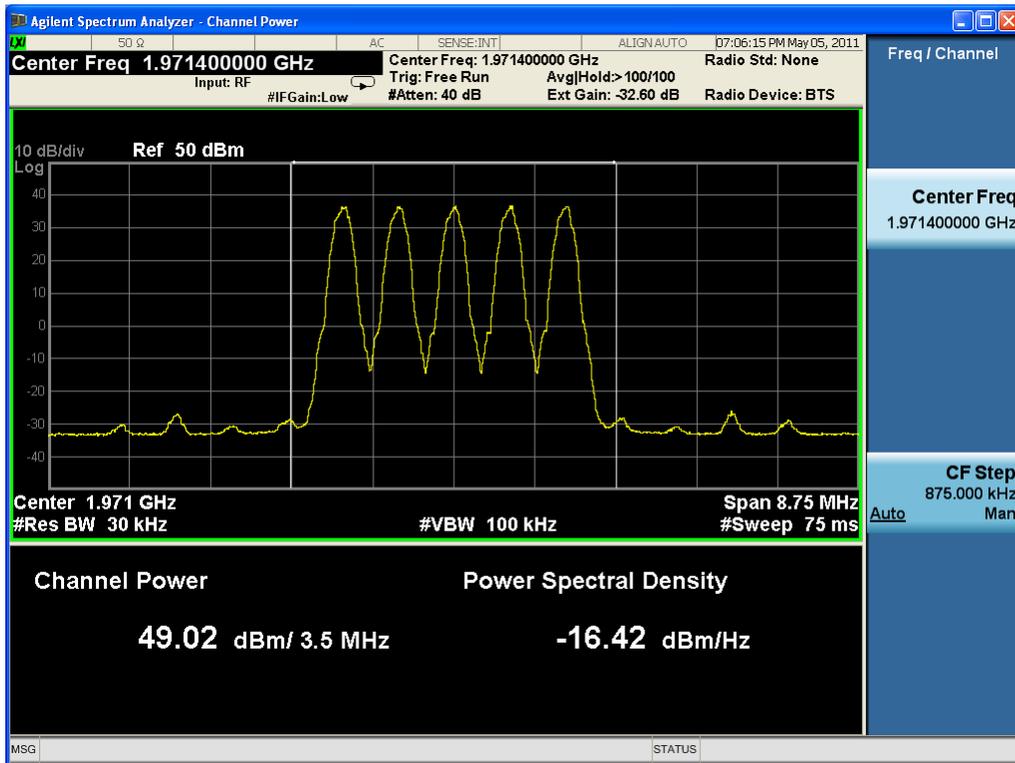
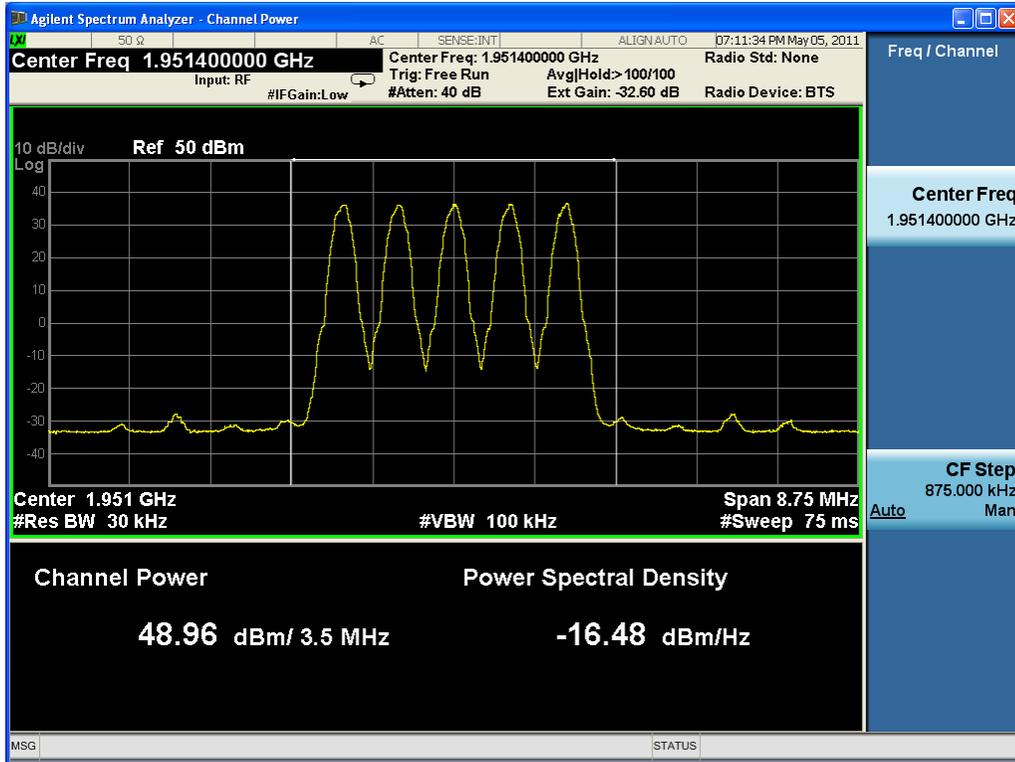
**Five carriers**

