POWERWAVE TECHNOLOGIES, INC. TEST REPORT

FOR THE

NEXUS RT DIGITAL REPEATER, NP50-11311

FCC PART 15 22H AND RSS 131 ISSUE 2 (2003)

TESTING

DATE OF ISSUE: OCTOBER 7, 2008

PREPARED FOR:

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

P.O. No.: 123038
W.O. No.: 88230

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Date of test: September 10-12, 2008

Report No.: FC08-093

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ADMINISTRATIVE INFORMATION

DATE OF TEST: September 10-12, 2008

DATE OF RECEIPT: September 10, 2008

REPRESENTATIVE: Charlotte Yu

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-9 GHz

TEST METHOD: FCC Part 15 22H, RSS 131 Issue 2 (2003) and RSS GEN Issue 2

PURPOSE OF TEST: To perform the testing of the Nexus RT Digital Repeater, NP50-11311 with the requirements for FCC Part 15 22H and RSS 131 devices.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Steve Behm, Director of Engineering Services

TEST PERSONNEL:

Eddie Wong, Senior EMC Engineer

SUMMARY OF RESULTS

Test	Specification	Results
RF Power Output	FCC 24.913(a) RSS 131 Issue 2 (2003) Section 6.2	Pass
Input Plots	FCC 2.1049(i)	Pass
Output Plots	FCC 2.1049(i)	Pass
Spurious Emissions at Antenna Terminal	FCC 22.917(a)	Pass
Field Strength of Spurious Radiation	FCC 22.917(a)	Pass
Blockedge		Pass
Intermodulation		Pass
Out of Band Rejection		Pass
99% Bandwidth	RSS 133 Section 5.6	Pass
Passband Gain and Bandwidth	RSS 131 Issue 2 (2003) Section 6.1	Pass
Site File No.	FCC 90473 RSS 131 IC 3172-A	

CONDITIONS DURING TESTING

Modification: Paint underneath the internal ground stud was removed to enhance chassis to ground cable connection.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit. The Nexus RT Digital Repeater increases the coverage and capacity of existing wireless networks. It simultaneously supports 3G and 4G communications protocols and multiple RF carriers using advanced processing. The repeaters are designed to increase the coverage and capacity of existing wireless networks for both indoor and outdoor use. GSM, EDGE and WCDMA protocols can operate simultaneously on the same unit. Key features include support for multiple GSM/EDGE carriers and WCDMA support in 850MHz and 1900MHz operating bands. The Nexus RT Digital Repeater also provides feedback cancellation to effectively increase antenna isolation and enable greater operating gain without oscillation. Remote control and supervision is supported through either a direct IP connection or a wireless modem supporting the Simple Network Management Protocol (SNMP).

The following model has been tested by CKC Laboratories: **NP50-11311 (850 band with Modem)**

The manufacturer states that the following additional models are identical electrically to the one which was tested, or any differences between them do not affect their EMC characteristics, and therefore they meet the level of testing equivalent to the tested models.
NP50-11111 (850 band without Modem)
NP50B0-22111 (850 band of the 1900/850 dual band without Modem)
NP50B0-22311 (850 band of the 1900/850 dual band with Modem)

EQUIPMENT UNDER TEST

Nexus RT Digital Repeater
Manuf: Powerwave Technologies, Inc.
Model: NP50-11311
Serial: NA
FCC ID: E675JS00107

PERIPHERAL DEVICES

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

Laptop
Manuf: HP
Model: HSTNNC18C
Serial: CND63661JIC7

Ethernet Switch
Manuf: Linksys
Model: SD205
Serial: REF003600624

ESG
Manuf: Agilent
Model: E4433B
Serial: US40052191

Powermeter
Manuf: HP
Model: E4419B
Serial: MY40510694

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, GXW, F9W

FCC 2.1033 (c)(5) FREQUENCY RANGE
824-849MHz Uplink, 864-894MHz Downlink

FCC 2.1033 (c)(6) OPERATING POWER
0.63 watts

FCC 2.1033 (c)(7) MAXIMUM POWER RATING
500 watts peak power

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, GSM, 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	021508	021510
Power Sensor	02777	HP	E4412A	MY41499662	021508	021510

Test Setup Photos

Test Conditions

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 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. The measurement satisfies the above requirement by demonstrating the measured power is below 500 watts.

The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to an ESG and 850MHz Server antenna port is connected to a power meter. For uplink configuration, 850MHz Donor antenna port is connected to Power meter and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a support laptop, ethernet port: WAN is connected to an ethernet switch. RF signal measured at the output antenna port.

Test Data

Uplink EDGE, GSM, WCDMA

	dBm	Watts
824MHz	28	0.63
836MHz	28	0.63
849MHz	28	0.63

Downlink EDGE, GSM, WCDMA

	dBm	Watts
864MHz	28	0.63
881MHz	28	0.63
894MHz	28	0.63

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

RSS 131 SECTION 6.2 - RF POWER OUTPUT

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02869	Agilent	E4440A	MY46186290	021207	021209

Test Conditions

4.3 Mean Output power.

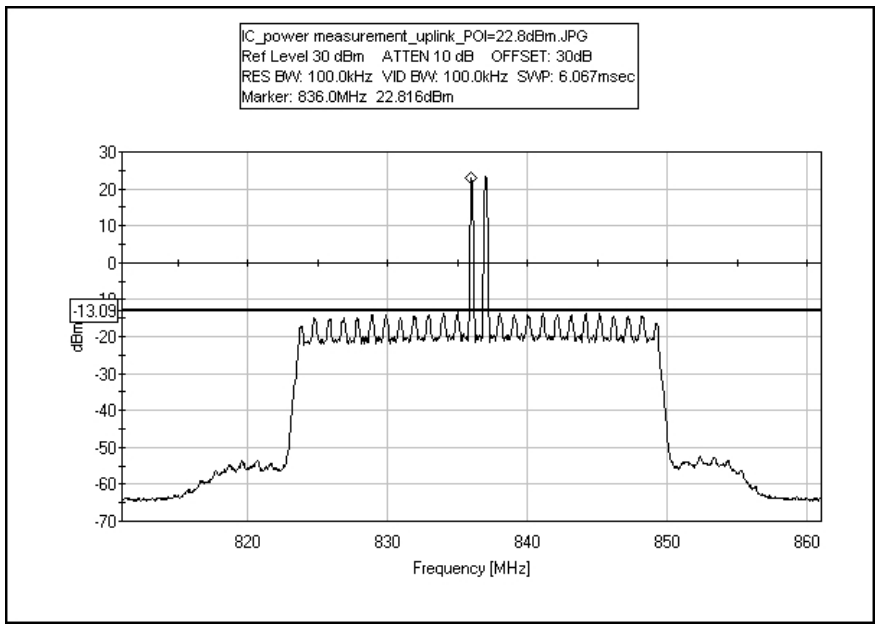
The EUT is a RF amplifier. The manufacture does not provide an antenna for sale with the product, hence EIRP is not measured nor calculated.

The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to an ESG and 850MHz Server antenna port is connected to a power meter. For uplink configuration, 850MHz Donor antenna port is connected to Power meter and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a support laptop, ethernet port: WAN is connected to an ethernet switch.

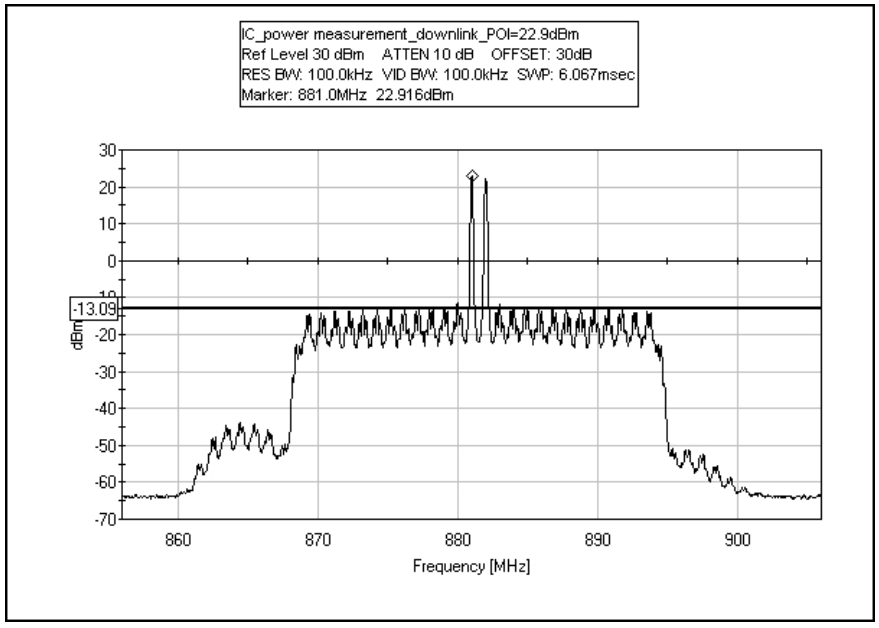
The RF power of the EUT was measured at the antenna port in accordance with RSS 131, 4.3.1 requirement.

Test Setup Photos

Test Plots



Uplink
824-849MHz



Downlink
869-893MHz

Highest Measured Po1 =+ 22.9 dBm
P mean = Po1 + 3 dB = 22.9 + 3 dBm = 25.9 dBm = 0.3890W=0.4Watts

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

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02869	Agilent	E4440A	MY46186290	021207	021209
36" 40GHz cable	02945	Strolab	NA	NA	091807	091809

Test Conditions

The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to remote ESG and 850MHz Server antenna port is connected to a spectrum analyzer. For uplink configuration, 850MHz Donor antenna port is connected to spectrum analyzer and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch.

Output waveform is recorded with a spectrum analyzer at the Antenna port of the device.
Input waveform is recorded with a spectrum analyzer at the RF out of the support ESG.

Uplink: 824 - 849MHz
Downlink: 869 - 894MHz

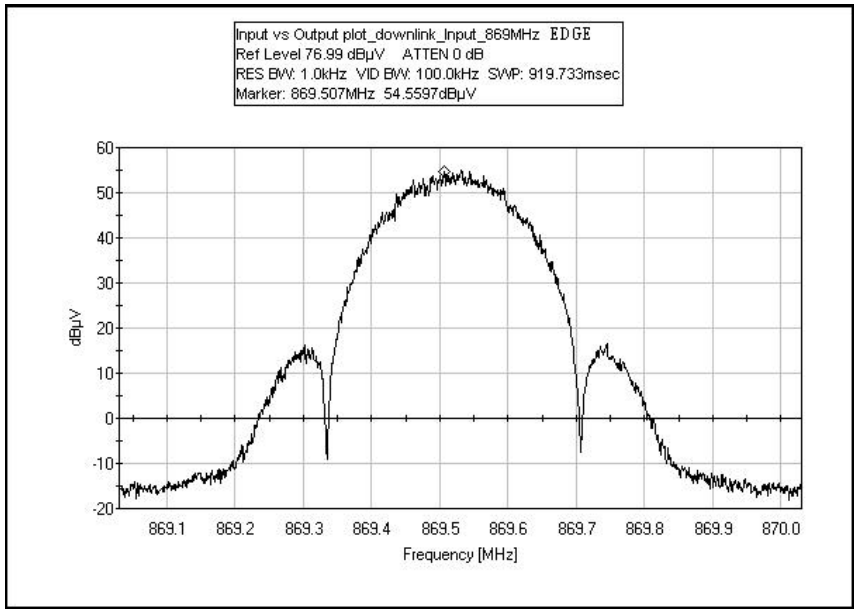
Uplink
Modulation: EDGE, GSM, WCDMA
TX= 824.5MHz, 836.5MHz, 848.5MHz
Power = 28dBm= 0.63W

Downlink:
Modulation: EDGE, GSM, WCDMA
TX=869.5MHz, 881.5MHz, 893.5MHz
Power = 28dBm= 0.63W

