ITS Intertek Testing Services
ETL SEMKO

Test Report

Report #: 30361842
Project #: 3036184
Report Date:
Date of Test: January 13-20, 2003

Testing performed on

Spread Spectrum Radio
Model: 40100-XXXX
FCC ID: HZB-S58-S60C
to

FCC Part 15.247 DSSS

For

Proxim Corporation

A2LA Certificate Number: 1755-01

Prepared by: David Chernomordik Date: 3/05/03
David Chernomordik, EMC Technical Manager

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1.0 Summary of Tests

FCC ID: HZB-S58-S60C

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

2.0 General Description

2.1 Product Description

The EUT, Model: 40100-XXXX, FCC ID: HZB-S58-S60C 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 an RJ-45 jack to connect the Ethernet data to either a computer or hub/switch.

Through an RF connector and an RF cable, the ODU is connected to an external antenna, from which the radio signal is transmitted towards one fixed location. One or more HZB-S58-S60C units may be used as remote units with a base station product at a center location to form a point-to-multipoint fixed wireless access network. Two HZB-S58-S60C units can also be used to form a fixed point-to-point wireless link.

Overview of the Model: 40100-XXXX, FCC ID: HZB-S58-S60C

Applicant name & address	Proxim Corporation 935 Stewart Drive, Sunnyvale, CA 94085 USA
Manufacturer	Proxim Corporation
FCC Identifier	HZB-S58-S60C
Use of Product	Fixed Wireless Ethernet Access
Type of Transmission	TDD
Type of Modulation	QAM16, QAM8, QPSK 3/4, QPSK 1/2
Rated RF Output	17 dBm (peak)
Frequency Range	5740 – 5810 MHz
Number of Channel(s)	6 channels maximum
Antenna(s) & Gain	Omni, 7.5 dBi, model 5830AN (from Telex) Omni, 12 dBi, model MT-483003/N (from MTI) 2 Foot Flat Panel, 28 dBi, model DFPD2-52 (from Gabriel) 3 Foot Parabolic, 31.4 dBi, model SP3-5.8 (from Radio Waves)
Antenna Requirement	The EUT requires professional installation.

A pre-production version of the EUT was received on January 10, 2003 in good operating condition. As declared by the Applicant, it is identical to the production units.

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

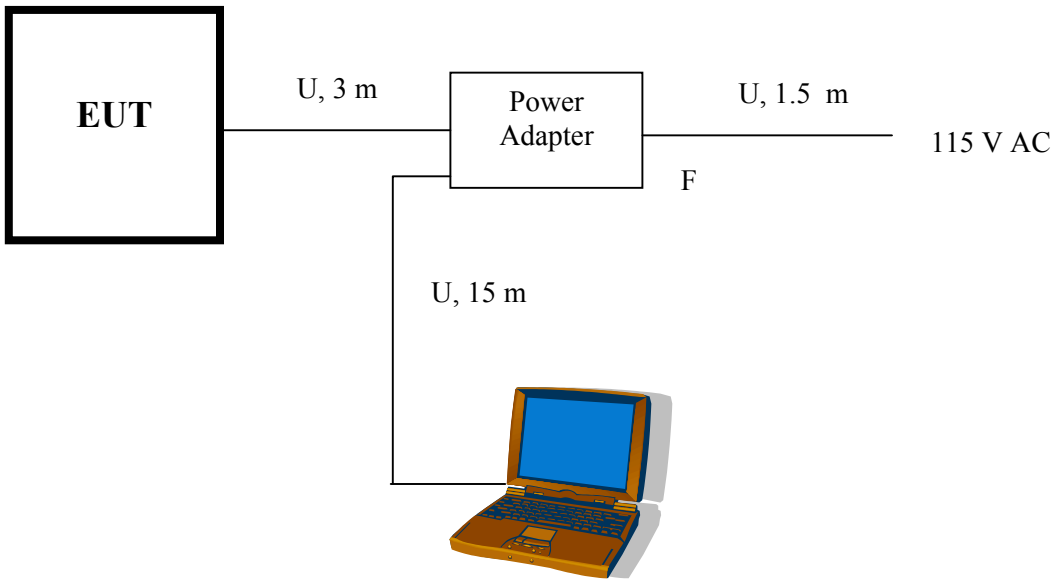
The open area test site and conducted measurement facility used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

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.

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

Transmitting signal on different channels with different types of modulation.

3.6 Modifications required for Compliance

Intertek Testing Services installed no modifications 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 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 Power mW
5740	QAM16	43.7
	QAM8	38.0
	QPSK 3/4	45.7
	QPSK 1/2	49.0
5768	QAM16	45.7
	QAM8	38.9
	QPSK 3/4	44.7
	QPSK 1/2	50.0
5810	QAM16	41.7
	QAM8	34.7
	QPSK 3/4	45.7
	QPSK 1/2	49.0

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

Requirements

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

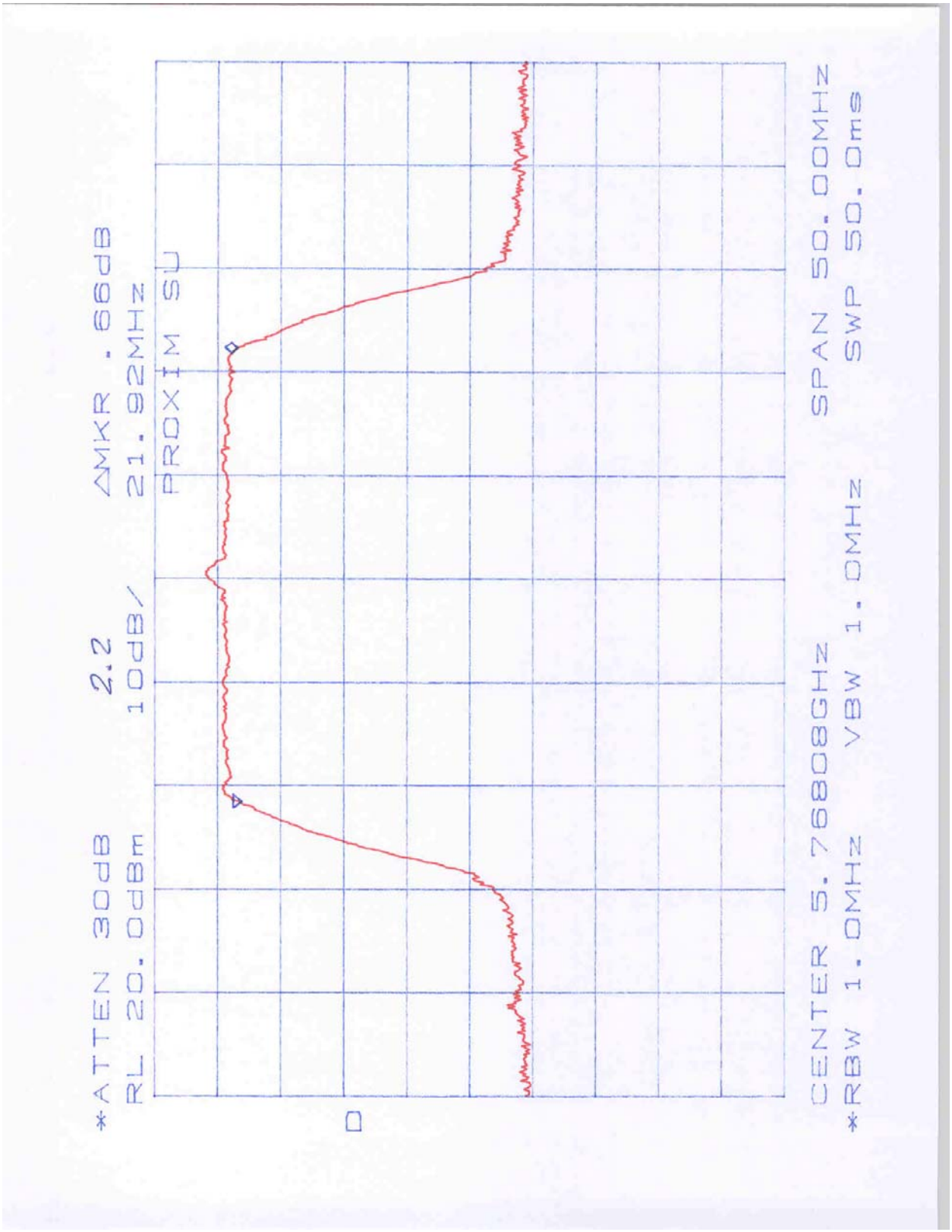
Procedure

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 MHz	Plot
5740	QAM16	21.92	2.1
5768	QAM16	21.92	2.2
	QAM8	22.25	2.3
	QPSK 3/4	22.17	2.4
	QPSK 1/2	22.17	2.5
5810	QAM16	21.92	2.6


*ATTEN 30dB
RL 20.00dBm
2.1
10dB/
ΔMKR -.17dB
21.92MHz
PROXIM SU
CENTER 5.740GHz
*RBW 1.0MHz
VBW 1.0MHz
SPAN 50.00MHz
SWP 50.0ms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2.2
10dB/
ΔMKR -.66dB
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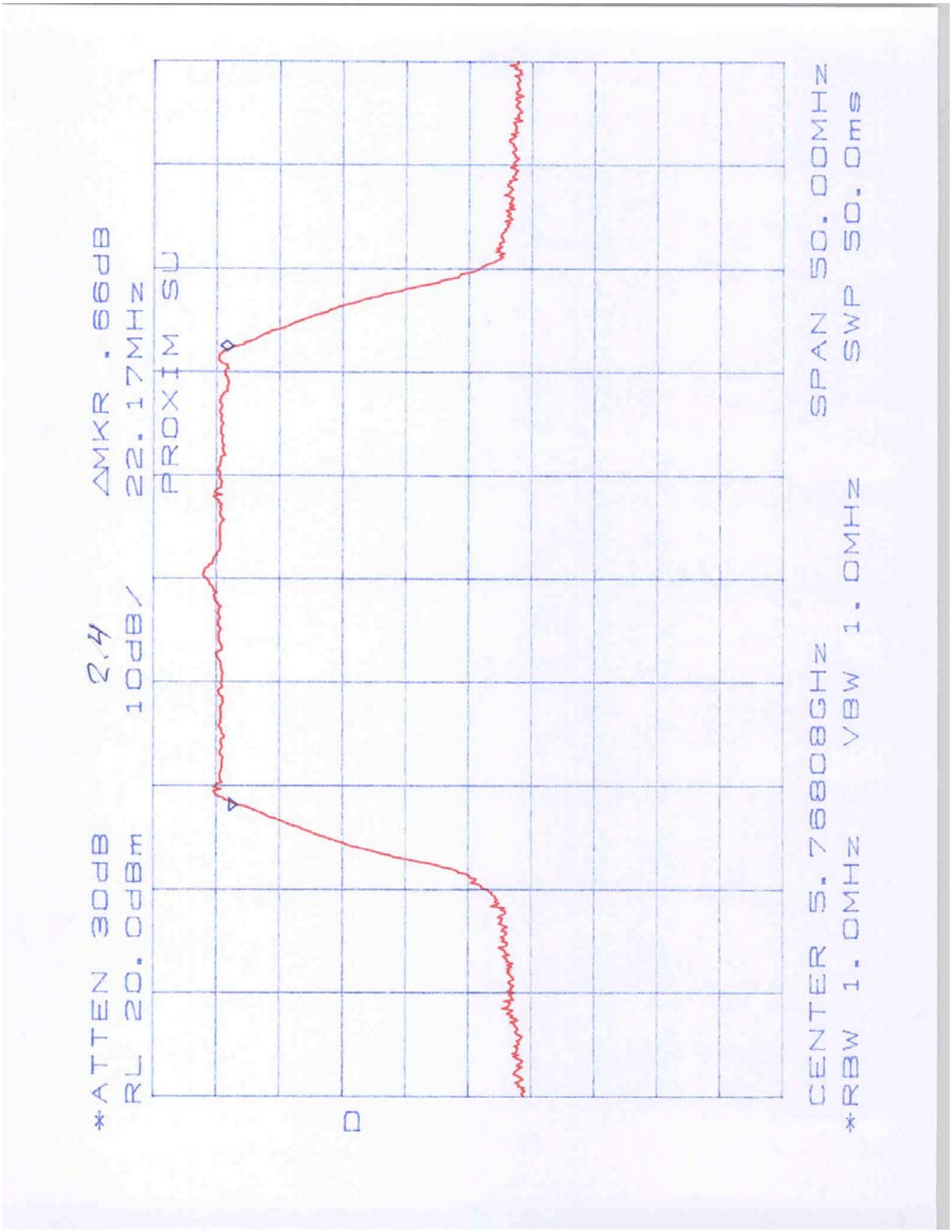
VBW 1.0MHz
SPAN 50.00MHz
SWP 50.0ms


