



FCC 2.1051/PART 22 – INTERMODULATION ATTENUATION

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **Powerwave**
 Specification: **FCC 22.438**
 Work Order #: **83357** Date: 03/09/2005
 Test Type: **Antenna Terminals Conducted Emissions** Time: 09:39:19
 Equipment: **Remote Radio Head** Sequence#: 41
 Manufacturer: Powerwave Technologies Tested By: Randal Clark
 Model: RH340000/100 120V 60Hz
 S/N: 42129

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A SA	US44300407	01/12/2005	01/12/2007	02660
Cable, Andrews	NA	06/04/2003	06/04/2005	P00740
Hardline				
Attenuator 14dB, JFW 50FHC-014-20		05/09/2003	05/09/2005	P01623
Attenuator PE7004-6		09/29/2004	09/29/2006	P02226

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Remote Radio Head*	Powerwave Technologies	RH340000/100	42129

Support Devices:

Function	Manufacturer	Model #	S/N
RF to Fiber Module	Powerwave Technologies	Optical Converter	42101
Pre-amplifier	Mini-Circuits	ZHL-1042J	H0327965-021
Power Sensor	HP	8481A	US37297854
Power Meter	Agilent	E4419B	GB40202125
Signal Generator	Agilent	E4433B	US40052296
Signal Generator	Agilent	E4433B	US40051692
Directional Coupler	HP	778D	18807
Preamp	HP	83017A	000009002
Combiner	Narda	4322-2	

Test Conditions / Notes:

EUT is a dual band remote radio head with multichannel capability and may otherwise be classified as a repeater/extender. EUT operates on 869-894 MHz and 1930-1990 MHz. Support equipment is used to convert RF from signal generator to fiber for input to the EUT. Power output is monitored using customer support equipment. EUT does not demodulate the input signal. Temperature: 28°C, Relative Humidity: 53%. Intermodulation test setup: The output of each of the support signal generators are connected to a preamp. The output of each preamp is connected to the combiner which feeds the RF to fiber module. The RF output of the EUT is fed through suitable attenuation and directional coupler to a monitoring power sensor. Input to the measuring receiver is fed via the directional coupler. Insertion loss at the indicated frequency is included as an amplitude offset. EUT Power output is set such that the following aggregate output power is measured: 800MHz PCS, GSM: 1.00 W, EDGE: 1.00 W, NADC: 1.00 W, CDMA: 1.00 W, WCDMA: 1.00 W, AMPS V: 1.00 W, AMPS D: 1.00 W. Tabular data is provided for WCDMA and CDMA formats

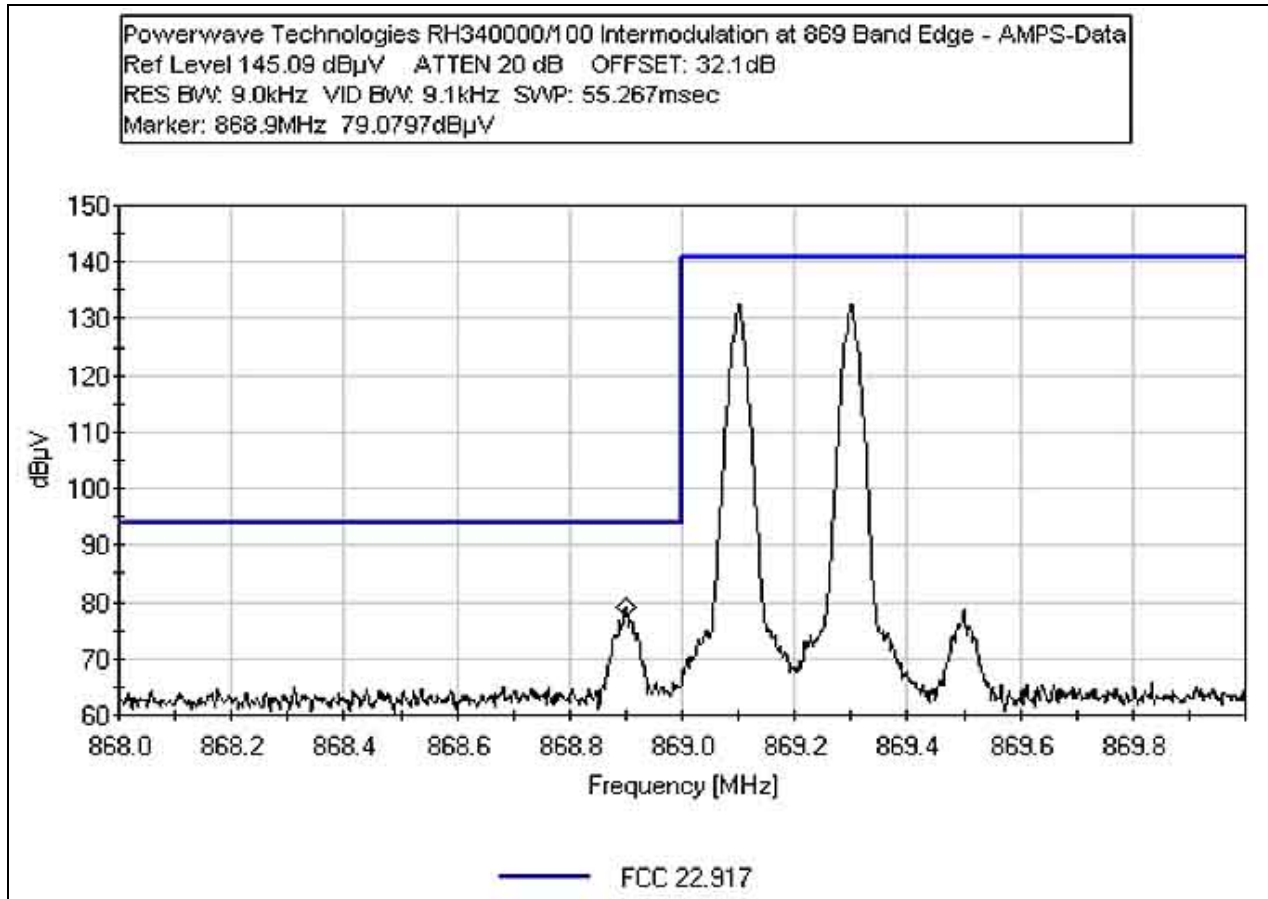
Transducer Legend:

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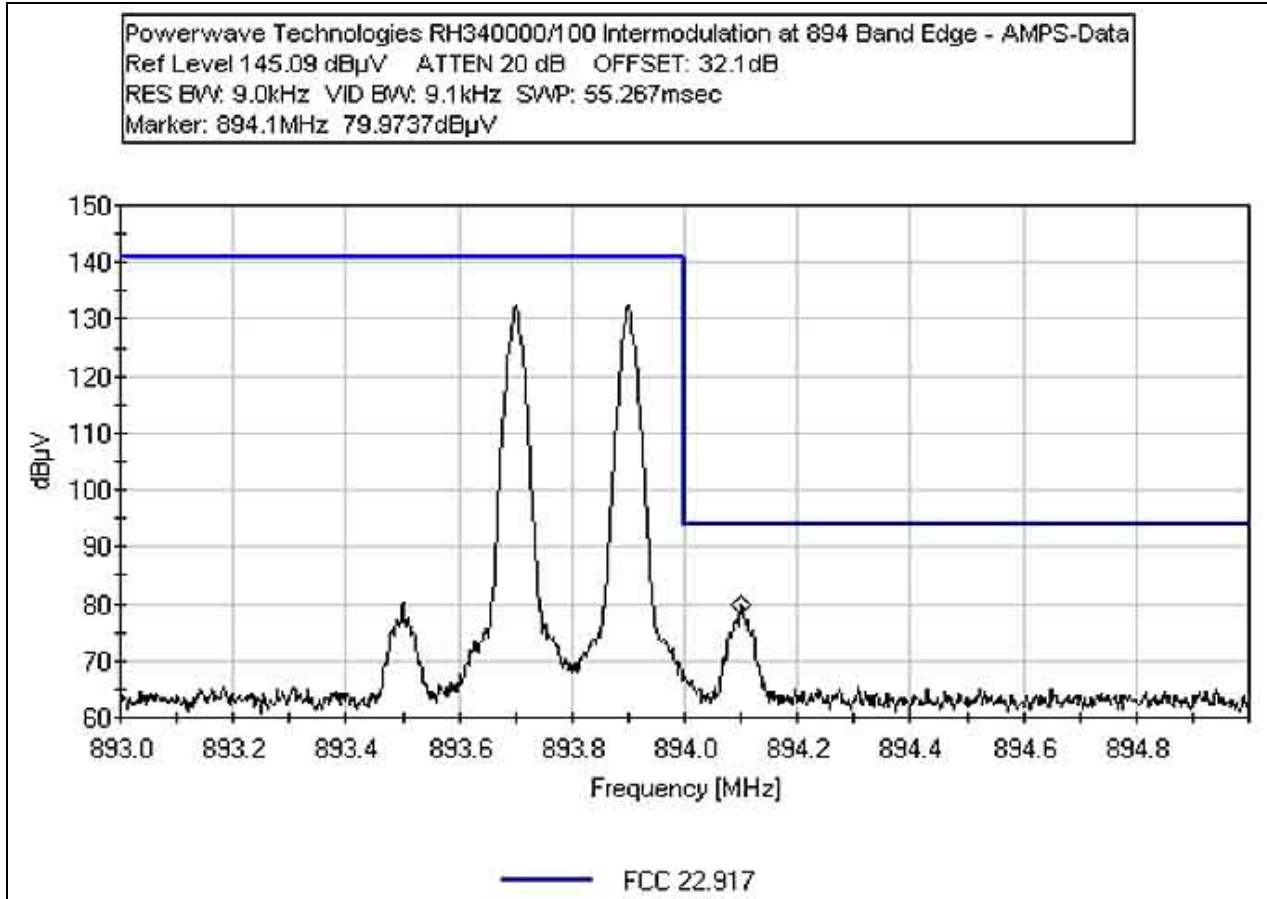
Measurement Data: Reading listed by margin. Test Lead: RF Output

#	Freq MHz	Rdng dB μ V	dB	dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	869.000M Ave	90.5					+0.0	90.5	94.0	-3.5	RF Ou
									869 Band Edge for CDMA		
^	869.000M	93.9					+0.0	93.9	94.0	-0.1	RF Ou
									869 Band Edge for WCDMA		
3	894.000M Ave	89.8					+0.0	89.8	94.0	-4.2	RF Ou
									894 Band Edge for CDMA		
^	894.000M	91.1					+0.0	91.1	94.0	-2.9	RF Ou
									894 Band Edge for WCDMA		
5	869.000M Ave	84.9					+0.0	84.9	94.0	-9.1	RF Ou
									869 Band Edge for WCDMA		
6	894.000M Ave	84.4					+0.0	84.4	94.0	-9.6	RF Ou
									894 Band Edge for WCDMA		

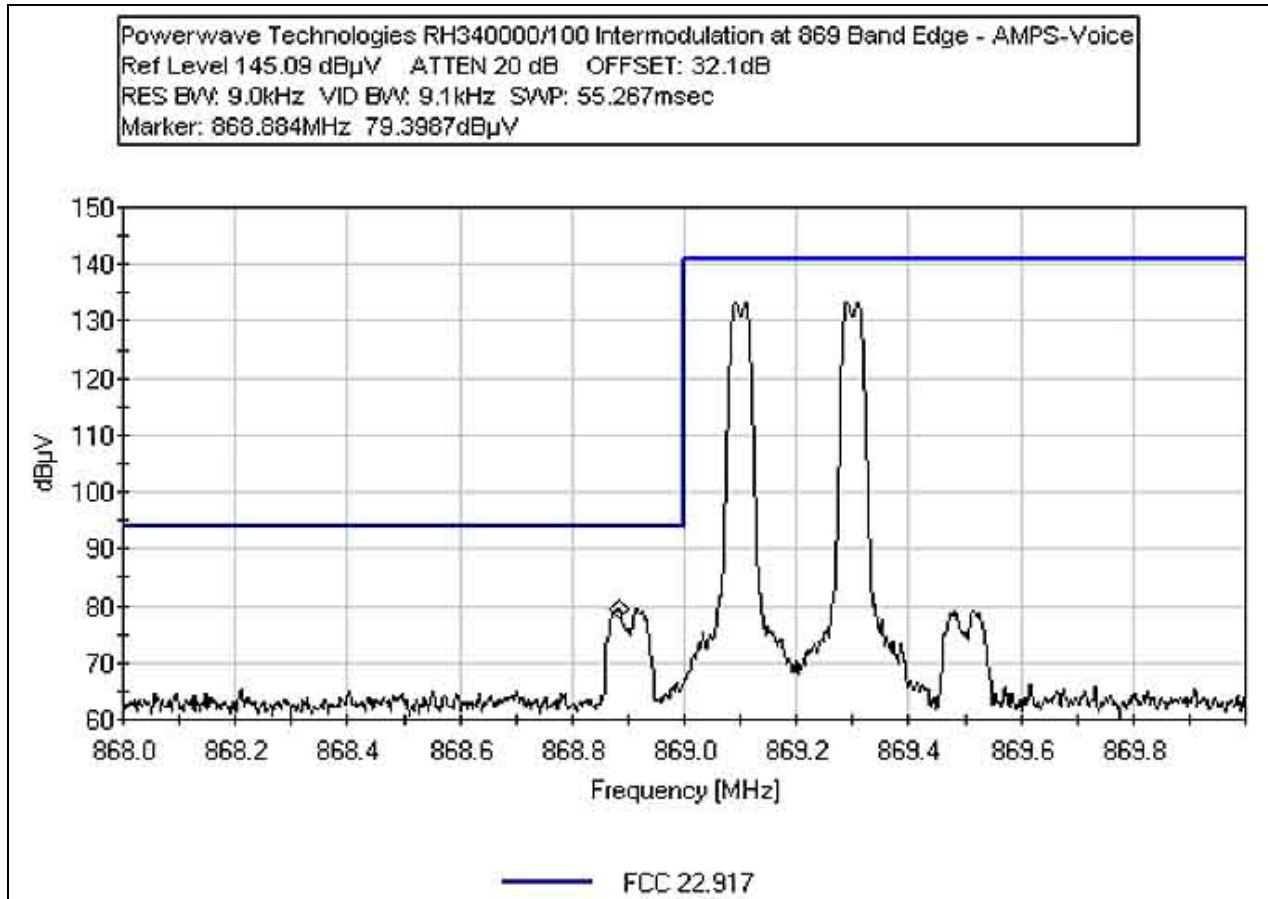
FCC PART 22 INTERMODULATION - AMPS-DATA LOW CHANNEL



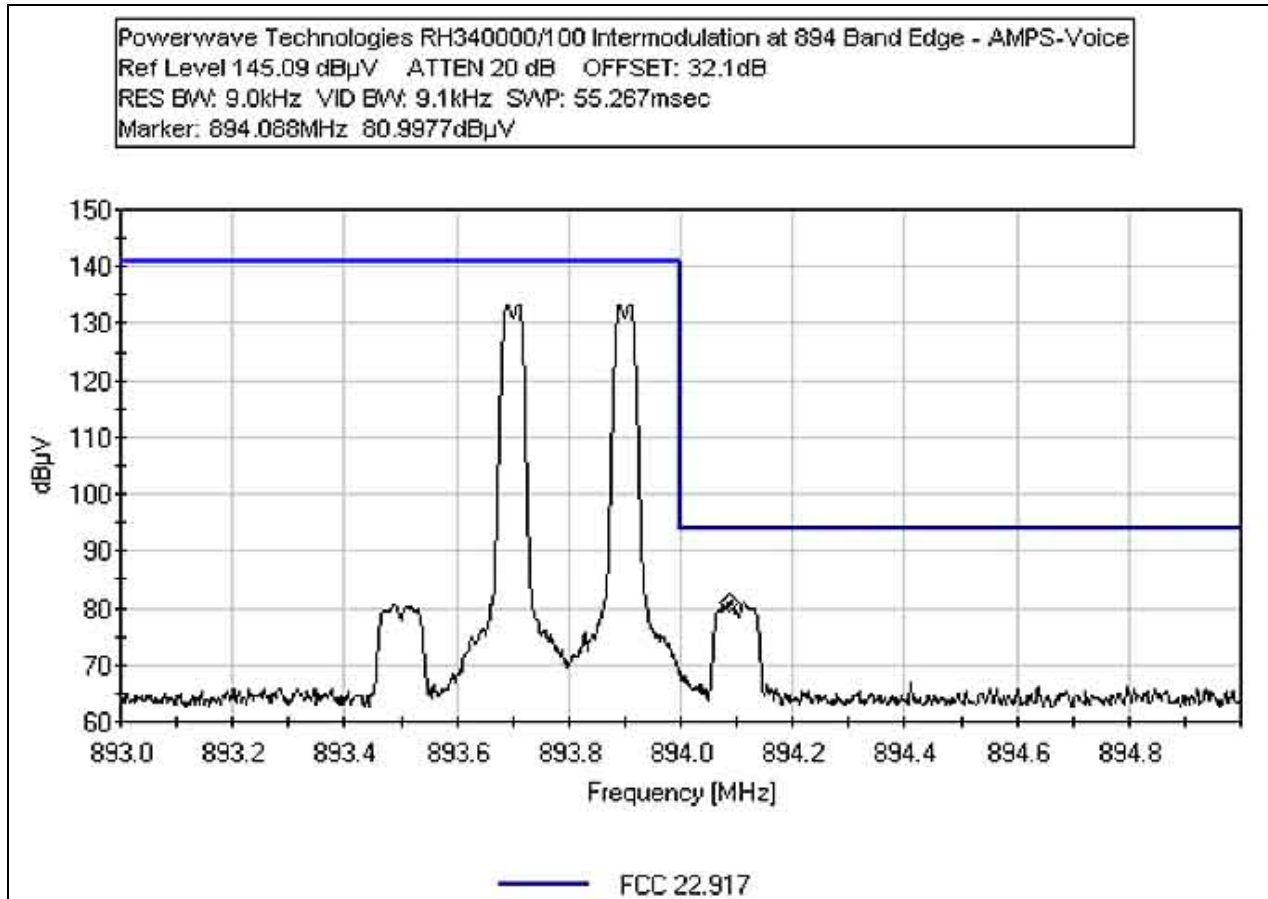
FCC PART 22 INTERMODULATION - AMPS-DATA HIGH CHANNEL



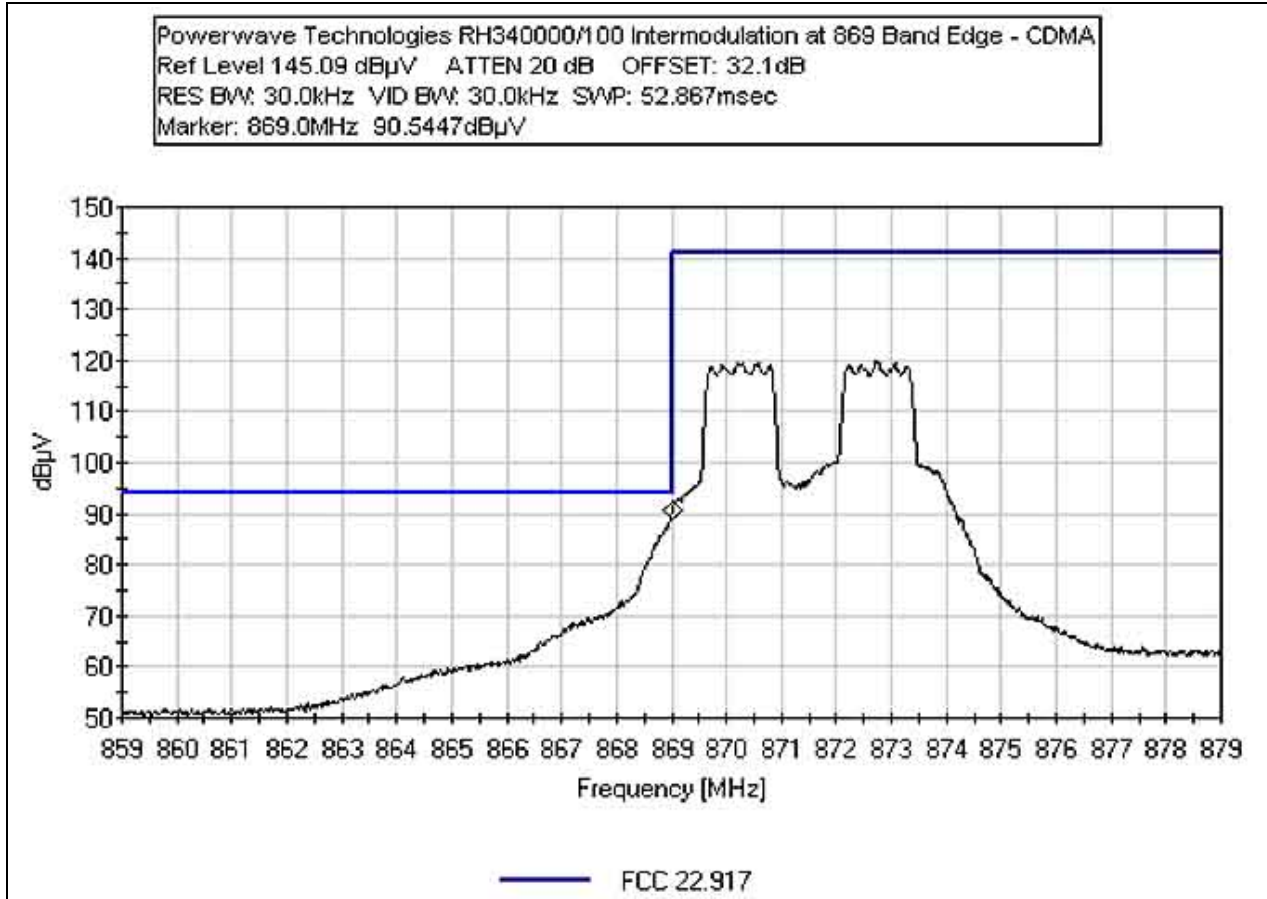
FCC PART 22 INTERMODULATION - AMPS-VOICE LOW CHANNEL



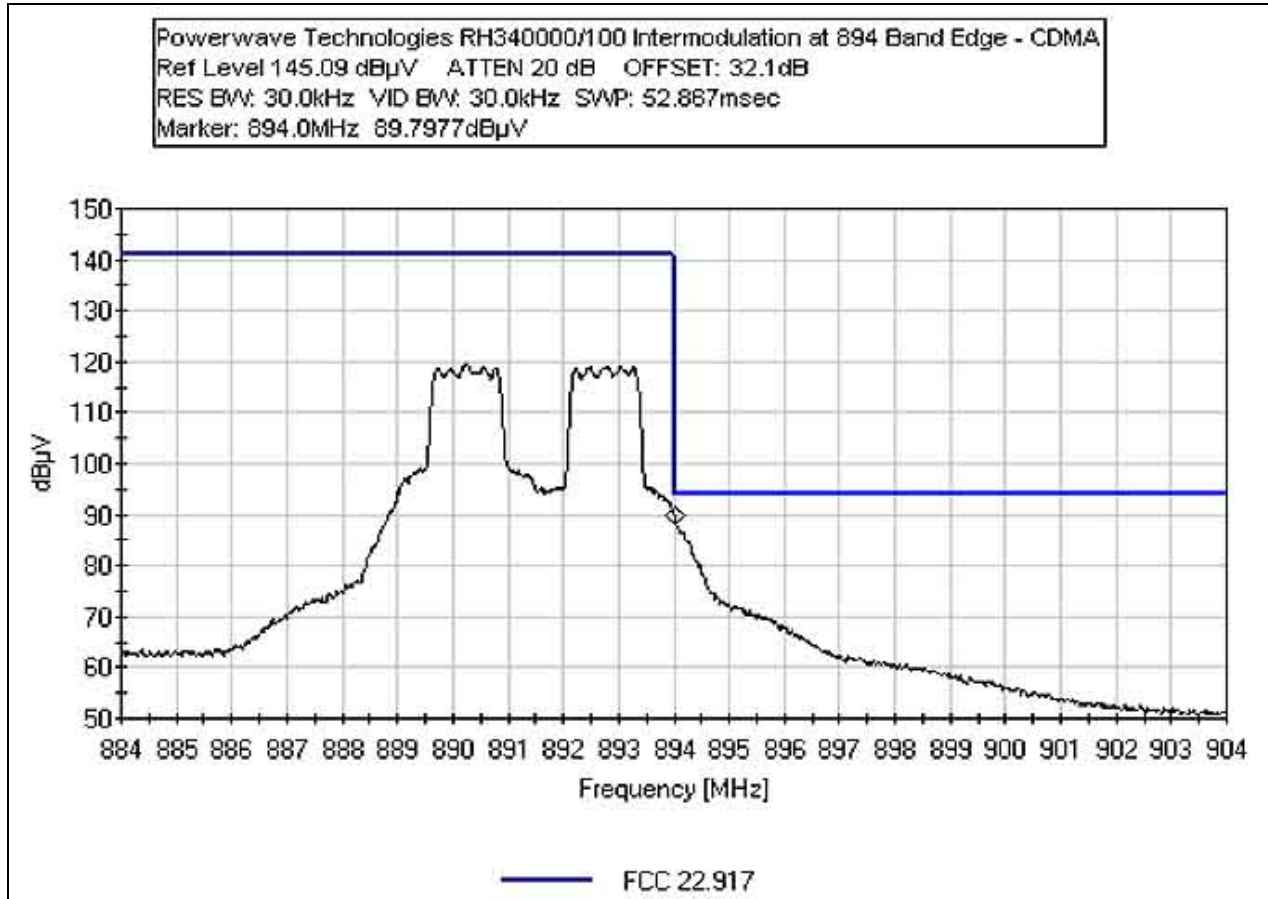
FCC PART 22 INTERMODULATION - AMPS-VOICE HIGH CHANNEL



