TEST REPORT

Report Number: 30449042
Project Number: 3044904
October 6, 2003

Testing performed on the
Tsunami Multipoint Base Station Unit
FCC ID: HZB-S58-B60
to

FCC Part 15, Subpart C

for
Proxim Corporation

Test Performed by:	Test Authorized by:
Intertek Testing Services	Proxim Corporation
1365 Adams Court	935 Stewart Drive
Menlo Park, CA 94025	Sunnyvale, California 94085

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David Chernomordik

Reviewed by: Date: 10/08/03
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1.0 Summary of Tests

FCC ID: HZB-S58-B60

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
RF Exposure Requirement	2.1091	Complies, see exhibit "RF Exposure"
Antenna Requirement	15.203	Not Applicable; professional installation is required

A pre-production version of the EUT was received on June 24, 2003 in good operating condition. As declared by the Applicant, it is identical to the production units.

Date of Test: June 25, 2003 – July 17, 2003

2.0 General Description

2.1 Product Description

The 40400-xxx (FCC ID: HZB-S58-B60) is a product family that includes the following models:

Model	Description
40400-35	Tsunami Multipoint 30MB Base Station Unit
40400-65	Tsunami Multipoint 60MB Base Station Unit
40400-35R	Tsunami Multipoint 30MB A.I.R. Base Station Unit
40400-65R	Tsunami Multipoint 60MB A.I.R. Base Station Unit
40400-35C	Tsunami Multipoint 30MB Base Station Unit with External Antenna Connector
40400-65C	Tsunami Multipoint 60MB Base Station Unit with External Antenna Connector

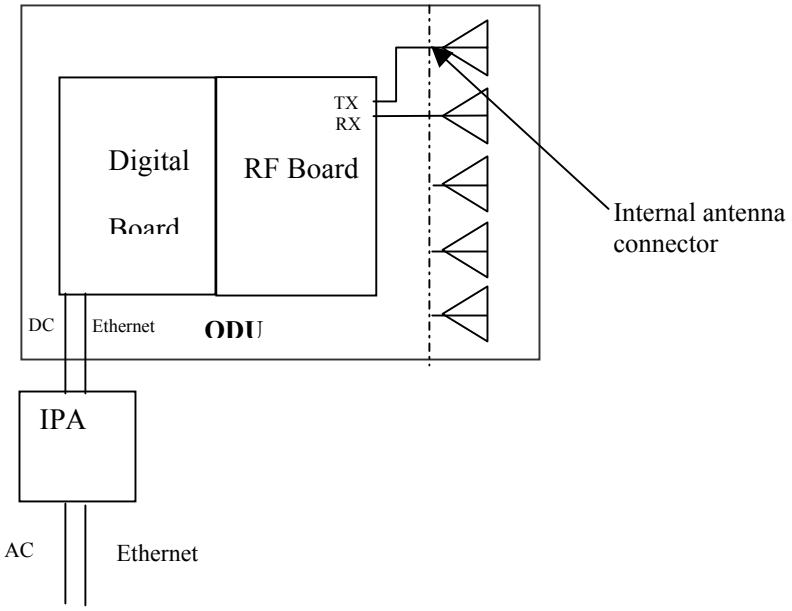
The HZB-S58-B60 platform consists of two major components: an outdoor unit (ODU) and an indoor power adapter (IPA). It supports four modulation modes: QPSK ½, QPSK ¾, 8QAM and 16QAM. Corresponding to each different modulation mode, the product is capable of data communication with data rate of 20Mbps, 30Mbps, 40Mbps and 60Mbps. The table above lists all product models Proxim currently markets.

With regards to antenna connection, the product family can be divided into two groups, base station with integrated antenna (integrated BSU) and base station using external antenna (connectorized BSU).

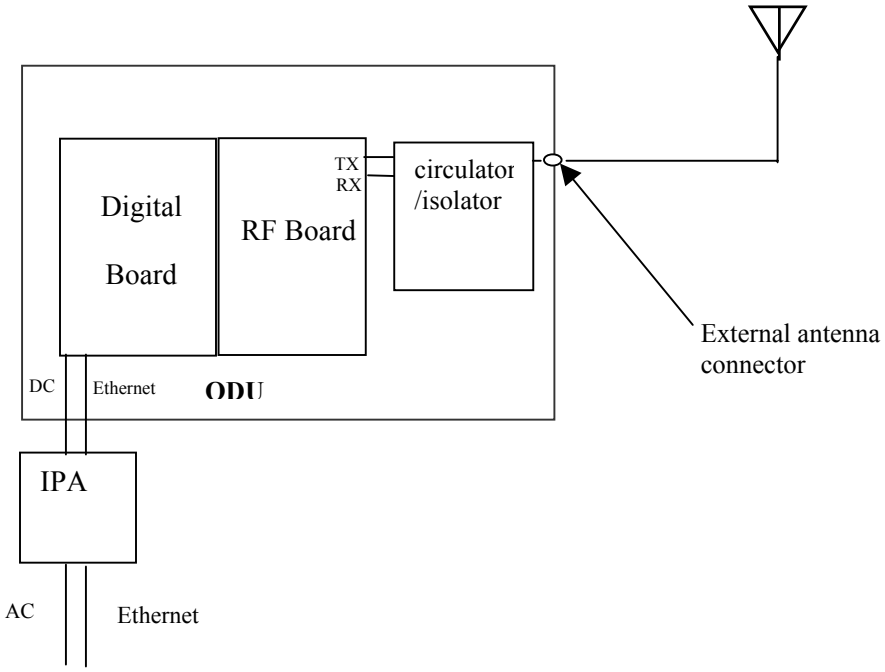
An integrated BSU has an integrated antenna with up to five arrays of antenna patches, one for transmit and one or four for receive. The internal PCB design for all the models is identical, except for the component loading options between the regular (40400-35/65) version and the A.I.R. version (40400-35R/65R). In the A.I.R. version, all four receivers are loaded to receive signals via different antenna arrays, thereby allowing the system to further process the signal using a noise cancellation algorithm. On the other hand, the regular version only has one receiver loaded. Testing was done on the fully loaded option that yields the worst-case emission.

A connectorized BSU is identical to the regular version integrated BSU internally, except the connectorized BSU has a circulator/isolator hardware in between the RF output of the RF board and the radio antenna port. See the diagram below.

Base Station Unit with Integrated Antenna



Connectorized Base Station Unit



Overview of the Model: 40100-xxx, FCC ID: HZB-S58-B60

Applicant name & address	Proxim Corporation 935 Stewart Drive, Sunnyvale, CA 94085 USA
Manufacturer	Proxim Corporation
FCC Identifier	HZB-S58-S60
Use of Product	Fixed Wireless Ethernet Access
Type of Transmission	TDD
Type of Modulation	QAM16, QPSK 3/4, QPSK 1/2
Rated RF Output	20 dBm (peak)
Frequency Range	5740 – 5810 MHz
Number of Channel(s)	6 channels maximum
Antenna Requirement	The EUT requires professional installation.

As declared by the Applicant, the following antennas may be used with the Connectorized **BSU:**

Connectorized **BSU Antenna List**					
Antenna Type	Manufacturer	Model Number	Mid-band Gain (dBi)	Notes	Used for testing
Omni	Telex	5830AN	7.5	Vertical	**X**
	MTI	MT-482009/N	9		
	MTI	MT-483003/N	12		**X**
Flat Panel	European Antennas	SA17-55V/450	17	Vertical, 60 x 7 degree sector antenna	
	Radio Waves	SEC-5V/H-90-17	17	Linear, 90 x 6 degree sector antenna	
	Radio Waves	SEC-5V/H-60-18	18	Linear, 60 x 6 degree sector antenna	**X**

Therefore, the antennas marked with ”X” have been chosen for testing.

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Both 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

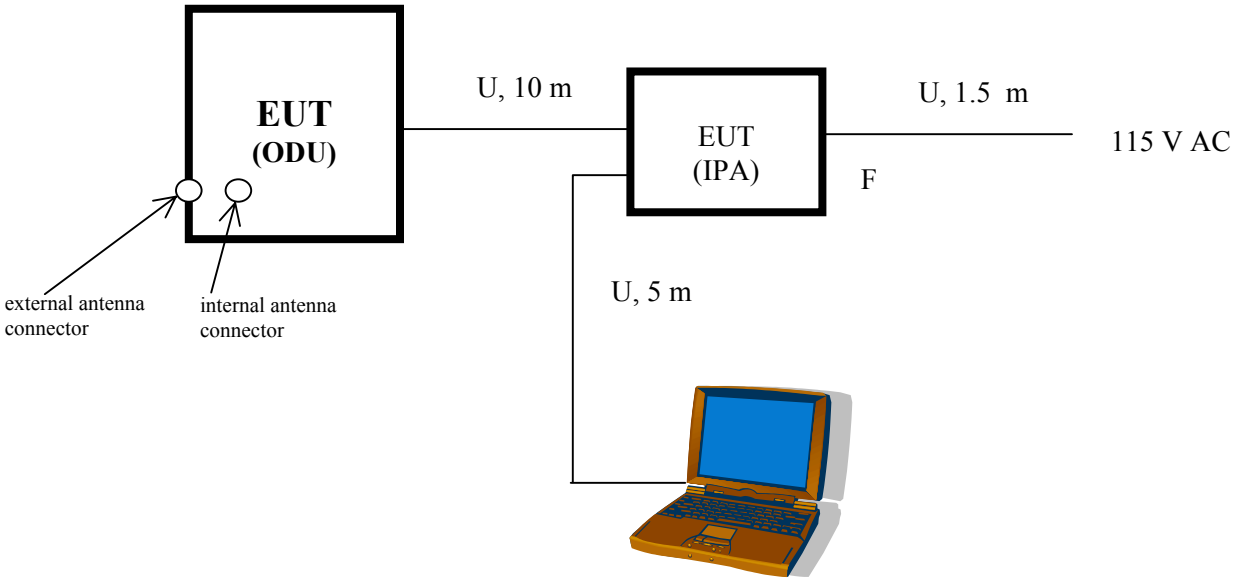
The open area test site and conducted measurement facility used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

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.

Care was taken to ensure proper power supply voltages during testing.

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.

3.5 Mode of operation during test

Transmitting signal on different channels with different types of modulation.

3.6 Modifications required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance.

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 Rule: 15.247(b)

Requirements

For systems operating in the 5725 - 5850 MHz band, maximum allowed transmitter output is 1 Watt or 30 dBm (for antenna gain up to 6 dBi).

Procedure

The antenna port of the EUT was connected to the input of a peak power meter. Power was read directly from the power meter.

Test Results

Frequency MHz	**Modulation**	**Output Peak Power** (measured from integrated BSU RF output) **dBm**	**Output Peak Power** (measured from connectorized BSU antenna connector) **dBm**
5740	QAM16	19.0	19.9
	QPSK 3/4	17.1	18.0
	QPSK 1/2	17.3	17.9
5775	QAM16	18.6	20.3
	QPSK 3/4	17.2	18.7
	QPSK 1/2	17.0	18.9
5810	QAM16	18.7	20.3
	QPSK 3/4	17.2	18.1
	QPSK 1/2	17.2	18.2

Note: Since the maximum output power is 20.3 dBm, the maximum allowed antenna gain is 15.7 dBi. ($G \leq 15.7$ dBi). Therefore, if an antenna with higher than 15.7 dBi gain is used, the output power must be reduced accordingly. The calculated gain G may include an antenna cable loss, e.g. G=Ga-Cable Loss, where Ga is the gain of the antenna.

