



POWERWAVE TECHNOLOGIES, INC. TEST REPORT

FOR THE

MULTI-CARRIER RF POWER AMPLIFIER, G3L-1929-160-001

FCC PART 24E AND RSS-131 (2003)

TESTING

DATE OF ISSUE: SEPTEMBER 11, 2007

PREPARED FOR:

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Santa Ana, CA 92705

P.O. No.: 114355
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PREPARED BY:

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Date of test: July 19 - August 30, 2007

Report No.: FC07-072

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ADMINISTRATIVE INFORMATION

DATE OF TEST: July 19 - August 30, 2007

DATE OF RECEIPT: July 19, 2007

REPRESENTATIVE: Caesar Barillas

MANUFACTURER:

Powerwave Technologies, Inc.
1801 E. St. Andrew Place
Santa Ana, CA 92705

TEST LOCATION:

CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

FREQUENCY RANGE TESTED: 9 kHz-20 GHz

TEST METHOD: FCC Part 24E, RSS-131 (2003) and RSS GEN

PURPOSE OF TEST: To perform the testing of the Multi-Carrier RF Power Amplifier, G3L-1929-160-001 with the requirements for FCC Part 24E and RSS-131 devices.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Joyce Walker, Quality Assurance Administrative Manager

TEST PERSONNEL:

Eddie Wong, EMC Engineer

FCC TO CANADA STANDARD CORRELATION MATRIX

Canadian Standard	Canadian Section	FCC Standard	FCC Section	Test Description
RSS 131	5.4	N/A	N/A	External Controls
RSS 131	5.5	47 CFR	1.1307	RF Exposure
RSS 131	6.1	N/A	N/A	Passband Gain and Bandwidth
RSS 131	6.2	47 CFR	24.232	RF Power Output
RSS 131	6.3	TIA/EIA	603	Non-Linearity (Intermodulation Attenuation)
RSS 131	6.4	47 CFR	24.238	Spurious Emissions Limitations
RSS 131	6.5	N/A	N/A	Frequency Stability (Band Translators)
	3172-A		90473	Site File No.

CONDITIONS DURING TESTING

No modifications to the EUT were necessary during testing.



EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

EQUIPMENT UNDER TEST

Multi-Carrier RF Power Amplifier

Manuf: Powerwave Technologies
Model: G3L-1929-160-001
Serial: NA
FCC ID: pending

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Power Supply

Manuf: HP
Model: 6032A
Serial: 3542A12327

Signal Generator

Manuf: Agilent
Model: E4433B
Serial: US40051853



TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

FCC 2.1033(c)(3) USER'S MANUAL

The necessary information is contained in a separate document.

FCC 2.1033 (c)(4) TYPE OF EMISSIONS

DXW, F9W, GXW, G7W

FCC 2.1033 (c)(5) FREQUENCY RANGE

1930 MHz – 1995 MHz

FCC 2.1033 (c)(6) OPERATING POWER

66.7 Watts per channel

FCC 2.1033 (c)(7) MAXIMUM POWER RATING

200 Watts total

FCC 2.1033 (c)(8) DC VOLTAGES

The necessary information is contained in a separate document.

FCC 2.1033 (c)(9) TUNE-UP PROCEDURE

The necessary information is contained in a separate document.

FCC 2.1033(c)(10) SCHEMATICS AND CIRCUITRY DESCRIPTION

The necessary information is contained in a separate document.

FCC 2.1033(c)(11) LABEL AND PLACEMENT

The necessary information is contained in a separate document.

FCC 2.1033(c)(12) SUBMITTAL PHOTOS

The necessary information is contained in a separate document.

FCC 2.1033 (c)(13) MODULATION INFORMATION

CDMA, EDGE, GSM, TDMA, WCDMA

FCC 2.1033(c)(14)/2.1046/24.232 - RF POWER OUTPUT

Test Equipment

Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
RF Power meter	02778	HP	EPM-441A	GB37170458	012706	012708
Power Sensor	02777	HP	E4412A	MY41499662	012706	012708

Test Setup Photos



Test Data

§24.232 Power and antenna height limits.

(a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (e.i.r.p.) with an antenna height up to 300 meters HAAT. See 24.53 for HAAT calculation method. Base station antenna heights may exceed 300 meters with a corresponding reduction in power; see Table 1 of this section. **In no case may the peak output power of a base station transmitter exceed 100 watts.** The service area boundary limit and microwave protection criteria specified in §§24.236 and 24.237 apply.

Table 1: Reduced Power for Base Station Antenna Heights Over 300 Meters

<i>HAAT in meters</i>	<i>Maximum E.I.R.P. (watts)</i>
<i>6300</i>	<i>1640</i>
<i>6500</i>	<i>1070</i>
<i>61000</i>	<i>490</i>
<i>61500</i>	<i>270</i>
<i>62000</i>	<i>160</i>

The EUT is a RF amplifier. The manufacturer does not provide an antenna for sale with the product, hence EIRP is not measured nor calculated.

The RF power of the EUT was measured at the antenna port. The measurement satisfies the above requirement by demonstrating the measured power per channel is below 100 watts.

Test setup: The EUT is placed on the wooden table. The EUTs input ports are connected to a support signal amplifier and signal generator. The RF Output is connected to a RF load and a directional coupler. The RF power of the EUT is monitored at the output of the directional coupler and the RF input signal is adjusted to maintain the output power. RF Power = 200 watts.

Modulation	Frequency	Measured power
EDGE	1930.5, 1931.5, 1932.5 MHz 1961.5, 1962.5, 1963.5 MHz 1992.5, 1993.5, 1994.5MHz	200 W total 66.7 W per ch
GSM	1930.5, 1931.5, 1932.5 MHz 1961.5, 1962.5, 1963.5 MHz 1992.5, 1993.5, 1994.5MHz	200 W total 66.7 W per ch
TDMA	1930.5, 1931.5, 1932.5 MHz 1961.5, 1962.5, 1963.5 MHz 1992.5, 1993.5, 1994.5MHz	200 W total 66.7 W per ch
CDMA	1930.5, 1931.5, 1932.5 MHz 1961.5, 1962.5, 1963.5 MHz 1992.5, 1993.5, 1994.5MHz	200 W total 66.7 W per ch
WCDMA	1930.5, 1931.5, 1932.5 MHz 1961.5, 1962.5, 1963.5 MHz 1992.5, 1993.5, 1994.5MHz	200 W total 66.7 W per ch

Conclusion

As indicated above, each **single channel** does not exceed the 100 Watt peak power limit.

RSS-131 Output Power

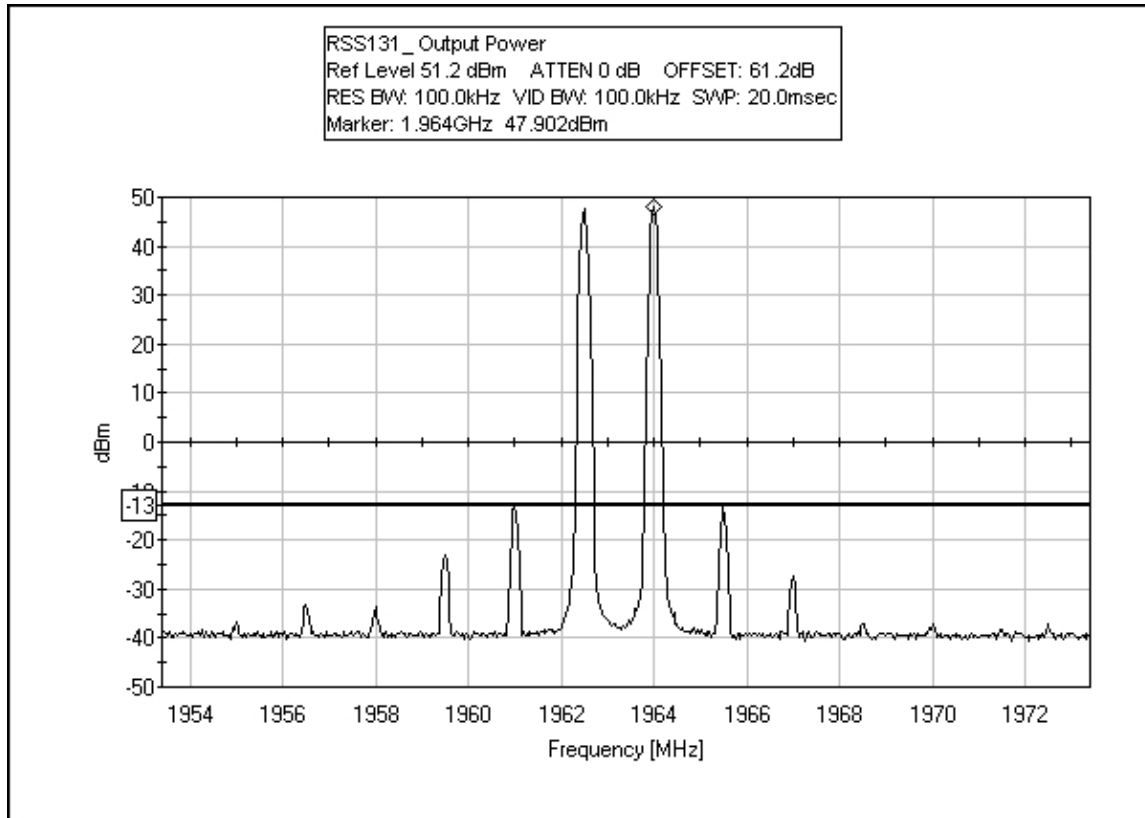
Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
High Freq Cable (big blue)	05421	Huber Suhner	NA	12237/4A	112805	112807

Test Setup Photos



4.3 Mean Output power.



The EUT is a RF amplifier. The manufacture does not provide an antenna for sale with the product, hence EIRP is not measured nor calculated.

The RF power of the EUT was measured at the antenna port in accordance with RSS 131, 4.3.1 requirement.

Measured Po1 =+ 47.9. dBm

$P_{\text{mean}} = P_{o1} + 3 \text{ dB} = 47.9 + 3 \text{ dB} = 50.9 \text{ dBm} = 123 \text{ W}$

FCC 2.1033(c)(14)/2.1049(i)- OCCUPIED BANDWIDTH INPUT PLOTS

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
High Freq Cable (big blue)	05421	Huber Suhner	NA	12237/4A	112805	112807

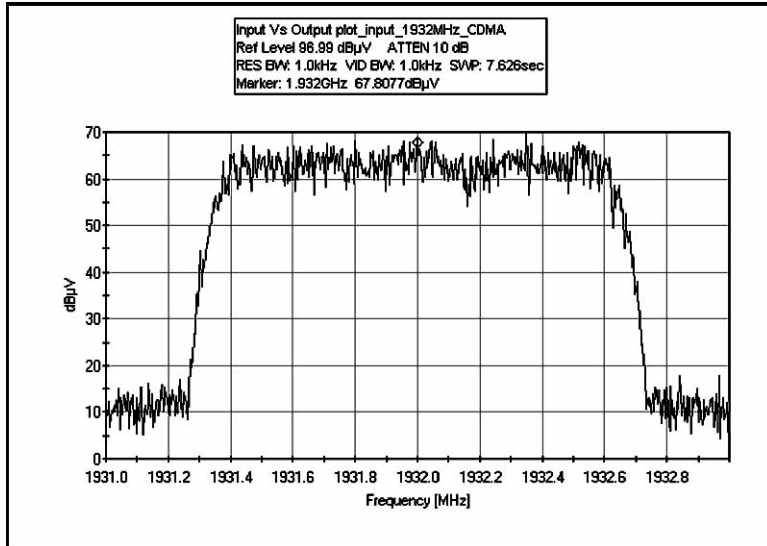
Test Conditions: The EUT is placed on the wooden table. RF out is connected to remote loadstring and power meter. RF in receives RF signal via remote ESGs and a preamp. The RF level is adjusted to maintain the transmit power. Output wave form evaluation performed at the antenna port. Input waveform form evaluation performed at the RF input port.

