

FCC MEASUREMENT AND TEST REPORT

For

ZTE Corporation

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

FCC ID: Q78- R8882S8500

Apr 13, 2012

This Report Concerns: ☒ Original Report		Equipment Type: Macro Radio Remote Unit
Test Engineer:	Bloom <i>Bloom</i>	
Report No.:	FCC-2011-085	
Test Date:	Mar 29 – Apr 7, 2012	
Reviewed By:	Xie Yuming <i>Xie Yuming</i>	
Prepared By:	ZTE Corporation.	
ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong, China 518057, P.R.China Tel: +86-755-26770000 Fax: +86-755-26771999		

Note: The test report is specially limited to the above company and this particular sample only. It may not be duplicated without prior written consent of ZTE Corporation. This report must not be used by the client to claim product certification ,approval ,or endorsement by any agency of the US Government.

TABLE OF CONTENTS

TABLE OF CONTENTS.....	2
1 GENERAL INFORMATION.....	7
Product Description for Equipment Under Test (EUT)	7
Objective.....	8
Related Submittal(s)/Grant(s).....	8
Test Methodology	8
Test Facility.....	9
2 SYSTEM TEST CONFIGURATION.....	9
Description of Test Configuration	9
3 CDMA OF TEST RESULTS	11
3.1 TRANSMITTER OUTPUT POWER	12
Applicable Standard: FCC §2.1046 §22.913	12
Test Equipment List and Details.....	12
Test Procedure.....	13
Environmental Conditions	13
Test Result: Pass.....	13
Test Mode: Transmitting CDMA	13
Test Data:.....	13
3.2 RF EXPOSURE	22
Applicable standard: FCC §2.1091 §1.1037	22
Limit.....	22
Test Data.....	22
Test Result: pass.....	22
3.3 MODULATION CHARACTERISTIC.....	23
Applicable Standard: FCC §2.1047	23
Test Equipment List and Details.....	23
Test Procedure.....	23
Test Data Environmental Conditions	23
Test Result: Pass.....	23
Test Mode: Transmitting CDMA	23
Test Data:.....	24
3.4 SPURIOUS RADIATED EMISSIONS.....	26
Applicable Standard: FCC CFR 47, §2.1053	26
Test Equipment List and Details.....	26
Test Procedure.....	27
Test Results Summary: PASS	27
Environmental Conditions	27
Test data	28
3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS	29
Applicable Standard: FCC§2.1051, §22.917	29
Test Equipment List and Details.....	29
Test Procedure.....	29
Test Data Environmental Conditions	30
Test Result: Pass.....	30
Test Mode: Transmitting CDMA	30
Test Data:.....	30
3.6 OCCUPIED BANDWIDTH.....	43
Applicable Standard: FCC §2.1049 §22.917	43

Test Equipment List and Details:.....	43
Test Procedure.....	43
Environmental Conditions	43
Test Result: Pass.....	44
Test Mode: Transmitting CDMA	44
Test Data.....	44
3.7 BAND EDGES.....	52
Applicable Standard: FCC §2.1051	52
Test Equipment List and Details.....	52
Test Procedure.....	52
Test Data Environmental Conditions	52
Test Result: Pass.....	53
Test Mode: Transmitting CDMA	53
Test Data.....	53
3.8 FREQUENCY STABILITY	59
Applicable Standard: FCC § 2.1055, § 22.355.....	59
Test Equipment List and Details.....	59
Test Procedure.....	59
Environmental Conditions	59
Test Result: Pass.....	60
Test Mode: Transmitting CDMA	60
Test Data.....	60
Frequency Stability Versus Temperature.....	60
Frequency Stability Versus Voltage.....	61
4 UMTS OF TEST RESULTS	62
4.1 TRANSMITTER OUTPUT POWER	63
Applicable Standard: FCC §2.1046 §22.913	63
Test Equipment List and Details.....	63
Test Procedure.....	64
Environmental Conditions	64
Test Result: Pass.....	64
Test Mode: Transmitting UMTS.....	64
Test Data:.....	64
4.2 RF EXPOSURE	73
Applicable standard: FCC §2.1091 §1.1037	73
Limit.....	73
Test Data.....	73
Test Result: pass.....	73
4.3 MODULATION CHARACTERISTIC.....	74
Applicable Standard: FCC §2.1047	74
Test Equipment List and Details.....	74
Test Procedure.....	74
Test Data Environmental Conditions	74
Test Result: Pass.....	74
Test Mode: Transmitting UMTS.....	74
Test Data:.....	75
4.4 SPURIOUS RADIATED EMISSIONS.....	77
Applicable Standard: FCC CFR 47, §2.1053	77
Test Equipment List and Details.....	77
Test Procedure.....	78
Test Results Summary: PASS	78
Environmental Conditions	78
Test data	79

4.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS	80
Applicable Standard: FCC§2.1051, §22.917	80
Test Equipment List and Details	80
Test Procedure	80
Test Data Environmental Conditions	81
Test Result: Pass	81
Test Mode: Transmitting UMTS	81
Test Data:	81
4.6 OCCUPIED BANDWIDTH	118
Applicable Standard: FCC §2.1049 §22.917	118
Test Equipment List and Details:	118
Test Procedure	118
Environmental Conditions	118
Test Result: Pass	119
Test Mode: Transmitting UMTS	119
Test Data	119
4.7 BAND EDGES	121
Applicable Standard: FCC §2.1051	121
Test Equipment List and Details	121
Test Procedure	121
Test Data Environmental Conditions	121
Test Result: Pass	122
Test Mode: Transmitting UMTS	122
Test Data	122
4.8 FREQUENCY STABILITY	128
Applicable Standard: FCC § 2.1055, § 22.355	128
Test Equipment List and Details	128
Test Procedure	128
Environmental Conditions	128
Test Result: Pass	129
Test Mode: Transmitting UMTS	129
Test Data	129
Frequency Stability Versus Temperature	129
Frequency Stability Versus Voltage	130
5 GSM OF TEST RESULTS	132
5.1 TRANSMITTER OUTPUT POWER	133
Applicable Standard: FCC §2.1046 §22.913	133
Test Equipment List and Details	133
Test Procedure	134
Environmental Conditions	134
Test Result: Pass	134
Test Mode: Transmitting GSM	134
Test Data:	134
5.2 RF EXPOSURE	159
Applicable standard: FCC §2.1091 §1.1037	159
Limit	159
Test Data	159
Test Result: pass	159
5.3 MODULATION CHARACTERISTIC	160
Applicable Standard: FCC §2.1047	160
Test Equipment List and Details	160
Test Procedure	160
Test Data Environmental Conditions	160

Test Result: Pass	160
Test Mode: Transmitting GSM	160
Test Data:	161
5.4 SPURIOUS RADIATED EMISSIONS	165
Applicable Standard: FCC CFR 47, §2.1053	165
Test Equipment List and Details	165
Test Procedure	166
Test Results Summary: PASS	166
Environmental Conditions	166
Test data	167
5.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS	168
Applicable Standard: FCC§2.1051, §22.917	168
Test Equipment List and Details	168
Test Procedure	168
Test Data Environmental Conditions	169
Test Result: Pass	169
Test Mode: Transmitting GSM	169
Test Data:	169
5.6 OCCUPIED BANDWIDTH	188
Applicable Standard: FCC §2.1049 §22.917	188
Test Equipment List and Details:	188
Test Procedure	188
Environmental Conditions	188
Test Result: Pass	189
Test Mode: Transmitting GSM	189
Test Data	189
5.7 BAND EDGES	193
Applicable Standard: FCC §2.1051	193
Test Equipment List and Details	193
Test Procedure	193
Test Data Environmental Conditions	193
Test Result: Pass	194
Test Mode: Transmitting GSM	194
Test Data	194
5.8 FREQUENCY STABILITY	203
Applicable Standard: FCC § 2.1055, § 22.355	203
Test Equipment List and Details	203
Test Procedure	203
Environmental Conditions	203
Test Result: Pass	204
Test Mode: Transmitting GSM	204
Test Data	204
Frequency Stability Versus Temperature	204
Frequency Stability Versus Voltage	205
6 DUAL-MODE OF TEST RESULTS	207
6.1 TRANSMITTER OUTPUT POWER	208
Applicable Standard: FCC §2.1046 §22.913	208
Test Equipment List and Details	208
Test Procedure	209
Environmental Conditions	209
Test Result: Pass	209
Test Mode: Transmitting 2GSMTRX and 2UMTS carriers and 4GSMTRX and 1UMTS carriers	209

Test Data:.....	209
6.2 RF EXPOSURE	212
Applicable standard: FCC §2.1091 §1.1037	212
Limit.....	212
Test Data.....	212
Test Result: pass.....	212
6.3 SPURIOUS RADIATED EMISSIONS.....	213
Applicable Standard: FCC CFR 47, §2.1053	213
Test Equipment List and Details.....	213
Test Procedure.....	214
Test Results Summary: PASS	214
Environmental Conditions	214
Test data	215
6.4 SPURIOUS EMISSIONS AT ANTENNA TERMINALS.....	216
Applicable Standard: FCC§2.1051, §22.917	216
Test Equipment List and Details.....	216
Test Procedure.....	216
Test Data Environmental Conditions	217
Test Result: Pass.....	217
Test Mode: Transmitting 2GSMTRX and 2UMTS carriers and 4GSMTRX and 1UMTS carriers	217
Test Data:.....	217
6.5 OCCUPIED BANDWIDTH.....	224
Applicable Standard: FCC §2.1049 §22.917	224
Test Equipment List and Details:.....	224
Test Procedure.....	224
Environmental Conditions	224
Test Result: Pass.....	225
Test Mode: Transmitting 2GSMTRX and 2UMTS carriers and 4GSMTRX and 1UMTS carriers	225
Test Data.....	225
6.6 BAND EDGES.....	227
Applicable Standard: FCC §2.1051	227
Test Equipment List and Details.....	227
Test Procedure.....	227
Test Data Environmental Conditions	227
Test Result: Pass.....	228
Test Mode: Transmitting 2GSMTRX and 2UMTS carriers and 4GSMTRX and 1UMTS carriers	228
Test Data.....	228

1 GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The ZXSDR R8882 is a multi-mode remote RF unit that supports 2T4R FDD. It supports GSM, UMTS, and CDMA communications systems and features compact structure, large capacity, and easy installation.

Technical specification:

Size: 480 mm × 320 mm × 150 mm(H x W x D)

Input voltage: -48Vdc

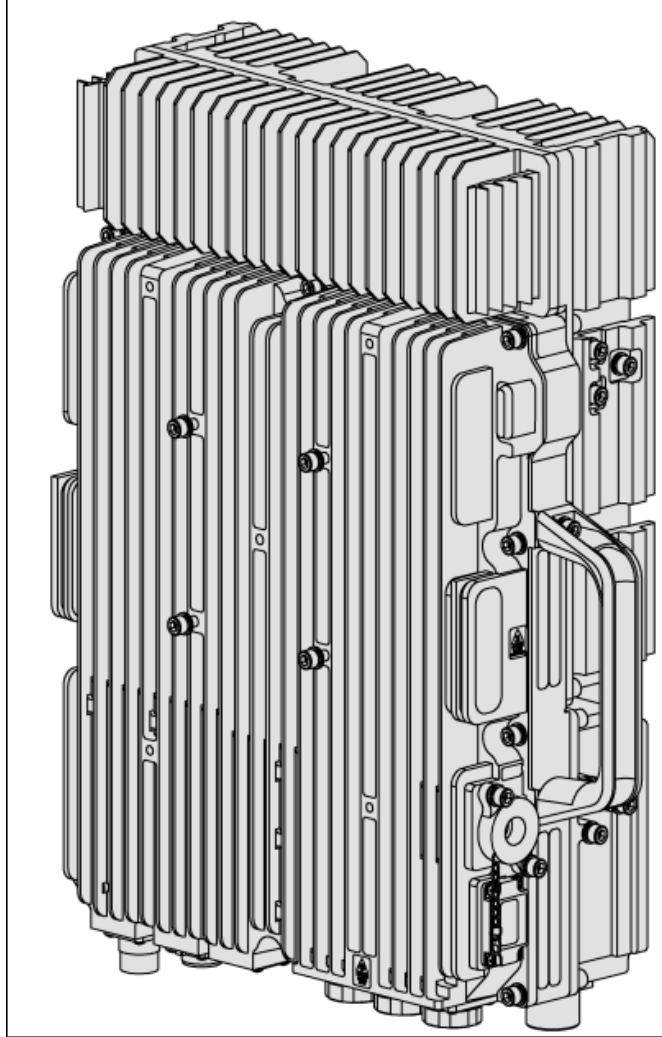
Frequency range: 869MHz to 894MHz

Max RF output power: 47.8dBm

Gain of the antenna: 18dBi, except CDMA is 13dBi

Modulation type of emission: the modulation of CDMA is QPSK; 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 22 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). ZTE Corporation EMC Lab was certificated by CNAS and the registration number was L0611. The FCC registration number of ZTE corporation EMC lab is 373926. The IC registration number of ZTE corporation EMC lab is 5200A. The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules. 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.: 0009043175. 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

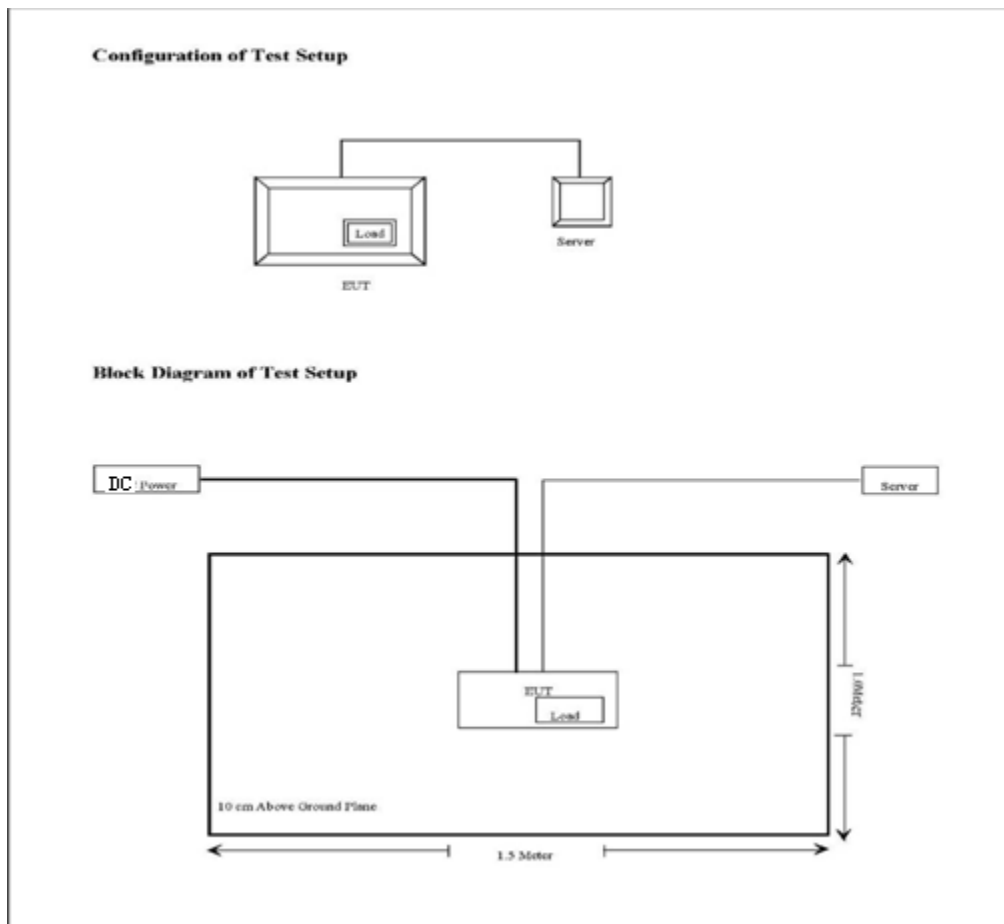
Justification

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 CDMA OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046 ,§22.913	Transmitter output Power	Compliant
§2.1091 ,§1.1037	RF Exposure	Compliant
§2.1047	Modulation Characteristic	Compliant
§2.1053, §22.917	Spurious Radiated Emissions	Compliant
§2.1051, §22.917	Spurious Emissions AT Antenna Terminals	Compliant
§2.1049 §22.917	Occupied Bandwidth	Compliant
§2.1051, §22.917	Band Edge	Compliant
§ 2.1055, §22.355	Frequency stability	Compliant

3.1 TRANSMITTER OUTPUT POWER

Applicable Standard: FCC §2.1046 §22.913

According to FCC §2.1046 & 22.913, the ERP (equivalent radiated power) must not exceed 500 Watts.

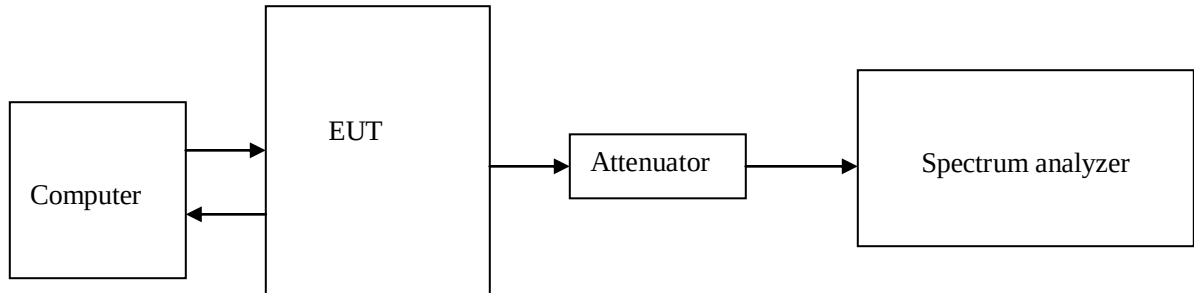
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

***statement of traceability:** ZTE Corporation Reliability Testing Center attests that all

calibration has 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 2dB

Environmental Conditions

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

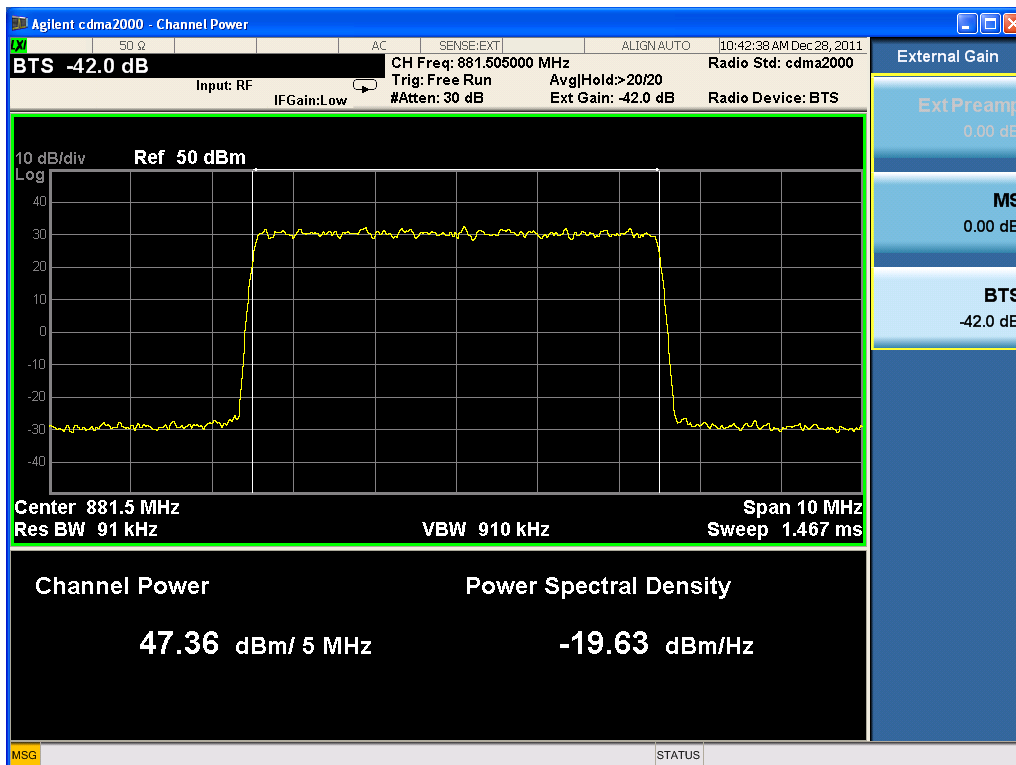
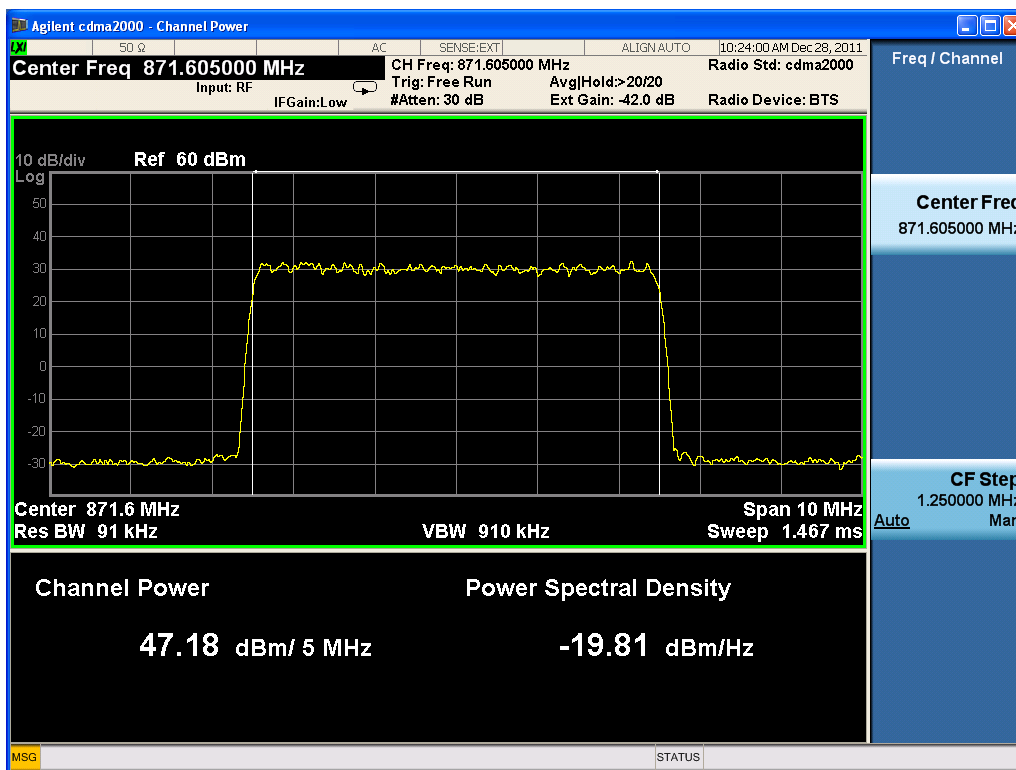
Test Result: Pass

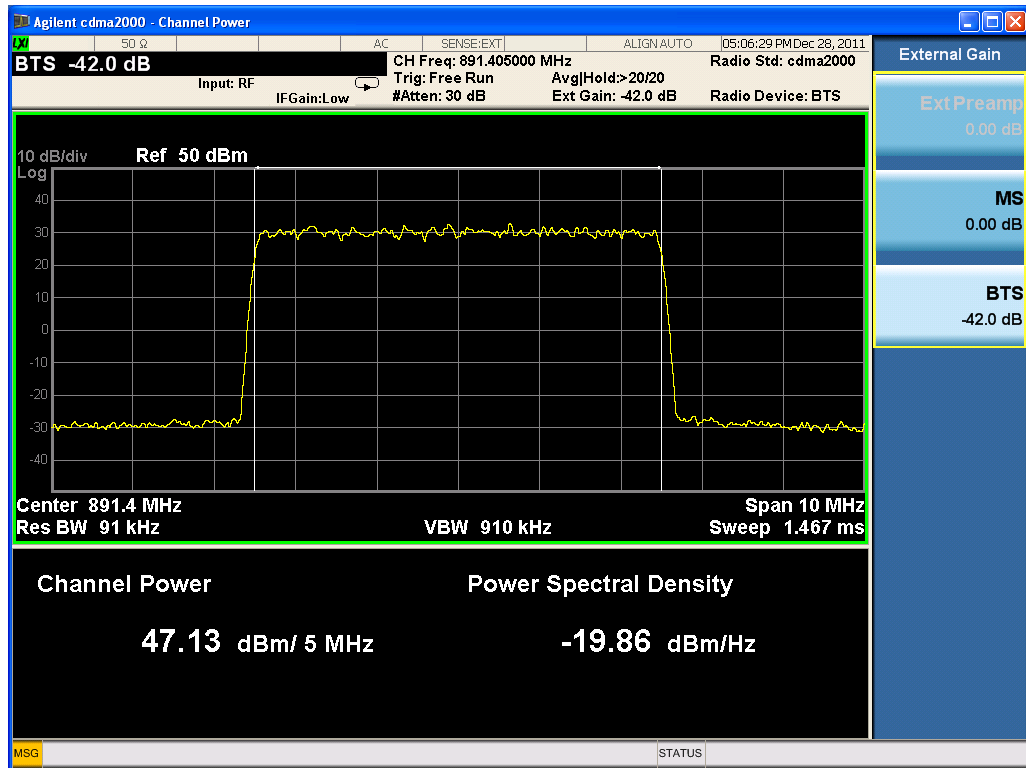
Test Mode: Transmitting CDMA

Test Data:

Four carriers

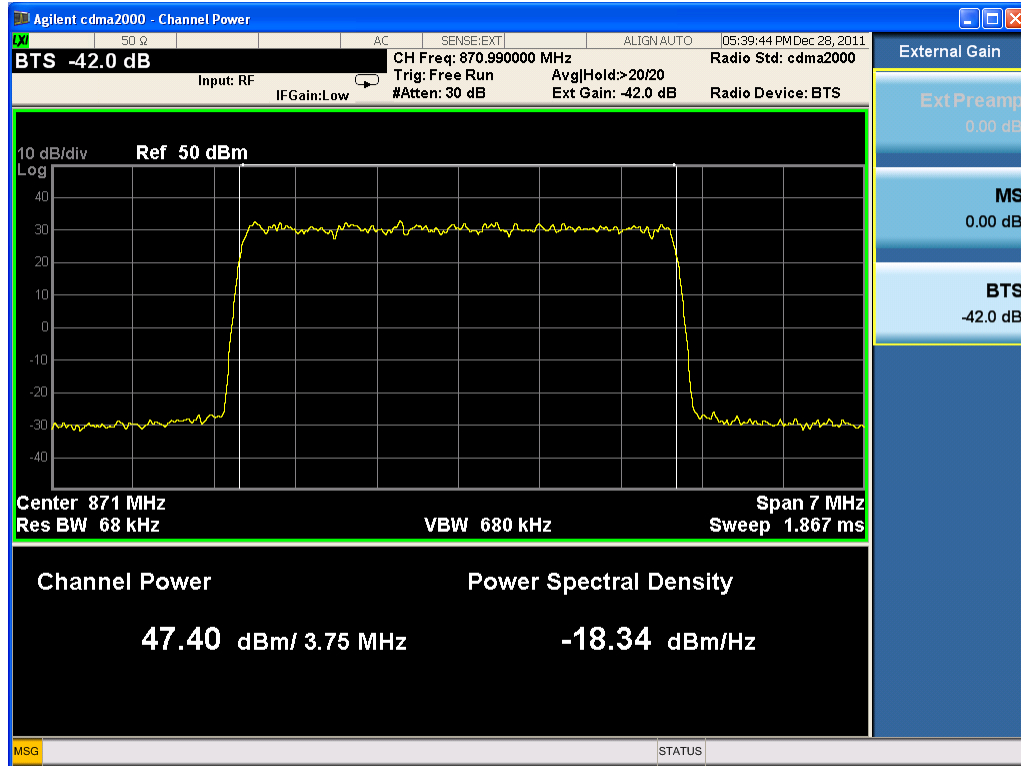
Center Freq. (MHz)	Frequency (MHz)	Max output Power (dBm)
871.605	869.76/870.99/872.22/873.45	47.18
881.505	879.66/880.89/882.12/883.35	47.36
891.405	889.56/890.79/892.02/893.25	47.13

