

FCC/MELLON DEC 21 1998



FCC CFR47 PART 22 SUBPART H CERTIFICATION

TEST REPORT

FOR

WIRELESS SUB-SYSTEM FOR CELLULAR OR PCS SYSTEM

MODEL: PICOBTS-800

FCC ID: NPVAVAL-PICO-800

REPORT NUMBER: 98U0033-1

ISSUE DATE: NOVEMBER 23, 1998

Prepared for
AVAL COMMUNICATIONS INC.
Suite 300, 1777 N. California Blvd.
Walnut Creek, CA 94595-4173

Prepared by
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dBa
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FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TÜV, BCIQ, DHHS, NVLAP

1. FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J, sections 2.983 - 2.999.

2.983(a) Applicant: AVAL COMMUNICATIONS INC.
Suite 300, 1777 N. California Blvd.
Walnut Creek, CA 94595-4173

2.983(b) FCC ID: NPVAVAL-PICO-800

2.983(c) Quantity production is planned.

2.983(d) Technical Description

The Picocell BTS includes 1 to 4 radio, one scanning receiver, a power supply module and master oscillator, and a BTS controller which includes T1 interface function. Only digital mode operation is supported, using full-rate traffic channels and a Digital Control Channel. The Wireless Station Base Unit is used in the 800 MHz Domestic Public Cellular Radiotelephone Communications Services. The system was tested using TIA/IS-136/IS-138, and will operate in digital mode at a maximum power output of 100 milliwatts. The system was tested for compliance with FCC Rule Part 15 and Part 22 Subpart H.

Each radio supports one RF carrier, which has 6 TDMA time slot. In the full-rate digital operation, slot 1&4 is designated as digital channel #1, slot 2&5 as digital channel #2, and slot 3&6 as digital channel #2 and #3 assigned as Digital Traffic Channels (DTCs). The DCCH shall support private system registration functions as specified in IS-136A

In call processing, whether it is origination or paging, the Wireless Base Station Unit (WBSU) is a slave unit under the control of the Wireless Office Service Controller (WOSC), which controls one or more Picocell BTSs. The WOSC communicates with each Picocell BTS using a dedicated control time slot (per Picocell BTS) on the T1 interface. This control interface is designated Abis, in that it is similar in nature to the interface between BTS and BSC in the GSM standard. The main duty of the controller function within the Picocell BTS is as a message translator between the air interface messages and the Abis interface messages.

For more information on the unit please refer to manual included.

(1) Types of Emissions

DIGITAL= 40K0DXW {TDMA ($\pi/4$ DQPSK)}

(2) Frequency Range

Transmitter: 869.04 – 893.97 MHz

Receiver: 824.04 – 848.97 MHz

(3) Range of Operating Power

-8dBm to +20dBm (Maximum)

.158mW to 100mW (Maximum)

(4) Maximum Power Rating

Section 22.913(a); base transmitters and cellular repeaters must not exceed 500 Watts.

(5) Applied voltages and currents into the final transistor elements

6 Vdc @ 400 mA

(6) List of each Active Device:

- 10.1 DSP1: ADSP-2183-KST-210
- 10.2 DSP2: ADSP-2185L-KST-210 (presently unpopulated)
- 10.3 DSP3: TMS320LC548PGE-80
- 10.4 Digital to Analog converter: AD6582AR
- 10.5 Digital to Analog converter: TLC5615
- 10.6 Analog to Digital converter: TLC1196-2BCS8
- 10.7 I/Q modulator: AD7011ARS
- 10.8 Flash Memory: AM29LV004T-120
- 10.9 Bus Controller Buffer: SM74AHC244PW
- 10.10 Low Noise Amplifier: AM50-0001
- 10.11 Bus Controller Switch: IDT74FST3384PG
- 10.12 Switching Regulator: LT1507
- 10.13 OCXO: 970-2197-0 (+/- 0.25ppm)
- 10.14 RISC: IDT79R36100-25-MS
- 10.15 CPLD: EPM7128SQC100-15

(7) Complete Circuit Diagrams and Functional Block Diagram

Refer Attachment: Schematics and Parts list. Confidentiality is requested for these items.

(8) Instructions/Installation Manual

Refer to Attachment: Installation and Service manual.

(9) Tune-up/Optimization Procedure

Refer to Attachment: Installation and Service manual.

(10) Means for Frequency Stabilization

A 9.6 MHz Ovenized reference Oscillator (OCXO) is used. The OCXO has frequency drift of +/- 0.25ppm

(11) Means for Limiting Modulation

DSP

(11) Means for Limiting Power

DSP

(11) Means for Attenuating Higher Audio Frequencies

Built-in filters in Radio and Branching Board.

(12) Description of Digital Modulation Techniques

Digital Mode: TDMA ($\pi/4$ DQPSK)

2.983(e) Standard Test Conditions

The transmitter was tested under the following conditions:

Room Temperature: 20 - 23 °C
Relative Humidity: 35 - 50%
DC Supply Voltage: 24 to 48Vdc

The transmitter was aligned and tuned up according to manufacturer's alignment procedure, prior to testing. All data presented represents the worst case parameter being measured.

Section 2.983(f) Equipment Identification

A drawing of the equipment identification nameplate appears under Attachment:
PROPOSED FCC ID LABEL FORMAT.

Section 2.983(g) Photographs

Photographs of the equipment, internal and external views, are found in the
Attachment: Eut Photographs.

Section 2.983 Description of Various Base Station Configurations

Not applicable.

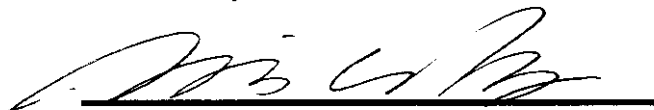
Section 2.983 Use of Various Power Supplies

Ac Adapter Input: 120Vac, 60Hz: Output: 48Vdc
Dc power supply form 24 to 48 Vdc

TYPE OF EQUIPMENT:	WIRELESS SUB-SYSTEM FOR CELLULAR OR PCS SYSTEM
MEASUREMENT DISTANCE:	3 METER
TECHNICAL LIMIT:	FCC 22.917, IS-138A
FCC RULES:	PART 2, PART 15, PART 22, and IS-138A
EQUIPMENT AUTHORIZATION PROCEDURE	CERTIFICATION
MODIFICATIONS MADE ON EUT	☐ YES (REFER TO PAGE 7) ☐ NO

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 15 AND 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.

Reviewed By



**MIKE C.I. KUO / VICE - PRESIDENT
COMPLIANCE CERTIFICATION SERVICES**

2. 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.

3. 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))

4. 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, and 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.

5. 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.

6. 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.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm} [(32 \text{ dBuV/m})/20] = 39.8 \text{ uV/m}$$

7. CLASSIFICATION OF DIGITAL DEVICE

Class A includes digital devices that are marketed for use in commercial, industrial or business environments, excluding devices which are marketed for use by the general public or are intended to be used in the home.

Class B includes digital devices that are marketed for use in residential environments, notwithstanding use in commercial, business and industrial environments.

Note: The responsible party may also qualify a device intended to be marketed in a commercial, business or industrial environment as Class B device, and in fact is encouraged to do so provided the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use.

8. RADIATED EMISSION LIMITS

FCC PART 15 CLASS A

MEASURING DISTANCE OF 10 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	90	39.1
88-216	150	43.5
216-960	210	46.4
Above 960	300	49.5

FCC PART 15 CLASS B

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

FCC RADIATED EMISSION ALTERNATIVE METHOD (CISPR 22/EN55022)

Limits for radiated disturbance of Class A ITE at
measuring distance of 10 m

Frequency range (MHz)	Quasi-peak limits dB(uV/m)
30 to 230	40
230 to 1000	47
NOTES 1. The lower limit shall apply at the transition frequency. 2. Additional provisions may be required for cases where interference occurs.	

Limits for radiated disturbance of Class B ITE at
Measuring distance of 10 m

Frequency range (MHz)	Quasi-peak limits dB(uV/m)
30 to 230	30
230 to 1000	37
NOTES 1. The lower limit shall apply at the transition frequency. 2. Additional provisions may be required for cases where interference occurs.	

9. RADIATED EMISSION TEST PROCEDURE

The EUT and all other support equipment are placed on a wooden table 80-cm above the ground screen. Antenna to EUT distance is 3 meters . During the test, the table is rotated 360 degrees to maximize emissions and the antenna is positioned from 1 to 4 meters above the ground screen to further maximize emissions. The antenna is polarized in both vertical and horizontal positions.

EUT test configuration is according to Section 8 of ANSI C63.4/1992.

Monitor the frequency range of interest at a fixed antenna height and EUT azimuth. Frequency span should be small enough to easily differentiate between broadcast stations and intermittent ambients. Rotate EUT 360 degrees to maximize emissions received from EUT. If emission increases by more than 1 dB, or if another emission appears that is greater by 1 dB, return to azimuth where maximum occurred and perform additional cable manipulation to further maximize received emission.

Move antenna up and down to further maximize suspected highest amplitude signal. If emission increased by 1 dB or more, or if another emission appears that is greater by 1dB or more, return to antenna height where maximum signal was observed and manipulate cables to produce highest emissions, noting frequency and amplitude.

10. CONDUCTED EMISSION LIMITS

FCC CLASS A

FREQUENCY RANGE	FIELD STRENGTH (Microvolts)	FIELD STRENGTH (dBuV)/QP
450kHz-1.705MHz	1000	60
1.705MHz - 30MHz	3000	69.54

FCC CLASS B

FREQUENCY RANGE	FIELD STRENGTH (Microvolts)	FIELD STRENGTH (dBuV)/QP
450kHz-30MHz	250	48

FCC CONDUCTED EMISSION ALTERNATIVE METHOD (CISPR 22/EN55022)

Limits for conducted disturbance at the mains ports of
Class A ITE

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.5 to 30	73	60
Note- The lower limit shall apply at the transition frequency.		

Limits of Conducted disturbance at the mains ports
of Class B ITE

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

11. CONDUCTED EMISSION TEST PROCEDURE

The EUT is located so that the distance between the boundary of the EUT and the closest surface to the LISN is 0.8m.

EUT test configuration is according to Section 7 of ANSI C63.4/1992.

Conducted disturbance shall be measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.450 - 30 MHz (or 0.150 - 30 MHz in case of CISPR 22/EN55022 method) shall be investigated.

Set the EMI receiver to PEAK detector setting and sweep continuously over the frequency range to be investigated. Set resolution bandwidth to 9kHz minimum. Connect EMI receiver input cable to LINE 1 RF measurement connection on the LISN. Connect a 50ohm terminator to the unused RF connection on the LISN. For each mode of EUT operation, maximize emissions readings by manipulating cable and wire positions. Record the configuration for each EUT power cord, which produces emissions closest to the limit. Repeat the same procedure for LINE 2 of each EUT power cord.

12. AMBIENT CONDITIONS

The ambient conditions at the time of final tests were as follows:

	Radiated Emission	Conducted Emission
Temperature	17°C	21°C
Humidity	81%	62%

13. EQUIPMENT MODIFICATIONS

Not Applicable

14. A) TEST EQUIPMENT LIST

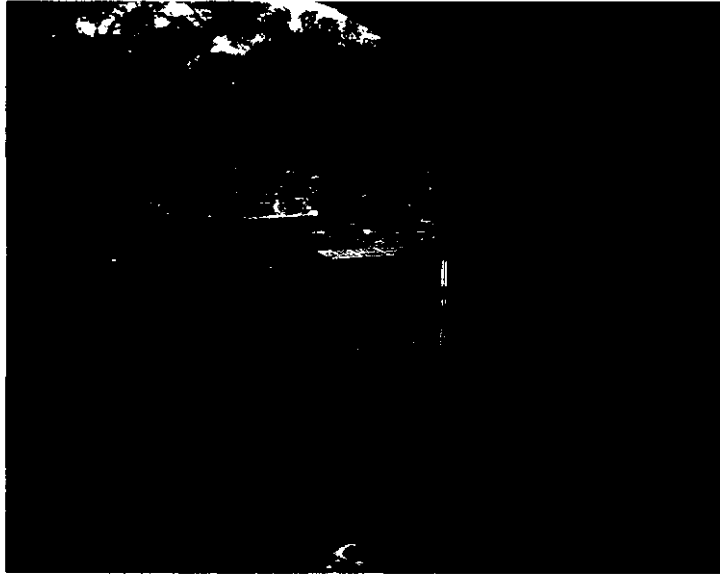
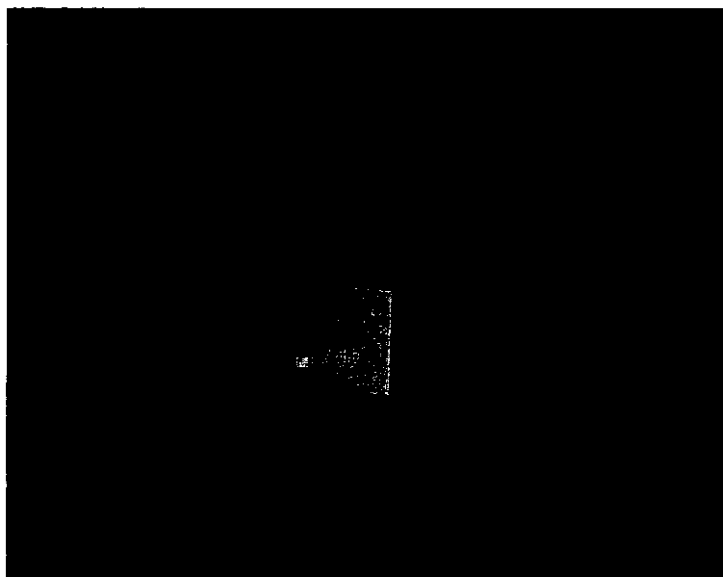
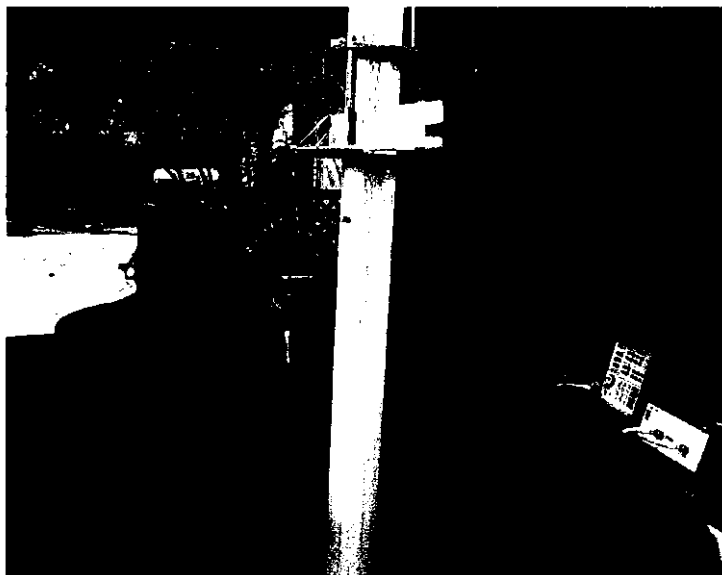
Equipment	Manufacturer	Model No.	Serial No.	Site	Cal Date	Due Date
Spectrum Analyzer	H.P.	8593EM	3710A00205	A	05/98	05/99
Antenna	Eaton	94455-1	1197	B	10/98	10/99
Antenna	Emco	3146	2120	B	10/98	10/99
Horn Antenna	EMCO	3115	9001-3245	A	12/97	12/00
Pre-Amp	H.P.(P2)	8447D	2944A06550	A	09/98	09/99
Pre-Amp	H.P. (1-26.5GHz)	8449B	3008A00369	A	04/98	04/99

B) SUPPORT EQUIPMENT

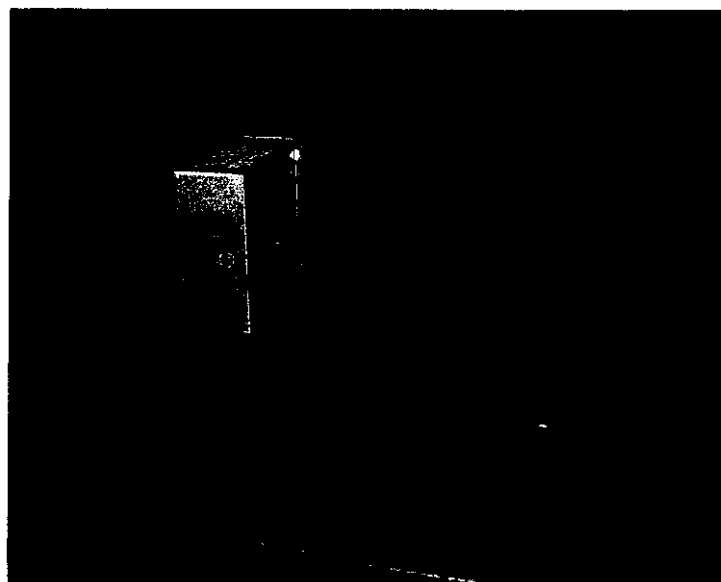
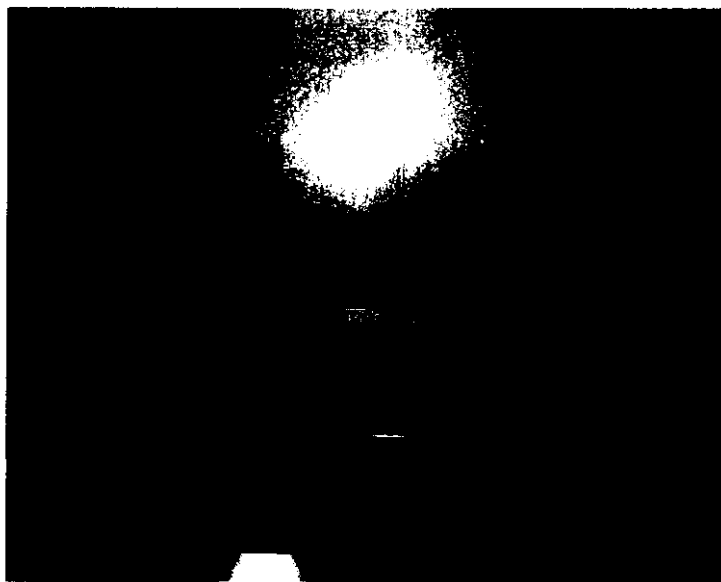
Device Type	Manufacturer	Model Number	Serial No.	FCC ID / DoC
LAPTOP	NEC	PC-6100-41402	5Y001048	A3DP8
HIGH POWER ATTENUATOR	NARDA	766-10	4800	N/A
AC POWER SUPPLY	AULT	PW102	N/A	N/A

15. EUT SETUP PHOTOS

RADIATED EMISSION TEST SETUP



CONDUCTED EMISSION TEST SETUP



MAIN ANTENNA PORT



DVSTY ANTENNA PORT



16. TEST RESULT SUMMARY FOR PART 15.

FCC PART 15 Radiated Emission Test was conducted by operating the configuration as indicated below.

WIRELESS BASE STATION UNIT							
OATS No: B-SITE		Data Report No. 981123B1		Date 11/23/98		Tested By: JUAN MARTINEZ	
Six Highest Radiated Emission Readings							
Frequency Range Investigated				30 MHz TO 1000 MHz			
Freq. (MHz)	Meter Reading (dBuV)	C.F. (dB/m)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type (P/Q/A)	Polar (H/V)
518.4	36.6	-4.84	31.76	37.0	-5.24	P	H
40.96	42.2	-14.94	27.26	30.0	-2.74	P	V
74.65	43.7	-19.29	24.41	30.0	-5.59	P	V
212.99	37.4	-12.24	25.16	30.0	-4.48	P	V
222.34	40.33	-12.64	27.69	30.0	-2.31	P	H
222.34	39.4	-12.0	27.40	30.0	-2.60	Q	V

C.F.(Correction Factor)=Antenna Factor + Cable Loss-Amplifier Gain

Corrected Reading = Metering Reading + C.F. Margin = Corrected Reading - Limits

P= Peak Reading

H= Horizontal Polarization/Antenna

Q= Quasi-peak

V= Vertical Polarization/Antenna

A= Average Reading

Comments: N/A

17. FCC PART 15 FINAL CONDUCTED EMISSION TEST was conducted by operating the configuration as indicated below.

Conducted Room	Plot No. N/A		Date 5/14/98		Tested By: Juan Martinez		
Six Highest Conducted Emission Readings							
Frequency Range Investigated				450 kHz TO 30 MHz			
Freq. (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type (P/Q/A)	Line (L1/L2)
.176	48.7	0	48.7	54.7	-6.0	P	L1
.221	42.9	0	42.9	52.8	-9.9	P	L1
3.95	41.7	0	41.7	46.0	-4.3	P	L1
3.77	39.8	0	39.8	46.0	-6.2	P	L1
.175	43.6	0	43.6	54.7	-11.1	P	L2
.151	40.4	0	40.4	55.9	-15.5	P	L2

C.F.(Correction Factor)=Insertion Loss + Cable Loss

Corrected Reading = Metering Reading + C.F.

Margin = Corrected Reading - Limits

P= Peak Reading

L1=Hot

Q= Quasi-peak

L2=Neutral

A= Average Reading

Comments: N/A

Compliance Engineering Services Inc.

Project No. : 98U0033-1
Report No. : 981123B1
Date : 11/23/1998
Time : 10:10
Test Engr : JUAN MARTINEZ

>> 10 M RADIATED EMISSION DATA <<

gm

Company : AVAL COMMUNICATIONS INC
Equipment Under Test : WIRELESS BASE STATION UNIT
Test Configuration : EUT
Type of Test : EN55022 CLASS B
Mode of Operation : RX/T1

Freq.	dBuV	PreAmp	Ant	Cable	dBuV/m	Limit	Margin	Pol	Hgt (m)	Az
518.40	36.60	-27.90	17.67	5.39	31.76	37.00	-5.24	H	1.6	225
40.96	42.20	-27.72	11.17	1.61	27.26	30.00	-2.74	V	1.0	180
74.65	43.70	-27.62	6.36	1.96	24.41	30.00	-5.59	V	1.6	135
212.99	37.40	-27.07	11.47	3.36	25.16	30.00	-4.84	V	1.0	90
222.34	40.33	-27.01	10.95	3.42	27.69	30.00	-2.31	H	3.6	0

MEASUREMENT BELOW IS QUASI-PEAK:

222.34	39.40	-27.01	11.59	3.42	27.40	30.00	-2.60	V	1.0	0
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Total # of data 6
V. b2.2

Jm

OMPLIANCE ENGINEERING SERVICES INC. RFI VOLTAGE

23. Nov 98 17:38

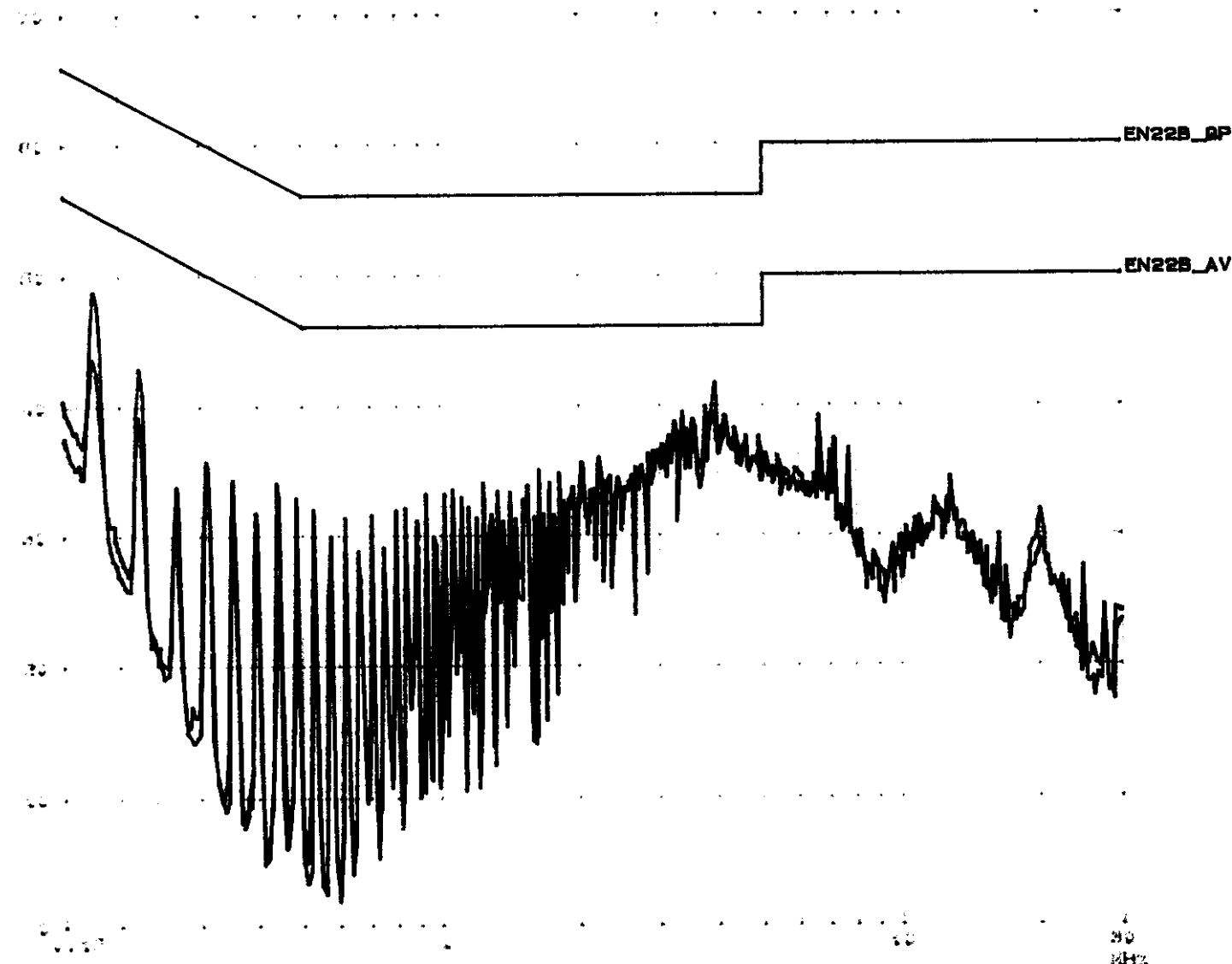
EUT: WIRELESS BASE STATION UNIT (PICOBTS-800)
Manuf: AVAL COMMUNICATIONS
Op Cond: T1/NORMAL
Operator: JUAN MARTINEZ
Test Spec: EN55022 CLASS B
Comment: LINE: HOT (RED), NEUTRAL (BLUE)
120Vac, 60Hz

