Intertek Testing Services
ETL SEMKO

FCC Part 15.247 Direct Sequence Spread Spectrum Test Report

for

Proxim Corporation

on the

Tsunami Subscriber Unit

Model: 40100-XXX

FCC ID: HZB-US58-S60

Job #: 3018893

Date of Test: February 4, 2002

Total No of Pages contained in this Report: 36

Test Report #: 3018893

Date of Report: February 5, 2002

Revised: February 26, 2002

Revised: April 20, 2002

NVLAP Laboratory Code 200201-0

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Review Date: 9/24/02

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1.0 Summary of Tests

MODEL: 40100-XXX
FCC ID: HZB-US58-S60

TEST	REFERENCE	RESULTS
Output power	15.247(b)	Complies
6 dB Bandwidth	15.247(a)(2)	Complies
Power Density	15.247(d)	Complies
Out-of-band Antenna Conducted Emission	15.247(c)	Complies
Out-of-band Radiated Emission (except emissions in restricted bands)	15.247(c)	Not Applicable. The EUT passed out-of-band antenna conducted emission
Radiated Emission in Restricted Bands	15.209, 15.205	Complies
AC Line-conducted Emission	15.207	Complies
Radiated Emission from Digital Part	15.109	Complies
Radiated Emission from Receiver L.O.	15.109	Not Applicable. The operating frequency is above 960 MHz
Processing Gain	15.247(e)	Complies, see exhibit “Processing Gain”
RF Exposure Requirement	2.1091	Complies, see exhibit “RF Exposure”
Antenna Requirement	15.203	Complies. The EUT uses a permanently connected antenna

2.0 General Description

2.1 Product Description

The Tsunami Subscriber Unit consists of two major components: an outdoor unit (ODU) and an indoor power adapter (IPA). The two components are connected with a single category-5 cable (4 unshielded twisted pairs) to transfer direct-current power to the ODU and to transport 10/100BaseT Ethernet data to and from the ODU. The IPA provides a RJ-45 jack to connect the Ethernet data to either a computer or hub/switch. The ODU is an integrated antenna, radio modem, and Ethernet interface to provide fixed, broadband digital data services for individuals, businesses, and institutions.

As the device is used at a remote location to communicate with the Base Station unit at a central location, the transmission of the Subscriber unit is of fixed point-to-point.

A pre-production version of the EUT was received on September 18, 2001 in good operating condition.

Overview of the Tsunami Subscriber Unit

Applicant	Proxim Corporation
Trade Name & Model No.	Tsunami Subscriber Unit, Model 40100-XXX
FCC Identifier	HZB-US58-S60
Use of Product	Fixed Wireless Ethernet Access
Type of Transmission	TDD
Type of Modulation	QPSK R $^1/_2$
Rated RF Output	18 dBm (peak)
Frequency Range	5740 – 5810 MHz
Number of Channel(s)	6 channels maximum
Antenna(s) & Gain	Circle polarized internal permanently connected antenna, 21 dBi gain
Antenna Requirement	[X] The EUT uses a permanently connected antenna. [ ] The antenna is affixed to the EUT using a unique connector which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector. [ ] The EUT requires professional installation.
Manufacturer name & address	Proxim Corporation 1196 Borregas Avenue, Sunnyvale, , CA 94089 USA

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in parts 2 and 15 of CFR 47.

2.4 Test Facility

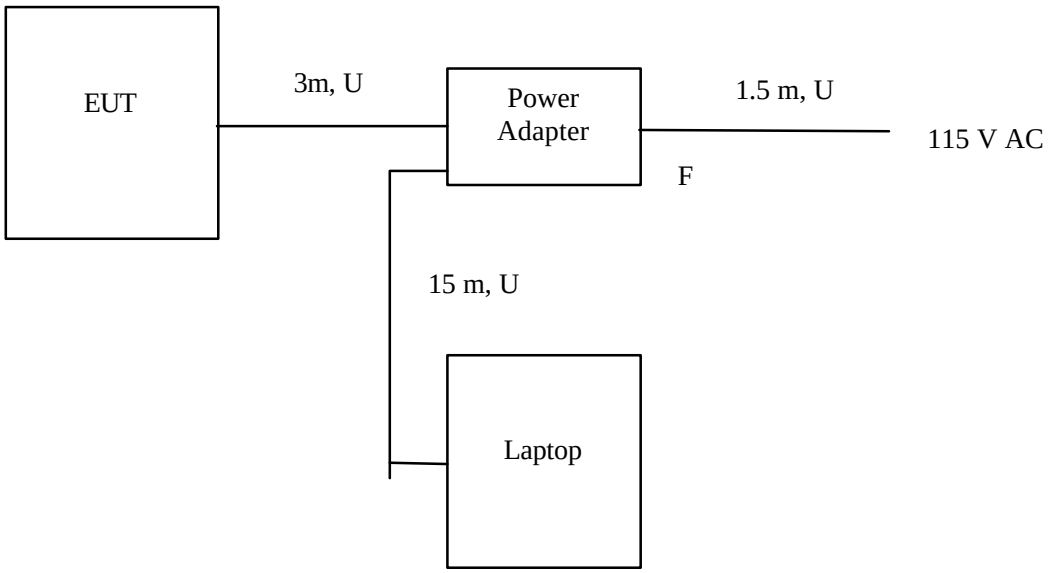
The open area test site and conducted measurement facility used to collect the radiated data is site 3. This test facility and site measurement data have been fully placed on file with the FCC and NVLAP accredited.

3.0 System Test Configuration

3.1 Support Equipment and description

Laptop computer: Hewlett Packard Omnibook 4150

3.2 Block Diagram of Test Setup



S = Shielded **U** = Unshielded	**F** = With Ferrite **M** = Meter

3.3 Justification

For emission testing, the Equipment Under Test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions.

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

3.5 Mode of operation during test

100% time transmitting signal on different channels with QPSK R $^{1}/_{2}$ modulation.

3.6 Modifications required for Compliance

No modifications were installed by Intertek Testing Services during compliance testing in order to bring the product into compliance (Please note that this does not include changes made specifically by Proxim Cor. prior to compliance testing).

3.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

4.0 Measurement Results

4.1 Conducted Output Power at Antenna Terminals
FCC Rules 15.247(b):

Requirements

For systems operating in the 5725 - 5850 MHz band that are used exclusively for fixed, point-to-point operations, maximum allowed transmitter output is 1 watt (+30 dBm).

Procedure

The antenna port of the 40100-XXX was connected to the input of a peak power meter. Power was read directly and cable loss correction was added to the reading to obtain the power at the 40100-XXX antenna terminal.

Test Results

Frequency (MHz)	Output in mW
5740	61.3
5768	62.1
5810	63.1

4.2 6 dB RF Bandwidth
FCC Rule 15.247(a)(2):

Requirements

The minimum 6-dB bandwidth shall be at least 500 kHz

Procedure

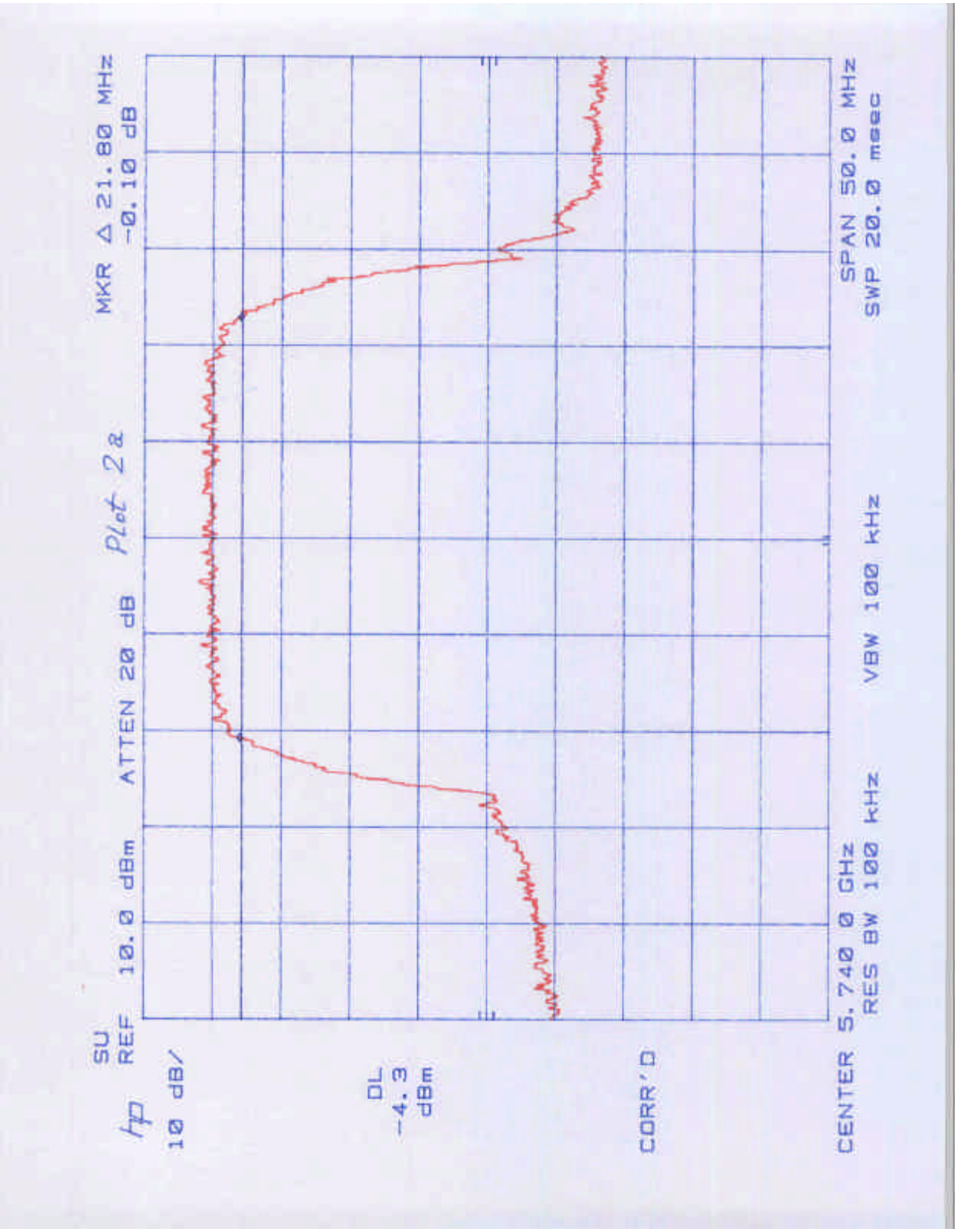
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6-dB bandwidth was determined from where the channel output spectrum intersected the display line.

