FCC CFR47 PART 22 SUBPART H CERTIFICATION

CERTIFICATION REPORT

FOR

MULTI-CHANNEL CELLULAR AMPLIFIER

MODEL: MCPS2135

FCC ID: I2OMCPS2135

REPORT NUMBER: 01U0851

ISSUE DATE: JULY 30, 2001

Prepared for

SPECTRIAN
350 W. JAVA DRIVE
SUNNYVALE, CA 94089

Prepared by

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1. FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part2, Subpart J, Sections 2.1033 – 2.1055.

2.1033(c)(1) Applicant: **SPECTRIAN**
350 W. JAVA DRIVE
SUNNYVALE, CA 94089

Contact person: **CHARLES S. ROBERTSON**
Title: **EXECUTIVE DIRECTOR OF ENGINEERING**
Telephone number: **(408) 745-5400**
Fax number: **(408) 542-0265**

2.1033(c)(2) **FCC ID:** I2OMCPS2135

2.1033(c)(3) A copy of the installation and operating instructions is provided see attachment: *Users Manual*

§2.1033(c)(4) Types of Emissions:
AMPS Service: 30K0F3D, 30K0F3E, 30K0F2D, 30K0F8W, 30K0F9W
TDMA Service: 30K0DXW
CDMA Service: 1M25DXW
CDPD Device: 30K0G1W
GSM Service incl. GPRS: 200KG7W
EDGE Service: 200KD7W

§2.1033(c)(5) Frequency Range:
The MCPS2135 is designed for normal operation over the cellular band transmit frequency range of 869 MHz to 894 MHz, with a minimum channel frequency separation of 60 kHz and a maximum channel frequency separation of 25 MHz.

§2.1033(c)(6) Operating Power Range and Means of Variation:
The MCPS2135 produces up to 500 Watts of average output power when equipped with four MCPA modules. When equipped with fewer MCPA modules, the average output power is reduced accordingly, as follows.

Three MCPA Modules	375 W
Two MCPA Modules	250 W
One MCPA Module	135 W in stand alone subrack

The MCPS2135 is manufactured with a factory-set gain which can be 30 dB to 60 dB, normally 57.5 dB. The end user may adjust this preset gain by up to +/- 6dB, subject to a internally limited maximum gain of 63dB. This adjustment is made by software commands to the AMM module in

the 2-4 PA module configurations. The end user may adjust the output power with either the gain control or by varing the input power to the PA. The one module configuration is a fixed gain product, whose output power must be adjusted by varing the input power level.

§2.1033(c)(7) Maximum Power Rating:
The MCPS2135 produces 500 Watts of average output power (including combiner losses) when equipped with four MCPA modules. The MCPS2135 is designed to be used with a wide variety of modulations, frequency allocations and antennas. The end user is responsible for creating a frequency plan and power allocation which ensures that the radiated power output remains below 500W ERP per channel. The PA will self limit its power output to nominal 0.5dB above the maximum power rating, regardless of customer gain alignment or input drive level. This feature will also reconfigure the PA to the appropriate lower power limit if one or more modules are shut down by alarms or removed from the system. When equipped with fewer MCPA modules, the maximum average output power rating is reduced accordingly, as follows:

Three MCPA Modules	375 W
Two MCPA Modules	250 W
One MCPA Module	135 W in stand alone subrack

§2.1033(c)(8) DC Voltage and Current:
The MCPS2135 has a normal operating input voltage of 27 VDC, and will operate fully within specifications with an input voltage of 26 VDC to 28 VDC. The MCPS2135 will operate with reduced output power levels with inputs of 21 VDC to 26 VDC.
Within the MCPS2135, the distribution module provides DC power to the other modules. At full power, each MCPA module draws approximately 50A at 27VDC; including the AMM a fully equipped MCPS2135 draws approximately 200A at 27VDC and operates at ~ 9% efficiency. The A4 BPM subassemblies run at approximately 9A at 27V whenever a system is configured to run at rated power. The A11 Error Amplifier will draw 6A under these conditions.

§2.1033(c)(9) Tune-Up Procedure:
The MCPS2135 requires no field or customer tuning. It is manufactured and inspected to the specification. The gain of the PA may be adjusted as described above in 2.1033(c)(6).

§2.1033(c)(13)Modulation System
The MCPS2135 does not modulate: it increases the RF power of its input signal.

TYPE OF EQUIPMENT:	Cellular Power Amplifier
MEASUREMENT DISTANCE:	3 METER
TECHNICAL LIMIT:	FCC 22.359, 22.917
FCC RULES:	PART 22
EQUIPMENT AUTHORIZATION PROCEDURE	CERTIFICATION
MODIFICATIONS MADE ON EUT	☒ YES (REFER TO PAGE) ☐ NO

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 22. The results of testing in this report apply to the product/system, which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested and Released By:

_____

Pete Krebill
EMC ASSOCIATE ENGINEER
COMPLIANCE CERTIFICATION SERVICES

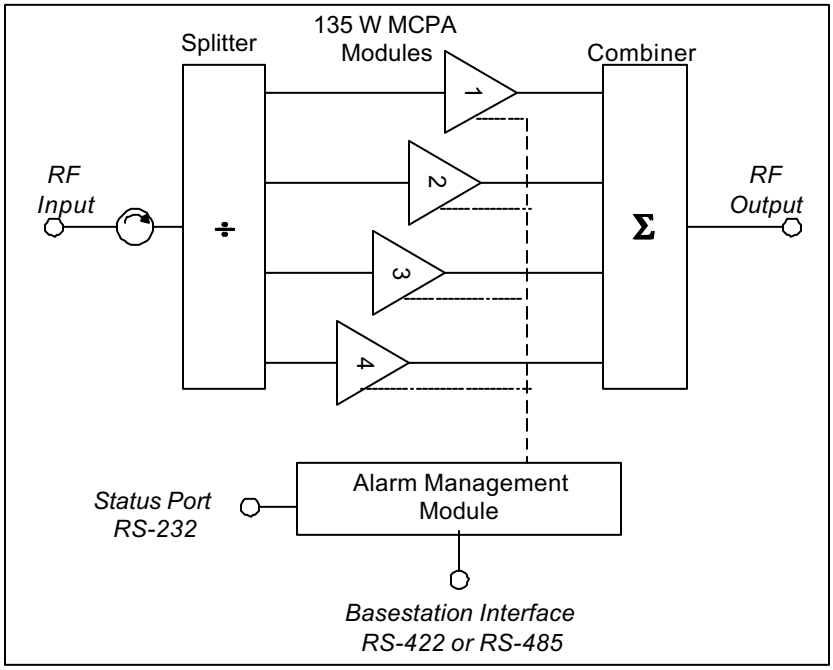
2. EUT DESCRIPTION

The MCPS2135 power amplifier system family consists of up to four 135W multicarrier power amplifier (MCPA) modules combined in a rack-mount shelf.

The top-level block diagram of a fully equipped MCPS2135 system is shown below.

The following modules comprise the MCPS2135 system.

- One to Four MCPA Modules
- One Combiner/Divider Assembly
- One Amplifier Management Module (AMM)
- One DC Distribution Module (not shown in the diagram)



MAJOR EQUIPMENT SPECIFICATIONS FOR THE MCPS2135

Electrical Specifications	Specification @ 25ºC
Frequency Range	869 - 894 MHz
Average Power[1] into 50 Ohms	135W (51.3 dBm) to 500W (57.0 dBm)
Intermodulation Distortion (IMD)	-65 dBc for 100W per RF Module -60 dBc for 135W per RF Module
CDMA Adjacent Channel Power @ 881 MHz, 100W Output per RF Module	< -45 dBc, 750 kHz offset, 30 kHz int. bandwidth < -60 dBc, 1.98 MHz offset, 30 kHz int. bandwidth
Receive Band Noise	-30 dBm/30 kHz bandwidth
Carrier Spacing (AMPS/TDMA/CDPD)	60 kHz min., 25 MHz max.
Carrier Spacing (CDMA)	1.25MHz min, 25MHz max.
Carrier Spacing (GSM/EDGE)	200kHz min, 25MHz max
Power Output Stability for Single Frequency	± 1.0 dB
Operating Bandwidth	up to 25 MHz
Gain	Factory selectable from 30 to 60 dB, 85 dB with optional preamp
Gain Flatness vs. Frequency	± 0.5 dB (over all temps)
Gain Variation over Temp @ Any Inband Frequency	± 1 dB
Forward Power Sample Port Gain	-50 dB typ.
Input/Output Port Return Loss	-15 dB min.
Second/Third and Greater Harmonic Output	-45dbc/-60dBc
DC Input Voltage Range	26 to 28VDC[2]
DC Input Current @ 27VDC (max)	135W single RF module – 55A 250W two RF modules – 110A 375W three RF modules – 165A 500W four RF modules – 220A

[1]Power levels at the output of the system combiner will vary depending on the configuration.

[2]Reduced power performance over 21-26V. Full spec performance (22-30V) available with optional DC/DC converter.

Mechanical Specifications	
Operating/Storage Temperatures	0ºC to 50ºC/-40ºC to 85ºC
Size, 4 module system, mounting ears excluded	(D x W x H) 17.72 x 21.56 x 13.97 in. max (450 x 547,62 x 354,84 mm max.)
Weight, 4 module system	Installed: approx. 250 lbs. (113 kg) Shipping: approx. 290 lbs. max. (132 kg) Heaviest Module: <50 lbs. max. (23 kg)
Connectors	RF Input(s): SMA (F) RF Output(s): N (F) Maintenance Port: RS232 Alarms Port: RS422 DC Inputs: 10-32 and ¼-20 threaded lugs DC Ground: ¼-20 threaded lugs RF Output Sample Port: SMA (F)
Indicators	AMM: DC On, Alarm LEDs MCPA Modules: DC On, Enable, Alarm, Fan LEDs

3. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

4. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code:200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT(1300F2))

5. MEASUREMENT INSTRUMENTATION

Radiated emissions were measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide liner horn. EMI receivers were used for line conducted readings, spectrum analyzers with pre-selectors and quasi-peak detectors were used to perform radiated measurements. Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specification for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

6. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

7. UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the spectrum analyzer were converted to dB(uV/m) by

use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

The field strength is calculated by adding the Antenna Factor and Cable Factors, then by subtracting the Amplifier Gain from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/m. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBuV/m

Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

8. EQUIPMENT MODIFICATIONS

To achieve compliance for FCC PART 22 requirement, the following change(s) were made during compliance testing:

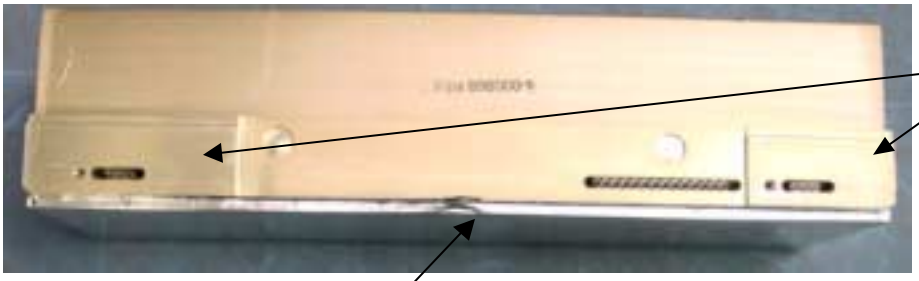
The following modifications were made to our MCPS2135 power amplifier. These modifications were required to meet the radiated emissions requirements of FCC part 22.

Aluminum tape was used to close the second slot opening in the PA module front panel.
RF absorber material was added to the backplane assembly (A4E) inside the MCPA modules.
Aluminum tape was wrapped around the cover of the A4 BPM Modules to improve their RF shielding.

The aluminum tape used for changes 1 and 3 is 3M Tape 1170, 3/8" wide
The RF absorber added to A4E assembly is: BSR-I/SS-6M
Details of the changes are in the attached rework instruction.

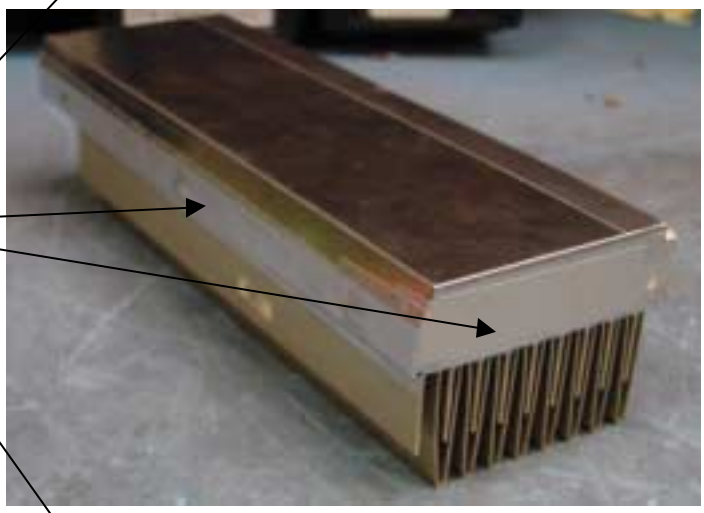
Zeus Brick Rework Instructions

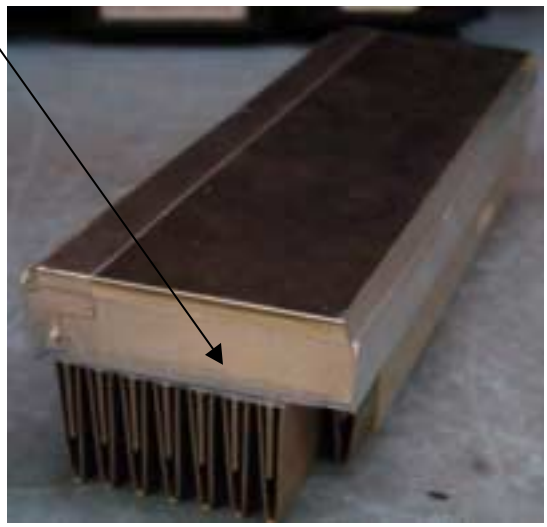
With each BPM removed from the assembly, apply aluminum tape around the edges of the cover on all four sides as shown below. 3/8" tape may be used on the front and sides, and 3/4" tape should be used along the back of the BPM. Be careful not to cover too much of the heatsink fin area. On the back edge of the cover, do not let the tape extend past the back edge of the top of the heatsink. The surface that mates with the backplane should be CLEAN and COMPLETELY FREE OF TAPE.