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Presamp	OpRge
150k	500k	1k	10k	PK	100ms	AUTO	LN OFF	60dB
500k	30M	10k	10k	PK	20ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	10k	30M	FISCHER

dBm

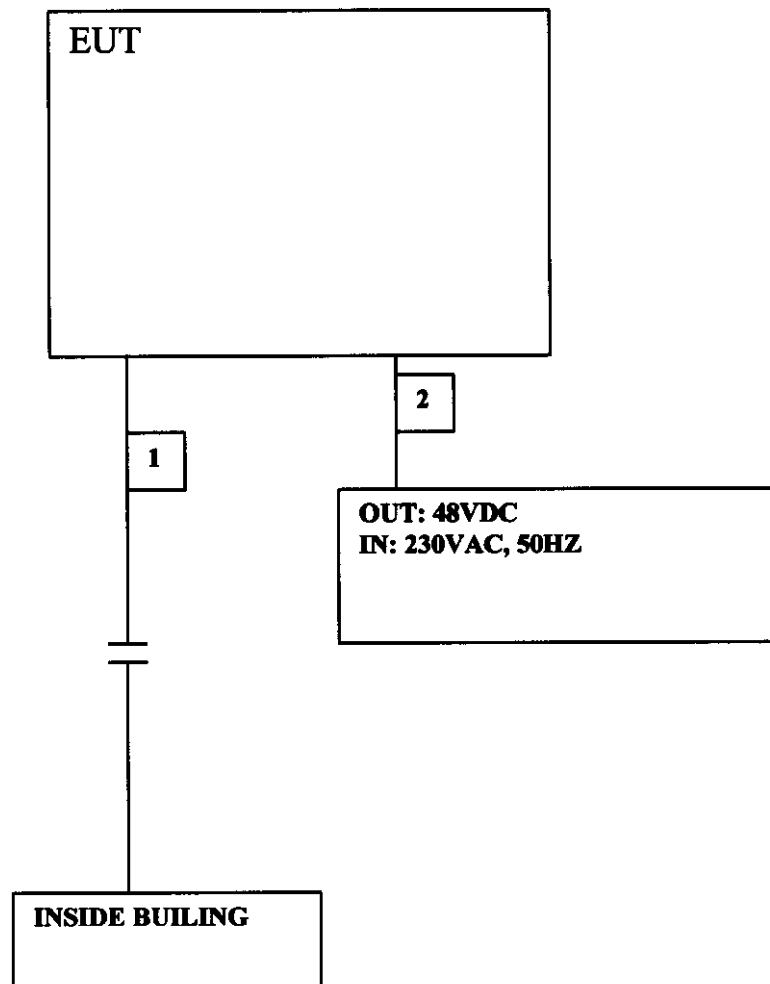


18. EXTERNAL I/O CABLE CONSTRUCTION DESCRIPTION

CABLE NO:1	
I/O Port: : TI	Number of I/O ports of this type: 1
Number of Conductors: 8	Connector Type: TI
Capture Type: SNAP-IN	Type of Cable used: SHIELDED
Cable Connector Type: METAL	Cable Length:30M (B-SITE UNDERGROUND)
Bundled During Tests: NO	Data Traffic Generated: YES
Remark: B-SITE UNDERGROUND SHIELDED CABLE	

CABLE NO:2	
I/O Port:: DC-INPUT	Number of I/O ports of this type: 1 (AC ADAPTOR)
Number of Conductors: 2	Connector Type: USA POWER PLUG
Capture Type: PUSH-IN	Type of Cable used: UNSHIELDED
Cable Connector Type: PLASTIC	Cable Length:1.6M
Bundled During Tests: NO-RADIATED YES- LINE CONDUCTED	Data Traffic Generated: NO
Remark: N/A	

19. CONFIGURATION BLOCK DIAGRAM



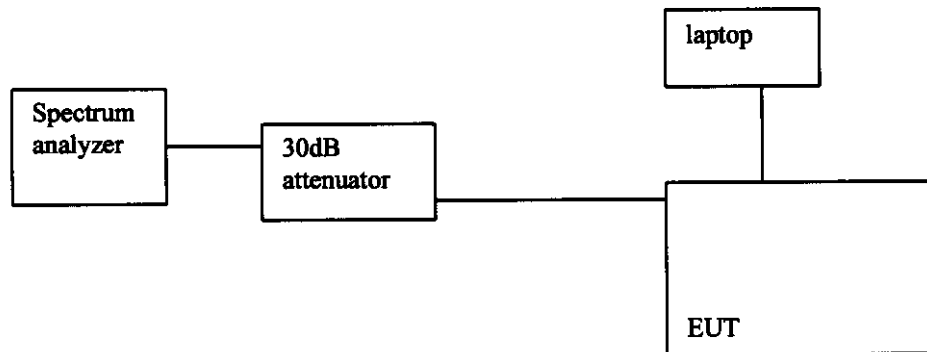
20. FCC PART 2 CERTIFICATION TEST RESULTS:**SECTION 2.1046 (was section 2.985): RF POWER OUTPUT****Equipment used.**

HP Spectrum Analyzer/8593EM

Narda 30dB Attenuator

Flexco low loss cables, 9ft. (Loss: 0.85 dB/ft @ 26GHz)

NEC laptop computer.

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:

Turn on the EUT and connected the transmitter antenna output to spectrum analyzer using a low loss cable. RES b/w. was set to 30kHz or 100kHz and adjusted spectrum analyzer to center frequency at the highest amplitude appearing on spectral display. Then set spectrum analyzer frequency span to show signal on spectrum analyzer. This test was done for low, middle, and high channel at both the **MAIN** antenna port and **DVSTY** antenna port

Test Result:

Power was measured with Spectrum analyzer. Plots of power output are included

MAIN ANTENNA PORT

RF POWER OUPUT PLOTS	
	PLOT NUMBER
LOW: 20dBm (0.1 W)	1
MIDDLE: 20dBm	2
HIGH: 20dBm	3

DVSTY ANTENNA PORT

RF POWER OUPUT PLOTS	
	PLOT NUMBER
LOW: 20dBm (0.1 W)	4
MIDDLE: 20dBm	5
HIGH: 20dBm	6

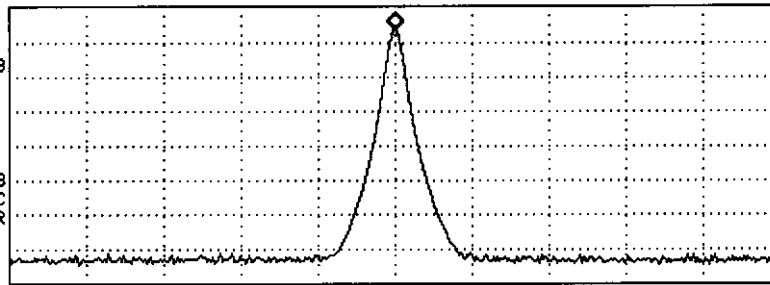
14:29:38 NOV 24, 1998
POWER OUTPUT; (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA -11.99 MHz
19.74 dB

REF OFFST 35.0 dB
LOG REF 33.0 dBm

10
dB/
ATN
10 dB

VA SB
SC FC
CORR



CENTER 870.00 MHz SPAN 10.00 MHz
#IF BW 100 kHz #AVG BW 100 kHz SWP 20.0 msec

10:59:26 NOV 24, 1998

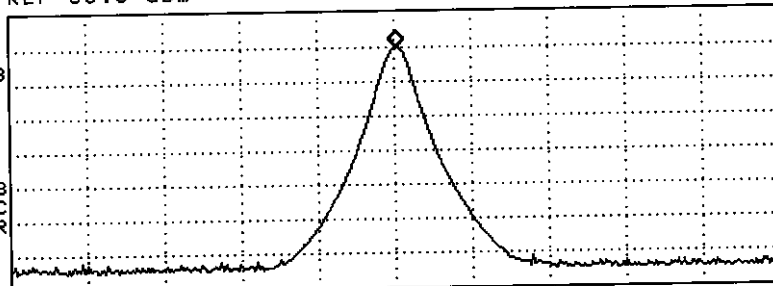
POWER OUTPUT: AVAL(CELLULAR BASE STATION)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 881.550 MHz
20.11 dBm

LOG REF OFFST .5 dB
10 REF 30.5 dBm
dB/
ATN
40 dB

VA SB
SC FC
CORR

CENTER 881.538 MHz SPAN 5.000 MHz
#IF BW 100 kHz #AVG BW 100 kHz SWP 20.0 msec

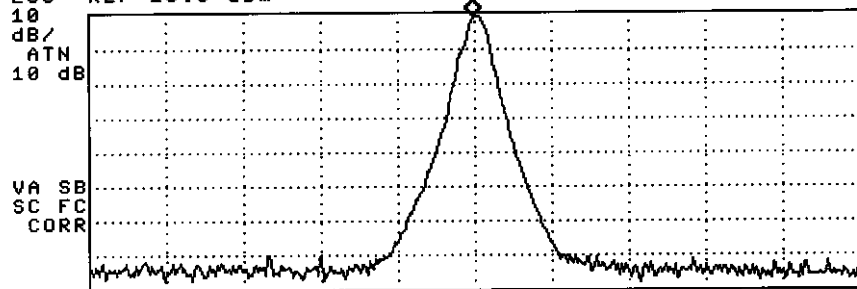


#3

14:05:03 NOV 24, 1998
POWER OUTPUT; (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 893.960 MHz
21.94 dBm

LOG REF OFFST 35.0 dB
10 dB/ REF 23.0 dBm
ATN 10 dB



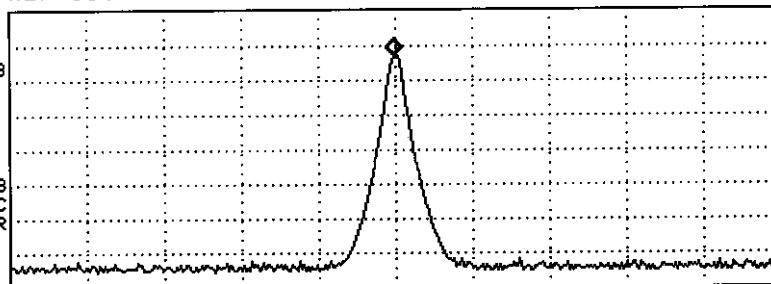
CENTER 893.965 MHz SPAN 2.000 MHz
#IF BW 30 kHz #AVG BW 30 kHz SWP 20.0 msec

14:35:33 NOV 24, 1998
POWER OUTPUT: (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 869.98 MHz
19.70 dBm

LOG REF OFFST 35.0 dB
10 REF 33.0 dBm
dB/
ATN
10 dB

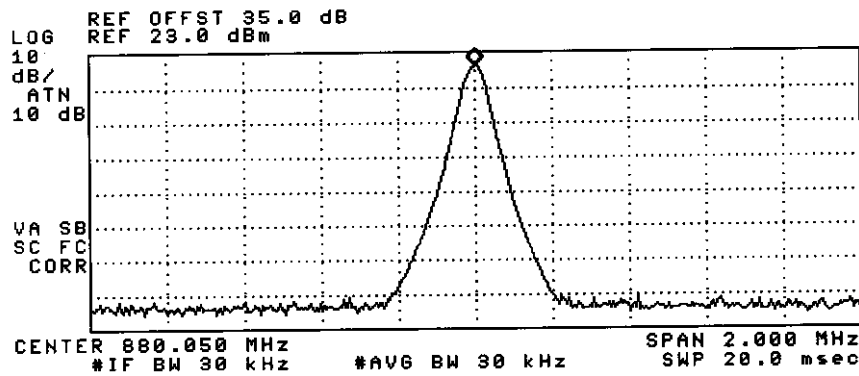
VA SB
SC FC
CORR



CENTER 870.00 MHz SPAN 10.00 MHz
#IF BW 100 kHz #AVG BW 100 kHz SWP 20.0 msec

14:55:54 NOV 24, 1998
POWER OUTPUT: (PICOBTS-800), PSEUDO-RANDOM

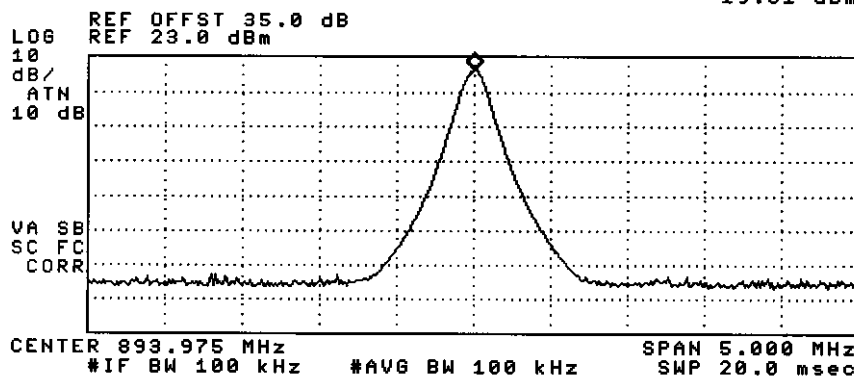
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 880.050 MHz
19.20 dBm



15:20:47 NOV 24, 1998
POWER OUTPUT; (PICOBTS-800), PSEUDO-RANDOM

#6

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 893.975 MHz
19.01 dBm



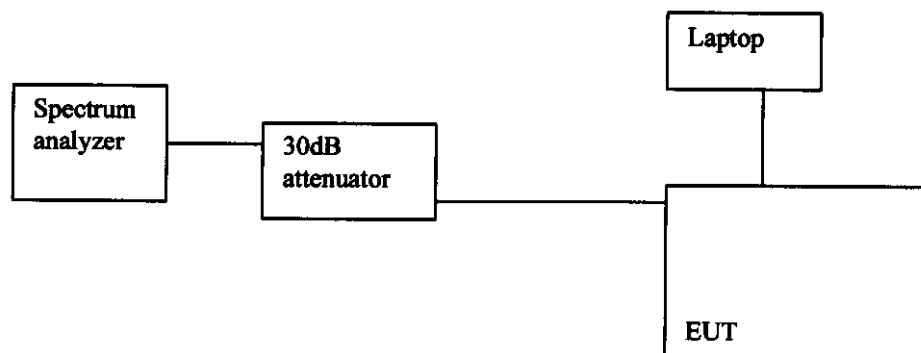
SECTION 2.1047(was Section2.987): MODULATION CHARACTERISTICS**Equipment used.**

HP Spectrum Analyzer/8593EM

Narda 30dB Attenuator

Flexco low loss cables, 9ft. (Loss: 0.85 dB/ft @ 26GHz)

NEC Laptop Computer.

TEST SETUP:**Minimum requirement:**

Section 2.987 (d), for other type of equipment, a curve or equivalent data which shows that equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

Test procedure:

For this device, only digital TDMA ($\pi/4$ DQPSK) is used by Eut. The RF carrier was modulated with a test software, TDMA ($\pi/4$ DQPSK) as specified in IS-138A. Since digital is used and no analog, frequency response of Eut was not performed. Test was performed both at MAIN and DVSTY antenna port.

Test result:

Included are plots of the digital TDMA modulation for low, middle, and high channel showing the 20dB bandwidth.

MAIN ANTENNA PORT

	PLOT NUMBER
LOW: 20dB BANDWIDTH	7
MIDDLE: 20dB BANDWIDTH	8
HIGH: 20dB BANDWIDTH	9

DVSTY ANTENNA PORT

	PLOT NUMBER
LOW: 20dB BANDWIDTH	10
MIDDLE: 20dB BANDWIDTH	11
HIGH: 20dB BANDWIDTH	12

14:00:07 NOV 24, 1998

OCC. BANDWIDTH: (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

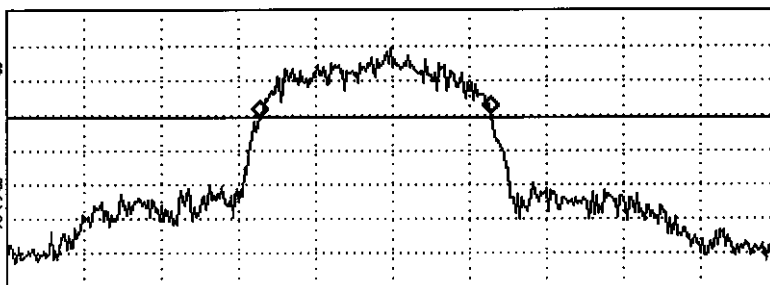
MKRΔ 30.0 kHz

.97 dB

LOG REF OFFST 35.0 dB
10 dB/ REF 25.0 dBm

ATN
10 dB

DL
-5.9
dBm
VA SB
SC FC
CORR



CENTER 869.0423 MHz

#IF BW 300 Hz

#AVG BW 300 Hz

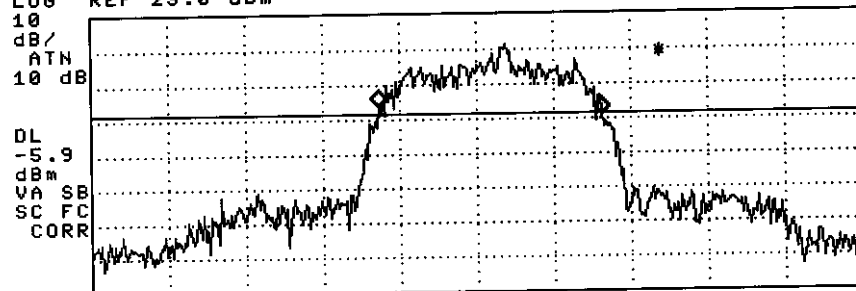
SPAN 100.0 kHz

SWP 3.33 sec

14:27:02 NOV 24, 1998
OCC. BANDWIDTH: (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 29.0 kHz
-2.79 dB

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm
dB/
ATN
10 dB



CENTER 881.9983 MHz SPAN 100.0 kHz
#IF BW 300 Hz #AVG BW 300 Hz SWP 3.33 sec

14:16:59 NOV 24, 1998
OCC. BANDWIDTH: (PICOBITS-800), PSEUDO-RANDOM

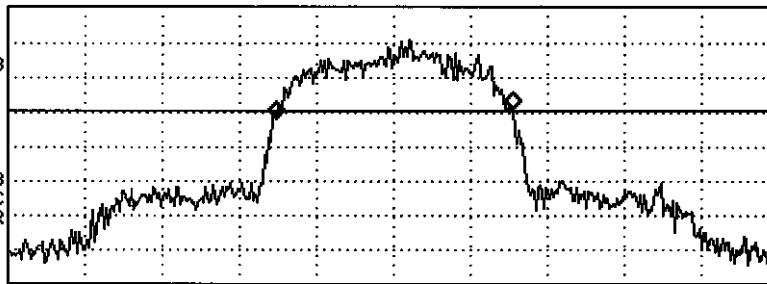
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.8 kHz
2.95 dB

#9

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm

dB/
ATN
10 dB

DL
-6.6
dBm
VA SB
SC FC
CORR



CENTER 893.9700 MHz
#IF BW 300 Hz

#AVG BW 300 Hz

SPAN 100.0 kHz
SWP 3.33 sec

14:51:58 NOV 24, 1998

~~17~~ OCC. BANDWIDTH; (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK

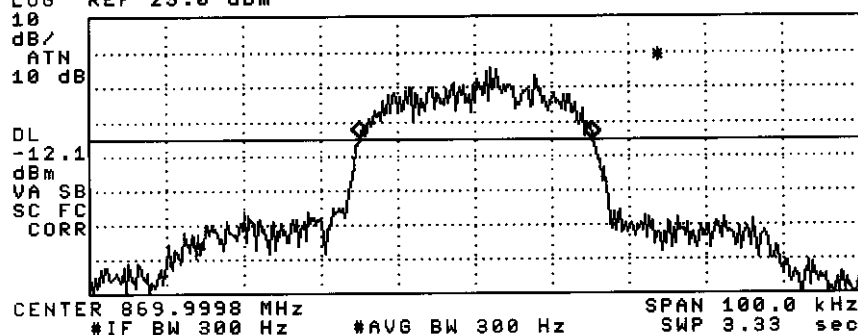
MEAS DET: PEAK QP AVG

MKRΔ 30.3 kHz

-.60 dB

#10

LOG REF OFFST 35.0 dB
REF 23.0 dBm



15:13:09 NOV 24, 1998

411
OCC. BANDWIDTH; (PICOBT5-800), PSEUDO-RANDOM

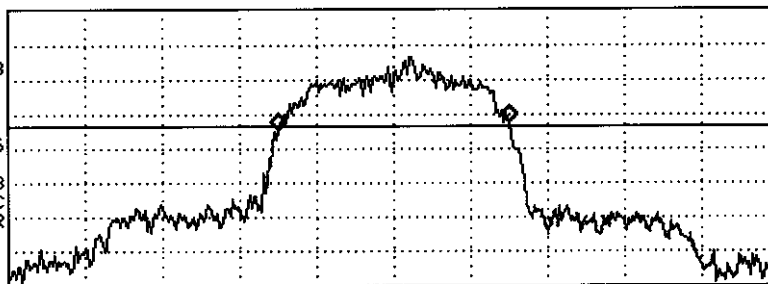
ACTV DET: PEAK

MEAS DET: PEAK QP AVG
MKRA 90.0 kHz
2.25 dB

LOG REF OFFST 35.0 dB
REF 23.0 dBm

10
dB/
ATN
10 dB

DL
-10.6
dBm
VA SB
SC FC
CORR



CENTER 880.0500 MHz
#IF BW 300 Hz

#AVG BW 300 Hz

SPAN 100.0 kHz
SWP 3.33 sec

15:34:11 NOV 24, 1998

✓ OCC. BANDWIDTH; (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKRA 30.3 kHz

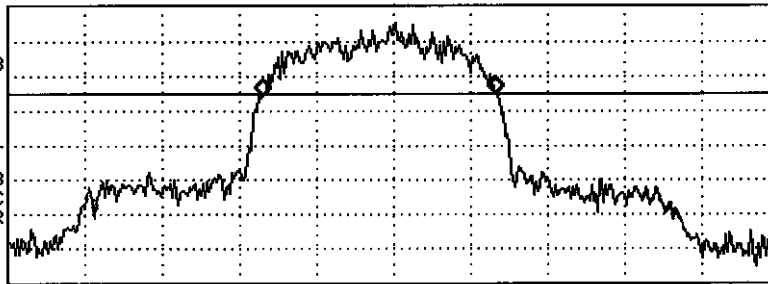
.18 dB

#12

LOG REF OFFST 35.0 dB
10 REF 13.0 dBm

dB/
ATN
10 dB

DL
-12.1
dBm
VA SB
SC FC
CORR



CENTER 893.9720 MHz

#IF BW 300 Hz

#AVG BW 300 Hz

SPAN 100.0 kHz

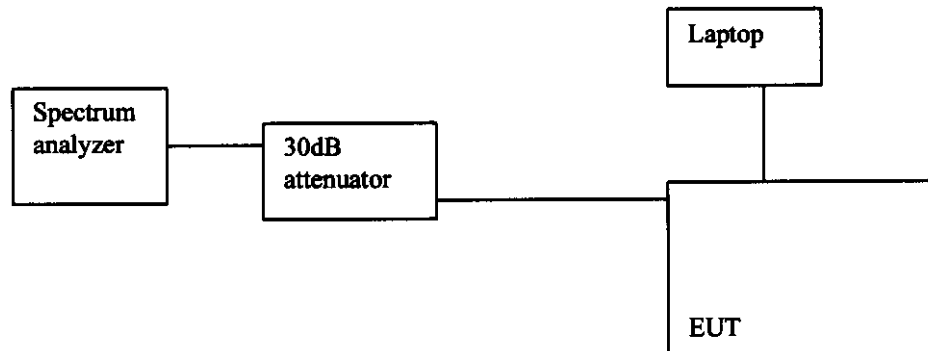
SWP 3.33 sec

SECTION 2.1049 (Was Section 2.989): OCCUPIED BANDWIDTH

Equipment used.

HP Spectrum Analyzer/8593EM
Narda 30dB Attenuator
Flexco low loss cables, 9ft. (Loss: 0.85 dB/ft @ 26GHz)
NEC Laptop Computer.

TEST SETUP:



Minimum Requirement:

Section 2.989 (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.

22.905; all channels have a bandwidth of 40kHz.

Test Procedure:

The device was modulated as manufacture specification. The RF carrier was modulated with a test software, TDMA ($\pi/4$ DQPSK) as specified in IS-138A. Since Eut is digital only, no other external signals were used. Test was performed both at **MAIN** and **DVSTY** antenna port.

Test Result:

Included are plots of TDMA's Occupied Bandwidth for low, middle, and high channel. Table shows the order of Occupied Bandwidth #13-18. Also, refer to plots # 7-12.