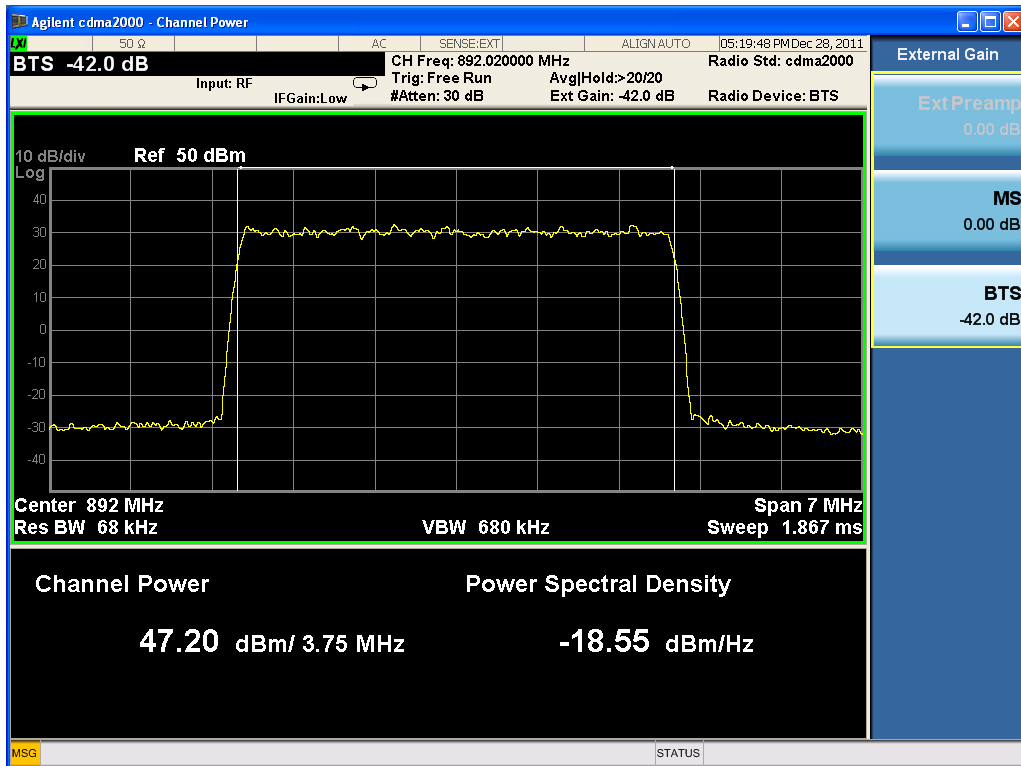
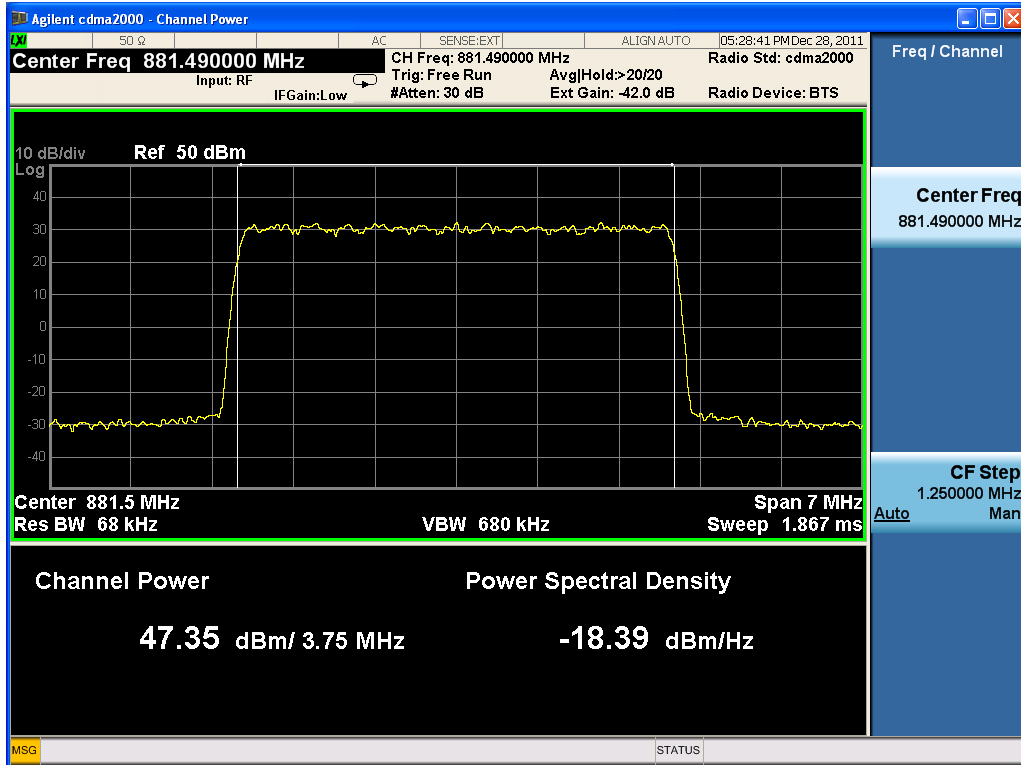




Three carriers

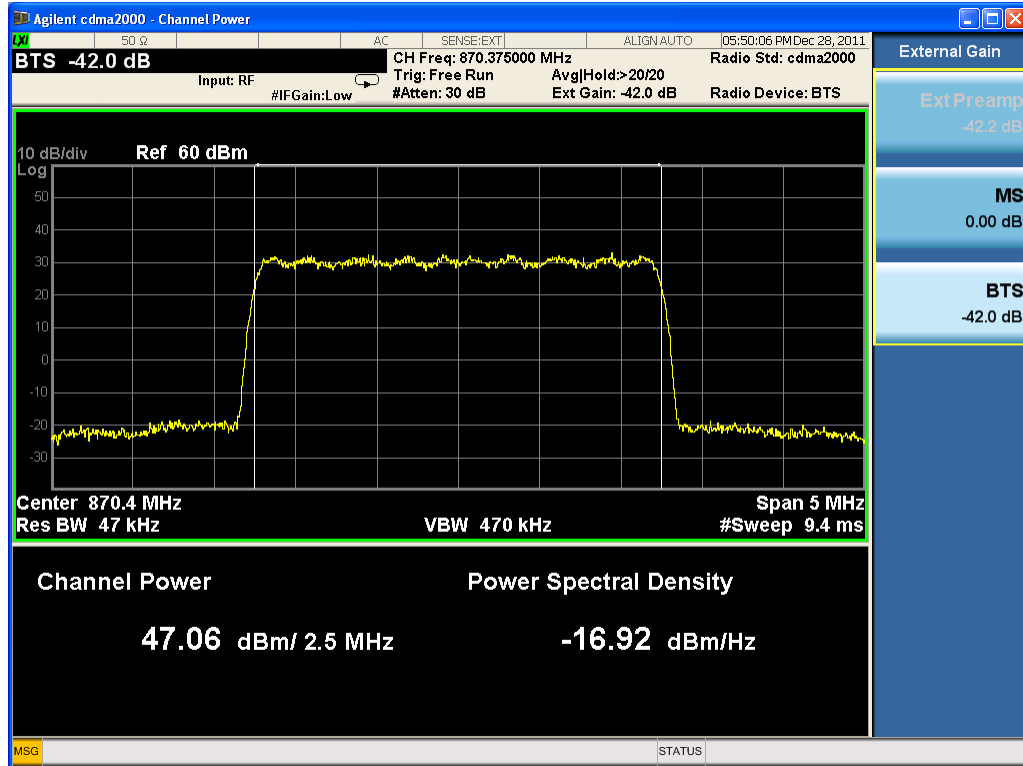
Center Freq. (MHz)	Frequency (MHz)	Max output Power (dBm)
870.99	869.76/870.99/872.22	47.40
881.49	880.26/881.49/882.72	47.35
892.02	890.79/892.02/893.25	47.20

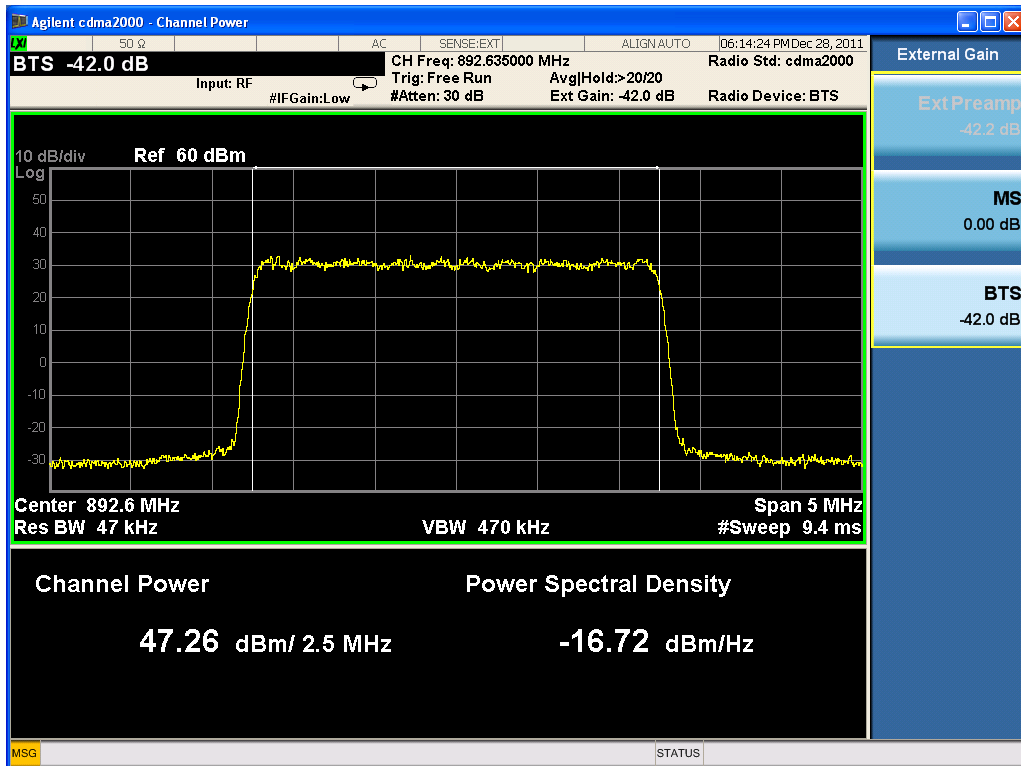
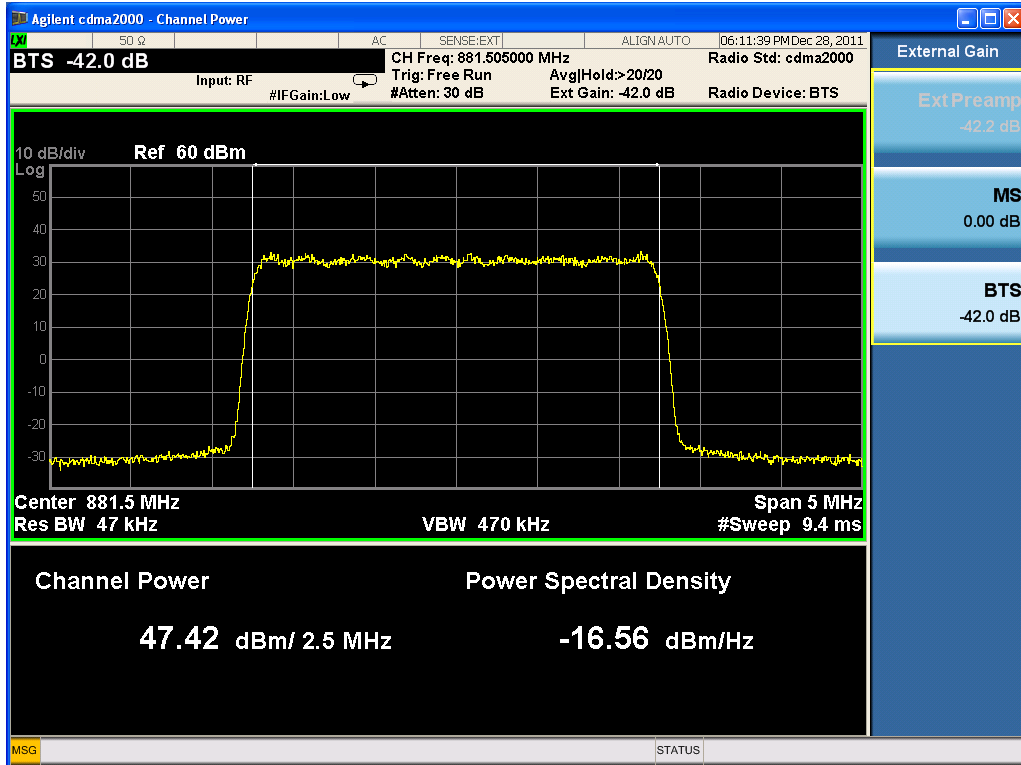




Two carriers

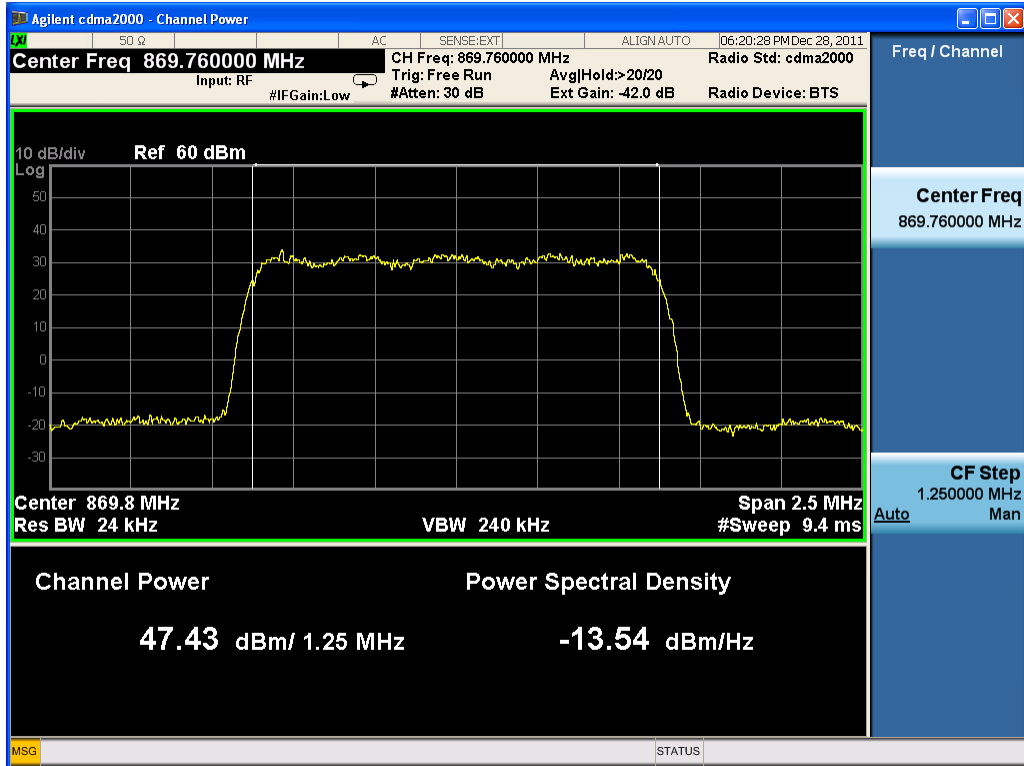
Center Freq. (MHz)	Frequency (MHz)	Max output Power (dBm)
870.375	869.76/870.99	47.06
881.505	880.89/882.12	47.42
892.635	892.02/893.25	47.26

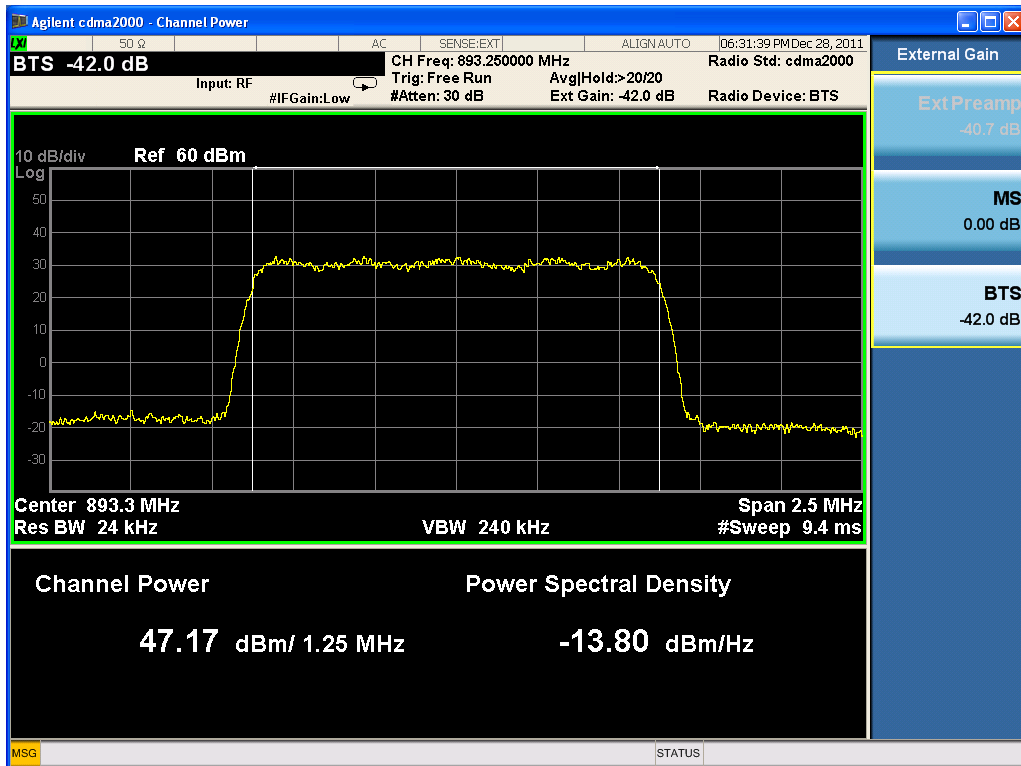
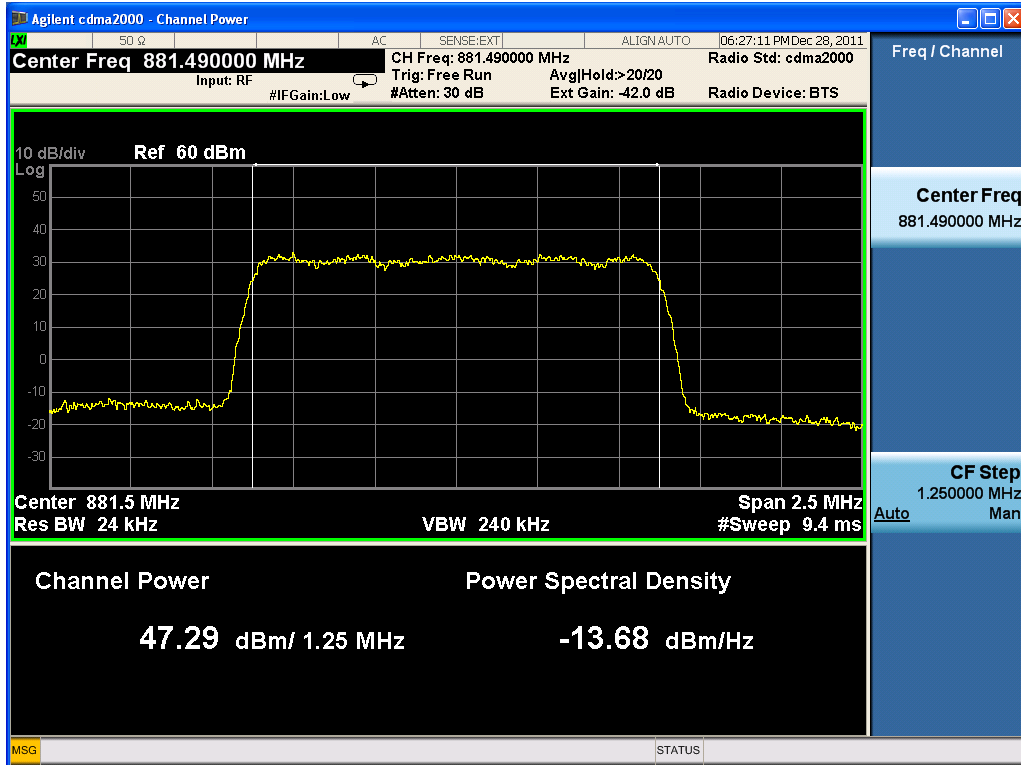




One carrier

Center Freq. (MHz)	Frequency (MHz)	Max output Power (dBm)
869.76	869.76	47.43
881.49	881.49	47.29
893.25	893.25	47.17





3.2 RF EXPOSURE

Applicable standard: FCC §2.1091 §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 ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	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

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

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 47.43(dBm) Maximum peak output power at antenna input terminals: 55.335 (W), the cable loss is 2dB

Prediction distance: 400 (cm)

Predication frequency: 869.76(MHz)

Antenna Gain (typical): 13(dBi)

Power density at predication frequency at 400 cm: 0.5494(mW/cm²)

MPE limit for uncontrolled exposure at prediction frequency: 0.57984 (mW/cm²)

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
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

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

Test Procedure

CDMA digital mode is used by EUT.

Test Data Environmental Conditions

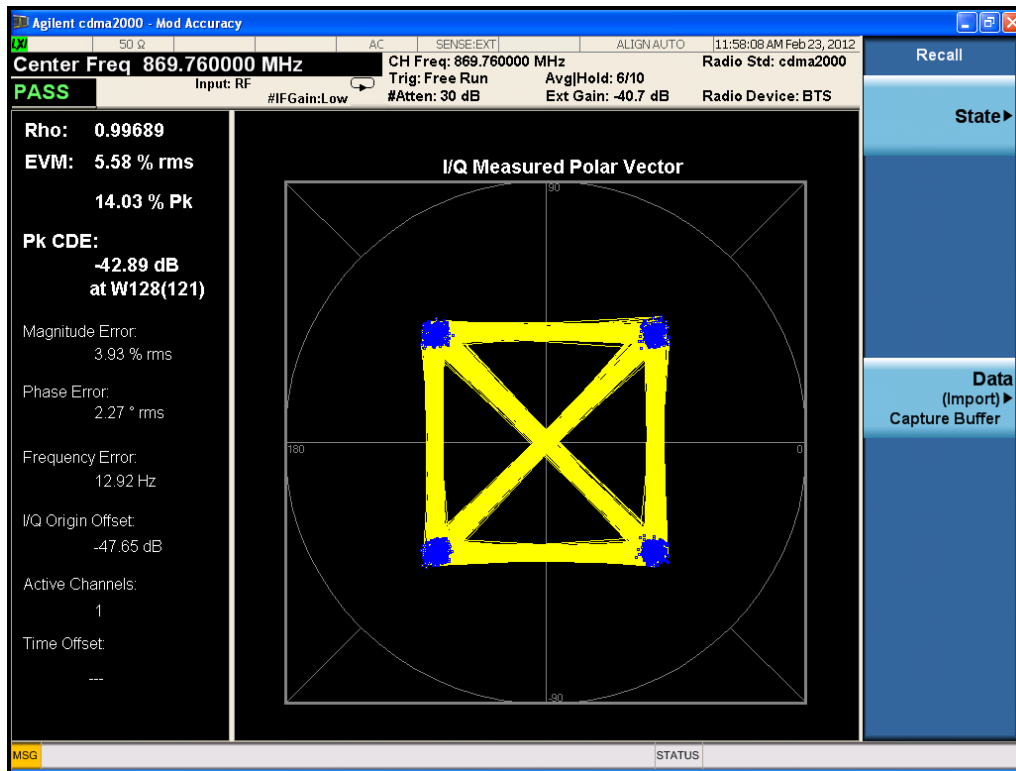
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

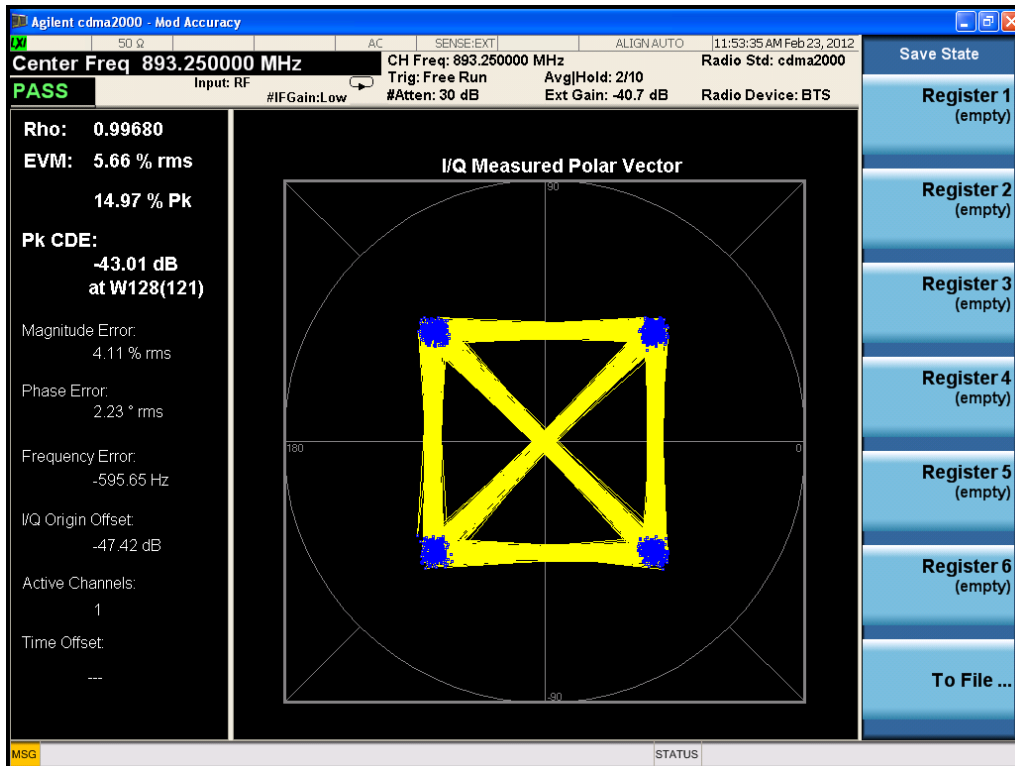
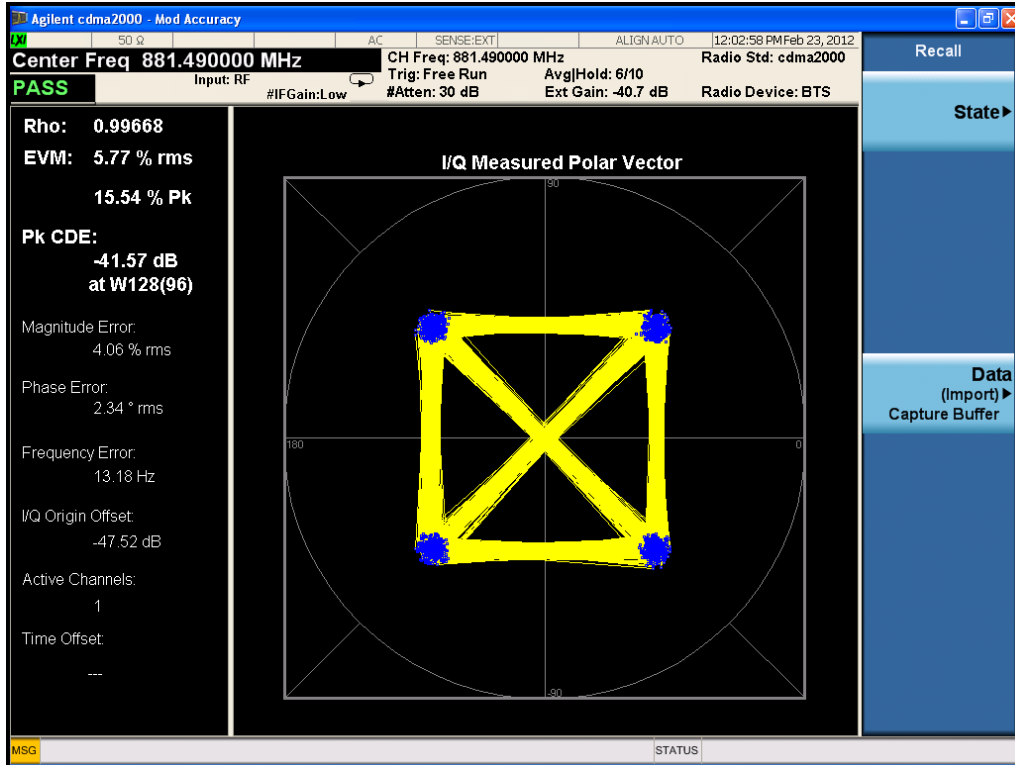
Test Result: Pass