No tape on this surface

Tape edges as shown



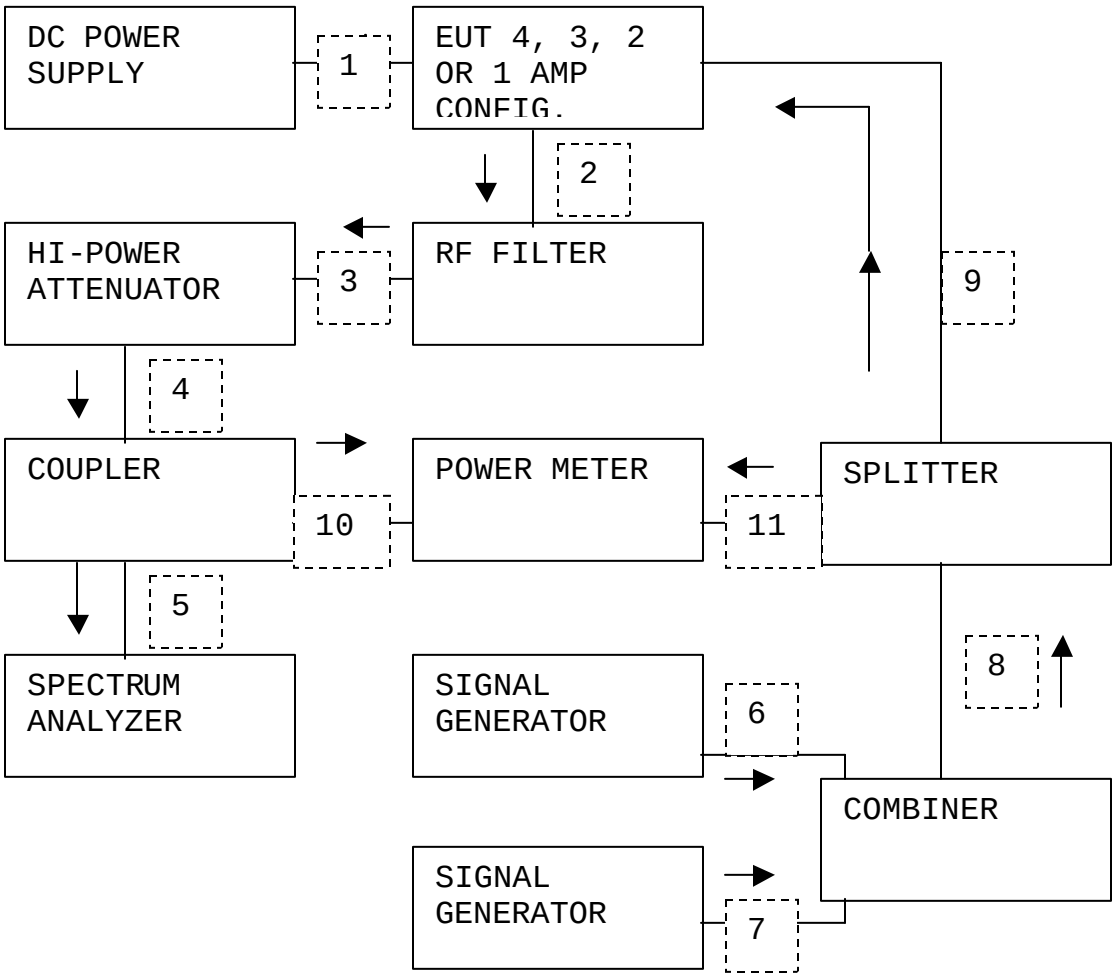


COMPLIANCE CERTIFICATION SERVICES
561 F MONTEREY RD, MORGAN HILL, CA 95037 USA

9. TEST EQUIPMENT LIST

Equipment	Manufacturer	Model No.	Serial No.	Site	Cal Date	Due Date
Bilog Antenna	**CHASE**	**CBL6112**	**2049**	**A**	**12/11/00**	**12/11/01**
Pre-Amp	**H.P.(P1_M)**	**8447D**	**2944A06833**	**A**	**11/21/00**	**11/21/01**
Spectrum Analyzer	**H.P.**	**8566B**	**3014A06685**	**N/A**	**5/4/01**	**5/4/02**
Spectrum Analyzer	**H.P.**	**8593EM**	**3710A00205**	**N/A**	**6/20/01**	**6/20/02**
Horn Antenna	**EMCO**	**3115**	**9001-3245**	**N/A**	**6/20/01**	**6/20/02**
Horn Antenna	**EMCO**	**3115**	**2238**	**N/A**	**6/20/01**	**6/20/02**
Pre-Amp	**H.P. (1-26.5GHz)**	**8449B**	**3008A00369**	**N/A**	**8/23/01**	**8/23/02**
Signal Generator	**HP**	**83732B**	**US3449059**	**N/A**	**3/21/01**	**3/21/02**
Power Meter	**H.P.**	**436A**	**2709A29209**	**N/A**	**4/2/01**	**4/2/02**
Power Sensor	**H.P.**	**8482A**	**2349A08568**	**N/A**	**4/2/01**	**4/2/02**
Signal Generator	**HP**	**ESG-D 4432B**	**08909**	**Spectrian**	**10/2/2001**	**10/2/2002**
Signal Generator	**HP**	**ESG-D 4432B**	**14082**	**Spectrian**	**11/22/2001**	**11/22/2002**
Power Meter	**HP**	**E4419B**	**M440516963**	**Spectrian**	**7/2/2001**	**7/2/2002**
Power Supply	**SORENSEN**	**DHP 40-250**	**N/A**	**Spectrian**	**NCR**	**NCR**

10. CONFIGURATION BLOCK DIAGRAM



CABLE NO: 1	
I/O Port:: DC	Number of I/O ports of this type:1
Number of Conductors: 2	Connector Type: DC
Capture Type: SCREW-IN	Type of Cable used: UNSHIELDED
Cable Connector Type: METAL	Cable Length:2.5 Meter
Bundled During Tests: NO	Data Traffic Generated: NO
Remark: N/A	

CABLE NO: 2 - 9	
I/O Port:: RF	Number of I/O ports of this type:1 – 3 each
Number of Conductors: 2	Connector Type: SMA TO SMA
Capture Type: SCREW-IN	Type of Cable used: SHIELDED
Cable Connector Type: METAL	Cable Length:1.0 to 2.5 Meter
Bundled During Tests: NO	Data Traffic Generated: YES

Remark: Similar cables used throughout setup above.	
CABLE NO: 10 & 11	
I/O Port:: POWER SENSOR	Number of I/O ports of this type:2
Number of Conductors: 2	Connector Type: N-TYPE
Capture Type: SCREW-IN	Type of Cable used: SHIELDED
Cable Connector Type: METAL	Cable Length:1.5 Meter
Bundled During Tests: NO	Data Traffic Generated: YES
Remark: N/A	

11. STANDARD INPUT SIGNALS

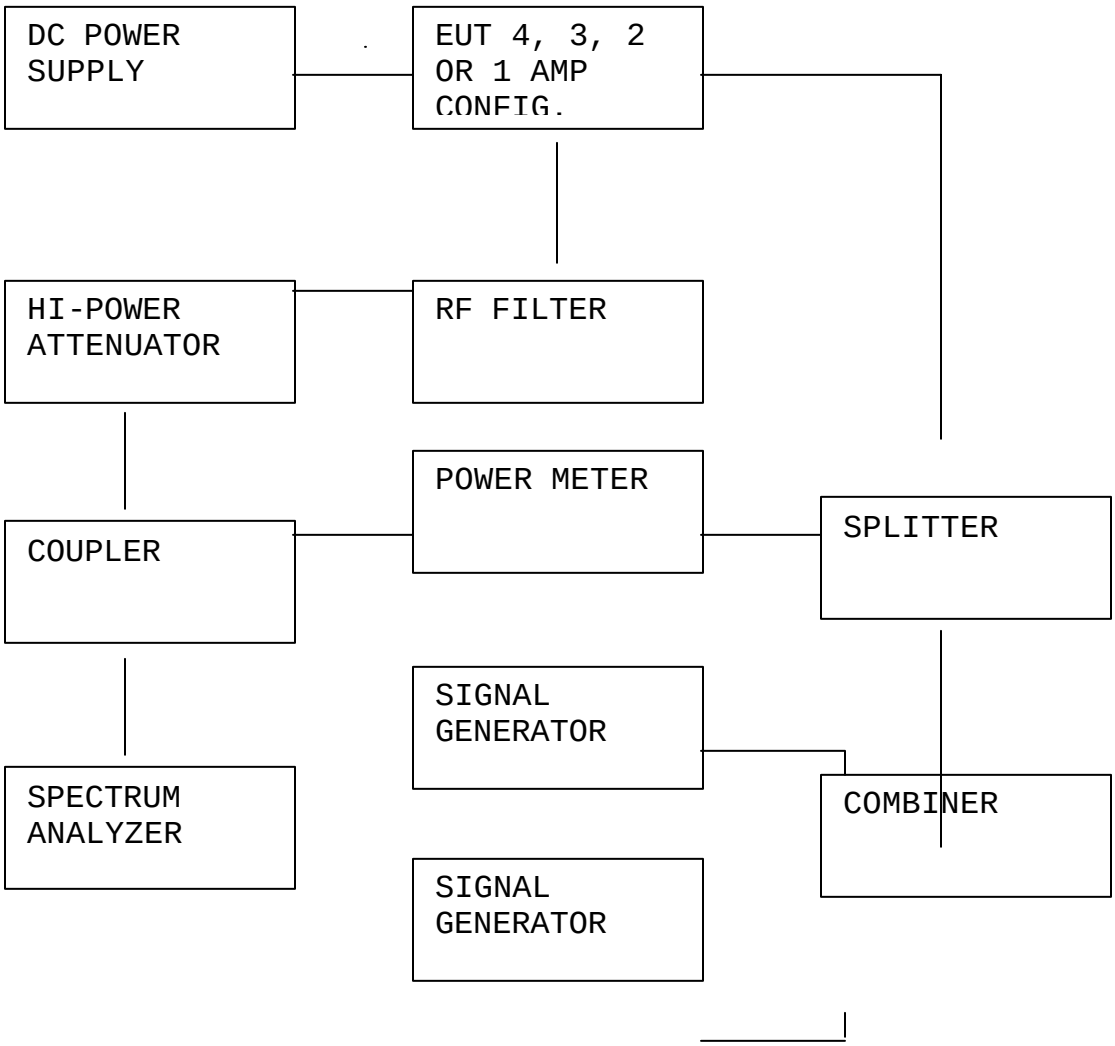
The chart below describes the signals that were input to the EUT during most of the conducted tests listed in this reports. The radiated emissions tests were performed using two CW signals. See *SECTION 2.1053 FIELD STRENGTH OF SPURIOUS EMISSION* for a description of the signals used during radiated emissions tests.

Modulation Type	Frequencies Low Side of Band	Frequencies Low Side of Band
CDMA	870.25MHz & 872.75MHz	890.25MHz & 892.75MHz
TDMA	869.3MHz & 869.9MHz	893.1MHz & 893.7MHz
CDPD	869.3MHz & 869.9MHz	893.1MHz & 893.7MHz
EDGE	869.35MHz & 869.95MHz	893.05MHz & 893.65MHz
GSM	869.3MHz & 869.9MHz	893.1MHz & 893.7MHz
AMPS VOICE	869.3MHz & 869.9MHz	893.1MHz & 893.7MHz
AMPS WIDEBAND DATA	869.3MHz & 869.9MHz	893.1MHz & 893.7MHz

12. PART 2: CERTIFICATION TEST REQUIREMENT:

SECTION 2.1046: RF POWER OUTPUT

TEST SETUP:



Minimum requirement:
Section 22.913(a); Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Test procedure:

The EUT was configured as shown above with 4, 3 and 2 amplifiers in the 4 brick shelf, and 1 amplifier in the single brick shelf. The EUT was operated according to the manufacturer's tune-up procedure to give its maximum output power. The power meter was offset for all path losses and used to measure the output power. Two modulated tones of equal amplitude were input to the EUT to achieve a composite output power equal to the maximum rated output power for each configuration...This power was monitored and maintained throughout testing. For a description of the modulated tones used see section 11. *STANDARD INPUT SIGNALS*.