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

Requirements

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

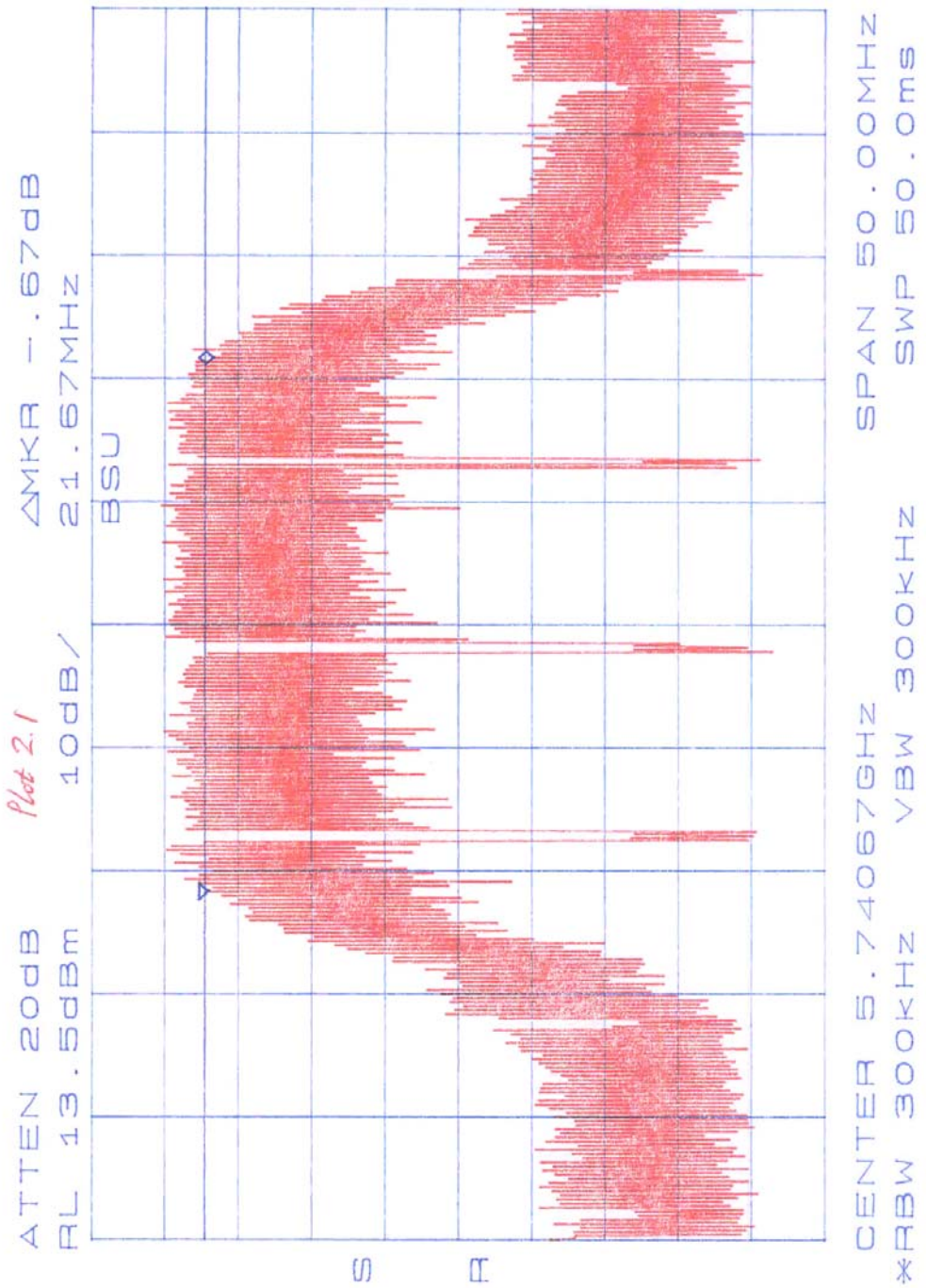
Procedure

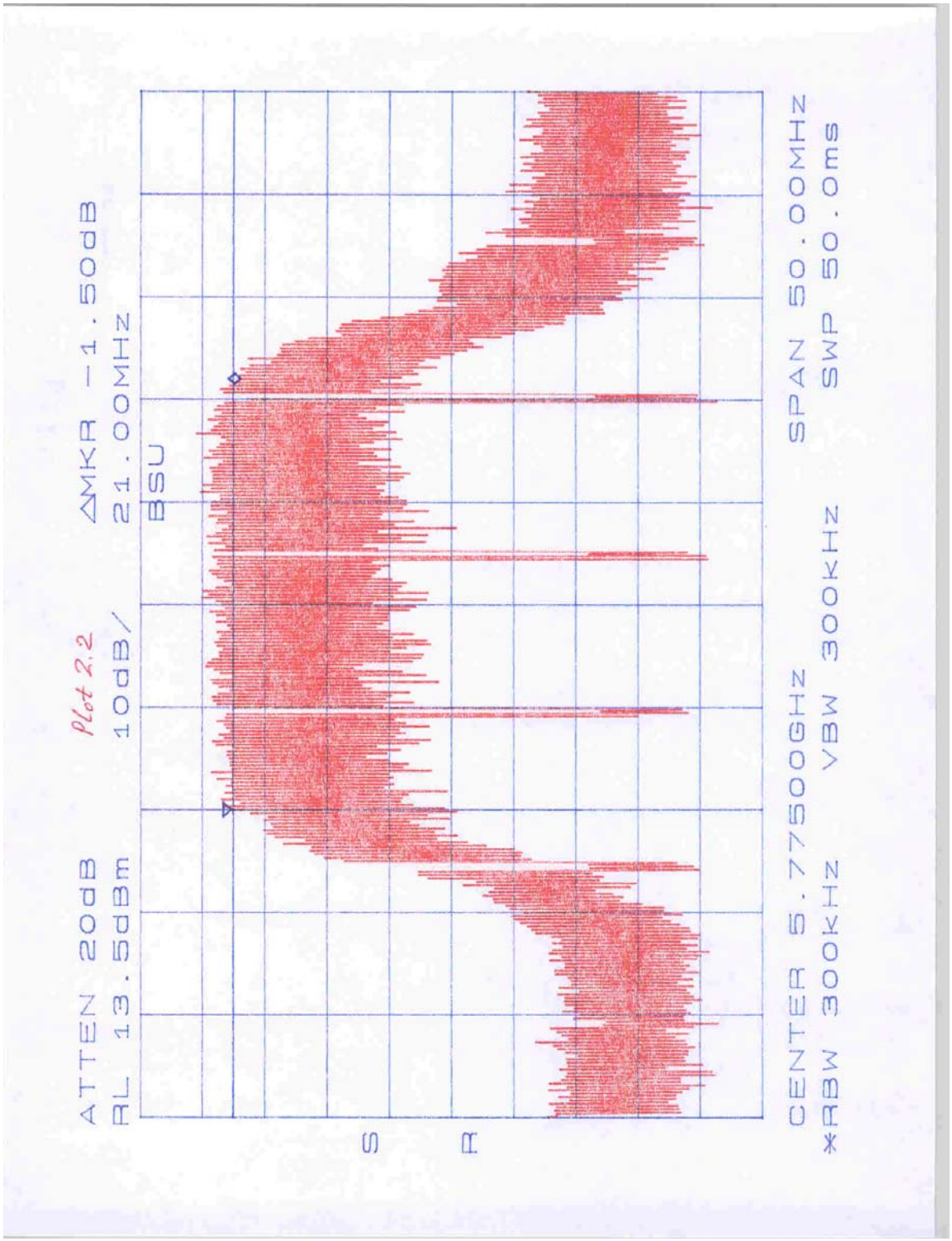
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than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

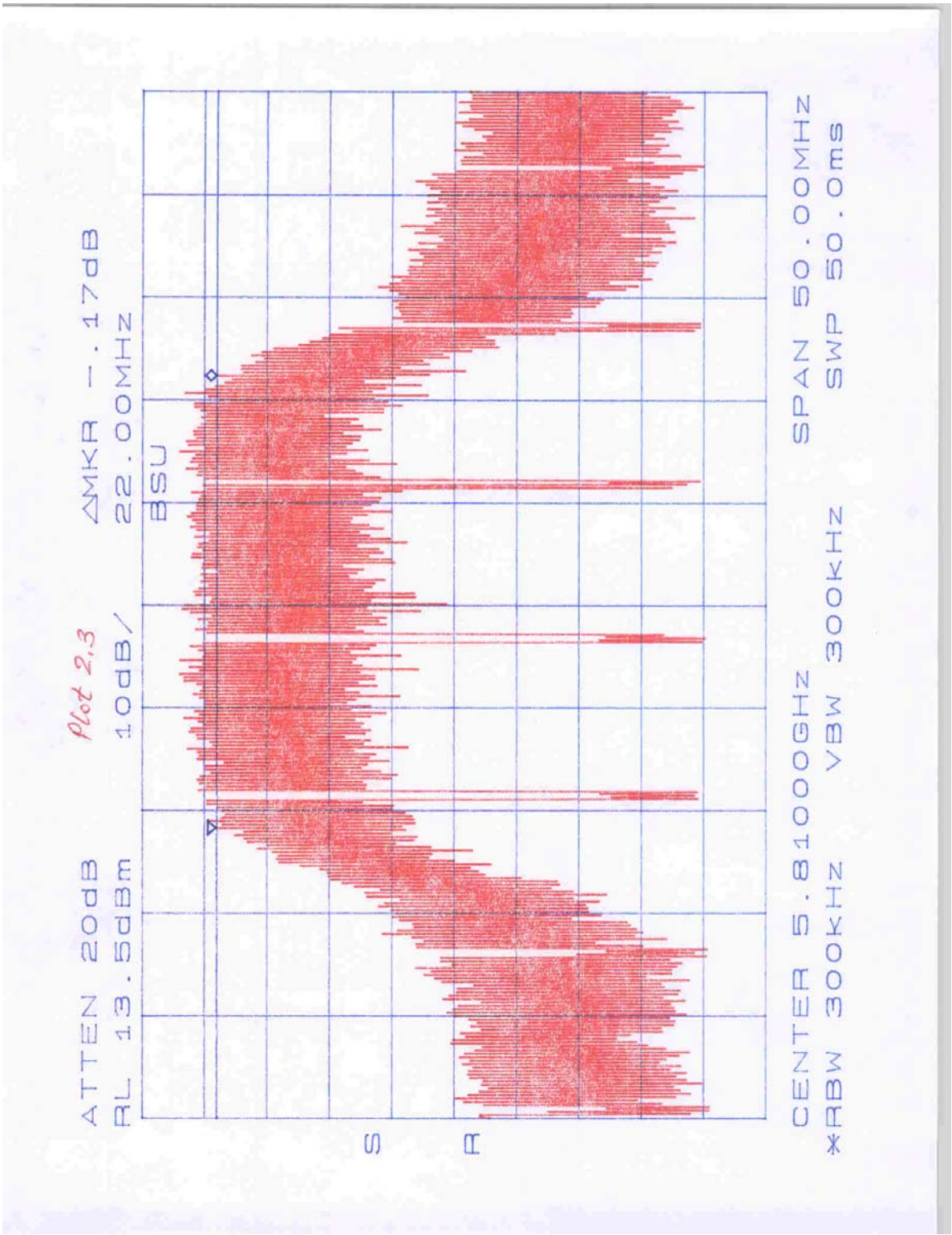
Test Result

Frequency MHz	**Modulation**	**6-dB Bandwidth** (measured from integrated BSU RF output) **MHz**	**6-dB Bandwidth** **(**measured from connectorized BSU antenna connector**)** **MHz**
5740	QAM16	21.4	21.7
5775	QAM16	21.5	21.0
	QPSK 3/4	21.8	21.7
	QPSK 1/2	21.8	21.6
5810	QAM16	21.3	22.0

On the plots 2.1 – 2.3 the 6-dB bandwidth is presented for QAM16 modulation for the configuration with external antenna connector.