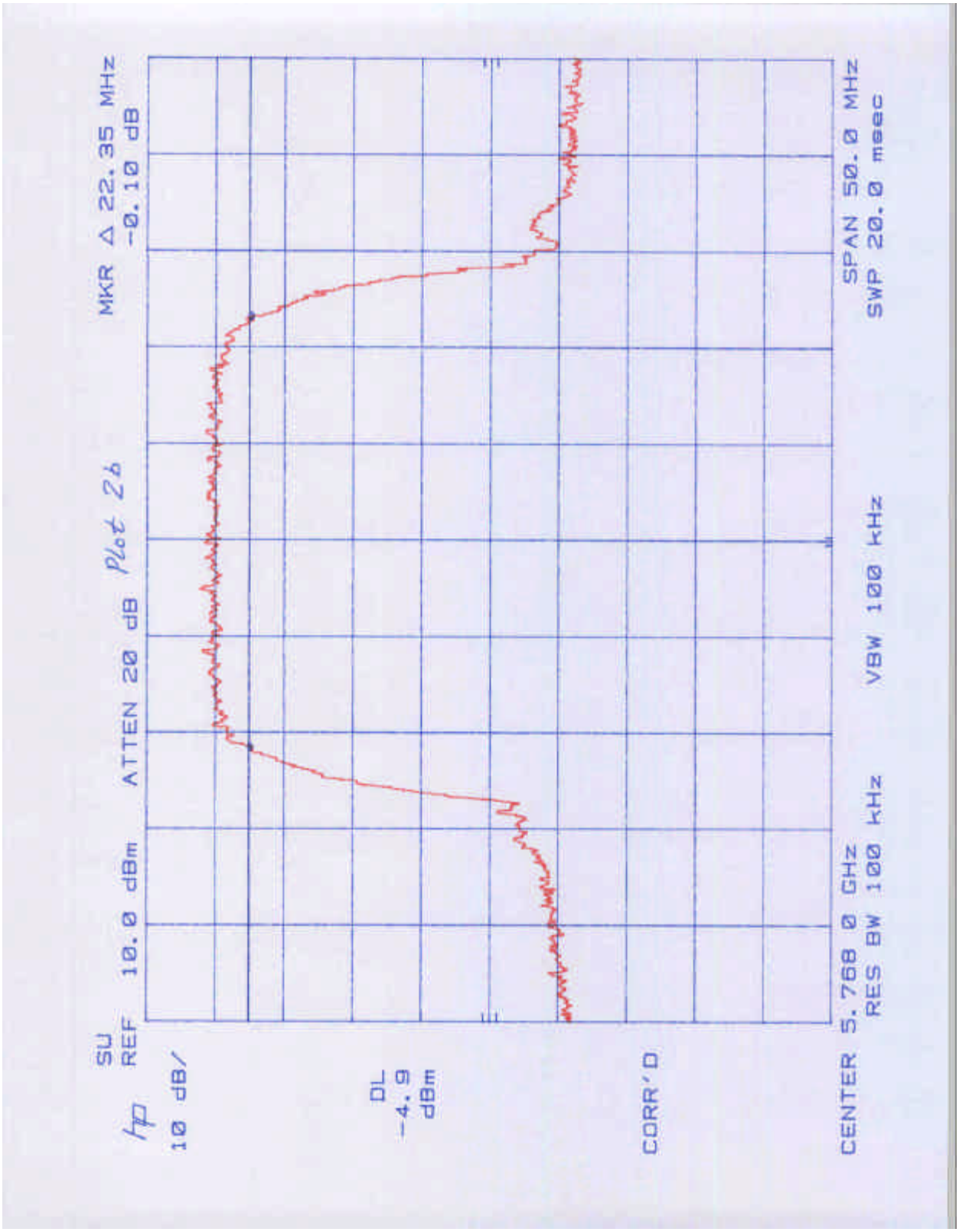
Test Result

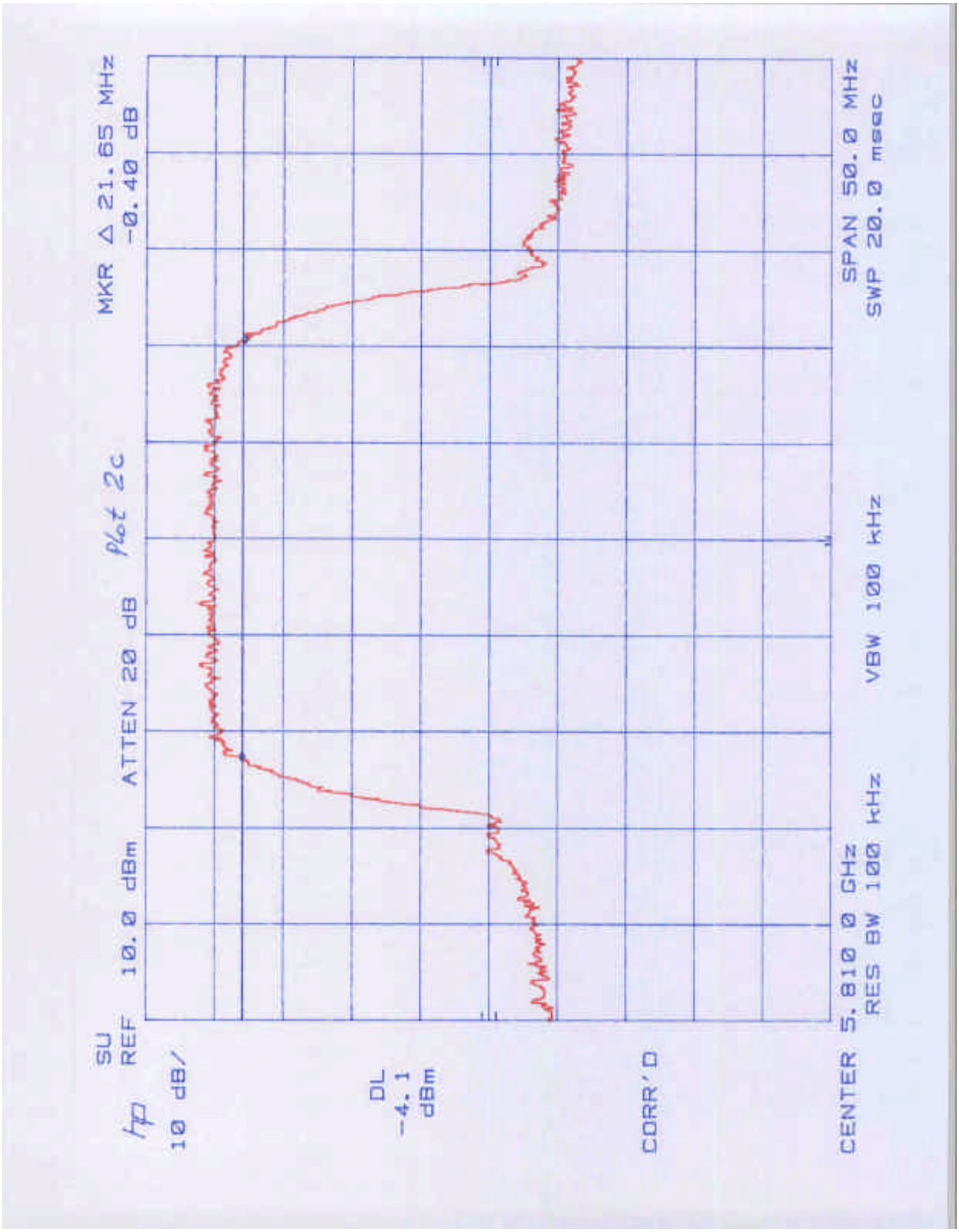
Frequency (MHz)	6 dB Bandwidth
5740	21.80 MHz
5768	22.35 MHz
5810	21.65 MHz

Refer to the following plots for 6 dB bandwidth:

Plot 2a: Low Channel, 6 dB RF Bandwidth
Plot 2b: Middle Channel, 6 dB RF Bandwidth
Plot 2c: High Channel, 6 dB RF Bandwidth