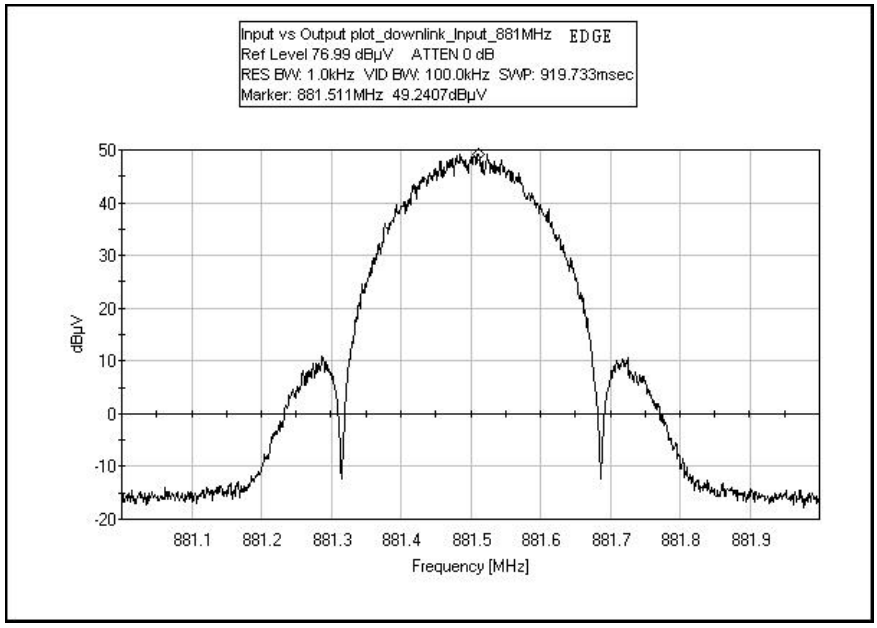
Test Setup Photos

Test Plots

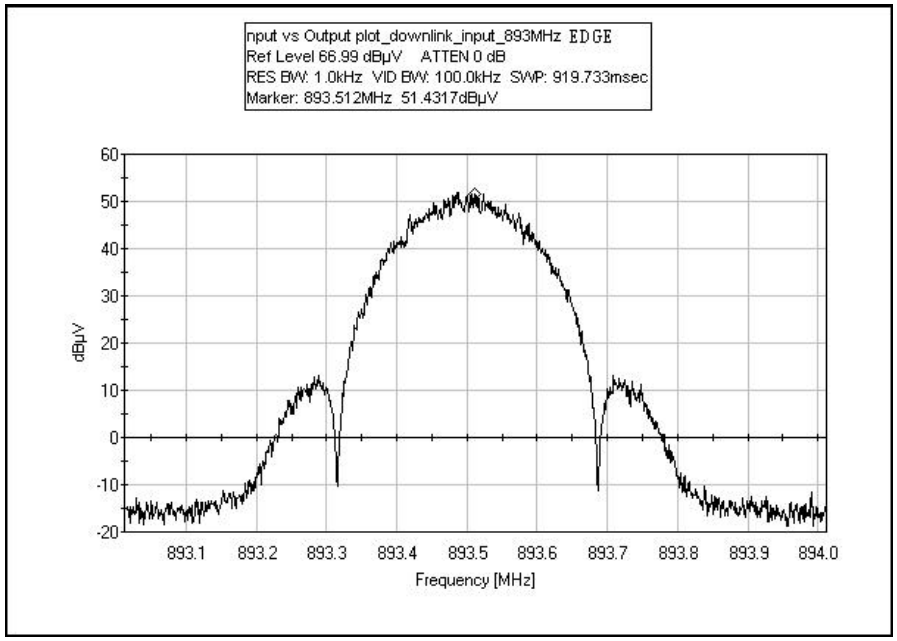
INPUT PLOT DOWNLINK - EDGE 869MHz



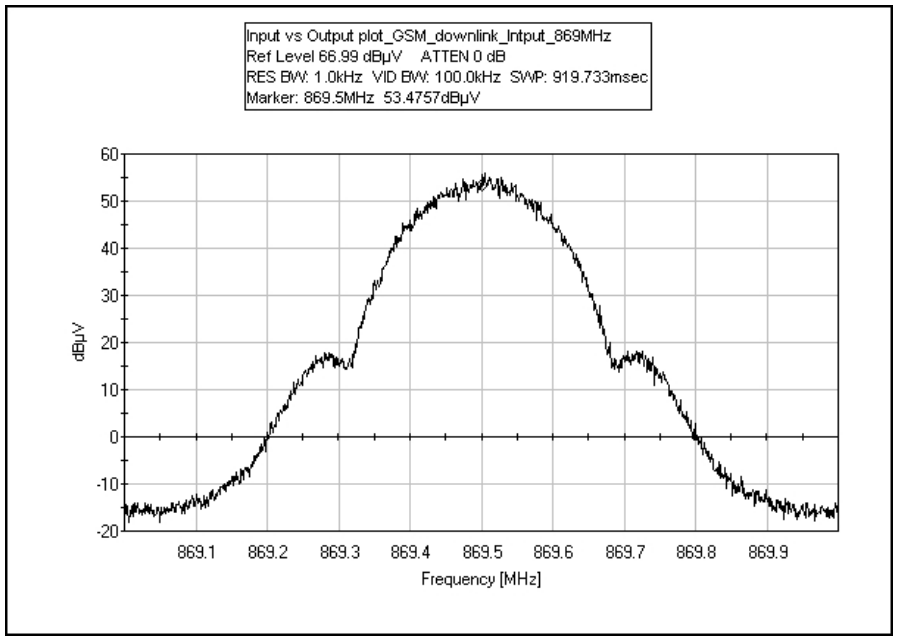
INPUT PLOT DOWNLINK - EDGE 881MHz



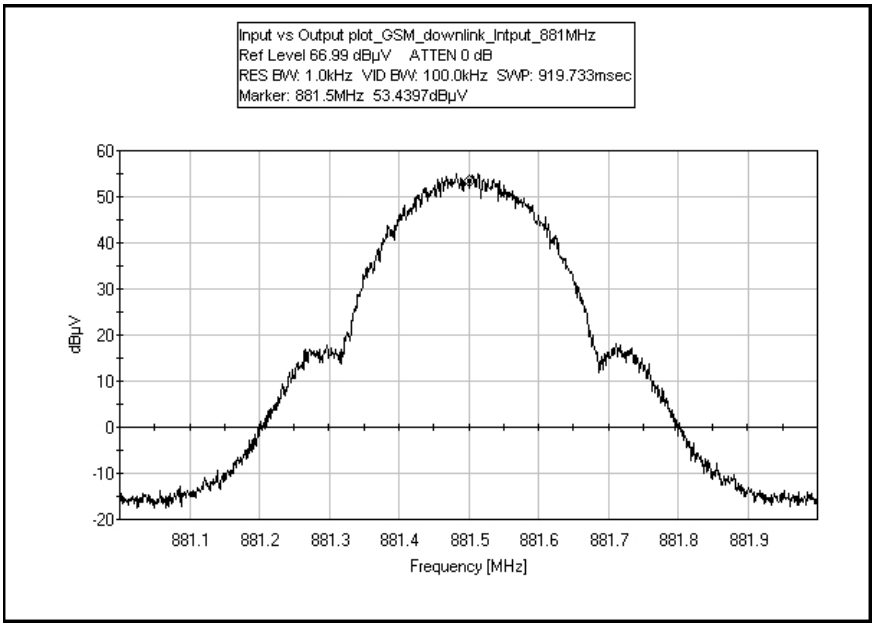
INPUT PLOT DOWNLINK - EDGE 893MHz



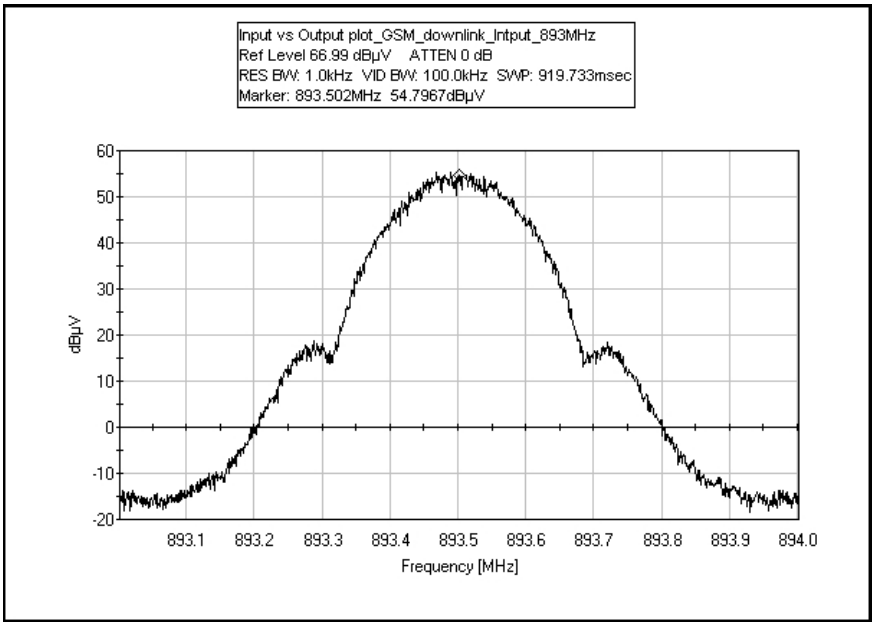
INPUT PLOT DOWNLINK - GSM 869MHz



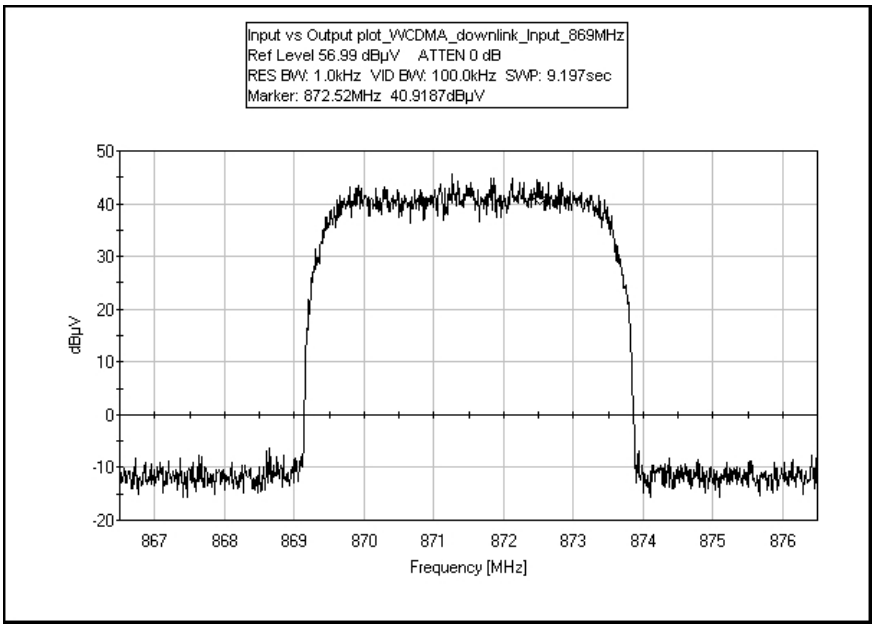
INPUT PLOT DOWNLINK - GSM 881MHz



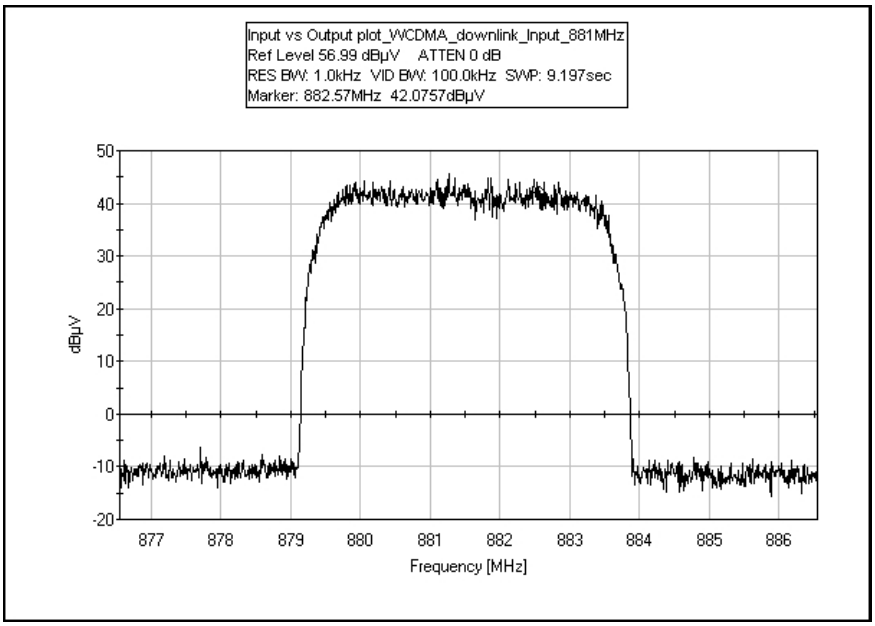
INPUT PLOT DOWNLINK - GSM 893MHz



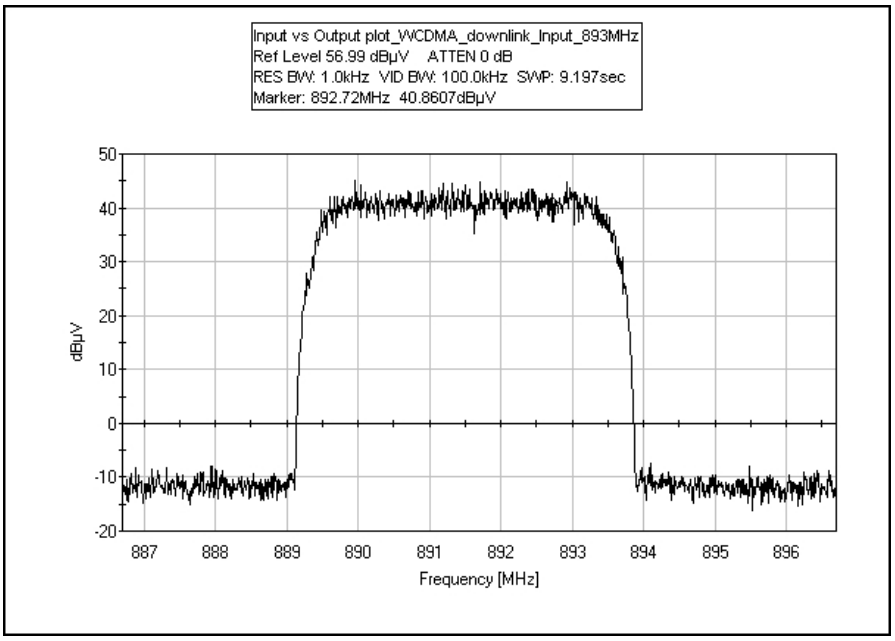
INPUT PLOT DOWNLINK - WCDMA 869MHz



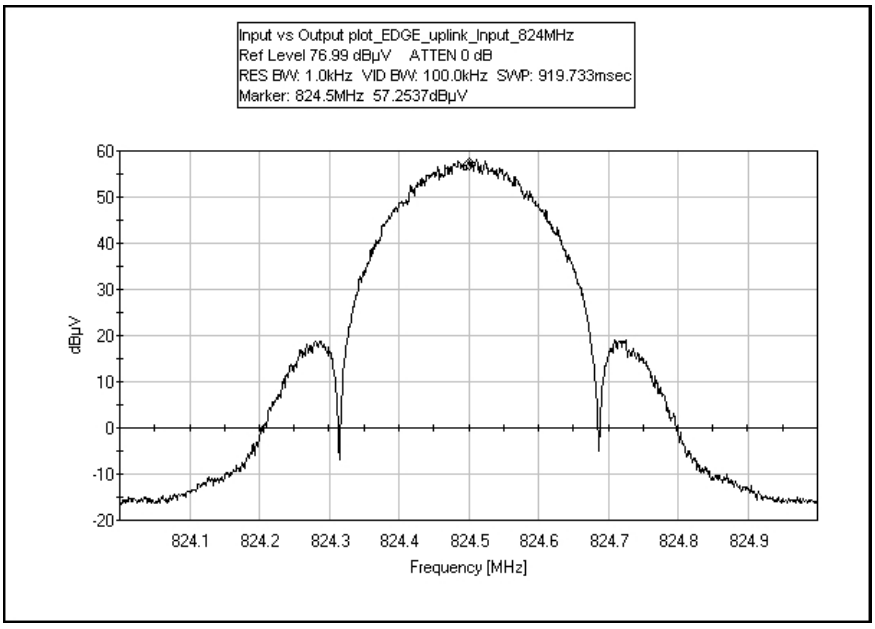
INPUT PLOT DOWNLINK - WCDMA 881MHz



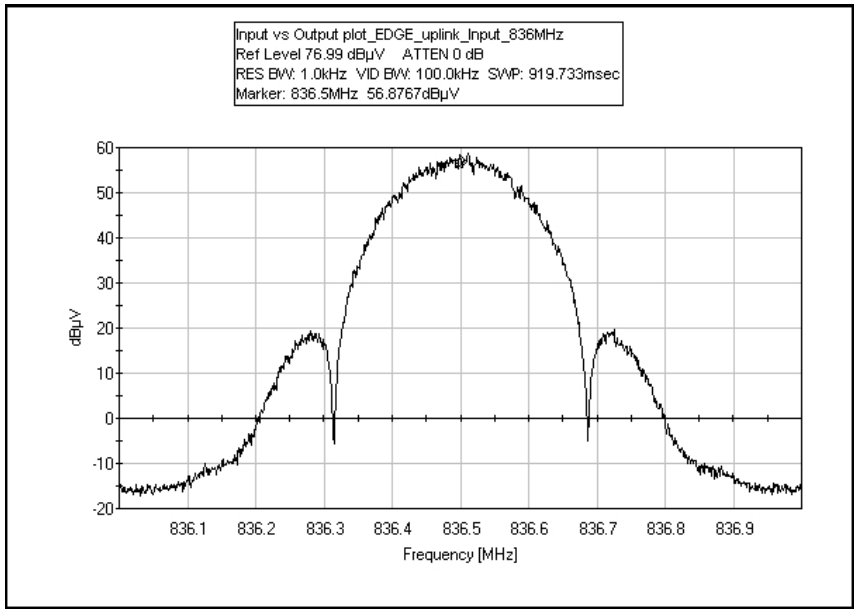
INPUT PLOT DOWNLINK - WCDMA 893MHz



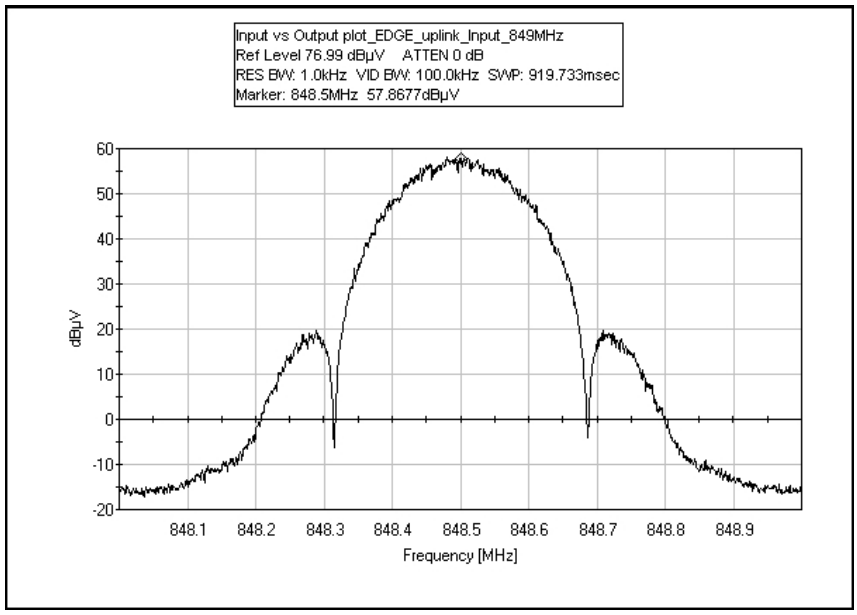
INPUT PLOT UPLINK - EDGE 824MHz



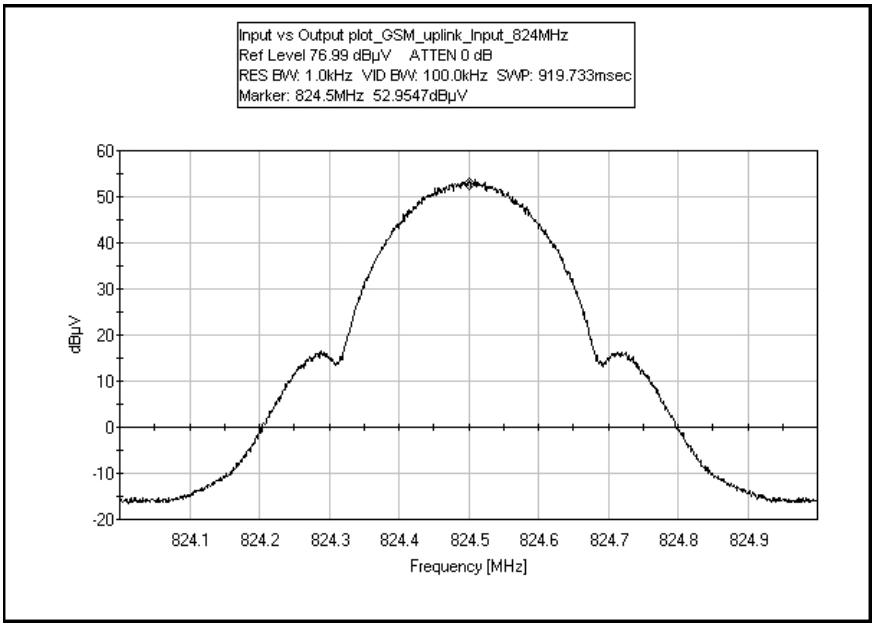
INPUT PLOT UPLINK - EDGE 836MHz



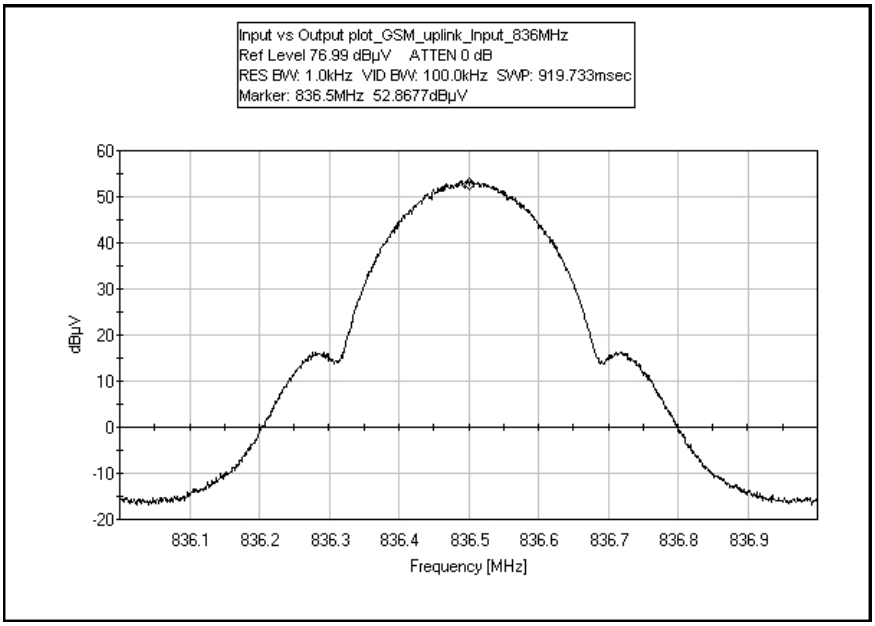
INPUT PLOT UPLINK - EDGE 849MHz



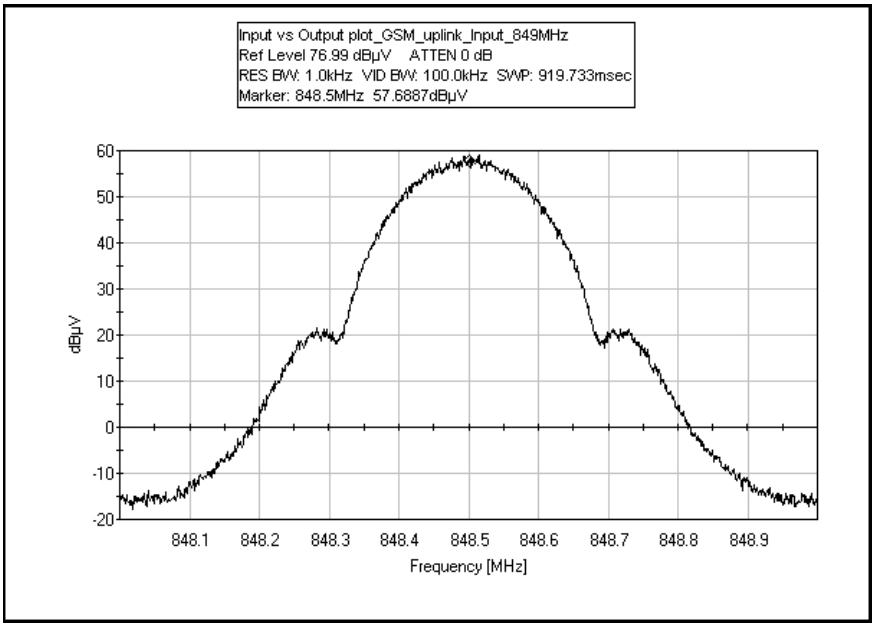
INPUT PLOT UPLINK - GSM 824MHz



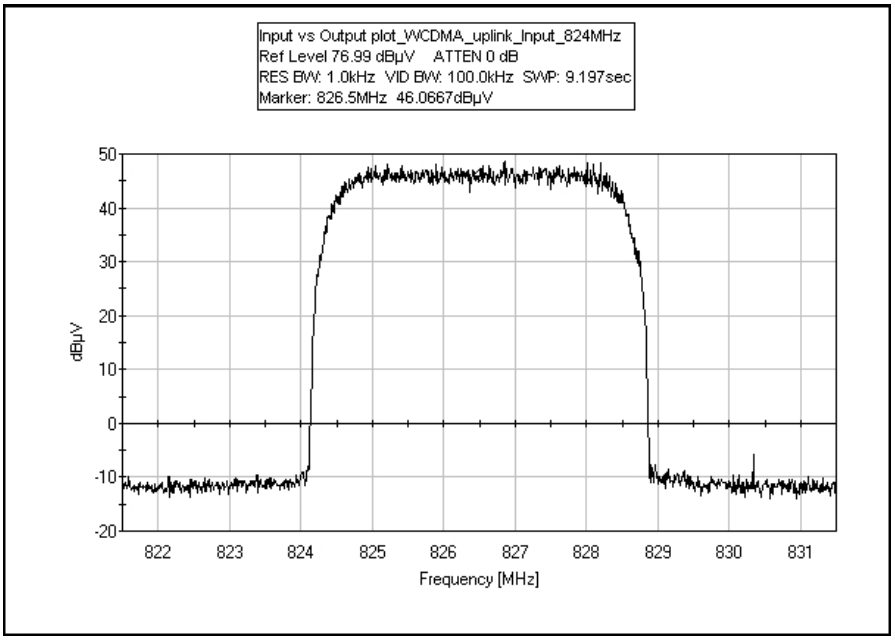
INPUT PLOT UPLINK - GSM 836MHz



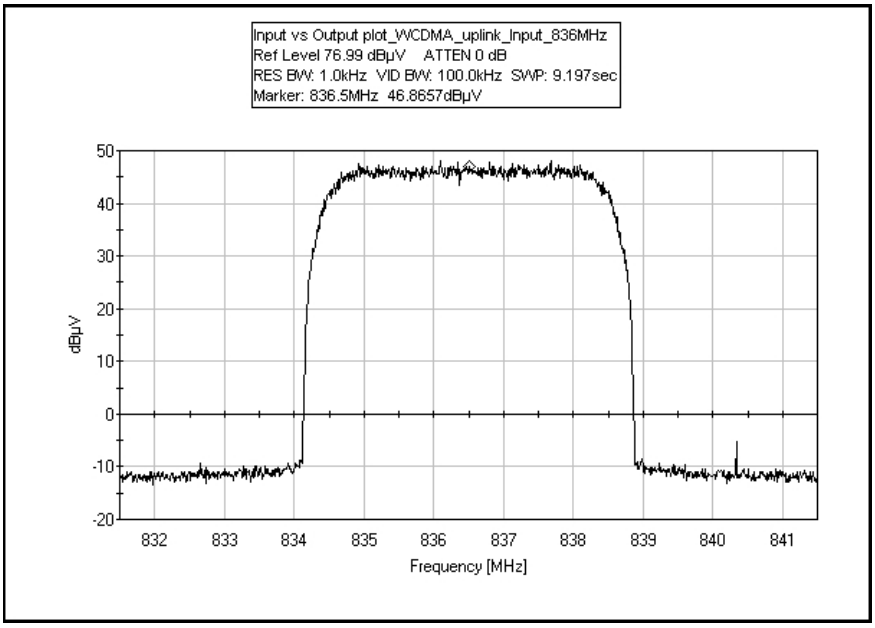
INPUT PLOT UPLINK - GSM 849MHz



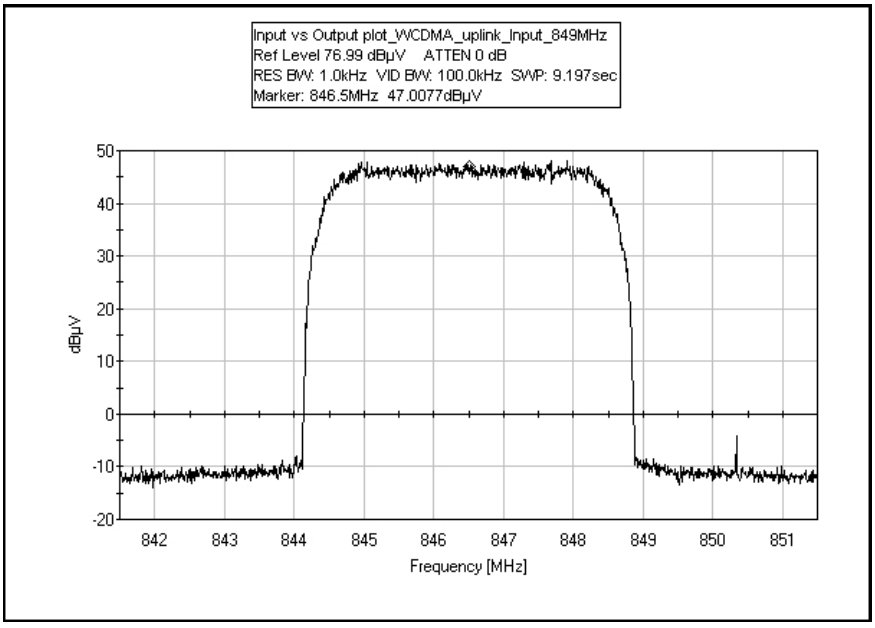
INPUT PLOT UPLINK - WCDMA 824MHz



INPUT PLOT UPLINK - WCDMA 836MHz



INPUT PLOT UPLINK - WCDMA 849MHz



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

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02869	Agilent	E4440A	MY46186290	021207	021209
36" 40GHz cable	02945	Strolab	NA	NA	091807	091809

Test Conditions

The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to remote ESG and 850MHz Server antenna port is connected to a spectrum analyzer. For uplink configuration, 850MHz Donor antenna port is connected to spectrum analyzer and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch.

Output waveform is recorded with a spectrum analyzer at the Antenna port of the device.
Input waveform is recorded with a spectrum analyzer at the RF out of the support ESG.

Uplink: 824 - 849MHz
Downlink: 869 - 894MHz

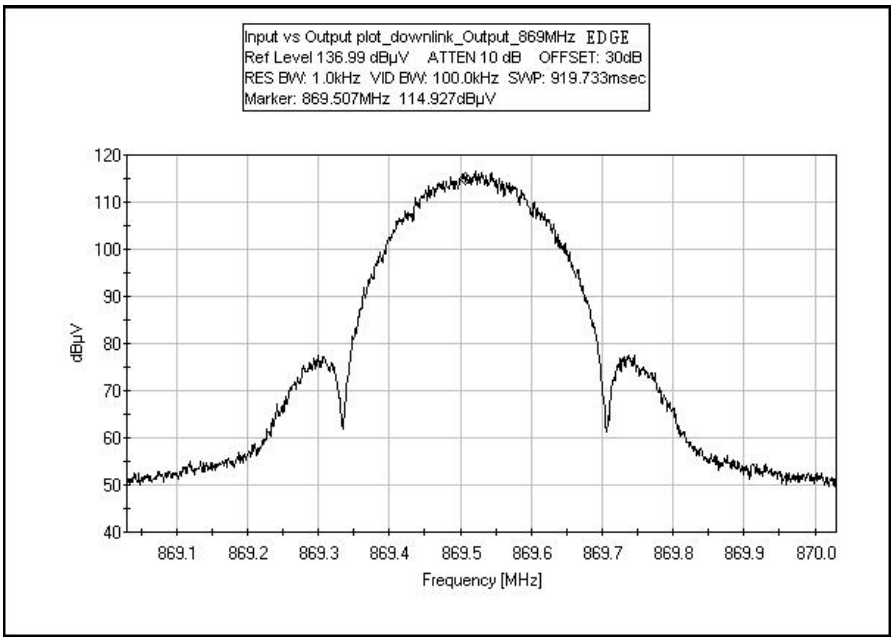
Uplink
Modulation: EDGE, GSM, WCDMA
TX= 824.5MHz, 836.5MHz, 848.5MHz
Power = 28dBm= 0.63W

Downlink:
Modulation: EDGE, GSM, WCDMA
TX=869.5MHz, 881.5MHz, 893.5MHz
Power = 28dBm= 0.63W