ATTEN 20dB
RL 13.5dBm
10dB/
ΔMKR -.67dB
21.67MHz
BSU
Plot 2.1
CENTER 5.74067GHz
*RBW 300kHz
VBW 300kHz
SPAN 50.00MHz
SWP 50.0ms


ATTEN 20dB
RL 13.5dBm
10dB/
Plot 2.2
ΔMKR -1.50dB
21.00MHz
BSU
CENTER 5.775000GHz
*RBW 300KHz
VBW 300KHz
SPAN 50.00MHz
SWP 50.0ms
S
R


ATTEN 20dB
RL 13.5dBm
10dB/
Plot 2,3
ΔMKR -.17dB
22.00MHz
BSU
CENTER 5.810000GHz
*RBW 300KHz
VBW 300KHz
SPAN 50.00MHz
SWP 50.0ms

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 pass-band. 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

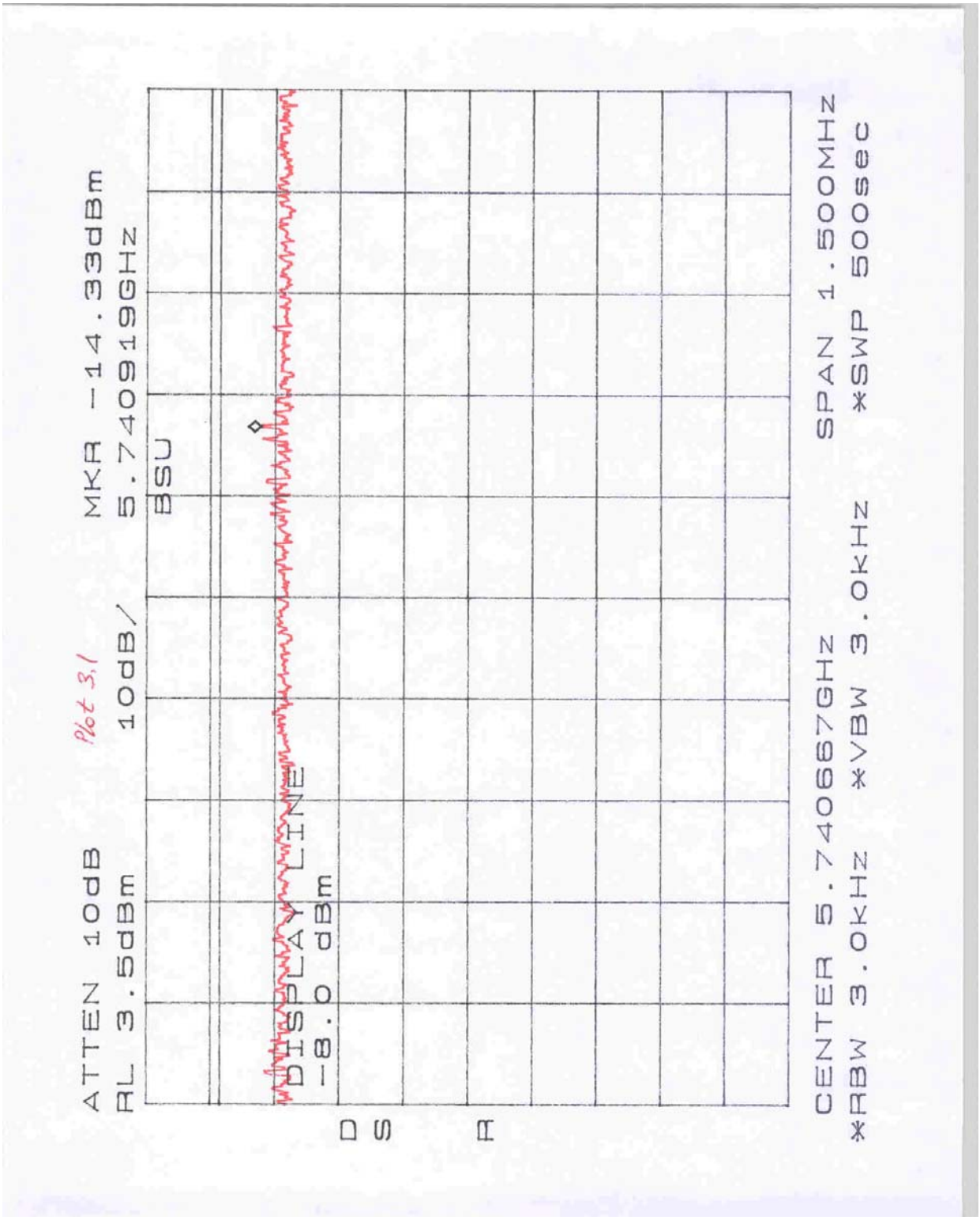
Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

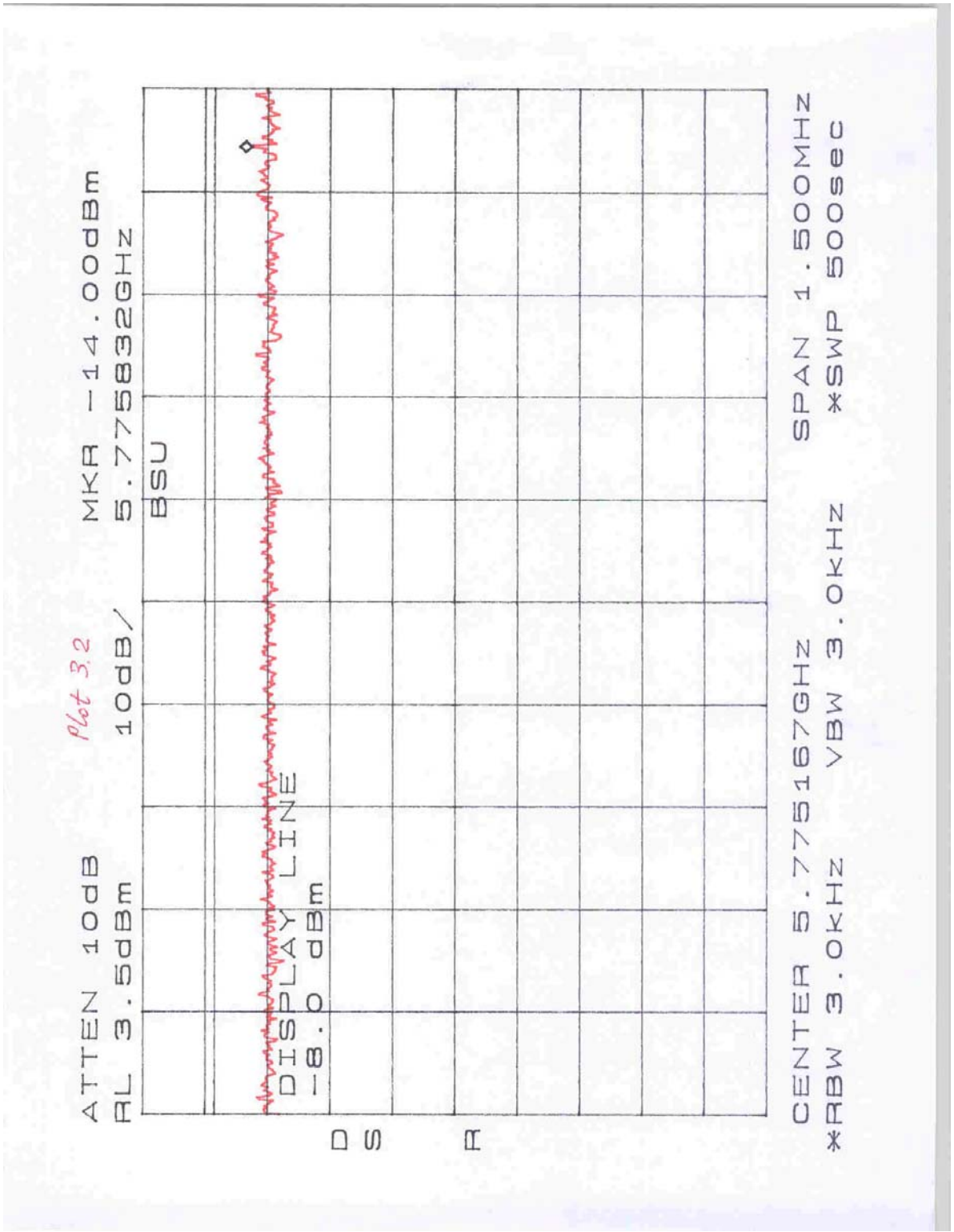
Frequency Span = 1500 kHz
Sweep Time = Frequency Span/3 kHz = 500 Seconds