Plot 2a
MKR Δ 21.80 MHz
-0.10 dB
SPAN 50.0 MHz
SWP 20.0 msec
ATTEN 20 dB
VBW 100 kHz
SU
REF 10.0 dBm
RES BW 100 kHz
CENTER 5.740 0 GHz
10 dB/
DL
-4.3
dBm
CORR'D


MKR Δ 22.35 MHz
-0.10 dB
Plot 26
SPAN 50.0 MHz
SWP 20.0 msec
SU
REF 10.0 dBm
ATTEN 20 dB
VBW 100 kHz
10 dB/
DL
-4.9 dBm
CORR'D
CENTER 5.768 0 GHz
RES BW 100 kHz


MKR Δ 21.65 MHz
-0.40 dB
Plot 2c
SPAN 50.0 MHz
SWP 20.0 msec
SU
REF 10.0 dBm
ATTEN 20 dB
VBW 100 kHz
10 dB/
DL
-4.1
dBm
CORR'D
CENTER 5.810 0 GHz
RES BW 100 kHz

4.3 Power Density
FCC Rule 15.247(d):

Requirements

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Procedure

The spectrum analyzer RES BW was set to 3 kHz. The START and STOP frequencies were set to the band edges of the maximum output passband. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs. Total SWEEP TIME is calculated as follows:

SWEEP TIME (SEC) = (Fstop, kHz - Fstart, kHz)/3 kHz

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Test Result

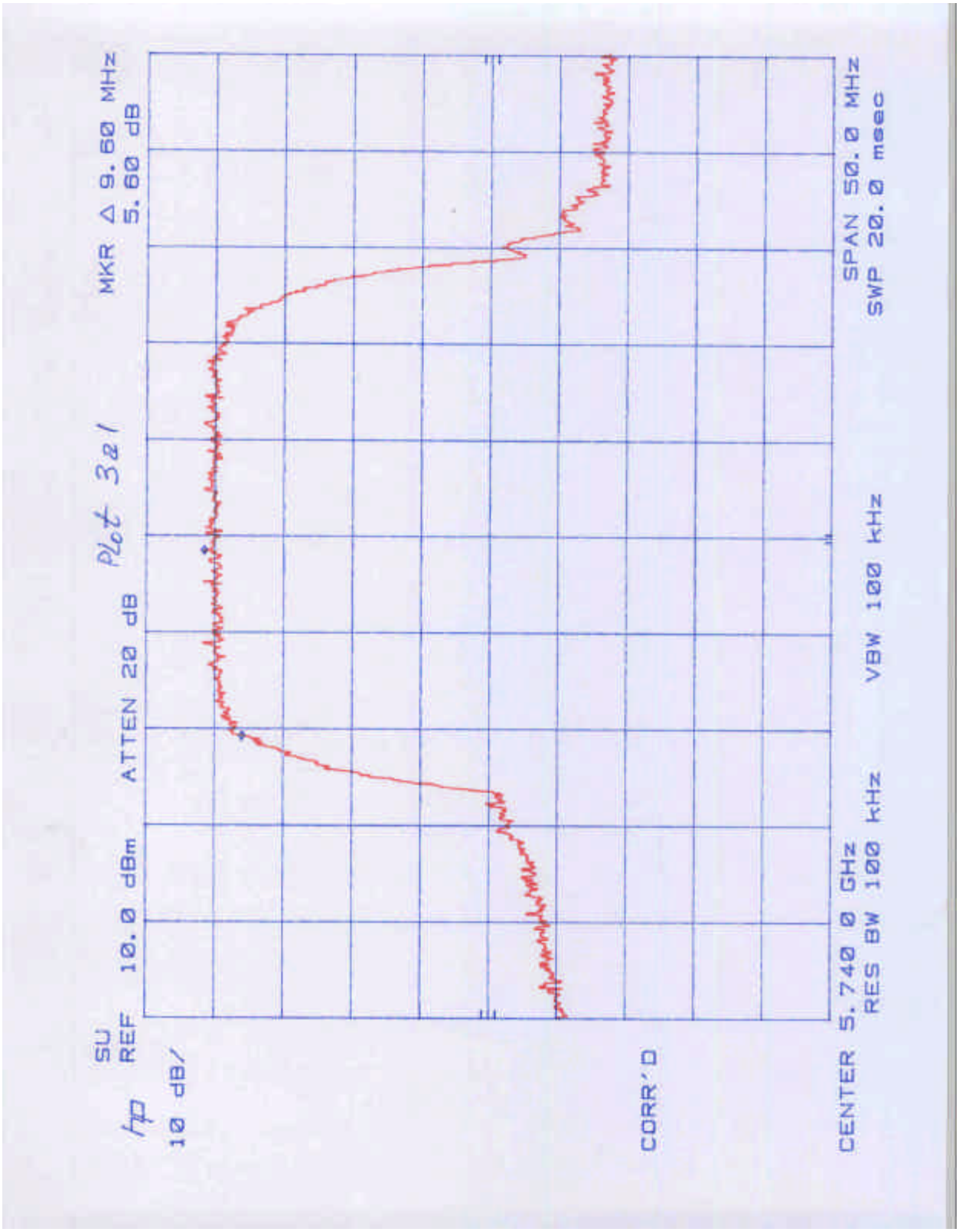
Frequency (MHz)	Power Density (dBm)
5740	-12.4
5768	-13.8
5810	-12.9

