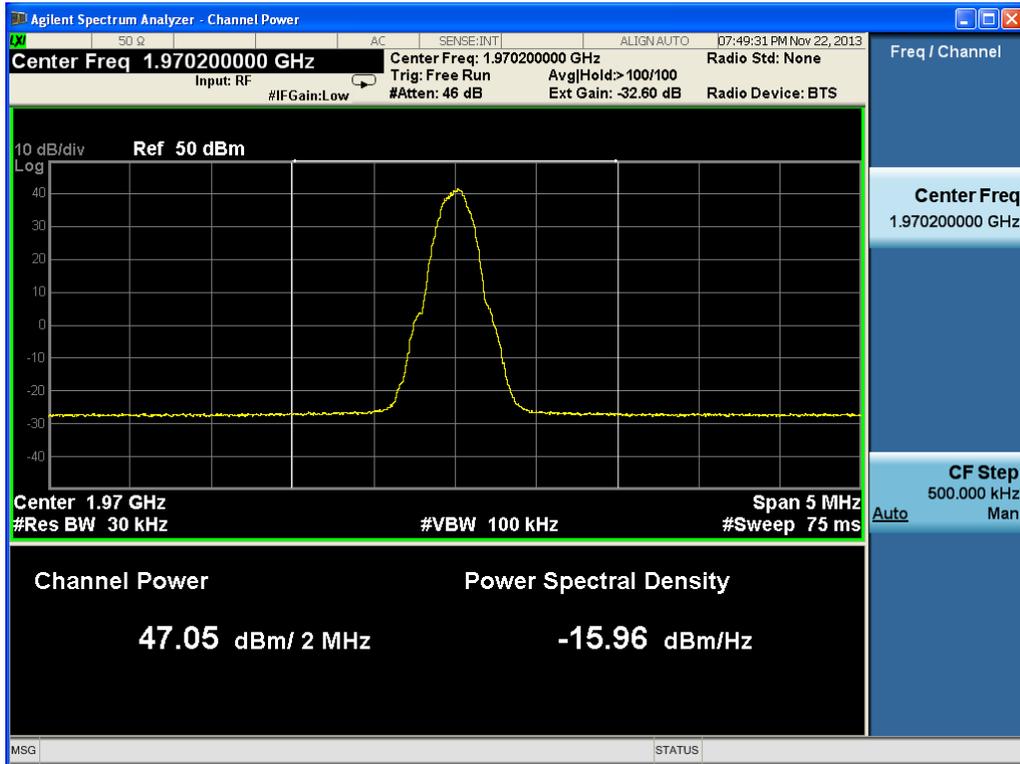
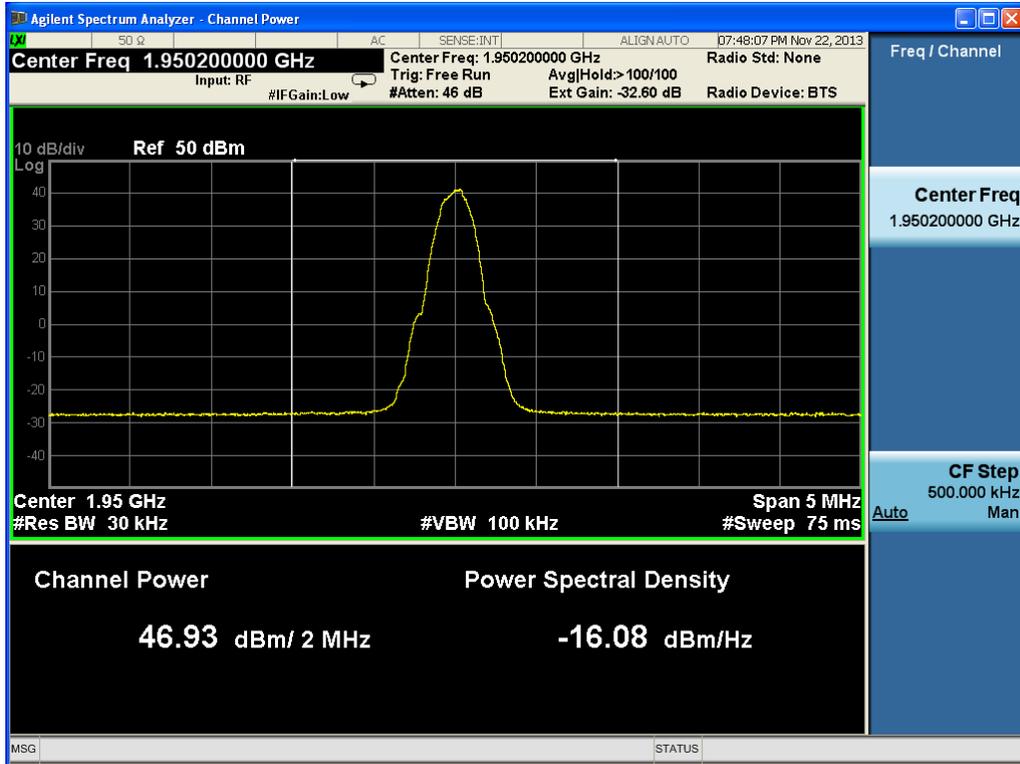
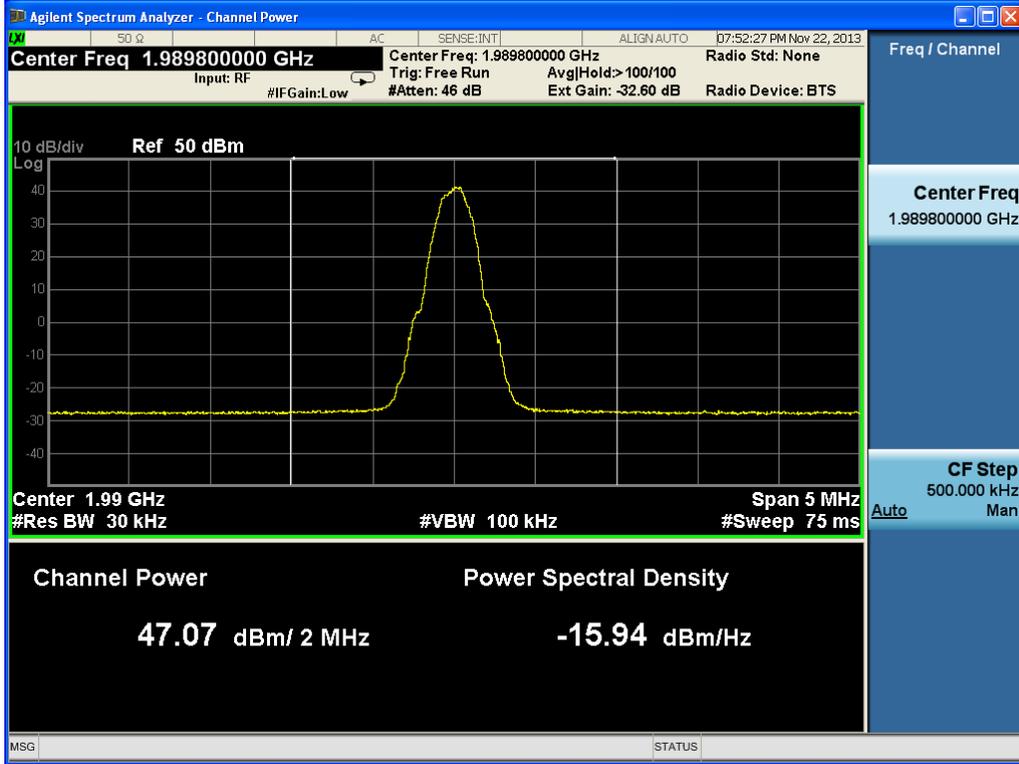


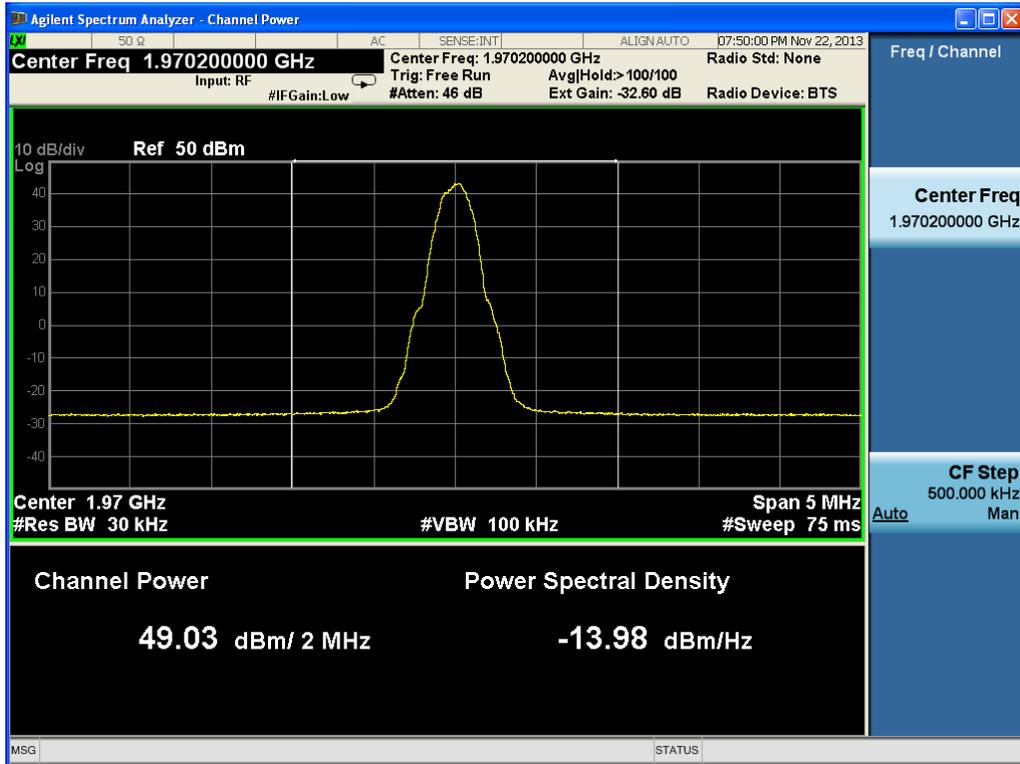
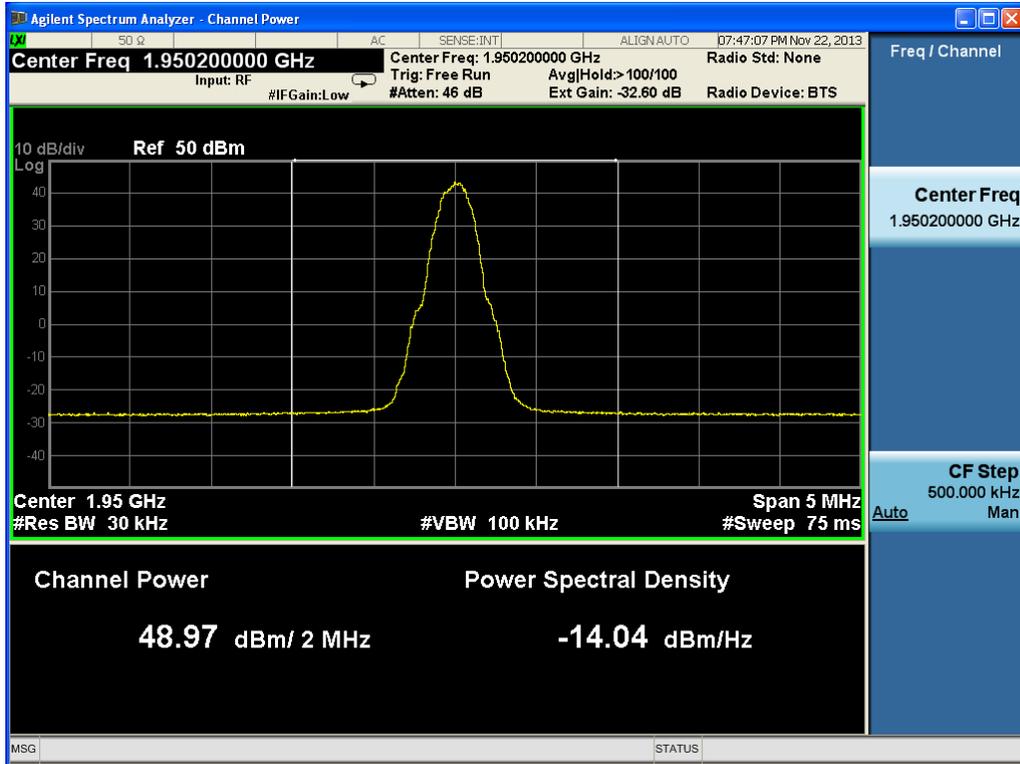
**One carrier**

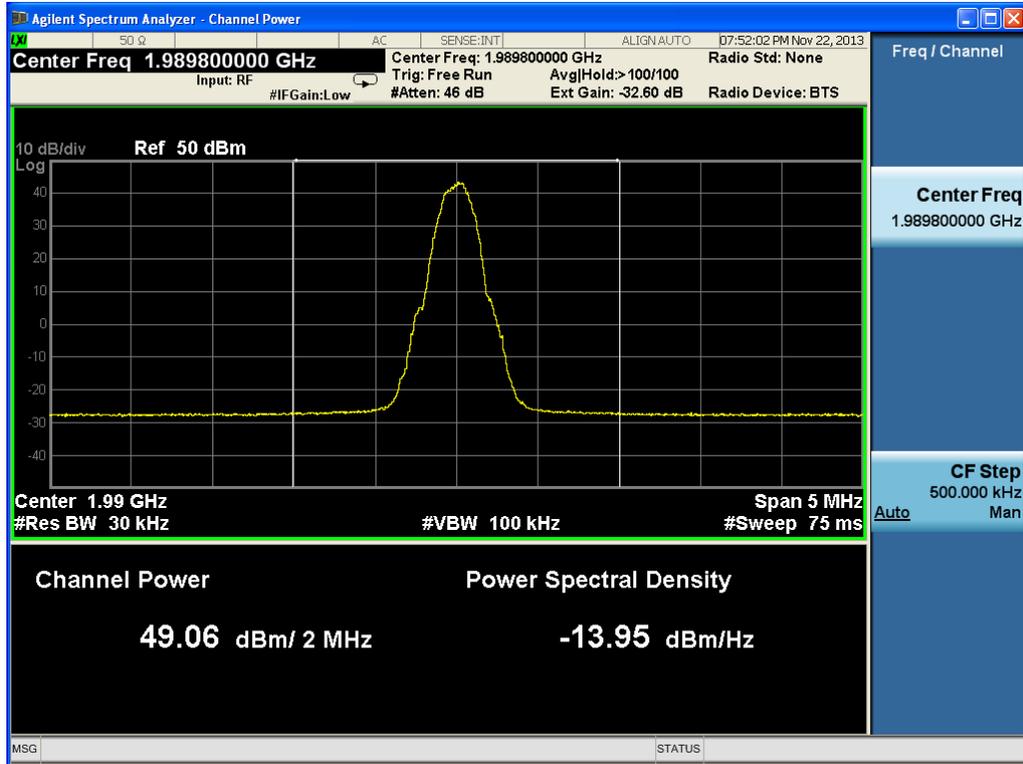
modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
8PSK	1950.2	1950.2	46.93
	1970.2	1970.2	47.05
	1989.8	1989.8	47.07





modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
GMSK	1950.2	1950.2	48.97
	1970.2	1970.2	49.03
	1989.8	1989.8	49.06





## 4.2 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

$$S = \text{EIRP} / 4\pi R^2$$

Where: S = power density

EIRP= equivalent isotropically radiated power=ERP+2.15dB

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

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

Frequency is between 1500MHz and 100000MHz, and the Maximum S=1.0mW/cm<sup>2</sup>  
R=3.61m.

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

**Test Result:** pass

## 4.3 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	2014-4-9	2015-4-8
Atten	30dB Attenuator	ATSI150-4-30	11300110201221	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-9	2015-4-8

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

### Test Procedure

GSM digital mode is used by EUT.

### Test Data Environmental Conditions

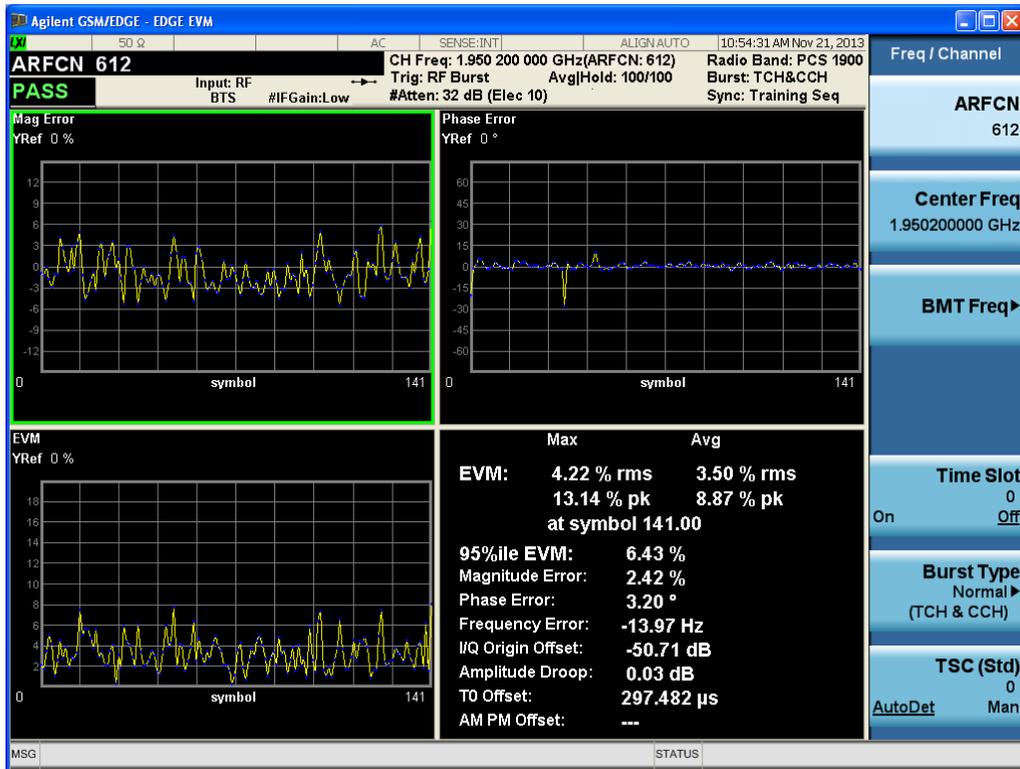
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

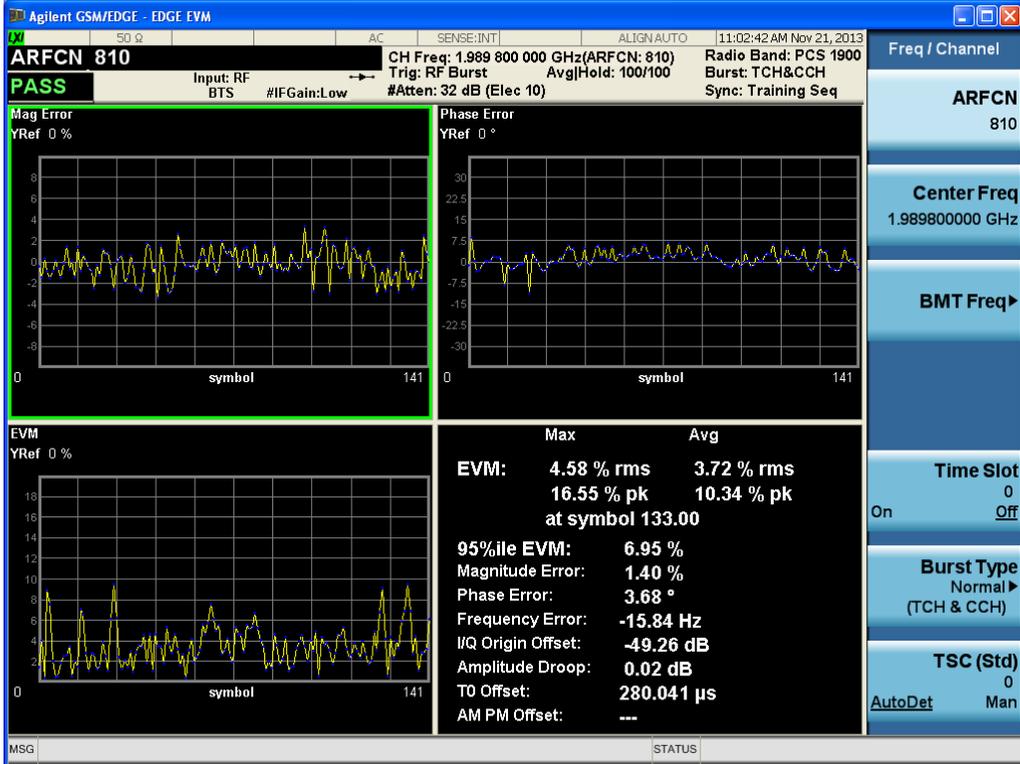
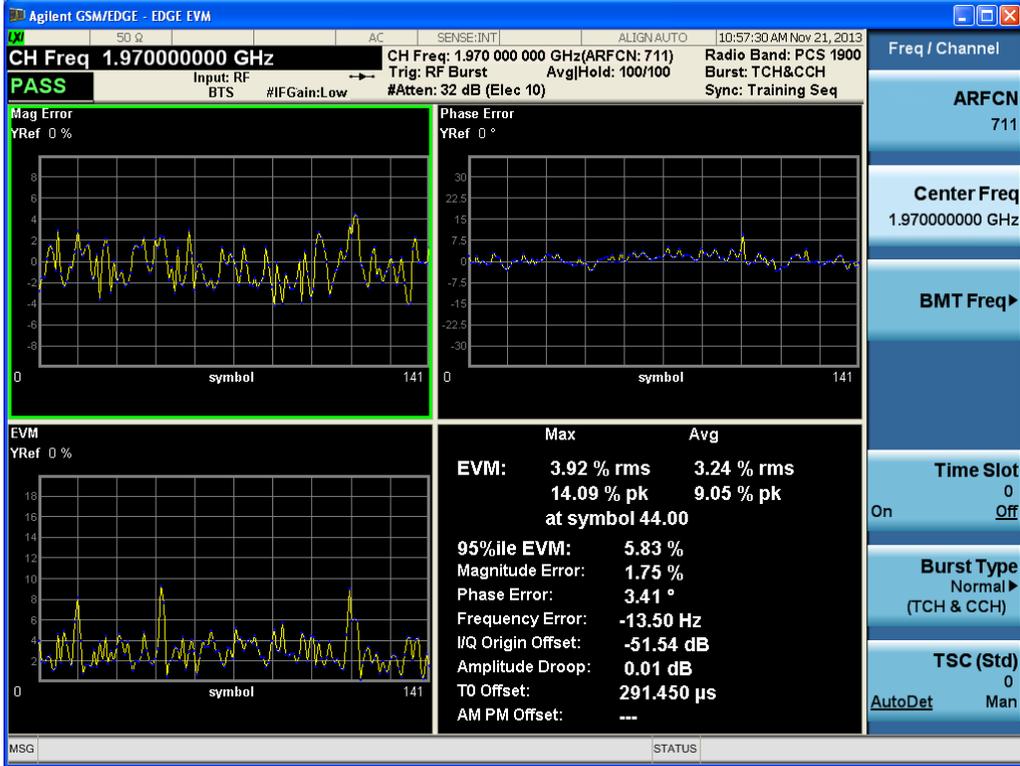
**Test Result:** Pass