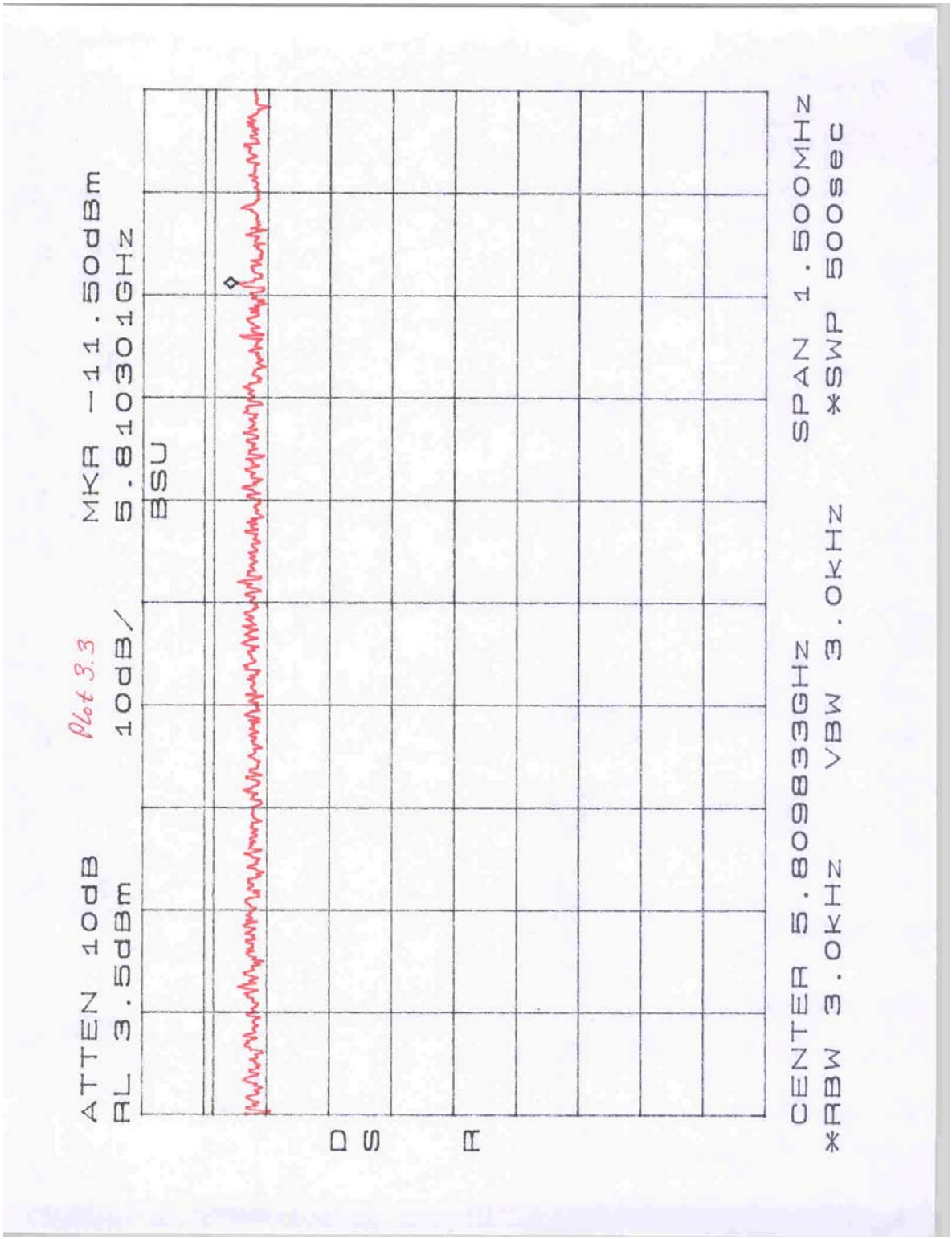
Test Result

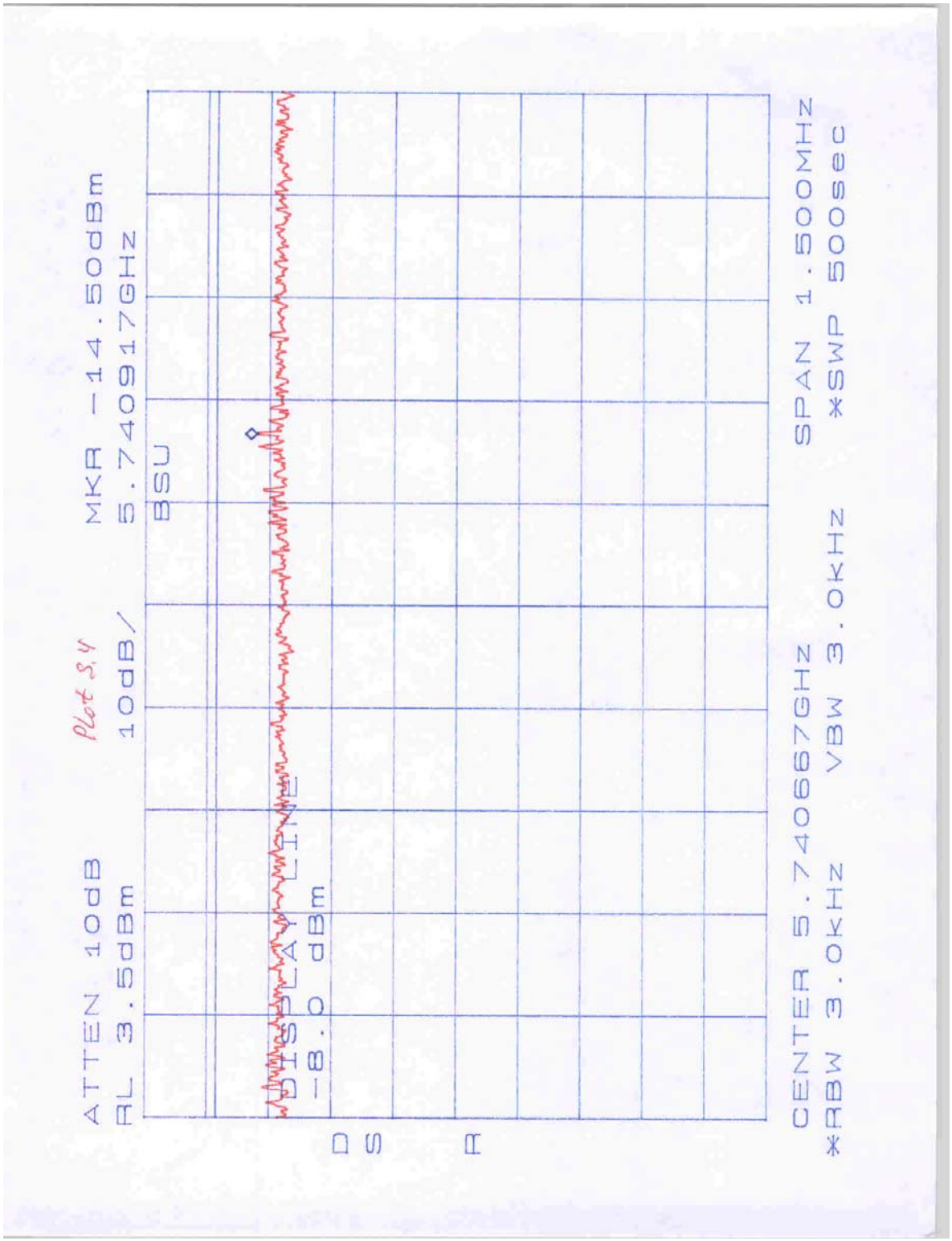
Frequency MHz	**Modulation**	**Power Density** (measured from integrated BSU RF output) **dBm**		**Power Density** (measured from connectorized BSU antenna connector) **dBm**	
		measured	plot	measured	plot
5740	QAM16	-14.3	3.1	-14.5	3.4
5775	QAM16	-14.0	3.2	-13.7	3.5
	QPSK 3/4	-	-	-12.2	3.7
	QPSK 1/2	-	-	-12.0	3.8
5810	QAM16	-11.5	3.3	-11.5	3.6

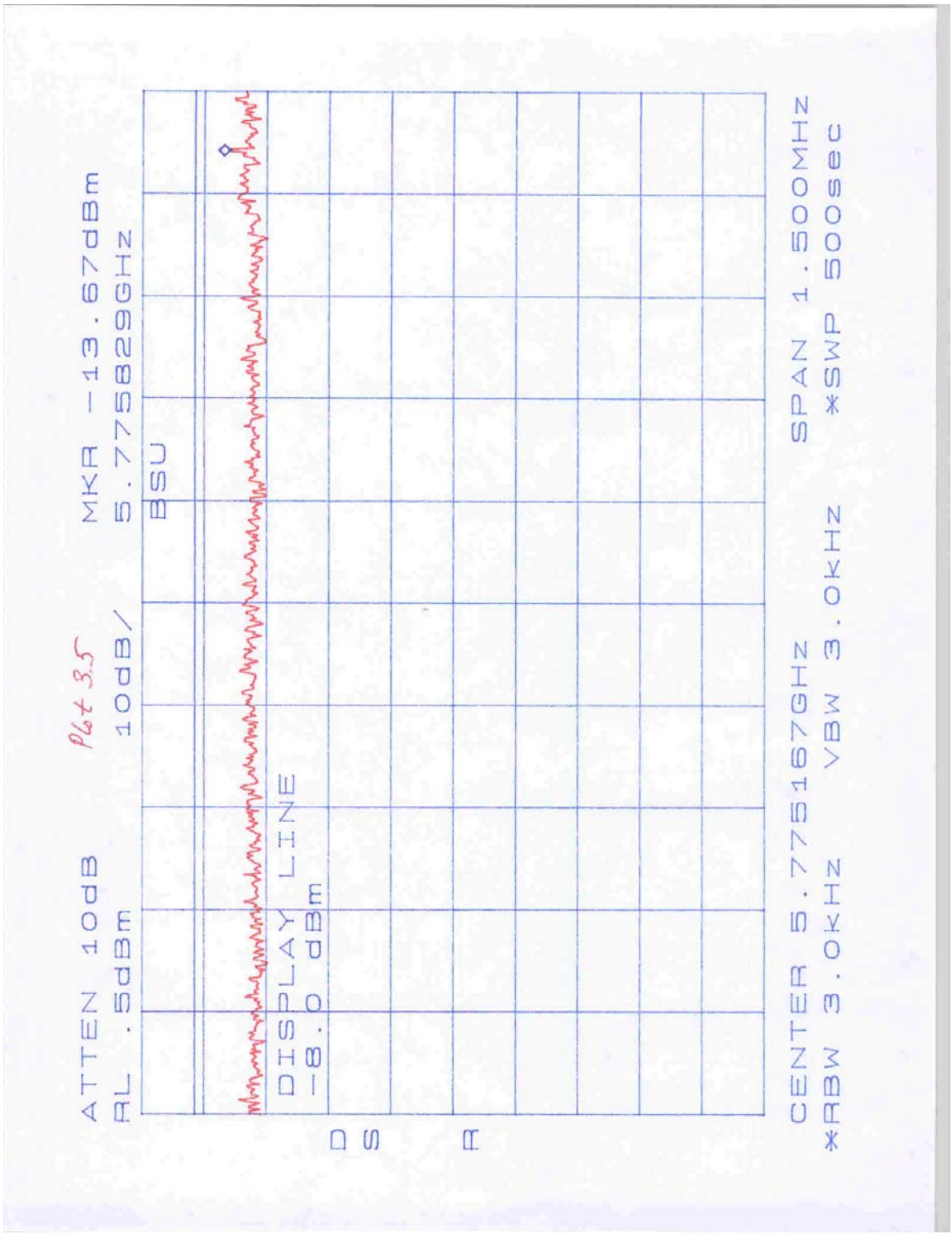
The EUT passed by 19.5 dB.