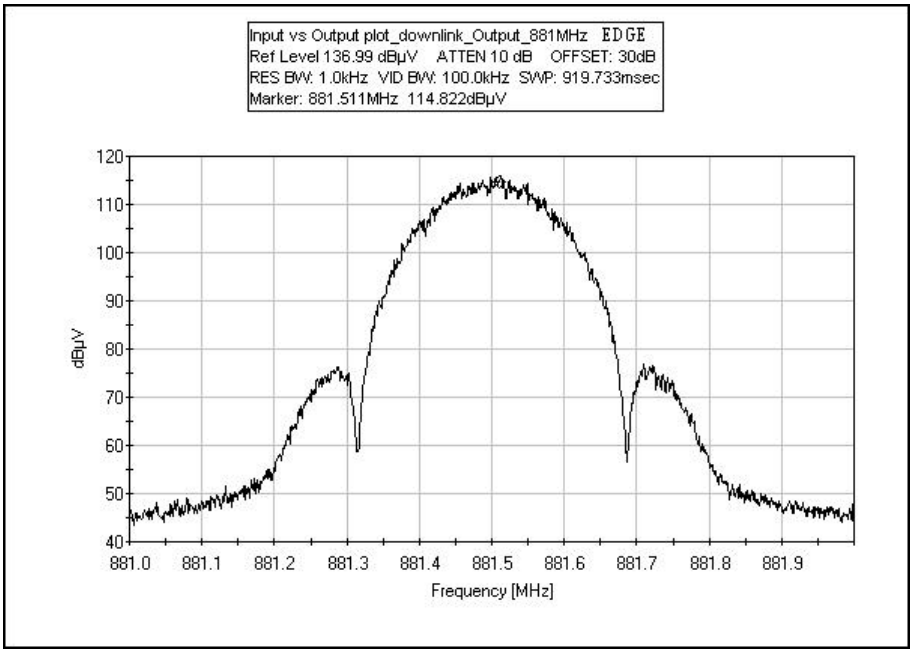
Test Setup Photos

Test Plots

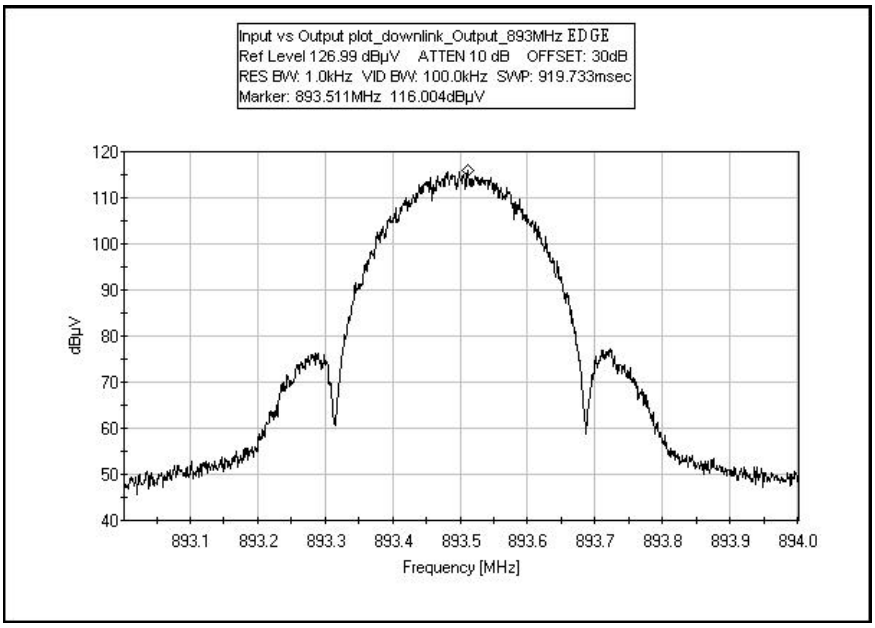
OUTPUT PLOT DOWNLINK - EDGE 869MHz



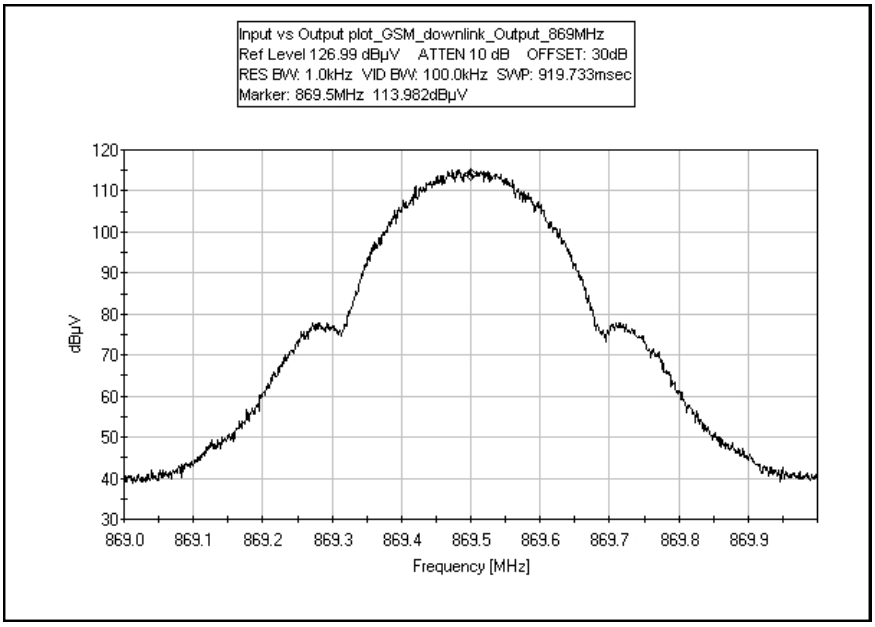
OUTPUT PLOT DOWNLINK - EDGE 881MHz



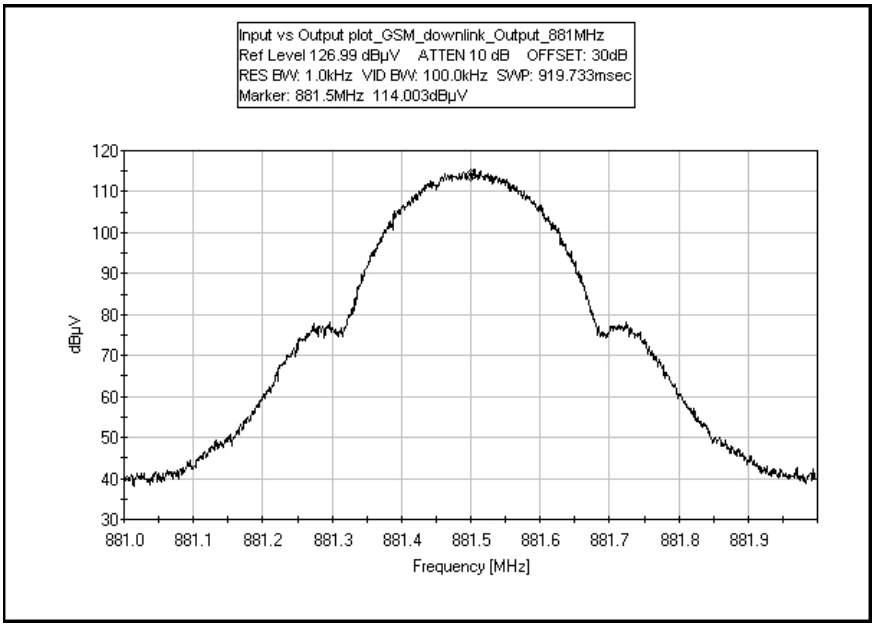
OUTPUT PLOT DOWNLINK - EDGE 893MHz



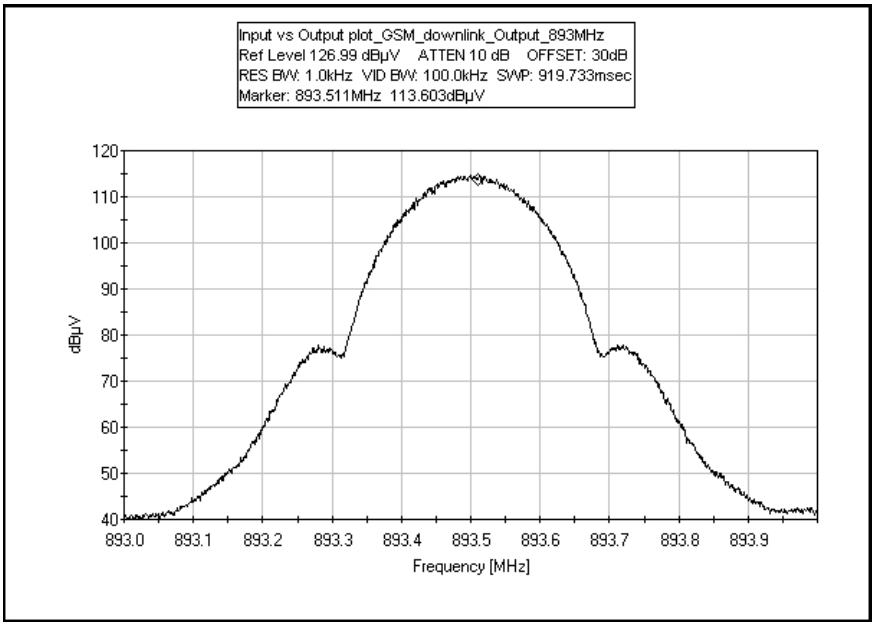
OUTPUT PLOT DOWNLINK - GSM 869MHz



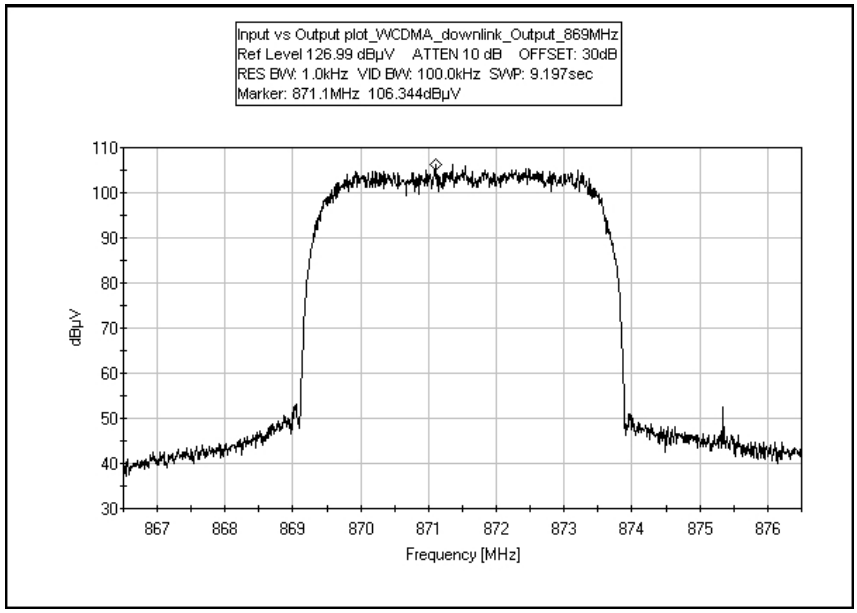
OUTPUT PLOT DOWNLINK - GSM 881MHz



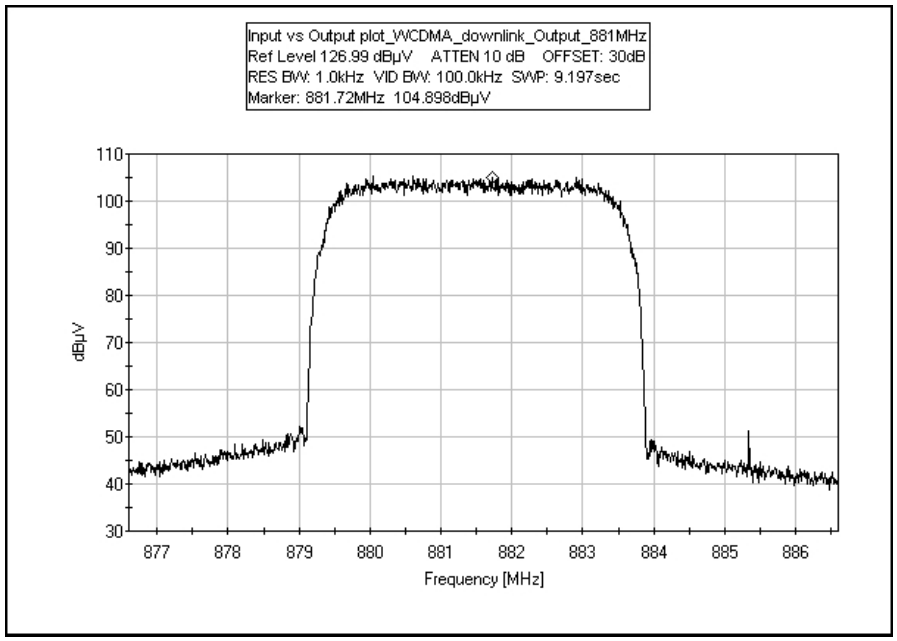
OUTPUT PLOT DOWNLINK - GSM 893MHz



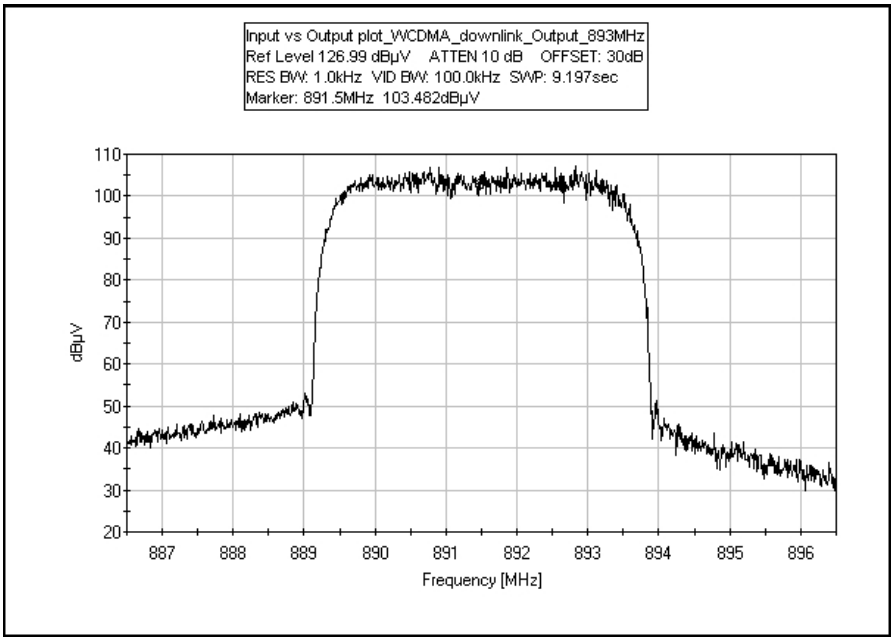
OUTPUT PLOT DOWNLINK - WCDMA 869MHz



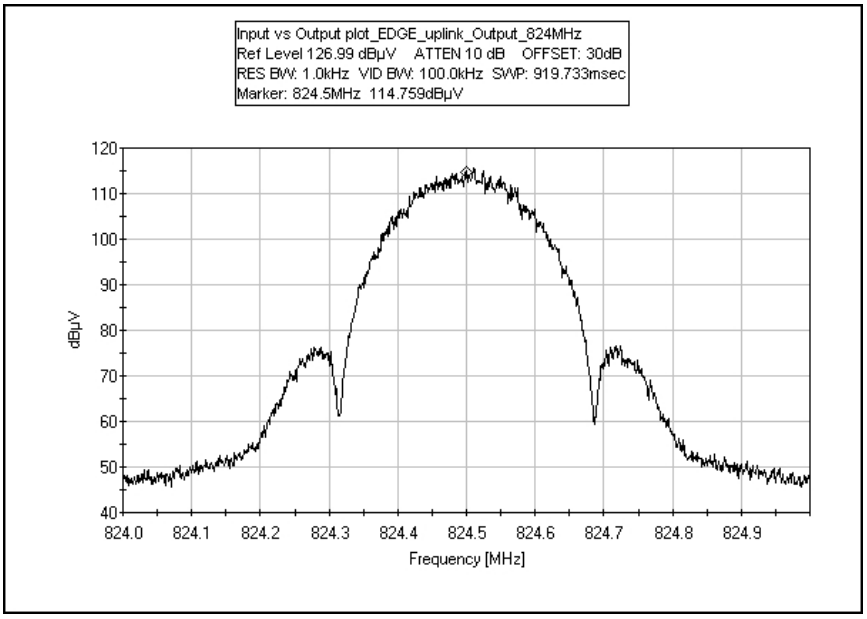
OUTPUT PLOT DOWNLINK - WCDMA 881MHz



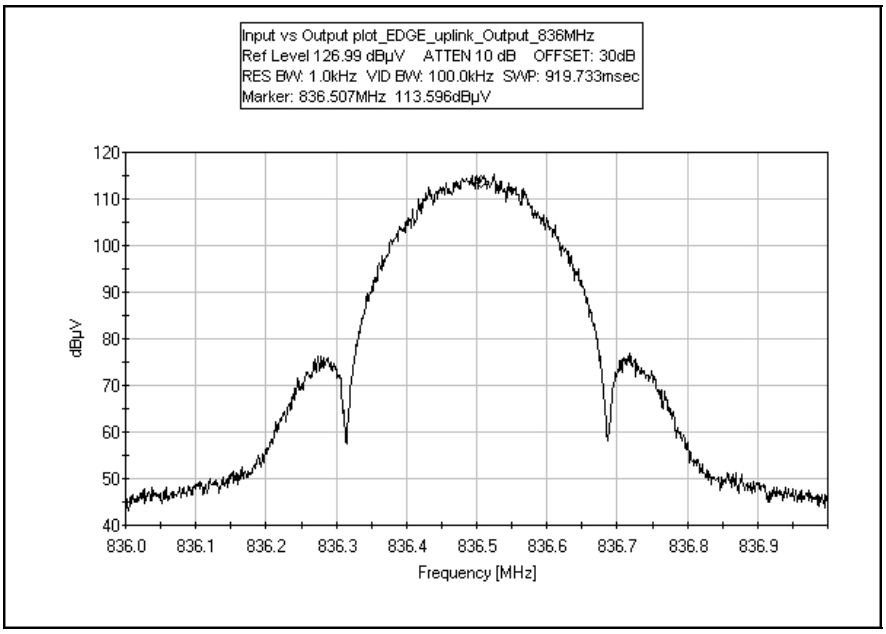
OUTPUT PLOT DOWNLINK - WCDMA 893MHz



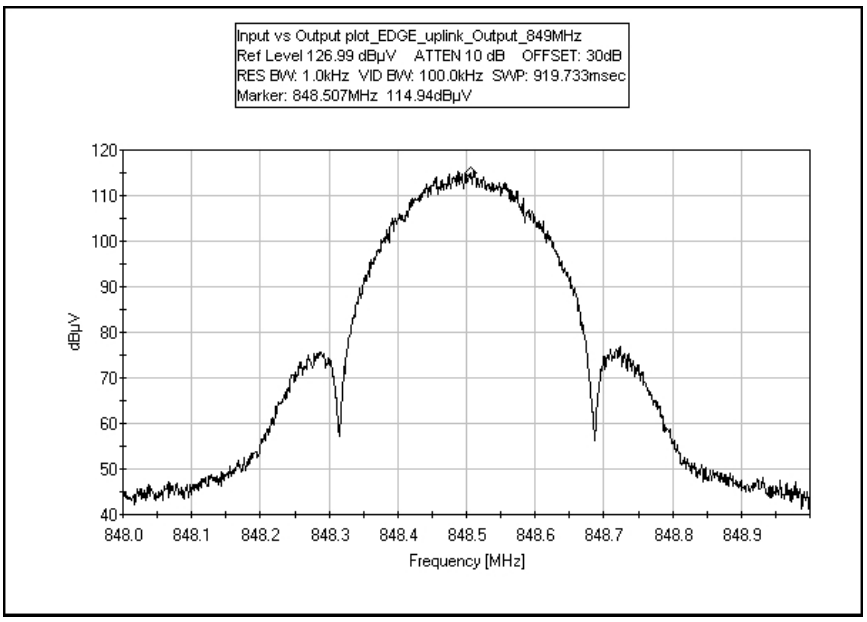
OUTPUT UPLINK - EDGE 824MHz



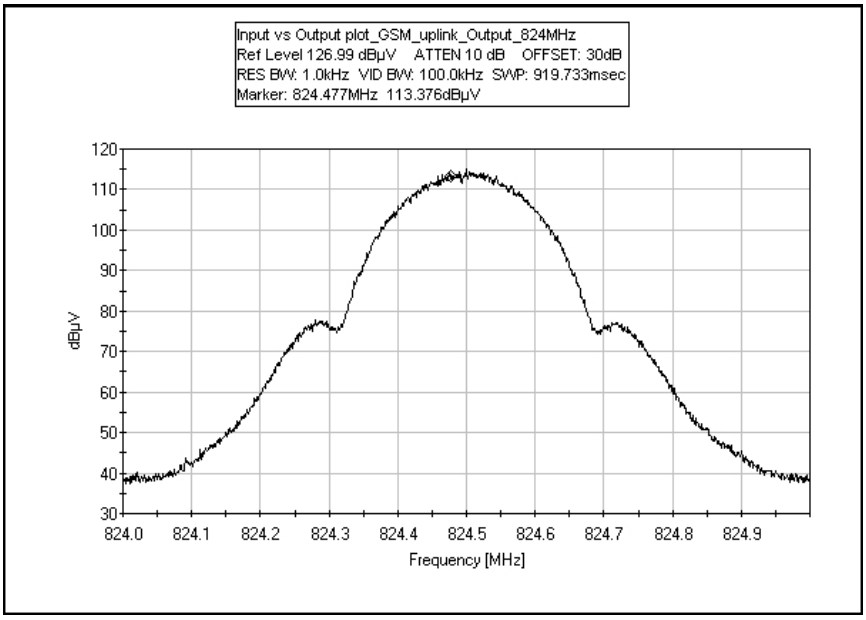
OUTPUT UPLINK - EDGE 836MHz



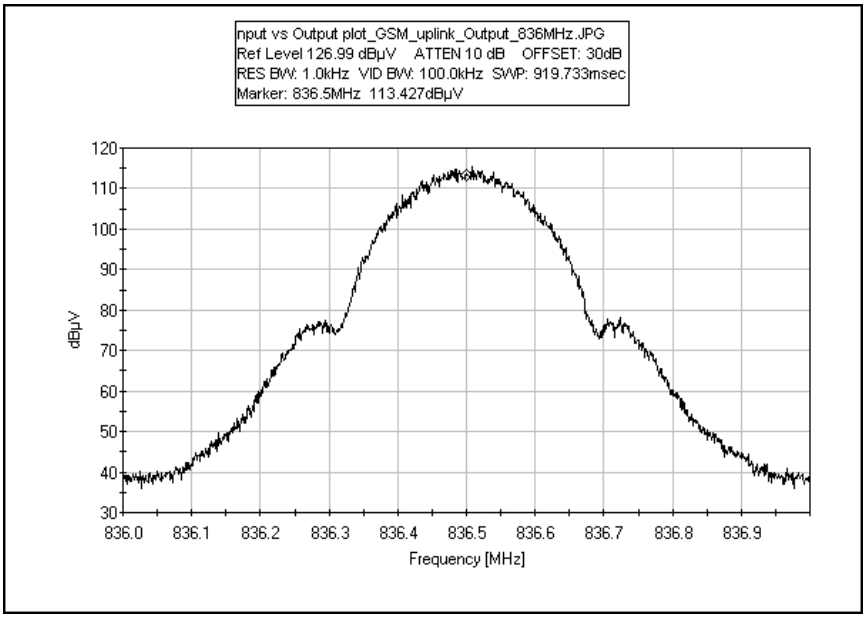
OUTPUT UPLINK - EDGE 849MHz



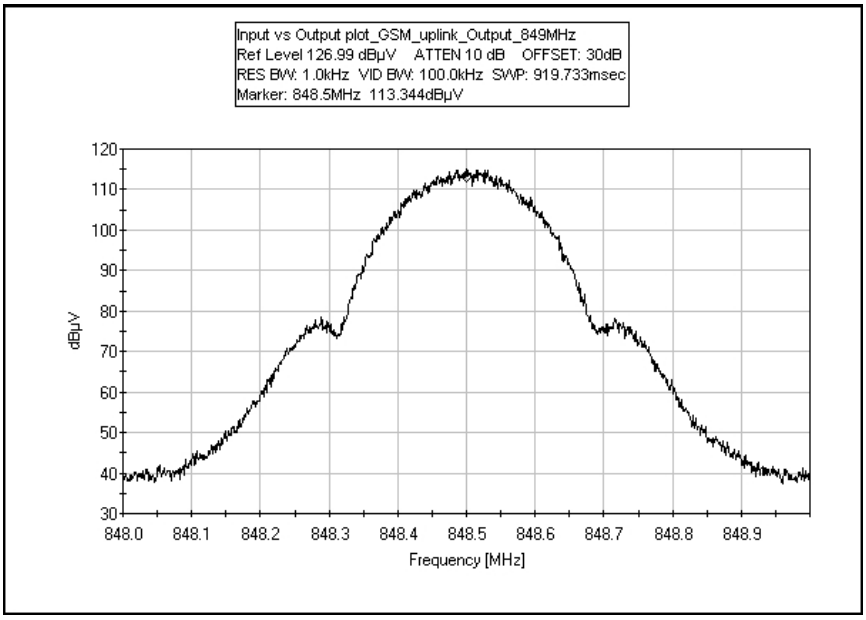
OUTPUT UPLINK - GSM 824MHz



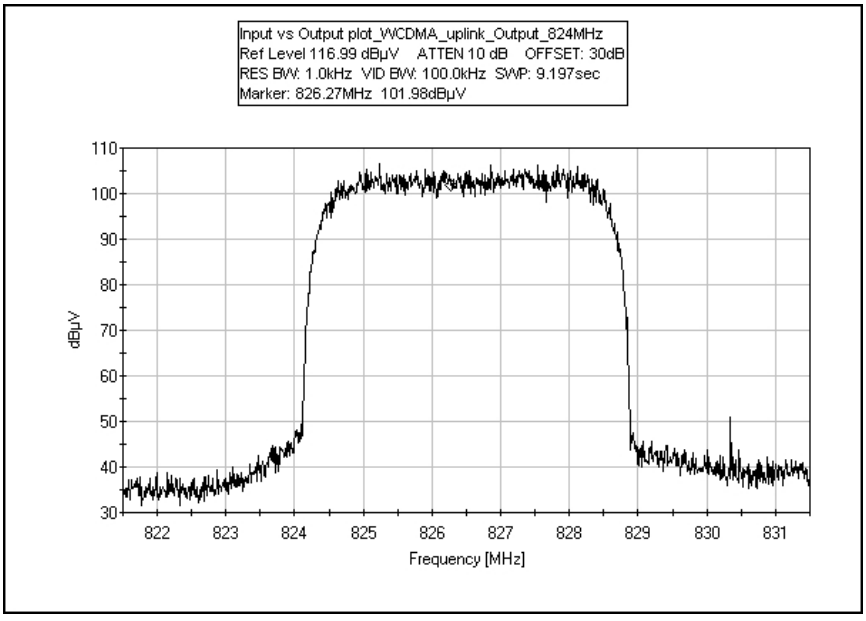
OUTPUT UPLINK - GSM 836MHz



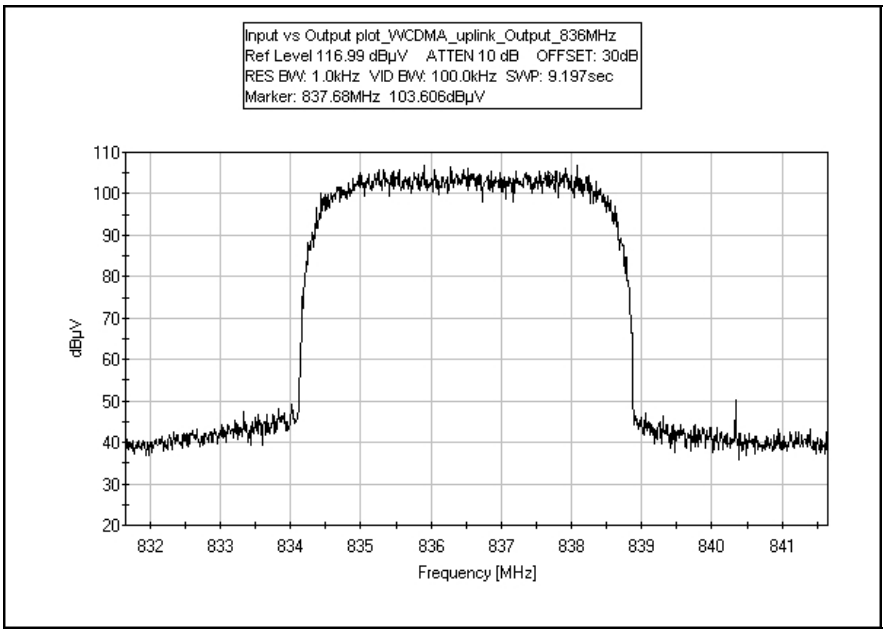
OUTPUT UPLINK - GSM 849MHz



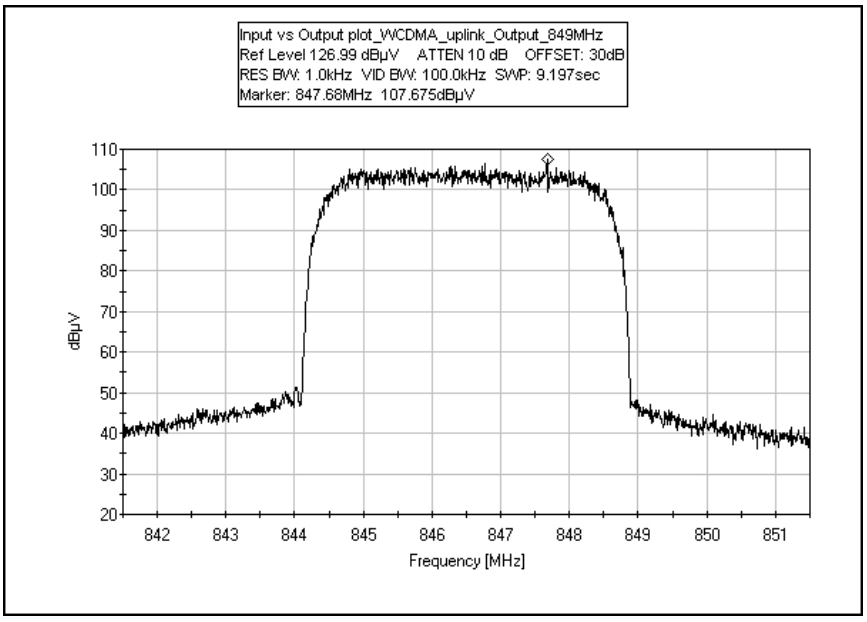
OUTPUT UPLINK - WCDMA 824MHz



OUTPUT UPLINK - WCDMA 836MHz



OUTPUT UPLINK - WCDMA 849MHz



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

Test Setup Photos

Test Data

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. •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 #:	**88230**	Date:	9/11/2008
Test Type:	**Conducted Emissions**	Time:	16:45:32
Equipment:	**Nexus RT Digital Repeater**	Sequence#:	4
Manufacturer:	Powerwave Technologies	Tested By:	E. Wong
Model:	NP50-11311		110V 60Hz
S/N:	NA		

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	MY46186290	02/12/2007	02/12/2009	02869
3'-40GHz cable	NA	09/18/2007	09/18/2009	P02945
1.0 GHz HPF	1	01/11/2008	01/11/2010	02749

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

Function	Manufacturer	Model #	S/N
Nexus RT Digital Repeater*	Powerwave Technologies	NP50-11311	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	HP	HSTNNC18C	CND63661JIC7
Ethernet Switch	Linksys	SD205	REF003600624
ESG	Agilent	E4433B	US40052191
Powermeter	HP	E4419B	MY40510694

Test Conditions / Notes:

FCC Part 22. The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to remote ESG and 850MHz Server antenna port is connected to a remote power meter. For uplink configuration, 850MHz Donor antenna port is connected to remote Power meter and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch. All other ports are service ports hence unpopulated. Uplink: 824 - 849MHz, Downlink: 869 - 894MHz. Uplink Modulation: EDGE, GSM, WCDMA. TX= 824.5MHz, 836.5MHz, 848.5MHz Power = 28dBm= 0.63W. Downlink: Modulation: EDGE, GSM, WCDMA. TX=869.5MHz, 881.5MHz, 893.5MHz. Power = 28dBm= 0.63W. 23°C, 52% relative humidity. Modification: Paint underneath the internal ground stud was removed to enhance chassis to ground cable connection. Frequency range of measurement = 9 kHz - 9 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 – 9 GHz RBW=1MHz, VBW=1MHz.

Transducer Legend:

T1=Hi Freq_40GHz_3ft_CAB-ANP02945-091809 T2=K&L 1GHz HPF AN02749_011110

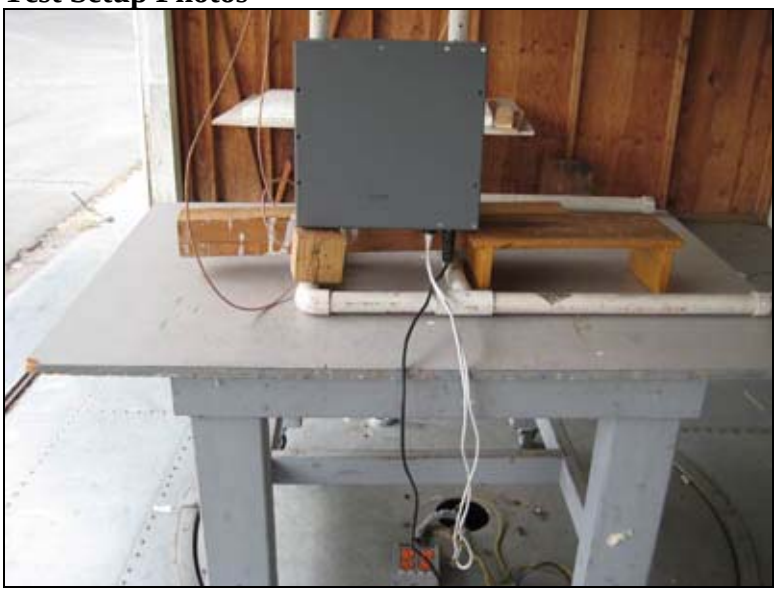
Measurement Data: Reading listed by margin. Test Lead: Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	1739.000M	53.8	+0.4	+0.4			+0.0	54.6	94.0	-39.4	Anten
									EDGE Downlink		
2	1786.840M	52.6	+0.4	+0.4			+0.0	53.4	94.0	-40.6	Anten
									EDGE Downlink		

3	1762.840M	52.5	+0.4	+0.4	+0.0	53.3	94.0	-40.7	Anten EDGE Downlink
4	1762.890M	48.1	+0.4	+0.4	+0.0	48.9	94.0	-45.1	Anten GSM Downlink
5	1787.140M	46.2	+0.4	+0.4	+0.0	47.0	94.0	-47.0	Anten GSM Downlink
6	1738.920M	45.1	+0.4	+0.4	+0.0	45.9	94.0	-48.1	Anten GSM Downlink
7	1762.500M	44.5	+0.4	+0.4	+0.0	45.3	94.0	-48.7	Anten WCDMA Downlink
8	1743.250M	43.4	+0.4	+0.4	+0.0	44.2	94.0	-49.8	Anten WCDMA Downlink
9	1783.000M	40.6	+0.4	+0.4	+0.0	41.4	94.0	-52.6	Anten WCDMA Downlink
10	1697.095M	38.3	+0.4	+0.4	+0.0	39.1	94.0	-54.9	Anten EDGE Uplink
11	1673.100M	37.7	+0.4	+0.5	+0.0	38.6	94.0	-55.4	Anten EDGE Uplink
12	1649.000M	37.1	+0.4	+0.5	+0.0	38.0	94.0	-56.0	Anten GSM_uplink
13	1697.060M	36.1	+0.4	+0.4	+0.0	36.9	94.0	-57.1	Anten GSM_uplink
14	1673.080M	36.0	+0.4	+0.5	+0.0	36.9	94.0	-57.1	Anten GSM_uplink
15	1694.100M	36.1	+0.4	+0.4	+0.0	36.9	94.0	-57.1	Anten WCDMA Uplink
16	1649.100M	35.9	+0.4	+0.5	+0.0	36.8	94.0	-57.2	Anten EDGE Uplink
17	1651.000M	35.2	+0.4	+0.5	+0.0	36.1	94.0	-57.9	Anten WCDMA Uplink
18	1673.560M	35.0	+0.4	+0.5	+0.0	35.9	94.0	-58.1	Anten WCDMA Uplink

FCC 2.1033(c)(14)/2.1053/22.917(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 Part 22.917(a) Radiated Spurious Emission**		
Work Order #:	**88230**	Date:	9/11/2008
Test Type:	**Radiated Scan**	Time:	09:09:54
Equipment:	**Nexus RT Digital Repeater**	Sequence#:	2
Manufacturer:	Powerwave Technologies	Tested By:	E. Wong
Model:	NP50-11311		
S/N:	NA		

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	MY46186290	02/12/2007	02/12/2009	02869
Bilog Antenna	2451	01/21/2008	01/21/2010	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	05/02/2008	05/02/2010	00309
Horn Antenna	6246	06/06/2008	06/06/2010	00849
Microwave Pre-amp	3123A00281	07/28/2008	07/28/2010	00786
3'-40GHz cable	NA	09/18/2007	09/18/2009	P02945
Heliax Antenna Cable	P5565	09/18/2006	09/18/2008	P05565
Loop Antenna	2014	06/16/2008	06/16/2010	00314
1.0 GHz HPF	1	01/11/2008	01/11/2010	02749

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

Function	Manufacturer	Model #	S/N
Nexus RT Digital Repeater*	Powerwave Technologies	NP50-11311	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	HP	HSTNNC18C	CND63661JIC7
Ethernet Switch	Linksys	SD205	REF003600624
ESG	Agilent	E4433B	US40052191
Powermeter	HP	E4419B	MY40510694

Test Conditions / Notes:

FCC part 22 (2007) The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to remote ESG and 850MHz Server antenna port is connected to a remote power meter. For uplink configuration, 850MHz Donor antenna port is connected to remote Power meter and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch. All other ports are service ports hence unpopulated. Uplink: 824 - 849MHz, Downlink: 869 - 894MHz. Uplink Modulation: EDGE TX= 824.5MHz, 836.5MHz, 848.5MHz Power = 28dBm= 0.63W. Downlink: Modulation: EDGE TX=869.5MHz, 881.5MHz, 893.5MHz Power = 28dBm= 0.63W. 23°C, 52% relative humidity. Modification: Paint underneath the internal ground stud was removed to enhance chassis to ground cable connection. Frequency range of measurement = 9 kHz - 9 GHz. Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz – 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz - 1000MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz – 9 GHz RBW=1MHz, VBW=1MHz. No Emission found, recorded data point represent noise floor level.

