CKC LABORATORIES, INC. Testing the Future

ADDENDUM TO POWERWAVE TECHNOLOGIES TEST REPORT FC04-006

FOR THE

1900 MHz SINGLE CHANNEL RF POWER AMPLIFIER, SPA9323-30C

FCC PART 24 AND RSS 131

COMPLIANCE

DATE OF ISSUE: DECEMBER 2, 2004

PREPARED FOR:

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

P.O. No.: 92753
W.O. No.: 81703

PREPARED BY:

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CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: December 19, 2003 –
October 26, 2004

Report No.: FC04-006A

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

DATE OF TEST:	December 19, 2003 – October 26, 2004
DATE OF RECEIPT:	December 19, 2003
PURPOSE OF TEST:	To demonstrate the compliance of the 1900 MHz Single Channel RF Power Amplifier, SPA9321-30C with the requirements for FCC Part 24 devices. **Addendum A** is to add RSS 131 data, revise the output and input plots and bandedge plots, remove MPE calculations and to revise the model number to SPA9323-30C.
TEST METHOD:	FCC Part 24 and RSS 212
FREQUENCY RANGE TESTED:	9 kHz - 20 GHz
MANUFACTURER:	Powerwave Technologies 1801 E. St. Andrew Place Santa Ana, CA 92705
REPRESENTATIVE:	Jeffrey Dale
TEST LOCATION:	CKC Laboratories, Inc. 110 Olinda Place Brea, CA 92621

SUMMARY OF RESULTS

As received, the Powerwave Technologies 1900 MHz Single Channel RF Power Amplifier, SPA9323-30C was found to be fully compliant with the following standards and specifications:

Canada	FCC	Description
RSS 131 (3.6) / RSS 102	1.1307 / 2.1093	RF Exposure Requirements
RSS 131 (5.1)	22.917 / 2.1049	Occupied Bandwidth
RSS 131 (5.1)	N/A	Passband Gain requirements
RSS 131 (5.2)	22.913 / 2.1046	RF Power Output
RSS 131 (5.4)	22.917	Field Strength of Spurious Radiation

CONDITIONS FOR COMPLIANCE
No modifications to the EUT were necessary to comply.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Joyce Walker, Quality Assurance Administrative Manager

TEST PERSONNEL:

Eddie Wong, EMC Engineer

Stuart Yamamoto, EMC Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit. The following model name was referenced by CKC Laboratories during testing: **SPA9321-30C.** The model name referenced was incorrect. The proper model name should have been **SPA9323-30C.** Any differences between the names does not affect their EMC characteristics and therefore complies to the level of testing equivalent to the tested model name shown on the data sheets.

EQUIPMENT UNDER TEST

1900 MHz Single Channel RF Power Amplifier
Manuf: Powerwave Technologies, Inc.
Model: SPA9323-30C
Serial: PWWT01DHV8PH
FCC ID: E675JS0065

PERIPHERAL DEVICES

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

Pre Amp
Manuf: Comtech
Model: PST
Serial: 0231750
FCC ID: DoC

Signal Generator
Manuf: Agilent
Model: E4433B
Serial: US40051207
FCC ID: DoC

Power Meter
Manuf: Agilent
Model: E4419B
Serial: US395251692
FCC ID: DoC

DC Power Supply
Manuf: Agilent
Model: 6674A
Serial: US35371847
FCC ID: NA

MEASUREMENT UNCERTAINTY

TEST	HIGHEST UNCERTAINTY
Radiated Emissions	+/- 2.94 dB
Conducted Emissions	+/- 1.56 dB

Note: Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Statements of compliance are based on the nominal values only.

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
GSM, EDGE.

FCC 2.1033 (c)(5) FREQUENCY RANGE
1930-1990 MHz.

FCC 2.1033 (c)(6) OPERATING POWER
30 Watts.

FCC 2.1033 (c)(7) MAXIMUM POWER RATING
100 Watts per channel.

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
GXW, G7W.

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

The EUT is placed on the wooden table top. The EUT is a 1900 MHz Single Channel RF Power Amplifier. The RF input port is connected to a remotely located signal generator and pre-amplifier. The RF output port is connected to a directional coupler and power meter. 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 at 30 Watts.

RF Power output is measured at the antenna output port.

EDGE
1930MHz , measured RF power = 44.8 dBm= 30 watts
1960MHz, measured RF power = 44.8 dBm= 30 watts
1990MHz, measured RF power = 44.8 dBm= 30 watts

GSM
1930MHz , measured RF power = 44.8 dBm= 30 watts
1960MHz, measured RF power = 44.8 dBm= 30 watts

Test Equipment

RF Power meter	02082	HP	435B	2445A11881	093002	093004
Power Sensor	02036	HP	8482A	1551A01004	052902	052904

24.232 RF Power Output

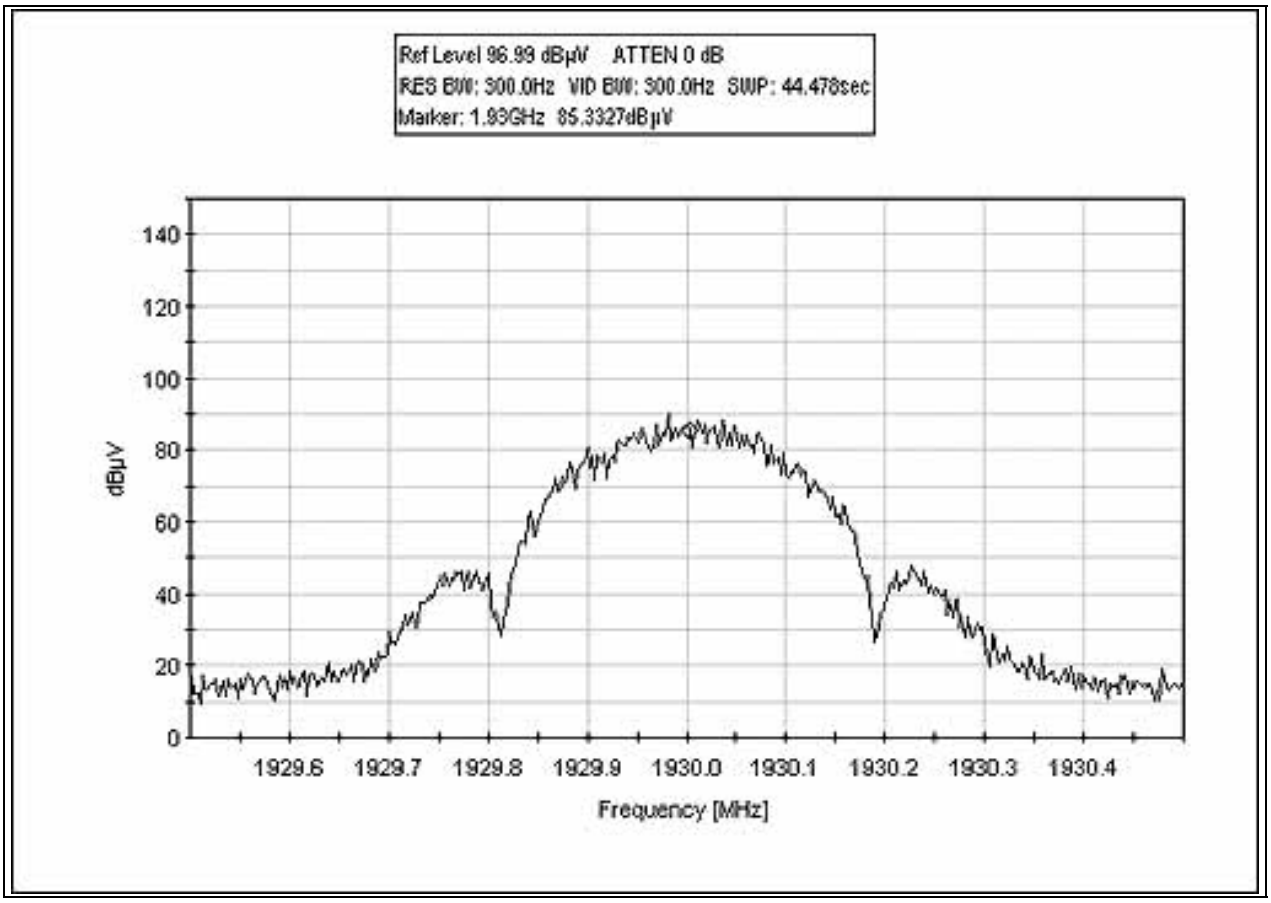
FCC 2.1033(c)(14)/2.1047(a) - MODULATION CHARACTERISTICS - AUDIO FREQUENCY RESPONSE

Not applicable to this unit.

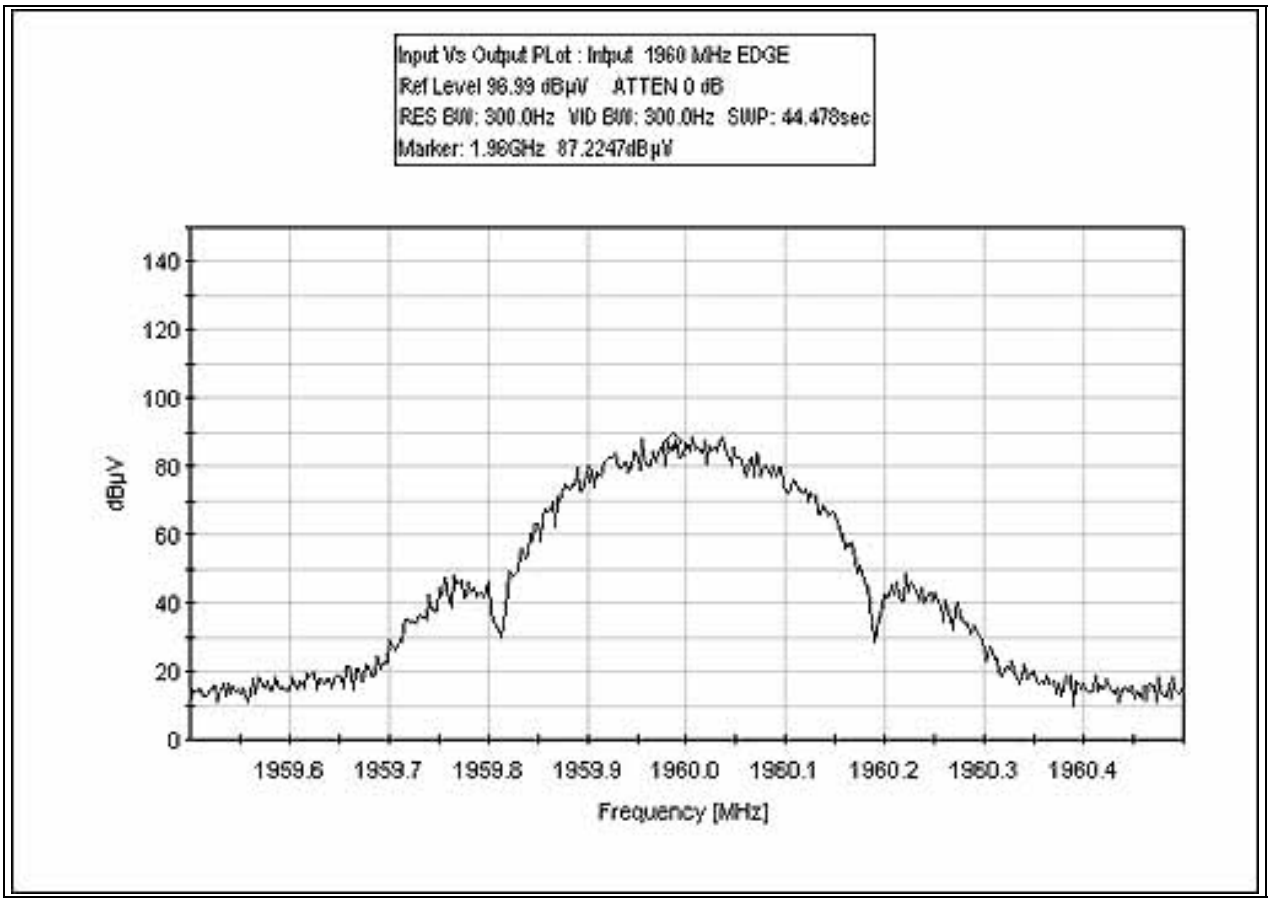
FCC 2.1033(c)(14)/2.1047(b) MODULATION CHARACTERISTICS– Modulation Limiting Response

Not applicable to this unit.