**Test Mode:** Transmitting GSM

## Test Data:

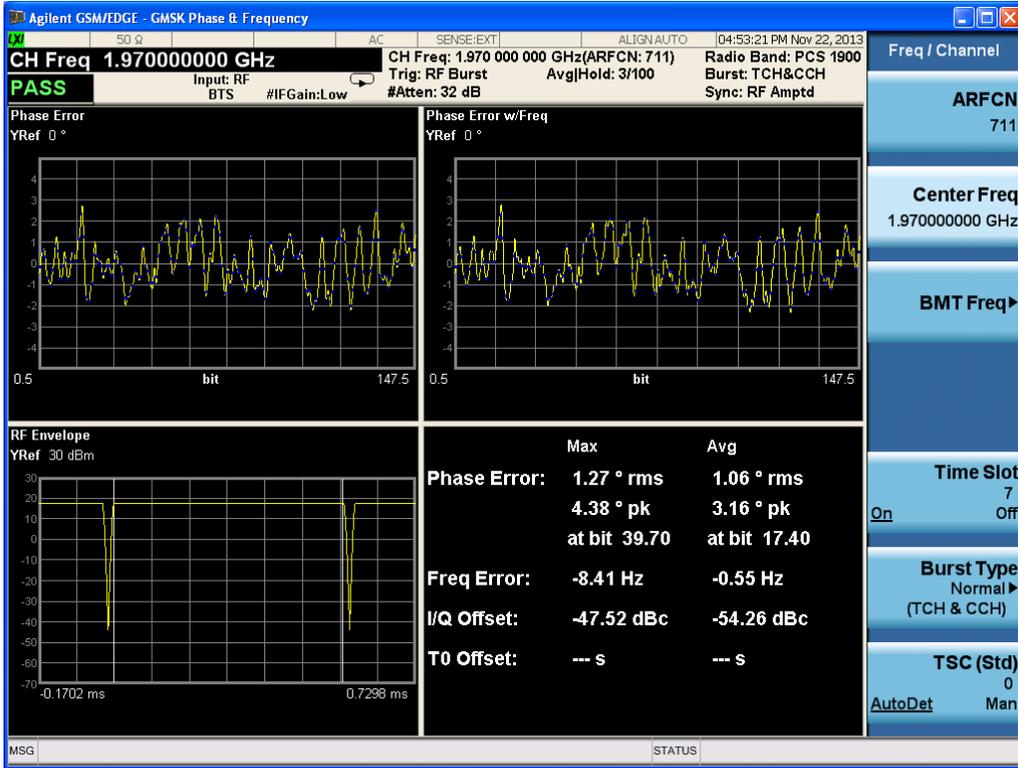
Modulation	Frequency (MHz)	EVM
8PSK	1950.2	3.50%
	1970.2	3.24%
	1989.8	3.72%





Modulation	Frequency (MHz)	Phase Error(° )	Frequency Error(Hz)
GMSK	1950.2	0.99	-0.63
	1970.0	1.06	-0.55
	1989.8	0.97	-0.82





## 4.4 SPURIOUS RADIATED EMISSIONS

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

### Test Equipment List and Details

Manufacturer	Equipment	Model	Serial Number	Last Cal.	Cal. Interval
R&S	SIGNAL GENERATOR	SMR20	A00017351	2014-09-26	1 year
Albatross	Anechoic Chamber	3m Site	A00017354	2014-11-02	1 year
R&S	EMI Test Receiver	ESIB26	100058	2014-10-29	1 year
R&S	Ultra Breitband Antennas	HL562	100022	2014-07-29	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100032	2014-07-29	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100446	2014-07-29	1 year
SCHWARZ-BECK	Biconical Antenna	VUBA9117	9117-122	2014-07-29	1 year

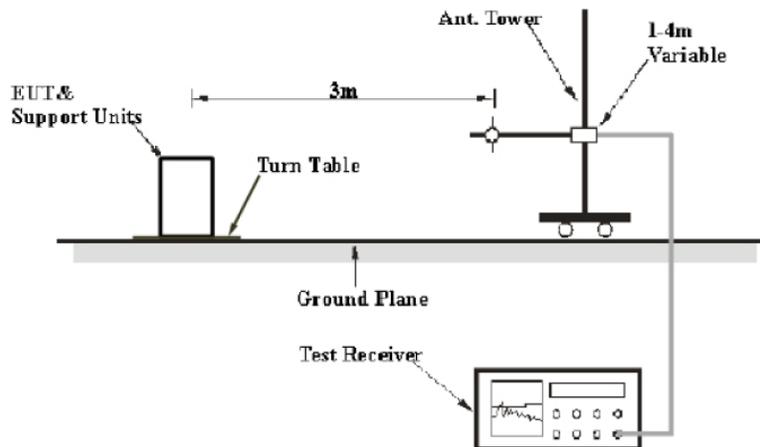
**\*statement of traceability:** ZTE Corporation Testing lab attest that all calibration have been performed per the NVLAP requirements, traceable to NIST.

#### 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 tenth 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		Test Antenna	Substituted			Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBuV)		Polar H/V	Frequency (MHz)	Level (dBm)				
119.418838	21.73	V	119.418838	-63.19	-12.48	0.8	-78.62	-36	42.62
249.659319	18.46	V	249.659319	-79.09	1.49	1.3	-81.05	-36	45.05
428.496994	23.56	V	428.496994	-70.95	-0.99	1.7	-75.79	-36	39.79
881.422846	90.44	V	881.422846	-6.75	-1.54	2.5	-12.94	-36	-23.06
1885.77154	47.11	V	1885.77154	-60.25	6.55	3.7	-59.55	-30	29.55
2647.29459	54.65	V	2647.29459	-52.88	7.95	4.3	-51.38	-30	21.38
119.418838	20.8	H	2647.29459	-65.36	-12.48	0.8	-80.79	-36	44.79
210.781563	20.45	H	119.418838	-78.8	1.23	1.2	-80.92	-36	44.92
471.262525	23.27	H	210.781563	-70.28	-1.3	1.8	-75.53	-36	39.53
881.422846	111.57	H	471.262525	14.48	-1.54	2.5	8.29	-36	-44.29
1853.70742	47.99	H	881.422846	-55.67	6.55	3.6	-54.87	-30	24.87
3000	54.33	H	1853.70742	-49.78	7.75	4.6	-48.78	-30	18.78

### Radiation emission spurious below 3GHz

Indicated		Test Antenna	Substituted			Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Amp. (dBuV)		Polar H/V	Frequency (MHz)	Level (dBm)				
3312.62525	42.69	V	3312.62525	-58.28	7.75	4.9	-57.58	-30	27.58
4731.46293	45.05	V	4731.46293	-62.55	9.15	5.8	-61.35	-30	31.35
6174.3487	48.86	V	6174.3487	-58.61	9.05	6.9	-58.61	-30	28.61
7610.72144	50.75	V	7610.72144	-61.6	9.25	7.8	-62.3	-30	32.3
9869.23848	56.18	V	9869.23848	-52.64	9.95	8.8	-53.64	-30	23.64
12312.1242	56.98	V	12312.1242	-53.74	12.05	9.9	-53.74	-30	23.74
3312.62525	44.78	H	3312.62525	-58.48	7.75	4.9	-57.78	-30	27.78
4050.1002	45.36	H	4050.1002	-59.29	7.95	5.3	-58.79	-30	28.79
6150.3006	48.51	H	6150.3006	-54.88	9.05	6.9	-54.88	-30	24.88
7633.76754	50.15	H	7633.76754	-58.48	9.25	7.8	-59.18	-30	29.18
9857.71543	55.7	H	9857.71543	-53.24	9.95	8.8	-54.24	-30	24.24
12300.6012	56.35	H	12300.6012	-50.62	12.05	9.9	-50.62	-30	20.62

### Radiation emission spurious above 3GHz

# 4.5 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 .

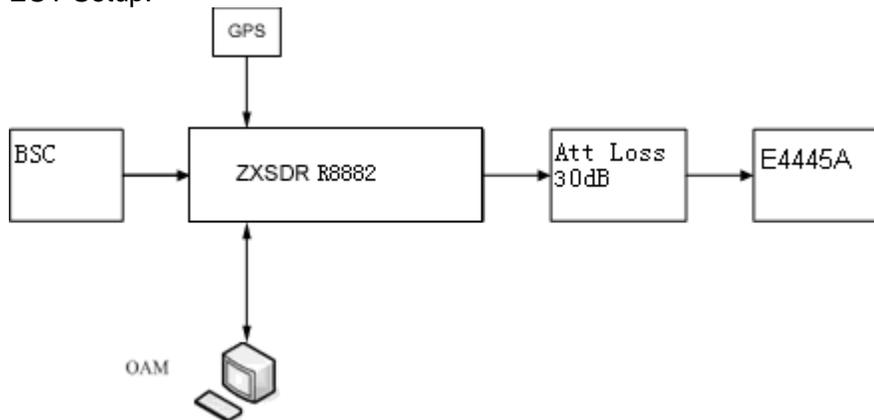
## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2014-4-9	2015-4-8
Atten	30dB Attenuator	ATSI150-4-30	11300110201221	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-9	2015-4-8

**\*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)=30dB, Cable Loss (dB)=2dB.

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 1MHz for 30MHz

to 1GHz scanning, set at 1MHz for 1GHz to 20GHz scanning. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

## Test Data Environmental Conditions

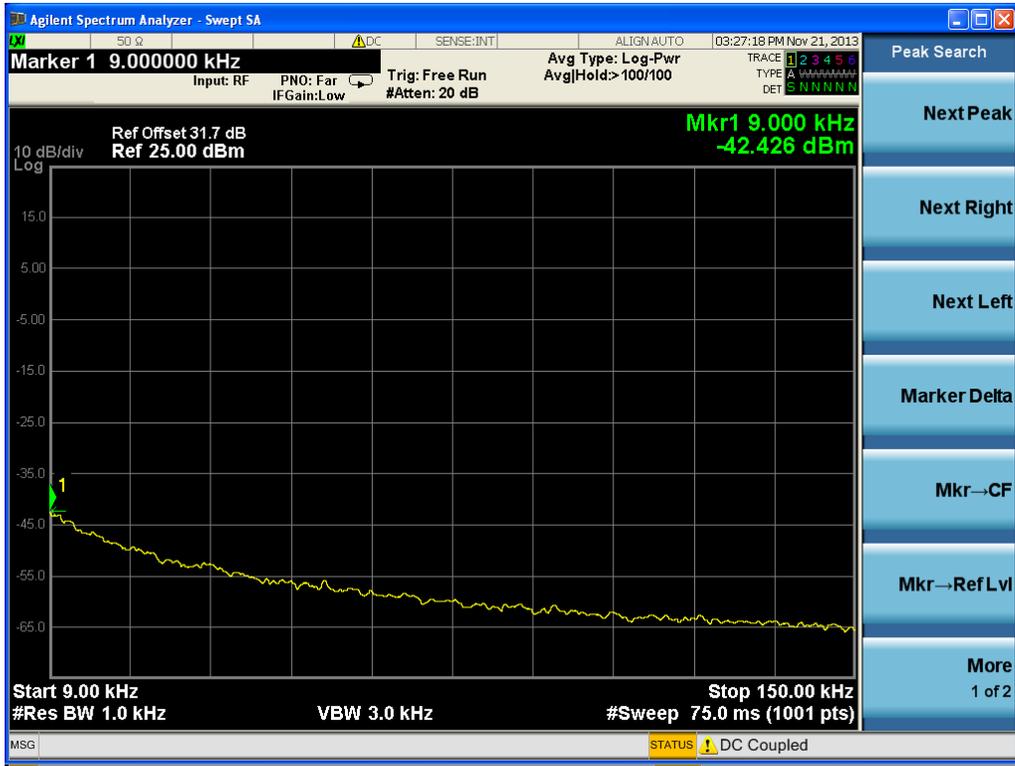
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

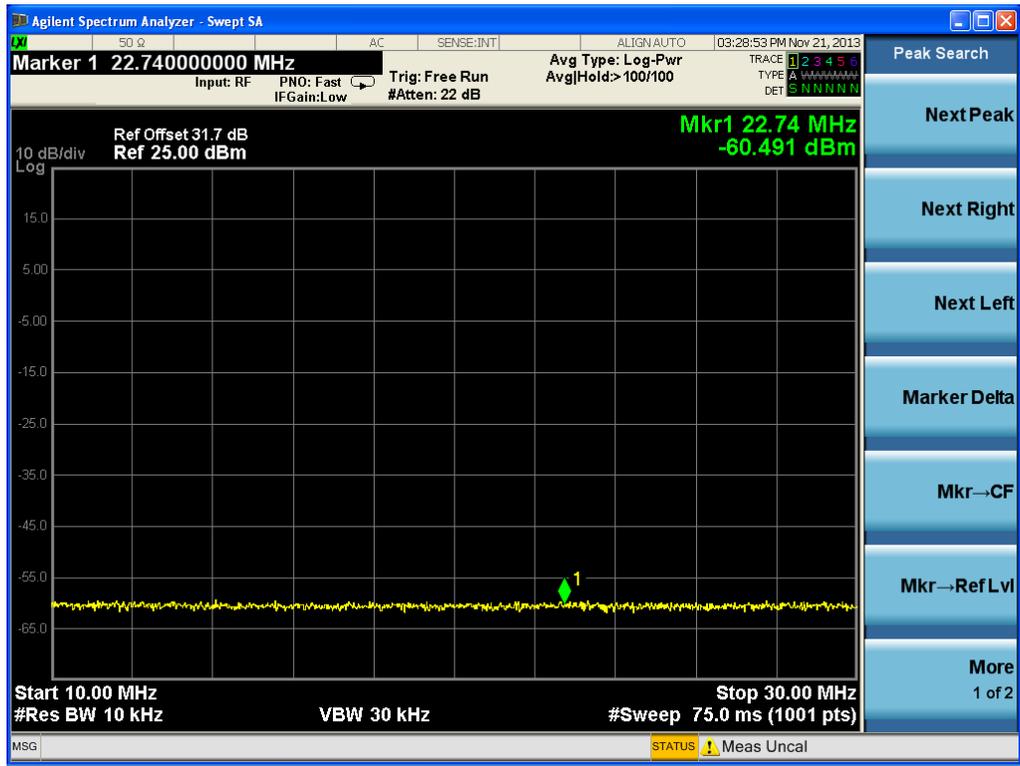
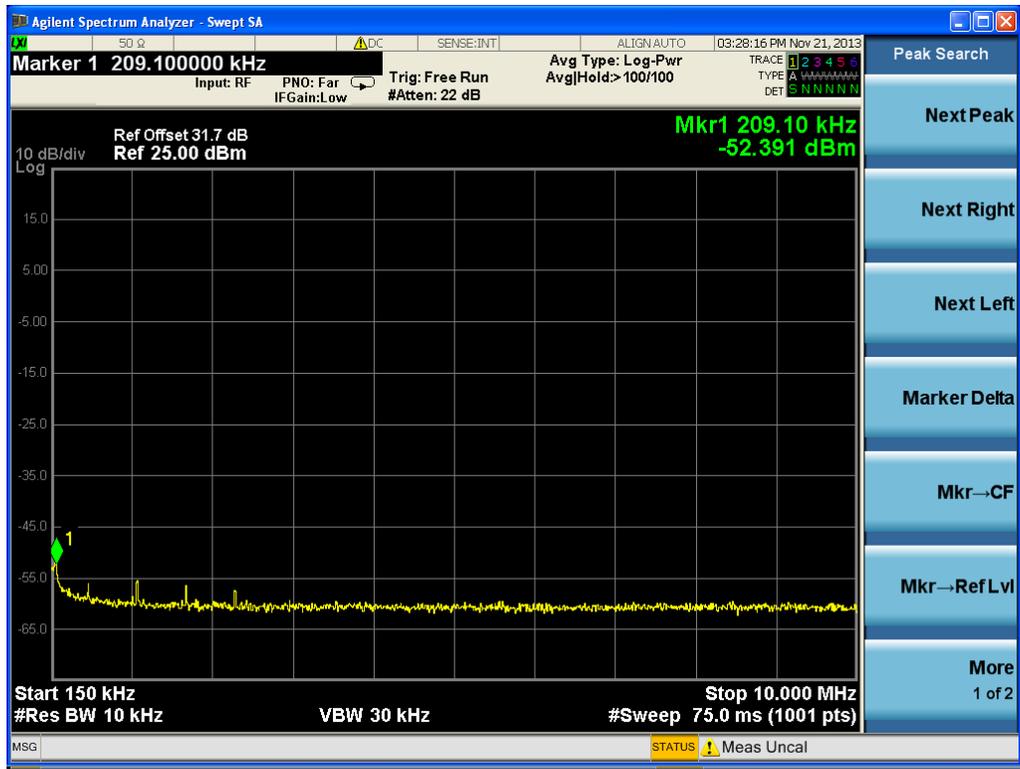
**Test Result:** Pass

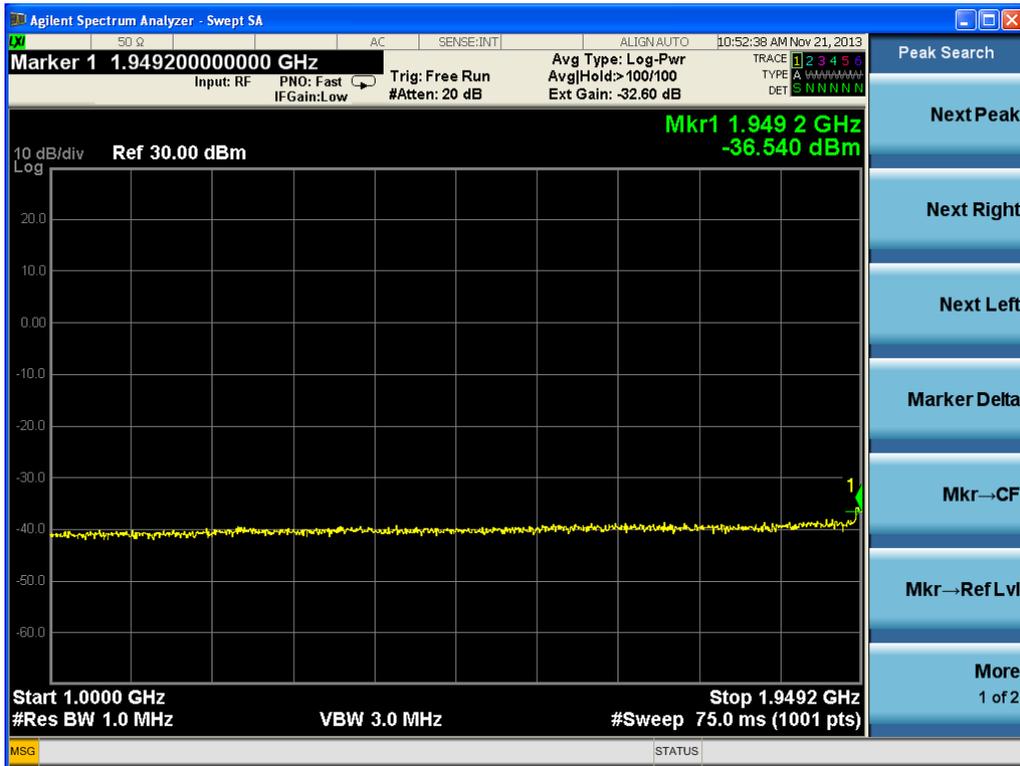
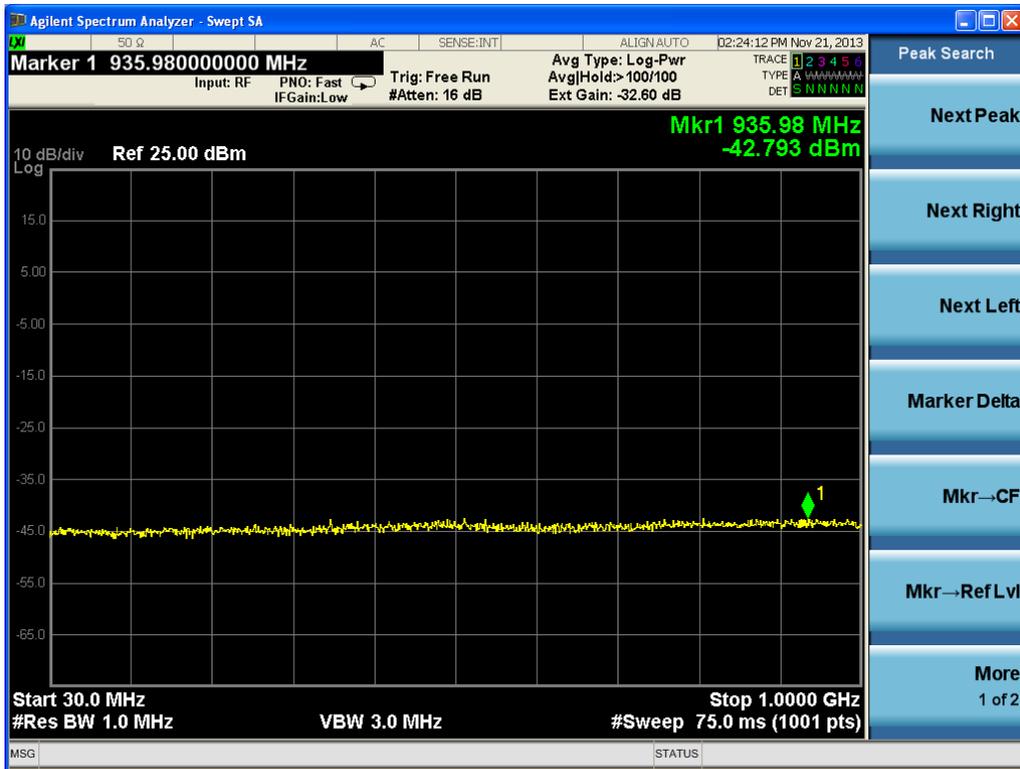
**Test Mode:** Transmitting GSM

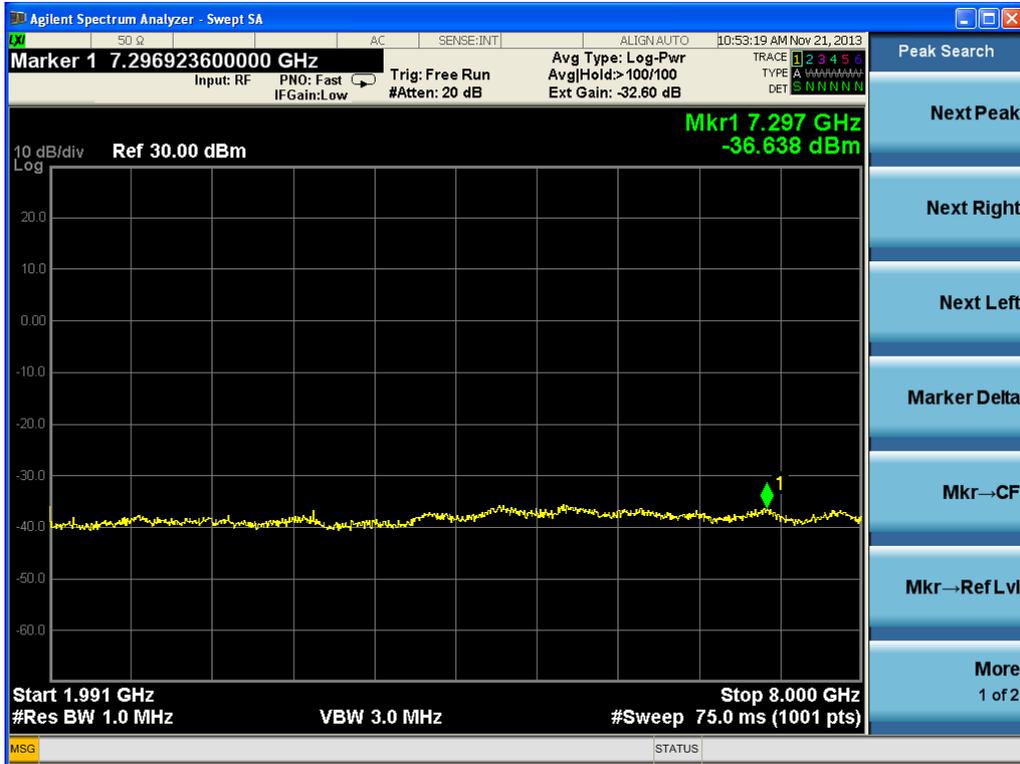
## Test Data:

Six Carriers

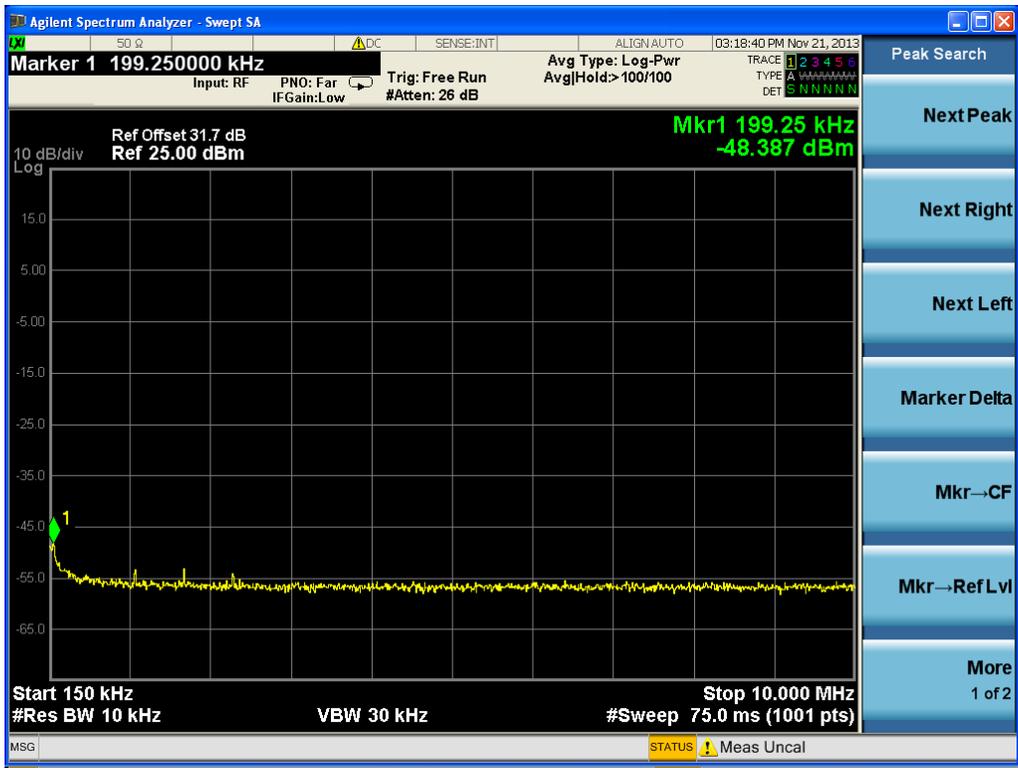


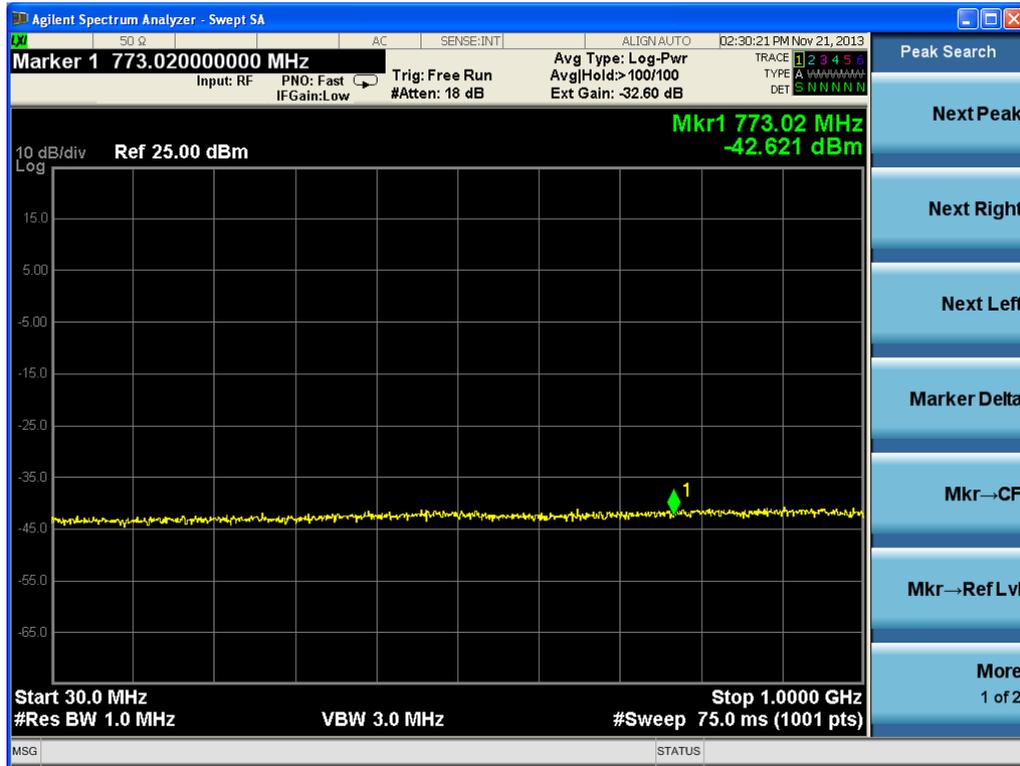
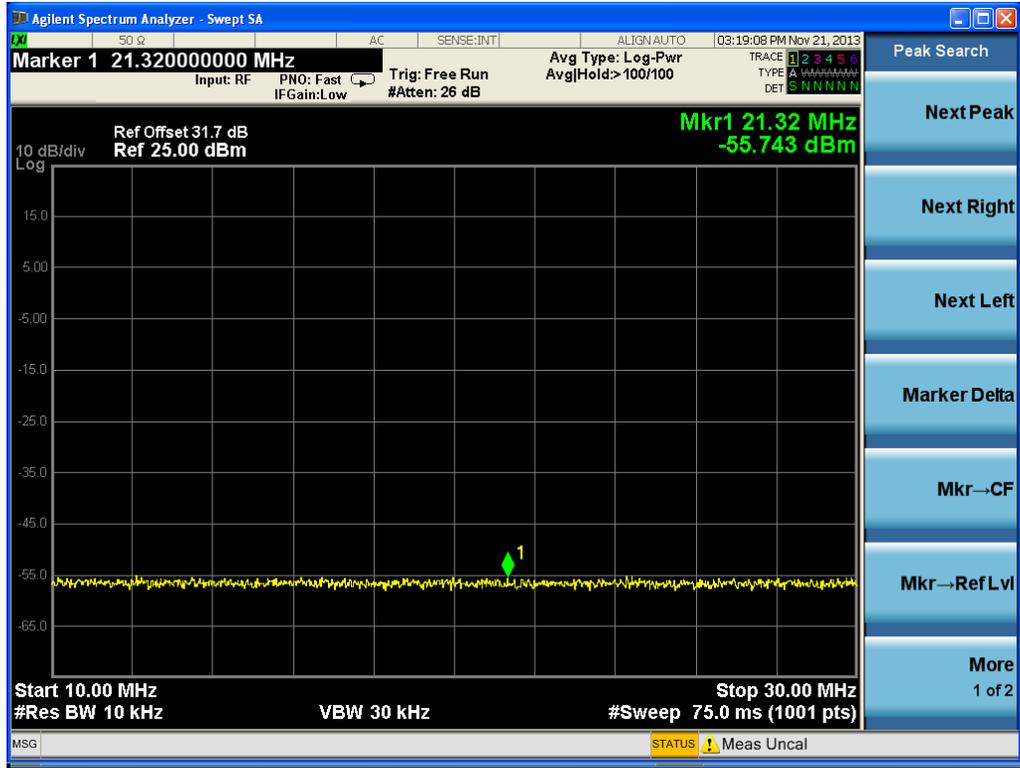


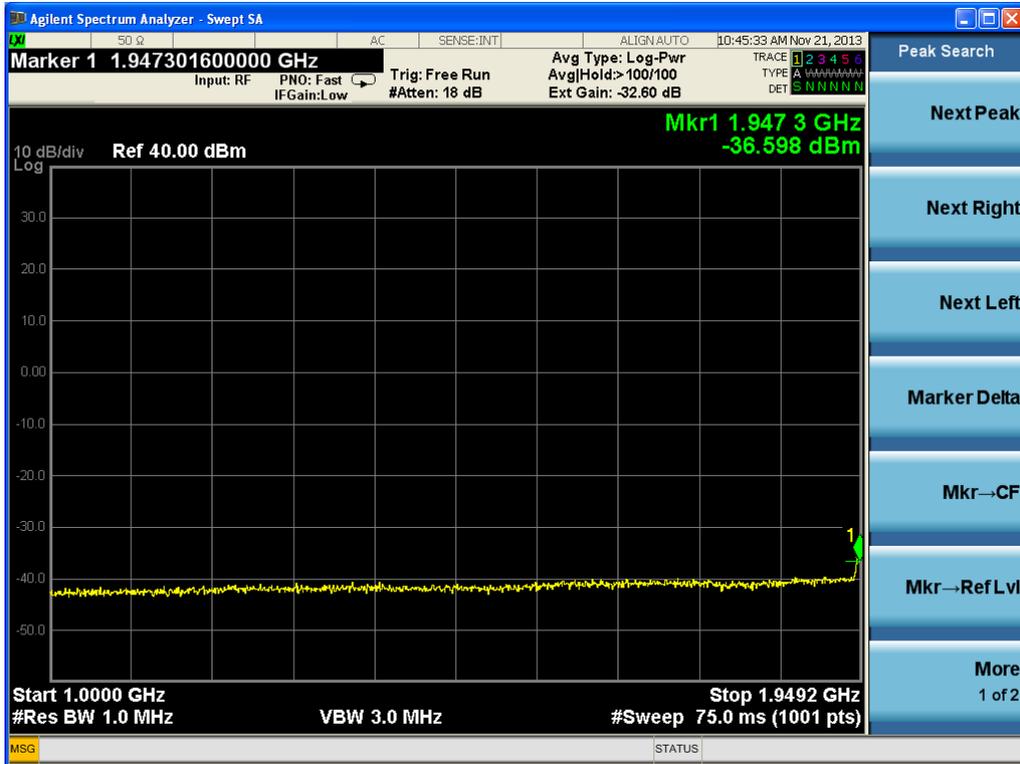




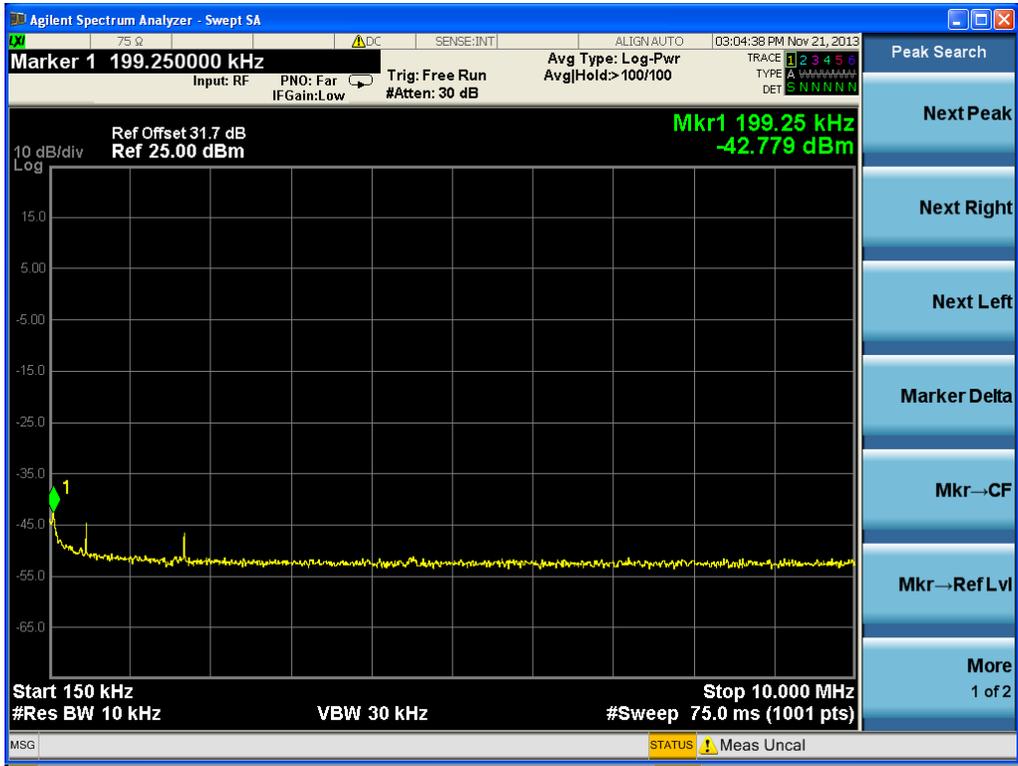
Five carriers

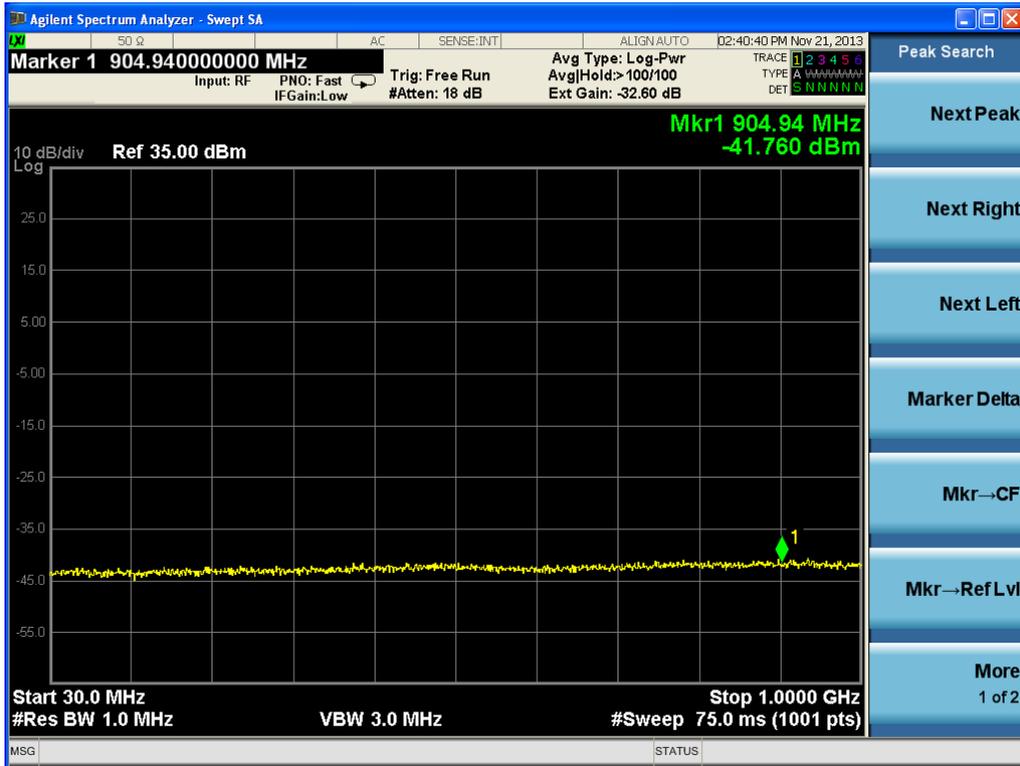
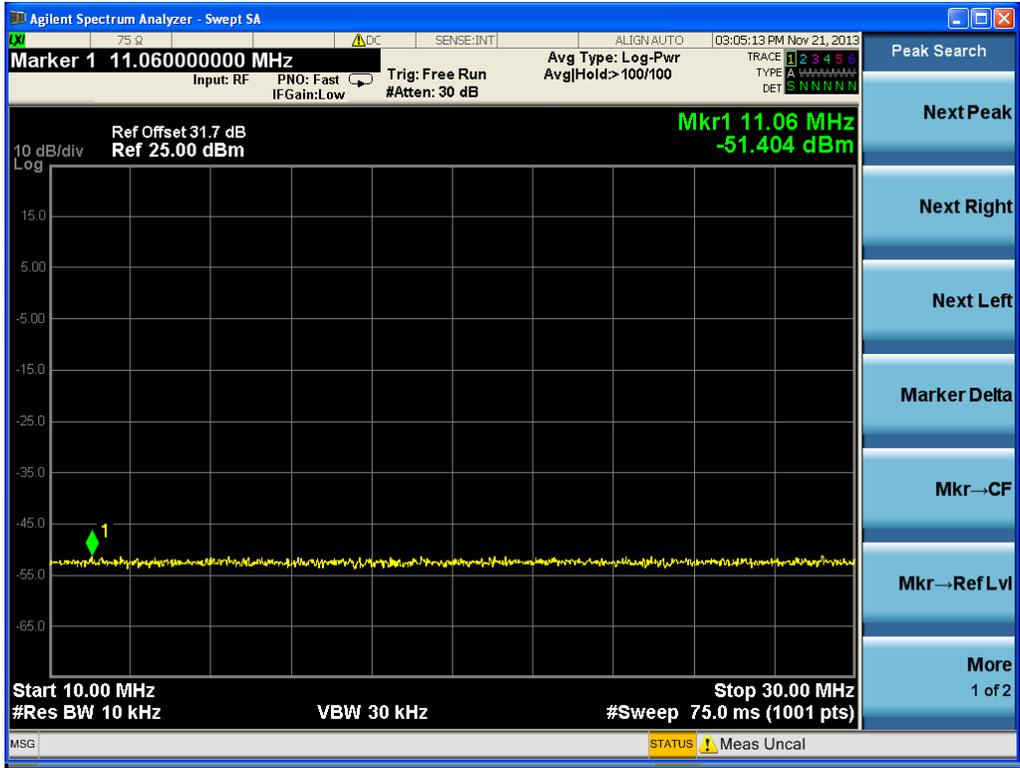