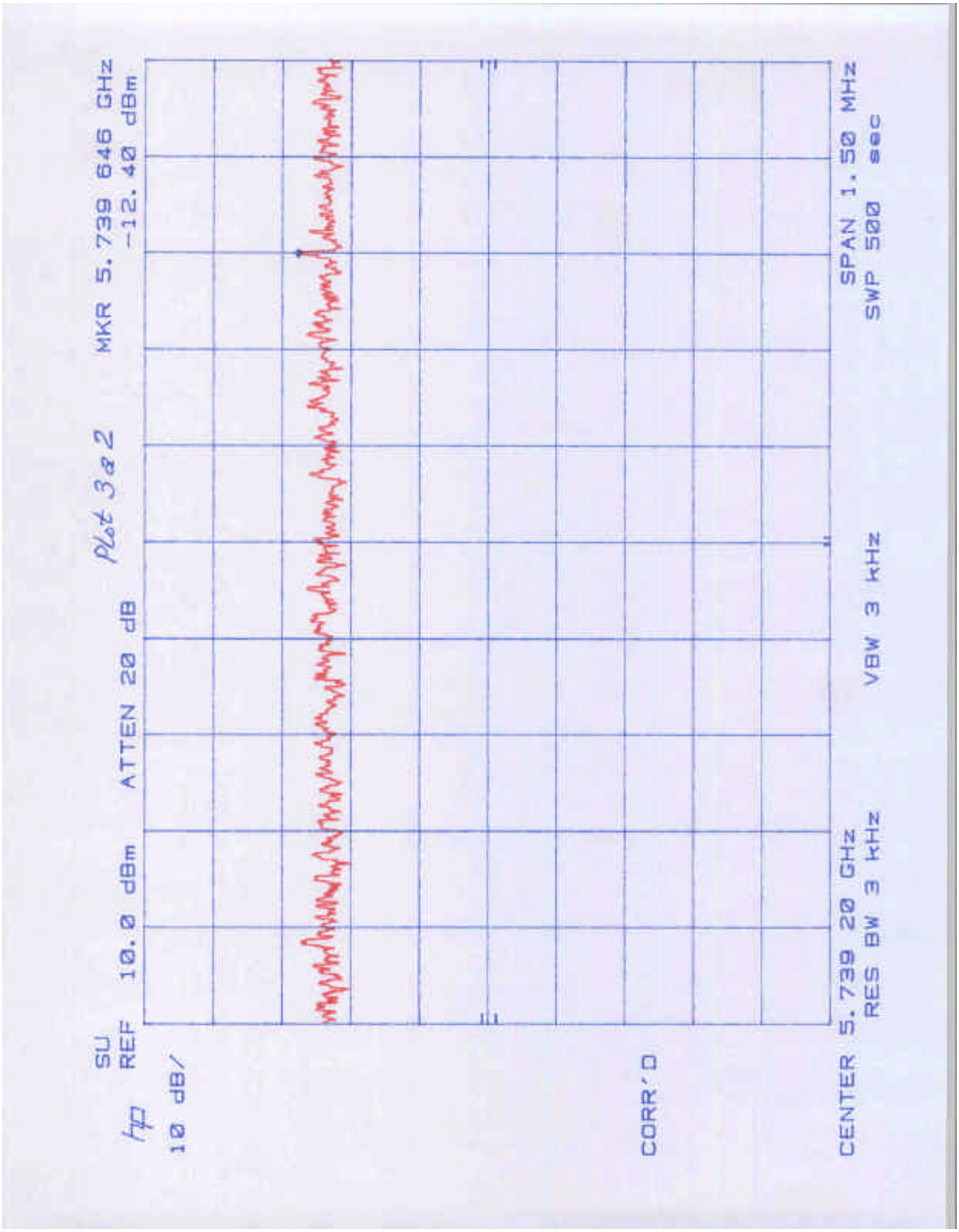
Frequency Span = 1500 kHz

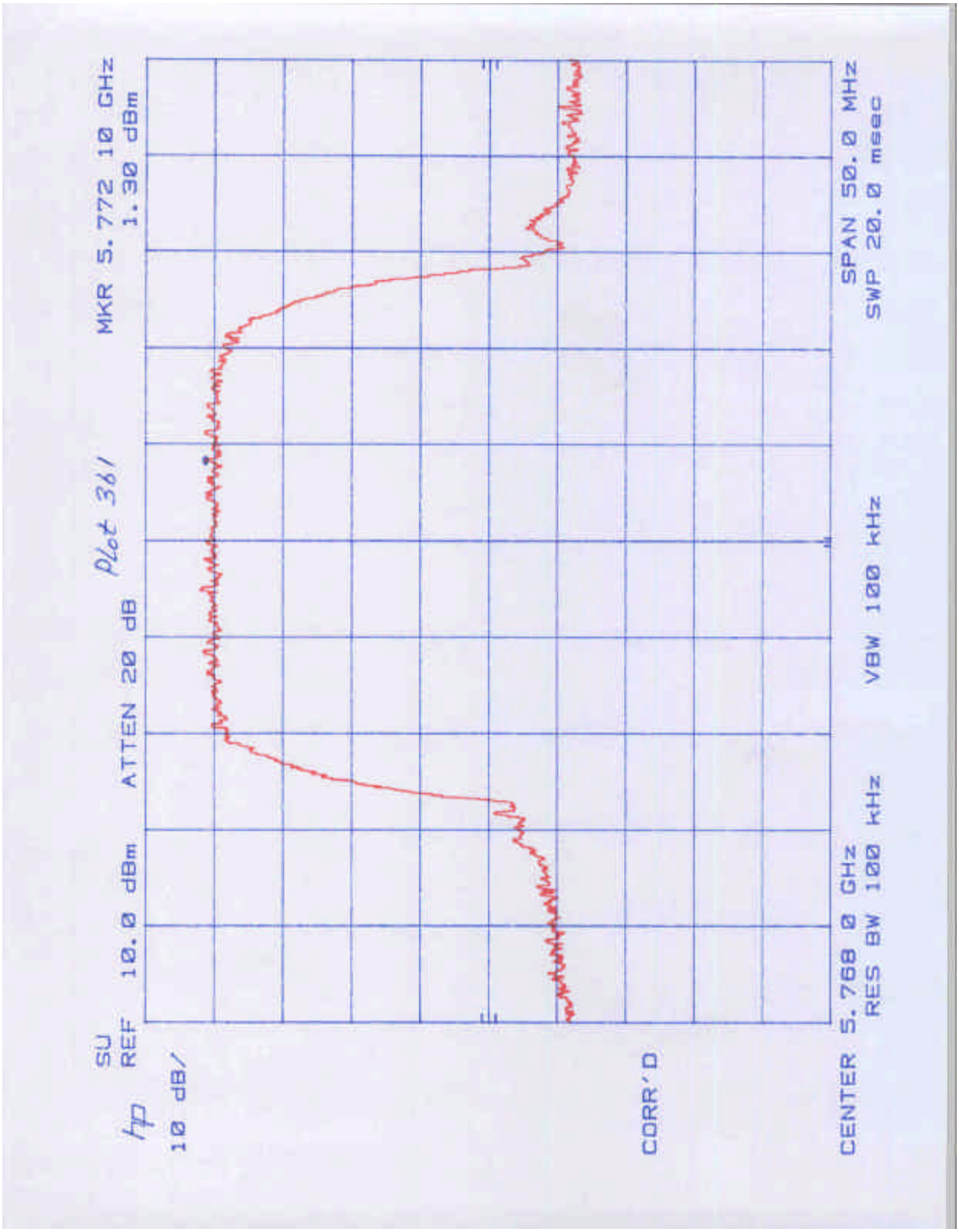
Sweep Time = Frequency Span/3 kHz = 500 Seconds

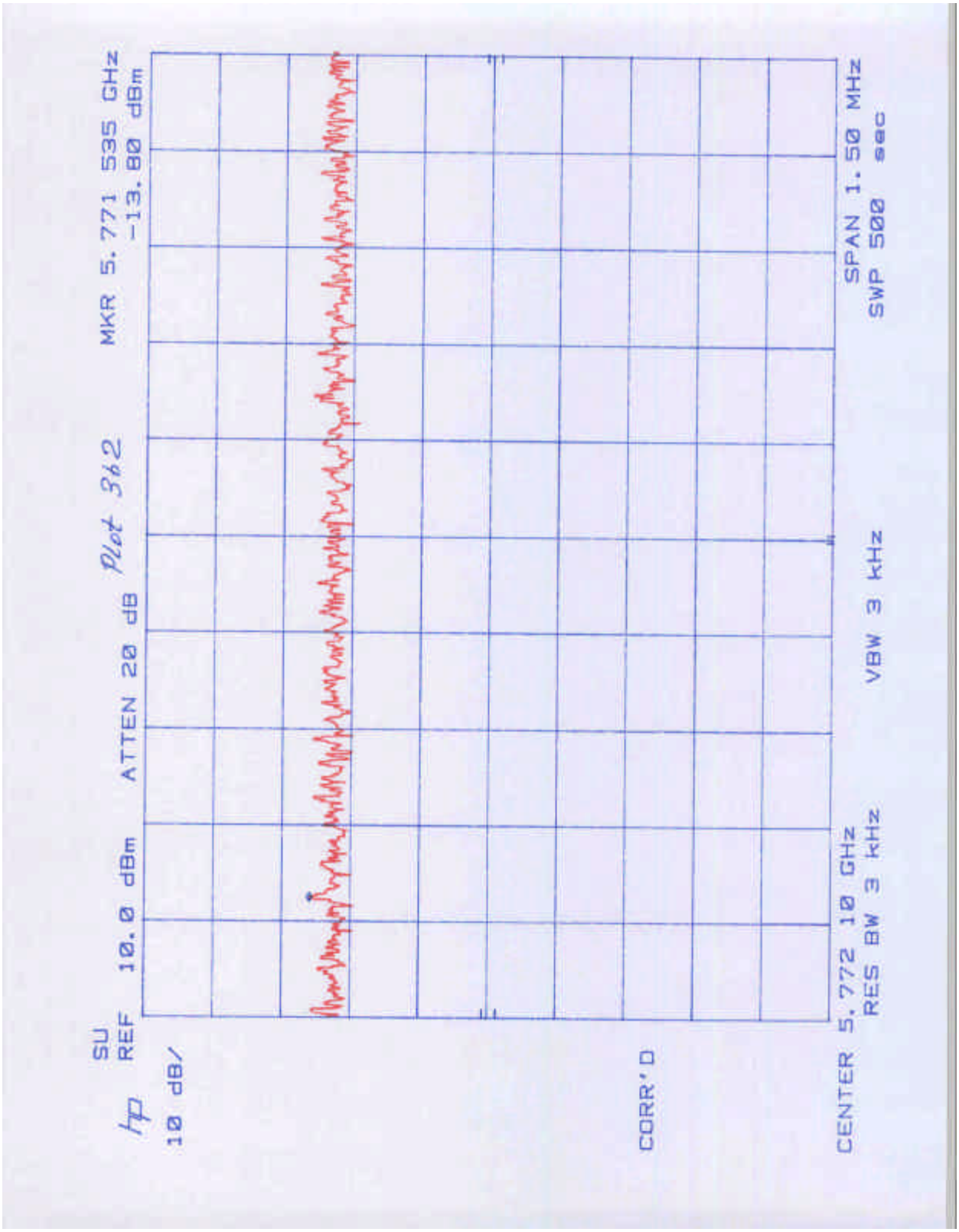
Refer to the following plots for power density data:

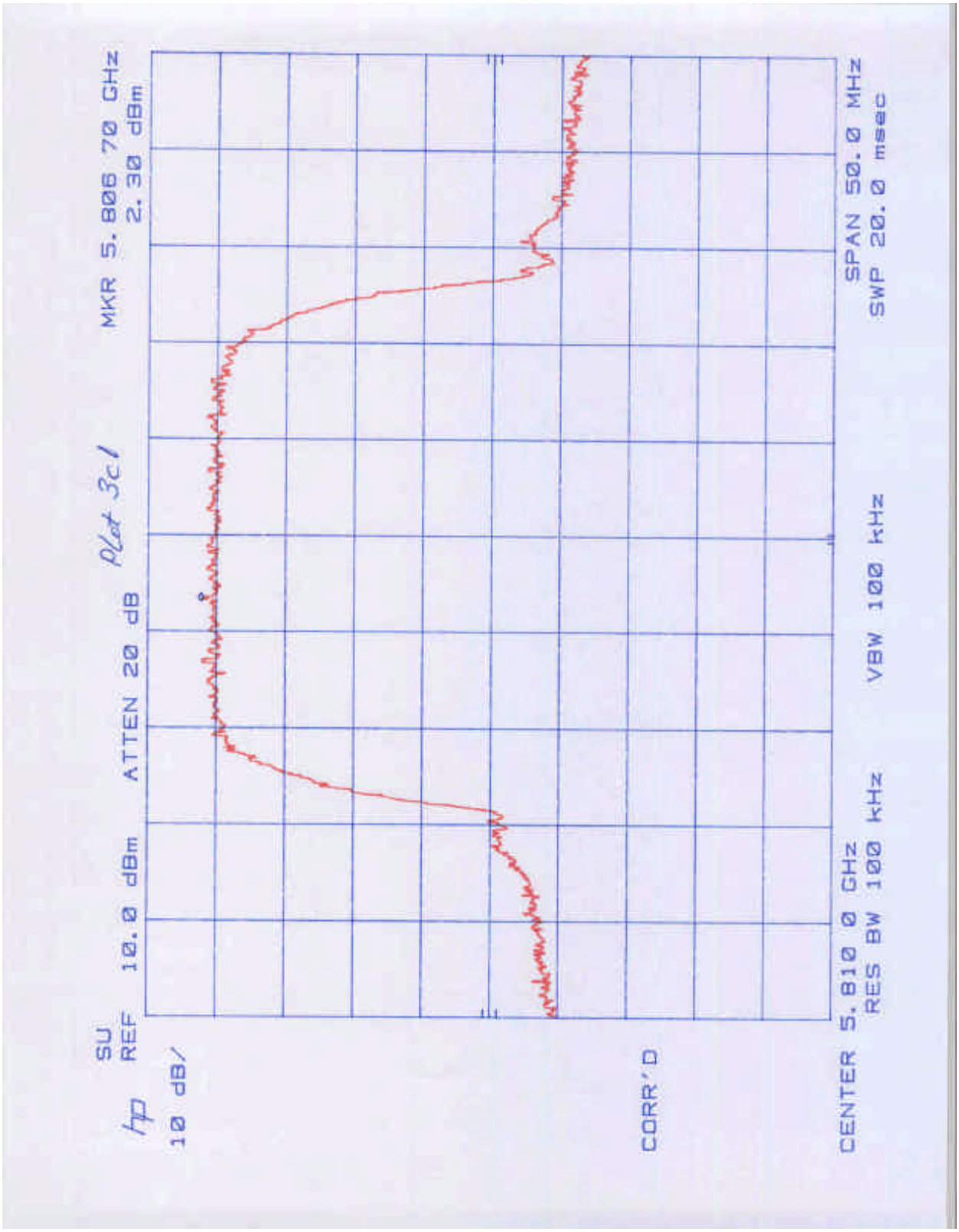
Plot 3a1 – 3a2: Low Channel Power Density
Plot 3b1 – 3b2: Middle Channel Power Density
Plot 3c1 – 3c2: High Channel Power Density