Test Result:

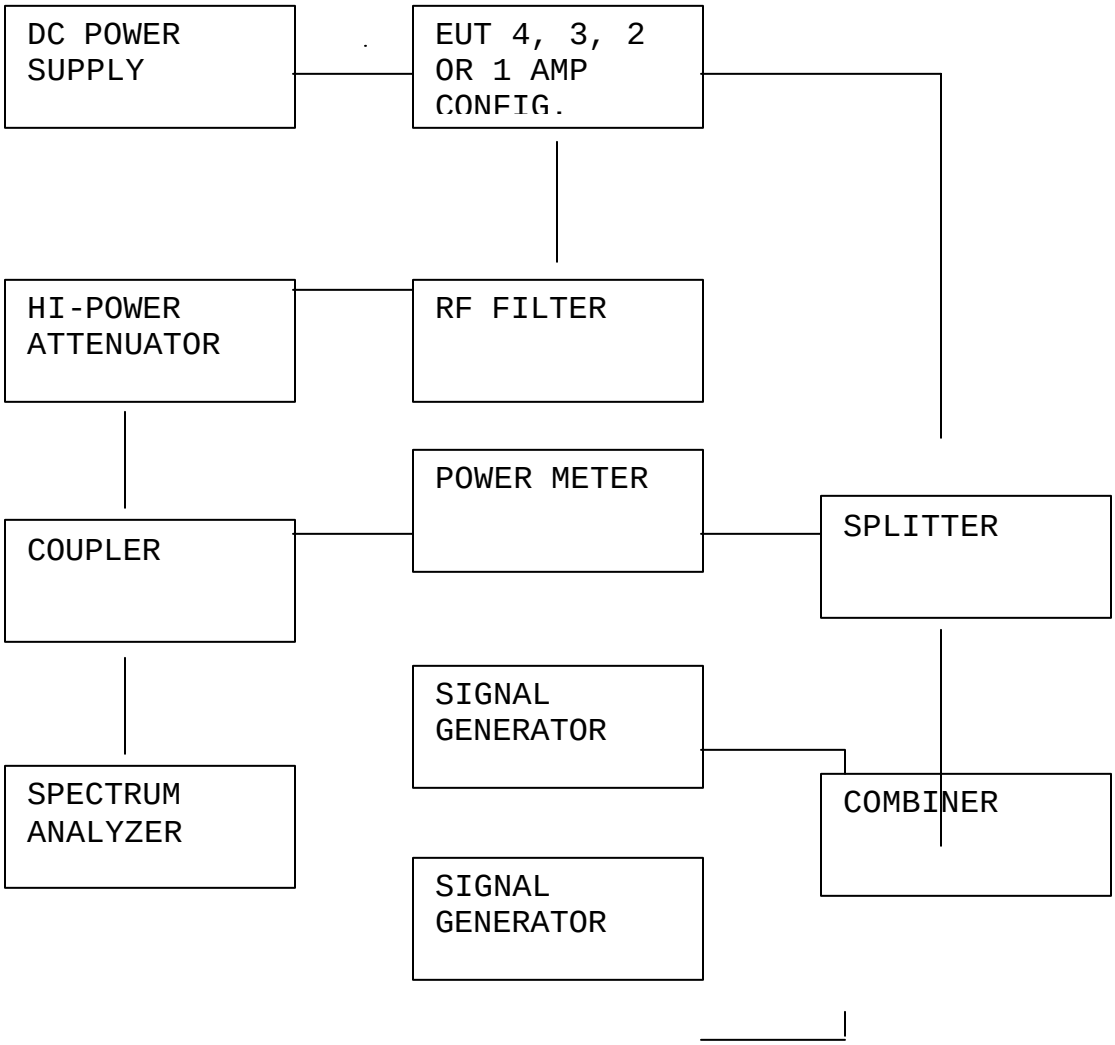
The EUT's measured output power was: 4 Amplifier Configuration 500 Watts.
3 Amplifier Configuration 370 Watts.
2 Amplifier Configuration 250 Watts.
1 Amplifier Configuration 135 Watts.

SECTION 2.1047: MODULATION CHARACTERISTICS

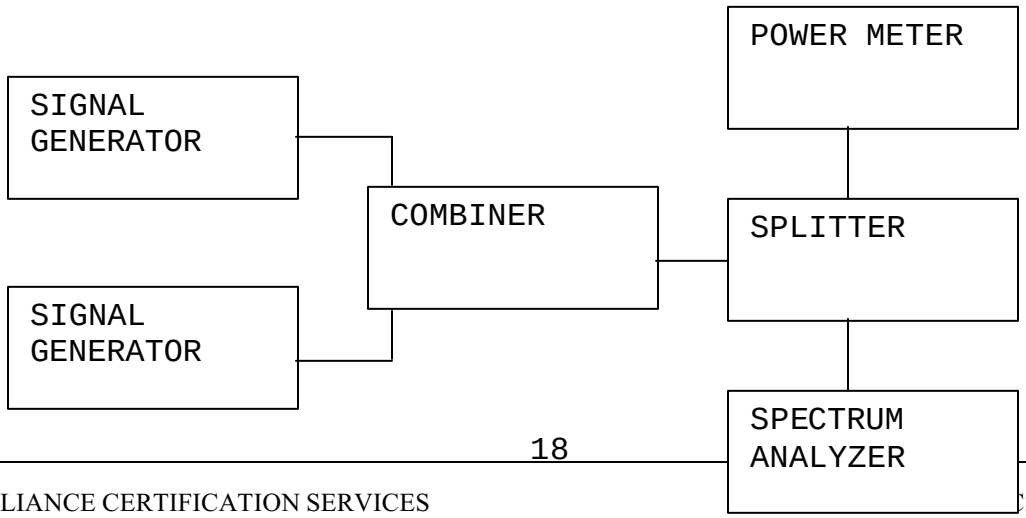
Not applicable. EUT is a power amplifier.

SECTION 2.1049: OCCUPIED BANDWIDTH

TEST SETUP for OUTPUT:



TEST SETUP FOR INPUT :



Minimum:
Section 2.1049(i); transmitters designed for other types of modulation-when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

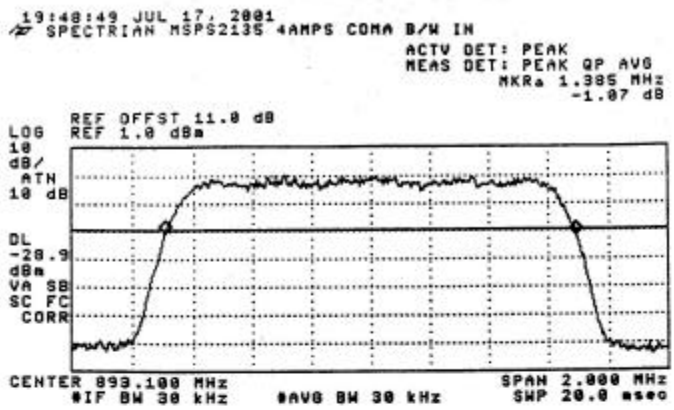
Test Procedure:
The Eut's occupied bandwidth is compared at the input source (signal generators) and output (power amplifier) to check that the signal bandwidth is not greater at the output of the amplifier.

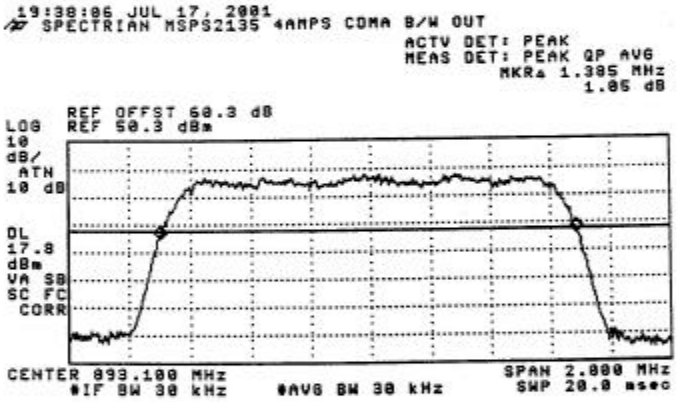
The EUT was configured as shown above with 4, 3 and 2 amplifiers in the 4 brick shelf. The EUT was operated to give its maximum rated output power. The spectrum analyzer's reference level was offset for all external attenuations. The marker delta function was used to measure the 20dB bandwidth of one of the Standard Input Signals at each end of the band. For a description of the modulated tones used see section 11. *STANDARD INPUT SIGNALS*.

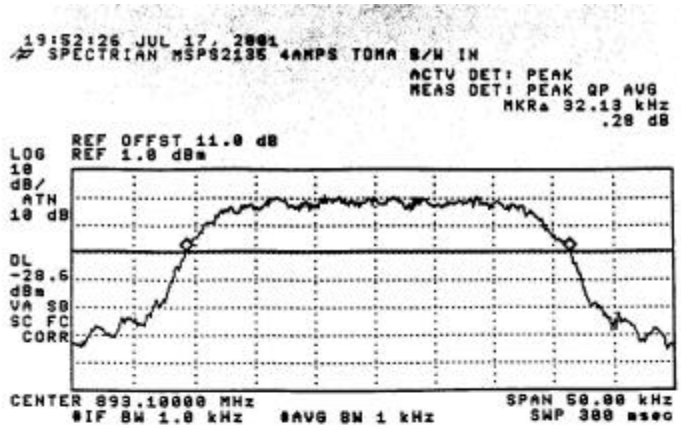
The setup for input as shown above is used to measure the bandwidth of the input signal. The spectrum analyzer's reference level was offset for all external attenuations. All other spectrum analyzer and signal generator settings were maintained from the output bandwidth test.

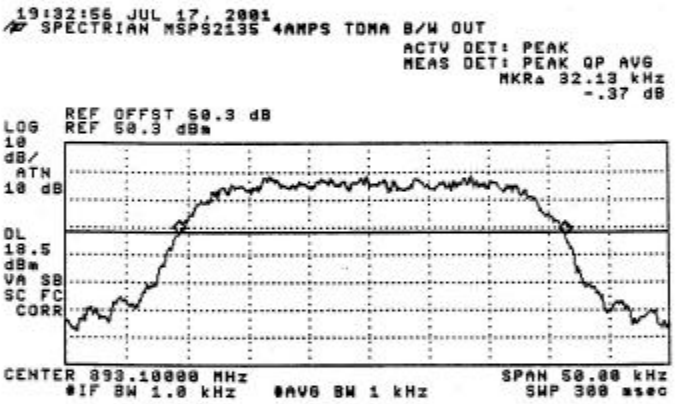
The occupied bandwidth of the 1 amplifier/single brick shelf configuration is measured as above except that the two signal are adjusted to the middle of the band.

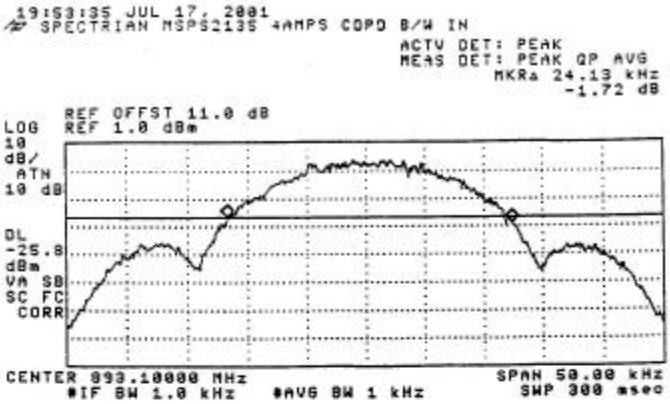
Test results:
Complies. Bandwidth measurements were nearly identical for all of the configurations and frequencies. One set of the input and output plots of the four amplifier configuration are shown below. One set of the input and output plots of the one amplifier configuration are shown below.