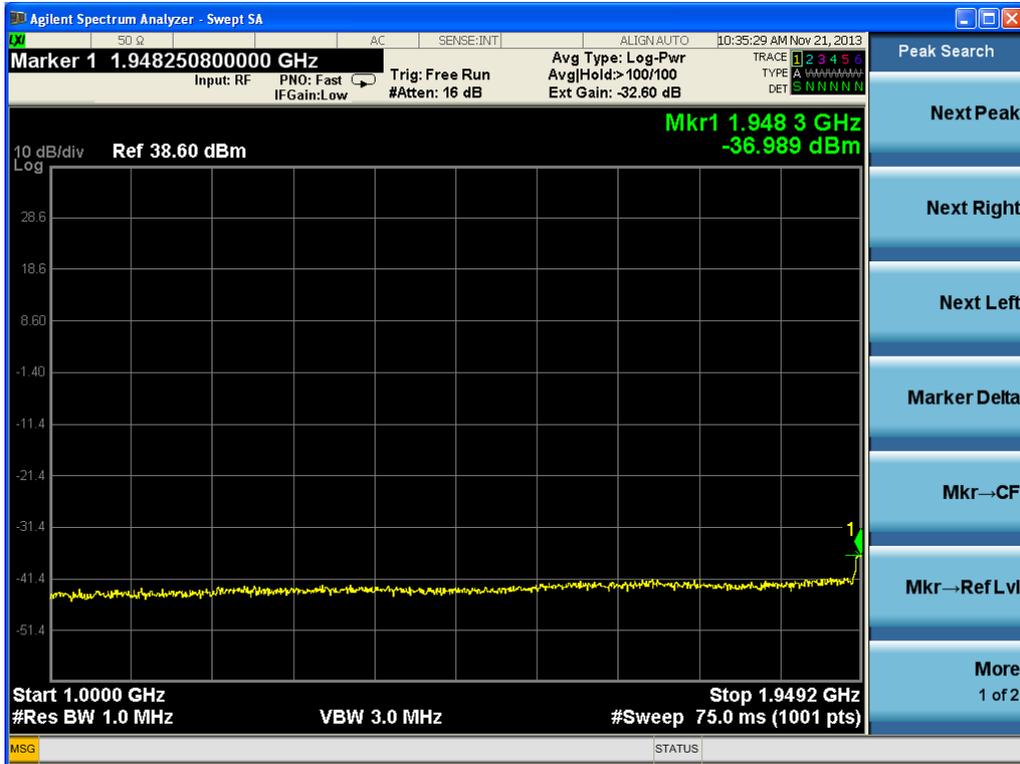




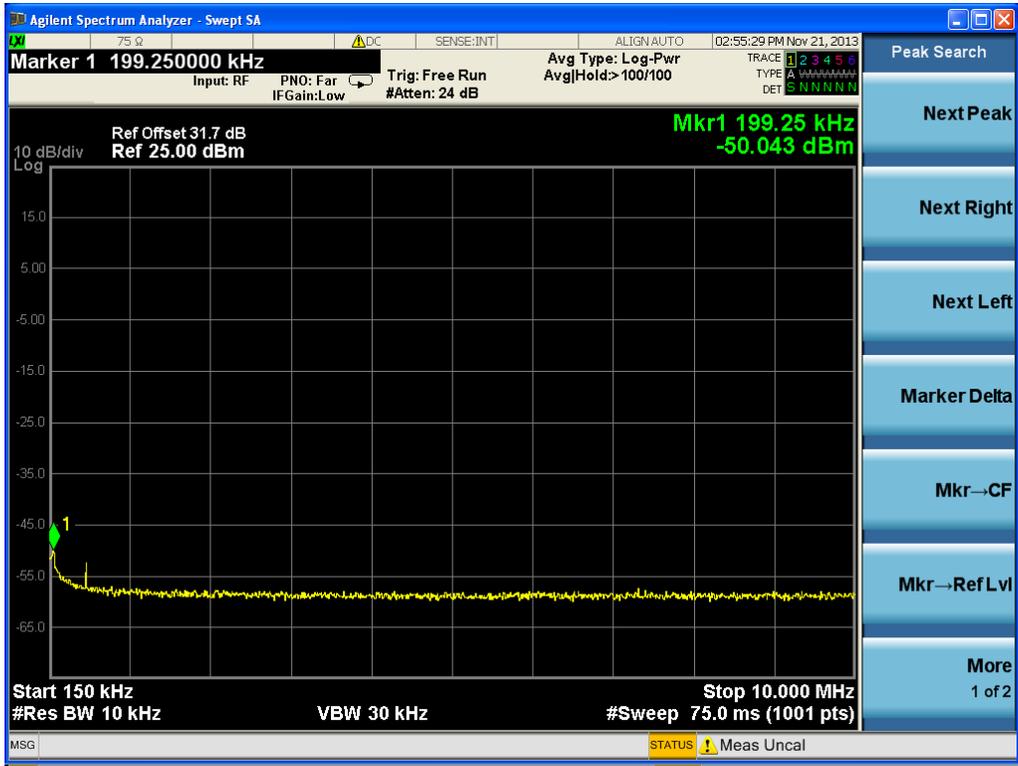
## Four Carriers

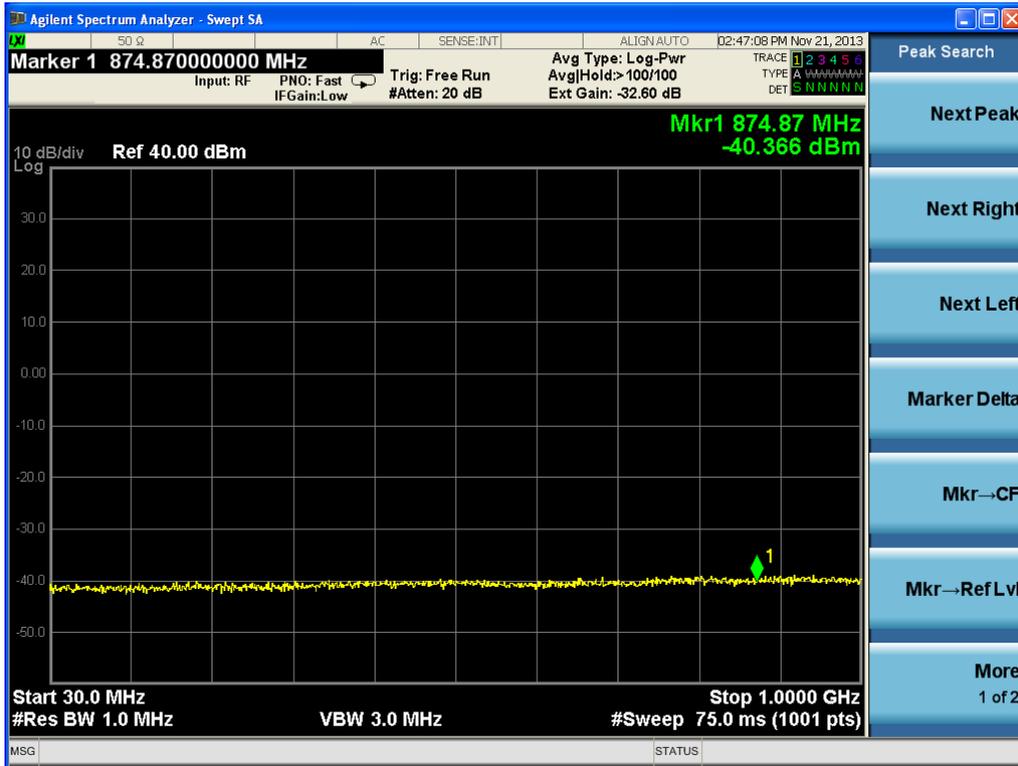
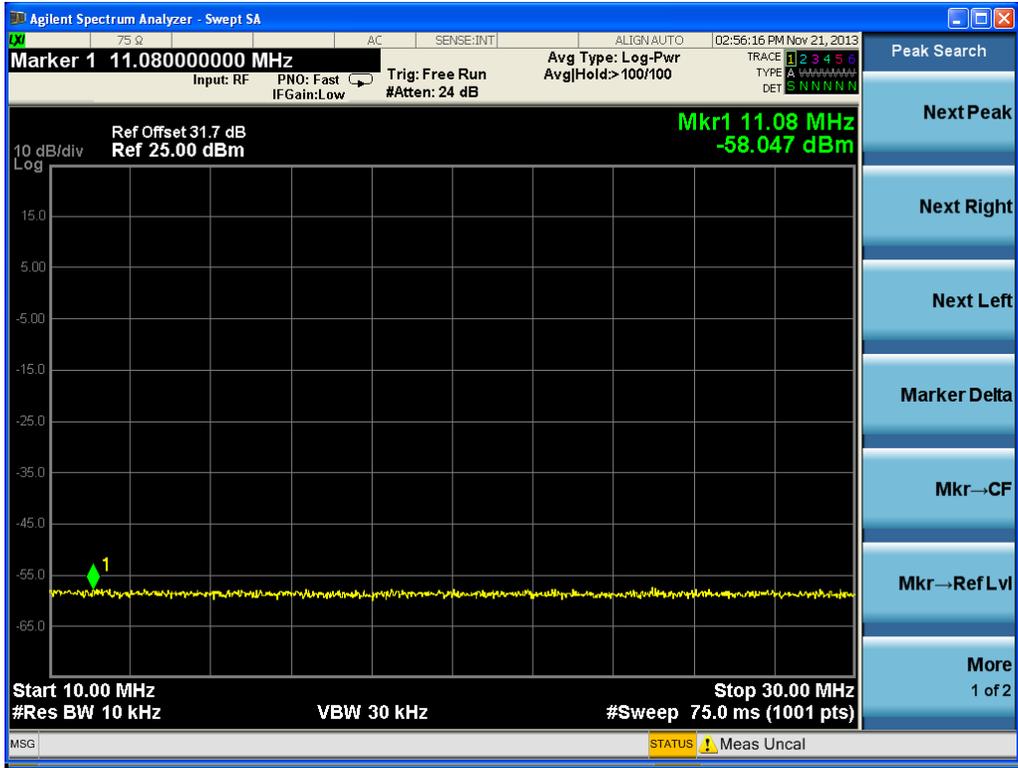


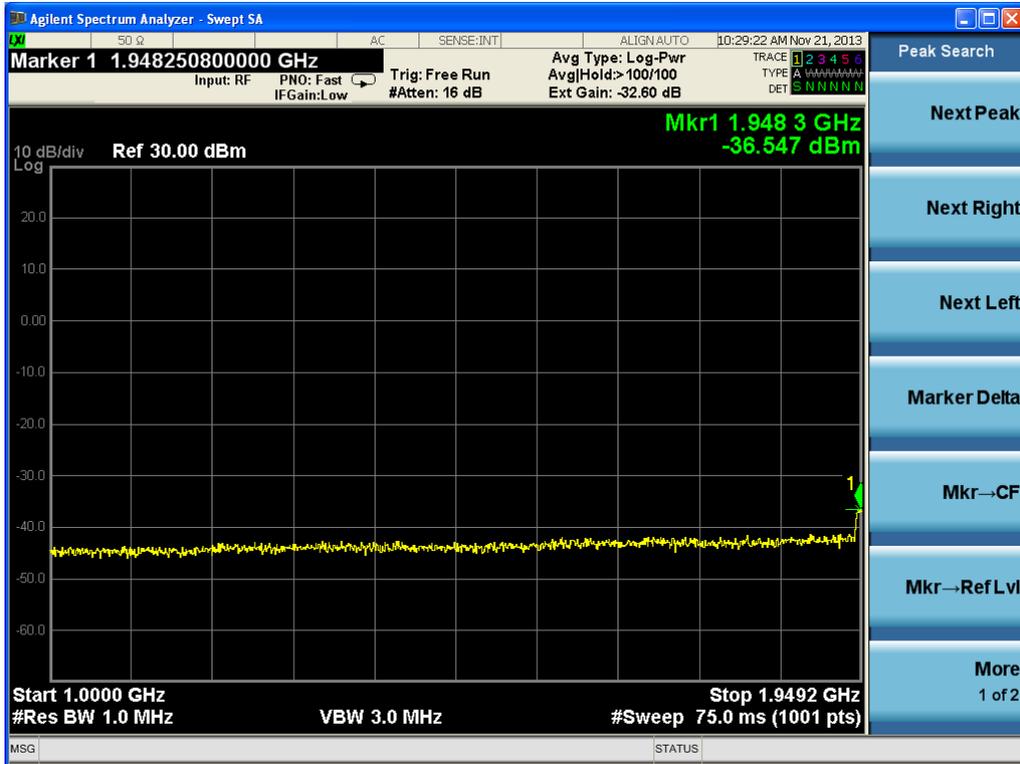




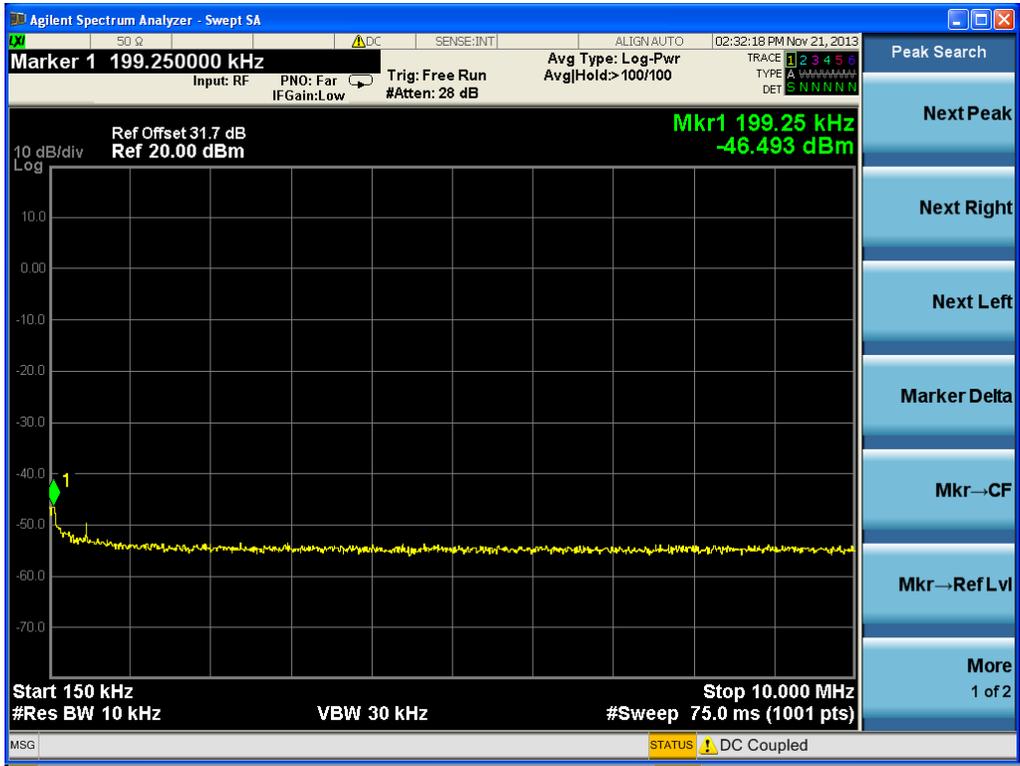
Three carriers

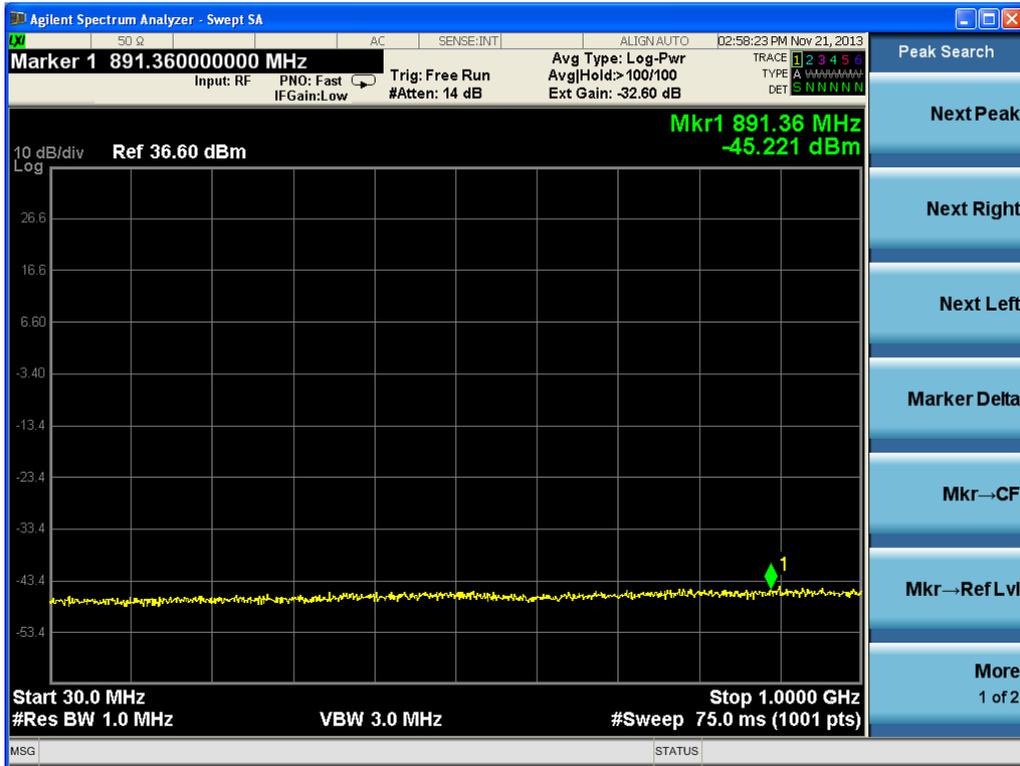
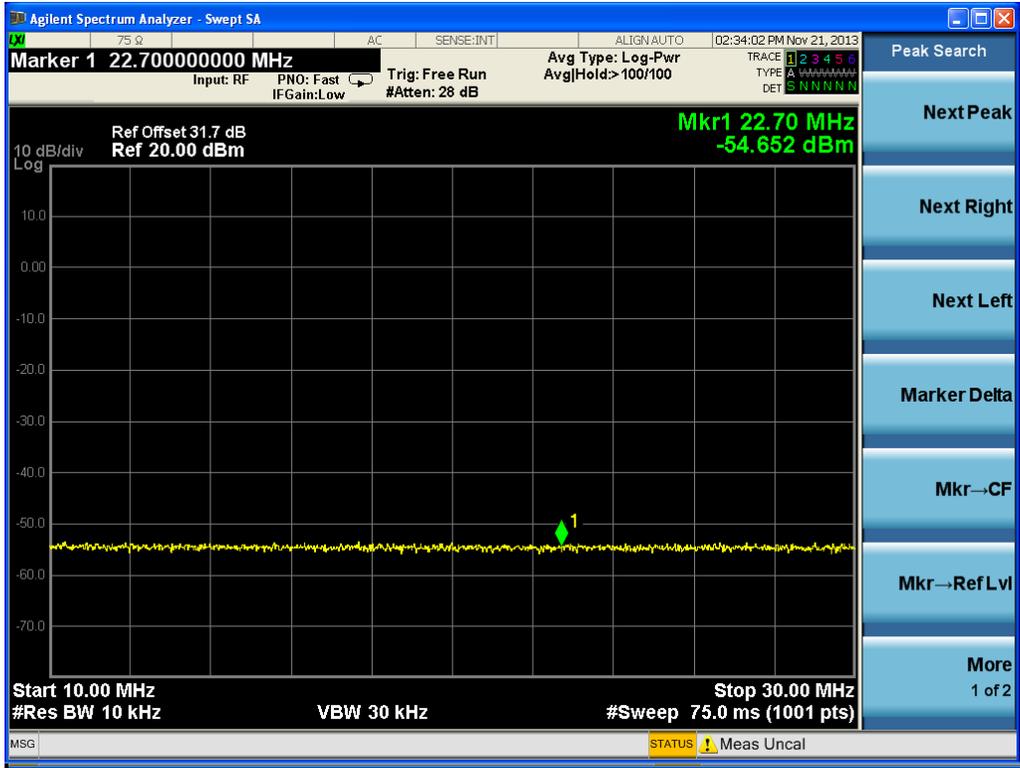


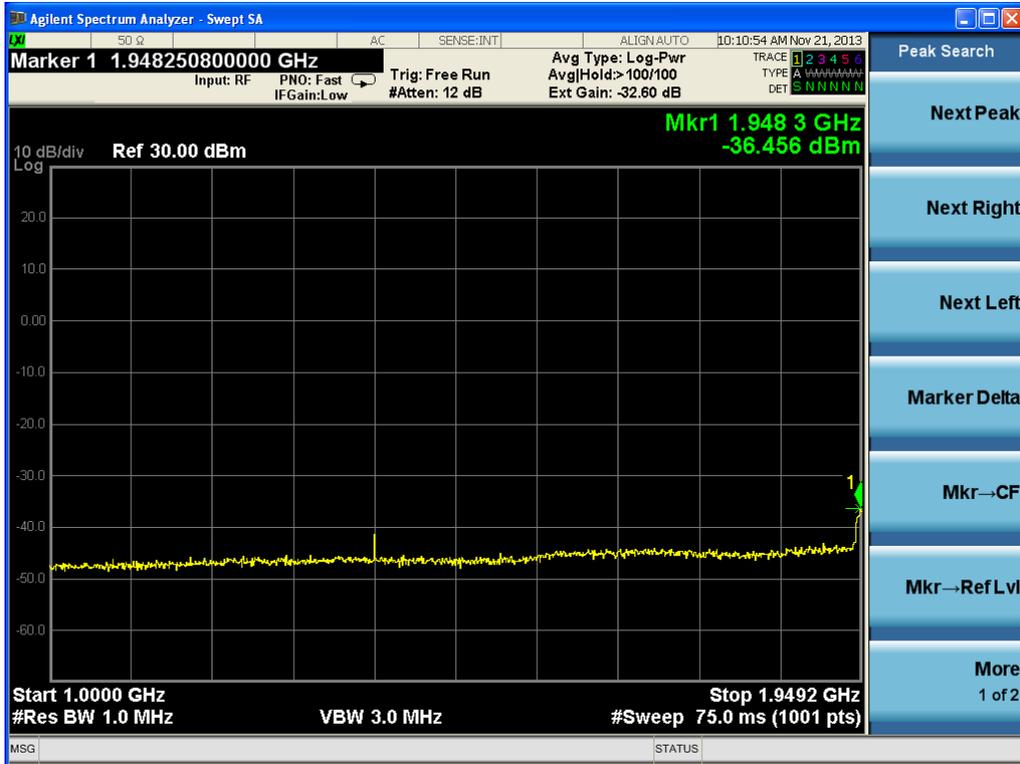




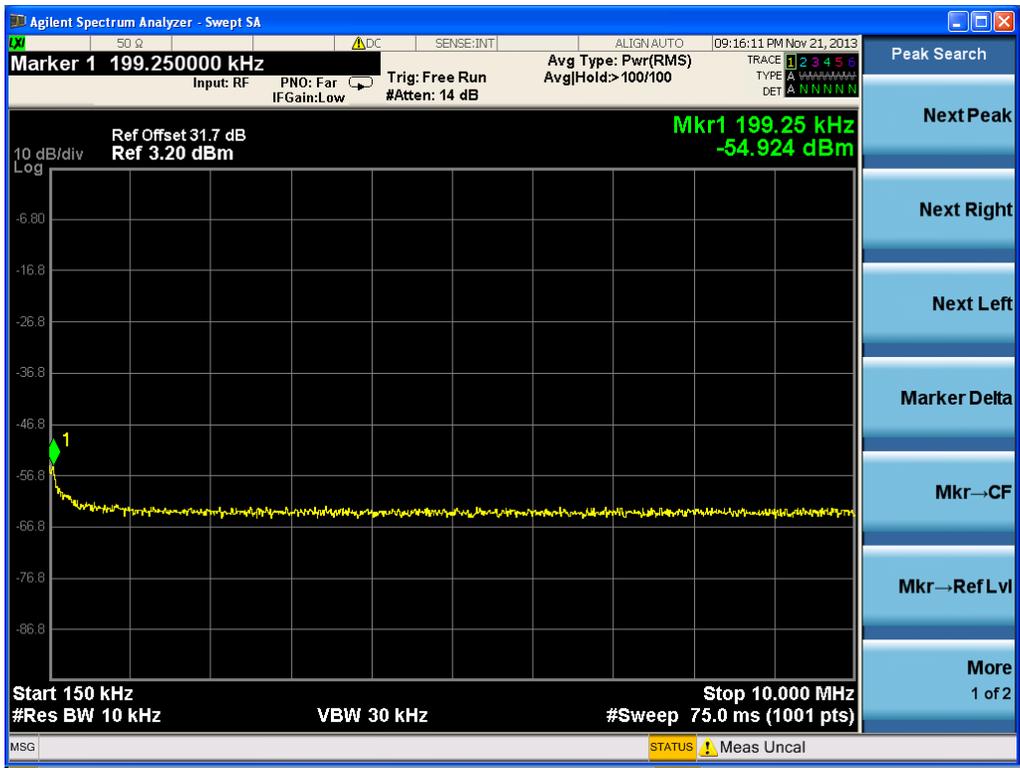
Two carriers

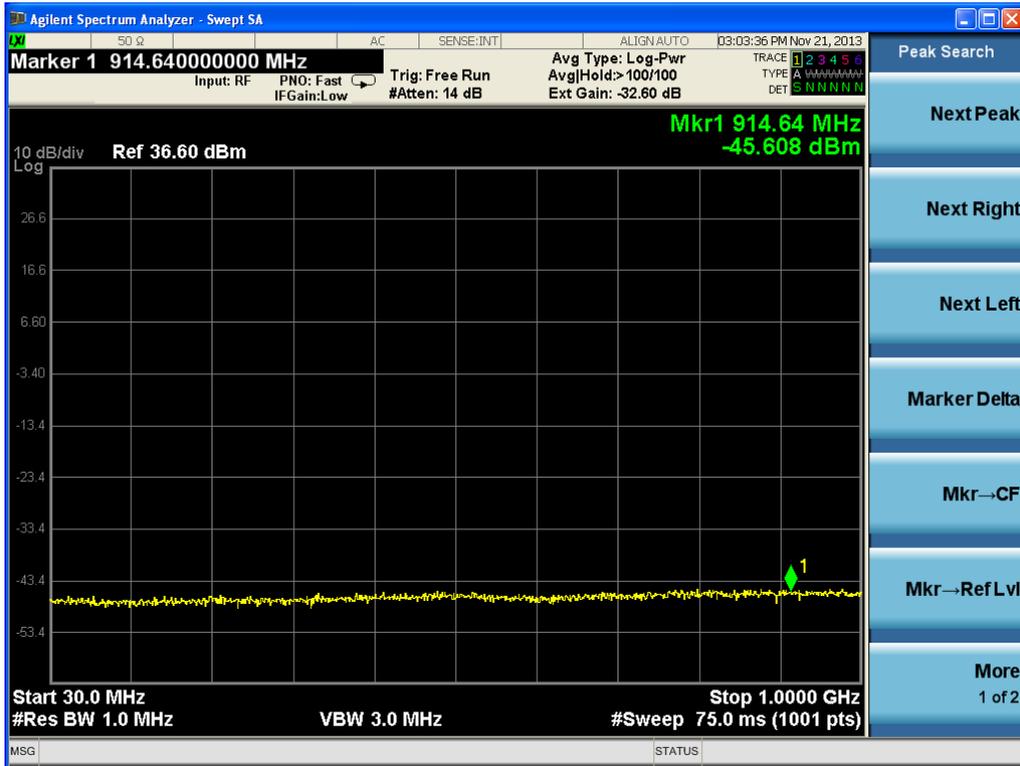
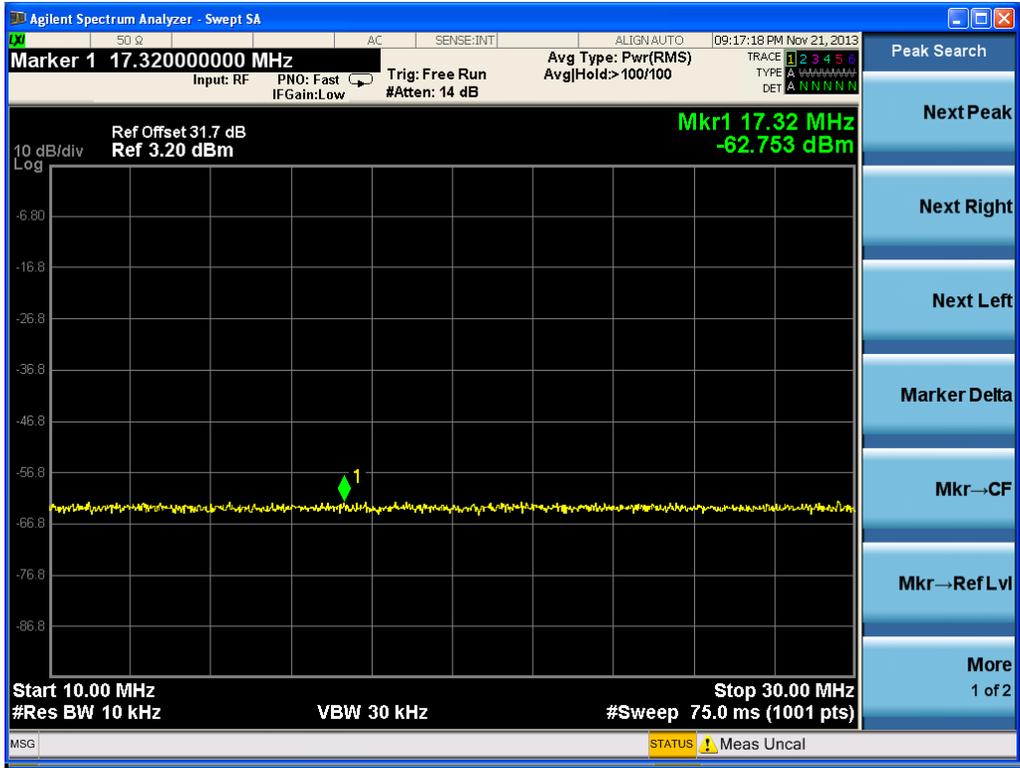