Test Mode: Transmitting CDMA

Test Data:

Frequency (MHz)	Rho
869.76	0.99689
881.49	0.99668
893.25	0.99680





3.4 SPURIOUS RADIATED EMISSIONS

Applicable Standard: FCC CFR 47, §2.1053

Test Equipment List and Details

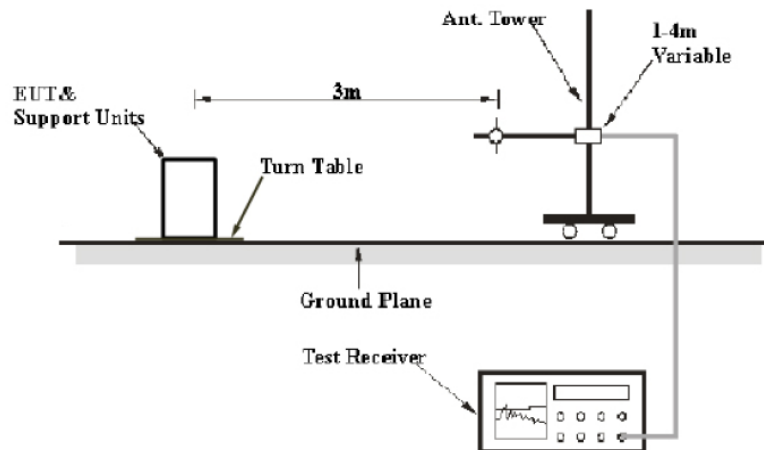
Manufacturer	Equipment	Model	Serial Number	Last Cal.	Cal. Interval
R&S	SIGNAL GENERATOR	SMR20	A00017351	2011-9-26	1 year
Albatross	Anechoic Chamber	3m Site	A00017354	2011-11-2	1 year
R&S	EMI Test Receiver	ESIB26	100058	2011-10-29	1 year
R&S	Ultra Breitband Antennas	HL562	100022	2011-7-29	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100032	2011-7-29	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100446	2011-7-29	1 year
SCHWARZ-BECK	Biconical Antenna	VUBA9117	9117-122	2011-7-29	1 year

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. 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 = $10 \lg (\text{TX pwr in Watts}/0.001)$ - 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 1 percent as specified for 30MHz to 1GHz scanning, set at 1MHz 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)	Effective radiated power (dBm)	Dipole Antenna	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (GHz)	Amp. (dB μ V)	Polar H/V	Level (dBm)	Antenna Gain Correction						
33.887776	23.08	V	-36	-42.03	0.3	-78.33	2.15	-80.48	-13	67.48
125.250501	22.74	V	-64.26	-10.46	0.8	-75.52	2.15	-77.67	-13	64.67
148.577154	23.36	V	-62.59	-6.46	1	-70.05	2.15	-72.2	-13	59.2
593.727455	27.02	V	-68.97	-1.21	2	-72.18	2.15	-74.33	-13	61.33
895.03006	78.46	V	-18.73	-1.54	2.5	-22.77	2.15	-24.92	-13	11.92
2755.51102	53.66	V	-48.59	7.95	4.4	-45.04	2.15	-47.19	-13	34.19
30	22.38	H	-30.36	-43.49	0.3	-74.15	2.15	-76.3	-13	63.3
138.857715	22.27	H	-69.77	-8.42	1	-79.19	2.15	-81.34	-13	68.34
150.521042	23.61	H	-68.43	-5.7	1	-75.13	2.15	-77.28	-13	64.28
644.268537	26.85	H	-74.04	-1.09	2.1	-77.23	2.15	-79.38	-13	66.38
893.086172	78.5	H	-18.59	-1.54	2.5	-22.63	2.15	-24.78	-13	11.78
2791.58317	53.68	H	-54.72	7.95	4.5	-51.27	2.15	-53.42	-13	40.42

Radiation emission spurious below 3GHz

Indicated		Test Antenna	Substituted		Cable Loss(dB)	Effective radiated power (dBm)	Dipole Antenna	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (GHz)	Amp. (dB μ V)	Polar H/V	Level (dBm)	Antenna Gain Correction						
4811.62325	41.88	V	-65.72	9.15	5.9	-62.47	2.15	-64.62	-13	51.62
6142.28457	47.82	V	-59.65	9.05	6.8	-57.4	2.15	-59.55	-13	46.55
6991.98397	48.96	V	-59.21	9.25	7.3	-57.26	2.15	-59.41	-13	46.41
7541.58317	50.02	V	-62.33	9.25	7.7	-60.78	2.15	-62.93	-13	49.93
9846.19239	55.41	V	-53.41	9.95	8.9	-52.36	2.15	-54.51	-13	41.51
12646.2926	56.48	V	-53.22	12.15	9.9	-50.97	2.15	-53.12	-13	40.12
3801.60321	40.63	H	-63.06	7.75	5.2	-60.51	2.15	-62.66	-13	49.66
4731.46293	42.01	H	-61.42	9.15	5.8	-58.07	2.15	-60.22	-13	47.22
6182.36473	47.9	H	-55.49	9.05	6.9	-53.34	2.15	-55.49	-13	42.49
7622.24449	49.3	H	-59.33	9.25	7.8	-57.88	2.15	-60.03	-13	47.03
9869.23848	55.92	H	-53.02	9.95	8.8	-51.87	2.15	-54.02	-13	41.02
12404.3086	56.89	H	-55.26	12.05	9.9	-53.11	2.15	-55.26	-13	42.26

Radiation emission spurious above 3GHz

3.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard: FCC§2.1051, §22.917

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

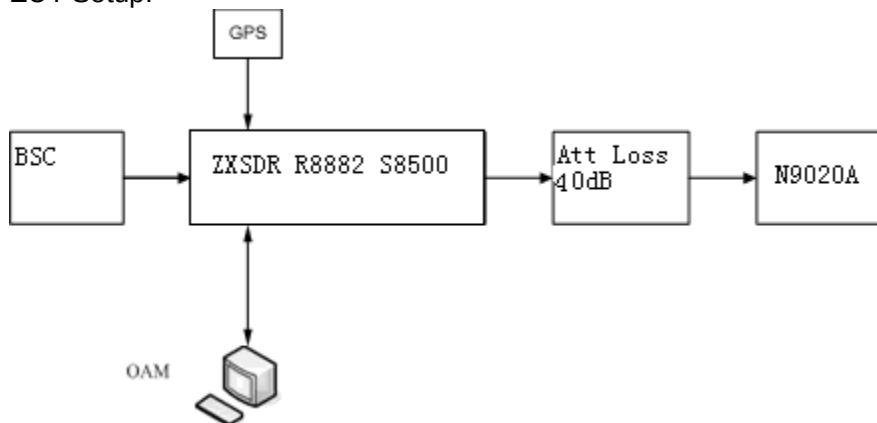
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

***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)=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 100KHz for 30MHz to 1GHz band, set at 1MHz for 1GHz to 10GHz band. Sufficient scans were taken to

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

Test Data Environmental Conditions

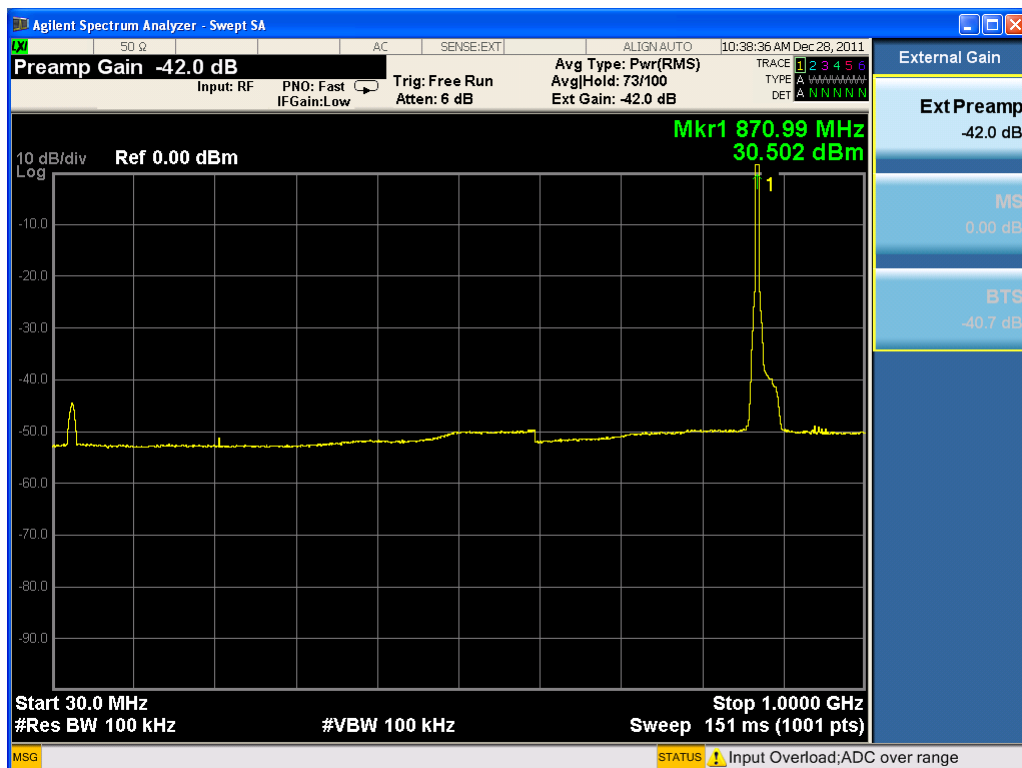
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

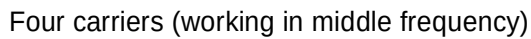
Test Result: Pass

Test Mode: Transmitting CDMA

Test Data:

Four carriers (working in bottom frequency)

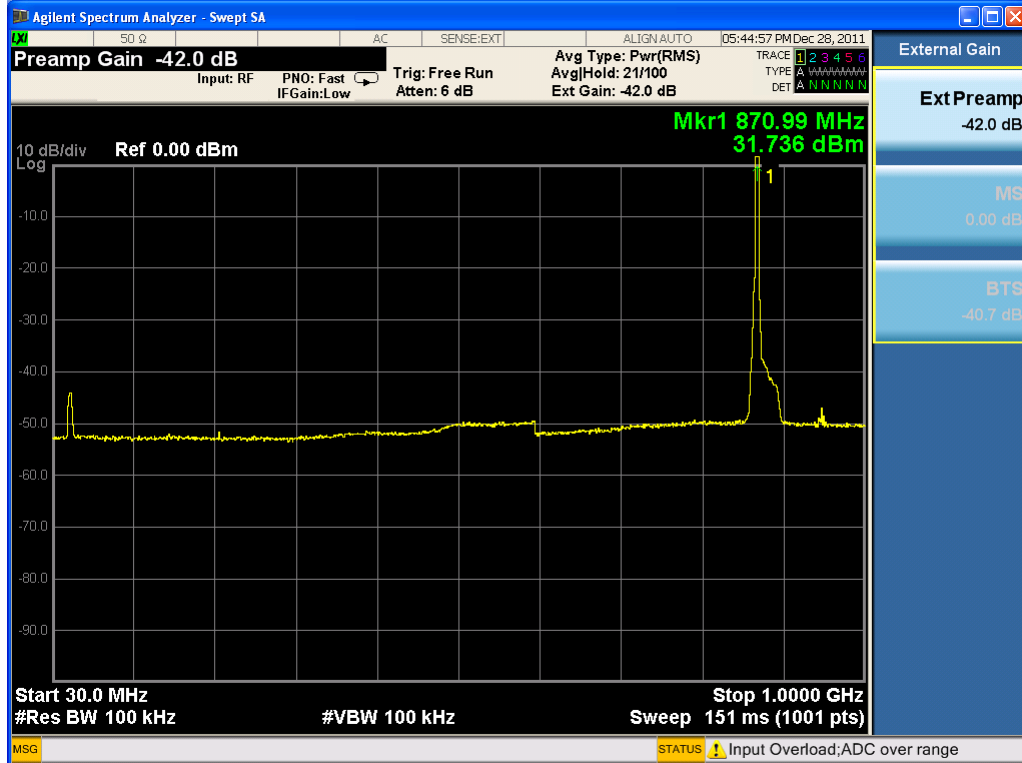


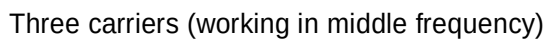






Three carriers (working in bottom frequency)

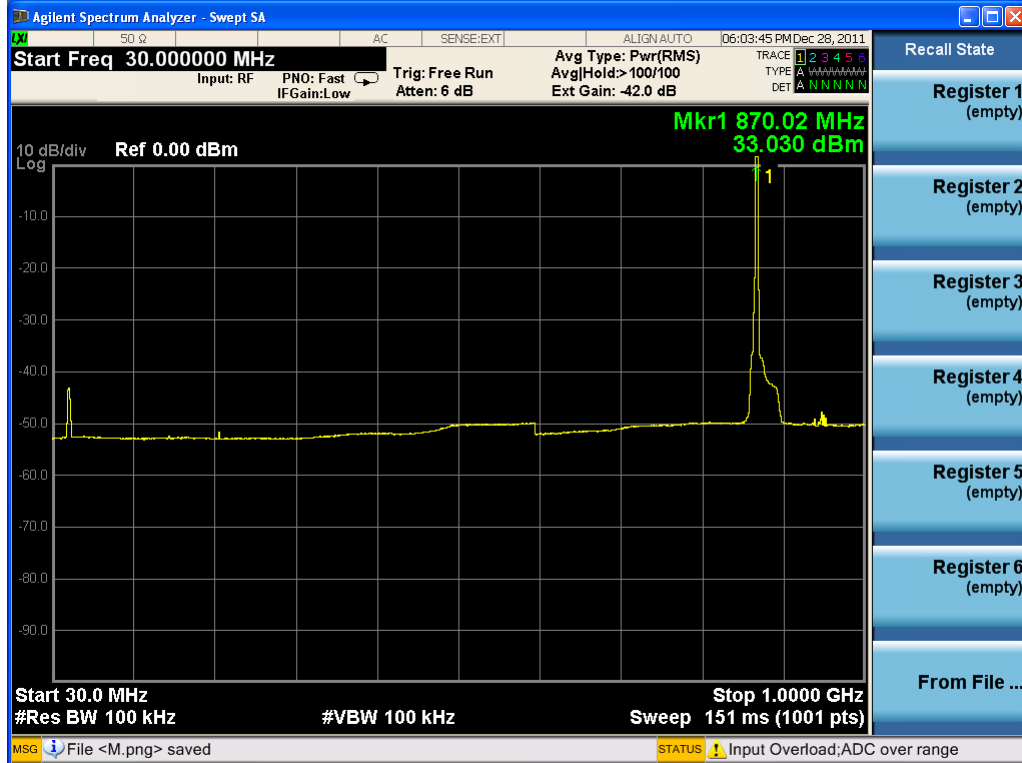






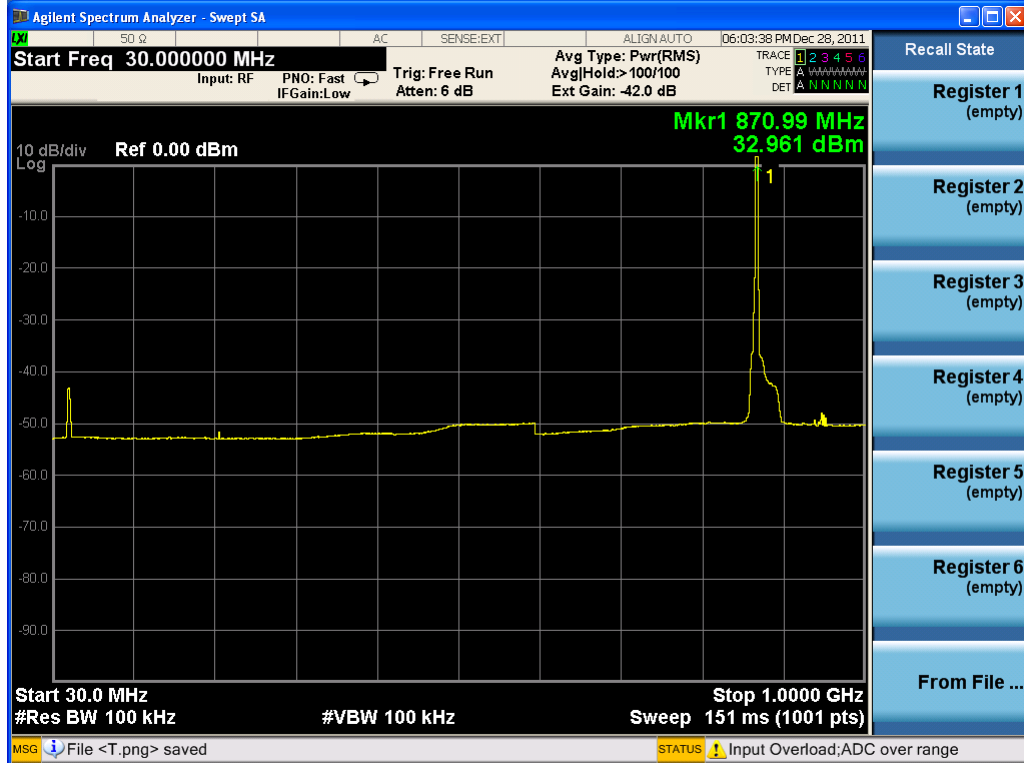


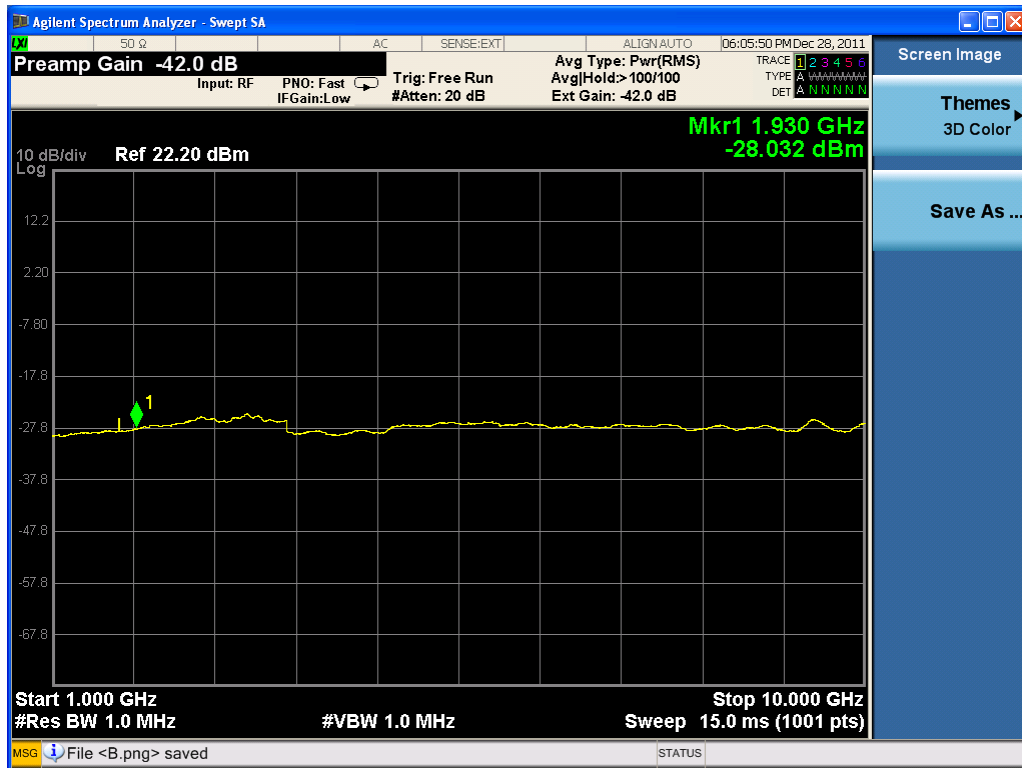
Two carriers (working in bottom frequency)



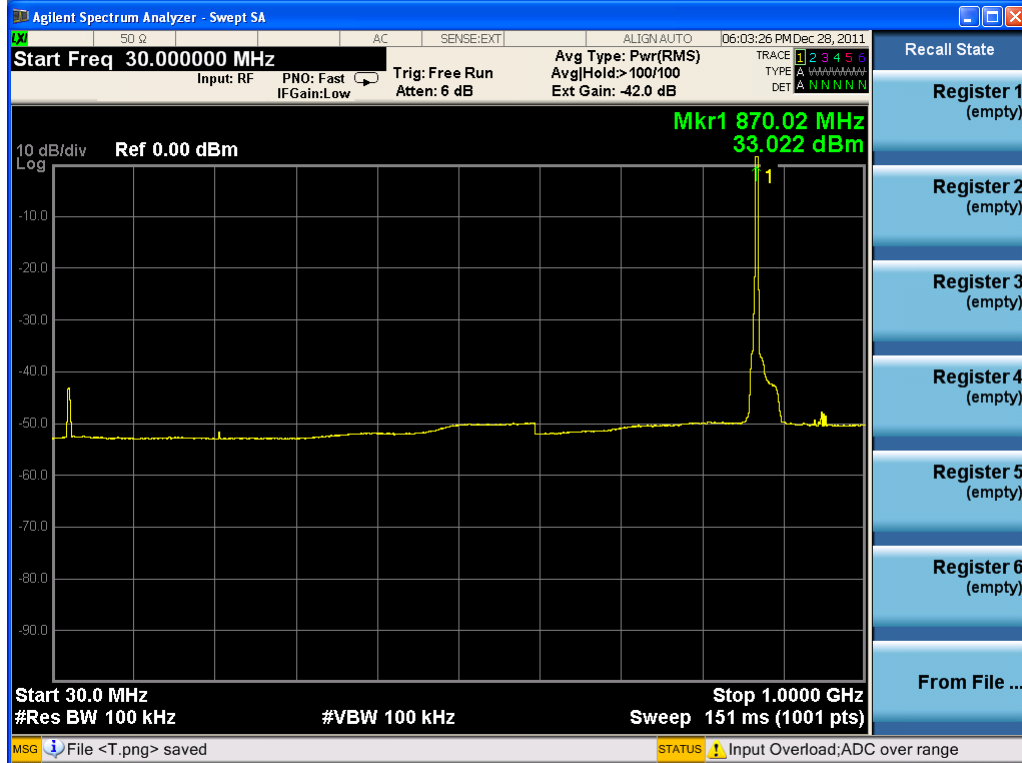


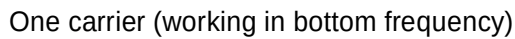
Two carriers (working in middle frequency)

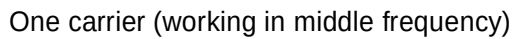




Two carriers (working in top frequency)

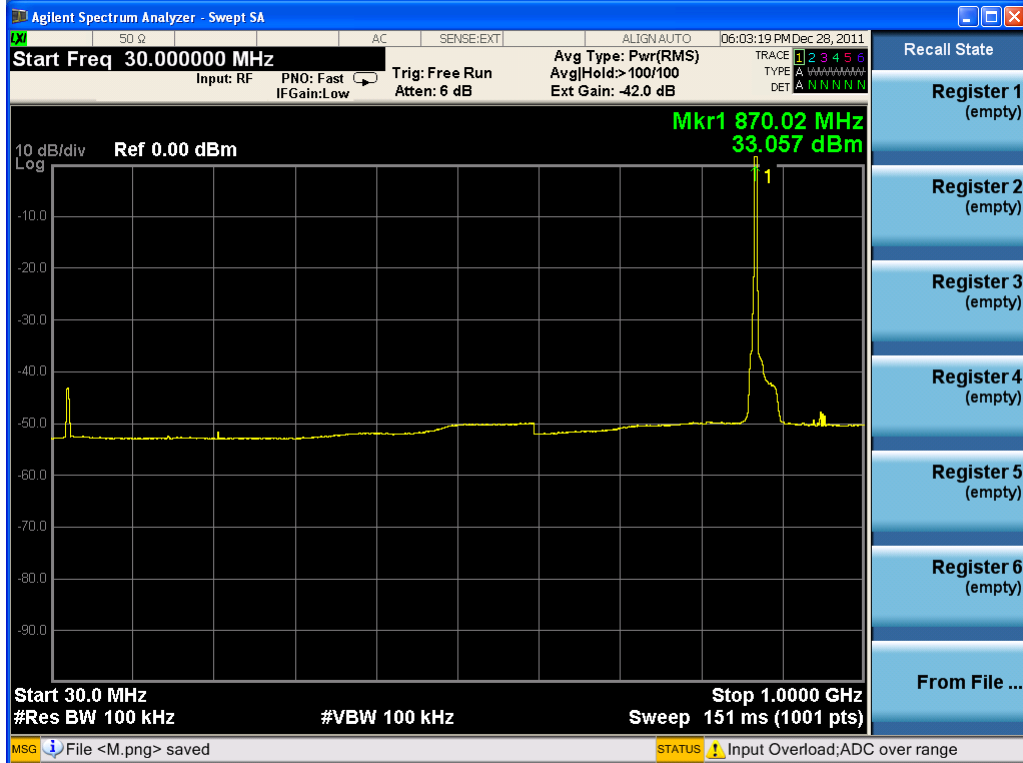


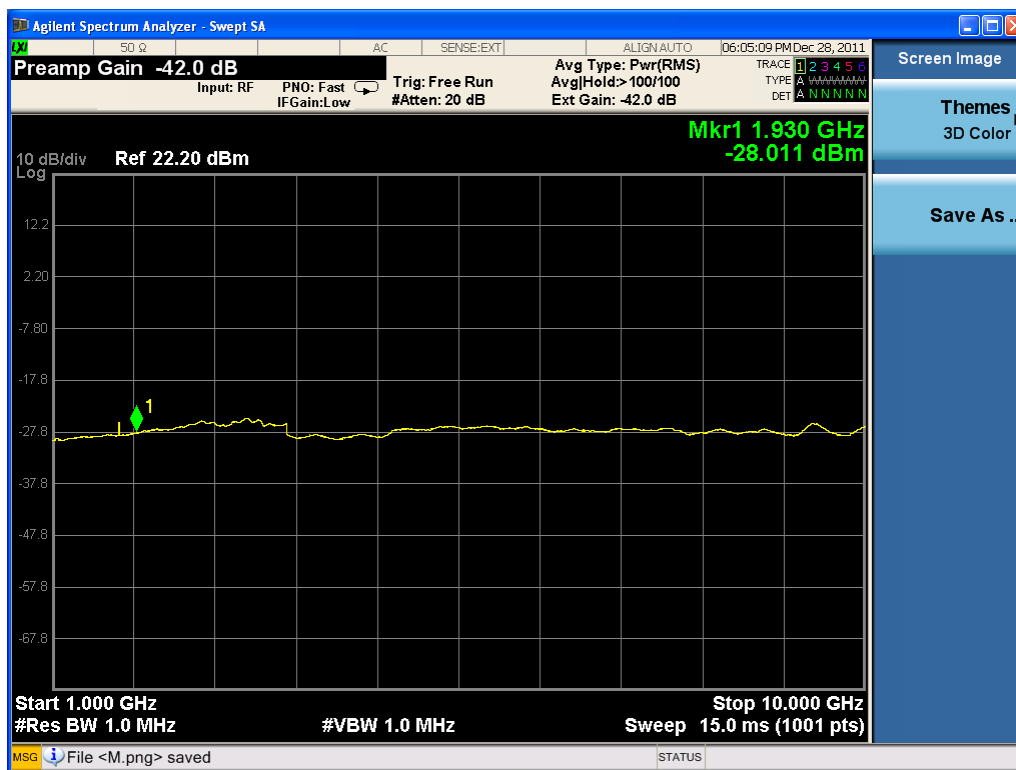






One carrier (working in top frequency)