Operating Frequency: 824-849 MHz Uplink and 869-894 MHz Downlink

Highest Measured Output Power: 27.99 ERP(dBm)= 0.63 ERP(Watts)
Distance: 3 meters
Limit: 43+10Log(P) 40.99 dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
3,293.80	-55.5	Vert	83.49
2,608.50	-56.5	Vert	84.49

BLOCKEDGE

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02869	Agilent	E4440A	MY46186290	021207	021209
36" 40GHz cable	02945	Strolab	NA	NA	091807	091809

Test Conditions

The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to remote ESG and 850MHz Server antenna port is connected to a spectrum analyzer. For uplink configuration, 850MHz Donor antenna port is connected to spectrum analyzer and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch.

Blockedge plot is recorded with a spectrum analyzer at the Antenna port of the device.

Uplink: 824 - 849MHz
Downlink: 869 - 894MHz

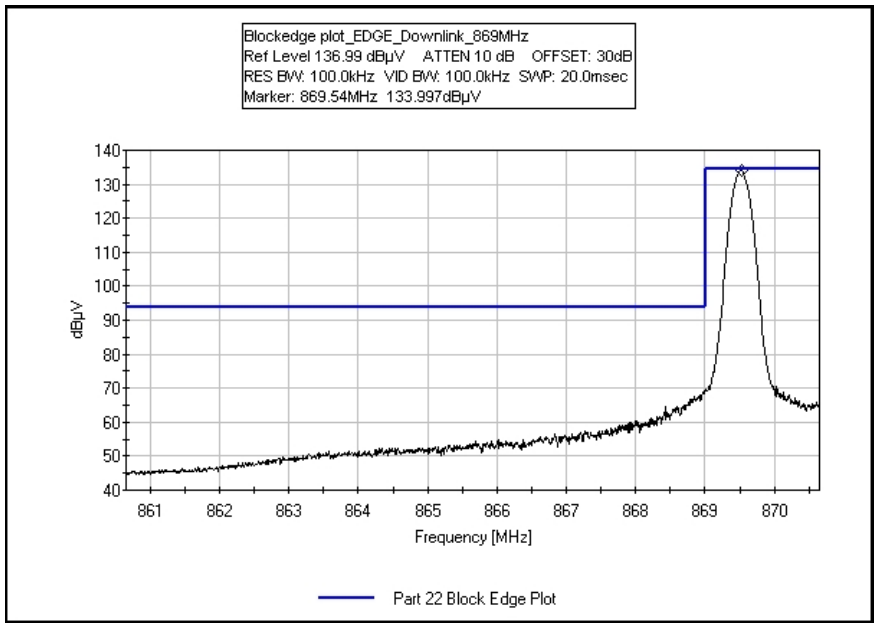
Uplink
Modulation: EDGE, GSM, WCDMA
TX= 824.5MHz, 836.5MHz, 848.5MHz
Power = 28dBm= 0.63W

Downlink:
Modulation: EDGE, GSM, WCDMA
TX=869.5MHz, 881.5MHz, 893.5MHz
Power = 28dBm= 0.63W

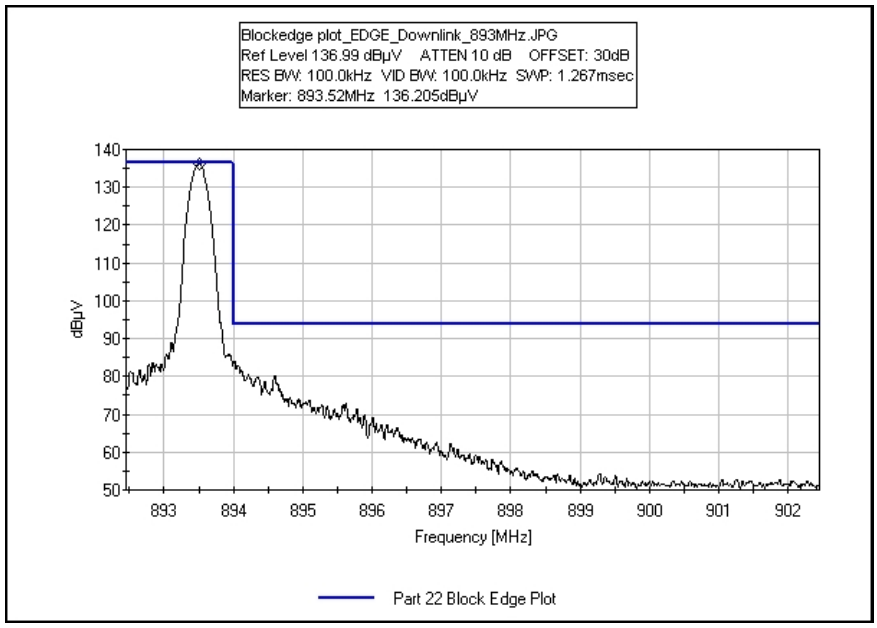
Test Setup Photos

Test Plots

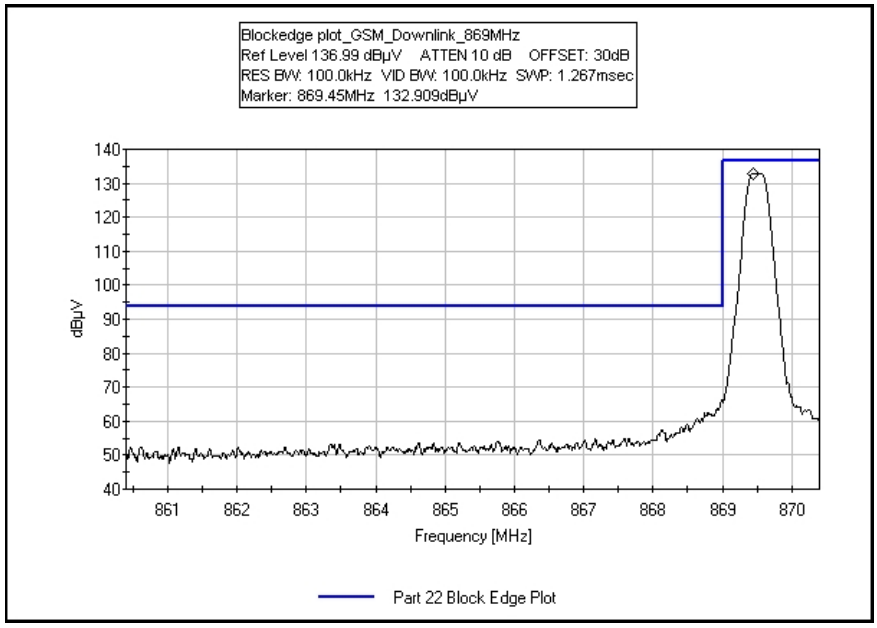
BLOCKEDGE DOWNLINK - EDGE 869MHz



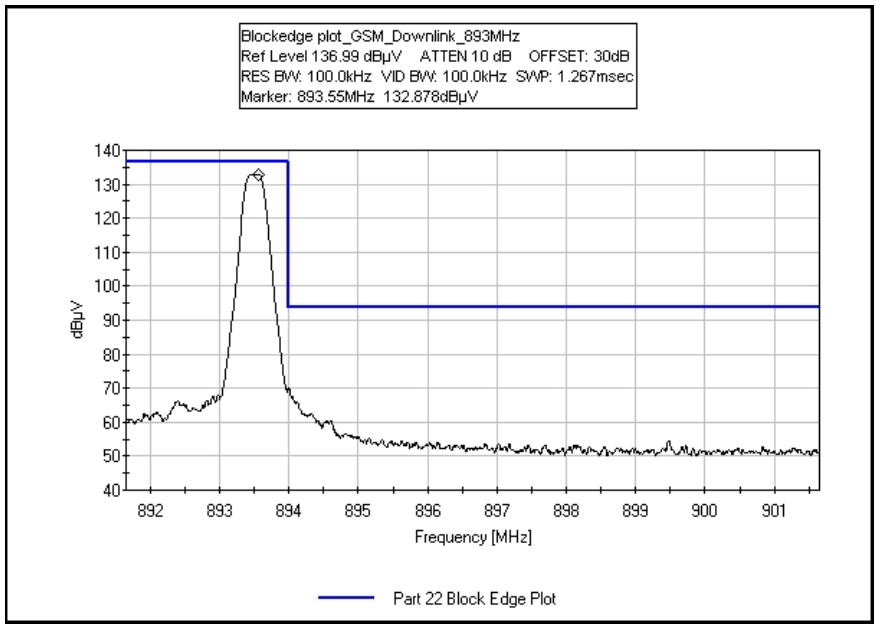
BLOCKEDGE DOWNLINK - EDGE 893MHz



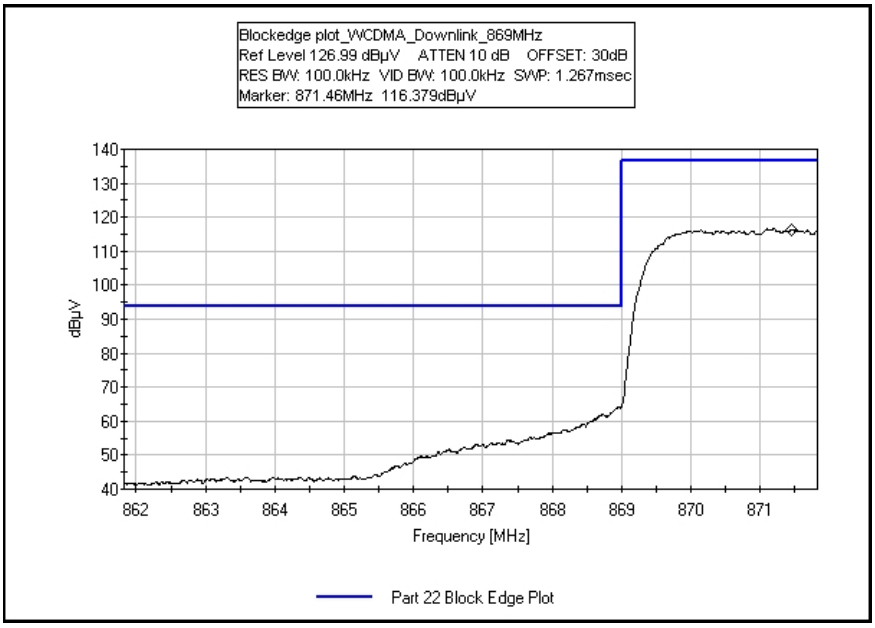
BLOCKEDGE DOWNLINK - GSM 869MHz



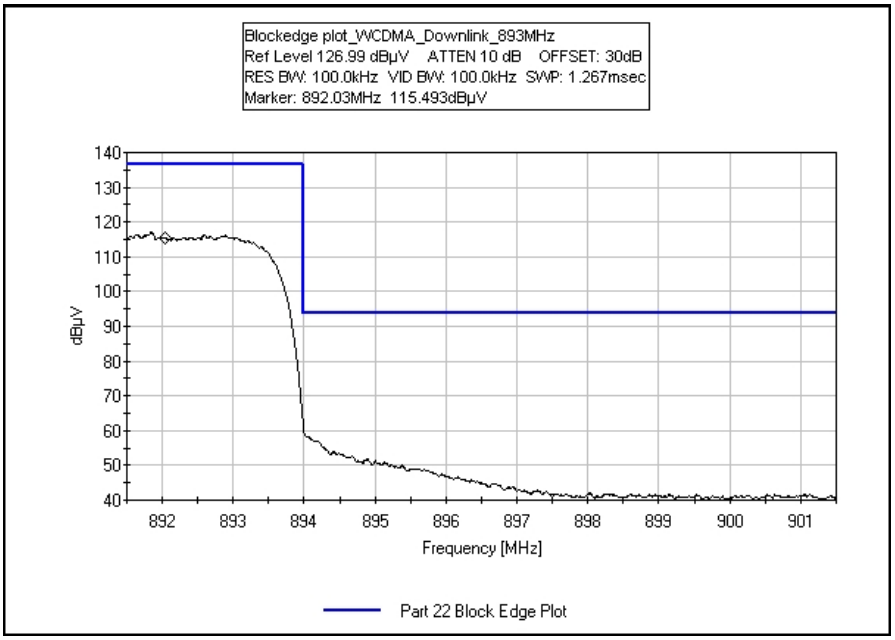
BLOCKEDGE DOWNLINK - GSM 893MHz



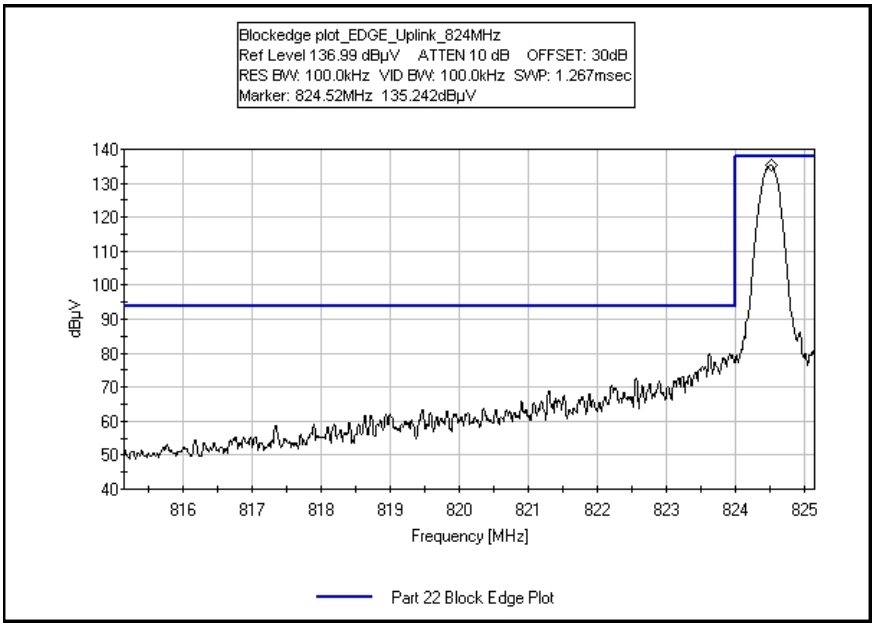
BLOCKEDGE DOWNLINK - WCDMA 869MHz



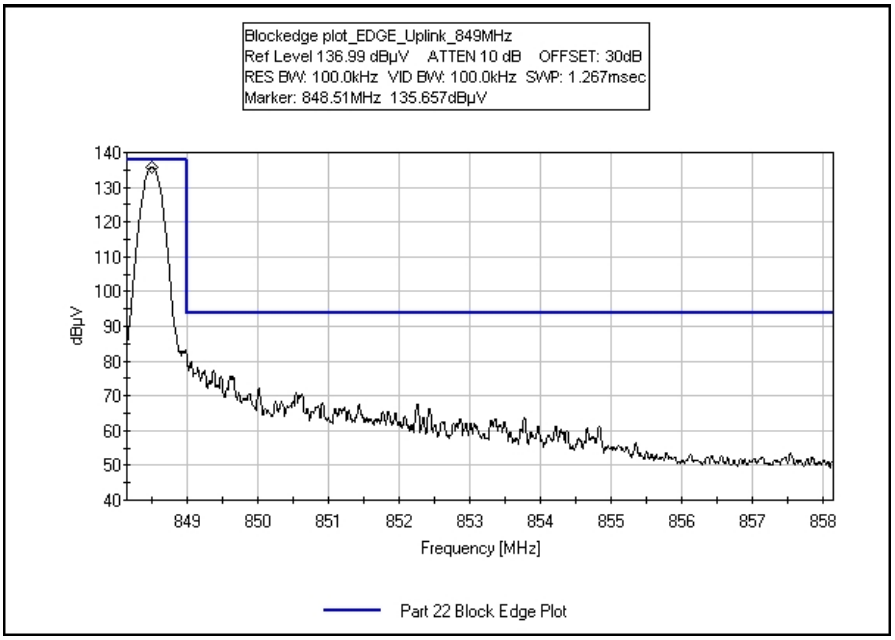
BLOCKEDGE DOWNLINK - WCDMA 893MHz



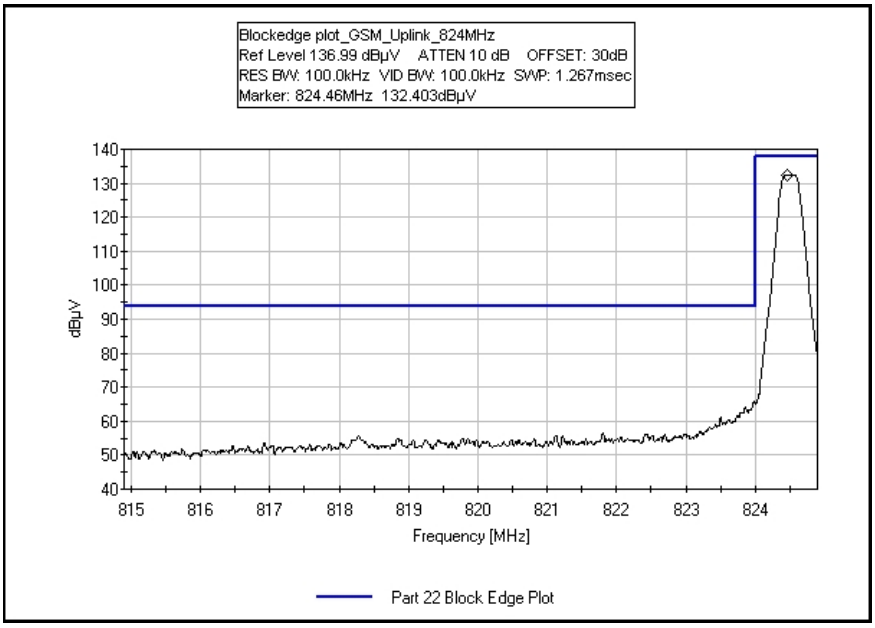
BLOCKEDGE UPLINK - EDGE 824MHz



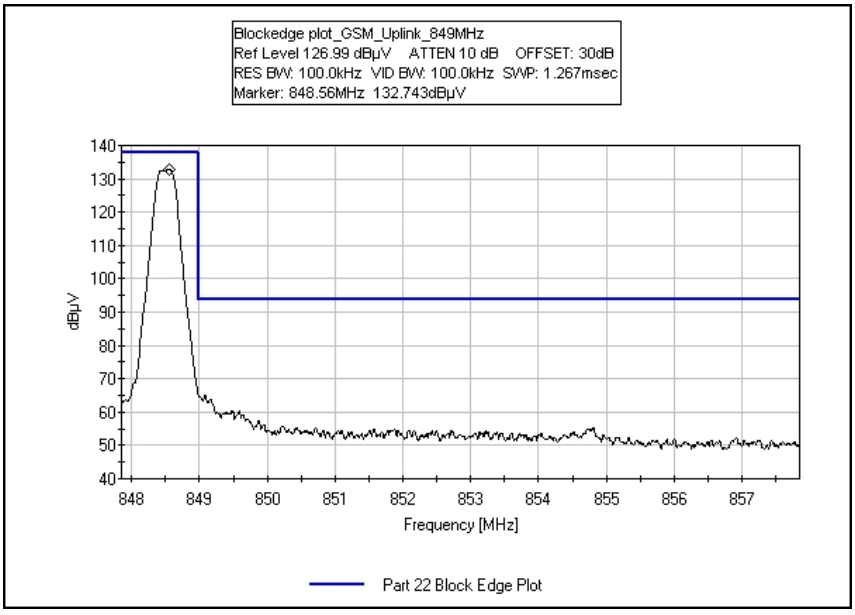
BLOCKEDGE UPLINK - EDGE 849MHz



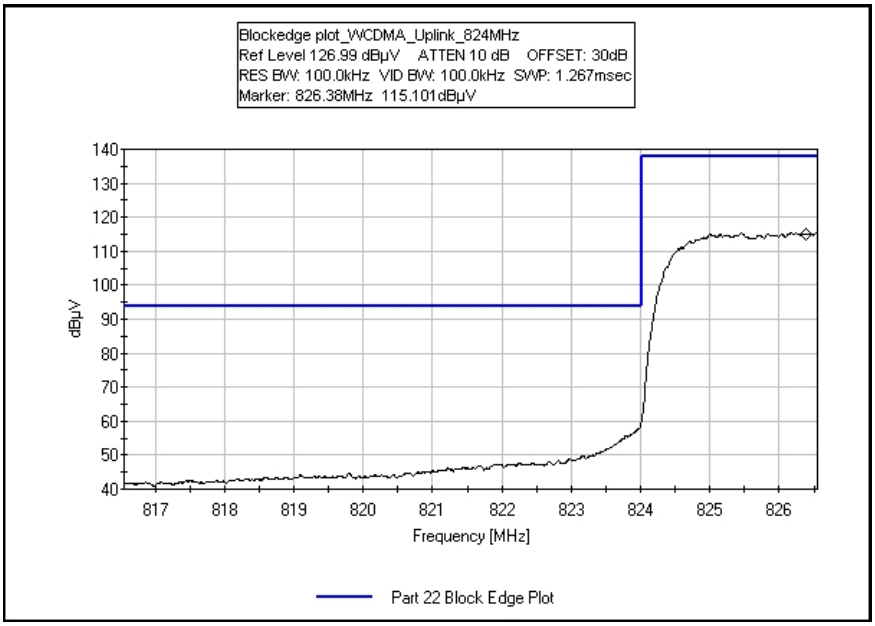
BLOCKEDGE UPLINK - GSM 824MHz



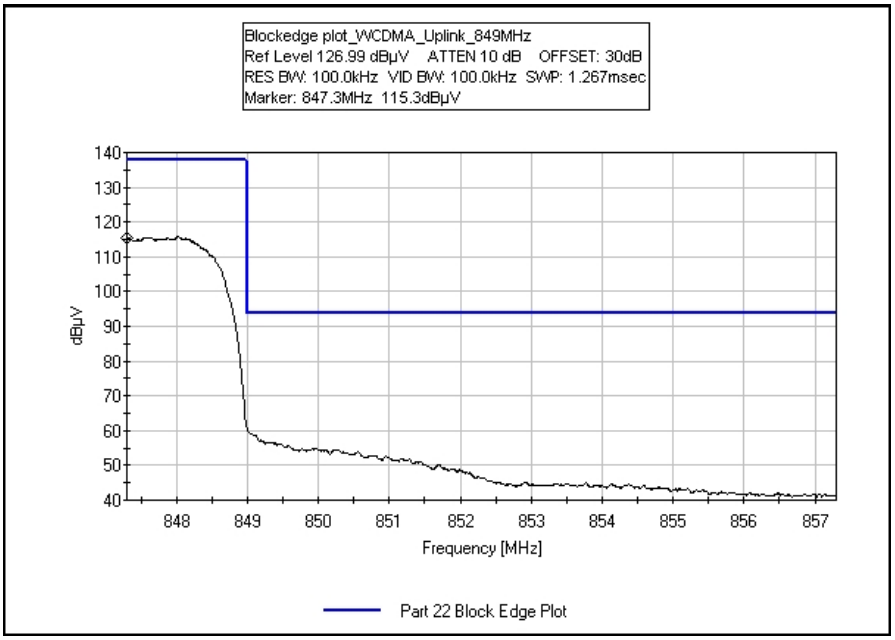
BLOCKEDGE UPLINK - GSM 849MHz



BLOCKEDGE UPLINK - WCDMA 824MHz



BLOCKEDGE UPLINK - WCDMA 849MHz



INTERMODULATION

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02869	Agilent	E4440A	MY46186290	021207	021209
36" 40GHz cable	02945	Strolab	NA	NA	091807	091809

Test Conditions

The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to remote ESG and 850MHz Server antenna port is connected to a spectrum analyzer. For uplink configuration, 850MHz Donor antenna port is connected to spectrum analyzer and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch.

Two modulated signal from the support ESG is injected into the device and the intermodulation product is measured at the RF antenna port under investigation.