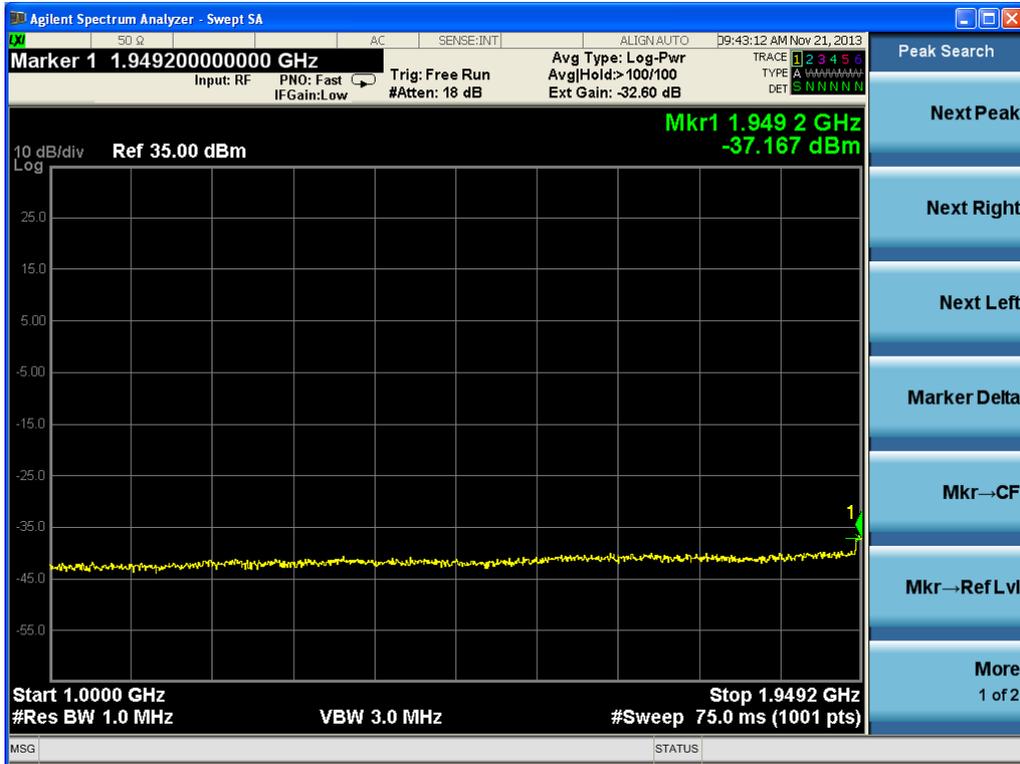




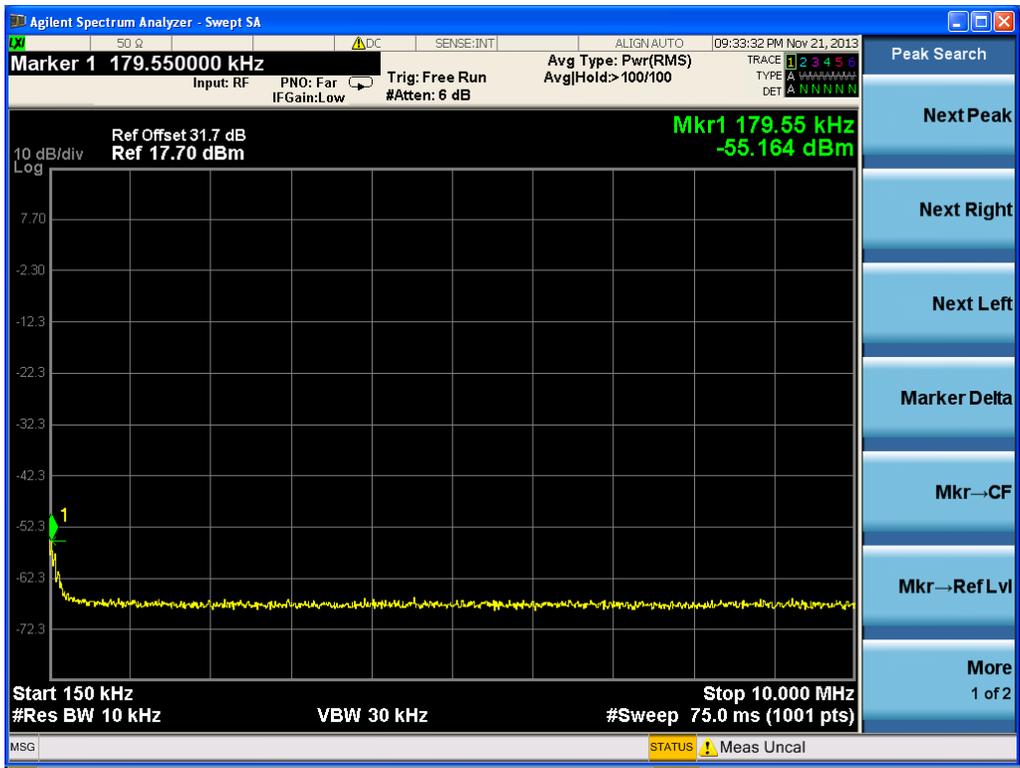
One carrier (working in bottom frequency)

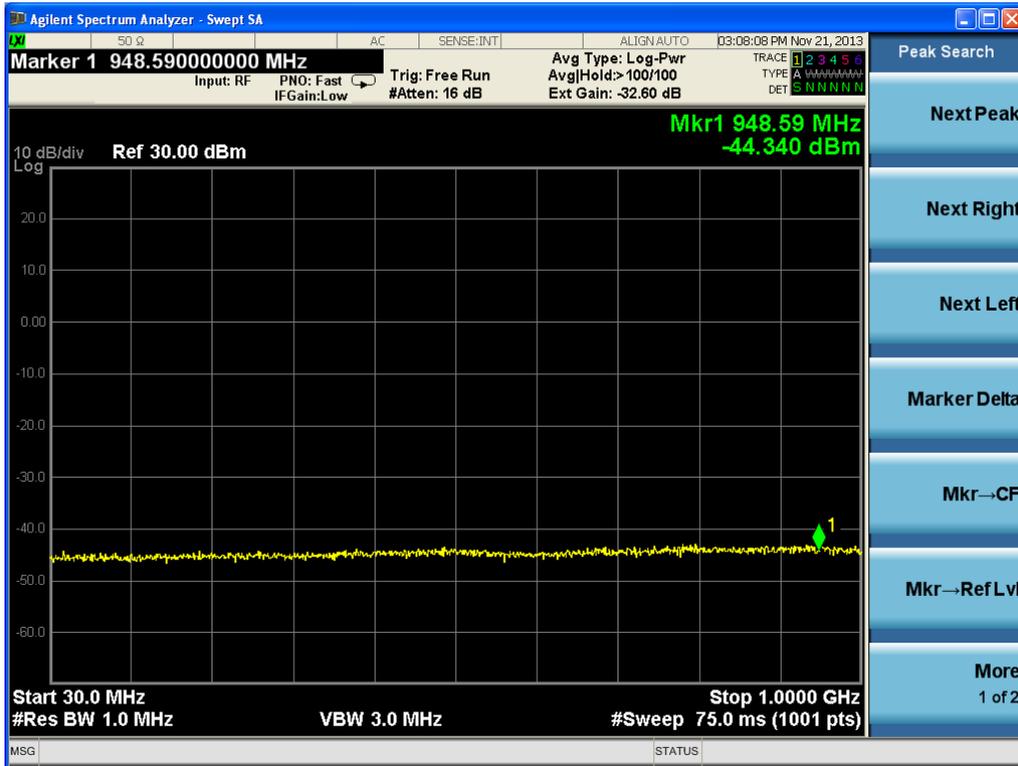
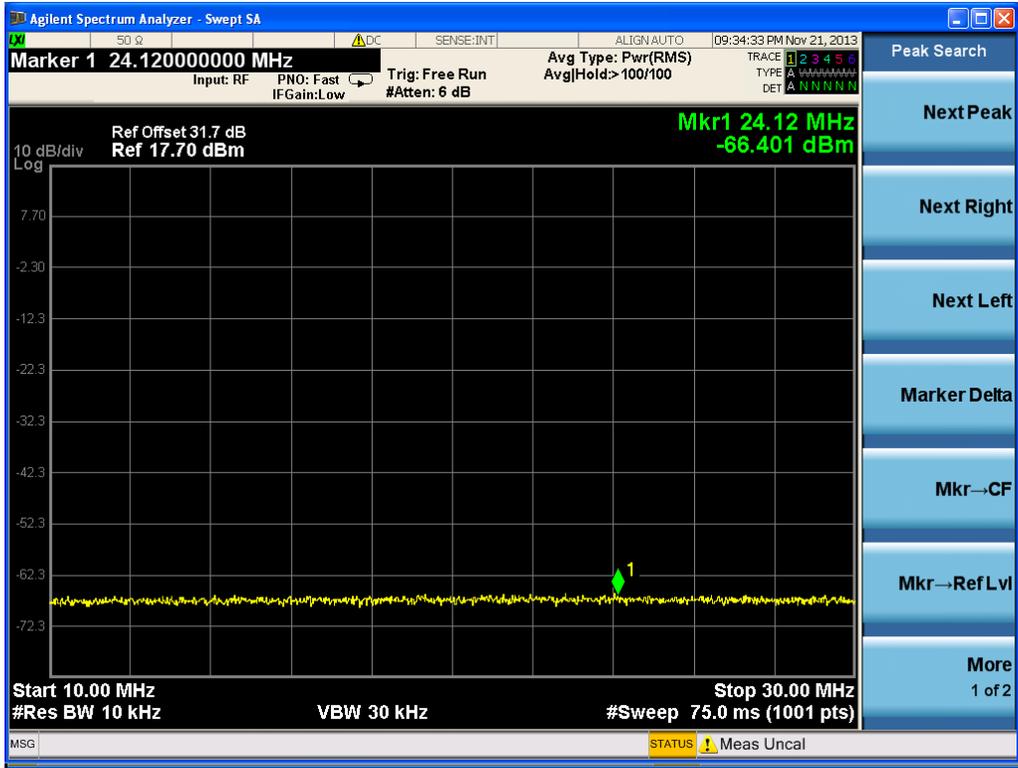


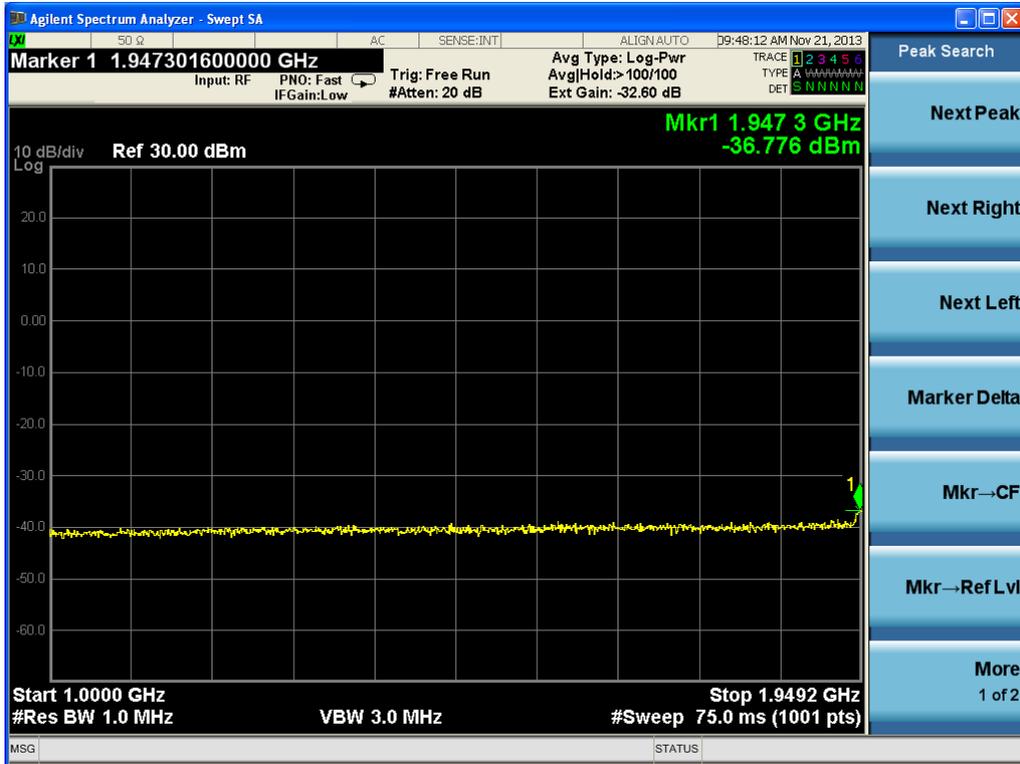




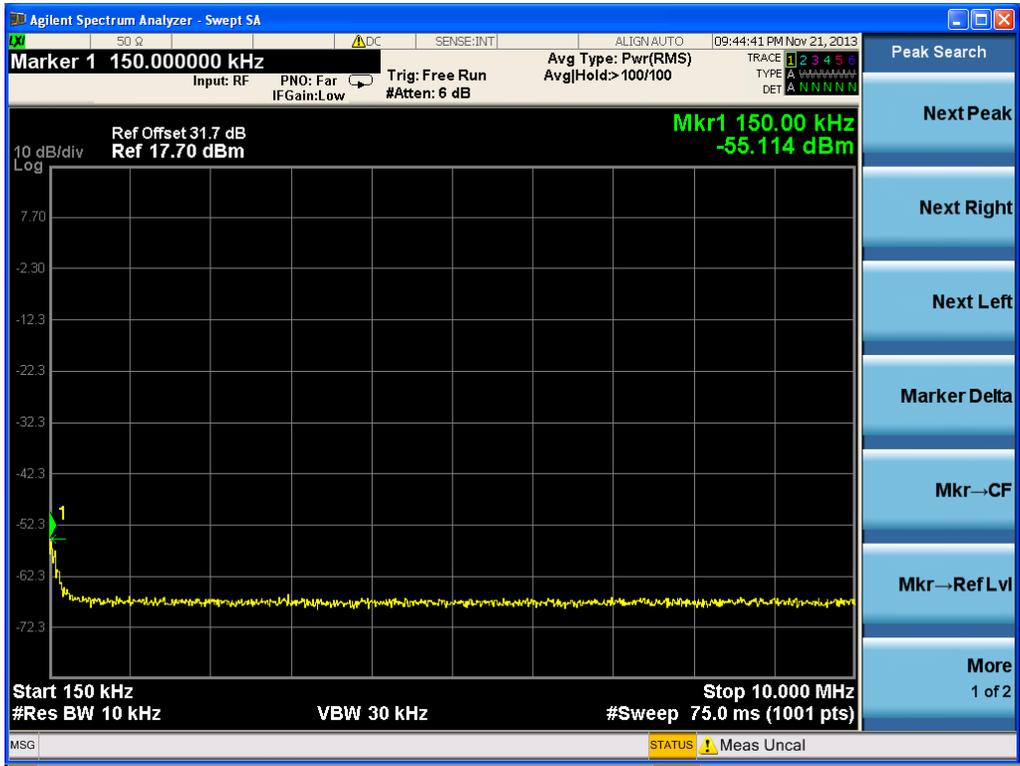
One carrier (working in middle frequency)

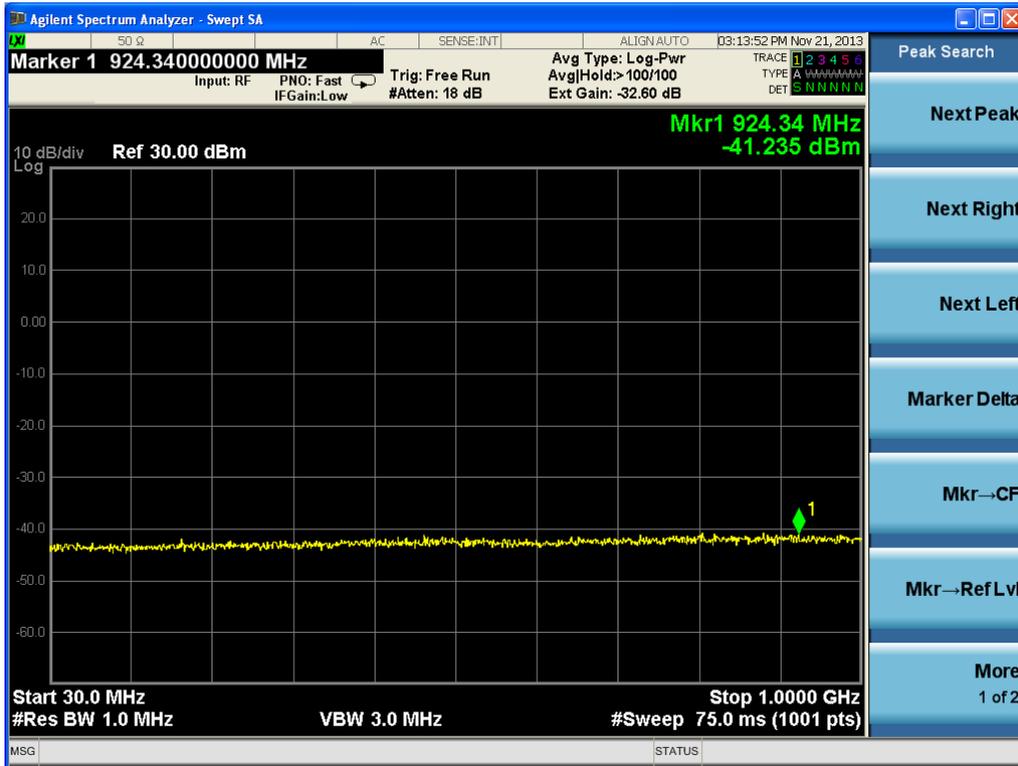
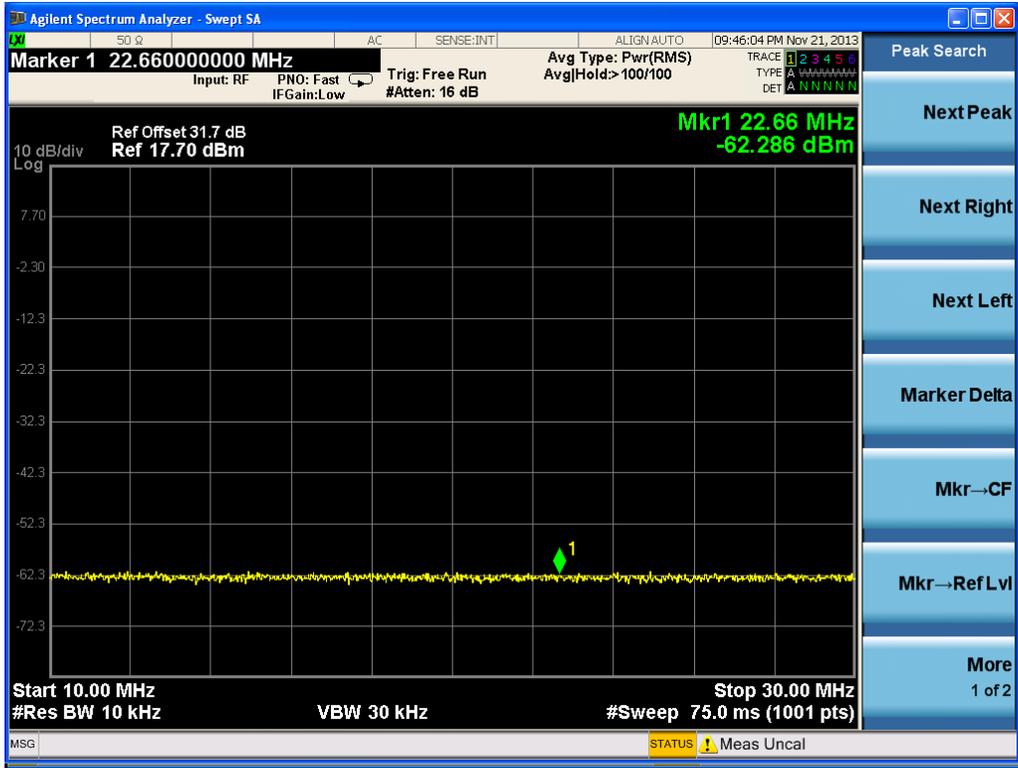


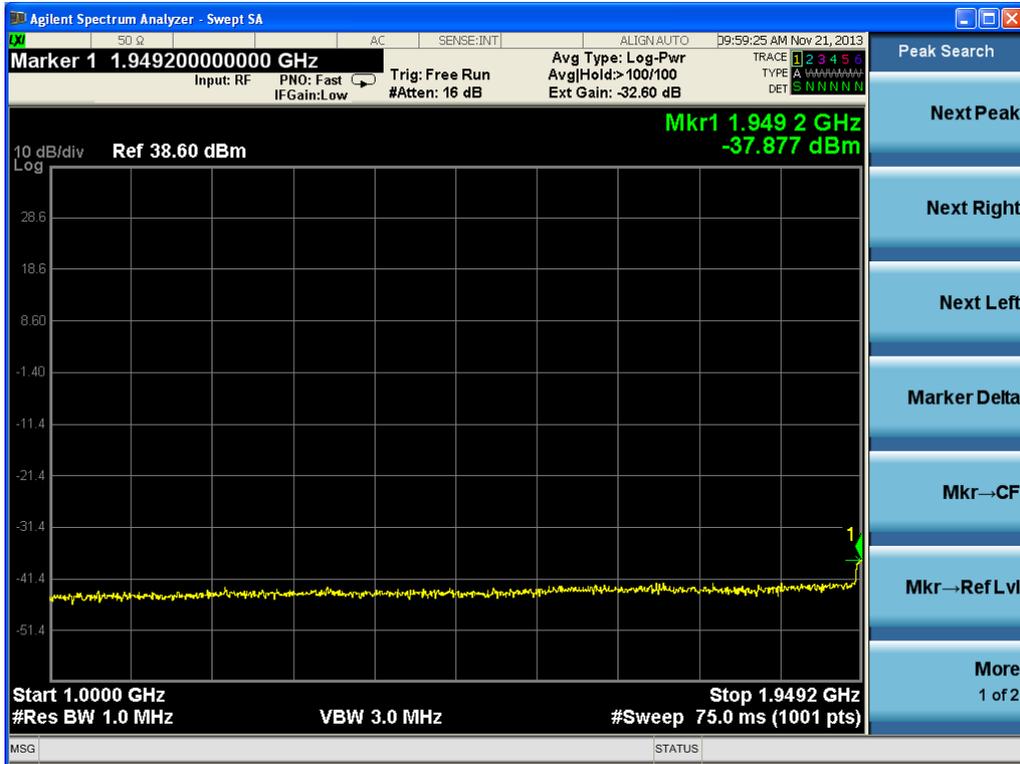




One carrier (working in top frequency)







## 4.6 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	2014-4-9	2015-4-8
Atten	30dB Attenuator	ATSI150-4-30	11300110201221	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-9	2015-4-8