3.6 OCCUPIED BANDWIDTH

Applicable Standard: FCC §2.1049 §22.917

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
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

***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. 99%Power bandwidth was recorded.

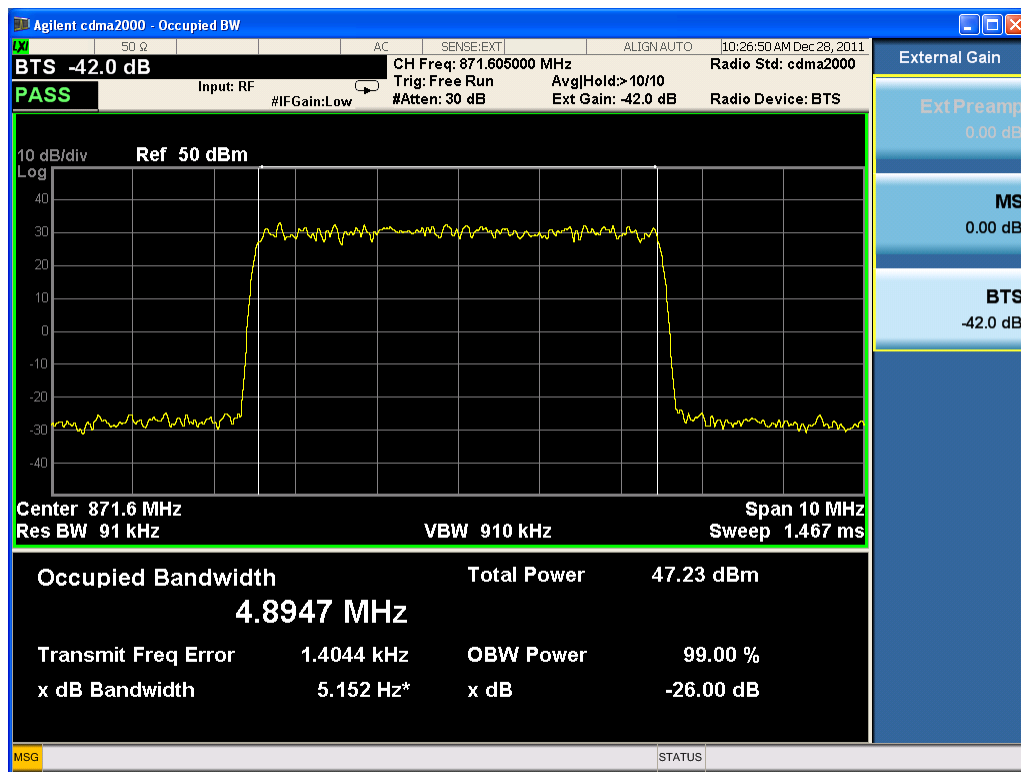
Environmental Conditions

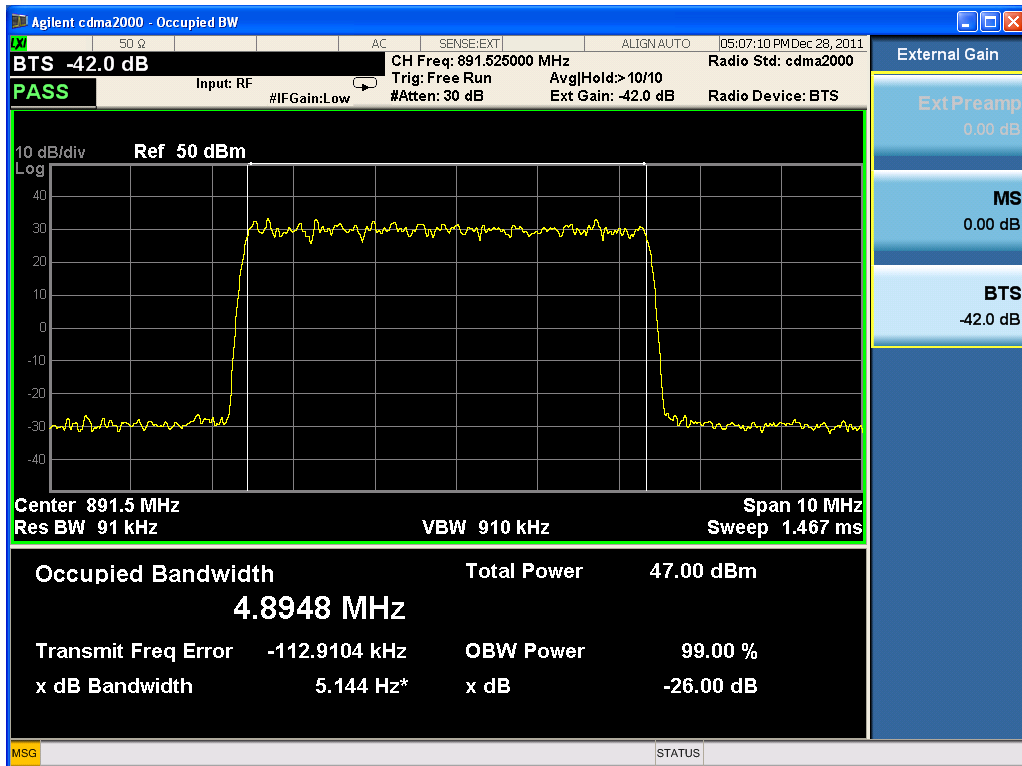
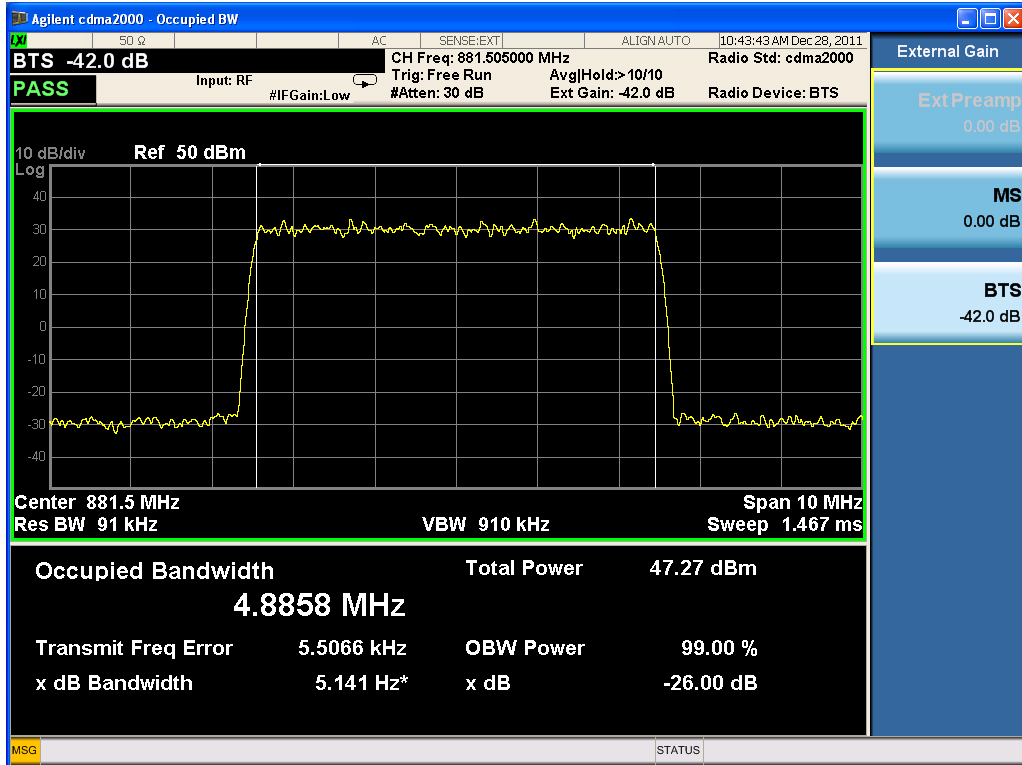
Temperature:	20 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

Test Result: Pass**Test Mode:** Transmitting CDMA**Test Data**

For four carries:

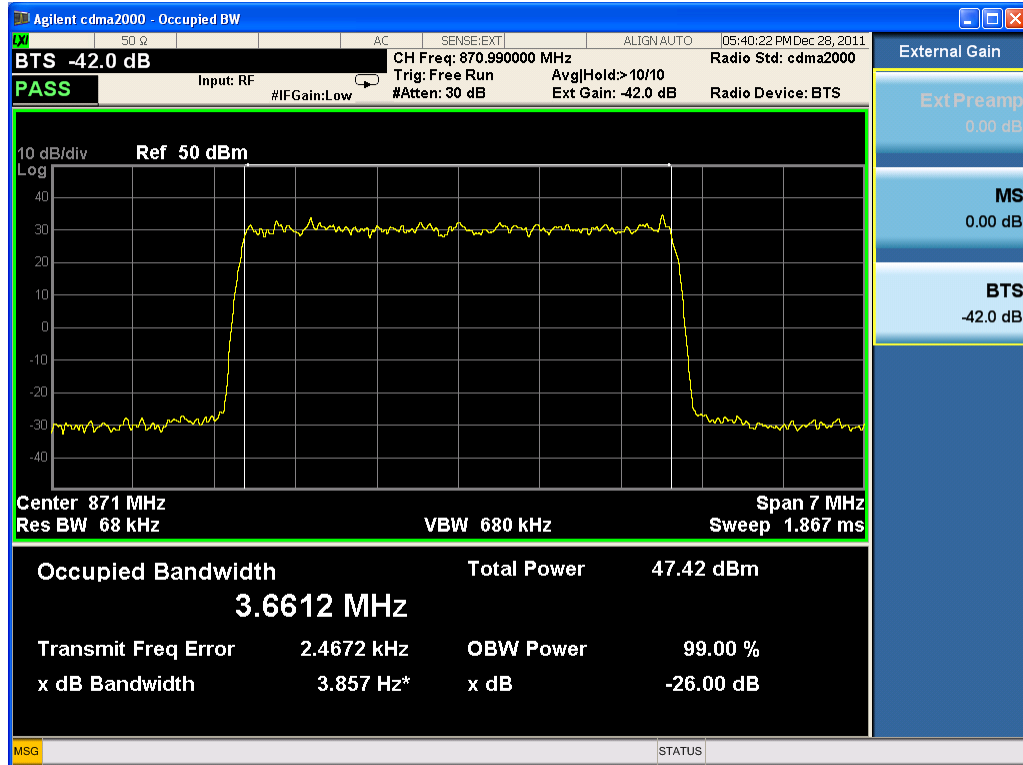
Frequency (MHz)	99% Power Bandwidth (MHz)	Limit (MHz)
869.76/870.99/872.22/873.45	4.8947	<5.00
879.66/880.89/882.12/883.35	4.8858	<5.00
889.56/890.79/892.02/893.25	4.8948	<5.00

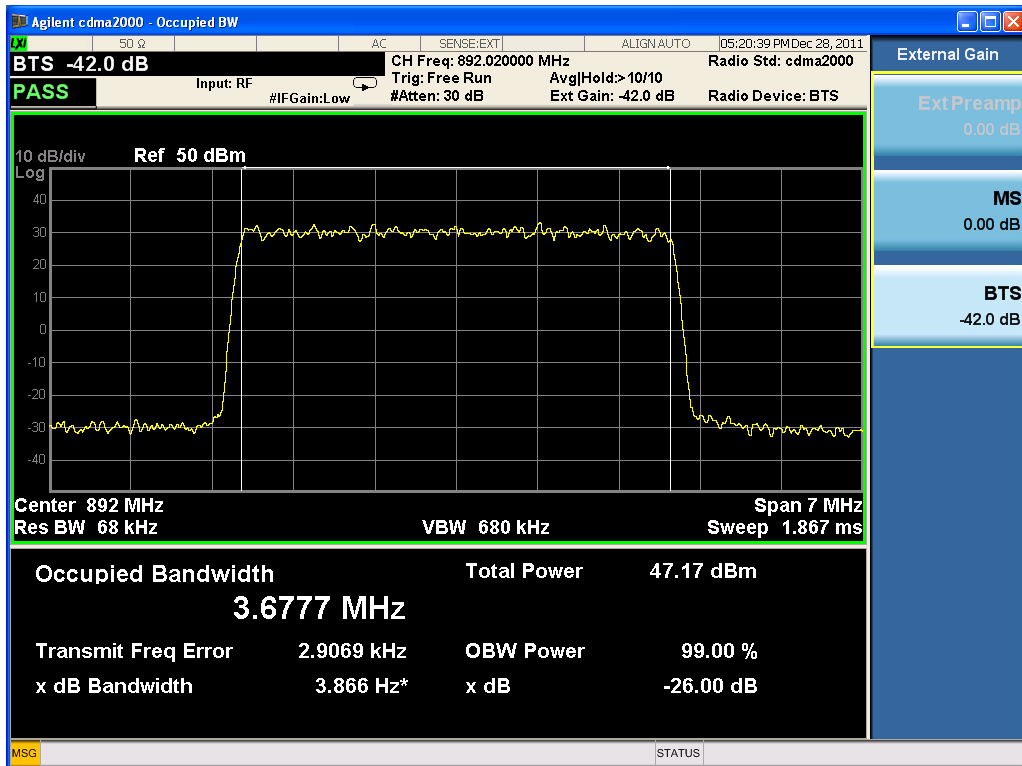
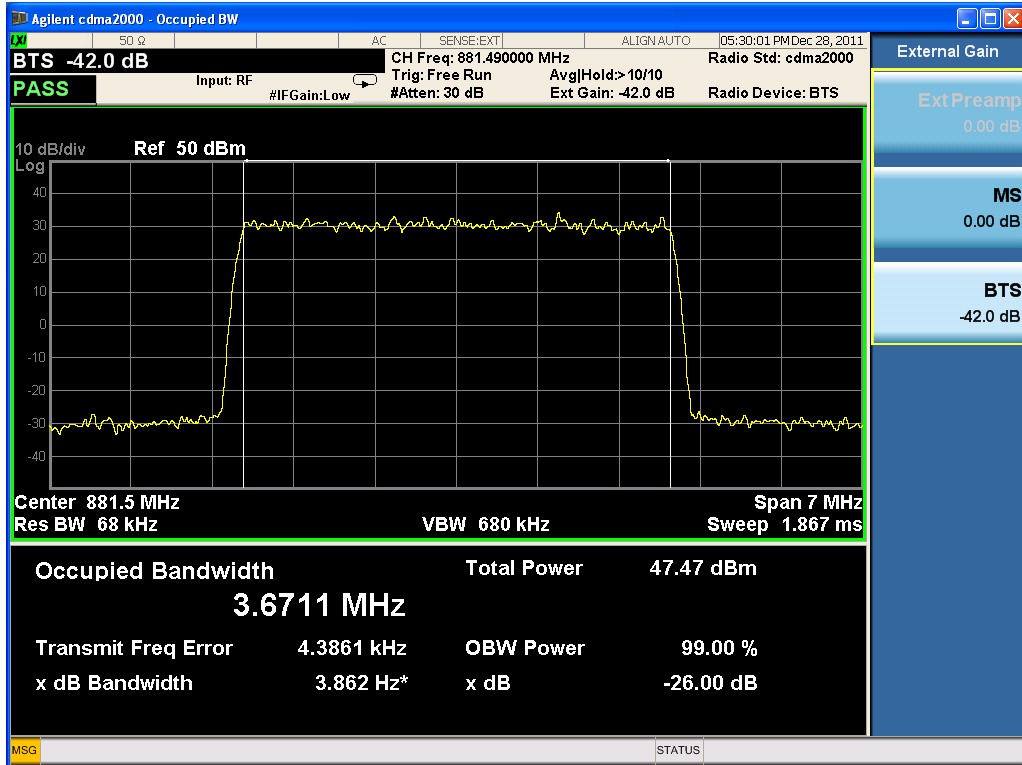




For three carries:

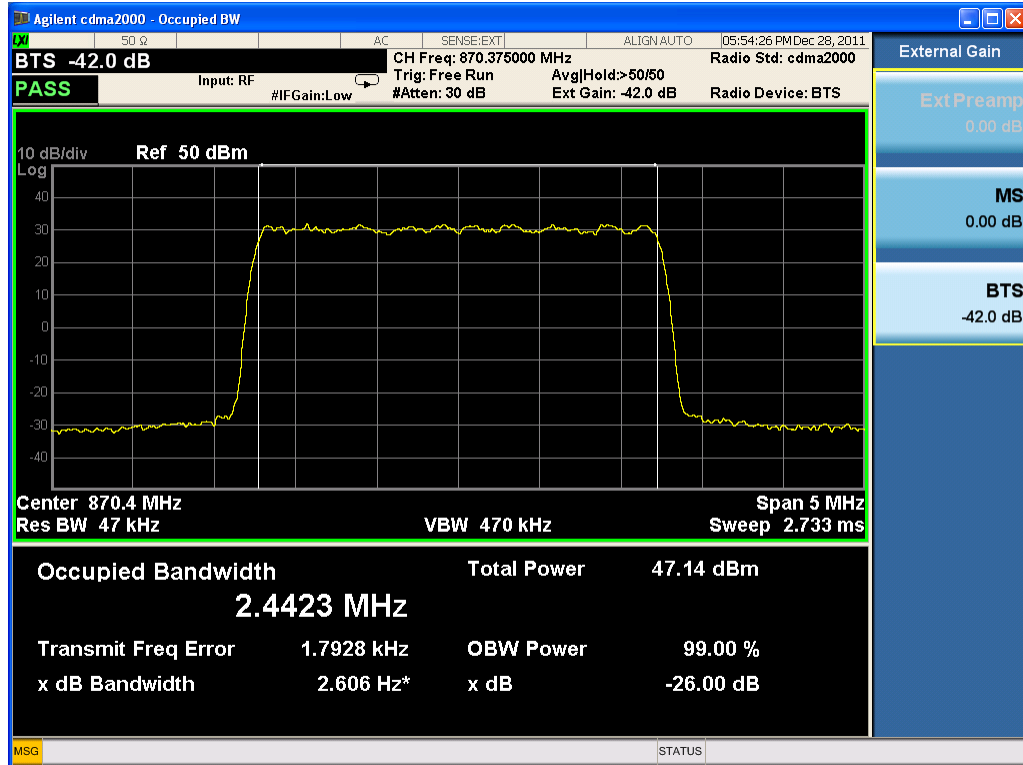
Frequency (MHz)	99% Power Bandwidth (MHz)	Limit (MHz)
869.76/870.99/872.22	3.6612	<3.75
880.26/881.49/882.72	3.6711	<3.75
890.79/892.02/893.25	3.6777	<3.75

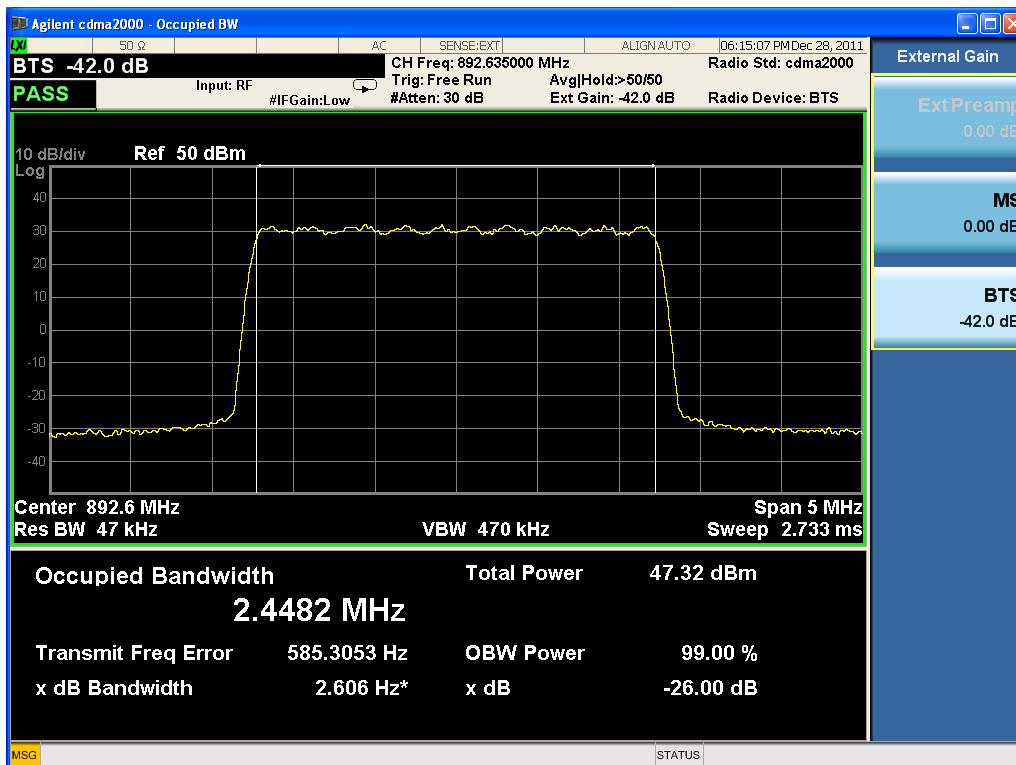
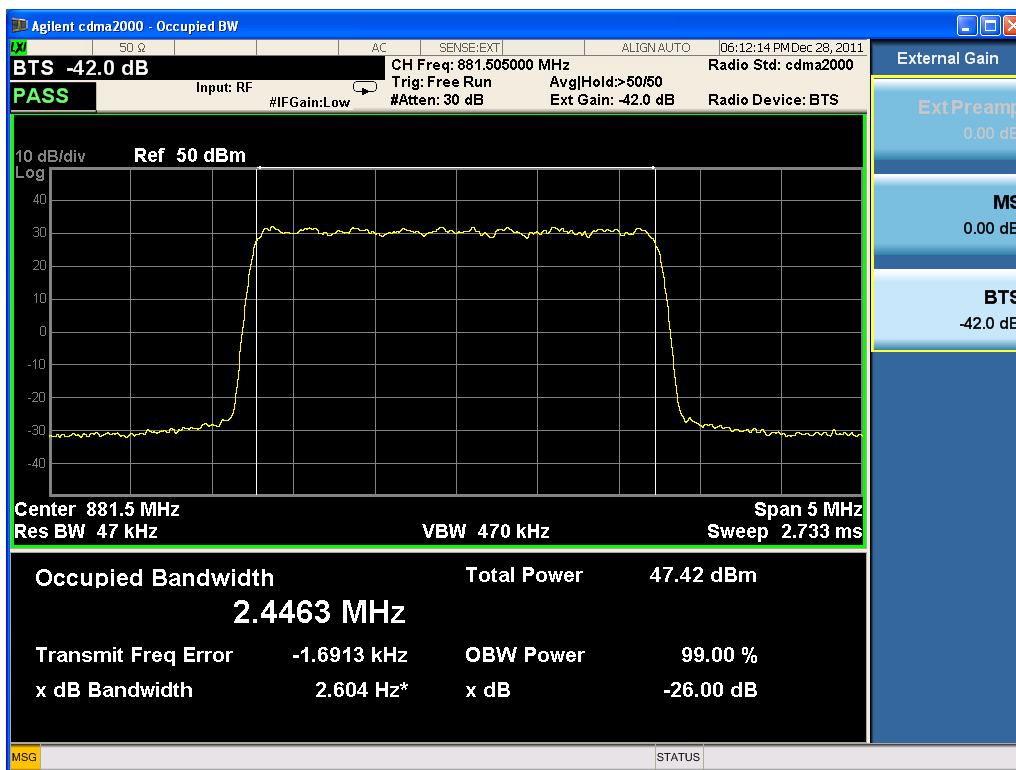




For two carries

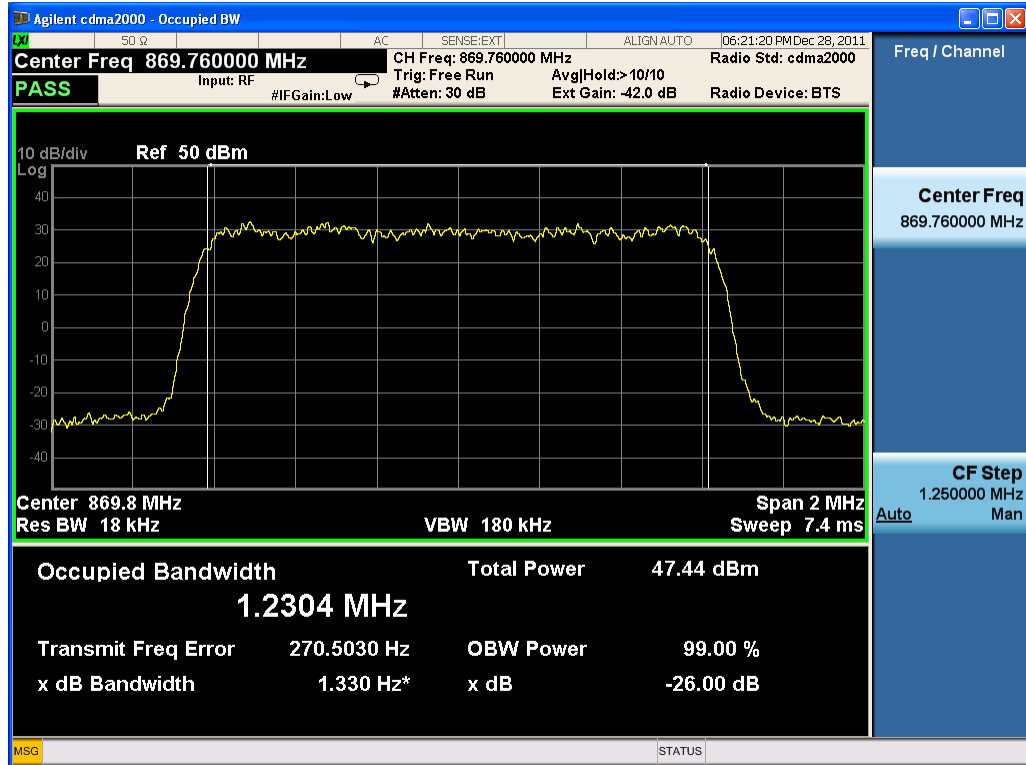
Frequency (MHz)	99% Power Bandwidth (MHz)	Limit (MHz)
869.76/870.99	2.4423	<2.50
880.89/882.12	2.4463	<2.50
892.02/893.25	2.4482	<2.50