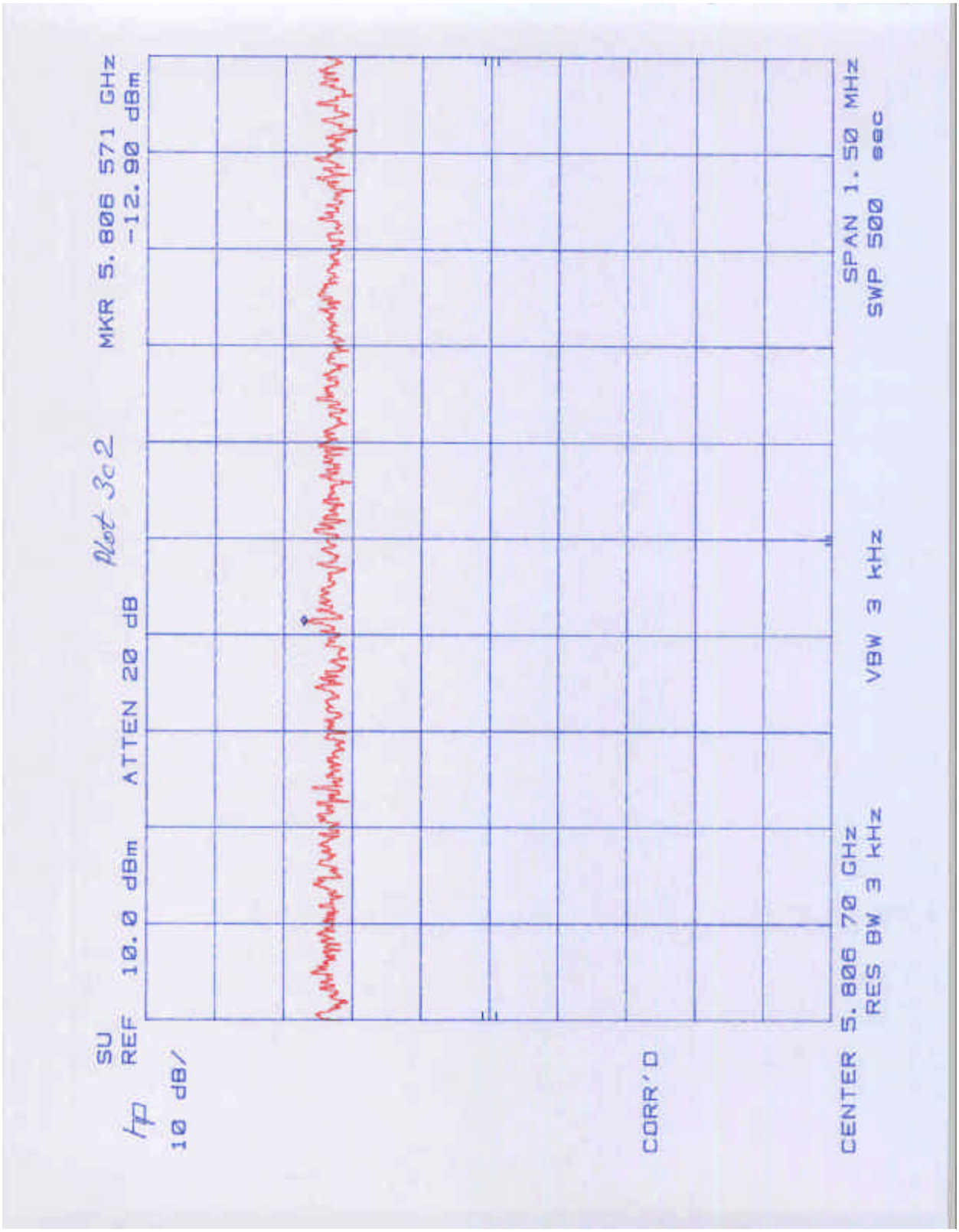

Plot 3a/
MKR Δ 9.60 MHz
5.60 dB
SPAN 50.0 MHz
SWP 20.0 msec
SU
REF 10.0 dBm
ATTEN 20 dB
VBW 100 kHz
10 dB/
CORR'D
CENTER 5.740 0 GHz
RES BW 100 kHz


Plot 3a2
MKR 5.739 646 GHz
-12.40 dBm
SU
REF 10.0 dBm
ATTEN 20 dB
10 dB/
CORR'D
CENTER 5.739 20 GHz
RES BW 3 kHz
VBW 3 kHz
SPAN 1.50 MHz
SWP 500 sec


SU
REF 10.0 dBm
10 dB/
ATTEN 20 dB
Plot 361
MKR 5.772 10 GHz
1.30 dBm
CORR'D
CENTER 5.768 0 GHz
RES BW 100 kHz
VBW 100 kHz
SPAN 50.0 MHz
SWP 20.0 msec


Plot 362
MKR 5.771 535 GHz
-13.80 dBm
SPAN 1.50 MHz
SWP 500 sec
VBW 3 kHz
ATTEN 20 dB
10.0 dBm
REF
SU
10 dB/
CORR'D
CENTER 5.772 10 GHz
RES BW 3 kHz


Plot 3c1
MKR 5.806 70 GHz
2.30 dBm
SU
REF 10.0 dBm
ATTEN 20 dB
10 dB/
CORR'D
CENTER 5.810 0 GHz
RES BW 100 kHz
VBW 100 kHz
SPAN 50.0 MHz
SWP 20.0 msec


Plot 3c 2
SU
REF 10.0 dBm
10 dB/
ATTEN 20 dB
MKR 5.806 571 GHz
-12.90 dBm
CORR'D
CENTER 5.806 70 GHz
RES BW 3 kHz
VBW 3 kHz
SPAN 1.50 MHz
SWP 500 sec

4.4 Out-of-Band Conducted Emissions
FCC Rule 15.247(c):

Requirements

In any 100 kHz bandwidth outside the EUT passband, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

Procedure

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 10 MHz to 40 GHz.

Test Result

Refer to the plots in Appendix A for the test result:

15.247 (c), Out-of-Band conducted emissions	
Plot 4a	In-band low Channel Emissions
Plot 4b	In-band middle Channel Emissions
Plot 4c	In-band high Channel Emissions
Plots 4a1 – 4a4	Out-of-band low Channel Emissions
Plots 4b1 – 4b4	Out-of-band middle Channel Emissions
Plots 4c1 – 4c4	Out-of-band high Channel Emissions

4.6 Transmitter Radiated Emissions
FCC Rules: 15.247 (c), 15.205, 15.209

Procedure

Radiated emission measurements were performed from 30 MHz to 40,000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz - for frequencies above 1000 MHz.