*ATTEN 30dB
RL 20.0dBm
2.3
10dB/
ΔMKR 0dB
22.25MHz
PROXIM SU
CENTER 5.768080GHz
*RBW 1.0MHz
VBW 1.0MHz
SPAN 50.00MHz
SWP 50.0ms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2.4
10dB/
ΔMKR -.66dB
22.17MHz
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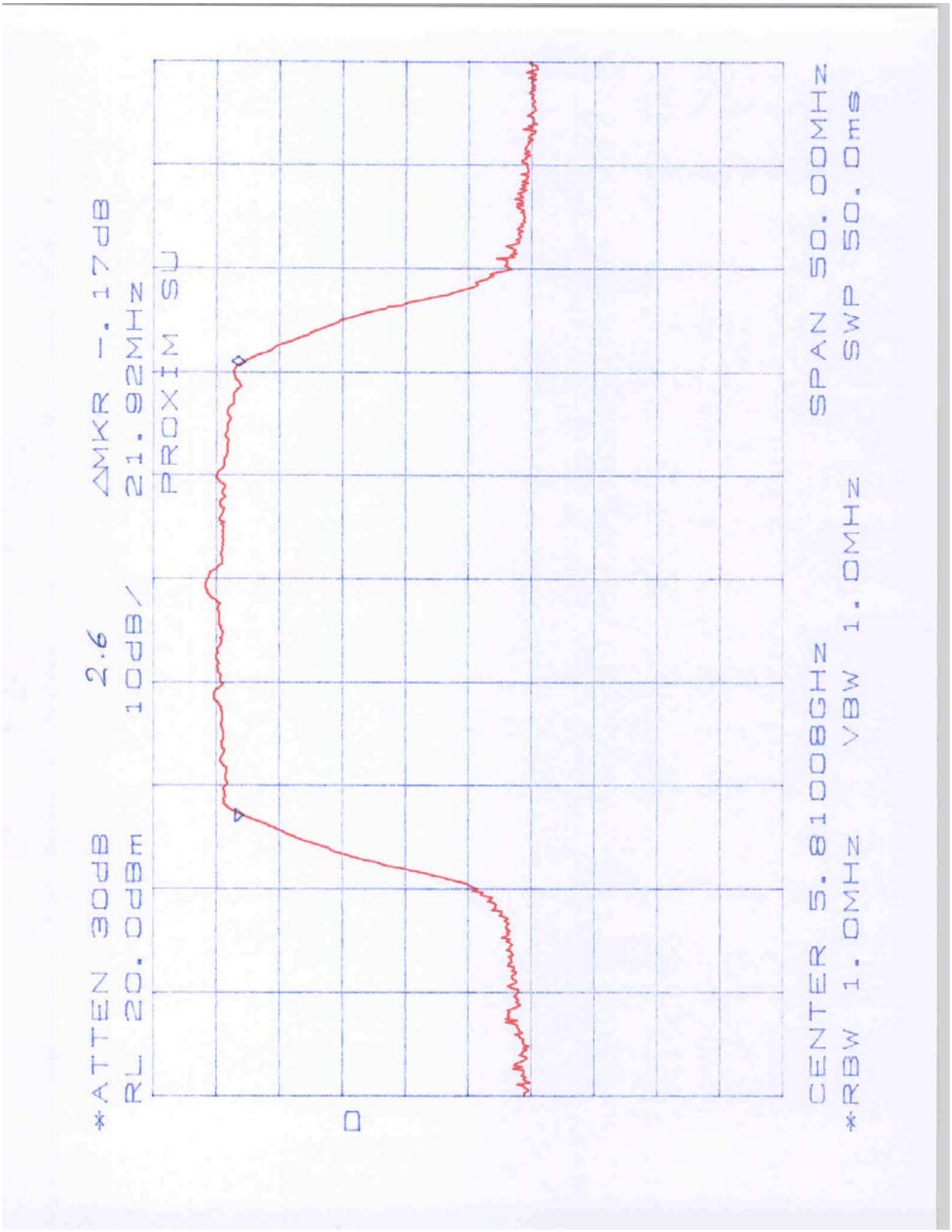
CENTER 5.76808GHz
*RBW 1.0MHz
VBW 1.0MHz
SPAN 50.00MHz
SWP 50.0ms


*ATTEN 30dB
RL 20.0dBm
2.5
10dB/
ΔMKR .33dB
22.17MHz
PROXIM SU
CENTER 5.768080GHz
*RBW 1.0MHz
VBW 1.0MHz
SPAN 50.00MHz
SWP 50.0ms


*ATTEN 30dB
RL 20.0dBm
2.6
10dB/
ΔMKR -.17dB
21.92MHz
PROXIM SU
CENTER 5.810GHz
*RBW 1.0MHz
VBW 1.0MHz
SPAN 50.0MHz
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 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:

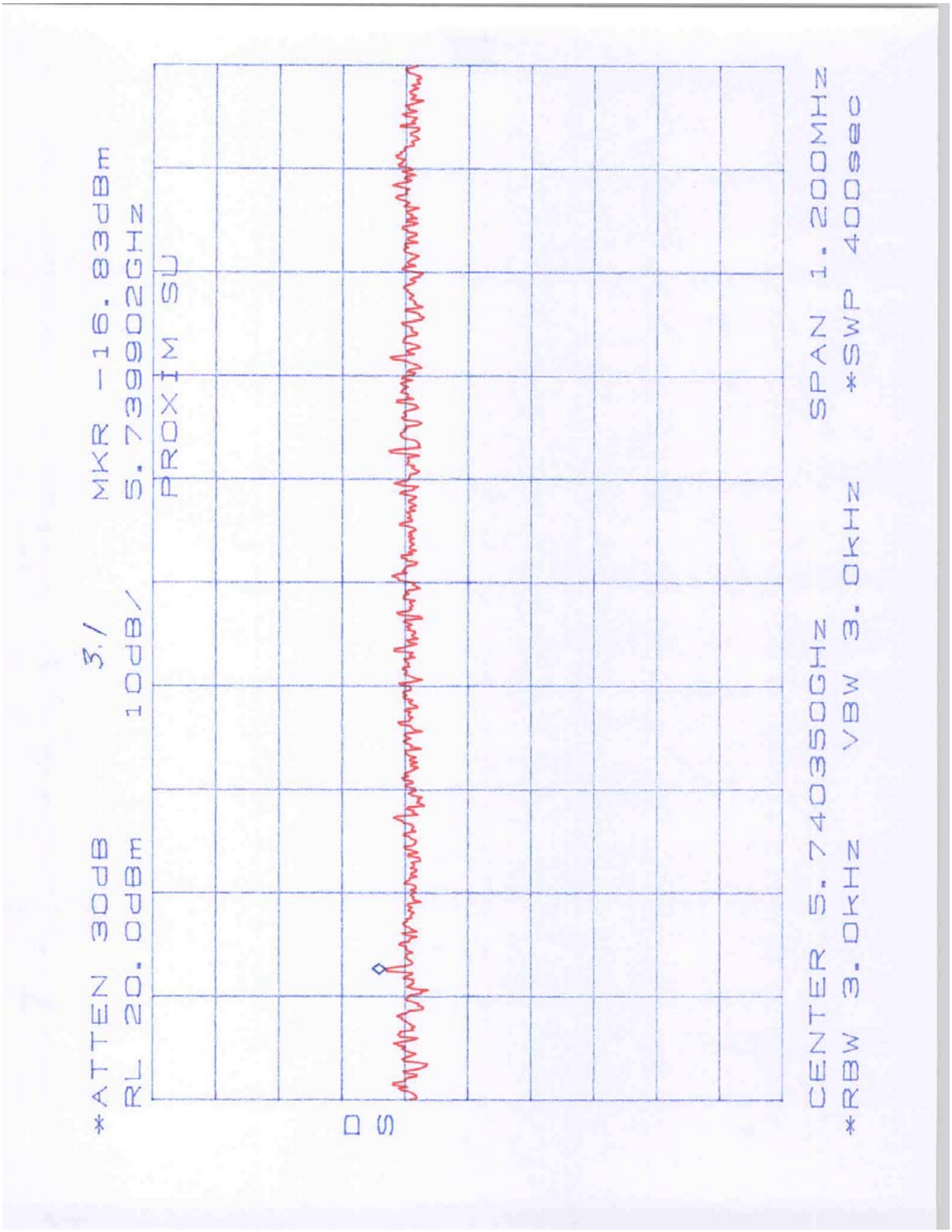
SWEEP TIME (SEC) = (Fstop, kHz - Fstart, kHz)/3 kHz

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	Modulation	Power Density dBm	Plot
5740	QAM16	-16.83	3.1
	QPSK 1/2	-13.33	3.2
5768	QAM16	-16.17	3.3
	QPSK 1/2	-13.33	3.4
5810	QAM16	-15.67	3.5
	QPSK 1/2	-13.17	3.6

Frequency Span = 1200 kHz
Sweep Time = Frequency Span/3 kHz = 400 Seconds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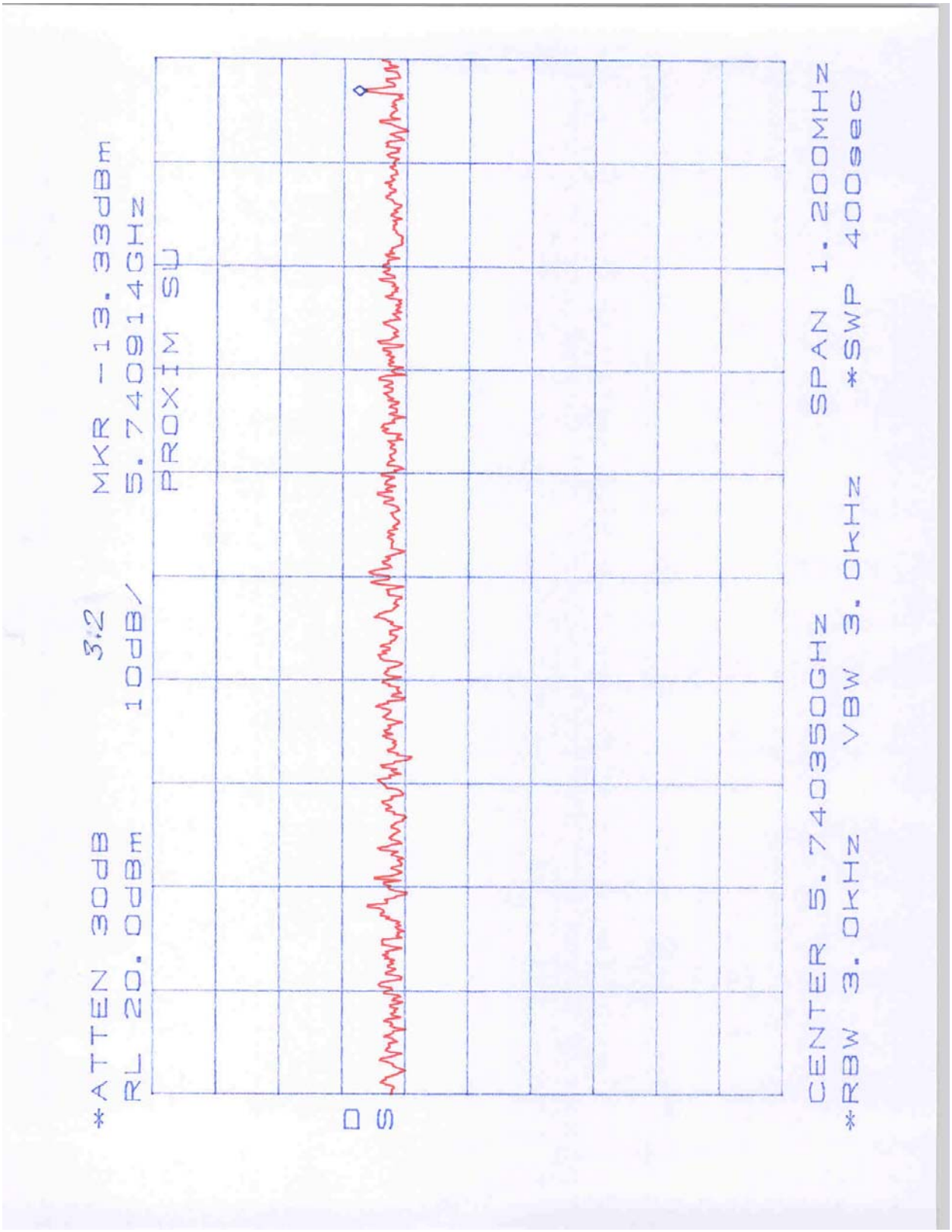
RL 20.0dBm
3/
10dB/
MKR -16.83dBm
5.739902GHz
PROXIM SU
D S
CENTER 5.740350GHz
SPAN 1.200MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 400sec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RL 20.0dBm
3.2
10dB/
MKR -13.33dBm
5.740914GHz
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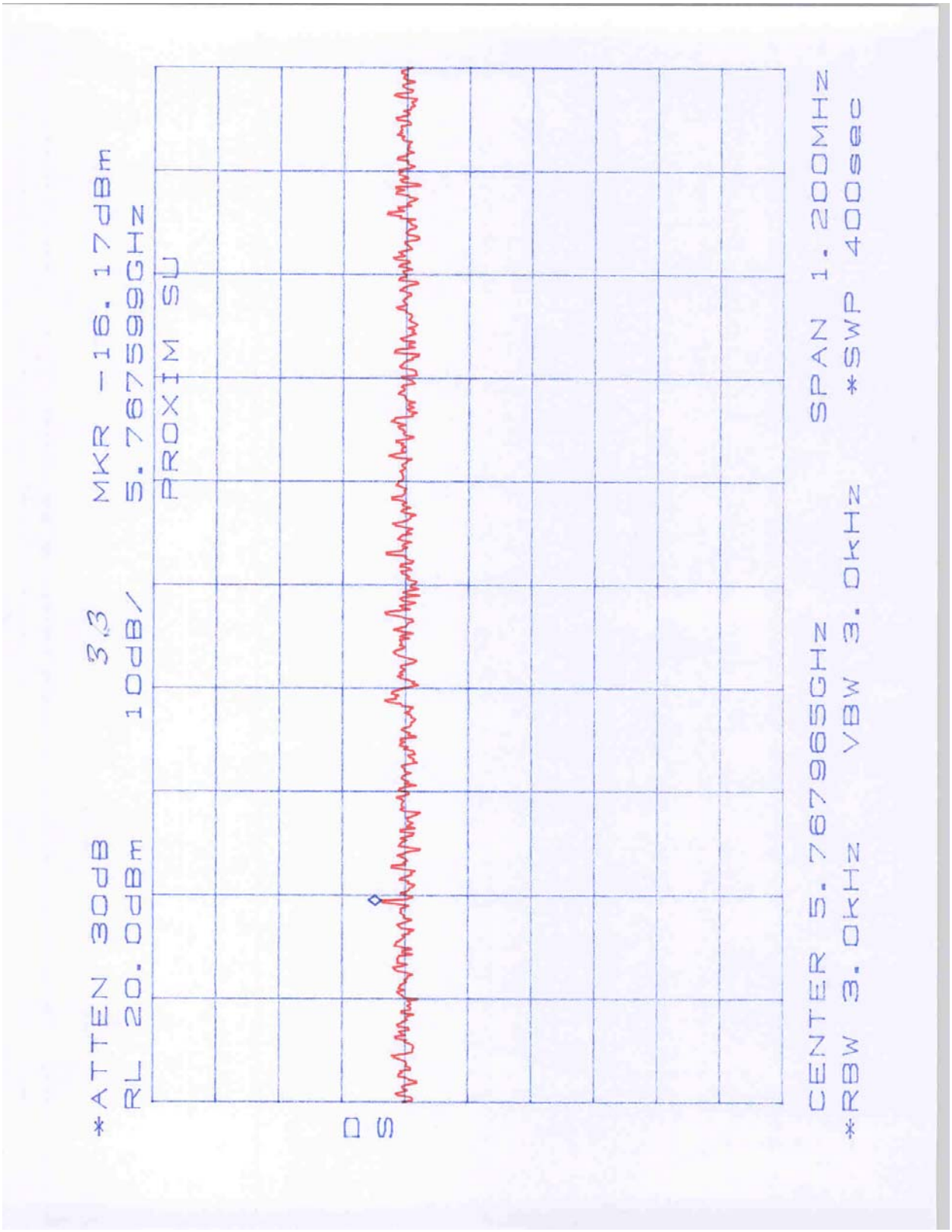
D S
CENTER 5.740350GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.200MHz
*SWP 400sec