MAIN ANTENNA PORT

		PLOT NUMBER
LOW:	OCCUPIED BANDWIDTH	13
MIDDLE:	OCCUPIED BANDWIDTH	14
HIGH:	OCCUPIED BANDWIDTH	15

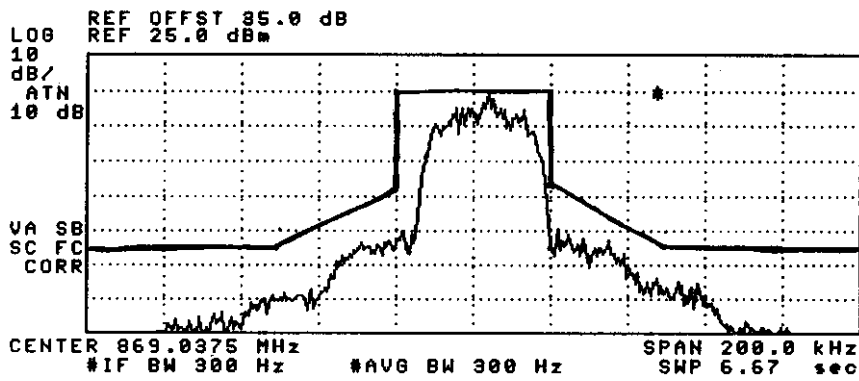
DVSTY ANTENNA PORT

		PLOT NUMBER
LOW:	OCCUPIED BANDWIDTH	16
MIDDLE:	OCCUPIED BANDWIDTH	17
HIGH:	OCCUPIED BANDWIDTH	18

13:57:34 NOV 24, 1998
22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

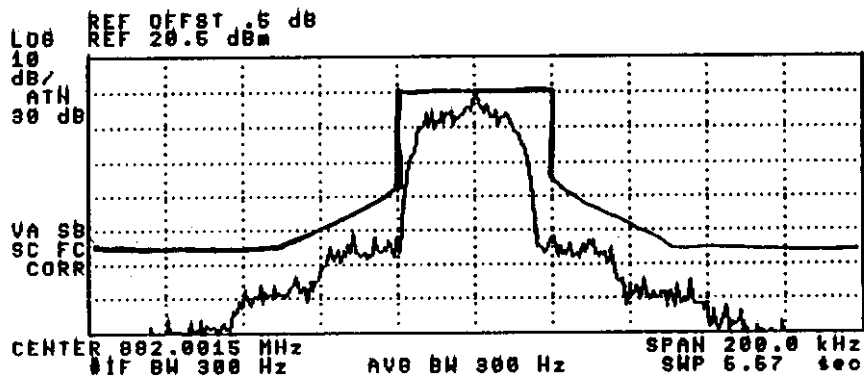
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

#13



11:27:06 NOV 24, 1998
 1S-198A(3.4.1.2) AVAL(PICOBITS-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG

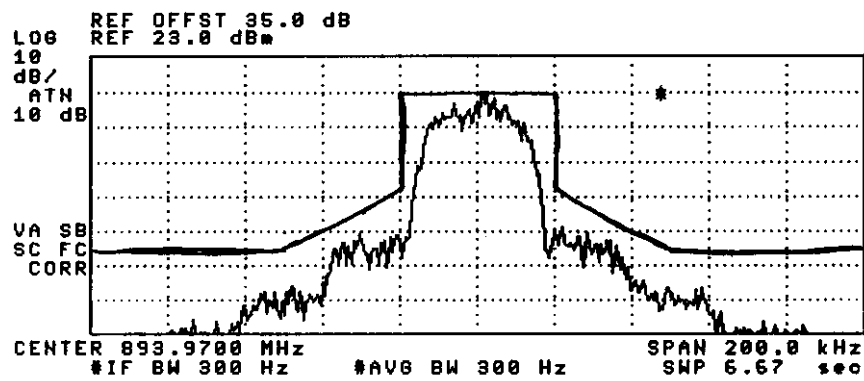
#14



14:15:29 NOV 24, 1998
22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

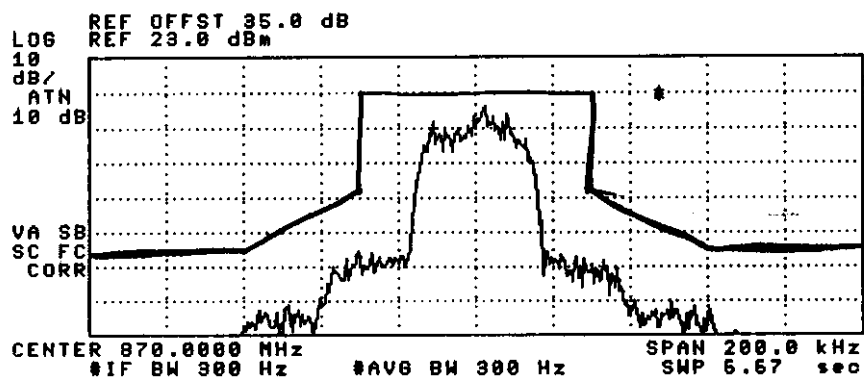
#15

ACTV DET: PEAK
MEAS DET: PEAK QP AVG



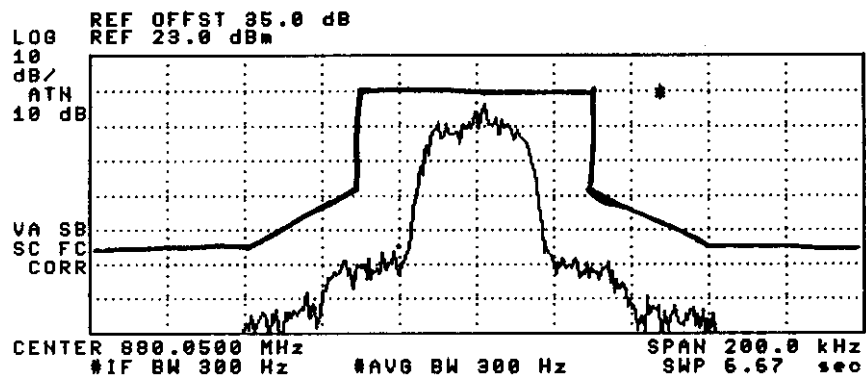
14:40:05 NOV 24, 1998
IS-138A(3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

#16



15:01:52 NOV 24, 1998
IS-130A (3.4.1.2) (PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

#17



15:25:07 NOV 24, 1998

IS-138A (3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

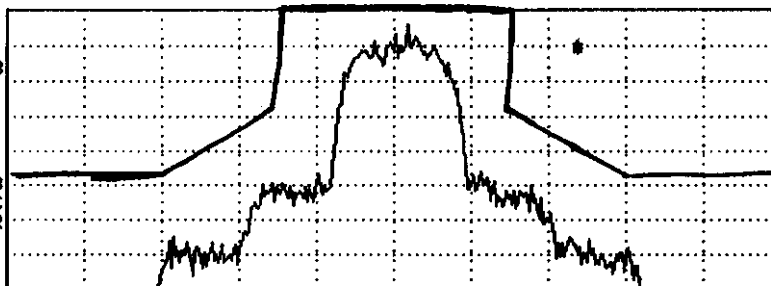
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

#18

REF OFFST 35.0 dB
REF 13.0 dBm

LOG
10
dB/
ATN
10 dB

VA SB
SC FC
CORR



CENTER 893.9688 MHz
#1F BW 300 Hz

#AVG BW 300 Hz

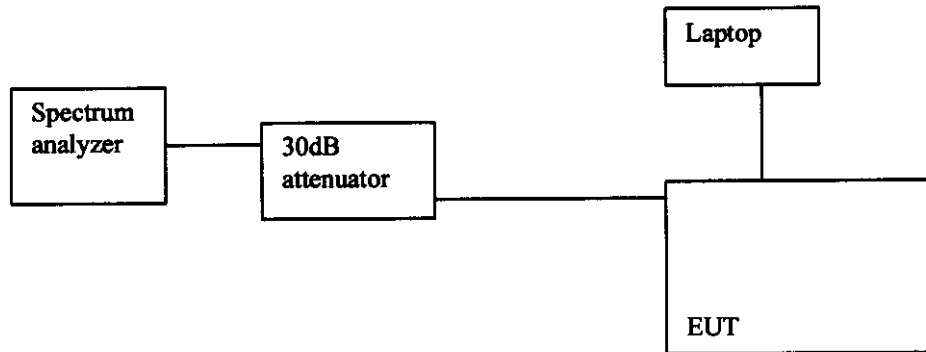
SPAN 200.0 kHz
SWP 6.67 sec

EMISSION LIMITATIONS FOR CELLULAR.

Equipment used.

HP Spectrum Analyzer/8593EM
Narda 30dB Attenuator
Flexco low loss cables, 9ft. (Loss: 0.85 dB/ft @ 26GHz)
NEC Laptop Computer.

TEST SETUP:



Minimum Requirement:

DIGITAL MODE:

22.917 (d) FD1 emission mask; FD1 emissions, the mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) as follows:

- 1) On any frequency removed from the carrier frequency by more than 20kHz, but no more than 45kHz: at least 26dB.
- 2) On any frequency removed from the carrier frequency by more than 45kHz, but no more than 90kHz: at least 45dB.
- 3) On any frequency removed from the carrier frequency by more than 90kHz, up to the first multiple of the carrier frequency: at least 60dB or $43 + \log(P)$ dB, whichever is the lesser attenuation.

IS-138A (3.4) Digital Mode:

The emission power in either adjacent channel, centered ± 30 kHz from the carrier frequency, shall not exceed a level of 26dB below the mean output power.

The emission power in either alternate channel, centered ± 60 kHz from the carrier frequency, shall not exceed a level of 45dB below the mean output power.

For output powers 50 W or less, the emission power in either second alternate channel, centered ± 90 kHz from the carrier frequency, shall not exceed a level of 45 dB below the mean output power of -13 dBm.

Test Procedure:

Test was performed for both 22.917(d) and IS-138A (3.4) standards to show that both limits are met. Measurements were made for low, middle, and high channel. Both MAIN and DVSTY antenna port were tested. Included are plots showing that RES BW: 30kHz cannot be used, instead a RES BW: 300Hz was used to measure signal.

Test Result:

Refer to plots. Table shows the order of plot.

SECTION 22.917 (D)

MAIN ANTENNA PORT	
	PLOT NUMBER
LOW: 30kHz	19
LOW	20
LOW	21
LOW	22
LOW	23
LOW	24
MIDDLE: 30kHz	25
MIDDLE	26
MIDDLE	27
MIDDLE	28
MIDDLE	29
MIDDLE	30
HIGH: 30kHz	31
HIGH	32
HIGH	33
HIGH	34
HIGH	35
HIGH	36

IS-138A (3.4) DIGITAL MODE:

MAIN ANTENNA PORT	
	PLOT NUMBER
LOW: 30kHz	37
LOW	38
LOW	39
LOW	40
LOW	41
LOW	42
MIDDLE: 30kHz	43
MIDDLE	44

MIDDLE	45
MIDDLE	46
MIDDLE	47
MIDDLE	48
HIGH: 30kHz	49
HIGH	50
HIGH	51
HIGH	52
HIGH	53
HIGH	54

SECTION 22.917 (D)

DVSTY ANTENNA PORT	
	PLOT NUMBER
LOW: 30kHz	55
LOW	56
LOW	57
LOW	58
LOW	59
LOW	60
MIDDLE: 30kHz	61
MIDDLE	62
MIDDLE	63
MIDDLE	64
MIDDLE	65
MIDDLE	66
HIGH: 30kHz	67
HIGH	68
HIGH	69
HIGH	70
HIGH	71
HIGH	72

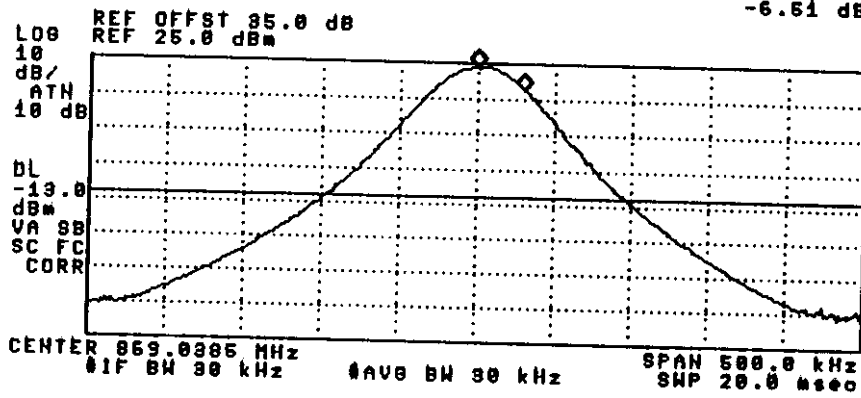
IS-138A (3.4) DIGITAL MODE:

DVSTY ANTENNA PORT	
	PLOT NUMBER
LOW: 30kHz	73
LOW	74
LOW	75
LOW	76
LOW	77
LOW	78
MIDDLE: 30kHz	79
MIDDLE	80
MIDDLE	81
MIDDLE	82
MIDDLE	84
MIDDLE	85
HIGH: 30kHz	86
HIGH	87
HIGH	88
HIGH	89
HIGH	90
HIGH	91

13:35:46 NOV 24, 1998
22.917d(3); AVAL(PICOBTS-800), PSEUDO-RANDOM

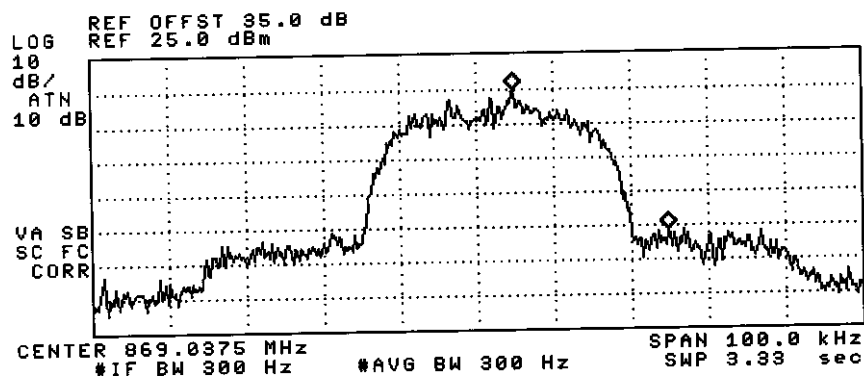
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-6.61 dB

#19



13:54:38 NOV 24, 1998
 22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

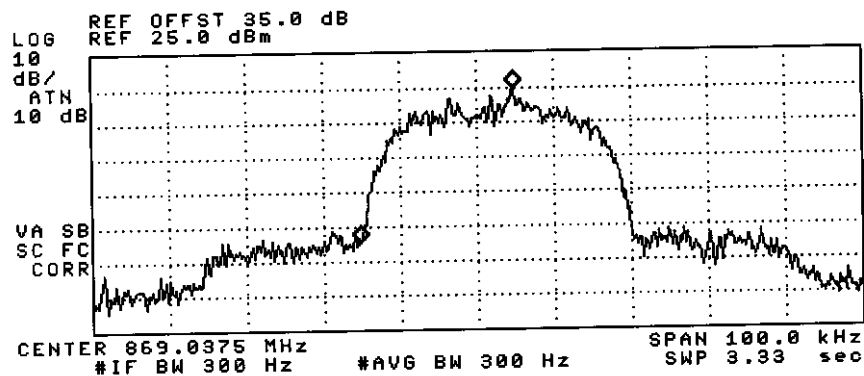
ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 20.0 kHz
 -40.91 dB



#20

13:55:01 NOV 24, 1998
 22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

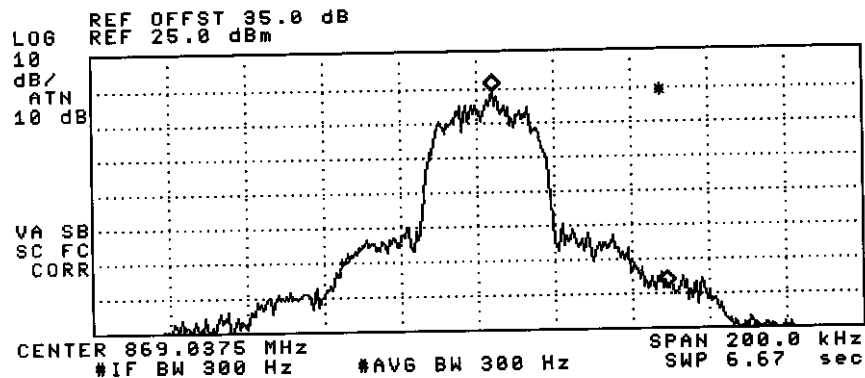
ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 20.0 kHz
 -43.88 dB



#21

13:55:45 NOV 24, 1998
 22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 45.0 kHz
 -57.38 dB



#22

13:56:31 NOV 24, 1998
22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

MARKER Δ
-45.0 kHz
-59.71 dB

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ -45.0 kHz
-59.71 dB

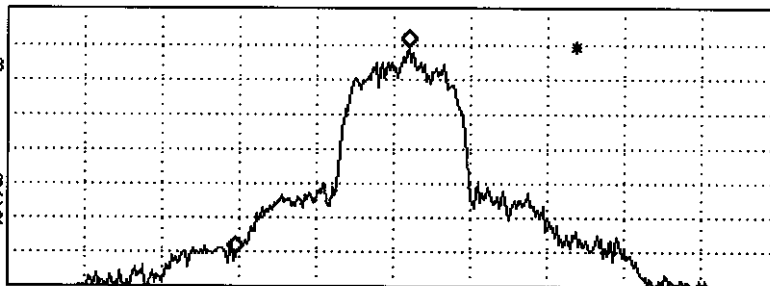
MARKER
NORMAL

#23

LOG REF OFFST 35.0 dB
REF 25.0 dBm

LOG
10
dB/
ATN
10 dB

VA SB
SC FC
CORR



CENTER 869.0375 MHz

#IF BW 300 Hz

#AVG BW 300 Hz

SPAN 200.0 kHz

SWP 6.67 sec

MARKER

MARKER
AMPTD

SELECT
1 2 3 4

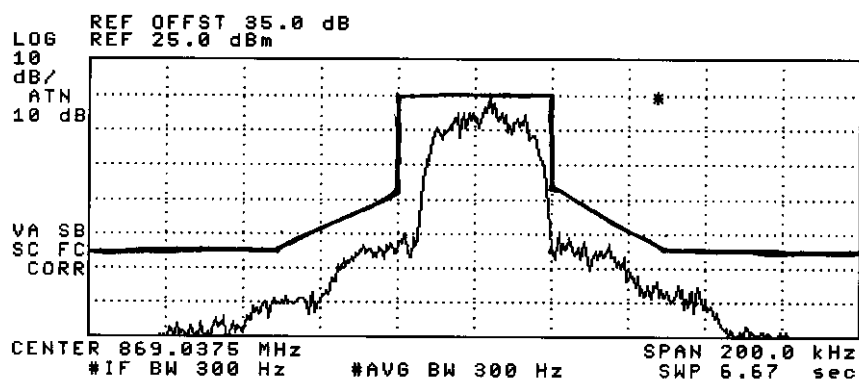
MARKER 1
ON OFF

More
1 of 3

13:57:34 NOV 24, 1998
22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG

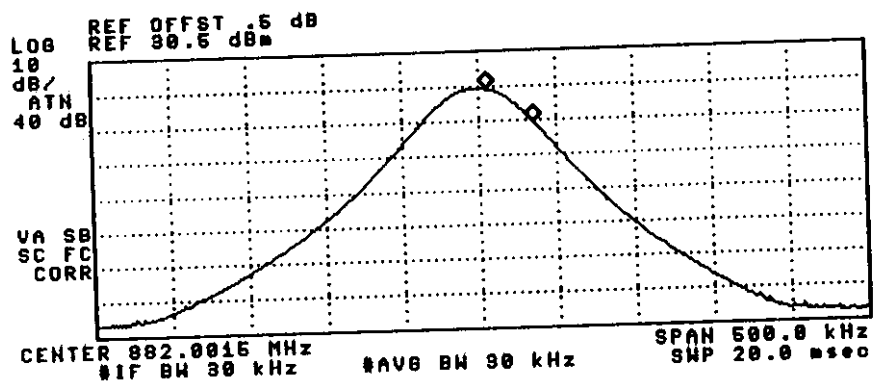
#24



11:11:09 NOV 24, 1998
AVAL(PICOBTS-800)

#25

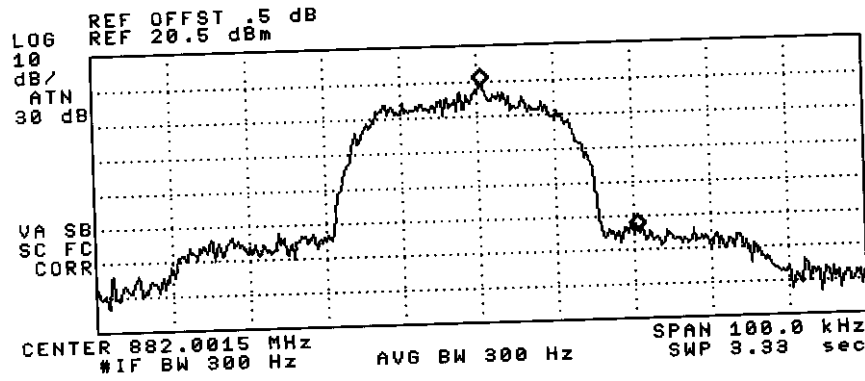
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-9.58 dB



11:32:13 NOV 24, 1998
 22.917(D); AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK QP AVG
 MEAS DET: PEAK QP AVG
 MKRA 20.0 kHz
 -43.48 dB

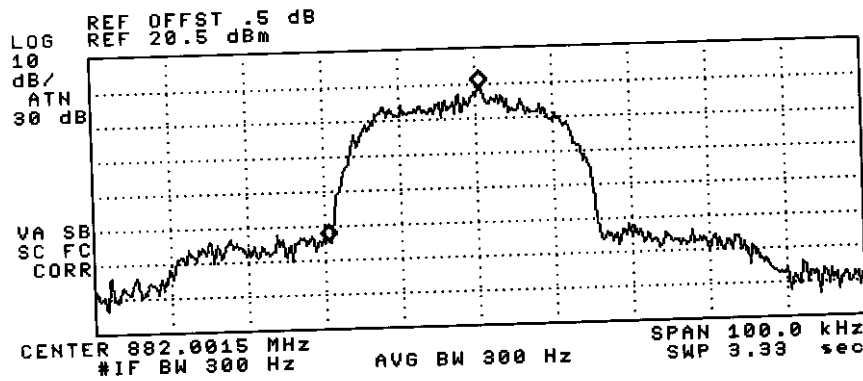
#26



11:32:41 NOV 24, 1998
 22.917(D); AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK QP AVG
 MEAS DET: PEAK QP AVG
 MKRA 20.0 kHz
 -43.46 dB

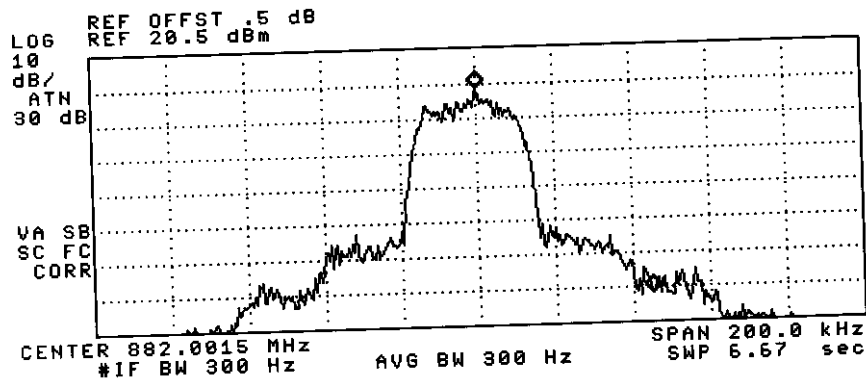
#27



11:33:53 NOV 24, 1998
 22.917(D); AVAL(PICOBTS-800), PSEUDO-RANDOM

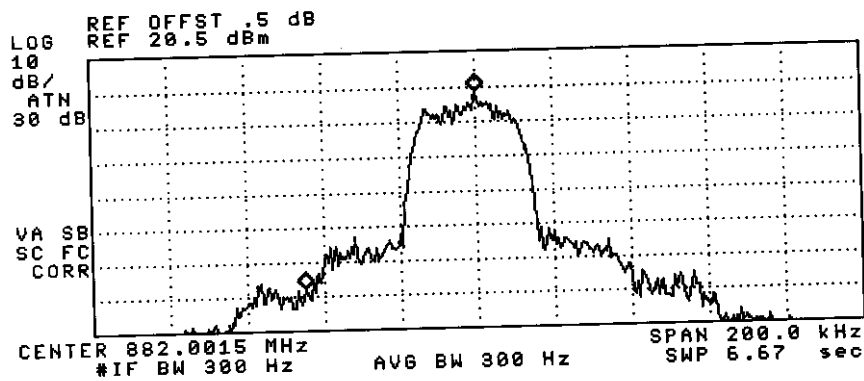
ACTV DET: PEAK QP AVG
 MEAS DET: PEAK QP AVG
 MKRA 45.0 kHz
 -60.48 dB

#28



11:34:40 NOV 24, 1998
22.917(D); AVAL(PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA -45.0 kHz
-56.40 dB

#29



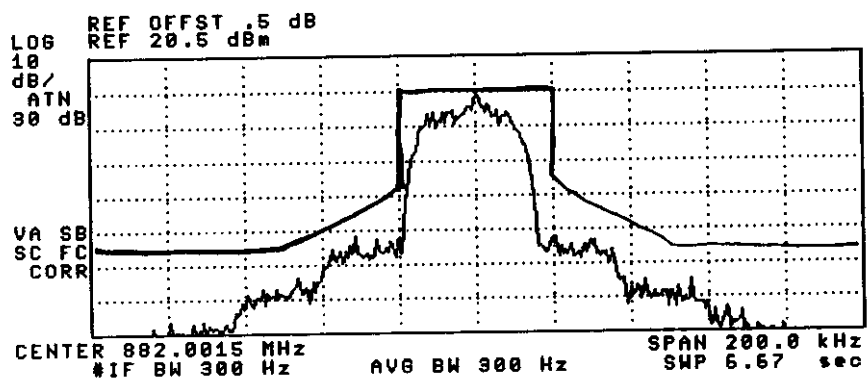
11:27:06 NOV 24, 1998

AVAL(PICOBTS-800), PSEUDO-RANDOM

229170

ACTV DET: PEAK
MEAS DET: PEAK QP AVG

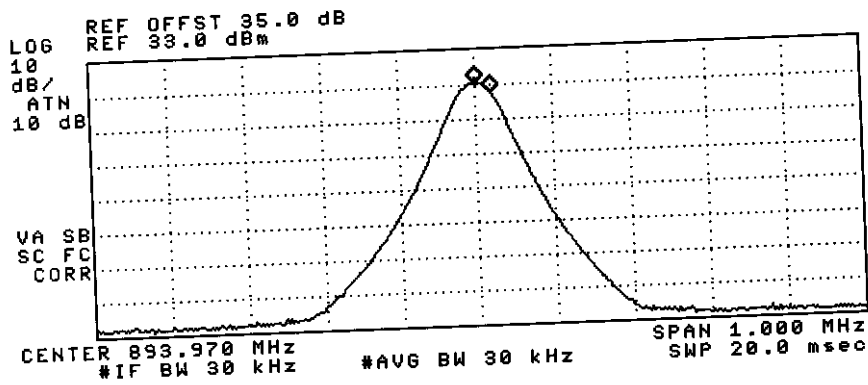
#30



14:11:26 NOV 24, 1998
 22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRA 20 kHz
 -2.89 dB

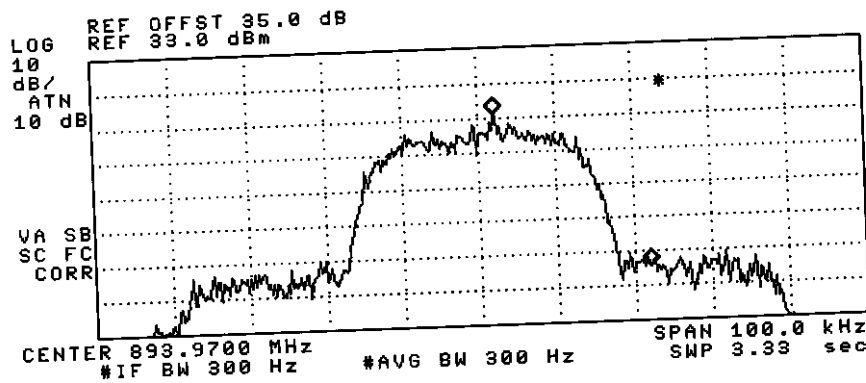
#31



14:12:12 NOV 24, 1998
 22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRA 20.0 kHz
 -45.24 dB

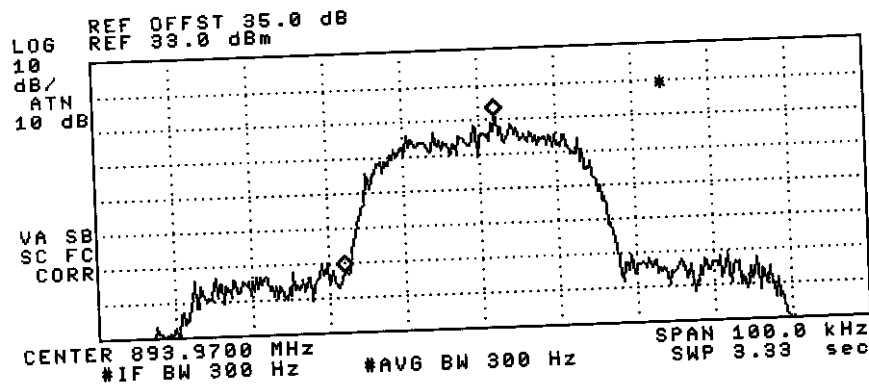
#32



14:12:41 NOV 24, 1998
 22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRA 20.0 kHz
 -43.39 dB

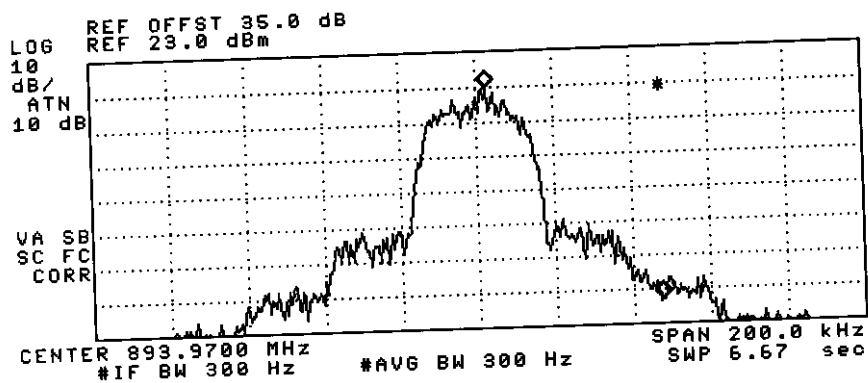
#33



14:14:27 NOV 24, 1998
22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 45.0 kHz
-62.51 dB