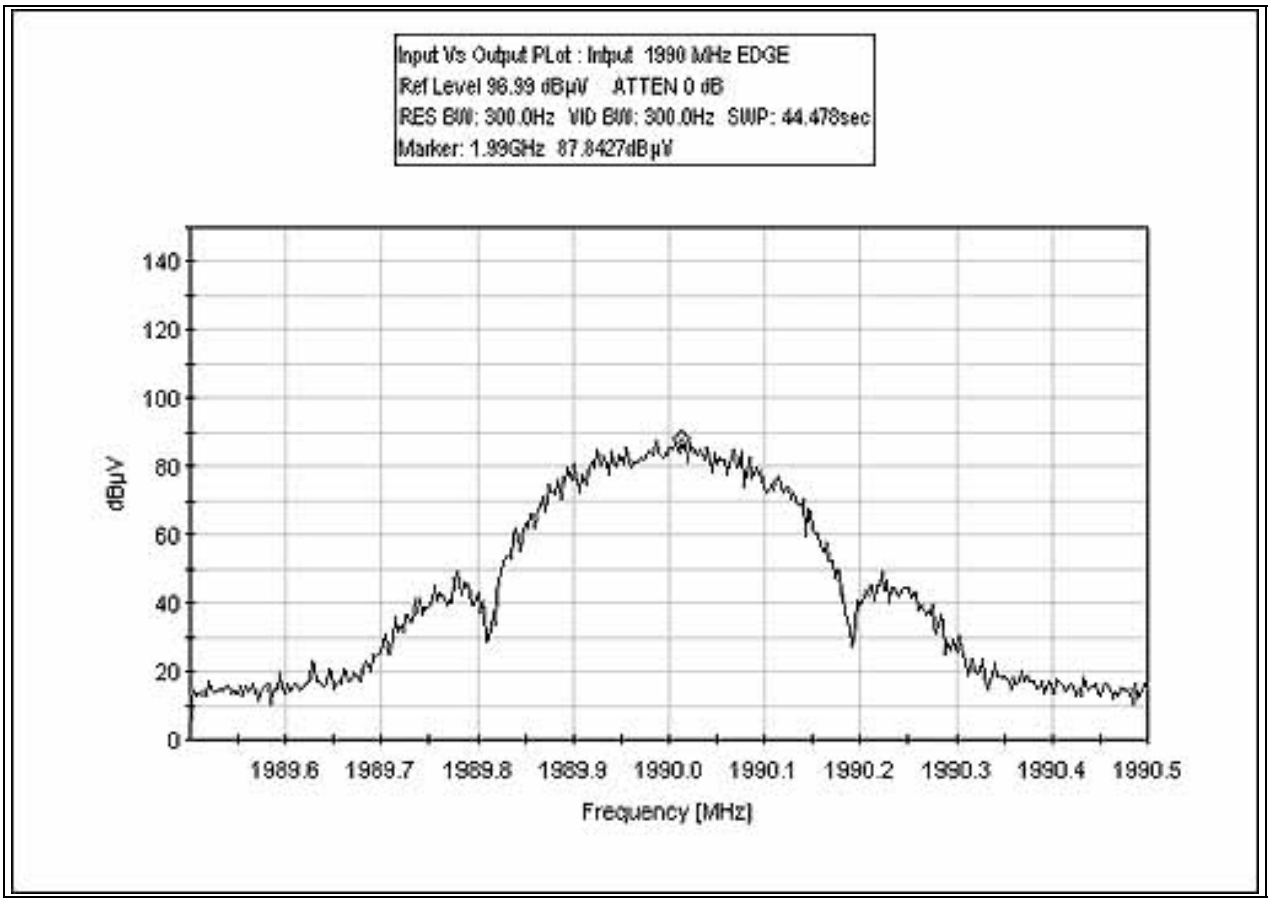
INPUT PLOT EDGE 1930 MHz



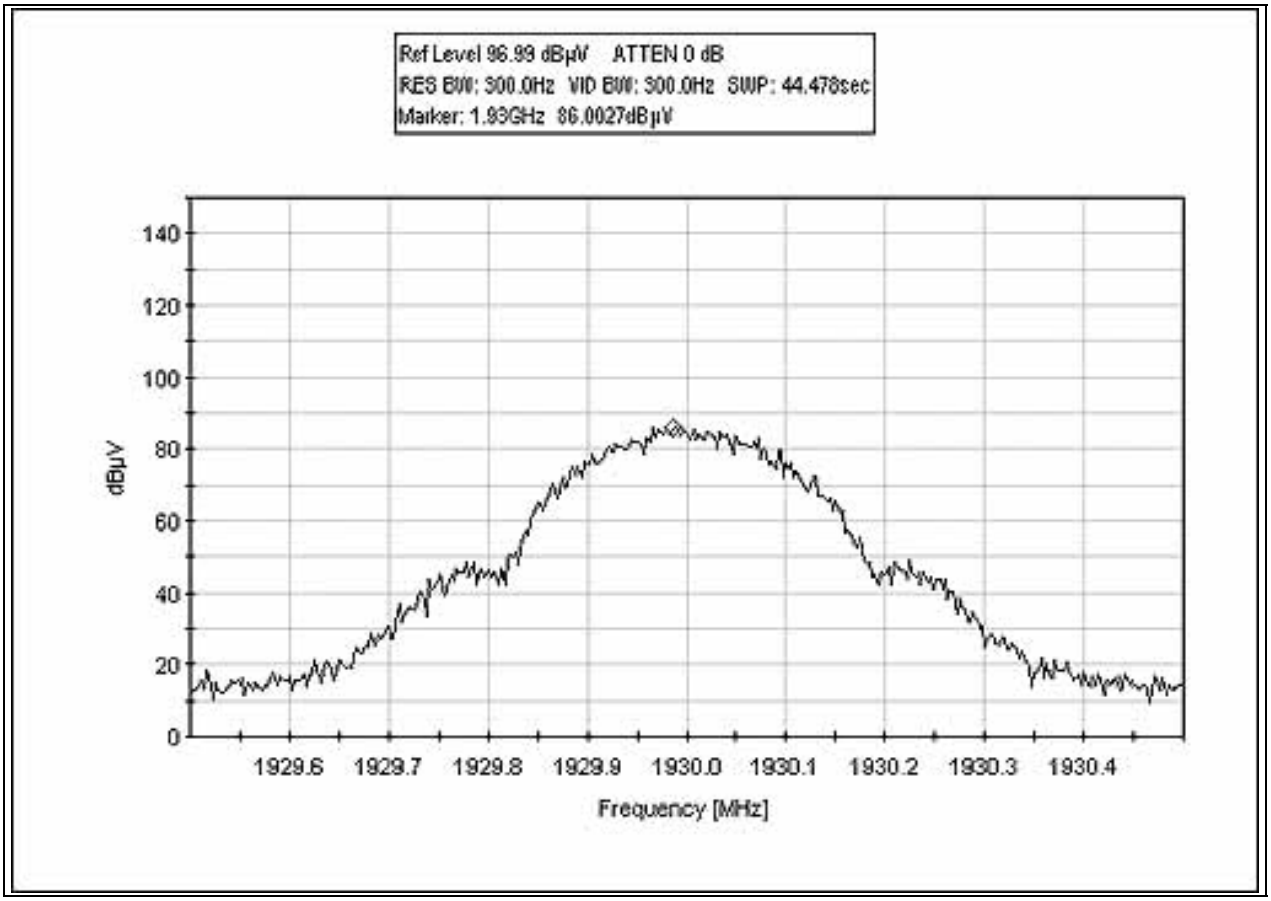
INPUT PLOT EDGE 1960 MHz



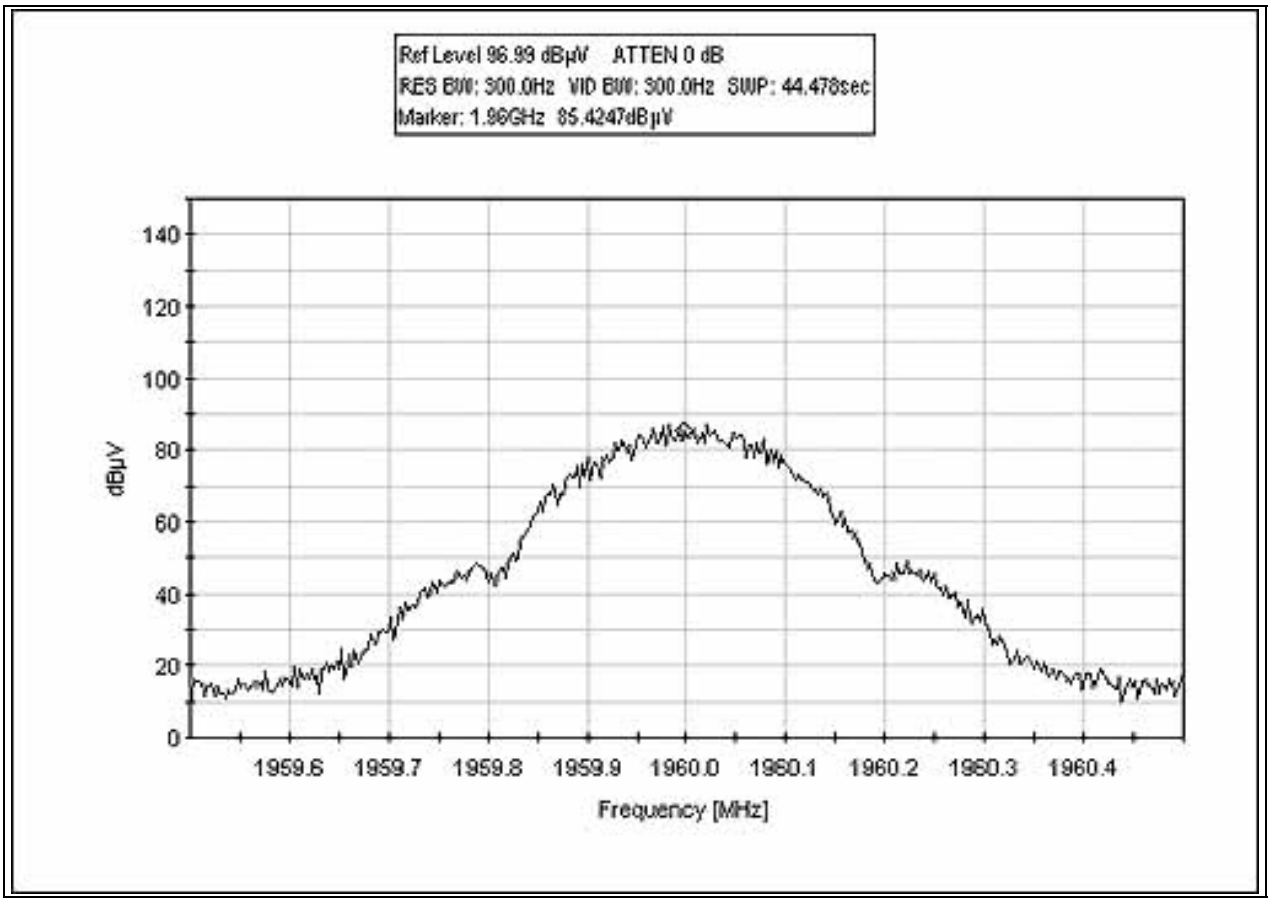
INPUT PLOT EDGE 1990 MHz



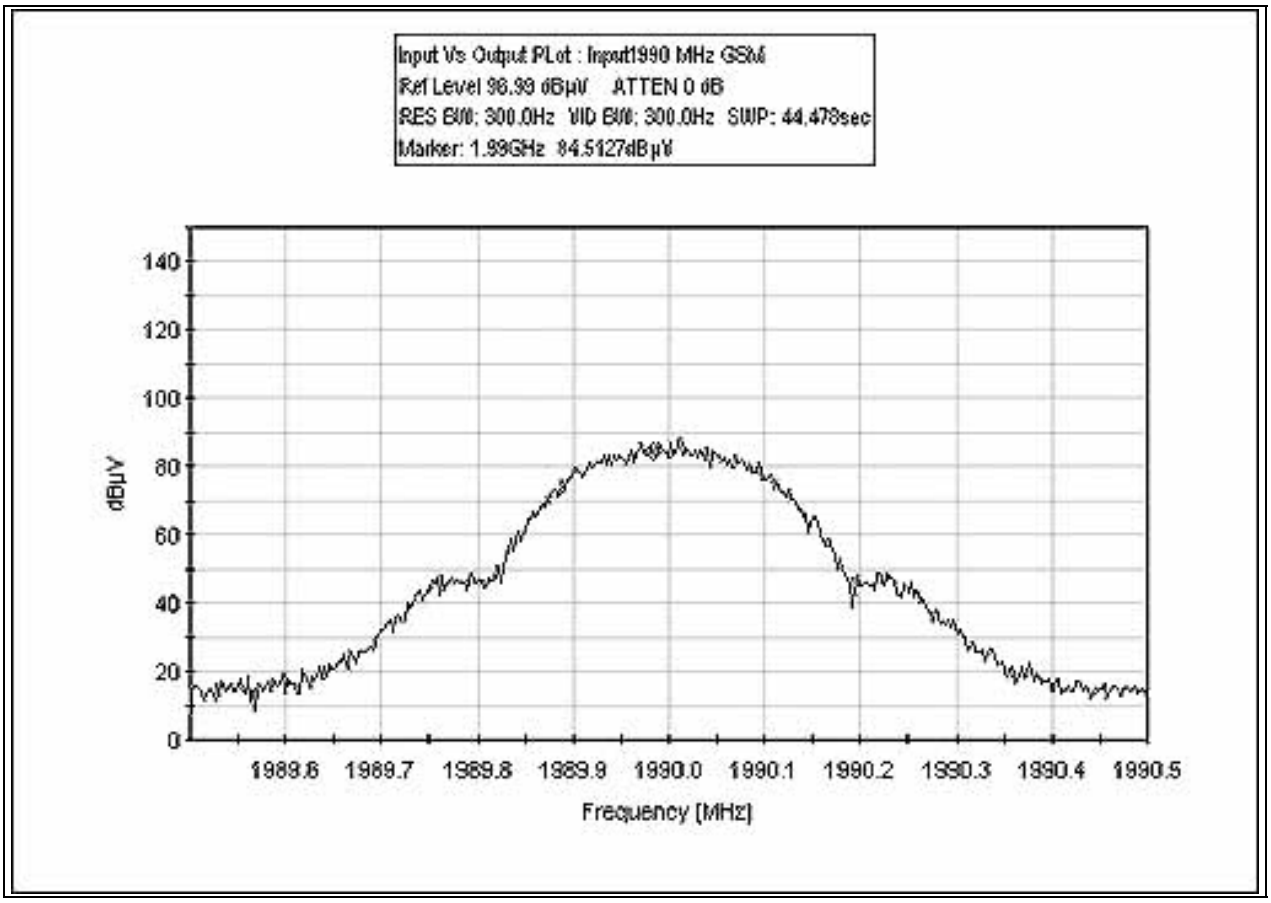
INPUT PLOT GSM 1930 MHz



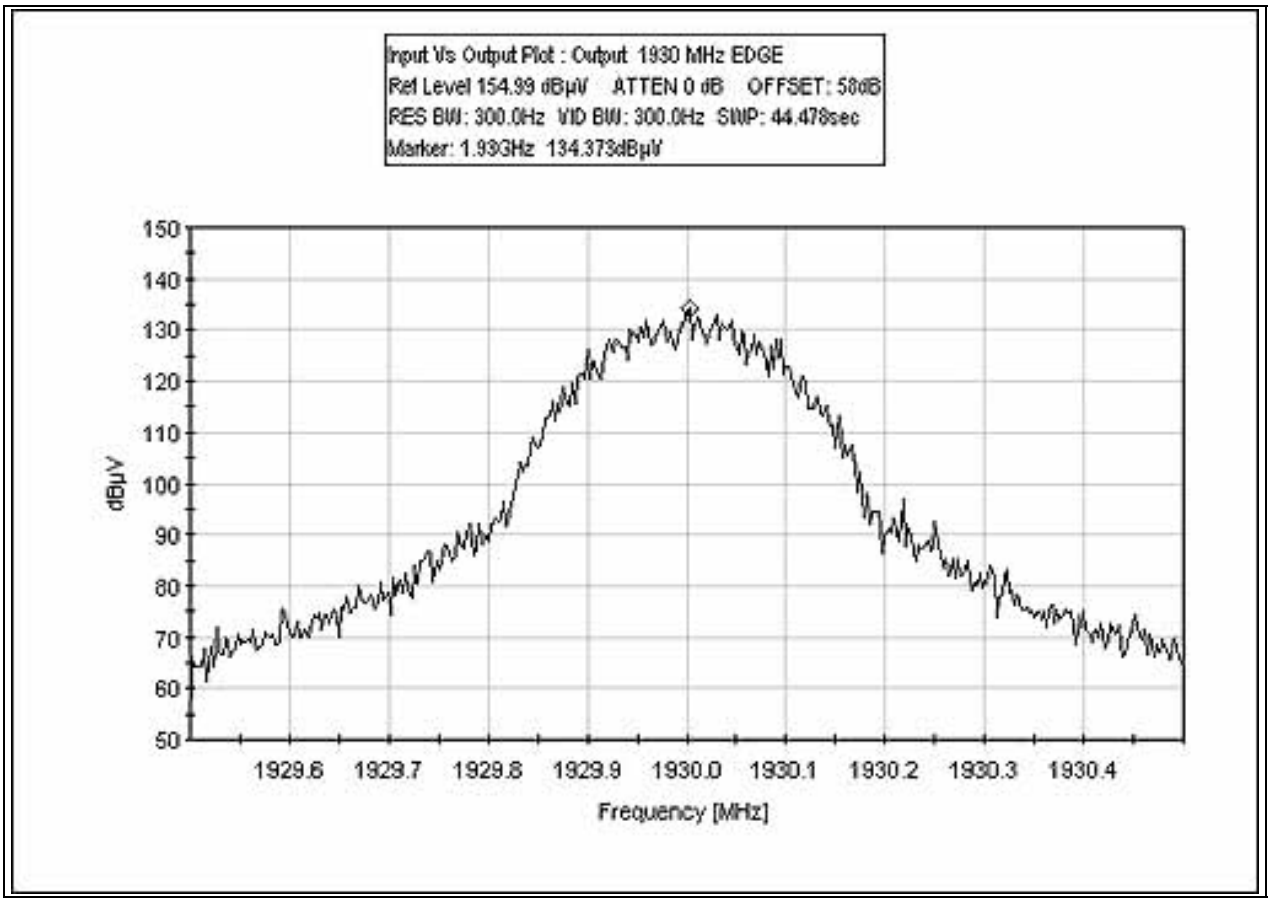
INPUT PLOT GSM 1960 MHz



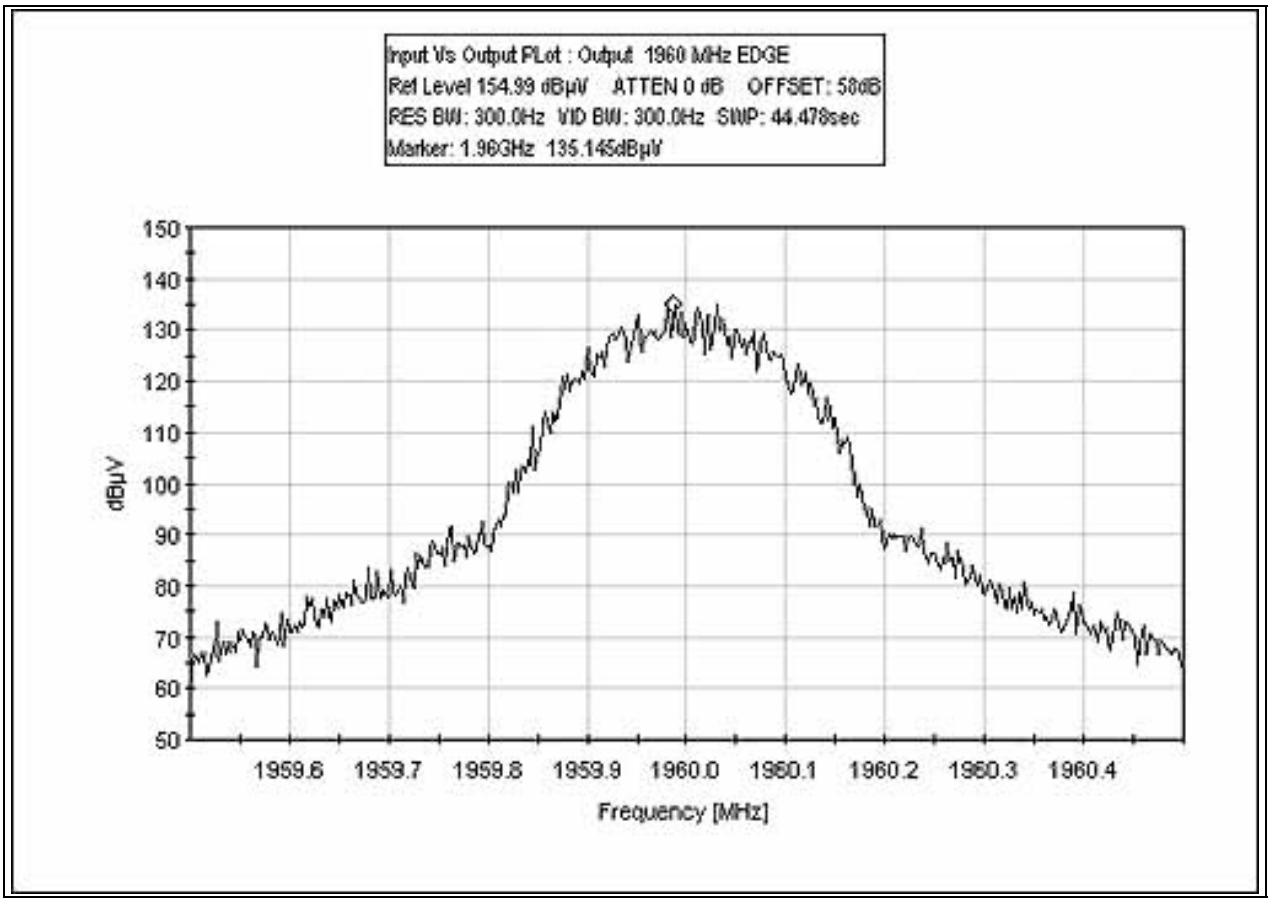
INPUT PLOT GSM 1990 MHz



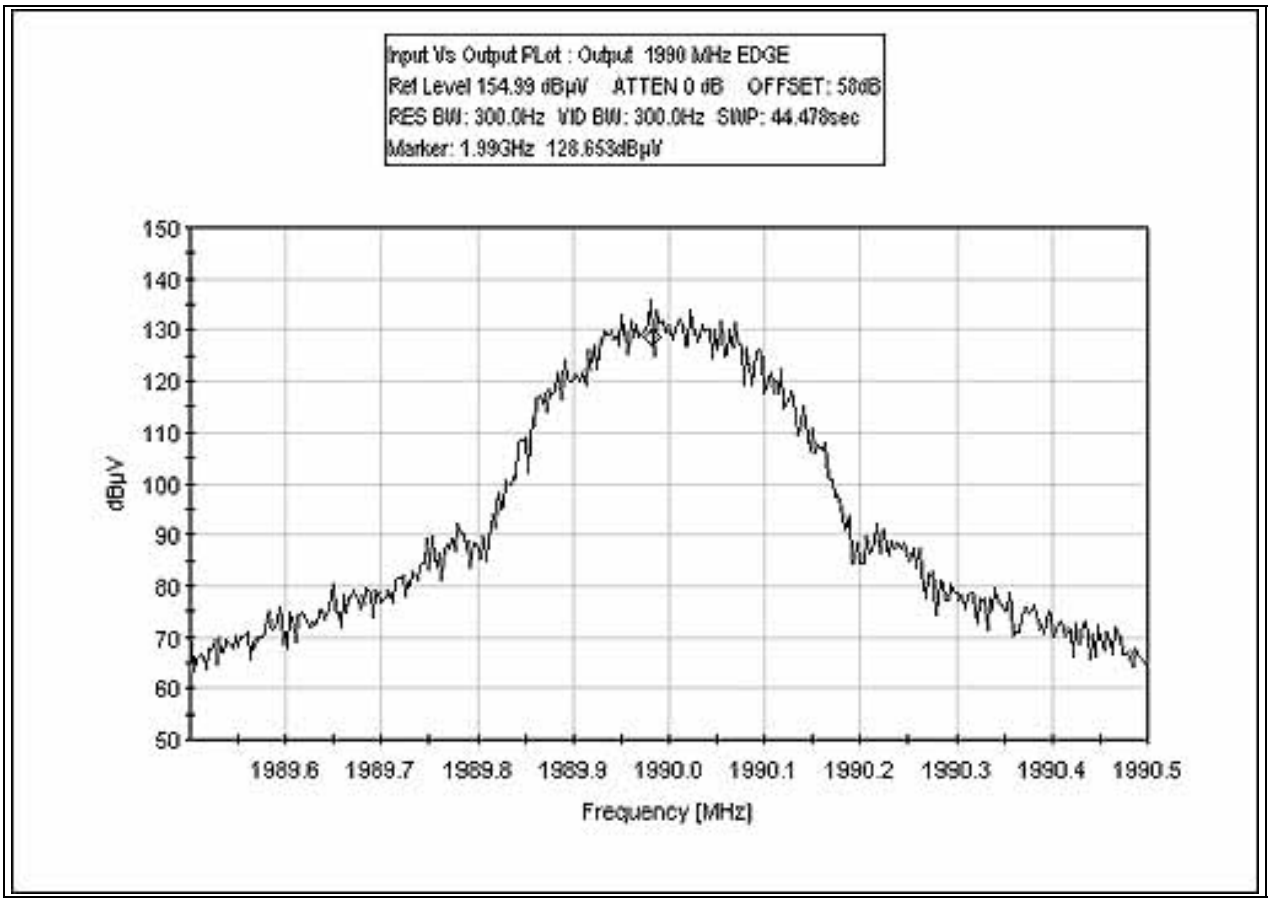
OUTPUT PLOT EDGE 1930 MHz



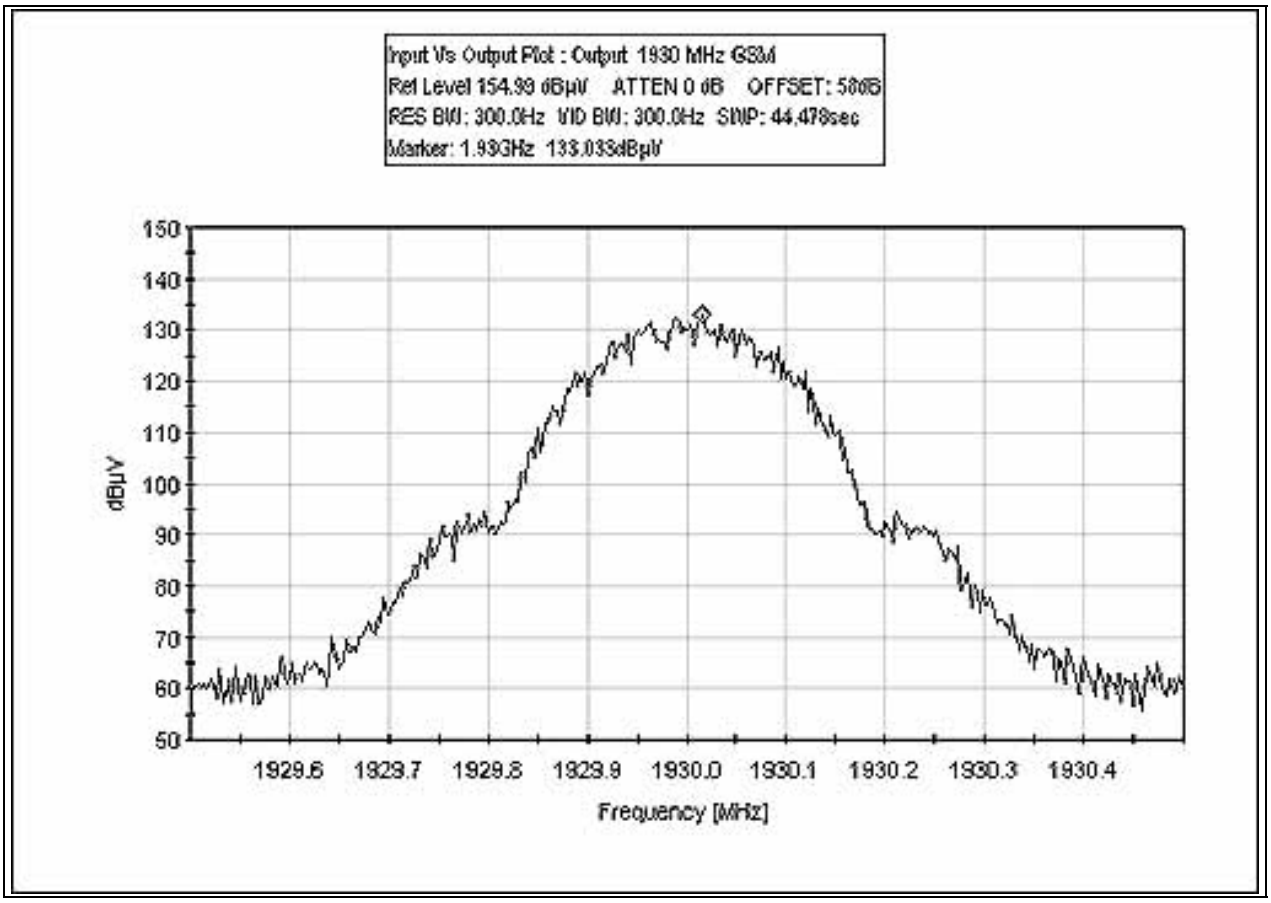
OUTPUT PLOT EDGE 1960 MHz



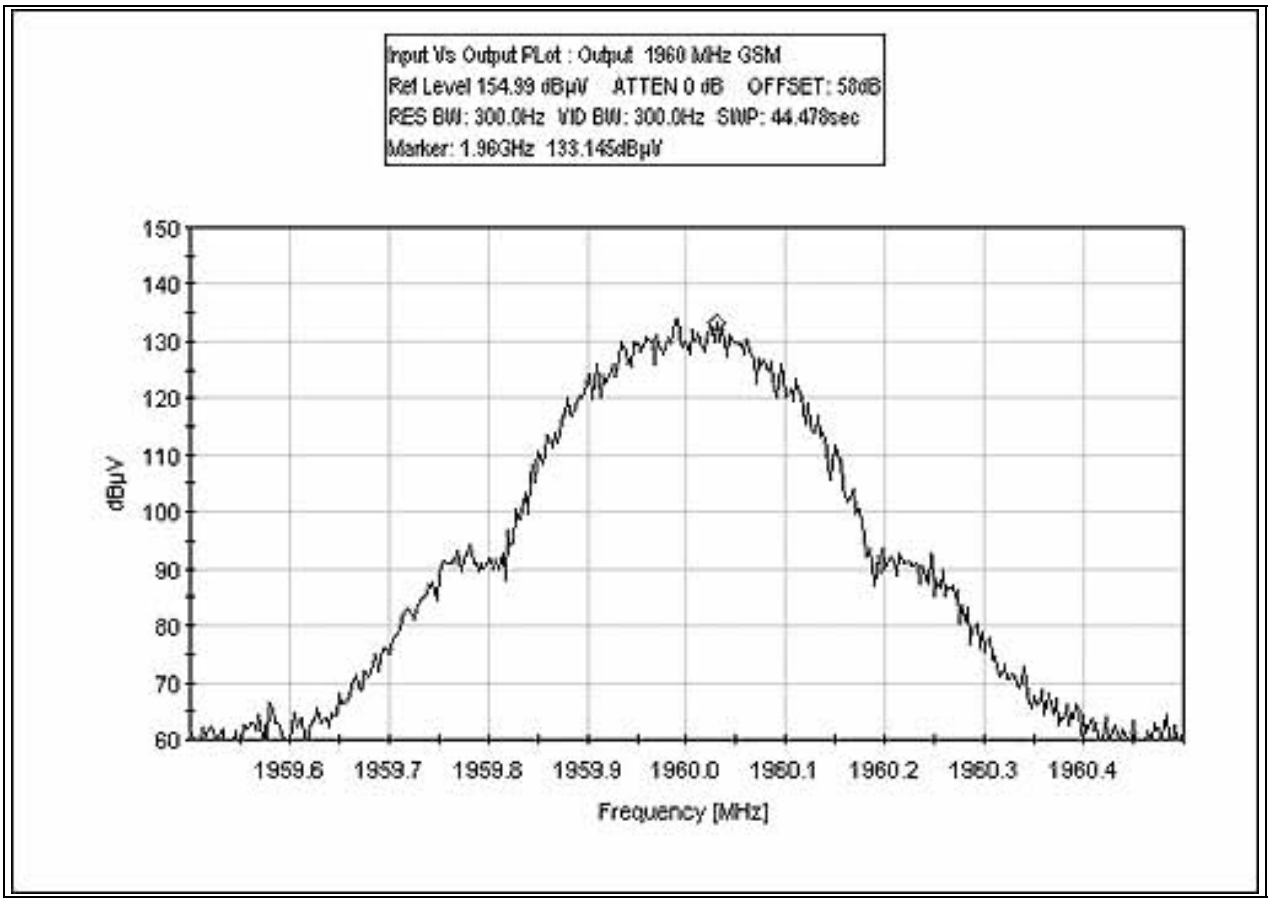
OUTPUT PLOT EDGE 1990 MHz



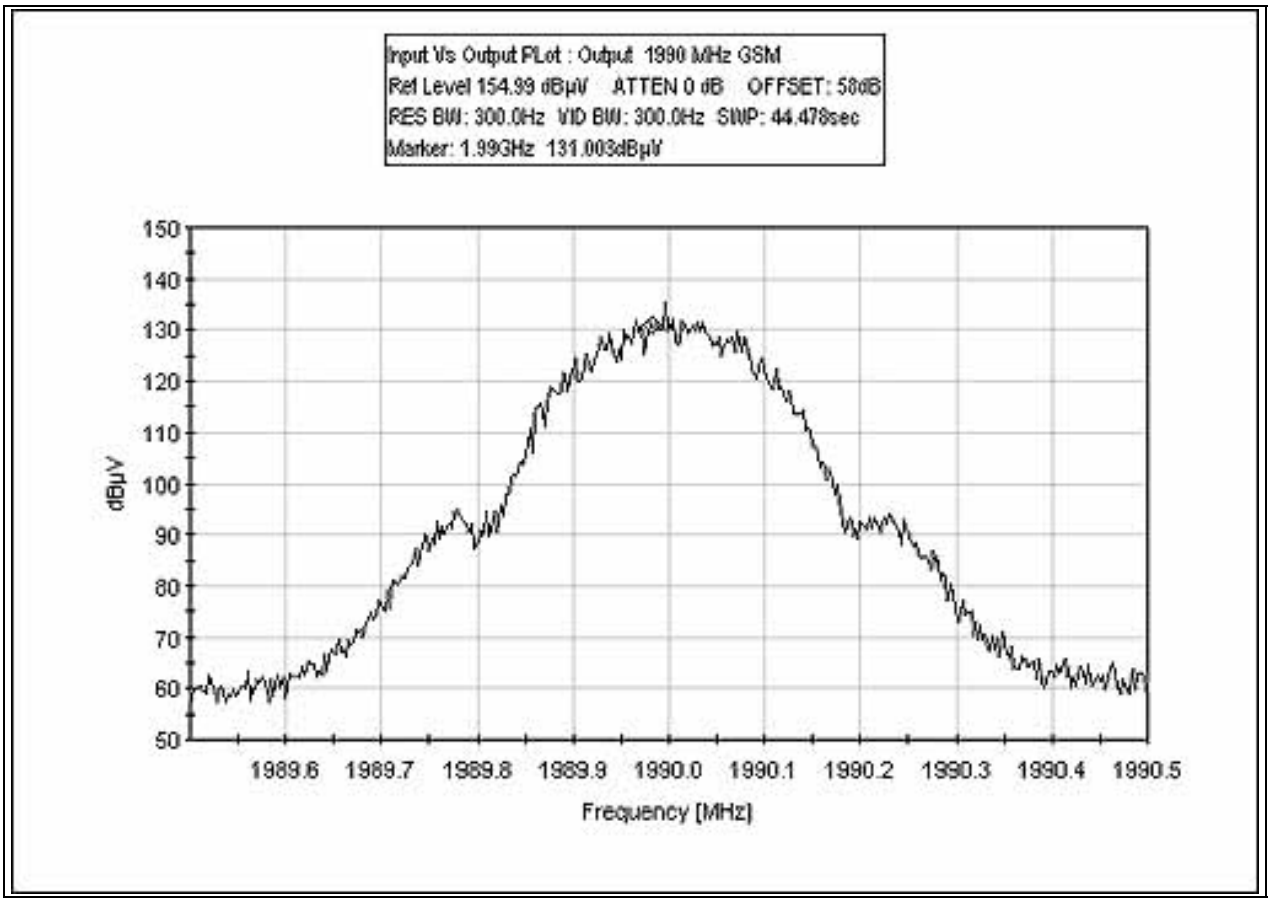
OUTPUT PLOT GSM 1930 MHz



OUTPUT PLOT GSM 1960 MHz



OUTPUT PLOT GSM 1990 MHz



Test Equipment

Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033104

2.1049 Occupied Bandwidth

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

Limit line for Spurious Conducted Emission

Required Attenuation = 43+10 Log P dB

Limit line (dBuV) = V_{dBuv} - Attenuation

V_{dBuV} = $20 \text{ Log } \frac{V}{1 \text{ x } 10^{-6}}$

= $20\left(\text{Log } V - \text{Log } 1 \text{ x } 10^{-6}\right)$

= $20 \text{ Log } V - 20 \text{ Log} 1 \text{ x } 10^{-6}$

= $20 \text{ Log } V - 20(-6)$

= $20 \text{ Log } V + 120$

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

= $43 + 10 \text{ Log } \frac{V^2}{R}$

= $43 + 10\left(\text{Log } V^2 - \text{Log } R\right)$

= $43 + 10\left(2 \text{ Log } V - \text{Log } R\right)$

= $43 + 20 \text{ Log } V - 10 \text{ Log } R$

Limit line = V_{dBuv} - Attenuation

= 20 Log V + 120 – (43 + 20 Log V – 10Log R)

= 20 Log V + 120 – 43 – 20 Log V + 10Log R