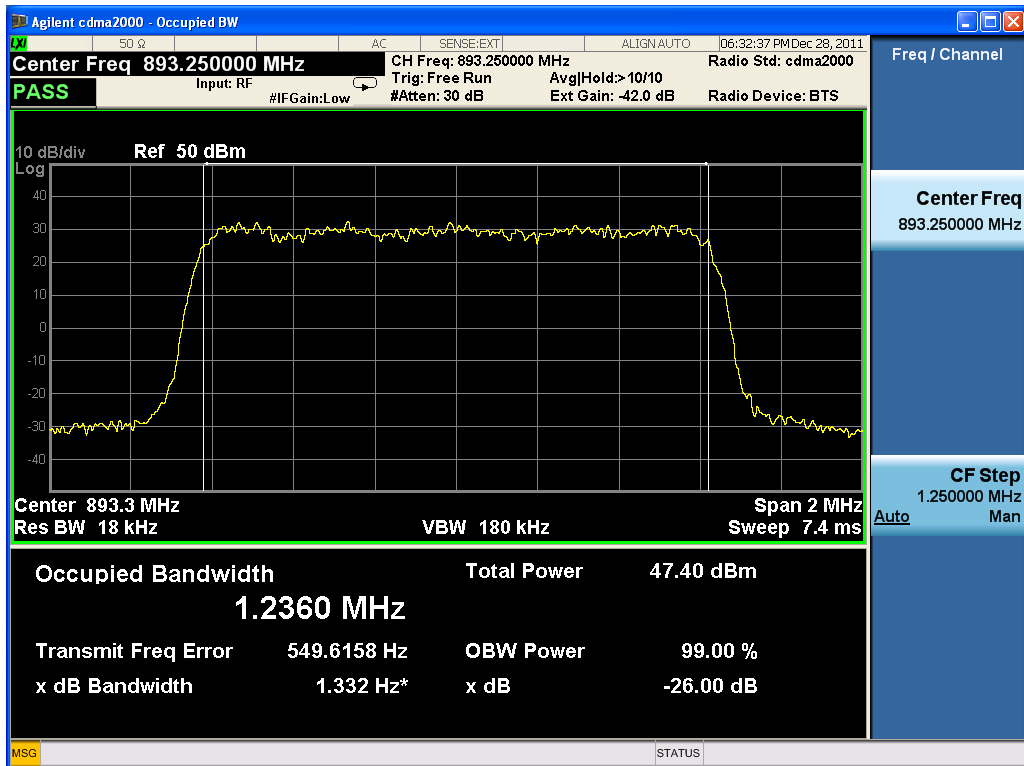
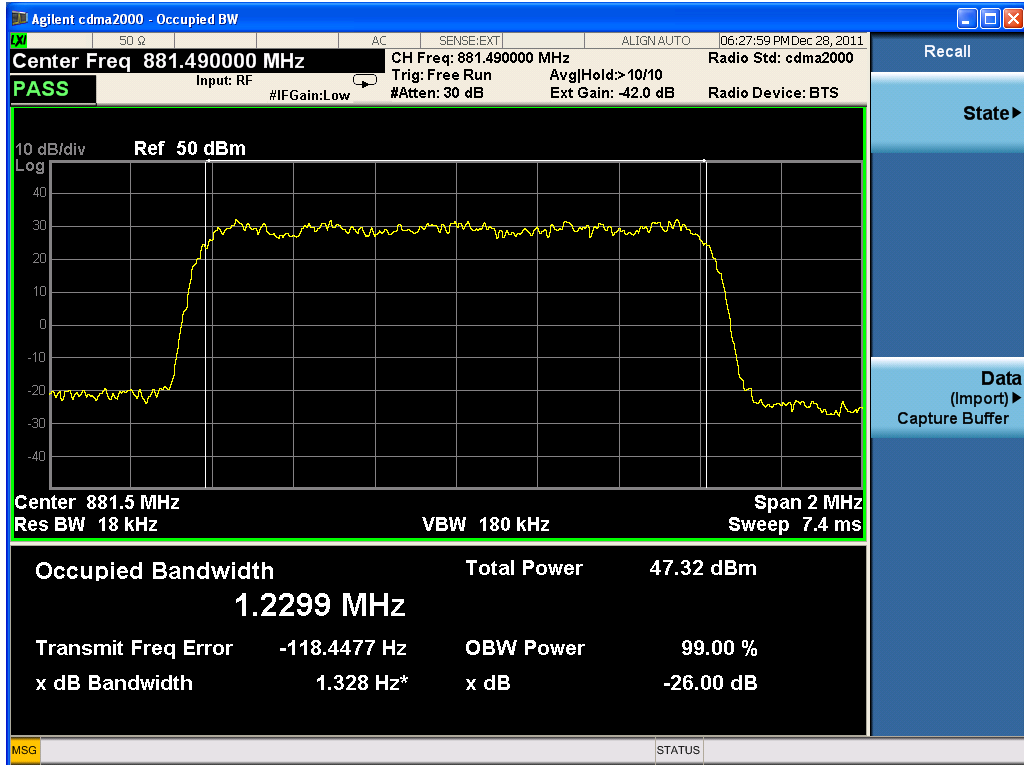




For one carrier

Frequency (MHz)	99% Power Bandwidth (MHz)	Limit (MHz)
869.76	1.2304	<1.25
881.49	1.2299	<1.25
893.25	1.2360	<1.25





3.7 BAND EDGES

Applicable Standard: FCC §2.1051

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	MY48011941	2011-4-8	2012-4-7
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

***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.

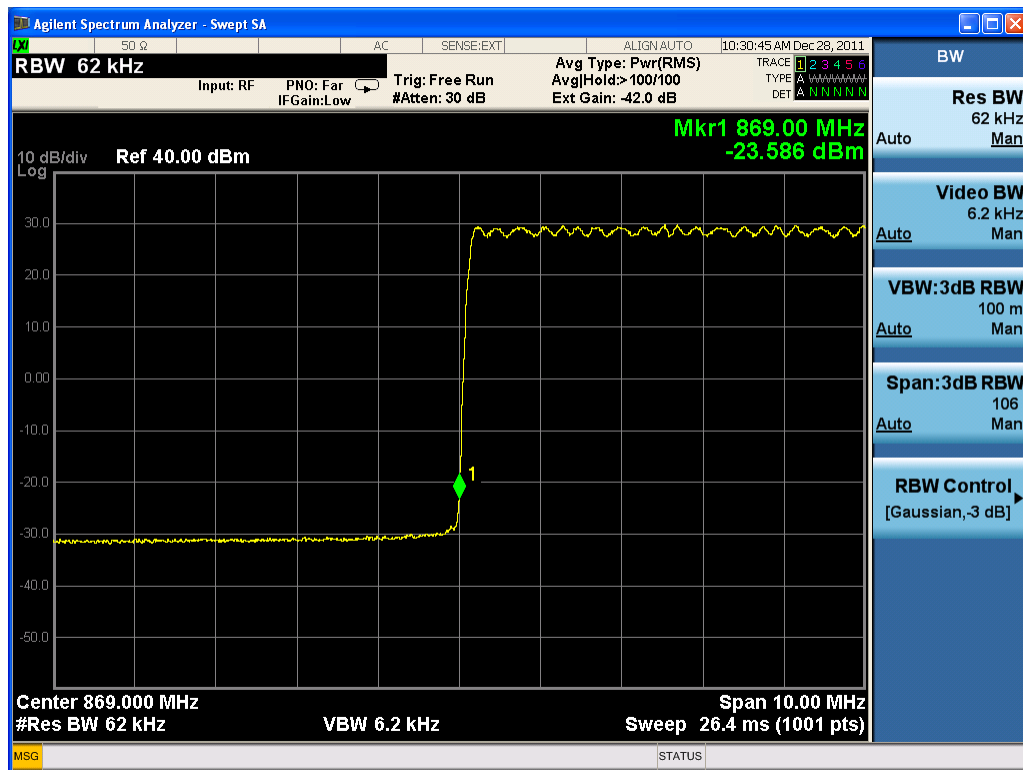
Test Data Environmental Conditions

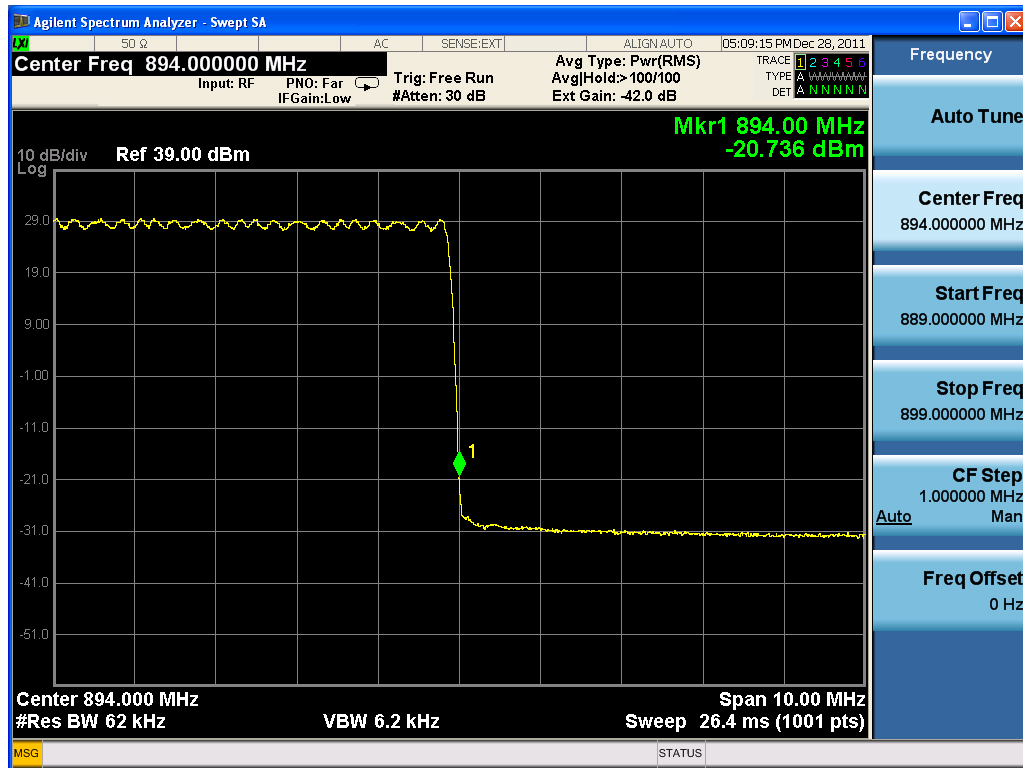
Temperature:	20 °C
Relative Humidity:	53%
ATM Pressure:	1009mbar

Test Result: Pass**Test Mode:** Transmitting CDMA**Test Data**

For four carriers

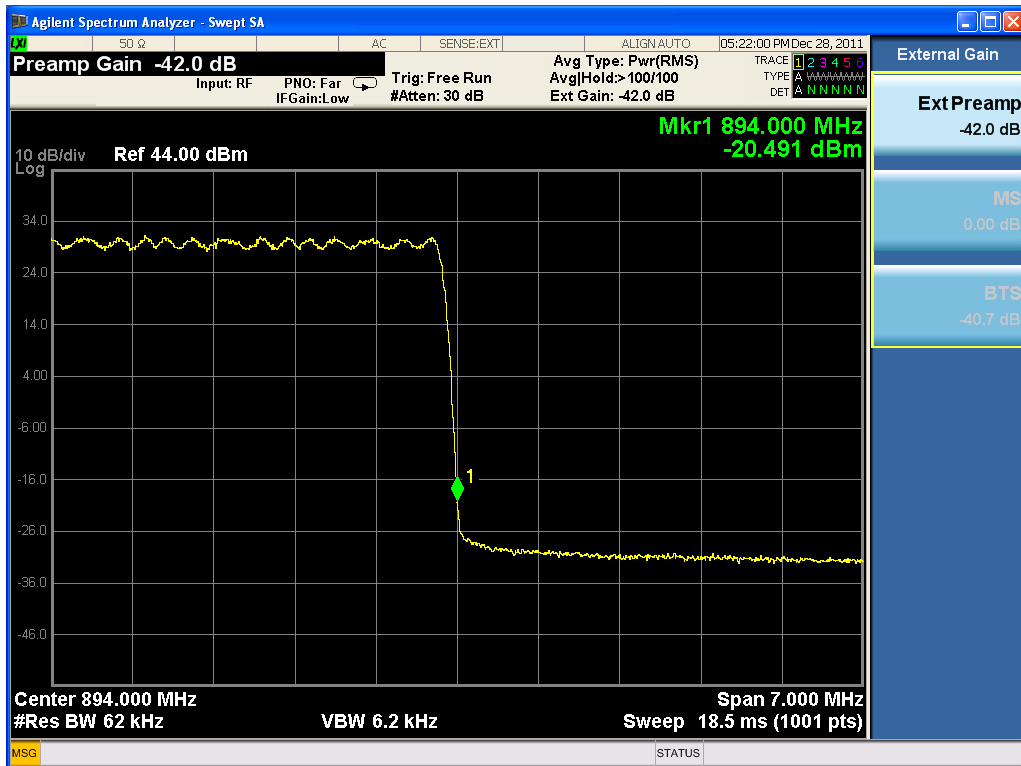
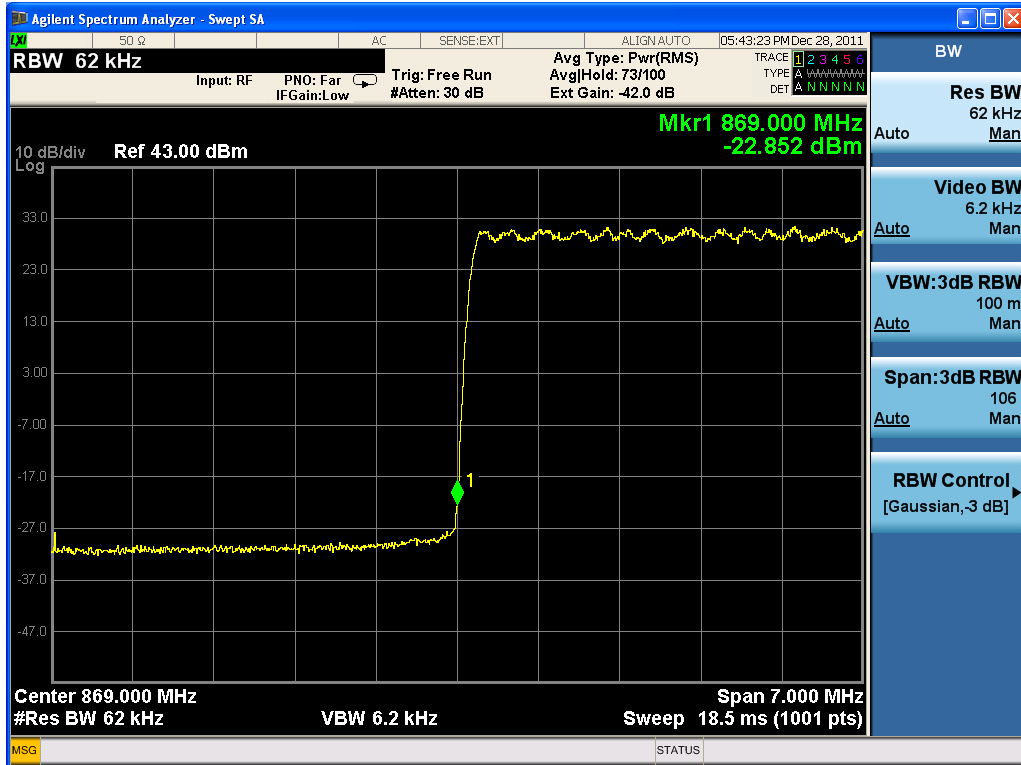
Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
869.76/870.99/872.22/873.45	-23.586	-13.00
889.56/890.79/892.02/893.25	-20.736	-13.00





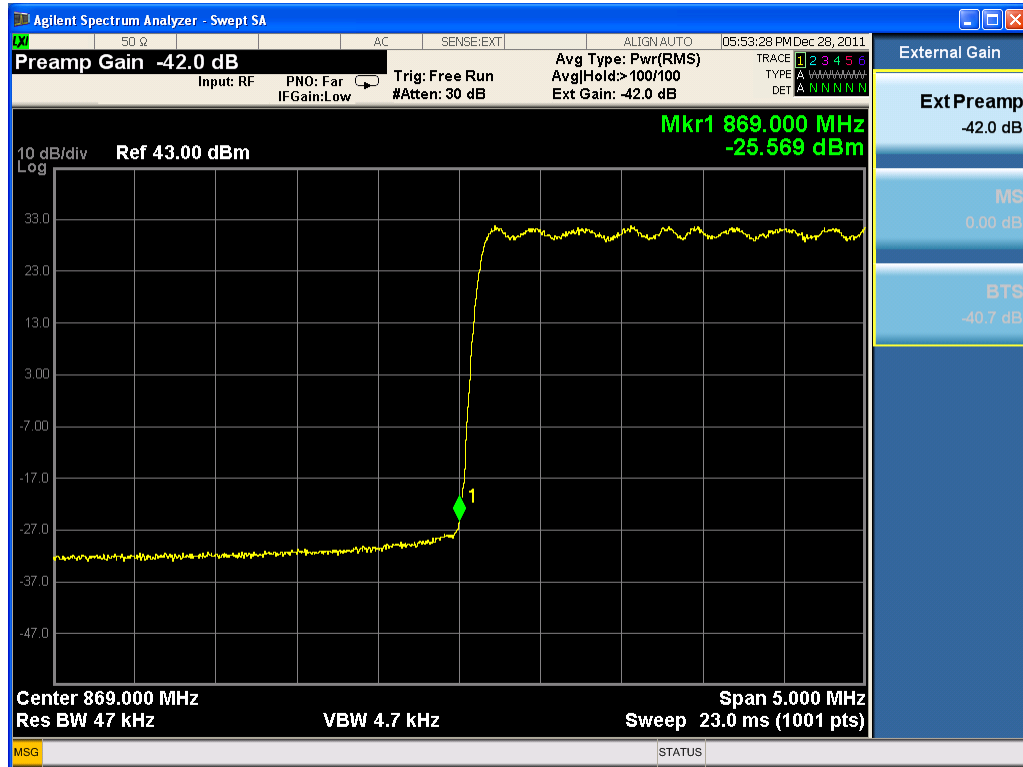
For three carriers

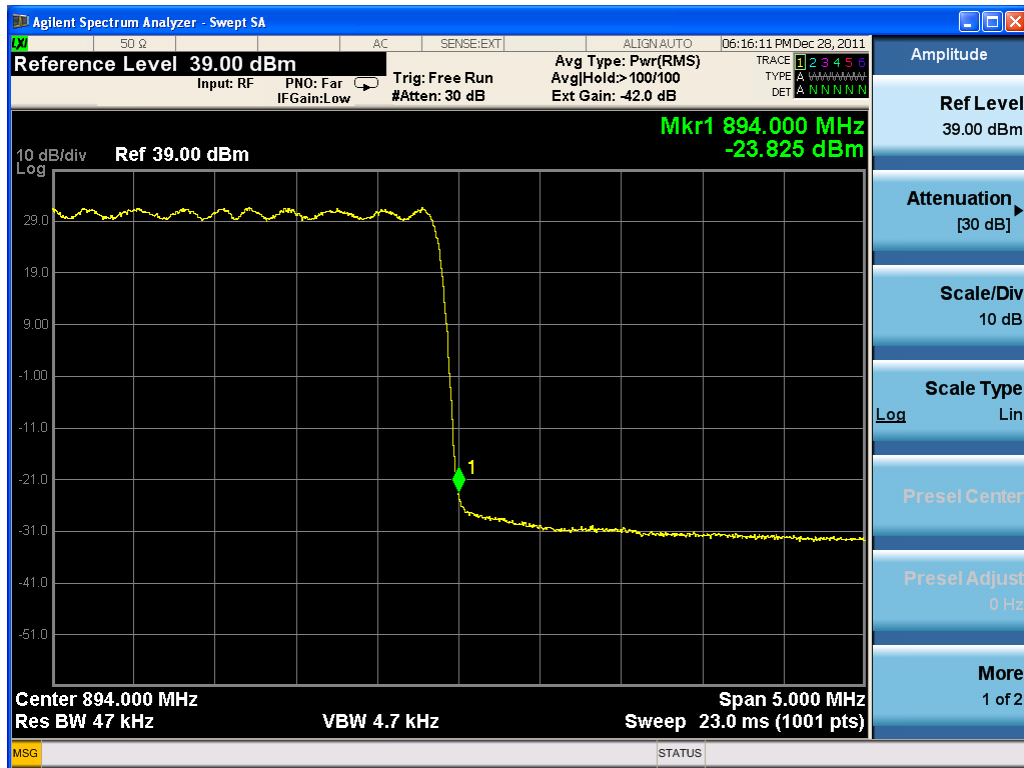
Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
869.76/870.99/872.22	-22.852	-13.00
890.79/892.02/893.25	-20.491	-13.00



For two carriers

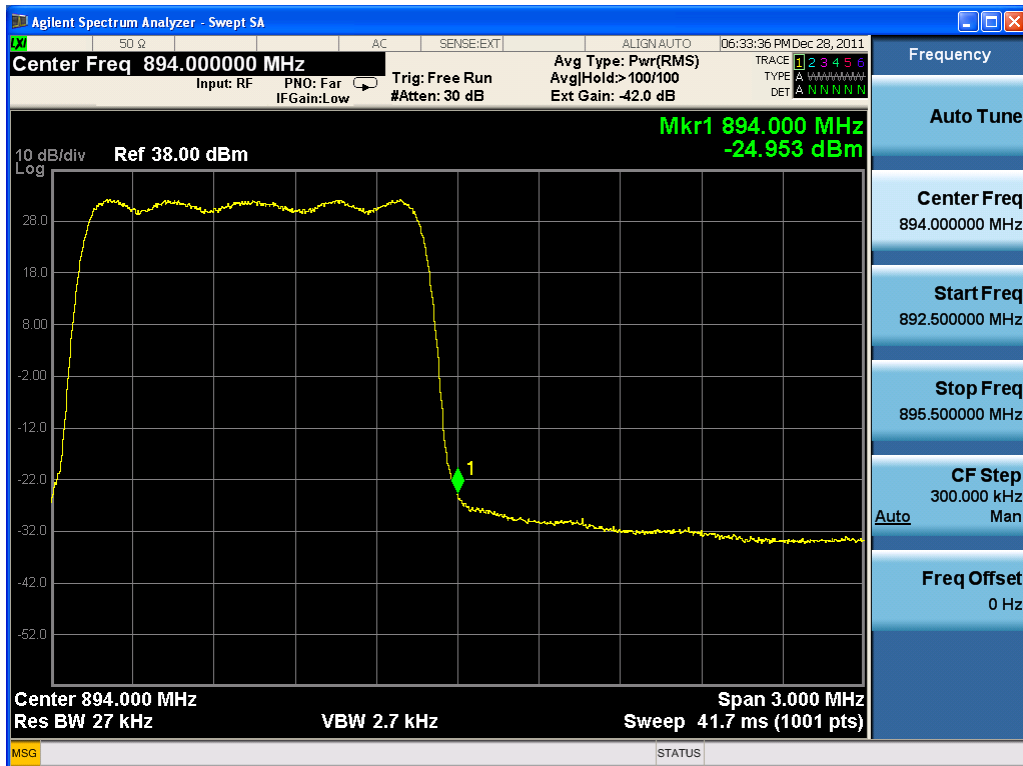
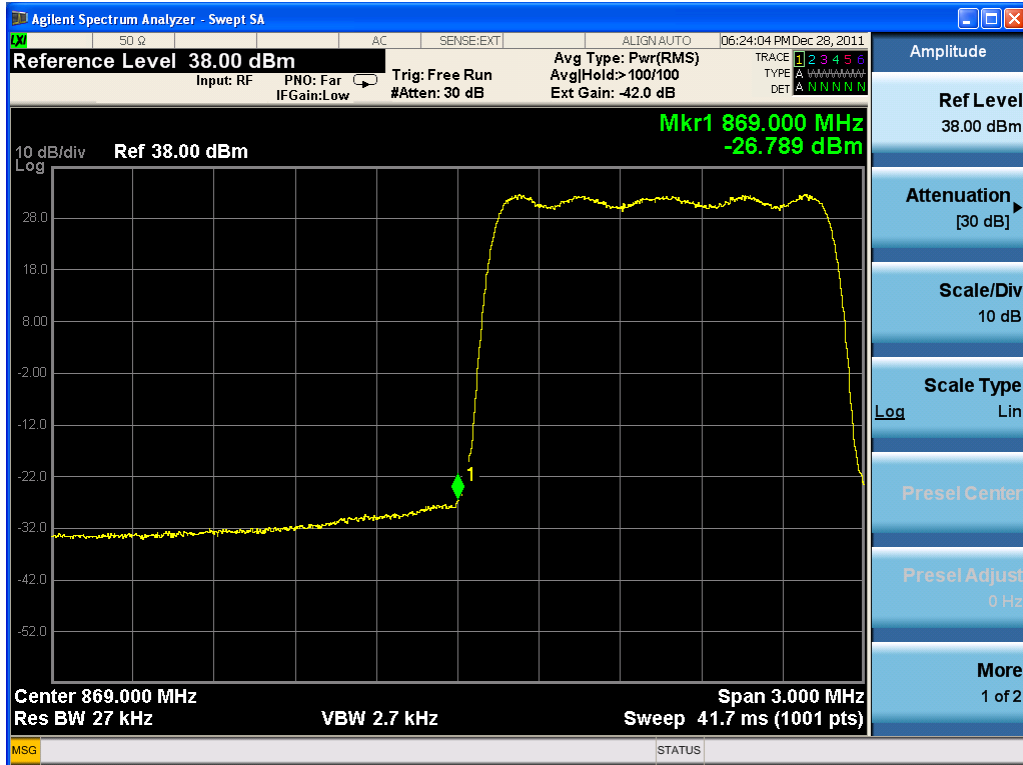
Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
869.76/870.99	-25.569	-13.00
892.02/893.25	-23.825	-13.00





For One carrier

Frequency channel	Max bandedge Emission (dBm)	Limit (dBm)
869.76	-26.789	-13.00
893.25	-24.953	-13.00



3.8 FREQUENCY STABILITY

Applicable Standard: FCC § 2.1055, § 22.355

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	2012-1-26	2013-1-26
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

***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 CDMA

Test Data

Frequency Stability Versus Temperature

Frequency Stability vs Temperature					
Temperature (°C)	Power Supplied (V _{dc})	Frequency Measure Error (Hz)	Error (ppm)	Limit (ppm)	Result
f=881.5MHz					
-40	-48	-13.6	-0.015472127	0.02	PASS
-30	-48	-12.4	-0.01410694	0.02	PASS
-20	-48	-14.2	-0.016154721	0.02	PASS
-10	-48	-13.4	-0.015244596	0.02	PASS
0	-48	-12.5	-0.014220705	0.02	PASS
10	-48	-10.1	-0.01149033	0.02	PASS
20	-48	-16.7	-0.018998862	0.02	PASS
30	-48	-14.9	-0.016951081	0.02	PASS
40	-48	-13.2	-0.015017065	0.02	PASS
50	-48	-12.4	-0.01410694	0.02	PASS
55	-48	-14.2	-0.016154721	0.02	PASS

Frequency Stability Versus Voltage

Frequency Stability vs. Voltage					
Voltage V_{dc}	Temperature $^{\circ}C$	Frequency Measure Error Hz	Error ppm	Limit ppm	Result
f=881.5MHz					
40	20	-15.4	-0.017519909	0.02	PASS
44	20	-14.2	-0.016154721	0.02	PASS
47	20	-14.8	-0.016837315	0.02	PASS
50	20	-15.9	-0.018088737	0.02	PASS
53	20	-12.4	-0.01410694	0.02	PASS
56	20	-13.6	-0.015472127	0.02	PASS
57	20	-12.1	-0.013765643	0.02	PASS

4 UMTS OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046 ,§22.913	Transmitter output Power	Compliant
§2.1091 ,§1.1037	RF Exposure	Compliant
§2.1047	Modulation Characteristic	Compliant
§2.1053, §22.917	Spurious Radiated Emissions	Compliant
§2.1051, §22.917	Spurious Emissions AT Antenna Terminals	Compliant
§2.1049 §22.917	Occupied Bandwidth	Compliant
§2.1051, §22.917	Band Edge	Compliant
§ 2.1055, §22.355	Frequency stability	Compliant

4.1 TRANSMITTER OUTPUT POWER

Applicable Standard: FCC §2.1046 §22.913

According to FCC §2.1046 & 22.913, the ERP (equivalent radiated power) must not exceed 500 Watts.