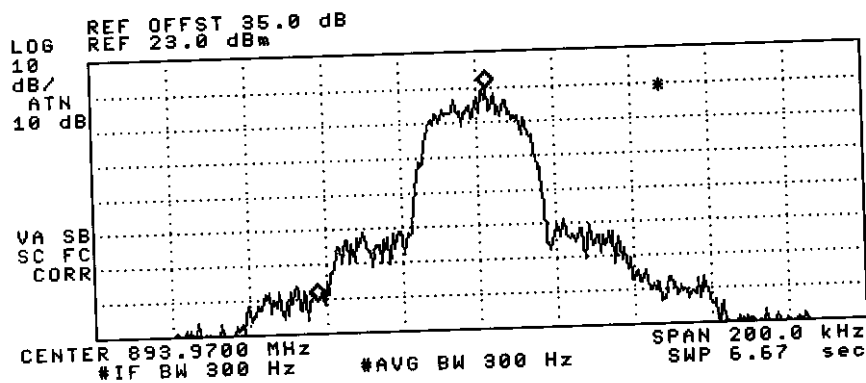
434



14:14:52 NOV 24, 1998
22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM

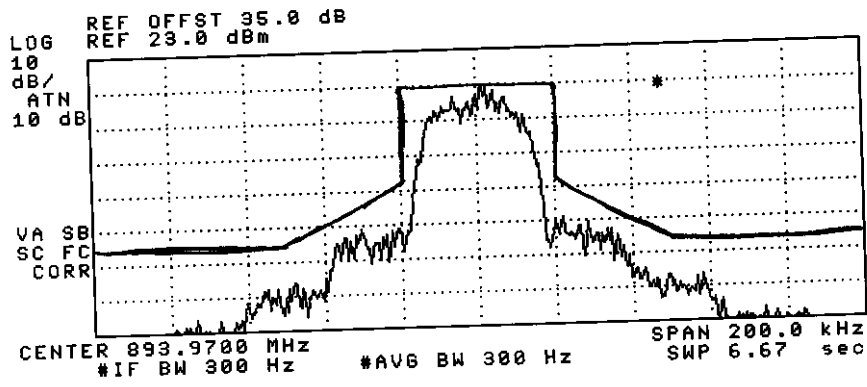
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 45.0 kHz
-60.17 dB

435



14:15:29 NOV 24, 1998
22.917d AVAL(PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

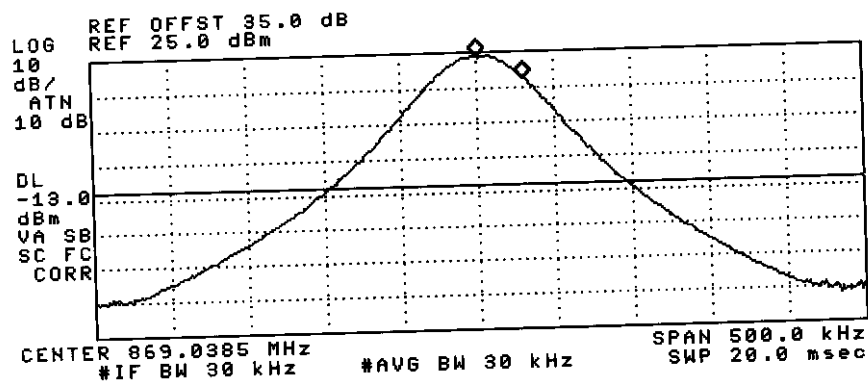
36



13:36:46 NOV 24, 1998

IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM

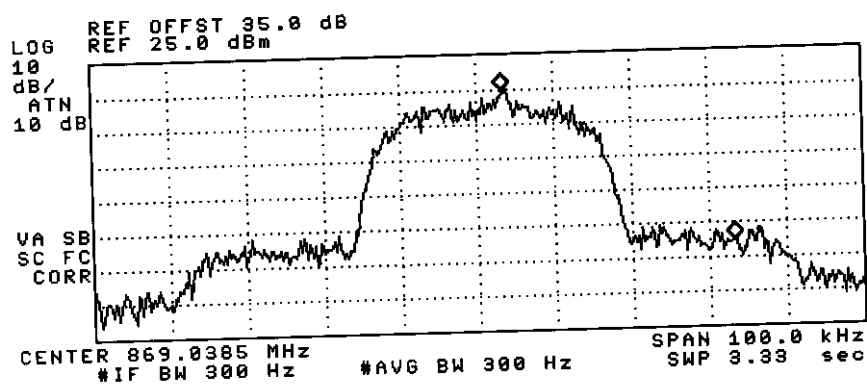
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-6.51 dB



13:38:26 NOV 24, 1998

IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM

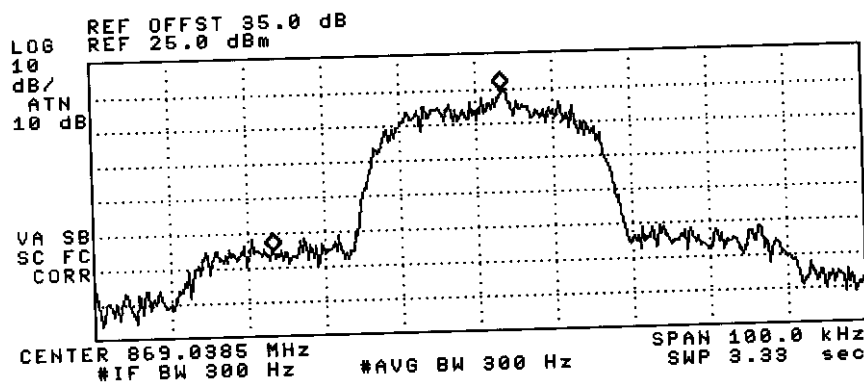
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-44.60 dB



13:38:46 NOV 24, 1998

IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM

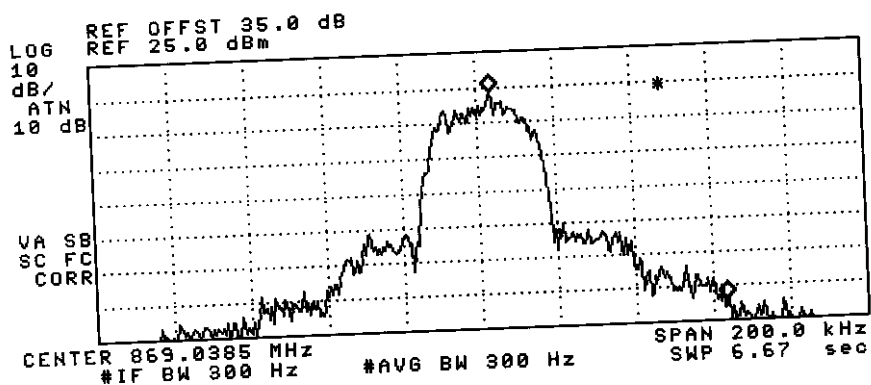
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-44.77 dB



13:45:54 NOV 24, 1998
IS-138A(3.4.1.2);

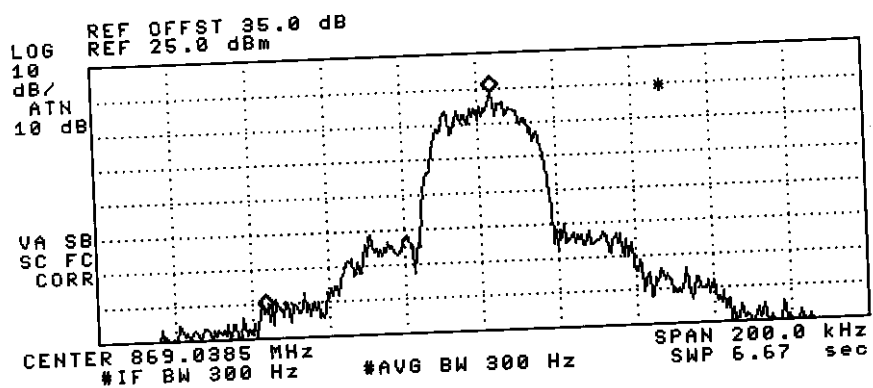
AVAL(PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRΔ 60.0 kHz
-62.52 dB

#40



13:48:12 NOV 24, 1998
IS-138A(3.4.1.2);

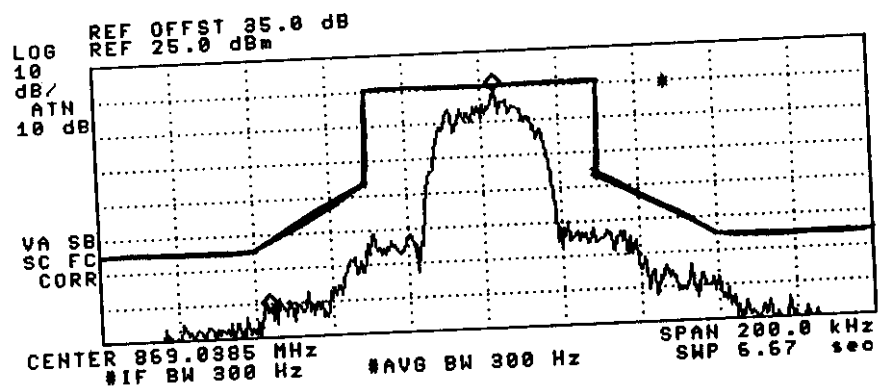
AVAL(PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRΔ -60.0 kHz
-60.76 dB



#41

13:48:12 NOV 24, 1998
IS-138A(3.4.1.2)

AVAL(PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA -60.0 kHz
-60.76 dB

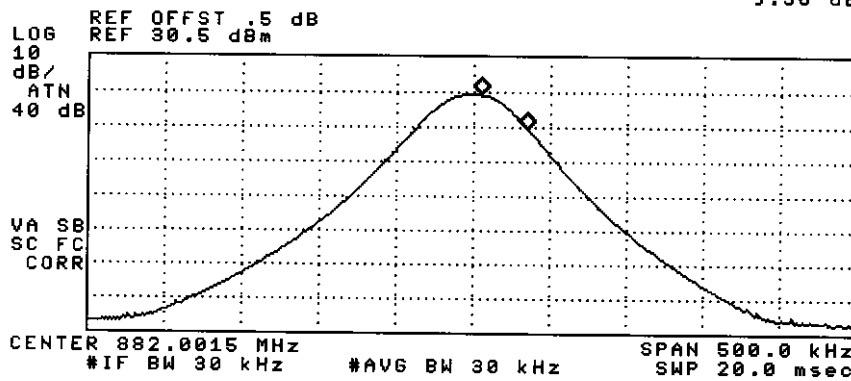


#42

11:11:09 NOV 24, 1998
IS-138A(3.4.1.2); AVAL(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-9.58 dB

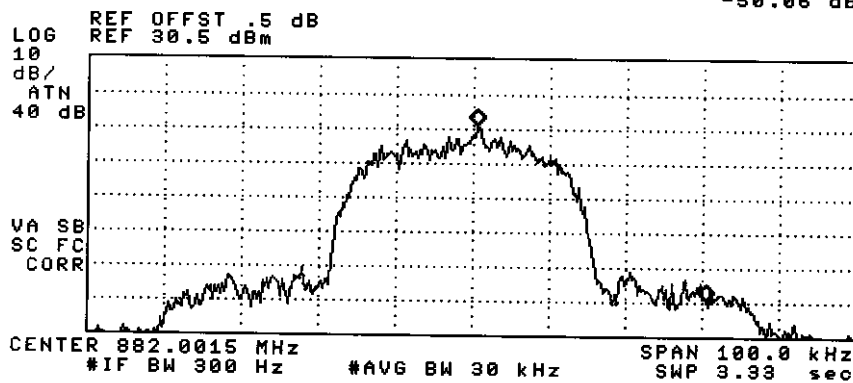
#43



11:17:20 NOV 24, 1998
IS-138A(3.4.1.2); AVAL(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-50.06 dB

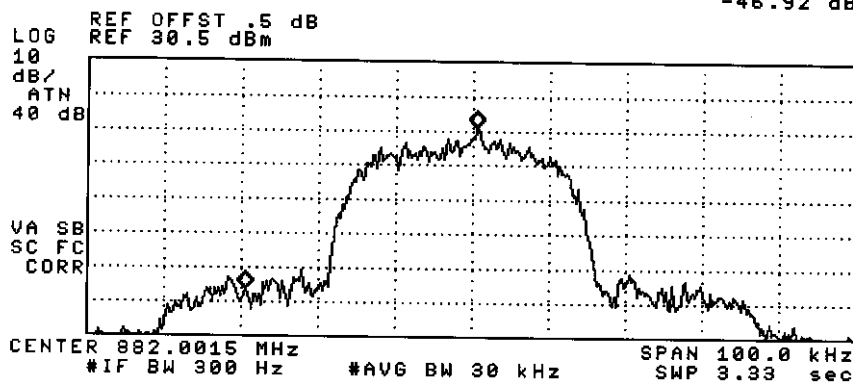
#44



11:18:24 NOV 24, 1998
IS-138A(3.4.1.2); AVAL(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-46.92 dB

#45



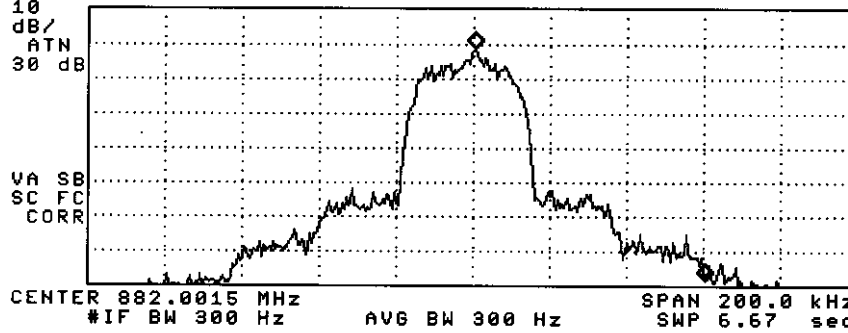
11:25:24 NOV 24, 1998

IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 60.0 kHz
-66.66 dB

#46

LOG REF OFFST .5 dB
10 REF 20.5 dBm
dB/
ATN
30 dB



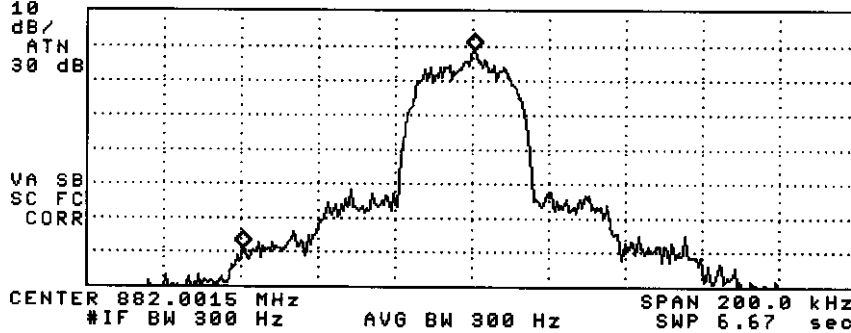
11:25:55 NOV 24, 1998

IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 60.0 kHz
-57.74 dB

#47

LOG REF OFFST .5 dB
10 REF 20.5 dBm
dB/
ATN
30 dB

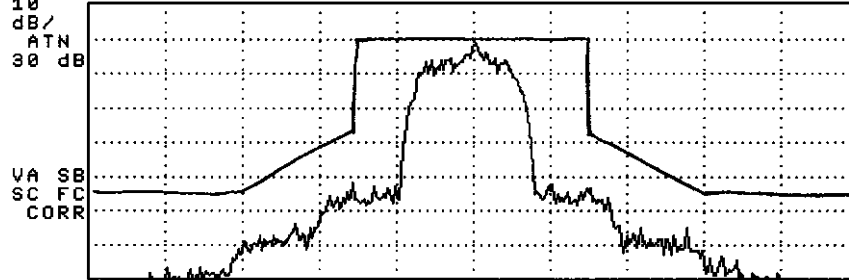


11:27:06 NOV 24, 1998

~~IS-138A~~(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

#48

LOG REF OFFST .5 dB
10 REF 20.5 dBm
dB/
ATN
30 dB



VA SB
SC FC
CORR

15:22:13 NOV 24, 1998

IS-138A (3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

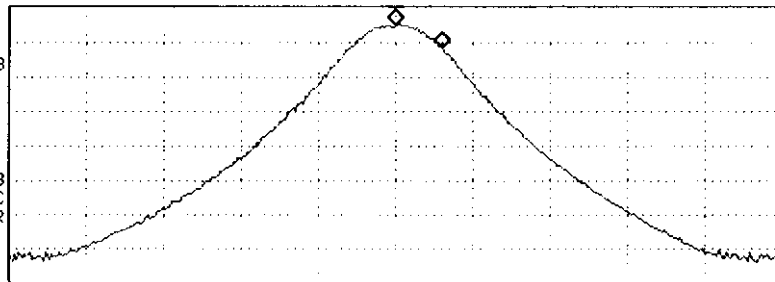
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-6.80 dB

#49

REF OFFST 35.0 dB
REF 23.0 dBm

LOG
10
dB/
ATN
10 dB

VA SB
SC FC
CORR



CENTER 893.9688 MHz

#IF BW 30 kHz

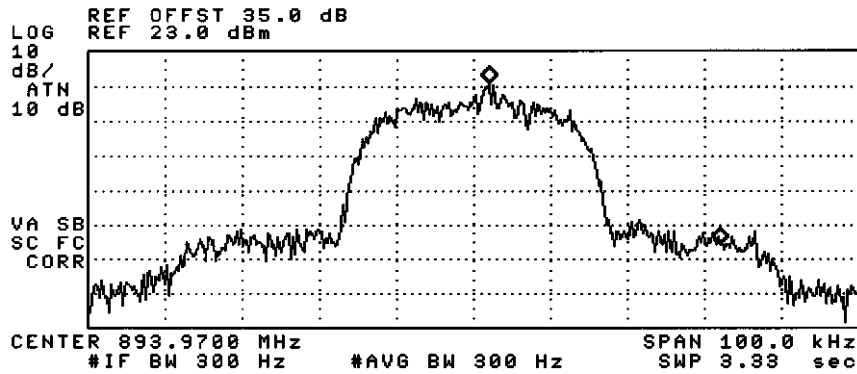
#AVG BW 30 kHz

SPAN 500.0 kHz

SWP 20.0 msec

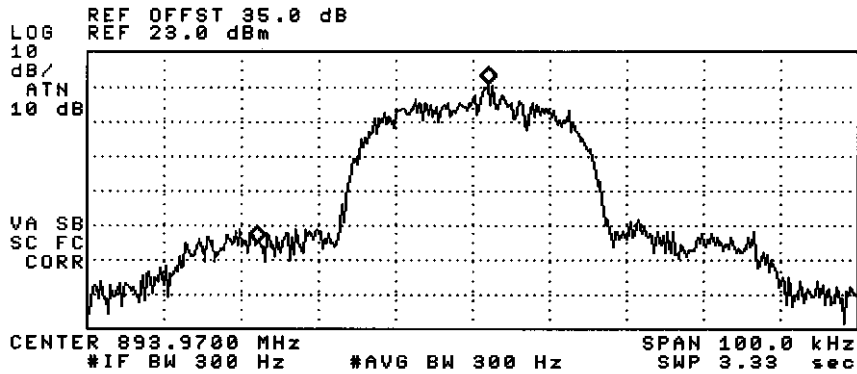
14:18:49 NOV 24, 1998
 # IS-138A(3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 30.0 kHz
 -46.64 dB

#50



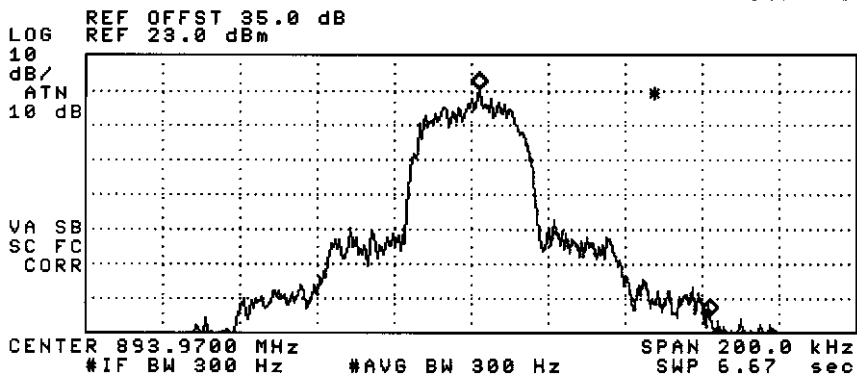
14:19:12 NOV 24, 1998
 # IS-138A(3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 30.0 kHz
 -46.16 dB

#51



14:19:50 NOV 24, 1998
 # IS-138A(3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 60.0 kHz
 -65.07 dB

#52



14:20:12 NOV 24, 1998

IS-138A(3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKRΔ -60.0 kHz

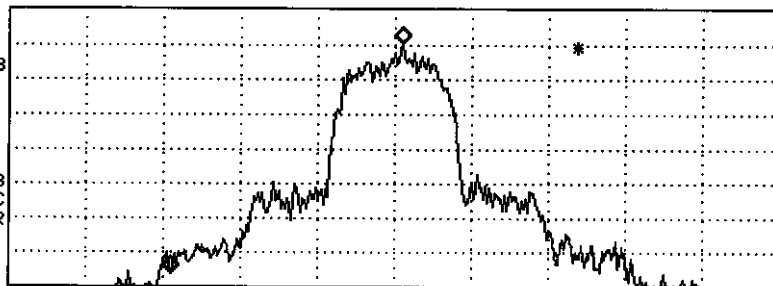
-66.44 dB

#153

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm

dB/
ATN
10 dB

VA SB
SC FC
CORR



CENTER 899.9700 MHz

#IF BW 300 Hz

#AVG BW 300 Hz

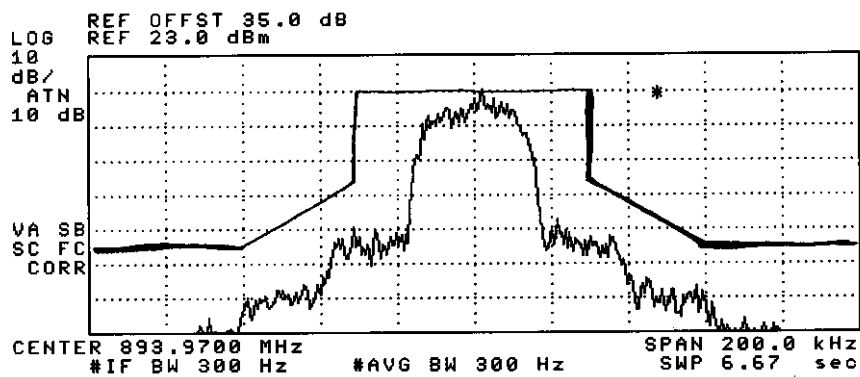
SPAN 200.0 kHz

SWP 6.67 sec

14:20:43 NO. 14:20:43
IS-138A(0.4.1.27) (PICOBTS-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

DEC 21 1998

#154

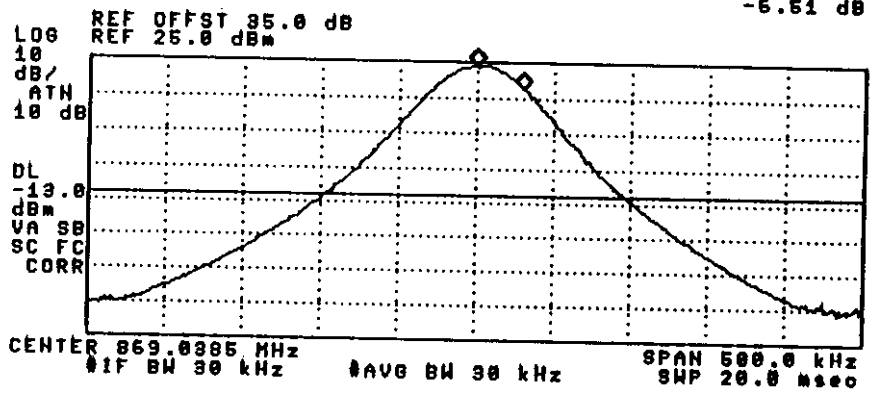


13136146 NOV 24, 1998

22.917d(3) AVAL(PICOBTS-888), PSEUDO-RANDOM

#155

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 90.0 kHz
-6.51 dB

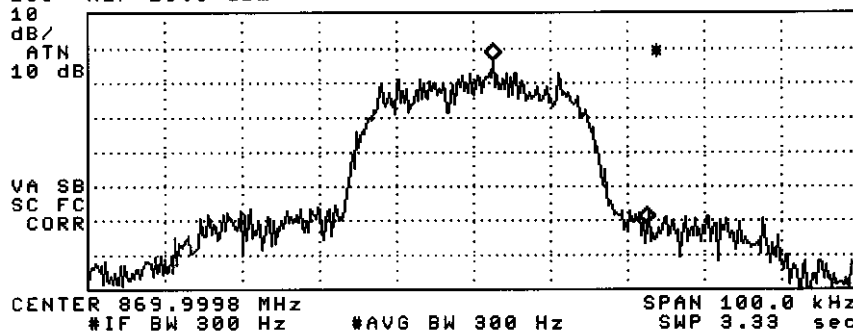


14:46:00 NOV 24, 1998 OUT OF BAND
22.9170; (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 20.0 kHz
-47.13 dB

#56

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm

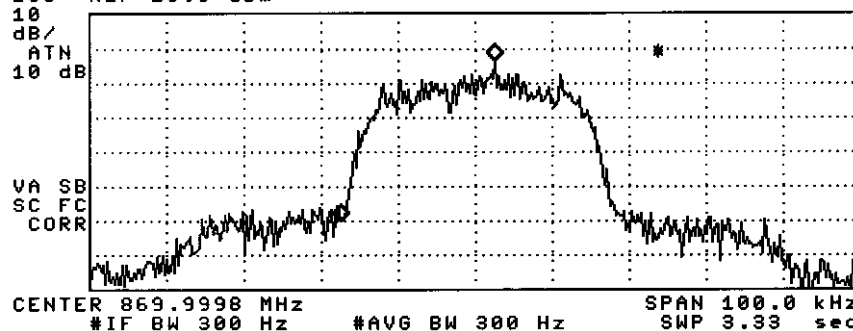


14:46:18 NOV 24, 1998 OUT OF BAND
22.9170; (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 20.0 kHz
-46.09 dB

#57

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm

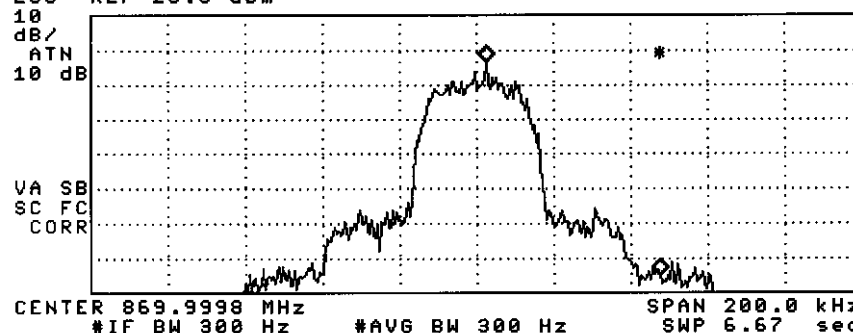


14:47:00 NOV 24, 1998 OUT OF BAND
22.9170; (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 45.0 kHz
-60.88 dB

