



POWERWAVE TECHNOLOGIES, INC. TEST REPORT

FOR THE

REPEATER, RH004002/000

FCC PART 22 AND RSS-131

COMPLIANCE

DATE OF ISSUE: APRIL 11, 2007

PREPARED FOR:

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

P.O. No.: 112376
W.O. No.: 86394

PREPARED BY:

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5046 Sierra Pines Drive
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Date of test: March 27 – April 5, 2007

Report No.: FC07-025

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ADMINISTRATIVE INFORMATION

DATE OF TEST: March 27 – April 5, 2007

DATE OF RECEIPT: March 27, 2007

FREQUENCY RANGE TESTED: 9 kHz-10 GHz

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

REPRESENTATIVE: Charolette Yu

TEST LOCATION: CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

TEST METHOD: FCC Part 22, RSS-131 and RSS GEN

PURPOSE OF TEST: To demonstrate the compliance of the Repeater, RH004002/000 with the requirements for FCC Part 22 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	N/A	N/A	RF Power Output
N/A	N/A	47 CFR	22.913	RF Power Output
RSS 131	6.3	TIA/EIA	603	Non-Linearity (Intermodulation Attenuation)
RSS 131	6.4	47 CFR	22.917	Spurious Emissions Limitations
RSS 131	6.5	N/A	N/A	Frequency Stability (Band Translators)
	3172-A		90473	Site File No.

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.



EQUIPMENT UNDER TEST (EUT) DESCRIPTION

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

The following model was tested by CKC Laboratories: **RH304022/100**

Since the time of testing the manufacturer has chosen to use the following model name in its place. 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: **RH004002/000**

EQUIPMENT UNDER TEST

Repeater

Manuf: Powerwave Technologies, Inc.
Model: RH004002/000
Serial: NA
FCC ID: E675JS0091 (pending)
IC ID: 2868C-5JS0091 (pending)

PERIPHERAL DEVICES

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

Optical Converter

Manuf: Powerwave Technologies, Inc.
Model: NA
Serial: 42473

Spectrum Analyzer

Manuf: HP
Model: 8563E
Serial: NA

Power Meter

Manuf: Agilent
Model: E4419B
Serial: MY40510694

ESG

Manuf: Agilent
Model: E4433B
Serial: US40051840

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

G7W, F9W

FCC 2.1033 (c)(5) FREQUENCY RANGE

869-894 MHz.

FCC 2.1033 (c)(6) OPERATING POWER

20 watts.

FCC 2.1033 (c)(7) MAXIMUM POWER RATING

500 Watts.

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

EDGE, WCDMA

FCC 2.1033(c)(14)/2.1046/22.913(a) - 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

22.913(a) RF Power Output:
Effective radiated power limits

- (a) Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

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 is below 500 watts.

Test Conditions: The EUT is placed on the wooden table. The RF Output port is connected to a power meter. Optical in port is connected to a support optical converter. The support optical converter receives a RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal is measured at the antenna port.

EDGE	dBm	Watts
869MHz	43	20
882MHz	43	20
894MHz	43	20
WCDMA		
869MHz	43	20
882MHz	43	20
894MHz	43	20

Conclusion: As indicated above, each single channel does not exceed the 500 Watt peak power limit.

RSS-131 - RF POWER OUTPUT

Test Equipment

Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309

Test Setup Photos



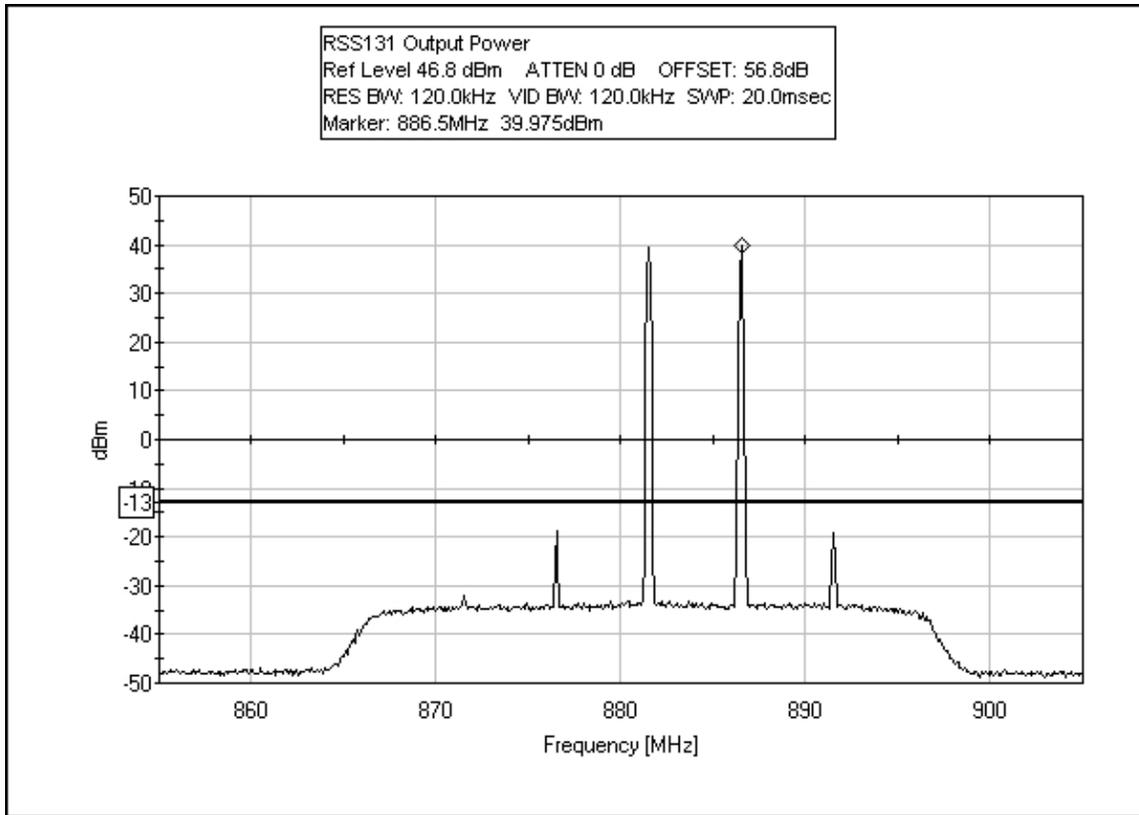
Test Conditions: The EUT is a RF amplifier. The manufacturer does not provide an antenna for sale with the product, hence EIRP is not measured nor calculated. The RF power of the EUT was measured at the antenna port in accordance with **RSS 131, 4.3.1** requirement.

Measured Po1 =+ 40. dBm

$$P \text{ mean} = P_{o1} + 3 \text{ dB} = 40 + 3 \text{ dBm} = 43 \text{ dBm} = 20 \text{ W}$$

Note: With protection circuits, the EUT did not enter inter-modulation mode at designated power level.

4.3 Mean Output power.



FCC 2.1033(c)(14)/2.1051/22.917(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINAL

Test Setup Photos



Limit line for Spurious Conducted Emission

Required Attenuation = 43+10 Log P dB

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

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

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

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



Test Data Sheets

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

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC Part 22.917(a) Conducted Spurious Emission**
 Work Order #: **86394** Date: 4/5/2007
 Test Type: **Conducted Emissions** Time: 11:47:43
 Equipment: **Repeater** Sequence#: 4
 Manufacturer: Powerwave Technologies, Inc. Tested By: E. Wong
 Model: RH304022/100 110V 60Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
1.5 GHz HPF	3643A00027	06/27/2005	06/27/2007	02116
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
24" SMA Cable	1-40GHz_white	02/16/2007	02/16/2009	P05204

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Repeater*	Powerwave Technologies, Inc.	RH304022/100	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Optical Converter	Powerwave Technologies, Inc.	NA	42473
Spectrum Analyzer	HP	8563E	NA
Power Meter	Agilent	E4419B	MY40510694
ESG	Agilent	E4433B	US40051840

Test Conditions / Notes:

The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives a RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port. Power = 20 watts, Frequency = 869 MHz. Modulation: EDGE. 18°C, 53% relative humidity. Frequency range of measurement = 9 kHz - 10 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 - 10,000 MHz RBW=1 MHz, VBW=1 MHz.