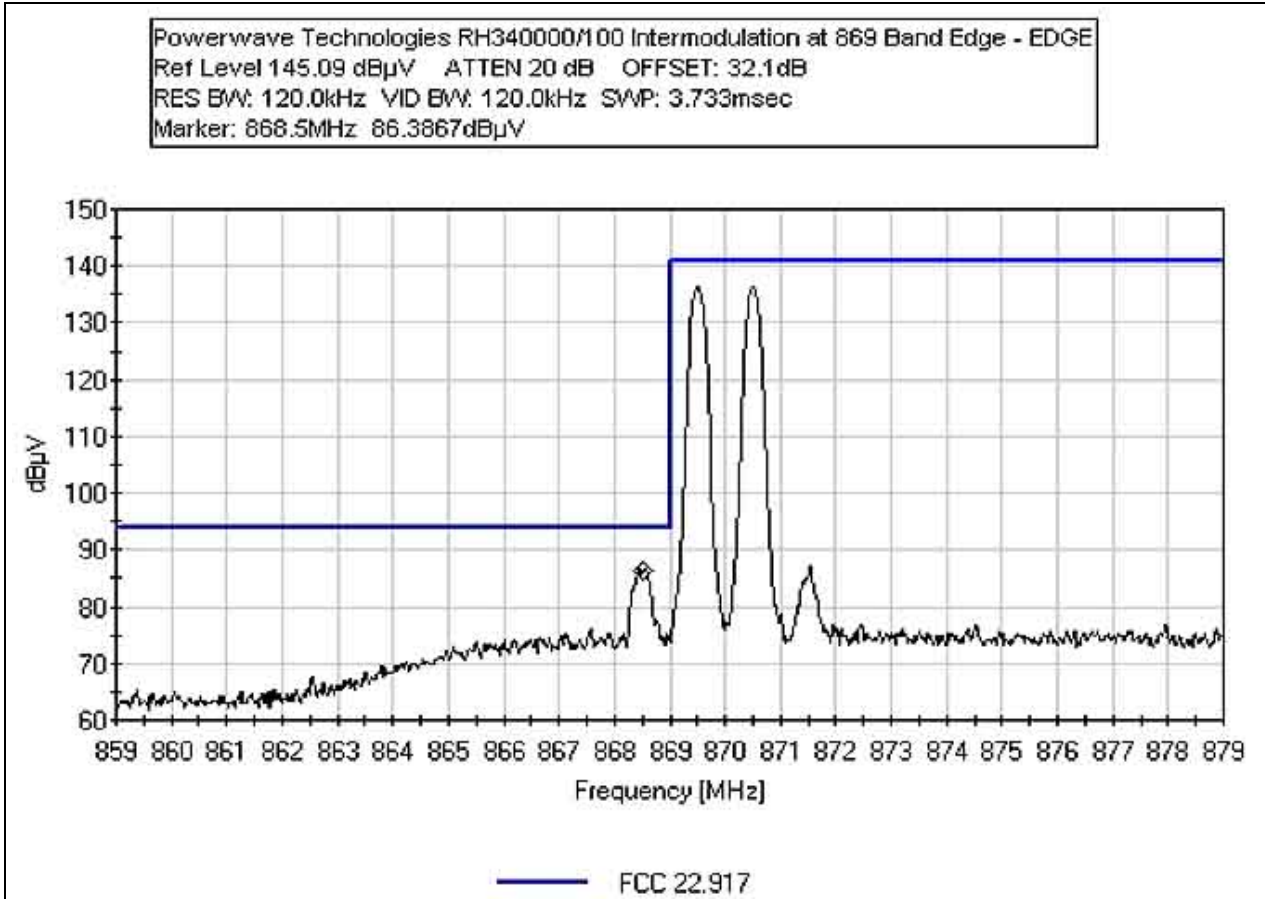
FCC PART 22 INTERMODULATION - CDMA LOW CHANNEL



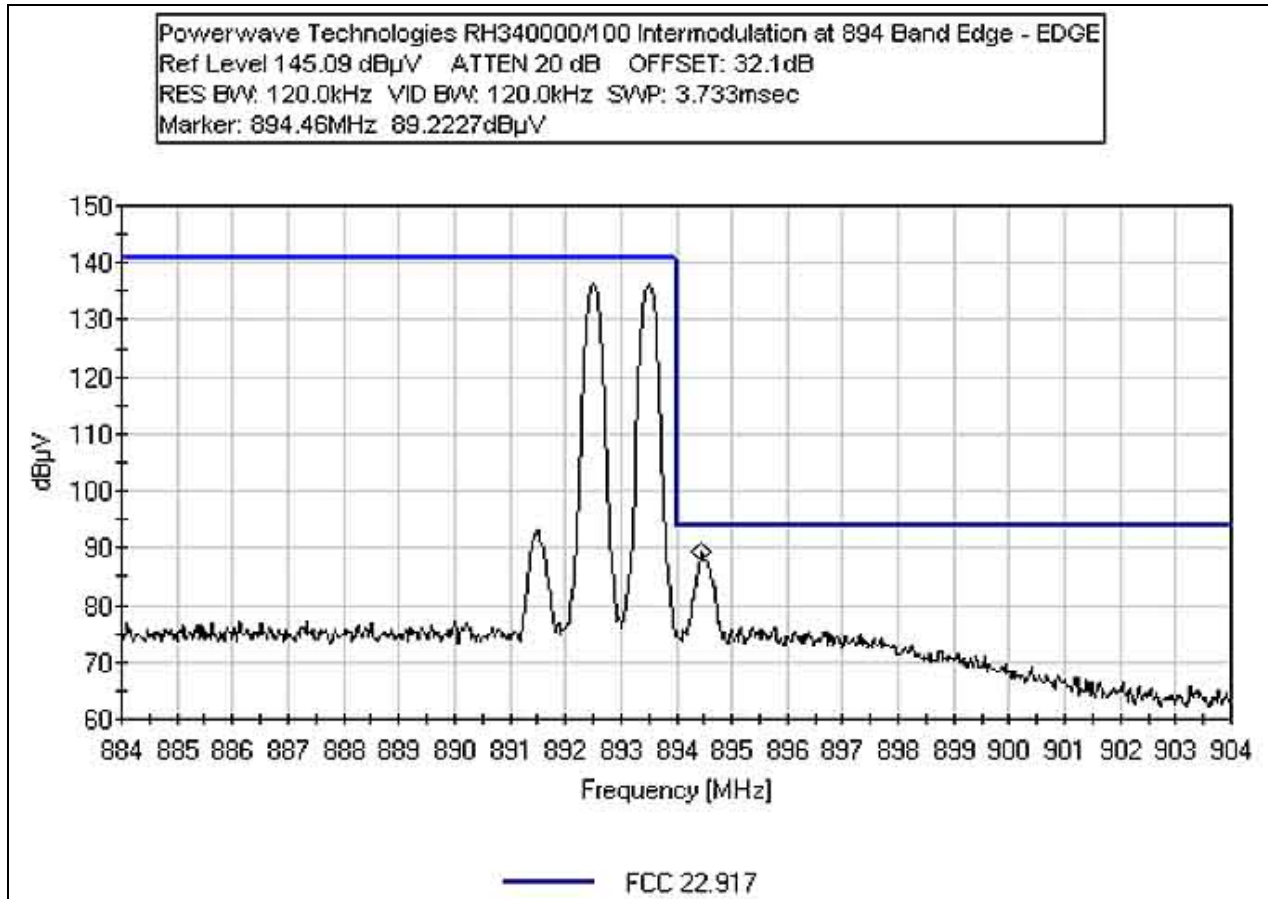
FCC PART 22 INTERMODULATION - CDMA HIGH CHANNEL



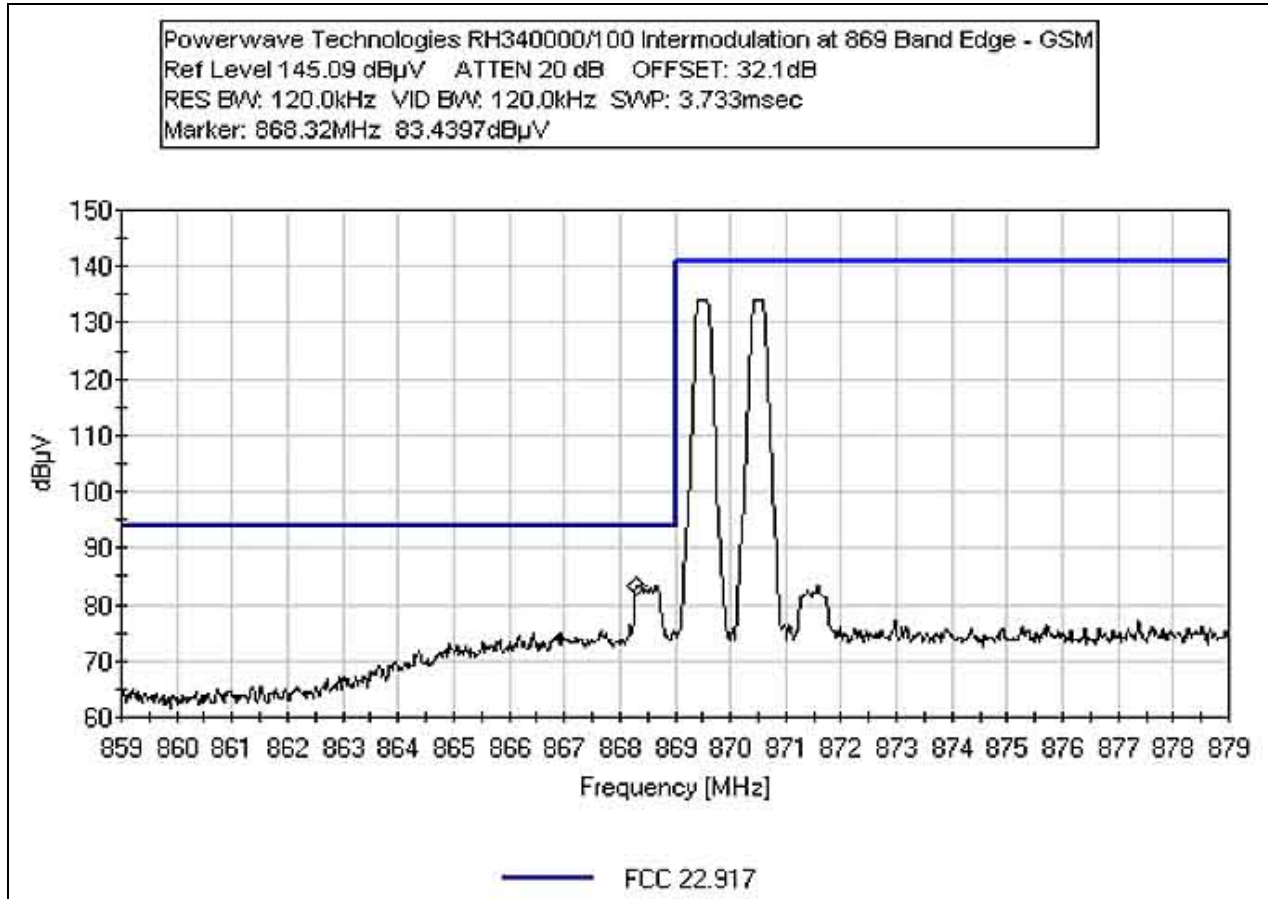
FCC PART 22 INTERMODULATION - EDGE LOW CHANNEL



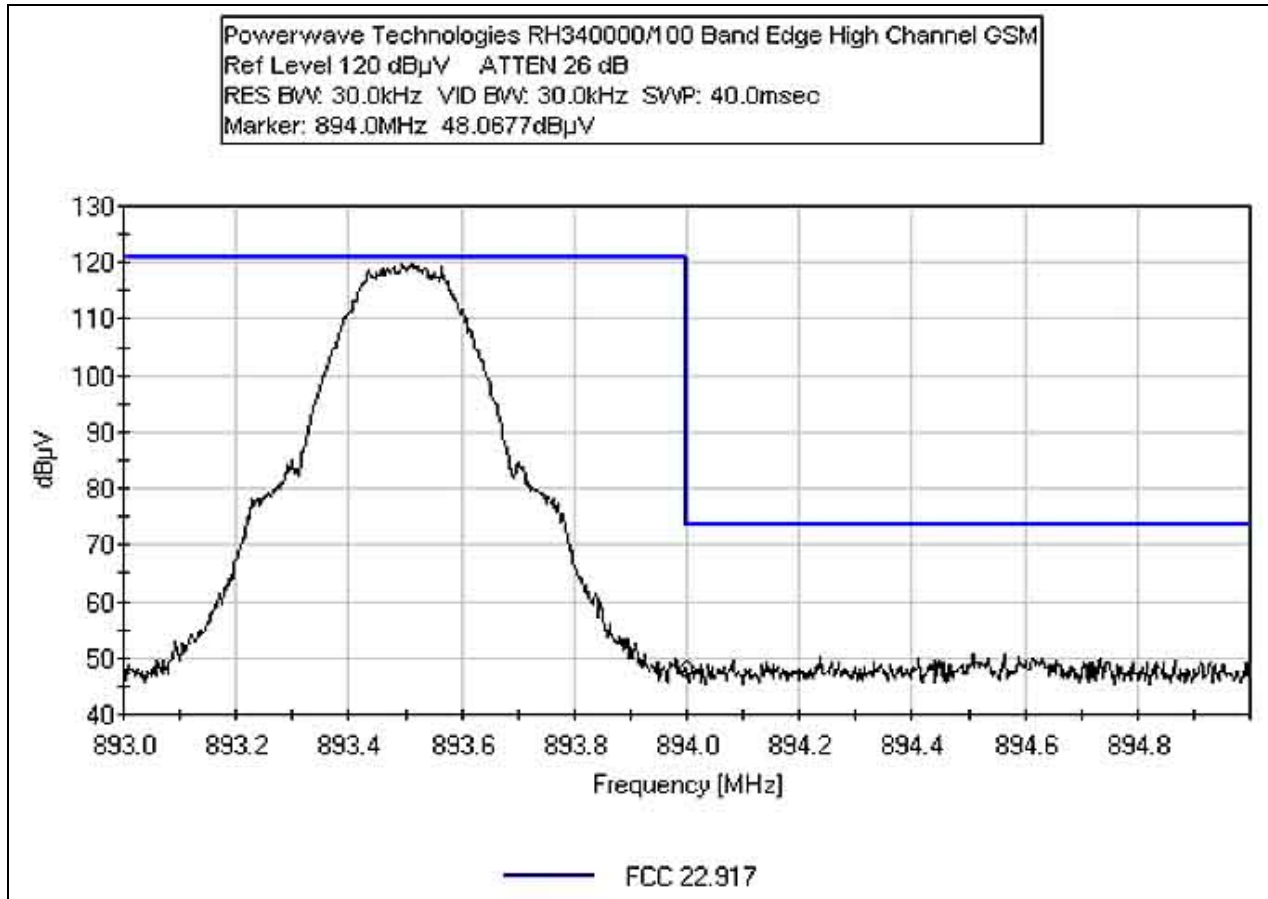
FCC PART 22 INTERMODULATION - EDGE HIGH CHANNEL



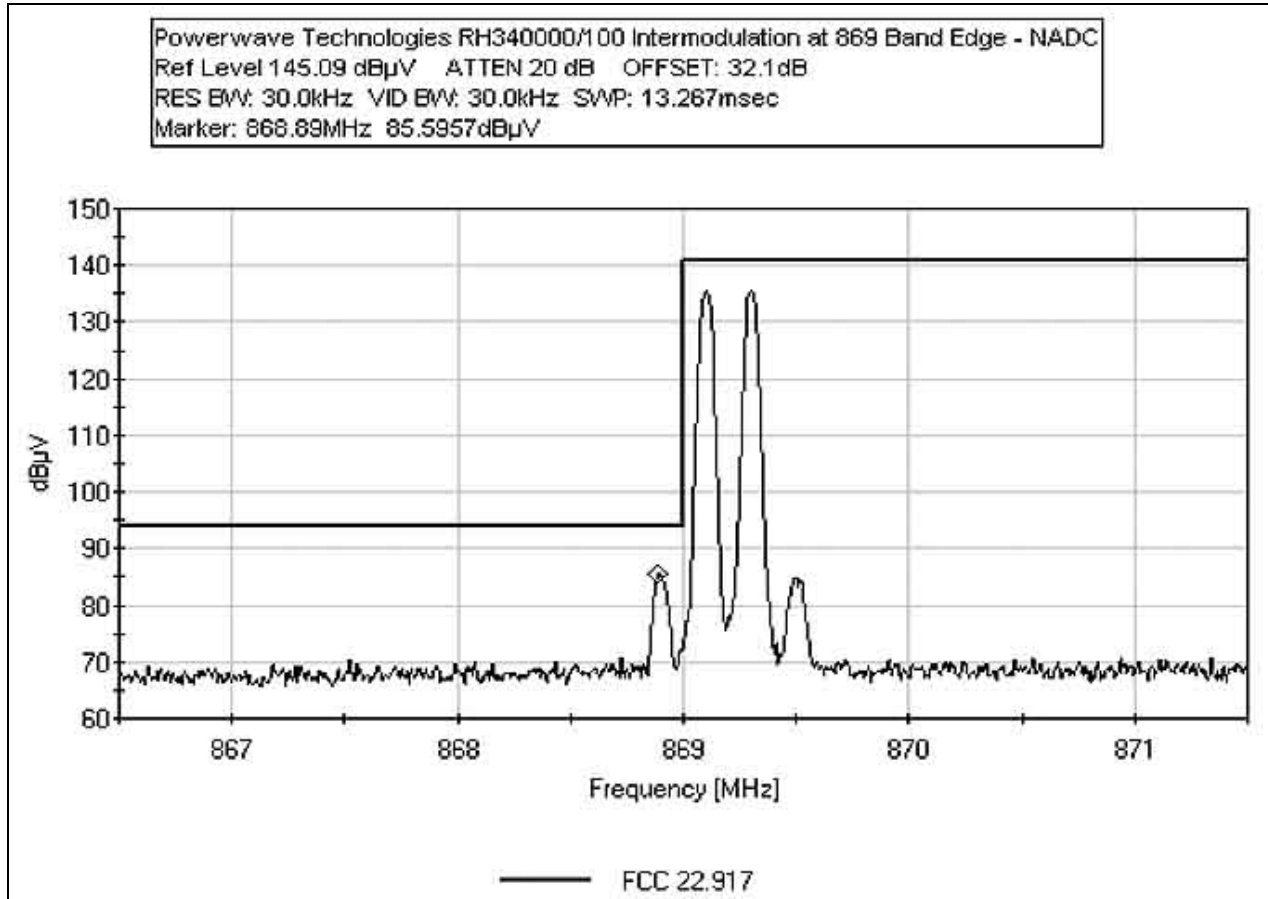
FCC PART 22 INTERMODULATION - GSM LOW CHANNEL



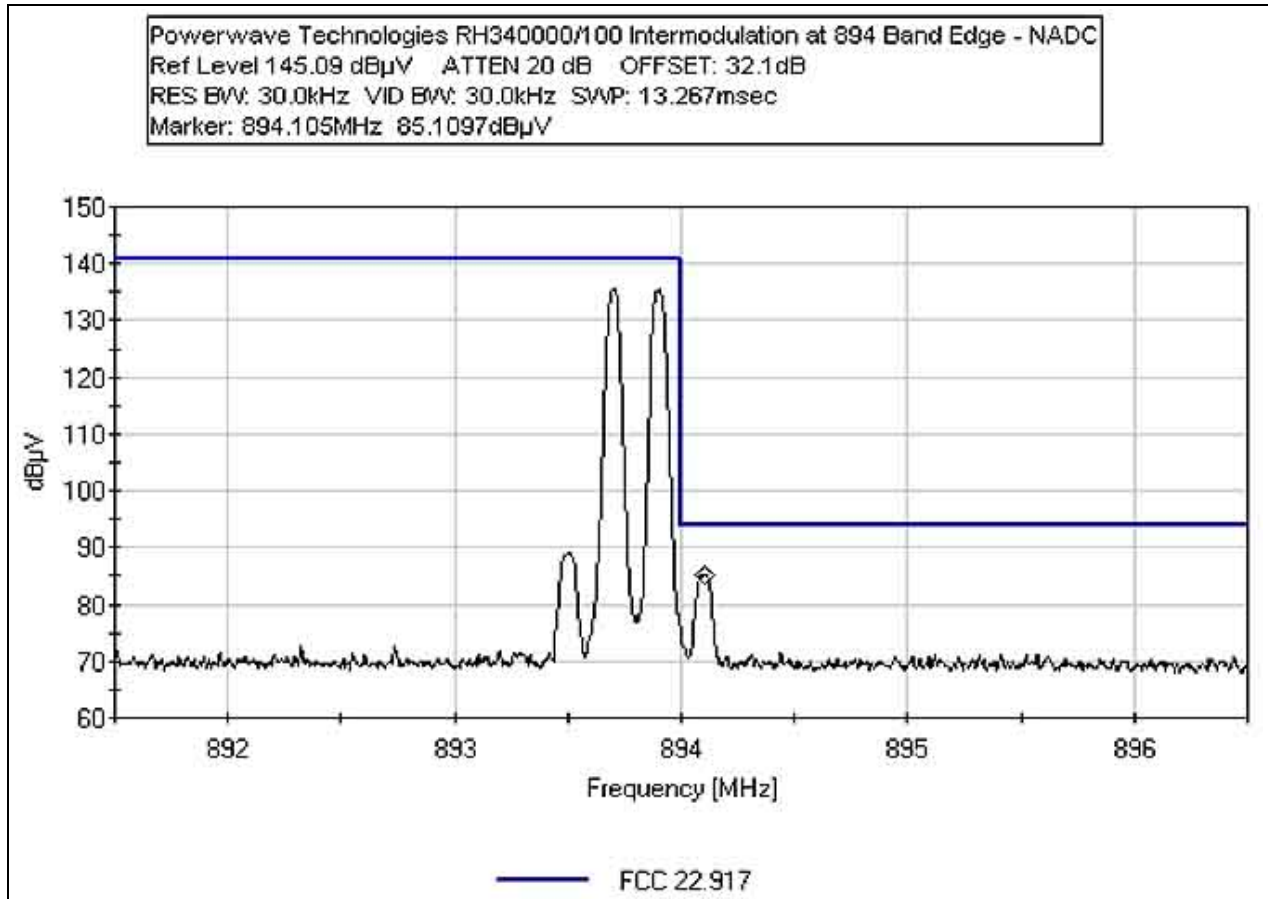
FCC PART 22 INTERMODULATION - GSM HIGH CHANNEL



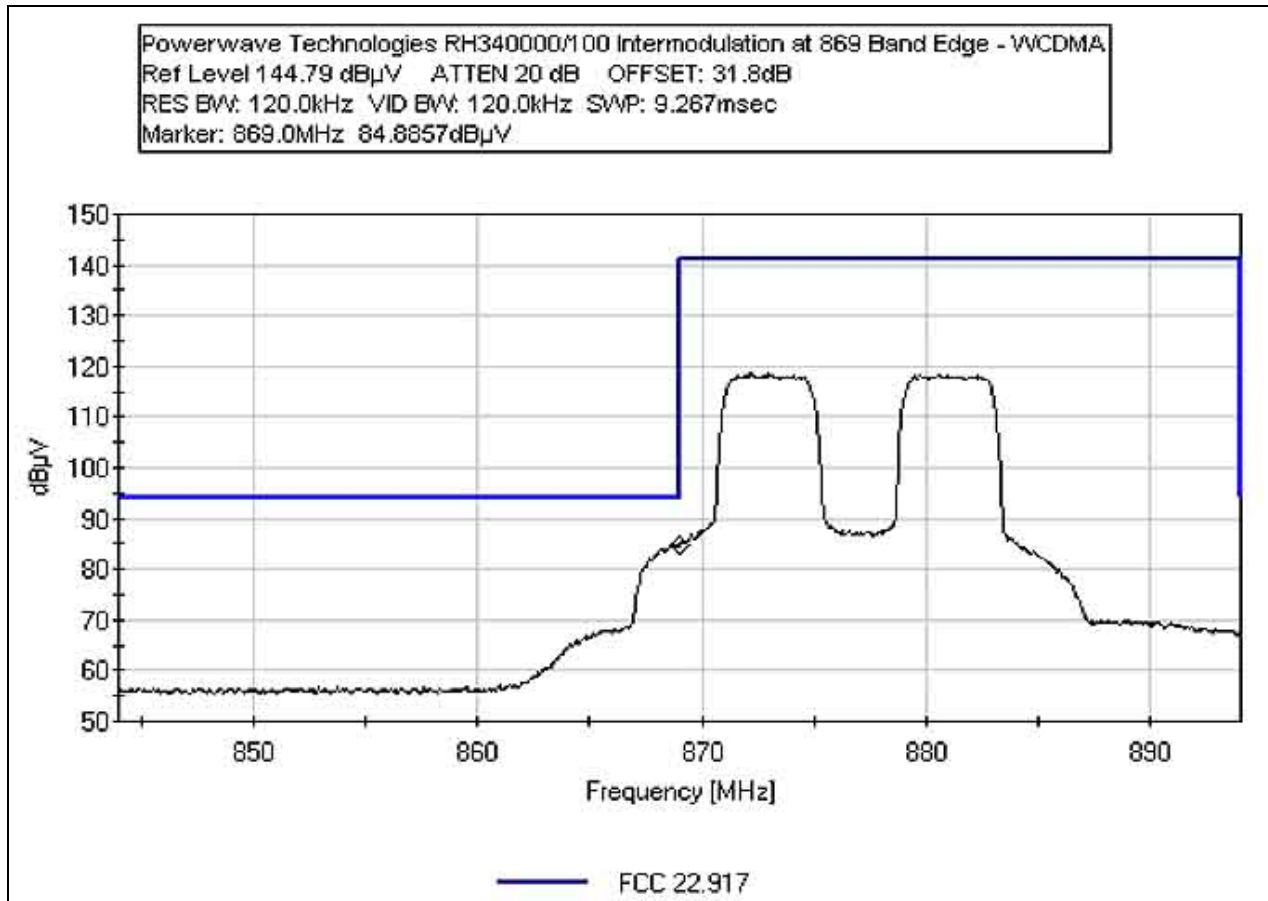
FCC PART 22 INTERMODULATION - NADC LOW CHANNEL