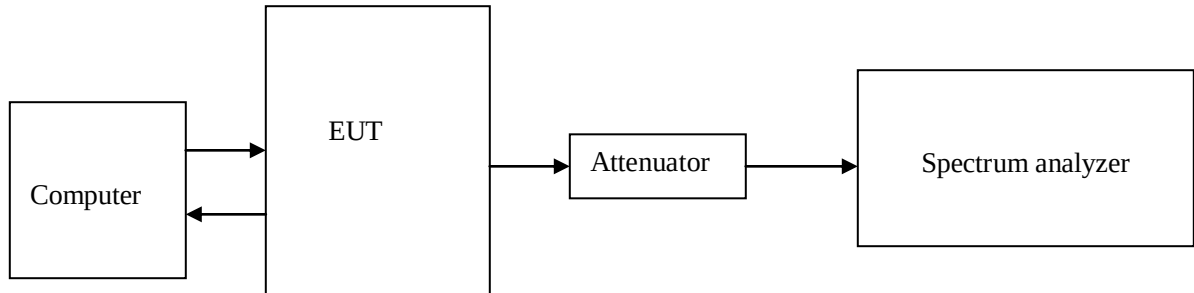
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

***statement of traceability:** ZTE Corporation Reliability Testing Center attests that all

calibration has 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 2dB

Environmental Conditions

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

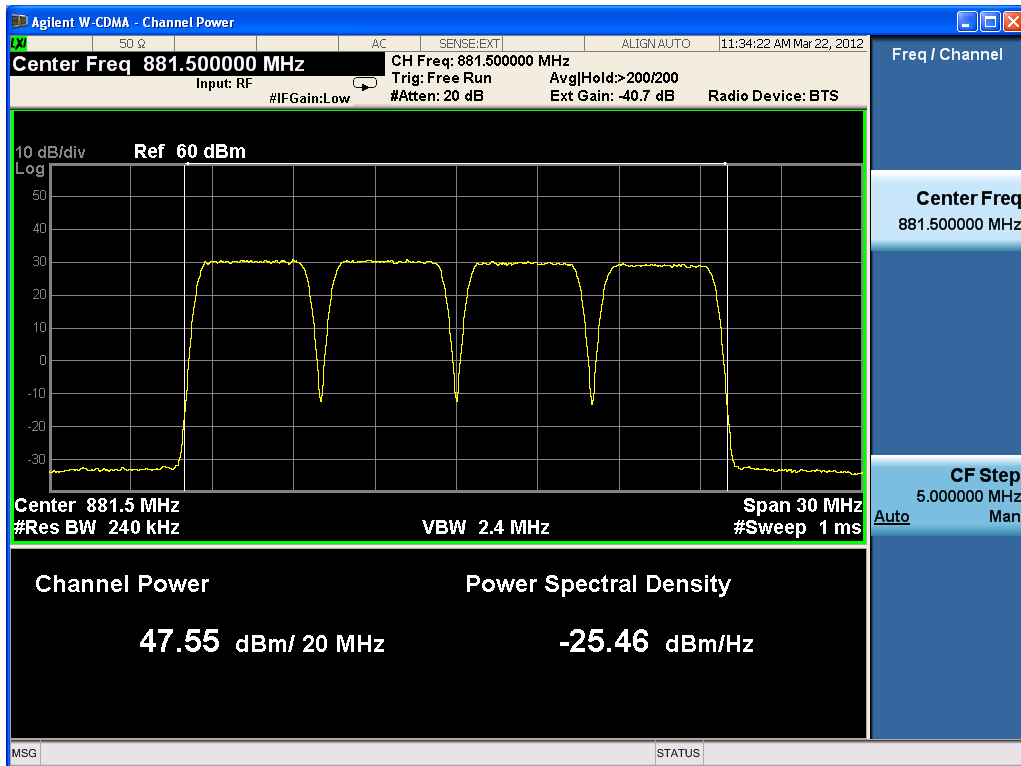
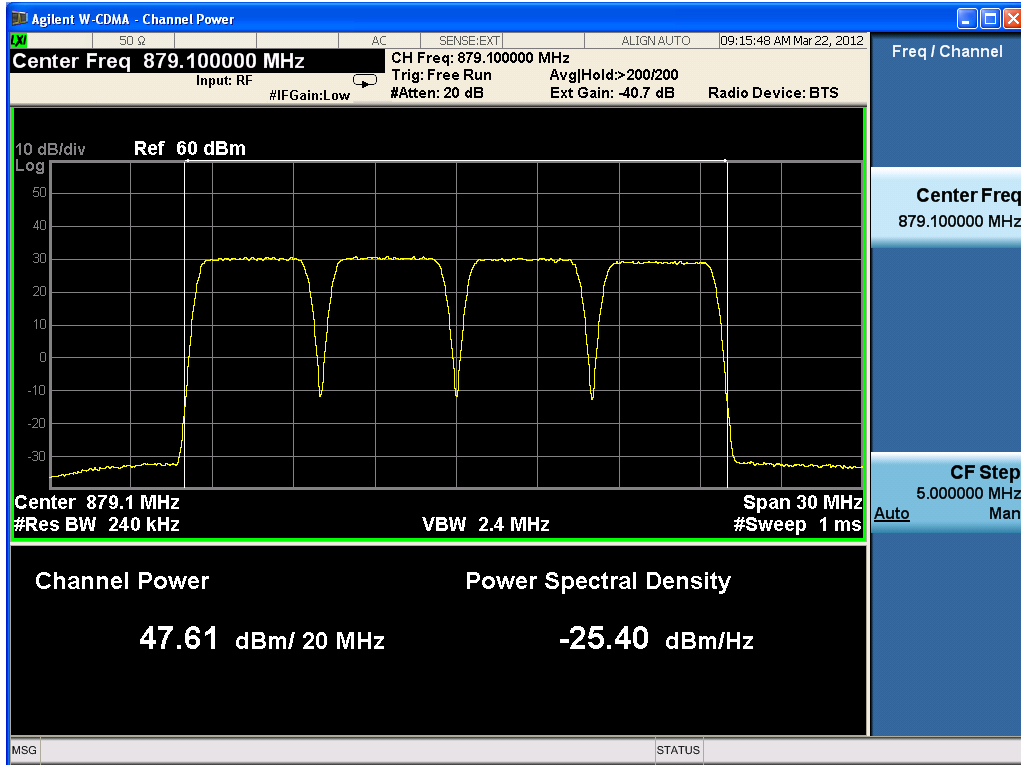
Test Result: Pass

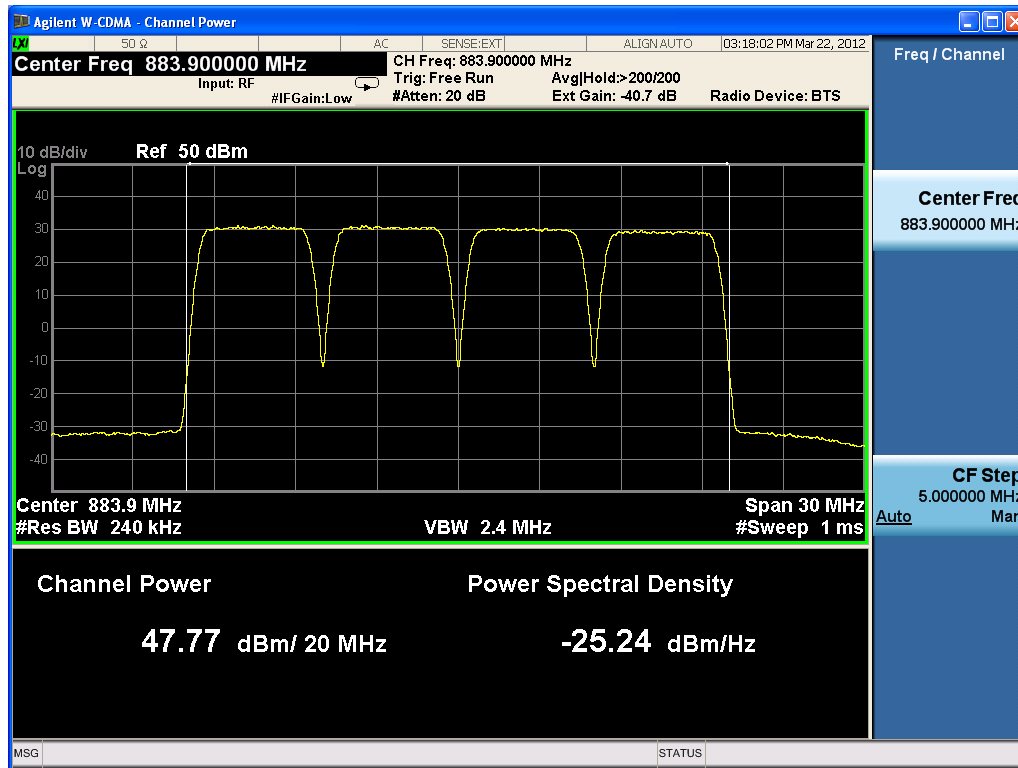
Test Mode: Transmitting UMTS

Test Data:

Four carriers

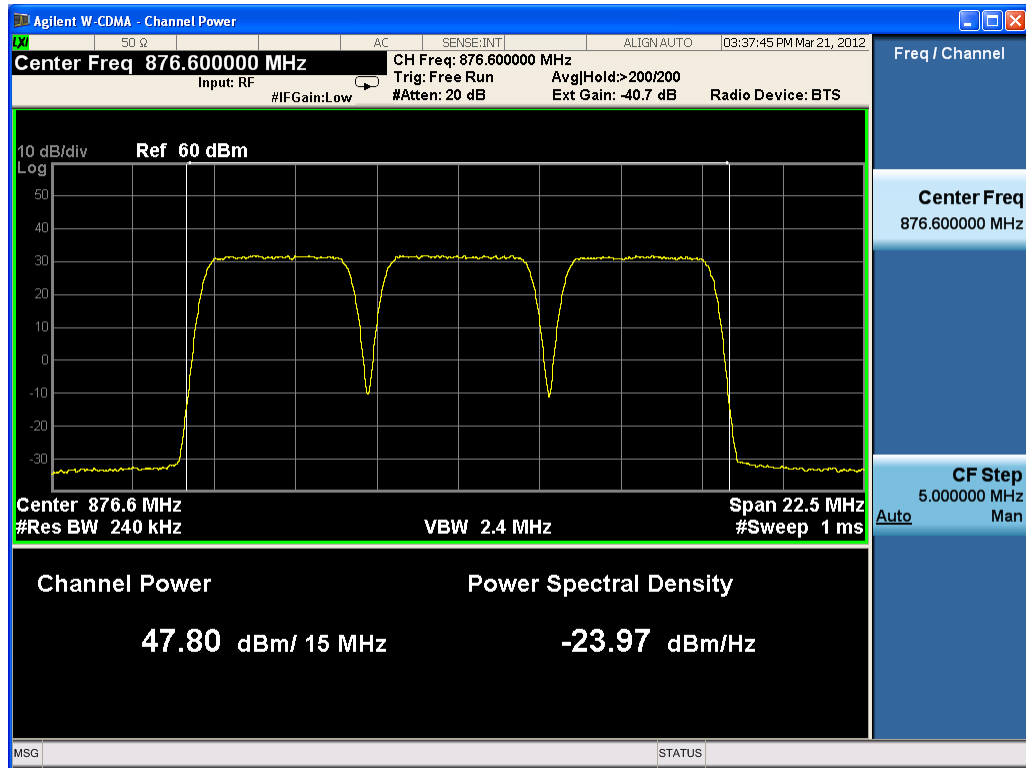
Center Freq. (MHz)	Frequency (MHz)	Max output Power (dBm)
871.9	871.6/ 876.6/ 881.6/ 886.6	47.61
881.5	874/879/884/889	47.55
883.9	876.4/881.4/886.4/891.4	47.77

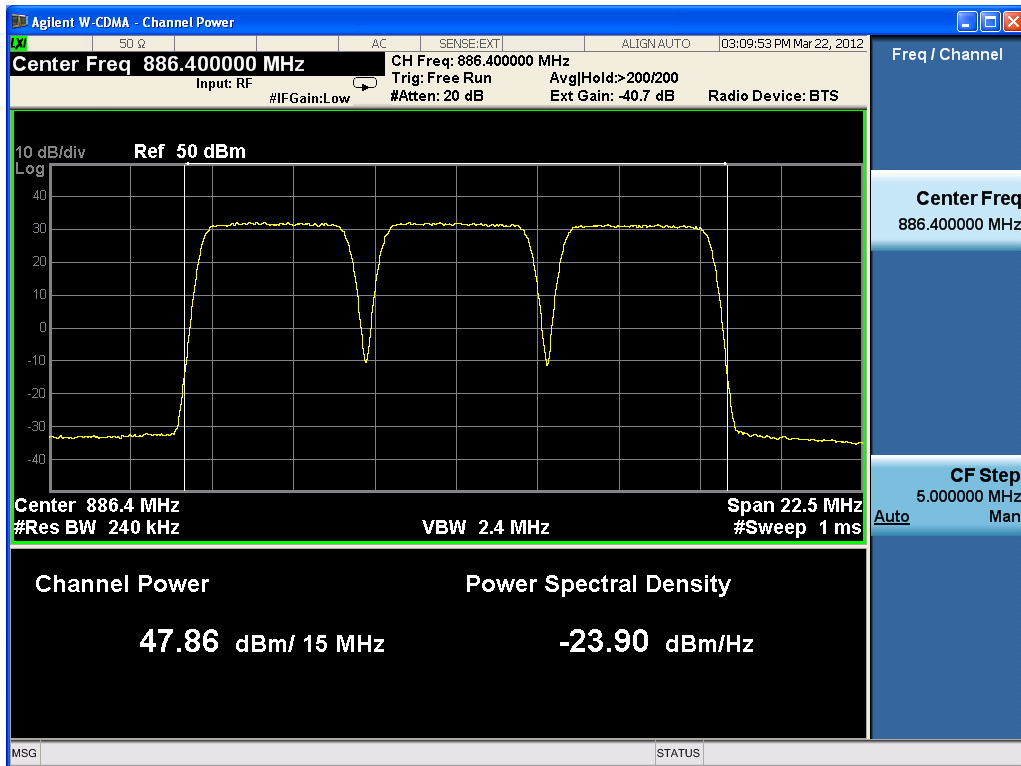
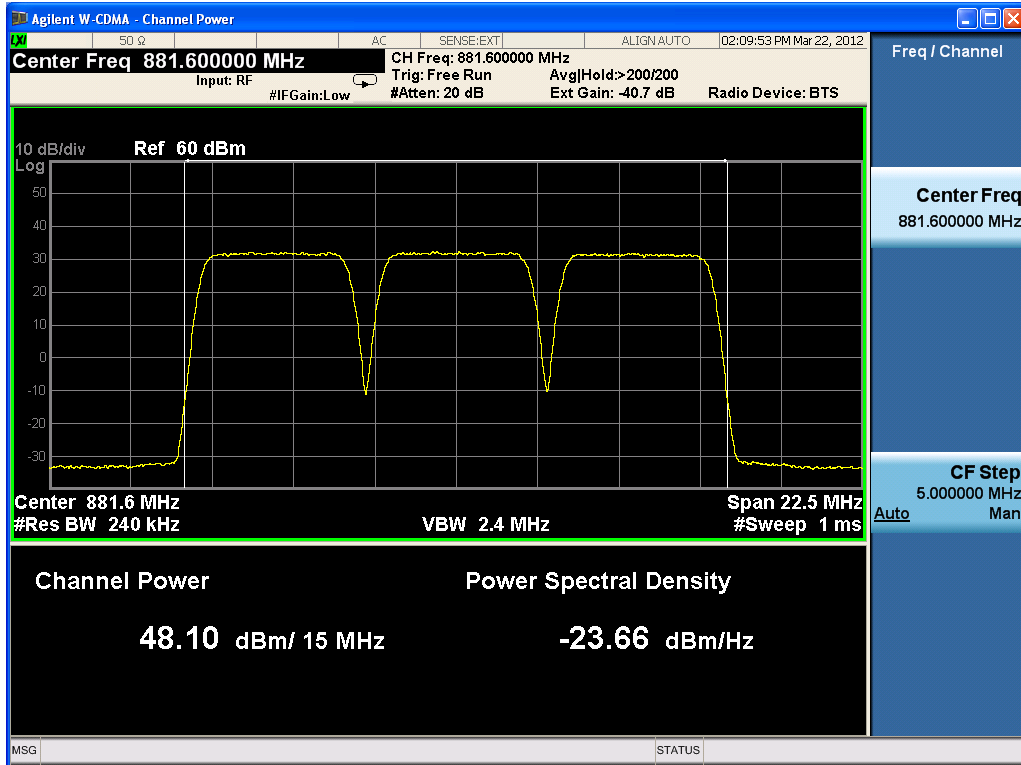




Three carriers

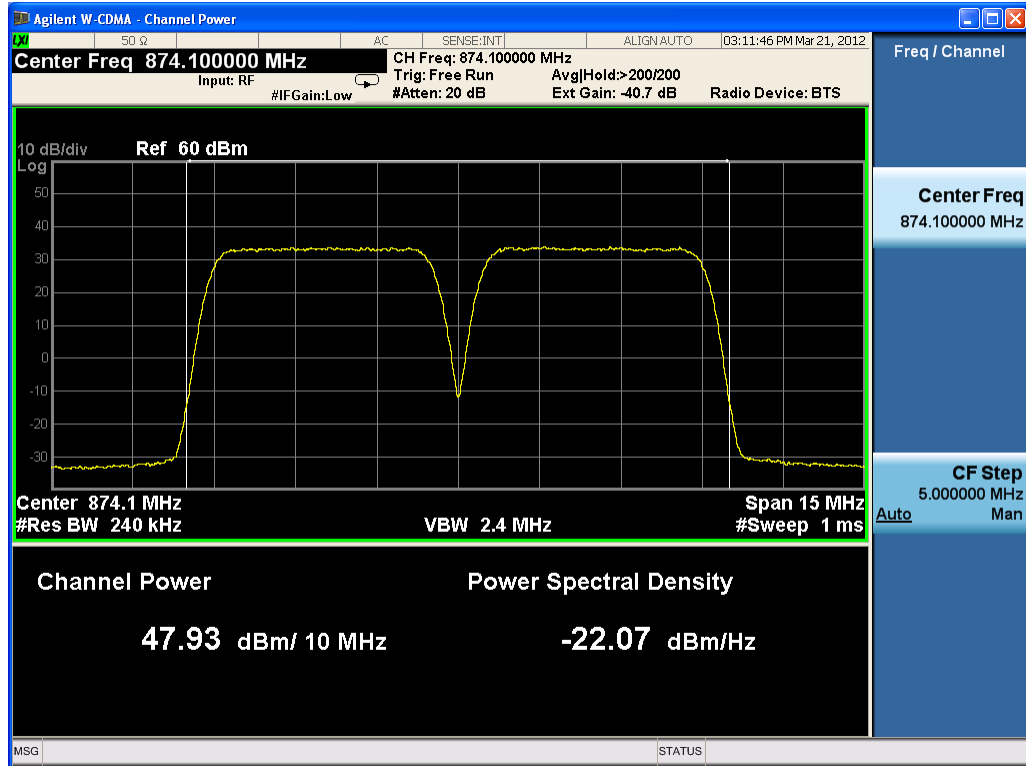
Center Freq. (MHz)	Frequency (MHz)	Max output Power (dBm)
876.6	871.6/876.6/881.6	47.80
881.6	876.6/881.6/886.6	48.10
886.4	881.4/886.4/891.4	47.86

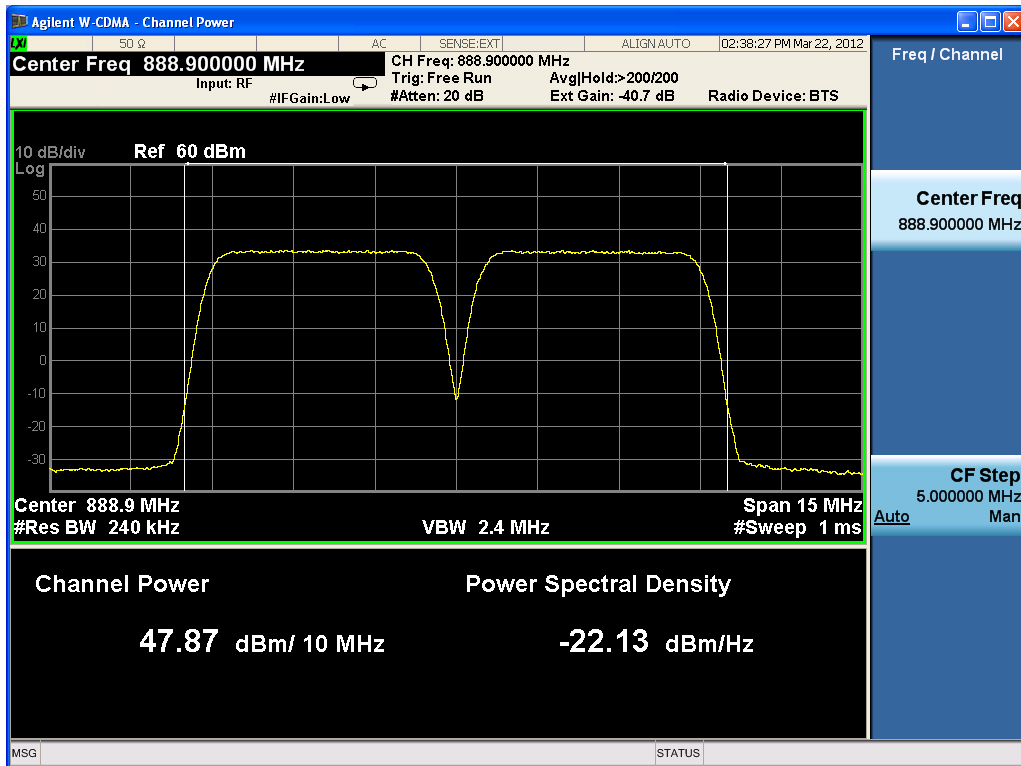
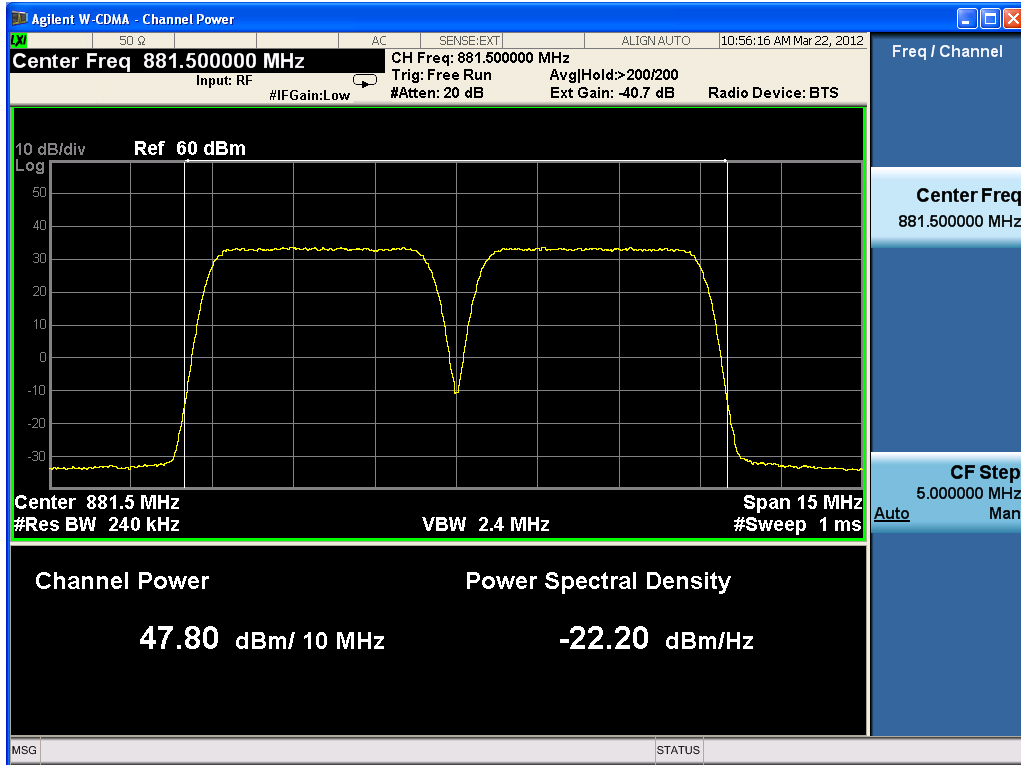




Two carriers

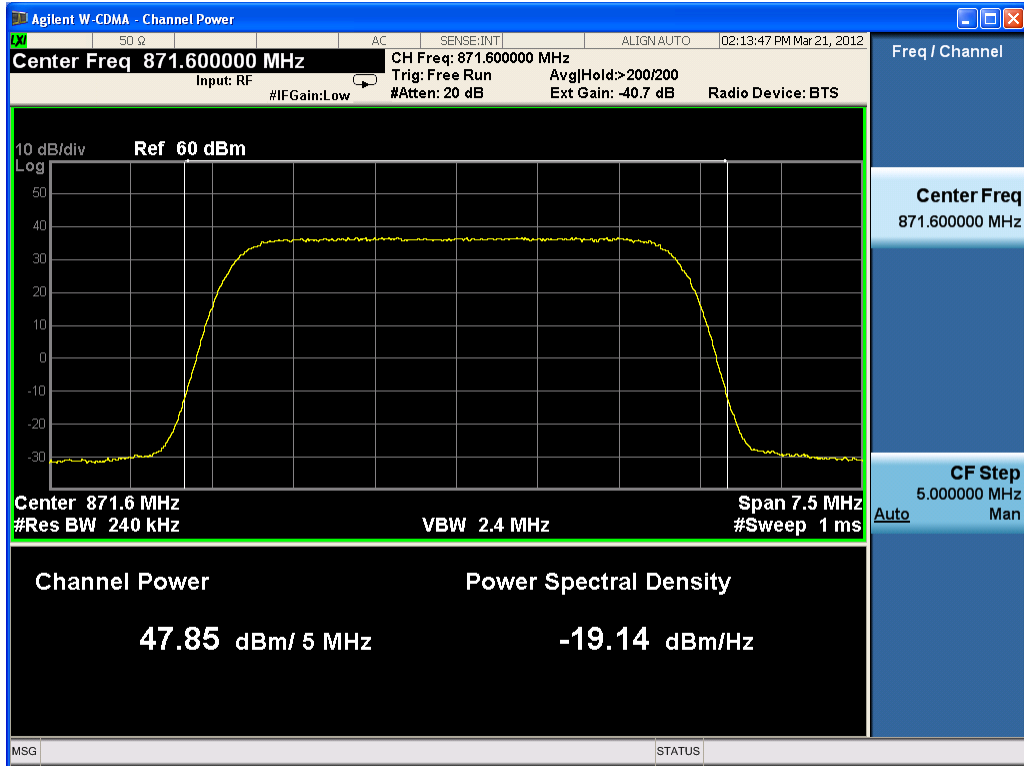
Center Freq. (MHz)	Frequency (MHz)	Max output Power (dBm)
874.1	871.6/876.6	47.93
881.5	879/884	47.80
888.9	886.4/891.4	47.87

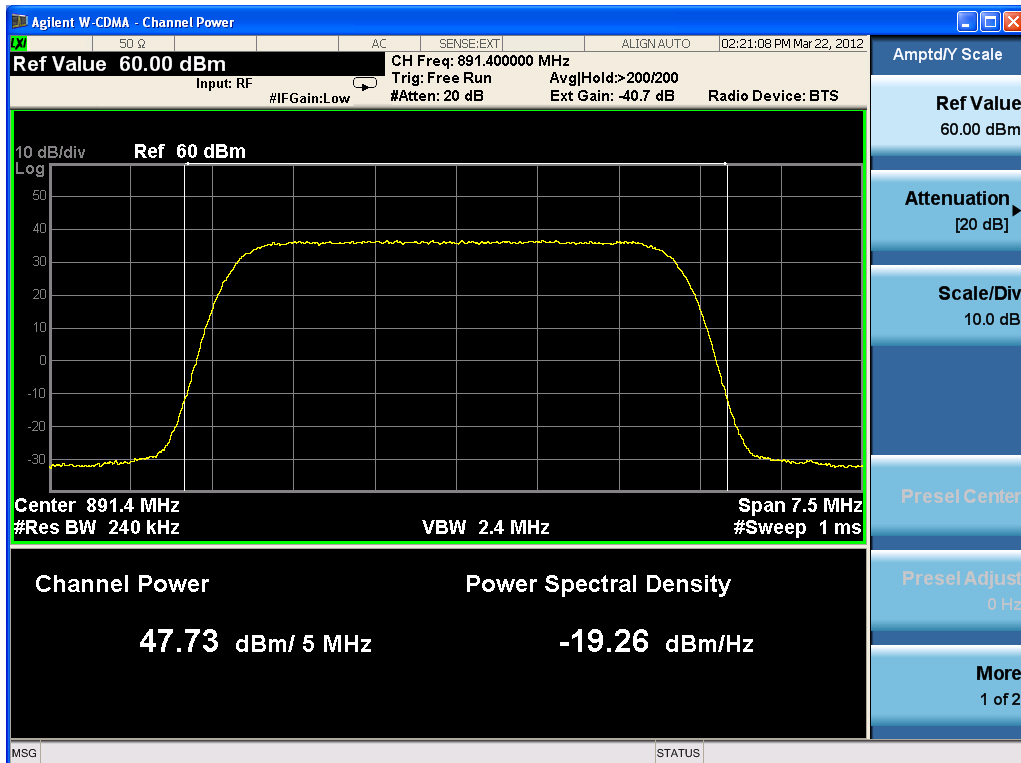
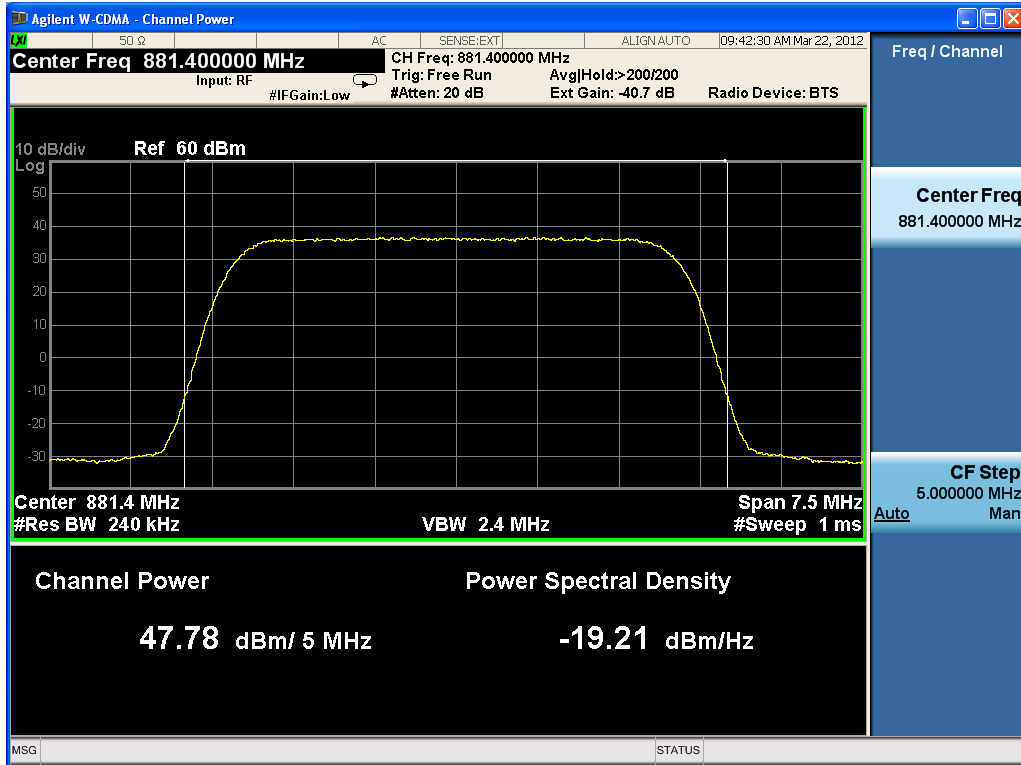




One carrier

Center Freq. (MHz)	Frequency (MHz)	Max output Power (dBm)
871.6	871.6	47.85
881.4	881.4	47.78
891.4	891.4	47.73





4.2 RF EXPOSURE

Applicable standard: FCC §2.1091 §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 ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	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= $[(\text{ERP}+2.15\text{dB})/4\pi S]^{1/2}$

Maximum EIRP, In general, the equivalent isotropically radiated power (EIRP) of base transmitters and cellular repeaters must not exceed 500 Watts.