= 20 Log V + 120 – 43 – 20 Log V + 10Log R

= 120 – 43 + 10 Log 50 Note : R = 50 Ω

= 120 –43 + 16.897

= 94 dBuV at any power level

Test Location: CKC Laboratories Inc. •180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer:	**Powerwave Technologies**		
Specification:	**FCC 24.238 (a) Conducted Spurious Emission**		
Work Order #:	**81703**	Date:	01/15/2004
Test Type:	**Conducted Emissions**	Time:	13:50:13
Equipment:	**1900 MHz Single Channel RF Power Amplifier**	Sequence#:	3
Manufacturer:	Powerwave Technologies, Inc.	Tested By:	Eddie Wong
Model:	SPA9321-30C		48Vdc
S/N:	PWWT01DHV8PH		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
1900 MHz Single Channel RF Power Amplifier*	Powerwave Technologies, Inc.	SPA9321-30C	PWWT01DHV8PH

Support Devices:

Function	Manufacturer	Model #	S/N
Pre Amp	Comtech	PST	0231750
Signal Generator	Agilent	E4433B	US40051207
Power Meter	Agilent	E4419B	US395251692
DC Power Supply	Agilent	6674A	US35371847

Test Conditions / Notes:

The EUT is placed on the wooden table top. The EUT is a 1900 MHz Single Channel RF Power Amplifier. The RF input port is connected to a remotely located signal generator and pre-amplifier. The RF output port is connected to a directional coupler and power meter. 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 at 30 Watts. Frequency: 1930 MHz. Modulation :GSM. Required attenuation = -43+10Log(P)dB = 94 dBuV at antenna terminal. Frequency range of measurement = 9 kHz - 20 GHz. 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 - 20000 MHz; RBW=1 MHz, VBW=1 MHz. -48 VDC (from 220Vac/60Hz source), 20°C, 33% relative humidity.

Transducer Legend:

T1=HPF 2.4GHz High Pass 022004

Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	3860.000M Ave	91.3	+0.9				+0.0	92.2	94.0	-1.8	Anten
^	3860.000M	92.1	+0.9				+0.0	93.0	94.0	-1.0	Anten

Test Location: CKC Laboratories Inc. •180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer:	**Powerwave Technologies**		
Specification:	**FCC 24.238 (a) Conducted Spurious Emission**		
Work Order #:	**81703**	Date:	01/15/2004
Test Type:	**Conducted Emissions**	Time:	13:29:18
Equipment:	**1900 MHz Single Channel RF Power Amplifier**	Sequence#:	2
Manufacturer:	Powerwave Technologies, Inc.	Tested By:	Eddie Wong
Model:	SPA9321-30C		48Vdc
S/N:	PWWT01DHV8PH		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
1900 MHz Single Channel RF Power Amplifier*	Powerwave Technologies, Inc.	SPA9321-30C	PWWT01DHV8PH

Support Devices:

Function	Manufacturer	Model #	S/N
Pre Amp	Comtech	PST	0231750
Signal Generator	Agilent	E4433B	US40051207
Power Meter	Agilent	E4419B	US395251692
DC Power Supply	Agilent	6674A	US35371847

Test Conditions / Notes:

The EUT is placed on the wooden table top. The EUT is a 1900 MHz Single Channel RF Power Amplifier. The RF input port is connected to a remotely located signal generator and pre-amplifier. The RF output port is connected to a directional coupler and power meter. 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 at 30 Watts. Frequency: 1930 MHz. Modulation: EDGE. Required attenuation = -43+10Log(P)dB = 94 dBuV at antenna terminal. Frequency range of measurement = 9 kHz - 20 GHz. 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 - 20000 MHz; RBW=1 MHz, VBW=1 MHz. -48 VDC (from 220Vac/60Hz source), 20°C, 33% relative humidity.