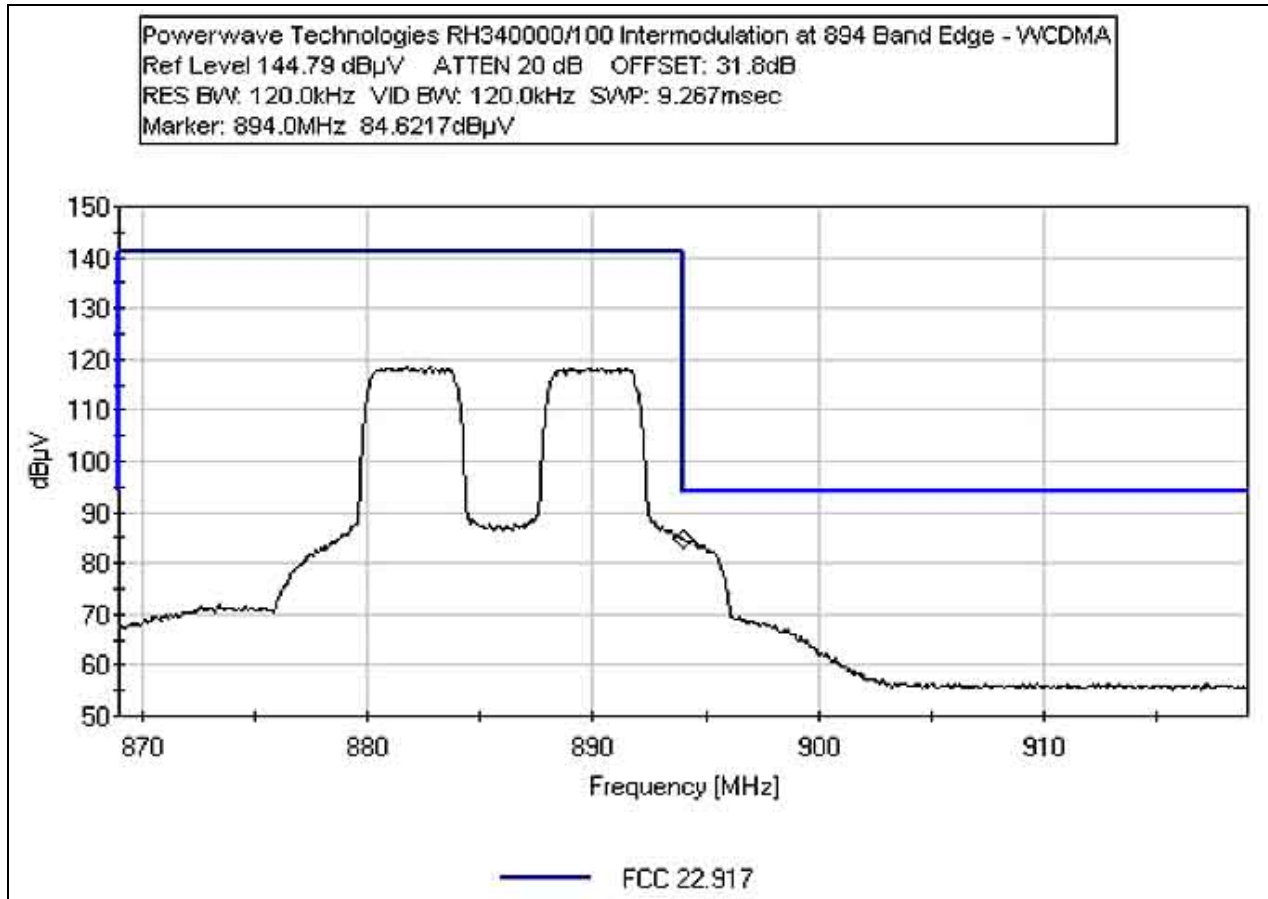
FCC PART 22 INTERMODULATION - NADC HIGH CHANNEL



FCC PART 22 INTERMODULATION - WCDMA LOW CHANNEL



FCC PART 22 INTERMODULATION - WCDMA HIGH CHANNEL



Intermodulation Test Setup



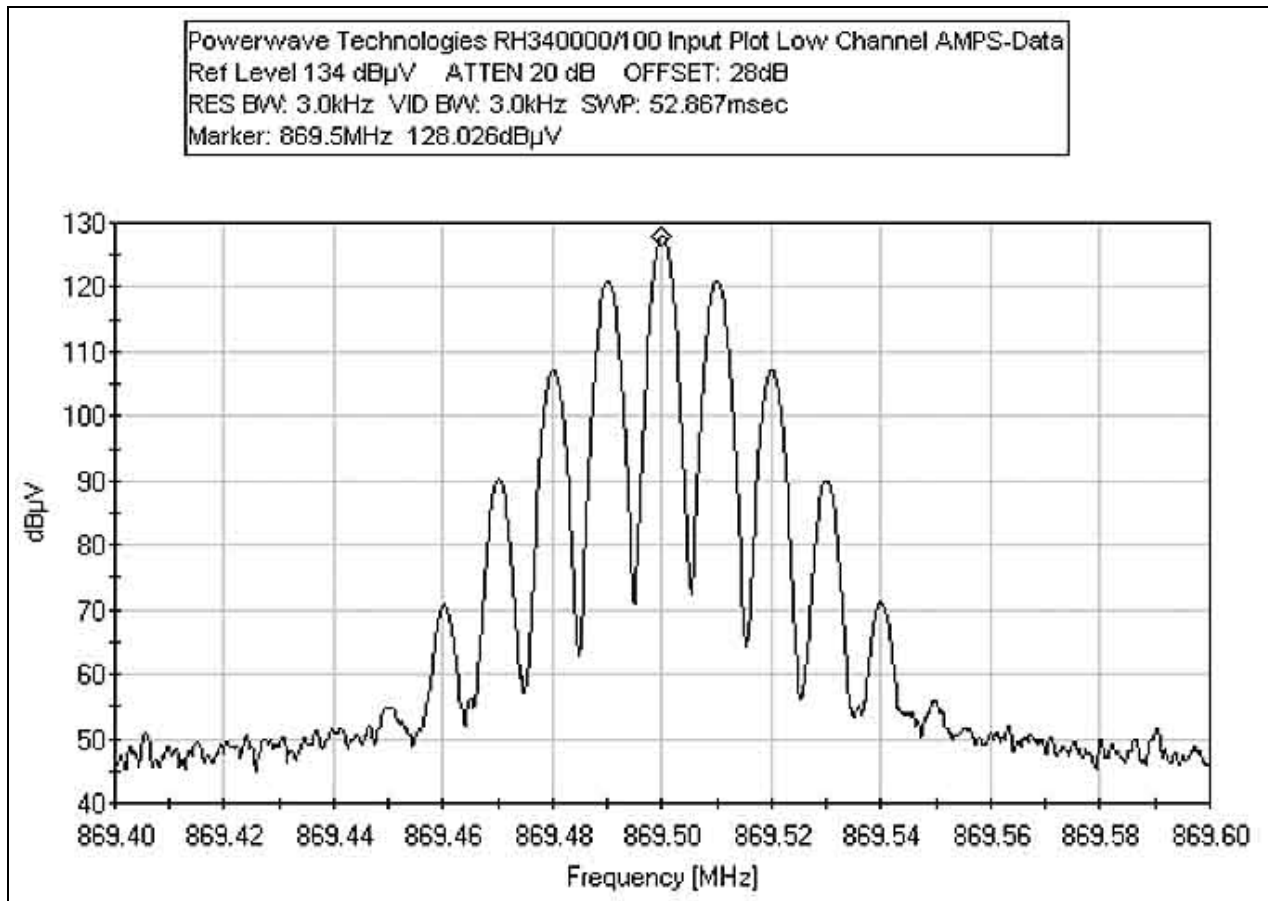
Intermodulation Support Equipment Setup



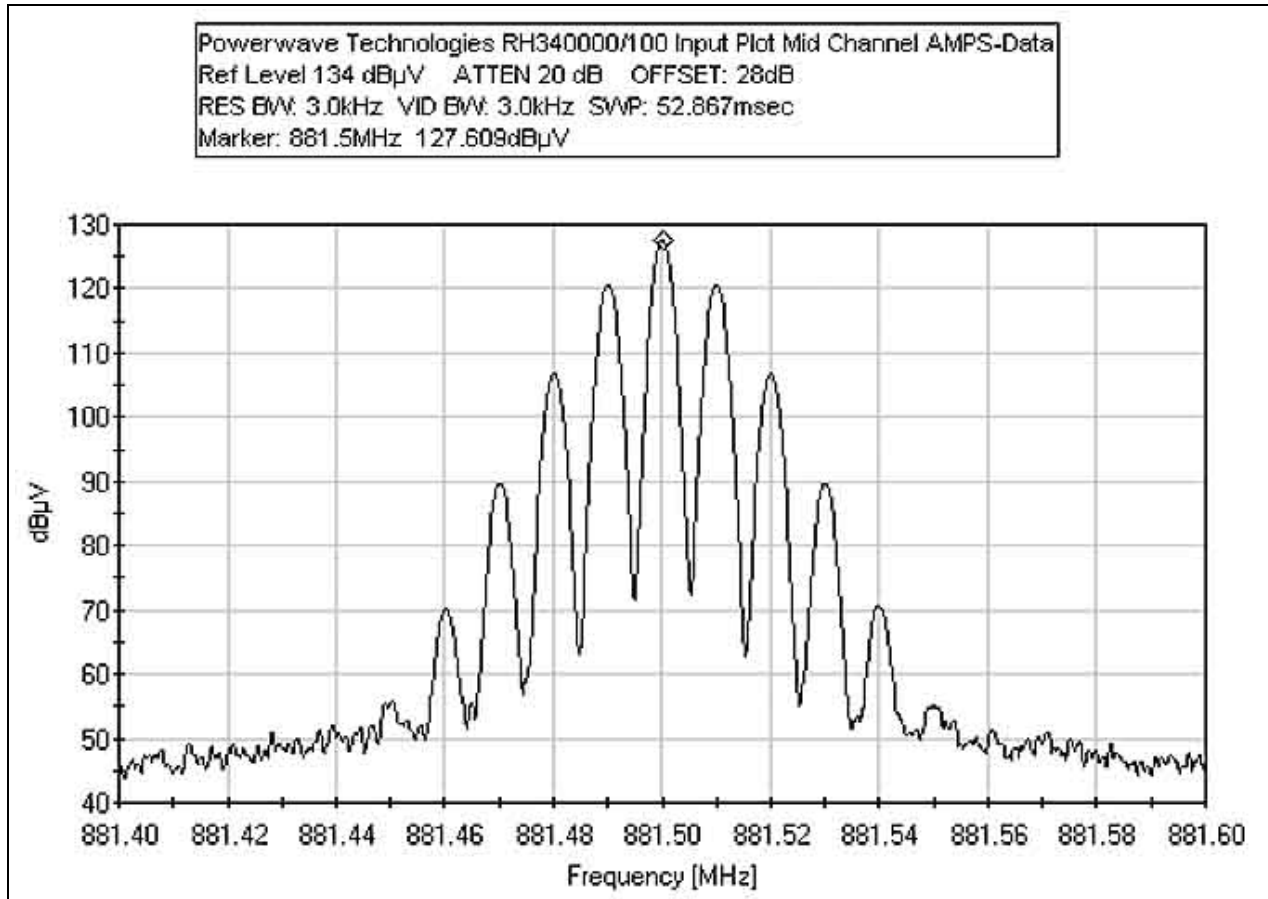
FCC PART 22 – INPUT PLOTS

Test Conditions: EUT is a dual band remote radio head with multichannel capability and may otherwise be classified as a repeater/extender. EUT operates on 869-894 MHz and 1930-1990 MHz. The RF output of the support equipment prior to the RF to fiber module (at the output of the support preamp) is routed to the measurement receiver for comparison to the output of the RF output of the EUT.

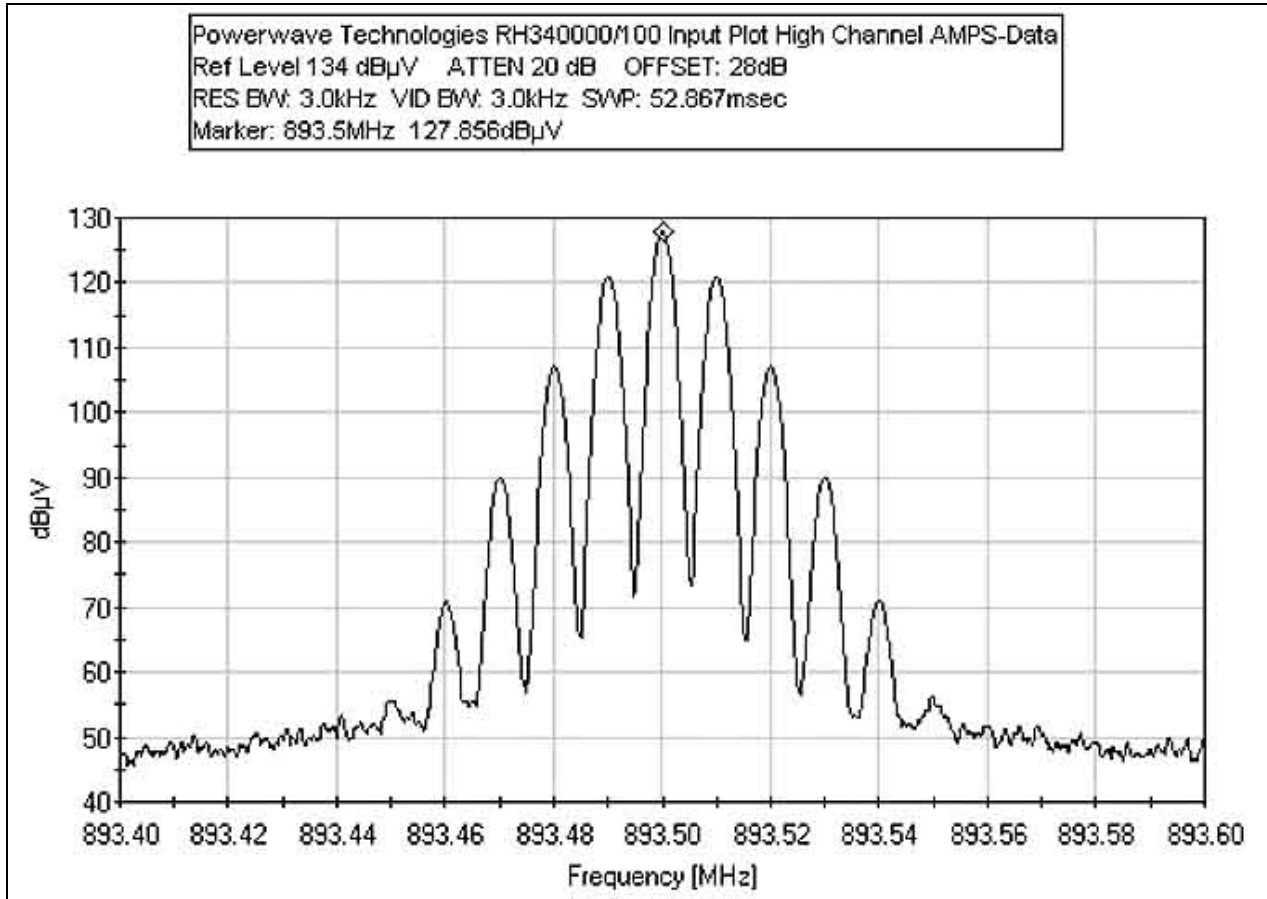
FCC PART 22 INPUT PLOT - AMPS-DATA LOW CHANNEL



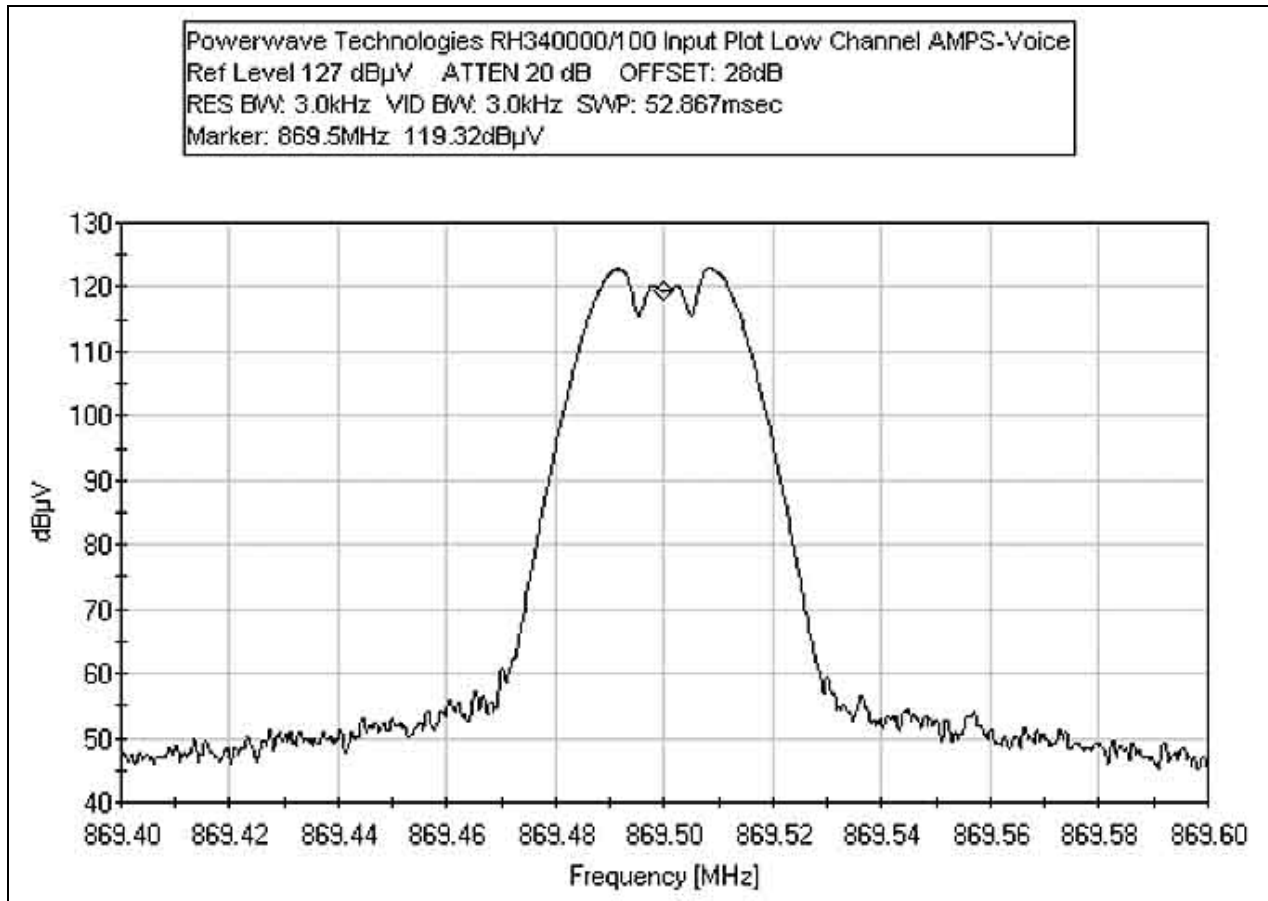
FCC PART 22 INPUT PLOT - AMPS-DATA MID CHANNEL



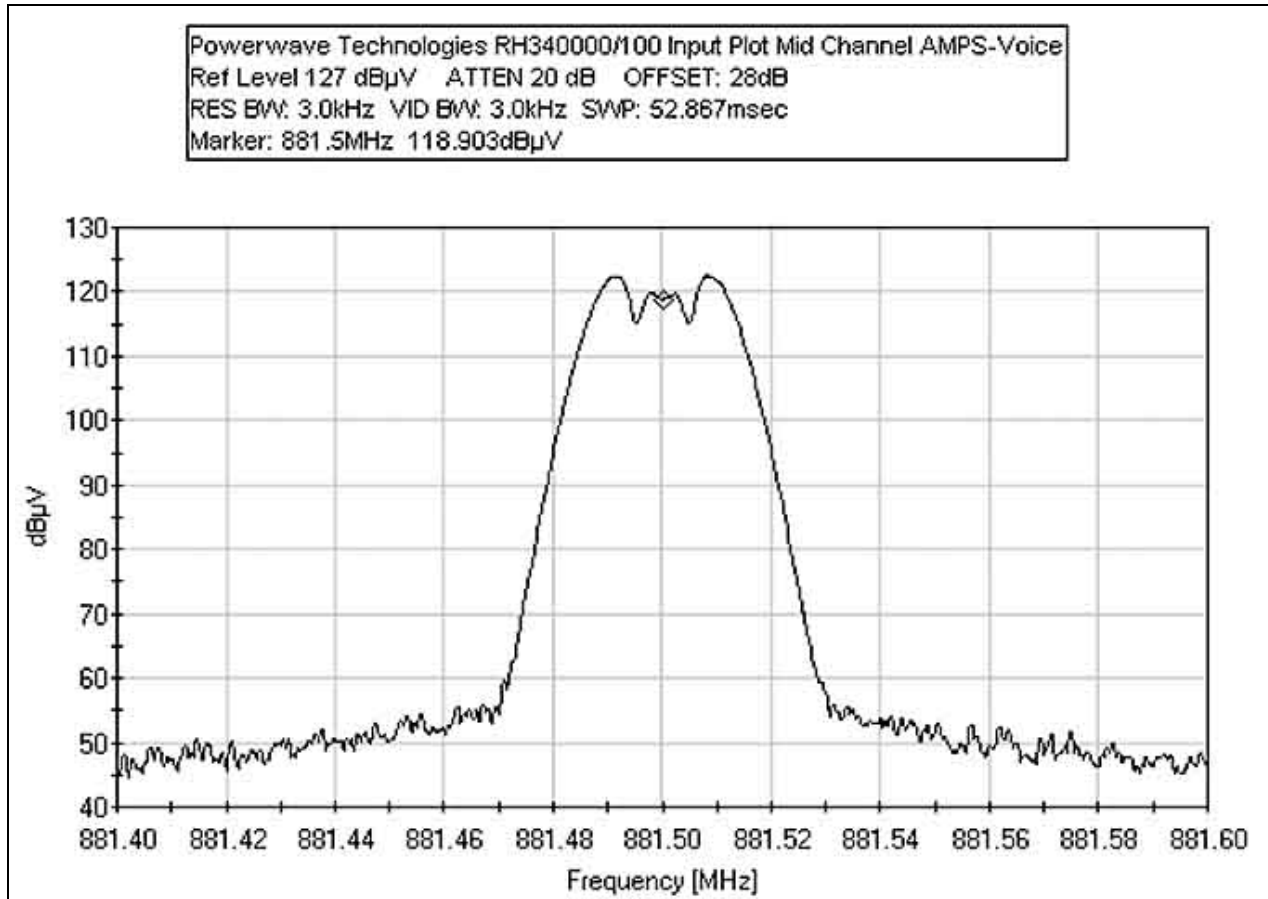
FCC PART 22 INPUT PLOT - AMPS-DATA HIGH CHANNEL



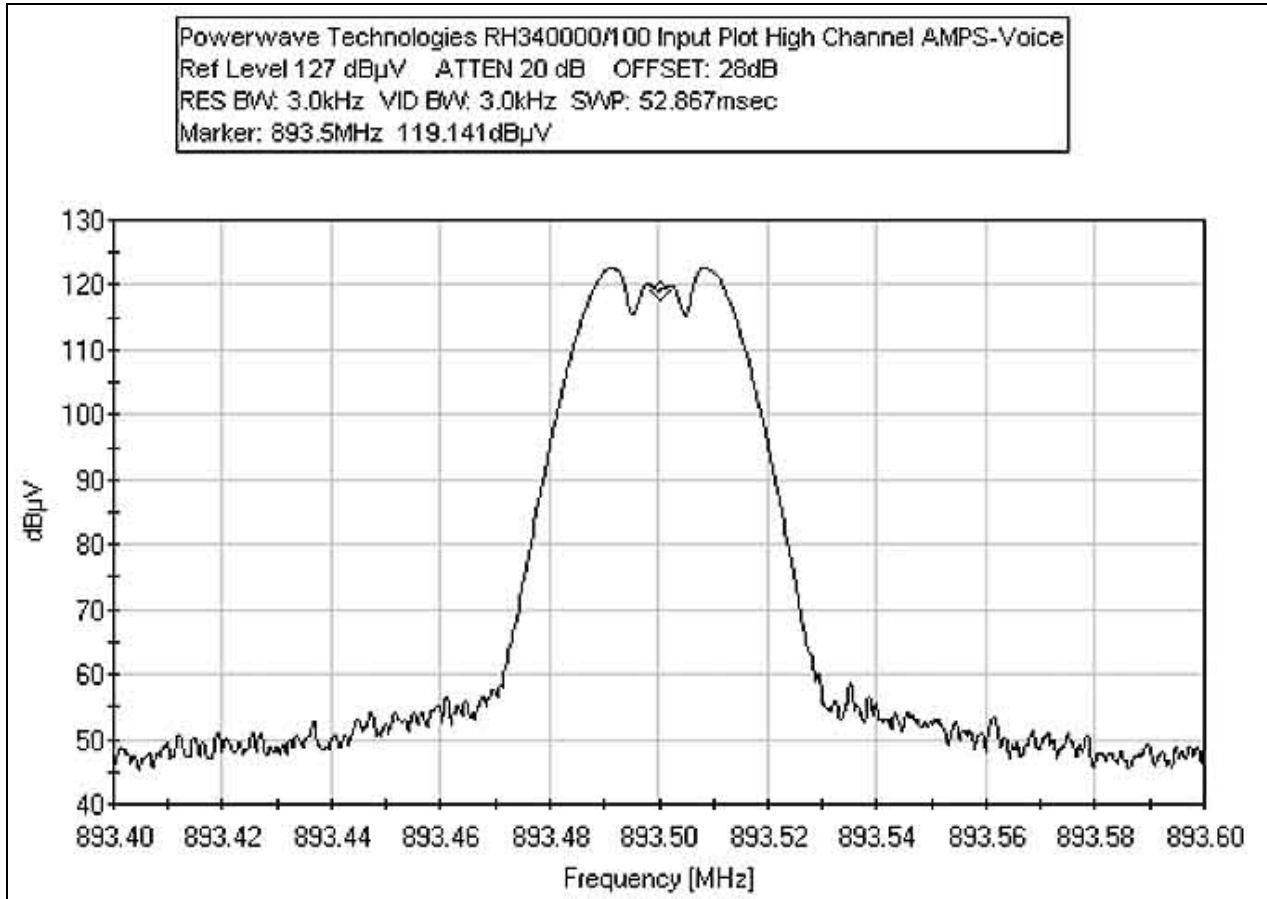
FCC PART 22 INPUT PLOT - AMPS-VOICE LOW CHANNEL



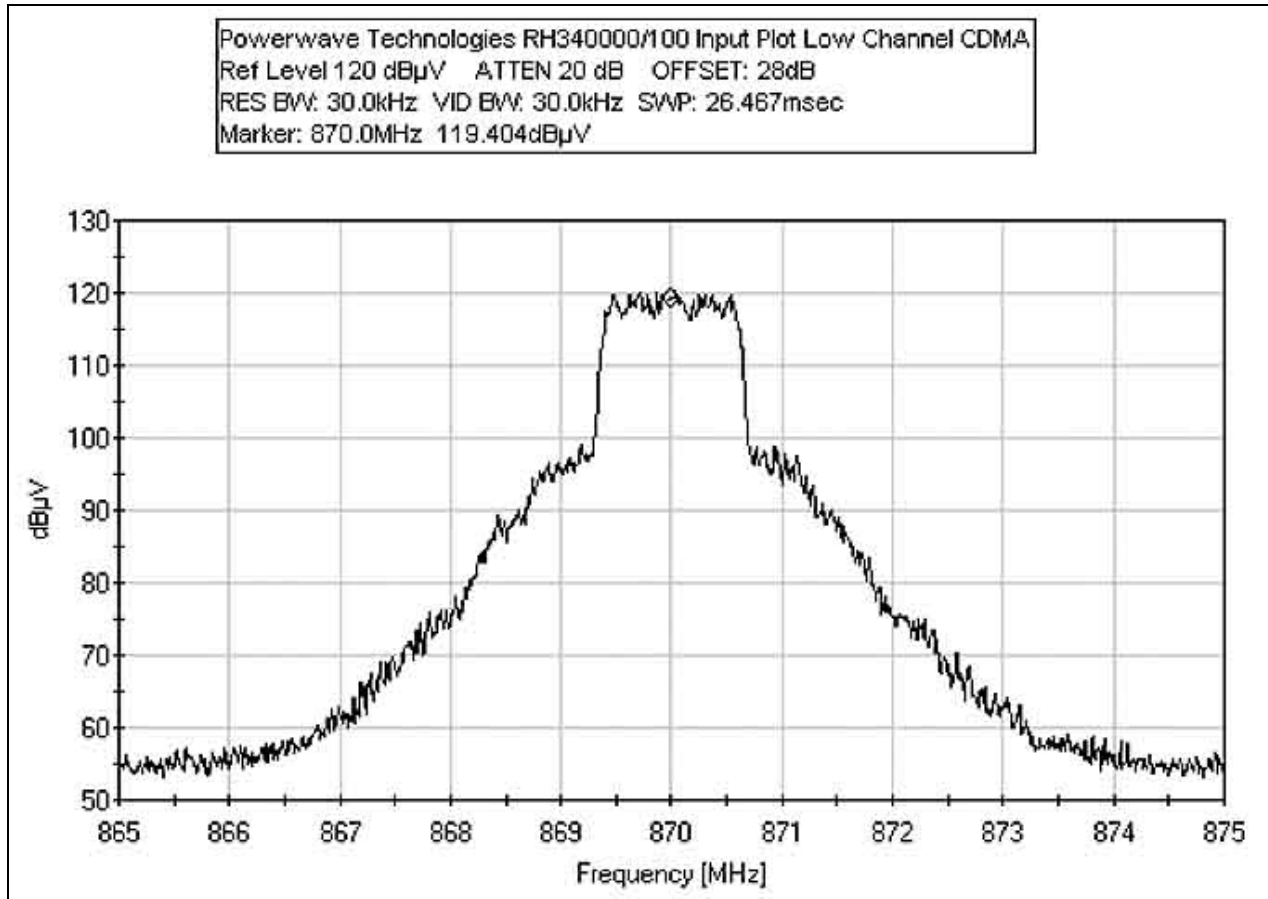
FCC PART 22 INPUT PLOT - AMPS-VOICE MID CHANNEL