Test Setup Photos

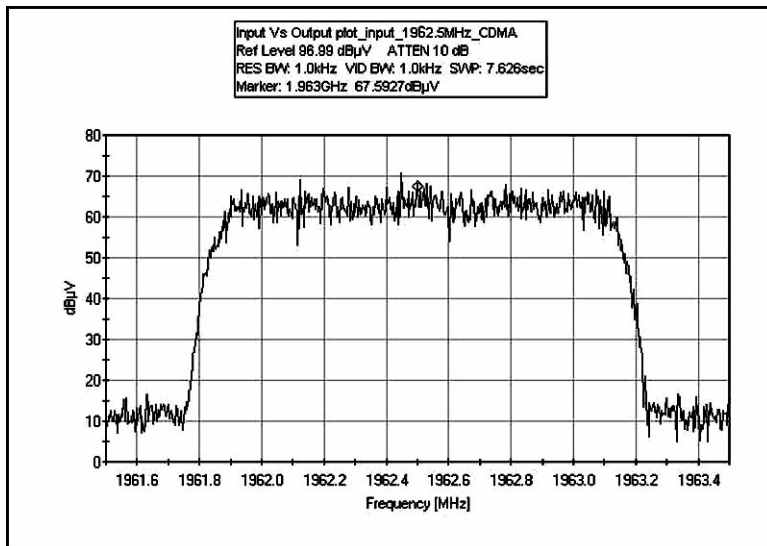


Test Plots

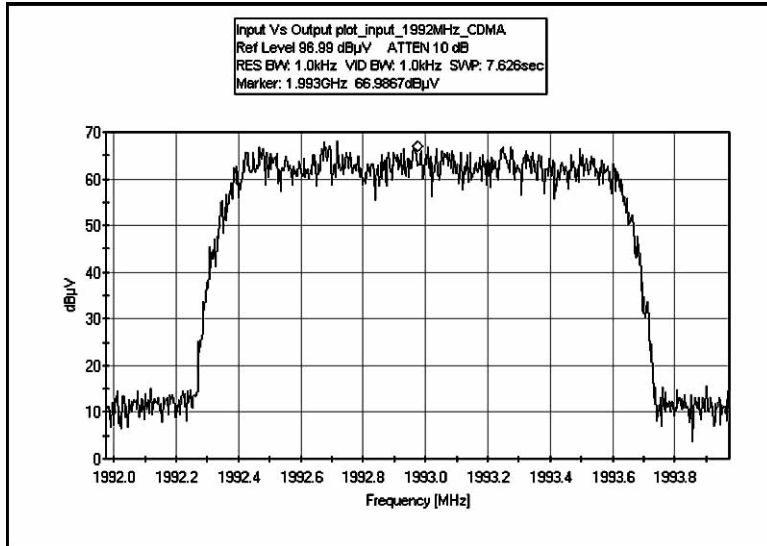
INPUT PLOT - CDMA 1932MHz



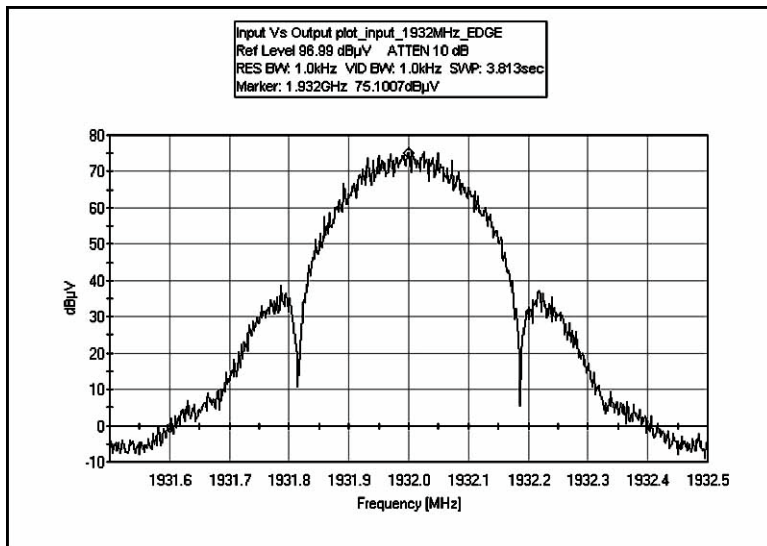
INPUT PLOT - CDMA 1962.5MHz



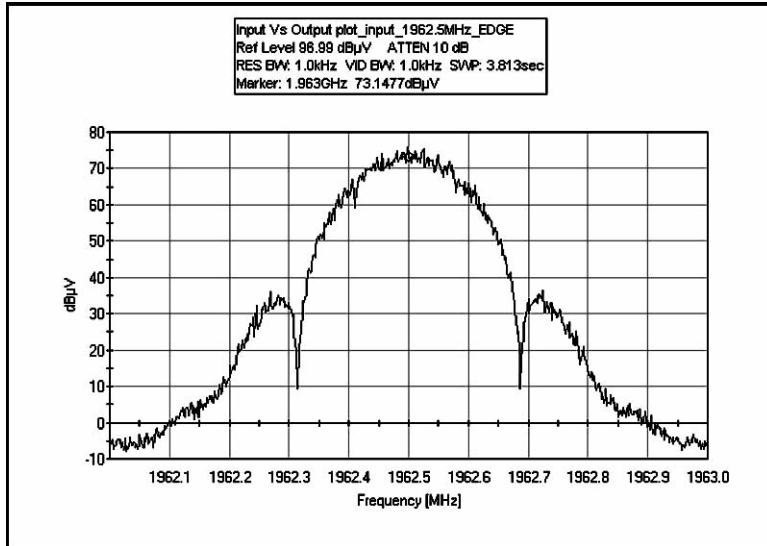
INPUT PLOT - CDMA 1992MHz



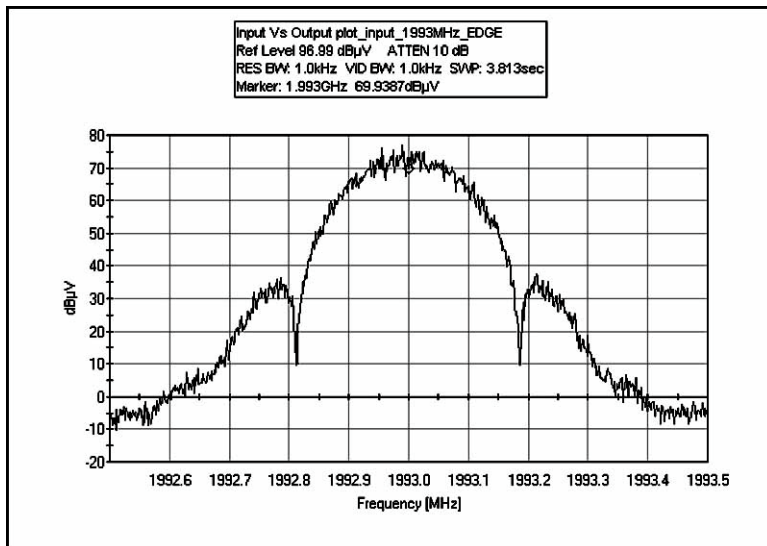
INPUT PLOT - EDGE 1932MHz



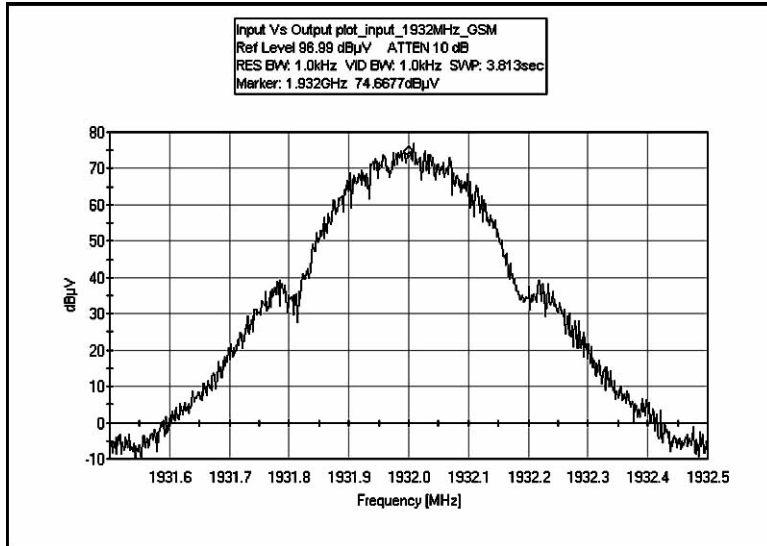
INPUT PLOT - EDGE 1962.5MHz



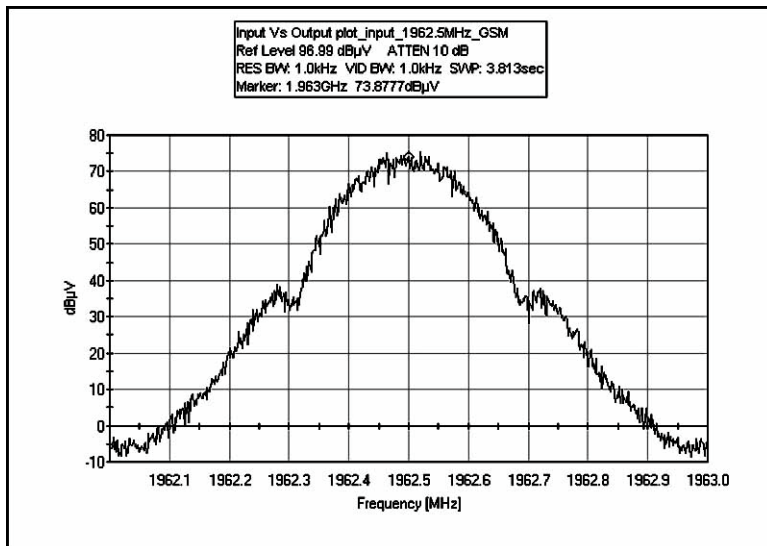
INPUT PLOT - EDGE 1993MHz



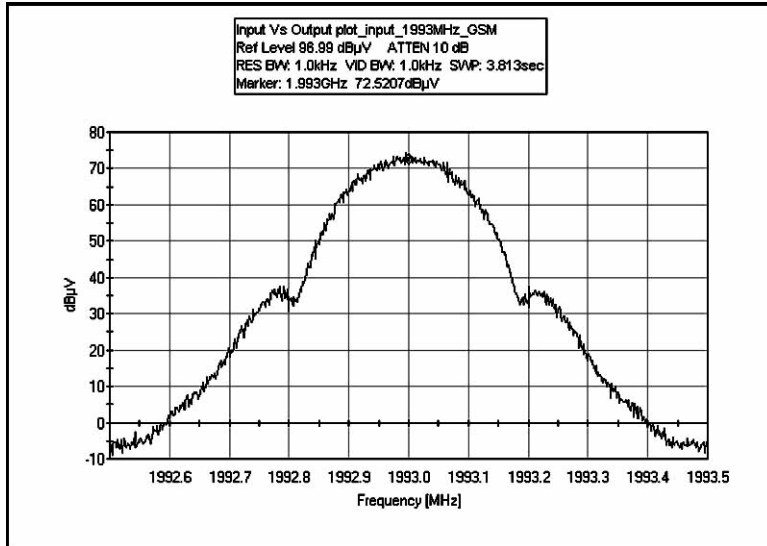
INPUT PLOT - GSM 1932MHz



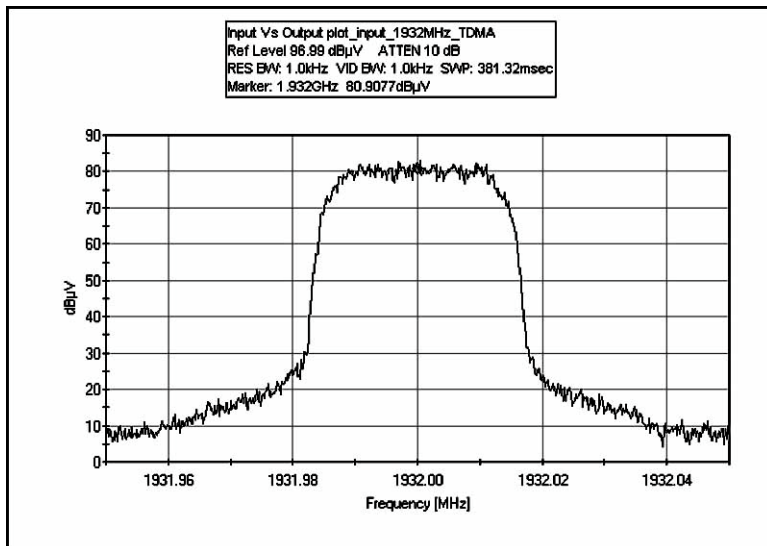
INPUT PLOT - GSM 1962.5MHz



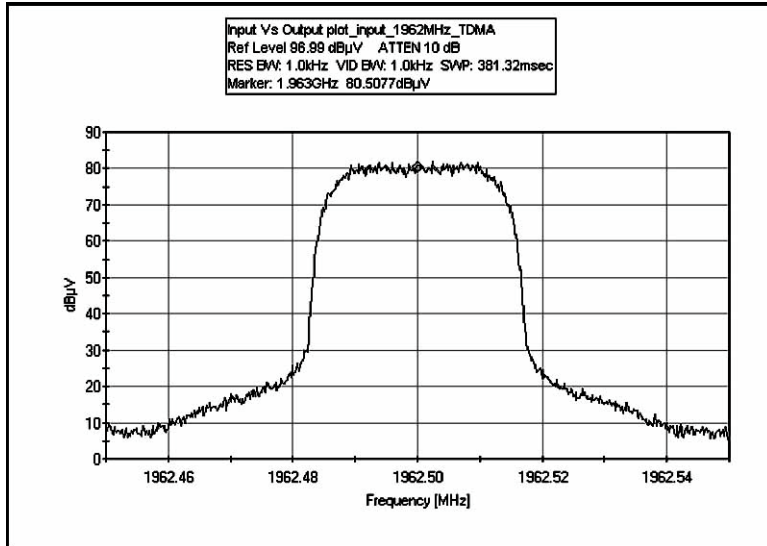
INPUT PLOT - GSM 1993MHz



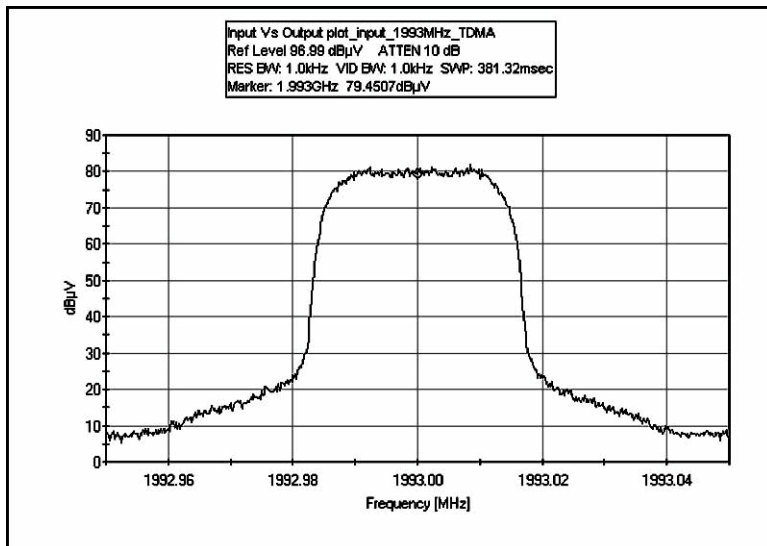
INPUT PLOT - TDMA 1932MHz



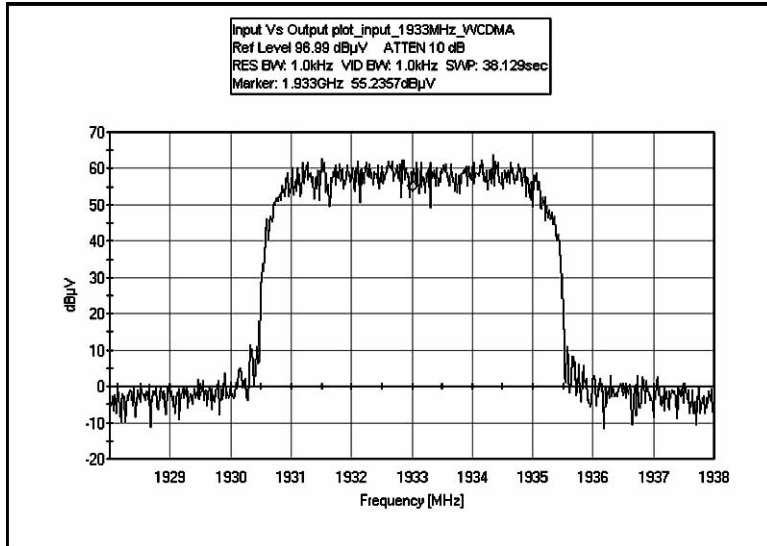
INPUT PLOT - TDMA 1962MHz



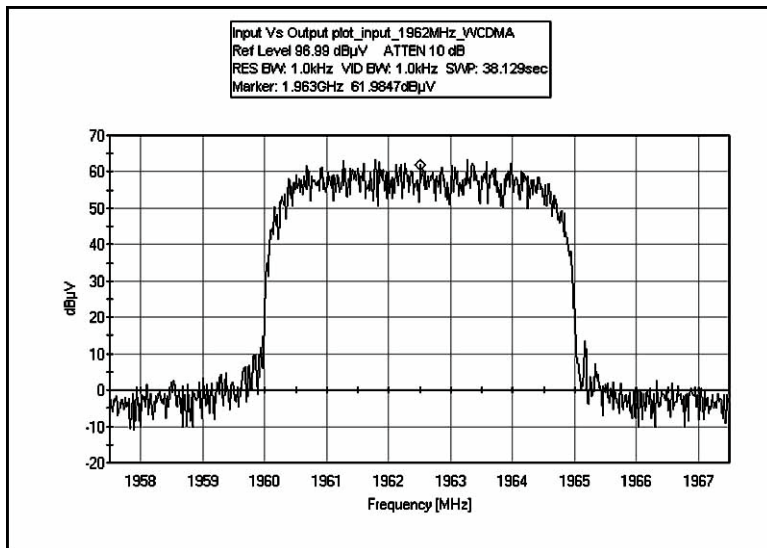
INPUT PLOT - TDMA 1993MHz



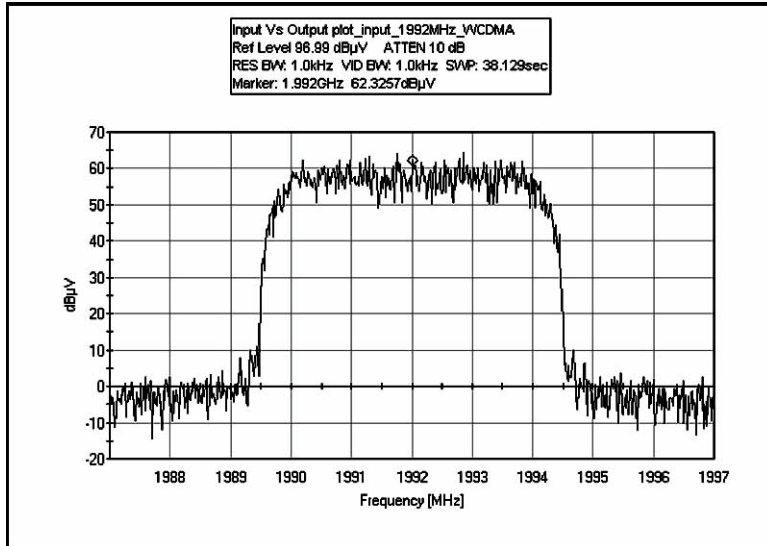
INPUT PLOT - WCDMA 1933MHz



INPUT PLOT - WCDMA 1962MHz



INPUT PLOT - WCDMA 1992MHz



FCC 2.1033(c)(14)/2.1049(i)- OCCUPIED BANDWIDTH OUTPUT PLOTS

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
High Freq Cable (big blue)	05421	Huber Suhner	NA	12237/4A	112805	112807

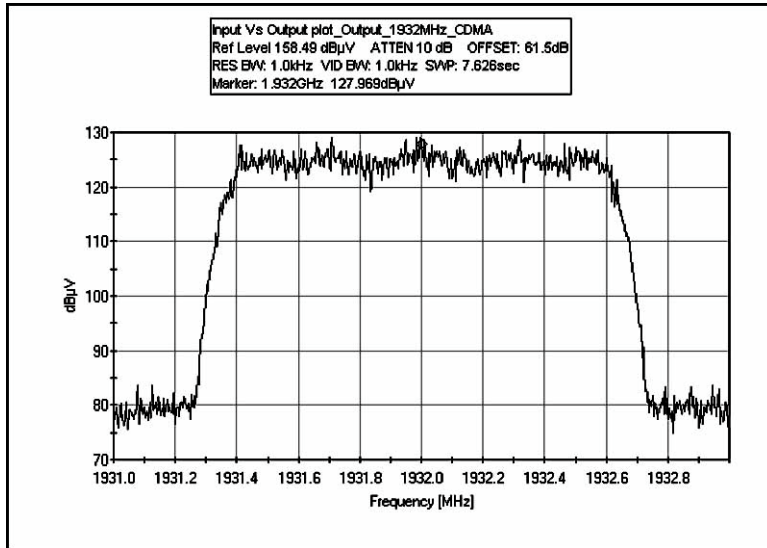
Test Conditions: The EUT is placed on the wooden table. RF out is connected to remote loadstring and power meter. RF in receives RF signal via remote ESGs and a preamp. The RF level is adjusted to maintain the transmit power. Output wave form evaluation performed at the antenna port. Input waveform form evaluation performed at the RF input port.