Transducer Legend:

T1=SMA-cable_W_05204-021609-26GHz	T2=HPF_AN02116_1.5GHz_062707
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Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist dB	Corr dB	Spec dBμV/m	Margin dB	Polar Ant
1	2646.000M	83.8	+1.9	+0.6	+0.0	86.3	94.0	-7.7	Anten
2	3476.017M	73.7	+2.2	+0.6	+0.0	76.5	94.0	-17.5	Anten
3	1738.300M	71.6	+1.4	+0.6	+0.0	73.6	94.0	-20.4	Anten



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

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC Part 22.917(a) Conducted Spurious Emission**
 Work Order #: **86394** Date: 4/5/2007
 Test Type: **Conducted Emissions** Time: 12:01:52
 Equipment: **Repeater** Sequence#: 5
 Manufacturer: Powerwave Technologies, Inc. Tested By: E. Wong
 Model: RH304022/100 110V 60Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
1.5 GHz HPF	3643A00027	06/27/2005	06/27/2007	02116
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
24" SMA Cable	1-40GHz white	02/16/2007	02/16/2009	P05204

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Repeater*	Powerwave Technologies, Inc.	RH304022/100	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Optical Converter	Powerwave Technologies, Inc.	NA	42473
Spectrum Analyzer	HP	8563E	NA
Power Meter	Agilent	E4419B	MY40510694
ESG	Agilent	E4433B	US40051840

Test Conditions / Notes:

The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives a RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port. Power = 20 watts, Frequency = 881.5 MHz. Modulation: EDGE. 18°C, 53% relative humidity. Frequency range of measurement = 9 kHz - 10 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 - 10,000 MHz RBW=1 MHz, VBW=1 MHz.

Transducer Legend:

T1=SMA-cable W 05204-021609-26GHz	T2=HPF AN02116 1.5GHz 062707
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Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	2646.000M	74.9	+1.9	+0.6	+0.0	77.4	94.0	-16.6	Anten
2	1773.000M	73.6	+1.5	+0.5	+0.0	75.6	94.0	-18.4	Anten



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

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC Part 22.917(a) Conducted Spurious Emission**
 Work Order #: **86394** Date: 4/5/2007
 Test Type: **Conducted Emissions** Time: 13:28:43
 Equipment: **Repeater** Sequence#: 6
 Manufacturer: Powerwave Technologies, Inc. Tested By: E. Wong
 Model: RH304022/100 110V 60Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
1.5 GHz HPF	3643A00027	06/27/2005	06/27/2007	02116
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
24" SMA Cable	1-40GHz white	02/16/2007	02/16/2009	P05204

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Repeater*	Powerwave Technologies, Inc.	RH304022/100	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Optical Converter	Powerwave Technologies, Inc.	NA	42473
Spectrum Analyzer	HP	8563E	NA
Power Meter	Agilent	E4419B	MY40510694
ESG	Agilent	E4433B	US40051840

Test Conditions / Notes:

The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives a RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port. Power = 20 watts, Frequency = 894 MHz. Modulation: EDGE. 18°C, 53% relative humidity. Frequency range of measurement = 9 kHz - 10 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 - 10,000 MHz RBW=1 MHz, VBW=1 MHz.

Transducer Legend:

T1=SMA-cable W 05204-021609-26GHz	T2=HPF AN02116 1.5GHz 062707
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Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist Table dB	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	1773.000M	75.1	+1.5	+0.5	+0.0	77.1	94.0	-16.9	Anten



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

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC Part 22.917(a) Conducted Spurious Emission**
 Work Order #: **86394** Date: 4/5/2007
 Test Type: **Conducted Emissions** Time: 13:30:44
 Equipment: **Repeater** Sequence#: 7
 Manufacturer: Powerwave Technologies, Inc. Tested By: E. Wong
 Model: RH304022/100 110V 60Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
1.5 GHz HPF	3643A00027	06/27/2005	06/27/2007	02116
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
24" SMA Cable	1-40GHz white	02/16/2007	02/16/2009	P05204

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Repeater*	Powerwave Technologies, Inc.	RH304022/100	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Optical Converter	Powerwave Technologies, Inc.	NA	42473
Spectrum Analyzer	HP	8563E	NA
Power Meter	Agilent	E4419B	MY40510694
ESG	Agilent	E4433B	US40051840

Test Conditions / Notes:

The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives a RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port. Power = 20 watts, Frequency = 869 MHz. Modulation: WCDMA. 18°C, 53% relative humidity. Frequency range of measurement = 9 kHz - 10 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 - 10,000 MHz RBW=1 MHz, VBW=1 MHz.

Transducer Legend:

T1=SMA-cable W 05204-021609-26GHz	T2=HPF AN02116 1.5GHz 062707
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Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist Table dB	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	1741.950M	53.7	+1.4	+0.6	+0.0	55.7	94.0	-38.3	Anten
2	2614.700M	48.5	+1.9	+0.6	+0.0	51.0	94.0	-43.0	Anten



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

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC Part 22.917(a) Conducted Spurious Emission**
 Work Order #: **86394** Date: 4/5/2007
 Test Type: **Conducted Emissions** Time: 13:49:41
 Equipment: **Repeater** Sequence#: 8
 Manufacturer: Powerwave Technologies, Inc. Tested By: E. Wong
 Model: RH304022/100 110V 60Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
1.5 GHz HPF	3643A00027	06/27/2005	06/27/2007	02116
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
24" SMA Cable	1-40GHz white	02/16/2007	02/16/2009	P05204

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Repeater*	Powerwave Technologies, Inc.	RH304022/100	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Optical Converter	Powerwave Technologies, Inc.	NA	42473
Spectrum Analyzer	HP	8563E	NA
Power Meter	Agilent	E4419B	MY40510694
ESG	Agilent	E4433B	US40051840

Test Conditions / Notes:

The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives a RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port. Power = 20 watts, Frequency = 882MHz. Modulation: WCDMA. 18°C, 53% relative humidity. Frequency range of measurement = 9 kHz - 10 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 - 10,000 MHz RBW=1 MHz, VBW=1 MHz.

Transducer Legend:

T1=SMA-cable W 05204-021609-26GHz	T2=HPF AN02116 1.5GHz 062707
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Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist Table dB	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	1762.750M	51.0	+1.5	+0.5	+0.0	53.0	94.0	-41.0	Anten
2	2644.750M	24.0	+1.9	+0.6	+0.0	26.5	94.0	-67.5	Anten



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

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC Part 22.917(a) Conducted Spurious Emission**
 Work Order #: **86394** Date: 4/5/2007
 Test Type: **Conducted Emissions** Time: 14:00:10
 Equipment: **Repeater** Sequence#: 9
 Manufacturer: Powerwave Technologies, Inc. Tested By: E. Wong
 Model: RH304022/100 110V 60Hz
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
1.5 GHz HPF	3643A00027	06/27/2005	06/27/2007	02116
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
24" SMA Cable	1-40GHz white	02/16/2007	02/16/2009	P05204

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Repeater*	Powerwave Technologies, Inc.	RH304022/100	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Optical Converter	Powerwave Technologies, Inc.	NA	42473
Spectrum Analyzer	HP	8563E	NA
Power Meter	Agilent	E4419B	MY40510694
ESG	Agilent	E4433B	US40051840

Test Conditions / Notes:

The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives a RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port. Power = 20 watts, Frequency = 894MHz. Modulation: WCDMA. 18°C, 53% relative humidity. Frequency range of measurement = 9 kHz - 10 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 - 10,000 MHz RBW=1 MHz, VBW=1 MHz.