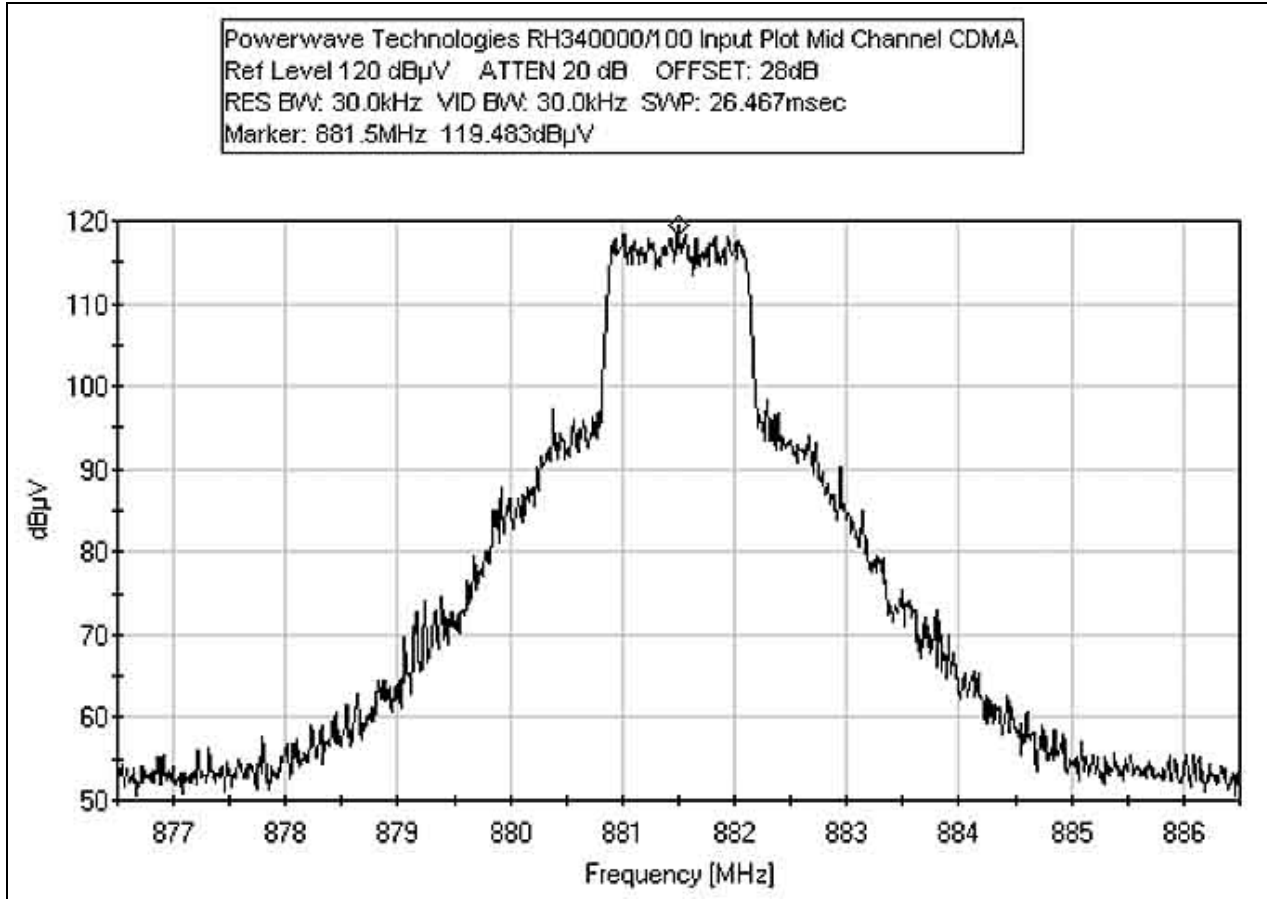
FCC PART 22 INPUT PLOT - AMPS-VOICE HIGH CHANNEL



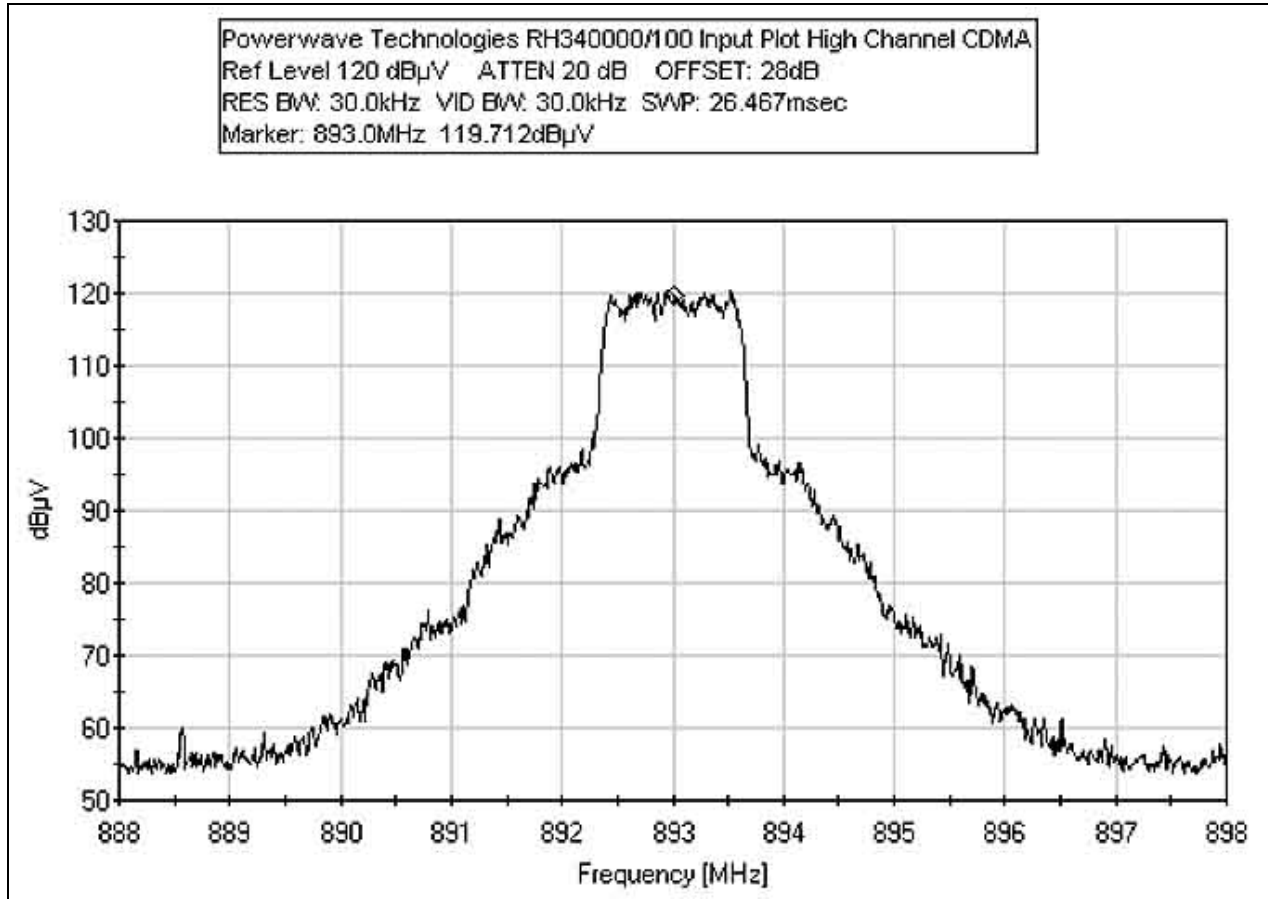
FCC PART 22 INPUT PLOT - CDMA LOW CHANNEL



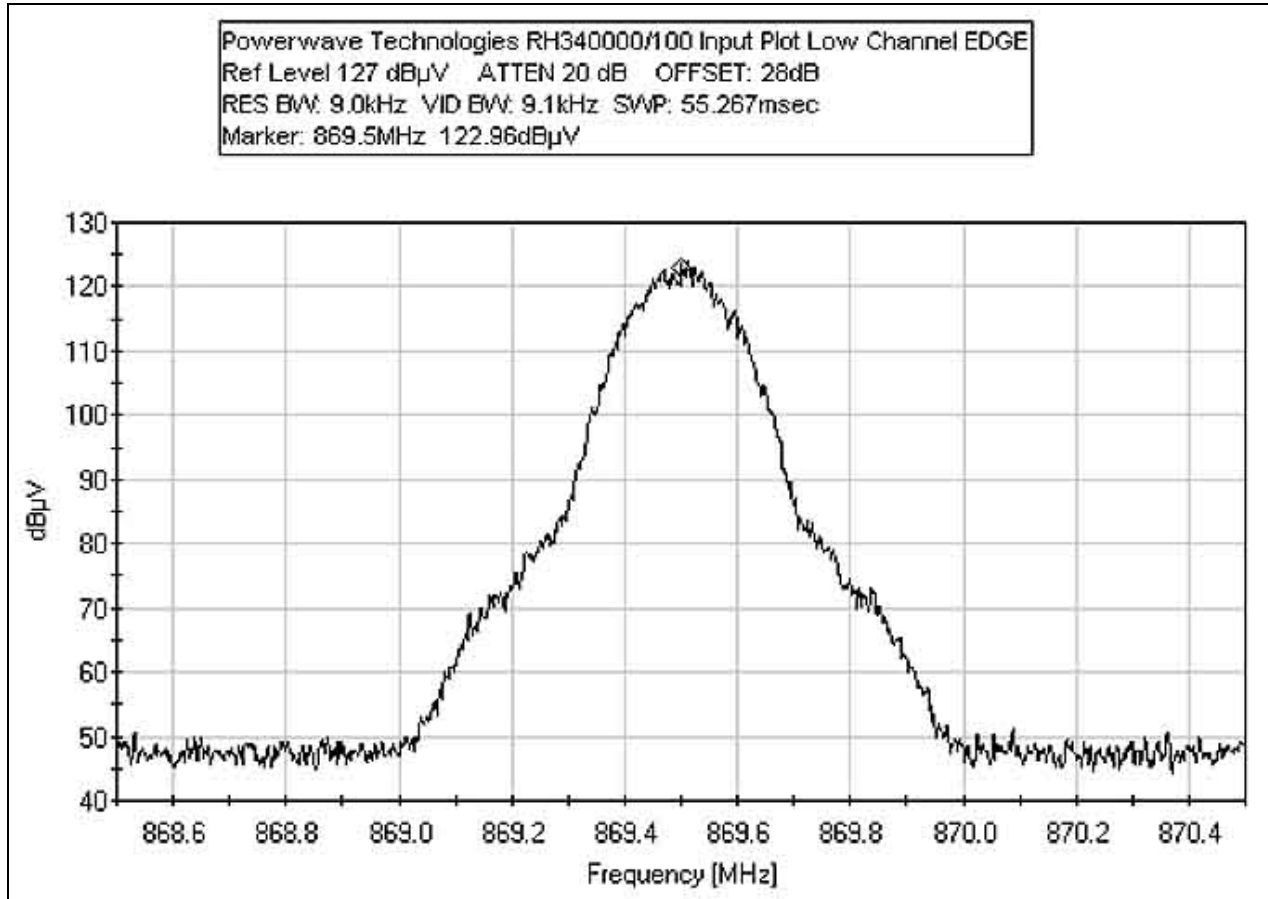
FCC PART 22 INPUT PLOT - CDMA MID CHANNEL



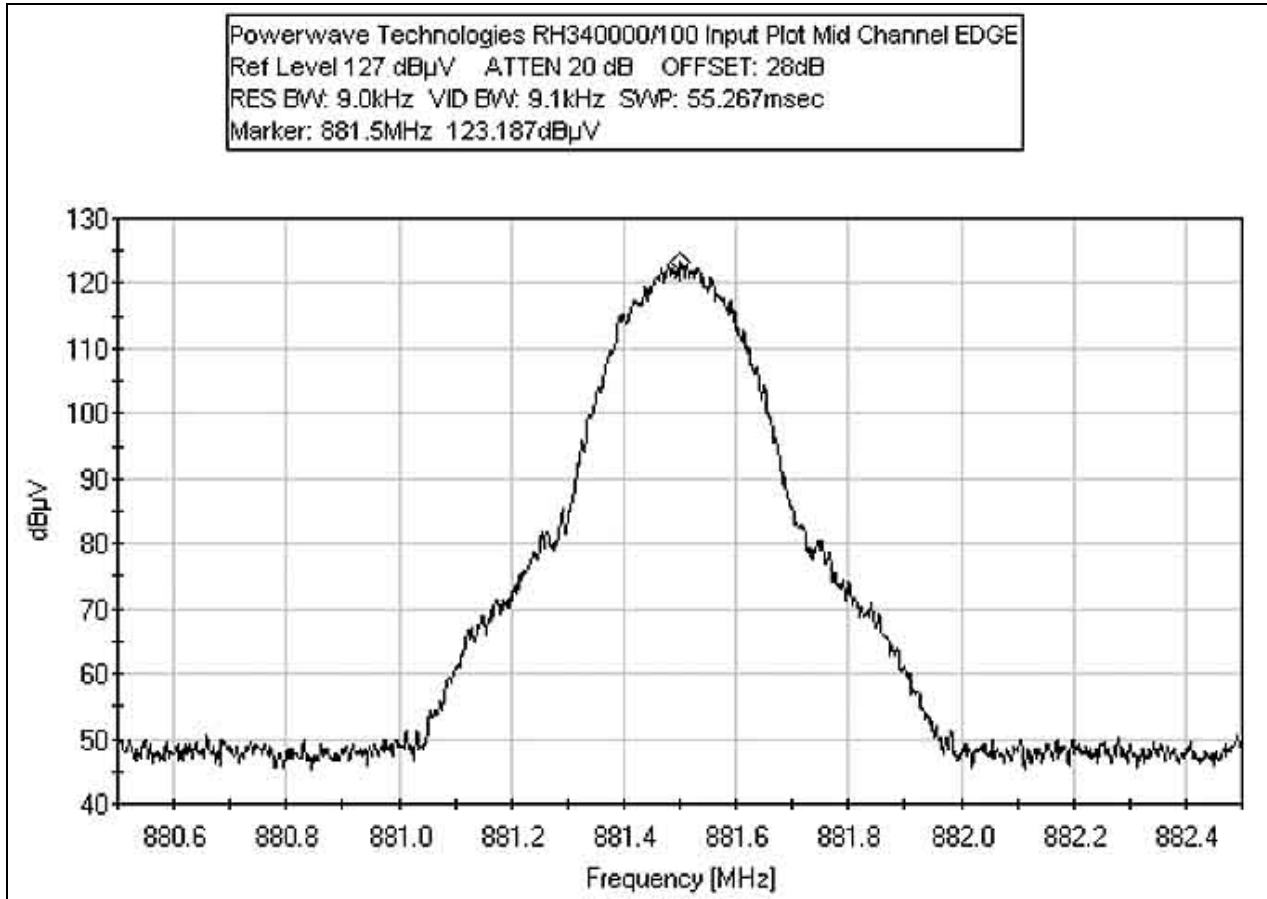
FCC PART 22 INPUT PLOT - CDMA HIGH CHANNEL



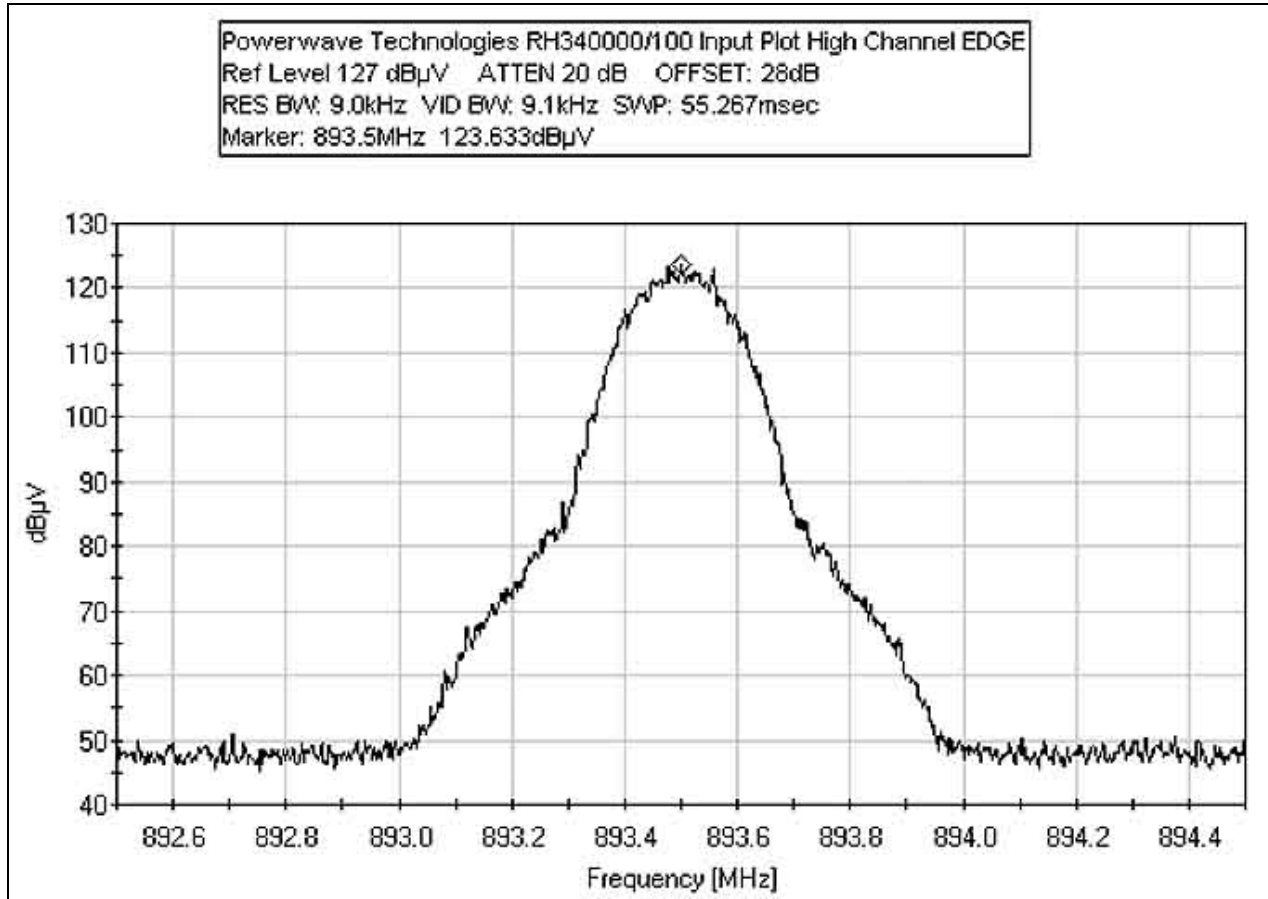
FCC PART 22 INPUT PLOT - EDGE LOW CHANNEL



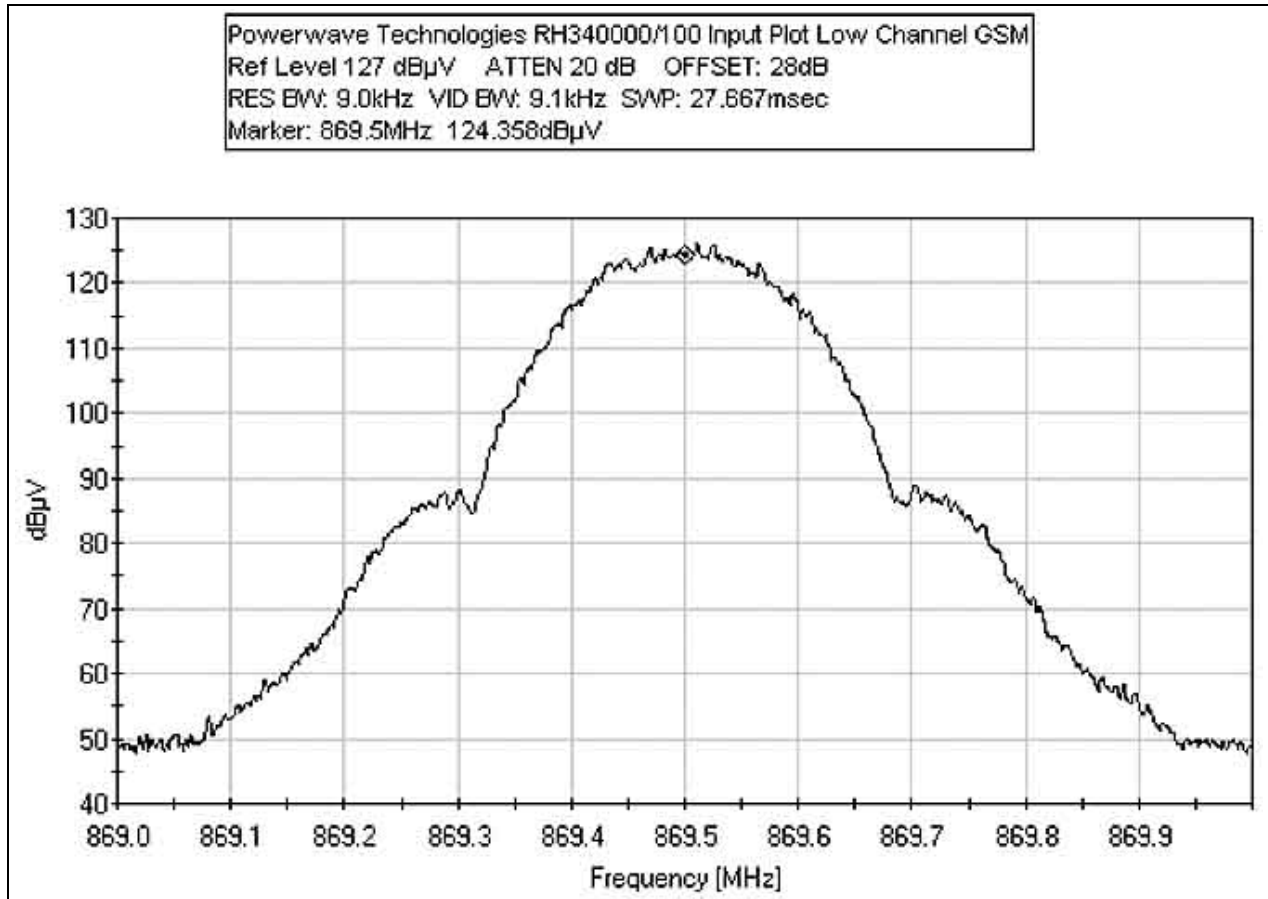
FCC PART 22 INPUT PLOT - EDGE MID CHANNEL



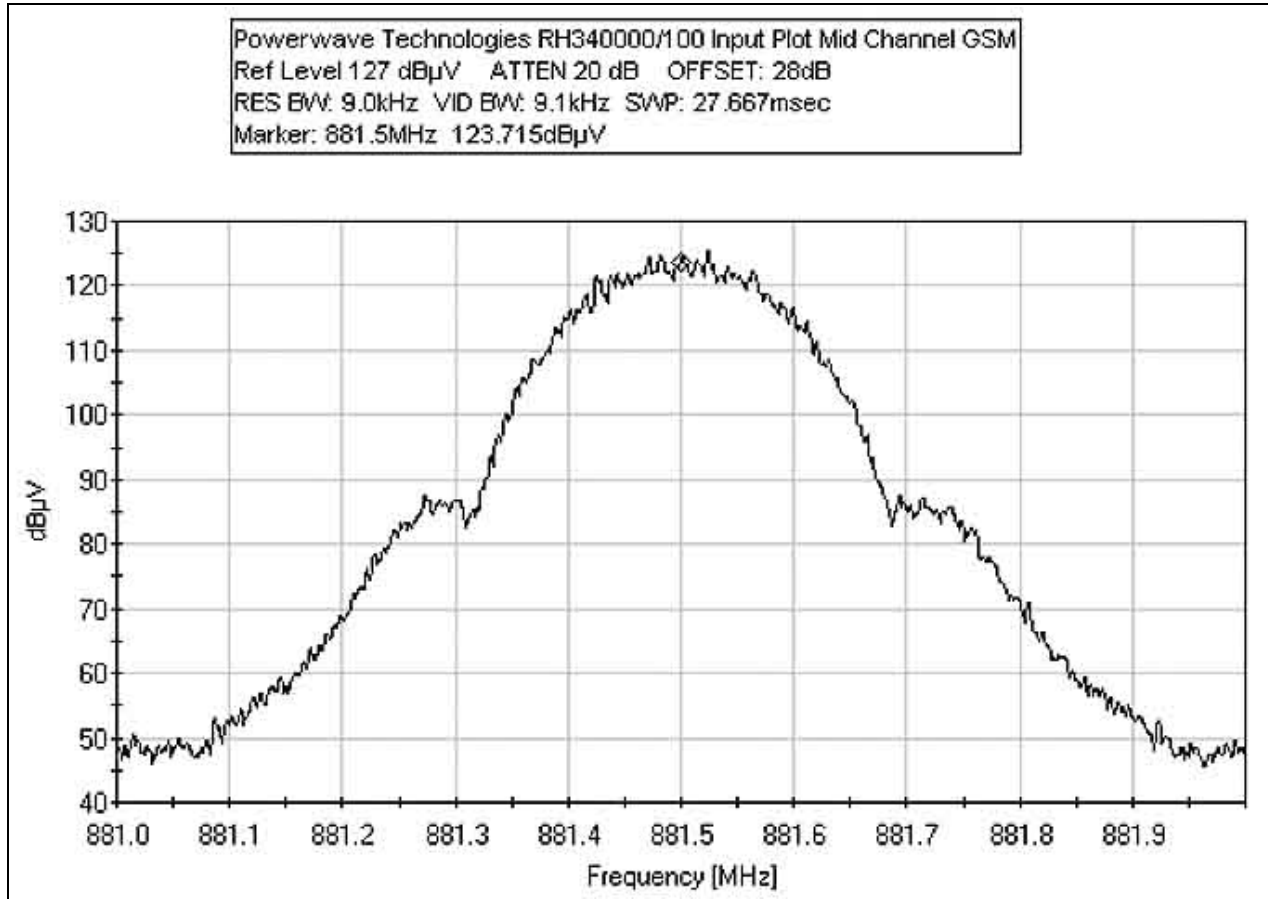
FCC PART 22 INPUT PLOT - EDGE HIGH CHANNEL