Test Setup Photos

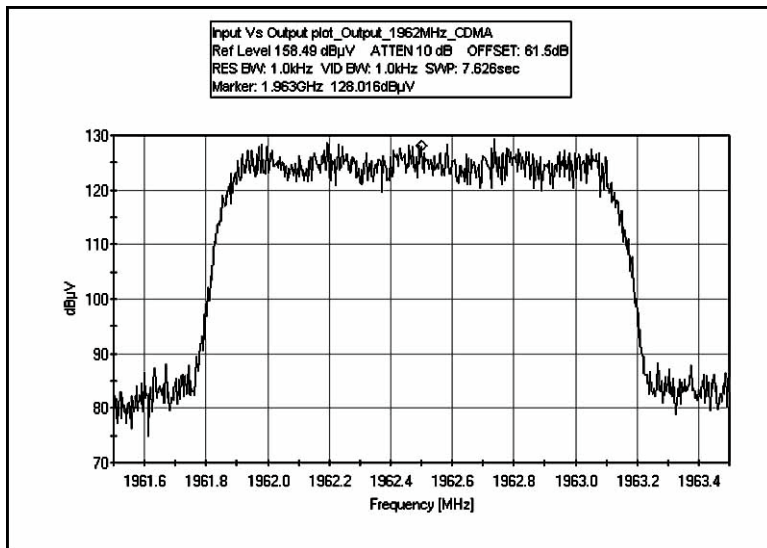


Test Plots

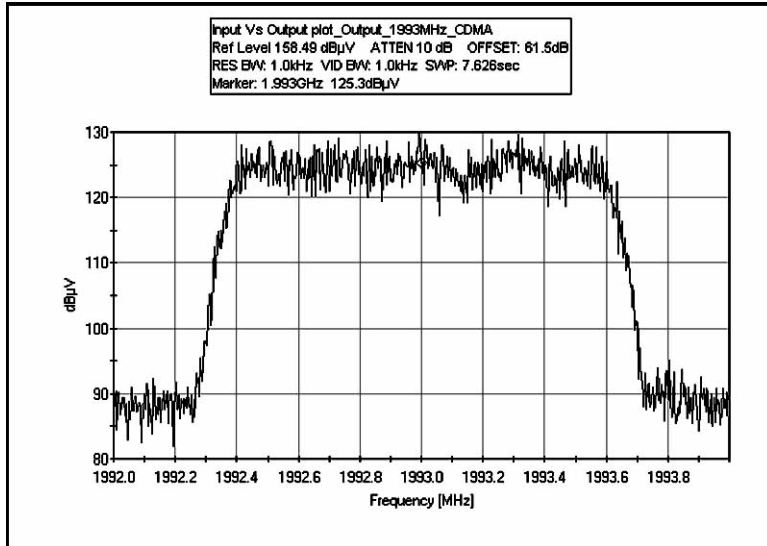
OUTPUT PLOT - CDMA 1932MHz



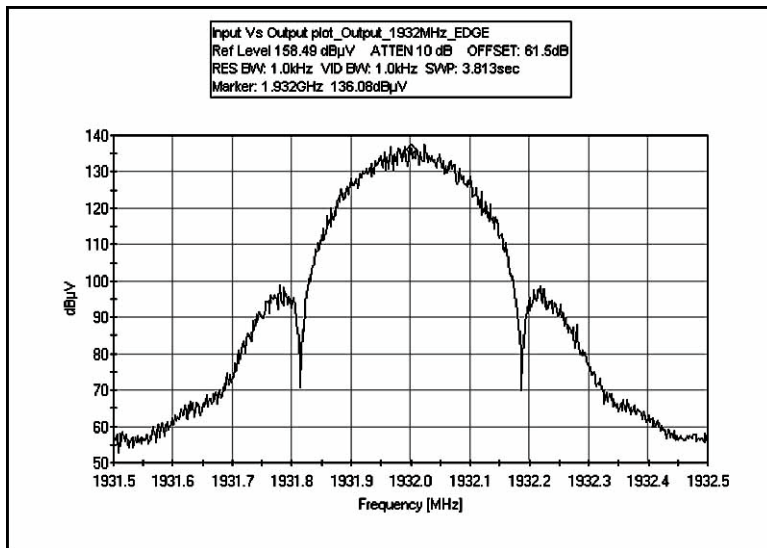
OUTPUT PLOT - CDMA 1962MHz



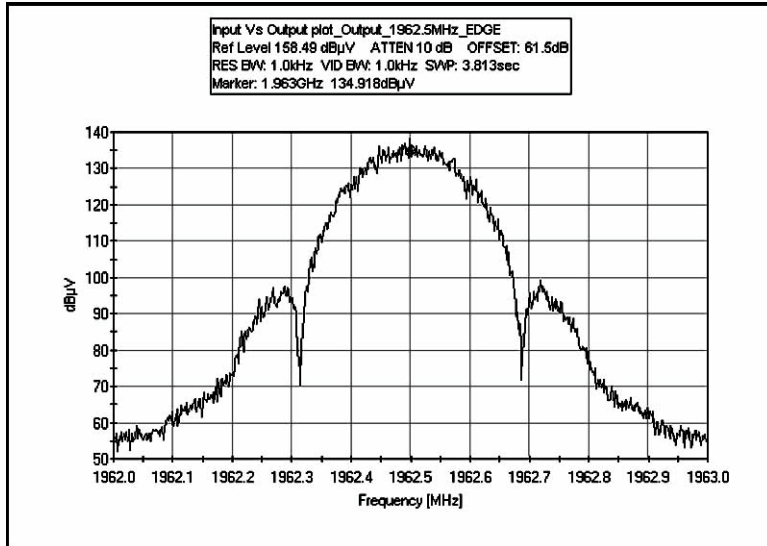
OUTPUT PLOT - CDMA 1993MHz



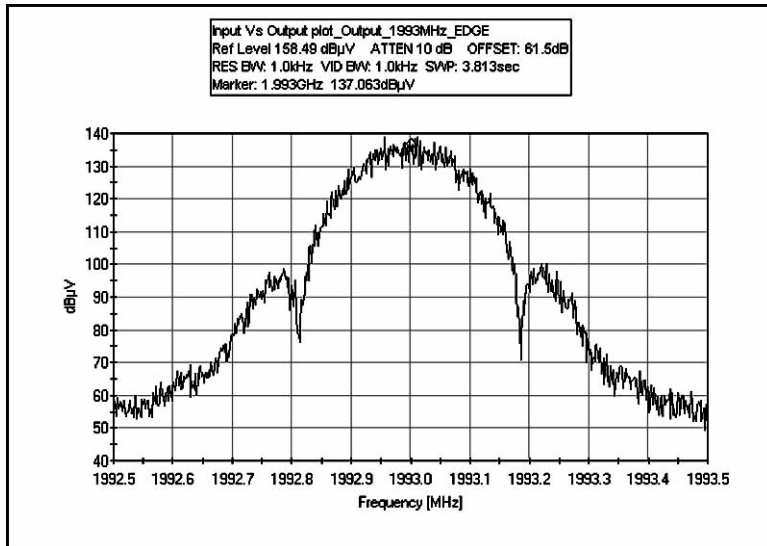
OUTPUT PLOT - EDGE 1932MHz



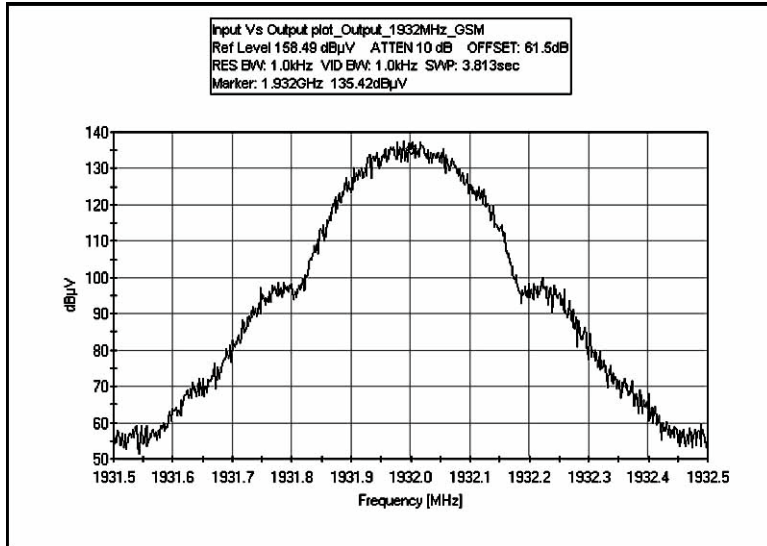
OUTPUT PLOT - EDGE 1962.5MHz



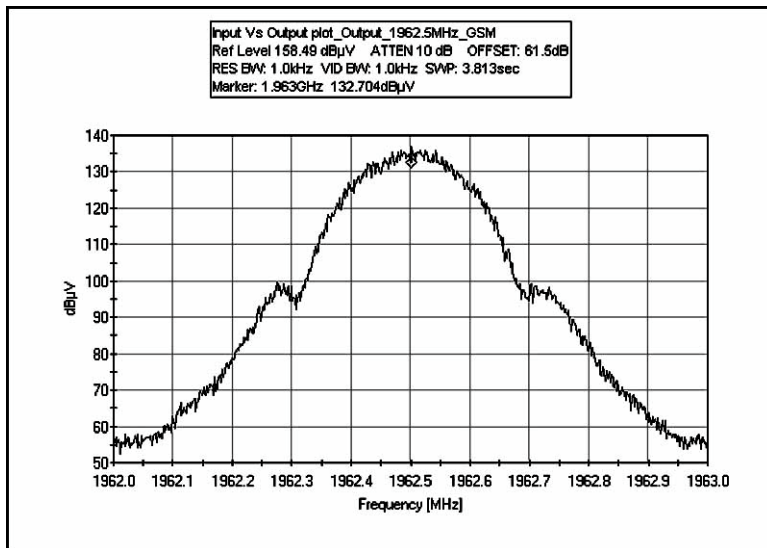
OUTPUT PLOT - EDGE 1993MHz



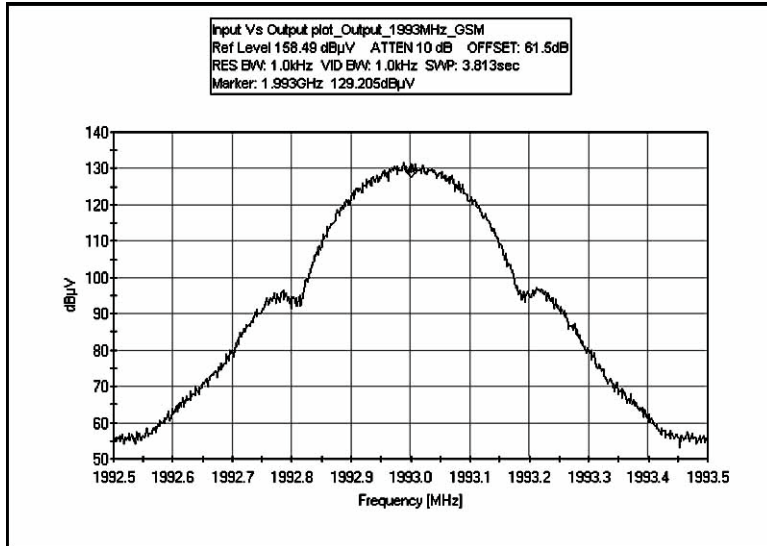
OUTPUT PLOT - GSM 1932MHz



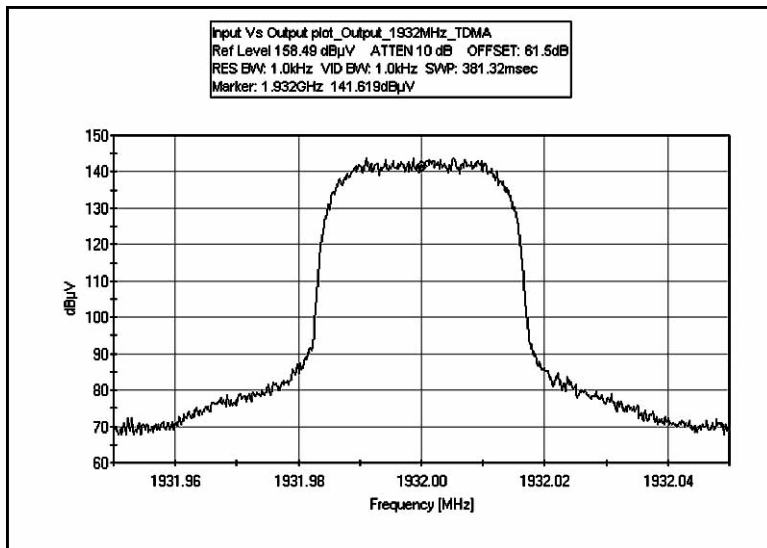
OUTPUT PLOT - GSM 1962.5MHz



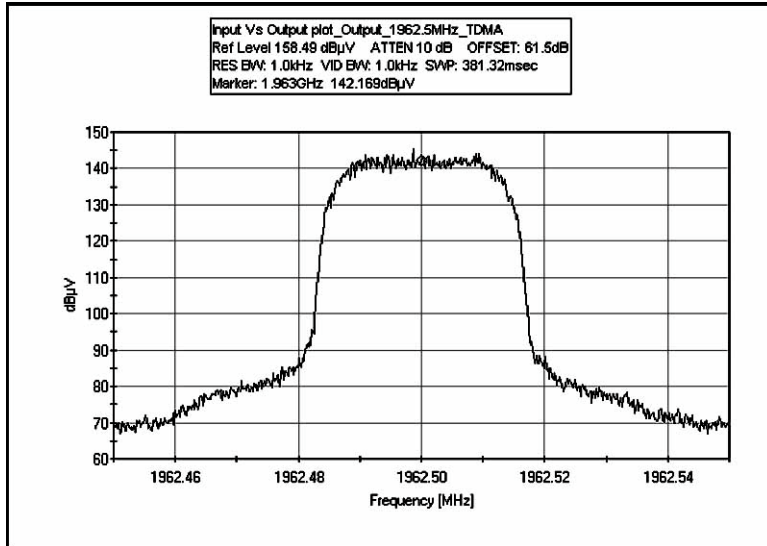
OUTPUT PLOT - GSM 1993MHz



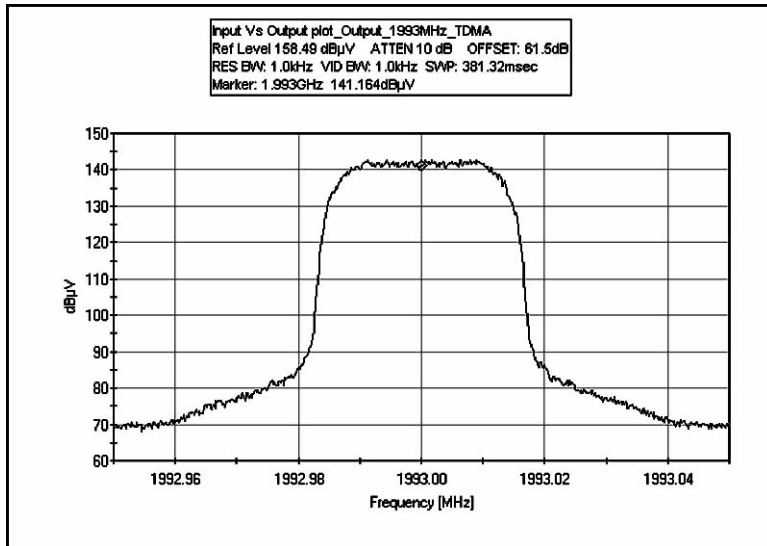
OUTPUT PLOT - TDMA 1932MHz



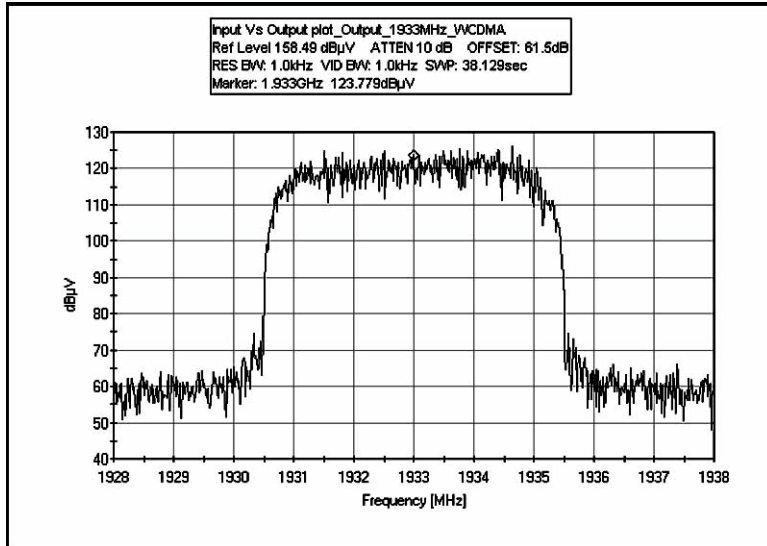
OUTPUT PLOT - TDMA 1962.5MHz



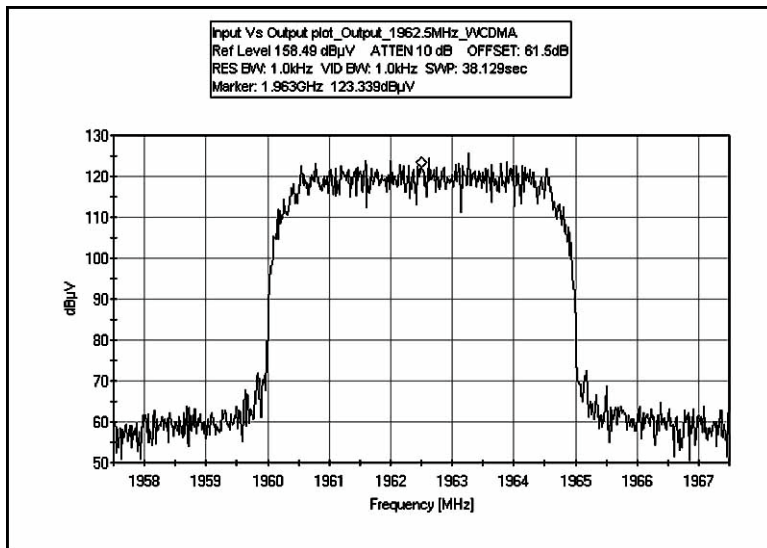
OUTPUT PLOT - TCDMA 1993MHz



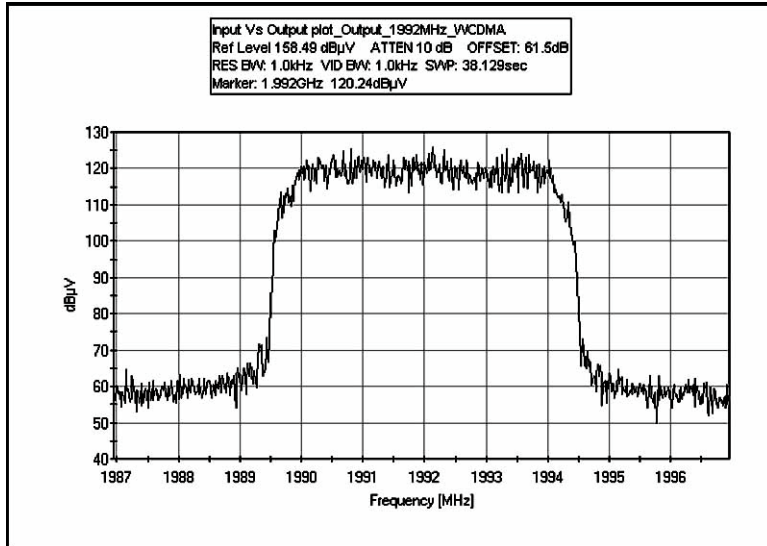
OUTPUT PLOT - WCDMA 1933MHz



OUTPUT PLOT - WCDMA 1962.5MHz



OUTPUT PLOT - WCDMA 1992MHz



**FCC 2.1033(c)(14)/2.1051/24.238(a) - SPURIOUS EMISSIONS AT ANTENNA
TERMINAL**

Test Setup Photos



Limit line for Spurious Conducted Emission

$$\underline{\text{Required Attenuation}} = 43 + 10 \text{ Log } P \text{ dB}$$

$$\text{Limit line (dBuV)} = V_{\text{dBuV}} - \text{Attenuation}$$

$$\begin{aligned} V_{\text{dBuV}} &= 20 \text{ Log } \frac{V}{1 \times 10^{-6}} \\ &= 20 (\text{Log } V - \text{Log } 1 \times 10^{-6}) \\ &= 20 \text{ Log } V - 20 \text{ Log } 1 \times 10^{-6} \\ &= 20 \text{ Log } V - 20 (-6) \\ &= 20 \text{ Log } V + 120 \end{aligned}$$

$$\begin{aligned} \text{Attenuation} &= 43 + 10 \text{ Log } P \\ &= 43 + 10 \text{ Log } \frac{V^2}{R} \\ &= 43 + 10 (\text{Log } V^2 - \text{Log } R) \\ &= 43 + 10 (2 \text{ Log } V - \text{Log } R) \\ &= 43 + 20 \text{ Log } V - 10 \text{ Log } R \end{aligned}$$

$$\begin{aligned} \text{Limit line} &= V_{\text{dBuV}} - \text{Attenuation} \\ &= 20 \text{ Log } V + 120 - (43 + 20 \text{ Log } V - 10 \text{ Log } R) \\ &= 20 \text{ Log } V + 120 - 43 - 20 \text{ Log } V + 10 \text{ Log } R \\ &= 20 \text{ Log } V + 120 - 43 - 20 \text{ Log } V + 10 \text{ Log } R \\ &= 120 - 43 + 10 \text{ Log } 50 \quad \text{Note : } R = 50 \Omega \\ &= 120 - 43 + 16.897 \\ &= 94 \text{ dBuV at any power level} \end{aligned}$$



Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC 24.238 (a) Conducted Spurious Emissions**
 Work Order #: **86843** Date: 8/23/2007
 Test Type: **Conducted Emissions** Time: 14:30:27
 Equipment: **Multi-Carrier RF Power Amplifier** Sequence#: 3
 Manufacturer: Powerwave Technologies Tested By: E. Wong
 Model: G3L-1929-160-001 230Vac 60Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
3.0 GHz HPF	1	03/08/2006	03/08/2008	02744
High Freq Cable(big blue)	12237/4A	11/28/2005	11/28/2007	05421

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Multi-Carrier RF Power Amplifier*	Powerwave Technologies	G3L-1929-160-001	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	HP	6032A	3542A12327
Signal Generator	Agilent	E4433B	US40051853

Test Conditions / Notes:

The EUT is placed on the wooden table. RF out is connected to remote loadstring and power meter. RF in receives RF signal via remote ESG. The RF level is adjusted to maintain the transmit power. Evaluation performed at the antenna port. Modulation: GSM, EDGE, TDMA, CDMA, WCDMA. Frequency = 1932MHz, 1962.5MHz, 1993 MHz. Power = 200 watts. Frequency range of measurement = 9 kHz - 20 GHz. Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz - 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz - 1000 MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz - 20,000 MHz RBW=1 MHz, VBW=1 MHz. 28.5Vdc, 23°C, 64% relative humidity.