Transducer Legend:

T1=HPF 2.4GHz High Pass 022004

Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	3860.020M Ave	90.8	+0.9				+0.0	91.7	94.0	-2.3	Anten
^	3860.020M	98.3	+0.9				+0.0	99.2	94.0	+5.2	Anten
3	5790.000M	73.8	+1.4				+0.0	75.2	94.0	-18.8	Anten

Test Location: CKC Laboratories Inc. •180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer:	**Powerwave Technologies**		
Specification:	**FCC 24.238 (a) Conducted Spurious Emission**		
Work Order #:	**81703**	Date:	01/15/2004
Test Type:	**Conducted Emissions**	Time:	14:07:57
Equipment:	**1900 MHz Single Channel RF Power Amplifier**	Sequence#:	4
Manufacturer:	Powerwave Technologies, Inc.	Tested By:	Eddie Wong
Model:	SPA9321-30C		48Vdc
S/N:	PWWT01DHV8PH		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
1900 MHz Single Channel RF Power Amplifier*	Powerwave Technologies, Inc.	SPA9321-30C	PWWT01DHV8PH

Support Devices:

Function	Manufacturer	Model #	S/N
Pre Amp	Comtech	PST	0231750
Signal Generator	Agilent	E4433B	US40051207
Power Meter	Agilent	E4419B	US395251692
DC Power Supply	Agilent	6674A	US35371847

Test Conditions / Notes:

The EUT is placed on the wooden table top. The EUT is a 1900 MHz Single Channel RF Power Amplifier. The RF input port is connected to a remotely located signal generator and pre-amplifier. The RF output port is connected to a directional coupler and power meter. 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 at 30 Watts. Frequency: 1960 MHz. Modulation: EDGE. Required attenuation = -43+10Log(P)dB = 94 dBuV at antenna terminal. Frequency range of measurement = 9 kHz - 20 GHz. 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 - 20000 MHz; RBW=1 MHz, VBW=1 MHz. -48 VDC (from 220Vac/60Hz source), 20°C, 33% relative humidity.

Transducer Legend:

T1=HPF 2.4GHz High Pass 022004

Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	3920.000M Ave	90.4	+0.8				+0.0	91.2	94.0	-2.8	Anten
^	3920.000M	95.2	+0.8				+0.0	96.0	94.0	+2.0	Anten
3	5880.000M	77.1	+1.0				+0.0	78.1	94.0	-15.9	Anten

Test Location: CKC Laboratories Inc. •180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer:	**Powerwave Technologies**		
Specification:	**FCC 24.238 (a) Conducted Spurious Emission**		
Work Order #:	**81703**	Date:	01/15/2004
Test Type:	**Conducted Emissions**	Time:	14:27:40
Equipment:	**1900 MHz Single Channel RF Power Amplifier**	Sequence#:	5
Manufacturer:	Powerwave Technologies, Inc.	Tested By:	Eddie Wong
Model:	SPA9321-30C		48Vdc
S/N:	PWWT01DHV8PH		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
1900 MHz Single Channel RF Power Amplifier*	Powerwave Technologies, Inc.	SPA9321-30C	PWWT01DHV8PH

Support Devices:

Function	Manufacturer	Model #	S/N
Pre Amp	Comtech	PST	0231750
Signal Generator	Agilent	E4433B	US40051207
Power Meter	Agilent	E4419B	US395251692
DC Power Supply	Agilent	6674A	US35371847

Test Conditions / Notes:

The EUT is placed on the wooden table top. The EUT is a 1900 MHz Single Channel RF Power Amplifier. The RF input port is connected to a remotely located signal generator and pre-amplifier. The RF output port is connected to a directional coupler and power meter. 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 at 30 Watts. Frequency : 1960 MHz. Modulation: GSM. Required attenuation = -43+10Log(P)dB = 94 dBuV at antenna terminal. Frequency range of measurement = 9 kHz - 20 GHz. 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 - 20000 MHz; RBW=1 MHz, VBW=1 MHz. -48 VDC (from 220Vac/60Hz source), 20°C, 33% relative humidity.

Transducer Legend:

T1=HPF 2.4GHz High Pass 022004

Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	3920.000M Ave	91.9	+0.8				+0.0	92.7	94.0	-1.3	Anten
^	3920.000M	92.6	+0.8				+0.0	93.4	94.0	-0.6	Anten
3	5880.000M	71.0	+1.0				+0.0	72.0	94.0	-22.0	Anten

Test Location: CKC Laboratories Inc. •180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer:	**Powerwave Technologies**		
Specification:	**FCC 24.238 (a) Conducted Spurious Emission**		
Work Order #:	**81703**	Date:	01/15/2004
Test Type:	**Conducted Emissions**	Time:	14:43:03
Equipment:	**1900 MHz Single Channel RF Power Amplifier**	Sequence#:	6
Manufacturer:	Powerwave Technologies, Inc.	Tested By:	Eddie Wong
Model:	SPA9321-30C		48Vdc
S/N:	PWWT01DHV8PH		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
1900 MHz Single Channel RF Power Amplifier*	Powerwave Technologies, Inc.	SPA9321-30C	PWWT01DHV8PH

Support Devices:

Function	Manufacturer	Model #	S/N
Pre Amp	Comtech	PST	0231750
Signal Generator	Agilent	E4433B	US40051207
Power Meter	Agilent	E4419B	US395251692
DC Power Supply	Agilent	6674A	US35371847

Test Conditions / Notes:

The EUT is placed on the wooden table top. The EUT is a 1900 MHz Single Channel RF Power Amplifier. The RF input port is connected to a remotely located signal generator and pre-amplifier. The RF output port is connected to a directional coupler and power meter. 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 at 30 Watts. Frequency : 1990 MHz. Modulation: EDGE. Required attenuation = -43+10Log(P)dB = 94 dBuV at antenna terminal. Frequency range of measurement = 9 kHz - 20 GHz. 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 - 20000 MHz; RBW=1 MHz, VBW=1 MHz. -48 VDC (from 220Vac/60Hz source), 20°C, 33% relative humidity.

Transducer Legend:

T1=HPF 2.4GHz High Pass 022004

Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	3980.020M Ave	88.2	+0.3				+0.0	88.5	94.0	-5.5	Anten
^	3980.020M	92.4	+0.3				+0.0	92.7	94.0	-1.3	Anten
3	5970.000M	73.3	+0.6				+0.0	73.9	94.0	-20.1	Anten

Test Location: CKC Laboratories Inc. •180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer:	**Powerwave Technologies**		
Specification:	**FCC 24.238 (a) Conducted Spurious Emission**		
Work Order #:	**81703**	Date:	01/15/2004
Test Type:	**Conducted Emissions**	Time:	14:48:00
Equipment:	**1900 MHz Single Channel RF Power Amplifier**	Sequence#:	7
Manufacturer:	Powerwave Technologies, Inc.	Tested By:	Eddie Wong
Model:	SPA9321-30C		48Vdc
S/N:	PWWT01DHV8PH		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
1900 MHz Single Channel RF Power Amplifier*	Powerwave Technologies, Inc.	SPA9321-30C	PWWT01DHV8PH

Support Devices:

Function	Manufacturer	Model #	S/N
Pre Amp	Comtech	PST	0231750
Signal Generator	Agilent	E4433B	US40051207
Power Meter	Agilent	E4419B	US395251692
DC Power Supply	Agilent	6674A	US35371847

Test Conditions / Notes:

The EUT is placed on the wooden table top. The EUT is a 1900 MHz Single Channel RF Power Amplifier. The RF input port is connected to a remotely located signal generator and pre-amplifier. The RF output port is connected to a directional coupler and power meter. 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 at 30 Watts. Frequency : 1990 MHz. Modulation: GSM. Required attenuation = -43+10Log(P)dB = 94 dBuV at antenna terminal. Frequency range of measurement = 9 kHz - 20 GHz. 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 - 20000 MHz; RBW=1 MHz, VBW=1 MHz. -48 VDC (from 220Vac/60Hz source), 20°C, 33% relative humidity.

Transducer Legend:

T1=HPF 2.4GHz High Pass 022004

Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	3980.000M Ave	89.7	+0.3				+0.0	90.0	94.0	-4.0	Anten
^	3980.000M	90.5	+0.3				+0.0	90.8	94.0	-3.2	Anten
3	5970.300M	70.4	+0.6				+0.0	71.0	94.0	-23.0	Anten

Test Equipment

2.4 GHz HPF	01440	K&L	91H31-3000	001	022003	022004
Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033104

24.238(a) Conducted Spurious Emissions

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

Operating Frequency: 1930 MHz - 1990 MHz
Channels:
Highest Measured Output Power: 44.77 (dBm)= 30 (Watts)
Distance: 3 meters
Limit: 43+10Log(P) 57.77 dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
3,860.00	-18.6	Horiz	63.37
3,860.03	-16.70	Vert	61.47
5,790.00	-26.00	Vert	70.77
5,790.00	-31.50	Horiz	76.27
5,880.00	-18.20	Vert	62.97
3,920.00	-18.70	Horiz	63.47
3,920.00	-22.10	Vert	66.87
3,920.00	-16.90	Vert	61.67
5,880.00	-27.40	Horiz	72.17
3,980.00	-22.90	Vert	67.67
3,980.00	-16.40	Vert	61.17
3,980.00	-23.10	Horiz	67.87
3,980.00	-17.00	Horiz	61.77
5,970.00	-32.10	Vert	76.87
5,970.00	-39.10	Horiz	83.87

Test Conditions:

The EUT is placed on the wooden table top. The EUT is a 1900 MHz Single Channel RF Power Amplifier. The RF input port is connected to a remotely located signal generator and pre-amplifier. The RF output port is connected to a directional coupler and power meter. 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 at 30 Watts. Frequency : 1930 MHz, 1960 MHz and 1990 MHz. Modulation :EDGE. Required attenuation = -43+10Log(P)dB = 82.3dBuV/m at 3 meters. Frequency range of measurement = 9 kHz - 20 GHz. 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 - 20000 MHz; RBW=1 MHz, VBW=1 MHz. -48 VDC (from 220Vac/60Hz source), 20°C, 33% relative humidity.

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer RF Section	02462	HP	8568B	2928A04874	031103	031104
Spectrum Analyzer Display Section	02472	HP	85662A	3001A18430	031103	031104
QP Adapter	01437	HP	85650A	3303A01884	092702	092704
Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033104
24.238(a) Radiated Spur Emission 9kHz-30MHz						
Loop Antenna	00314	EMCO	6502	2014	072302	072304
24.238(a) Radiated Spur Emission 30-1000MHz						
Bicon Antenna	306	AH	SAS200/540	220	092302	092304
Log Periodic Antenna	300	AH	SAS 00/516	331	092302	092304
Pre-amp	00309	HP	8447D	1937A02548	082303	082304
Antenna cable	NA	NA	RG214	Cable#15	123002	123003
Pre-amp to SA cable	NA	Harbour	RG223/U	Cable#10	070802	070804
24.238(a) Radiated Spur Emission 1-18GHz						
Horn Antenna	0849	EMCO	3115	6246	091002	091004
Microwave Pre-amp	00786	HP	83017A	3123A00281	091102	091104
Heliax Antenna cable	NA	Andrew	LDF1-50	Cable#20	101303	101304
SMA Cable	1403	Simflex	5878-23	0038	012103	012104
2.4 GHz HPF	01440	K&L	91H31-3000	001	022003	022004
24.238(a) Radiated Spur Emission 18-20 GHz						
2.4 GHz HPF	01440	K&L	91H31-3000	001	022003	022004
Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033104
SMA Cable	1403	Simflex	5878-23	0038	012103	012104
Horn Antenna	2112	HP	84125-80008	3643A00027	070103	070105

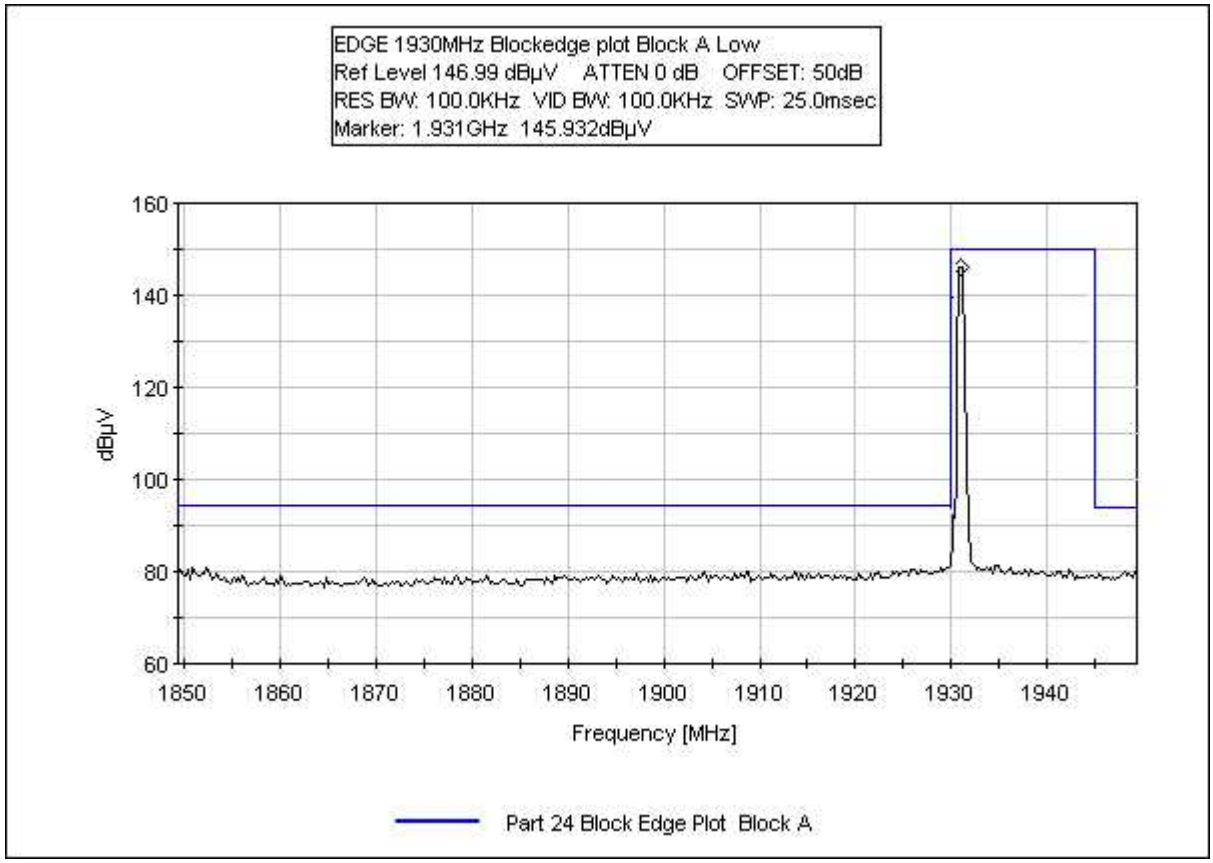
24.238(a) Radiated Spurious Emissions 9 kHz - 30 MHz