*ATTEN 30dB
RL 20.0dBm
3.3
10dB/
MKR -16.17dBm
5.767599GHz
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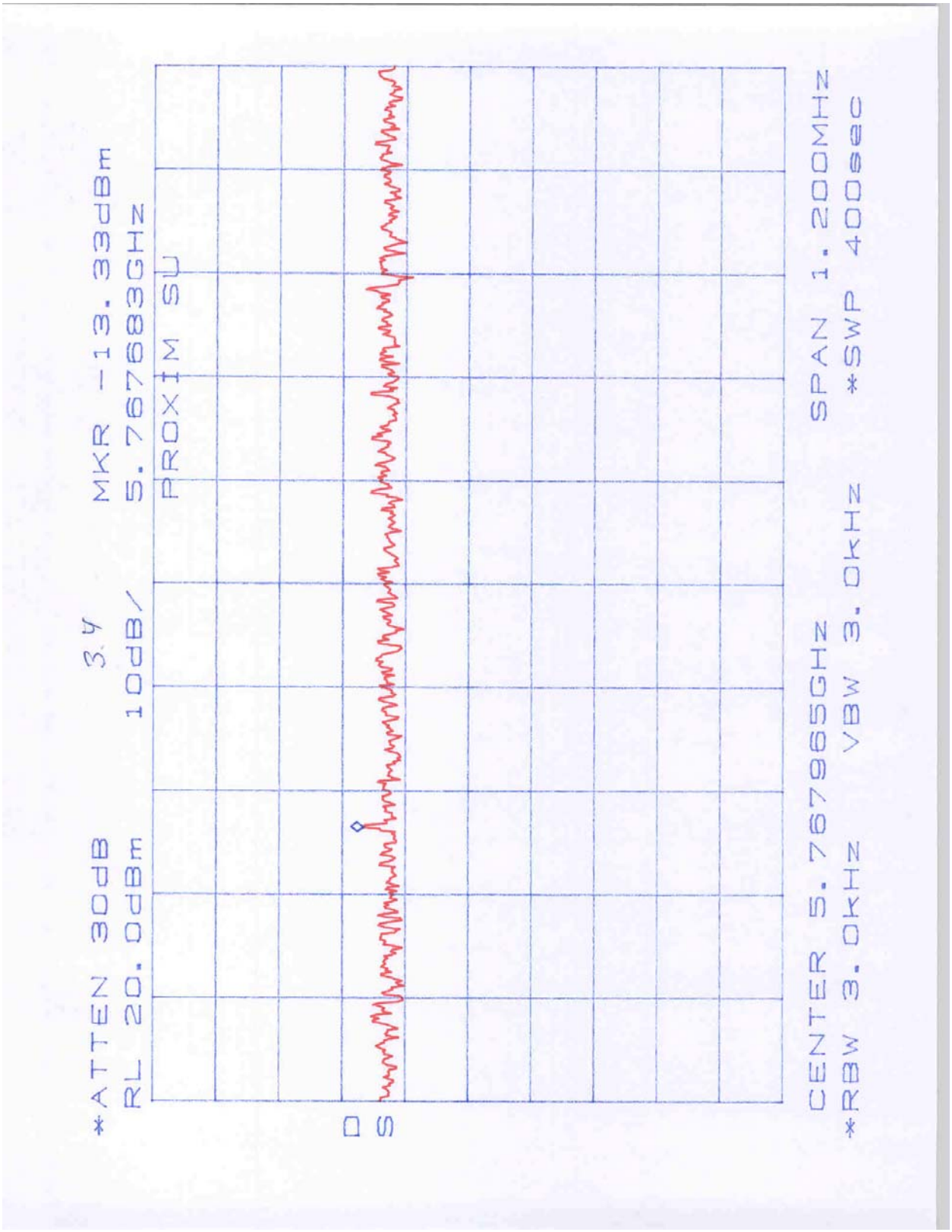
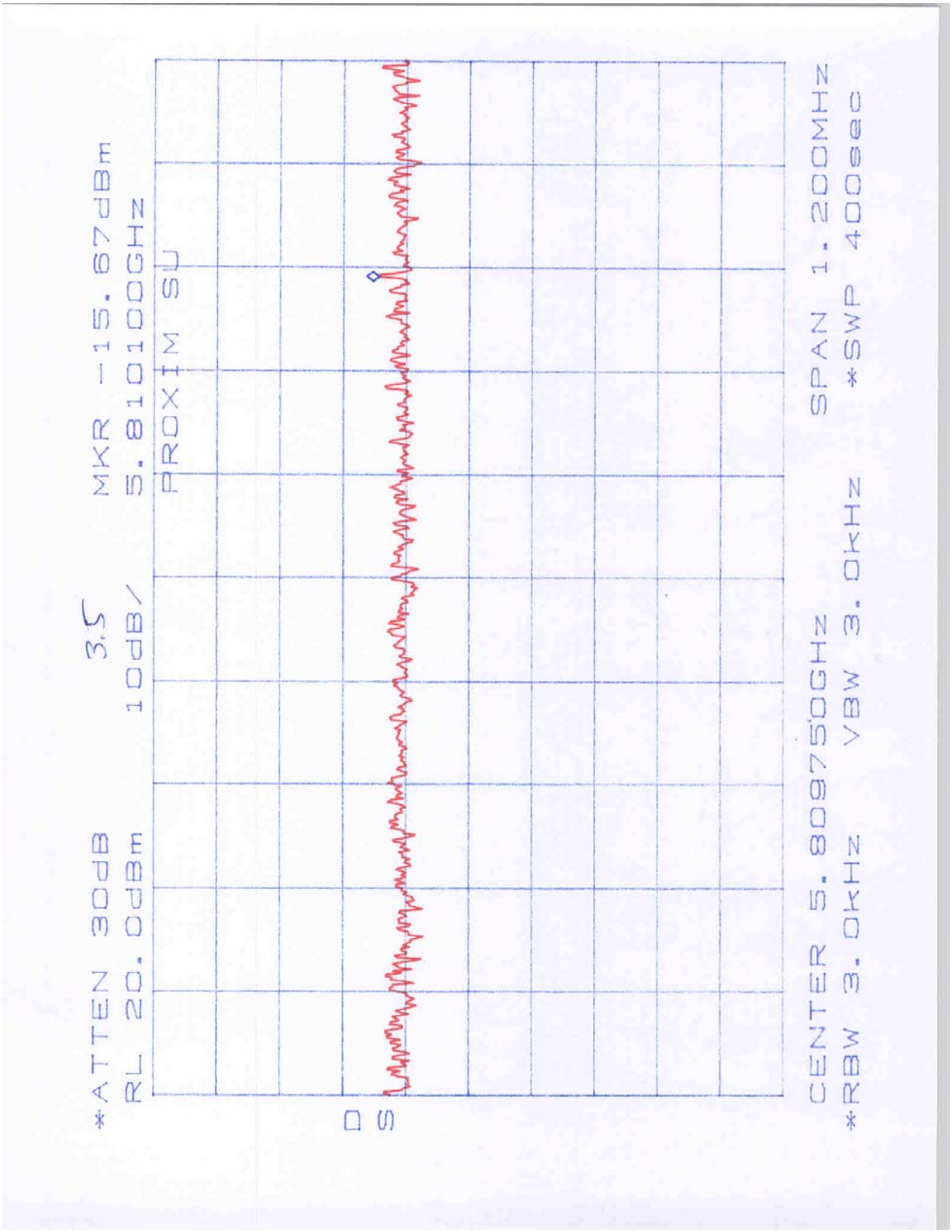
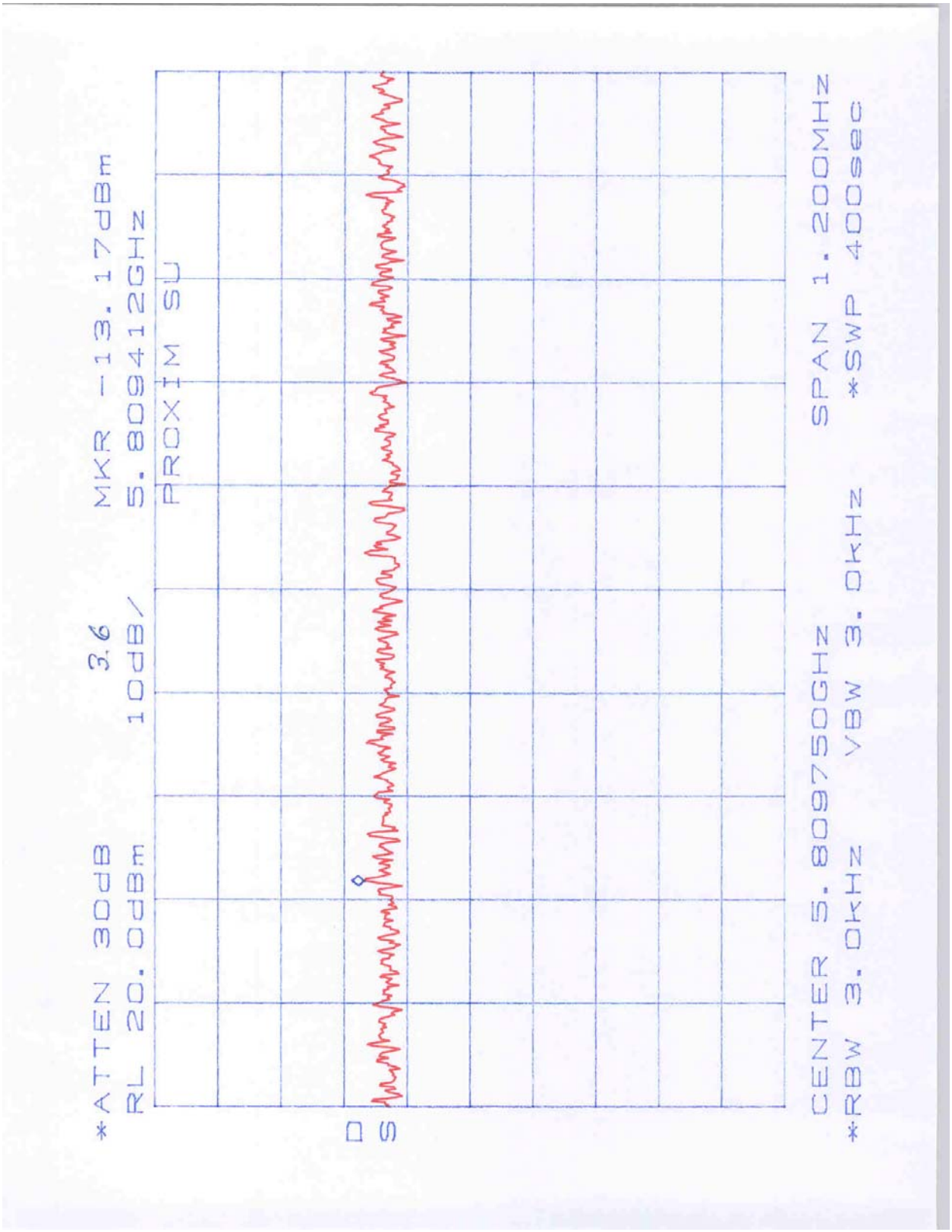
D S
CENTER 5.767965GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.200MHz
*SWP 400sec


*ATTEN 30dB
RL 20.0dBm
3Y
10dB/
MKR -13.33dBm
5.767683GHz
PROXIM SU
D S
CENTER 5.767965GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.200MHz
*SWP 400sec


*ATTEN 30dB
RL 20.0dBm
10dB/
3.5
MKR -15.67dBm
5.810100GHz
PROXIM SU
CENTER 5.809750GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.200MHz
*SWP 400sec


*ATTEN 30dB
RL 20.0dBm
3.6
10dB/
MKR -13.17dBm
5.809412GHz
PROXIM SU
CENTER 5.809750GHz
*RBW 3.0KHz
VBW 3.0KHz
SPAN 1.200MHz
*SWP 400sec
D S

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.