Uplink: 824 - 849MHz
Downlink: 869 - 894MHz

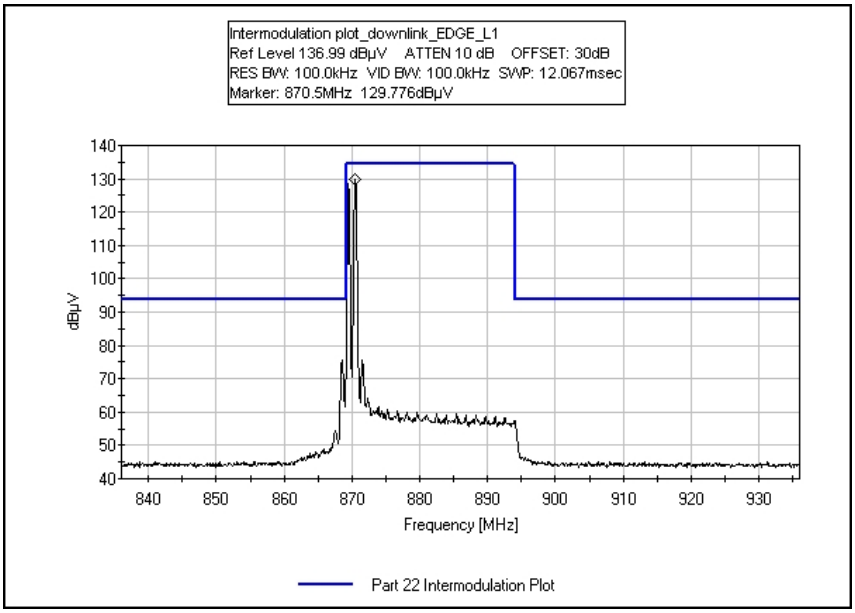
Uplink
Modulation: EDGE, GSM, WCDMA
TX= 824.5MHz, 836.5MHz, 848.5MHz
Power = 28dBm= 0.63W

Downlink:
Modulation: EDGE, GSM, WCDMA
TX=869.5MHz, 881.5MHz, 893.5MHz
Power = 28dBm= 0.63W