24.238(a) Radiated Spurious Emissions - Front View

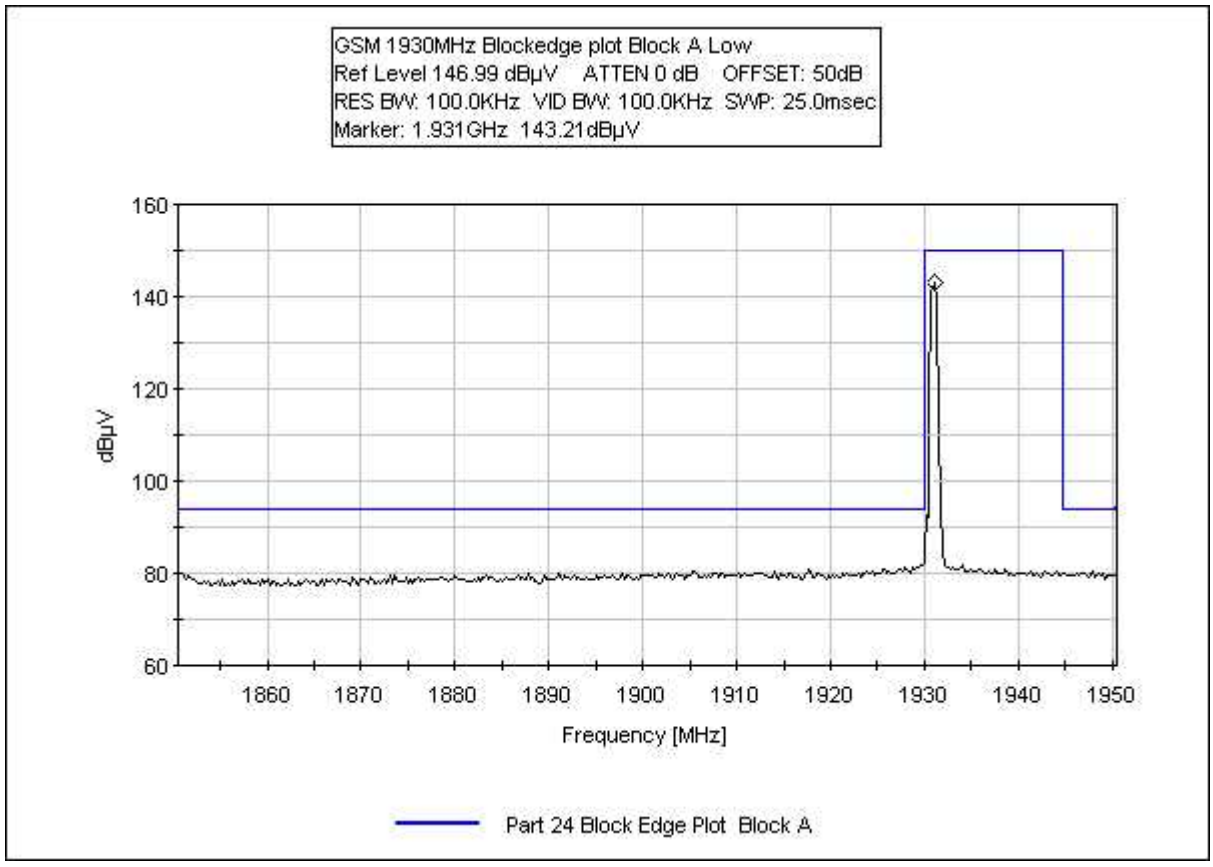
24.238(a) Radiated Spurious Emissions - Back View