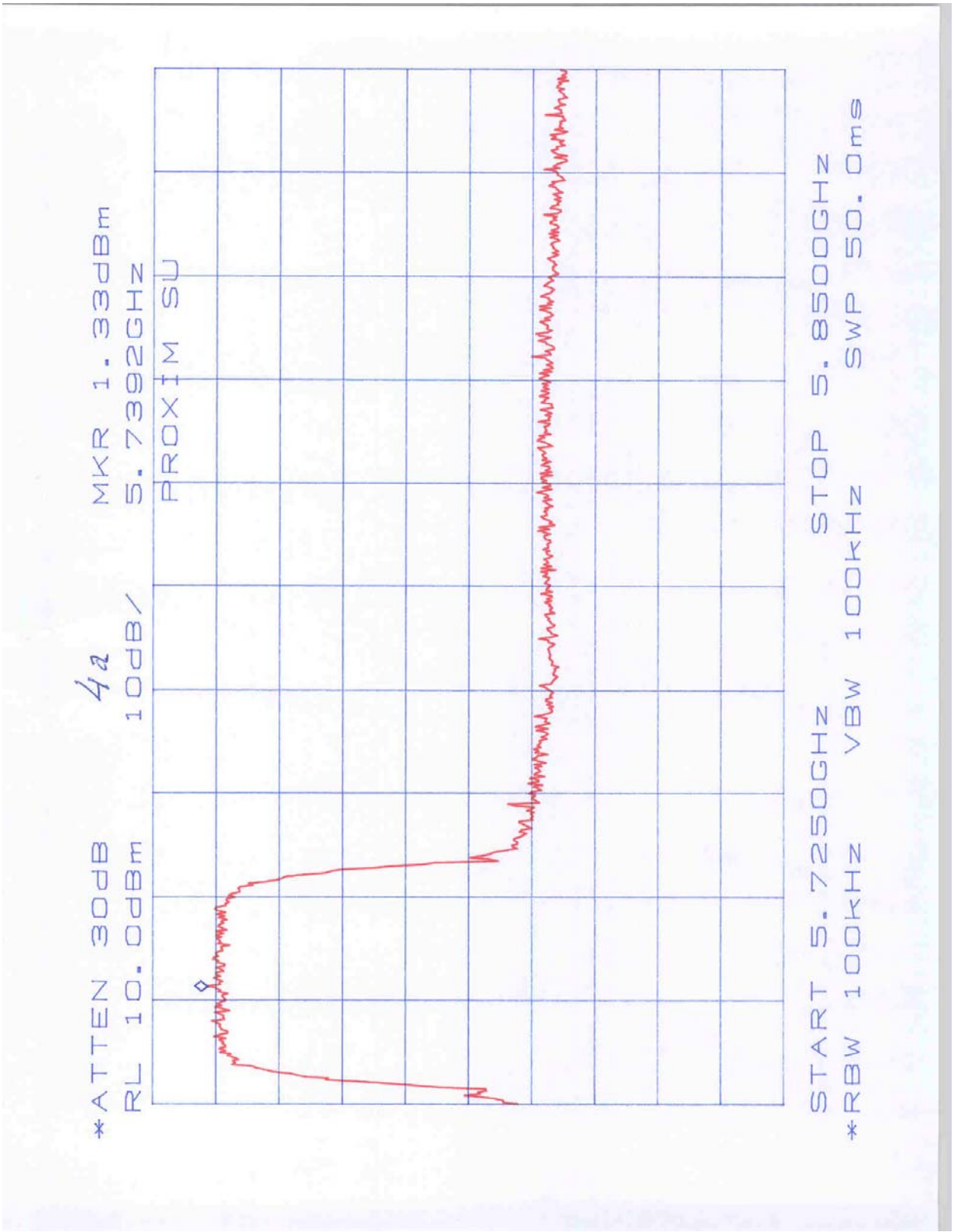
Procedure

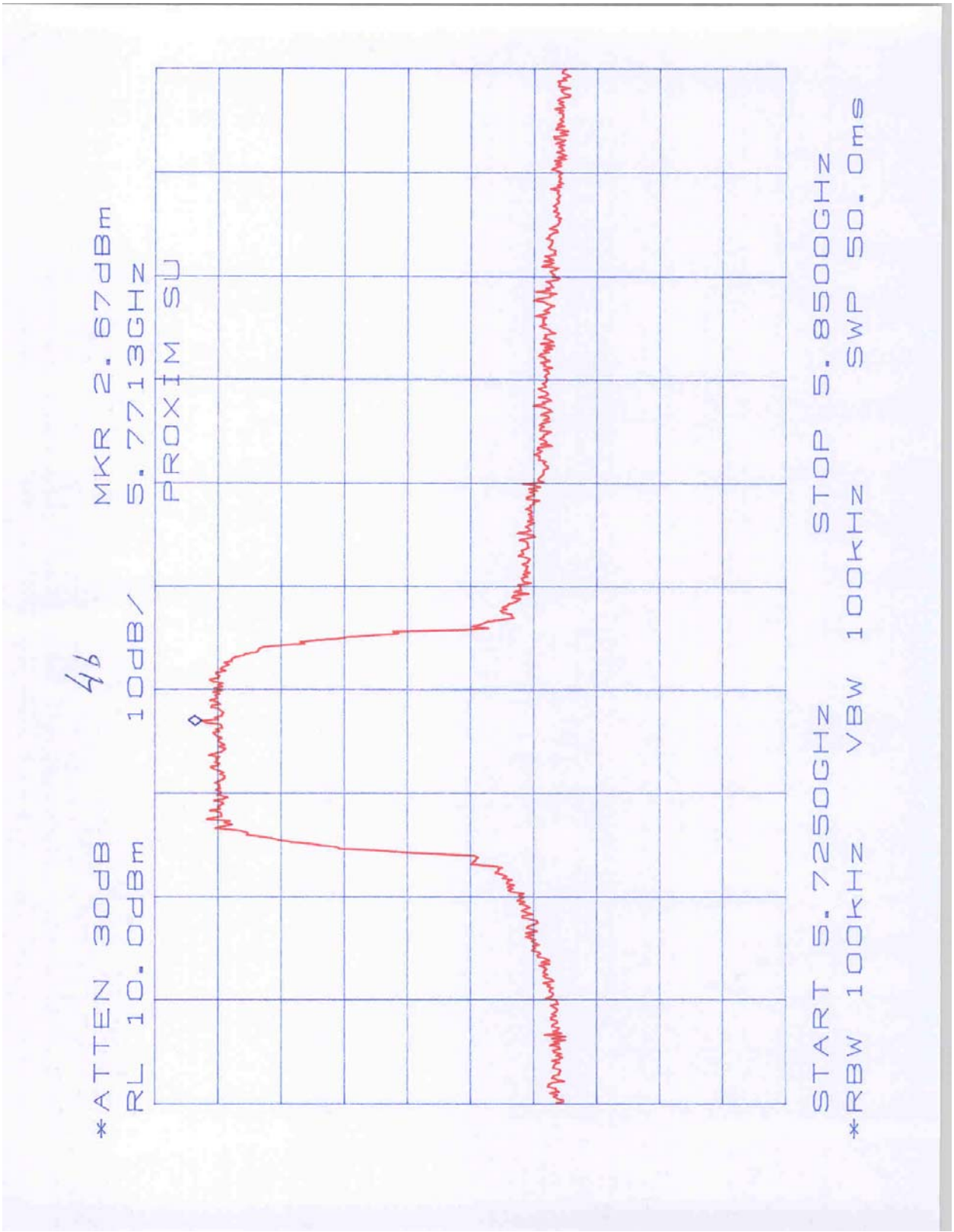
A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 10 MHz to 40 GHz.

Test Result

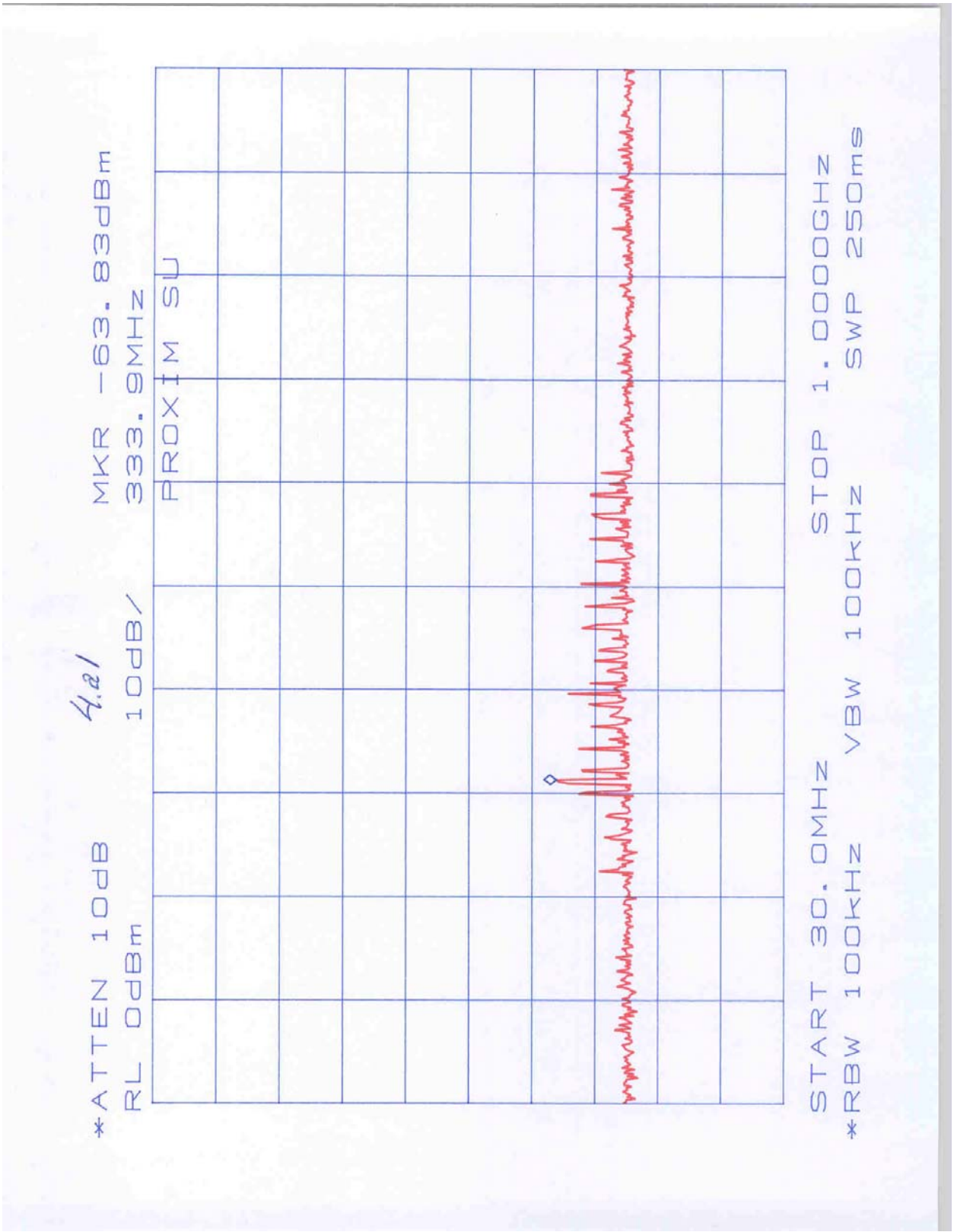
Refer to the following plots for the test result:

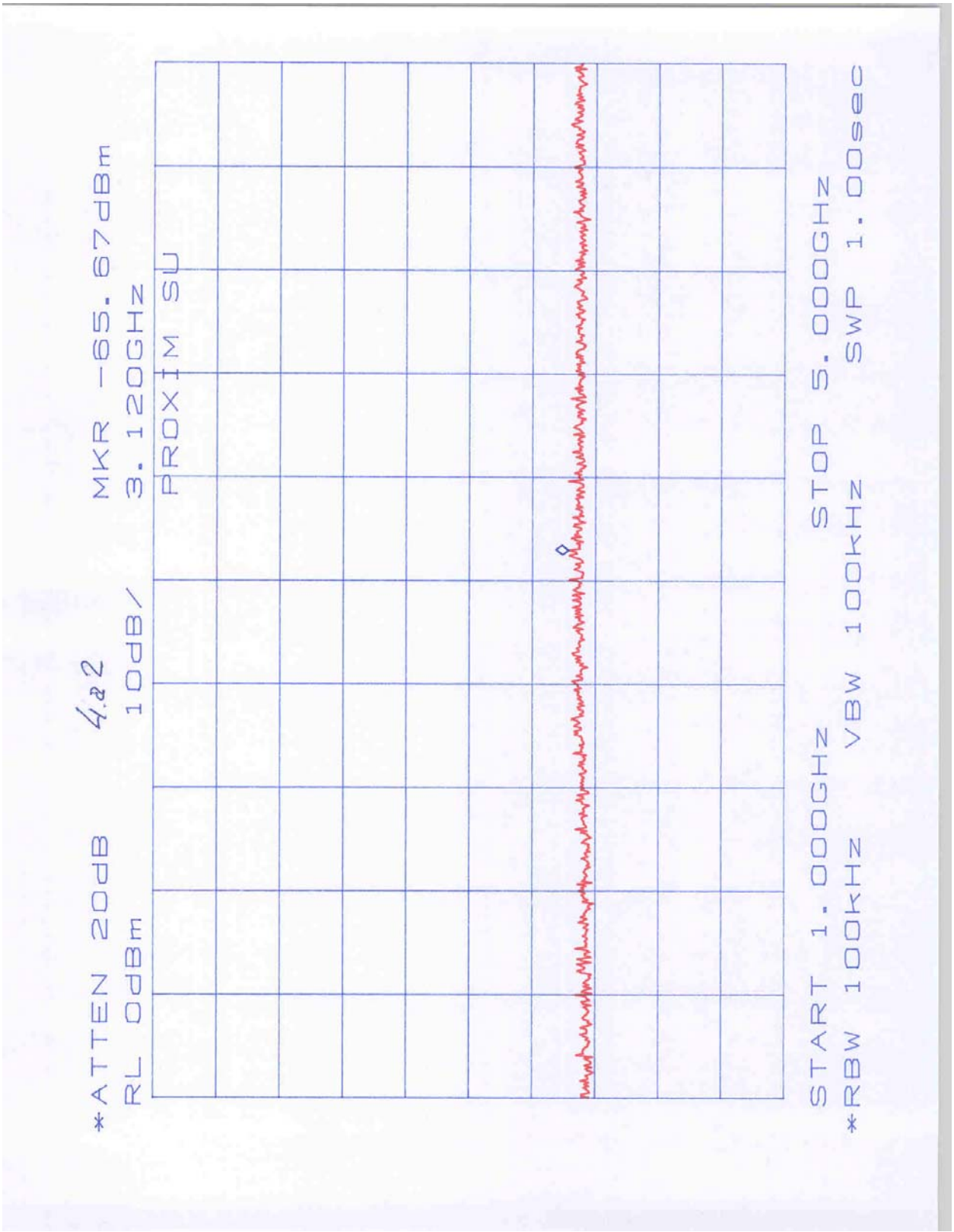
15.247 (c), Out-of-Band conducted emissions	
Plot 4a	In-band low Channel Emissions
Plot 4b	In-band middle Channel Emissions
Plot 4c	In-band high Channel Emissions
Plots 4a1 – 4a5	Out-of-band low Channel Emissions
Plots 4b1 – 4b4	Out-of-band middle Channel Emissions
Plots 4c1 – 4c4	Out-of-band high Channel Emissions