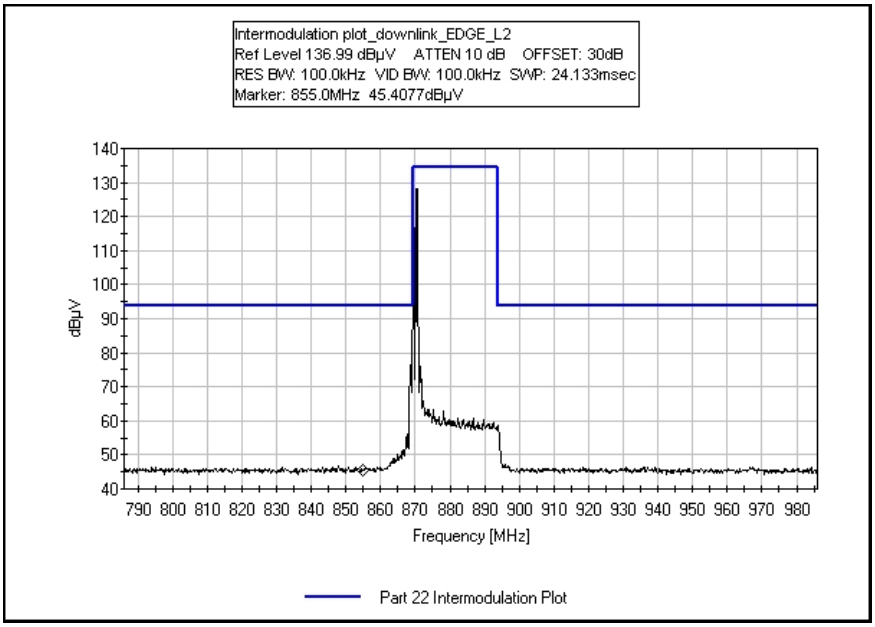
Test Setup Photos

Test Plots

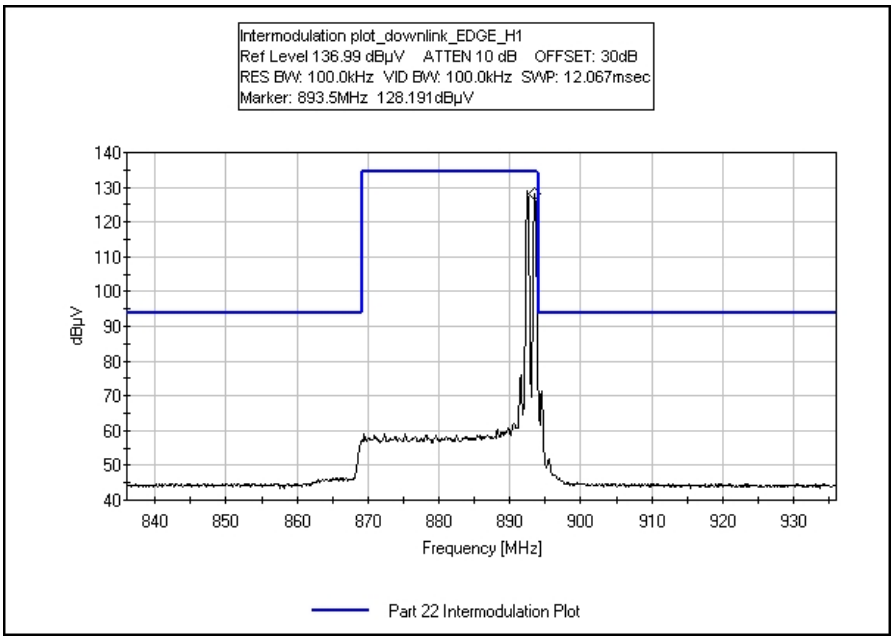
INTERMODULATION DOWNLINK - EDGE L1



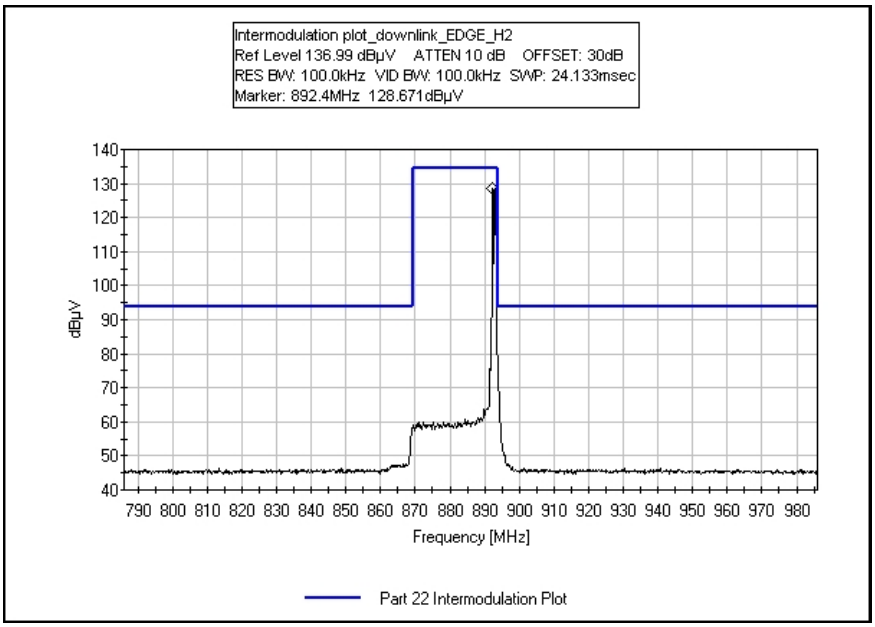
INTERMODULATION DOWNLINK - EDGE L2



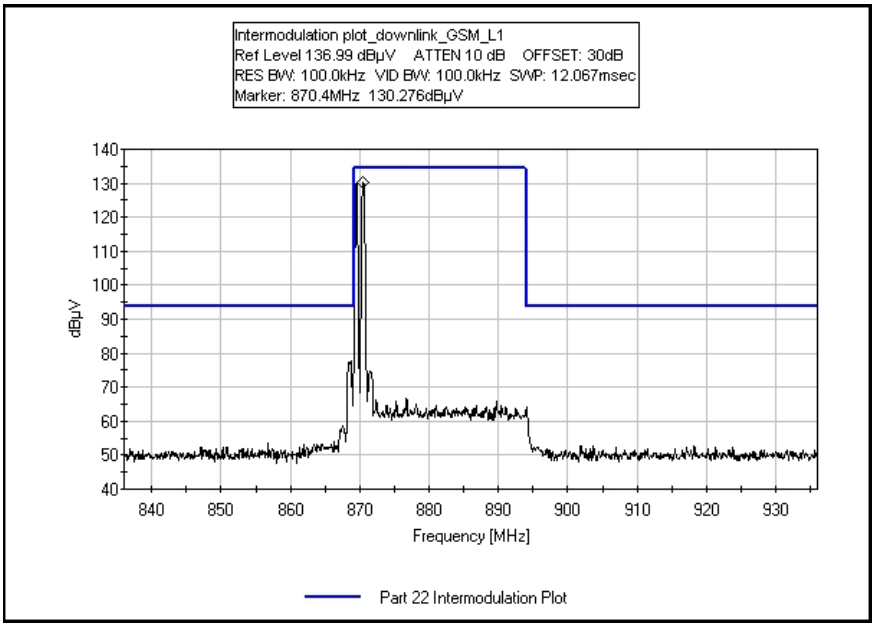
INTERMODULATION DOWNLINK - EDGE H1



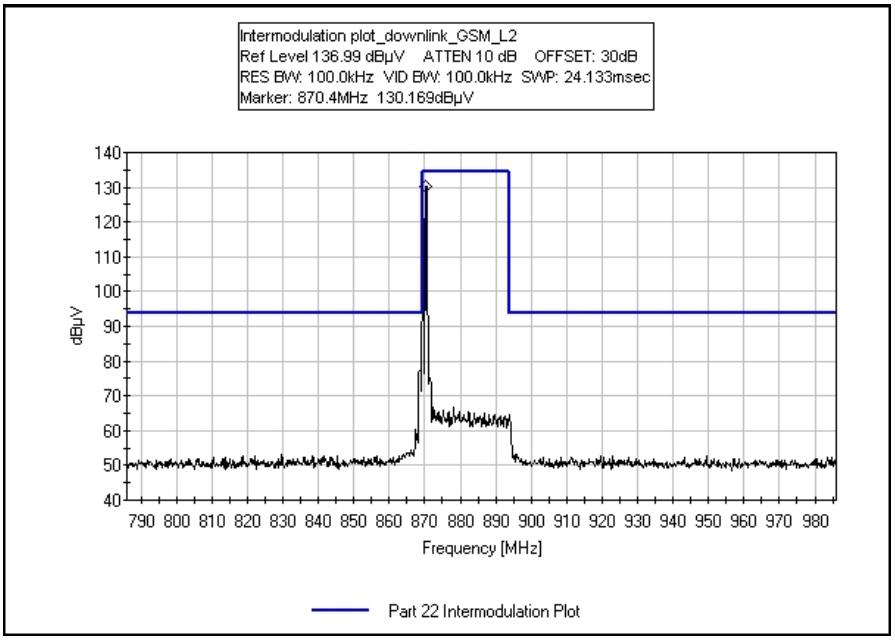
INTERMODULATION DOWNLINK - EDGE H2



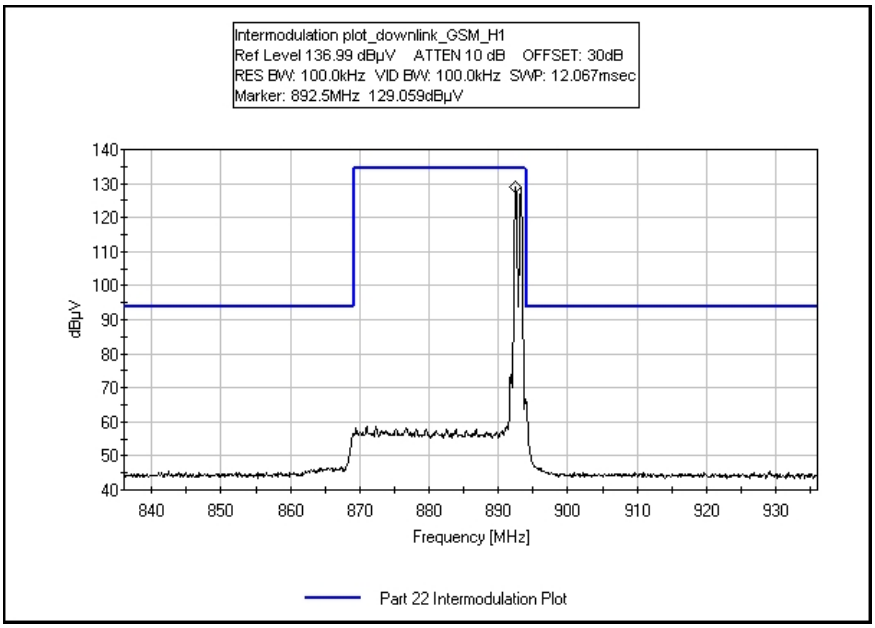
INTERMODULATION DOWNLINK - GSM L1



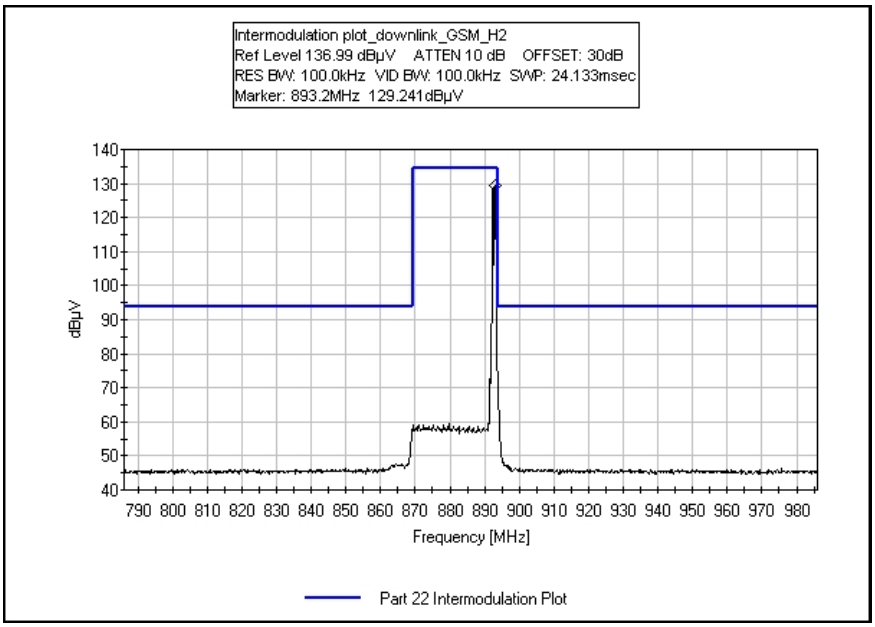
INTERMODULATION DOWNLINK - GSM L2



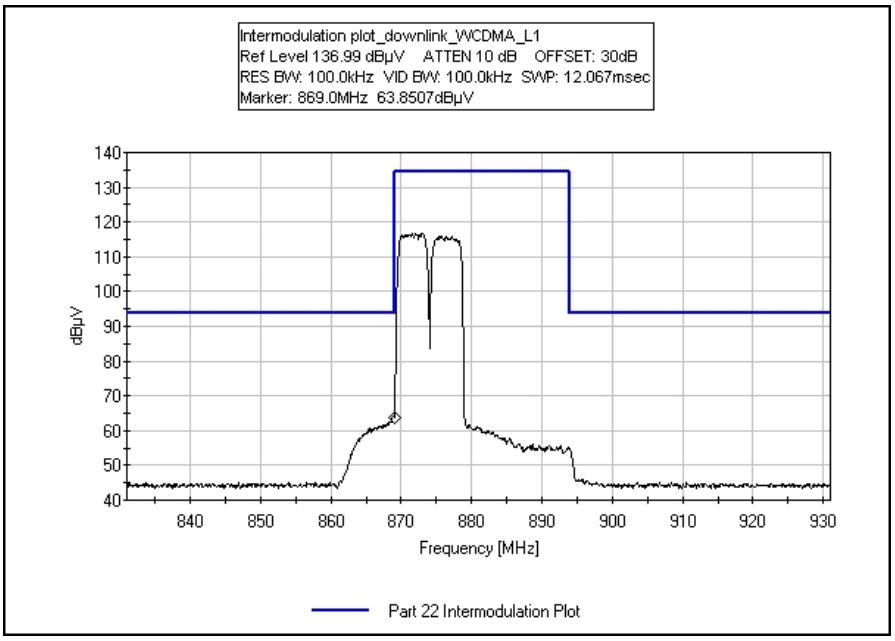
INTERMODULATION DOWNLINK - GSM H1



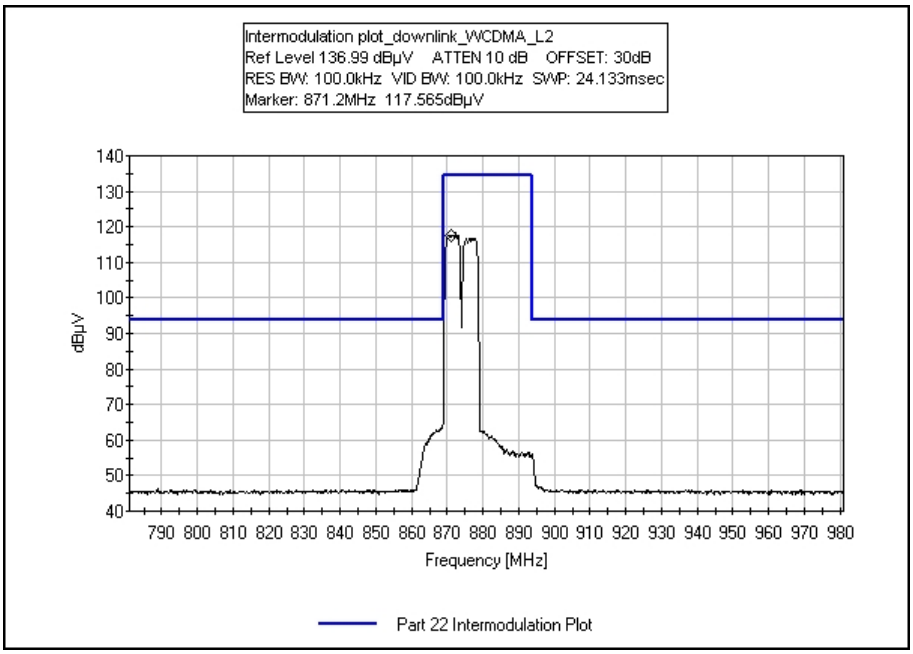
INTERMODULATION DOWNLINK - GSM H2



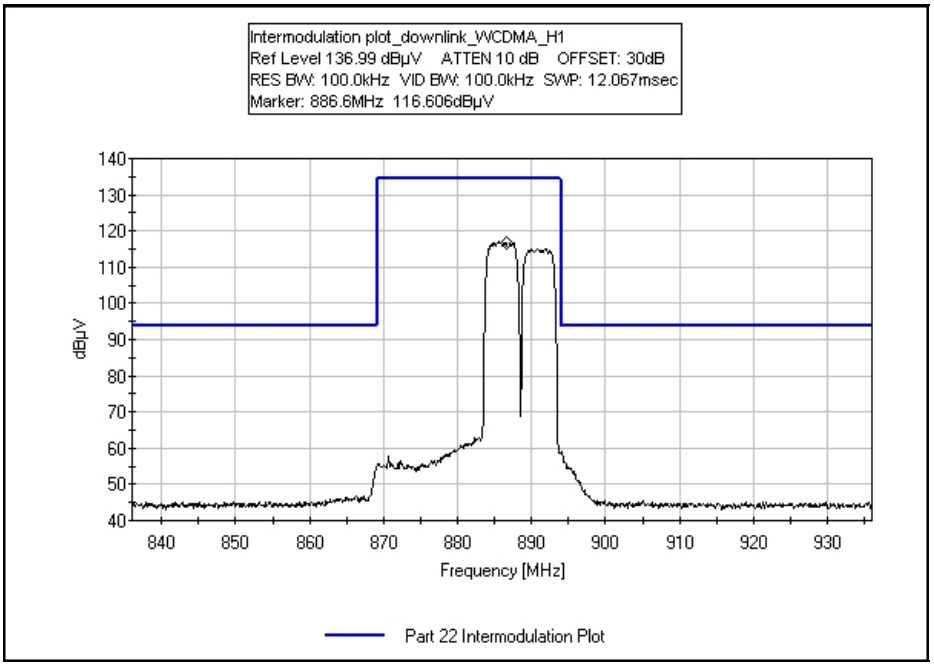
INTERMODULATION DOWNLINK - WCDMA L1



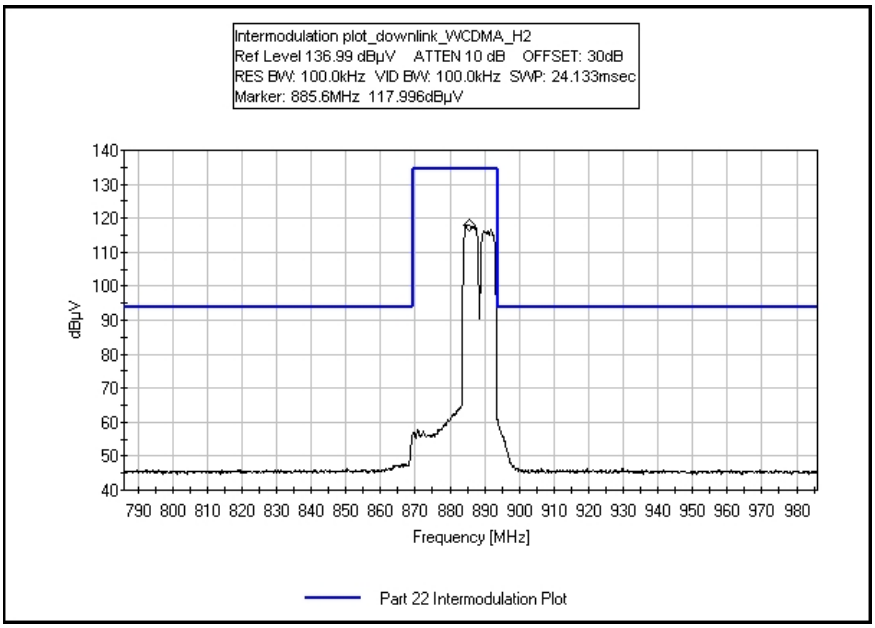
INTERMODULATION DOWNLINK - WCDMA L2



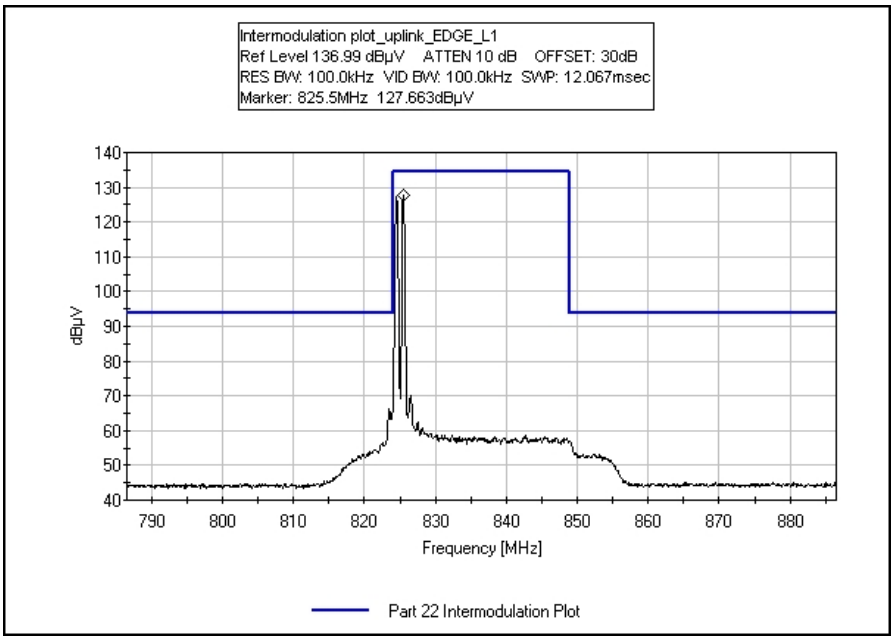
INTERMODULATION DOWNLINK - WCDMA H1



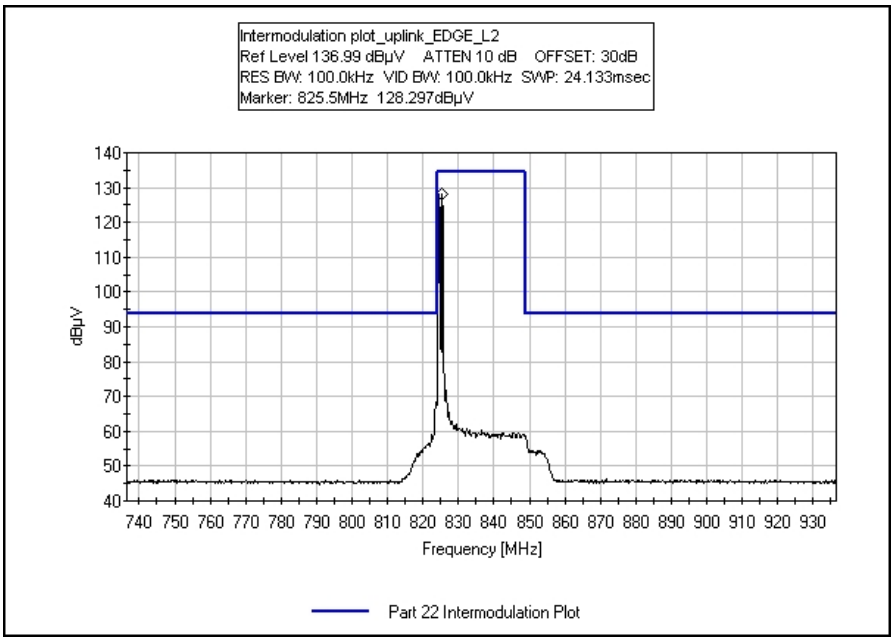
INTERMODULATION DOWNLINK - WCDMA H2



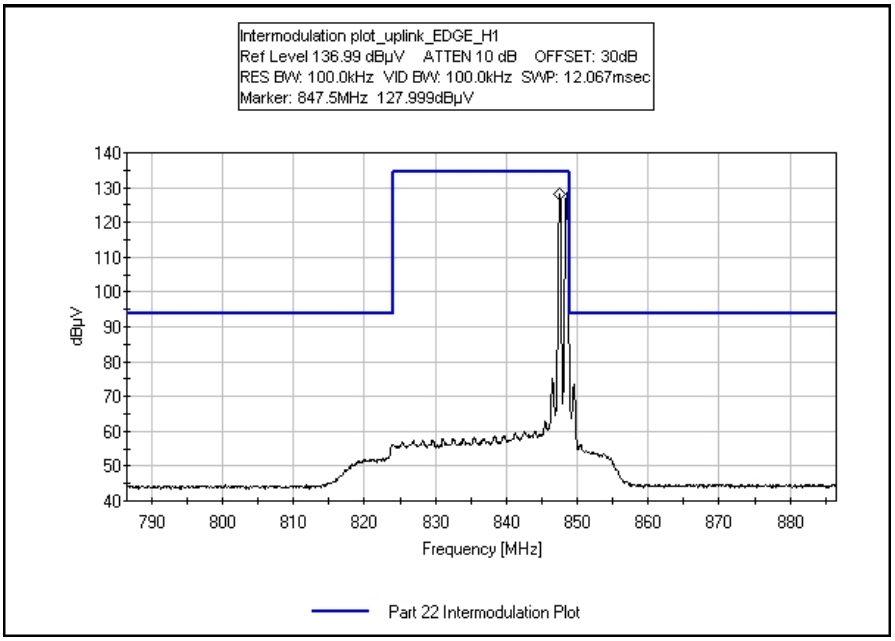
INTERMODULATION UPLINK - EDGE L1



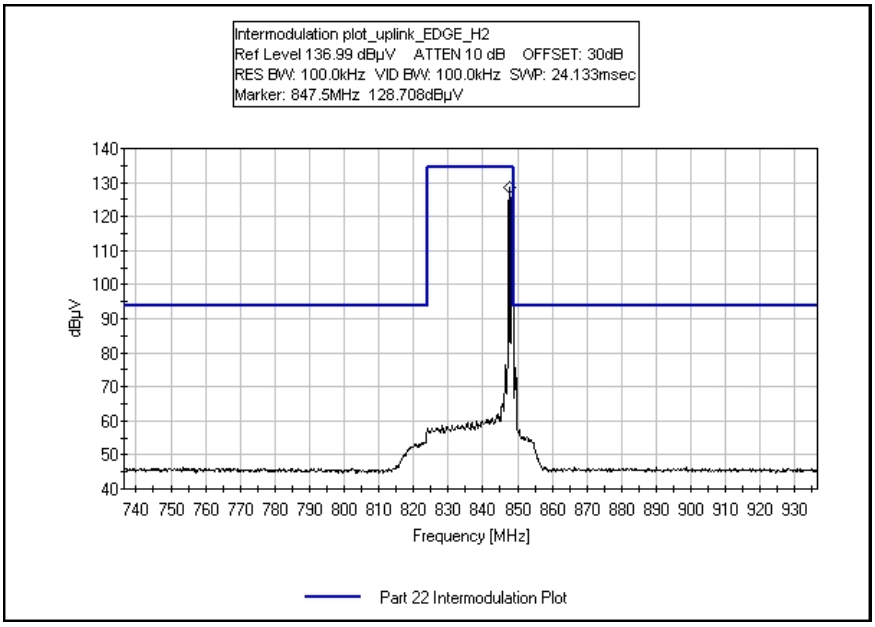
INTERMODULATION UPLINK - EDGE L2



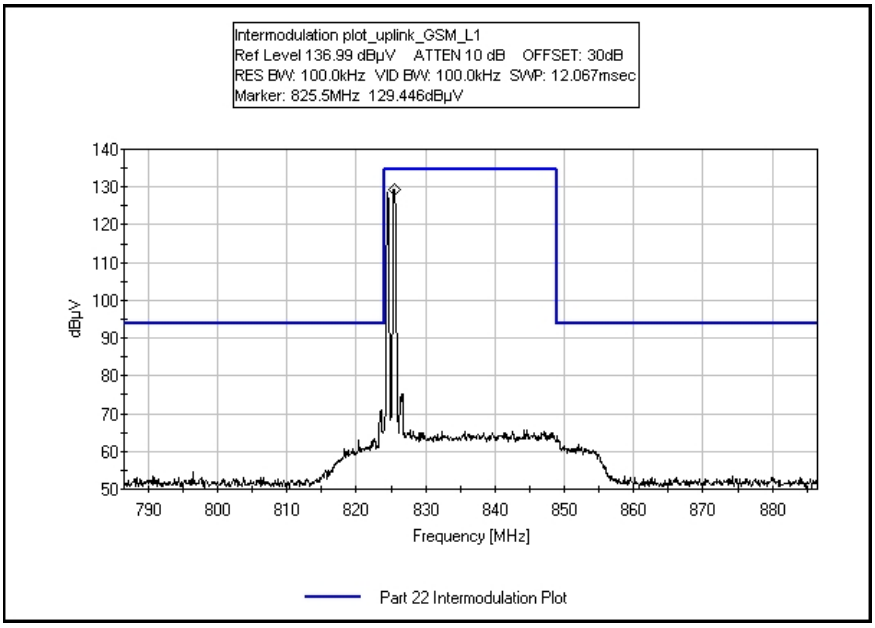
INTERMODULATION UPLINK - EDGE H1



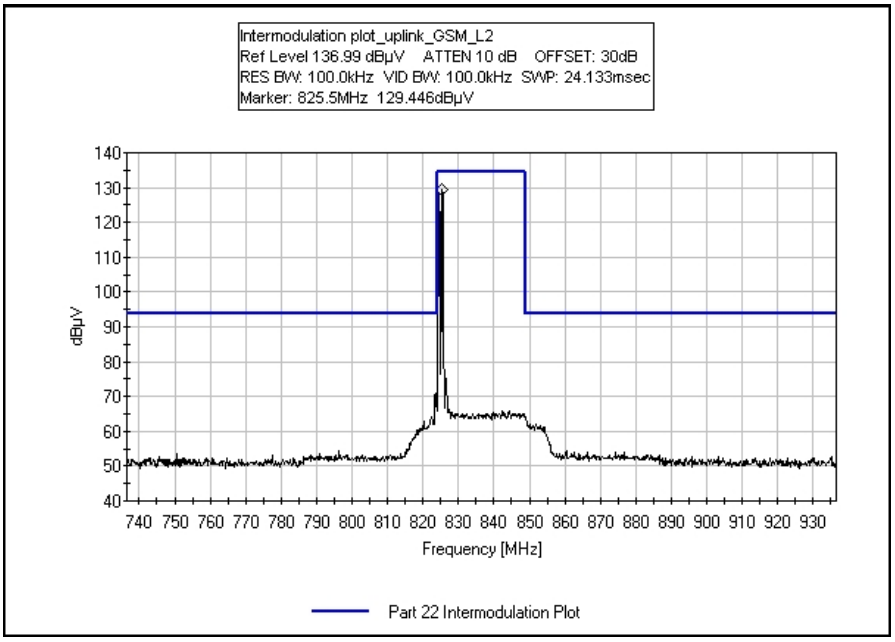
INTERMODULATION UPLINK - EDGE H2



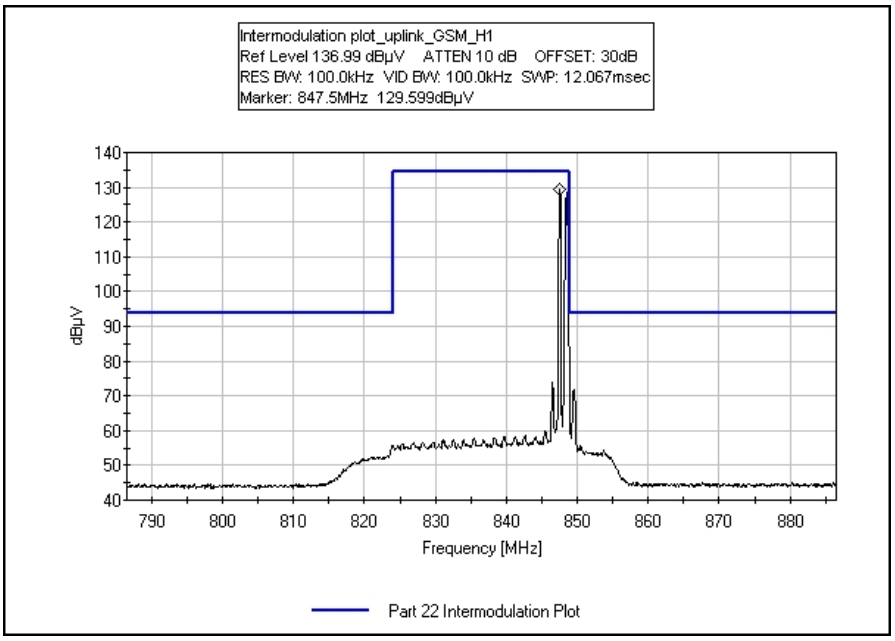
INTERMODULATION UPLINK - GSM L1



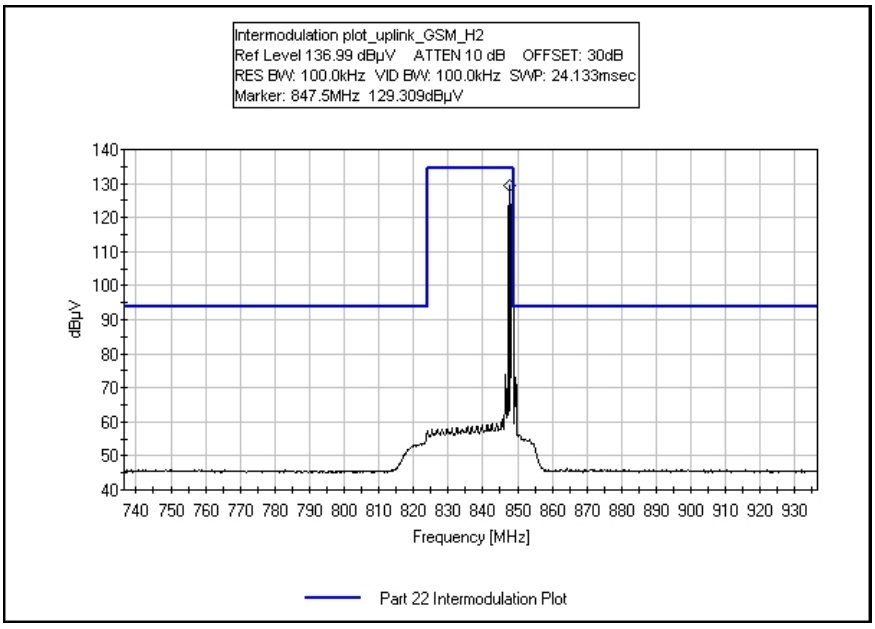
INTERMODULATION UPLINK - GSM L2



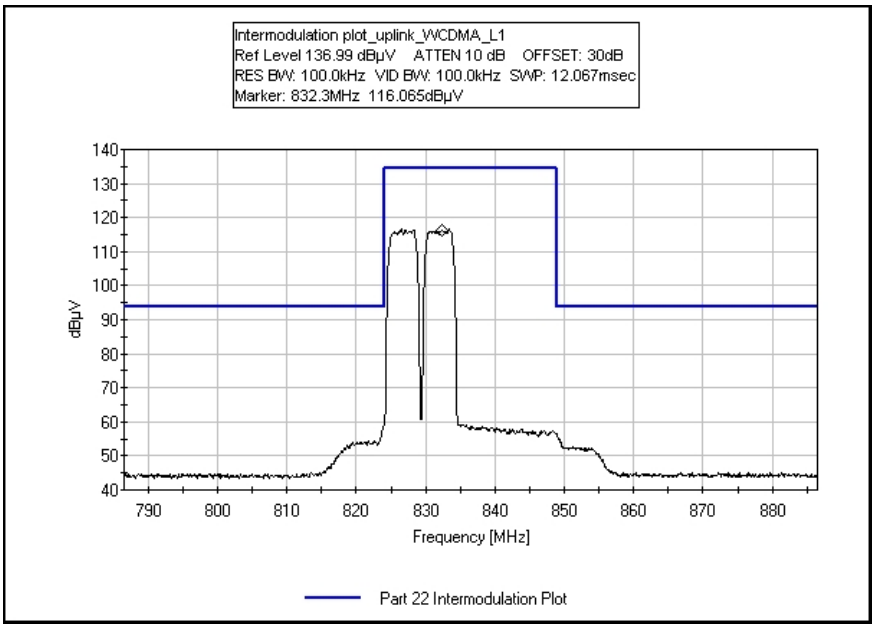
INTERMODULATION UPLINK - GSM H1



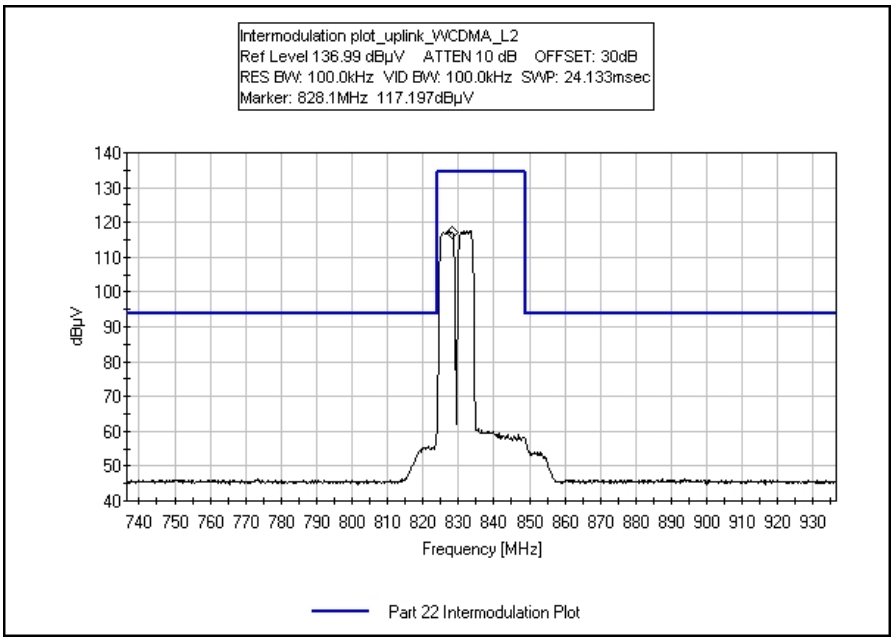
INTERMODULATION UPLINK - GSM H2



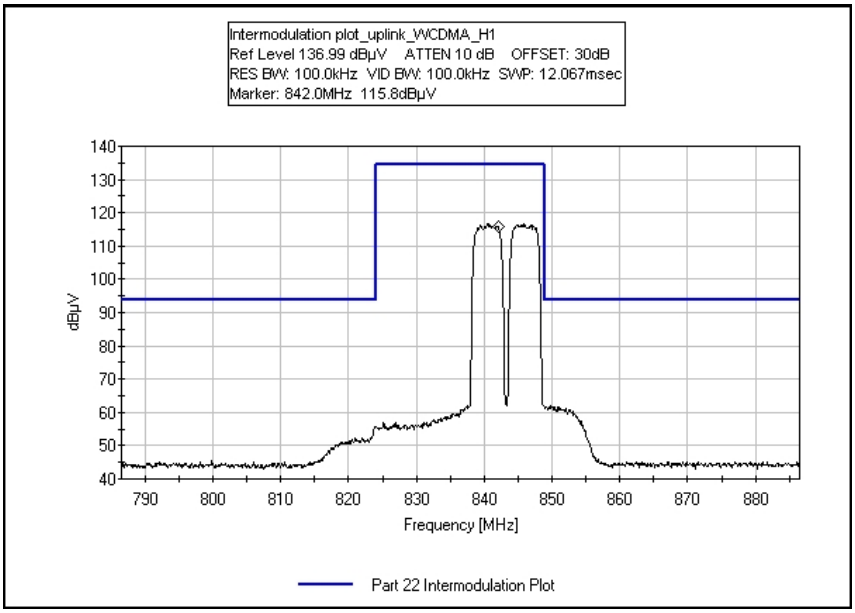
INTERMODULATION UPLINK - WCDMA L1



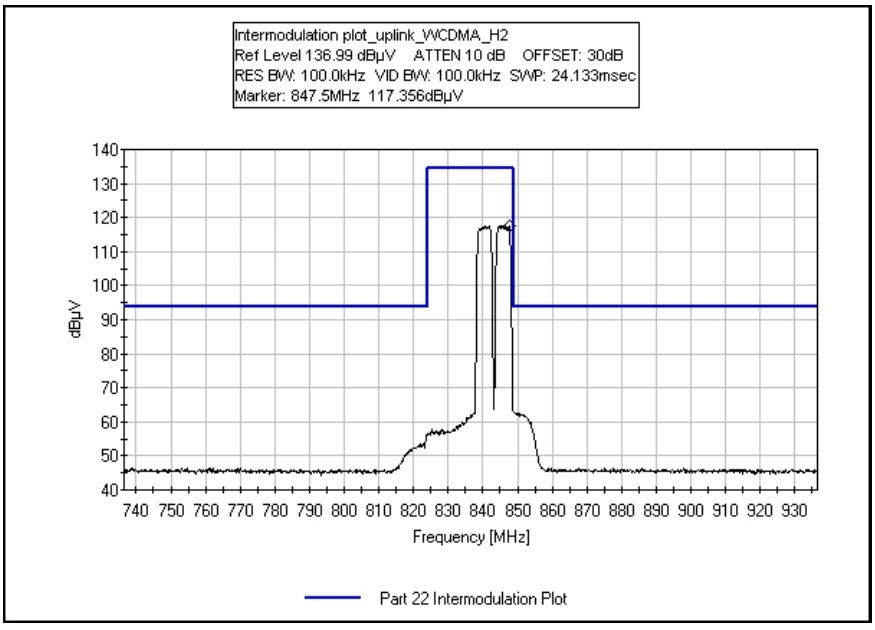
INTERMODULATION UPLINK - WCDMA L2



INTERMODULATION UPLINK - WCDMA H1



INTERMODULATION UPLINK - WCDMA H2



OUT OF BAND REJECTION

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Network analyzer	C00012	HP	8753E	Us38432770	091208	091208

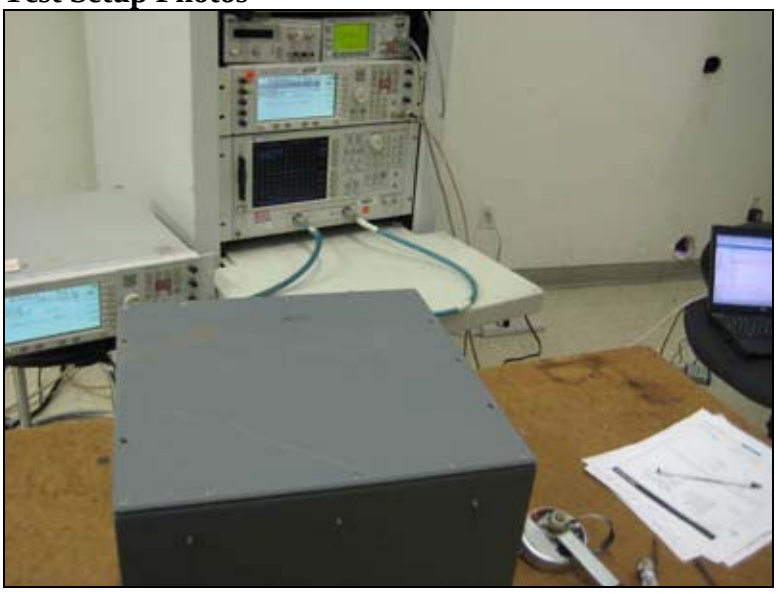
Test Conditions

The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected output port of the network analyzer and 850MHz Server antenna port is connected to an input port of the network analyzer. For uplink configuration, 850MHz Donor antenna port is connected to input port of the network analyzer and 850MHz Server antenna port is connected to an output port of the network analyzer. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch.
Uplink: 824 - 849MHz
Downlink: 869 - 894MHz

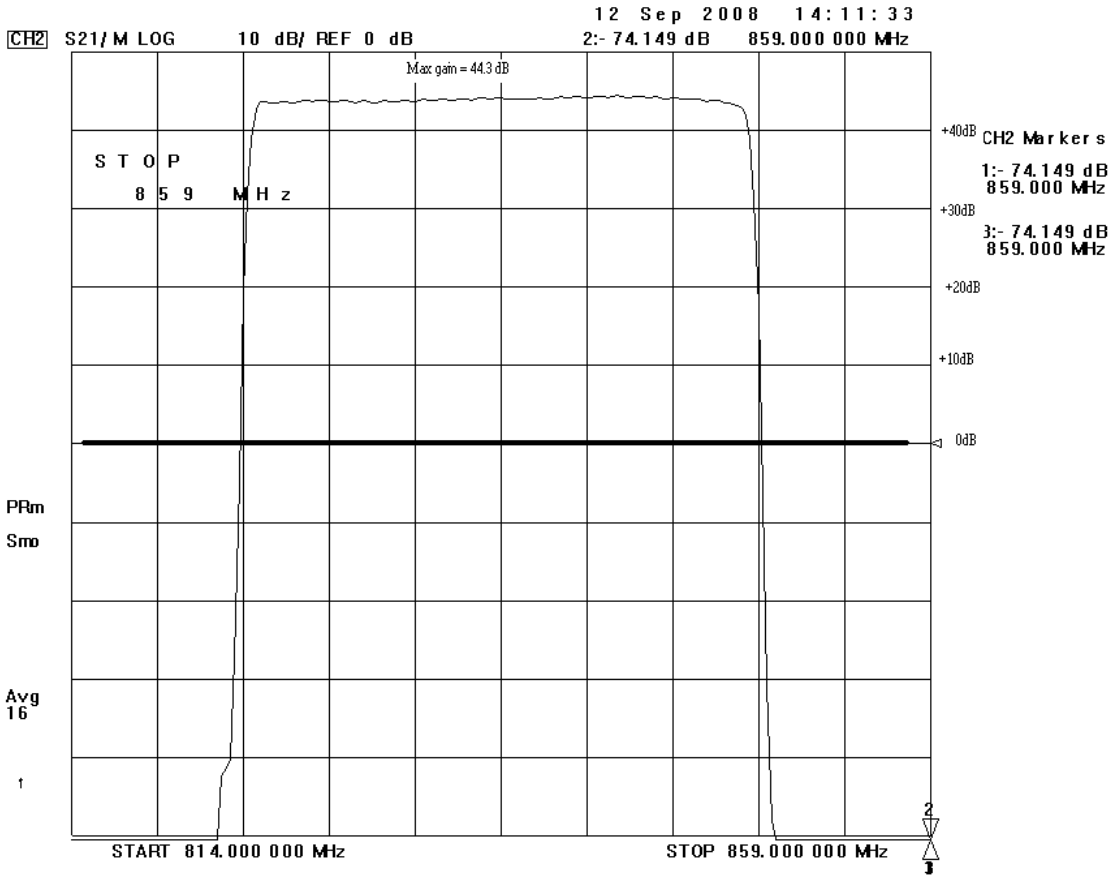
The gain response is measured with a network analyzer in the uplink and down link direction.

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.

Test Setup Photos

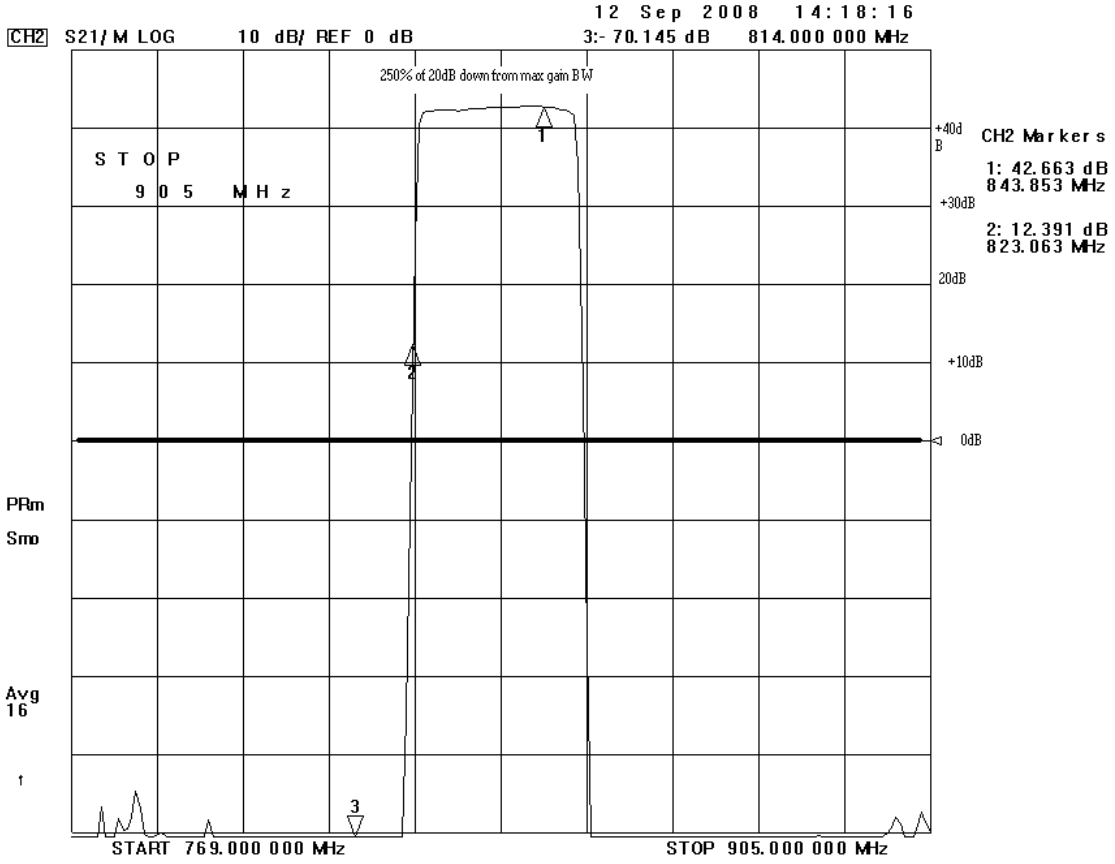


Test Plots

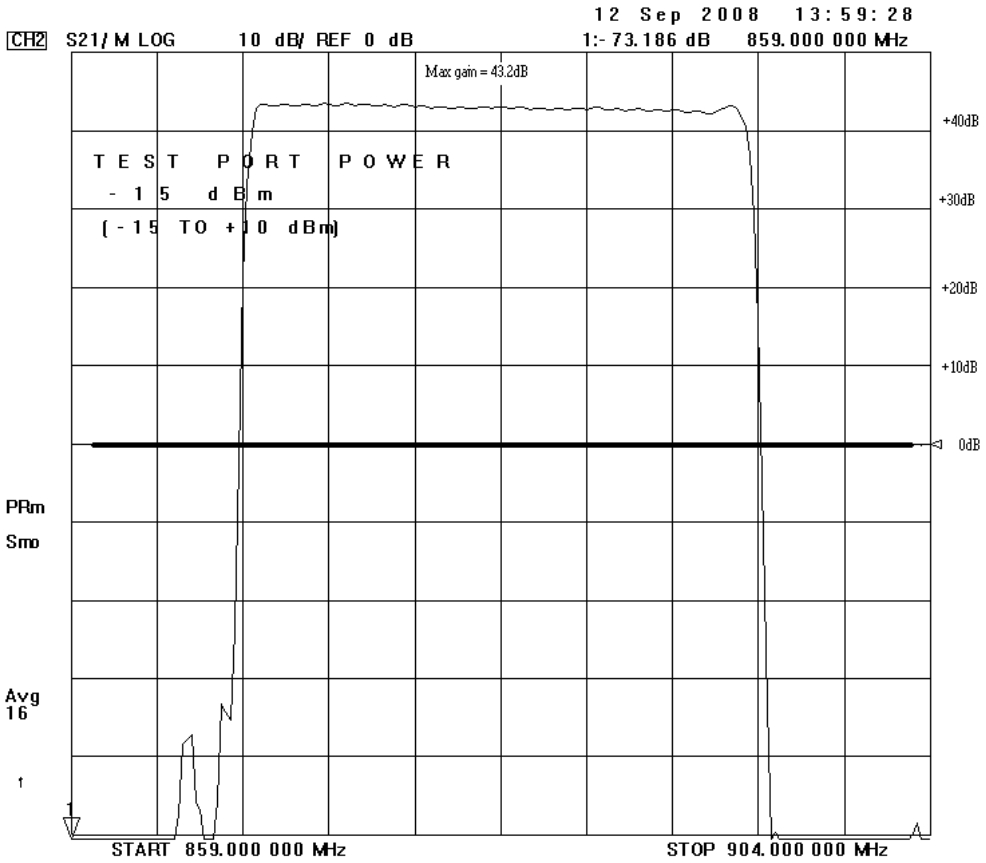


Uplink

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

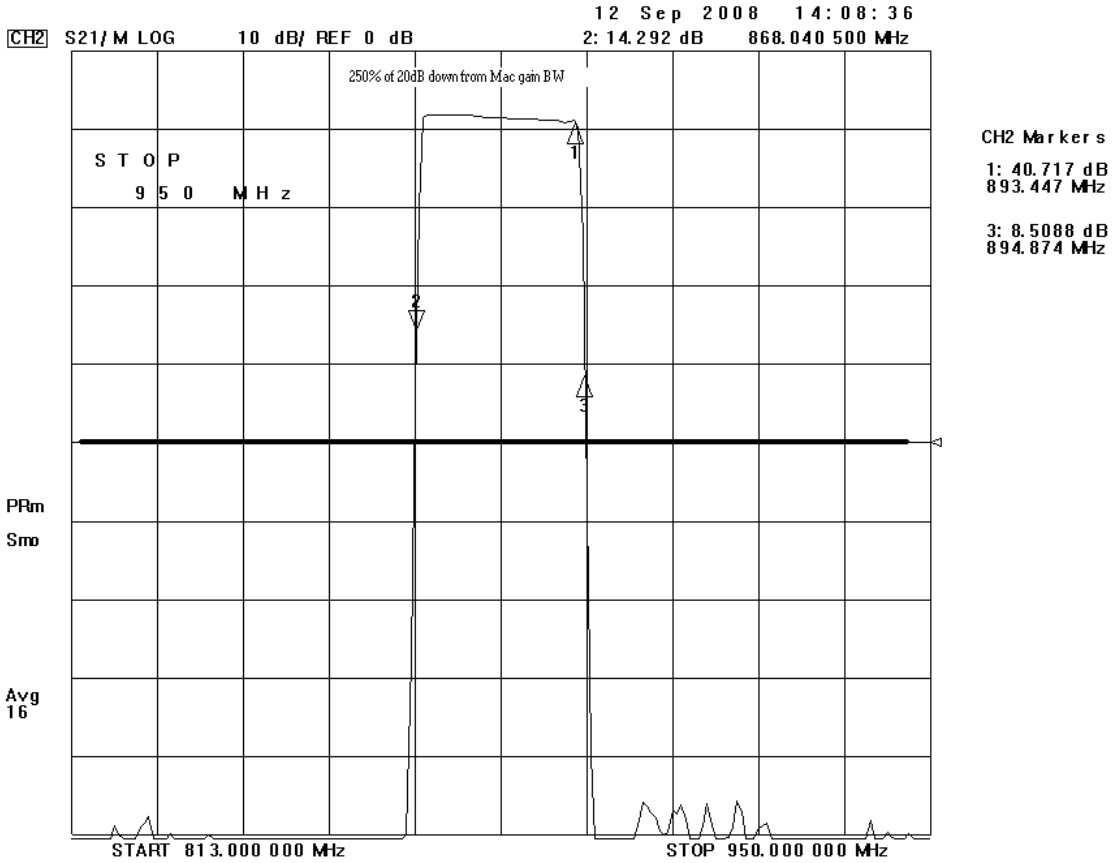

12 Sep 2008 14:18:16
CH2 S21/M LOG 10 dB/ REF 0 dB
3:- 70.145 dB 814.000 000 MHz
250% of 20dB down from max gain BW
STOP 905 MHz
+40dB
+30dB
20dB
+10dB
0dB
CH2 Markers
1: 42.663 dB
843.853 MHz
2: 12.391 dB
823.063 MHz
PRm
Smo
Avg
16
START 769.000 000 MHz
STOP 905.000 000 MHz

Uplink



Downlink

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


12 Sep 2008 14:08:36
CH2 S21/M LOG 10 dB/ REF 0 dB
2: 14.292 dB 868.040 500 MHz
250% of 20dB down from Mac gain BW
STOP
950 MHz
CH2 Markers
1: 40.717 dB
893.447 MHz
3: 8.5088 dB
894.874 MHz
PRm
Smo
Avg
16
START 813.000 000 MHz
STOP 950.000 000 MHz

Downlink

RSS 131 99% BANDWIDTH

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02869	Agilent	E4440A	MY46186290	021207	021209
36" 40GHz cable	02945	Strolab	NA	NA	091807	091809

Test Conditions

The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected to remote ESG and 850MHz Server antenna port is connected to a spectrum analyzer. For uplink configuration, 850MHz Donor antenna port is connected to spectrum analyzer and 850MHz Server antenna port is connected to an ESG. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch.