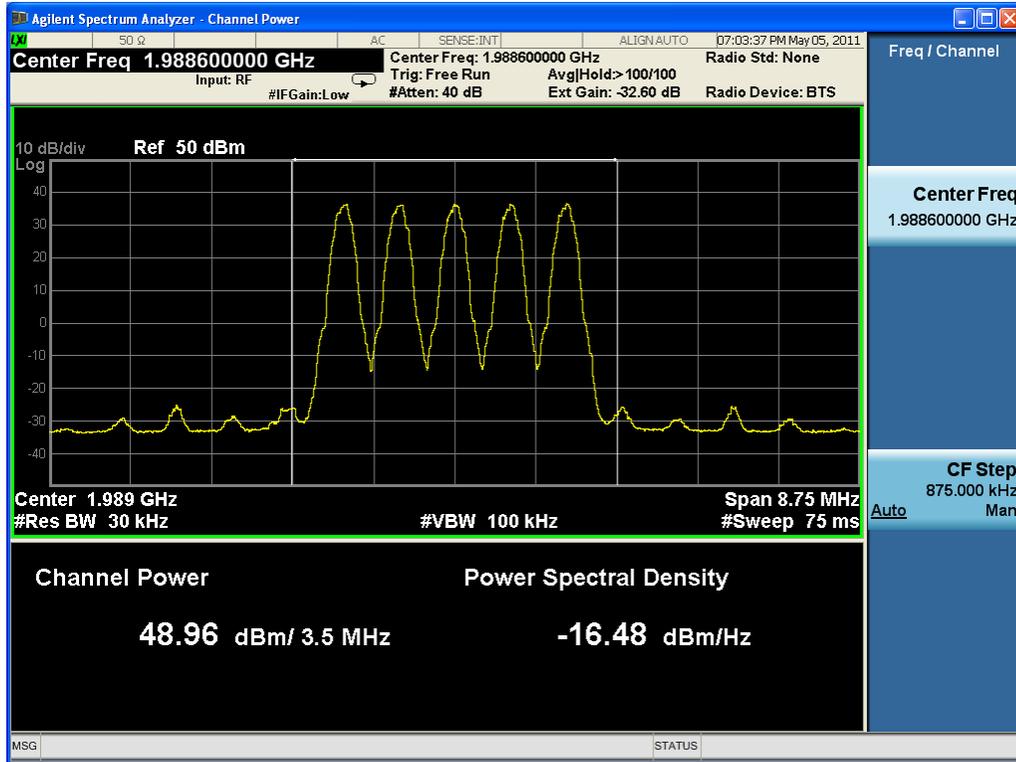
Modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
8PSK	1951.4	1950.2/1950.8/1951.4/1952/1952.6	46.97
	1971.4	1970.2/1970.8/1971.4/1972/1972.6	47.04
	1988.6	1987.4/1988/1988.6/1989.2/1989.8	46.98





Modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
GMSK	1951.4	1950.2/1950.8/1951.4/1952/1952.6	48.96
	1971.4	1970.2/1970.8/1971.4/1972/1972.6	49.02
	1988.6	1987.4/1988/1988.6/1989.2/1989.8	48.96





**Four carriers**

Modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
8PSK	1951.1	1950.2/1950.8/1951.4/1952	46.98
	1971.1	1970.2/1970.8/1971.4/1972	46.99
	1988.9	1988/1988.6/1989.2/1989.8	47.01