Transducer Legend:

T1=CABLE bigblue ANP5421 112807 T2=Filter 3GHz HPF AN02744

#	Freq MHz	Rdng dBμV	Reading listed by margin.				Test Lead: Antenna Terminal					
			T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant	
1	5978.830M	79.5	+2.2	+0.4		+0.0	82.1	94.0	-11.9	Anten		
	Ave							EDGE 1993 MHz				
^	5978.830M	90.0	+2.2	+0.4		+0.0	92.6	94.0	-1.4	Anten		
								EDGE 1993 MHz				
3	5977.700M	79.4	+2.2	+0.4		+0.0	82.0	94.0	-12.0	Anten		
	Ave							GSM 1993 MHz				
^	5977.700M	86.5	+2.2	+0.4		+0.0	89.1	94.0	-4.9	Anten		
								GSM 1993 MHz				

5	5796.200M Ave	79.0	+2.2	+0.2	+0.0	81.4	94.0	-12.6	Anten
							TDMA 1962MHz		
^	5796.200M	87.8	+2.2	+0.2	+0.0	90.2	94.0	-3.8	Anten
							TDMA 1962MHz		
^	5796.300M	86.9	+2.2	+0.2	+0.0	89.3	94.0	-4.7	Anten
							EDGE 1932MHz		
8	5978.700M Ave	78.8	+2.2	+0.4	+0.0	81.4	94.0	-12.6	Anten
							TDMA 1993MHz		
^	5978.700M	86.6	+2.2	+0.4	+0.0	89.2	94.0	-4.8	Anten
							TDMA 1993MHz		
10	5795.880M Ave	78.7	+2.2	+0.2	+0.0	81.1	94.0	-12.9	Anten
							CDMA 1932MHz		
^	5795.880M	96.4	+2.2	+0.2	+0.0	98.8	94.0	+4.8	Anten
							CDMA 1932MHz		
^	5795.900M	85.7	+2.2	+0.2	+0.0	88.1	94.0	-5.9	Anten
							GSM 1932MHz		
13	3985.870M Ave	78.7	+1.8	+0.3	+0.0	80.8	94.0	-13.2	Anten
							EDGE 1993 MHz		
14	5796.300M Ave	78.1	+2.2	+0.2	+0.0	80.5	94.0	-13.5	Anten
							EDGE 1932MHz		
15	3985.130M Ave	78.2	+1.8	+0.3	+0.0	80.3	94.0	-13.7	Anten
							GSM 1993 MHz		
^	3985.130M	84.8	+1.8	+0.3	+0.0	86.9	94.0	-7.1	Anten
							GSM 1993 MHz		
17	5887.500M Ave	77.6	+2.2	+0.3	+0.0	80.1	94.0	-13.9	Anten
							TDMA 1962.5MHz		
^	5887.500M	86.4	+2.2	+0.3	+0.0	88.9	94.0	-5.1	Anten
							TDMA 1962.5MHz		
19	3985.800M Ave	77.9	+1.8	+0.3	+0.0	80.0	94.0	-14.0	Anten
							TDMA 1993MHz		
^	3985.870M	88.9	+1.8	+0.3	+0.0	91.0	94.0	-3.0	Anten
							EDGE 1993 MHz		
^	3985.800M	85.9	+1.8	+0.3	+0.0	88.0	94.0	-6.0	Anten
							TDMA 1993MHz		
22	5795.900M Ave	77.6	+2.2	+0.2	+0.0	80.0	94.0	-14.0	Anten
							GSM 1932MHz		
23	3863.900M Ave	77.4	+1.8	+0.3	+0.0	79.5	94.0	-14.5	Anten
							CDMA 1932MHz		
^	3863.900M	84.7	+1.8	+0.3	+0.0	86.8	94.0	-7.2	Anten
							CDMA 1932MHz		
25	5887.300M Ave	76.9	+2.2	+0.3	+0.0	79.4	94.0	-14.6	Anten
							EDGE1962.5MHz		
^	5887.300M	86.6	+2.2	+0.3	+0.0	89.1	94.0	-4.9	Anten
							EDGE1962.5MHz		

27	5882.533M Ave	76.6	+2.2	+0.3	+0.0	79.1	94.0	-14.9	Anten
							WCDMA 1962.5MHz		
^	5882.533M	85.4	+2.2	+0.3	+0.0	87.9	94.0	-6.1	Anten
							WCDMA 1962.5MHz		
29	5887.700M Ave	76.6	+2.2	+0.3	+0.0	79.1	94.0	-14.9	Anten
							GSM 1962.5MHz		
^	5887.700M	85.0	+2.2	+0.3	+0.0	87.5	94.0	-6.5	Anten
							GSM 1962.5MHz		
31	3924.870M Ave	76.7	+1.8	+0.3	+0.0	78.8	94.0	-15.2	Anten
							EDGE1962.5MHz		
^	3924.870M	84.9	+1.8	+0.3	+0.0	87.0	94.0	-7.0	Anten
							EDGE1962.5MHz		
33	3925.230M Ave	76.6	+1.8	+0.3	+0.0	78.7	94.0	-15.3	Anten
							CDMA 1962.5MHz		
^	3925.230M	85.5	+1.8	+0.3	+0.0	87.6	94.0	-6.4	Anten
							CDMA 1962.5MHz		
35	5887.850M Ave	76.1	+2.2	+0.3	+0.0	78.6	94.0	-15.4	Anten
							CDMA 1962.5MHz		
^	5887.850M	87.1	+2.2	+0.3	+0.0	89.6	94.0	-4.4	Anten
							CDMA 1962.5MHz		
37	3864.270M Ave	76.4	+1.8	+0.3	+0.0	78.5	94.0	-15.5	Anten
							GSM 1932MHz		
38	3864.200M Ave	76.2	+1.8	+0.3	+0.0	78.3	94.0	-15.7	Anten
							EDGE 1932MHz		
^	3864.270M	85.0	+1.8	+0.3	+0.0	87.1	94.0	-6.9	Anten
							GSM 1932MHz		
40	5969.400M Ave	75.5	+2.2	+0.4	+0.0	78.1	94.0	-15.9	Anten
							CDMA 1993MHz		
^	5969.400M	86.1	+2.2	+0.4	+0.0	88.7	94.0	-5.3	Anten
							CDMA 1993MHz		
42	3925.130M Ave	75.7	+1.8	+0.3	+0.0	77.8	94.0	-16.2	Anten
							GSM 1962.5MHz		
^	3925.130M	87.4	+1.8	+0.3	+0.0	89.5	94.0	-4.5	Anten
							GSM 1962.5MHz		
44	3984.430M Ave	75.5	+1.8	+0.3	+0.0	77.6	94.0	-16.4	Anten
							WCDMA 1992MHz		
^	3984.430M	85.1	+1.8	+0.3	+0.0	87.2	94.0	-6.8	Anten
							WCDMA 1992MHz		
46	3925.000M Ave	75.5	+1.8	+0.3	+0.0	77.6	94.0	-16.4	Anten
							TDMA 1962.5MHz		
^	3925.000M	86.2	+1.8	+0.3	+0.0	88.3	94.0	-5.7	Anten
							TDMA 1962.5MHz		

48	3866.030M Ave	75.2	+1.8	+0.3	+0.0	77.3	94.0	-16.7	Anten
							WCDMA 1933MHz		
^	3866.030M	85.8	+1.8	+0.3	+0.0	87.9	94.0	-6.1	Anten
							WCDMA 1933MHz		
50	3864.130M Ave	75.0	+1.8	+0.3	+0.0	77.1	94.0	-16.9	Anten
							TDMA 1962MHz		
^	3864.130M	85.0	+1.8	+0.3	+0.0	87.1	94.0	-6.9	Anten
							TDMA 1962MHz		
^	3864.200M	84.9	+1.8	+0.3	+0.0	87.0	94.0	-7.0	Anten
							EDGE 1932MHz		
53	3920.017M Ave	74.8	+1.8	+0.3	+0.0	76.9	94.0	-17.1	Anten
							WCDMA 1962.5MHz		
^	3920.017M	85.3	+1.8	+0.3	+0.0	87.4	94.0	-6.6	Anten
							WCDMA 1962.5MHz		
55	3976.200M Ave	74.8	+1.8	+0.3	+0.0	76.9	94.0	-17.1	Anten
							CDMA 1993MHz		
^	3976.200M	85.2	+1.8	+0.3	+0.0	87.3	94.0	-6.7	Anten
							CDMA 1993MHz		
57	5799.050M Ave	74.3	+2.2	+0.2	+0.0	76.7	94.0	-17.3	Anten
							WCDMA 1933MHz		
^	5799.050M	85.8	+2.2	+0.2	+0.0	88.2	94.0	-5.8	Anten
							WCDMA 1933MHz		
59	5976.650M Ave	74.1	+2.2	+0.4	+0.0	76.7	94.0	-17.3	Anten
							WCDMA 1992MHz		
^	5976.650M	84.5	+2.2	+0.4	+0.0	87.1	94.0	-6.9	Anten
							WCDMA 1992MHz		

FCC 2.1033(c)(14)/2.1053/24.238(a) - FIELD STRENGTH OF SPURIOUS RADIATION

Test Setup Photos





Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC 24.238 Radiated Spurious Emission**
 Work Order #: **86843** Date: 7/19/2007
 Test Type: **Radiated Scan** Time: 15:15:31
 Equipment: **Multi-Carrier RF Power Amplifier** Sequence#: 1
 Manufacturer: Powerwave Technologies Tested By: E. Wong
 Model: G3L-1929-160-001
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
Bilog Antenna	2451	02/02/2006	02/02/2008	01995
Pre amp to SA Cable	Cable #10	05/16/2007	05/16/2009	P05050
Cable	Cable15	01/05/2007	01/05/2009	P05198
Pre Amp	1937A02548	06/01/2006	06/01/2008	00309
Horn Antenna	6246	06/29/2006	06/29/2008	00849
24" SMA Cable	1-26GHz_white	01/11/2007	01/11/2009	P05205
Microwave Pre-amp	3123A00281	07/19/2006	07/19/2008	00786
HeliAx Antenna Cable	P5565	09/18/2006	09/18/2008	P05565
Loop Antenna	2014	06/14/2006	06/14/2008	00314
3.0 GHz HPF	1	03/08/2006	03/08/2008	02744

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Multi-Carrier RF Power Amplifier*	Powerwave Technologies	G3L-1929-160-001	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	Agilent	E4433B	US40051853
Power Supply	HP	6032A	3542A12327
Preamplifier	Mini-Circuits	ZHL-4240	
Linear DC Power Supply	HP	6269B	2436A-11867

Test Conditions / Notes:

The EUT is placed on the wooden table. RF out is connected to remote loadstring and power meter. RF in receives RF signal via remote ESGs and a preamp. The RF level is adjusted to maintain the transmit power. Modulation: EDGE. Frequency = 1930.5MHz, 1962.5MHz, 1994.5MHz. Power = 200 watts. Frequency range of measurement = 9 kHz - 20 GHz. Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz - 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz - 1000 MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz - 20,000 MHz RBW=1 MHz, VBW=1 MHz. 28.5Vdc, 23°C, 64% relative humidity.

Operating Frequency: 1930 MHz - 1995 MHz
 Channels: Low, Mid and High
 Highest Measured Output Power: 48.24 ERP(dBm)= 66.7 ERP(Watts)
 Distance: 3 meters
 Limit: $43+10\text{Log}(P)$ 61.24 dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
7,978.07	-17.3	Horiz	65.54
7,849.83	-18.2	Horiz	66.44
7,977.95	-18.6	Vert	66.84
5,791.40	-19.3	Vert	67.54
5,983.47	-19.6	Vert	67.84
3,861.00	-19.7	Horiz	67.94
7,722.13	-19.7	Vert	67.94
5,983.35	-19.8	Horiz	68.04
5,791.50	-20.1	Horiz	68.34
7,849.83	-20.2	Vert	68.44
3,989.04	-21.5	Vert	69.74
5,887.33	-22.3	Vert	70.54
5,887.46	-22.3	Horiz	70.54
3,860.93	-23.3	Vert	71.54
3,924.96	-23.8	Horiz	72.04
3,989.08	-24.3	Horiz	72.54
7,722.13	-26	Horiz	74.24
7,722.13	-15.6	Horiz	63.84
3,924.93	-31	Vert	79.24

BLOCKEDGE

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
High Freq Cable (big blue)	05421	Huber Suhner	NA	12237/4A	112805	112807

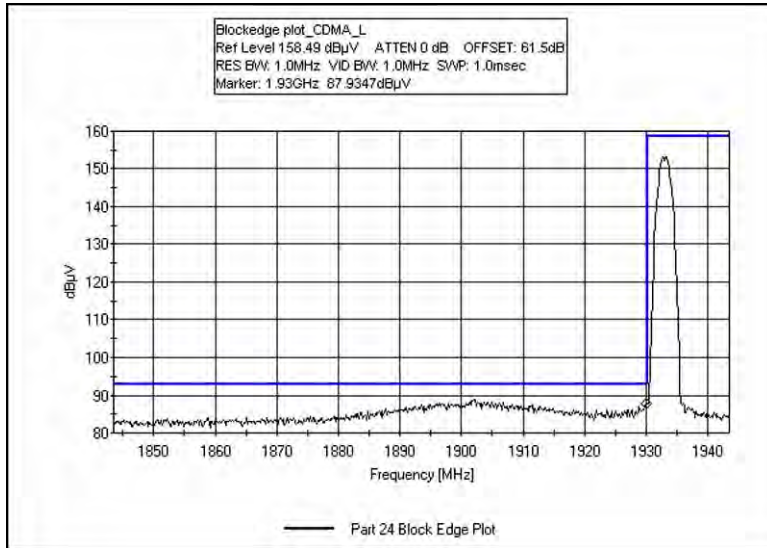
Test Conditions: The EUT is placed on the wooden table. RF out is connected to remote loadstring and power meter. RF in receives RF signal via remote ESGs and a preamp. The RF level is adjusted to maintain the transmit power. Evaluation performed at the antenna port.