The 99% BW is measured at the RF antenna port under investigation using the occupied bandwidth measurement function of the spectrum analyzer.

Uplink: 824 - 849MHz
Downlink: 869 - 894MHz

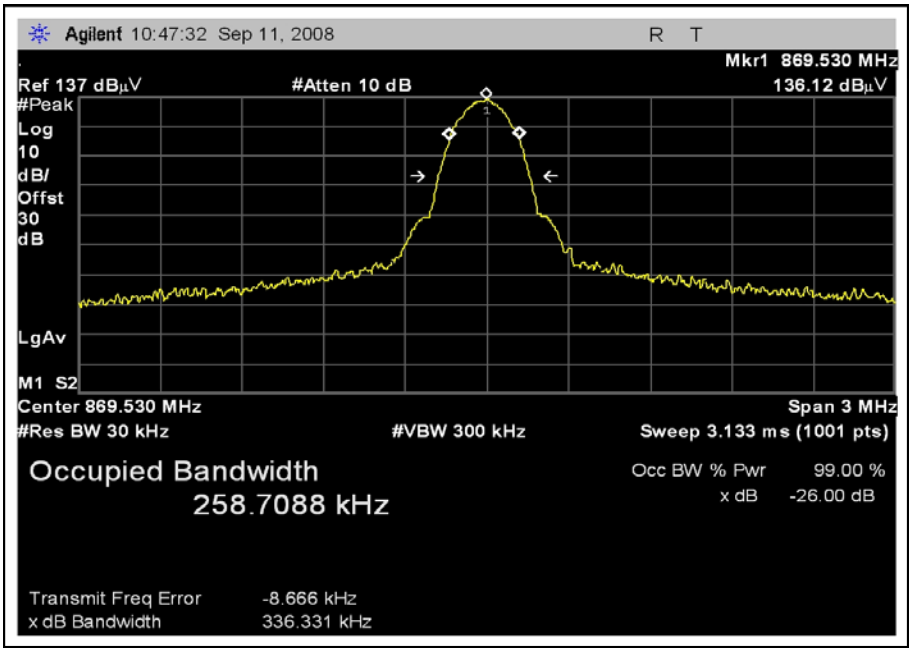
Uplink
Modulation: EDGE, GSM, WCDMA
TX= 824.5MHz, 836.5MHz, 848.5MHz
Power = 28dBm= 0.63W

Downlink:
Modulation: EDGE, GSM, WCDMA
TX=869.5MHz, 881.5MHz, 893.5MHz
Power = 28dBm= 0.63W

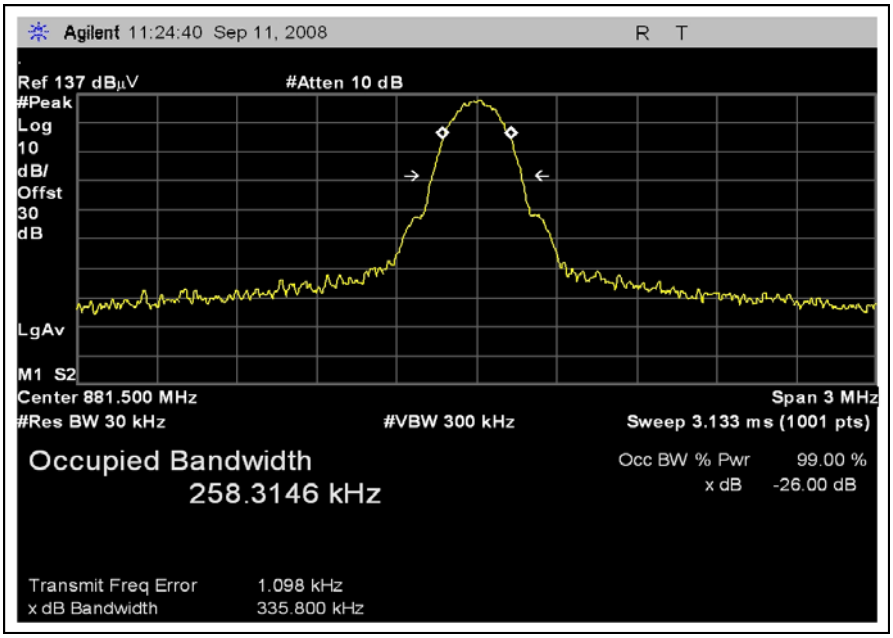
Test Setup Photos

Test Plots

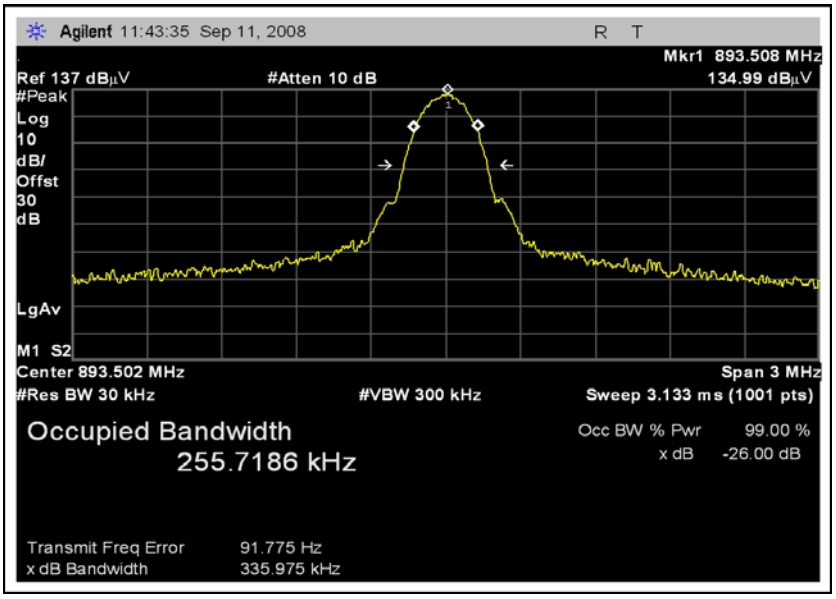
99% BANDWIDTH DOWNLINK - EDGE 869MHz 259kHz



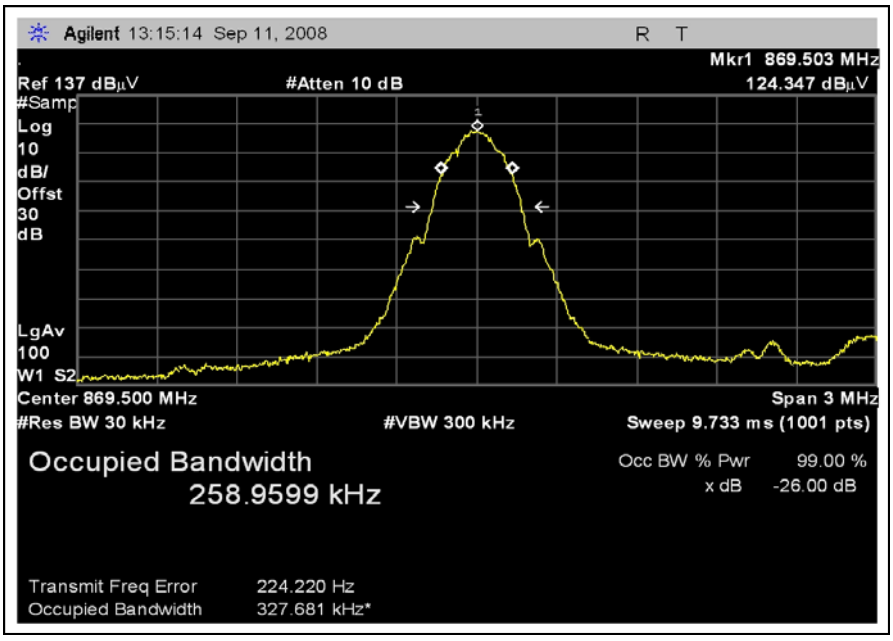
99% BANDWIDTH DOWNLINK - EDGE 881MHz 258kHz



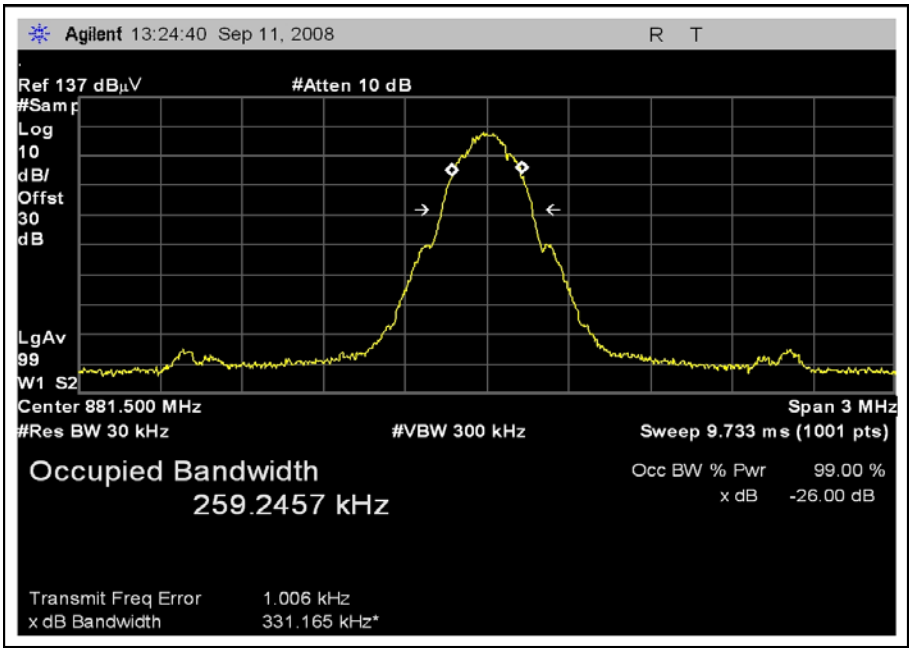
99% BANDWIDTH DOWNLINK - EDGE 893MHz 255kHz



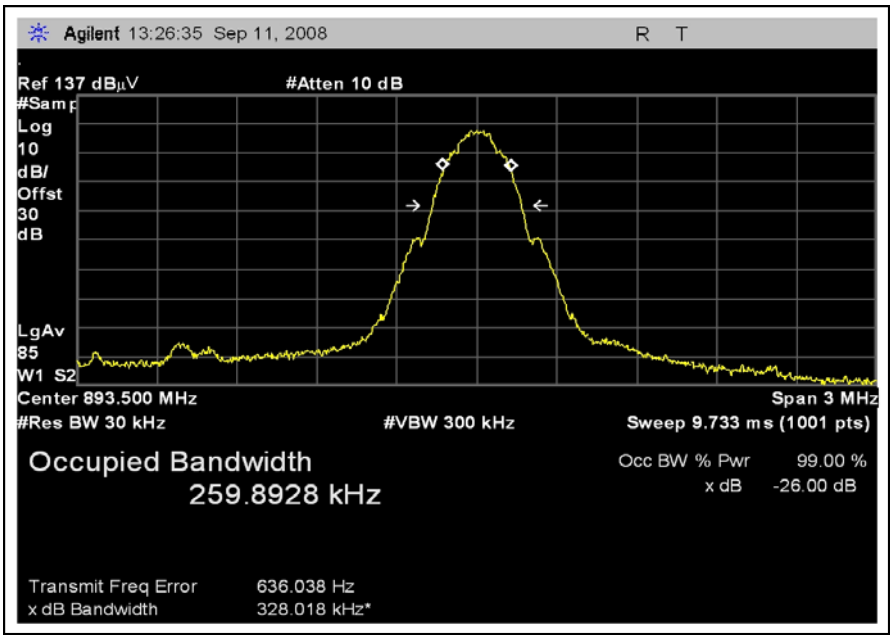
99% BANDWIDTH DOWNLINK - GSM 869MHz 259kHz



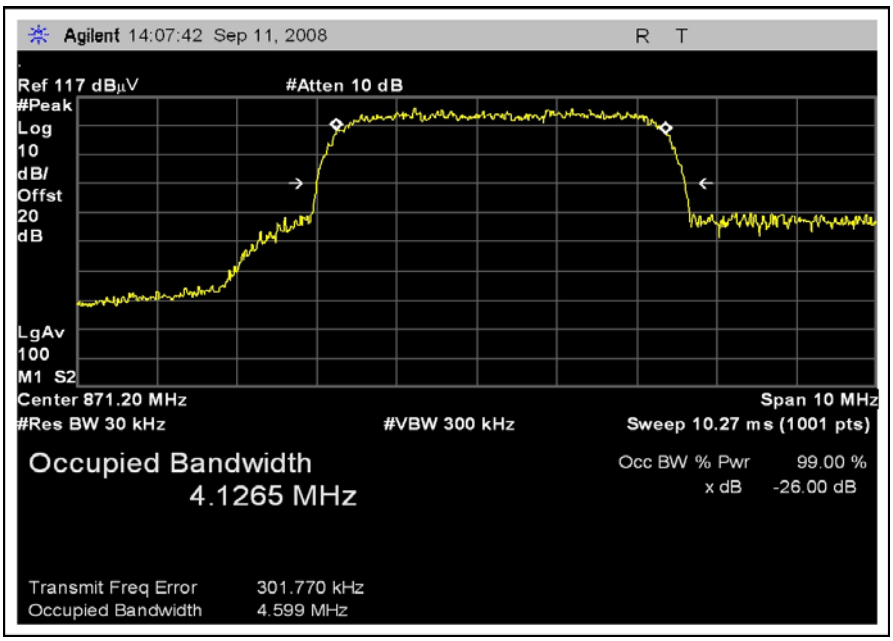
99% BANDWIDTH DOWNLINK - GSM 881MHz 259kHz



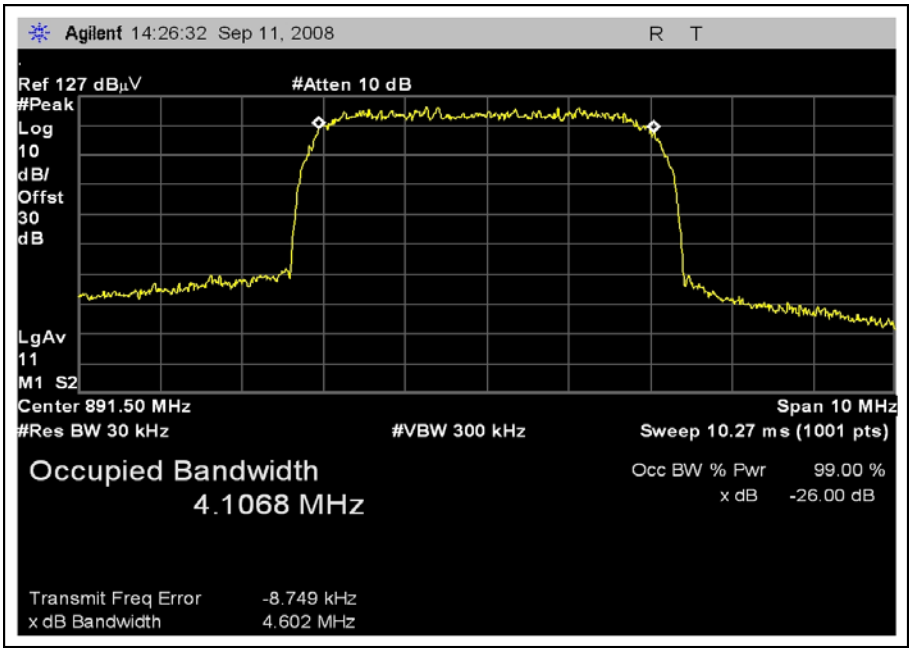
99% BANDWIDTH DOWNLINK - GSM 893MHz 260kHz



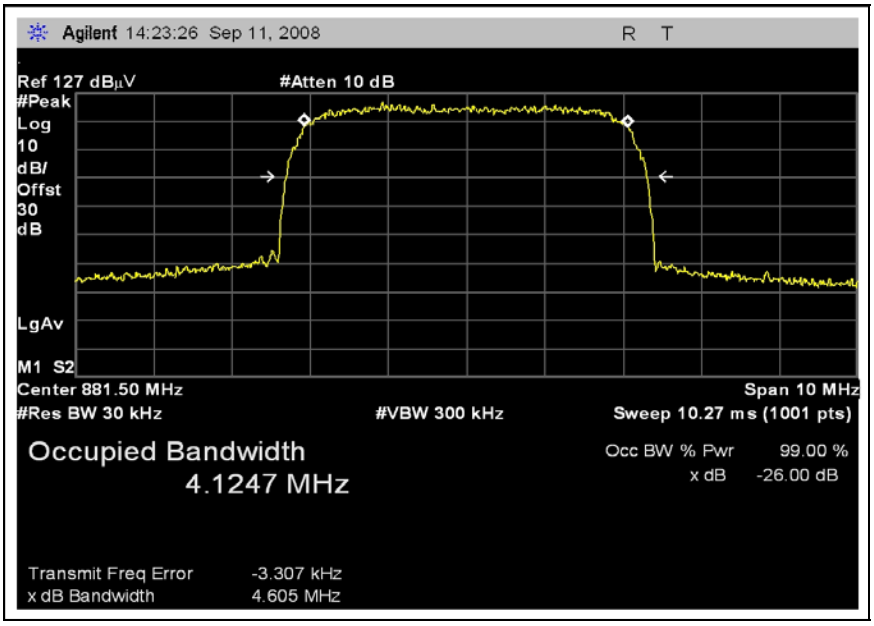
99% BANDWIDTH DOWNLINK - WCDMA 869MHz 4.12MHz



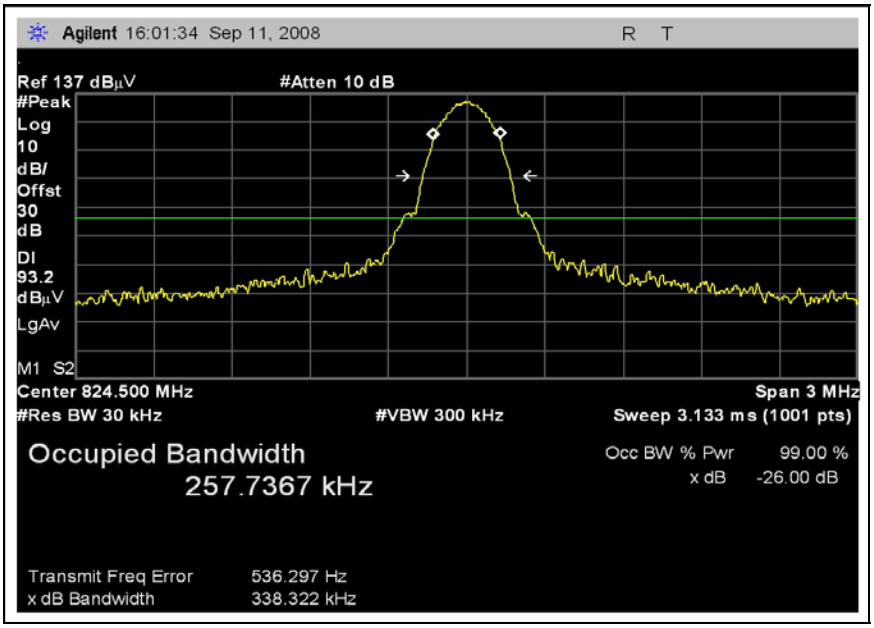
99% BANDWIDTH DOWNLINK - WCDMA 893MHz 4.10MHz



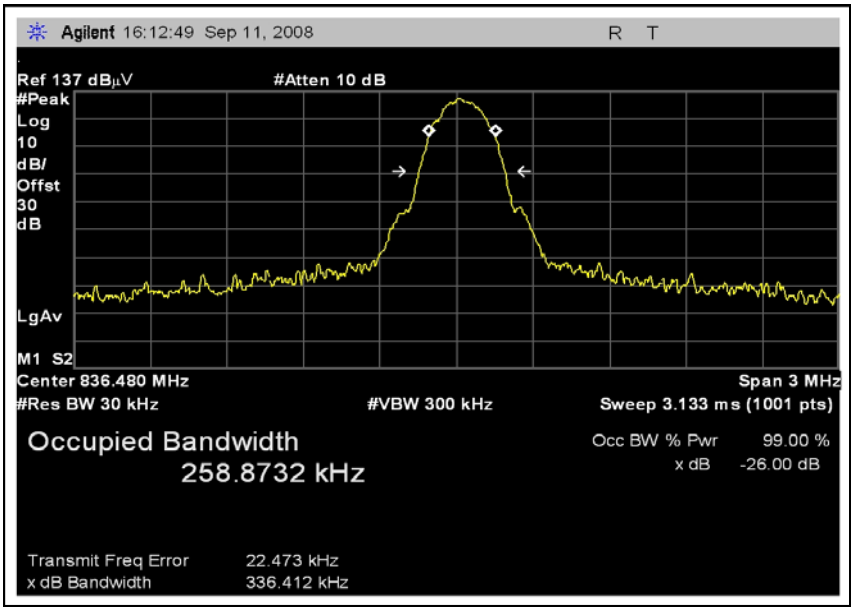
99% BANDWIDTH DOWNLINK - WCDMA 881MHz 4.12MHz



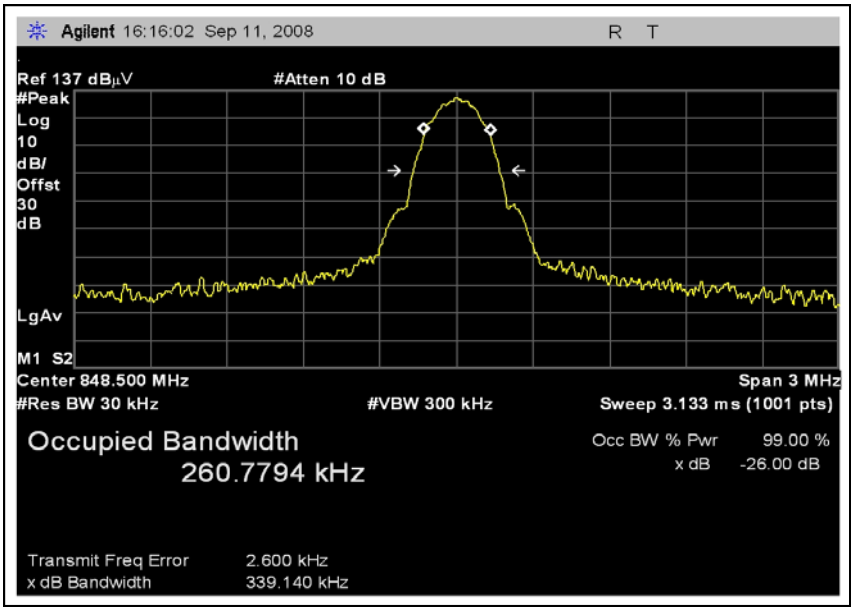
99% BANDWIDTH UPLINK - EDGE 824MHz 257.7kHz



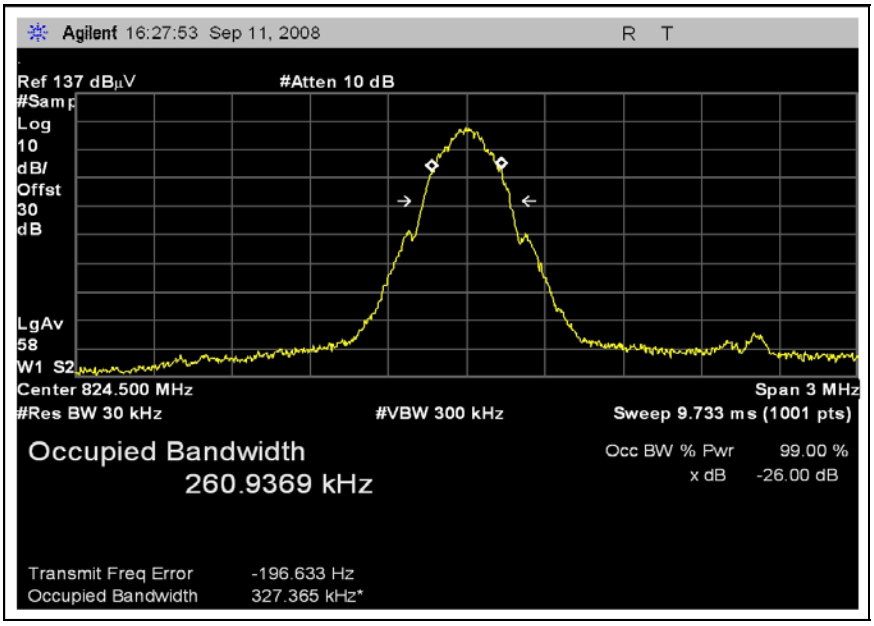
99% BANDWIDTH UPLINK - EDGE 835MHz 258kHz



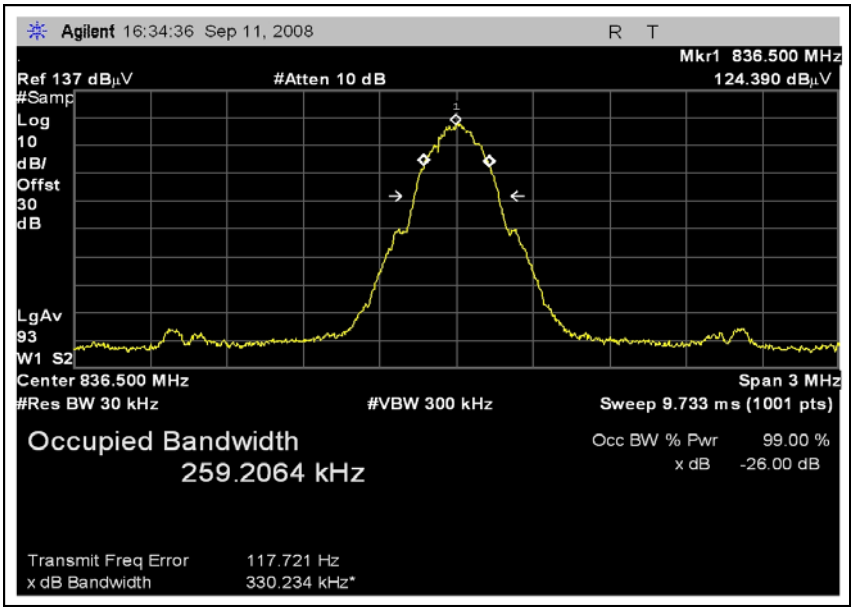
99% BANDWIDTH UPLINK - EDGE 849MHz 261kHz