Frequency is between 300MHz and 1500MHz, and the Maximum,

$$S=894/1500=0.596\text{mW/cm}^2, R=3.31\text{m}.$$

This equipment should be installed and operated with minimum distance 3.31m 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	2011-4-8	2012-4-7
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

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

Test Procedure

CDMA digital mode is used by EUT.

Test Data Environmental Conditions

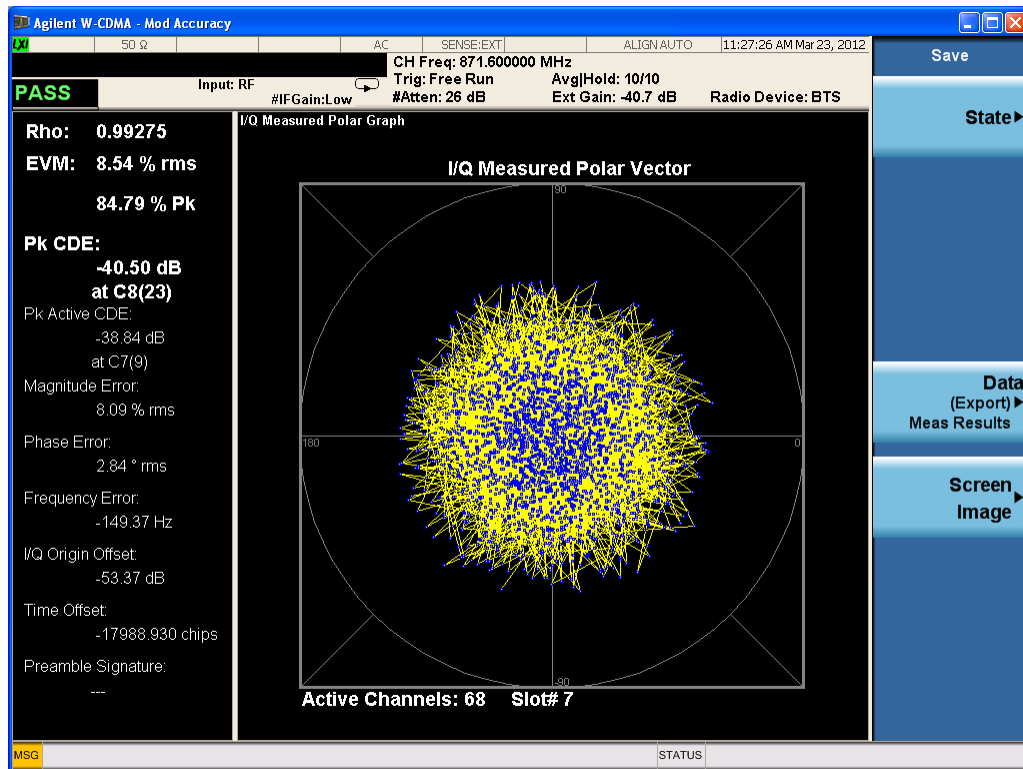
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

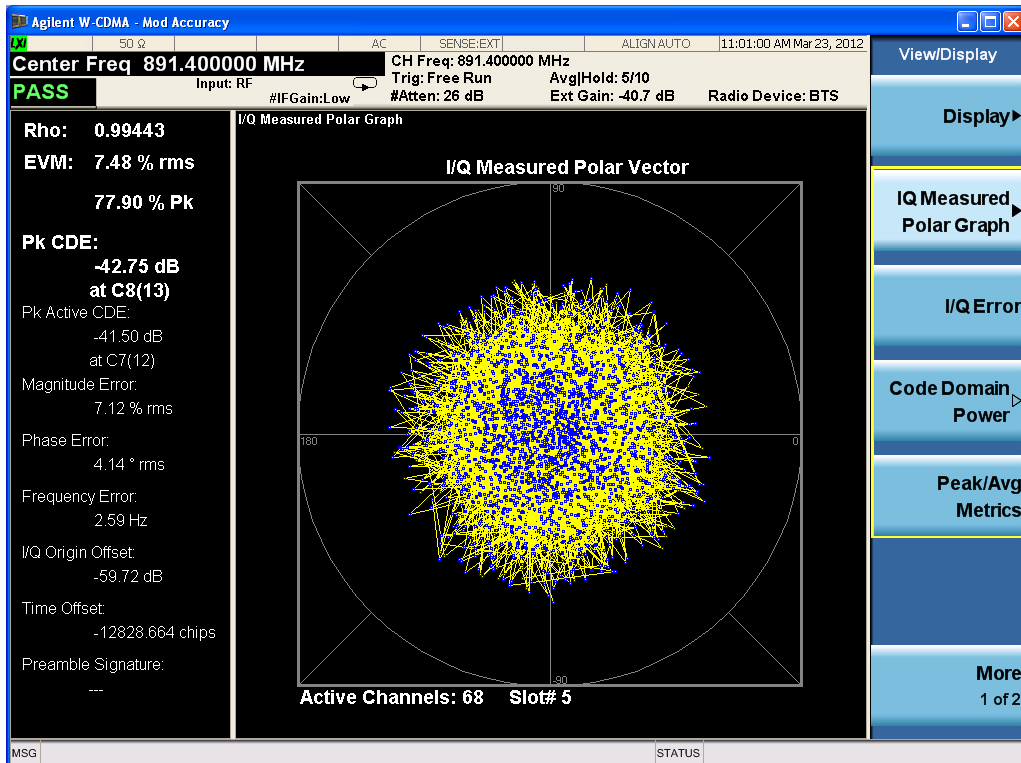
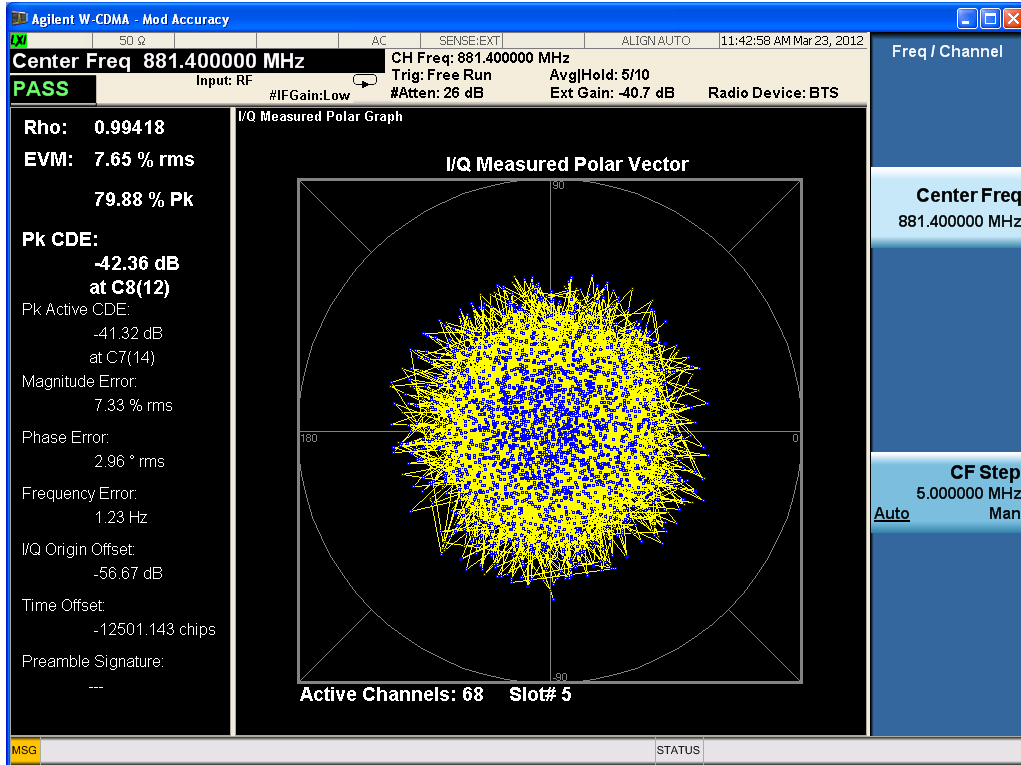
Test Result: Pass

Test Mode: Transmitting UMTS

Test Data:

Frequency (MHz)	Rho
871.6	0.99275
881.4	0.99418
891.4	0.99443





4.4 SPURIOUS RADIATED EMISSIONS

Applicable Standard: FCC CFR 47, §2.1053

Test Equipment List and Details

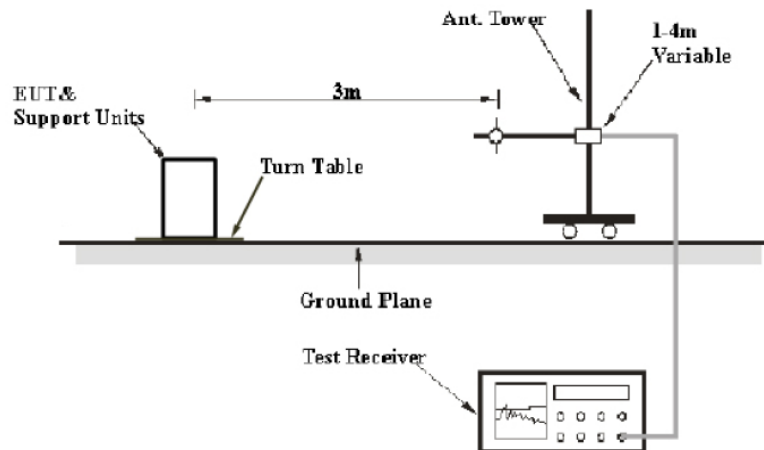
Manufacturer	Equipment	Model	Serial Number	Last Cal.	Cal. Interval
R&S	SIGNAL GENERATOR	SMR20	A00017351	2011-9-26	1 year
Albatross	Anechoic Chamber	3m Site	A00017354	2011-11-2	1 year
R&S	EMI Test Receiver	ESIB26	100058	2011-10-29	1 year
R&S	Ultra Breitband Antennas	HL562	100022	2011-7-29	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100032	2011-7-29	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100446	2011-7-29	1 year
SCHWARZ-BECK	Biconical Antenna	VUBA9117	9117-122	2011-7-29	1 year

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. 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 = $10 \lg(\text{TX pwr in Watts}/0.001)$ - 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 1 percent as specified for 30MHz to 1GHz scanning, set at 1MHz 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)	Effective radiated power (dBm)	Dipole Antenna	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (GHz)	Amp. (dB μ V)	Polar H/V	Level (dBm)	Antenna Gain Correction						
33.887776	23.08	V	-36	-42.03	0.3	-78.33	2.15	-80.48	-13	67.48
125.250501	22.74	V	-64.26	-10.46	0.8	-75.52	2.15	-77.67	-13	64.67
148.577154	23.36	V	-62.59	-6.46	1	-70.05	2.15	-72.2	-13	59.2
593.727455	27.02	V	-68.97	-1.21	2	-72.18	2.15	-74.33	-13	61.33
895.03006	78.46	V	-18.73	-1.54	2.5	-22.77	2.15	-24.92	-13	11.92
2755.51102	53.66	V	-48.59	7.95	4.4	-45.04	2.15	-47.19	-13	34.19
30	22.38	H	-30.36	-43.49	0.3	-74.15	2.15	-76.3	-13	63.3
138.857715	22.27	H	-69.77	-8.42	1	-79.19	2.15	-81.34	-13	68.34
150.521042	23.61	H	-68.43	-5.7	1	-75.13	2.15	-77.28	-13	64.28
644.268537	26.85	H	-74.04	-1.09	2.1	-77.23	2.15	-79.38	-13	66.38
893.086172	78.5	H	-18.59	-1.54	2.5	-22.63	2.15	-24.78	-13	11.78
2791.58317	53.68	H	-54.72	7.95	4.5	-51.27	2.15	-53.42	-13	40.42

Radiation emission spurious below 3GHz

Indicated		Test Antenna	Substituted		Cable Loss(dB)	Effective radiated power (dBm)	Dipole Antenna	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (GHz)	Amp. (dB μ V)	Polar H/V	Level (dBm)	Antenna Gain Correction						
4811.62325	41.88	V	-65.72	9.15	5.9	-62.47	2.15	-64.62	-13	51.62
6142.28457	47.82	V	-59.65	9.05	6.8	-57.4	2.15	-59.55	-13	46.55
6991.98397	48.96	V	-59.21	9.25	7.3	-57.26	2.15	-59.41	-13	46.41
7541.58317	50.02	V	-62.33	9.25	7.7	-60.78	2.15	-62.93	-13	49.93
9846.19239	55.41	V	-53.41	9.95	8.9	-52.36	2.15	-54.51	-13	41.51
12646.2926	56.48	V	-53.22	12.15	9.9	-50.97	2.15	-53.12	-13	40.12
3801.60321	40.63	H	-63.06	7.75	5.2	-60.51	2.15	-62.66	-13	49.66
4731.46293	42.01	H	-61.42	9.15	5.8	-58.07	2.15	-60.22	-13	47.22
6182.36473	47.9	H	-55.49	9.05	6.9	-53.34	2.15	-55.49	-13	42.49
7622.24449	49.3	H	-59.33	9.25	7.8	-57.88	2.15	-60.03	-13	47.03
9869.23848	55.92	H	-53.02	9.95	8.8	-51.87	2.15	-54.02	-13	41.02
12404.3086	56.89	H	-55.26	12.05	9.9	-53.11	2.15	-55.26	-13	42.26

Radiation emission spurious above 3GHz

4.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard: FCC§2.1051, §22.917

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

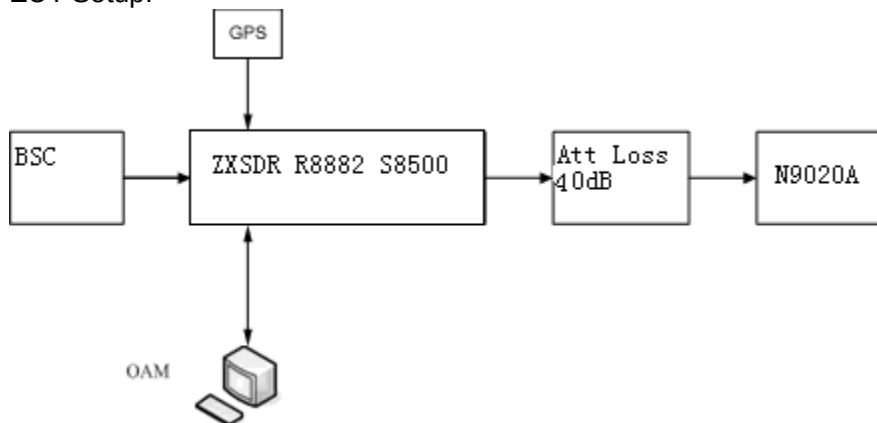
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY48011941	2011-4-8	2012-4-7
Atten	40dB Attenuator	ATSI150-4-40	11300100204204	2011-7-11	2012-7-11
Forstar	Forstar RF Cable	002	1034	2011-4-8	2012-4-7

***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)=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 100KHz for 30MHz to 1GHz band, set at 1MHz for 1GHz to 10GHz band. 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

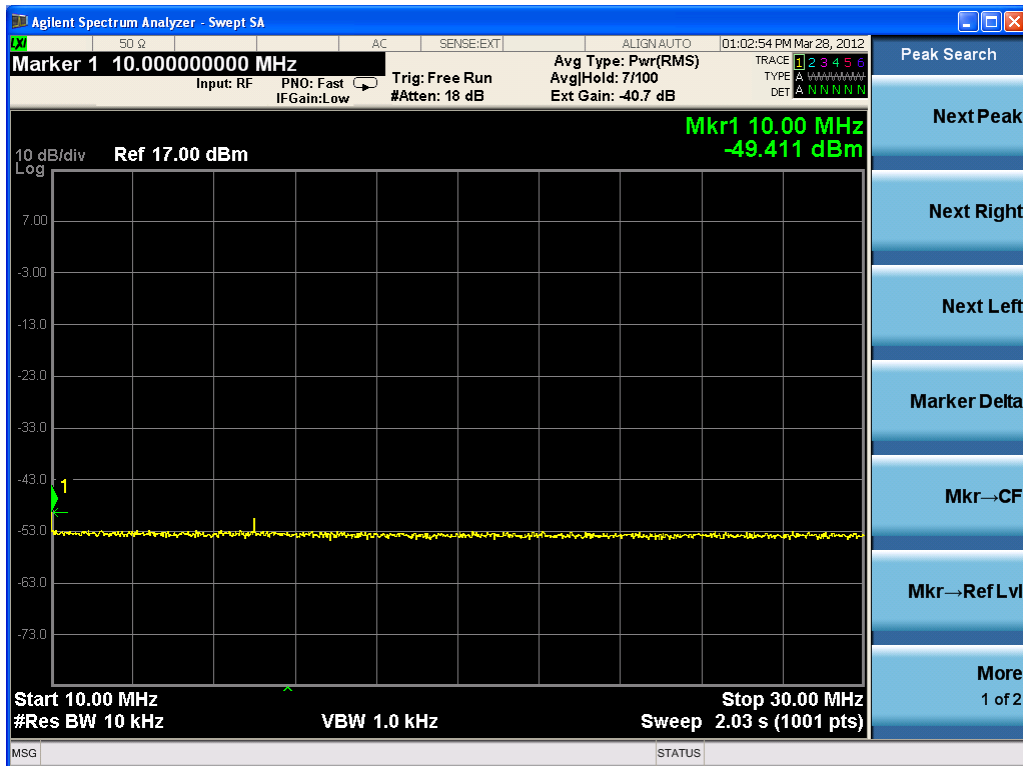
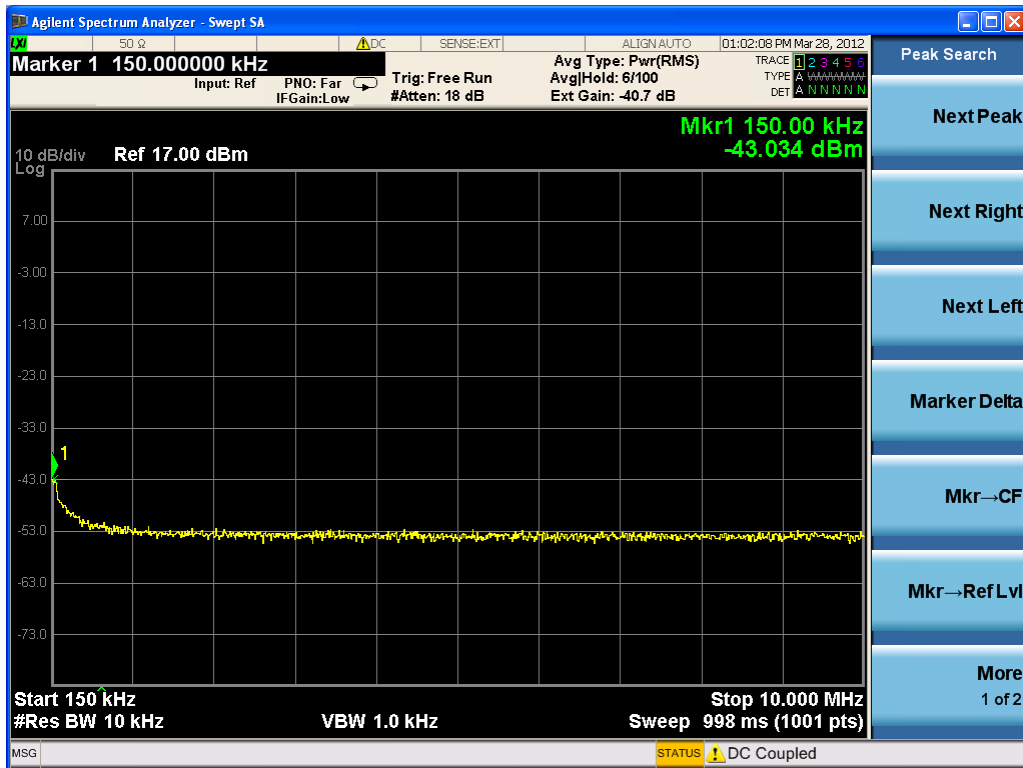
Test Result: Pass

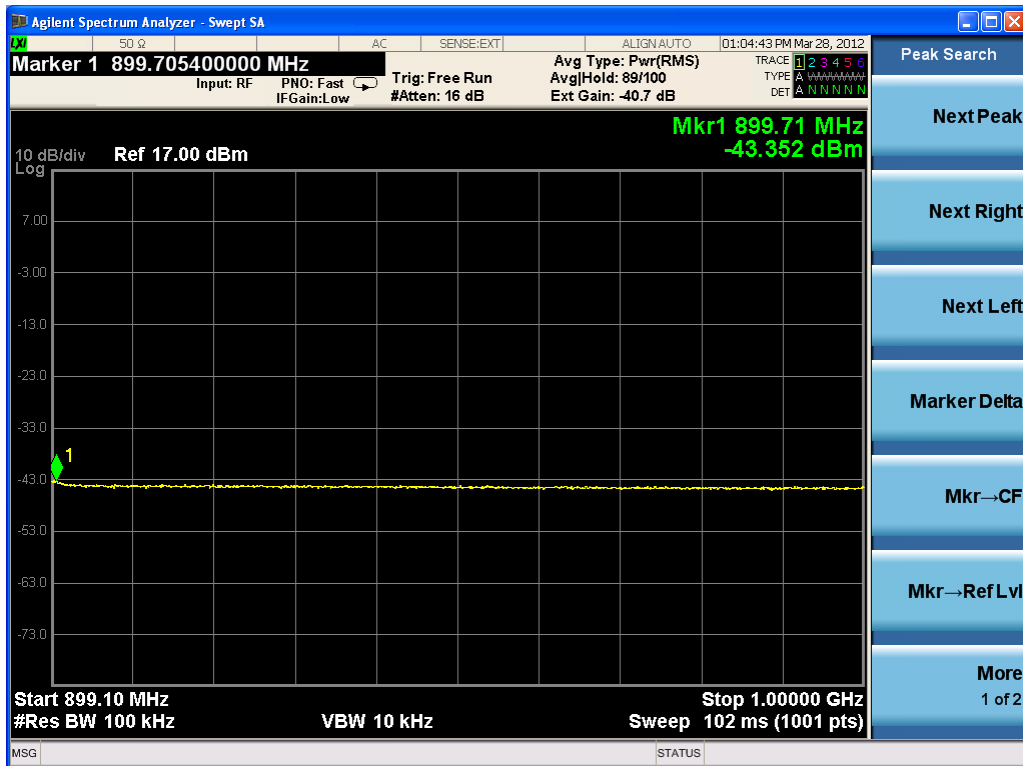
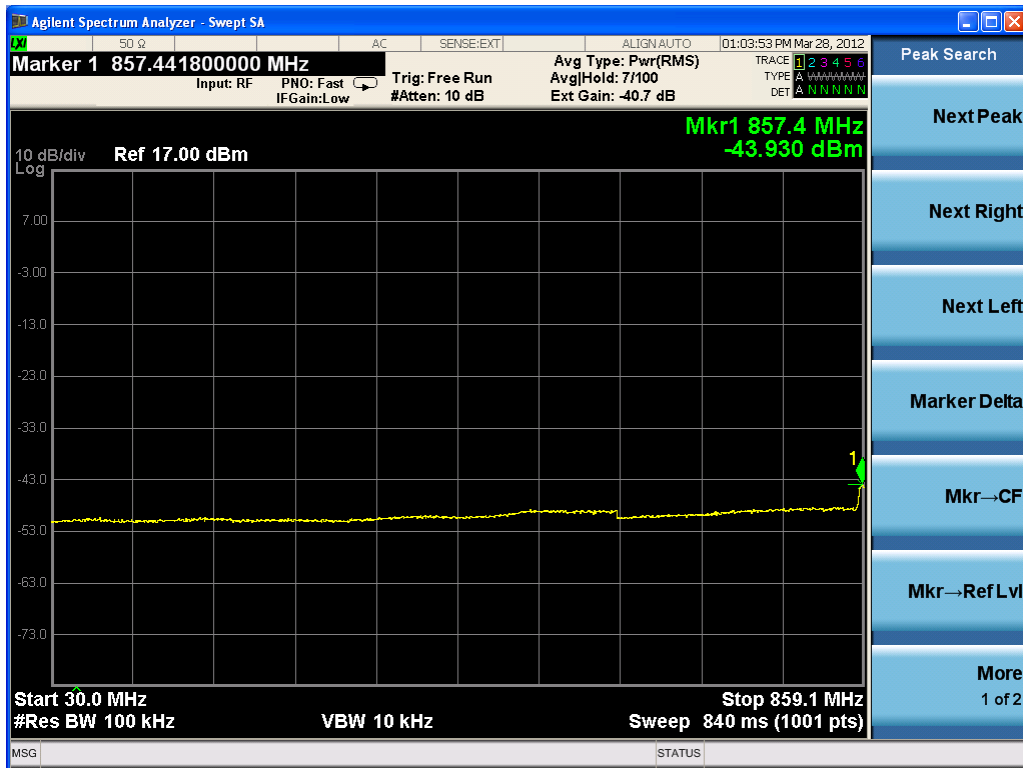
Test Mode: Transmitting UMTS