Transducer Legend:

T1=SMA-cable W 05204-021609-26GHz	T2=HPF AN02116 1.5GHz 062707
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Measurement Data: Reading listed by margin. Test Lead: Antenna Terminal

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	Dist Table dB	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	1779.850M	49.7	+1.5	+0.5	+0.0	51.7	94.0	-42.3	Anten
2	2673.850M	42.9	+1.9	+0.6	+0.0	45.4	94.0	-48.6	Anten



FCC 2.1033(c)(14)/2.1053/ 22.917(a)- FIELD STRENGTH OF SPURIOUS RADIATION

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

Customer: **Powerwave Technologies, Inc.**
 Specification: **FCC Part 22.917(a) Radiated Spurious Emission**
 Work Order #: **86394** Date: 4/5/2007
 Test Type: **Radiated Scan** Time: 08:41:25
 Equipment: **Repeater** Sequence#: 1
 Manufacturer: Powerwave Technologies, Inc. Tested By: E. Wong
 Model: RH304022/100
 S/N: NA

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Loop Antenna	2014	06/14/2006	06/14/2008	00314
1.5 GHz HPF	3643A00027	06/27/2005	06/27/2007	02116
Bilog Antenna	2451	02/02/2006	02/02/2008	01995
Spectrum Analyzer	US44300438	01/03/2007	01/03/2009	02672
Pre amp to SA Cable	Cable #10	05/16/2005	05/16/2007	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	1-40GHz_white	02/16/2007	02/16/2009	P05204
Microwave Pre-amp	3123A00281	07/19/2006	07/19/2008	00786
Helix Antenna Cable	P5565	09/18/2006	09/18/2008	P05565

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Repeater*	Powerwave Technologies, Inc.	RH304022/100	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Optical Converter	Powerwave Technologies, Inc.	NA	42473
Spectrum Analyzer	HP	8563E	NA
Power Meter	Agilent	E4419B	MY40510694
ESG	Agilent	E4433B	US40051840

Test Conditions / Notes:

The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. Power = 20 watts. Frequency = 869 MHz, 881.5 MHz and 894 MHz . Modulation: EDGE. 18°C, 53% relative humidity. Frequency range of measurement = 9 kHz - 10 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 - 10,000 MHz RBW=1 MHz, VBW=1 MHz.

Test Setup Photos



Test Data

Operating Frequency: 869-894 MHz
 Channels: Low, Mid and High
 Highest Measured Output Power: 43.01 ERP(dBm)= 20 ERP(Watts)
 Distance: 3 meters
 Limit: $43+10\text{Log}(P)$ 56.01 dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
1,738.02	-59.5	Vert	102.51
3,476.02	-55.6	Vert	98.61
4,345.02	-52.3	Vert	95.31
1,763.02	-59.6	Horiz	102.61
2,644.52	-56.3	Horiz	99.31
1,778.80	-60.4	Vert	103.41
5,363.99	-50.2	Horiz	93.21

INPUT PLOTS

Test Equipment

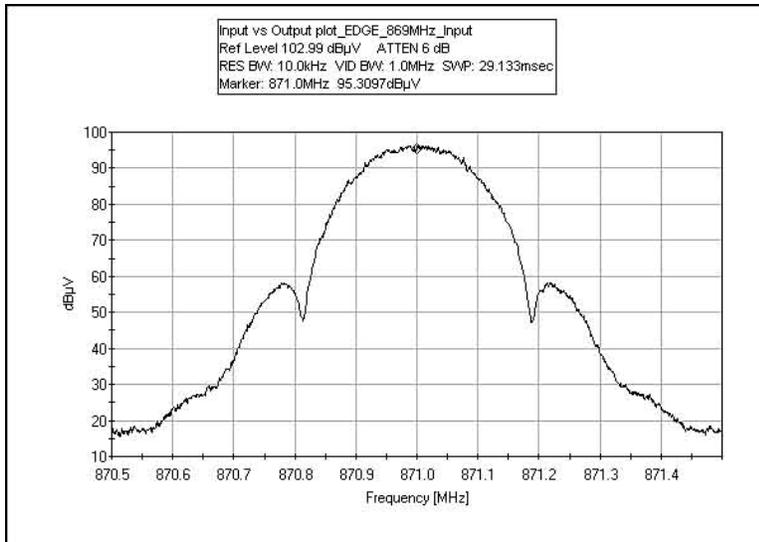
Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309

Test Conditions: The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port. Input plot: RF signal measured at the RF input port of the RF to optical converter,