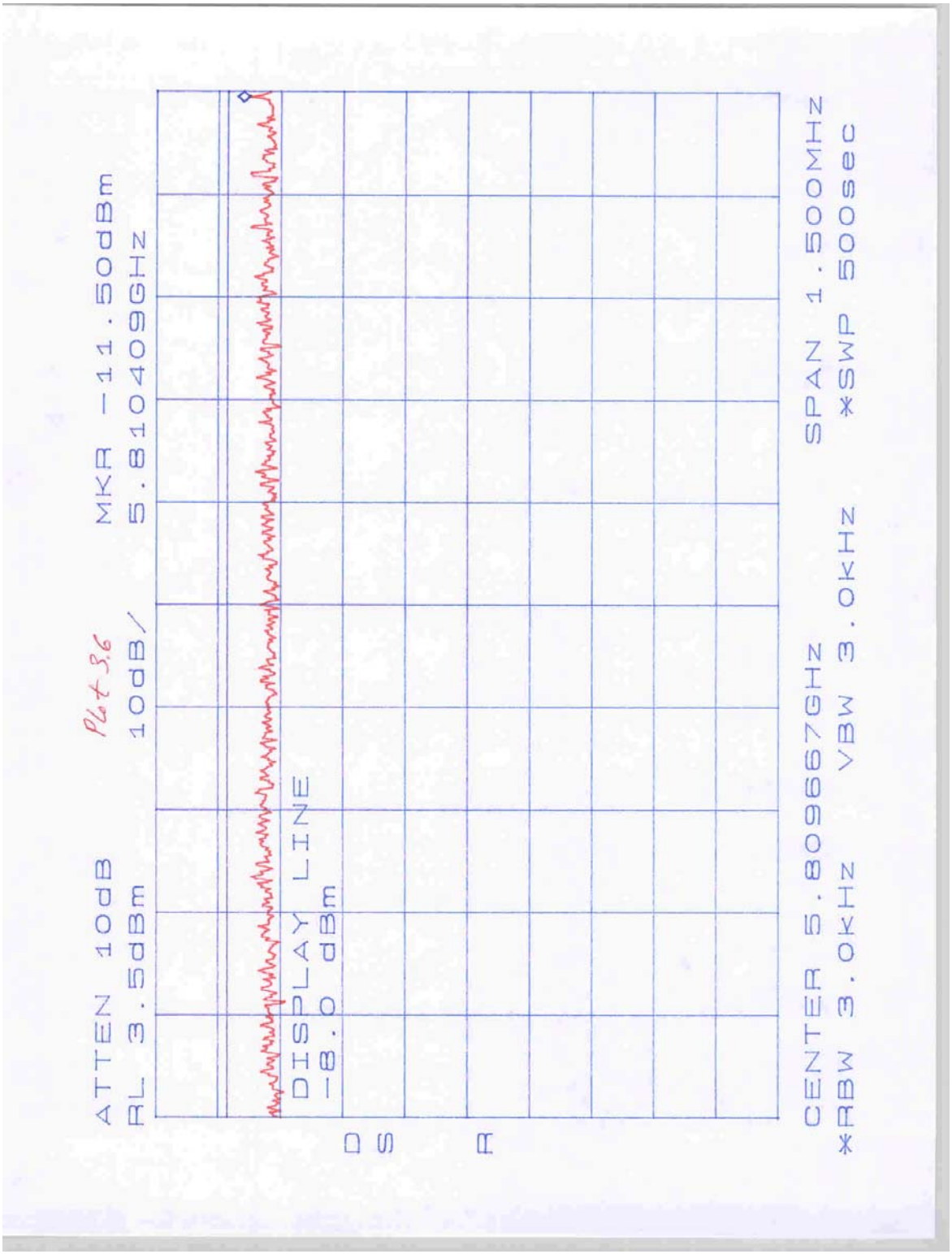

Plot 3.1
ATTEN 10dB
RL 3.5dBm
10dB/
MKR -14.33dBm
5.740919GHz
BSU
DISPLAY LINE
-18.0 dBm
D S
R
CENTER 5.740667GHz
SPAN 1.500MHz
*RBW 3.0KHz
*VBW 3.0KHz
*SWP 500sec

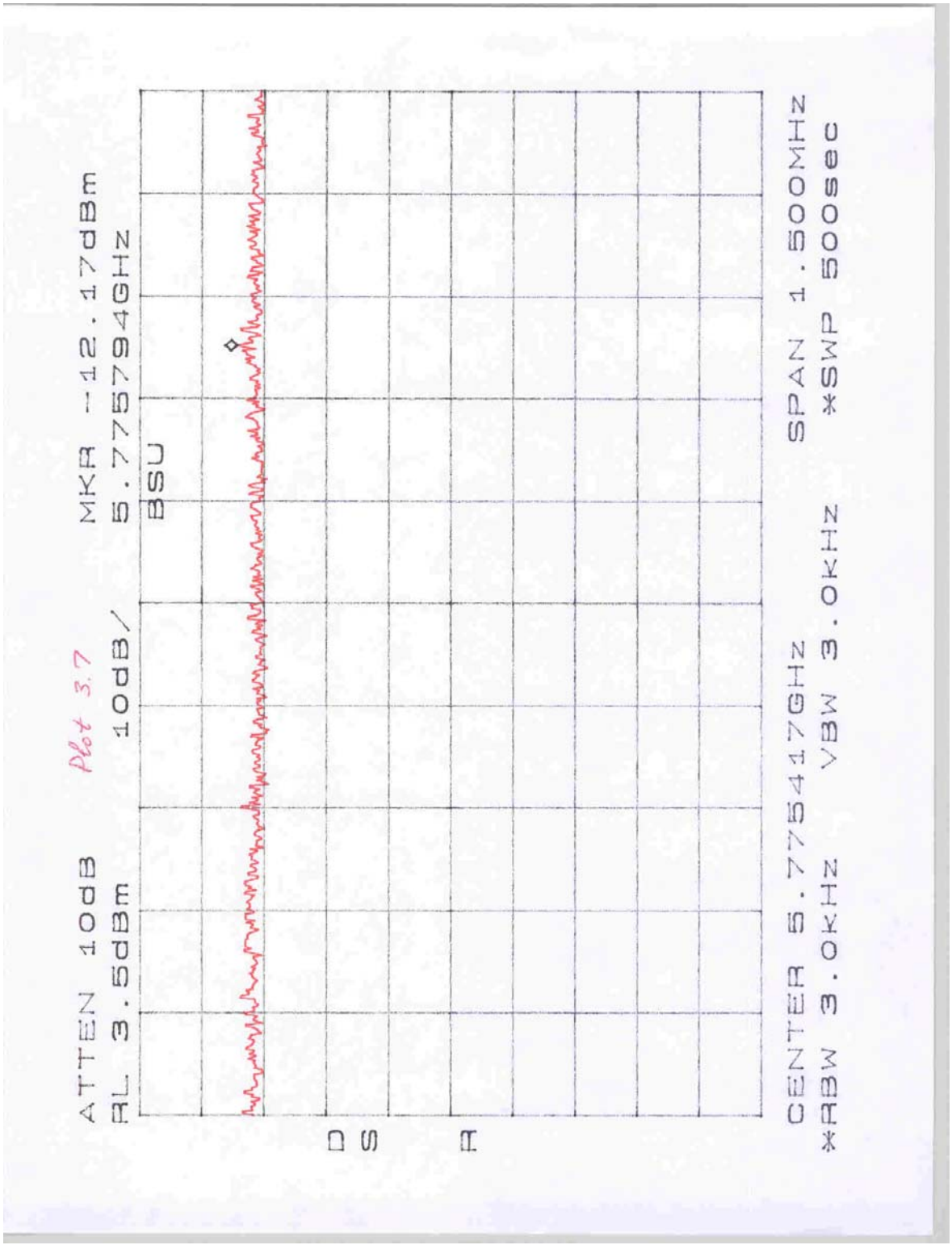

Plot 3.2
ATTEN 10dB
RL 3.5dBm
10dB/
MKR -14.00dBm
5.775832GHz
BSU
DISPLAY LINE
-18.0 dBm
D S
R
CENTER 5.775167GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.500MHz
*SWP 500sec

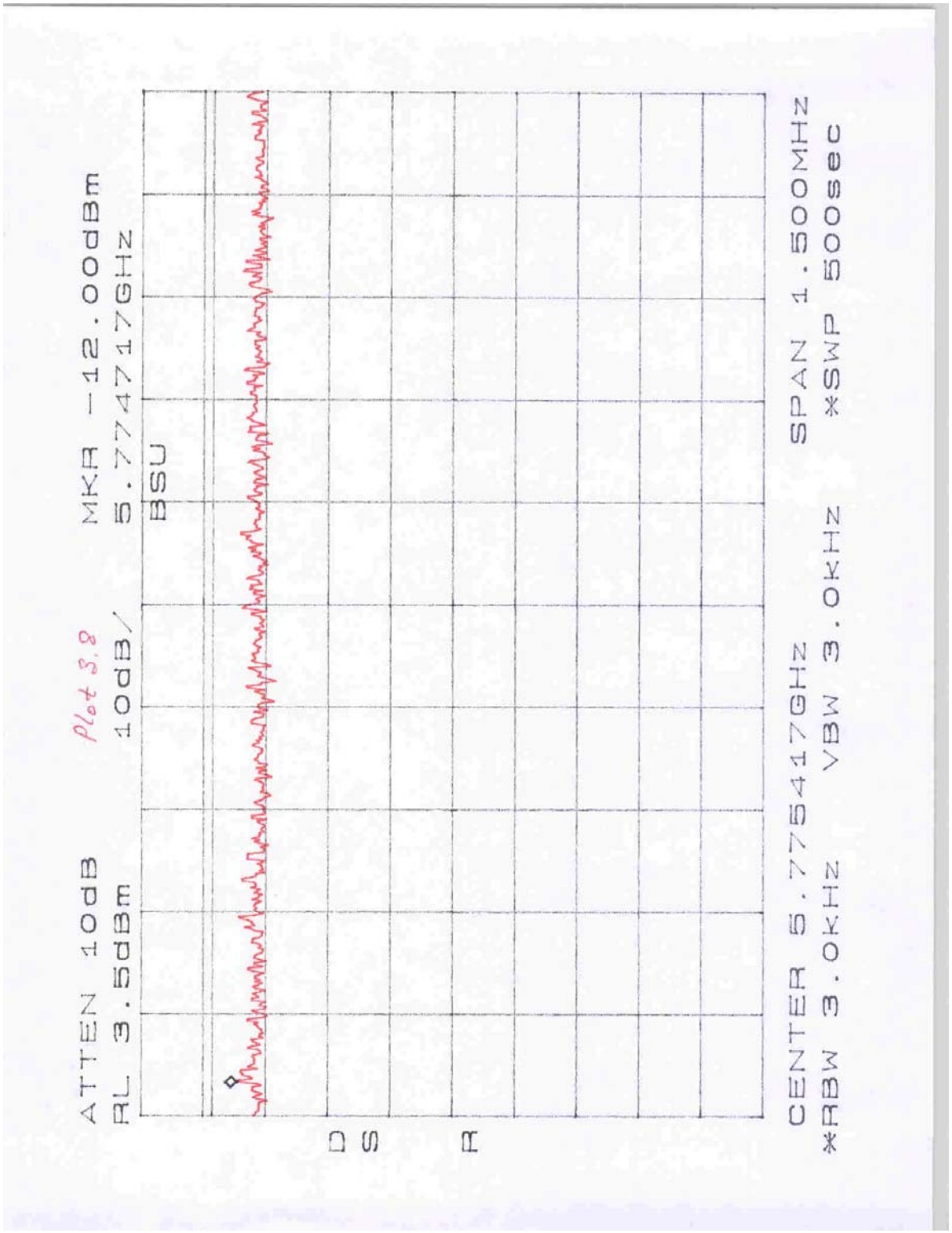

ATTEN 10dB
RL 3.5dBm
Plot 3.3
10dB/
MKR -11.50dBm
5.810301GHz
BSU
D S
R
CENTER 5.809833GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.500MHz
*SWP 500sec


Plot S.4
ATTEN 10dB
RL 3.5dBm
10dB/
MKR -14.50dBm
5.740917GHz
BSU
DISPLAY LINE
-18.0 dBm
D S R
CENTER 5.740667GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.500MHz
*SWP 500sec


Plot 3.5
ATTEN 10dB
RL .5dBm
10dB/
MKR -13.67dBm
5.775829GHz
BSU
DISPLAY LINE
-8.0 dBm
D S R
CENTER 5.775167GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.500MHz
*SWP 500sec


ATTEN 10dB
RL 3.5dBm
Plot 36
10dB/
MKR -11.50dBm
5.810409GHz
DISPLAY LINE
-18.0 dBm
D S R
CENTER 5.809667GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.500MHz
*SWP 500sec


ATTEN 10dB
RL 3.5dBm
Plot 3.7
10dB/
MKR -12.17dBm
5.775794GHz
BSU
CENTER 5.775417GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.500MHz
*SWP 500sec


ATTEN 10dB
RL 3.5dBm
Plot 3.8
10dB/
MKR -12.00dBm
5.774747GHz
BSU
D S
R
CENTER 5.775417GHz
SPAN 1.500MHz
*RBW 3.0KHz
VBW 3.0KHz
*SWP 500sec

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

Requirements

In any 100 kHz bandwidth outside the EUT pass-band, 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 for the configuration with an external antenna connector for QAM16 modulation. In addition, measurements on the band-edge frequencies were performed for both configuration for QPSK ¾ and QPSK ½ modulations.