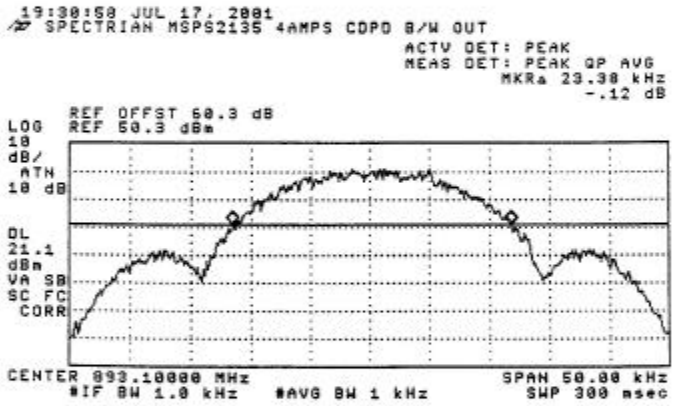


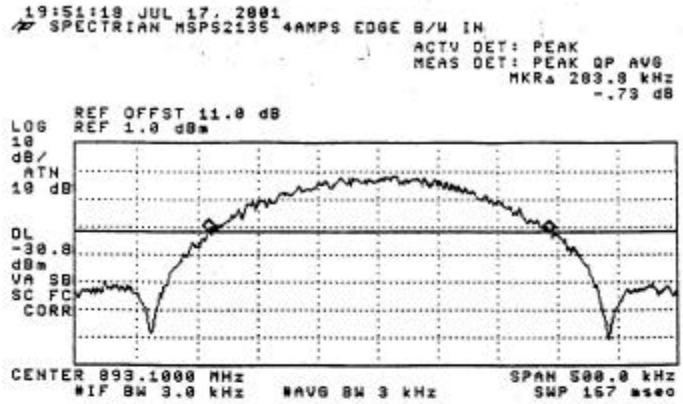


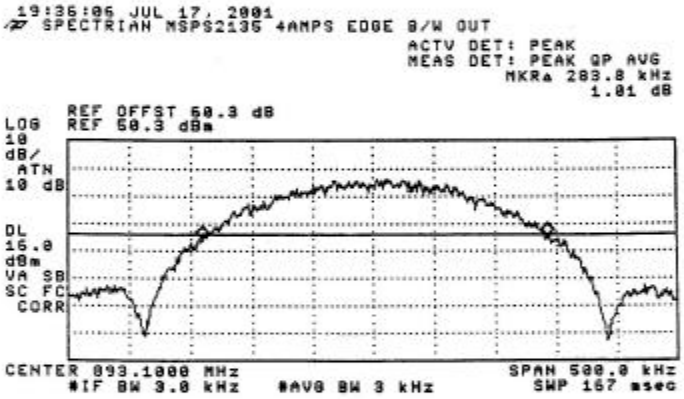


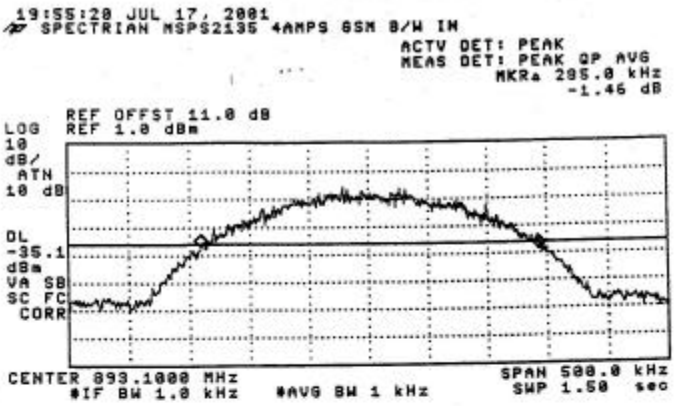


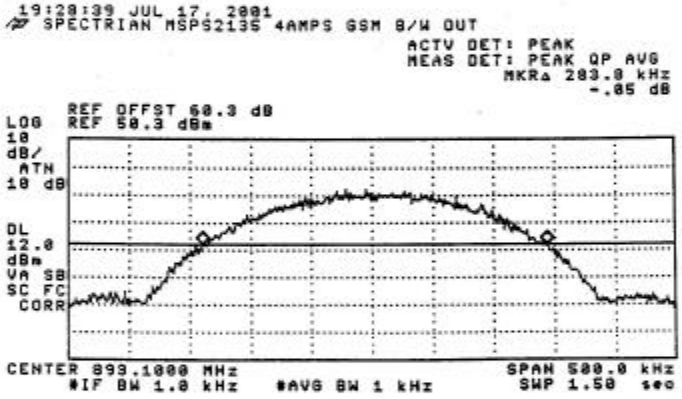


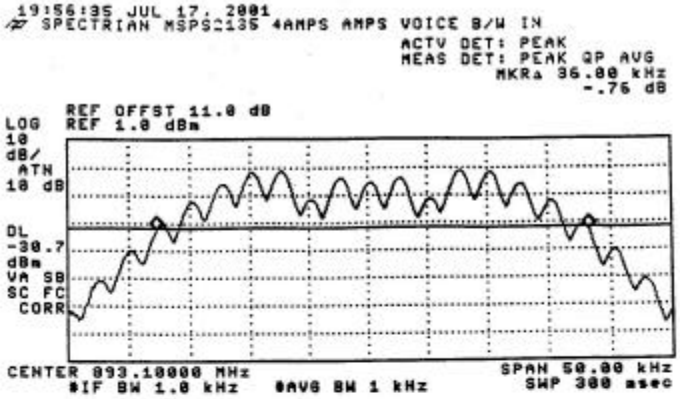


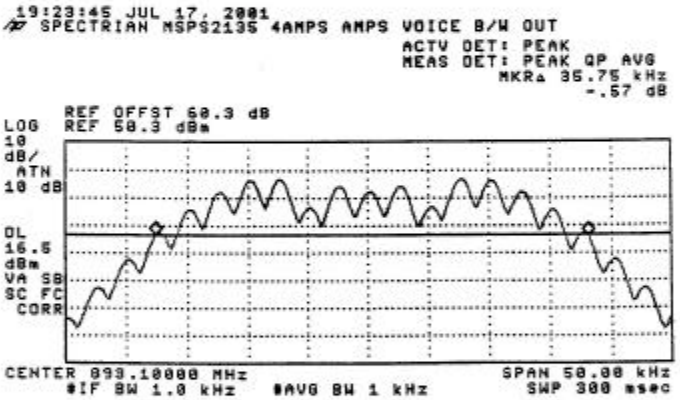


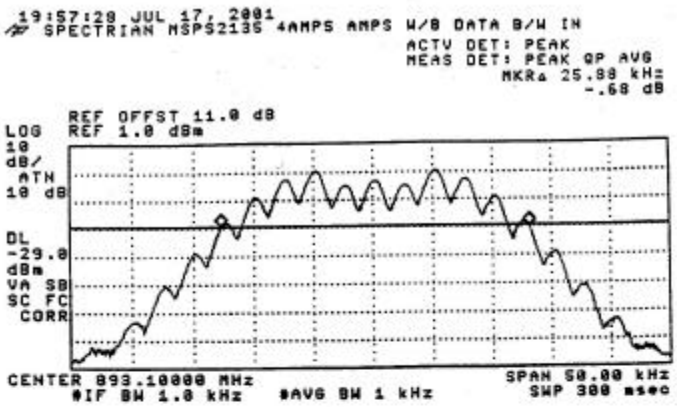


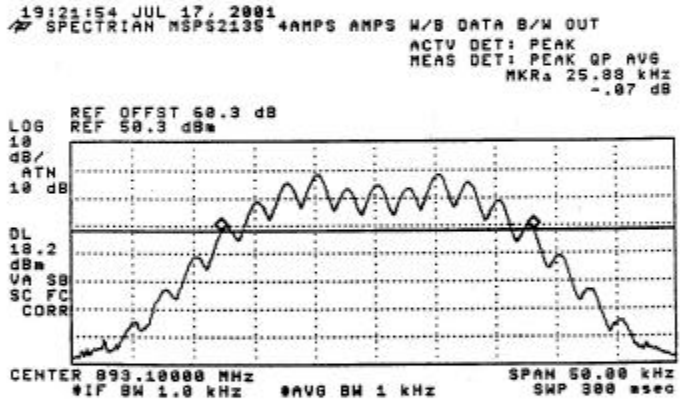


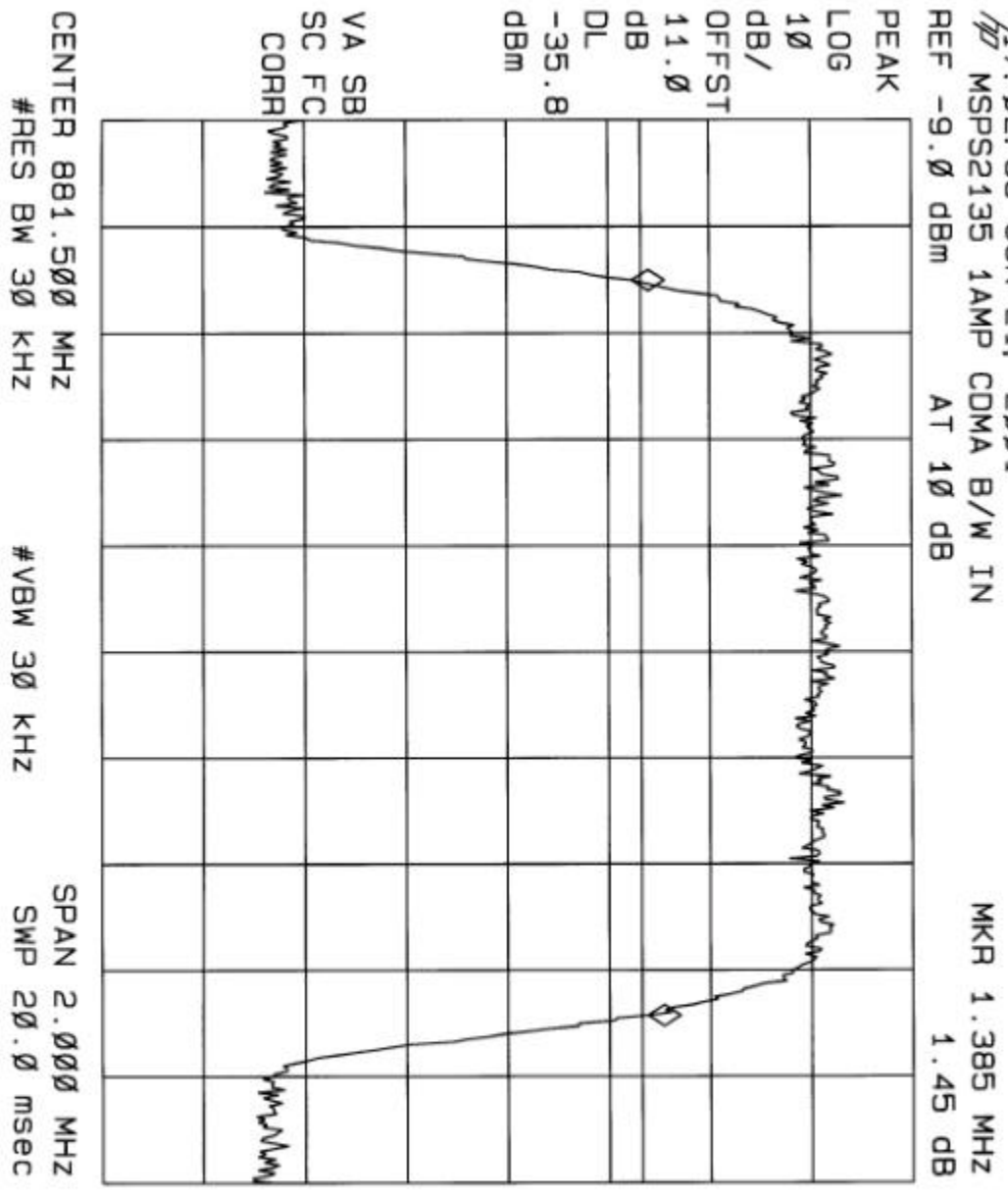


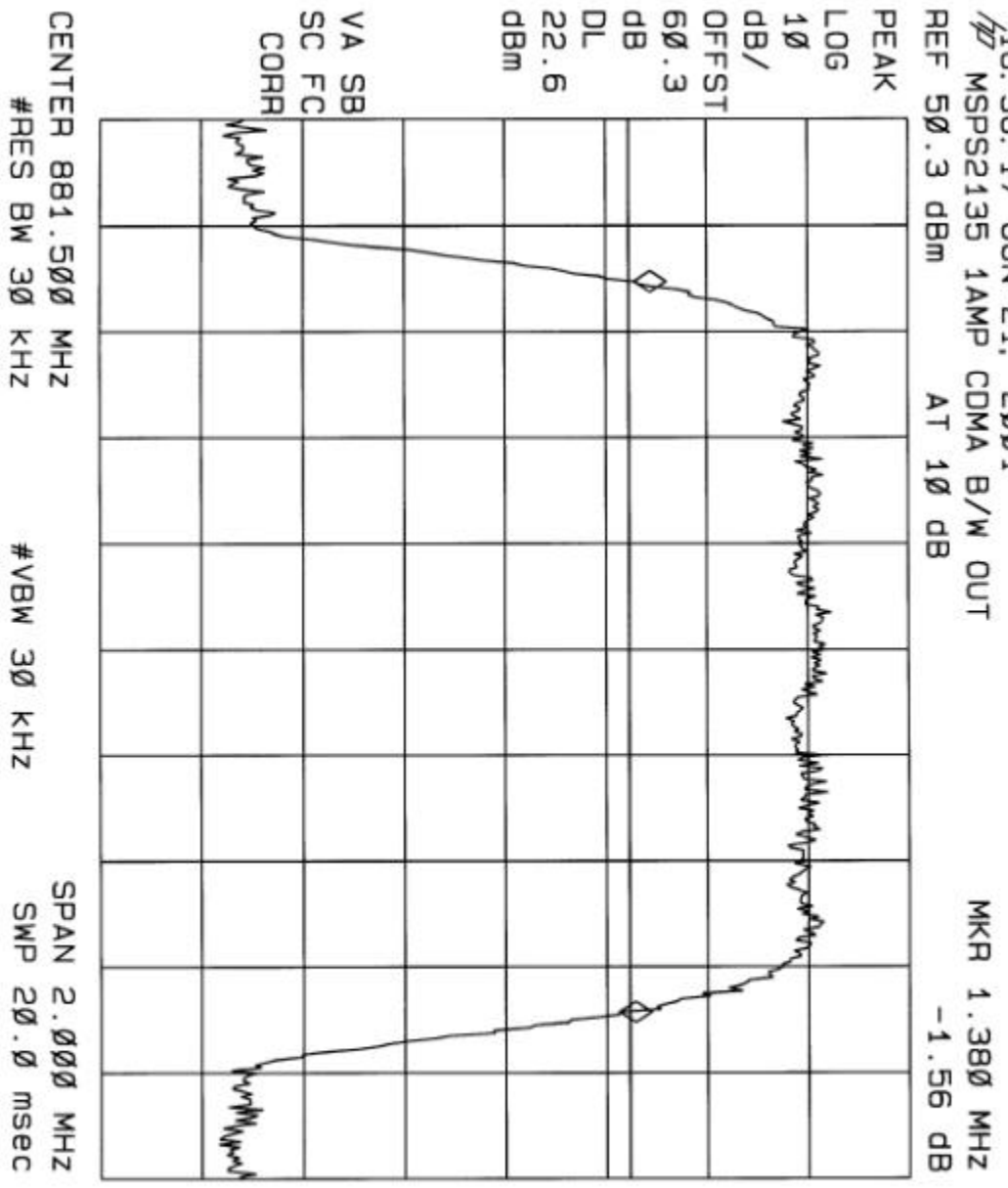


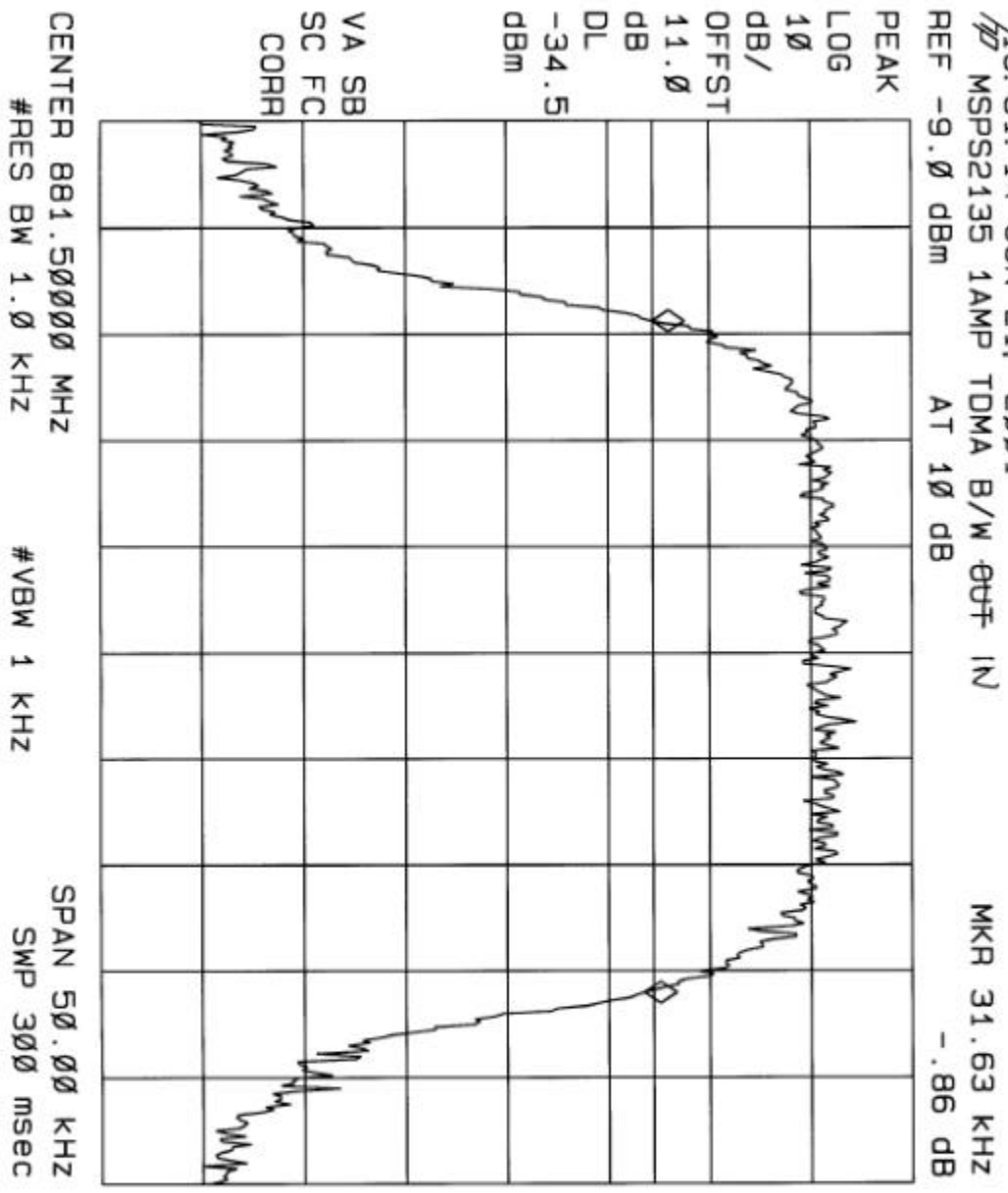


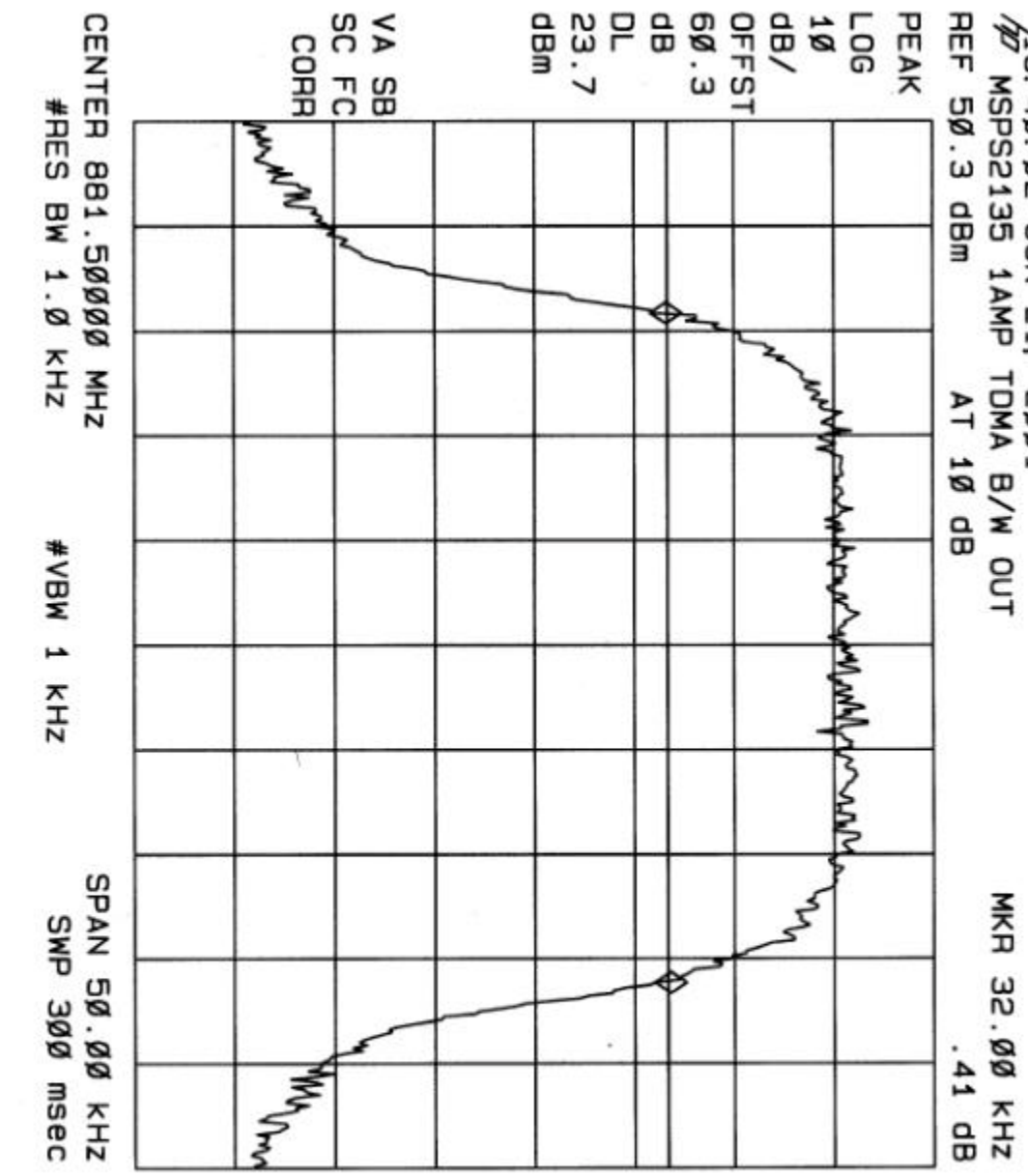


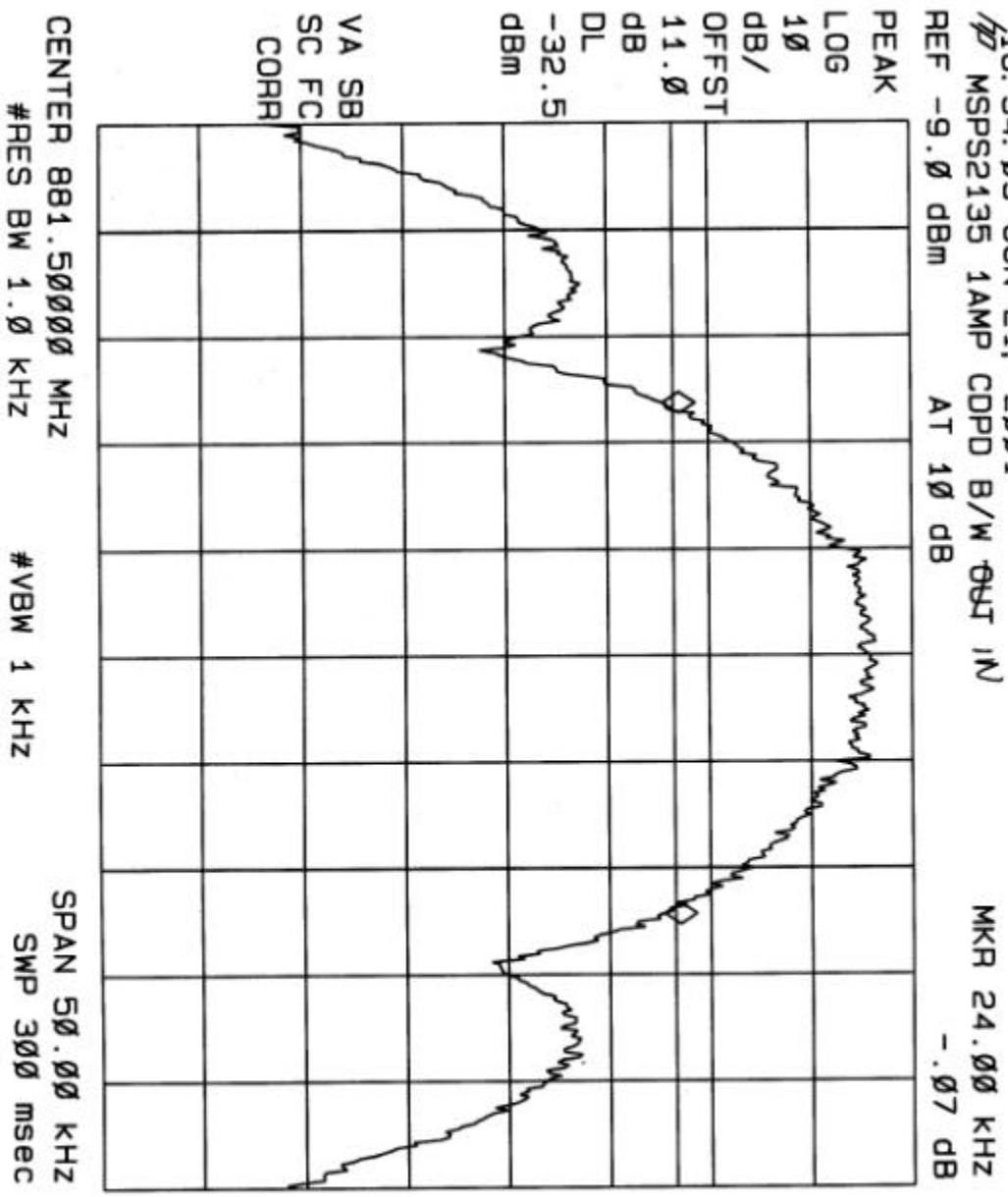


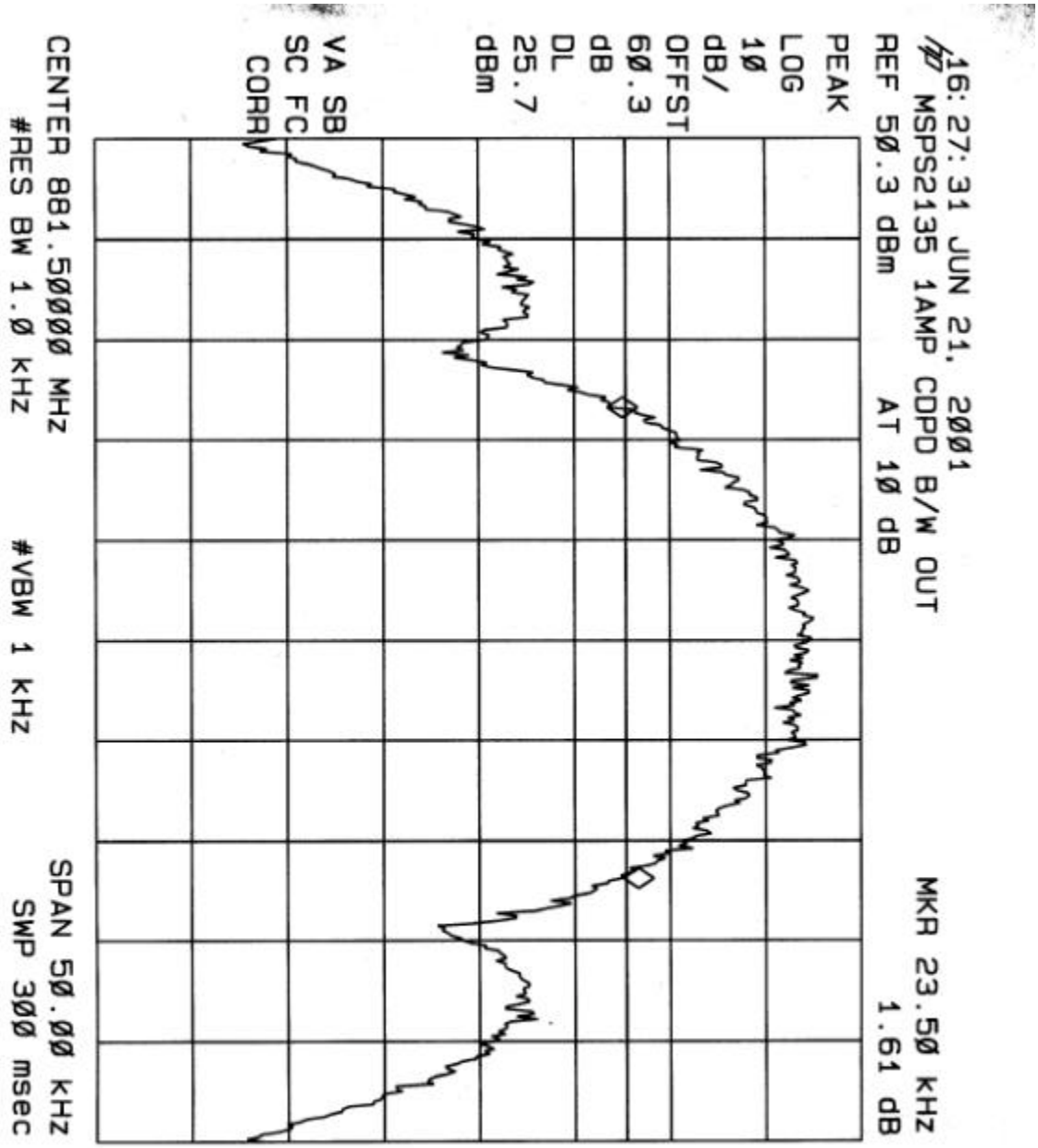


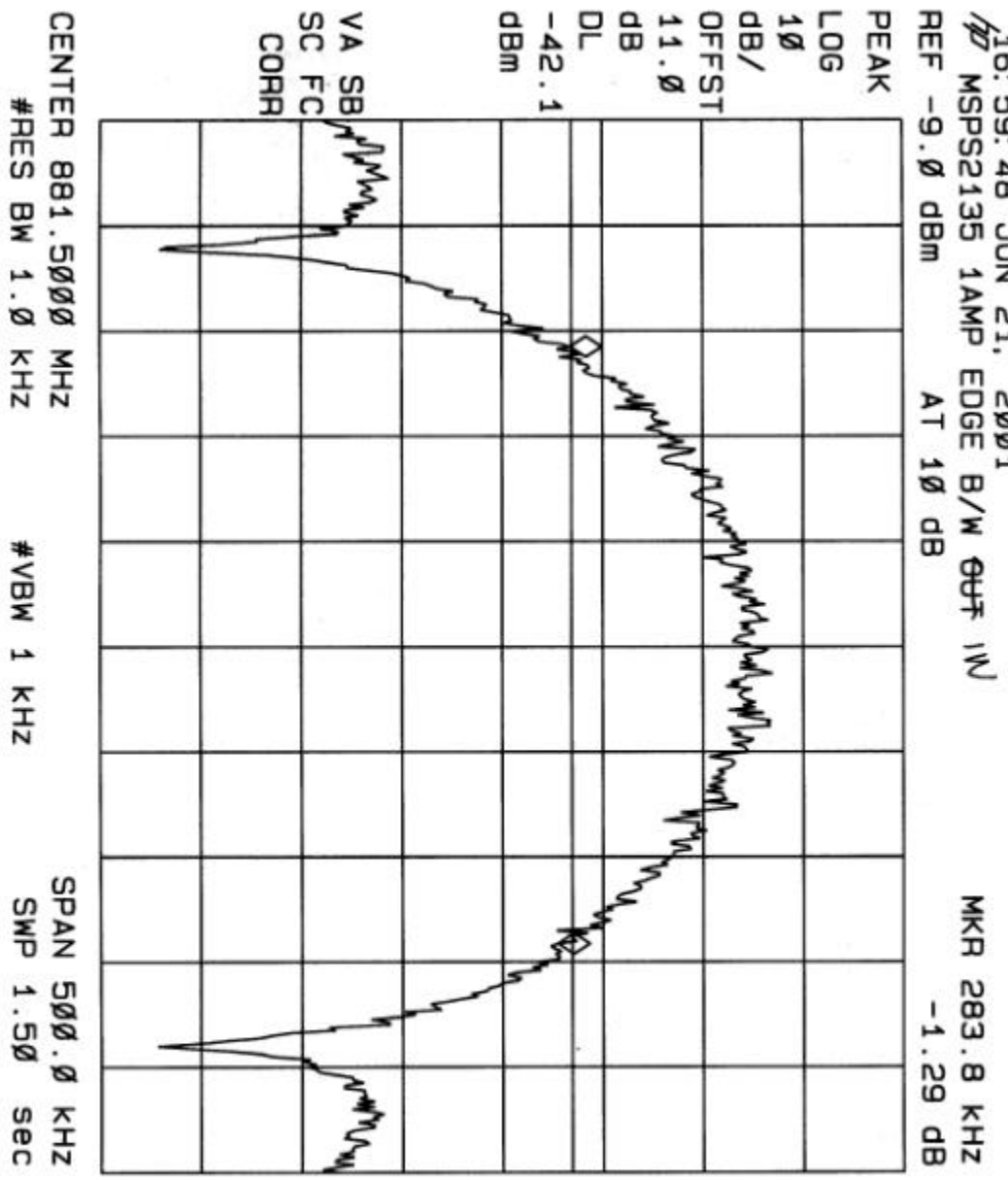


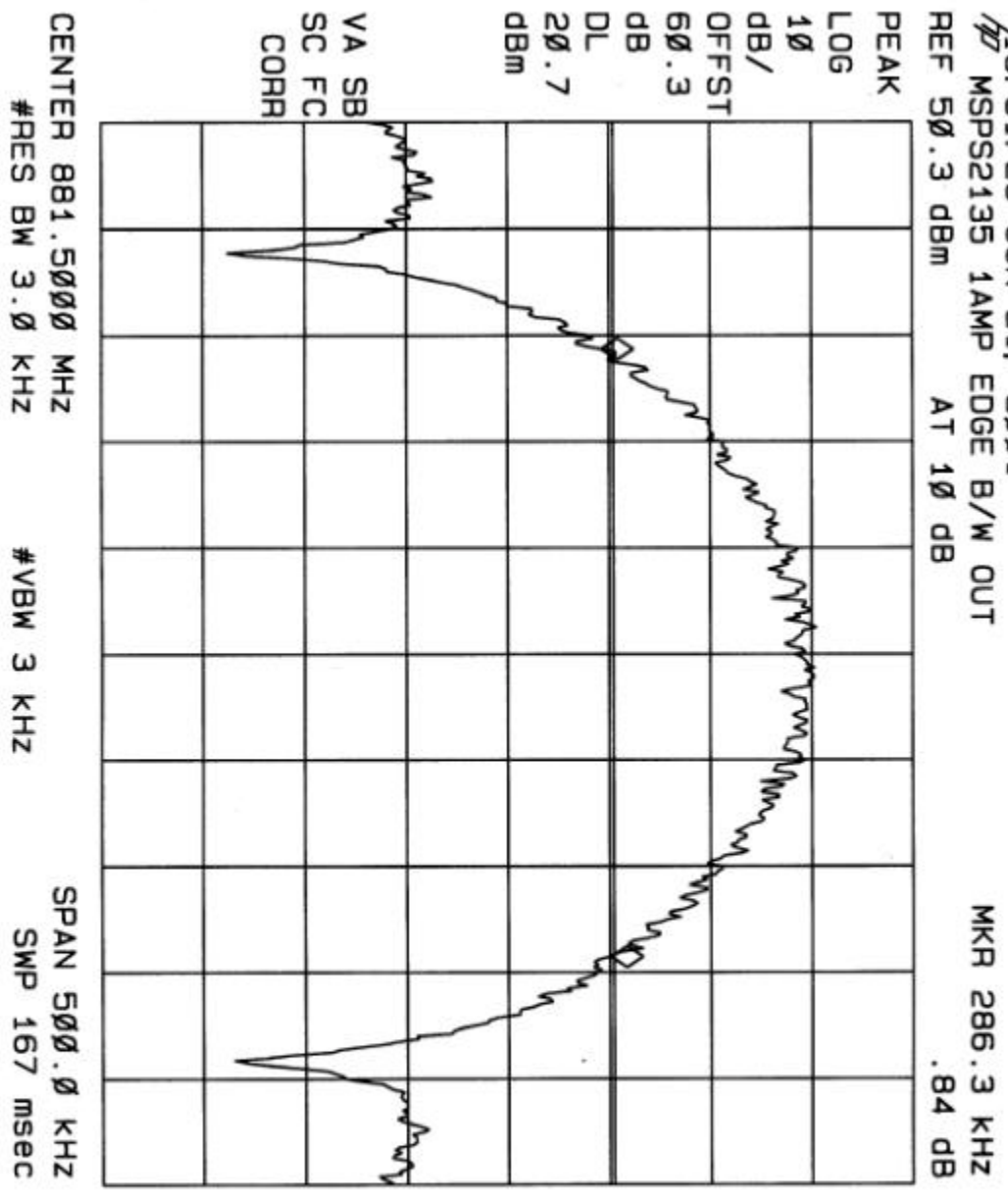


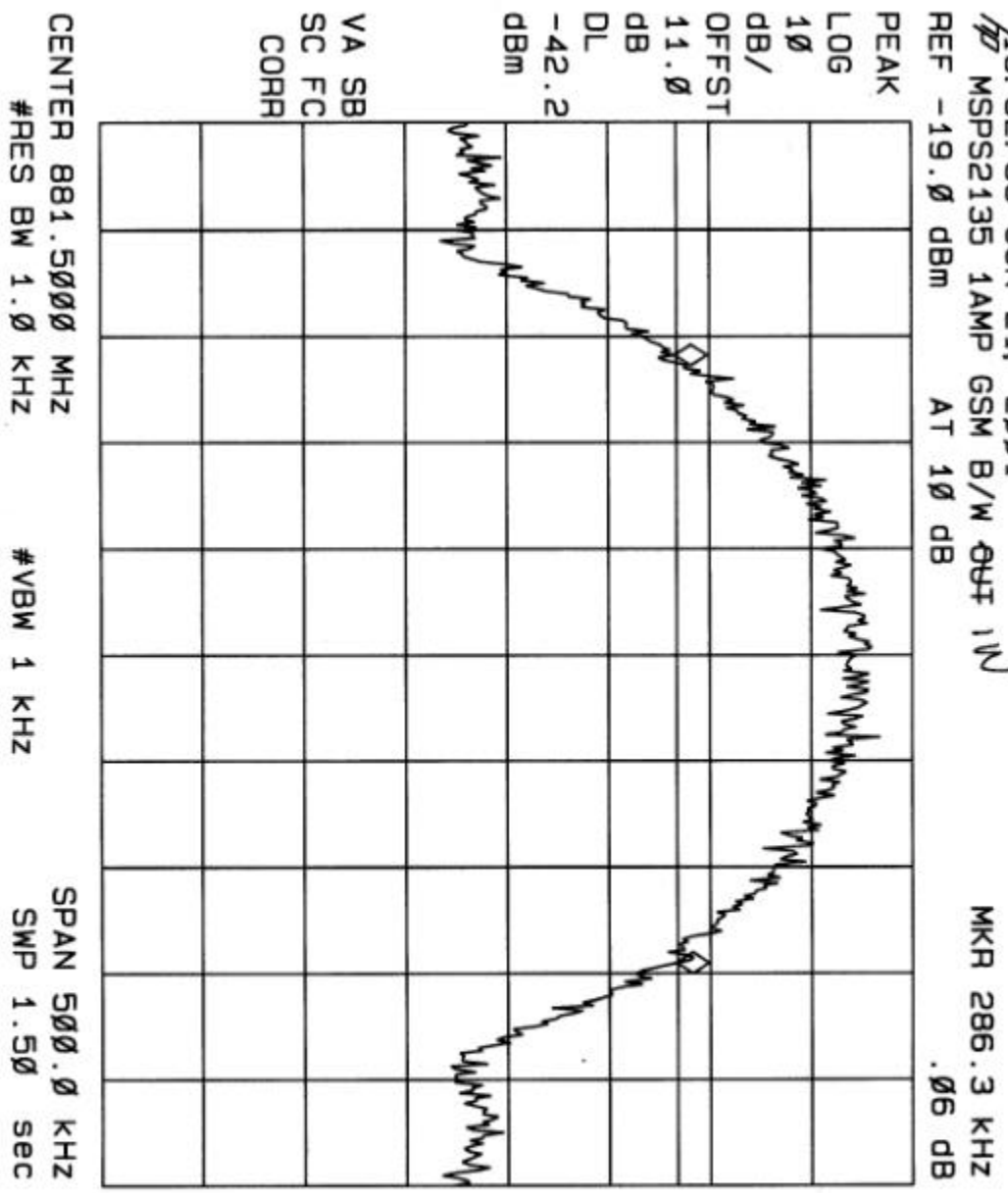


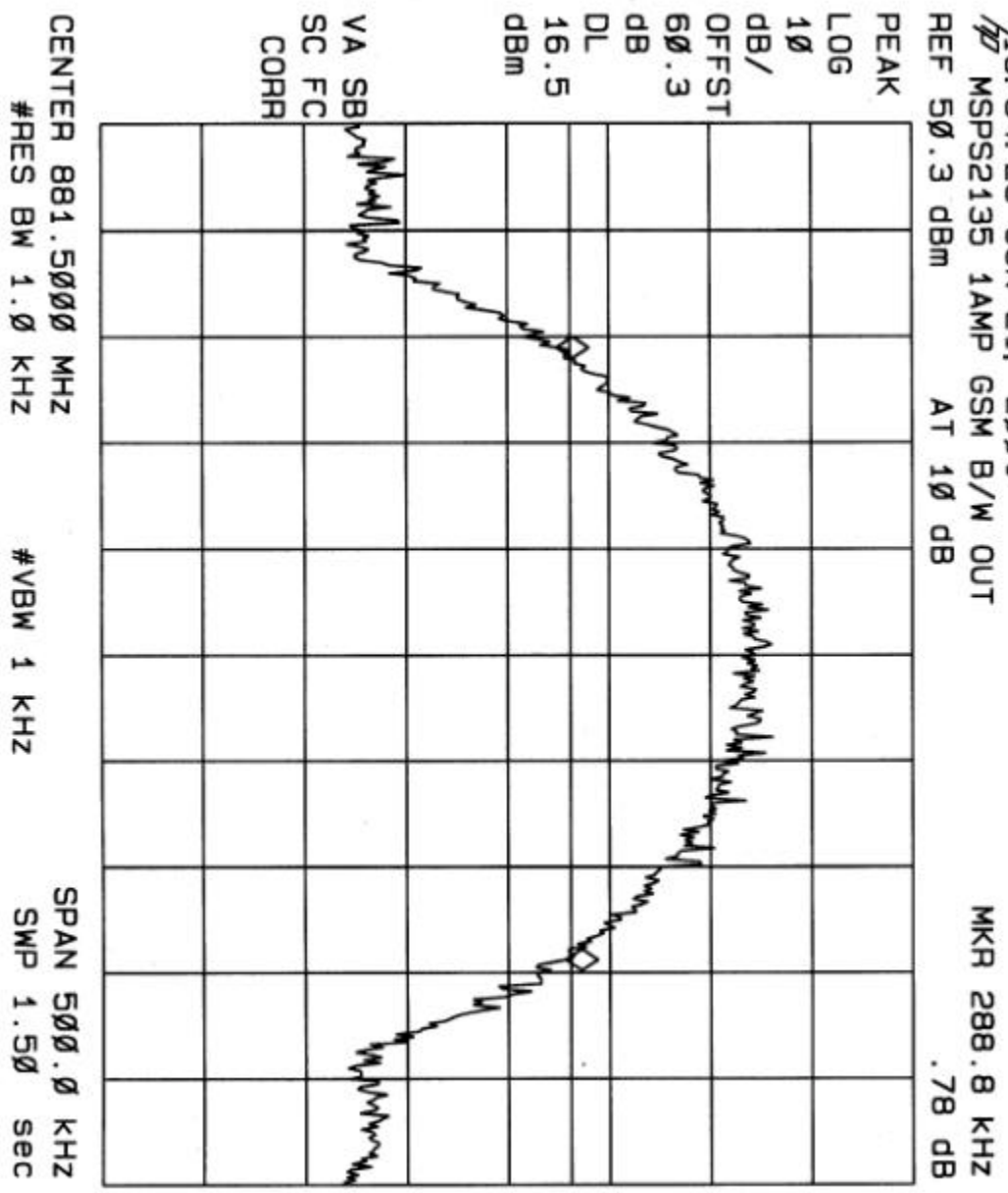


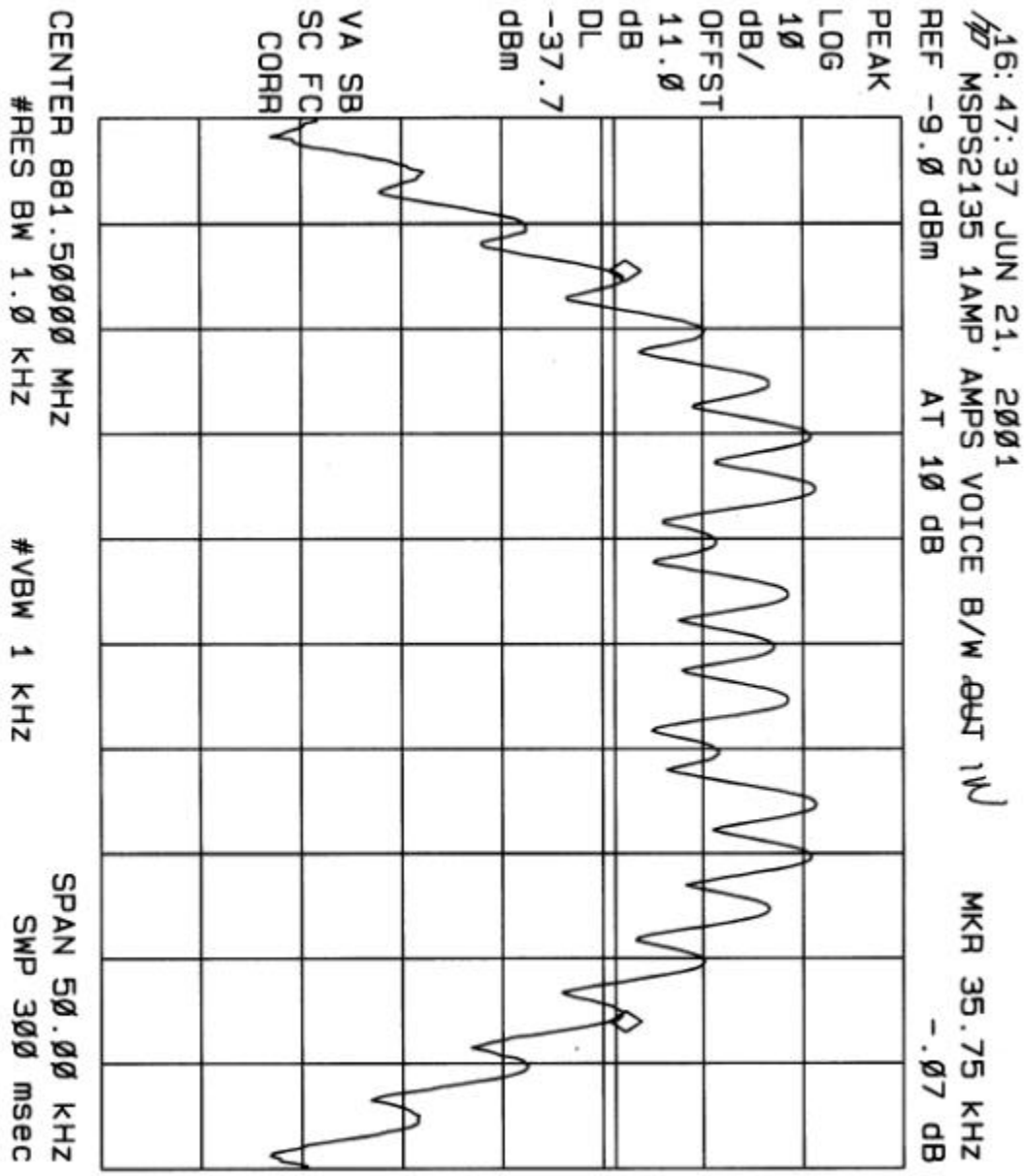


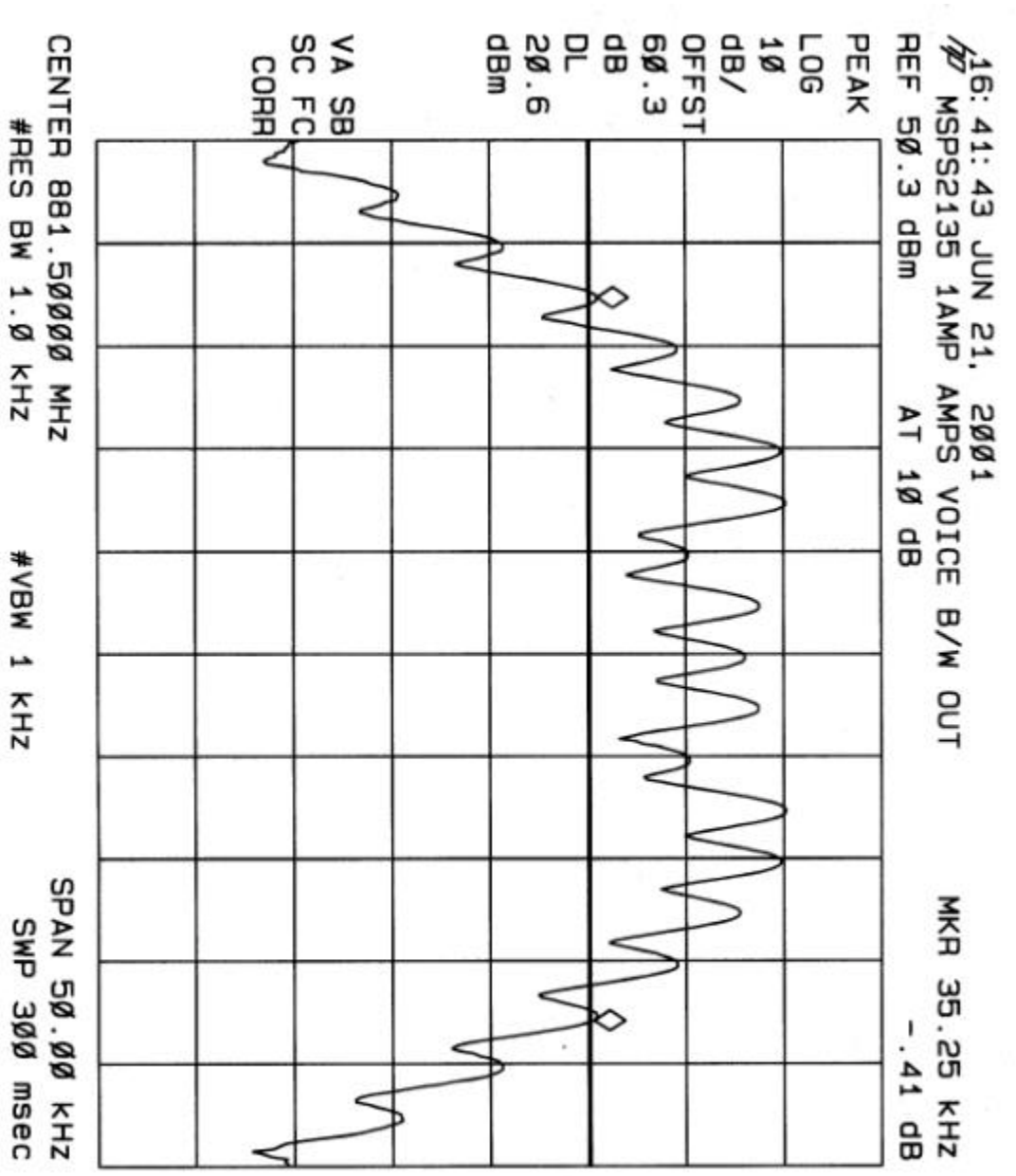


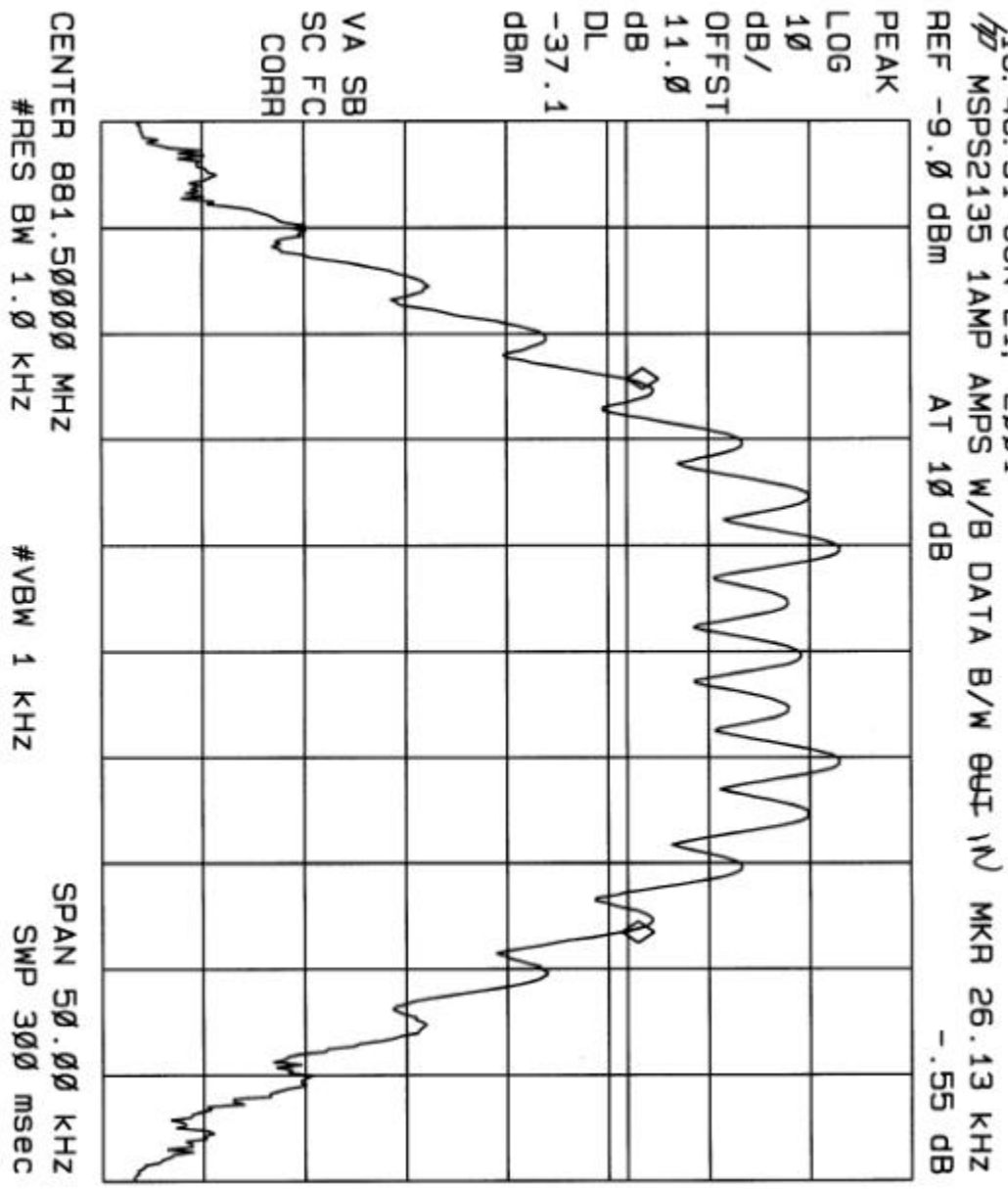


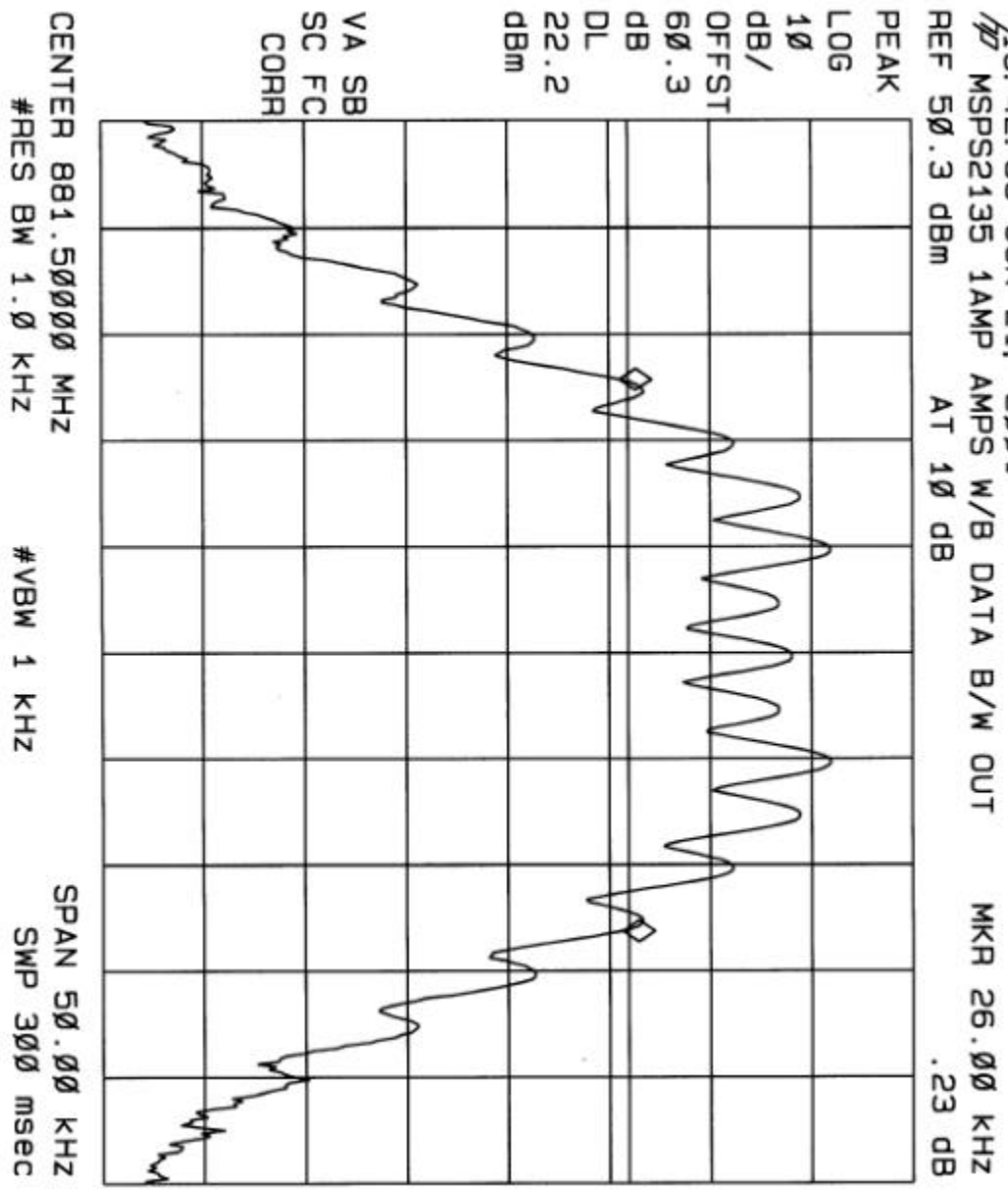






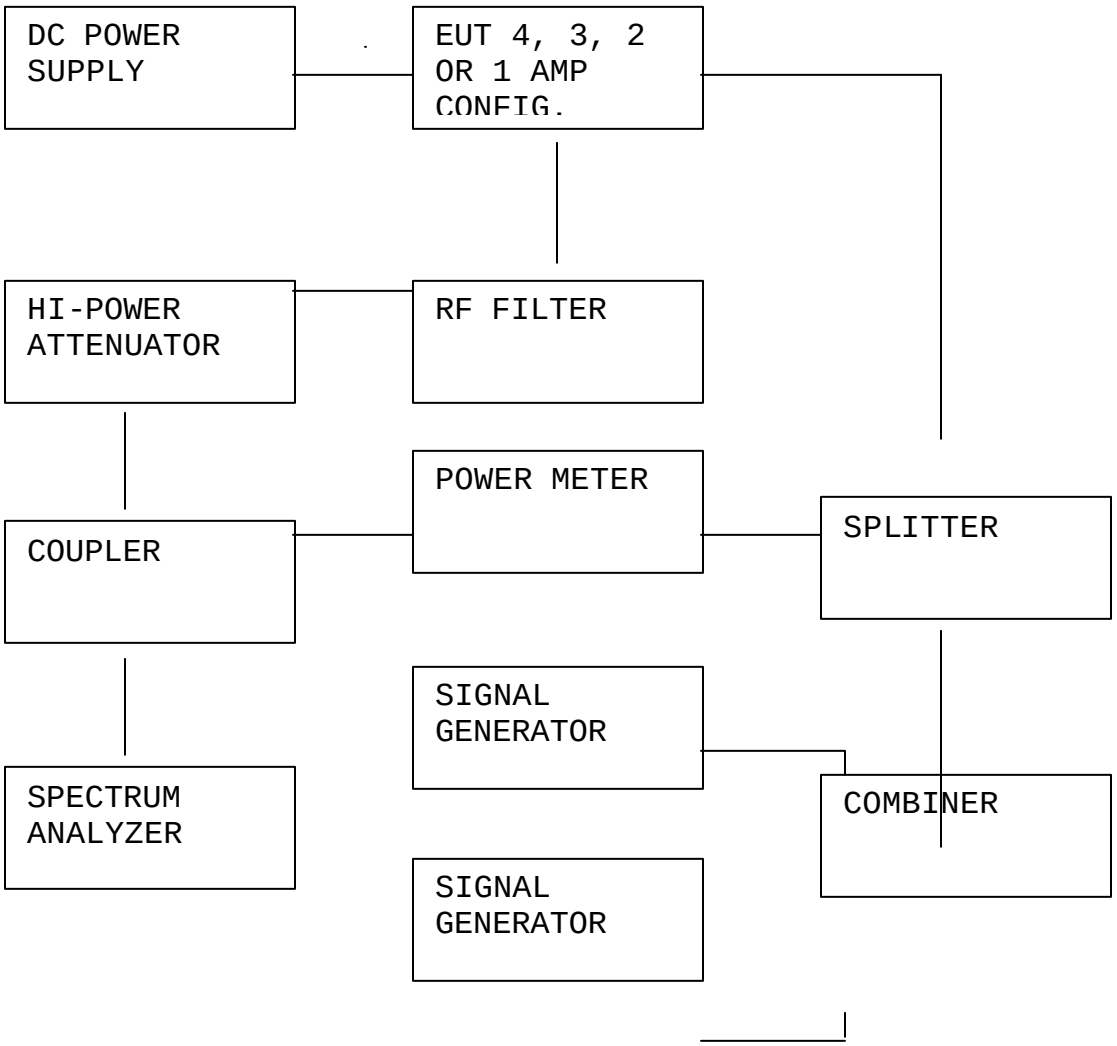






SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINALS

TEST SETUP:



Minimum Requirement:
Section 22.917(e):
The mean power of any spurious, harmonic, and intermodulation product emissions from base stations transmitters must be attenuated below the mean power of the unmodulated carrier by at least 43 + 10 log (P). This calculates to an absolute limit of –13dBm.

Test Procedure:
The EUT was configured as shown above with 4, 3 and 2 amplifiers in the 4 brick shelf, and 1 amplifier in the single brick shelf. The EUT was operated to give its maximum rated output power. Two modulated tones of equal amplitude were input to the EUT to achieve a composite

output power equal to the maximum rated output power for each configuration. For a description of the modulated tones used see section 11. STANDARD INPUT SIGNALS.

The following settings were used on the spectrum analyzer: offset the **Ref Level** for external attenuation, set the **RES Bw** to 30kHz and the **DISPLAY LINE** to –13dBm, video averaging was used if necessary to demonstrate compliance. Band edge plots were made to demonstrate that the out of band intermodulation product emissions are compliant. Out of band plots were made from 30MHz to 9000MHz.

Test Result:
Complies. See the plots below. Plots were taken for the 4 amplifier and 1 amplifier configurations. These were verified to be the worst case for each of the shelf types. All of the out of band plots from 2.679GHz to 9GHz showed nearly identical noise floor readings. To simplify this report only one 2.679GHz to 9GHz Out of Band plot is included for the 1 amplifier configuration. The table below describes the plots and shows their page number.

4 AMPLIFIER CONFIGURATION	
CDMA	**Page #**
Low Side of Band Standard Input Signal Band Edge & Out of Band Plots	
Hi Side of Band Standard Input Signal Band Edge & Out of Band Plots	
TDMA	
Low Side of Band Standard Input Signal Band Edge & Out of Band Plots	
Hi Side of Band Standard Input Signal Band Edge & Out of Band Plots	
CDPD	
Low Side of Band Standard Input Signal Band Edge & Out of Band Plots	
Hi Side of Band Standard Input Signal Band Edge & Out of Band Plots	
EDGE	
Low Side of Band Standard Input Signal Band Edge & Out of Band Plots	