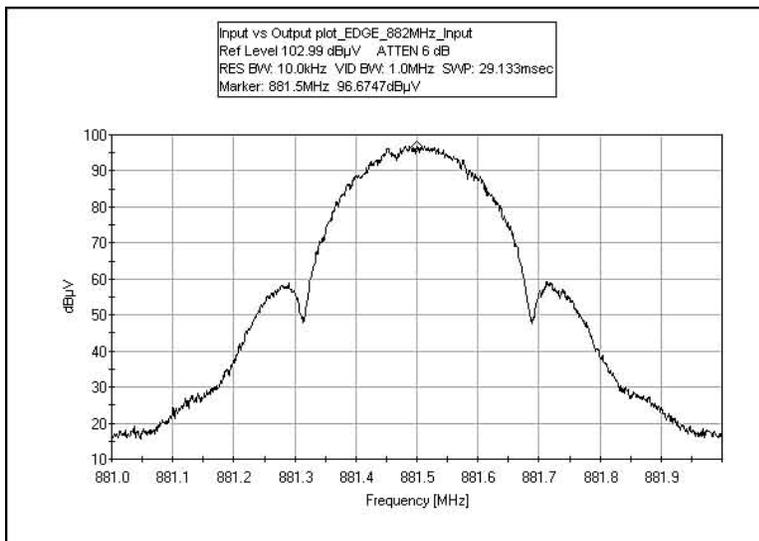
Test Setup Photos



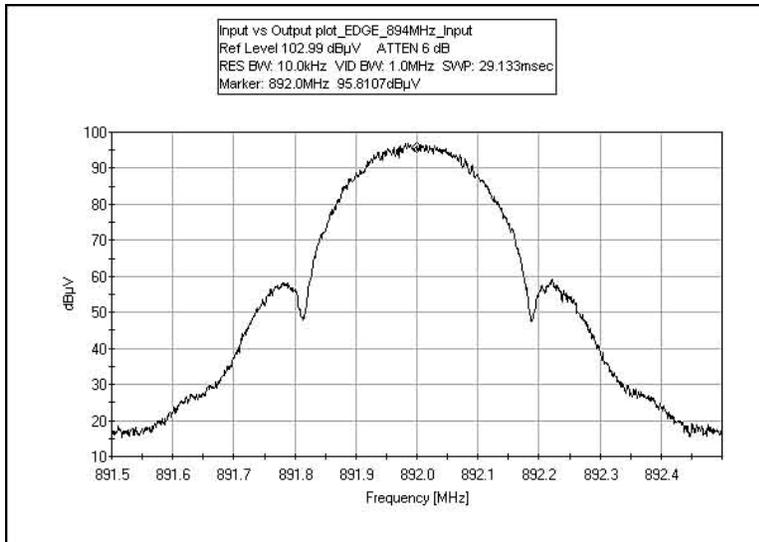
INPUT PLOT - EDGE 869MHz



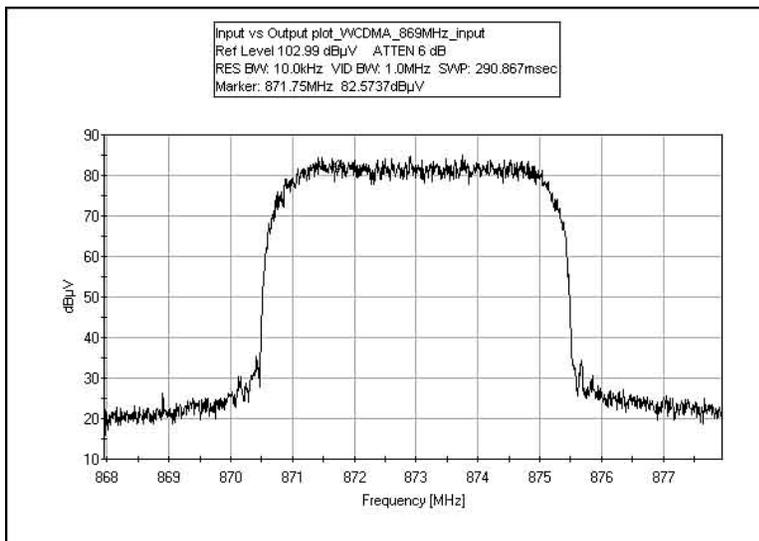
INPUT PLOT - EDGE 882MHz



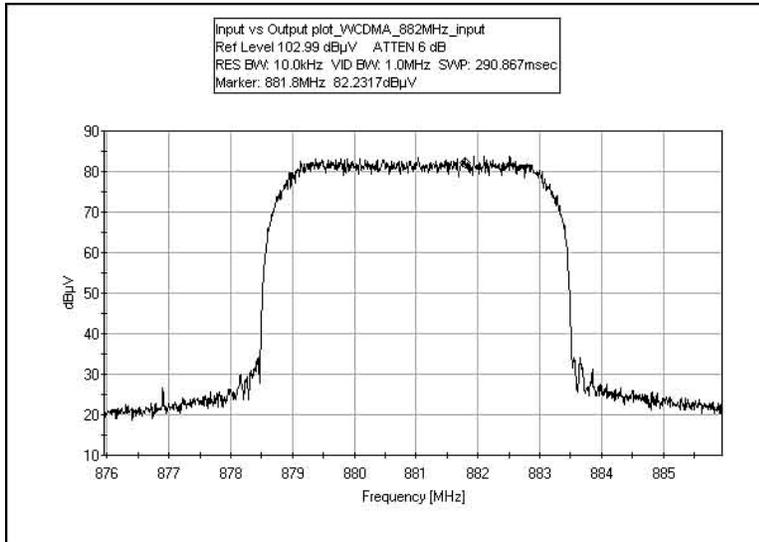
INPUT PLOT - EDGE 894MHz



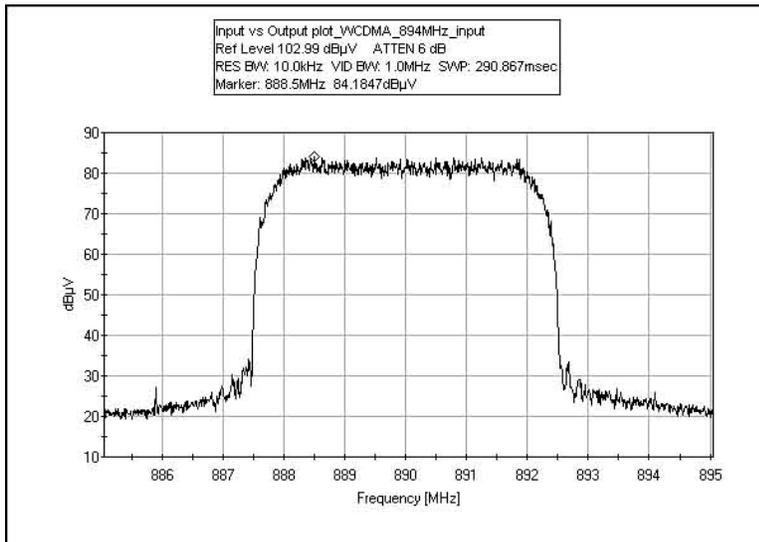
INPUT PLOT - WCDMA 869MHz



INPUT PLOT - WCDMA 882MHz



INPUT PLOT - WCDMA 894MHz



OUTPUT PLOTS

Test Equipment

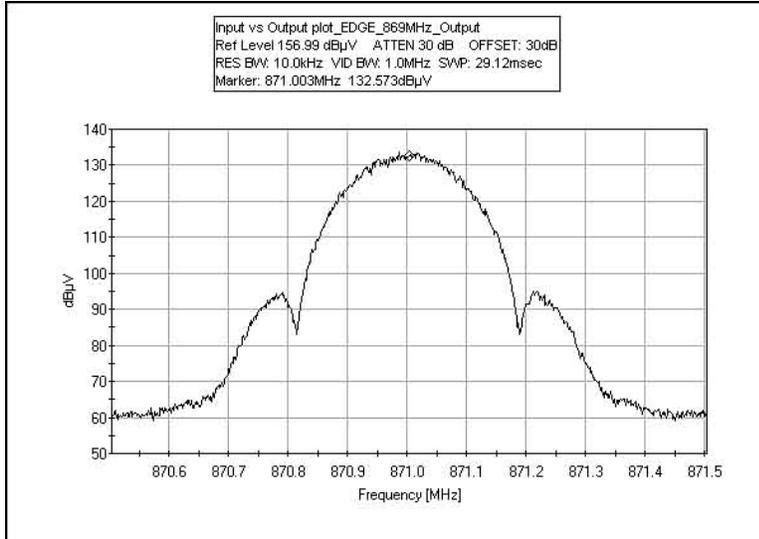
Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309

Test Conditions: The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port.