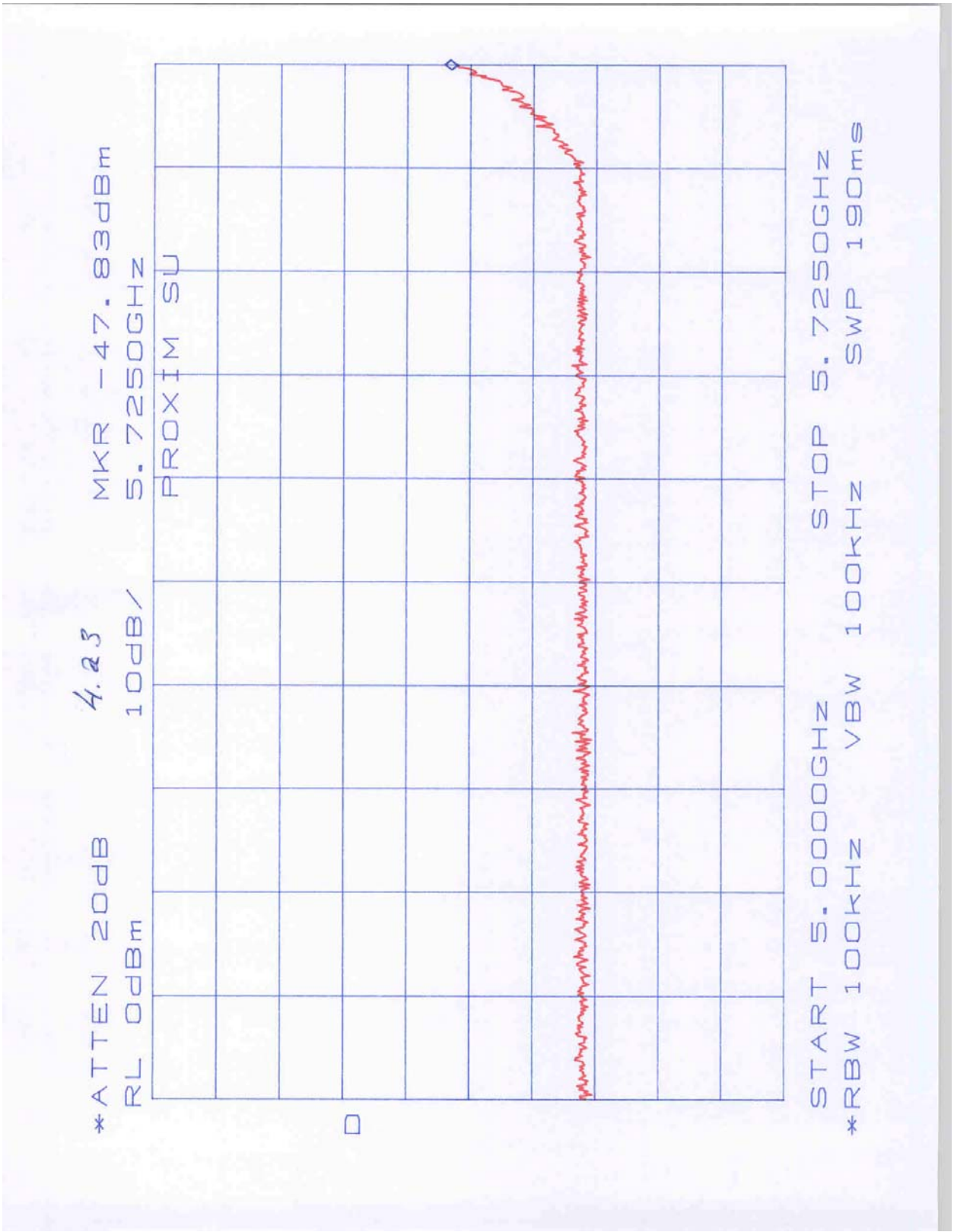

*ATTEN 30dB
RL 10.0dBm
4a
10dB/
MKR 1.33dBm
5.7392GHz
PROXIM SW
START 5.7250GHz
*RBW 100kHz
STOP 5.8500GHz
VBW 100kHz
SWP 50.0ms

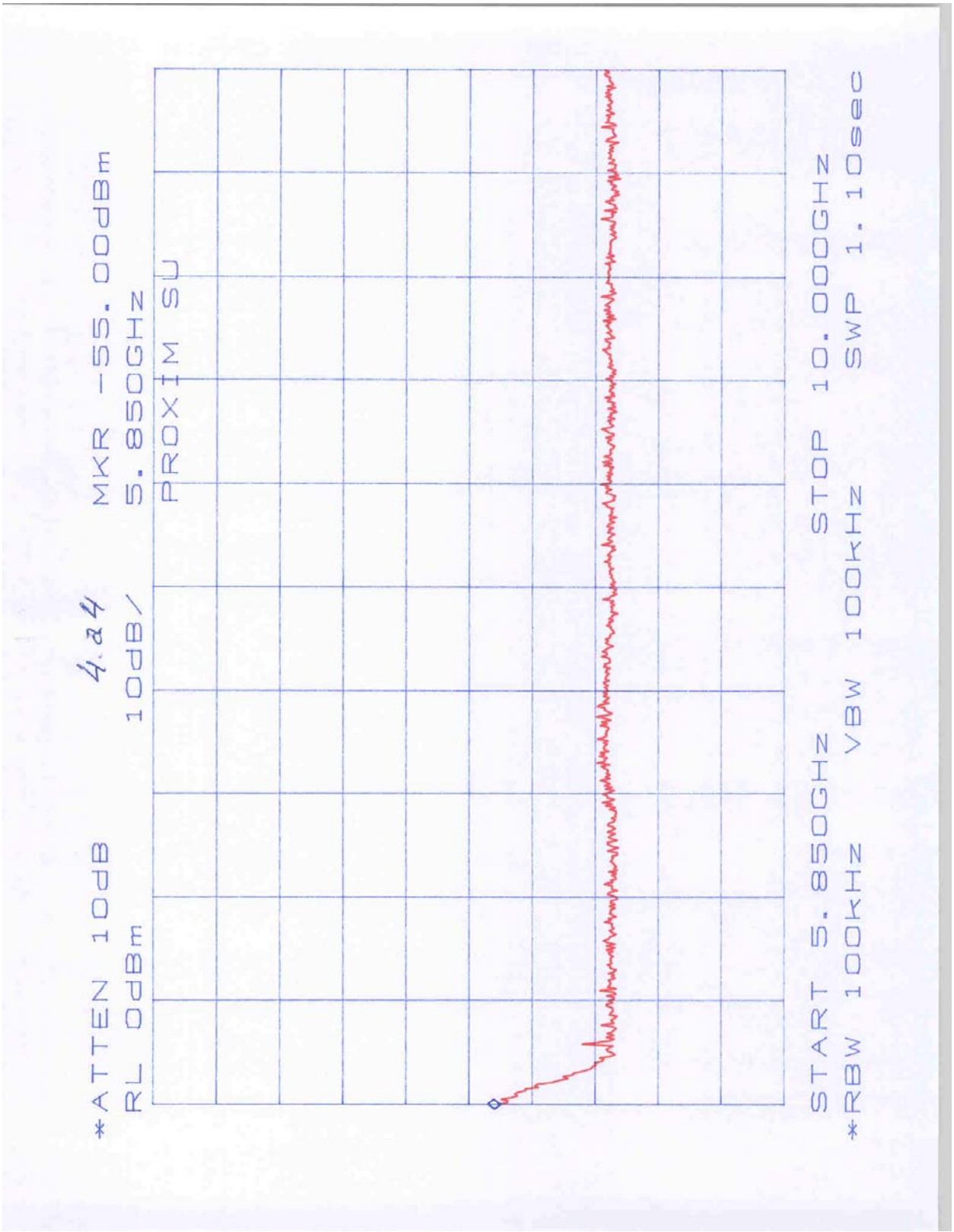

*ATTEN 30dB
RL 10.0dBm
10dB/
MKR 2.67dBm
5.77130GHz
PROXIM SU
46
START 5.72500GHz
*RBW 100KHz
VBW 100KHz
STOP 5.85000GHz
SWP 50.0ms

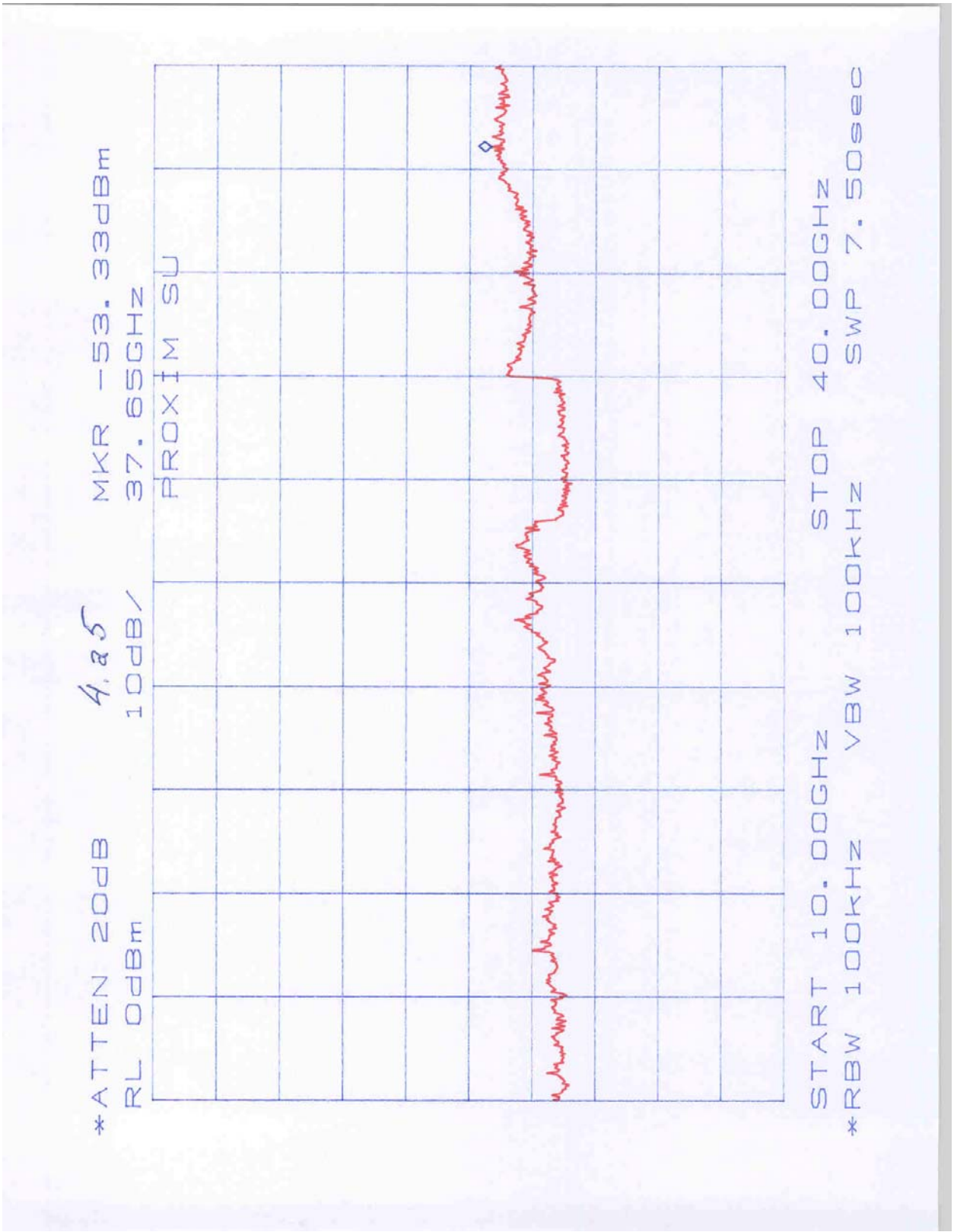

4c
*ATTEN 30dB
RL 10.0dBm
10dB/
MKR 2.17dBm
5.8079GHz
PROXIM SU
START 5.725GHz
*RBW 100KHz
VBW 100KHz
STOP 5.850GHz
SWP 50.0ms


*ATTEN 10dB
RL 0dBm
4.a1
10dB/
MKR -63.83dBm
333.9MHz
PROXIM SU
START 30.0MHz
*RBW 100KHz
VBW 100KHz
STOP 1.0000GHz
SWP 250ms


*ATTEN 20dB
RL 0dBm
4.a2
10dB/
MKR -65.67dBm
3.120GHz
PROXIM SU
START 1.000GHz
*RBW 100kHz
VBW 100kHz
STOP 5.000GHz
SWP 1.00sec


*ATTEN 20dB
RL 0dBm
10dB/
4.23
MKR -47.83dBm
5.7250GHz
PROXIM SU
START 5.0000GHz
*RBW 100kHz
VBW 100kHz
STOP 5.7250GHz
SWP 190ms


*ATTEN 10dB
RL 0dBm
4.24
10dB/
MKR -55.00dBm
5.850GHz
PROXIM SU
START 5.850GHz
*RBW 100KHz
VBW 100KHz
STOP 10.000GHz
SWP 1.10sec


*ATTEN 20dB
RL 0dBm
4.85
10dB/
MKR -53.33dBm
37.65GHz
PROXIM SU
START 10.000GHz
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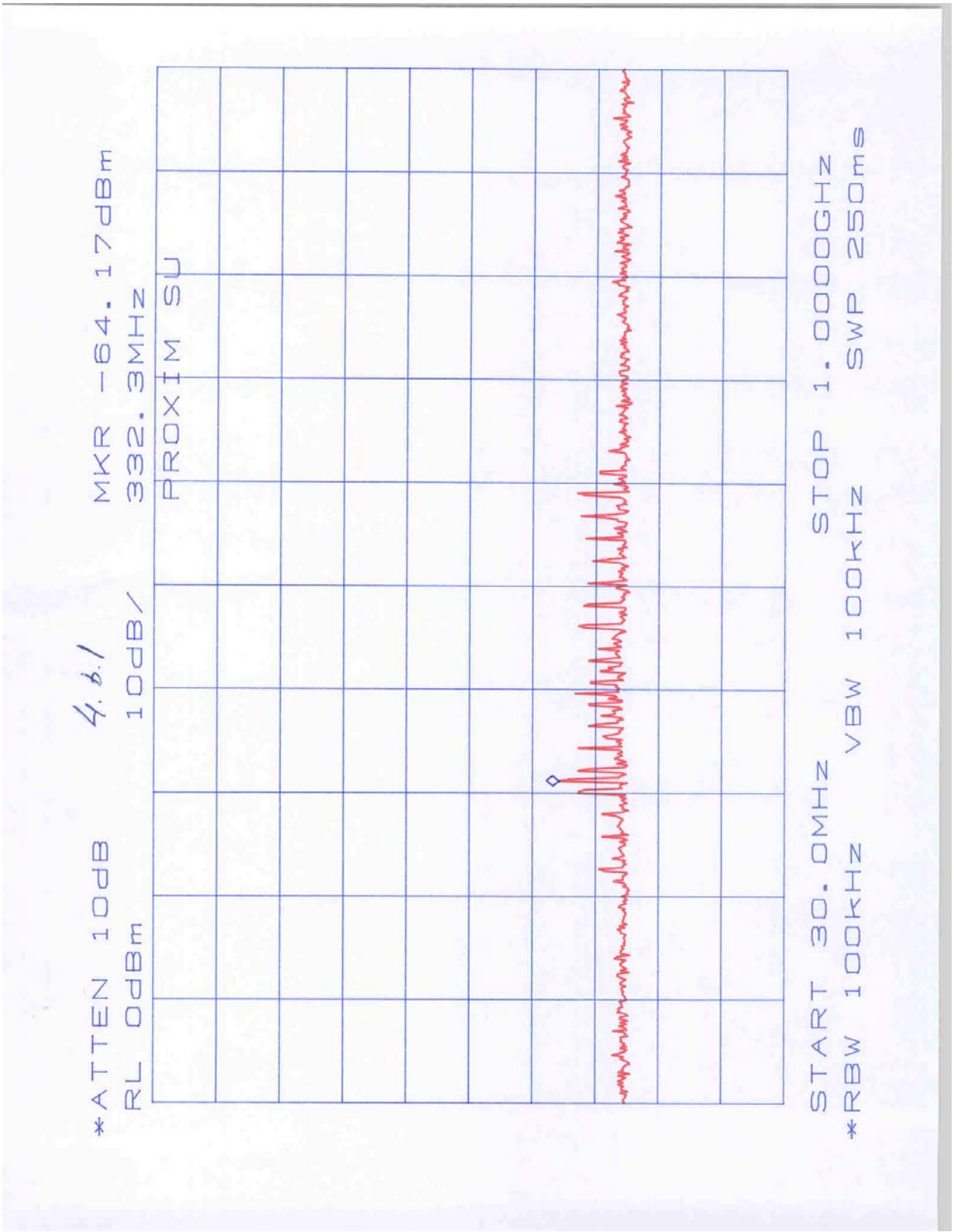
VBW 100kHz
STOP 40.000GHz
SWP 7.50sec