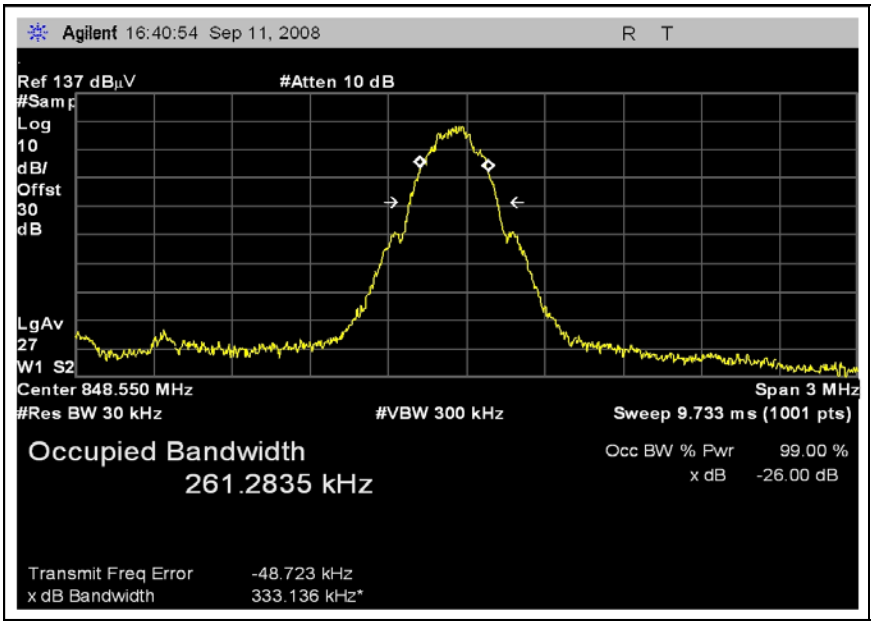
99% BANDWIDTH UPLINK - GSM 824MHz 261kHz



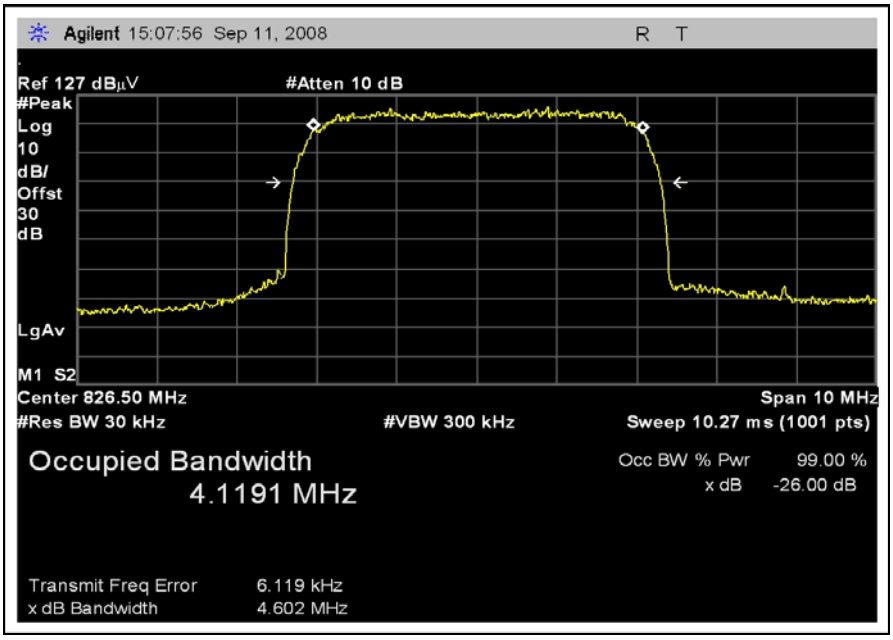
99% BANDWIDTH UPLINK - GSM 836MHz 259kHz



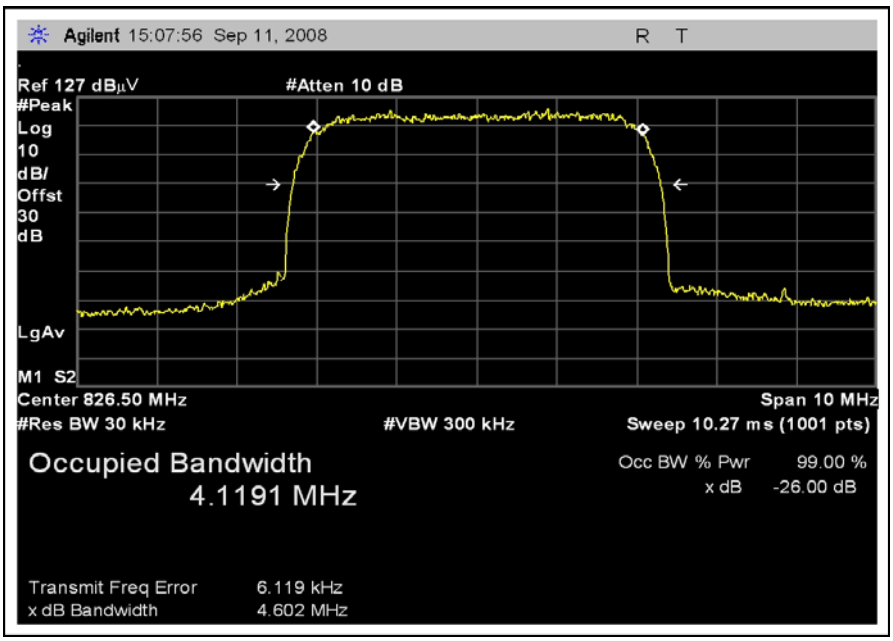
99% BANDWIDTH UPLINK - GSM 849MHz 261kHz



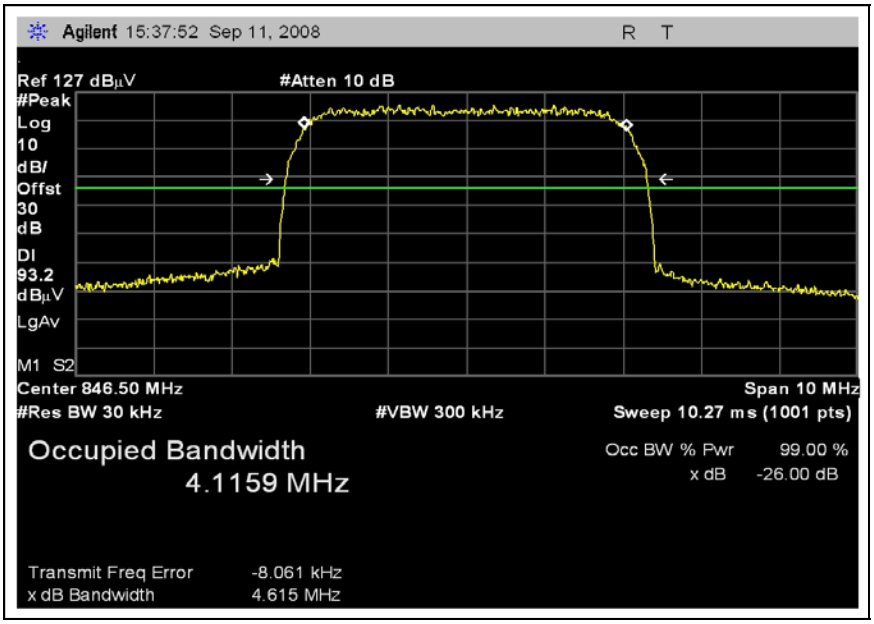
99% BANDWIDTH UPLINK - WCDMA 824MHz 4.11MHz



99% BANDWIDTH UPLINK - WCDMA 836MHz 4.12MHz



99% BANDWIDTH UPLINK - WCDMA 849MHz 4.12MHz



RSS 131 GAIN LINEARITY

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Network analyzer	C00012	HP	8753E	Us38432770	091208	091208

Test Conditions

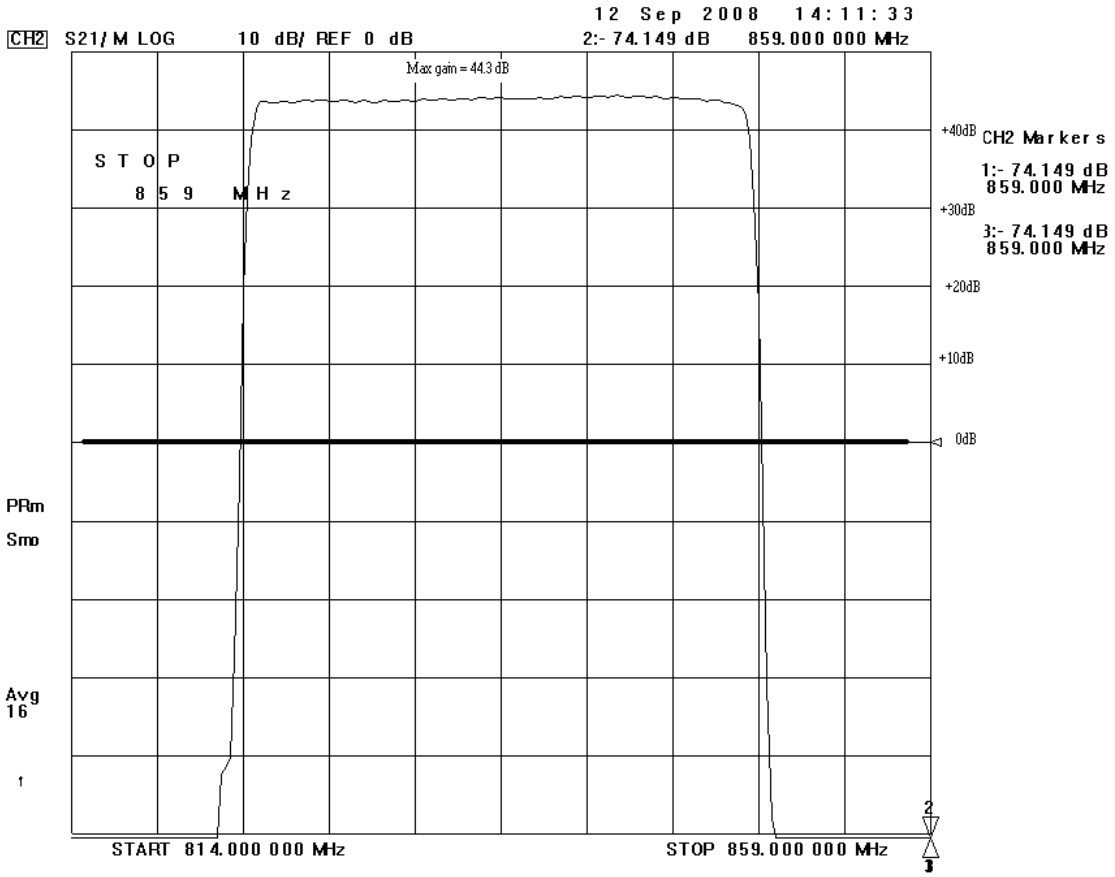
The rack mount EUT is placed on the wooden table. For downlink configuration, 850MHz Donor antenna port is connected output port of the network analyzer and 850MHz Server antenna port is connected to an input port of the network analyzer. For uplink configuration, 850MHz Donor antenna port is connected to input port of the network analyzer and 850MHz Server antenna port is connected to an output port of the network analyzer. The Ethernet port: Local is connected to a remote support laptop, ethernet port: WAN is connected to a remote, support ethernet switch.
Uplink: 824 - 849MHz
Downlink: 869 - 894MHz

The gain response is measured with a network analyzer in the uplink and down link direction.

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.

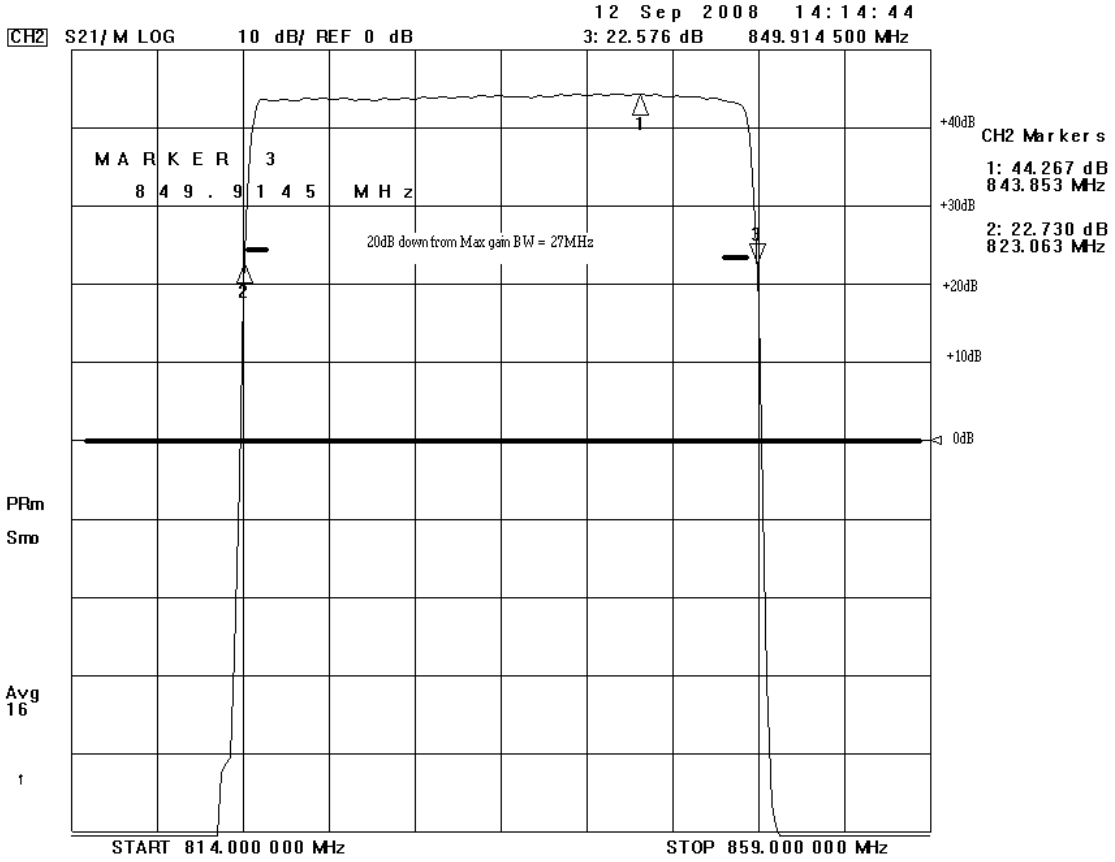
Test Setup Photos

Test Plots



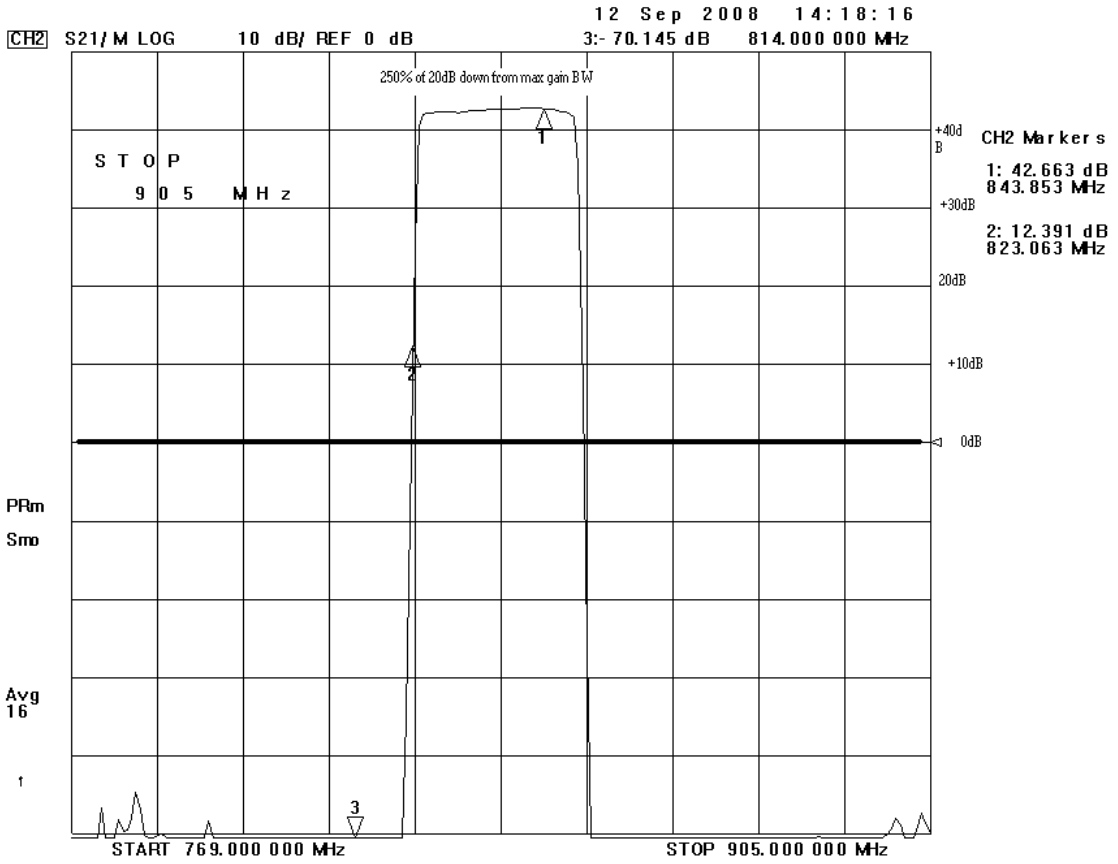
Uplink

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



Uplink

With the aid of a network analyzer, the 20 dB Bandwidth is measured.

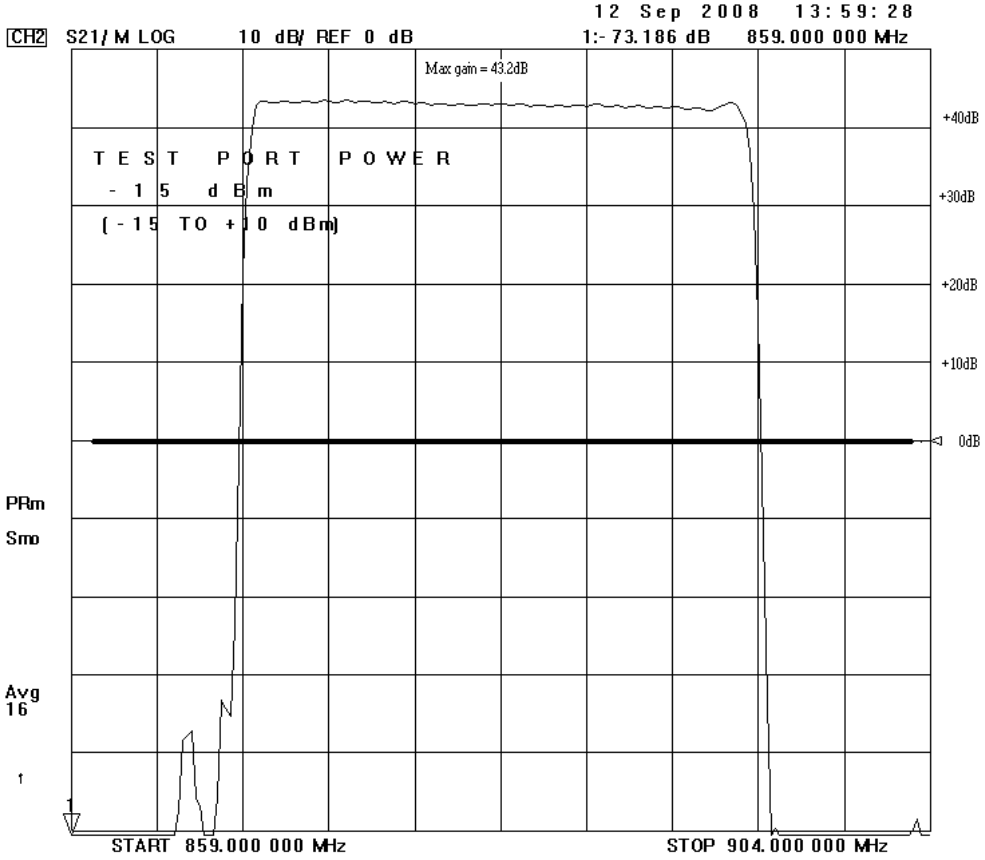


Uplink

The gain-versus-frequency response of the amplifier from the mid band Fo of the pass band up to at least Fo + - 250% of the 20dB Bandwidth.

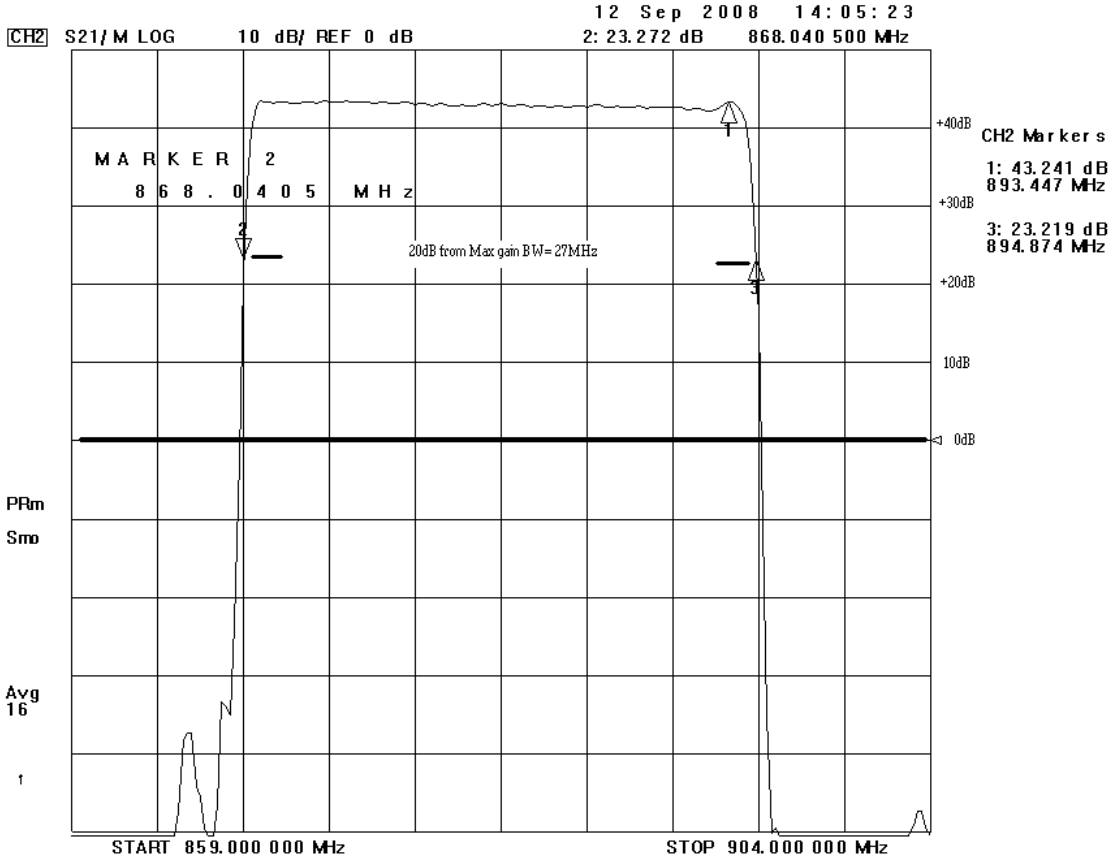
Minimum standard:
The pass band gain response shall not exceed the nominal gain by more than 1 dB. The 20 dB bandwidth shall not exceed the nominal bandwidth that is stated by the manufacturer.

Outside of the 20dB bandwidth the gain shall not exceed that at the 20dB point.



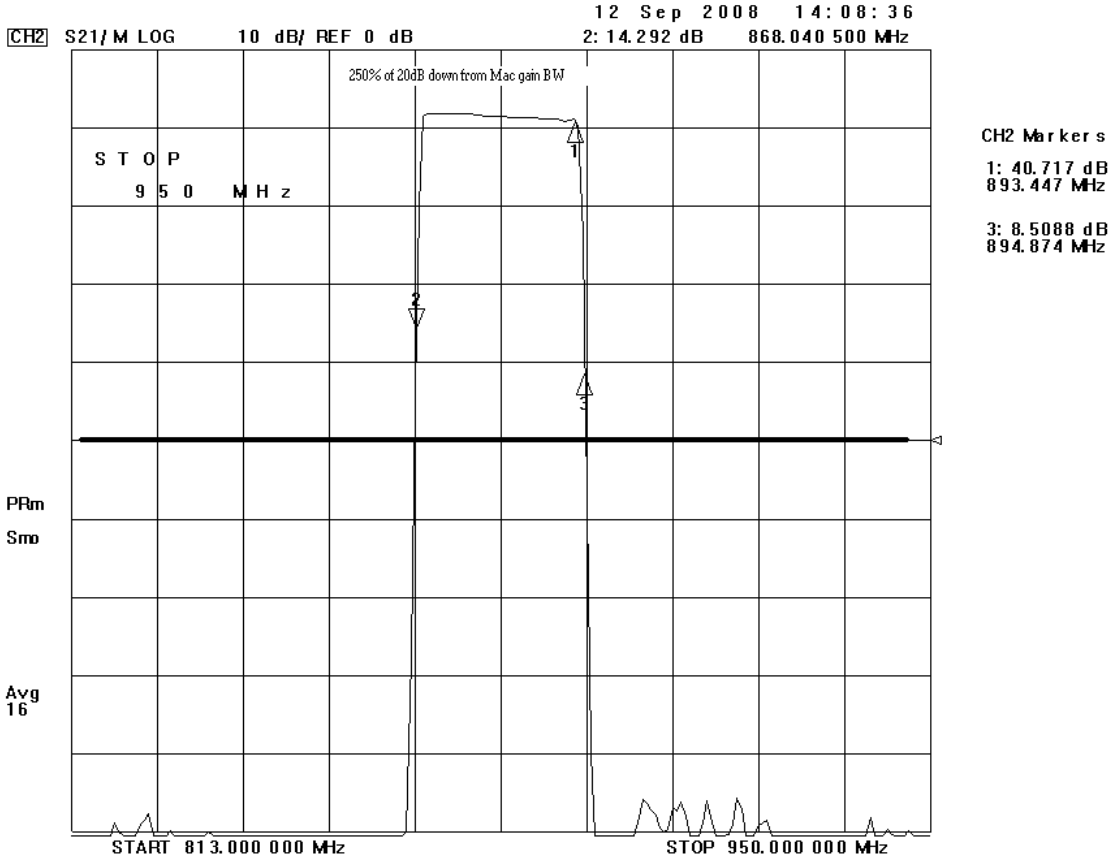
Downlink

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



Downlink

With the aid of a network analyzer, the 20 dB Bandwidth is measured.



Downlink

The gain-versus-frequency response of the amplifier from the mid band Fo of the pass band up to at least fo + - 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.