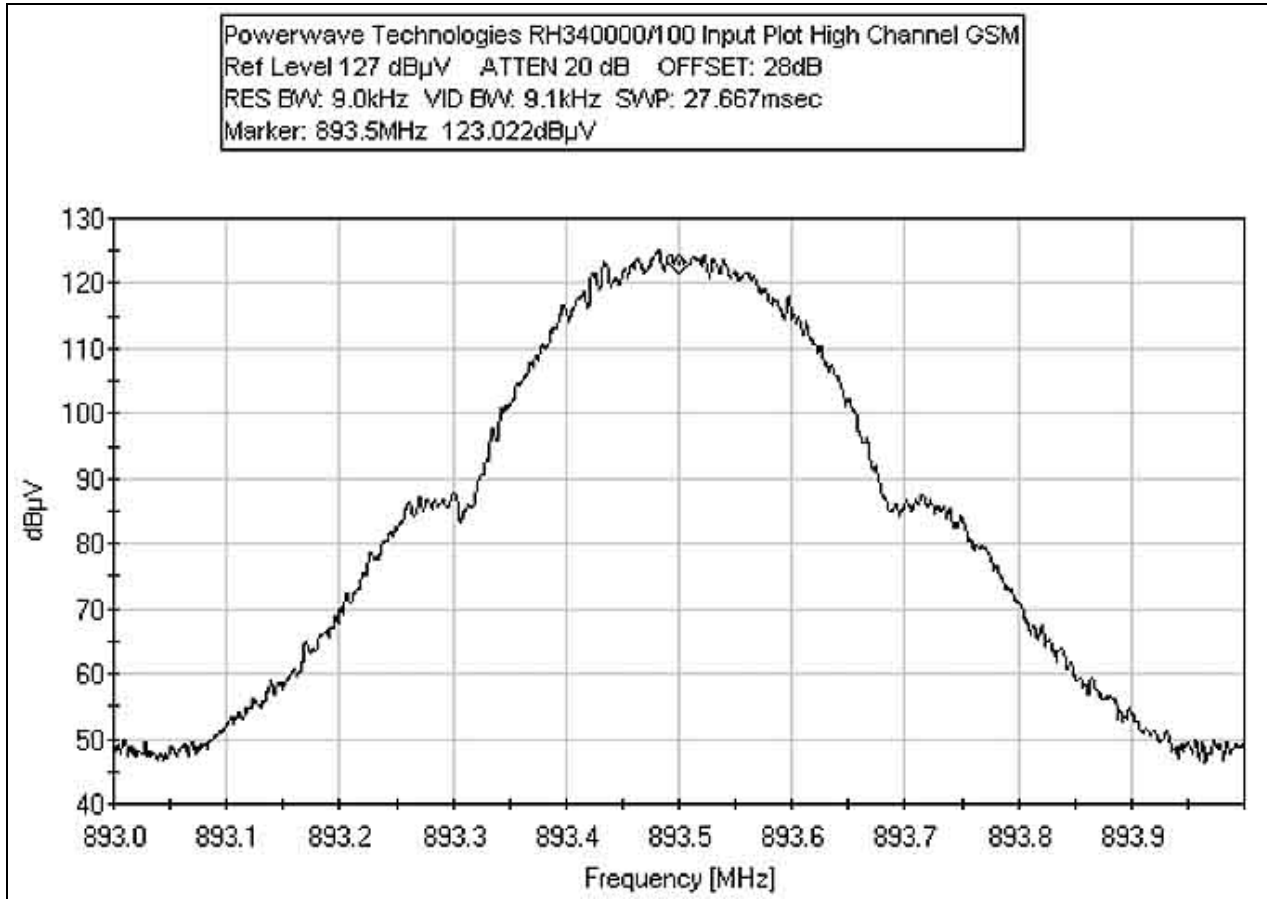
FCC PART 22 INPUT PLOT - GSM LOW CHANNEL



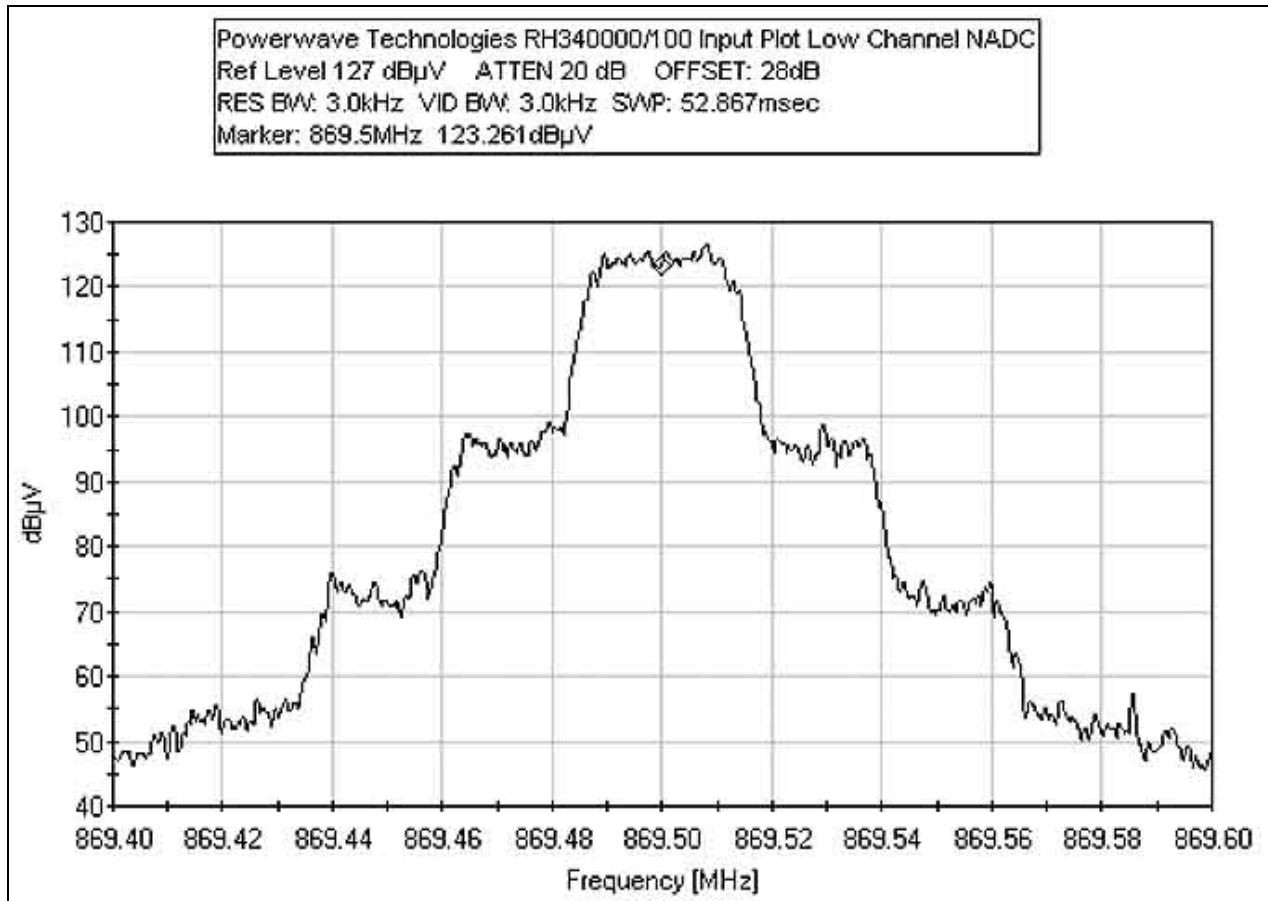
FCC PART 22 INPUT PLOT - GSM MID CHANNEL



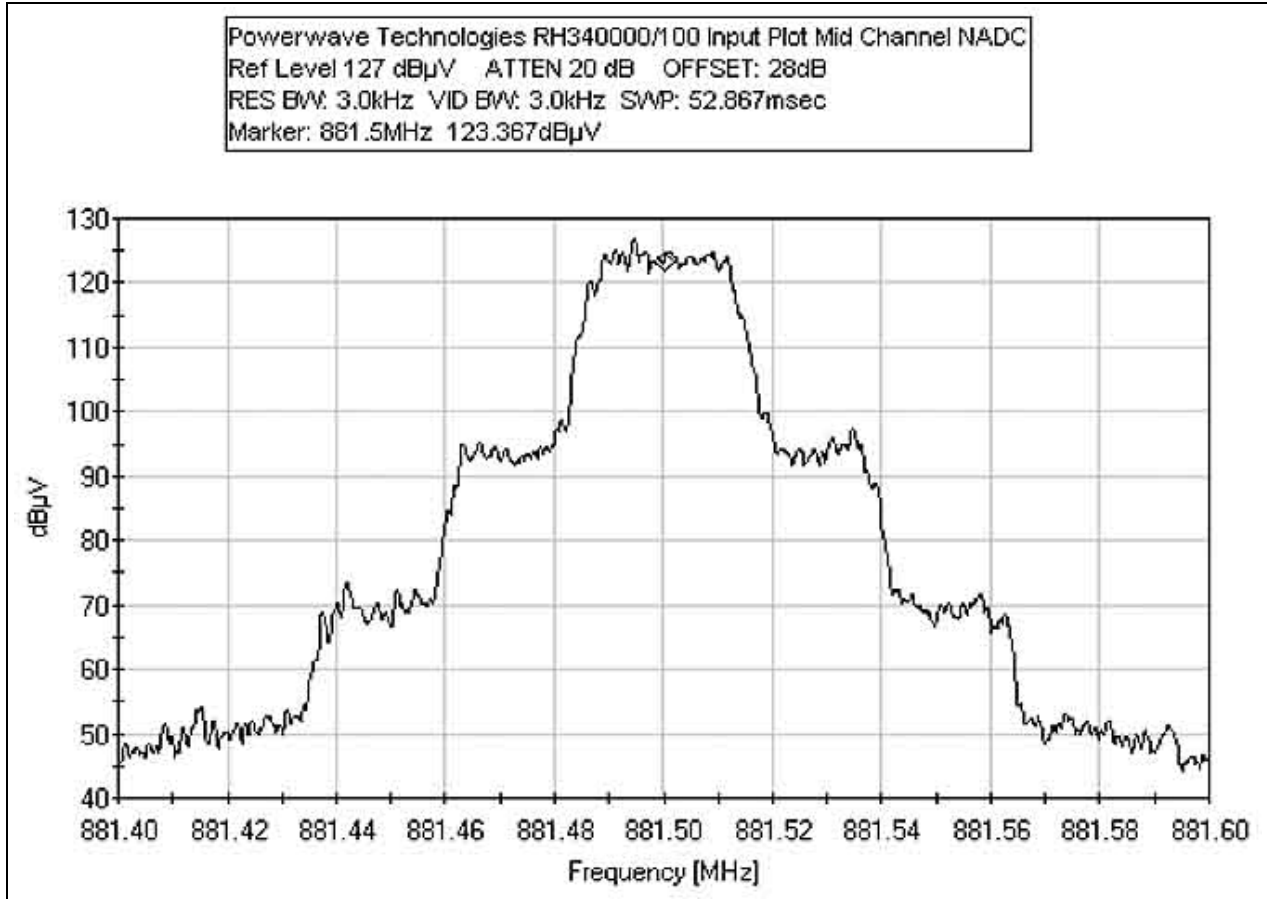
FCC PART 22 INPUT PLOT - GSM HIGH CHANNEL



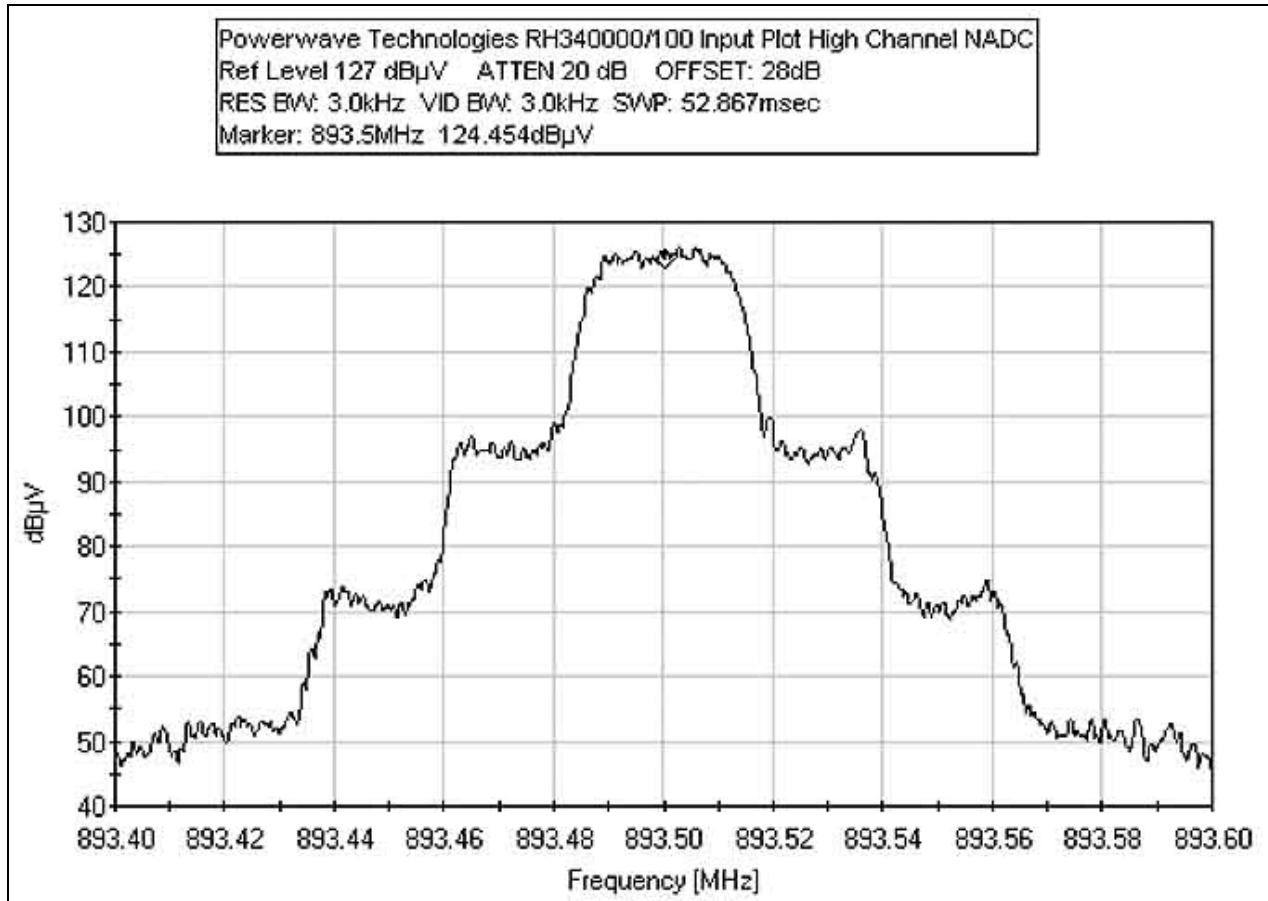
FCC PART 22 INPUT PLOT - NADC LOW CHANNEL



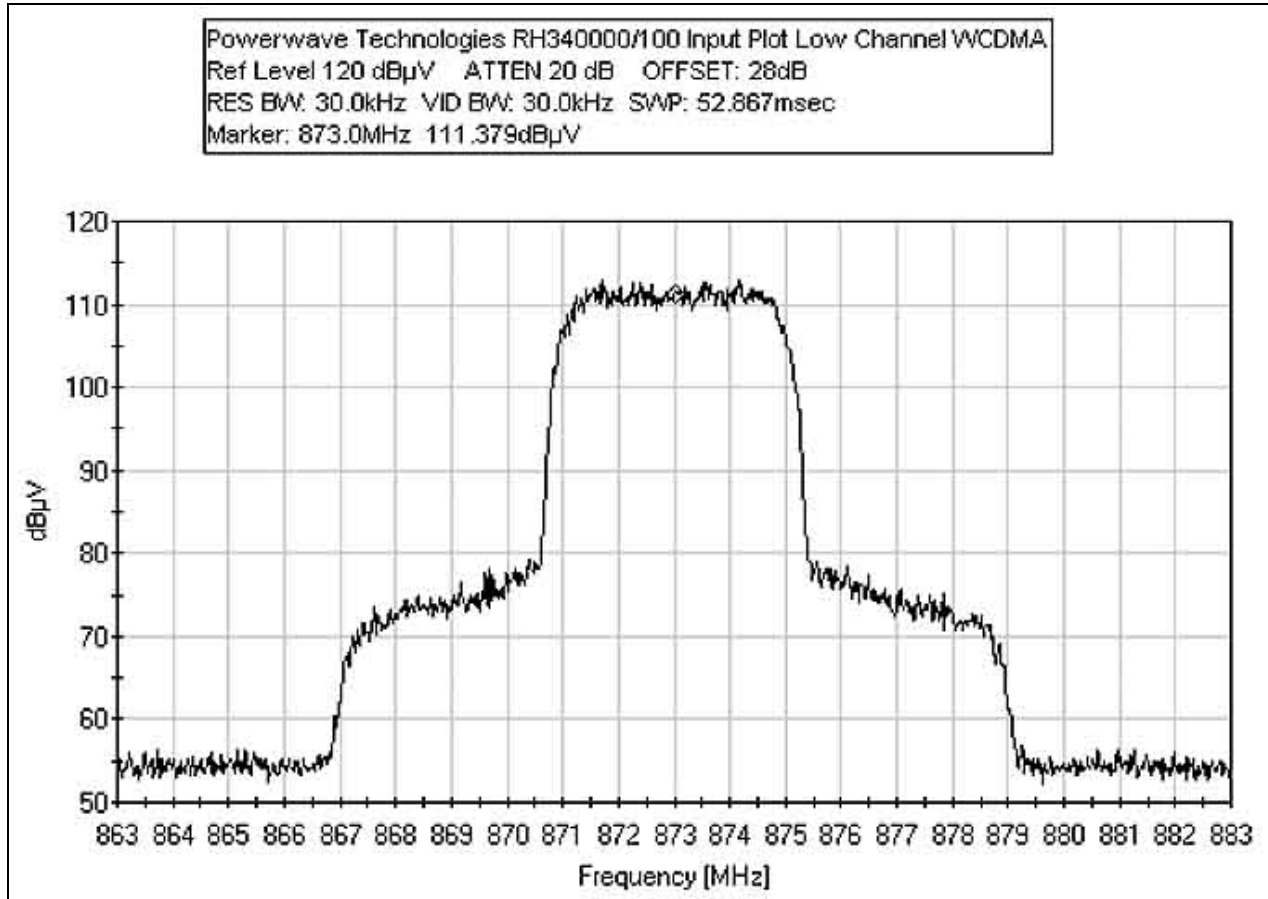
FCC PART 22 INPUT PLOT - NADC MID CHANNEL



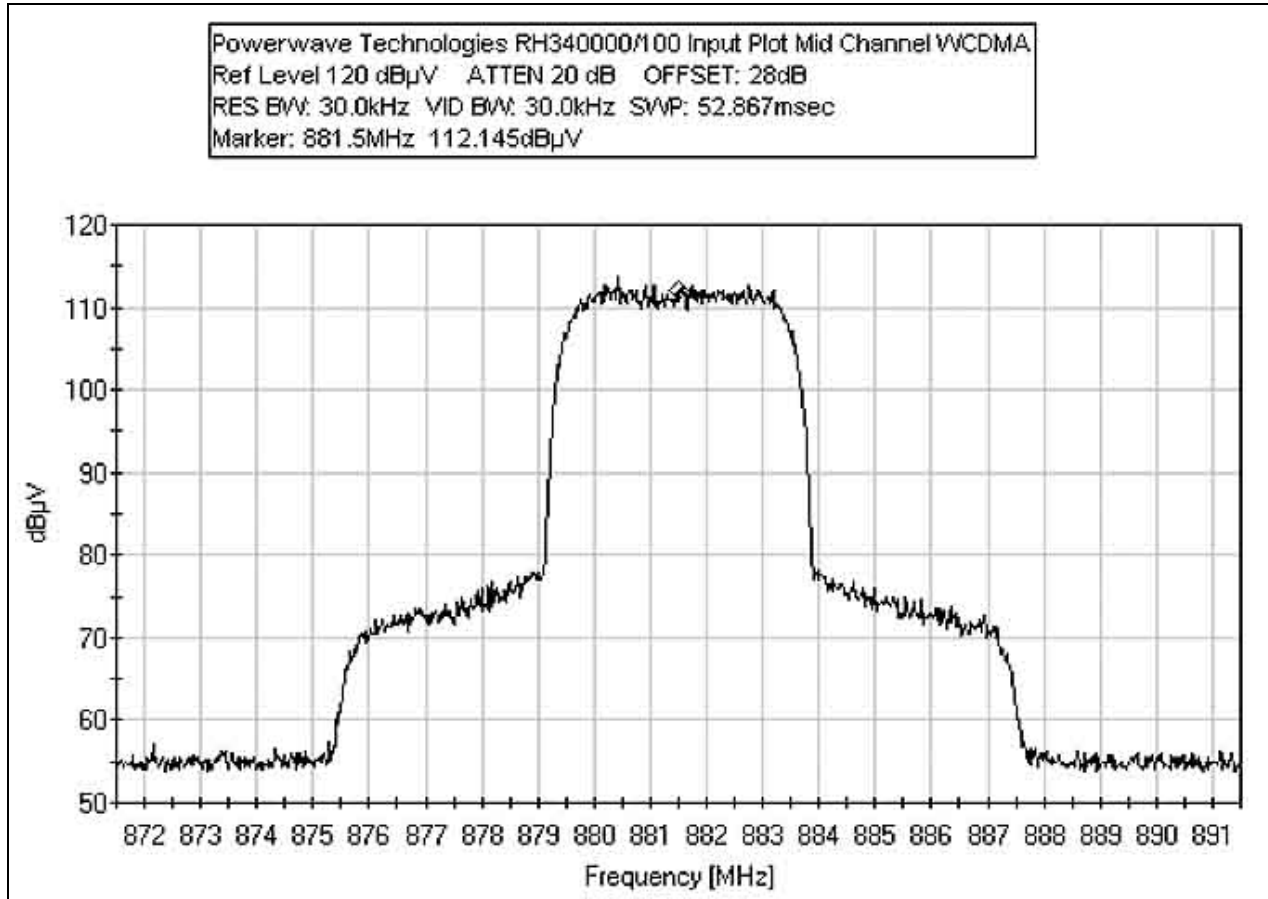
FCC PART 22 INPUT PLOT - NADC HIGH CHANNEL



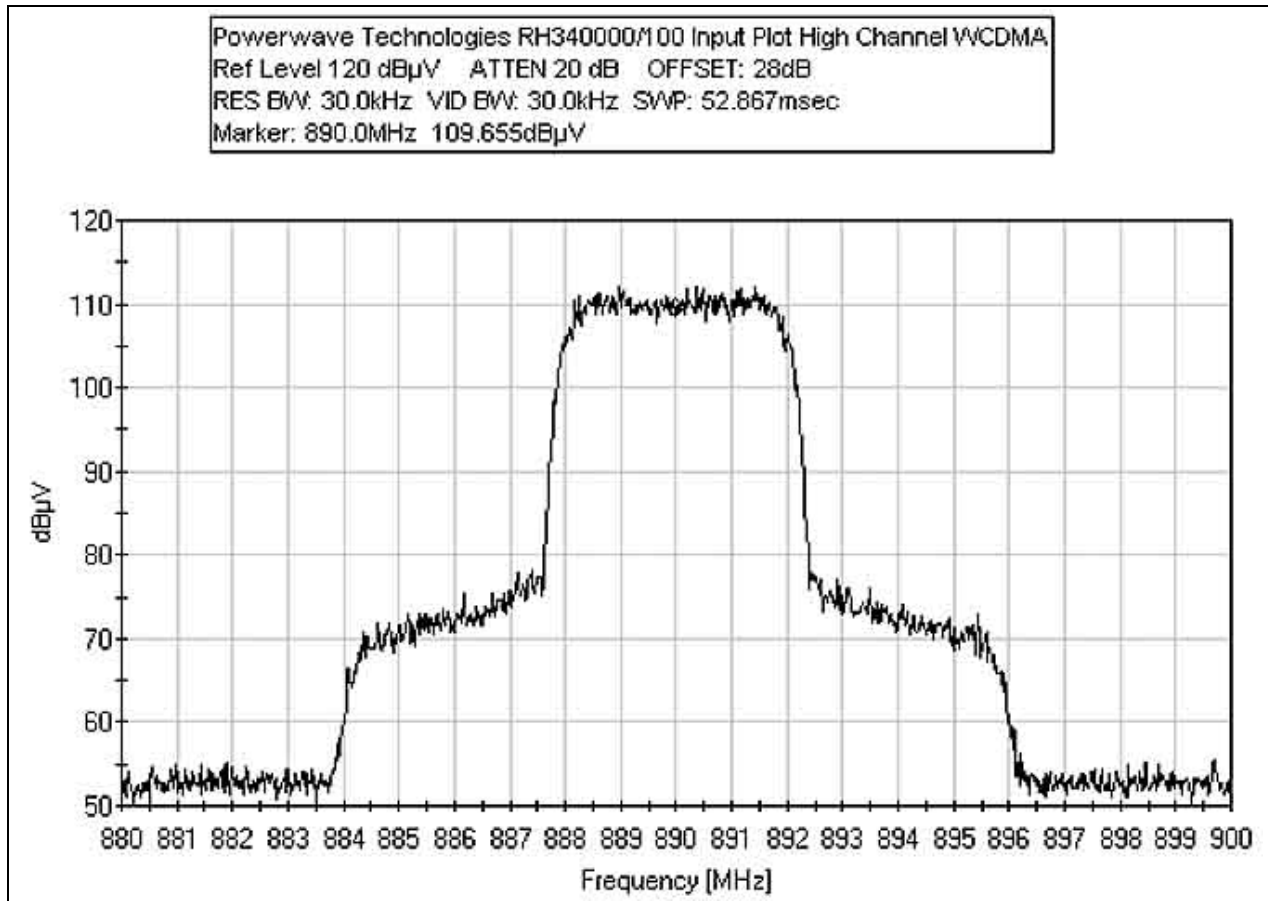
FCC PART 22 INPUT PLOT - WCDMA LOW CHANNEL