*ATTEN 10dB
RL 0dBm
4.6.1
10dB/
MKR -64.17dBm
332.3MHz
PROXIM SU
START 30.0MHz
*RBW 100kHz
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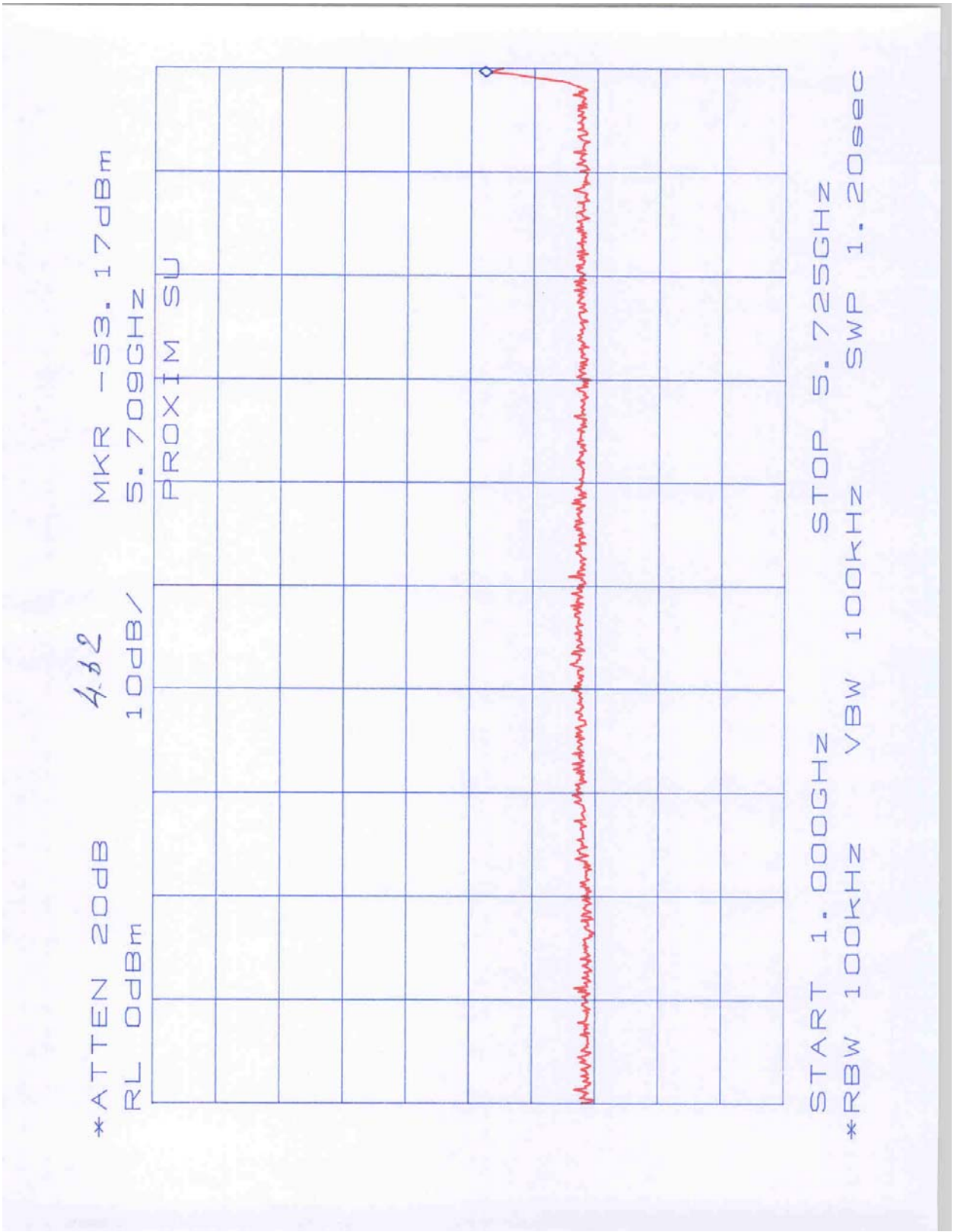
STOP 1.0000GHz
SWP 250ms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10dB/
MKR -53.17dBm
5.709GHz
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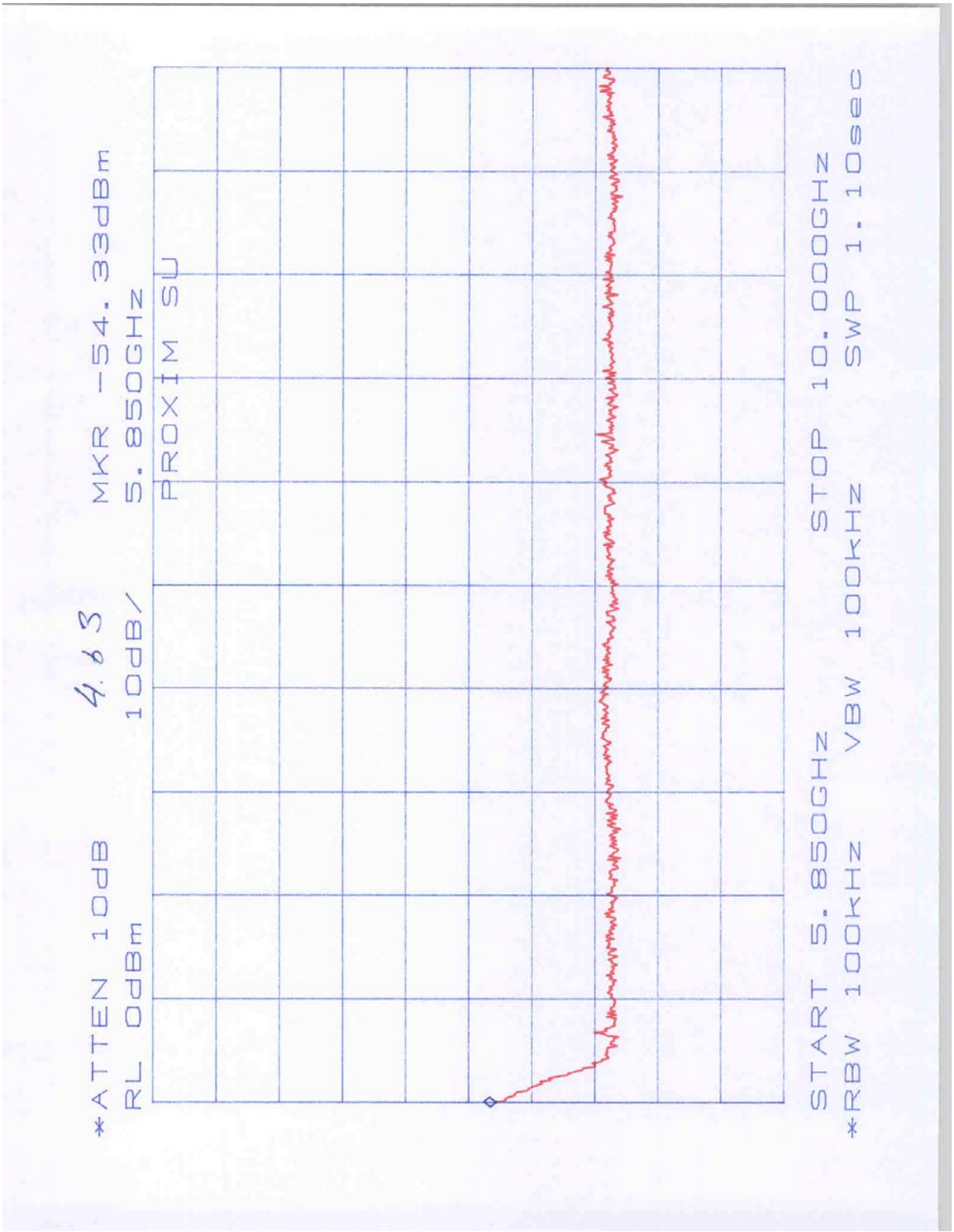
*RBW 100kHz
VBW 100kHz
STOP 5.725GHz
SWP 1.20sec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RL 0dBm
10dB/
4.63
MKR -54.33dBm
5.850GHz
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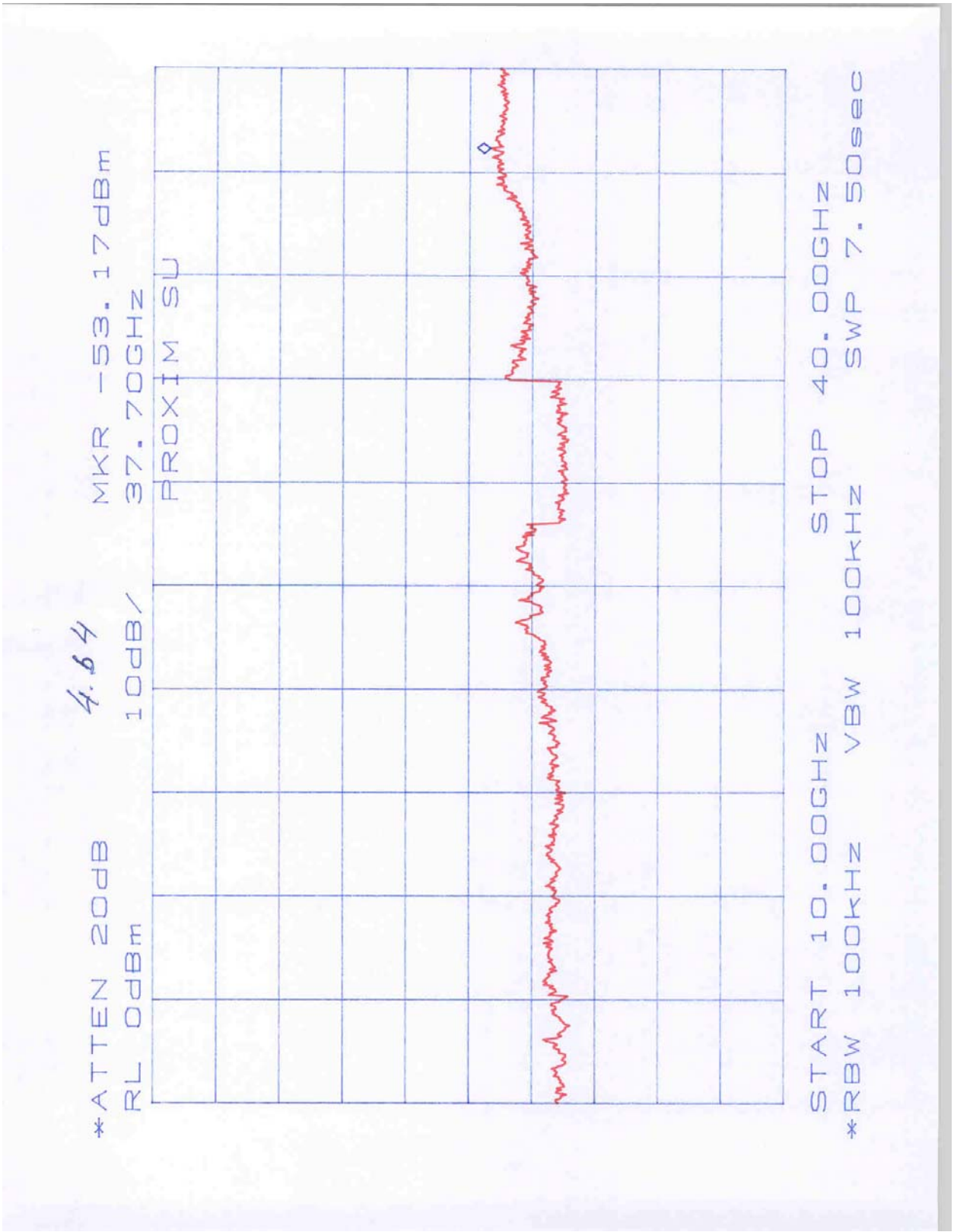
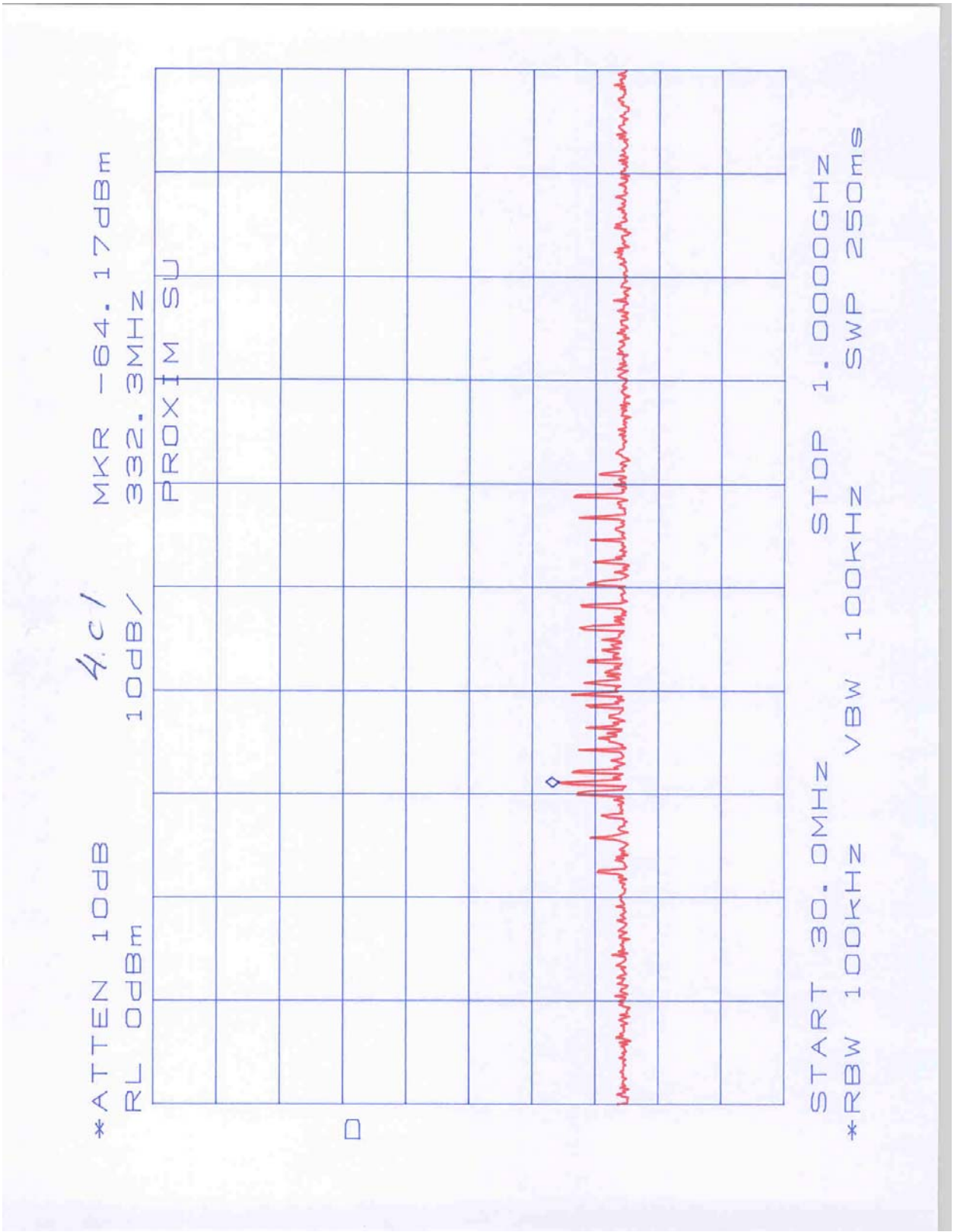
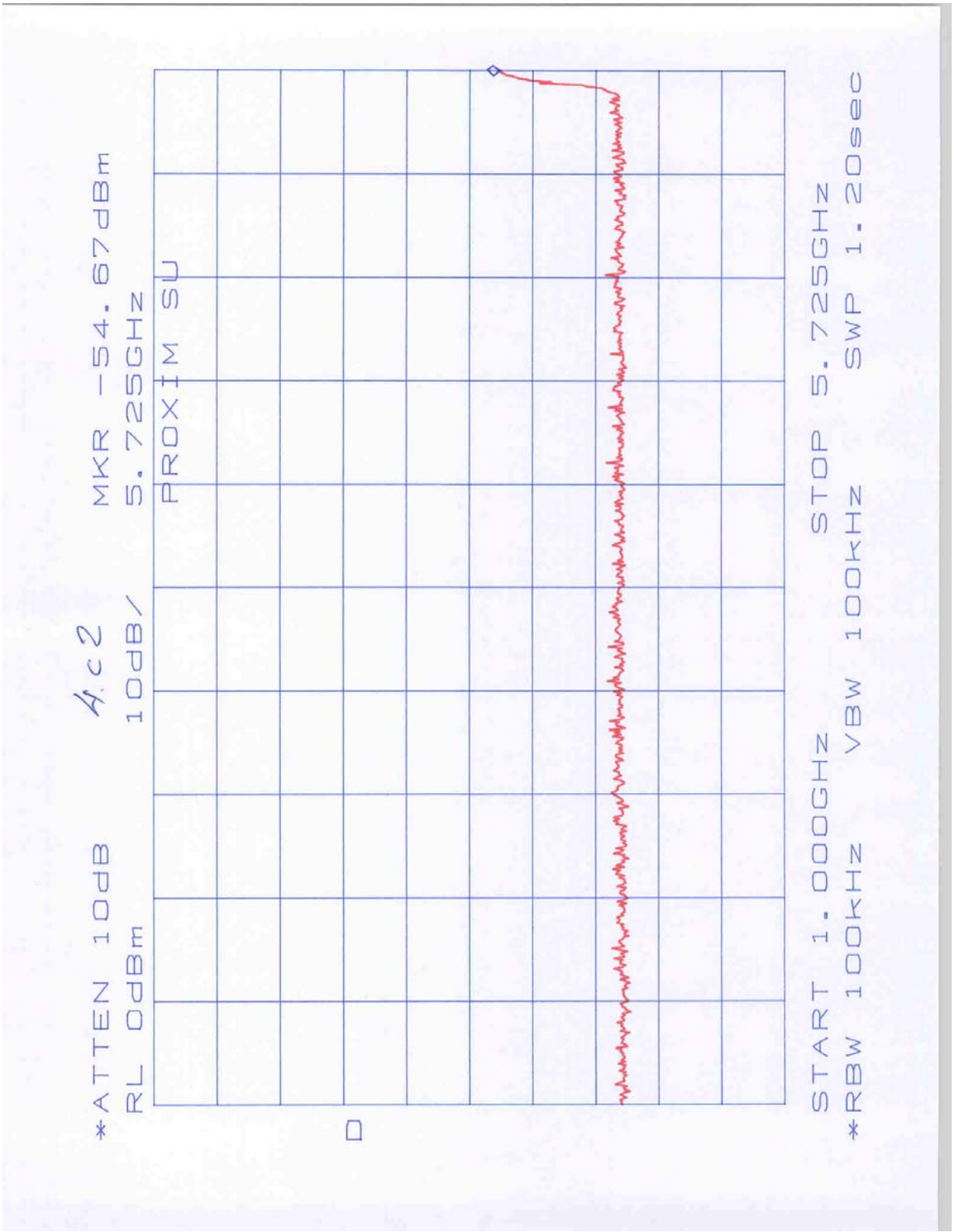
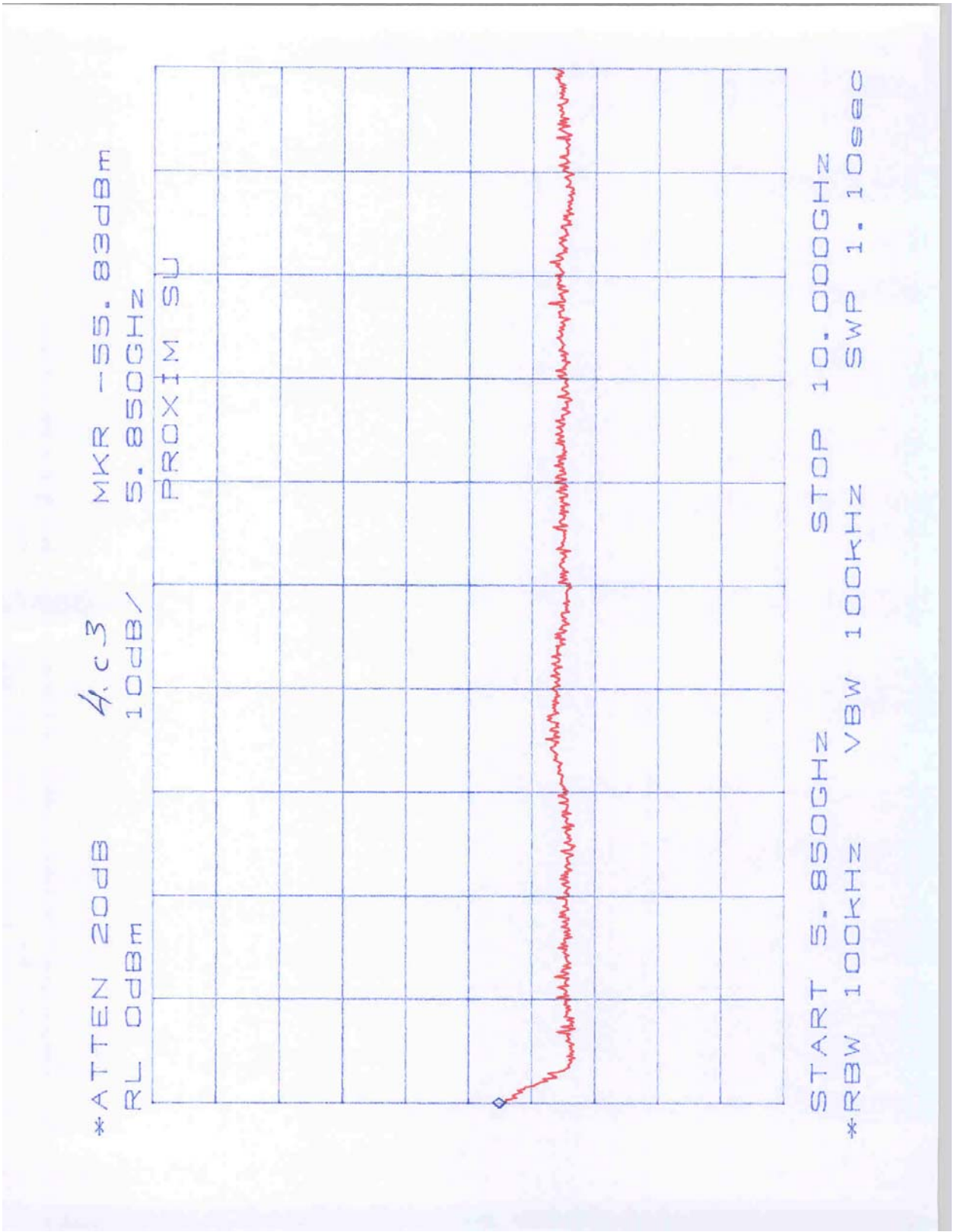
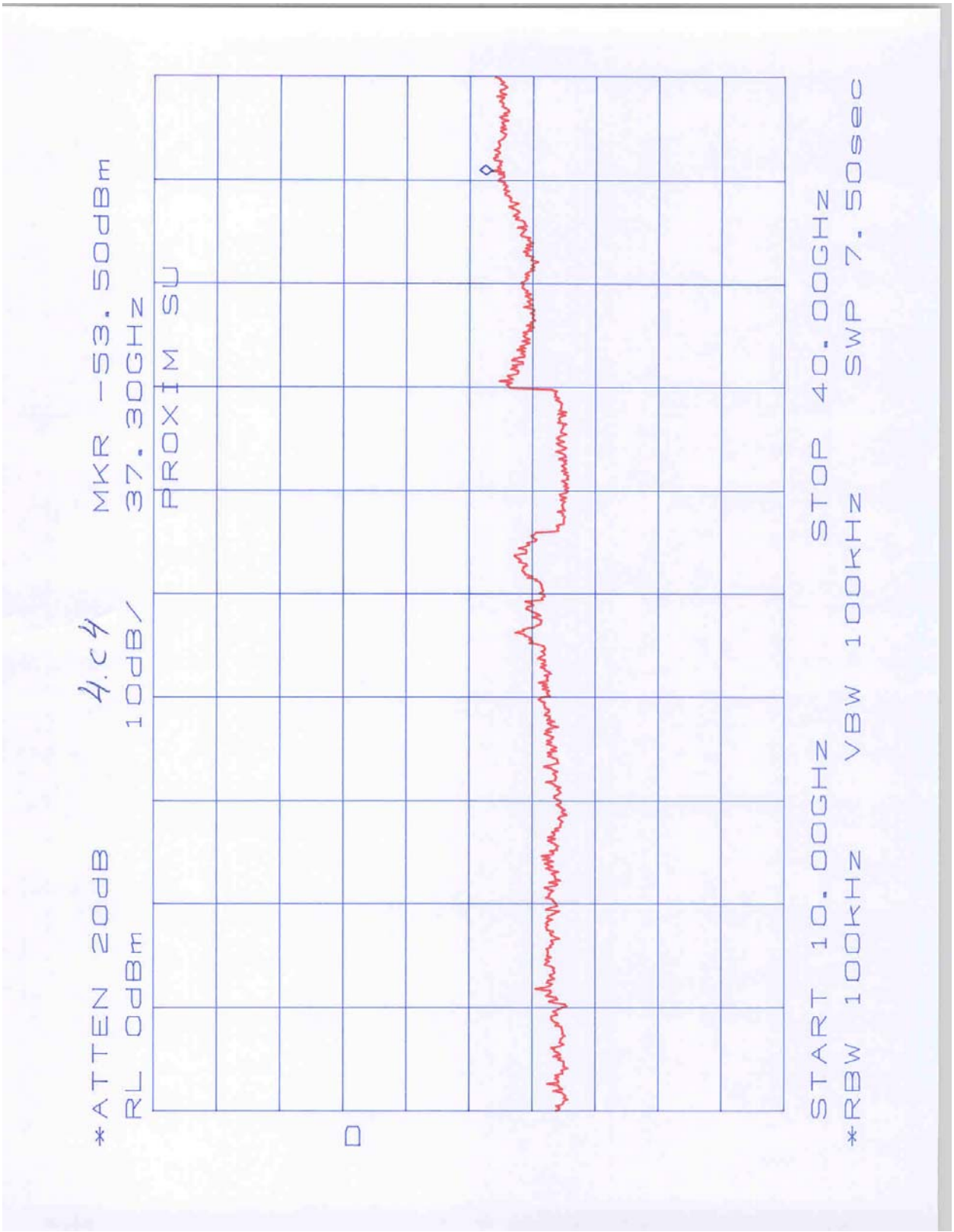
STOP 10.000GHz
VBW 100KHz
SWP 1.10sec