#59

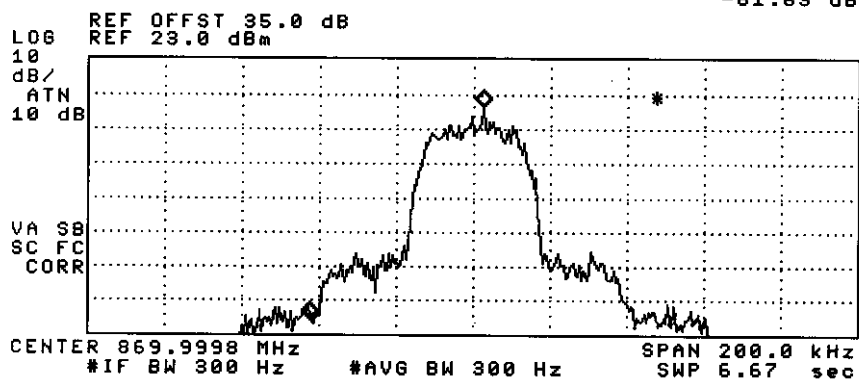
LOG REF OFFST 35.0 dB
10 REF 23.0 dBm



14:47:42 NOV 24, 1998 OUT OF BAND
22.917D; (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA -45.0 kHz
-61.63 dB

#60



14:49:02 NOV 24, 1998 OUT OF BAND
22.917D; (PICOBTS-800), PSEUDO-RANDOM

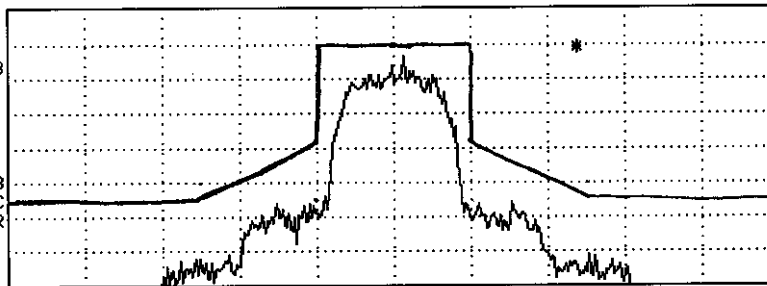
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

#161

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm

dB/
ATTN
10 dB

VA SB
SC FC
CORR



CENTER 869.9998 MHz
#IF BW 300 Hz

#AVG BW 300 Hz

SPAN 200.0 kHz
SWP 6.67 sec

14:58:18 NOV 24, 1998

~~15:15:00 (0.1.1.1.2)~~; (PICOBTS-800), PSEUDO-RANDOM

22 6.7(d)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30 kHz
-7.59 dB

#61

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm

dB/
ATN
10 dB

VA SB
SC FC
CORR

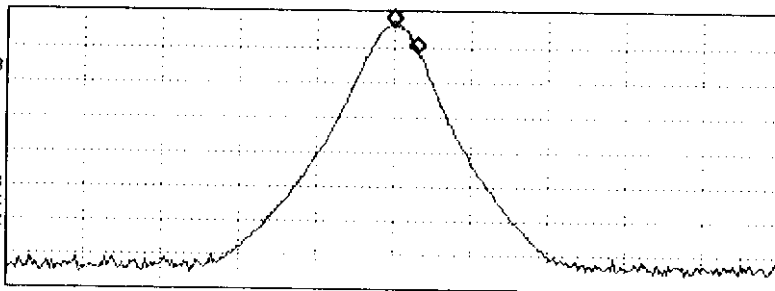
CENTER 880.050 MHz

#IF BW 30 kHz

#AVG BW 30 kHz

SPAN 1.000 MHz

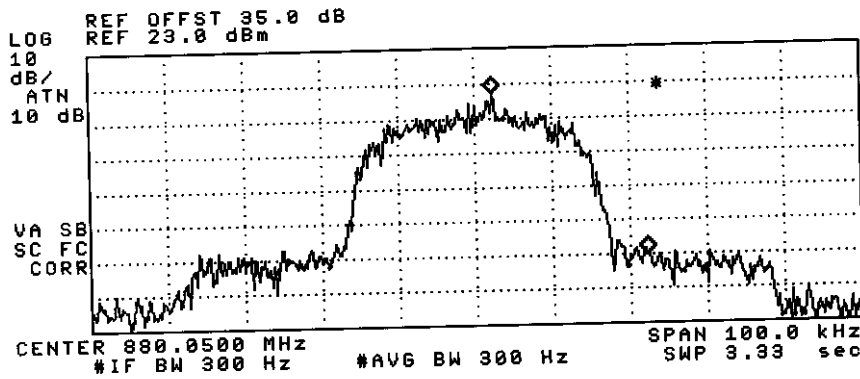
SWP 20.0 msec



15:07:30 NOV 24, 1998 OUT OF BAND
 # 22.917D; (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 20.0 kHz
 -46.90 dB

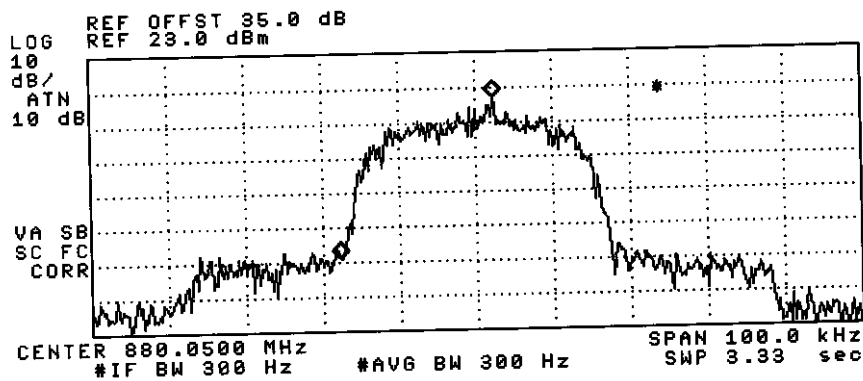
#62



15:07:52 NOV 24, 1998 OUT OF BAND
 # 22.917D; (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 20.0 kHz
 -45.31 dB

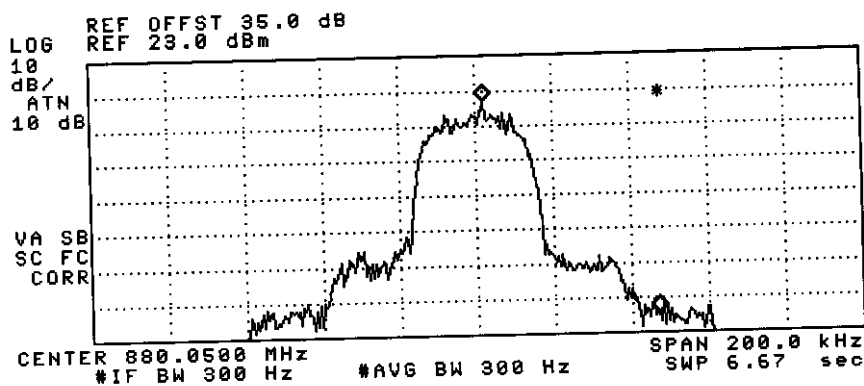
#63



15:08:36 NOV 24, 1998 OUT OF BAND
 # 22.917D; (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 45.0 kHz
 -60.92 dB

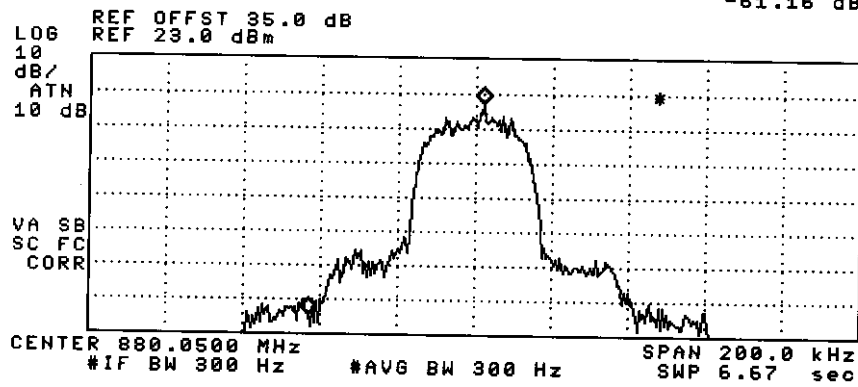
#64



15:09:11 NOV 24, 1998 OUT OF BAND
22.917D; (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA -45.0 kHz
-61.16 dB

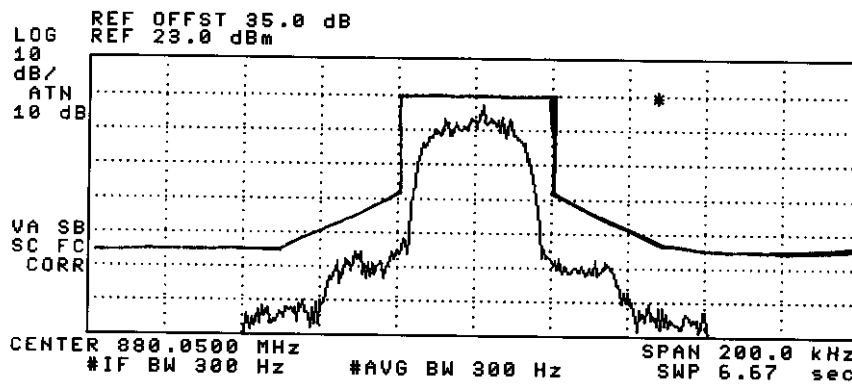
#65



15:10:36 NOV 24, 1998 OUT OF BAND
22.9170 (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG

#66



14:11:26 NOV 24, 1998
22.917d AVAL(PICOBTS-800). PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 20 kHz
-2.89 dB

#67

LOG REF OFFST 35.0 dB
REF 33.0 dBm

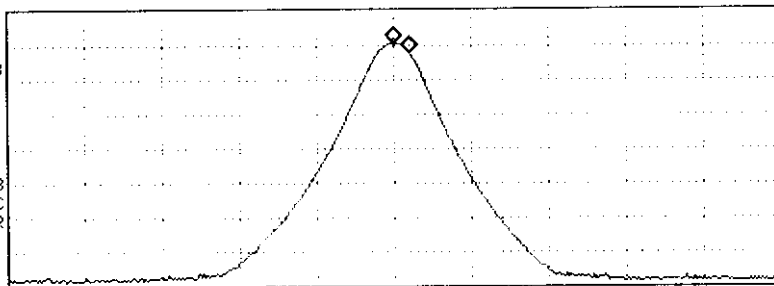
10
dB/
ATN
10 dB

VA SB
SC FC
CORR

CENTER 893.970 MHz
#IF BW 30 kHz

#AVG BW 30 kHz

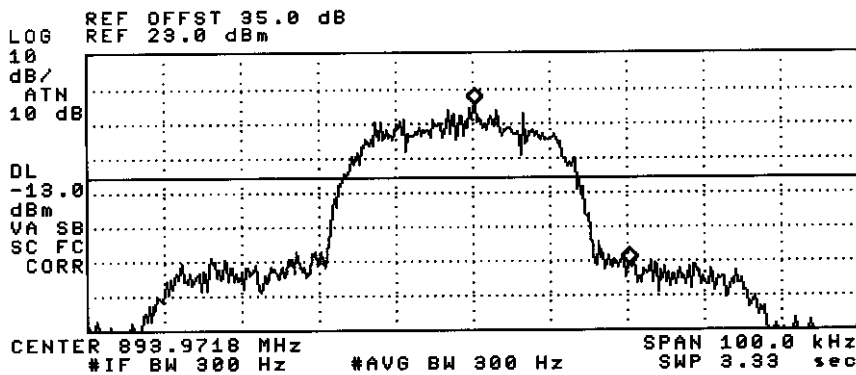
SPAN 1.000 MHz
SWP 20.0 msec



15:30:22 NOV 24, 1998 OUT OF BAND
 # 22.9170; (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRA 20.0 kHz
 -46.22 dB

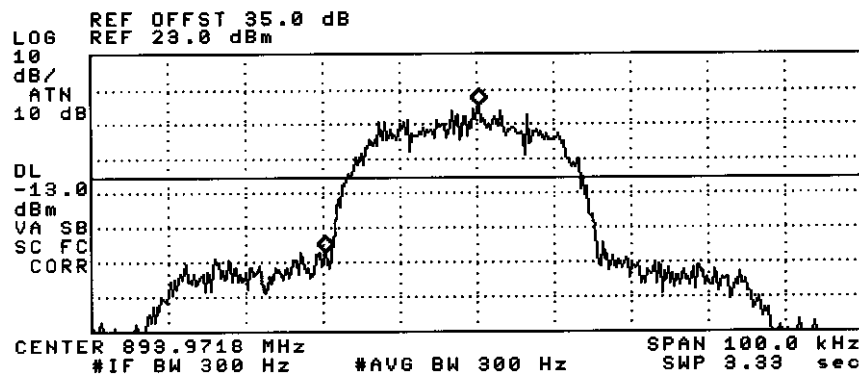
#68



15:30:41 NOV 24, 1998 OUT OF BAND
 # 22.9170; (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRA 20.0 kHz
 -42.42 dB

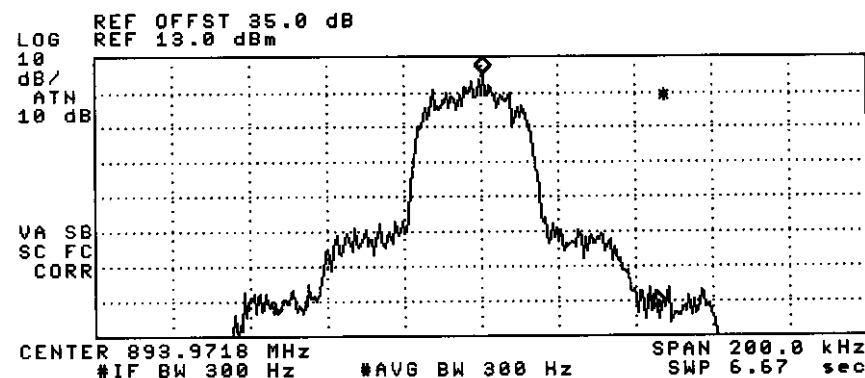
#69



15:31:30 NOV 24, 1998 OUT OF BAND
 # 22.9170; (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRA 45.0 kHz
 -67.17 dB

#70



15:31:51 NOV 24, 1998 OUT OF BAND
22.9170; (PICOBT5-800), PSEUDO-RANDOM

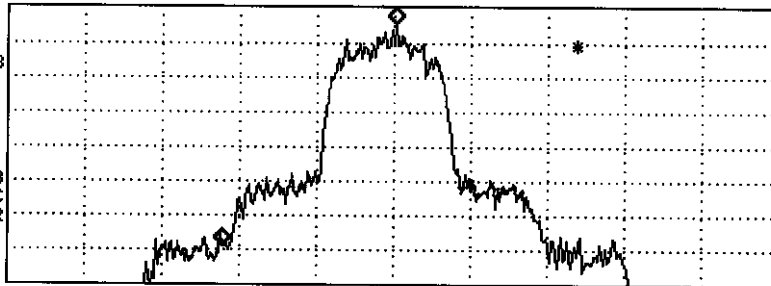
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA -45.0 kHz
-63.72 dB

±71

REF OFFST 35.0 dB
LOG REF 13.0 dBm

10
dB/
ATN
10 dB

VA SB
SC FC
CORR



CENTER 893.9718 MHz
#IF BW 300 Hz

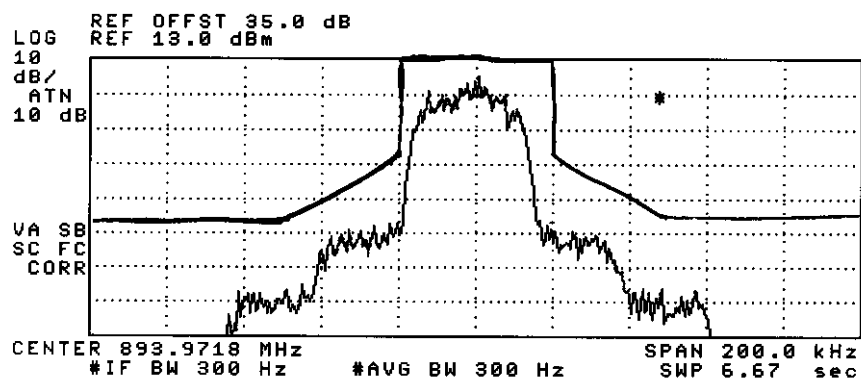
#AVG BW 300 Hz

SPAN 200.0 kHz
SWP 6.67 sec

15:32:23 NOV 24, 1998 OUT OF BAND
22.9170: (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG

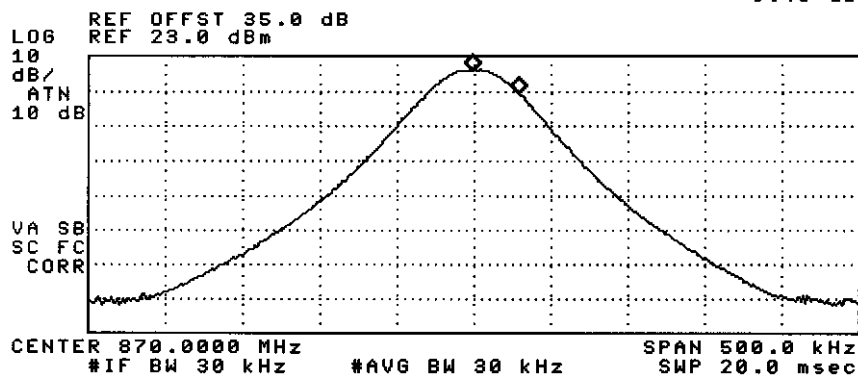
#72



14:37:03 NOV 24, 1998
 (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 30.0 kHz
 -6.46 dB

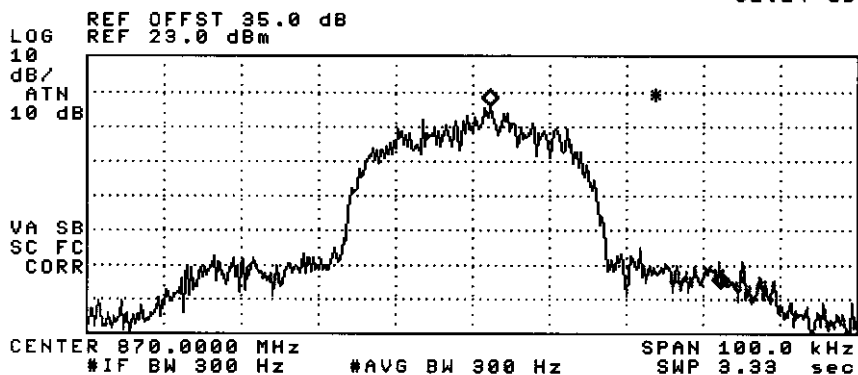
#73



14:38:02 NOV 24, 1998
 IS-138A(3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ 30.0 kHz
 -52.24 dB

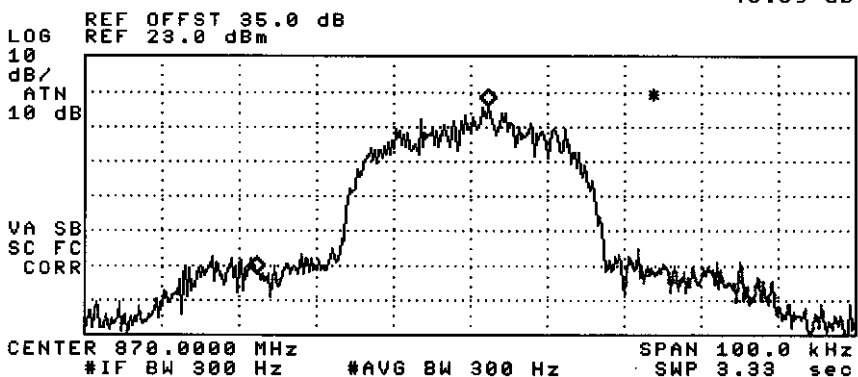
#72/



14:38:24 NOV 24, 1998
 IS-138A(3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRΔ -30.0 kHz
 -48.09 dB

#75

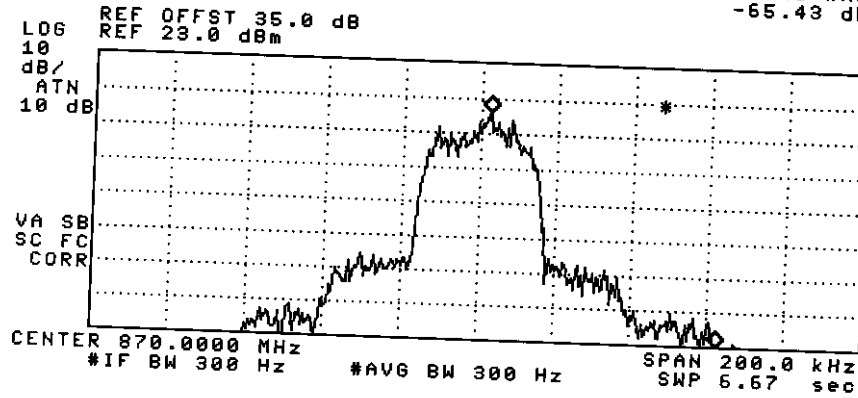


14:39:06 NOV 24, 1998

IS-138A(3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 60.0 kHz
-65.43 dB

#76

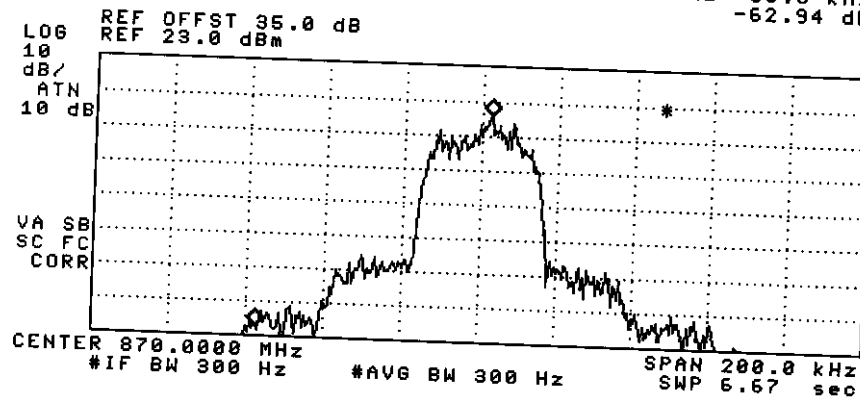


14:39:27 NOV 24, 1998

IS-138A(3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

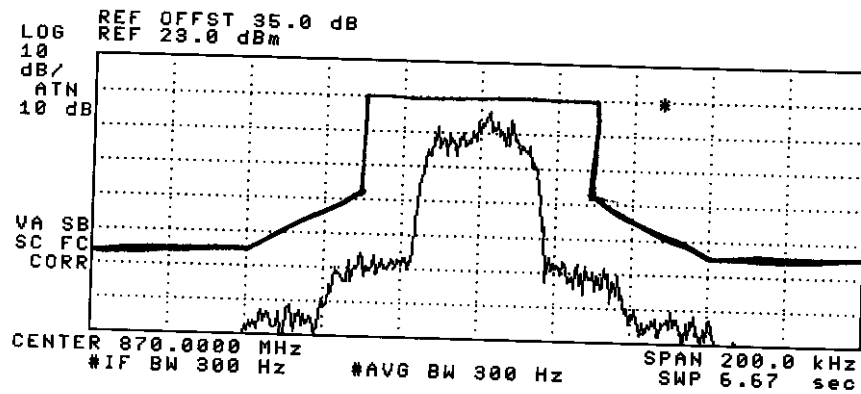
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 60.0 kHz
-62.94 dB

#77



14:40:05 NOV 24, 1998
IS-138A(3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM
ACTV DET: PEAK
MEAS DET: PEAK QP AVG

#78



14:58:18 NOV 24, 1998

IS-138A (3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

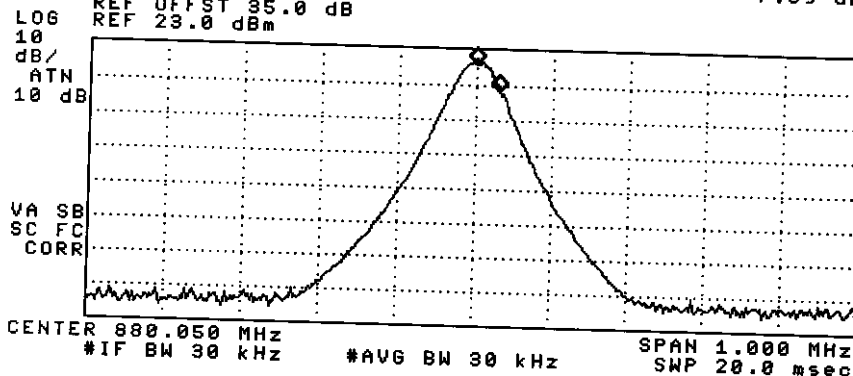
ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKRA 30 kHz

-7.59 dB

REF OFFST 35.0 dB
REF 23.0 dBm



#179

14:59:12 NOV 24, 1998

IS-138A (3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

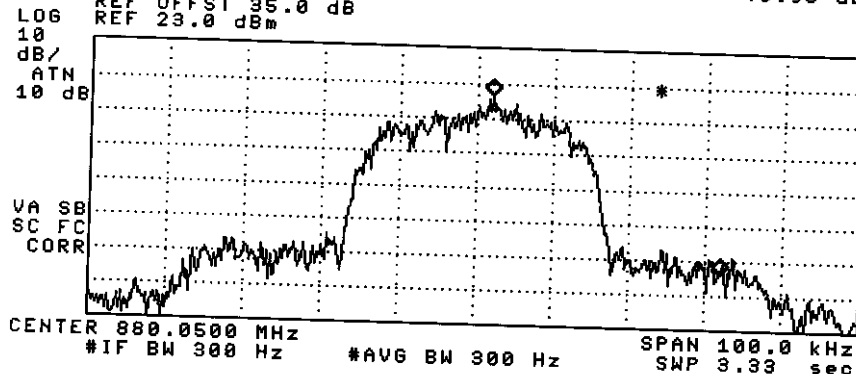
ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKRA 30.0 kHz

-49.95 dB

REF OFFST 35.0 dB
REF 23.0 dBm



#180

14:59:37 NOV 24, 1998

IS-138A (3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

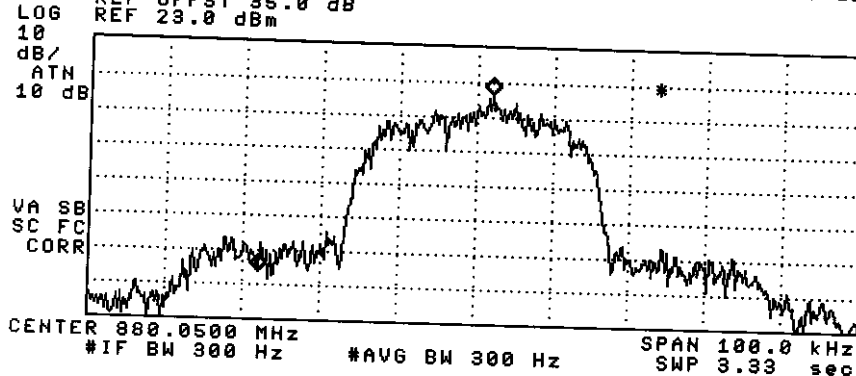
ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKRA 30.0 kHz

-52.45 dB

REF OFFST 35.0 dB
REF 23.0 dBm



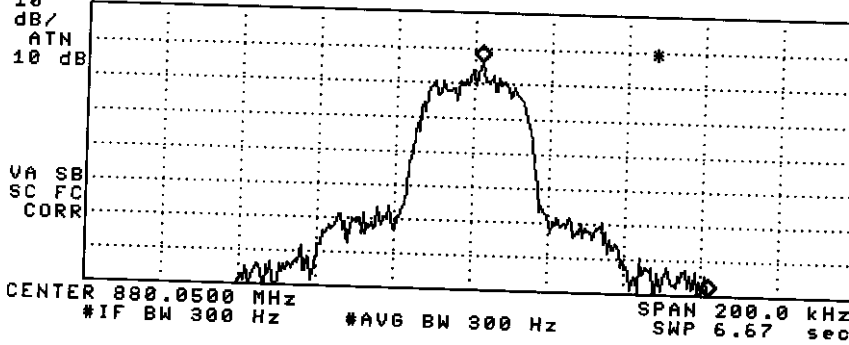
#181

15:01:13 NOV 24, 1998

IS-138A (3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRΔ 60.0 kHz
-65.58 dB

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm
dB/
ATN
10 dB



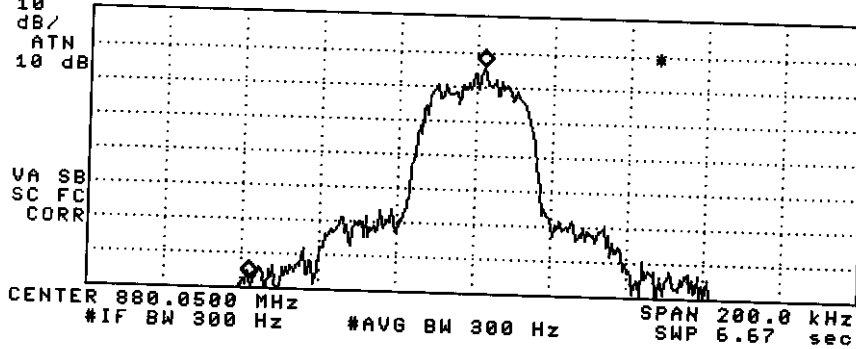
#182

15:01:31 NOV 24, 1998

IS-138A (3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRΔ 60.0 kHz
-62.74 dB

LOG REF OFFST 35.0 dB
10 REF 23.0 dBm
dB/
ATN
10 dB



#183

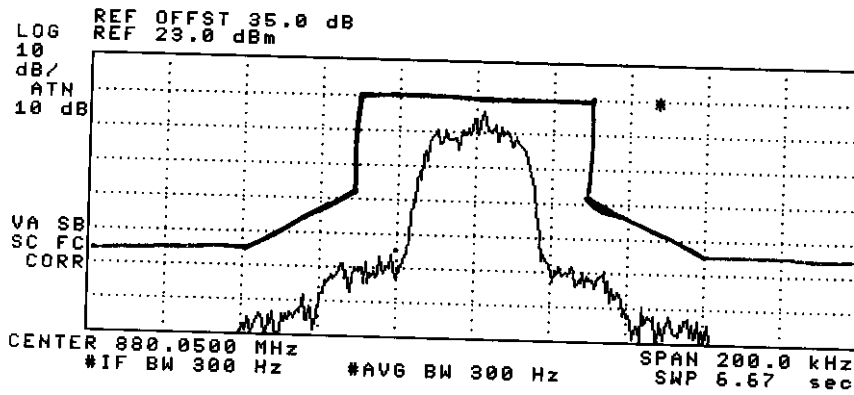
15:01:52 NOV 24, 1998

IS-138A (3.4.1.2), (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

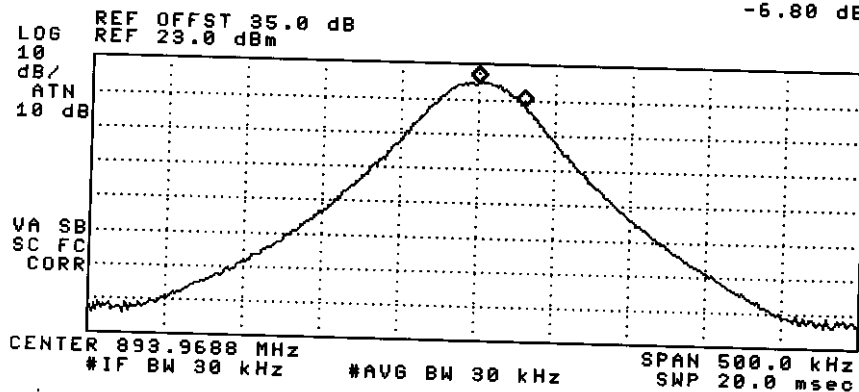
#84



15:22:13 NOV 24, 1998
IS-138A (3.4.1.2); (PICOBTBS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-5.80 dB

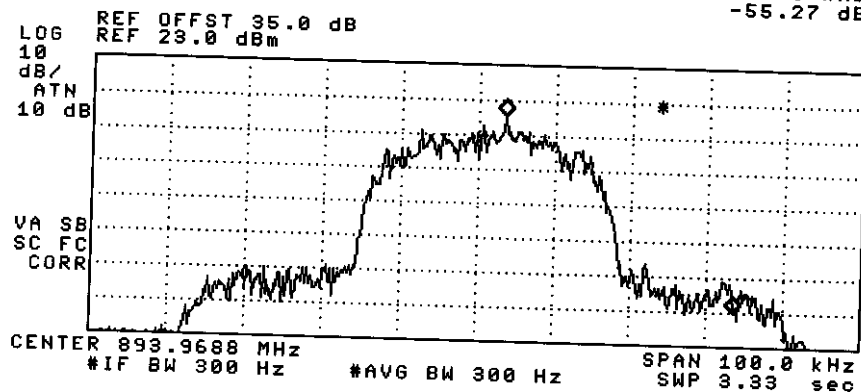
#86



15:22:58 NOV 24, 1998
IS-138A (3.4.1.2); (PICOBTBS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-55.27 dB

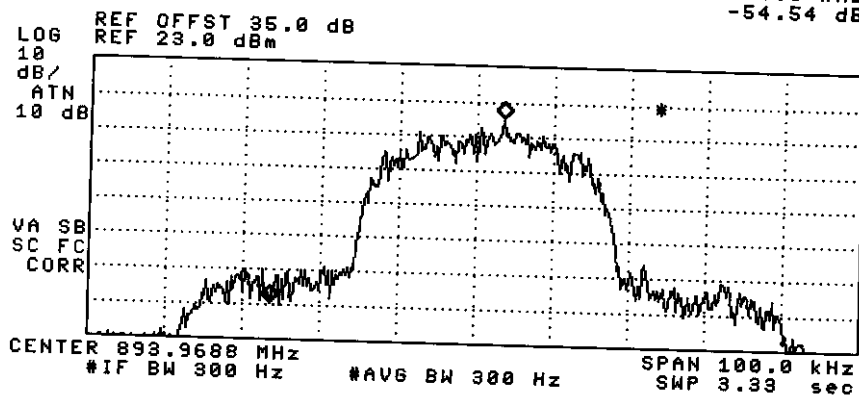
#87



15:23:21 NOV 24, 1998
IS-138A (3.4.1.2); (PICOBTBS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 30.0 kHz
-54.54 dB

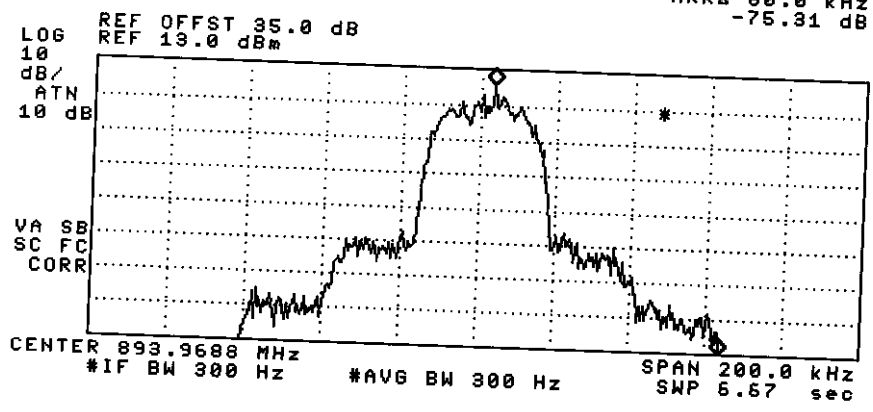
#88



15:24:27 NOV 24, 1998
IS-138A (3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 60.0 kHz
-75.31 dB

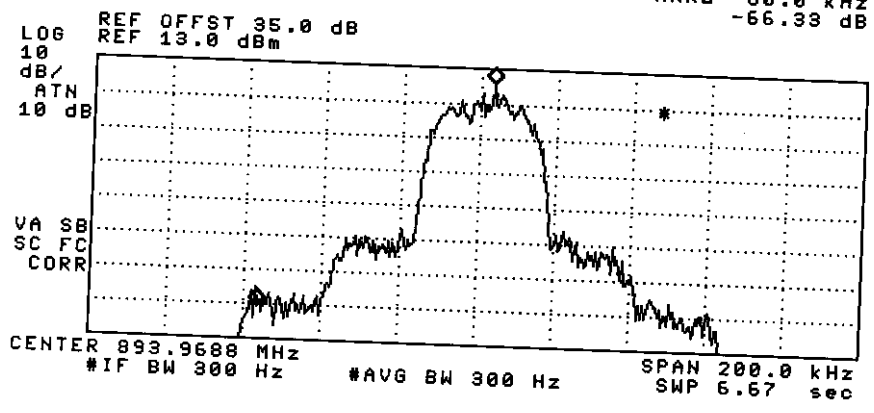
#89



15:24:48 NOV 24, 1998
IS-138A (3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRA 60.0 kHz
-66.33 dB

#90



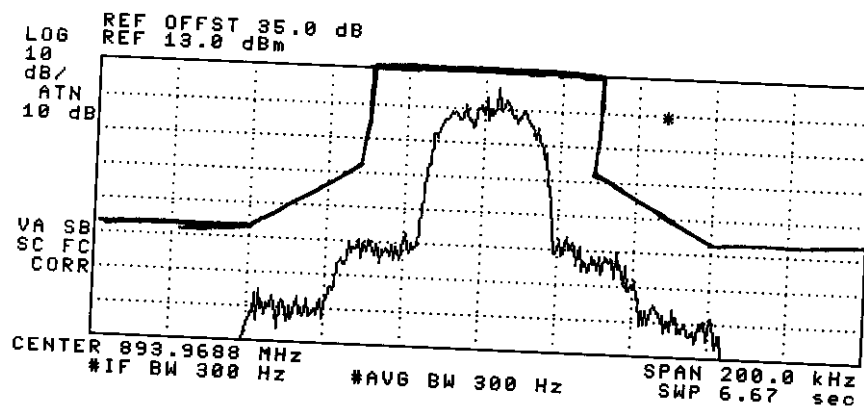
15:25:07 NOV 24, 1998

IS-138A (3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

#191



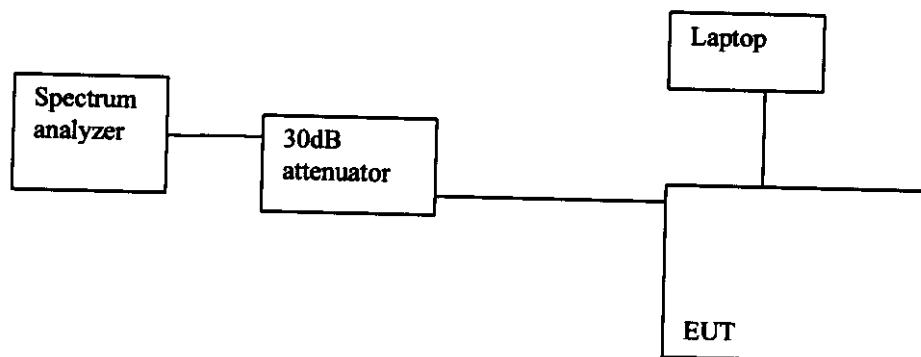
SECTION 2.1051 (2.991): SPURIOUS EMISSION AT ANTENNA TERMINAL.**Equipment used.**

HP Spectrum Analyzer/8593EM

Narda 30dB Attenuator

Flexco low loss cables, 9ft. (Loss: 0.85 dB/ft @ 26GHz)

NEC Laptop Computer.

TEST SETUP:**Minimum Requirement:****22.917(e) Out of Band emissions:**

The magnitude of each spurious and harmonic emissions that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not be more than $43 + \log(\text{mean output power})$ dBc below the mean power output, which is equivalent to -13 dBm.

IS-138A (3.4.1.2) Digital Mode:

The magnitude of each spurious and harmonic emissions that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not be more than $43 + \log(\text{mean output power})$ dBc below the mean power output, which is equivalent to -13 dBm.

Test Result:

Refer to spectrum plots attached. Plots are 5MHz to 10^{th} harmonic of the carrier frequency. Table shows the order of plots.

SECTION 22.917 (D)

MAIN ANTENNA PORT	
	PLOT NUMBER
LOW	
LOW	92
MIDDLE	93
MIDDLE	94
HIGH	95
HIGH	96
	97

IS-138A (3.4) DIGITAL MODE:

MAIN ANTENNA PORT	
	PLOT NUMBER
LOW	
LOW	98
MIDDLE	99
MIDDLE	100
HIGH	101
HIGH	102
	103

SECTION 22.917 (D)

DVSTY ANTENNA PORT	
	PLOT NUMBER
LOW	
LOW	104
MIDDLE	105
MIDDLE	106
HIGH	107
HIGH	108
	109

IS-138A (3.4) DIGITAL MODE:

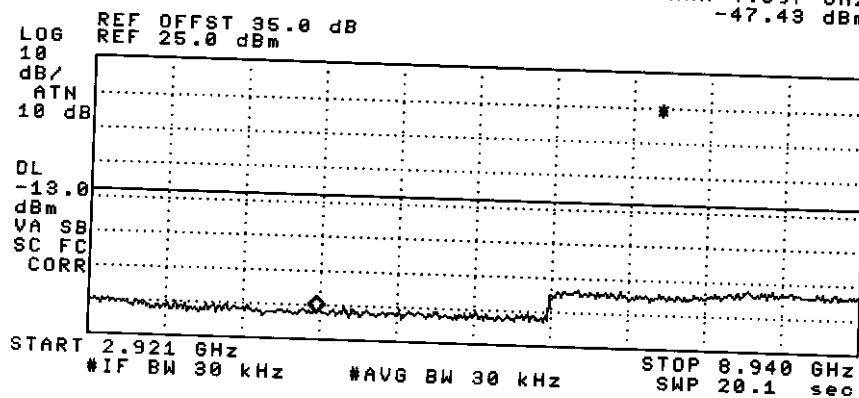
DVSTY ANTENNA PORT	
	PLOT NUMBER
LOW	110
LOW	111
MIDDLE	112
MIDDLE	113
HIGH	114
HIGH	115

13:52:36 NOV 24, 1998

22.917d(3); AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 4.697 GHz
-47.43 dBm

#192

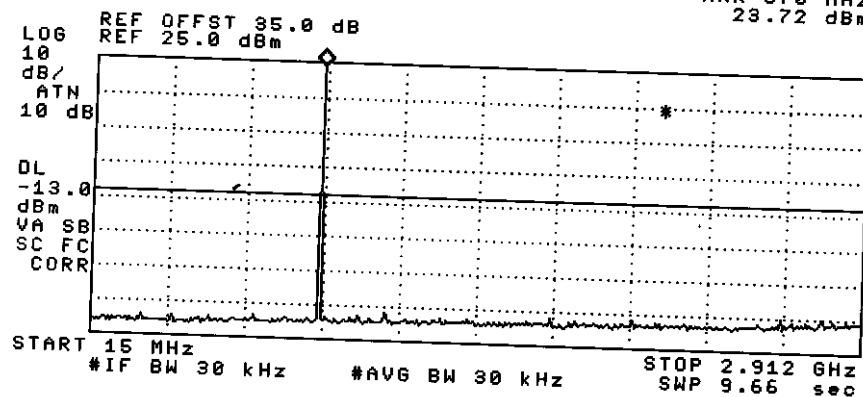


13:53:15 NOV 24, 1998 OUT OF BAND

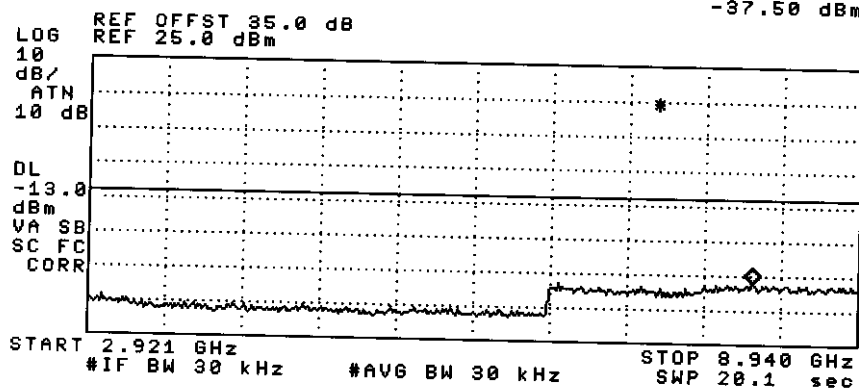
22.917d(3); AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 870 MHz
23.72 dBm

#193

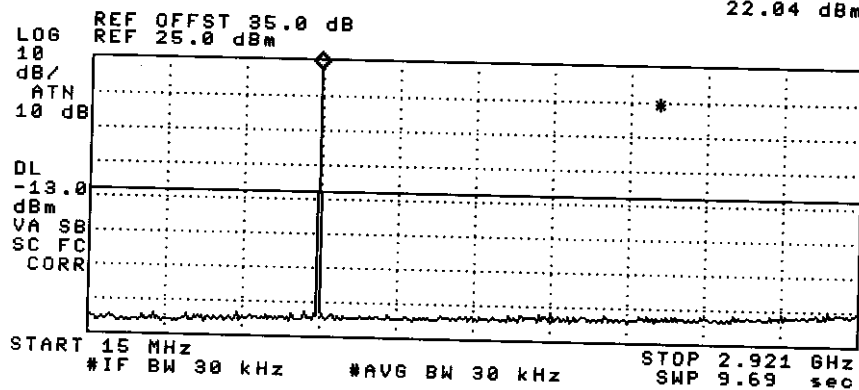


12:35:07 NOV 24, 1998
 22.917d(3); AVAL(PICOBTS-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 8.112 GHz
 -37.50 dBm



#94

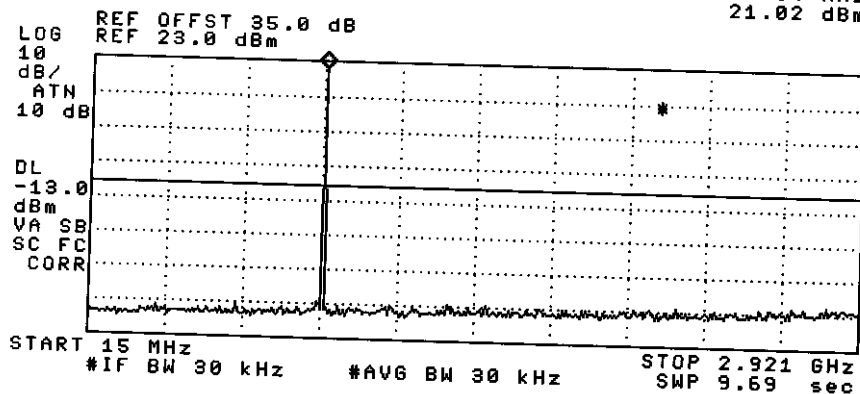
12:35:53 NOV 24, 1998
 22.917d(3); AVAL(PICOBTS-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 880 MHz
 22.04 dBm



#95

14:08:37 NOV 24, 1998 OUT OF BAND
POWER OUTPUT; (PICOBT5-800), PSEUDO-RANDOM

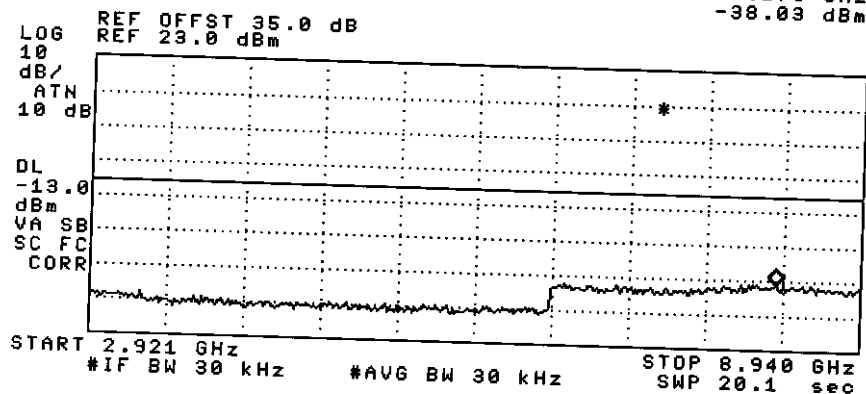
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 894 MHz
21.02 dBm



H96

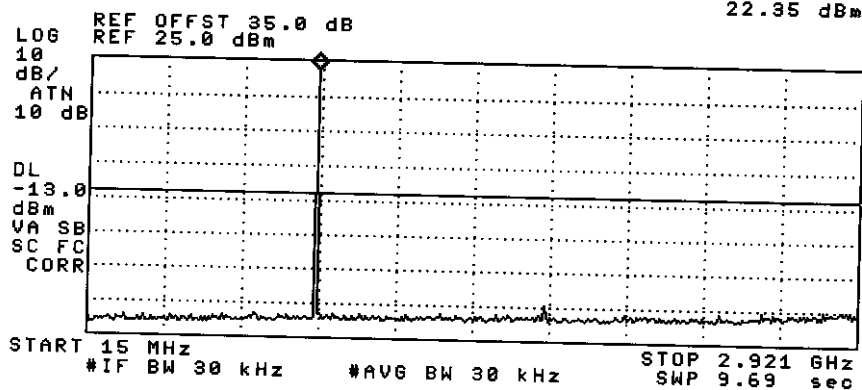
14:09:54 NOV 24, 1998 OUT OF BAND
POWER OUTPUT; (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.278 GHz
-38.03 dBm



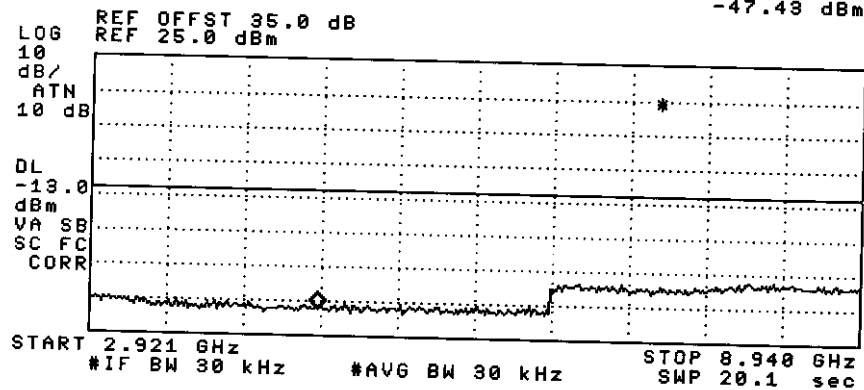
#97

13:50:33 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 872 MHz
 22.35 dBm



98

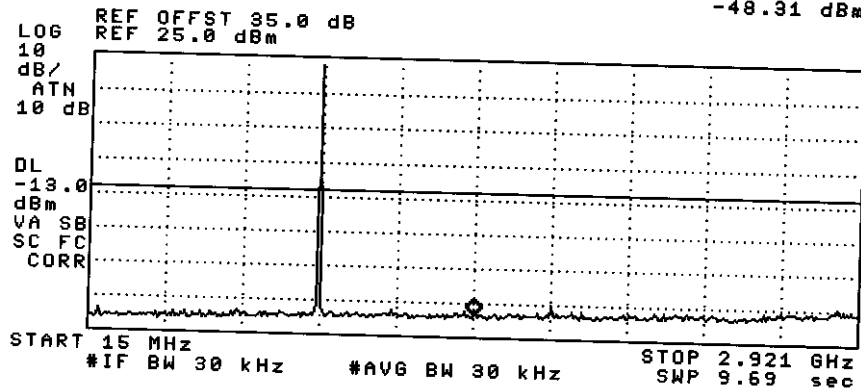
13:51:24 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 4.697 GHz
 -47.43 dBm



99

12:33:02 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM

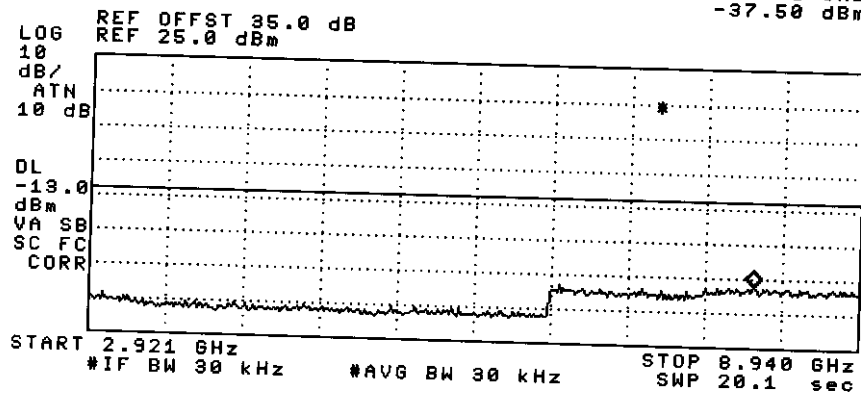
ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 1.468 GHz
 -48.31 dBm



#100

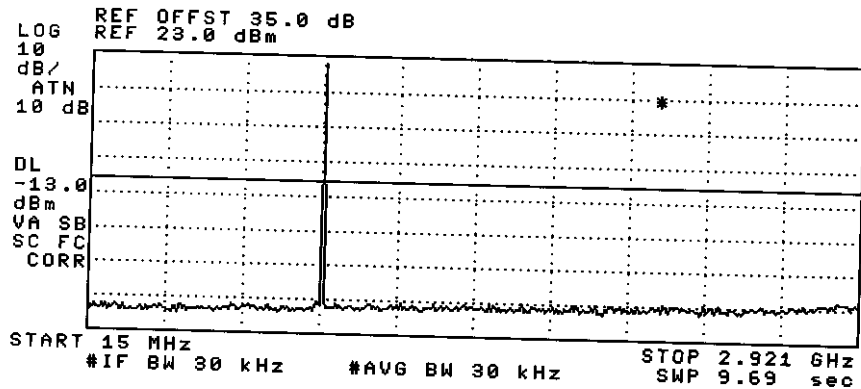
12:33:58 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.1.2); AVAL(PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 8.112 GHz
 -37.50 dBm