**\*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

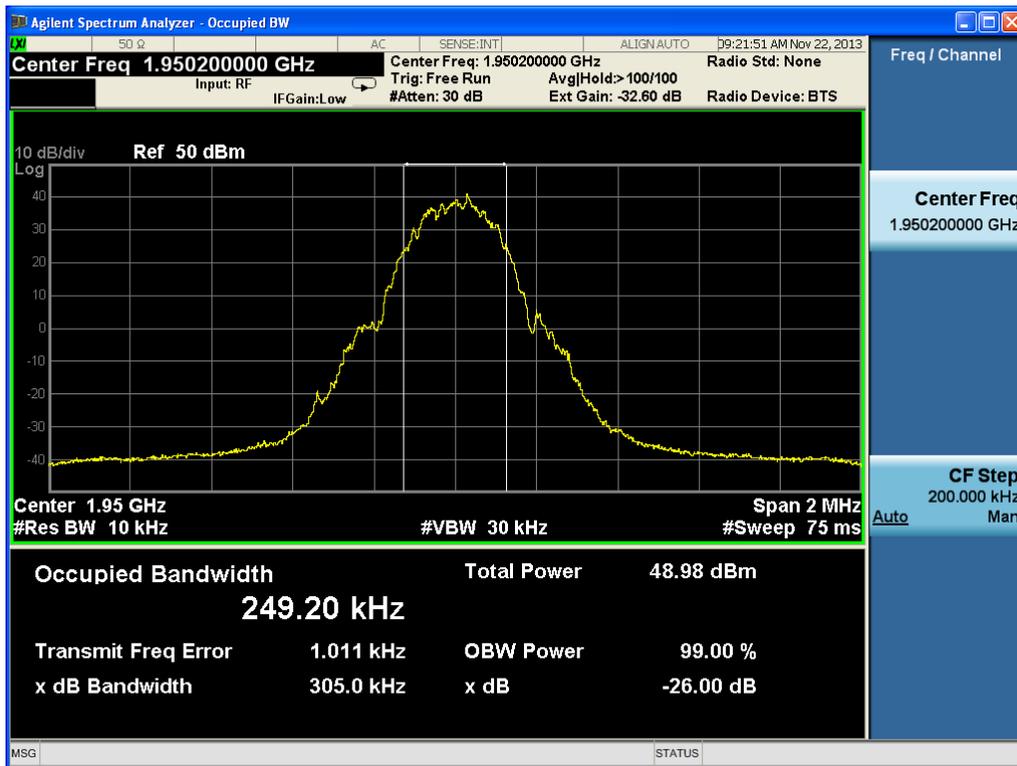
Temperature:	20 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

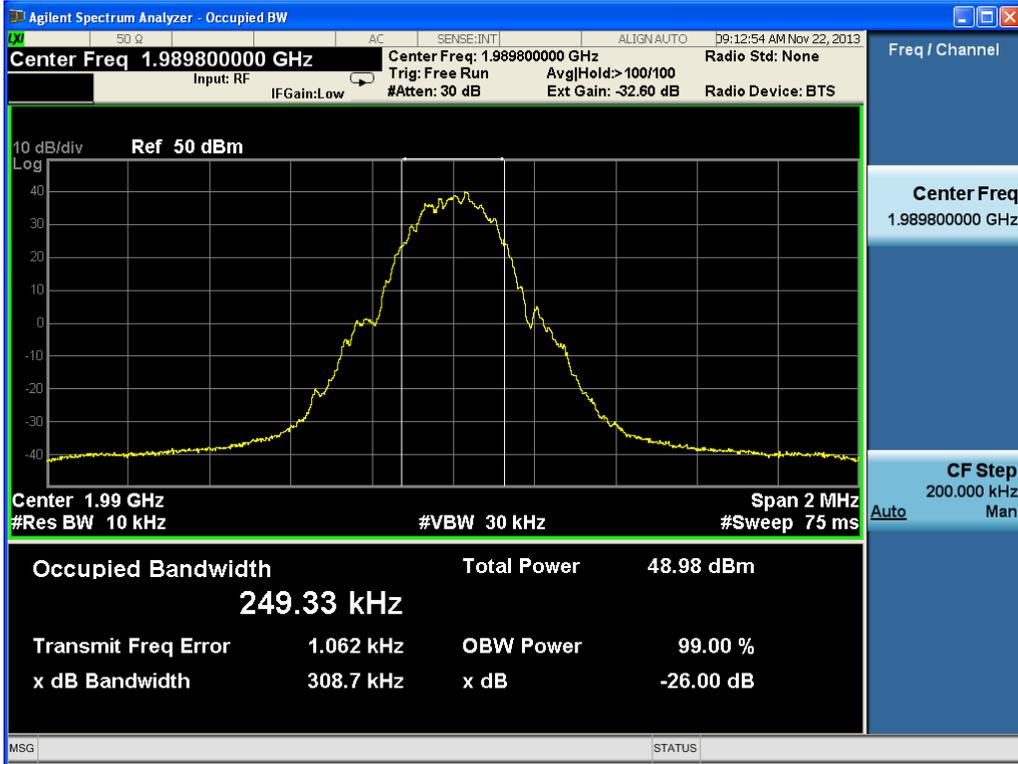
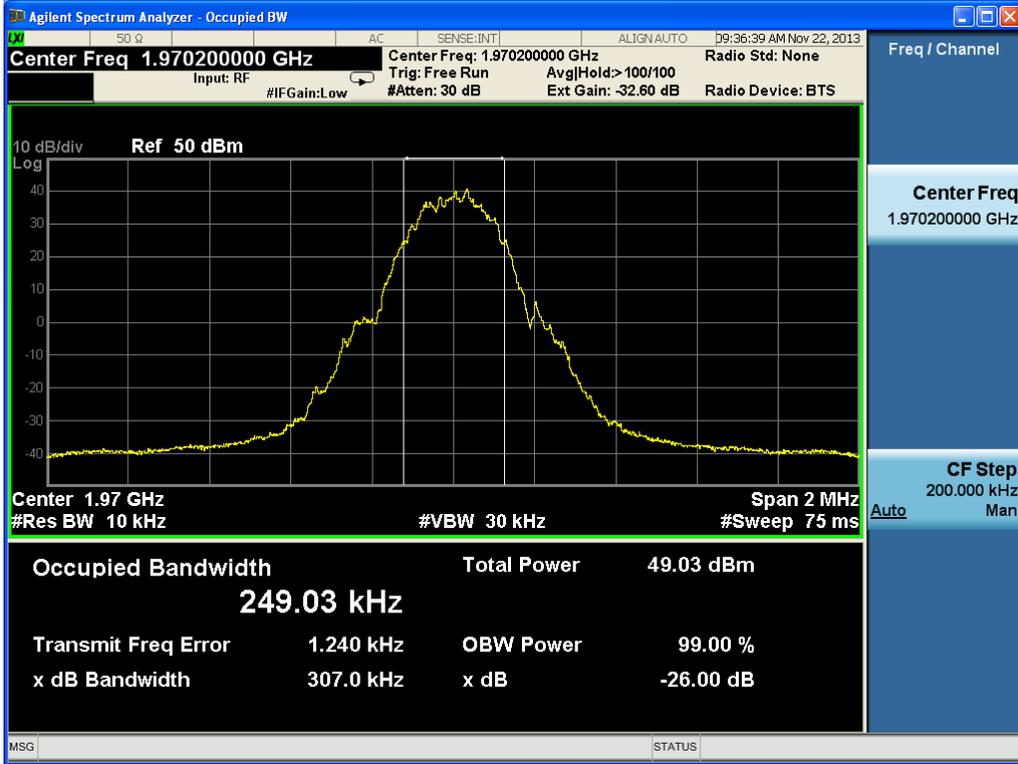
**Test Result:** Pass

**Test Mode:** Transmitting GSM

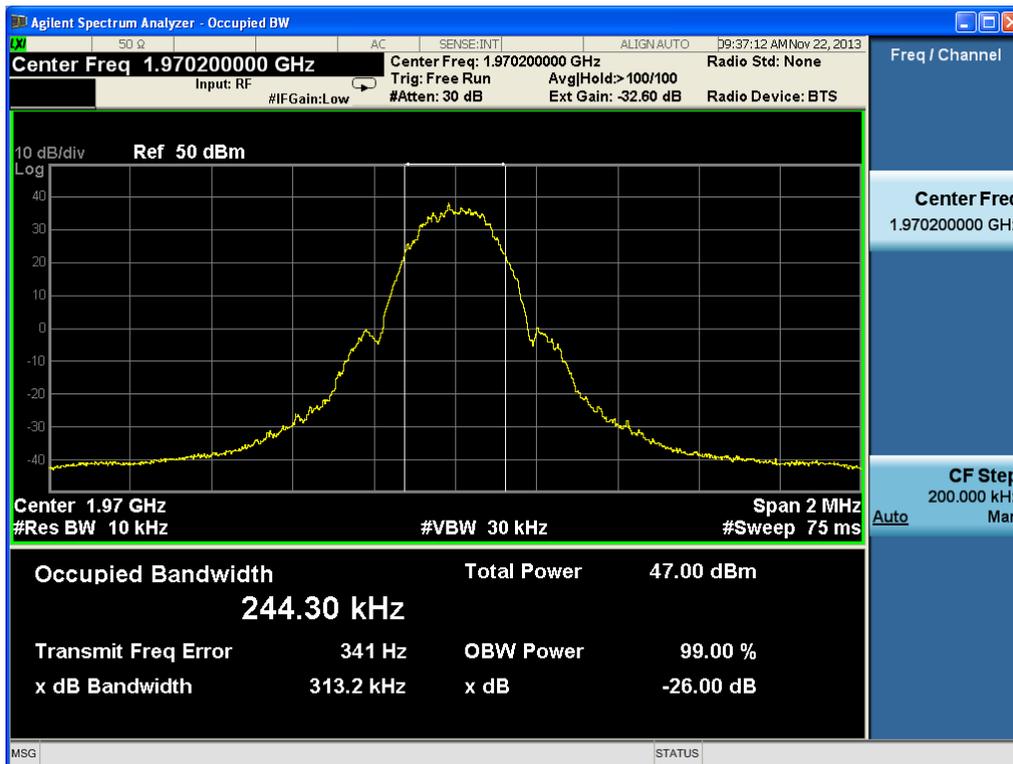
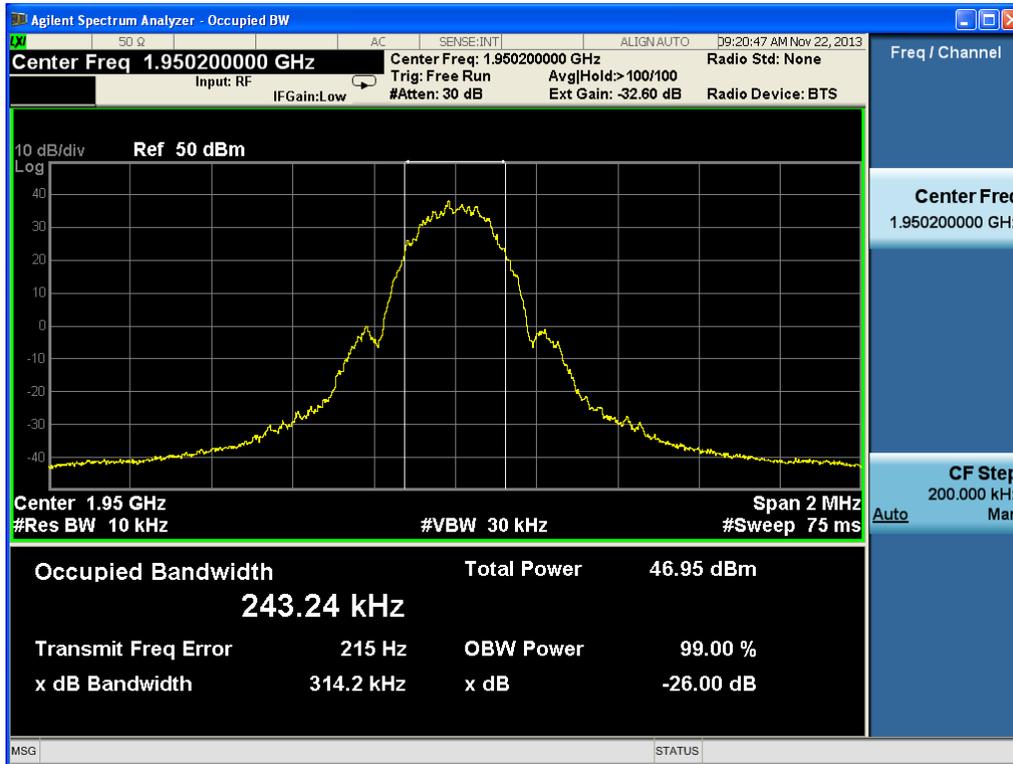
## Test Data

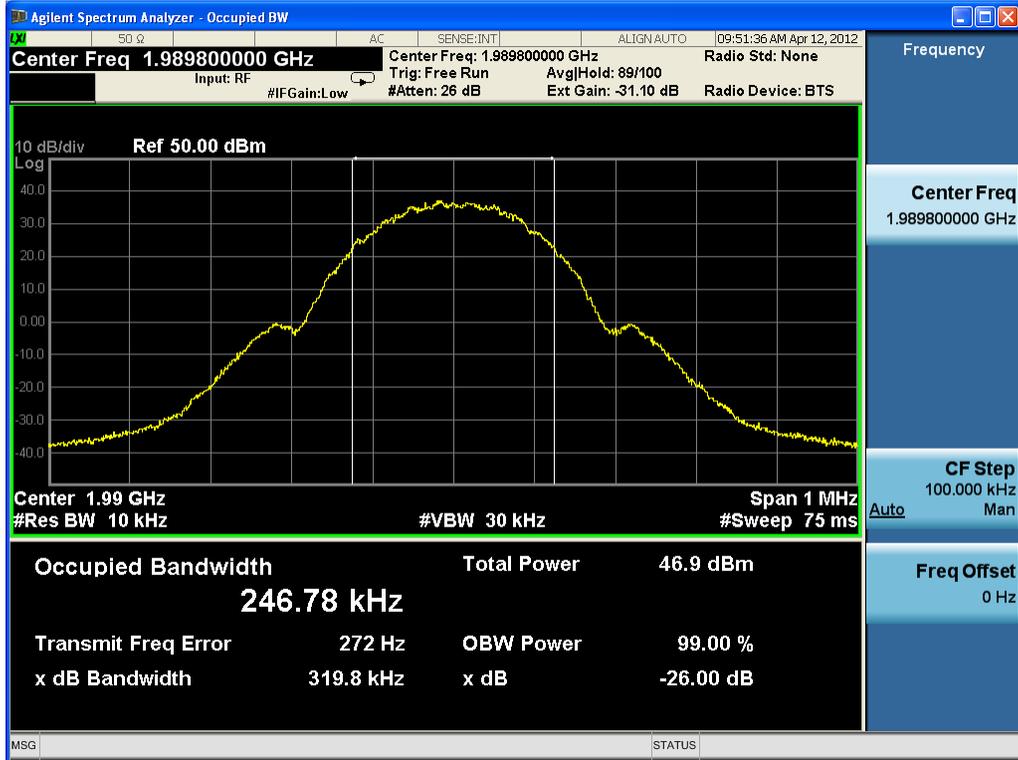
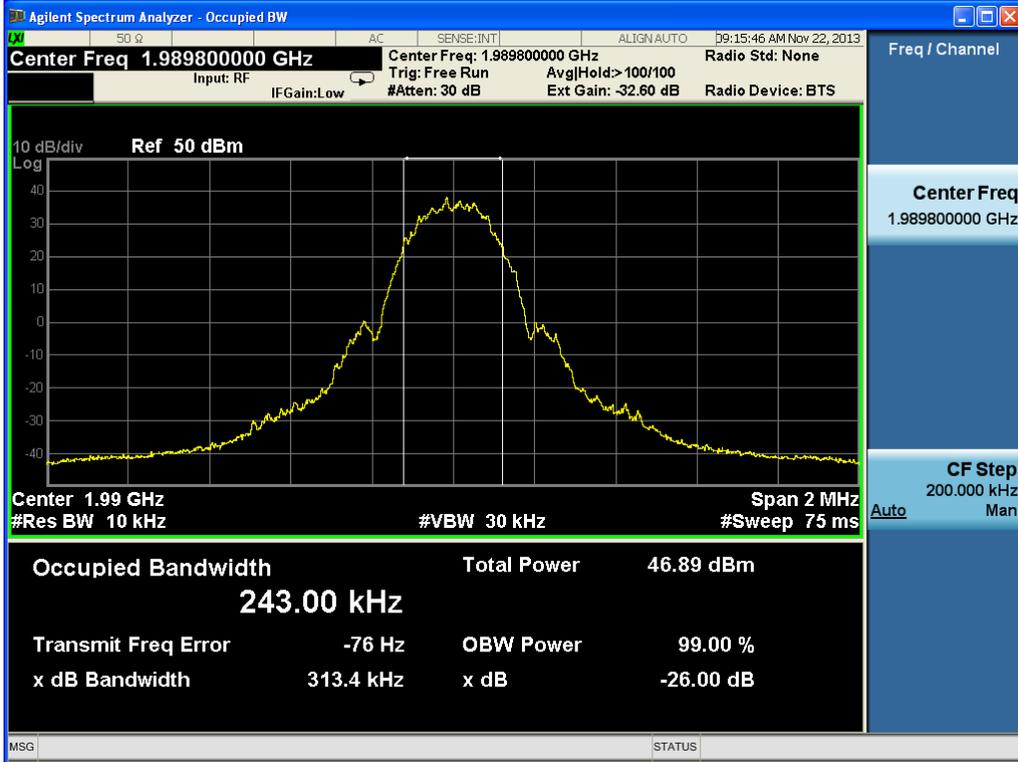
Modulation	Frequency (MHz)	99% Power Bandwidth (kHz)	Limit (kHz)
GMSK	1950.2/1970.2/1989.8	249.20/249.03/249.33	250





Modulation	Frequency (MHz)	99% Power Bandwidth (kHz)	Limit (kHz)
8PSK	1950.2/1970.2/1989.8	243.24/244.30/243.00	250





## 4.7 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	2014-4-9	2015-4-8
Atten	30dB Attenuator	ATSI150-4-30	11300110201221	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-9	2015-4-8

**\*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 GSM

## Test Data

Six carriers

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1950.2/1950.8/1951.4/1952/1952.6/1953.2	-14.883	-13.00
1986.8/1987.4/1988/1988.6/1989.2/1989.8	-13.633	-13.00





Five carriers

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1950.2/1950.8/1951.4/1952/1952.6	-14.614	-13.00
1987.4/1988/1988.6/1989.2/1989.8	-13.736	-13.00



Four carrier

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1950.2/1950.8/1951.4/1952	-14.201	-13.00
1988/1988.6/1989.2/1989.8	-14.194	-13.00



Three carriers

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1950.2/1950.8/1951.4	-14.898	-13.00
1988.6/1989.2/1989.8	-14.048	-13.00





Two carriers

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1950.2/1950.8	-14.630	-13.00
1989.2/1989.8	-13.659	-13.00





One carrier

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1950.2	-14.420	-13.00
1989.8	-13.841	-13.00



# 4.8 FREQUENCY STABILITY

## Applicable Standard: FCC § 2.1055

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	2014-6-25	2015-6-25
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2014-4-10	2015-4-9
Atten	40dB Attenuator	ATSI150-4-30	11300110201221	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-8	2015-4-8

**\*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
Relative Humidity:	54%
ATM Pressure:	1011 mbar

**Test Result:** Pass

**Test Mode:** Transmitting GSM

**Test Data**

**Frequency Stability Versus Temperature**

Frequency Stability vs. Temperature					
B(1950.2M)					
Temperature	Power Supplied Vdc	Frequency Measure Error Hz	Error ppm	Limit ppm	Result
-40	-48	-0.39	-0.00020	0.02	PASS
-30	-48	1.07	0.00055	0.02	PASS
-20	-48	-0.26	-0.00013	0.02	PASS
-10	-48	-0.54	-0.00028	0.02	PASS
0	-48	-0.21	-0.00011	0.02	PASS
10	-48	0.88	0.00046	0.02	PASS
20	-48	0.75	0.00039	0.02	PASS
30	-48	0.68	0.00035	0.02	PASS
40	-48	-0.46	-0.00024	0.02	PASS
50	-48	-1.15	-0.00060	0.02	PASS
55	-48	-0.86	-0.00045	0.02	PASS
M(1970M)					
-40	-48	0.78	0.00040	0.02	PASS
-30	-48	0.96	0.00049	0.02	PASS
-20	-48	-0.59	-0.00030	0.02	PASS
-10	-48	0.15	0.00008	0.02	PASS
0	-48	-1.12	-0.00057	0.02	PASS
10	-48	1.88	0.00096	0.02	PASS
20	-48	0.68	0.00035	0.02	PASS
30	-48	-1.55	-0.00079	0.02	PASS
40	-48	-0.36	-0.00018	0.02	PASS
50	-48	2.16	0.00110	0.02	PASS
55	-48	2.23	0.00114	0.02	PASS

<b>T(1989.8M)</b>					
-40	-48	0.99	0.00050	0.02	PASS
-30	-48	0.87	0.00044	0.02	PASS
-20	-48	-0.58	-0.00029	0.02	PASS
-10	-48	-0.45	-0.00023	0.02	PASS
0	-48	1.48	0.00074	0.02	PASS
10	-48	-1.11	-0.00056	0.02	PASS
20	-48	-0.13	-0.00007	0.02	PASS
30	-48	0.77	0.00039	0.02	PASS
40	-48	-0.47	-0.00024	0.02	PASS
50	-48	0.94	0.00047	0.02	PASS
55	-48	0.92	0.00046	0.02	PASS

### Frequency Stability Versus Voltage

<b>Frequency Stability vs. Voltage</b>					
<b>B(1950.2M)</b>					
<b>Voltage Vdc</b>	<b>Temperature</b>	<b>Frequency Measure Error Hz</b>	<b>Error ppm</b>	<b>Limit ppm</b>	<b>Result</b>
-37	20	0.76	0.00039	0.02	PASS
-39	20	-0.48	-0.00025	0.02	PASS
-41	20	0.84	0.00044	0.02	PASS
-43	20	-1.38	-0.00071	0.02	PASS
-45	20	-0.66	-0.00034	0.02	PASS
-47	20	-0.23	-0.00012	0.02	PASS
-49	20	-1.21	-0.00063	0.02	PASS
-51	20	-0.47	-0.00024	0.02	PASS
-53	20	-0.28	-0.00015	0.02	PASS
-55	20	1.76	0.00091	0.02	PASS
-57	20	0.99	0.00051	0.02	PASS
-59	20	-0.18	-0.00009	0.02	PASS
-61	20	-0.58	-0.00030	0.02	PASS
-62	20	-0.21	-0.00011	0.02	PASS
<b>M(1970M)</b>					
-37	20	-1.69	-0.00086	0.02	PASS
-39	20	1.86	0.00095	0.02	PASS
-41	20	-1.59	-0.00081	0.02	PASS
-43	20	-1.15	-0.00059	0.02	PASS
-45	20	-1.06	-0.00054	0.02	PASS
-47	20	1.98	0.00101	0.02	PASS

-49	20	1.86	0.00095	0.02	PASS
-51	20	0.88	0.00045	0.02	PASS
-53	20	1.26	0.00064	0.02	PASS
-55	20	-1.39	-0.00071	0.02	PASS
-57	20	-1.64	-0.00084	0.02	PASS
-59	20	-1.48	-0.00076	0.02	PASS
-61	20	0.95	0.00048	0.02	PASS
-62	20	-1.51	-0.00077	0.02	PASS
<b>T(1989.8M)</b>					
-37	20	0.75	0.00038	0.02	PASS
-39	20	-0.26	-0.00013	0.02	PASS
-41	20	-0.39	-0.00020	0.02	PASS
-43	20	1.52	0.00076	0.02	PASS
-45	20	-0.05	-0.00003	0.02	PASS
-47	20	-0.19	-0.00010	0.02	PASS
-49	20	-0.39	-0.00020	0.02	PASS
-51	20	1.35	0.00068	0.02	PASS
-53	20	-0.38	-0.00019	0.02	PASS
-55	20	-0.53	-0.00027	0.02	PASS
-57	20	-0.61	-0.00031	0.02	PASS
-59	20	1.58	0.00079	0.02	PASS
-61	20	1.04	0.00052	0.02	PASS
-62	20	-0.38	-0.00019	0.02	PASS

## 5 DUAL-MODE OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046 §24.232	Transmitter output Power	Compliant
§2.1091 §1.1037	RF Exposure	Compliant
§2.1053	Spurious Radiated Emissions	Compliant
§2.1051, §24.238	Spurious Emissions AT Antenna Terminals	Compliant
§2.1051, §24.238	Band edges	Compliant
§2.1049 §24.229 §24.238	Occupied Bandwidth	Compliant

## 5.1 TRANSMITTER OUTPUT POWER

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 3280 Watts/MHz for base station transmitters operating in the band of 1950 MHz to 1990 MHz with the antenna height above average terrain up to 300 meters. If used in urban area, the limit should be 1640 Watts/MHz.