Test Result

Refer to the following plots in Appendix A for the test result.

Plot	Point of measurement	Modulation	Description
4.1a–4.1e	connectorized BSU antenna connector	QAM16	low channel, scan 30 MHz to 40 GHz
4.2a–4.2d	connectorized BSU antenna connector	QAM16	middle channel, scan 30 MHz to 40 GHz
4.3a–4.3d	connectorized BSU antenna connector	QAM16	high channel, scan 30 MHz to 40 GHz
4.4a–4.4b	connectorized BSU antenna connector	QPSK ¾	low channel, scan 4 GHz to 5.85 GHz
4.4c–4.4d	connectorized BSU antenna connector	QPSK ½	low channel, scan 4 GHz to 5.85 GHz
4.5a–4.5b	connectorized BSU antenna connector	QPSK ¾	high channel, scan 5.725 GHz to 8 GHz
4.5c–4.5d	connectorized BSU antenna connector	QPSK ½	high channel, scan 5.725 GHz to 8 GHz
4.6a–4.6b	integrated BSU RF output	QAM16	low channel, scan 5 GHz to 5.85 GHz
4.6c–4.6d	integrated BSU RF output	QPSK ¾	low channel, scan 5 GHz to 5.85 GHz
4.6e–4.6f	integrated BSU RF output	QPSK ½	low channel, scan 5 GHz to 5.85 GHz
4.7a–4.7b	integrated BSU RF output	QAM16	high channel, scan 5.725 GHz to 10 GHz
4.7c–4.7d	integrated BSU RF output	QPSK ¾	high channel, scan 5.725 GHz to 10 GHz
4.7e–4.7f	integrated BSU RF output	QPSK ½	high channel, scan 5.725 GHz to 10 GHz

The EUT passed by more than 20 dB.

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

FS = RA + AF + CF - AG
Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(1/m)
AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μV) is obtained. The antenna factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.

RA = 52.0 dB(μV) AF = 7.4 dB(1/m)
CF = 1.6 dB AG = 29.0 dB

FS = 52 + 7.4 + 1.6 - 29 = 32 dB(μV/m)
Level in μV/m = Common Antilogarithm [(32 dB(μV/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. The EUT passed by 7.6 dB.

Company:	PROXIM	**Model #:**		**Standard_**	**FCC § 15.247(R.B.)**
EUT:	BSU with Internal Ant.	**S/N #:**		**Limits_**	2
Project #:	3034904	**Test Date:**	June 25, 2003	**Test Distance_**	1 meter
Test Mode:	Tx	**Engineer:**	AK.	**Duty Relaxation**	0 dB

	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	8	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	AFT18855	None	ACO/400	NPS72-1	None	None

TX at 5740 MHz

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	DCF	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
11480	64.0	Peak	14	10	H	40.4	39.9	4.2	-9.5	59.2	74.0	-14.8
11480	51.0	Ave.	14	10	H	40.4	39.9	4.2	-9.5	46.2	54.0	-7.8
22960	37.7 *	Peak	21	13	H	40.4	23.3	10.5	-9.5	55.8	74.0	-18.2
22960	24.8 *	Ave.	21	13	H	40.4	23.3	10.5	-9.5	42.9	54.0	-11.1

TX at 5775 MHz

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	DCF	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
11550	63.2	Peak	14	10	V	40.4	39.9	4.2	-9.5	58.4	74.0	-15.6
11550	50.7	Ave.	14	10	V	40.4	39.9	4.2	-9.5	45.9	54.0	-8.1
23100	38.9 *	Peak	21	13	H	40.4	23.3	10.5	-9.5	55.2	74.0	-18.8
23100	25.2 *	Ave.	21	13	H	40.4	23.3	10.5	-9.5	43.3	54.0	-10.7

TX at 5810 MHz

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	DCF	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
11620	60.2	Peak	14	10	V	40.4	39.9	4.2	-9.5	55.4	74.0	-18.6
11620	51.0	Ave.	14	10	V	40.4	39.9	4.2	-9.5	46.2	54.0	-7.8

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
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 10 dB below the limits.
f) * Noise floor reading

Company:	PROXIM		**Model #:**			**Standard_**	**FCC § 15.247(R.B.)**		
EUT:	BSU with External Ant.		**S/N #:**			**Limits_**	2		
Project #:			**Test Date:**	July 03, 2003		**Test Distance_**	1	meter	
Test Mode:	Tx		**Engineer:**	AK.		**Duty Relaxation**	0	dB	
	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	21	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	AFT18855	None	ACO/400	NPS72-1	None	None

OMNI Antenna, model: 5830AN

TX at 5740 MHz

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
11480	59.0	Peak	14	10	V	36.9	39.9	4.2	-9.5	50.7	74.0	-23.3
11480	46.5	Ave.	14	10	V	36.9	39.9	4.2	-9.5	38.2	54.0	-15.8
22960	38.3*	Peak	21	13	V/H	40.4	23.3	10.5	-9.5	56.4	74.0	-17.6
22960	27.8*	Ave.	21	13	V/H	40.4	23.3	10.5	-9.5	45.9	54.0	-8.1

TX at 5775 MHz

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
11550	58.9	Peak	14	10	V	36.9	39.9	4.2	-9.5	50.6	74.0	-23.4
11550	45.4	Ave.	14	10	V	36.9	39.9	4.2	-9.5	37.1	54.0	-16.9
23100	38.1*	Peak	21	13	V/H	40.4	23.3	10.5	-9.5	56.2	74.0	-17.8
23100	27.6*	Ave.	21	13	V/H	40.4	23.3	10.5	-9.5	45.7	54.0	-8.3

TX at 5810 MHz

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
11620	54.2	Peak	14	10	V	36.9	39.9	4.2	-9.5	45.9	74.0	-28.1
11620	42.2	Ave.	14	10	V	36.9	39.9	4.2	-9.5	33.9	54.0	-20.1

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
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 10 dB below the limits.
f) * Noise floor reading

Company:	PROXIM		**Model #:**			**Standard_**	**FCC § 15.247(R.B.)**		
EUT:	BSU with External Ant.		**S/N #:**			**Limits_**	2		
Project #:	3034904		**Test Date:**	July 03, 2003		**Test Distance_**	1	meter	
Test Mode:	Tx		**Engineer:**	AK.		**Duty Relaxation**	0	dB	
	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	21	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	AFT18855	None	ACO/400	NPS72-1	None	None

OMNI Antenna, model: MT-483003/N

TX at 5740 MHz

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
11480	60.6	Peak	14	10	V	36.9	39.9	4.2	-9.5	52.3	74.0	-21.7
11480	47.2	Ave.	14	10	V	36.9	39.9	4.2	-9.5	38.9	54.0	-15.1
22960	36.0*	Peak	21	13	V/H	40.4	23.3	10.5	-9.5	54.1	74.0	-15.3
22960	24.8*	Ave.	21	13	V/H	40.4	23.3	10.5	-9.5	42.9	54.0	-11.1

TX at 5775 MHz

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
11550	59.1	Peak	14	10	V	36.9	39.9	4.2	-9.5	50.8	74.0	-23.2
11550	44.8	Ave.	14	10	V	36.9	39.9	4.2	-9.5	36.5	54.0	-17.5
23100	36.0*	Peak	21	13	V/H	40.4	23.3	10.5	-9.5	54.1	74.0	-19.9
23100	24.6*	Ave.	21	13	V/H	40.4	23.3	10.5	-9.5	42.7	54.0	-11.3

TX at 5810 MHz

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
11620	57.2	Peak	14	10	V	36.9	39.9	4.2	-9.5	48.9	74.0	-25.1
11620	43.9	Ave.	14	10	V	36.9	39.9	4.2	-9.5	35.6	54.0	-18.4

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
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 10 dB below the limits.
f) * Noise floor reading

Company:	PROXIM	**Model #:**		**Standard_**	**FCC § 15.247(R.B.)**	
EUT:	BSU with External Ant.	**S/N #:**		**Limits_**	2	
Project #:		**Test Date:**	July 03, 2003	**Test Distance_**	1	meter
Test Mode:	Tx	**Engineer:**	AK.	**Duty Relaxation**	0	dB

	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	21	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	AFT18855	None	ACO/400	NPS72-1	None	None

Flat Panel Antenna, model: SEC-5V/H-60-18

TX at 5740 MHz

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
11480	63.1	Peak	14	10	V	36.9	39.9	4.2	-9.5	51.9	74.0	-22.1
11480	51.9	Ave.	14	10	V	36.9	39.9	4.2	-9.5	43.6	54.0	-10.4
22960	37.3*	Peak	21	13	V/H	40.4	23.3	10.5	-9.5	55.4	74.0	-18.6
22960	24.8*	Ave.	21	13	V/H	40.4	23.3	10.5	-9.5	42.9	54.0	-11.1

TX at 5775 MHz

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
11550	62.9	Peak	14	10	V	36.9	39.9	4.2	-9.5	54.6	74.0	-15.4
11550	54.9	Ave.	14	10	V	36.9	39.9	4.2	-9.5	46.6	54.0	-7.6
23100	38.1*	Peak	21	13	V/H	40.4	23.3	10.5	-9.5	56.2	74.0	-17.8
23100	24.6*	Ave.	21	13	V/H	40.4	23.3	10.5	-9.5	42.7	54.0	-11.3

TX at 5810 MHz

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
11620	66.7	Peak	14	10	V	36.9	39.9	4.2	-9.5	58.4	74.0	-15.6
11620	52.7	Ave.	14	10	V	36.9	39.9	4.2	-9.5	44.4	54.0	-9.6

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
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 10 dB below the limits.
f) * Noise floor reading

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 for the test procedure and field strength calculation.

Result

The result is presented on the following pages.
The EUT passed by 0.7 dB.

Radiated Emissions FCC Part 15 Class B

Operator: Arkadi Kaplan
ITS Job Number: 3044904
10-Jul-03

Model: BSU with internal antenna
Company: Proxim Corp.

Frequency MHz	Pol.	Quasi- Pk FS dB(uV/m)	FS Limit@3m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	CF dB	AF dB(1/m)	Atten dB
43.8	V	33.1	40.0	-6.9	53.0	32.4	0.6	8.9	3
58.4	V	26.7	40.0	-13.3	50.1	32.3	0.8	5.2	3
92.2	V	30.1	43.5	-13.4	51.0	32.3	0.9	7.6	3
94.9	V	40.4	43.5	-3.1	61.3	32.3	0.9	7.4	3
96.4	V	42.8	43.5	-0.7	63.9	32.3	0.9	7.4	3
101.0	V	40.5	43.5	-3.0	61.6	32.3	0.9	7.3	3

Test Mode: Tx/Rx
Temp: 22.5 C
Hum: 43.2 %

Radiated Emissions FCC Part 15 Class B

Operator: Arkadi Kaplan
ITS Job Number: 3044904
17-Jul-03

Model: BSU with external antenna
Company: Proxim Corp.