Test Setup Photos

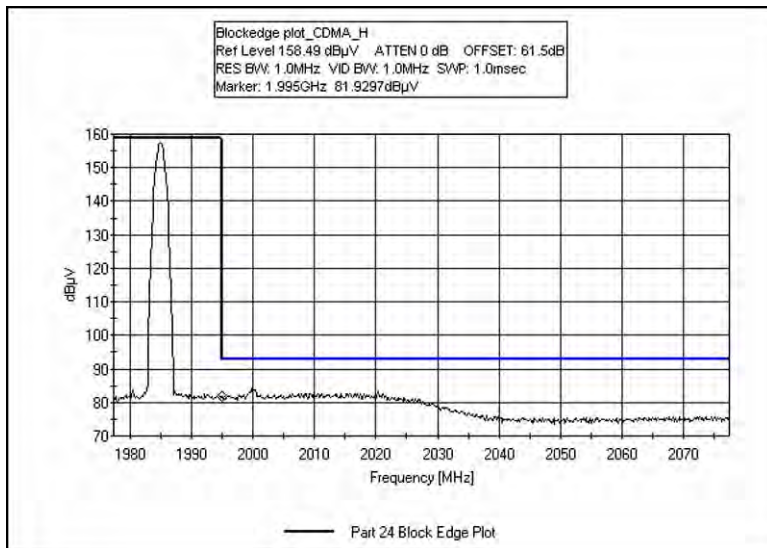


Test Plots

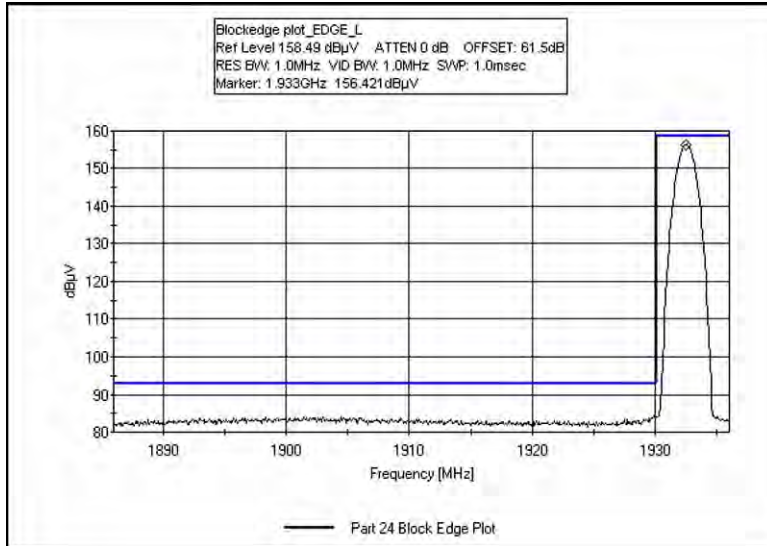
BLOCKEDGE - CDMA LOW



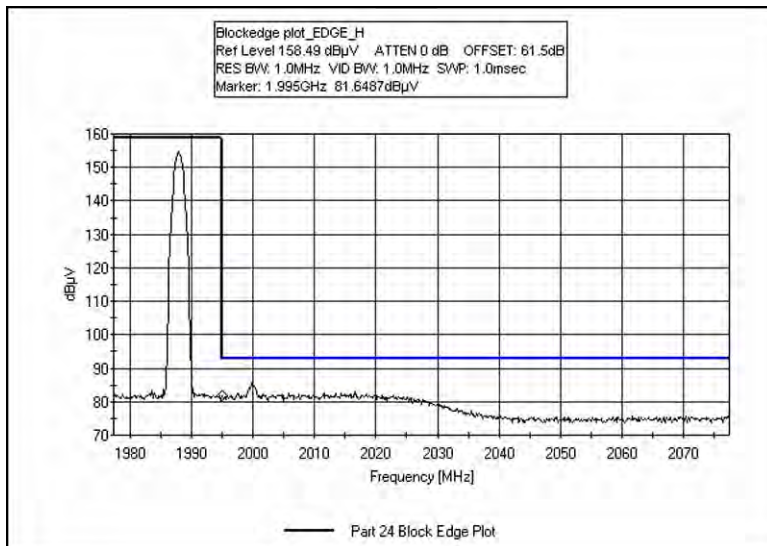
BLOCKEDGE - CDMA HIGH



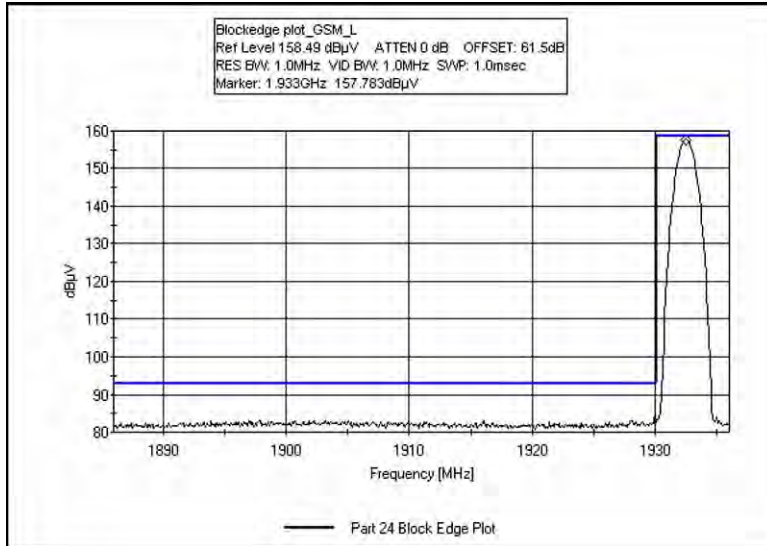
BLOCKEDGE - EDGE LOW



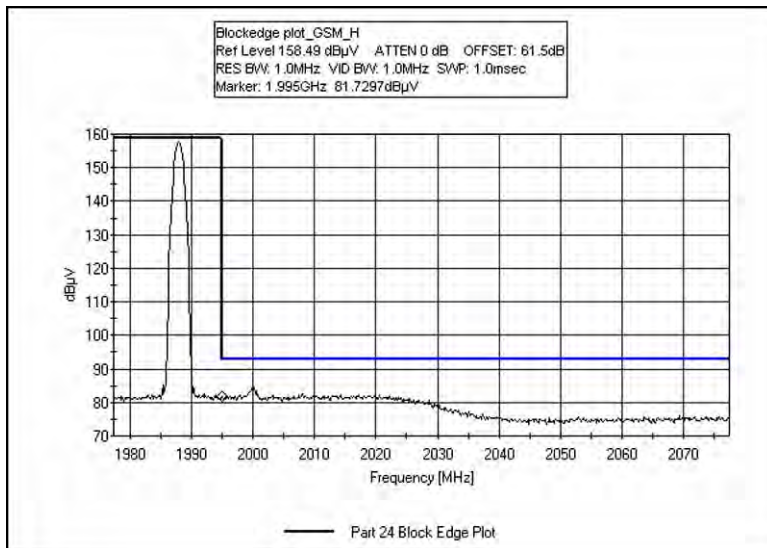
BLOCKEDGE - EDGE HIGH



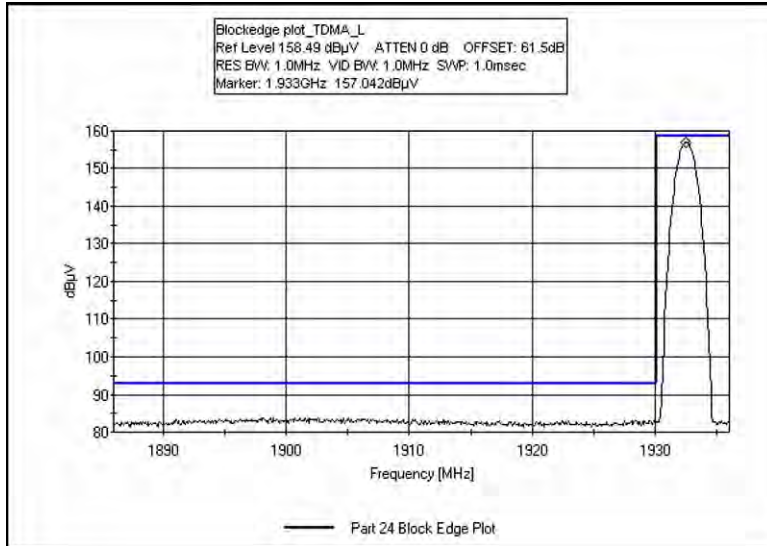
BLOCKEDGE - GSM LOW



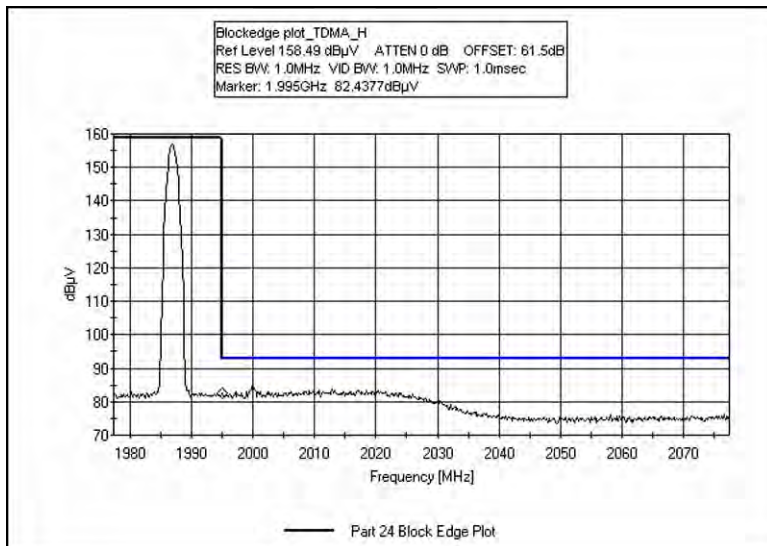
BLOCKEDGE - GSM HIGH



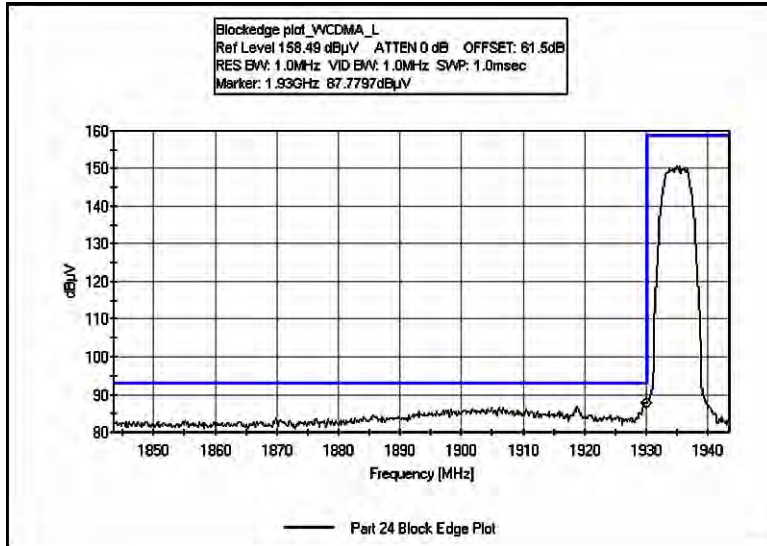
BLOCKEDGE - TDMA LOW



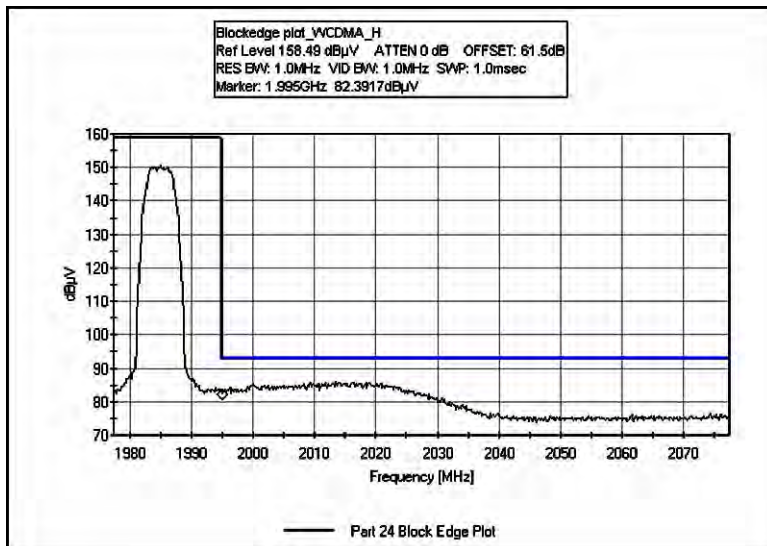
BLOCKEDGE - TDMA HIGH



BLOCKEDGE - WCDMA LOW



BLOCKEDGE - WCDMA HIGH



TWO TONE INTERMODULATION

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
High Freq Cable (big blue)	05421	Huber Suhner	NA	12237/4A	112805	112807

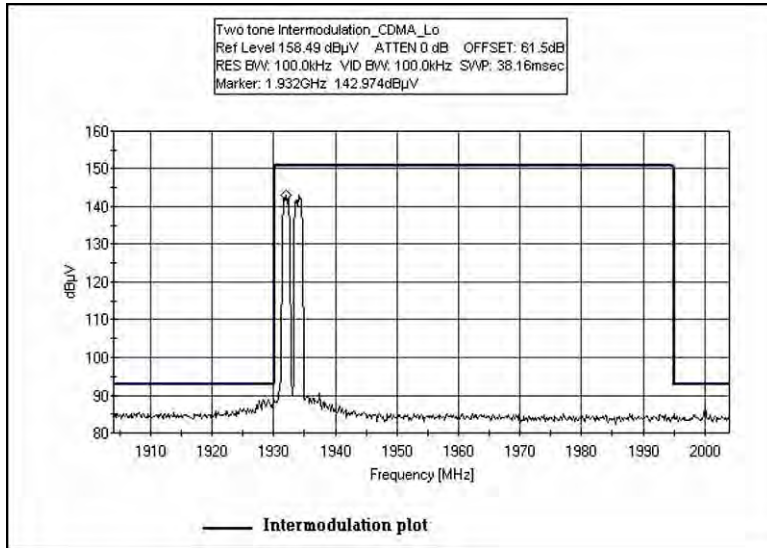
Test Conditions: The EUT is placed on the wooden table. RF out is connected to remote loadstring and power meter. RF in receives 3 RF signal, 2 signal near the lower edge of the pas band, one signal at the upper edge of the pass band via remote ESGs and a preamp. The RF level is adjusted to maintain the transmit power. Output wave form evaluation performed at the antenna port. Input waveform form evaluation performed at the RF input port.

Test Setup Photos

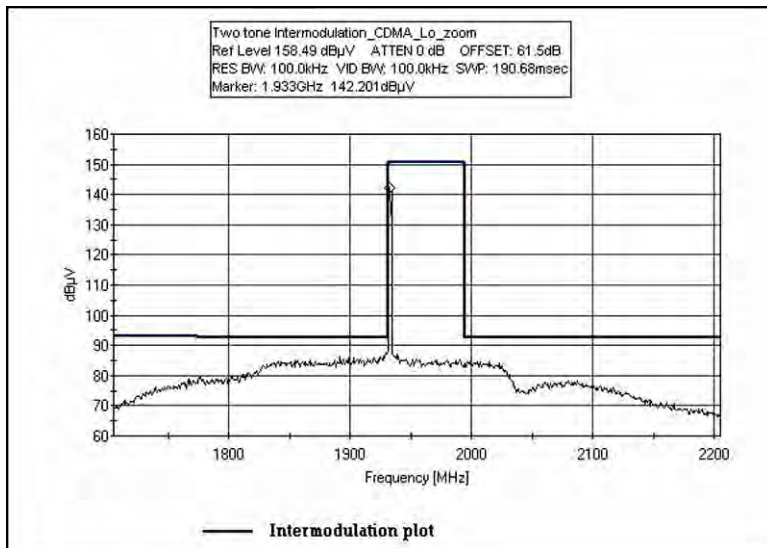


Test Plots

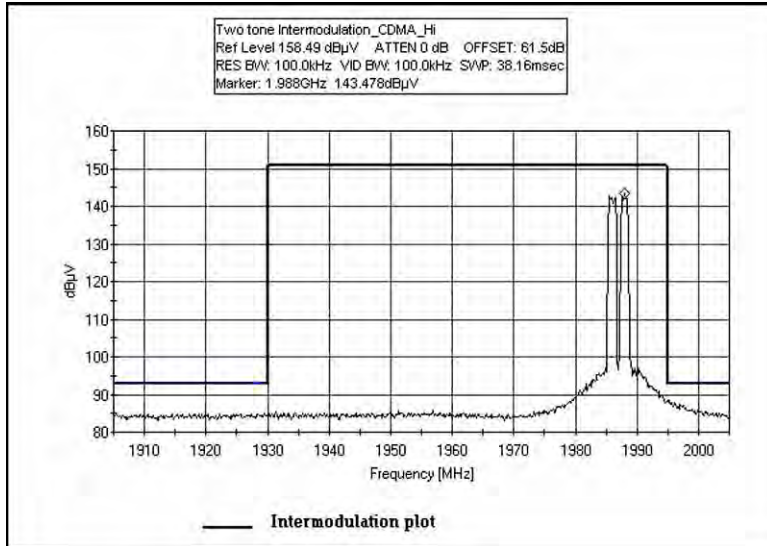
TWO TONE INTERMODULATION - CDMA LOW



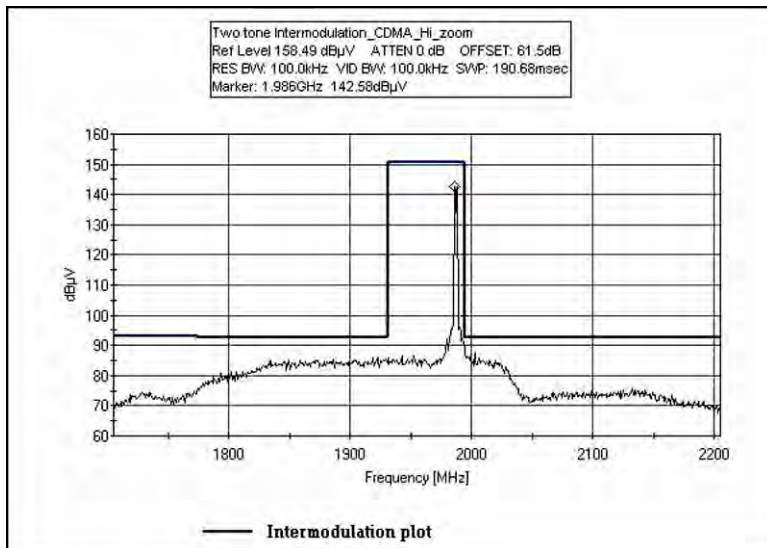
TWO TONE INTERMODULATION - CDMA LOW ZOOM