24.238(a) Radiated Spurious Emissions 18-20 GHz

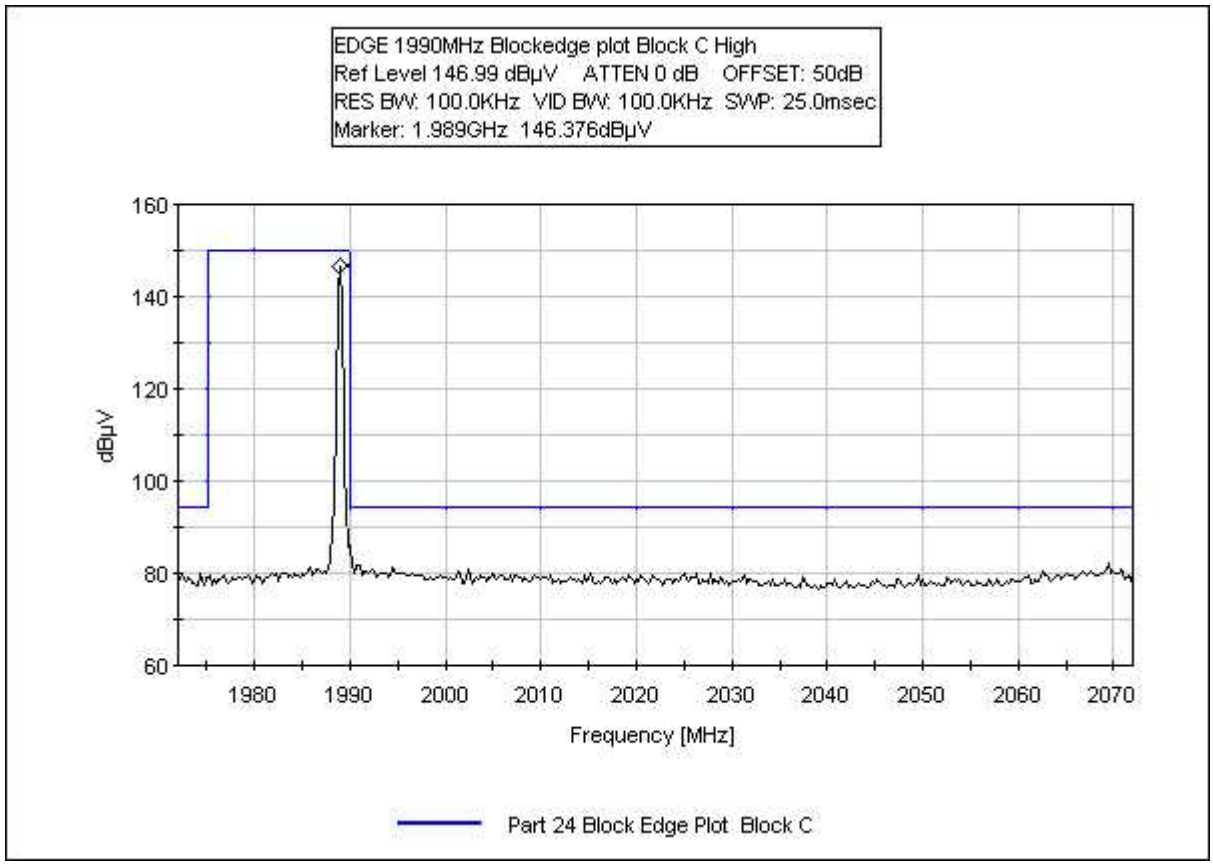
BLOCKEDGE EDGE 1930 MHz BLOCK A LOW



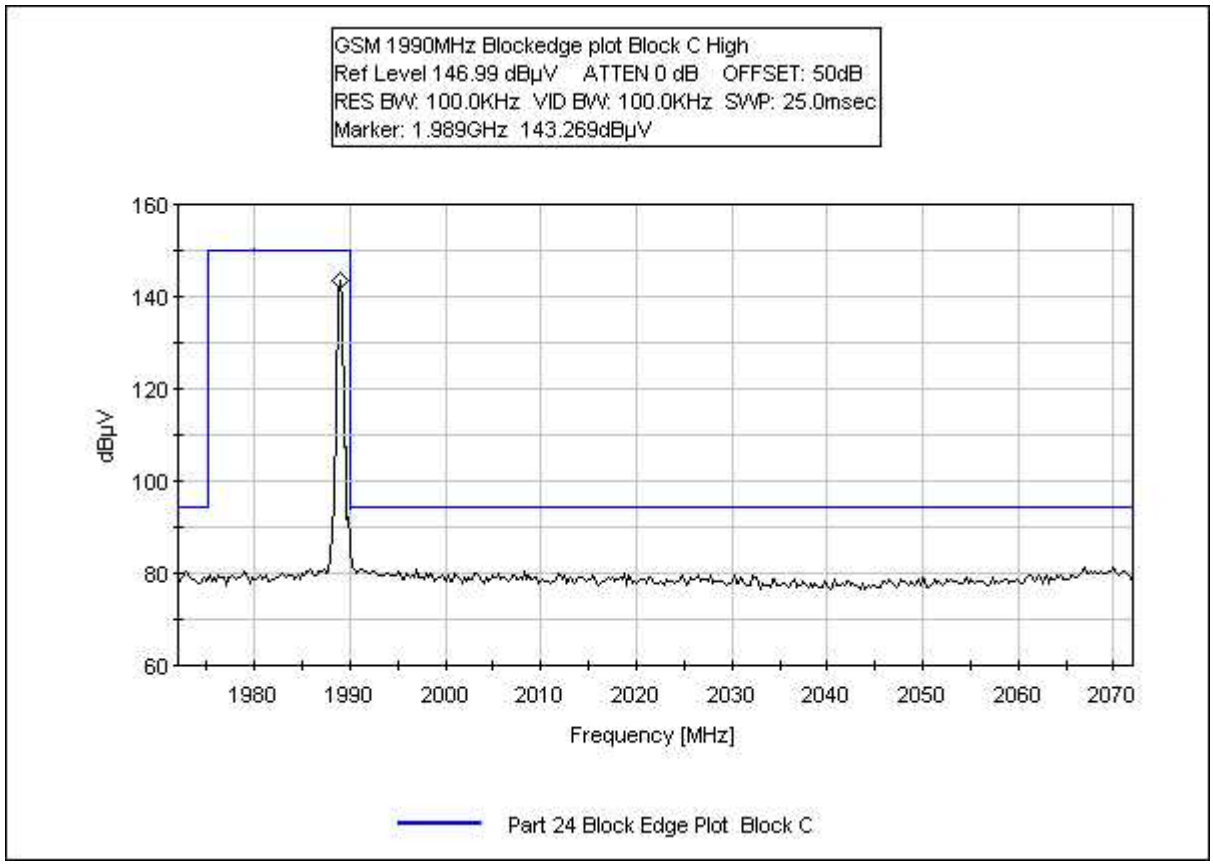
BLOCKEDGE GSM 1930 MHz BLOCK A LOW



BLOCKEDGE EDGE 1990 MHz BLOCK C HIGH



BLOCKEDGE GSM 1990 MHz BLOCK C HIGH

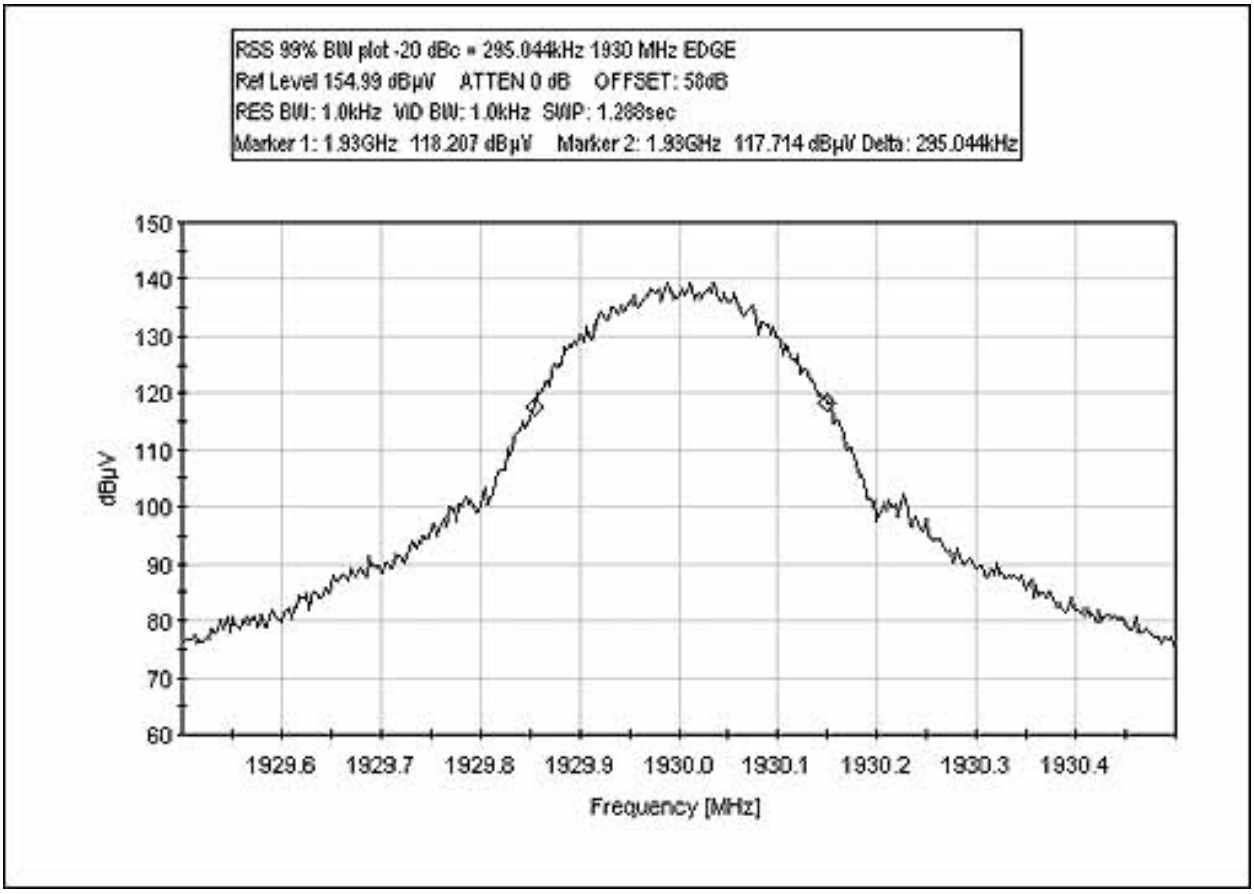


Test Equipment

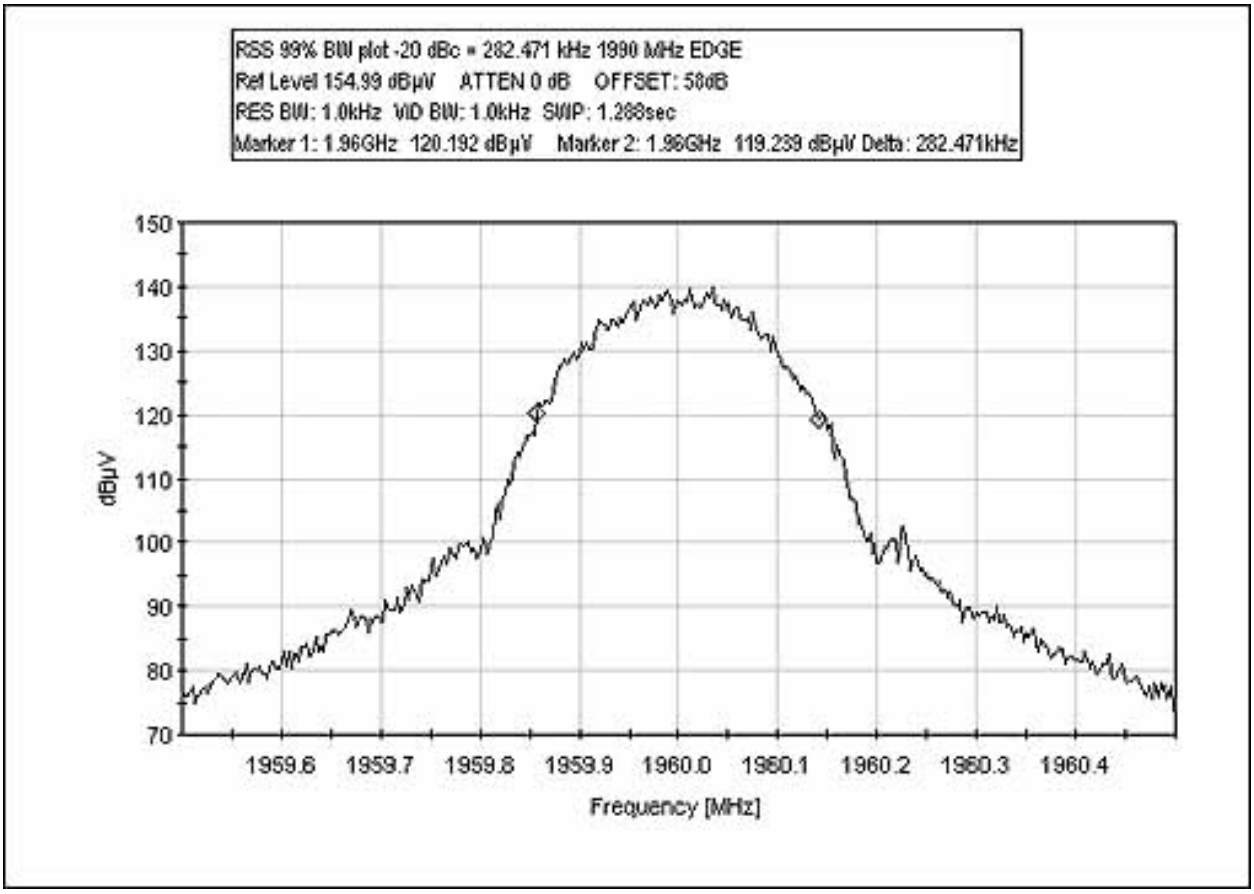
Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033105