Hi Side of Band Standard Input Signal Band Edge & Out of Band Plots	
GSM	
Low Side of Band Standard Input Signal Band Edge & Out of Band Plots	
Hi Side of Band Standard Input Signal Band Edge & Out of Band Plots	
AMPS VOICE	
Low Side of Band Standard Input Signal Band Edge & Out of Band Plots	
Hi Side of Band Standard Input Signal Band Edge & Out of Band Plots	
AMPS WIDEBAND DATA	
Low Side of Band Standard Input Signal Band Edge & Out of Band Plots	
Hi Side of Band Standard Input Signal Band Edge & Out of Band Plots	
1 AMPLIFIER CONFIGURATION	
CDMA	**Page #**
Low Side of Band Standard Input Signal Band Edge Plot	
Low Side of Band Standard Input Signal Out of Band Plot	
Hi Side of Band Standard Input Signal Band Edge Plot	
Hi Side of Band Standard Input Signal Out of Band Plot	

TDMA	
Low Side of Band Standard Input Signal Band Edge Plot	
Low Side of Band Standard Input Signal Out of Band Plot	
Hi Side of Band Standard Input Signal Band Edge Plot	
Hi Side of Band Standard Input Signal Out of Band Plot	
CDPD	
Low Side of Band Standard Input Signal Band Edge Plot	
Low Side of Band Standard Input Signal Out of Band Plot	