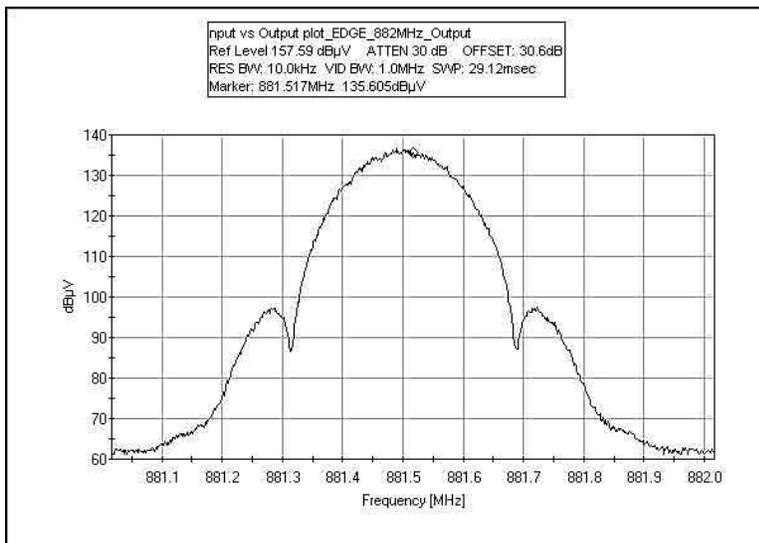
Test Setup Photos



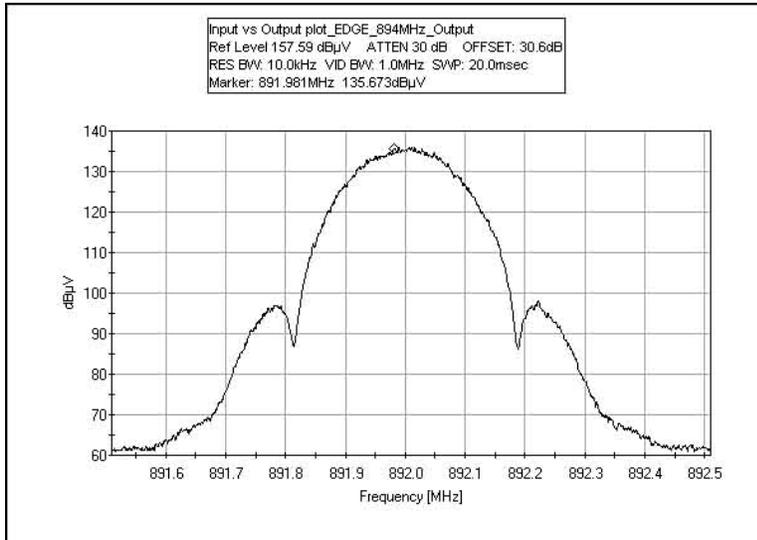
OUTPUT PLOT - EDGE 869MHz



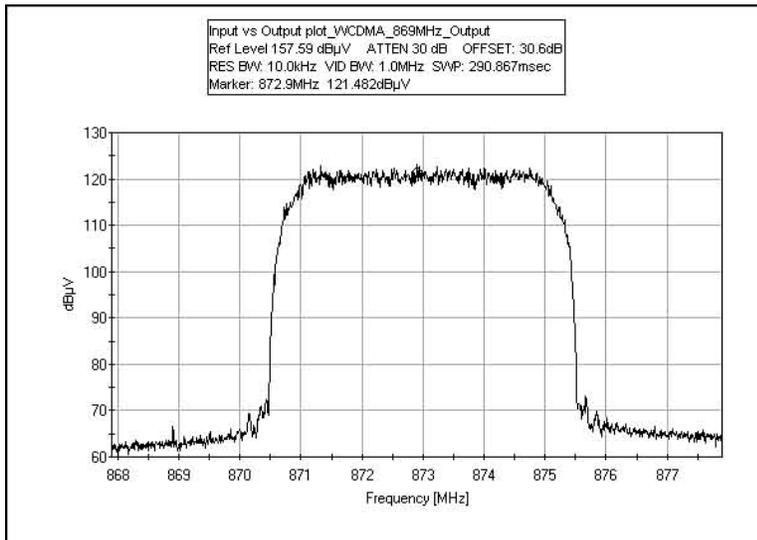
OUTPUT PLOT - EDGE 882MHz



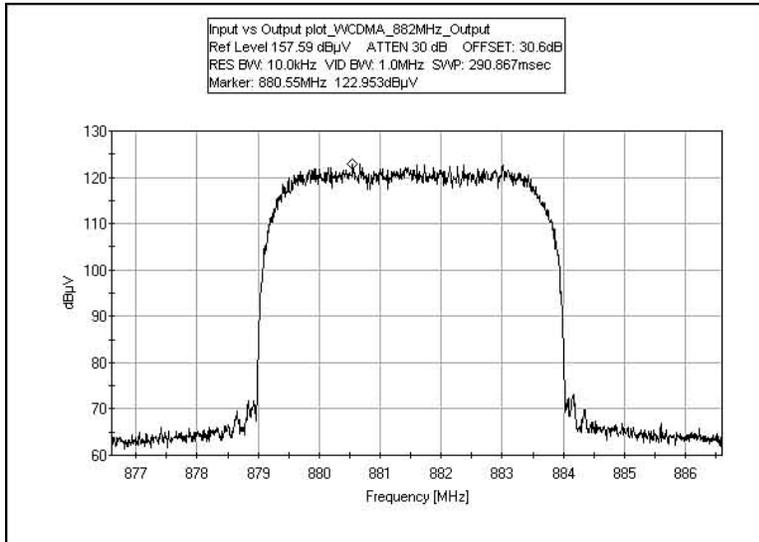
OUTPUT PLOT - EDGE 894MHz



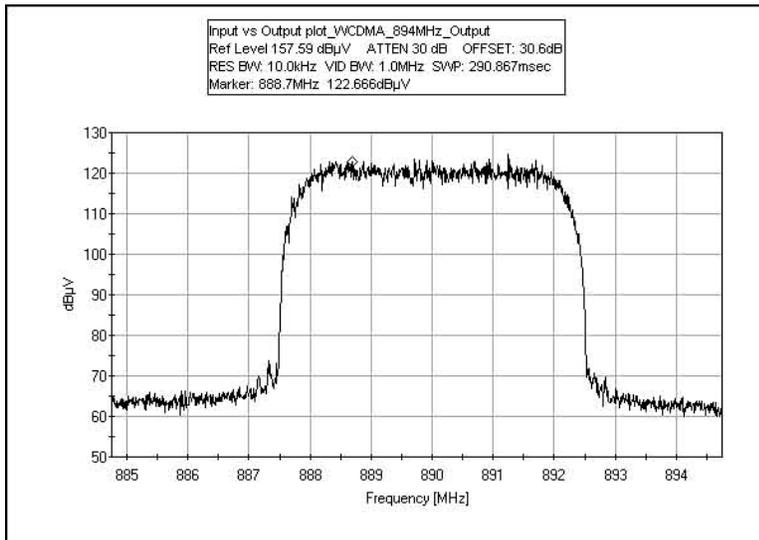
OUTPUT PLOT - WCDMA 869MHz



OUTPUT PLOT - WCDMA 882MHz



OUTPUT PLOT - WCDMA 894MHz



BLOCKEDGE

Test Equipment

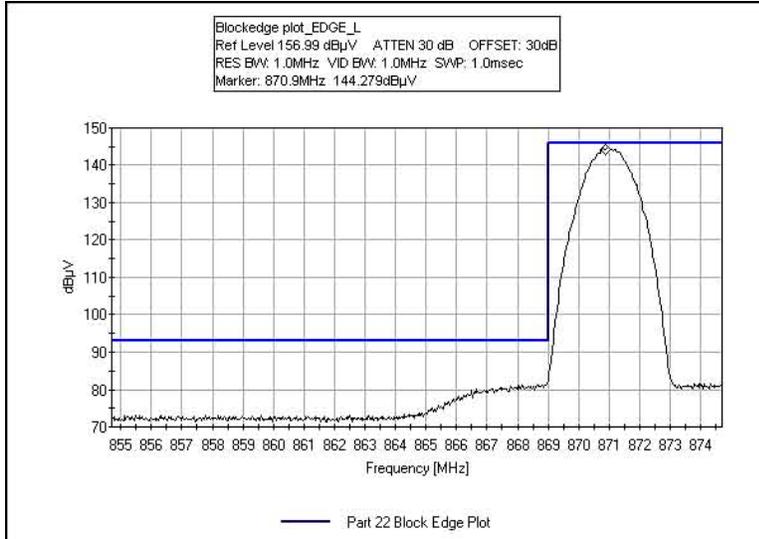
Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309

Test Conditions: The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port.

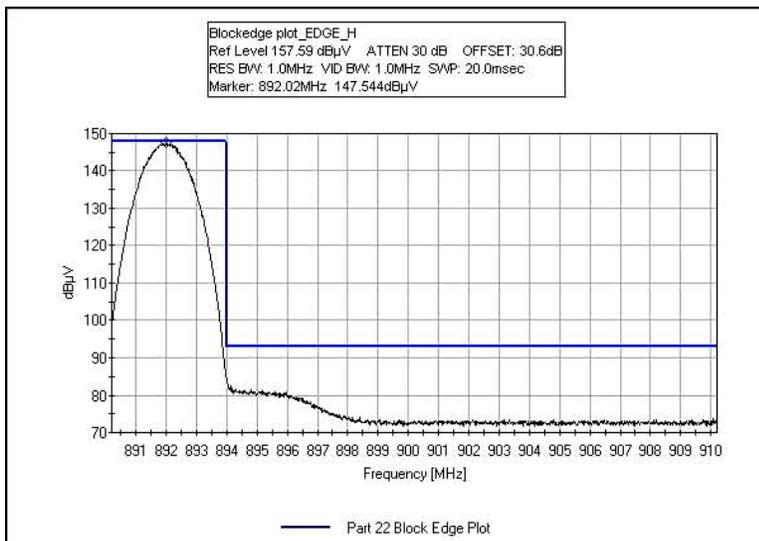
Test Setup Photos



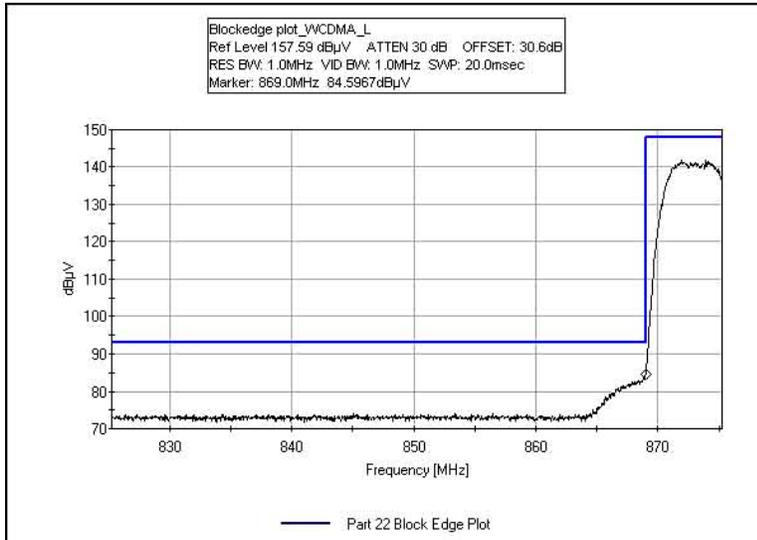
BLOCKEDGE - EDGE LOW



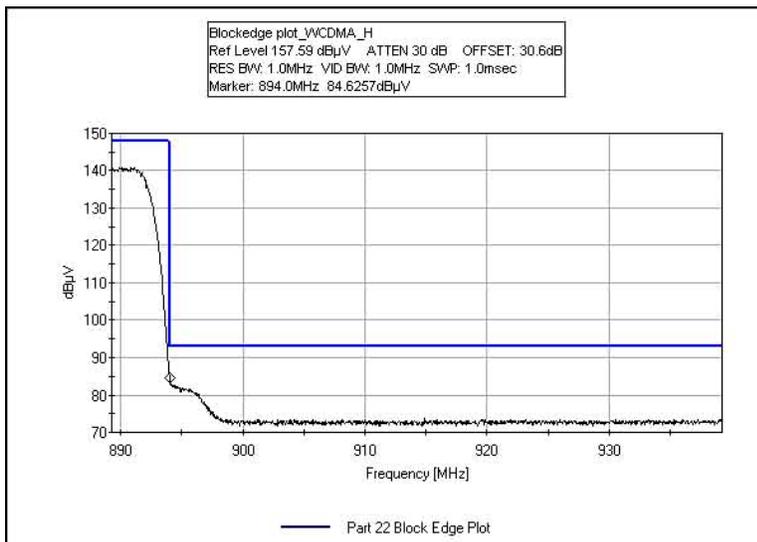
BLOCKEDGE - EDGE HIGH



BLOCKEDGE - WCDMA LOW



BLOCKEDGE - WCDMA HIGH



INTERMODULATION

Test Equipment

Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309

Test Setup Photos



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

Customer: **Powerwave Technologies, Inc.**

Specification: **Part 22 Intermodulation**

Work Order #: **86394**

Test Type: **Conducted Emissions**

Equipment: **Repeater**

Manufacturer: Powerwave Technologies, Inc.