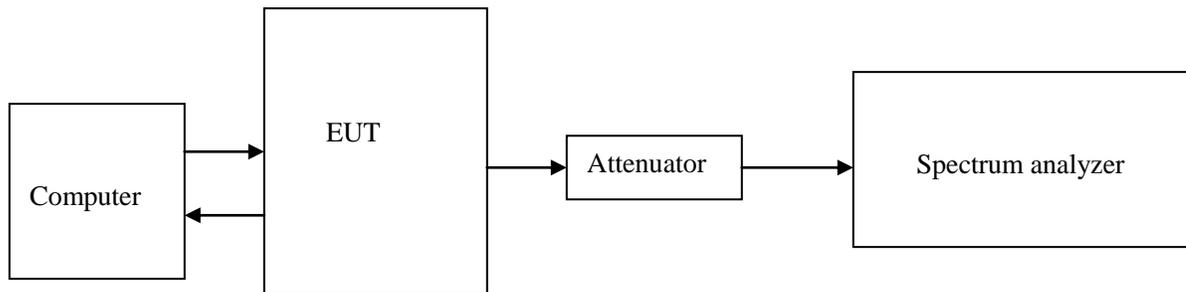
**Applicable Standard:** FCC §2.1046 §24.232

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY51160170	2014-6-16	2015-6-16
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-8	2015-4-8

**\*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 30dB, Cable Loss is about 2dB

## Environmental Conditions

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

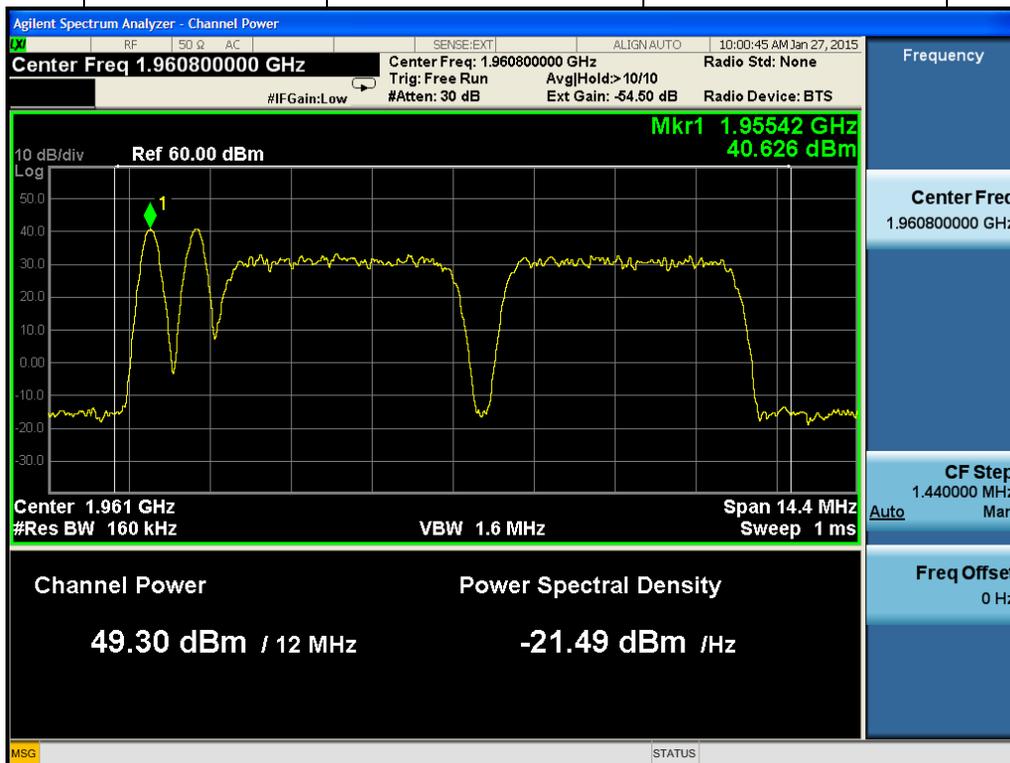
**Test Result:** Pass

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

## Test Data:

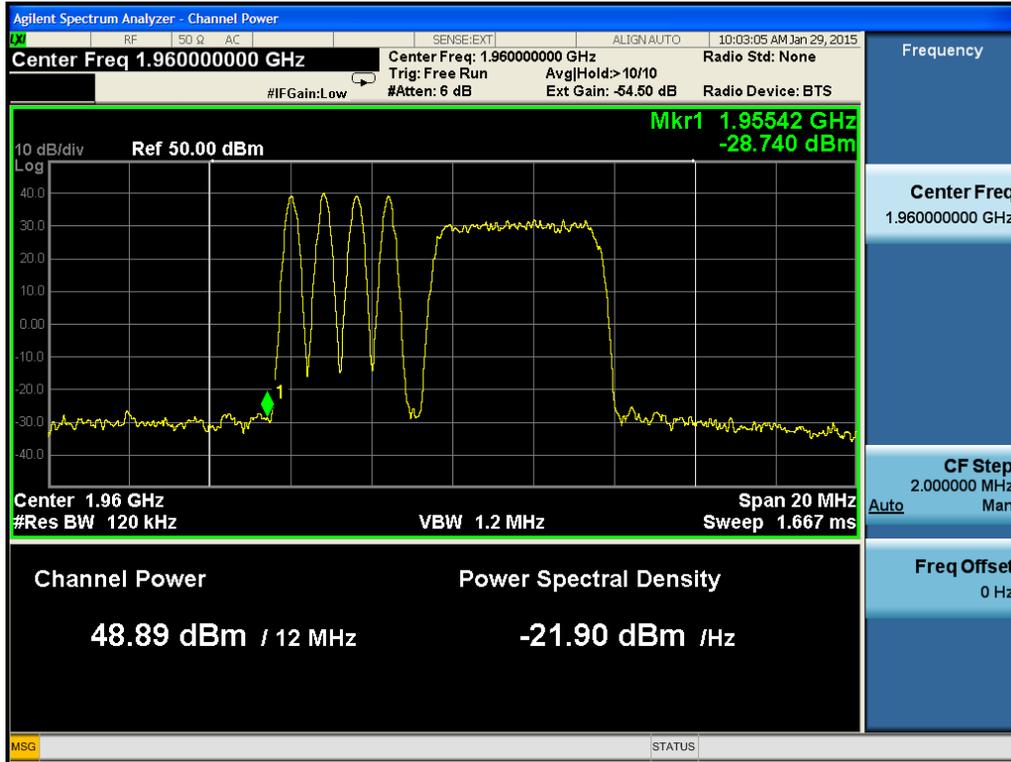
2GSMTRX and 2UMTS carriers

Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1960.8	1960.8	49.30



4GSM TRX and 1UMTS carriers

Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1960	1960	48.89



## 5.2 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) Limits for General Population/Uncontrolled Exposure**

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

Predication of MPE limit at a given distance

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

$$S = \text{EIRP} / 4\pi R^2$$

Where: S = power density

EIRP= equivalent isotropically radiated power=ERP+2.15dB

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

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

Frequency is between 1500MHz and 100000MHz, and the Maximum S=1.0mW/cm<sup>2</sup>  
R=3.61m.

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

**Test Result:** pass

## 5.3 SPURIOUS RADIATED EMISSIONS

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

### Test Equipment List and Details

Manufacturer	Equipment	Model	Serial Number	Last Cal.	Cal. Interval
R&S	SIGNAL GENERATOR	SMR20	A00017351	2014-09-09	1 year
Albatross	Anechoic Chamber	3m Site	A00017354	2014-12-01	1 year
R&S	EMI Test Receiver	ESIB26	100058	2014-10-13	1 year
R&S	Ultra Breitband Antennas	HL562	100022	2014-07-29	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100032	2014-07-14	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100446	2014-07-14	1 year
SCHWARZ-BECK	Biconical Antenna	VUBA9117	9117-122	2014-07-14	1 year

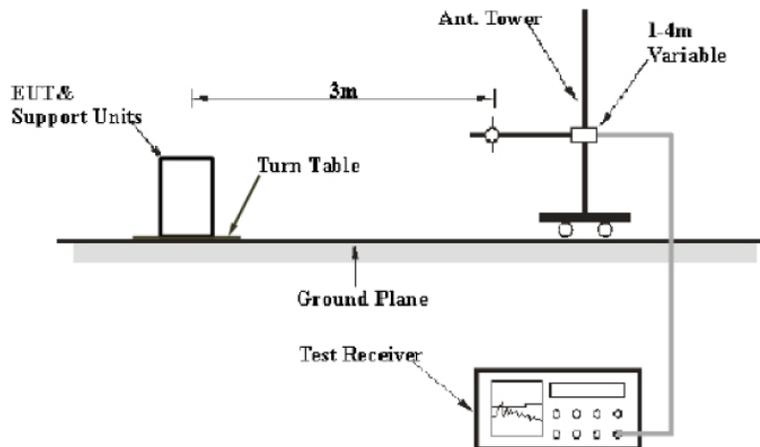
**\*statement of traceability:** ZTE Corporation Testing lab attest that all calibration have been performed per the NVLAP requirements , traceable to NIST.

#### 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 tenth 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**

Frequency (GHz)	Polar H/V	Corr. (dB)	Effective radiated power (dBm)	Dipole Antenna	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
55.270541	V	-79.2	-76.6	2.15	-78.75	-13	65.75
57.214429	V	-80.1	-77.1	2.15	-79.25	-13	66.25
92.204409	V	-81.3	-77.4	2.15	-79.55	-13	66.55
142.745491	V	-85.4	-73.7	2.15	-75.85	-13	62.85
271.042084	V	-82.8	-74.1	2.15	-76.25	-13	63.25
731.743487	V	-74.2	-69.6	2.15	-71.75	-13	58.75
996.112224	V	-70.9	-65.6	2.15	-67.75	-13	54.75
1300.601202	V	-67.8	-52.7	2.15	-54.85	-13	41.85
1949.899800	V	-63.3	-29.9	2.15	-32.05	-13	19.05
2983.967936	V	-55.7	-39.5	2.15	-41.65	-13	28.65
5825.651303	V	-94.1	-50.2	2.15	-52.35	-13	39.35
17969.939880	V	-67.3	-34.9	2.15	-37.05	-13	24.05
55.270541	H	-80.6	-77.6	2.15	-79.75	-13	66.75
57.214429	H	-81.9	-78.8	2.15	-80.95	-13	67.95
138.857715	H	-89.4	-72.0	2.15	-74.15	-13	61.15
199.118236	H	-84.6	-72.0	2.15	-74.15	-13	61.15
220.501002	H	-84.5	-73.8	2.15	-75.95	-13	62.95
593.727455	H	-75.3	-70.6	2.15	-72.75	-13	59.75
968.897796	H	-69.0	-64.2	2.15	-66.35	-13	53.35
1372.745491	H	-67.0	-52.6	2.15	-54.75	-13	41.75
1949.899800	H	-63.5	-22.8	2.15	-24.95	-13	11.95
2987.975952	H	-55.9	-39.3	2.15	-41.45	-13	28.45
3871.743487	H	-97.5	-52.4	2.15	-54.55	-13	41.55
5825.651303	H	-94.5	-50.9	2.15	-53.05	-13	40.05
6937.875752	H	-90.7	-50.5	2.15	-52.65	-13	39.65
17519.038076	H	-66.9	-35.5	2.15	-37.65	-13	24.65

Radiation emission spurious

# 5.4 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 .

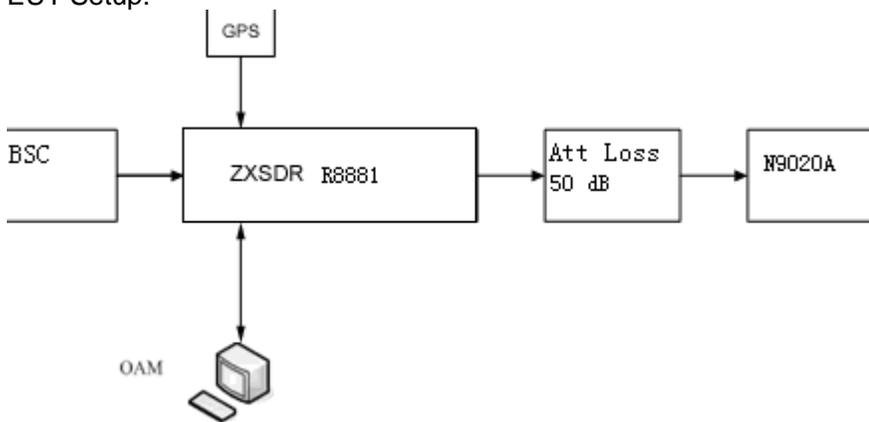
## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY51160170	2014-6-16	2015-6-16
Atten	50dB Attenuator	ATSI150-4-40	11300100204204	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-8	2015-4-8

**\*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)=50dB, Cable Loss (dB)=4dB.

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 1MHz for 30MHz to 1GHz scanning, set at 1MHz for 1GHz to 20GHz 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

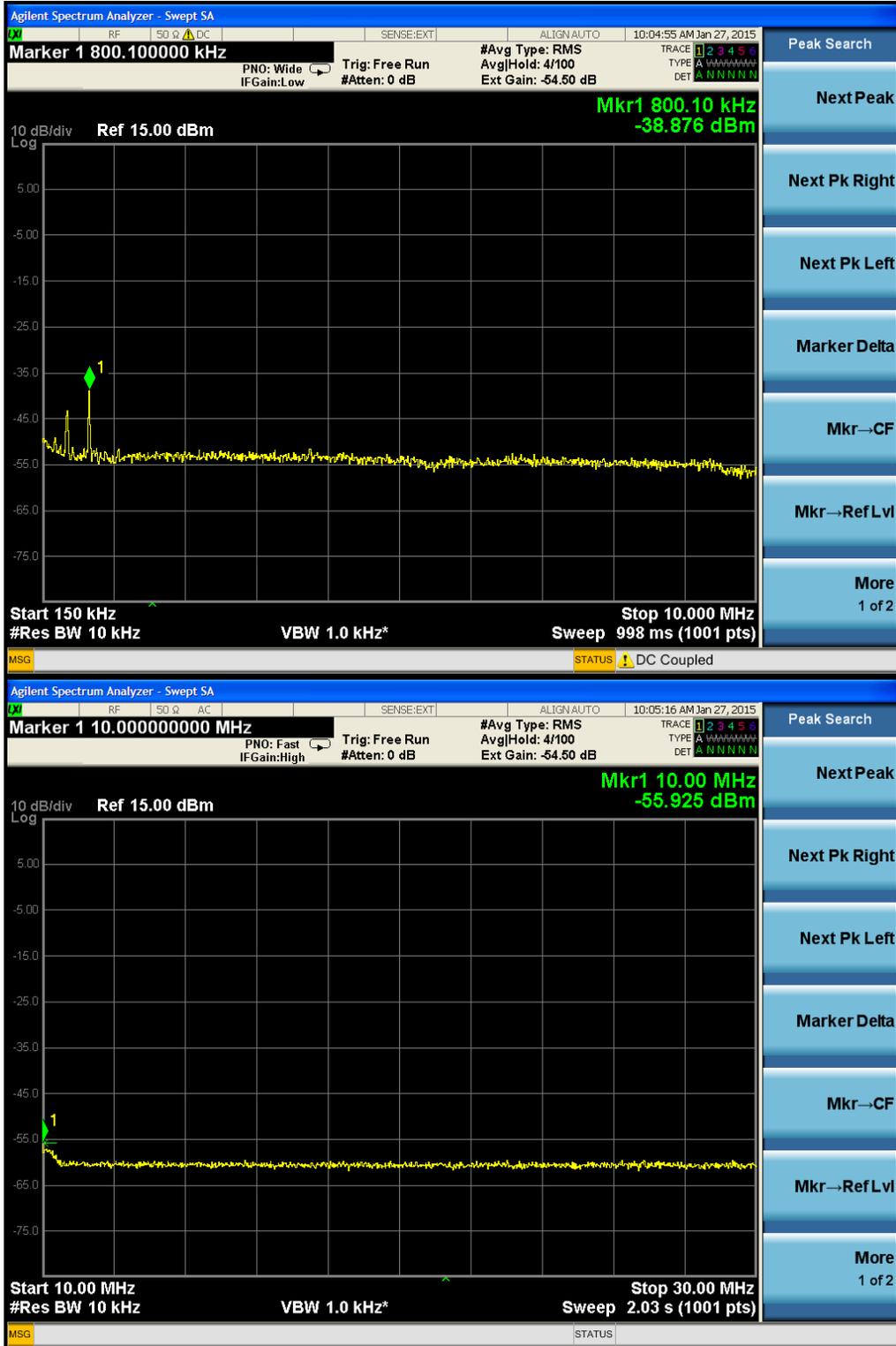
**Test Result:** Pass

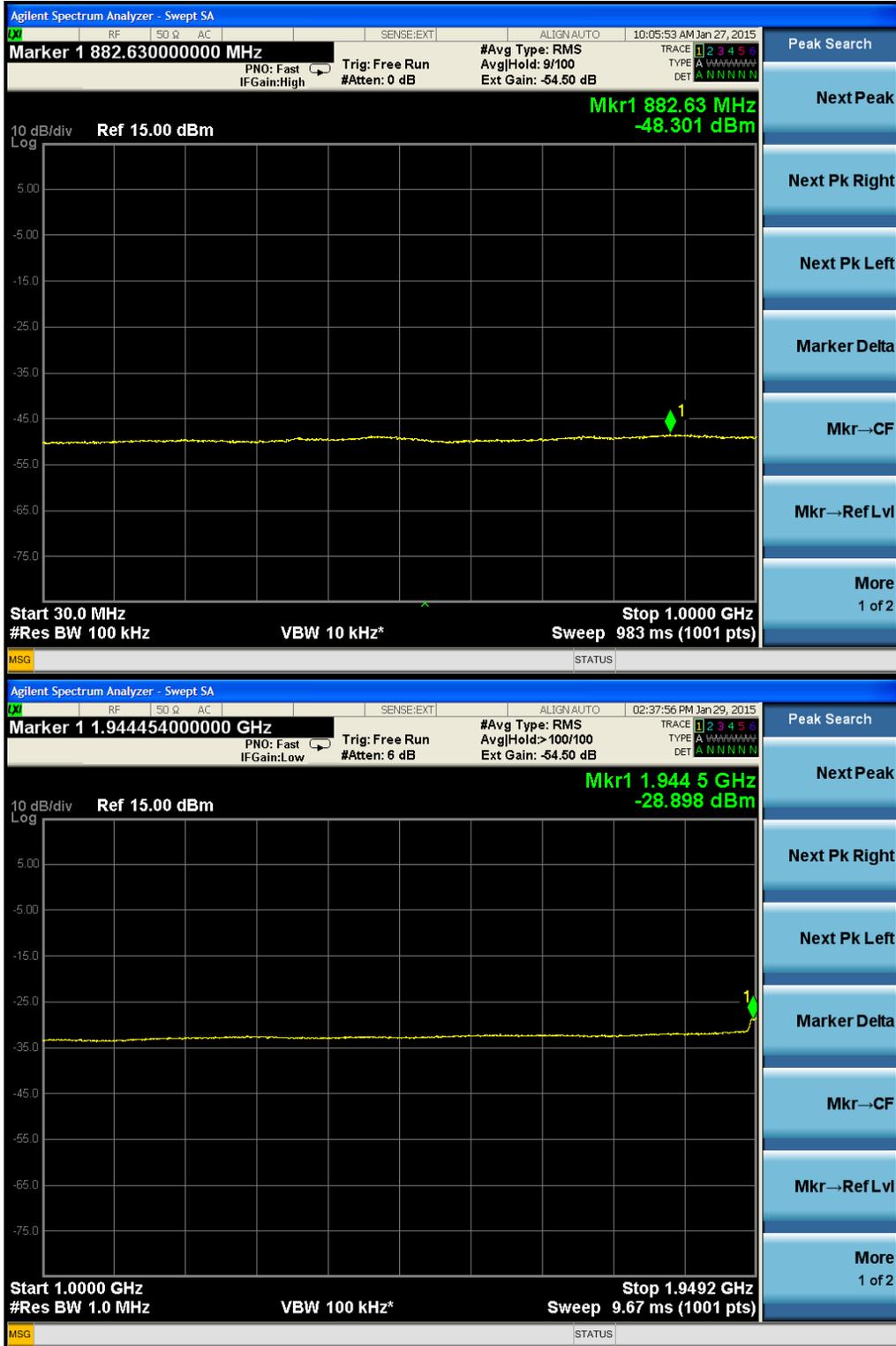
**Test Mode:** Transmitting 2GSMTRX and 2UMTS carriers and 4GSM TRX and 1UMTS carriers

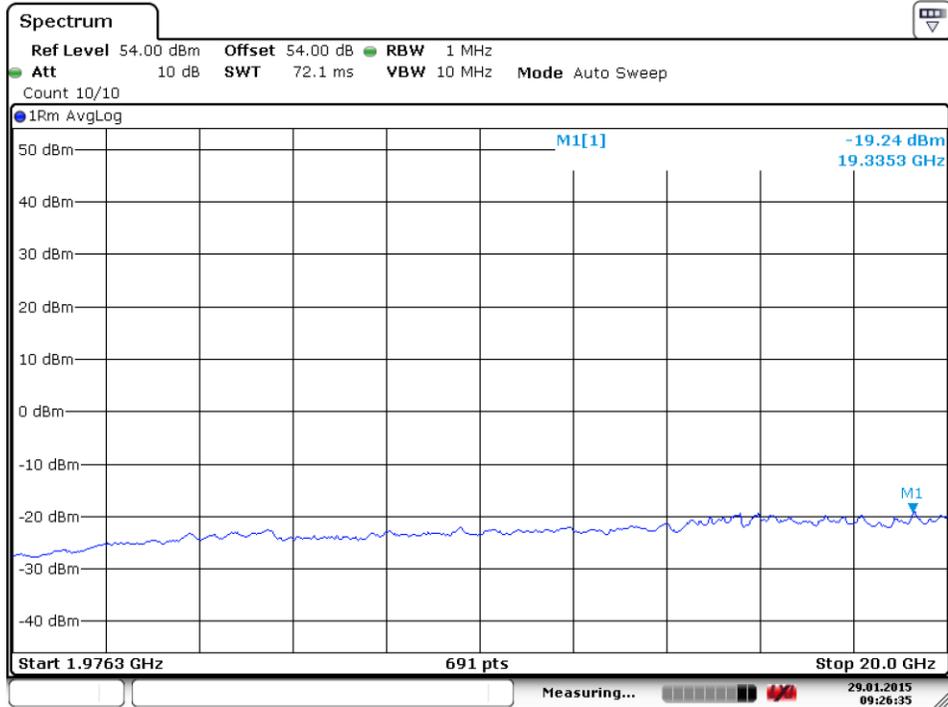
### Test Data:

2GSMTRX and 2UMTS carriers



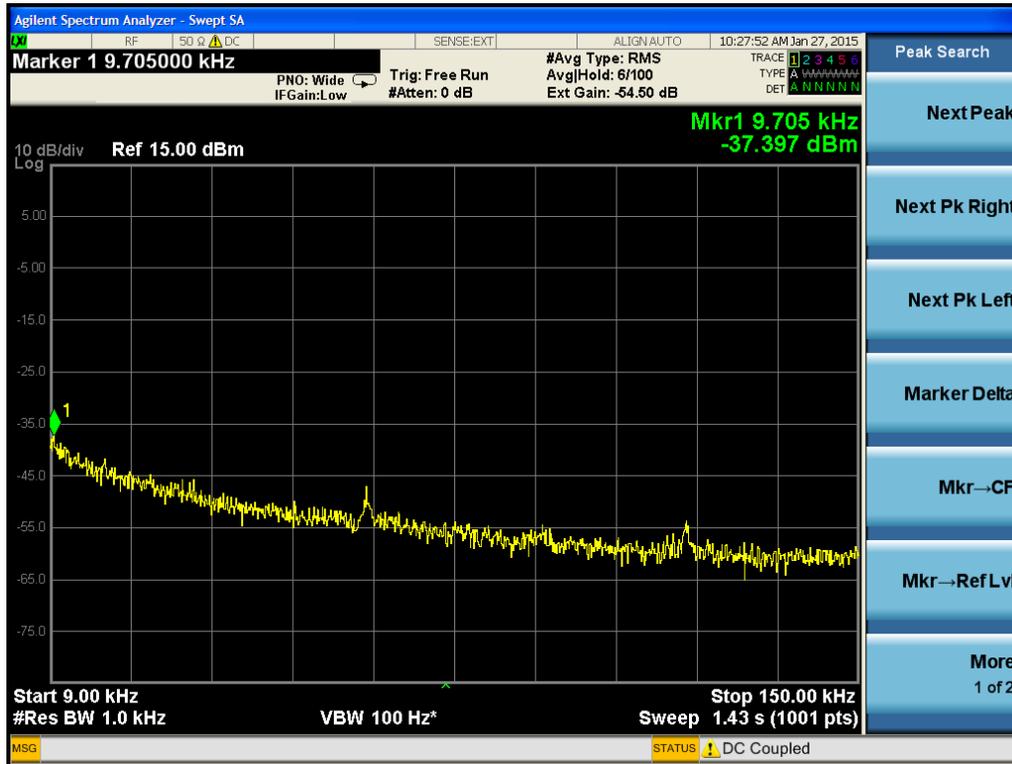


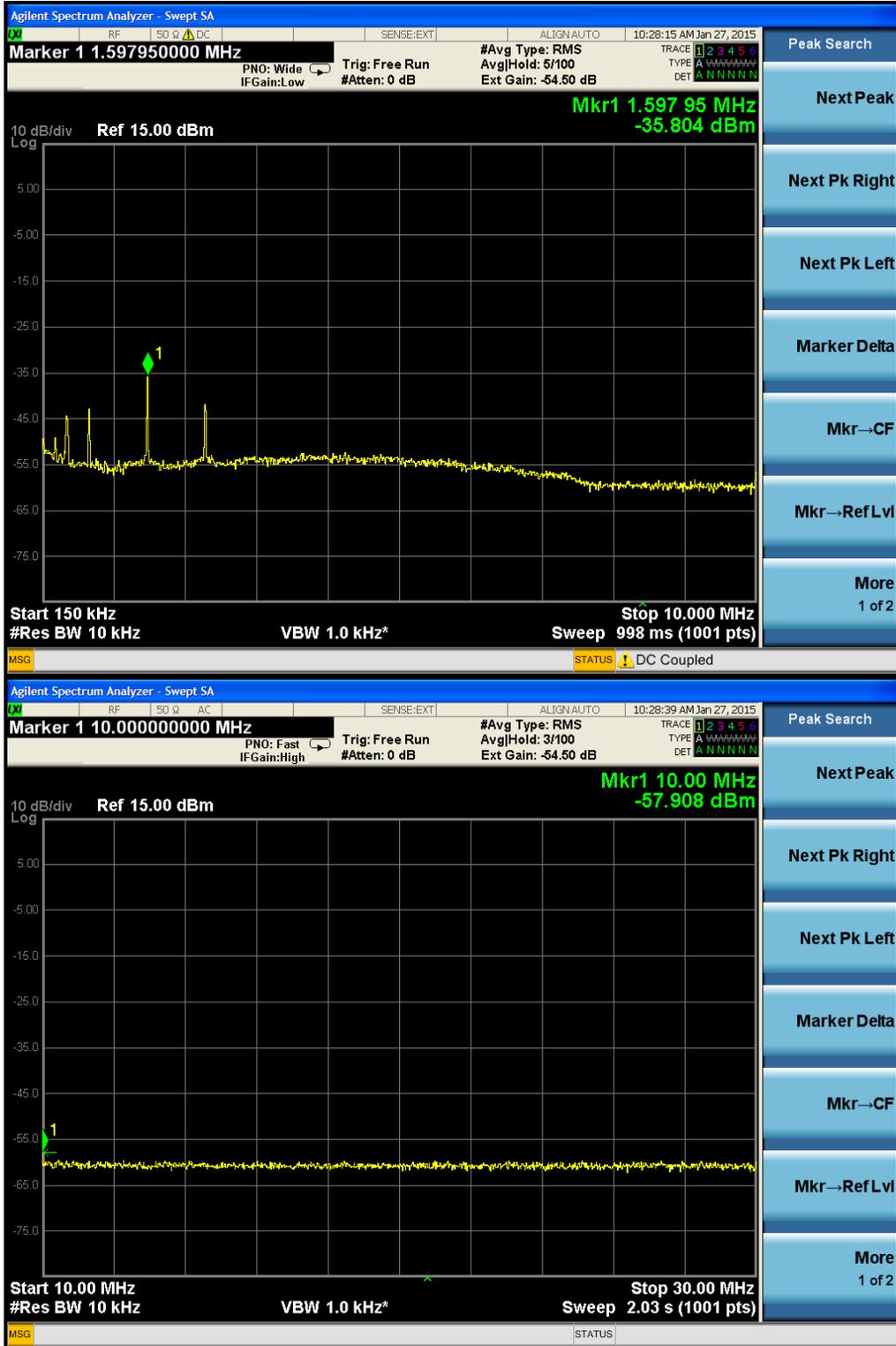


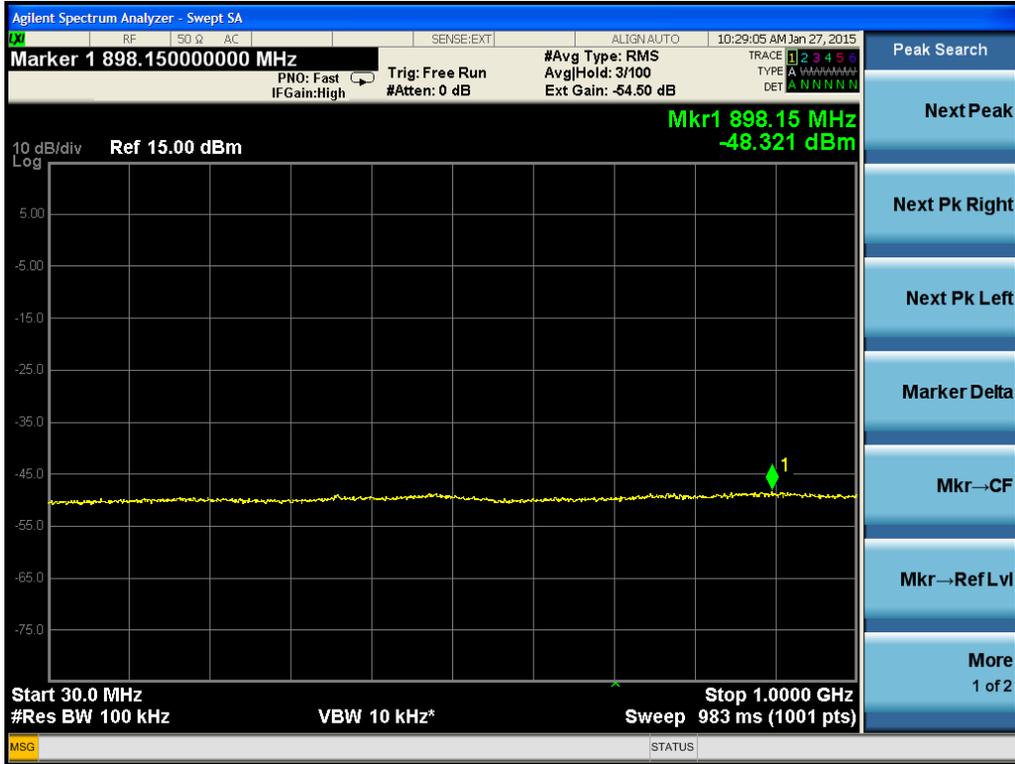


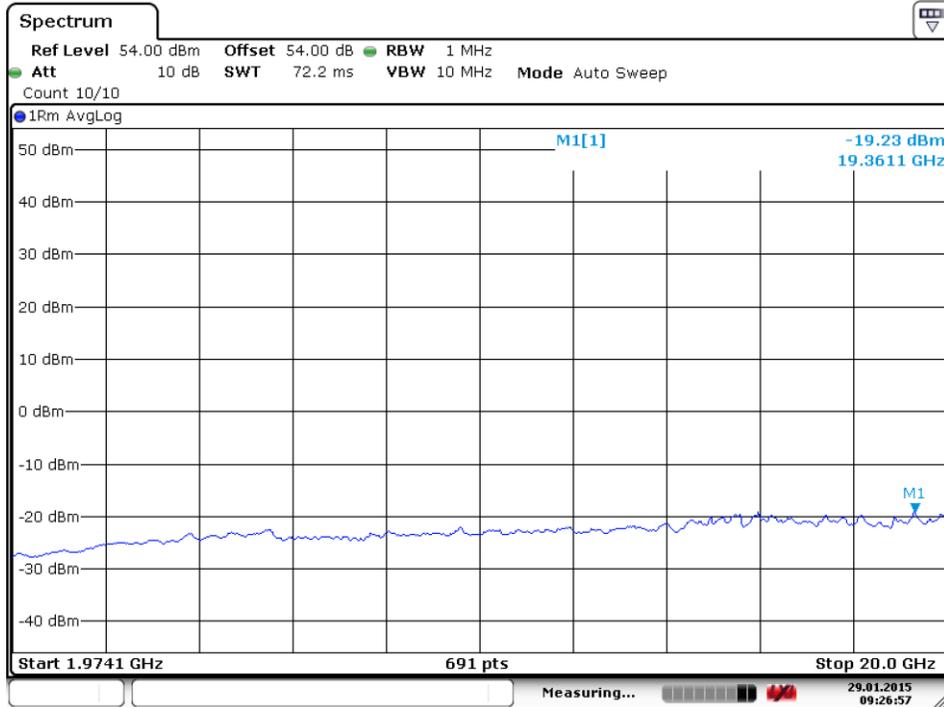
Date: 29.JAN.2015 09:26:35

## 4GSM TRX and 1UMTS carriers









Date: 29.JAN.2015 09:26:57

## 5.5 BAND EDGES

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

According to §2.1051, 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	MY51160170	2014-6-16	2015-6-16
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-8	2015-4-8

**\*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

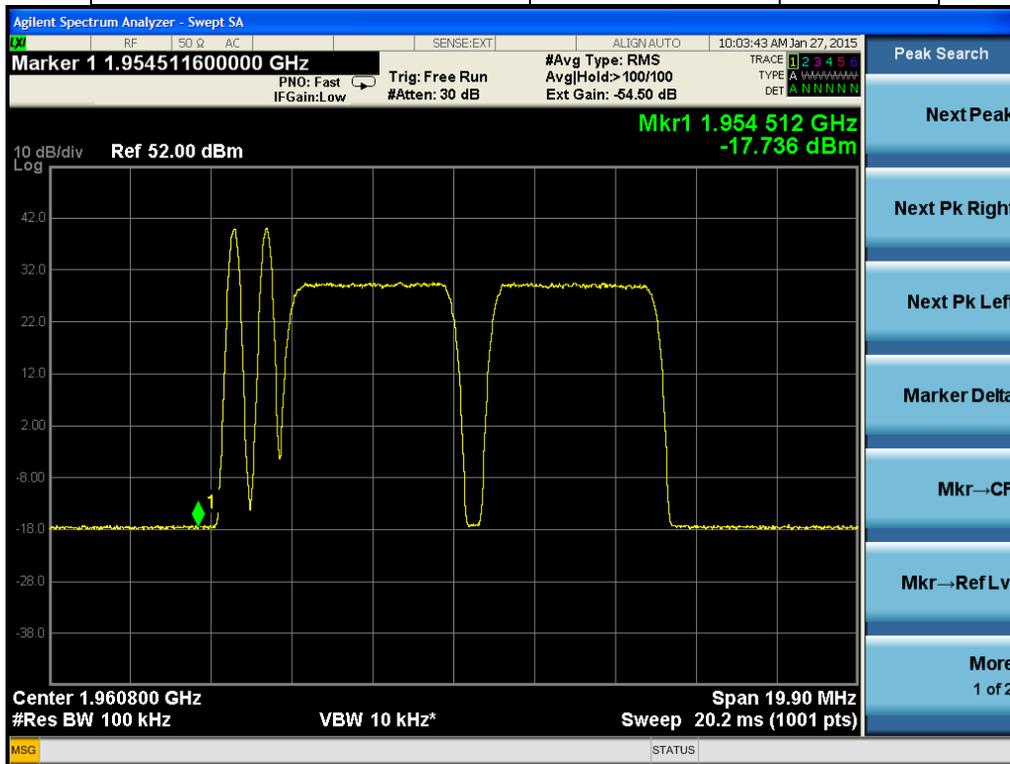
**Test Result:** Pass

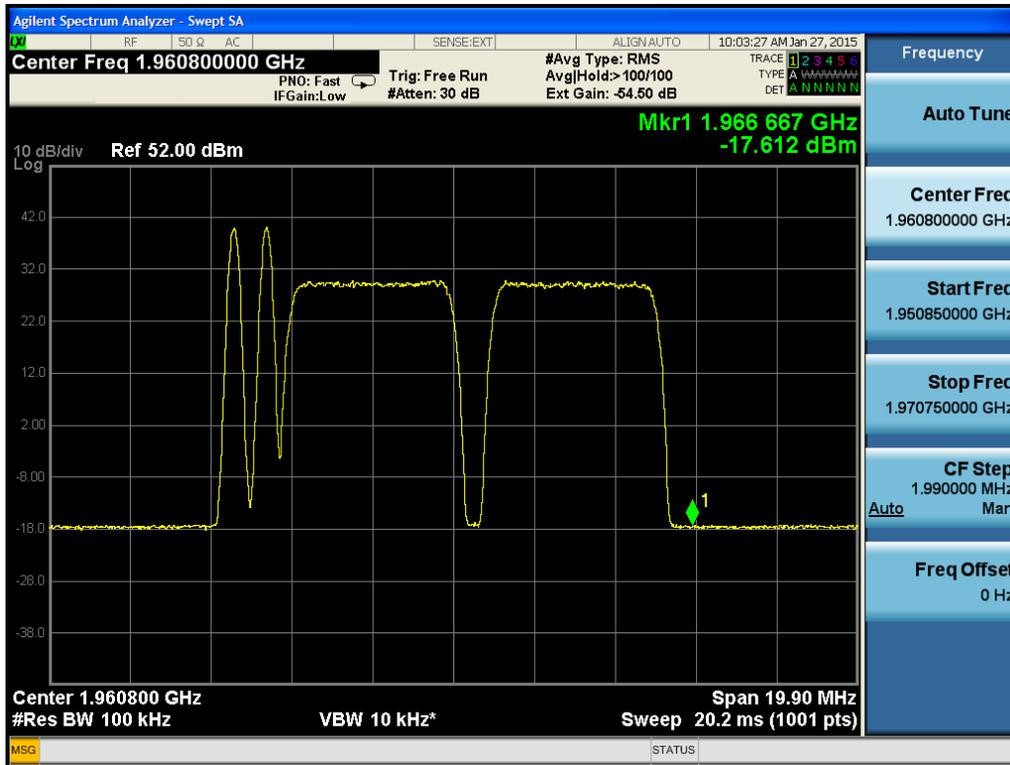
**Test Mode:** Transmitting 2GSMTRX and 2UMTS carriers and 4GSM TRX and 1UMTS carriers

## Test Data

2GSMTRX and 2UMTS carriers

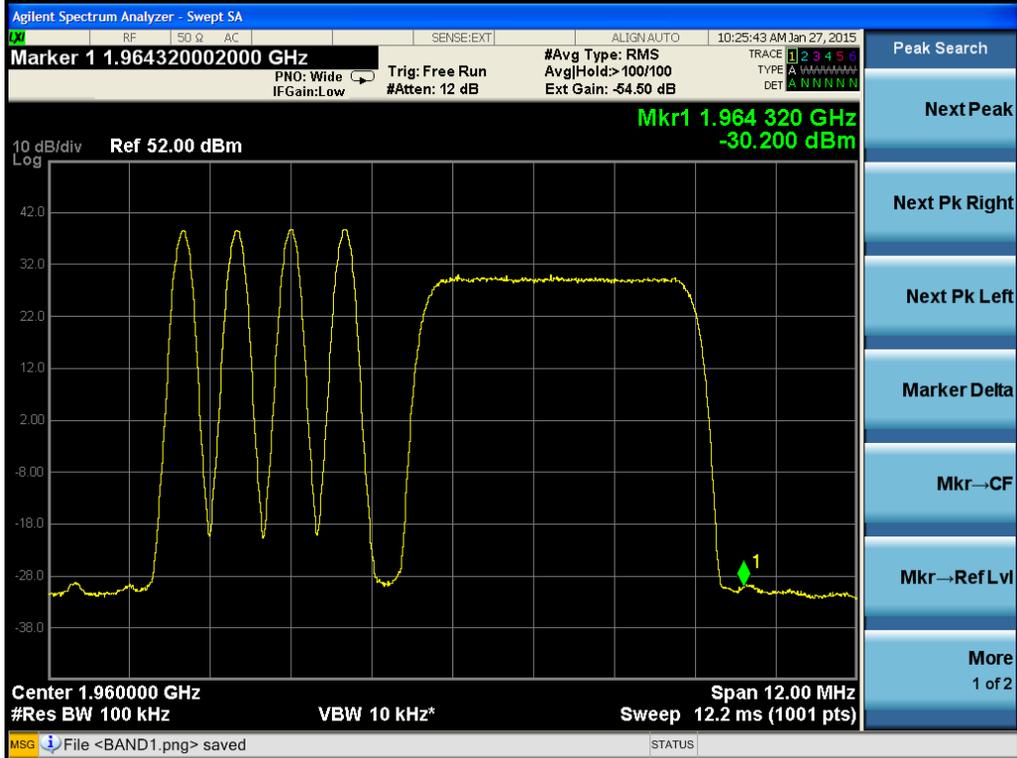
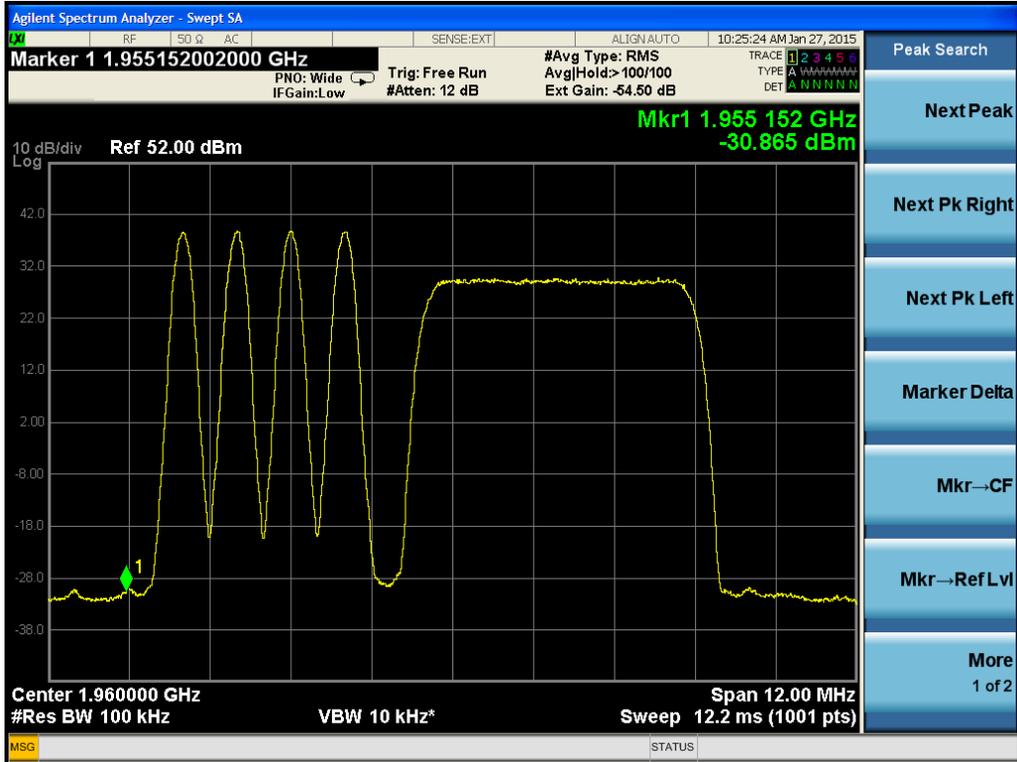
Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
1960.8	-17.736	-13.00
1960.8	-17.612	-13.00





4GSM TRX and 1UMTS carriers

Frequency	Max bandedge Emission (dBm)	Limit (dBm)
1960	-30.865	-13.00
1960	-30.200	-13.00



## 5.6 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	MY51160170	2014-6-16	2015-6-16
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2014-4-8	2015-4-8
Forstar	Forstar RF Cable	002	1034	2014-4-8	2015-4-8

**\*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

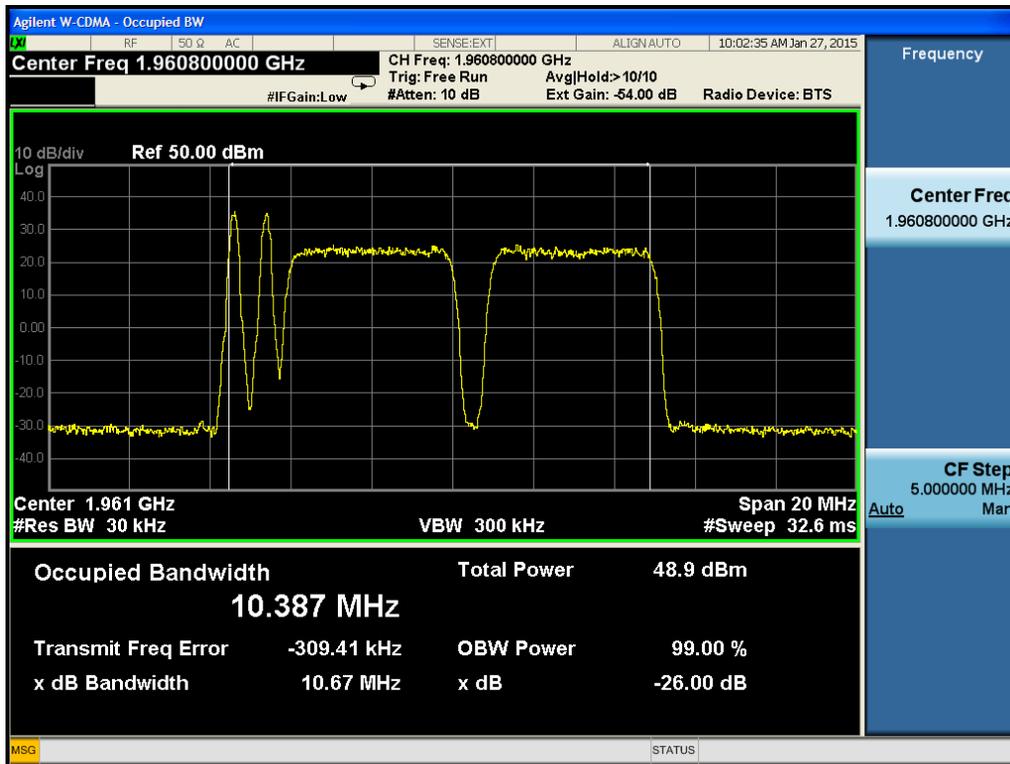
**Test Result:** Pass

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

## Test Data

2GSMTRX and 2UMTS carriers

Frequency (MHz)	99% Power Bandwidth (MHz)
1960.8	10.387



4GSM TRX and 1UMTS carriers

Frequency (MHz)	99% Power Bandwidth (MHz)
1960	7.6016