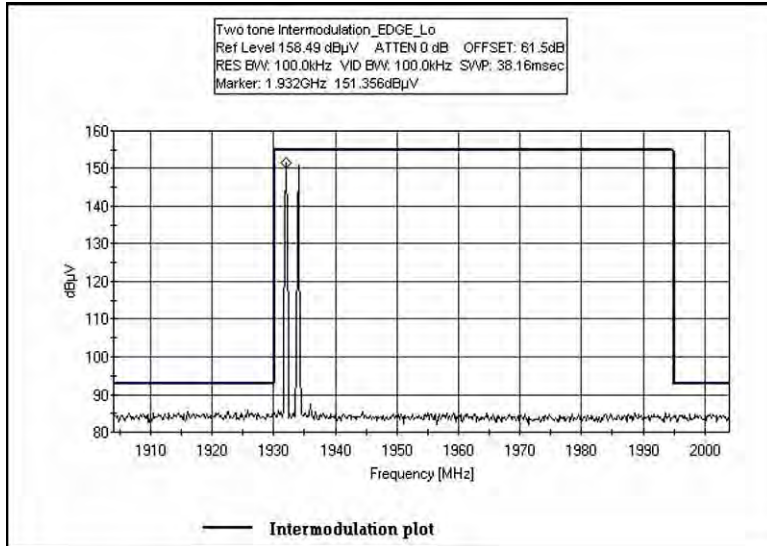
TWO TONE INTERMODULATION - CDMA HIGH



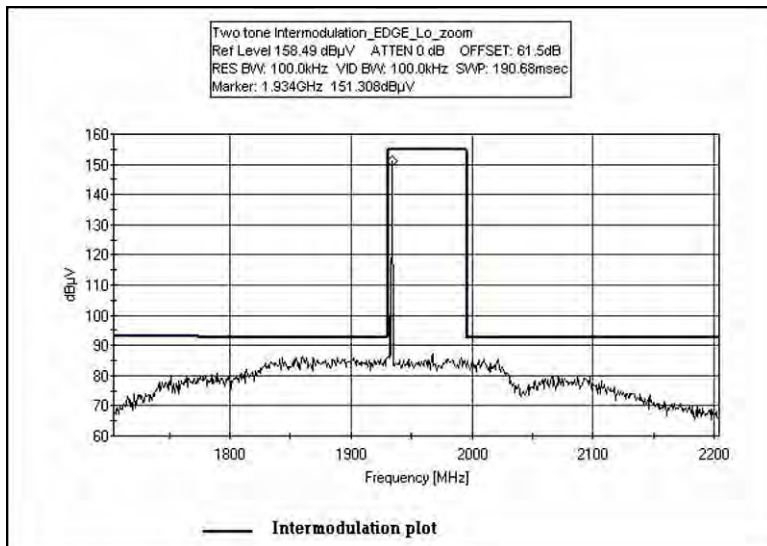
TWO TONE INTERMODULATION - CDMA HIGH ZOOM



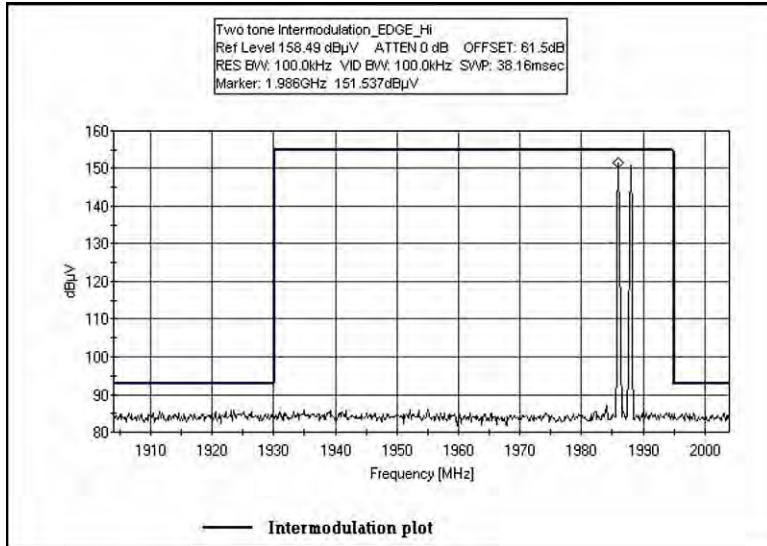
TWO TONE INTERMODULATION - EDGE LOW



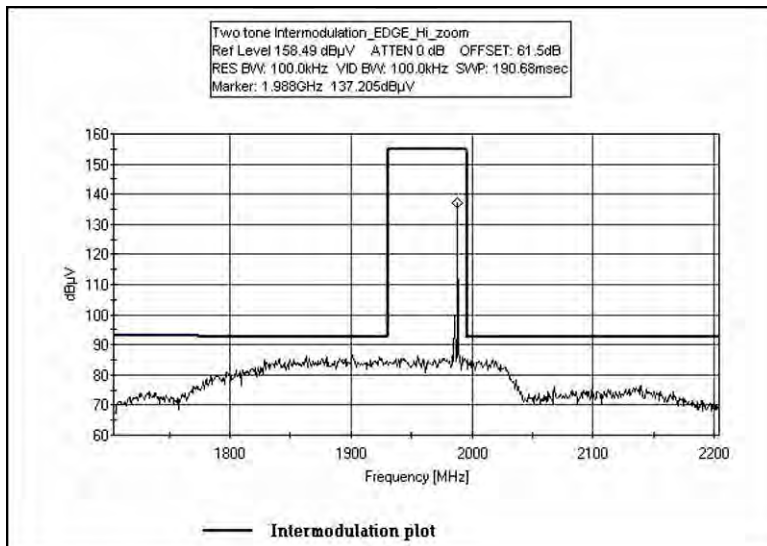
TWO TONE INTERMODULATION - EDGE LOW ZOOM



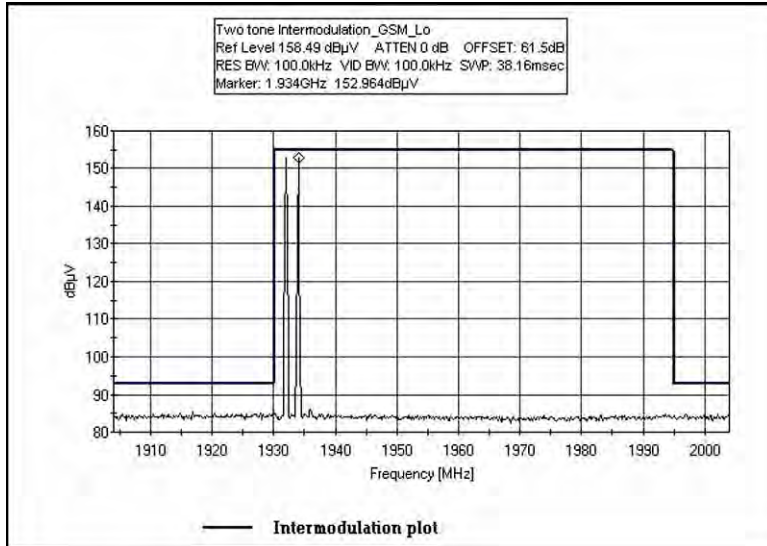
TWO TONE INTERMODULATION - EDGE HIGH



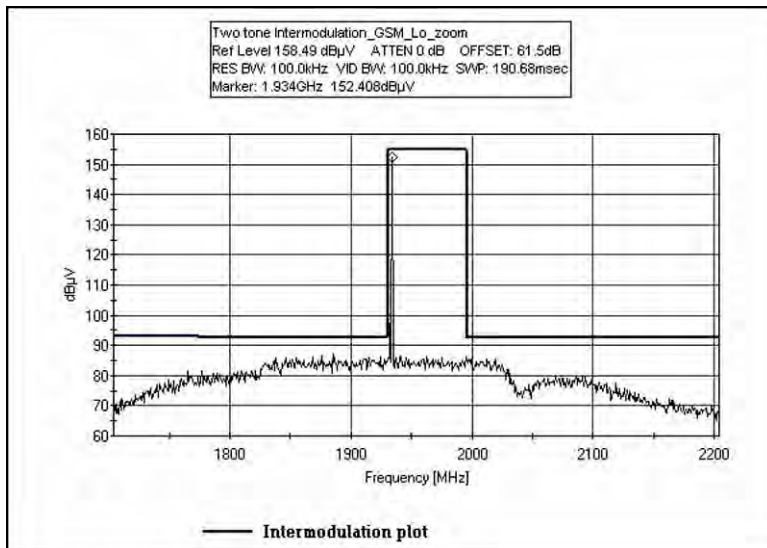
TWO TONE INTERMODULATION - EDGE HIGH ZOOM



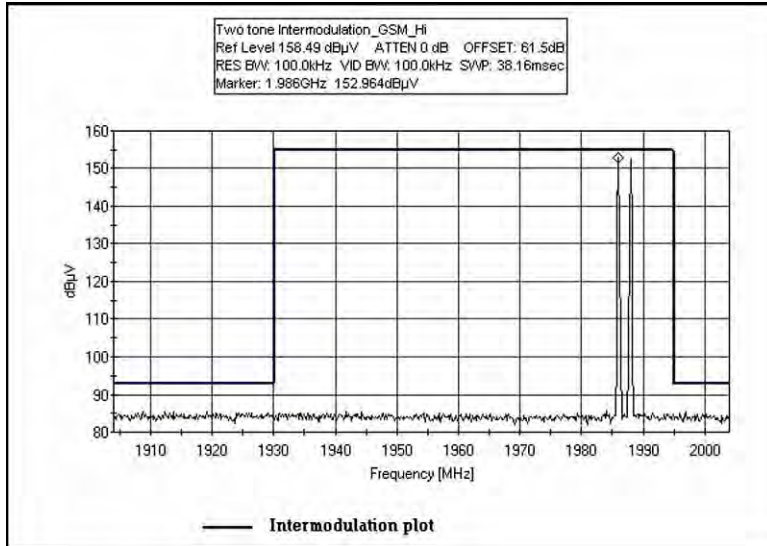
TWO TONE INTERMODULATION - GSM LOW



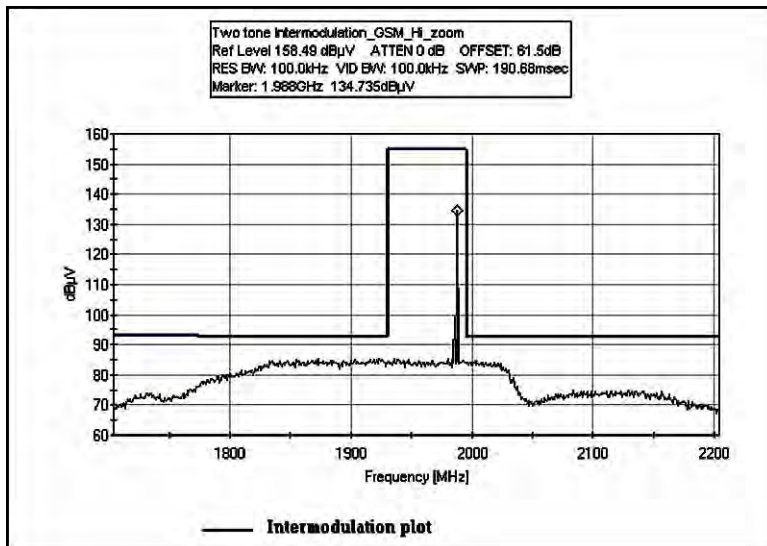
TWO TONE INTERMODULATION - GSM LOW ZOOM



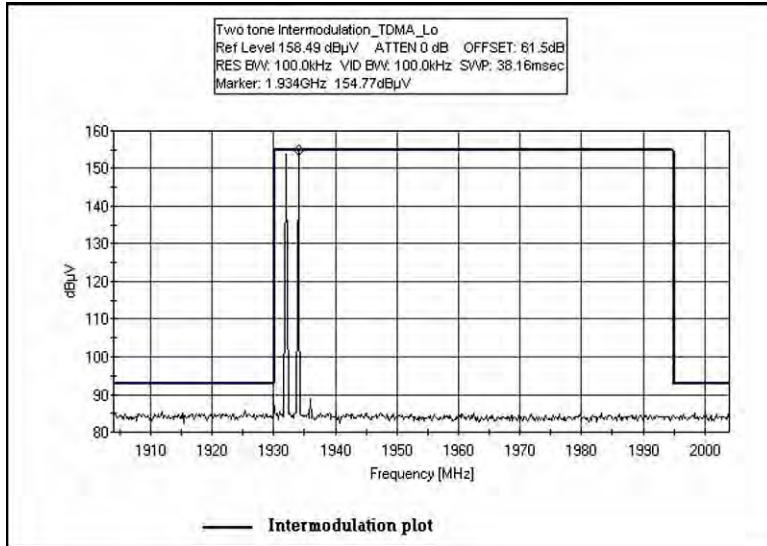
TWO TONE INTERMODULATION - GSM HIGH



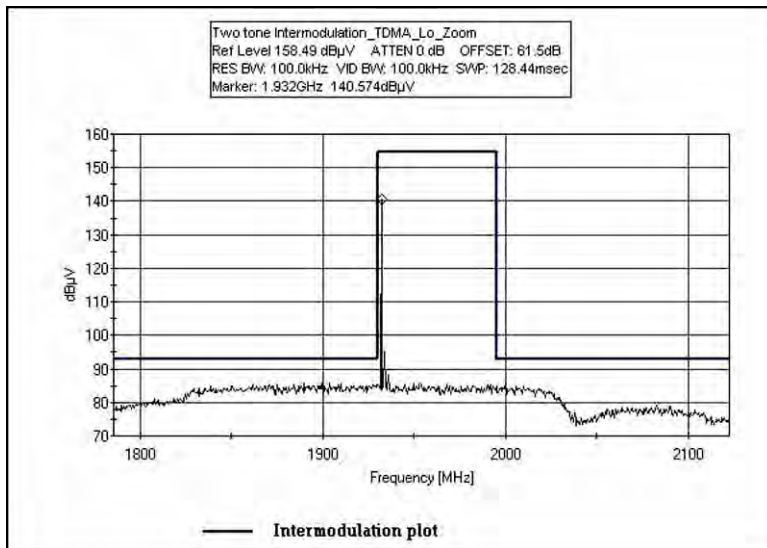
TWO TONE INTERMODULATION - GSM HIGH ZOOM



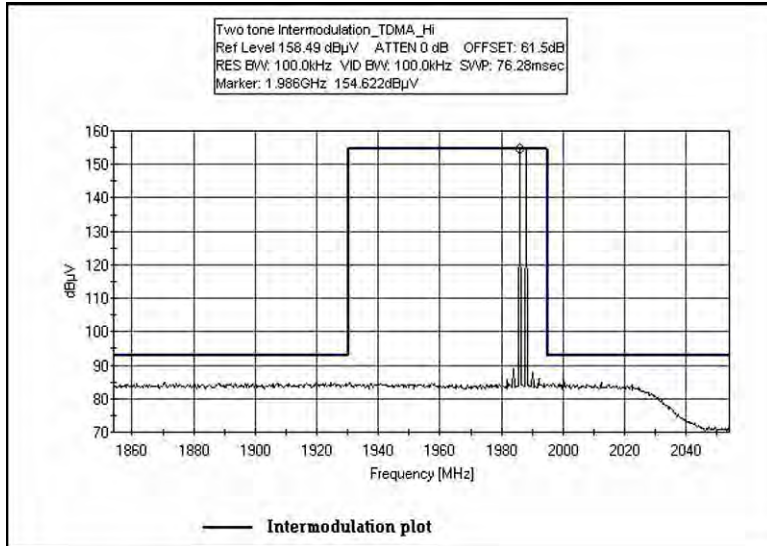
TWO TONE INTERMODULATION - TDMA LOW



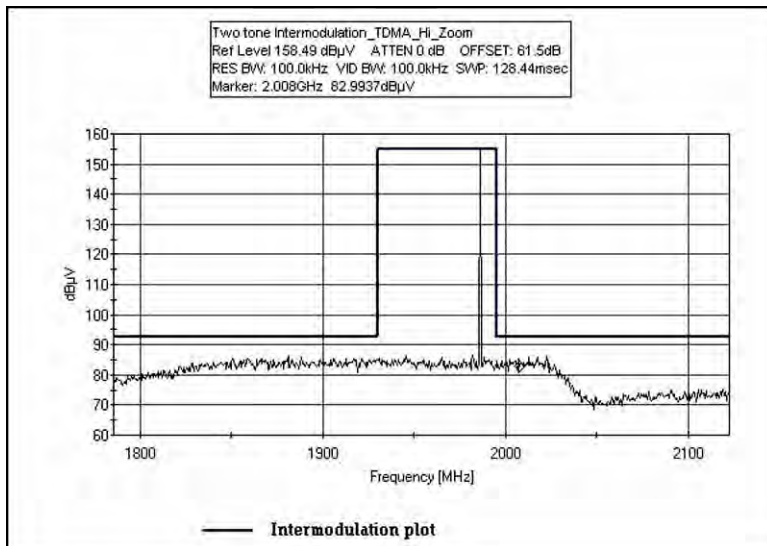
TWO TONE INTERMODULATION - TDMA LOW ZOOM



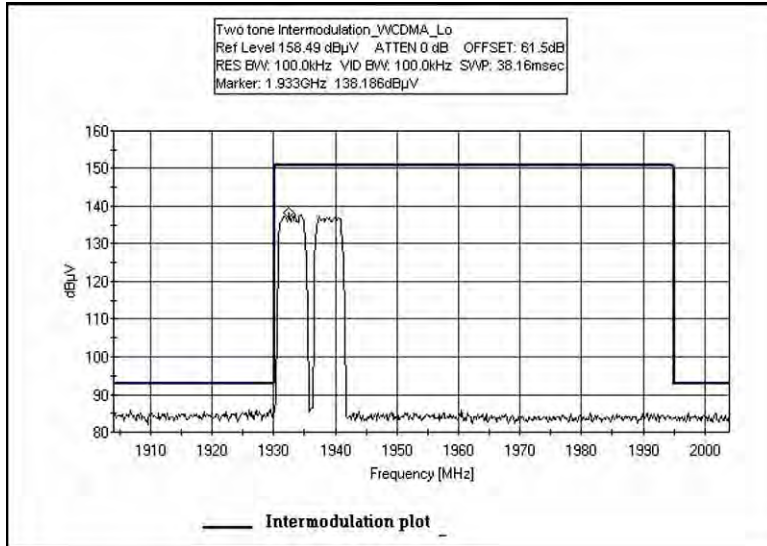
TWO TONE INTERMODULATION - TCDMA HIGH



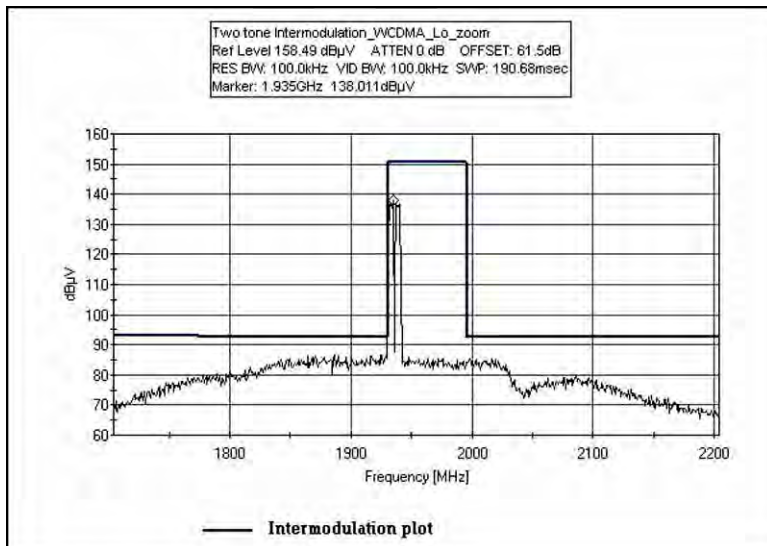
TWO TONE INTERMODULATION - TDMA HIGH ZOOM