The EUT is placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

Field Strength Calculation

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

FS = RA + AF + CF - AG
Where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF
Where FS = Field Strength in dBµV/m
RR = RA - AG in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBμV is obtained. The antennas factor of 7.4-dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB RR = 23.0 dBμV
CF = 1.6 dB LF = 9.0 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBμV/m
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

Result

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Radiated Emissions Test Data

Company:	Proxim Cor.	**Model #:** 40100-XXX	**Standard**	**FCC § 15.247**	
EUT:	PMP Subscriber unit	**S/N #:**	**Limits**	11	
Project #:	3018893	**Test Date:** Sep 19, 2001	**Test Distance**	3	meters
Test Mode:	Transmitter @5740.40MHz	**Engineer:** Suresh K	**Duty Relaxation**	0	dB

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	8	21	22	0	13	10	21	0	0	0
Model:	EMCO 3115	3160-9	3160-10	None	ACO/400	AFT18855	Grn	None	None	None

Frequency	Reading	Detector	Ant	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
5740.40	81.7	Peak	8	0	H	36.6	0.0	3.7	0.0	122.0	-	-
5740.40	66.2	Ave.	8	0	H	36.6	0.0	3.7	0.0	106.5	-	-
1.15E+4	38.0	Peak	8	10	H	40.4	39.9	5.6	0.0	44.1	74.0	-29.9
1.15E+4	27.9	Ave.	8	10	H	40.4	39.9	5.6	0.0	34.0	54.0	-20.0
1.72E+4	38.5	Peak	8	10	H	42.2	38.8	7.5	0.0	49.4	74.0	-24.6
1.72E+4	28.5	Ave.	8	10	H	42.2	38.8	7.5	0.0	39.4	54.0	-14.6
2.30E+4	39.9 *	Peak	21	13	H	40.4	23.3	8.5	-9.5	56.0	74.0	-18.0
2.30E+4	28.2 *	Ave.	21	13	H	40.4	23.3	8.5	-9.5	44.3	54.0	-9.7
2.87E+4	37.3 *	Peak	22	13	H	43.4	24.2	9.2	-9.5	56.2	74.0	-17.8
2.87E+4	27.5 *	Ave.	22	13	H	43.4	24.2	9.2	-9.5	46.4	54.0	-7.6
3.44E+4	43.6 *	Peak	22	13	H	43.6	25.9	10.0	-9.5	64.5	74.0	-9.5
3.44E+4	33.1 *	Ave.	22	13	H	43.6	25.9	10.0	-9.5	51.3	54.0	-2.7

Notes:

a) D.C.F.:Distance Correction Factor

b) Insert. Loss (dB) = Cable A + Cable B + Cable C

c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss - Duty Relaxation (transmitter only).

d) Negative signs (-) in Margin column signify levels below the limits.

e) All other emissions not reported are below the equipment noise floor, which is at least 3 dB below the limits.

f) Measurements above 20 GHz were made at 1 m distance

g) * noise floor

Radiated Emissions Test Data

Company:	Proxim Cor.	**Model #:** 40100-XXX	**Standard**	**FCC § 15.247**	
EUT:	PMP Subscriber unit	**S/N #:**	**Limits**	11	
Project #:	3018893	**Test Date:** Sep 19, 2001	**Test Distance**	3	meters
Test Mode:	Transmitter@5768.0MHz	**Engineer:** Suresh K	**Duty Relaxation**	0	dB

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	22	8	21	8	10	13	21	0	0	0
Model:	3160-10	EMCO 3115	3160-9	CDI P1000	AFT18855	ACO/400	Grn	None	None	None

Frequency	Reading	Detector	Ant	Amp	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
5768.06	82.9	Peak	8	0	H	36.6	0.0	3.7	0.0	123.2	-	-
5768.06	69.8	Ave.	8	0	H	36.6	0.0	3.7	0.0	110.1	-	-
1.15E+4	44.2	Peak	8	10	H	40.4	39.7	5.8	0.0	50.7	74.0	-23.3
1.15E+4	32.5	Ave.	8	10	H	40.4	39.7	5.8	0.0	39.0	54.0	-15.0
1.73E+4	39.4	Peak	8	10	H	42.2	38.8	7.5	0.0	50.3	74.0	-23.7
1.73E+4	28.0	Ave.	8	10	H	42.2	38.8	7.5	0.0	38.9	54.0	-15.1
2.31E+4	39.1 *	Peak	21	13	H	40.4	23.3	8.5	-9.5	55.2	74.0	-18.8
2.31E+4	28.3 *	Ave.	21	13	H	40.4	23.3	8.5	-9.5	44.4	54.0	-9.6
2.88E+4	36.5 *	Peak	22	13	H	43.4	24.2	9.2	-9.5	55.4	74.0	-18.6
2.88E+4	26.7 *	Ave.	22	13	H	43.4	24.2	9.2	-9.5	45.6	54.0	-8.4
3.46E+4	42.0 *	Peak	22	13	H	43.6	23.8	10.0	-9.5	62.3	74.0	-11.7
3.46E+4	31.7 *	Ave.	22	13	H	43.6	23.8	10.0	-9.5	52.0	54.0	-2.0

Notes:

a) D.C.F.:Distance Correction Factor

b) Insert. Loss (dB) = Cable A + Cable B + Cable C

c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss - Duty Relaxation (transmitter only).

d) Negative signs (-) in Margin column signify levels below the limits.

e) All other emissions not reported are below the equipment noise floor which is at least 3 dB below the limits.

f) Measurements above 20 GHz were made at 1 m distance

g) * noise floor

Radiated Emissions Test Data

Company:	Proxim Cor.	**Model #:**	40100-XXX	**Standard**	**FCC § 15.247**		
EUT:	PMP Subscriber unit	**S/N #:**		**Limits**	11		
Project #:	3018893	**Test Date:**	Sep 19, 2001	**Test Distance**	3	meters	
Test Mode:	Transmitter@5809.56MHz	**Engineer:**	Suresh K	**Duty Relaxation**	0	dB	

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	22	8	21	8	10	13	21	0	0	0
Model:	3160-10	EMCO 3115	3160-9	CDI_P1000	AFT18855	ACO/400	Grn	None	None	None

Frequency	**Reading**	**Detector**	**Ant**	**Amp**	**Ant. Pol.**	**Ant. Factor**	**Pre-Amp**	**Insert. Loss**	**D. C. F.**	**Net**	**Limit @3m**	**Margin**
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
5809.56	78.9	Peak	8	0	H	36.6	0.0	3.7	0.0	119.2	-	-
5809.56	65.4	Ave.	8	0	H	36.6	0.0	3.7	0.0	105.7	-	-
1.16E+4	42.9	Peak	8	10	H	40.4	39.7	5.8	0.0	49.4	74.0	-24.6
1.16E+4	32.1	Ave.	8	10	H	40.4	39.7	5.8	0.0	38.6	54.0	-15.4
1.74E+4	38.9	Peak	8	10	H	42.2	38.8	7.5	0.0	49.8	74.0	-24.2
1.74E+4	28.2	Ave.	8	10	H	42.2	38.8	7.5	0.0	39.1	54.0	-14.9
2.32E+4	39.1 *	Peak	21	13	H	40.4	23.3	8.5	-9.5	55.2	74.0	-18.8
2.32E+4	27.2 *	Ave.	21	13	H	40.4	23.3	8.5	-9.5	43.3	54.0	-10.7
2.90E+4	36.5 *	Peak	22	13	H	43.5	25.9	9.2	-9.5	53.8	74.0	-20.2
2.90E+4	26.4 *	Ave.	22	13	H	43.5	25.9	9.2	-9.5	43.7	54.0	-10.3
3.49E+4	42.0 *	Peak	22	13	H	43.6	23.8	10.0	-9.5	62.3	74.0	-11.7
3.49E+4	31.4 *	Ave.	22	13	H	43.6	23.8	10.0	-9.5	51.7	54.0	-2.3

Notes:

a) D.C.F.:Distance Correction Factor

b) Insert. Loss (dB) = Cable A + Cable B + Cable C

c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss - Duty Relaxation (transmitter only).

d) Negative signs (-) in Margin column signify levels below the limits.

e) All other emissions not reported are below the equipment noise floor, which is at least 3 dB below the limits.

f) Measurements above 20 GHz were made at 1 m distance

g) * noise floor

4.7 Radiated Emissions from Digital Section of Transceiver
FCC Ref: 15.109

Procedure

Radiated emission measurements were performed from 30 MHz to 1000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater. See also section 4.6.

Company: Proxim Corporation
Model: PMP Subscriber Unit
Test Mode: Tx/Rx
Engineer: Ollie Moyrong
Date: September_18_2001

FCC Part 15.109 Class B Radiated Emissions

Frequency	Antenna Location	Antenna Polariz.	Reading	Antenna Factor	Preamp	Dist. Corr. Factor	Cable Loss	Corrected Reading	Limit At 3 m	Margin
MHz	m	H/V	dB(uV)	dB(1/m)	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
35.0	3.0	V	35.1	8.2	-18.4	0.0	1.5	26.4	40.0	-13.6
35.4	3.0	V	38.6	8.2	-18.4	0.0	1.5	29.9	40.0	-10.1
51.0	3.0	V	37.1	5.0	-18.5	0.0	2.1	25.7	40.0	-14.3
56.8	3.0	V	34.3	5.7	-18.5	0.0	2.1	23.6	40.0	-16.4
64.2	3.0	V	38.4	5.8	-18.7	0.0	2.3	27.8	40.0	-12.2
64.8	3.0	V	39.7	5.8	-18.7	0.0	2.3	29.1	40.0	-10.9
80.0	3.0	V	36.7	6.7	-18.8	0.0	2.4	27.0	40.0	-13.0
103.4	3.0	V	27.0	7.2	-19.0	0.0	2.7	17.9	43.5	-25.6
112.8	3.0	V	32.3	7.1	-19.0	0.0	2.7	23.1	43.5	-20.4
731.3	3.0	V	31.9	20.7	-32.0	0.0	3.5	24.1	46.0	-21.9
759.4	3.0	V	30.0	20.7	-32.0	0.0	3.5	22.2	46.0	-23.8
801.2	3.0	V	32.0	20.7	-32.0	0.0	3.5	24.2	46.0	-21.8

Notes:
Negative signs (-) in the Margin column signify levels below the limit.
All readings are peak measurements.
All other emissions not reported are at least 10 dB below the applicable limits.
Frequency range of investigation is 30 MHz - 1 GHz.