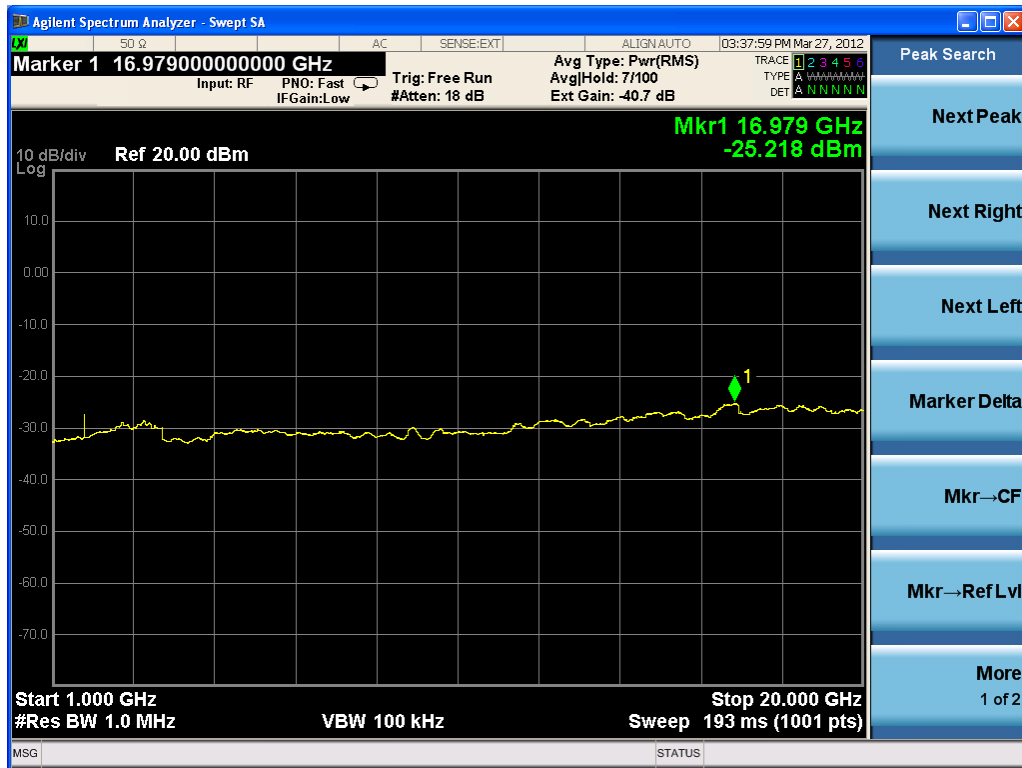
Test Data:

Four carriers (working in bottom frequency)



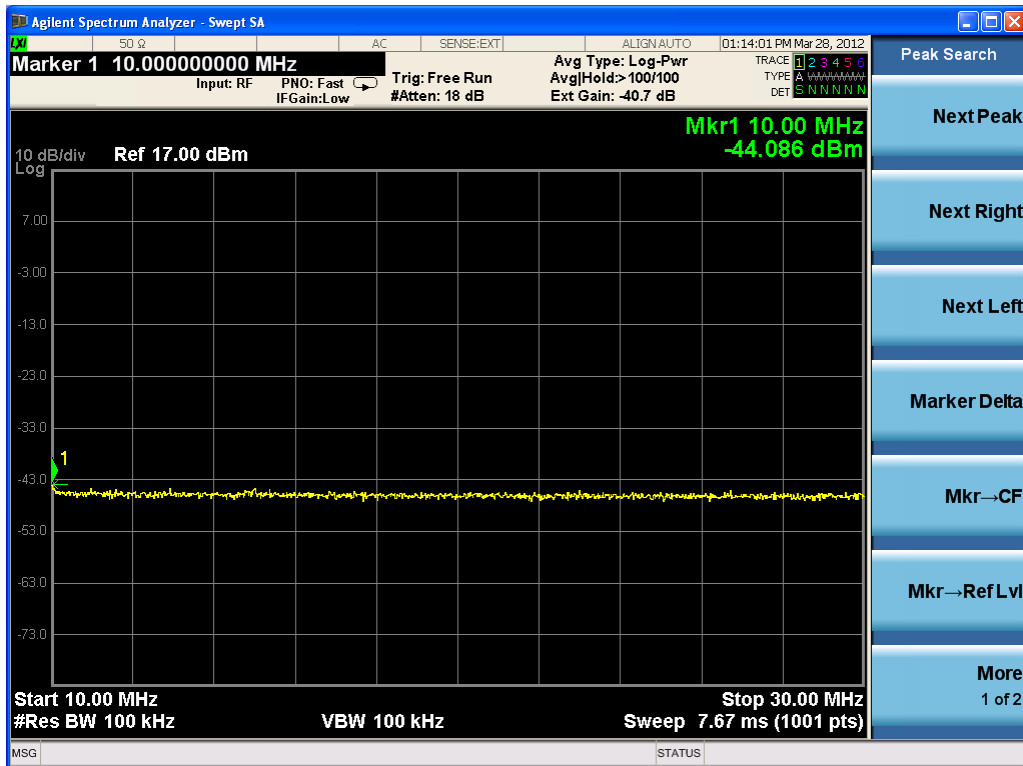
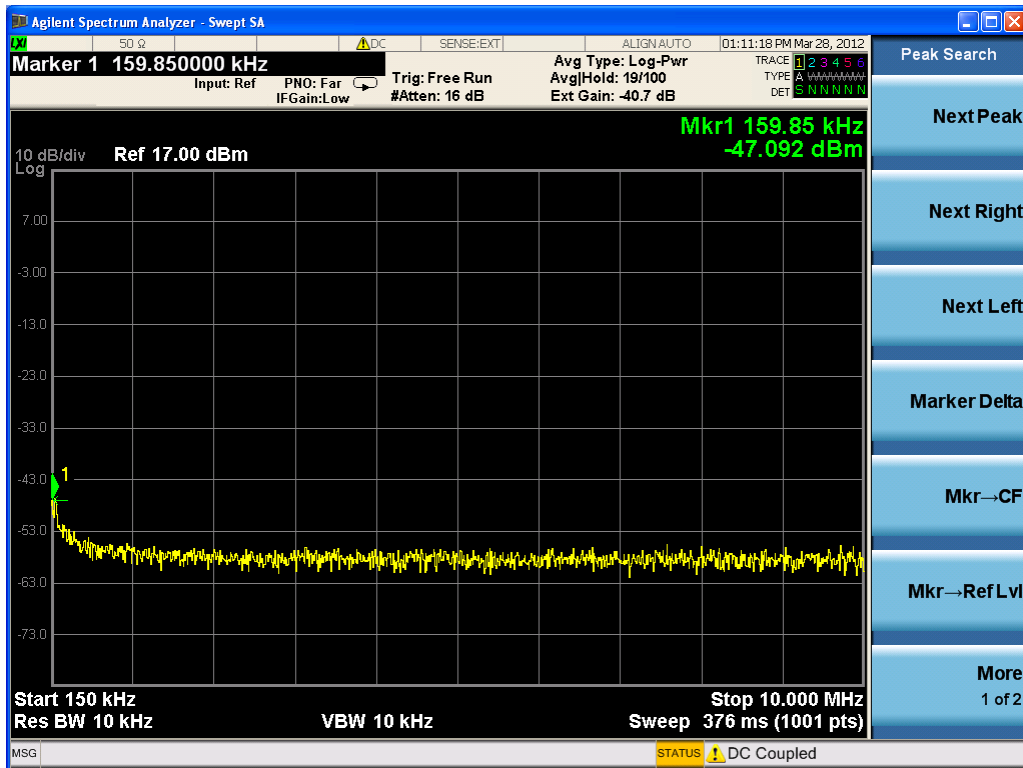


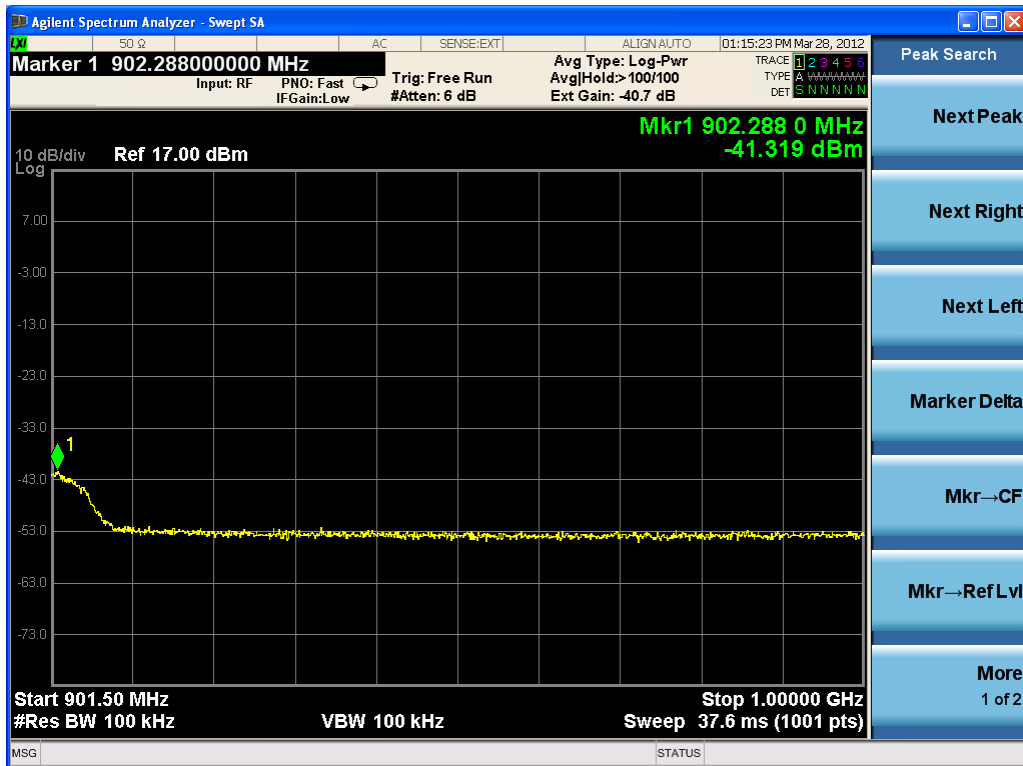
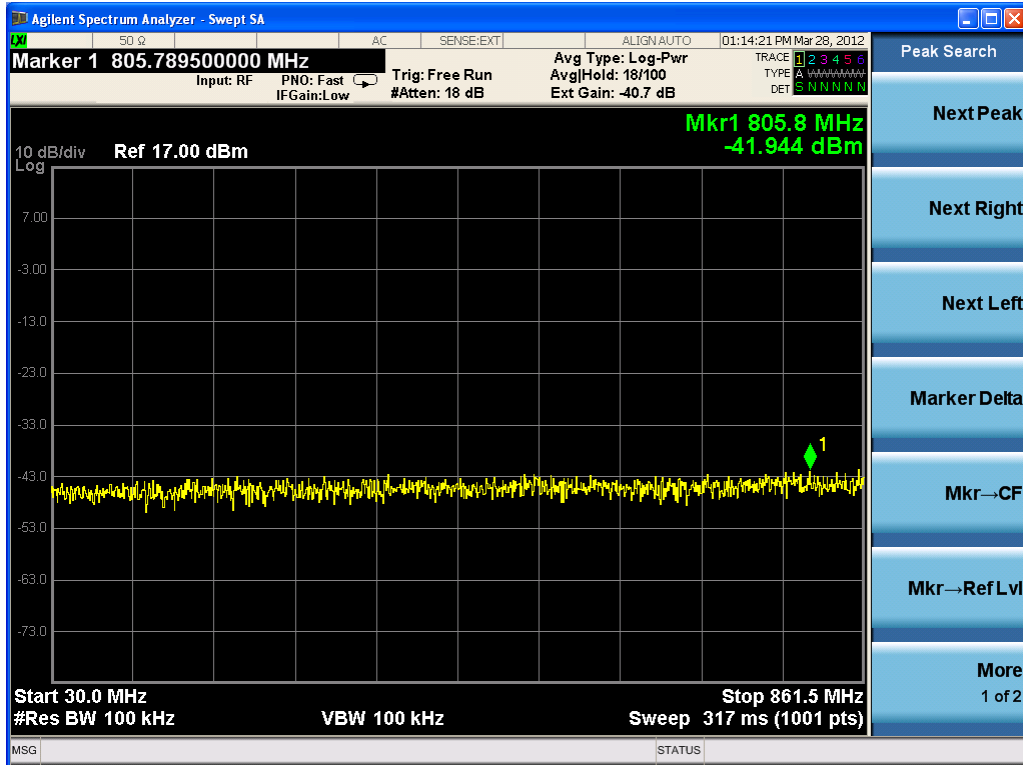


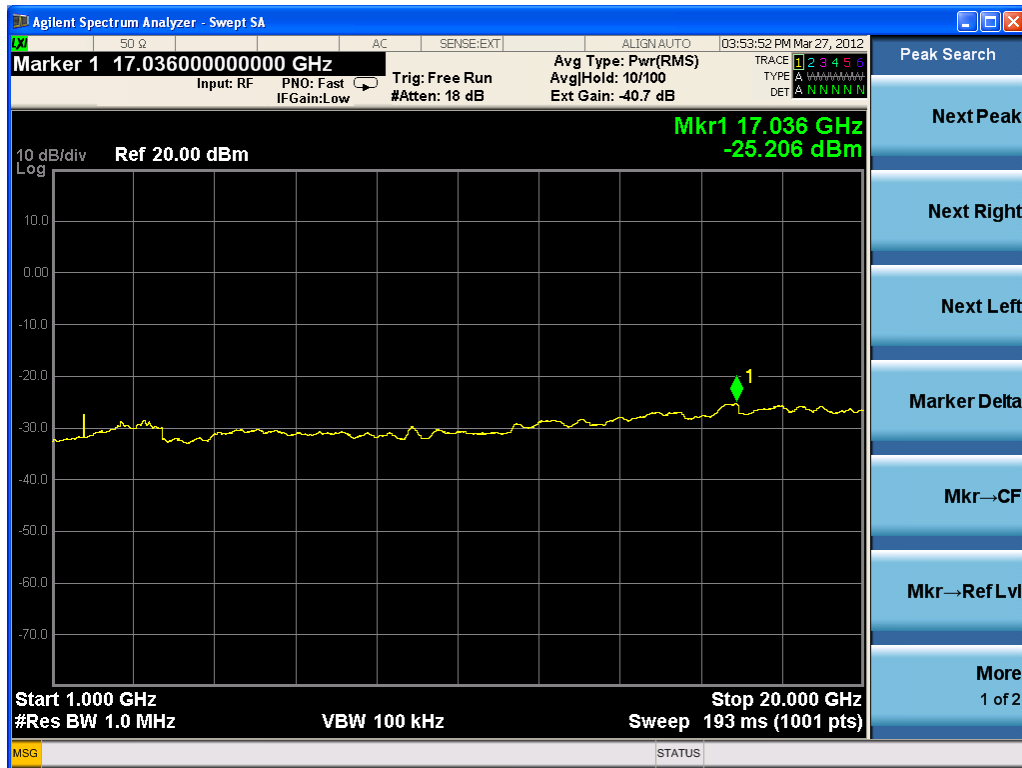


Four carriers (working in middle frequency)



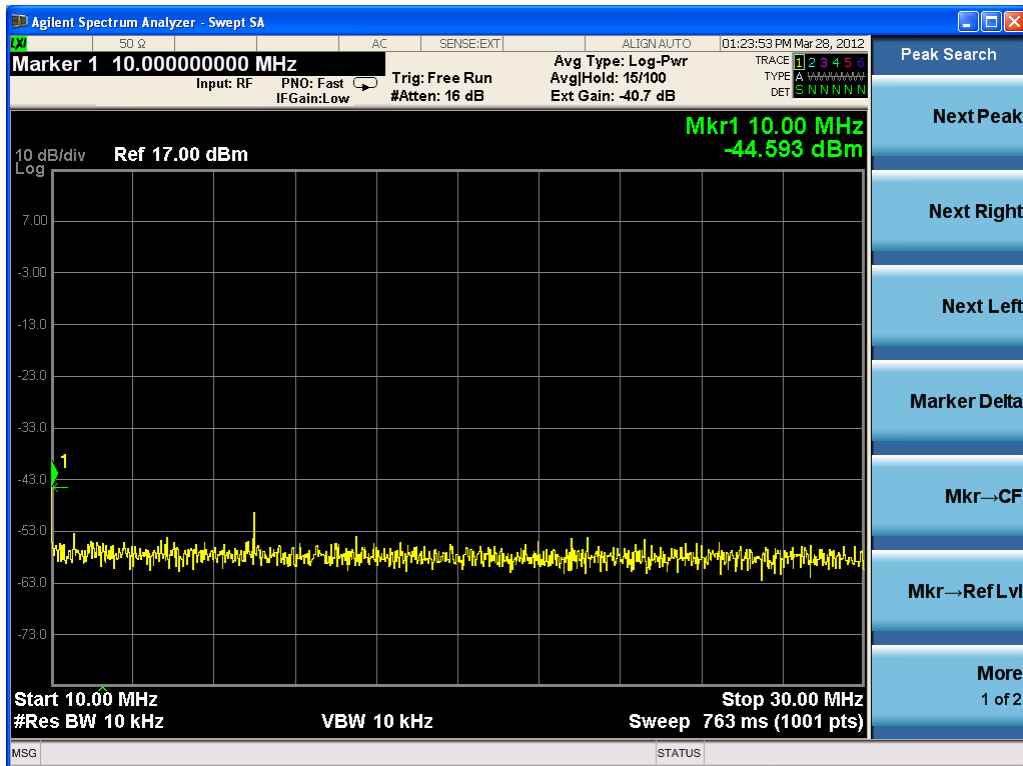
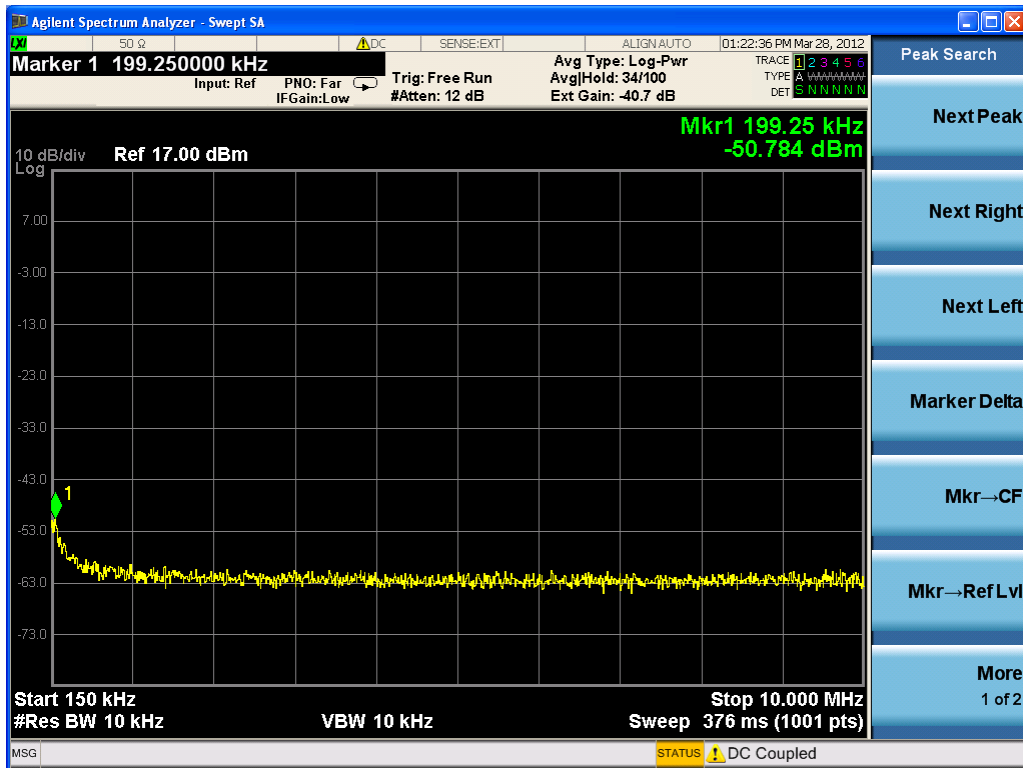


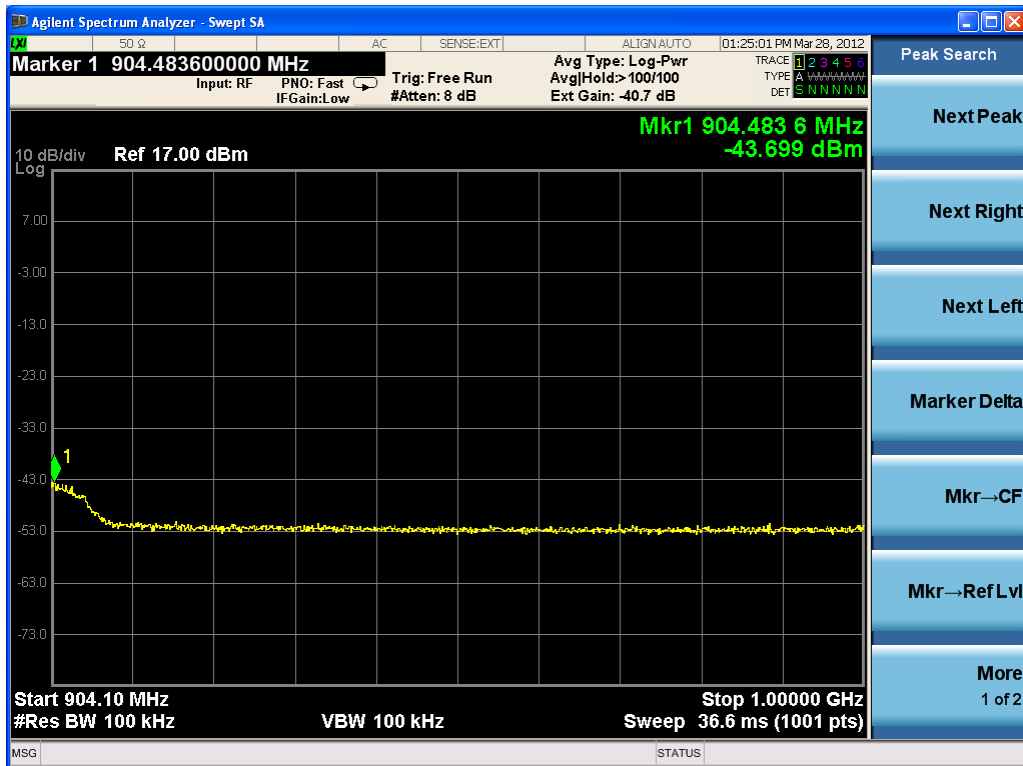
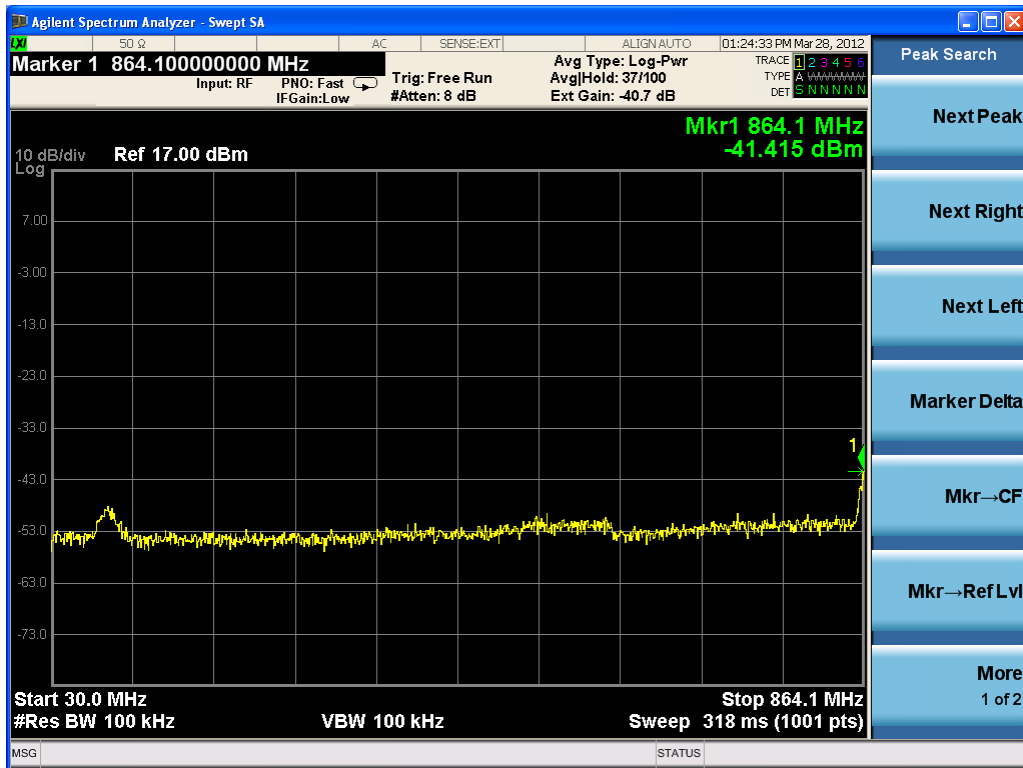


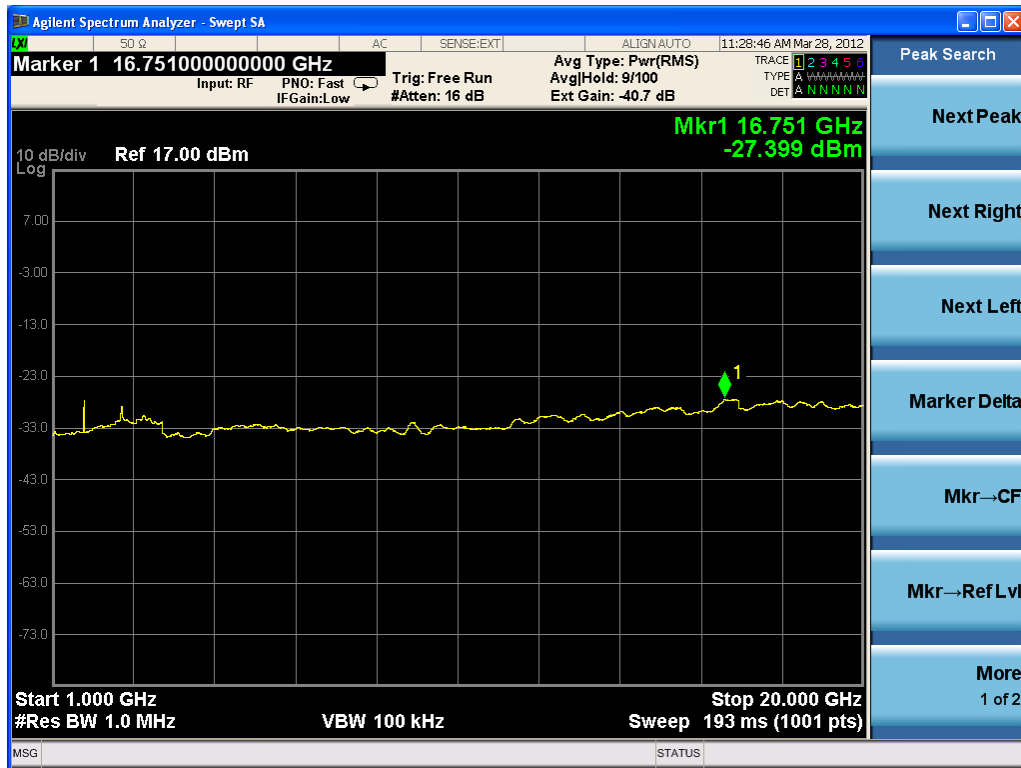


Four carriers (working in top frequency)









Three carriers (working in bottom frequency)