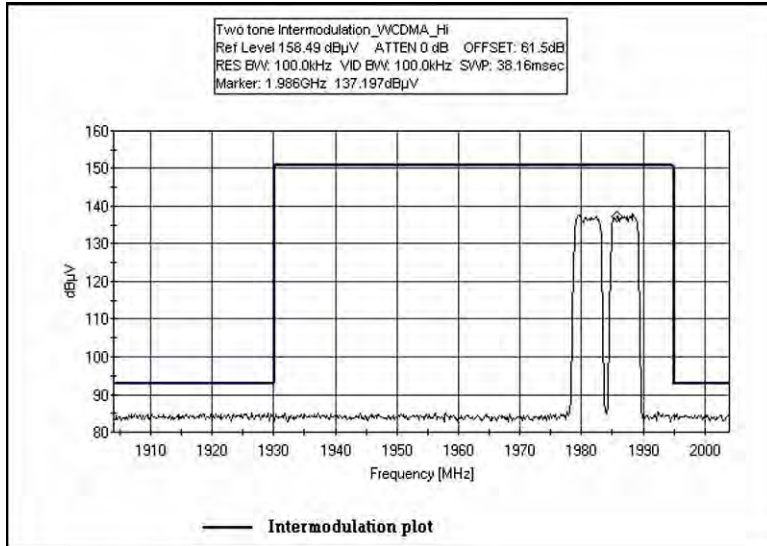
TWO TONE INTERMODULATION - WCDMA LOW



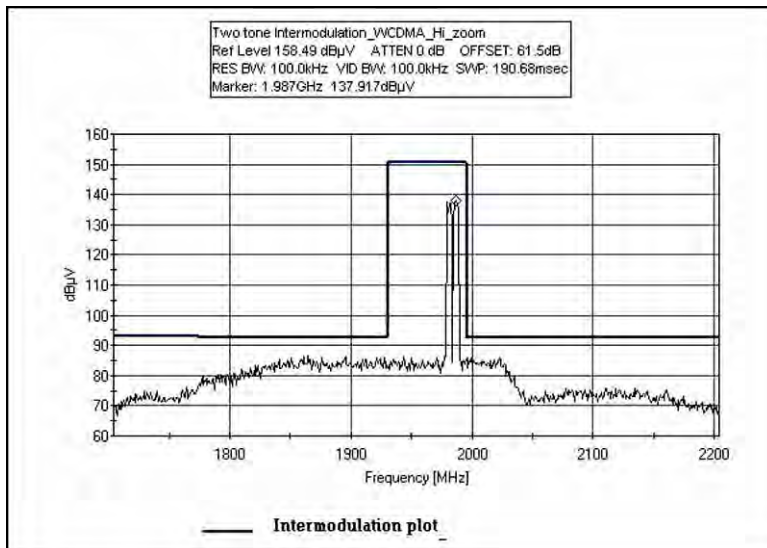
TWO TONE INTERMODULATION - WCDMA LOW ZOOM



TWO TONE INTERMODULATION - WCDMA HIGH



TWO TONE INTERMODULATION - WCDMA HIGH ZOOM



99% BANDWIDTH

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
High Freq Cable (big blue)	05421	Huber Suhner	NA	12237/4A	112805	112807

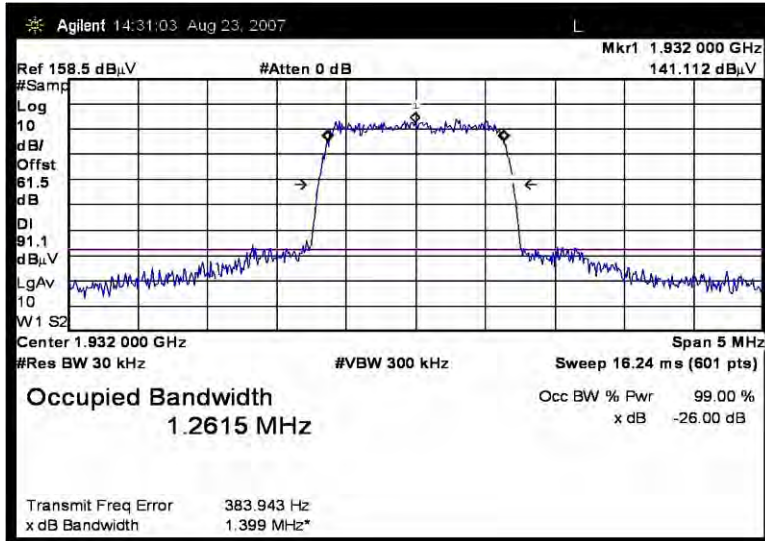
Test Conditions: The EUT is placed on the wooden table. RF out is connected to remote loadstring and power meter. RF in receives RF signal via remote ESGs and a preamp. The RF level is adjusted to maintain the transmit power. Evaluation performed at the antenna port