FCC PART 22 INPUT PLOT - WCDMA MID CHANNEL



FCC PART 22 INPUT PLOT - WCDMA HIGH CHANNEL



Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A SA	US44300407	01/12/2005	01/12/2007	02660
Cable, Andrews Hardline	NA	06/04/2003	06/04/2005	P00740
Attenuator 14dB, JFW 50FHC-014-20		05/09/2003	05/09/2005	P01623
Attenuator PE7004-6		09/29/2004	09/29/2006	P02226

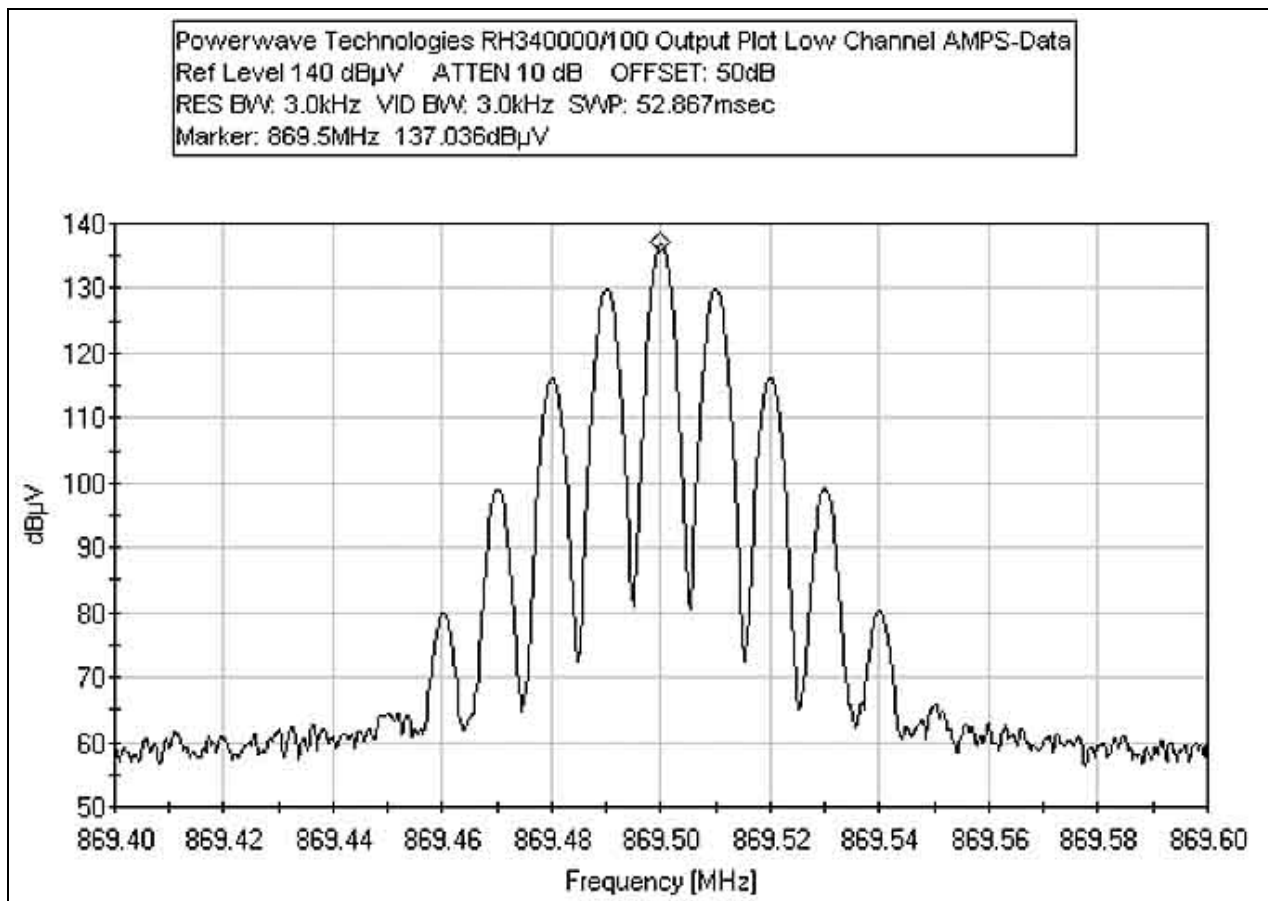
PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP



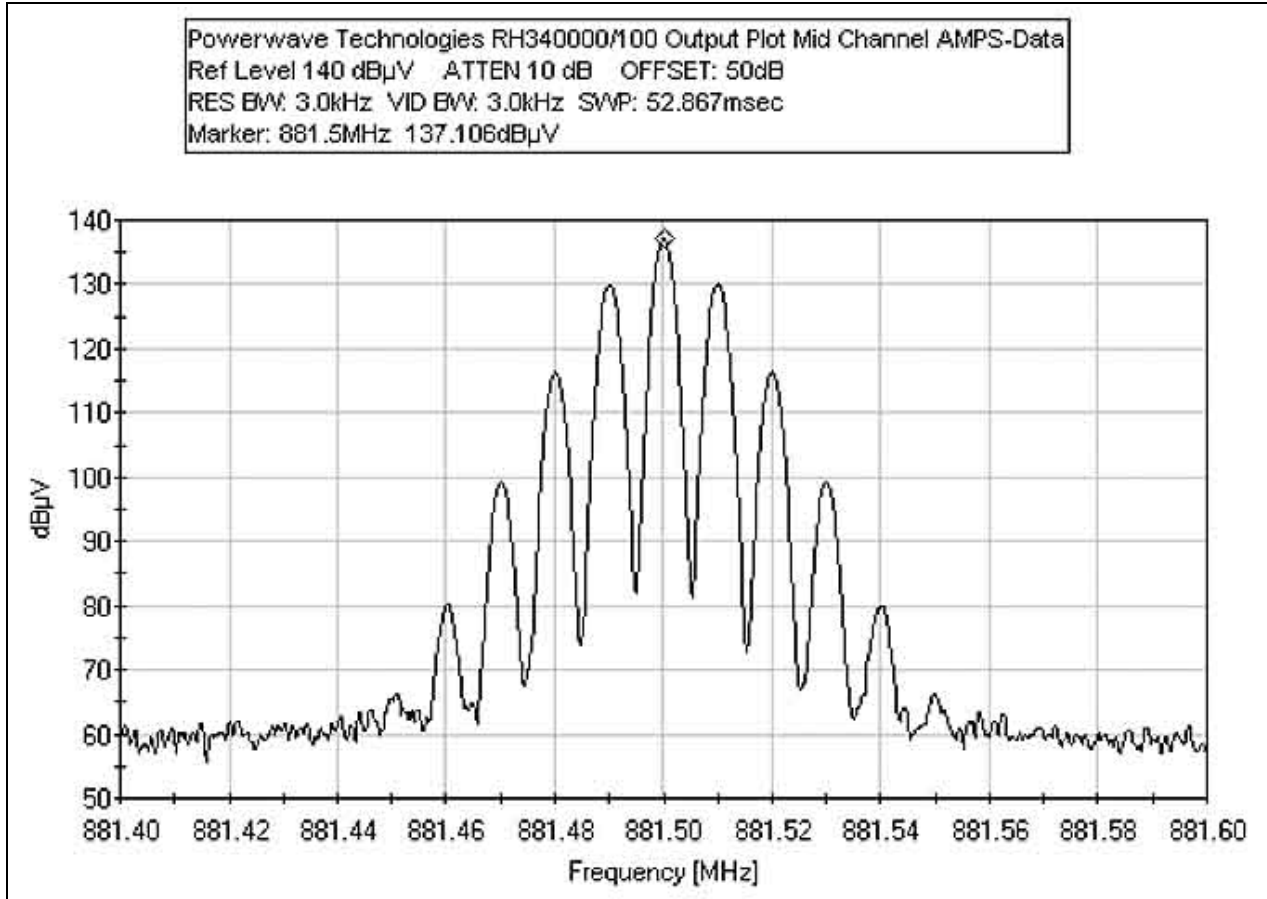
FCC PART 22 – OUTPUT PLOTS

Test Conditions: EUT is a dual band remote radio head with multichannel capability and may otherwise be classified as a repeater/extender. EUT operates on 869-894 MHz and 1930-1990 MHz. Support equipment is used to convert RF from signal generator to fiber for input to the EUT. Power output is monitored using customer support equipment. EUT does not demodulate the input signal. Frequency Range Investigated: 30MHz - 20GHz. Temperature: 28°C, Relative Humidity: 53%.

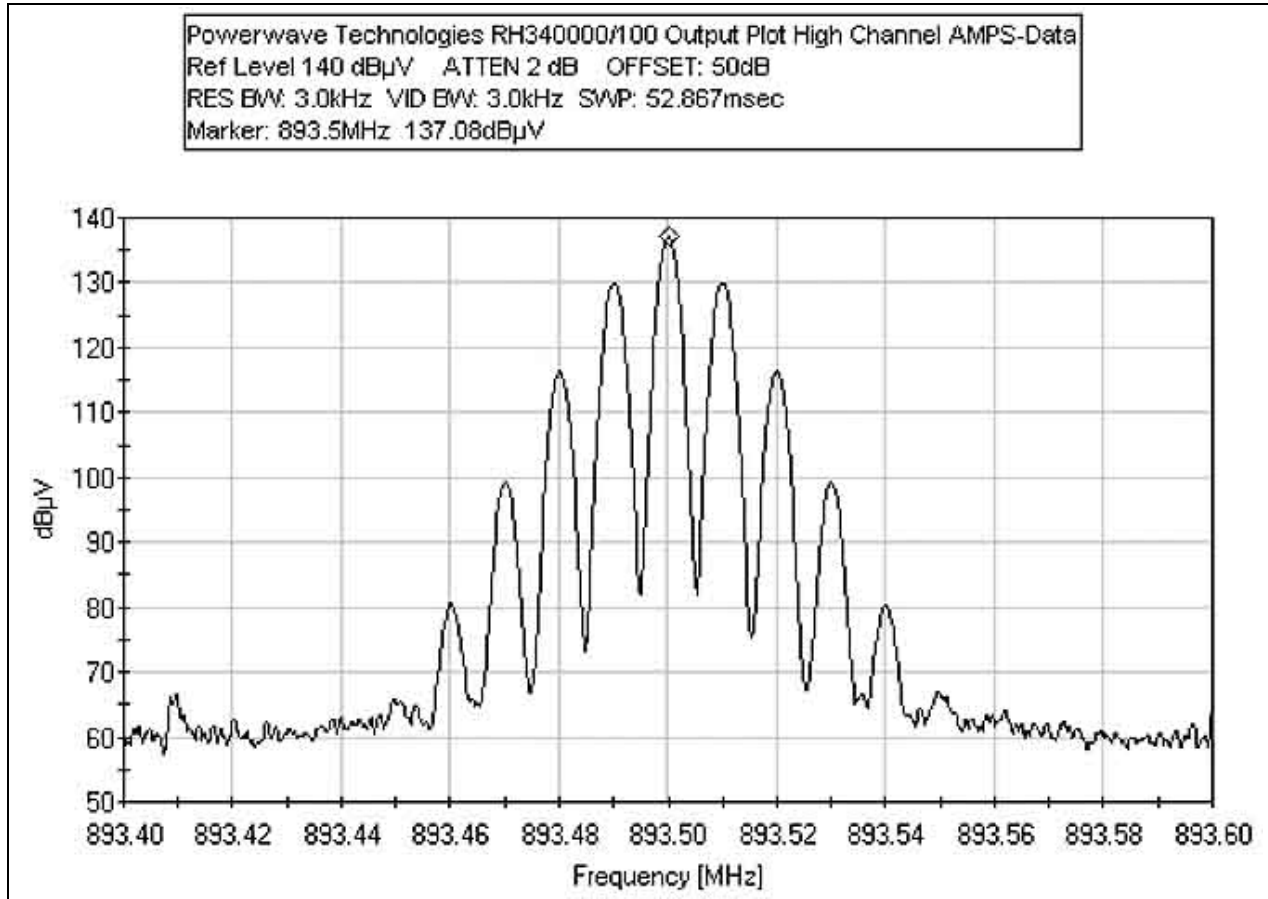
FCC PART 22 OUTPUT PLOT - AMPS-DATA LOW CHANNEL



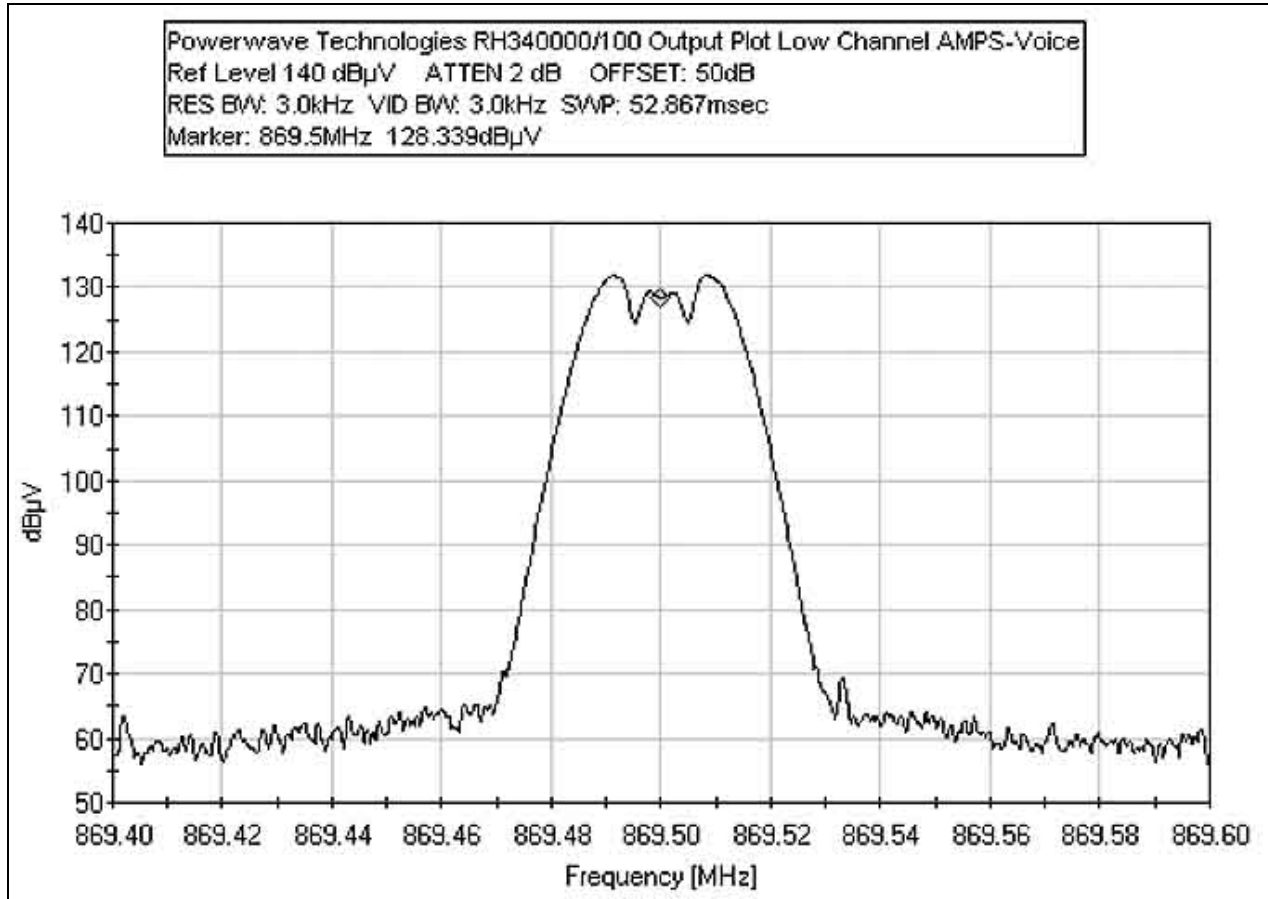
FCC PART 22 OUTPUT PLOT - AMPS-DATA MID CHANNEL



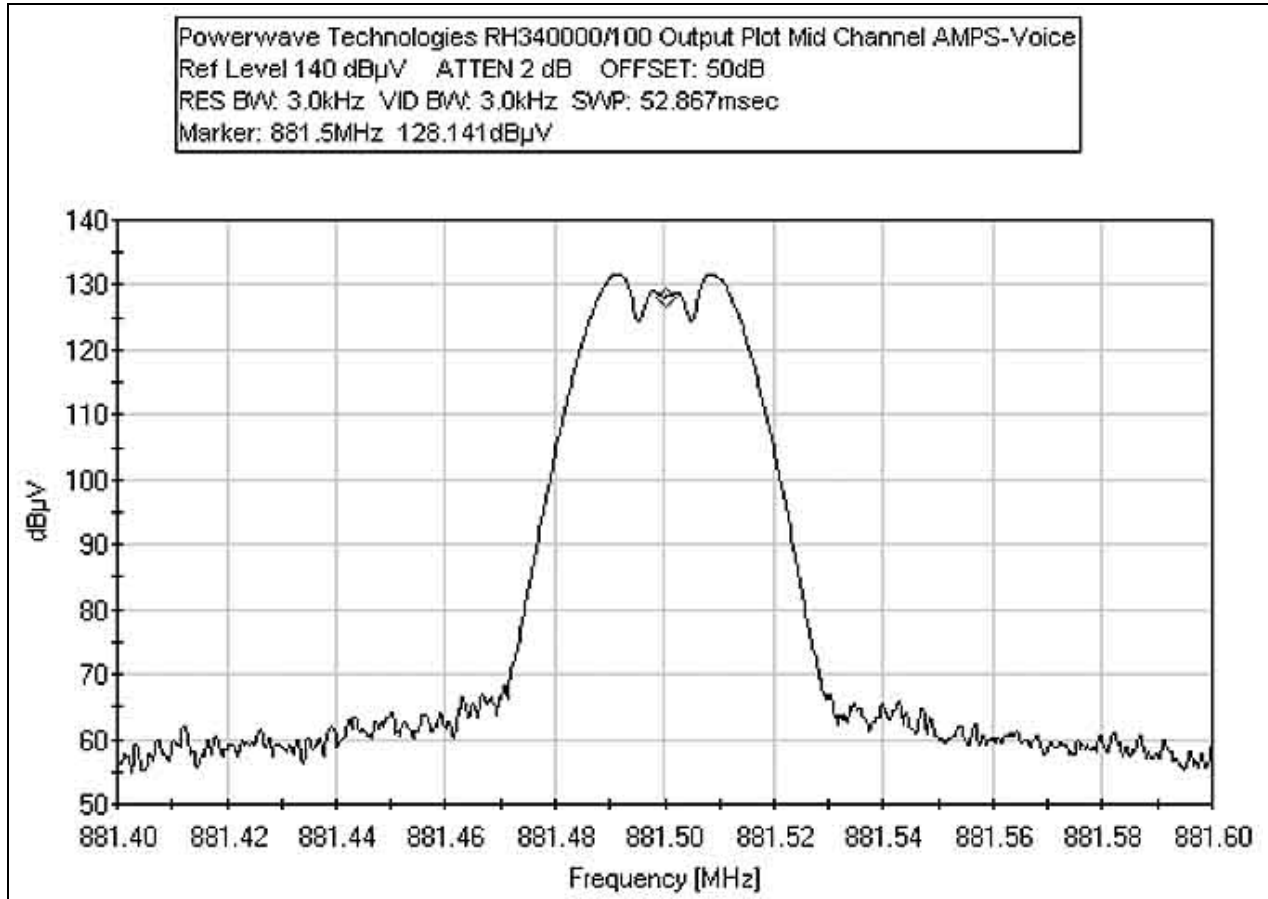
FCC PART 22 OUTPUT PLOT - AMPS-DATA HIGH CHANNEL



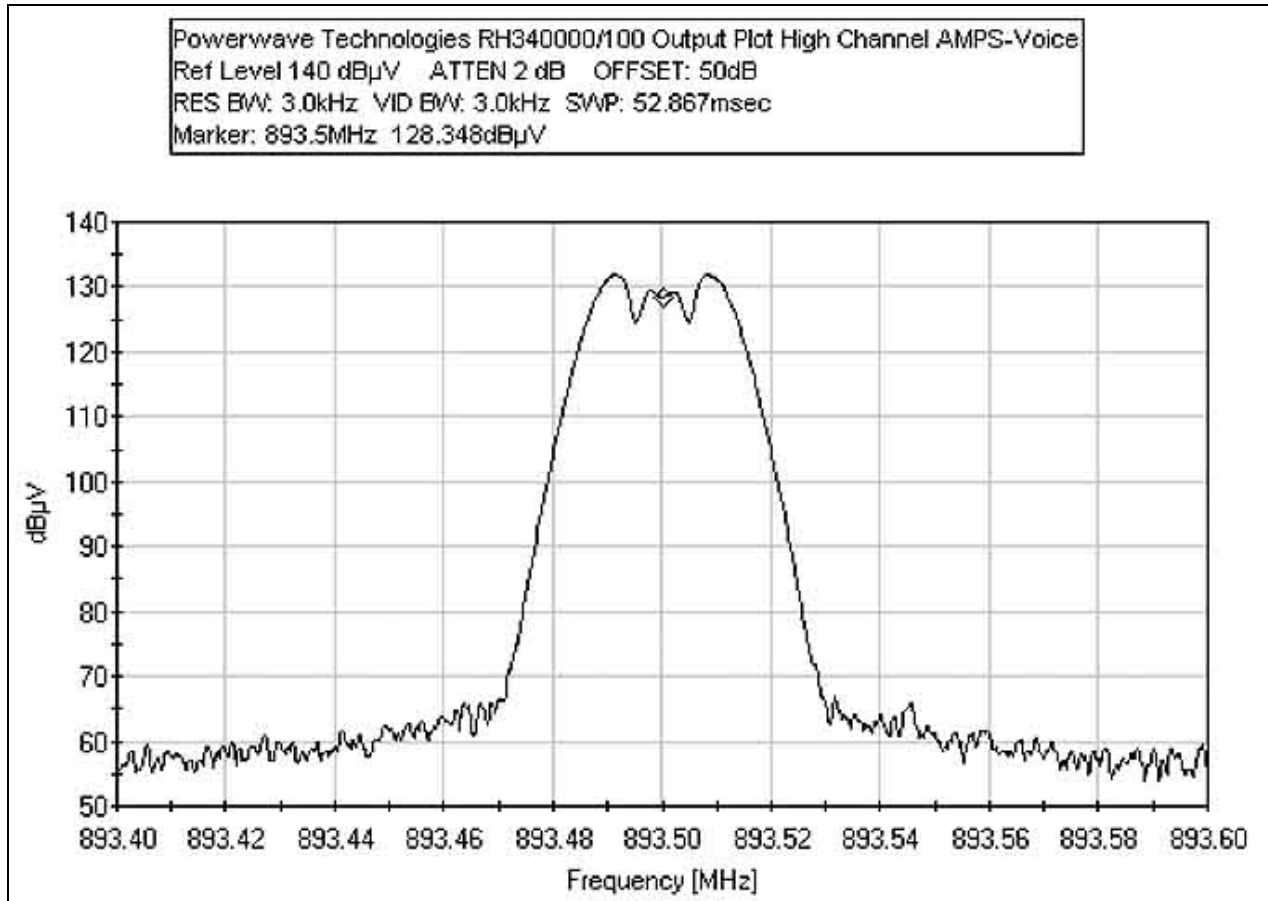
FCC PART 22 OUTPUT PLOT - AMPS-VOICE LOW CHANNEL



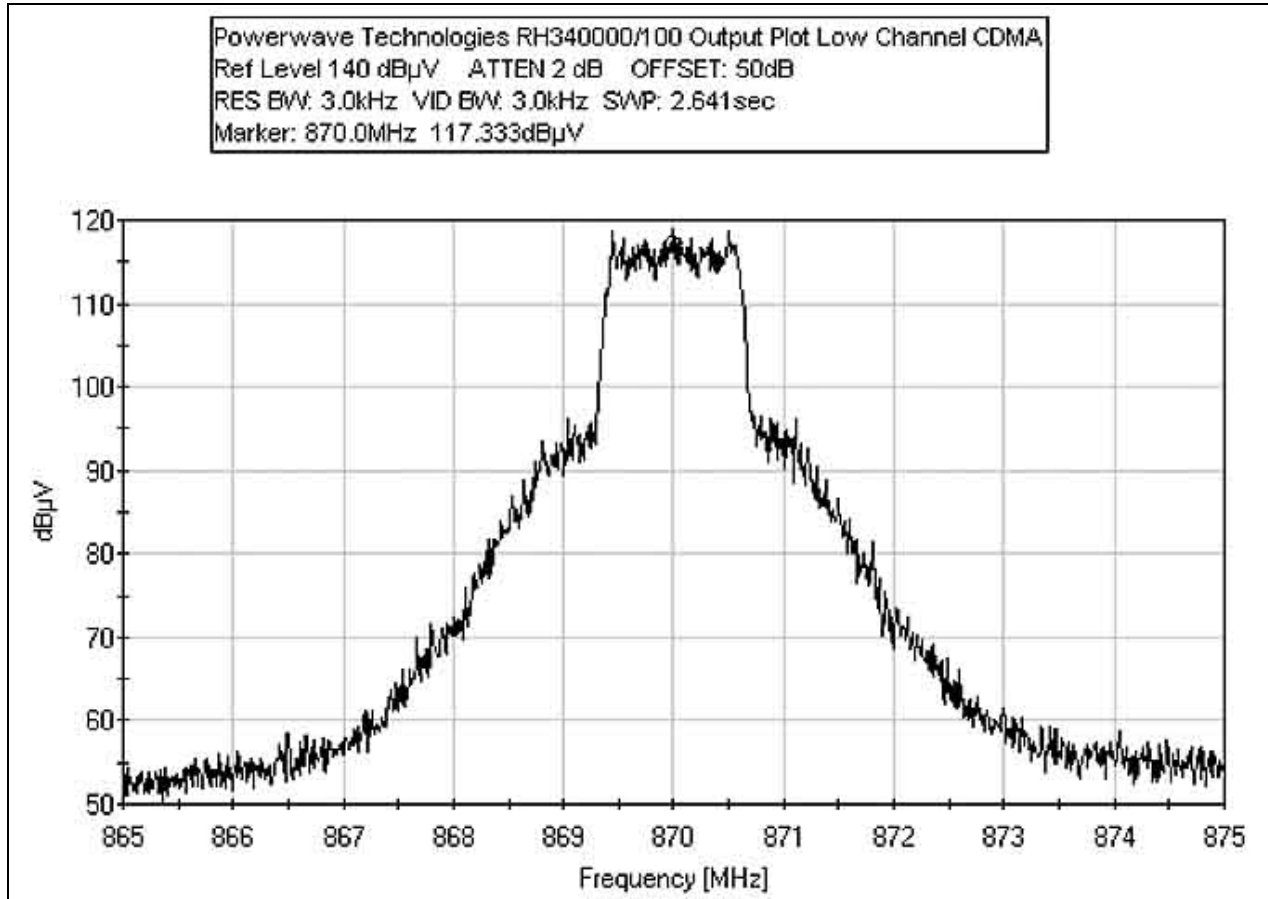
FCC PART 22 OUTPUT PLOT - AMPS-VOICE MID CHANNEL