Model: RH304022/100

S/N: NA

Date: 4/4/2007

Time: 14:48:25

Sequence#: 2

Tested By: E. Wong

110V 60Hz

Equipment Under Test (= EUT):*

Function	Manufacturer	Model #	S/N
Repeater*	Powerwave Technologies, Inc.	RH304022/100	NA

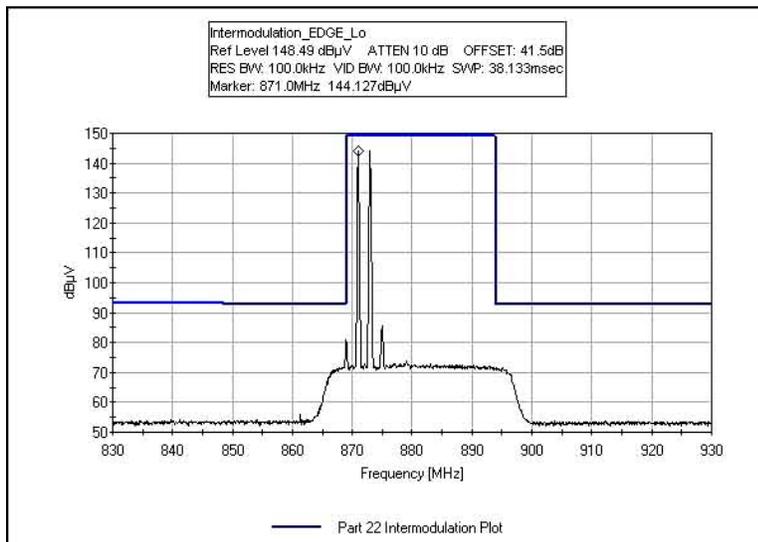
Support Devices:

Function	Manufacturer	Model #	S/N
Optical Converter	Powerwave Technologies, Inc.	NA	42473
Spectrum Analyzer	HP	8563E	NA
Power Meter	Agilent	E4419B	MY40510694
ESG	Agilent	E4433B	US40051840

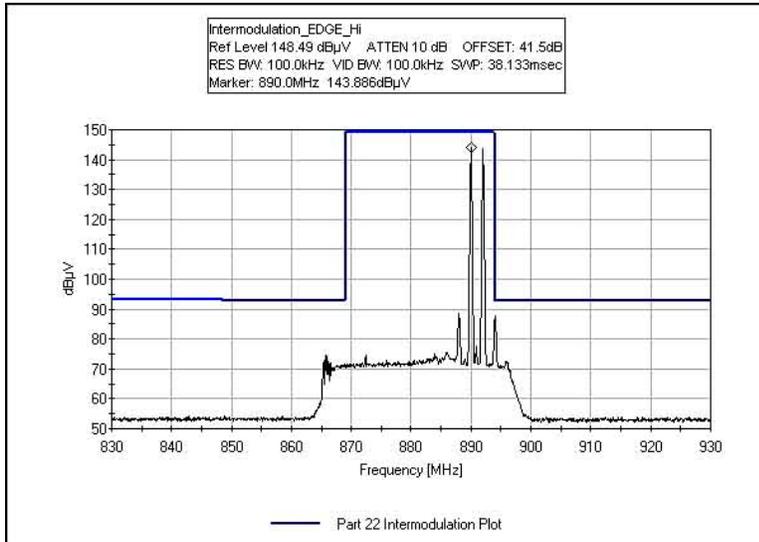
Test Conditions / Notes:

The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives a RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. Power = 20 watts. Frequency = 869 MHz, Modulation: EDGE. 18°C, 53% relative humidity. Frequency range of measurement = 9 kHz - 10 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 - 10,000 MHz RBW=1 MHz, VBW=1 MHz.

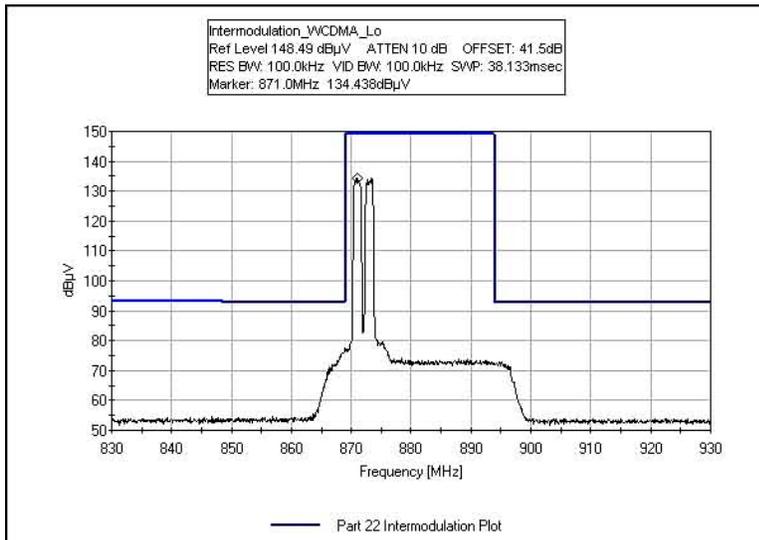
INTERMODULATION - EDGE LOW



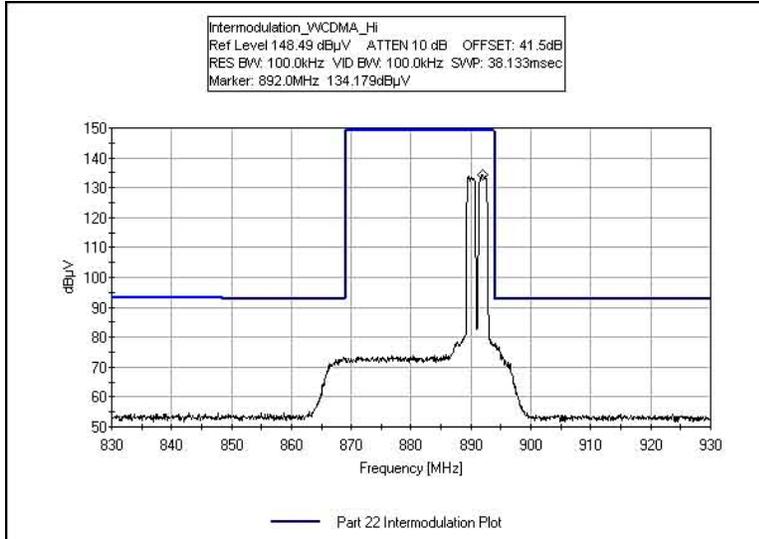
INTERMODULATION - EDGE HIGH



INTERMODULATION - WCDMA LOW



INTERMODULATION - WCDMA HIGH



99% BANDWIDTH

Test Equipment

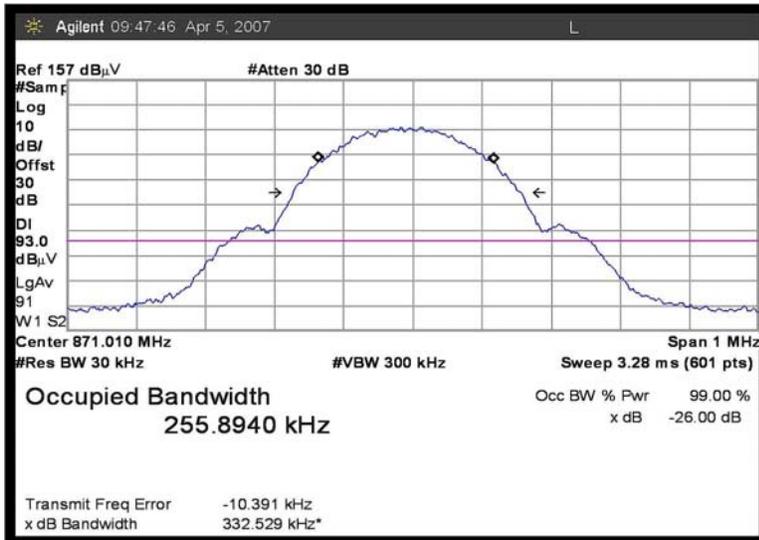
Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309

Test Conditions: The EUT is placed on the wooden table. The RF Output port is connected to a remote power meter. Optical in port is connected to a support optical converter. Support optical converter receives RF signal, converts the signal to optic and sends it to the EUT. The EUT decodes the optical signal and generates a RF signal. RF signal measured at the antenna port.