Frequency MHz	Pol	Quasi Pk FS dB(uV/m)	FS Limit@3m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	CF dB	AF dB(1/m)	Atten dB
42.1	V	30.2	40	-9.8	51.3	32.4	0.6	7.7	3
57.4	V	37.3	40	-2.7	60.5	32.3	0.7	5.4	3
64.3	V	30.6	40	-9.4	54.2	32.3	0.8	4.9	3
124.4	H	27.8	43.5	-15.7	48.8	32.3	1.0	7.3	3
188.7	H	32.7	43.5	-10.8	51.1	32.3	1.3	9.6	3
268.3	H	36.4	46.0	-9.6	51.2	32.2	1.5	12.9	3
301.1	H	29.0	46.0	-17.0	42.6	32.2	1.6	14.0	3

Test Mode: Tx/Rx
Temp: 22.1 C
Hum: 42.9 %

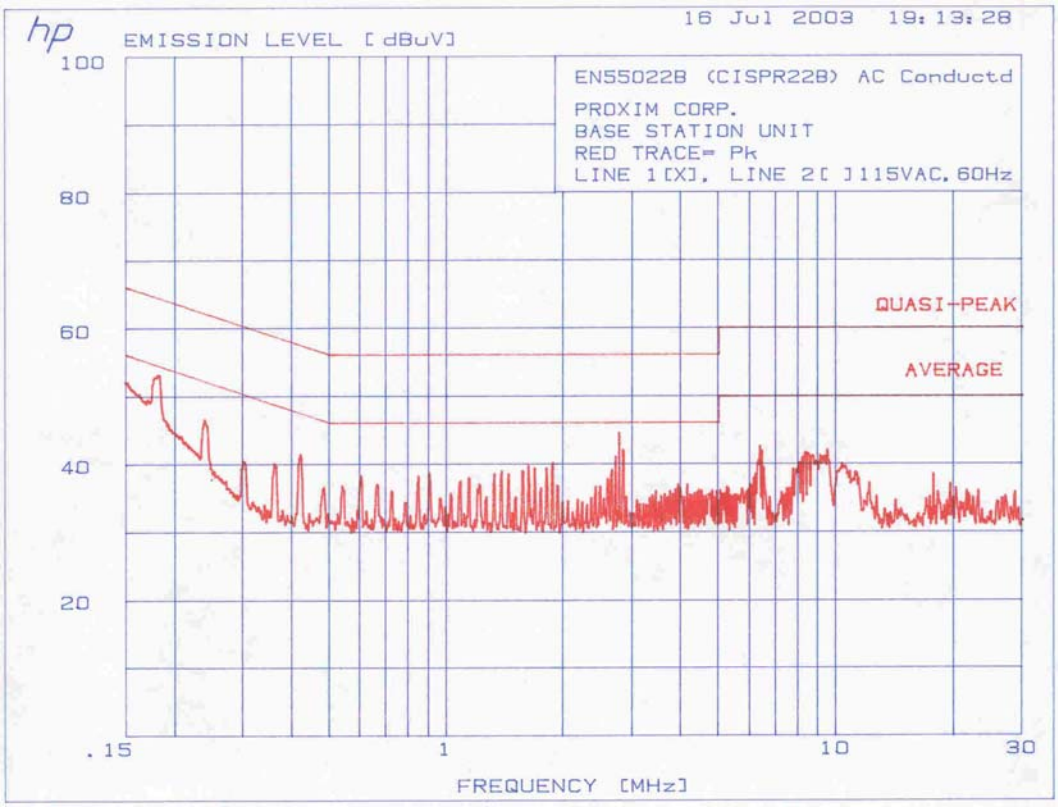
4.8 Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation)
FCC Ref: 15.109, 15.111

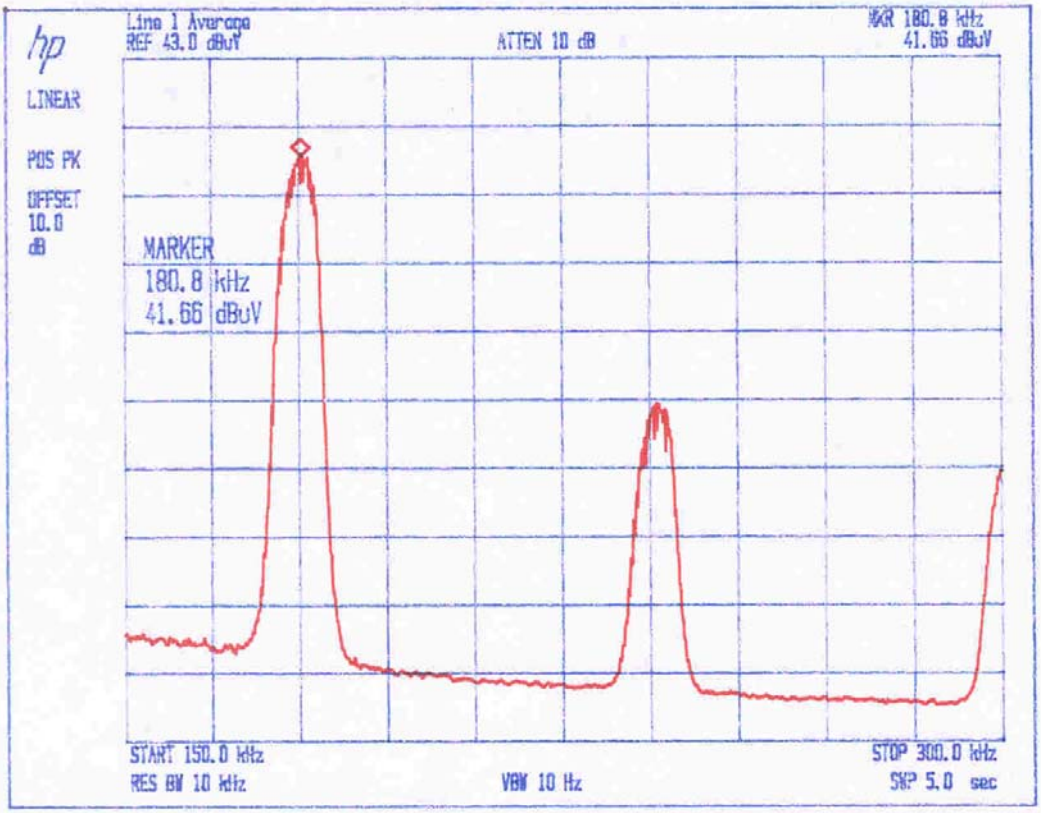
Not required - EUT operation above 960 MHz only.

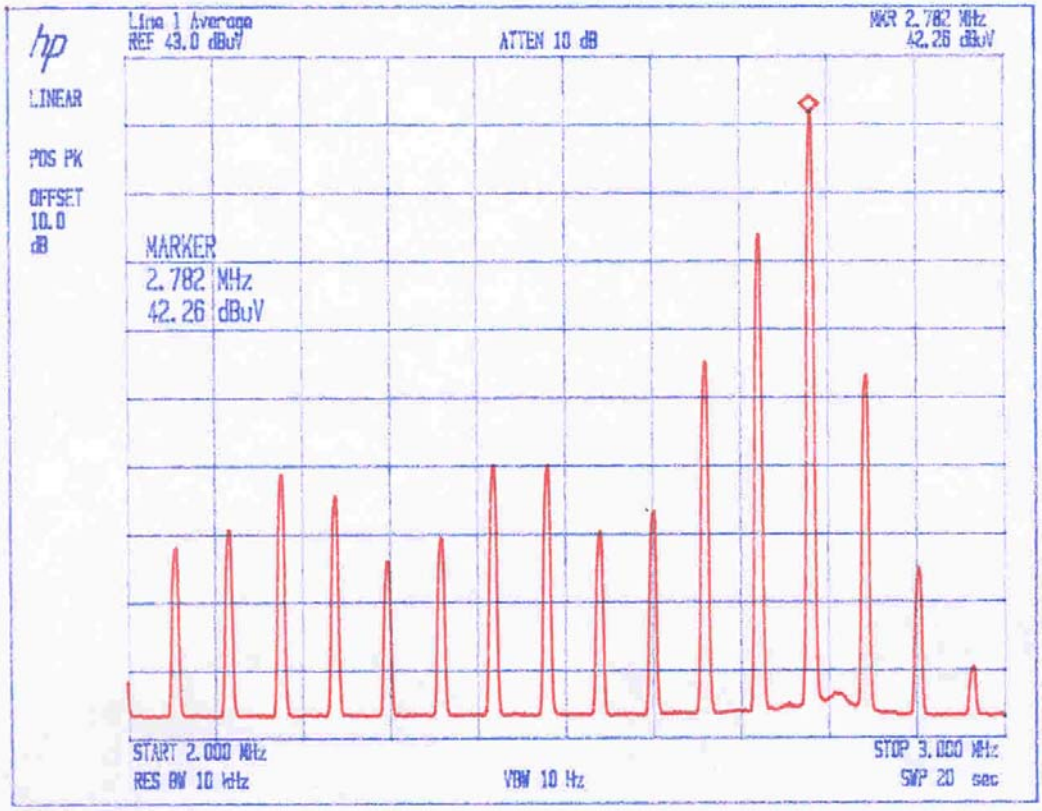
4.9 AC Line Conducted Emission
FCC Rule 15.207:

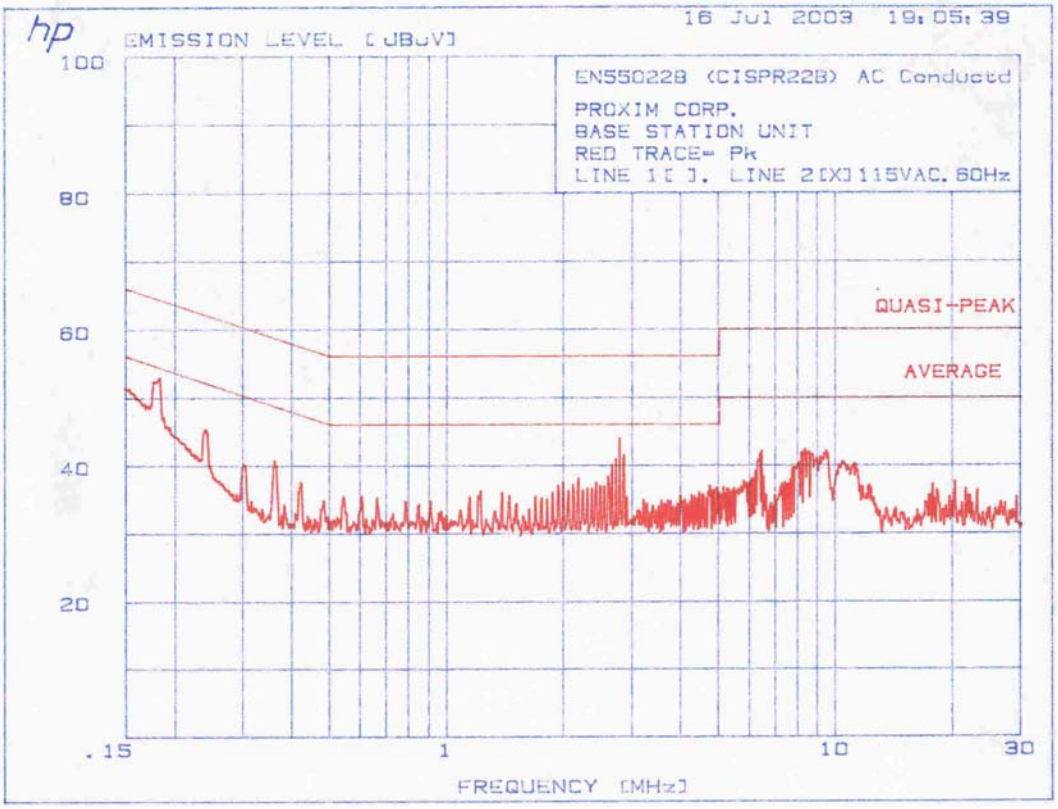
AC line conducted emission test was performed according the ANSI C63.4 standard. The EUT was connected to AC Line through the LISNs.