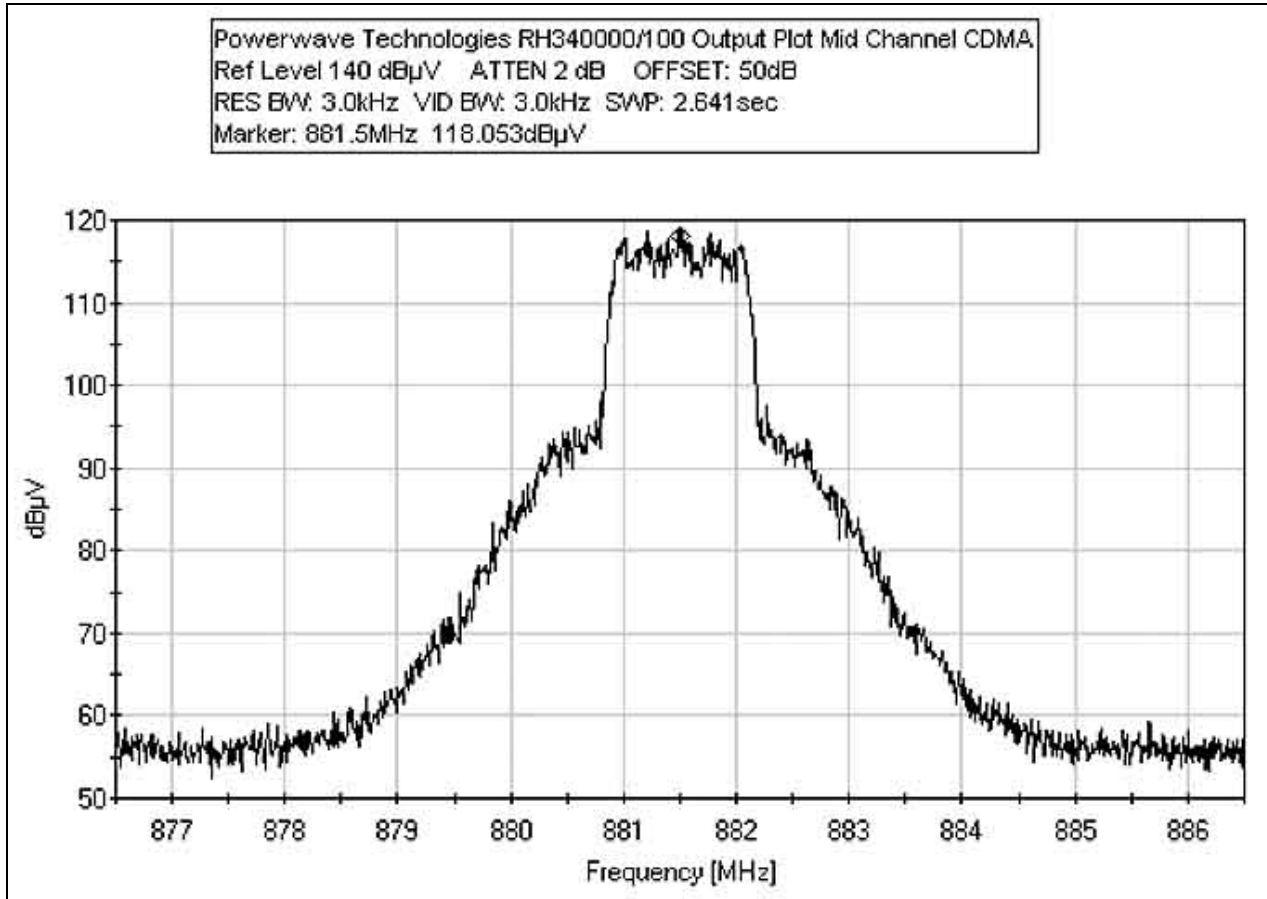
FCC PART 22 OUTPUT PLOT - AMPS-VOICE HIGH CHANNEL



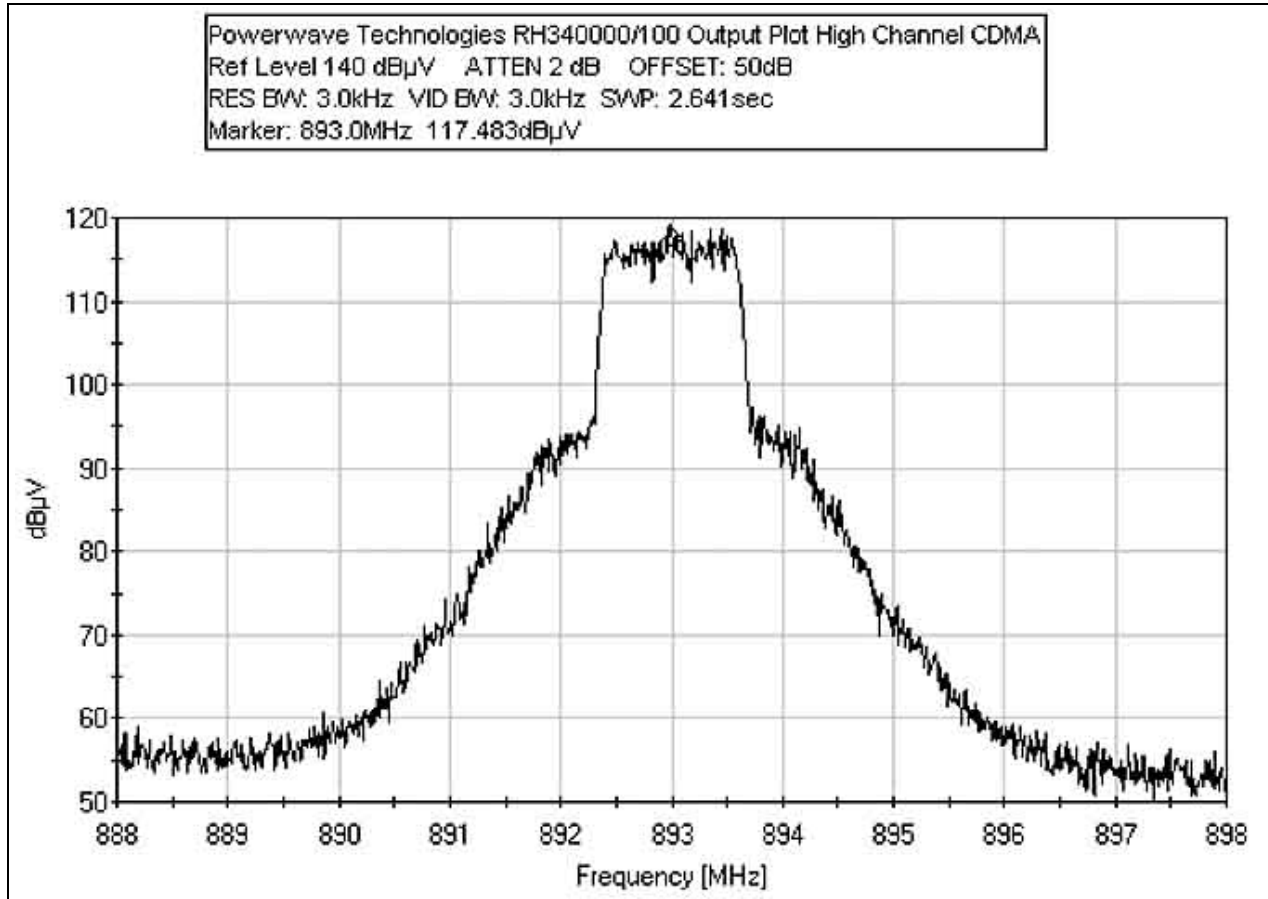
FCC PART 22 OUTPUT PLOT - CDMA LOW CHANNEL



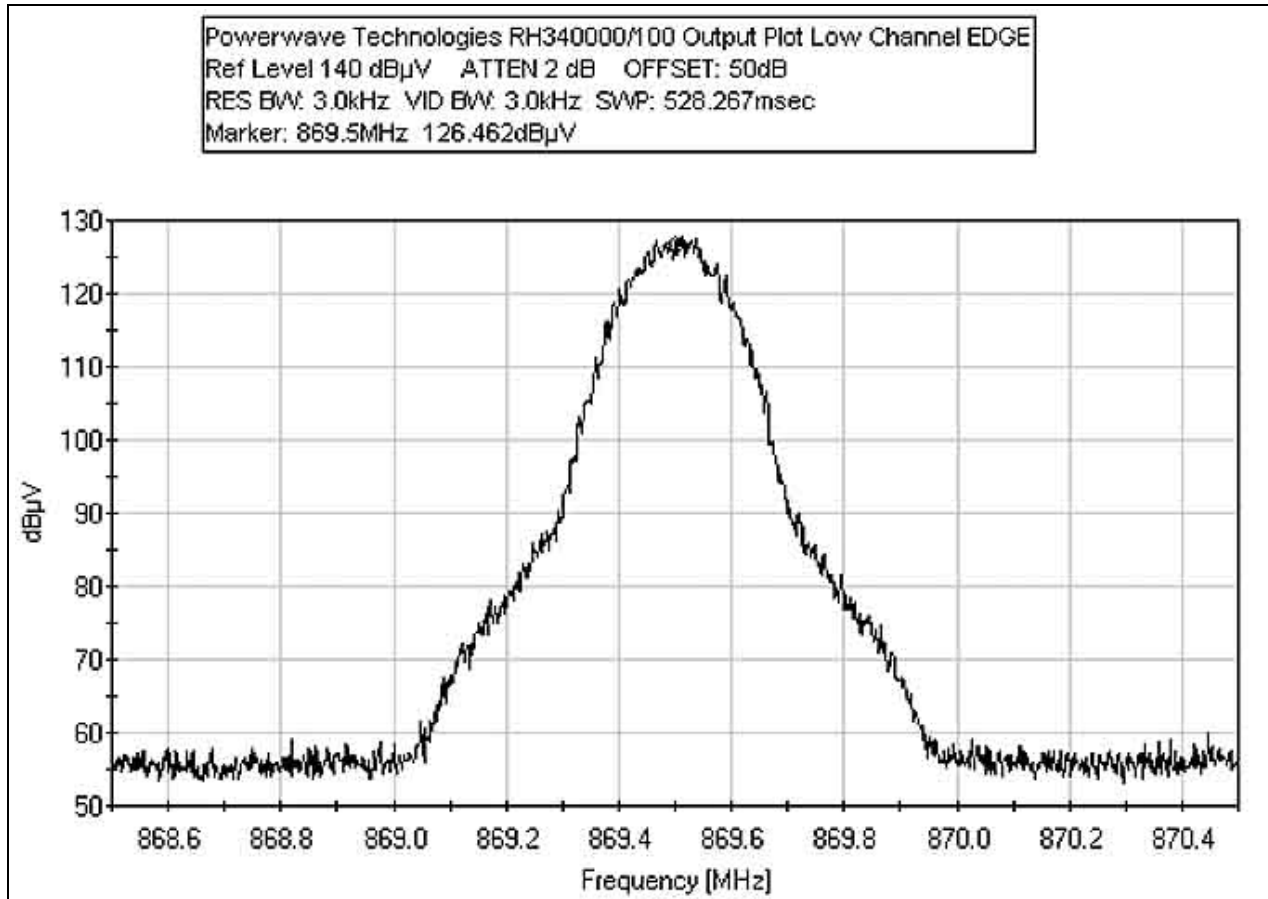
FCC PART 22 OUTPUT PLOT - CDMA MID CHANNEL



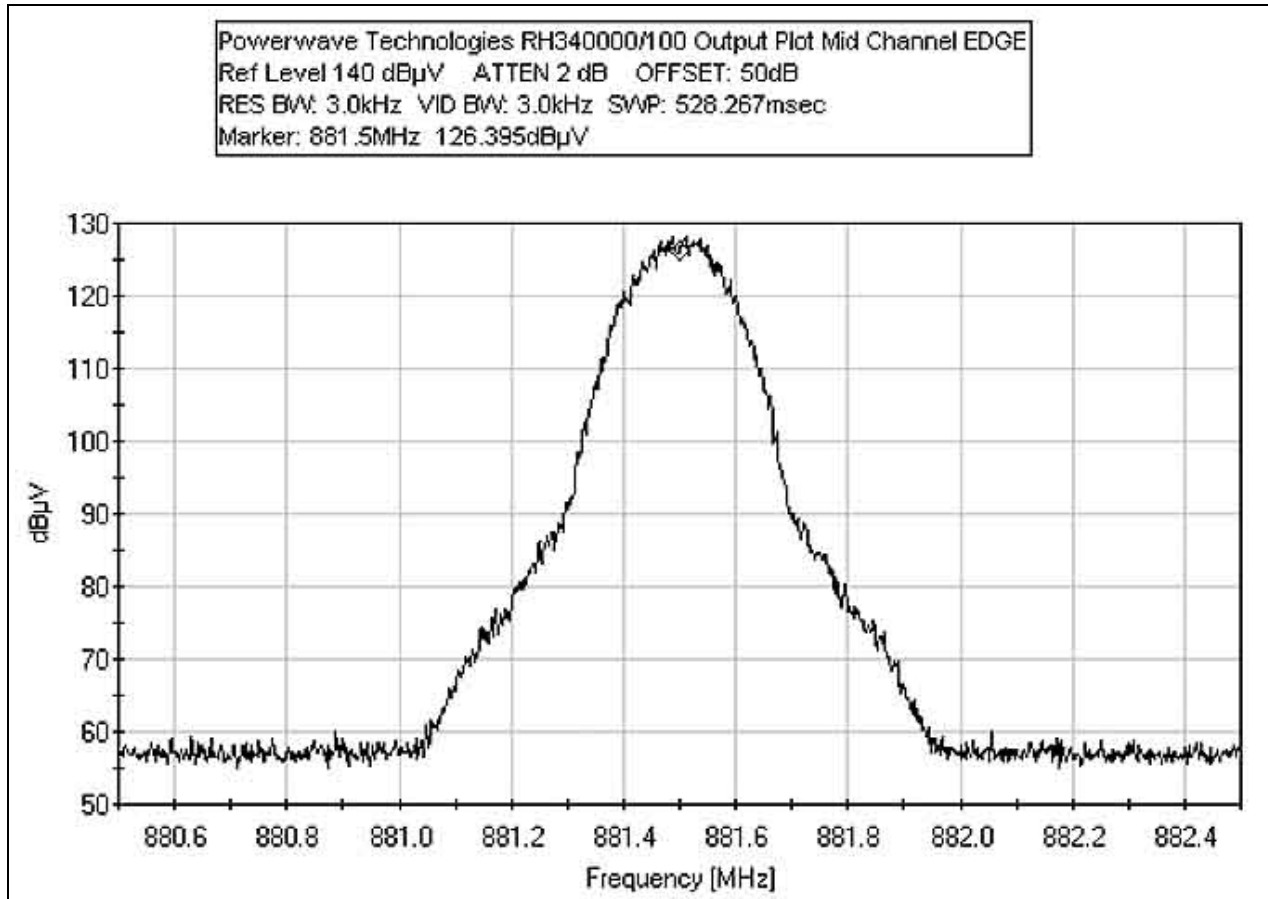
FCC PART 22 OUTPUT PLOT - CDMA HIGH CHANNEL



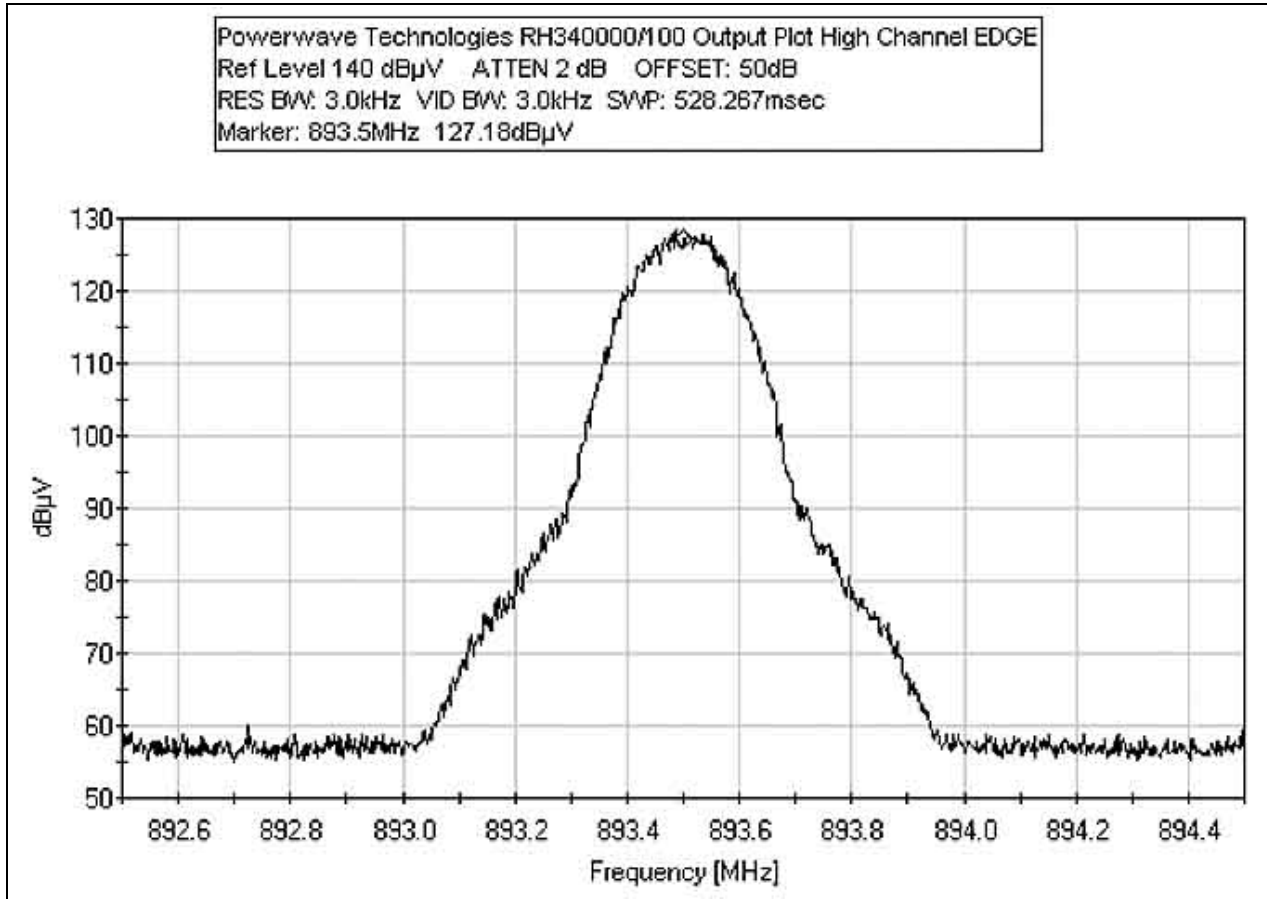
FCC PART 22 OUTPUT PLOT - EDGE LOW CHANNEL



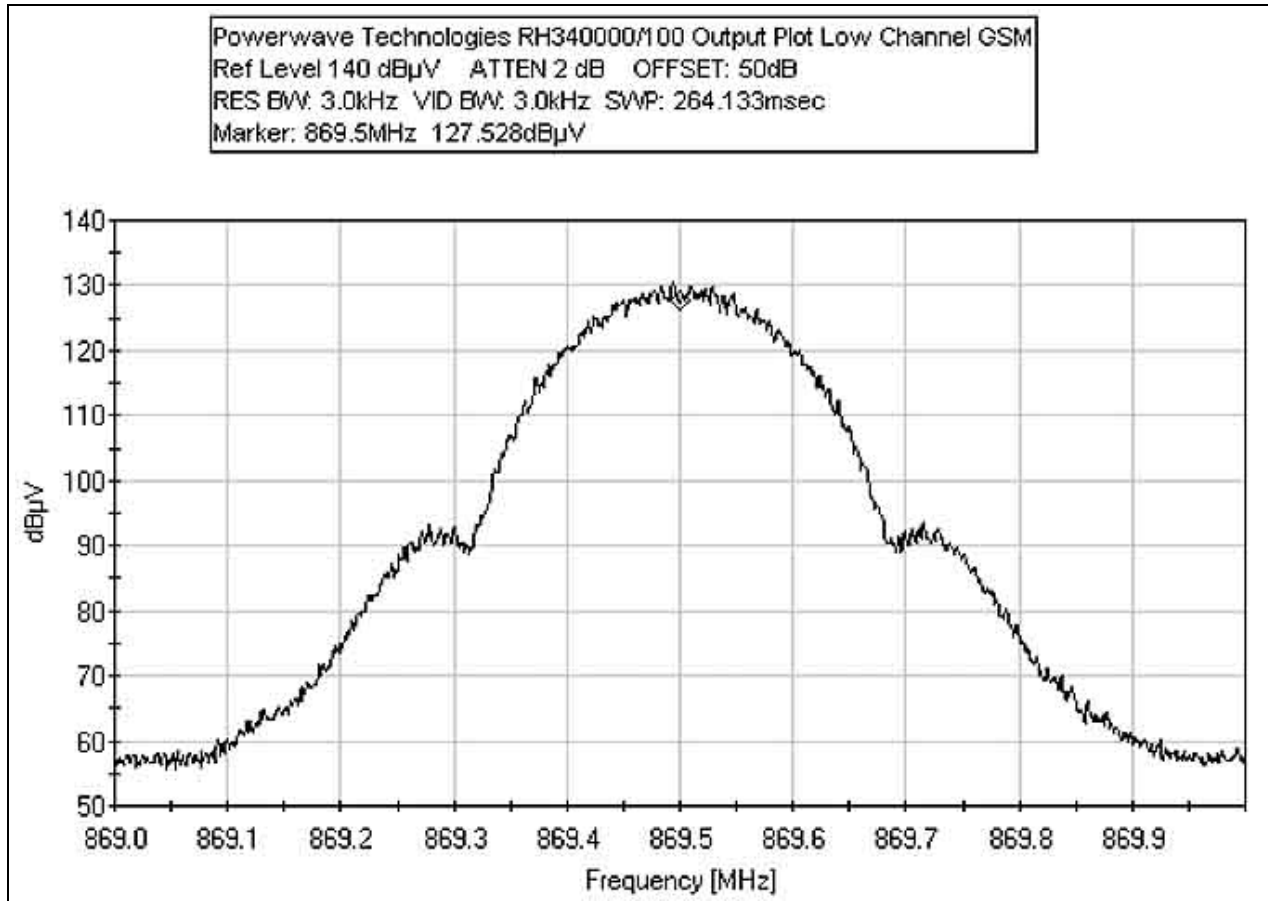
FCC PART 22 OUTPUT PLOT - EDGE MID CHANNEL



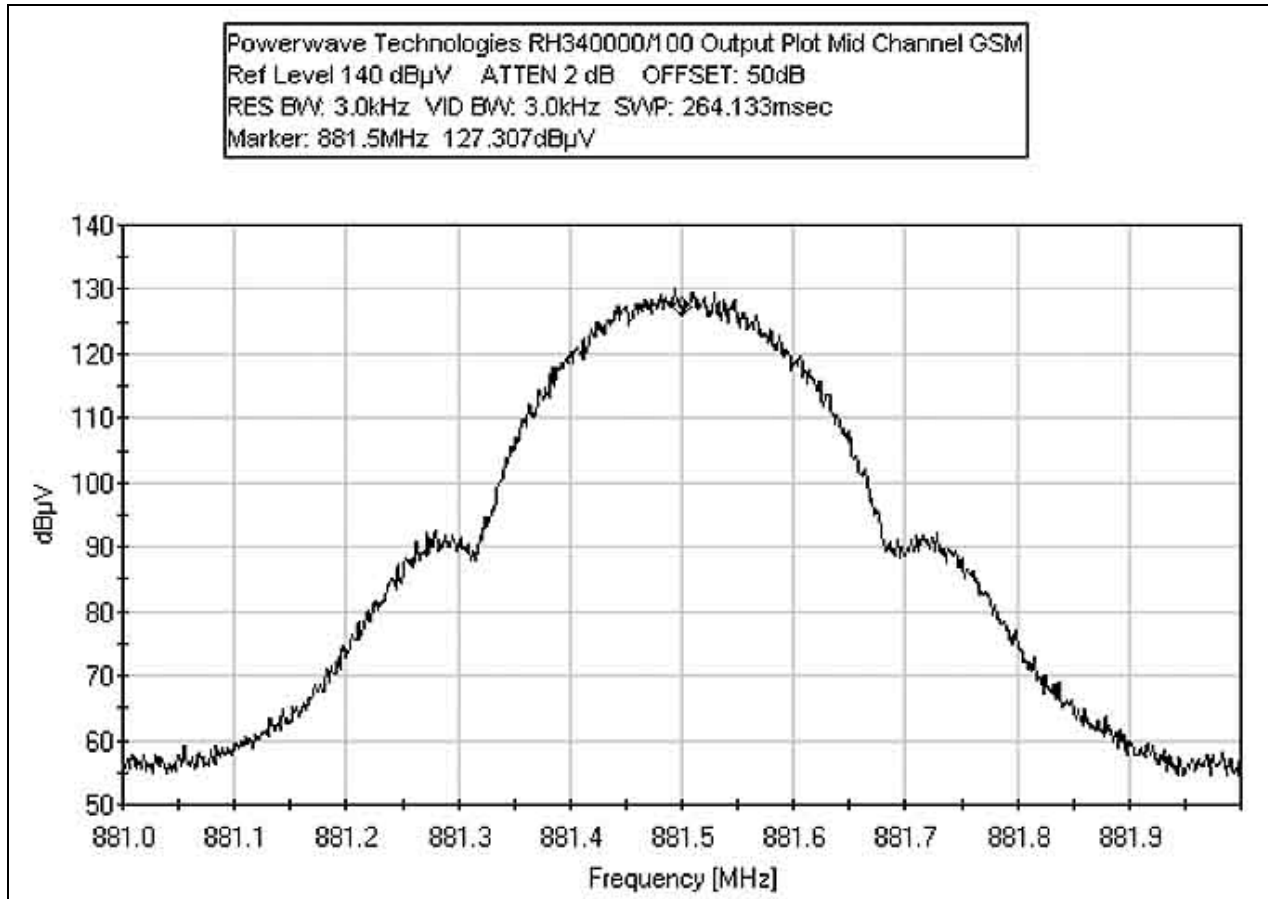
FCC PART 22 OUTPUT PLOT - EDGE HIGH CHANNEL