Hi Side of Band Standard Input Signal Band Edge Plot	
Hi Side of Band Standard Input Signal Out of Band Plot	
EDGE	
Low Side of Band Standard Input Signal Band Edge Plot	
Low Side of Band Standard Input Signal Out of Band Plot	
Hi Side of Band Standard Input Signal Band Edge Plot	
Hi Side of Band Standard Input Signal Out of Band Plot	
GSM	
Low Side of Band Standard Input Signal Band Edge Plot	
Low Side of Band Standard Input Signal Out of Band Plot	
Hi Side of Band Standard Input Signal Band Edge Plot	
Hi Side of Band Standard Input Signal Out of Band Plot	
AMPS VOICE	
Low Side of Band Standard Input Signal Band Edge Plot	
Low Side of Band Standard Input Signal Out of Band Plot	
Hi Side of Band Standard Input Signal Band Edge Plot	
Hi Side of Band Standard Input Signal Out of Band Plot	
AMPS WIDEBAND DATA	
Low Side of Band Standard Input Signal Band Edge Plot	
Low Side of Band Standard Input Signal Out of Band Plot	
Hi Side of Band Standard Input Signal Band Edge Plot	
Hi Side of Band Standard Input Signal Out of Band Plot	
ALL MODULATION TYPES	
1 Amplifier Out of Band 2.679GHz to 9GHz Plot