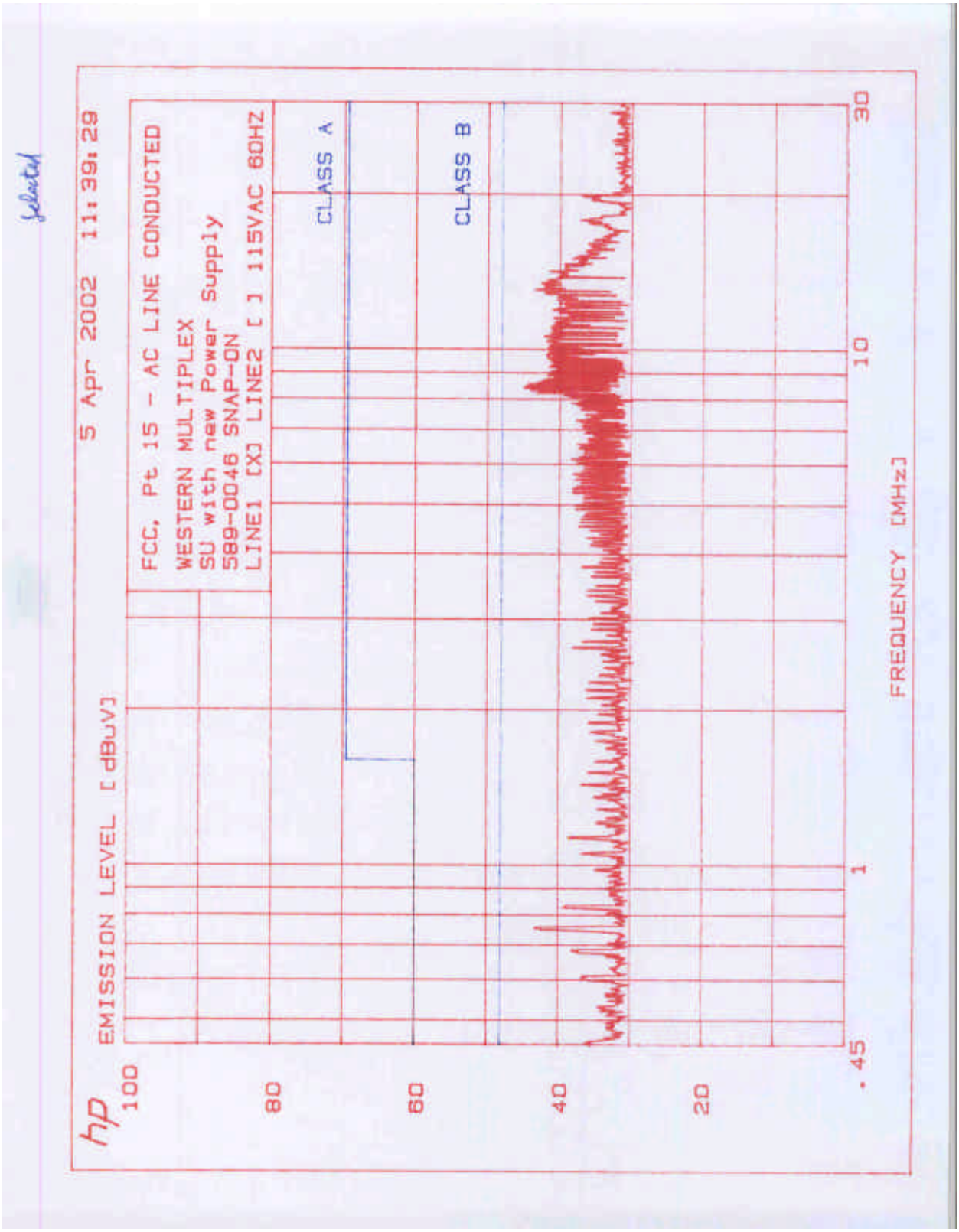
4.8 Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation)
FCC Ref: 15.109, 15.111

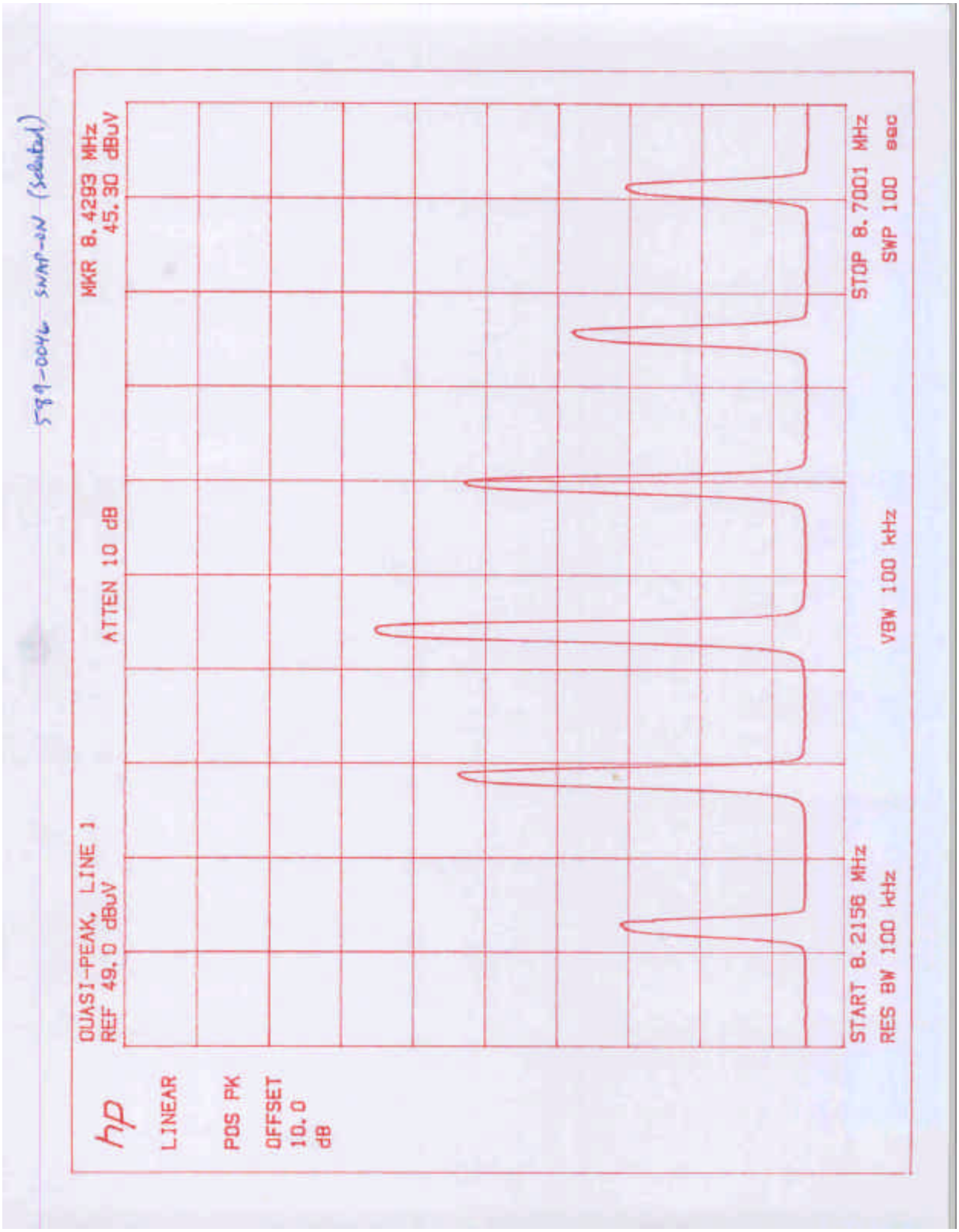
Not required - EUT operation above 960 MHz only.