4.64
*ATTEN 20dB
RL 0dBm
10dB/
MKR -53.17dBm
37.70GHz
PROXIM SU
START 10.00GHz
*RBW 100KHz
VBW 100KHz
STOP 40.00GHz
SWP 7.50sec


*ATTEN 10dB
RL 0dBm
4.c)
10dB/
MKR -64.17dBm
332.3MHz
PROXIM SU
START 30.0MHz
*RBW 100KHz
VBW 100KHz
STOP 1.00000GHz
SWP 250ms


*ATTEN 10dB
RL 0dBm
10dB/
Ac2
MKR -54.67dBm
5.725GHz
PROXIM SU
START 1.000GHz
*RBW 100KHz
VBW 100KHz
STOP 5.725GHz
SWP 1.20sec


*ATTEN 20dB
RL 0dBm
4.c.3
10dB/
MKR -55.83dBm
5.850GHz
PROXIM SU
START 5.850GHz
*RBW 100KHz
VBW 100KHz
STOP 10.000GHz
SWP 1.10sec


*ATTEN 20dB
RL 0dBm
4.c4
10dB/
MKR -53.50dBm
37.30GHz
PROXIM SU
START 10.000GHz
*RBW 100kHz
VBW 100kHz
STOP 40.000GHz
SWP 7.50sec

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.