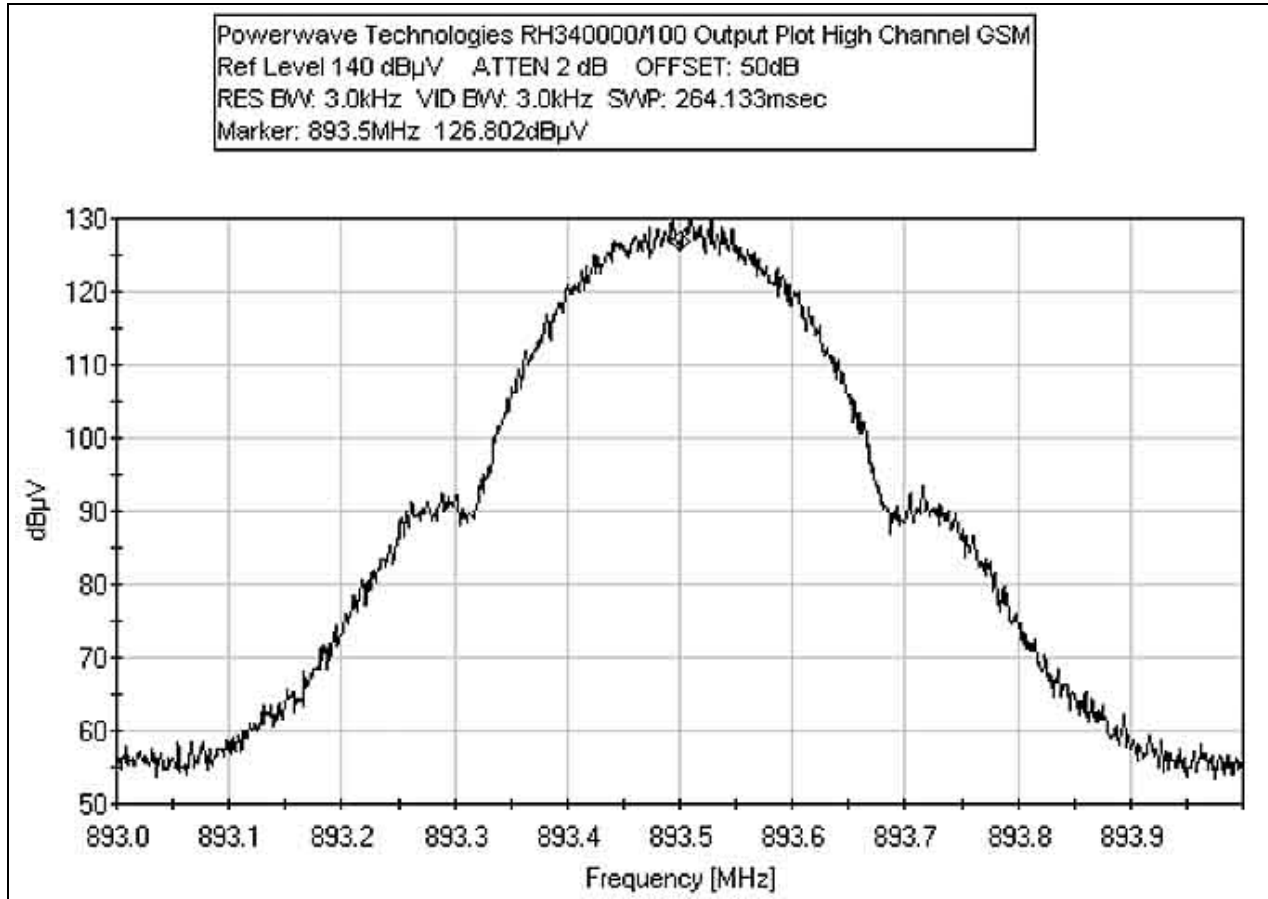
FCC PART 22 OUTPUT PLOT - GSM LOW CHANNEL



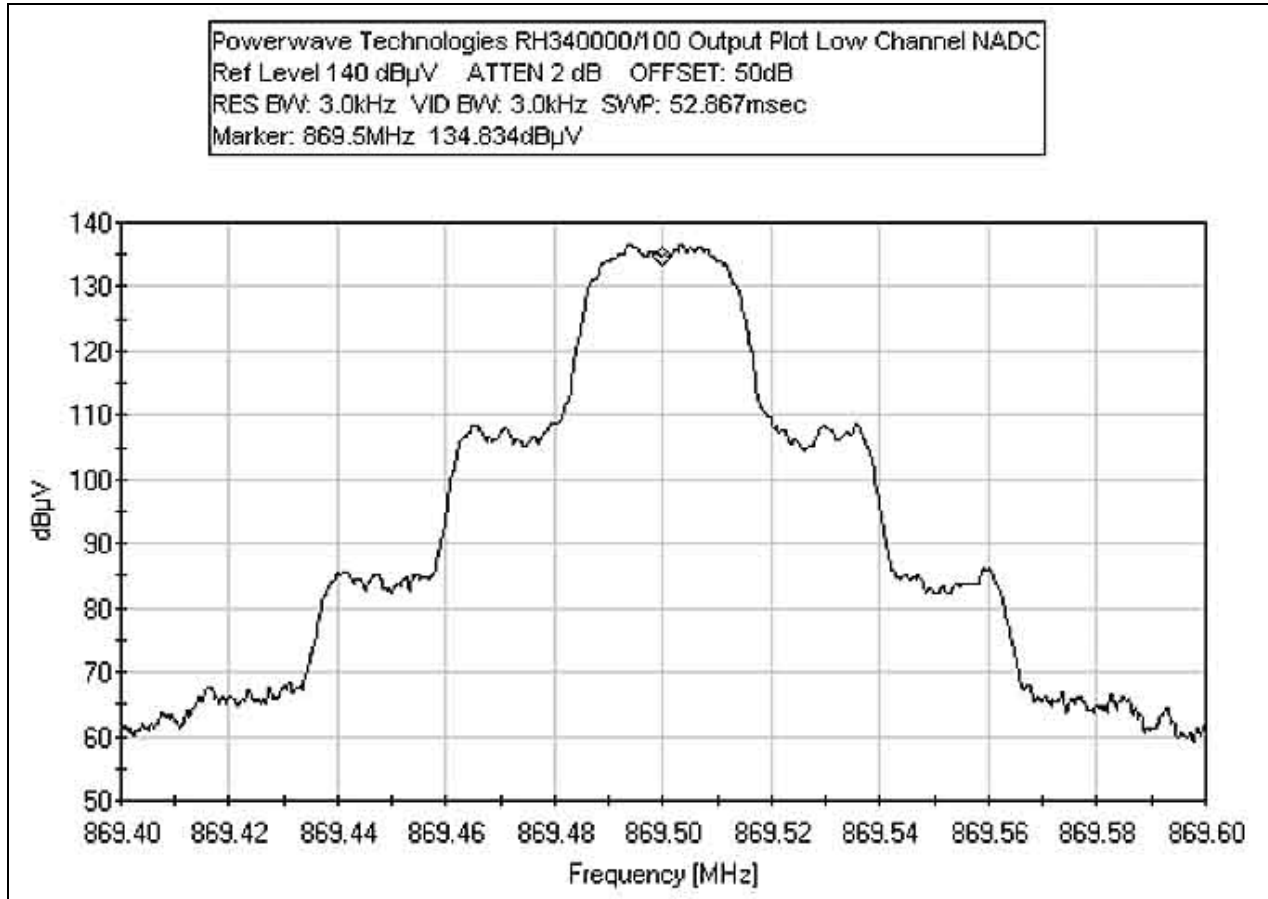
FCC PART 22 OUTPUT PLOT - GSM MID CHANNEL



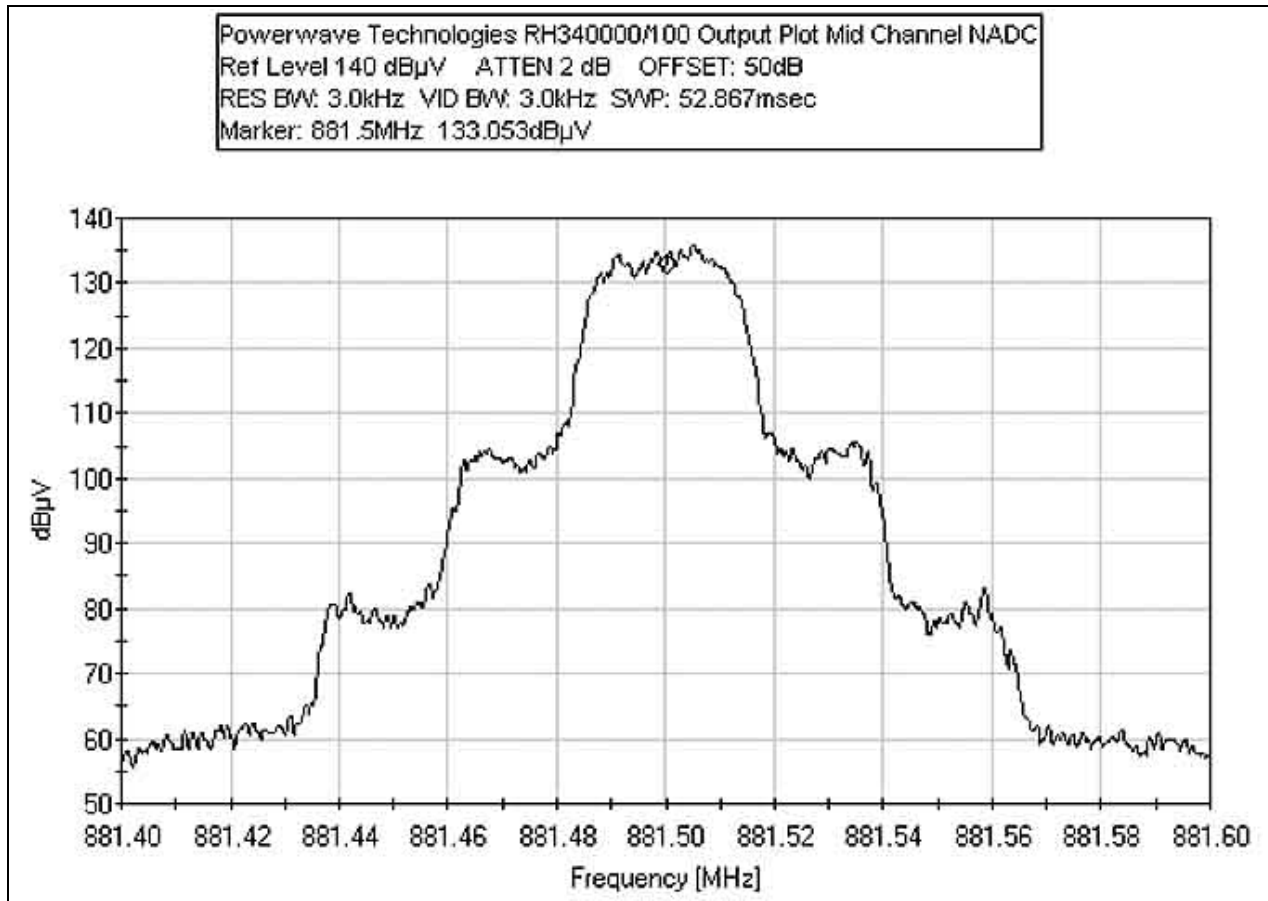
FCC PART 22 OUTPUT PLOT - GSM HIGH CHANNEL



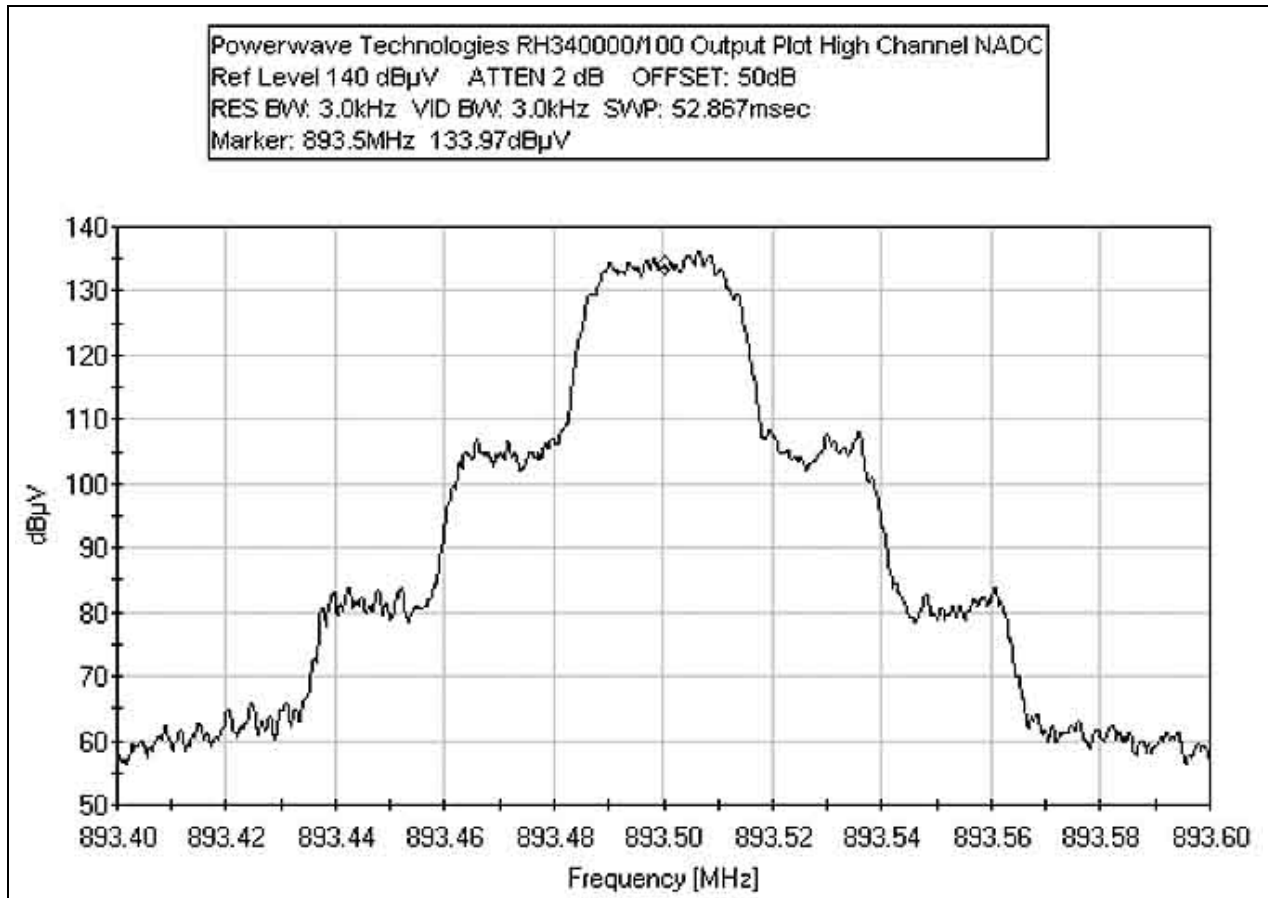
FCC PART 22 OUTPUT PLOT - NADC LOW CHANNEL



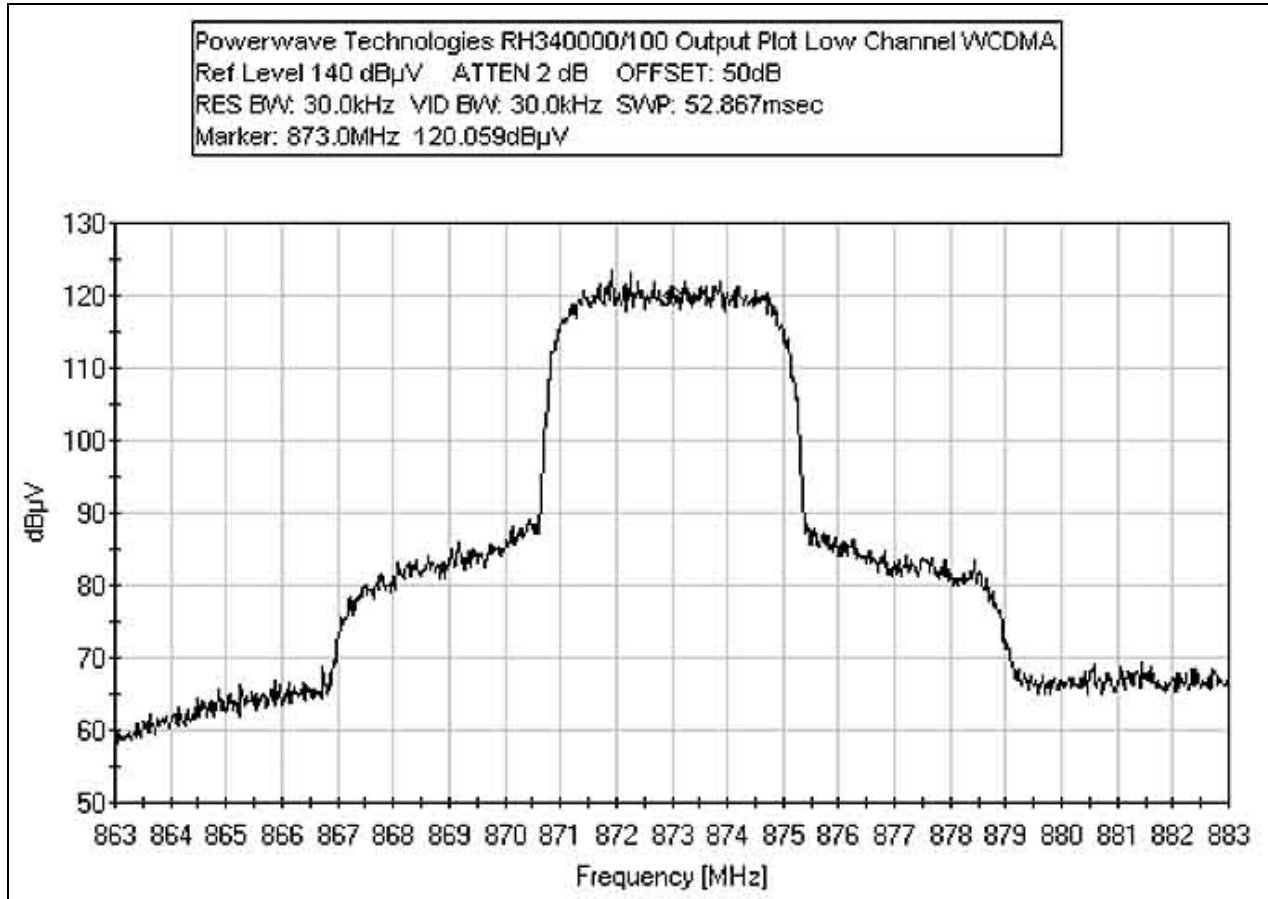
FCC PART 22 OUTPUT PLOT - NADC MID CHANNEL



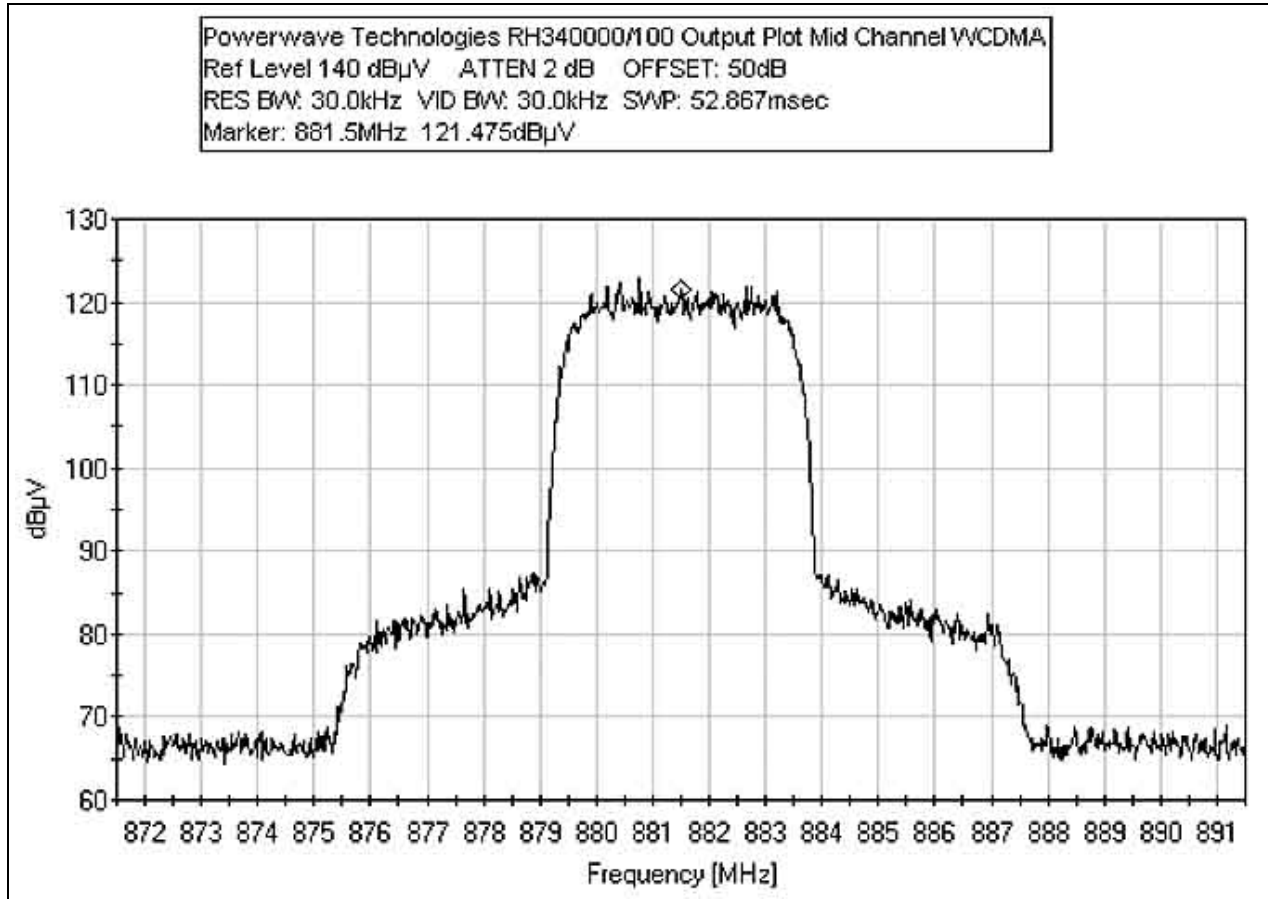
FCC PART 22 OUTPUT PLOT - NADC HIGH CHANNEL



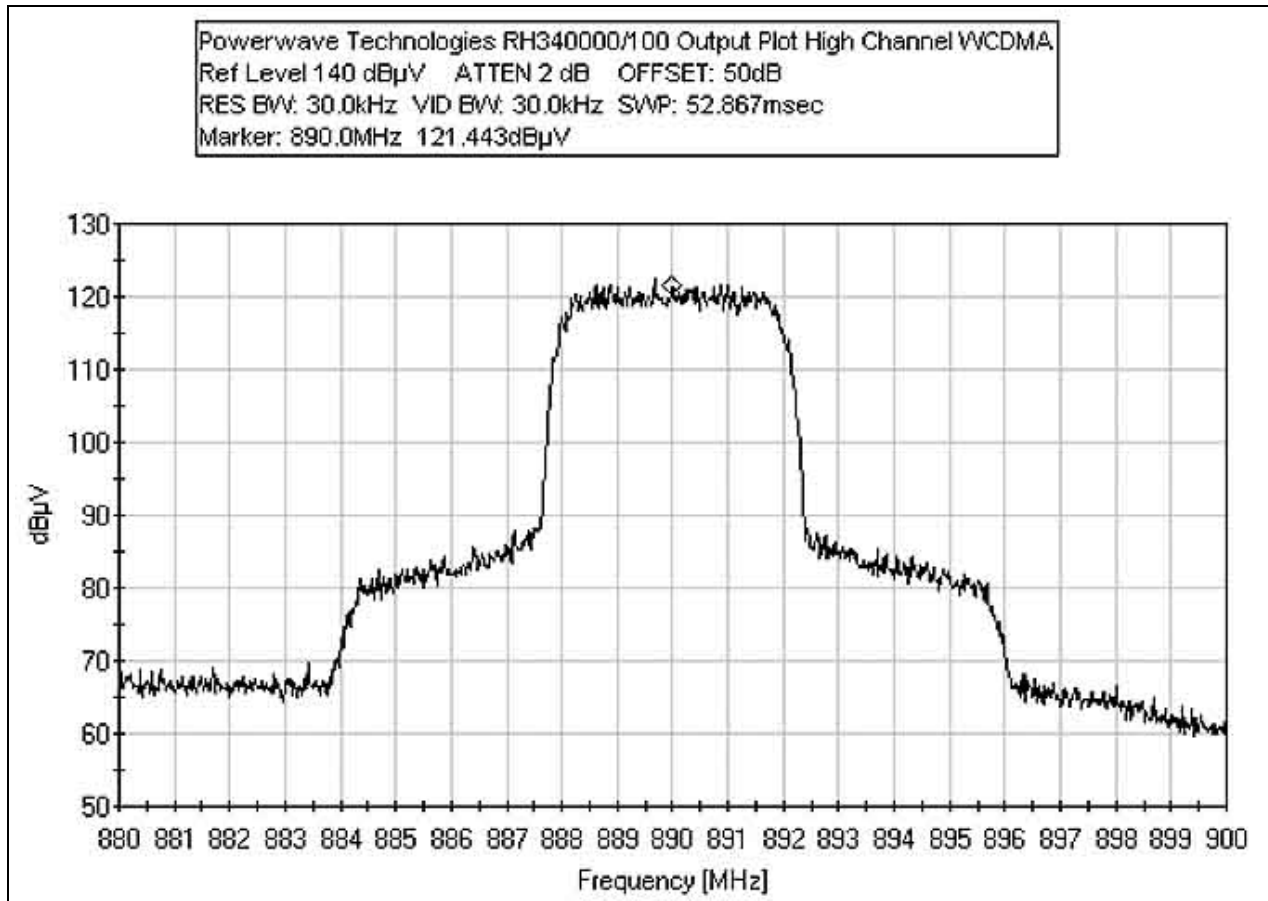
FCC PART 22 OUTPUT PLOT - WCDMA LOW CHANNEL



FCC PART 22 OUTPUT PLOT - WCDMA MID CHANNEL



FCC PART 22 OUTPUT PLOT - WCDMA HIGH CHANNEL



Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A SA	US44300407	01/12/2005	01/12/2007	02660
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Attenuator 14dB, JFW 50FHC-014-20		05/09/2003	05/09/2005	P01623
Attenuator PE7004-6		09/29/2004	09/29/2006	P02226

PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP