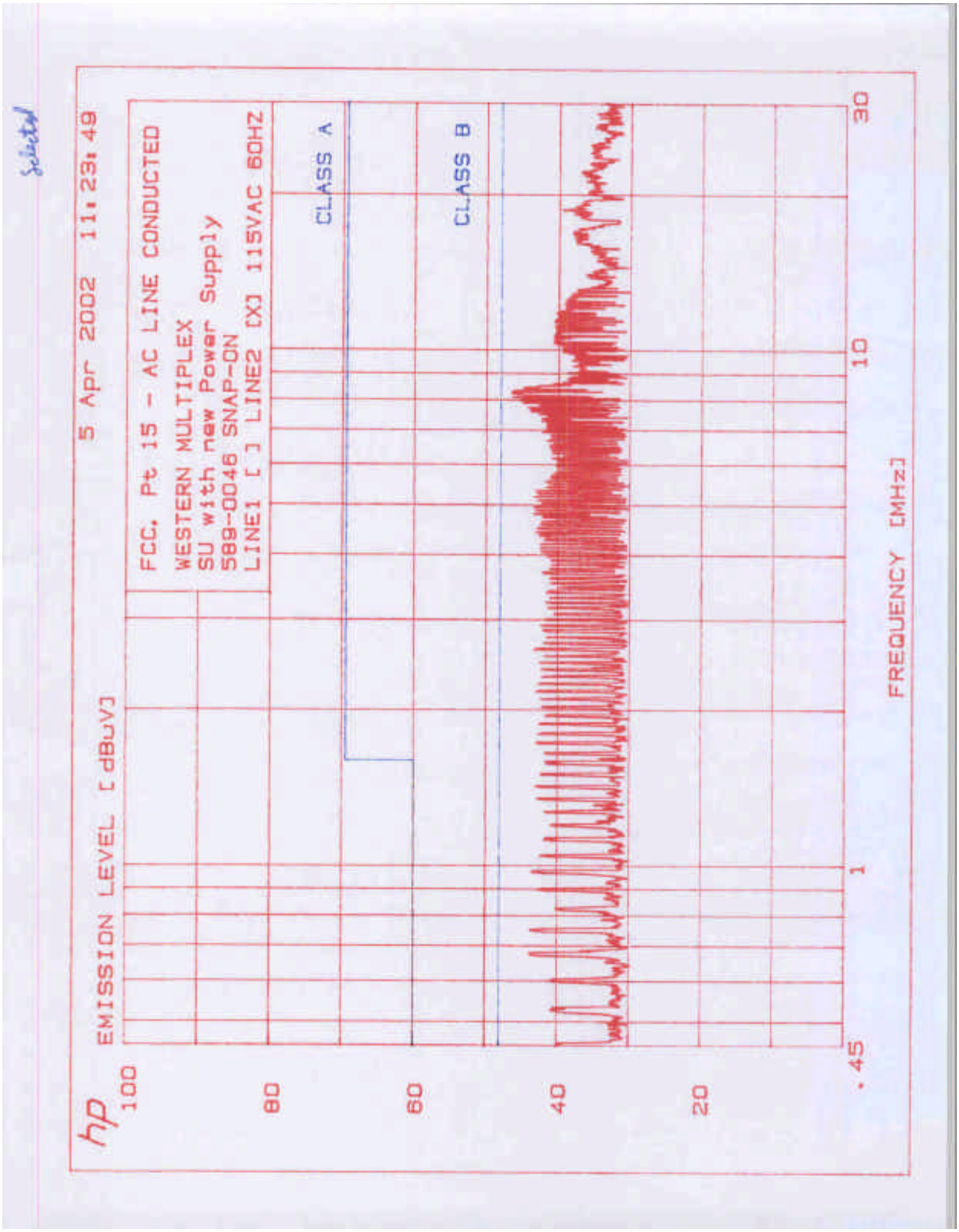
4.9 AC Line Conducted Emission
FCC Rule 15.207:

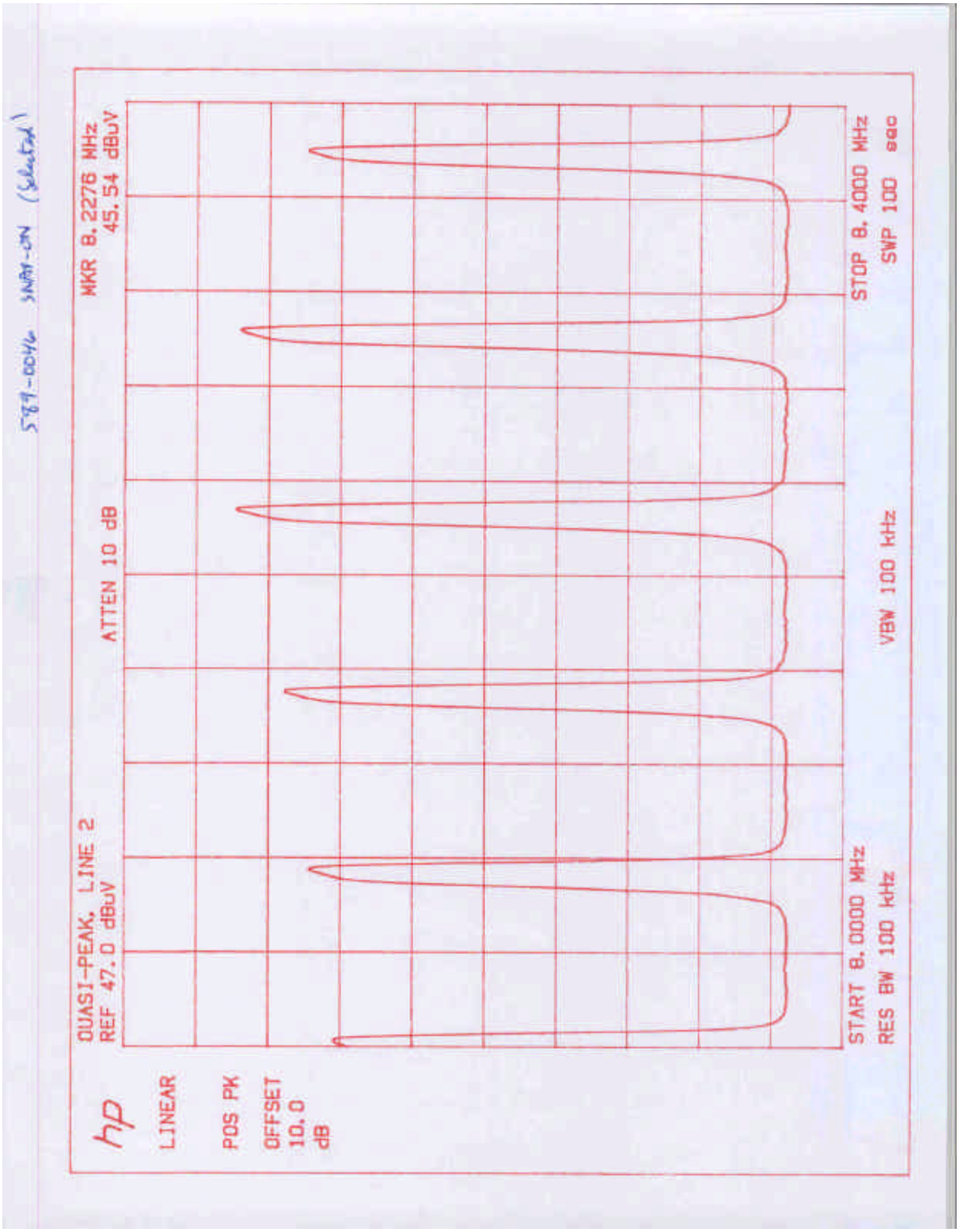
AC line conducted emission test was performed according the ANSI C63.4 standard. The EUT was connected to AC Line through the LISNs.

For the test result, see attached plots.
The EUT passed by 2.5 dB.


hp
EMISSION LEVEL [dBuV]
100
80
60
40
20
FREQUENCY [MHz]
.45
1
10
30
5 Apr 2002 11:39:29
FCC, Pt 15 - AC LINE CONDUCTED
WESTERN MULTIPLEX
SU with new Power Supply
589-0046 SNAP-ON
LINE1 [X] LINE2 [ ] 115VAC 60HZ
CLASS A
CLASS B


5819-0046 SWAT-4N (Sealed)
QUASI-PEAK, LINE 1
REF 49.0 dBuV
ATTEN 10 dB
MKR 8.4293 MHz
45.30 dBuV
hp
LINEAR
POS PK
OFFSET
10.0
dB
START 8.2158 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 8.7001 MHz
SWP 100 sec


hp
EMISSION LEVEL [dBuV]
100
80
60
40
20
5 Apr 2002 11:23:48
FCC, Pt 15 - AC LINE CONDUCTED
WESTERN MULTIPLEX
SU with new Power Supply
588-0046 SNAP-ON
LINE1 [ ] LINE2 [X] 115VAC 60HZ
CLASS A
CLASS B
.45
1
10
30
FREQUENCY [MHz]


QUASI-PEAK, LINE 2
REF 47.0 dBuV
ATTEN 10 dB
MKR 8.2276 MHz
45.54 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
START 8.0000 MHz
RES BW 100 kHz
VBW 100 kHz
STOP 8.4000 MHz
SWP 100 sec

5.0 List of test Equipment

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. INTERVAL	CAL. DUE
Spectrum Analyzer w/85650 QP Adapter	Hewlett Packard	8566B	2416A00317 2043A00251	12	4/6/02
Spectrum Analyzer w/8650 QP Adapter	Hewlett Packard	8568B	1912A0053 2521A01021	12	2/23/02
Spectrum Analyzer	Tektronix	2784	B3020108	12	8/8/02
BI-Log Antenna	EMCO	3143	9509-1164	12	3/4/03
Double-ridged Horn Antenna	EMCO	3115	9107-3712	12	3/17/02
Horn Antenna	EMCO	3160-09	Not Labeled	#	#
Horn Antenna	EMCO	3160-10	Not Labeled	#	#
Pre-Amplifier	CDI	P950	ITS009	12	7/2/02
Pre-Amplifier	Sonoma Inst.	310	185634	12	4/25/02
Pre-Amplifier	CDI	P1000	N/A	12	10/6/02
Pre-Amplifier	Avantek	AFT-18855	8723H705	12	10/5/02
Pre-amplifier	CTT	ACO/400	47526	12	10/5/02
Power Meter	Hewlett Packard	8900D	3607U00673	12	8/8/02
LISN	Solar Electronics	8025-50-TS-24-BNC	912434	12	6/11/02
LISN	Solar Electronics	8028-50-TS-24-BNC	941502	12	2/7/02

No Calibration Required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3018893	SS	February 5, 2002	Original document
	DC	April 20, 2002	Company Name

7.0 Appendix A

See file "Appendix A"