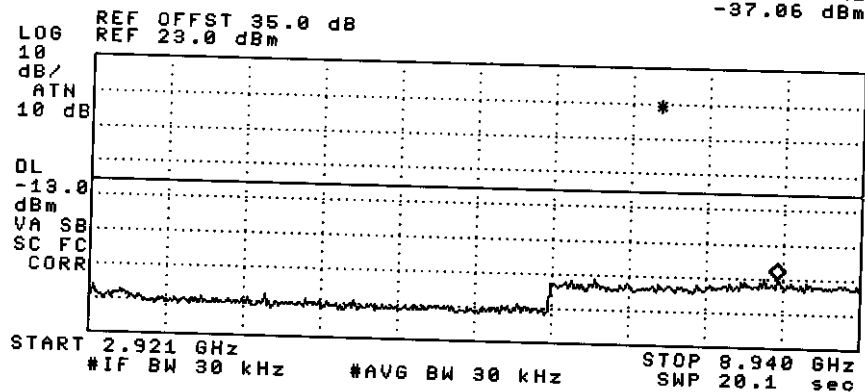
#101

14:21:55 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG



#102

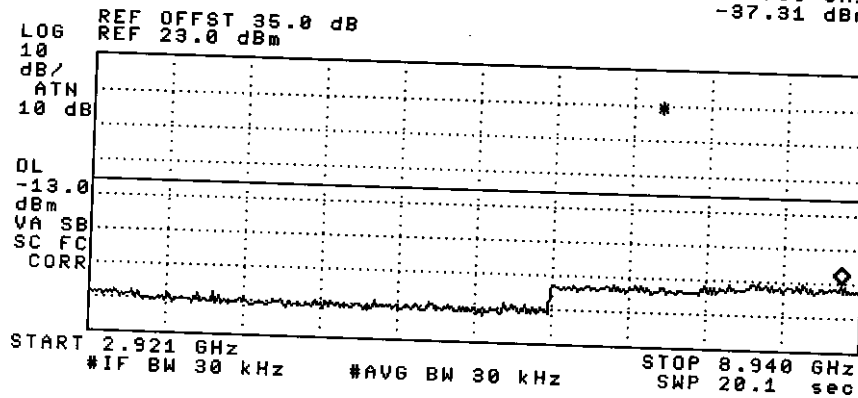
14:22:48 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.1.2); (PICOBT5-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 8.293 GHz
 -37.06 dBm



#103

14:44:20 NOV 24, 1998 OUT OF BAND
22.9170 (PICOBTTS-800), PSEUDO-RANDOM

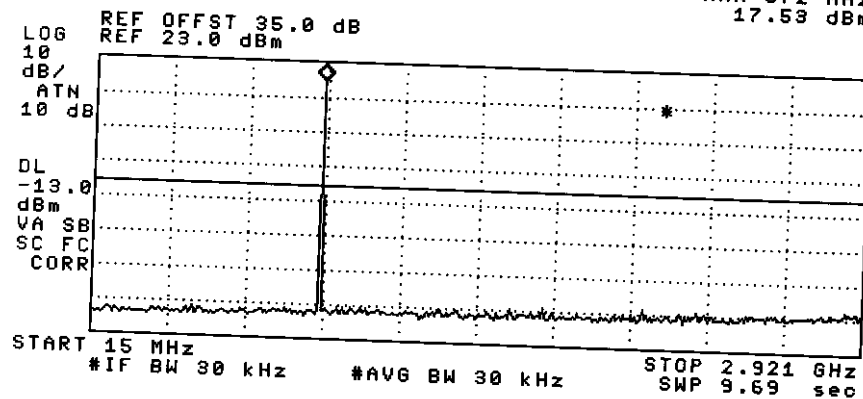
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.790 GHz
-97.31 dBm



#104

14:44:59 NOV 24, 1998 OUT OF BAND
22.9170 (PICOBTTS-800), PSEUDO-RANDOM

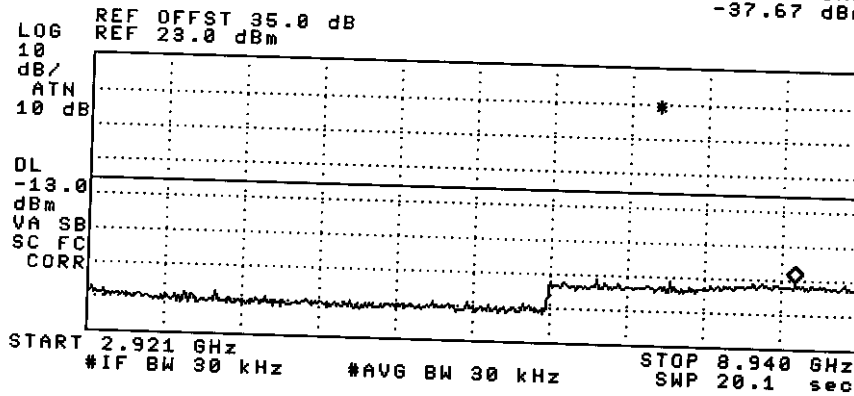
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 872 MHz
17.53 dBm



#105

15:05:36 NOV 24, 1998 OUT OF BAND
22.9170; (PICOBT5-800), PSEUDO-RANDOM

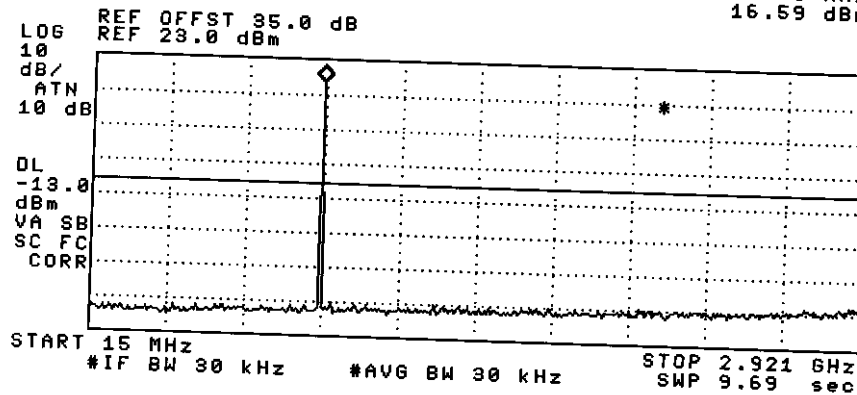
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.443 GHz
-37.67 dBm



#106

15:06:20 NOV 24, 1998 OUT OF BAND
22.9170; (PICOBT5-800), PSEUDO-RANDOM

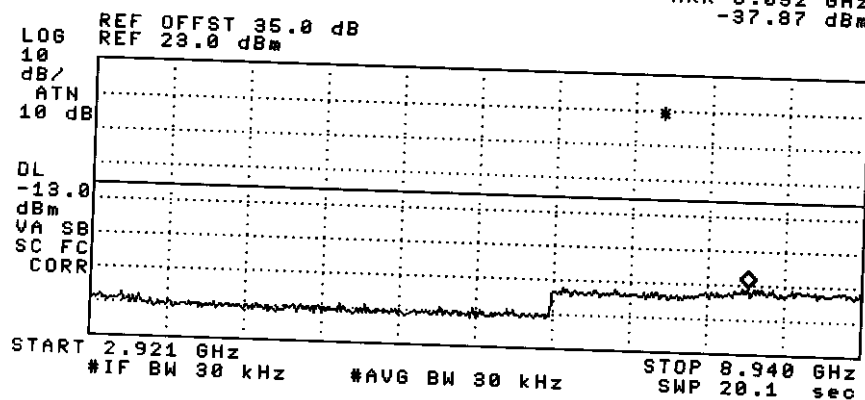
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 880 MHz
16.59 dBm



#107

15:28:13 NOV 24, 1998 OUT OF BAND
22.9170; (PICOBTIS-800), PSEUDO-RANDOM

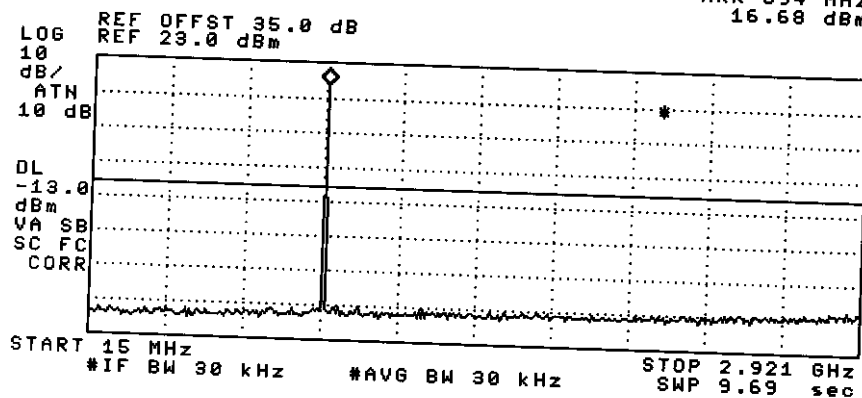
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.052 GHz
-37.87 dBm



#108

15:28:44 NOV 24, 1998 OUT OF BAND
22.9170; (PICOBTIS-800), PSEUDO-RANDOM

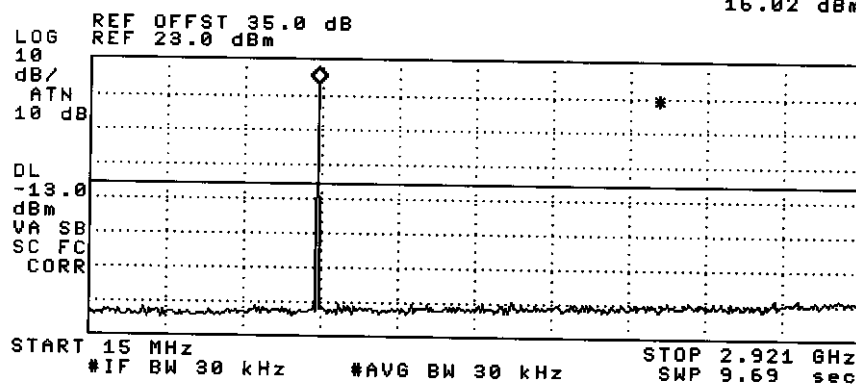
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 894 MHz
16.68 dBm



#109

14:42:45 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

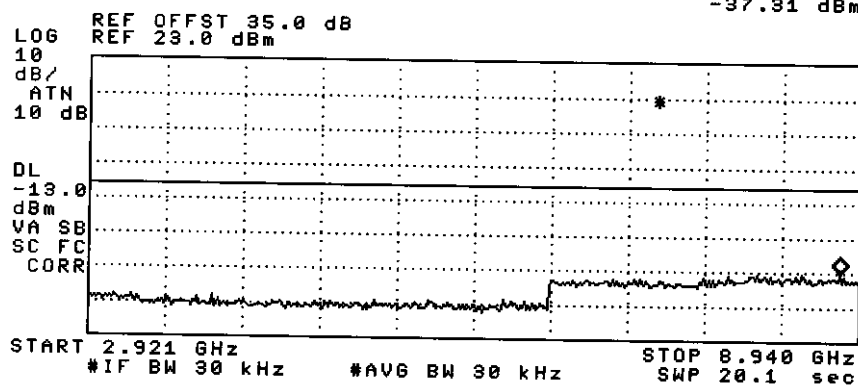
ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 872 MHz
 16.02 dBm



#110

14:43:32 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

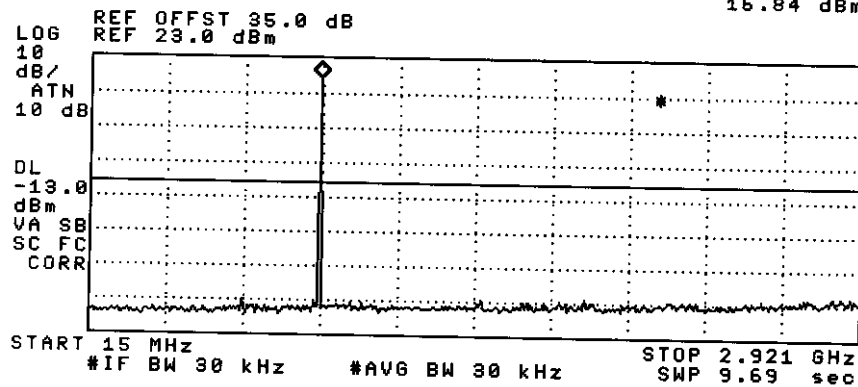
ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 8.790 GHz
 -37.31 dBm



#111

15:03:21 NOV 24, 1998 OUT OF BAND
IS-138A (3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

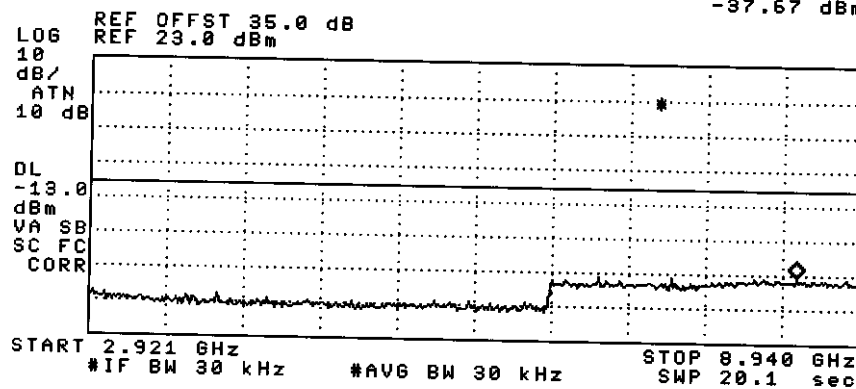
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 880 MHz
16.84 dBm



#1/2

15:04:22 NOV 24, 1998 OUT OF BAND
IS-138A (3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

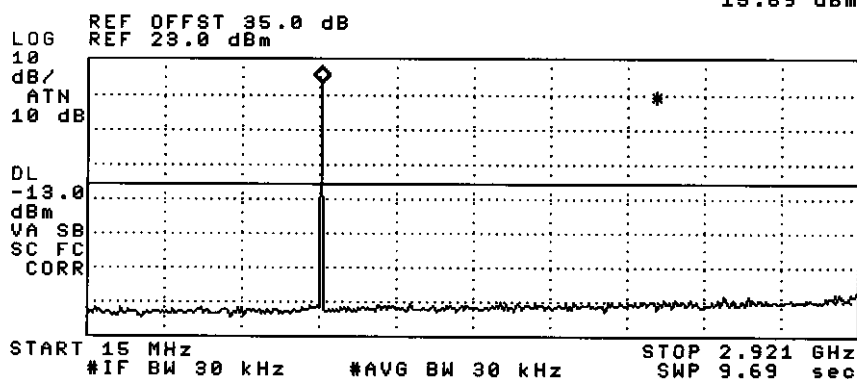
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.443 GHz
-37.67 dBm



#13

15:26:27 NOV 24, 1998 OUT OF BAND
IS-138A (3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

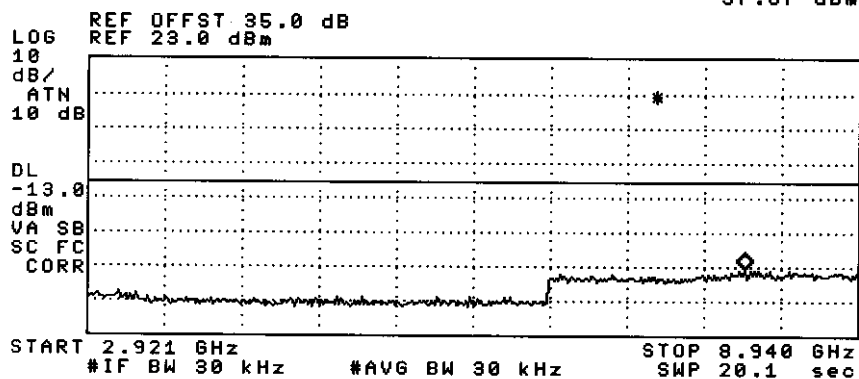
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 894 MHz
15.69 dBm



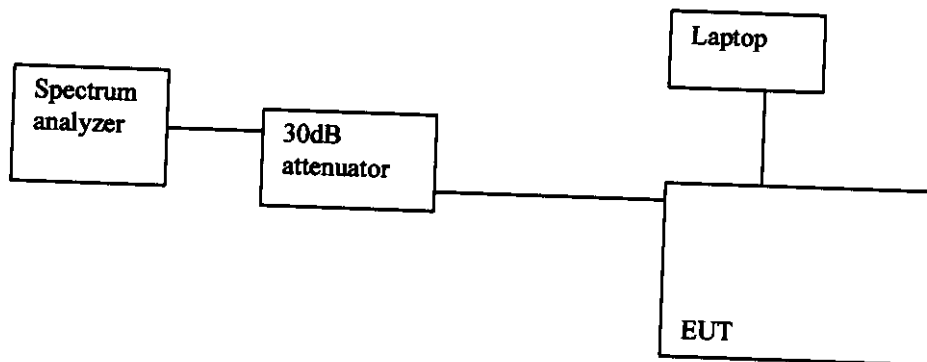
#114

15:27:18 NOV 24, 1998 OUT OF BAND
IS-138A (3.4.1.2); (PICOBTS-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.052 GHz
-37.87 dBm



#115

TWO-TONE TEST (spurious emissions at antenna terminal)**Equipment used.****HP Spectrum Analyzer/8593EM****Narda 30dB Attenuator****Flexco low loss cables, 9ft. (Loss: 0.85 dB/ft @ 26GHz)****NEC Laptop Computer.****TEST SETUP:****Minimum Requirement:****IS-138A (3.4.4):**

Intermodulation products must be attenuated below the rated power of the Eut by at least $43 + 10\log(P)$, or 60 dB, whichever is lesser attenuation. Equivalent to -13 dBm.

Test Procedure:

A) Tested both the **DVSTY** and **MAIN**, so that the two input signals are equal in level (and can be raised equally).

When testing two-tone one intermodulation product is outside the passband and the other intermodulation product is inside the passband.

Example:

Eut frequency passband range: 869 to 894 MHz.

To calculate f_3 and f_4 use: $f_3 = 2(f_1) - f_2$
 $f_4 = 2(f_2) - f_1$

For example:

$f_1 = 870$ MHz

$f_2 = 880$ MHz

$f_3 = 2(870) - 880 = 860 \text{ MHz}$ (it is outside the passband)
 $f_4 = 2(880) - 870 = 890 \text{ MHz}$ (it is inside the passband)

So, the first radio was be set to 870 MHz and the second radio was set to 880 MHz.

Set the REW BW: 30 kHz and SPAN enough to show both the two-tone and intermodulation products. Using the DISPLAY LINE place it at -13 dBm. Use enough attenuation to prevent overload at spectrum analyzer input

With the same setup as above scan from 1MHz to 10th harmonic of carrier, while ignoring the two-tone and intermodulation products

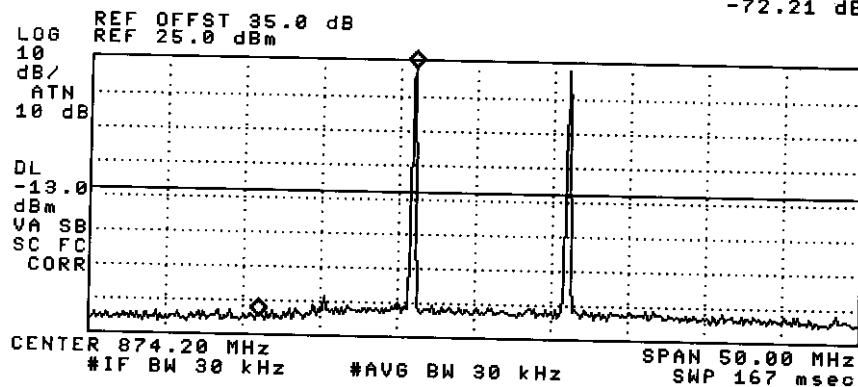
Test Result:

Make Plots of the Two-Tone test and Out-of-Band emission. Table shows the order of plots.

DIGITAL MODE:

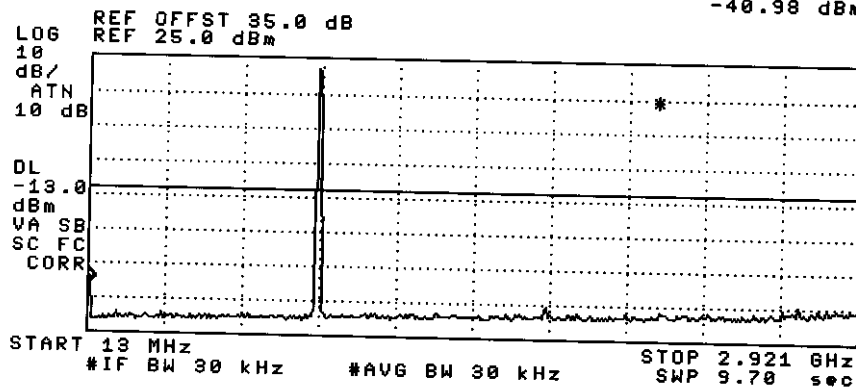
MAIN ANTENNA PORT	
TWO-TONE TEST	PLOT NUMBER
OUT-OF -BAND	116
OUT-OF-BAND	117
OUT-OF-BAND	118
DVSTY ANTENNA PORT	
TWO-TONE TEST	PLOT NUMBER
OUT-OF -BAND	119
OUT-OF-BAND	120
OUT-OF-BAND	121

12:17:17 NOV 24, 1998
 IS-138A(3.4.4); AVAL(PICOBTS-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKRA -10.00 MHz
 -72.21 dB



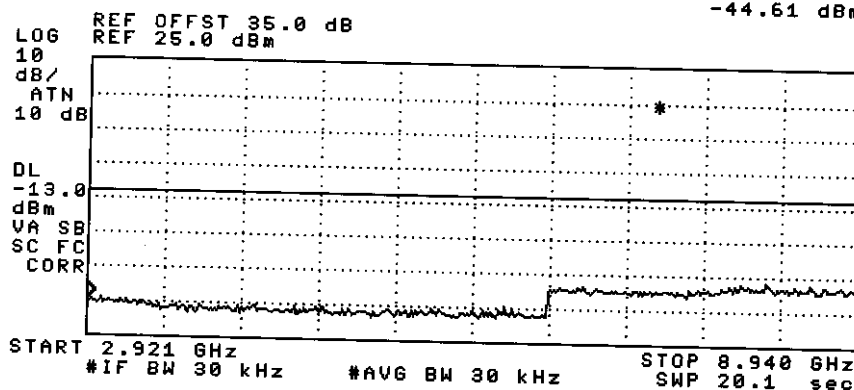
#116

12:20:54 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.4); AVAL(PICOBTS-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 13 MHz
 -40.98 dBm



#117

12:22:22 NOV 24, 1998 OUT OF BAND
 IS-138A(3.4.4); AVAL(PICOBTS-800), PSEUDO-RANDOM
 ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 2.921 GHz
 -44.61 dBm

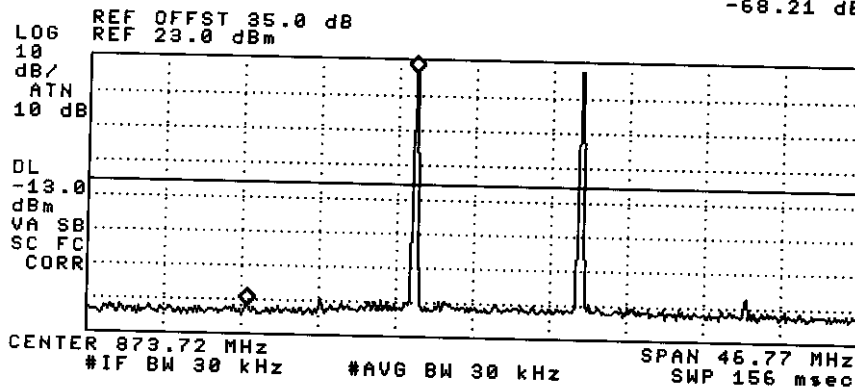


#118

15:42:11 NOV 24, 1998

IS-138A (3.4.4); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ -10.06 MHz
-68.21 dB

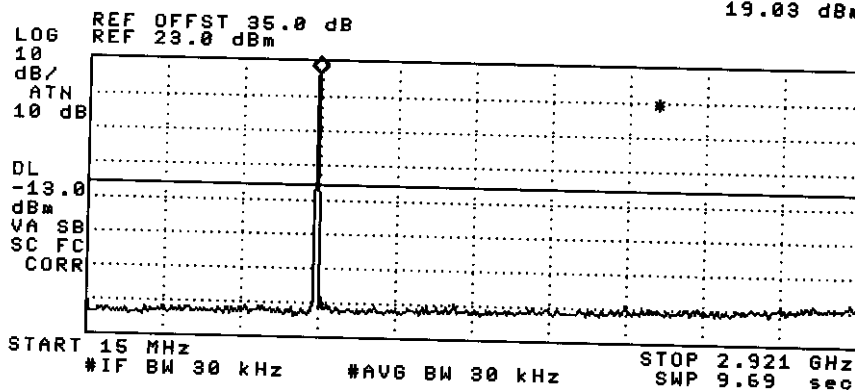


#119

15:43:09 NOV 24, 1998

IS-138A (3.4.4); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 880 MHz
19.03 dBm

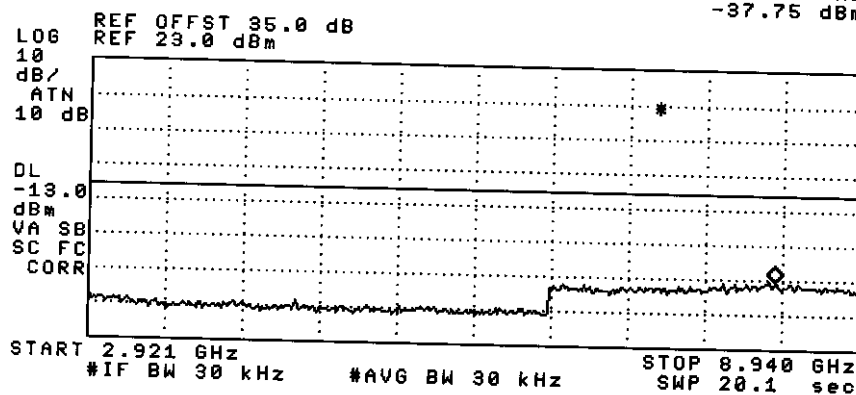


#120

15:44:21 NOV 24, 1998 OUT OF BAND

IS-138A (3.4.4); (PICOBT5-800), PSEUDO-RANDOM

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.278 GHz
-37.75 dBm



#121

SECTION 2.1053 (2.993): FIELD STRENGTH OF SPURIOUS RADIATION.**Equipment used.**

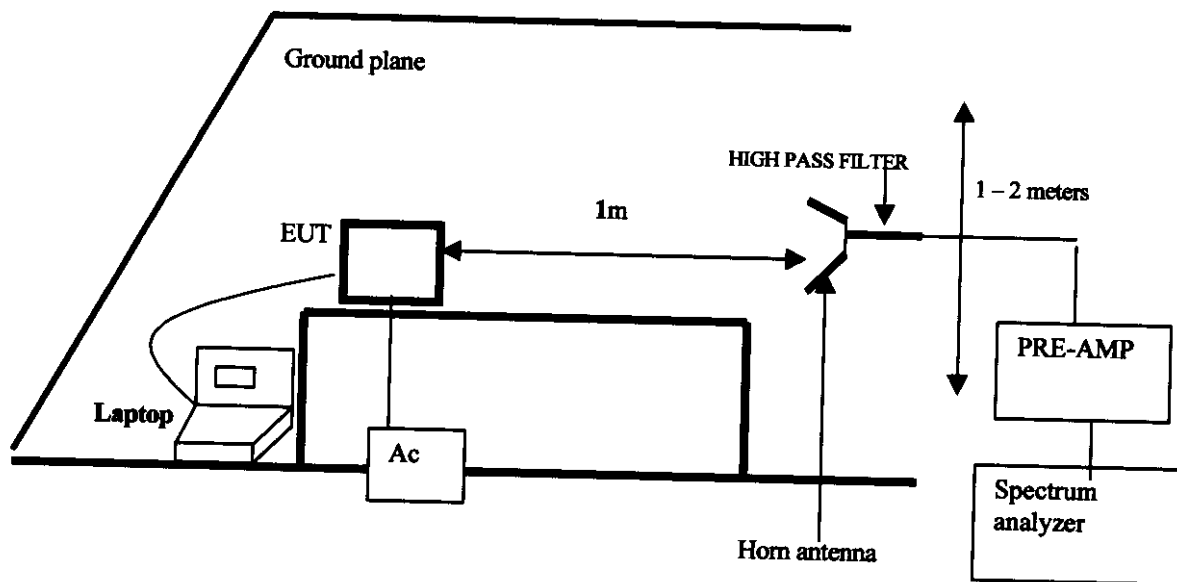
Emco Horn Antenna/3146

HP Pre-Amp (1 – 26.5 GHz)/8449B

HP Spectrum Analyzer/8593EM

FSY High Pass Filter (1.802GHz)/001

FLEXCO cable/20761; 19ft. coaxial cable (loss: .9dB/ft @ 26GHz)

Test setup**Minimum Requirement:**

The magnitude of each spurious and harmonic emissions detected as being radiated from the EUT must be at a level no more than $43 + 10 \log$ (mean output power, watts) dB below the mean power output (-13dBm).

Resultant radiated field at 3 meters from -13dBm source feeding isotropic antenna: 82 dBuV/m.

Test procedure:

EUT antenna output was terminated with a 50-ohm terminator. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3 ft from the EUT. With the transmitter operating at full power the turntable was slowly rotated to locate the direction of maximum emission once maximum direction was determined; the search antenna was raised and lowered in both vertical and horizontal polarization.

Test Result:

The maximum readings so obtained are recorded in a spreadsheet attached.

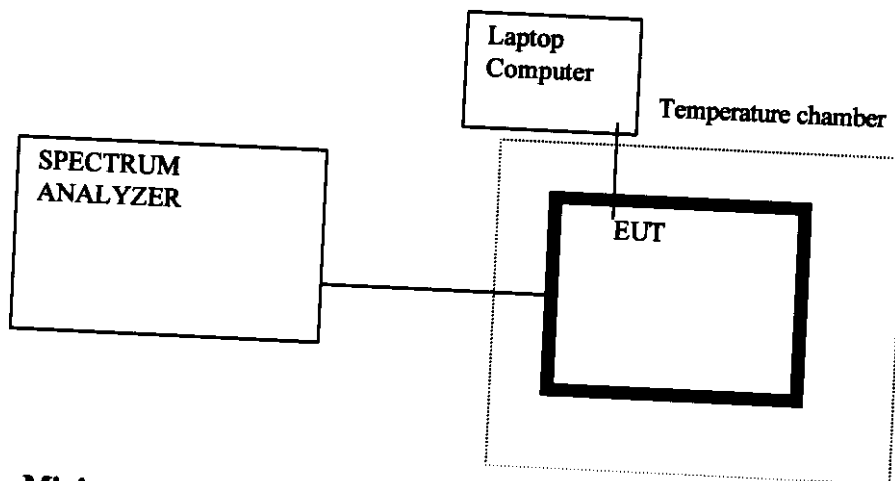
Compliance Certification Services										11/24/1998	
IS-138A(3.4.2.2) AND FCC 22.917(E)										Juan Martinez (1Meter)	
Aval Communications											
Wireless Base Station Unit.											
fo=881.5MHz											
F(MHz)	PK dBuv	AF (dB)	CL (dB)	AMP (dB)	DIST (dB)	OTHER (dB)	TOTAL (dBUV/m)	LIMIT (dBUV/m)	MARGIN (dBUV/m)		
							PK	PK	PK		
1763	64.53	26	2.34	-35.5	-9.5	0	47.87	82	-34		
2644	65.47	29.9	2.88	-35.5	-9.5	1	54.25	82	-28		
3526	54.43	33.1	4.68	-35.5	-9.5	1	48.21	82	-34		
4407n.f.	43.78	32.3	5.22	-35.5	-9.5	1	37.3	82	-45		
5289n.f.	44.21	34.7	5.4	-35.5	-9.5	1	40.31	82	-42		
6171n.f.	43.87	35.5	5.58	-35.5	-9.5	1	40.95	82	-41		
7047n.f.	47.2	36.2	6.48	-35.5	-9.5	1	45.88	82	-36		
7932n.f.	48.6	37	6.84	-35.5	-9.5	1	48.44	82	-34		
8810n.f.	48.17	38.1	7.38	-35.5	-9.5	1	49.65	82	-32		
n.f.: Noise Floor											
AF: Antenna Factor									RES	VBW	
AMP: Pre-amp gain									PK:	1MHz	1MHz
CL: Cable loss									PK:	Peak	

SECTION 2.1055 (Was Section 2.995): FREQUENCY STABILITY**Test Equipment:**

HP Spectrum Analyzer/8593EM

FLEXCO cable; 1ft. coaxial cable (loss: .9dB/ft @ 26GHz)

NEC laptop computer

Test Setup:**Minimum Requirement:****IS-138A (3.1.2) Digital Mode:**TDMA: Within ± 0.25 ppm of assigned carrier**Test Method**

Temperature: Vary the ambient temperature from -30 to +50°C, in 10 degree increments, allowing the EUT to stabilize at each temperature.

Primary Supply Voltage: Vary the supply voltage from 85% to 115% of the nominal operating voltage

Test Results

TX Output: 881.550000 MHz (Ch 385)

.25 ppm: ± 220.4 Hz

Temp°C	F(Hz)
+50	881.550045
+40	881.550011
+30	881.550011
+20	881.550054
+10	881.550033
0	881.550069
-10	881.550026
-20	881.550089

-30

881.550016

TX Output: 881.550088 MHz (Ch 385)

.25 ppm: ± 220.4 Hz

Voltage Stability reference voltage 24Vdc:

881.550088 :85%
(20.4 VDC)881.550088 :115%
(27.6 VDC)

Voltage Stability reference voltage 48Vdc:

881.550088:85%
(40.8 VDC)881.550032:104%
(50 VDC)

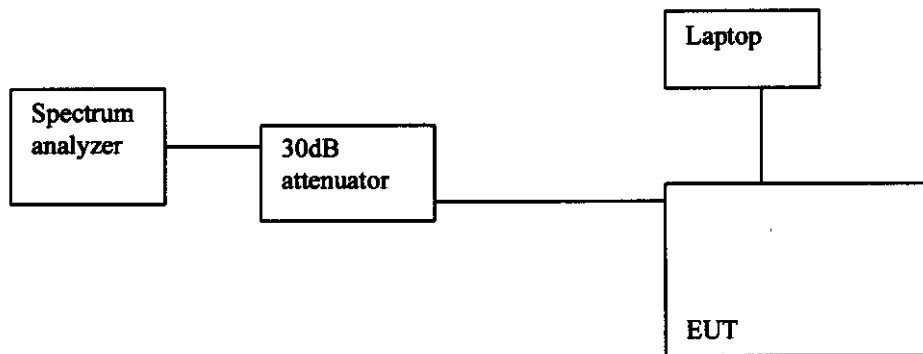
Note: for reference 48Vdc only 104 percent was tested, because Eut will shut down at 50Vdc, which is the manufactures stated maximum voltage level for this Eut.

21. RECEIVER SECTION

Equipment used.

HP Spectrum Analyzer/8593EM
Narda 30dB Attenuator
Flexco low loss cables, 9ft. (Loss: 0.85 dB/ft @ 26GHz)
NEC Laptop Computer.

TEST SETUP:



Minimum Requirement:

IS-138A (2.4) Conducted Spurious Emissions:

- A) No spurious-output signals appearing at the antenna terminals shall exceed 1000uV across 50 ohm (or equivalent output power of – 47 dBm).
- B) No spurious-output signals appearing at the antenna terminals and falling within the associated base station receive band shall exceed 22.4uV across 50 ohm (or equivalent output power of – 80 dBm).
- C) No spurious-output signals appearing at the antenna terminals and falling within the base station transmit band shall exceed 224uV across 50 ohm (or equivalent output power of – 60 dBm).

15.111; Conducted Spurious Emissions

No spurious-output signals appearing at the antenna terminals shall exceed 2nW across 50 ohm (or equivalent output power of – 57 dBm).

Test Result:

Plots of A, B, C, and 15.111 are included for low, middle, and high modes. Table shows the order of plots.

IS-138A (2.4)

824MHz(LOW)	
	PLOT NUMBER
A	122
A	123
B	124
C	125
836MHz(MIDDLE)	
	PLOT NUMBER
A	126
A	127
B	128
C	129
849MHz(HIGH)	
	PLOT NUMBER
A	130
A	131
C	132
B	133

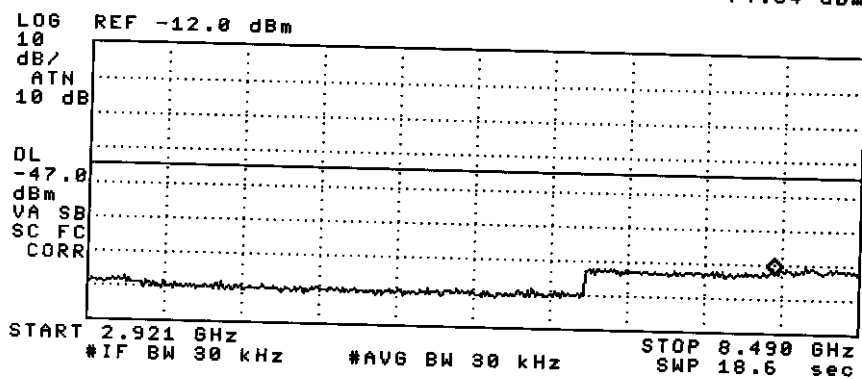
15.111; CONDUCTED

824MHz(LOW)	
	PLOT NUMBER
	134
	135
836MHz(MIDDLE)	
	PLOT NUMBER
	136
	137
849MHz(HIGH)	
	PLOT NUMBER
	138
	139

15:56:15 NOV 24, 1998
IS-138A(2.4) RX MODE; SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 7.877 GHz
-74.84 dBm

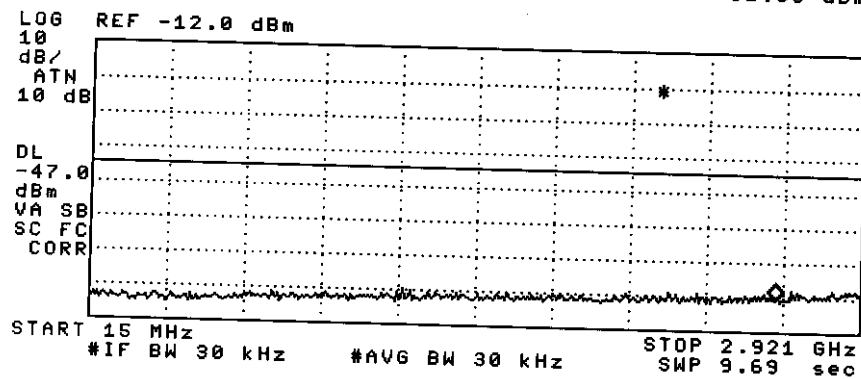
A)
H122



15:56:57 NOV 24, 1998
IS-138A(2.4) RX MODE; SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.601 GHz
-82.65 dBm

A)
H123



15:59:39 NOV 24, 1998

IS-138A(2.4) RX MODE; SCANNER(PICOBTS-800)

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MR 827.63 MHz
-85.01 dBm

B)

#127

LOG REF -22.0 dBm

10

dB/

ATN

10 dB

DL

-80.0

dBm

VA SB

SC FC

CORR

START 824.00 MHz

#IF BW 30 kHz

#AVG BW 30 kHz

STOP 849.00 MHz

SWP 83.3 msec

16:00:17 NOV 24, 1998

IS-138A(2.4) RX MODE; SCANNER(PICOBTS-800)

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MR 872.63 MHz
-86.15 dBm

C)

#125

LOG REF -22.0 dBm

10

dB/

ATN

10 dB

DL

-60.0

dBm

VA SB

SC FC

CORR

START 869.00 MHz

#IF BW 30 kHz

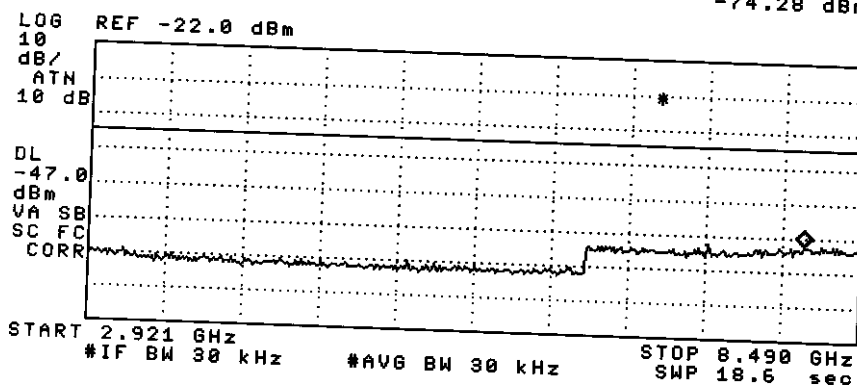
#AVG BW 30 kHz

STOP 894.00 MHz

SWP 83.3 msec

16:11:34 NOV 24, 1998
IS-138A(2.4) RX MODE; SCANNER(PICOBTS-800)

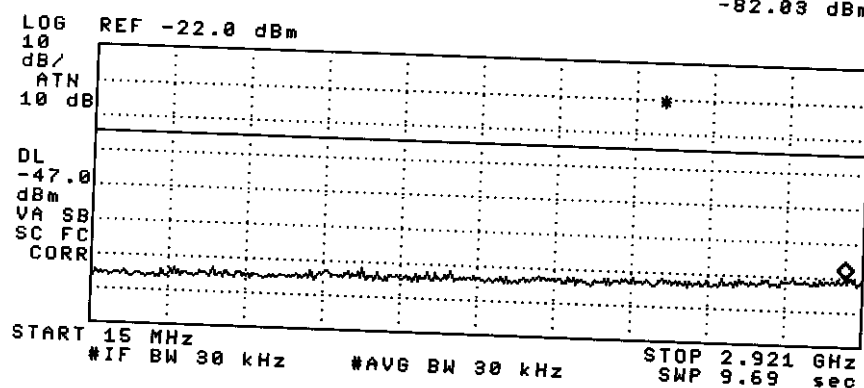
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.086 GHz
-74.28 dBm



#126

16:12:30 NOV 24, 1998
IS-138A(2.4) RX MODE; SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.856 GHz
-82.03 dBm



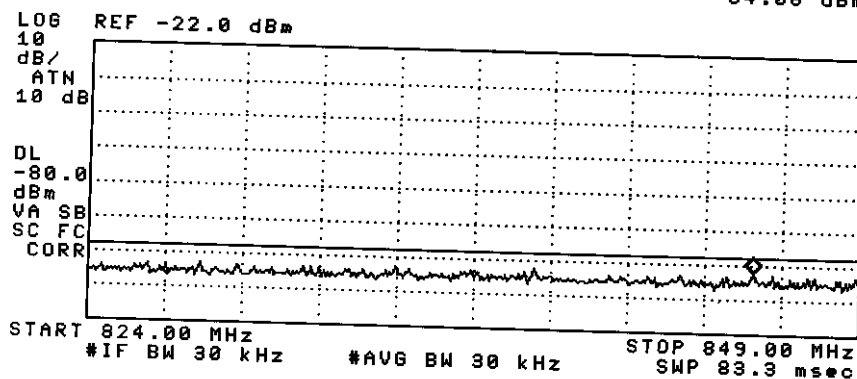
#127

16:14:25 NOV 24, 1998
IS-138A(2.4) RX MODE: SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 845.56 MHz
-84.08 dBm

B)

#128

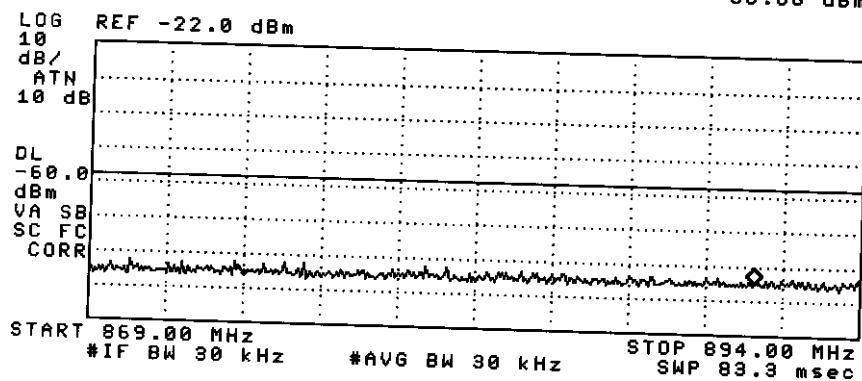


16:14:56 NOV 24, 1998
IS-138A(2.4) RX MODE: SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 890.56 MHz
-86.88 dBm

C)

#129



16:04:58 NOV 24, 1998

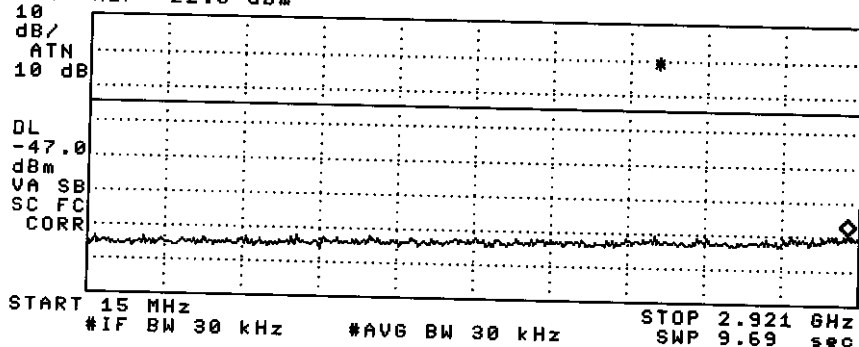
IS-138A(2.4) RX MODE: SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.877 GHz
-81.72 dBm

A)

#130

LOG REF -22.0 dBm



16:06:54 NOV 24, 1998

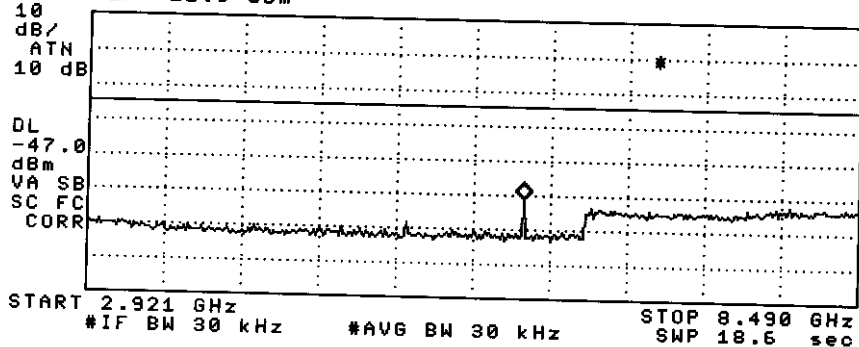
IS-138A(2.4) RX MODE: SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 6.067 GHz
-73.09 dBm

A)

#131

LOG REF -22.0 dBm

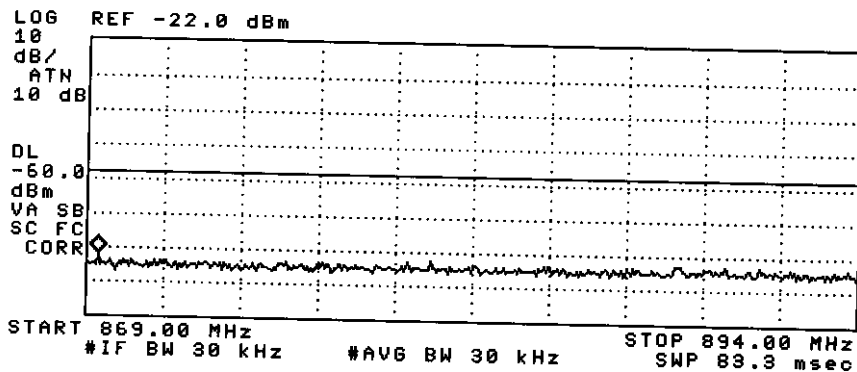


16:03:37 NOV 24, 1998
IS-138A(2.4) RX MODE; SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 869.38 MHz
-83.52 dBm

C)

#132

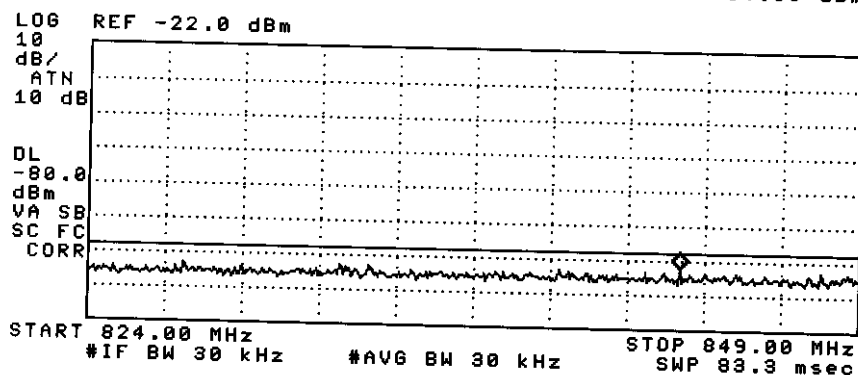


16:04:13 NOV 24, 1998
IS-138A(2.4) RX MODE; SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 843.19 MHz
-84.08 dBm

B)

#133



15:50:47 NOV 24, 1998

15.111 (RX MODE); (PICOBTs-800) SCANNER

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKR 2.601 GHz

-80.83 dBm

LOG REF -12.0 dBm

10

dB/

ATN

10 dB

DL

-57.0

dBm

VA SB

SC FC

CORR

START 15 MHz

#IF BW 30 kHz

#AVG BW 30 kHz

STOP 2.921 GHz

SWP 9.69 sec

H134

15:51:56 NOV 24, 1998

15.111 (RX MODE); (PICOBTs-800) SCANNER

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKR 7.877 GHz

-74.65 dBm

LOG REF -12.0 dBm

10

dB/

ATN

10 dB

DL

-57.0

dBm

VA SB

SC FC

CORR

START 2.921 GHz

#IF BW 30 kHz

#AVG BW 30 kHz

STOP 8.490 GHz

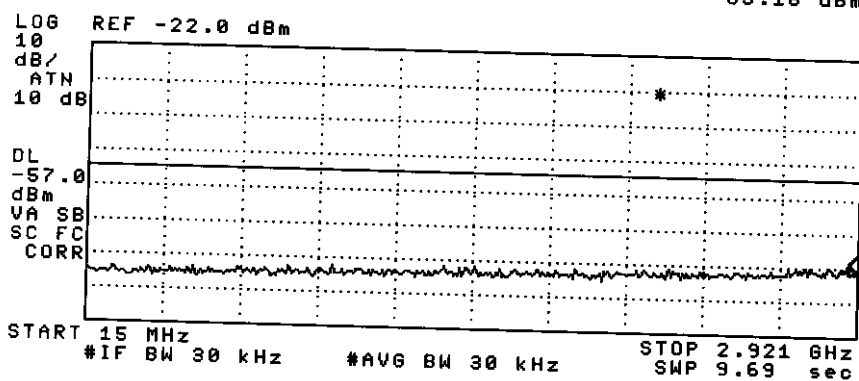
SWP 18.6 sec

E135

16:10:06 NOV 24, 1998
15.111 (RX MODE); SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.914 GHz
-88.18 dBm

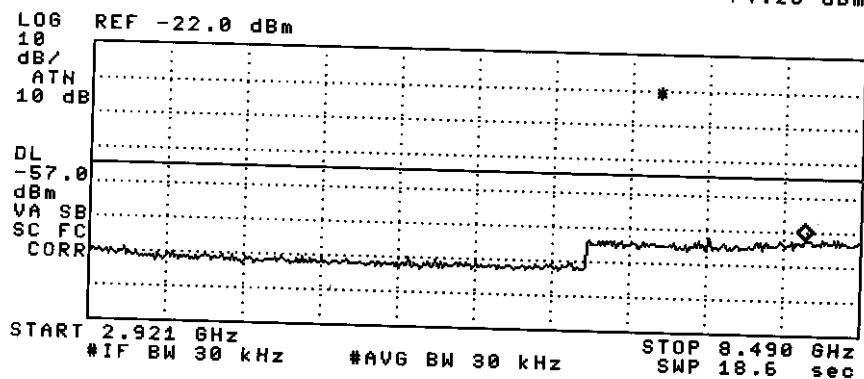
#136



16:11:01 NOV 24, 1998
15.111 (RX MODE); SCANNER(PICOBTS-800)

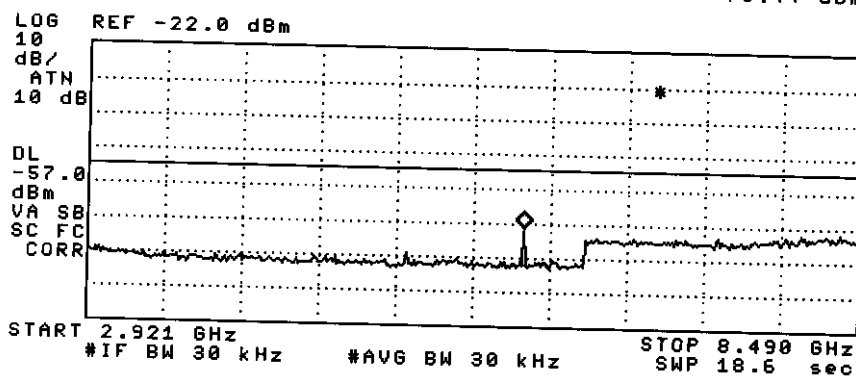
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 8.086 GHz
-74.28 dBm

#137



16:07:52 NOV 24, 1998
15.111 (RX MODE); SCANNER(PICOBTS-800)

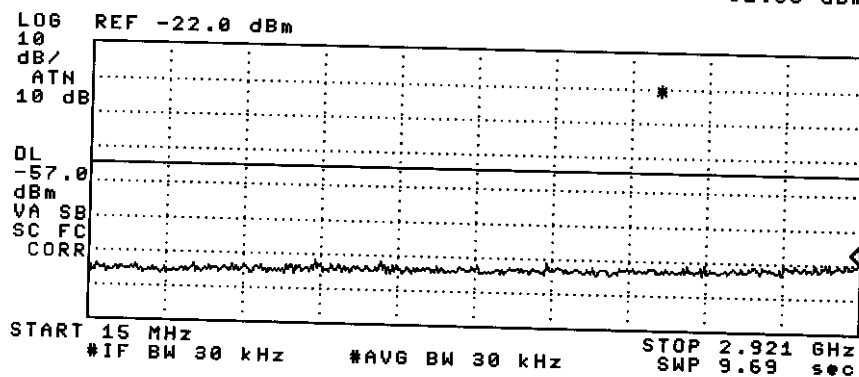
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 6.067 GHz
-73.44 dBm



#138

16:08:36 NOV 24, 1998
15.111 (RX MODE); SCANNER(PICOBTS-800)

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.914 GHz
-81.58 dBm



#139