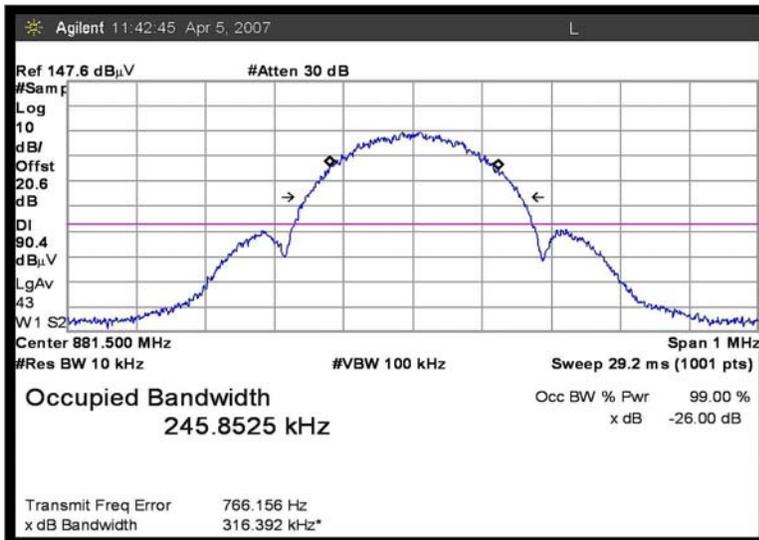
Test Setup Photos



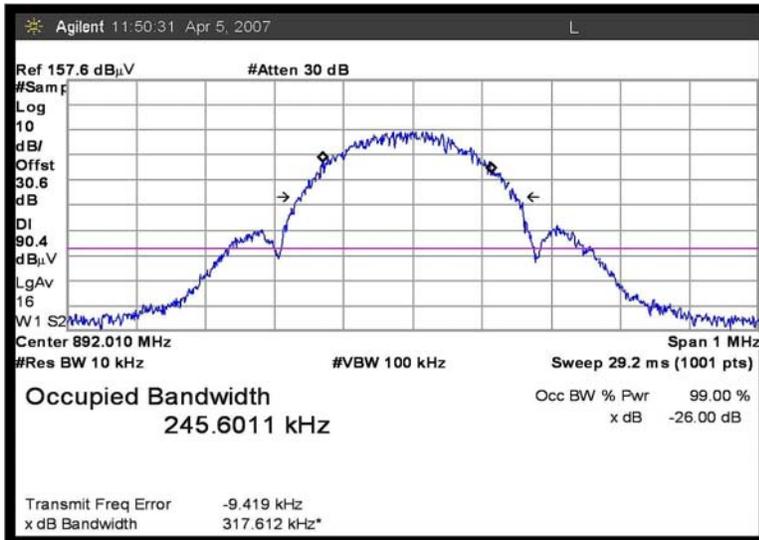
99% BANDWIDTH - EDGE 869MHz



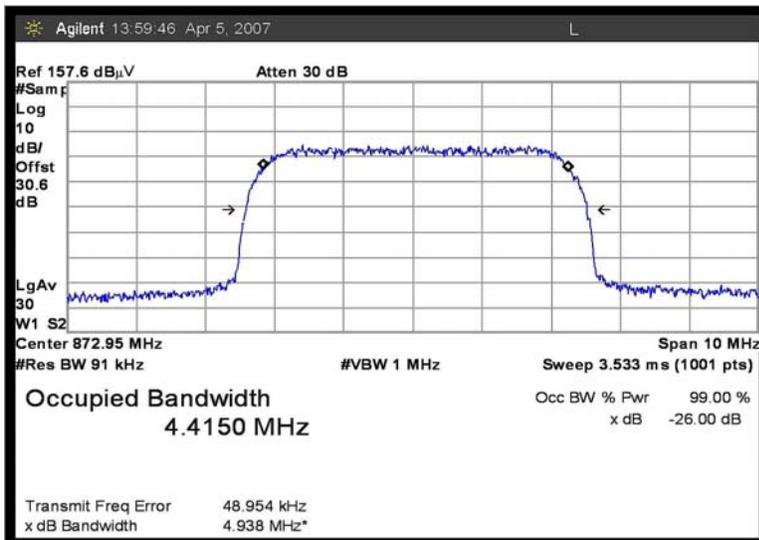
99% BANDWIDTH - EDGE 882MHz



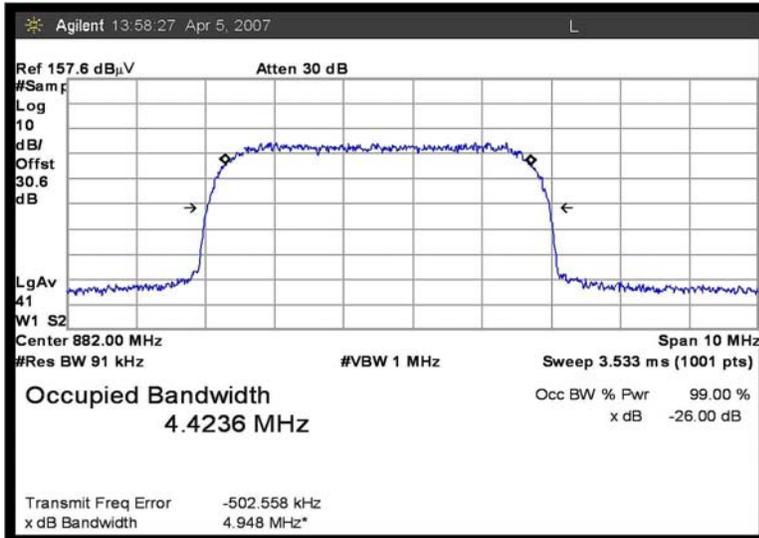
99% BANDWIDTH - EDGE 894MHz



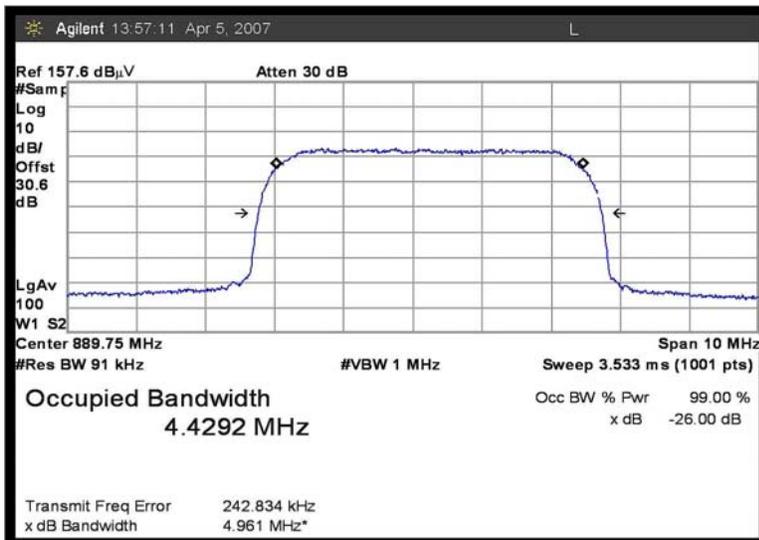
99% BANDWIDTH - WCDMA 869MHz



99% BANDWIDTH - WCDMA 882MHz



99% BANDWIDTH - WCDMA 894MHz

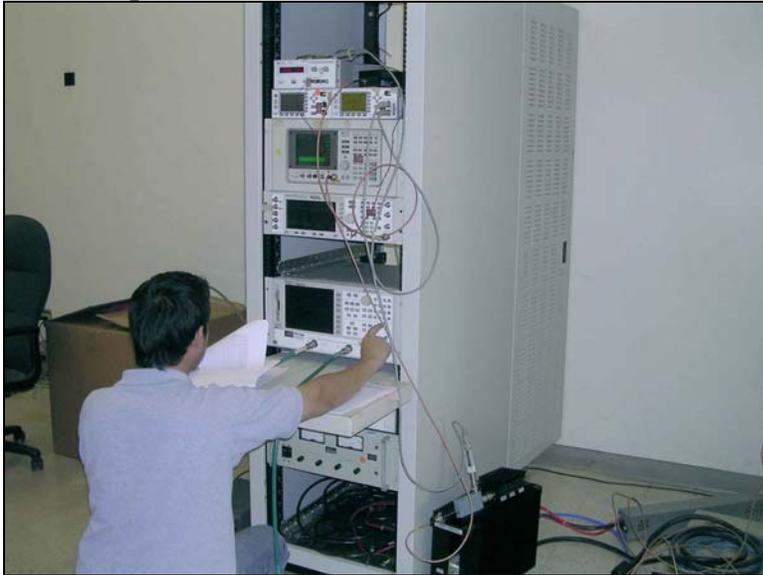


RSS-131 Amplifier Gain and Bandwidth

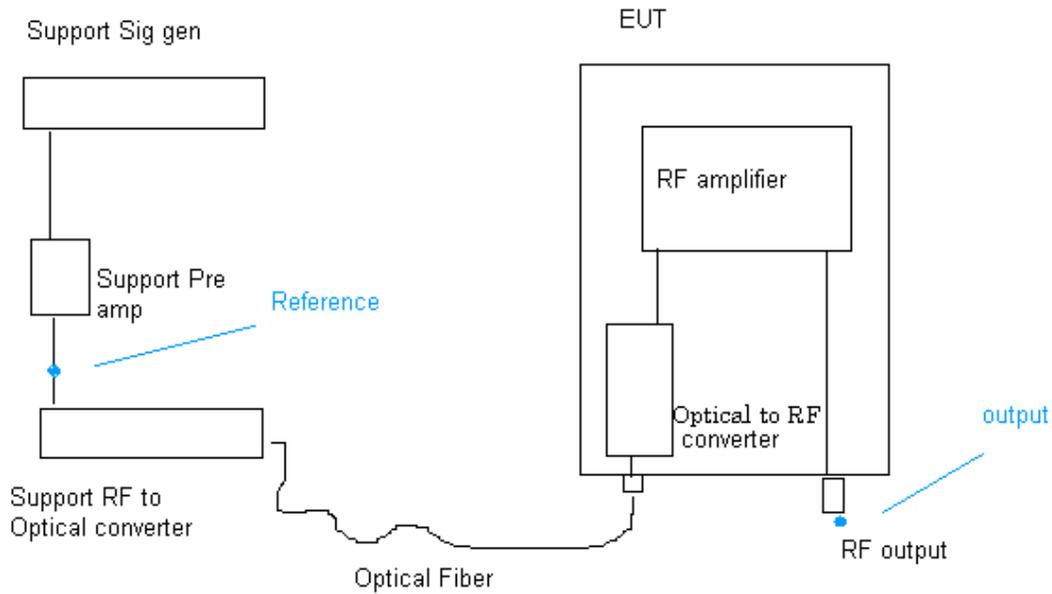
Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Network analyzer	PWAV	HP	8753E	Us38432770	052006	052008
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	011405	011407