Test Setup Photos

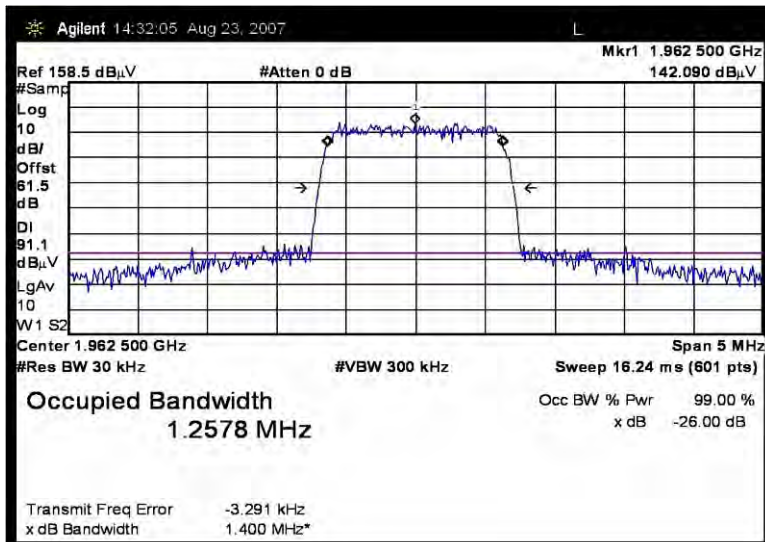


Test Plots

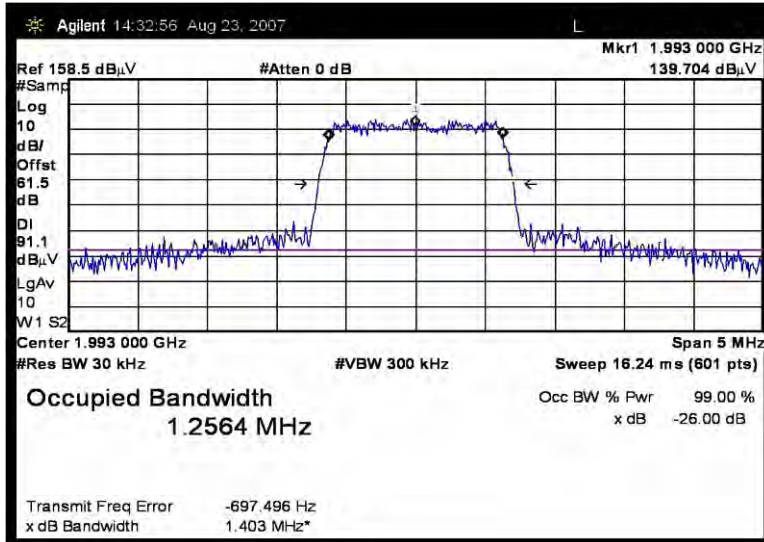
99% BANDWIDTH - CDMA 1.3MHz 1932MHz



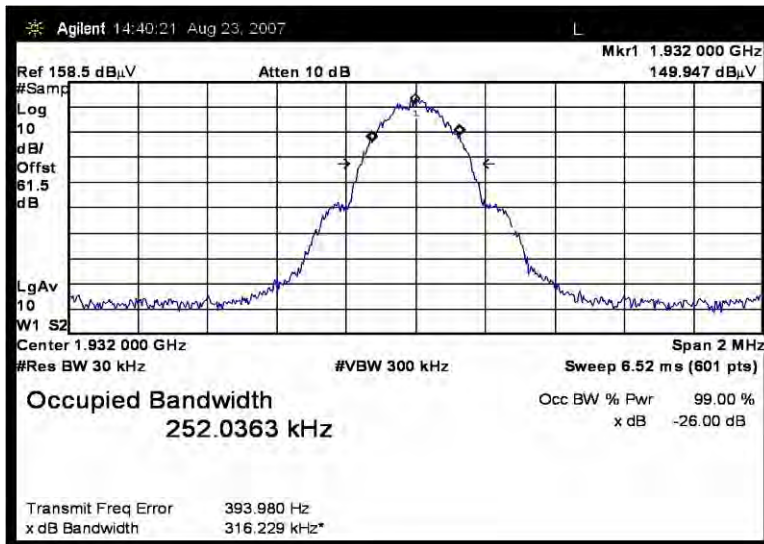
99% BANDWIDTH - CDMA 1.3MHz 1963MHz



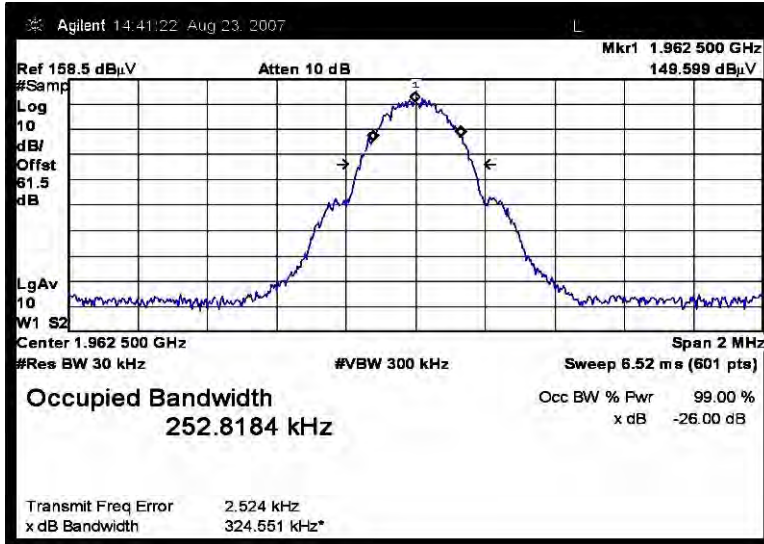
99% BANDWIDTH - CDMA 1.3MHz 1993MHz



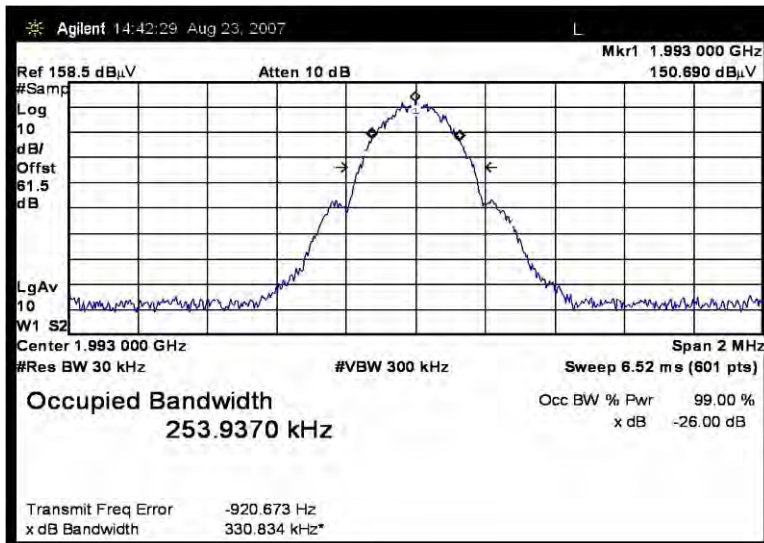
99% BANDWIDTH - EDGE 250kHz 1932MHz



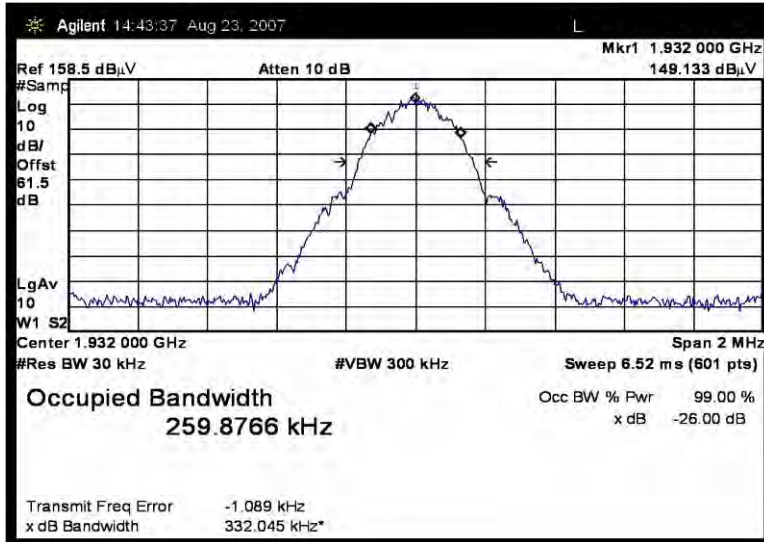
99% BANDWIDTH - EDGE 253kHz 1936MHz



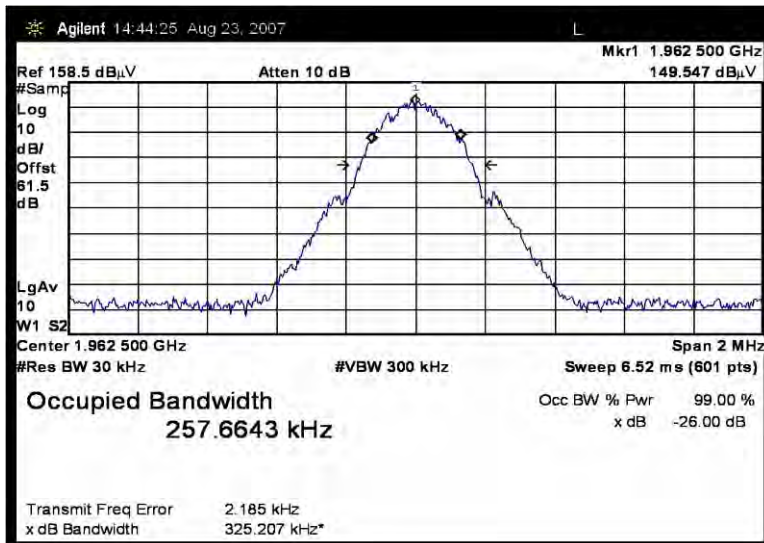
99% BANDWIDTH - EDGE 254kHz 1993MHz



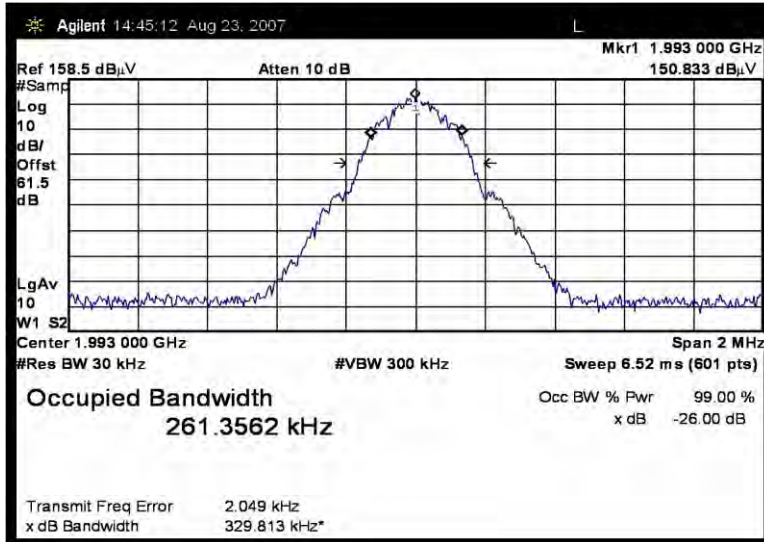
99% BANDWIDTH - GSM 260kHz 1932MHz



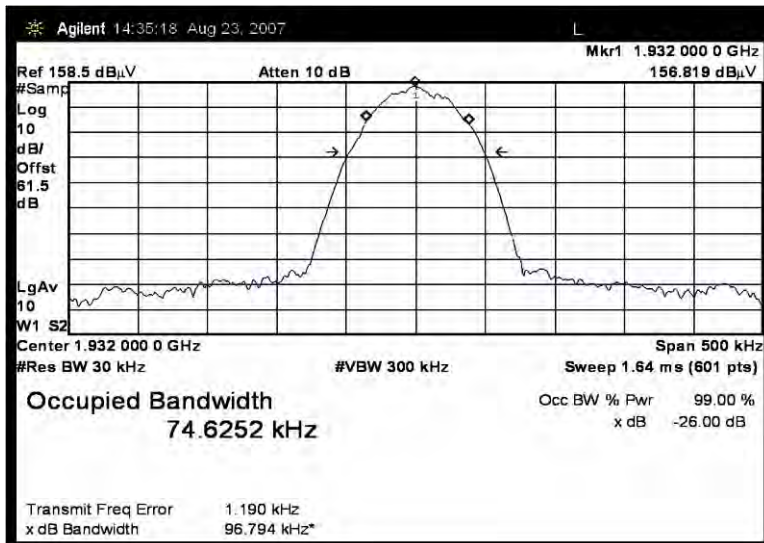
99% BANDWIDTH - GSM 257kHz 1963MHz



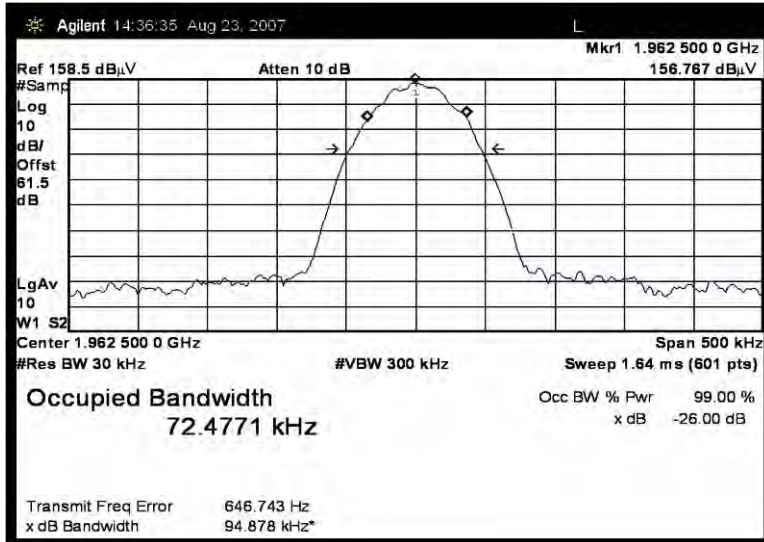
99% BANDWIDTH - GSM 261kHz 1993MHz



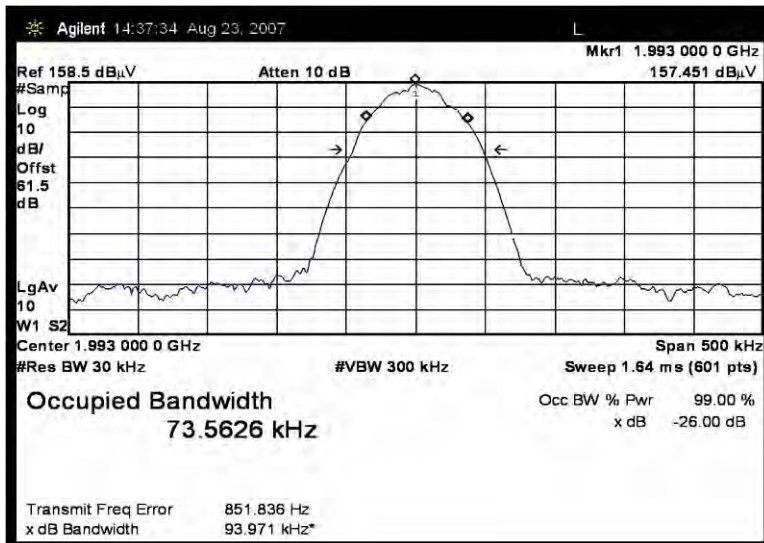
99% BANDWIDTH - TDMA 75kHz 1932MHz



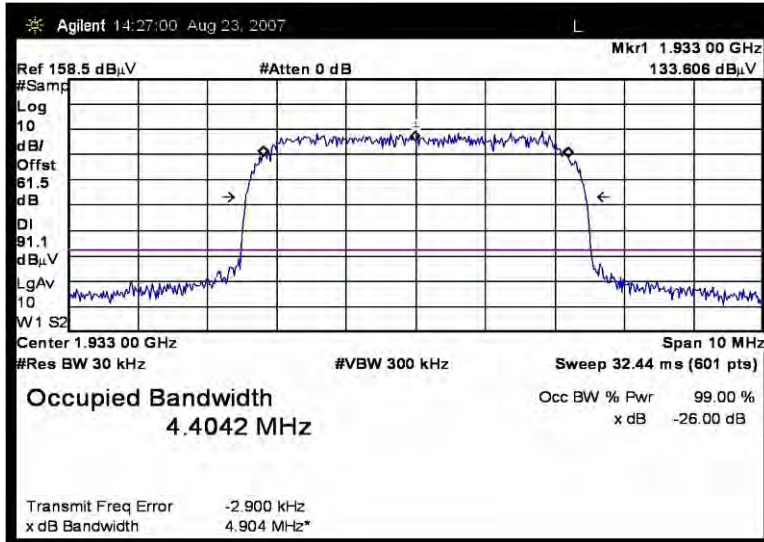
99% BANDWIDTH - TDMA 73kHz 1963MHz



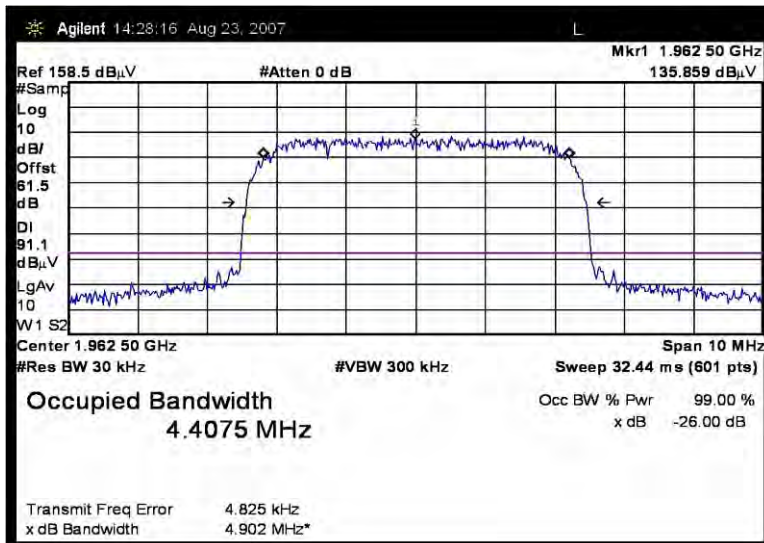
99% BANDWIDTH - TDMA 73kHz 1993MHz



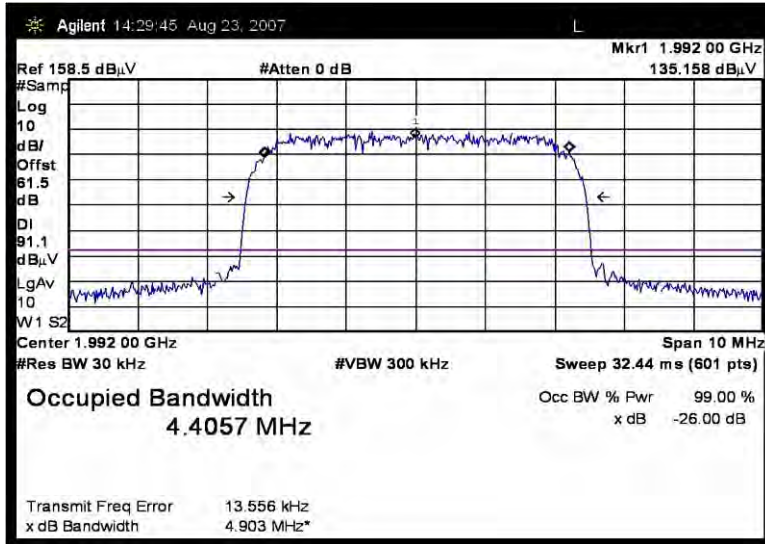
99% BANDWIDTH - WCDMA 4.4MHz 1933MHz



99% BANDWIDTH - WCDMA 4.4MHz 1963MHz



99% BANDWIDTH - WCDMA 4.4MHz 1932MHz



RSS-131 Amplifier Gain and Bandwidth

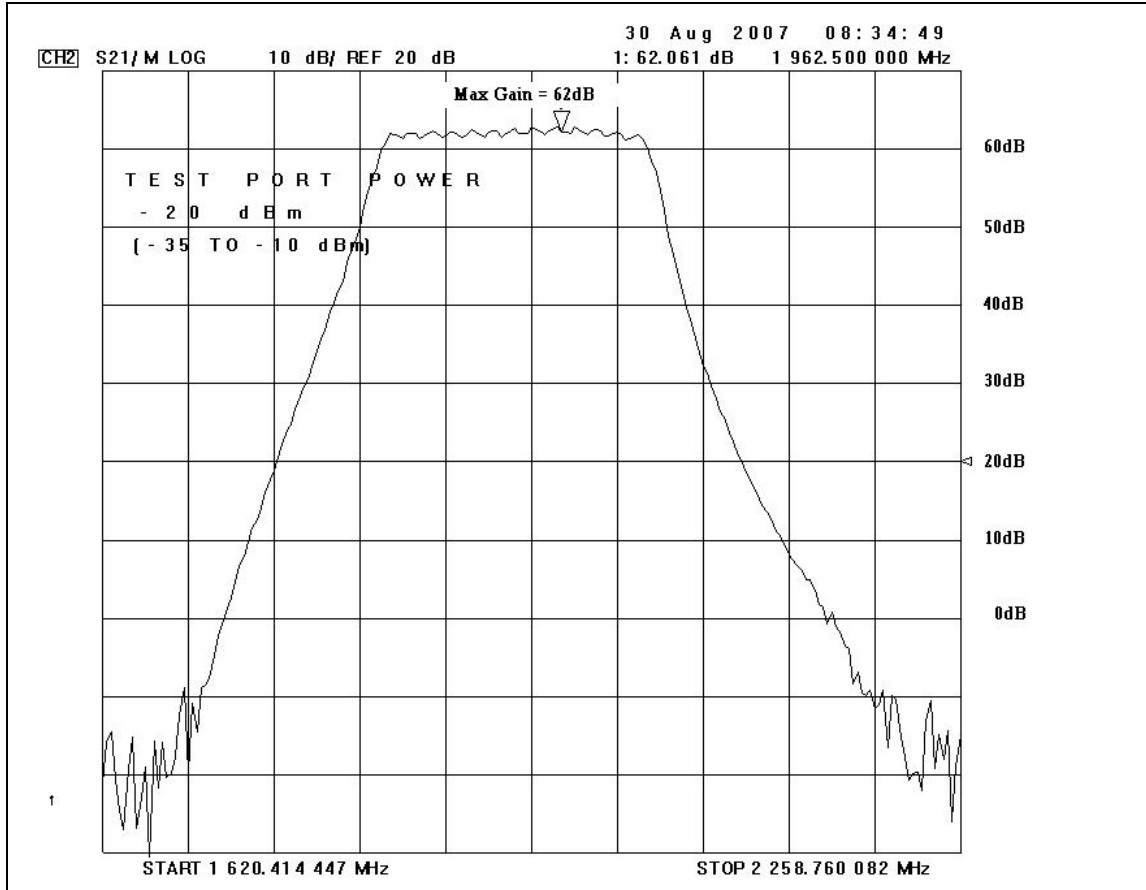
Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Network analyzer	C00012	HP	8753E	Us38432770	052006	052008

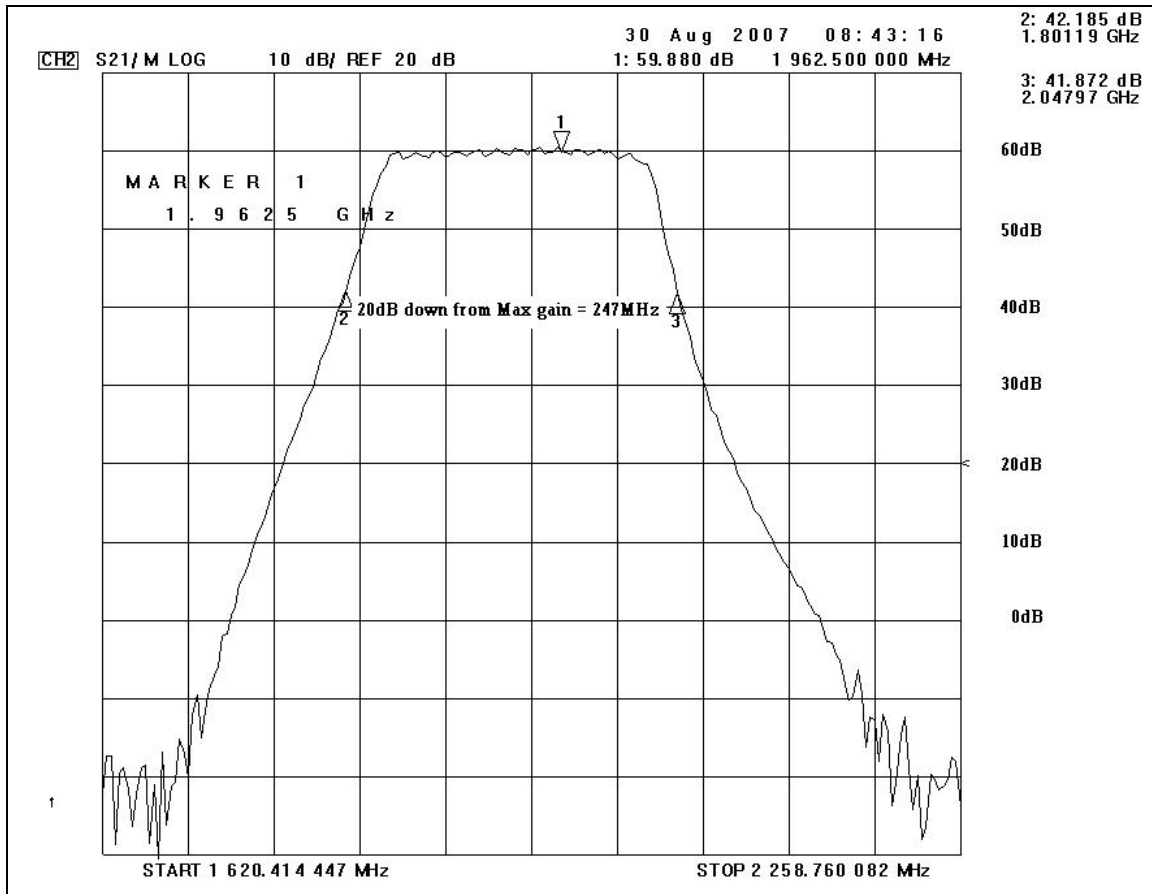
Test Setup Photos



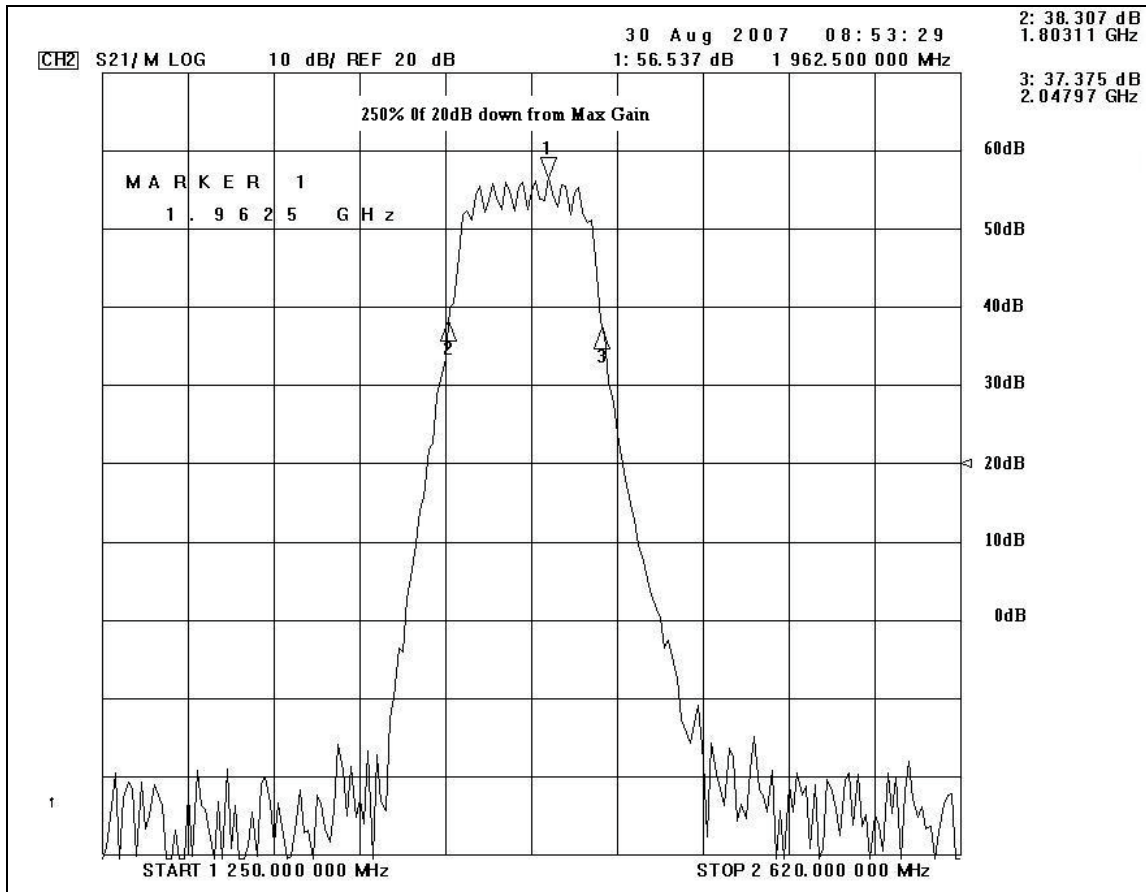
Test Data



The internal control is adjusted to the nominal gain for which equipment certification is sought.



With the aid of a signal generator and a spectrum analyzer, the 20 dB Bandwidth is measured.



The gain-versus-frequency response of the amplifier from the mid band F_o of the pass band up to at least $f_o \pm 250\%$ of the 20dB Bandwidth.

Minimum standard:

The pass band gain response shall not exceed the nominal gain by more than 1 dB. The 20 dB bandwidth shall not exceed the nominal bandwidth that is stated by the manufacturer. Outside of the 20dB bandwidth the gain shall not exceed that at the 20dB point.