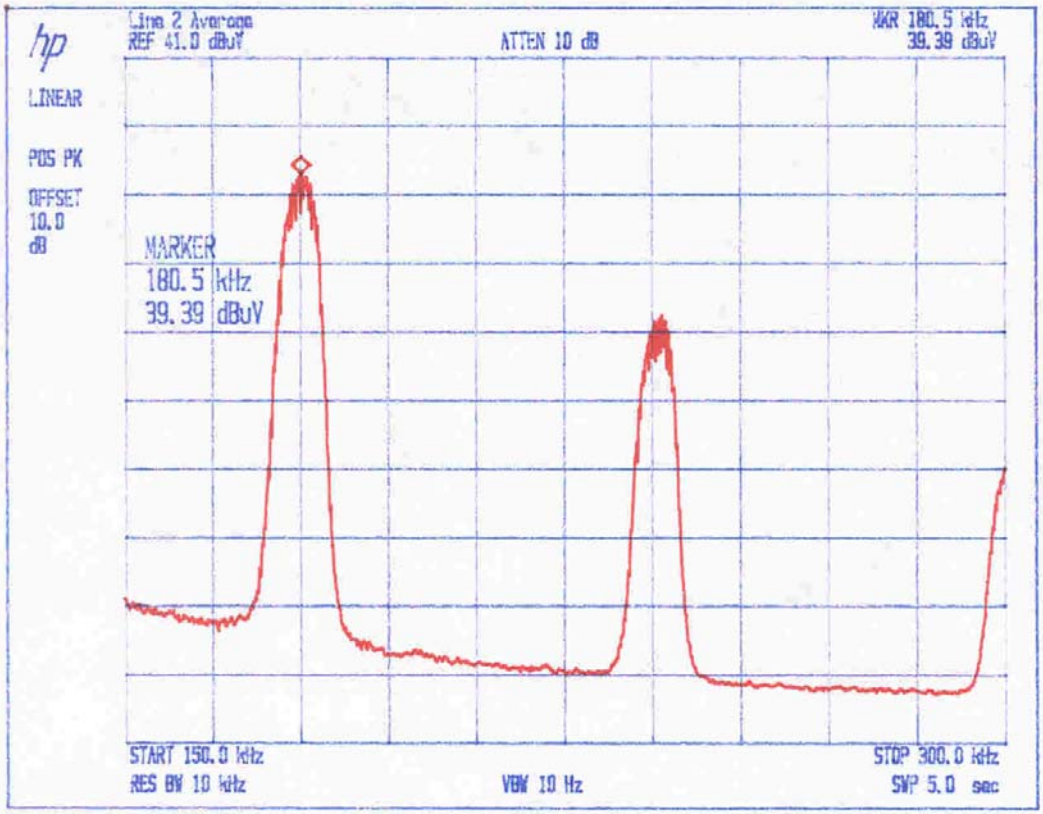
For the test result, see attached plots.
The EUT passed by 3.7 dB.

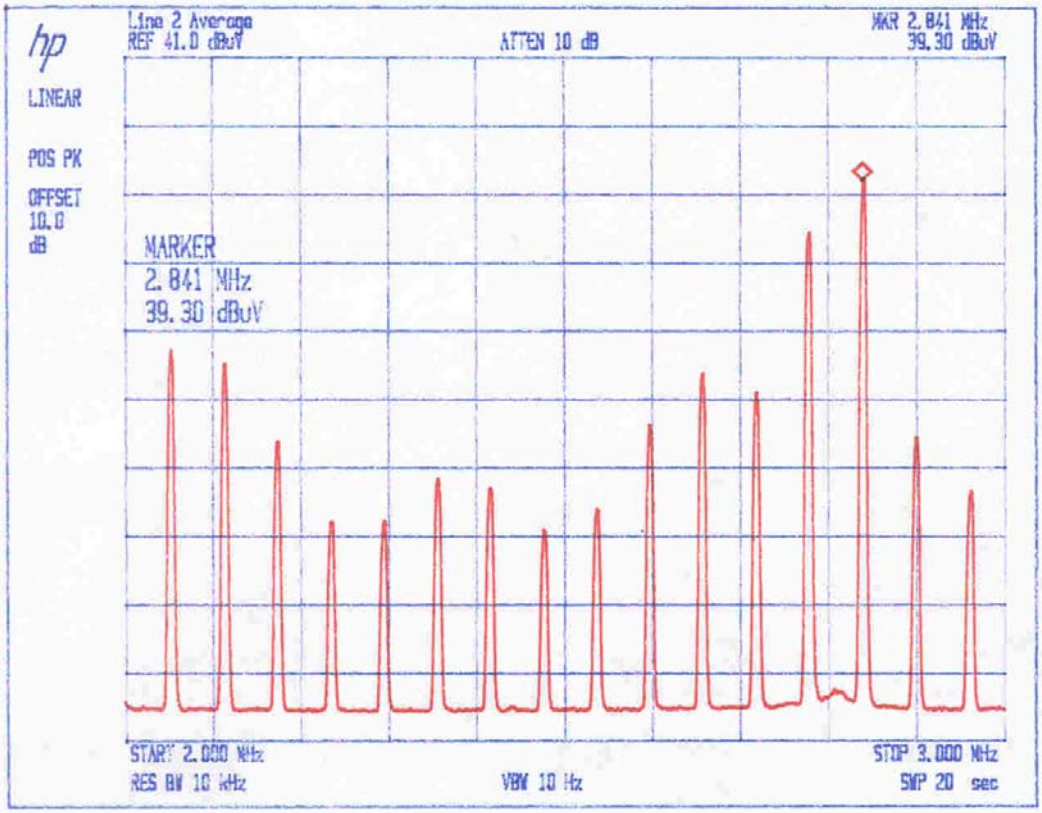

hp
16 Jul 2003 19:13:28
EMISSION LEVEL [dBuV]
100
80
60
40
20
EN55022B (CISPR22B) AC Conductd
PROXIM CORP.
BASE STATION UNIT
RED TRACE= Pk
LINE 1[X], LINE 2[ ]115VAC, 60Hz
QUASI-PEAK
AVERAGE
.15
1
10
30
FREQUENCY [MHz]


Line 1 Average
REF 43.0 dBuV
ATTEN 10 dB
MKR 180.8 kHz
41.66 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
MARKER
180.8 kHz
41.66 dBuV
START 150.0 kHz
RES BW 10 kHz
VBW 10 Hz
STOP 300.0 kHz
SWP 5.0 sec


Line 1 Average
REF 43.0 dBuV
ATTEN 10 dB
MKR 2.782 MHz
42.26 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
MARKER
2.782 MHz
42.26 dBuV
START 2.000 MHz
RES BW 10 kHz
VBW 10 Hz
STOP 3.000 MHz
SWP 20 sec


16 Jul 2003 19:05:39
EMISSION LEVEL [dBuV]
EN55022B (CISPR22B) AC Conducted
PROXIM CORP.
BASE STATION UNIT
RED TRACE= Pk
LINE 1[ ]. LINE 2[X] 115VAC, 60Hz
100
80
60
40
20
QUASI-PEAK
AVERAGE
.15
1
10
30
FREQUENCY [MHz]


Line 2 Average
REF 41.0 dBuV
ATTEN 10 dB
MKR 180.5 kHz
39.39 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
MARKER
180.5 kHz
39.39 dBuV
START 150.0 kHz
RES BW 10 kHz
VBW 10 Hz
STOP 300.0 kHz
SWP 5.0 sec


Line 2 Average
REF 41.0 dBuV
ATTEN 10 dB
MKR 2.841 MHz
39.30 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
MARKER
2.841 MHz
39.30 dBuV
START 2.000 MHz
RES BW 10 kHz
VBW 10 Hz
STOP 3.000 MHz
SWP 20 sec

5.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. INTERVAL	CAL. DUE
Spectrum Analyzer w/85650 QP Adapter	Hewlett Packard	8566B	2416A00317 2043A00251	12	10/29/03
Spectrum Analyzer w/8650 QP Adapter	Hewlett Packard	8568B	1912A0053 2521A01021	12	11/20/03
Spectrum Analyzer	Hewlett Packard	8565E	AE9674	12	5/27/04
BI-Log Antenna	EMCO	3143	9509-1160	12	9/19/03
Horn Antenna	EMCO	3115	8812-3049	12	4/08/04
Horn Antenna	EMCO	3160-09	Not Labeled	#	#
Horn Antenna	EMCO	3160-10	Not Labeled	#	#
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	799159	12	4/06/04
Pre-Amplifier	Avantek	AFT-18855	8723H705	12	4/10/04
Pre-amplifier	CTT	ACO/400	47526	12	4/10/04
LISN	FCC	FCC-LISN-50-50-M-H	2011	12	2/08/04

No Calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3044904	DC	October 6, 2003	Original document

Appendix A – Out-of-band conducted emissions plots

Plot	Point of measurement	Modulation	Description
4.1a–4.1e	connectorized BSU antenna connector	QAM16	low channel, scan 30 MHz to 40 GHz
4.2a–4.2d	connectorized BSU antenna connector	QAM16	middle channel, scan 30 MHz to 40 GHz
4.3a–4.3d	connectorized BSU antenna connector	QAM16	high channel, scan 30 MHz to 40 GHz
4.4a–4.4b	connectorized BSU antenna connector	QPSK ¾	low channel, scan 4 GHz to 5.85 GHz
4.4c–4.4d	connectorized BSU antenna connector	QPSK ½	low channel, scan 4 GHz to 5.85 GHz
4.5a–4.5b	connectorized BSU antenna connector	QPSK ¾	high channel, scan 5.725 GHz to 8 GHz
4.5c–4.5d	connectorized BSU antenna connector	QPSK ½	high channel, scan 5.725 GHz to 8 GHz
4.6a–4.6b	integrated BSU RF output	QAM16	low channel, scan 5 GHz to 5.85 GHz
4.6c–4.6d	integrated BSU RF output	QPSK ¾	low channel, scan 5 GHz to 5.85 GHz
4.6e–4.6f	integrated BSU RF output	QPSK ½	low channel, scan 5 GHz to 5.85 GHz
4.7a–4.7b	integrated BSU RF output	QAM16	high channel, scan 5.725 GHz to 10 GHz
4.7c–4.7d	integrated BSU RF output	QPSK ¾	high channel, scan 5.725 GHz to 10 GHz
4.7e–4.7f	integrated BSU RF output	QPSK ½	high channel, scan 5.725 GHz to 10 GHz