Bandedge

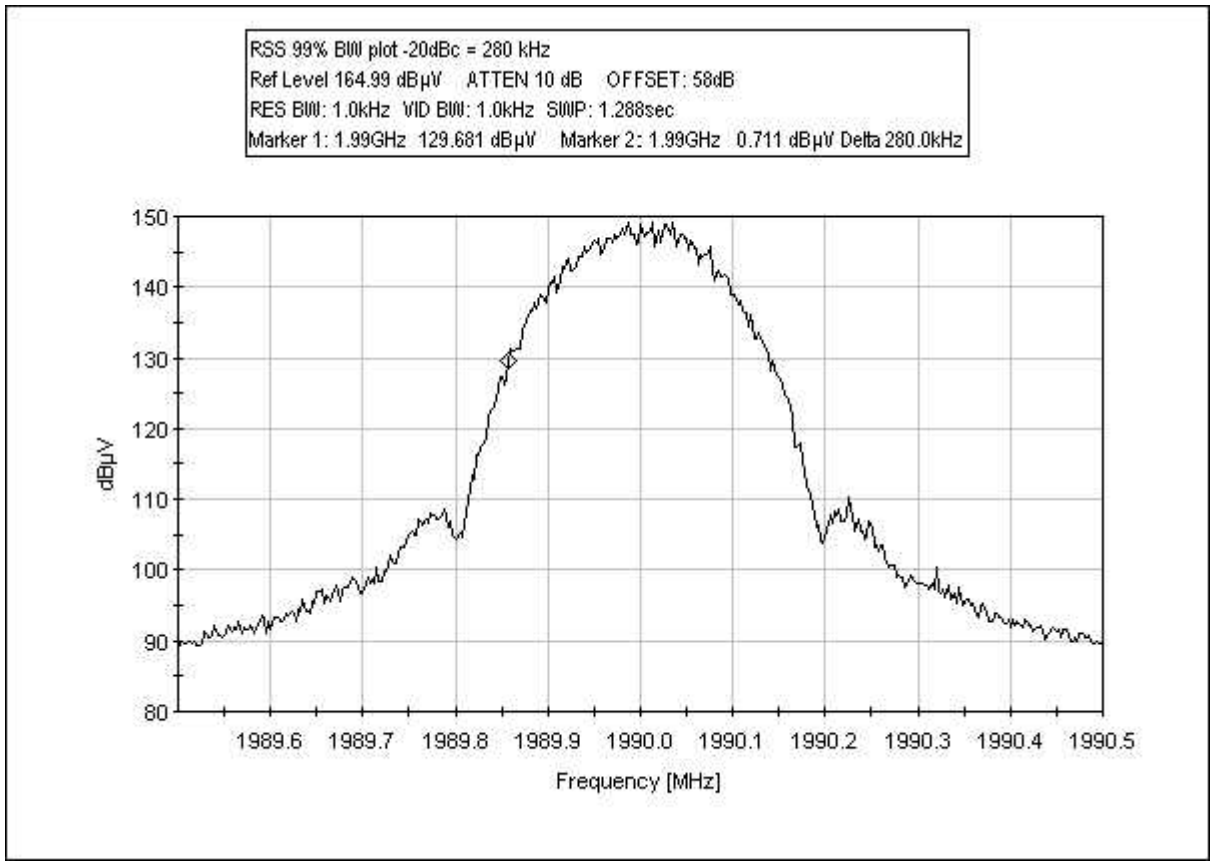
99% BANDWIDTH PLOT EDGE 1930 MHz



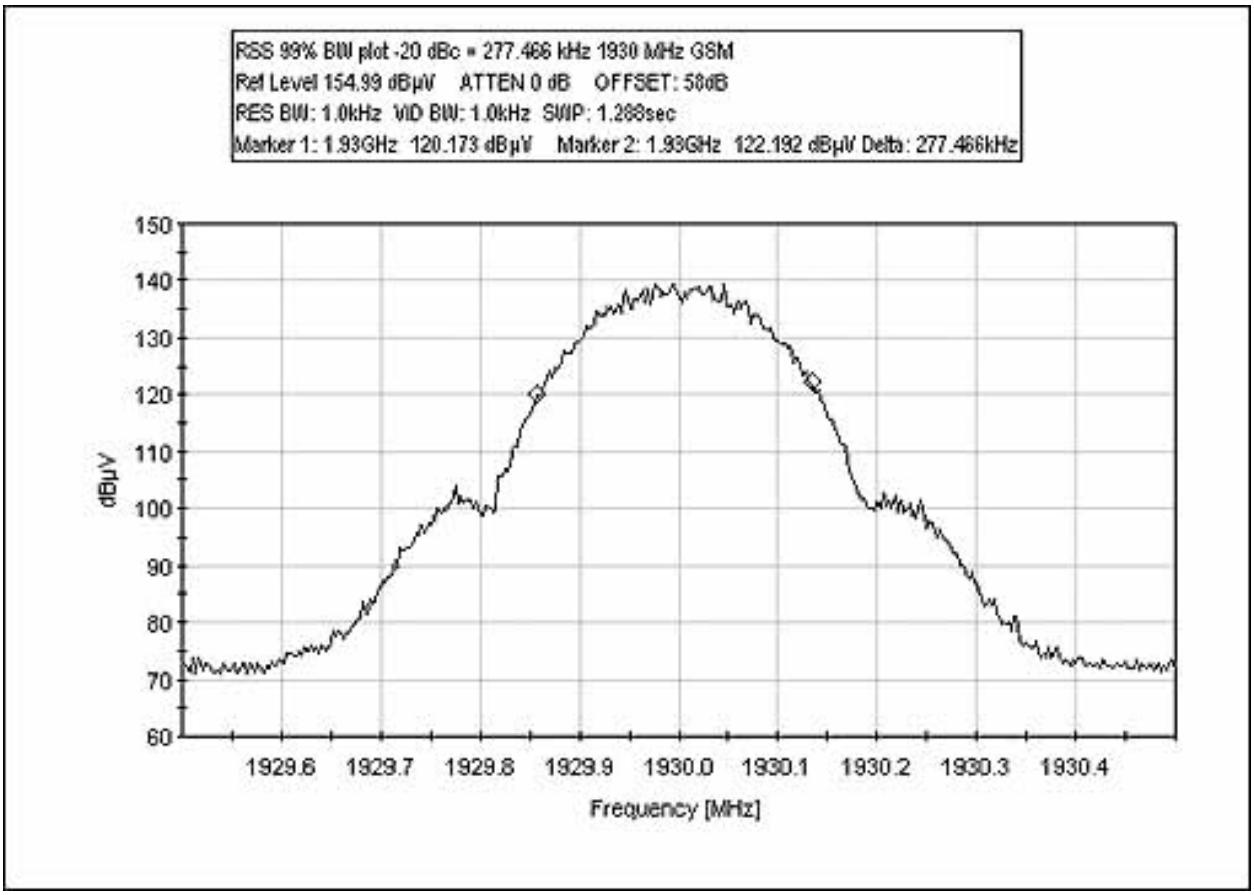
99% BANDWIDTH PLOT EDGE 1960 MHz



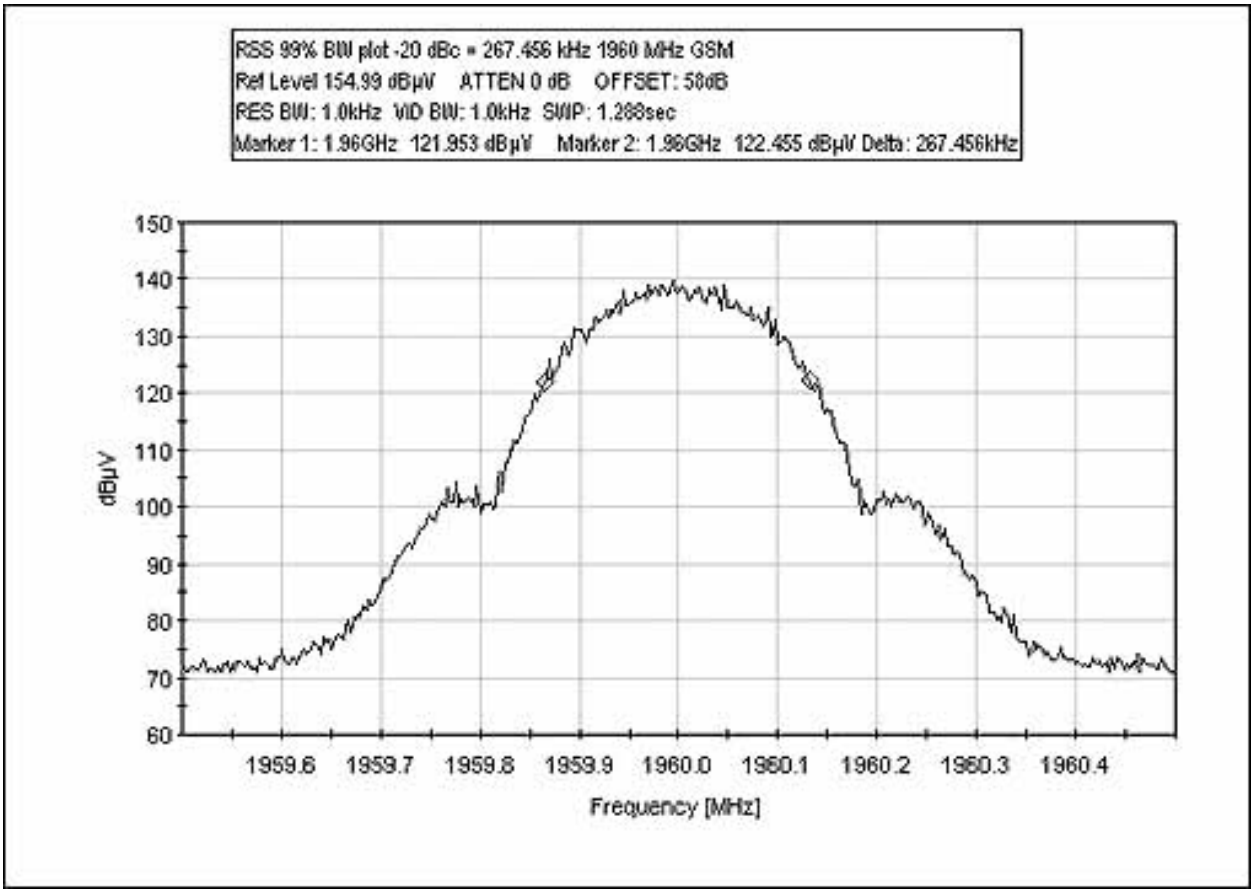
99% BANDWIDTH PLOT EDGE 1990 MHz



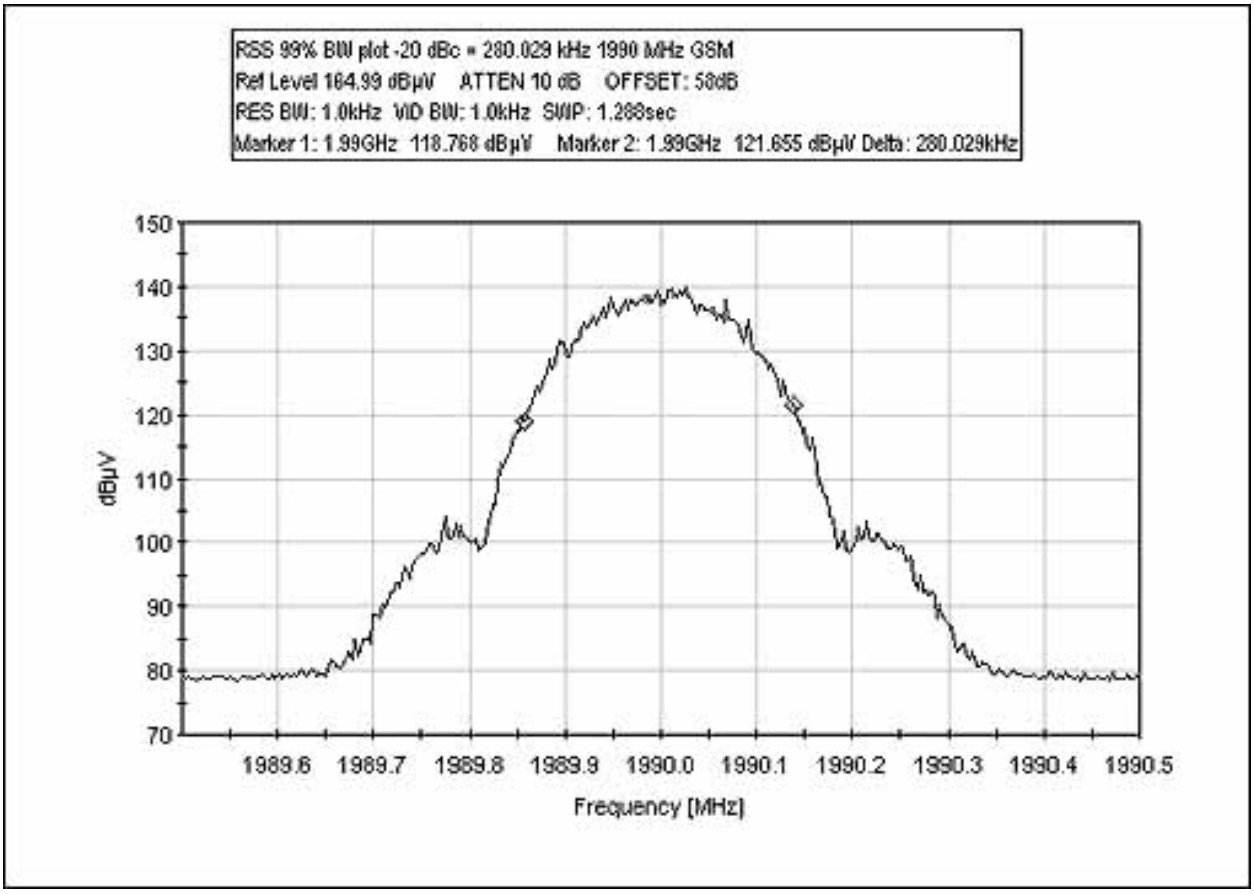
99% BANDWIDTH PLOT GSM 1930 MHz



99% BANDWIDTH PLOT GSM 1960 MHz



99% BANDWIDTH PLOT GSM 1990 MHz

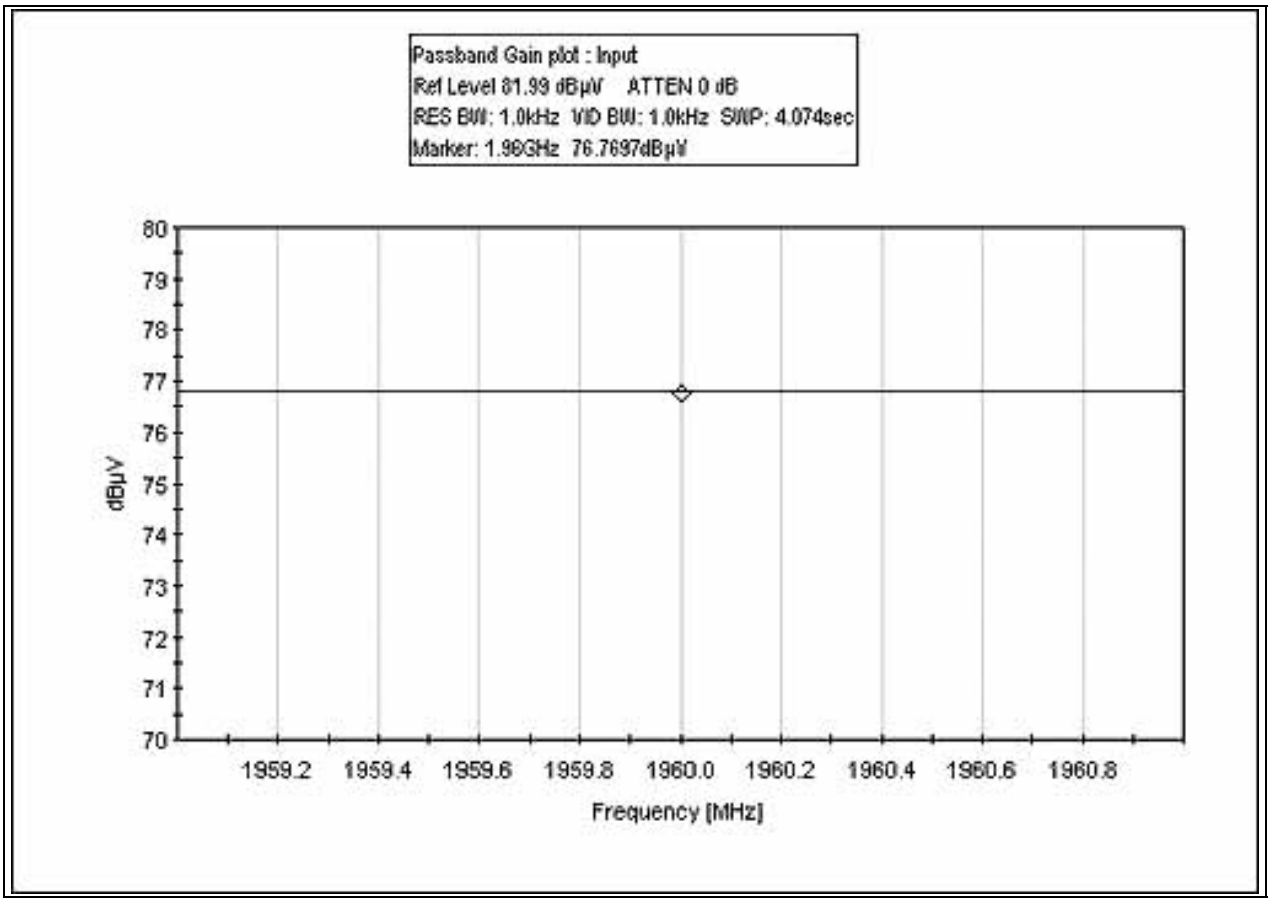


Test Equipment

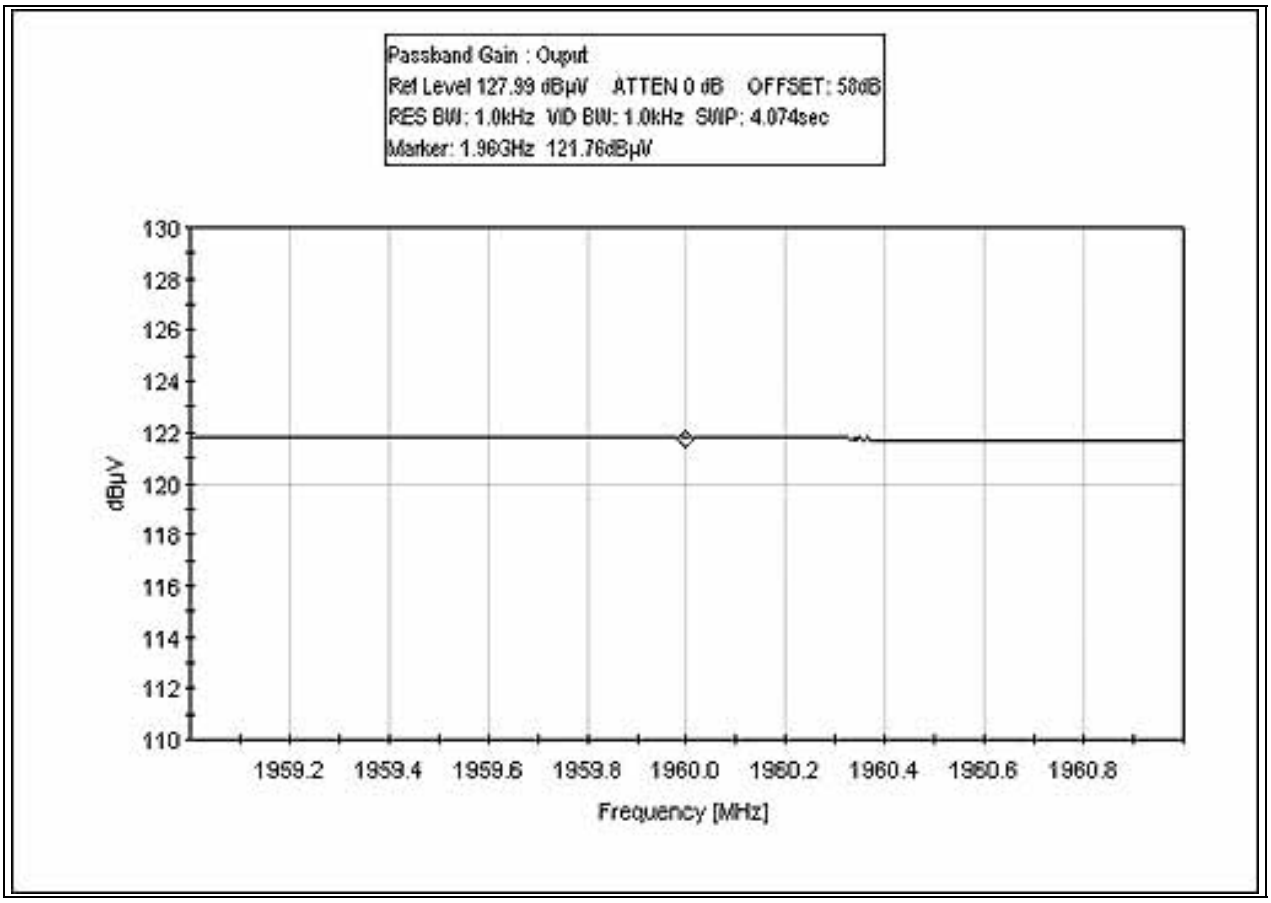
Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033105

PHOTOGRAPH SHOWING 99% BANDWIDTH

PASSBAND GAIN INPUT PLOT



PASSBAND GAIN OUTPUT PLOT



Test Equipment

Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033105

PHOTOGRAPH SHOWING PASSBAND GAIN