Signal Generator	02227	Marconi	2024	112282/515	081805	081807

Test Setup Photos



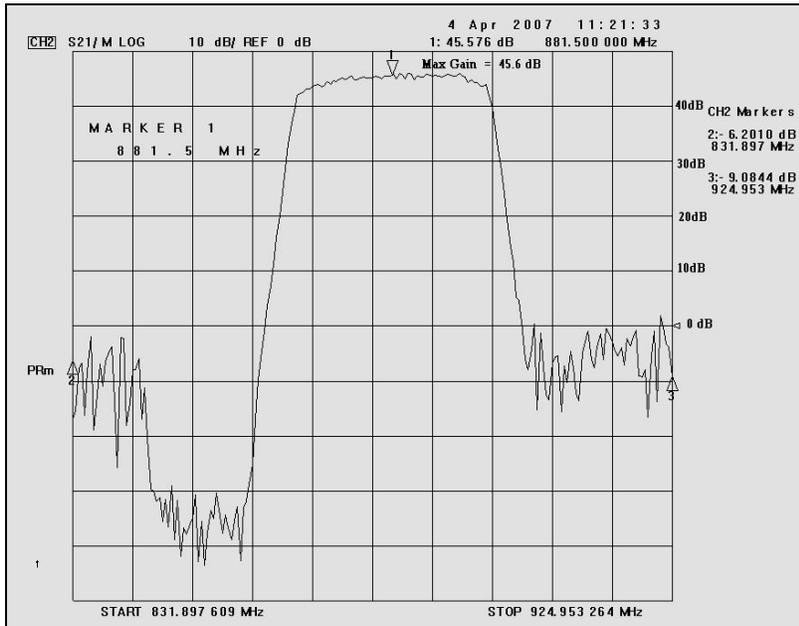
Setup



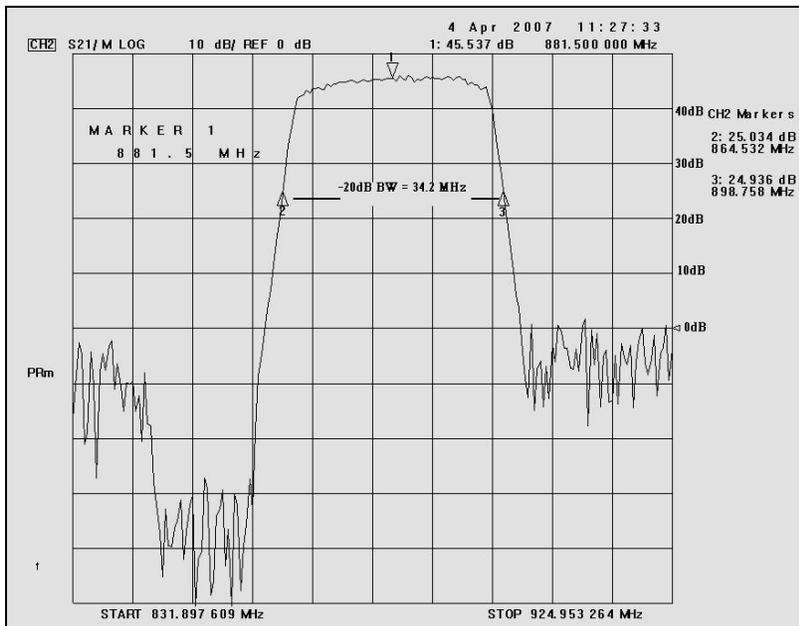
Measured gain = Output – Reference (dB)

The nominal bandwidth and nominal pass band gain (dB) of the RF enhancer or translator shall be stated by the manufacturer or equipment certification applicant and indicated in the test report.

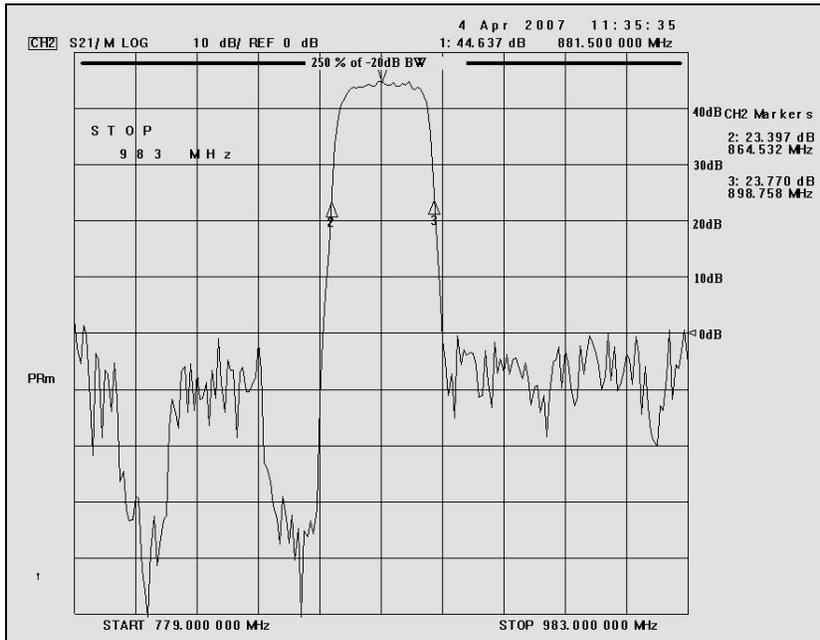
Manufacturer stated gain = 45 - 70 dB



The internal control is adjusted to the nominal gain for which equipment certification is sought.
 Maximum measured gain = 45.6 dB



With the aid of a Vector Network 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.