Company:	PROXIM	**Model #:**		**Standard_**	**FCC § 15.247 (R.B.)**				
EUT:	Subscriber Unit	**S/N #:**		**Limits_**	2				
Project #:	3036052	**Test Date:**	January 13, 2003	**Test Distance_**	1	meter			
Test Mode:	Tx	**Engineer:**	Bruce G.	**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

Antenna DFPD2-52

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	35.8	Ave.	14	10	V	40.7	39.9	1.4	-9.5	28.5	54.0	-25.5
11480	35.6	Ave.	14	10	H	40.7	39.9	1.4	-9.5	28.3	54.0	-25.7
22960	24.2*	Ave.	21	13	V	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0
22960	24.2*	Ave.	21	13	H	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0

TX at 5768 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
11536	35.5	Ave.	14	10	V	41.2	39.7	1.5	-9.5	29.0	54.0	-25.0
11536	36.0	Ave.	14	10	H	41.9	39.7	1.5	-9.5	30.2	54.0	-23.8
23072	24.2*	Ave.	21	13	V	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0
23072	24.2*	Ave.	21	13	H	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0

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	36.5	Ave.	14	10	V	41.2	39.7	1.5	-9.5	30.0	54.0	-24.0
11620	36.4	Ave.	14	10	H	41.9	39.7	1.5	-9.5	30.6	54.0	-23.4

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
g) Peak measurement was not done because the difference between the average and peak measurement was no more than 10 dB

Company:	PROXIM	**Model #:**		**Standard_**	**FCC § 15.247 (R.B.)**				
EUT:	Subscriber Unit	**S/N #:**		**Limits_**	2				
Project #:	3036052	**Test Date:**	January 13, 2003	**Test Distance_**	1	meter			
Test Mode:	Tx	**Engineer:**	Bruce G.	**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

Antenna SP3-5.8

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	37.3	Ave.	14	10	V	40.7	39.9	1.4	-9.5	30.0	54.0	-24.0
11480	37.4	Ave.	14	10	H	40.7	39.9	1.4	-9.5	30.1	54.0	-23.9
22960	24.2*	Ave.	21	13	V	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0
22960	24.2*	Ave.	21	13	H	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0

TX at 5768 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
11536	35.0	Ave.	14	10	V	41.2	39.7	1.5	-9.5	28.5	54.0	-25.5
11536	35.0	Ave.	14	10	H	41.9	39.7	1.5	-9.5	29.2	54.0	-24.8
23072	24.2*	Ave.	21	13	V	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0
23072	24.2*	Ave.	21	13	H	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0

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	35.5	Ave.	14	10	V	41.2	39.7	1.5	-9.5	29.0	54.0	-25.0
11620	35.4	Ave.	14	10	H	41.9	39.7	1.5	-9.5	29.6	54.0	-24.4

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
g) Peak measurement was not done because the difference between the average and peak measurement was no more than 10 dB

Company:	PROXIM	**Model #:**		**Standard_**	**FCC § 15.247 (R.B.)**
EUT:	Subscriber Unit	**S/N #:**		**Limits_**	2
Project #:	3036052	**Test Date:**	January 13, 2003	**Test Distance_**	1 meter
Test Mode:	Tx	**Engineer:**	Bruce G.	**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

Antenna 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	35.3	Ave.	14	10	V	40.7	39.9	1.4	-9.5	28.0	54.0	-26.0
11480	35.1	Ave.	14	10	H	40.7	39.9	1.4	-9.5	27.8	54.0	-26.2
22960	24.2*	Ave.	21	13	V	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0
22960	24.2*	Ave.	21	13	H	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0

TX at 5768 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
11536	35.5	Ave.	14	10	V	41.2	39.7	1.5	-9.5	29.0	54.0	-25.0
11536	35.0	Ave.	14	10	H	41.9	39.7	1.5	-9.5	29.2	54.0	-24.8
23072	24.2*	Ave.	21	13	V	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0
23072	24.2*	Ave.	21	13	H	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0

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	35.5	Ave.	14	10	V	41.2	39.7	1.5	-9.5	29.0	54.0	-25.0
11620	35.4	Ave.	14	10	H	41.9	39.7	1.5	-9.5	29.6	54.0	-24.4

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
g) Peak measurement was not done because the difference between the average and peak measurement was no more than 10 dB

Company:	PROXIM	**Model #:**		**Standard_**	**FCC § 15.247 (R.B.)**				
EUT:	Subscriber Unit	**S/N #:**		**Limits_**	2				
Project #:	3036052	**Test Date:**	January 13, 2003	**Test Distance_**	1	meter			
Test Mode:	Tx	**Engineer:**	Bruce G.	**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

Antenna 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	36.3	Ave.	14	10	V	40.7	39.9	1.4	-9.5	29.0	54.0	-25.0
11480	36.1	Ave.	14	10	H	40.7	39.9	1.4	-9.5	28.8	54.0	-25.2
22960	24.2*	Ave.	21	13	V	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0
22960	24.2*	Ave.	21	13	H	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0

TX at 5768 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
11536	36.0	Ave.	14	10	V	41.2	39.7	1.5	-9.5	29.5	54.0	-24.5
11536	36.0	Ave.	14	10	H	41.9	39.7	1.5	-9.5	30.2	54.0	-23.8
23072	24.2*	Ave.	21	13	V	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0
23072	24.2*	Ave.	21	13	H	40.4	23.3	2.2	-9.5	34.0	54.0	-20.0

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	36.5	Ave.	14	10	V	41.2	39.7	1.5	-9.5	30.0	54.0	-24.0
11620	36.4	Ave.	14	10	H	41.9	39.7	1.5	-9.5	30.6	54.0	-23.4

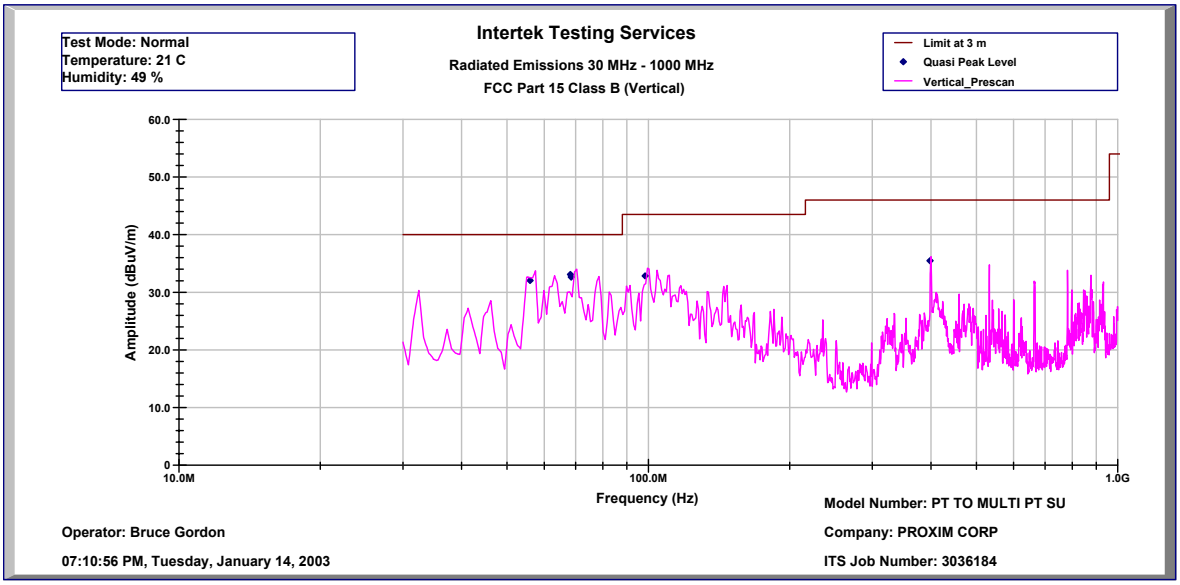
Notes:

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
g) Peak measurement was not done because the difference between the average and peak measurement was no more than 10 dB

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.

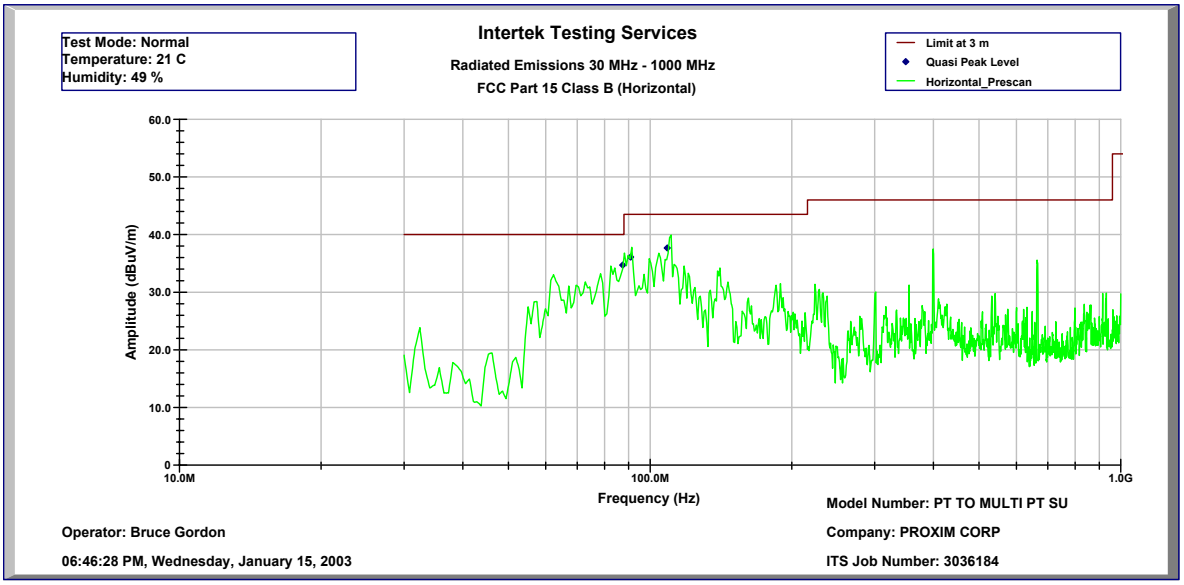


Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (QP-Vertical)

Operator: Bruce Gordon
Model Number: SU
ITS Job Number: 3036184
Company: PROXIM CORP

Frequency	Quasi Pk FS	Limit@3	Margin	RA	AG	CF	AF	Ext. Atten
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)	dB
55.98	32.0	40.0	-8.0	55.2	32.3	0.7	5.5	3
68.22	33.1	40.0	-6.9	56.6	32.3	0.9	5.0	3
68.50	32.6	40.0	-7.4	56.1	32.3	0.9	5.0	3
98.45	32.8	43.5	-10.7	53.9	32.3	0.9	7.4	3
398.27	35.5	46.0	-10.5	47.4	32.3	1.9	15.5	3

Test Mode: Normal
Temperature: 21 C
Humidity: 49 %



Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (QP-Horizontal)

Operator: Bruce Gordon Model Number: SU
ITS Job Number: 3036184
Fri Feb 14 16:24:14 2003 Company: PROXIM CORP

Frequency	Quasi Pk FS	Limit@3m	Margin	RA	AG	CF	AF	Ext. Atten
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)	dB
87.46	34.7	40.0	-5.3	54.9	32.3	0.9	8.3	3
90.88	36.1	43.5	-7.4	56.4	32.3	0.9	8.1	3
108.70	37.7	43.5	-5.8	59.1	32.3	0.9	7.0	3

Test Mode: Normal
Temperature: 21 C
Humidity: 49 %

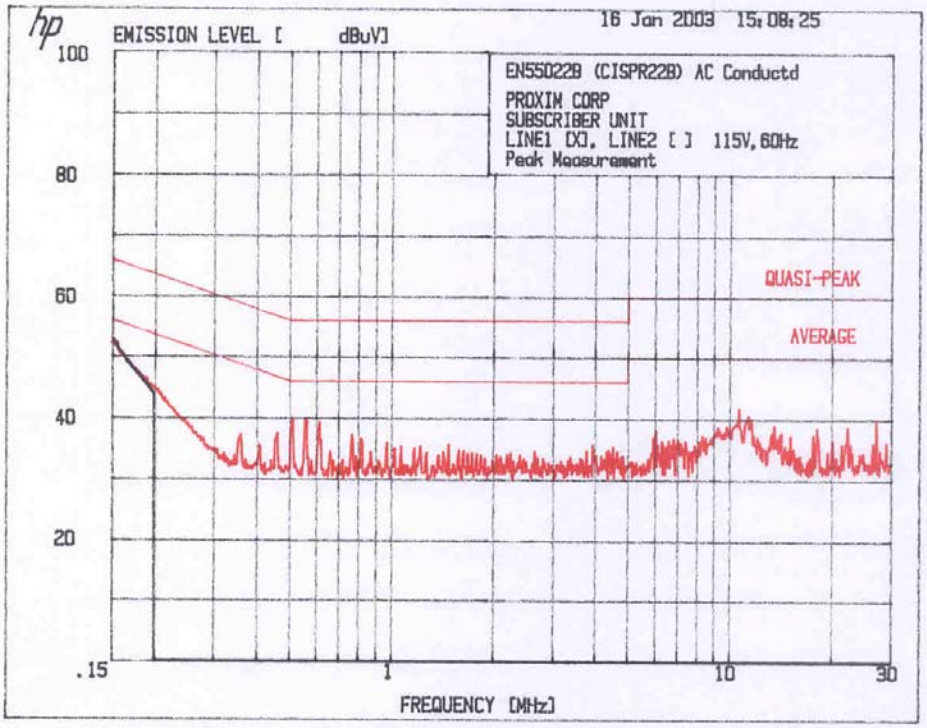
4.8 Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation)
FCC Ref: 15.109, 15.111

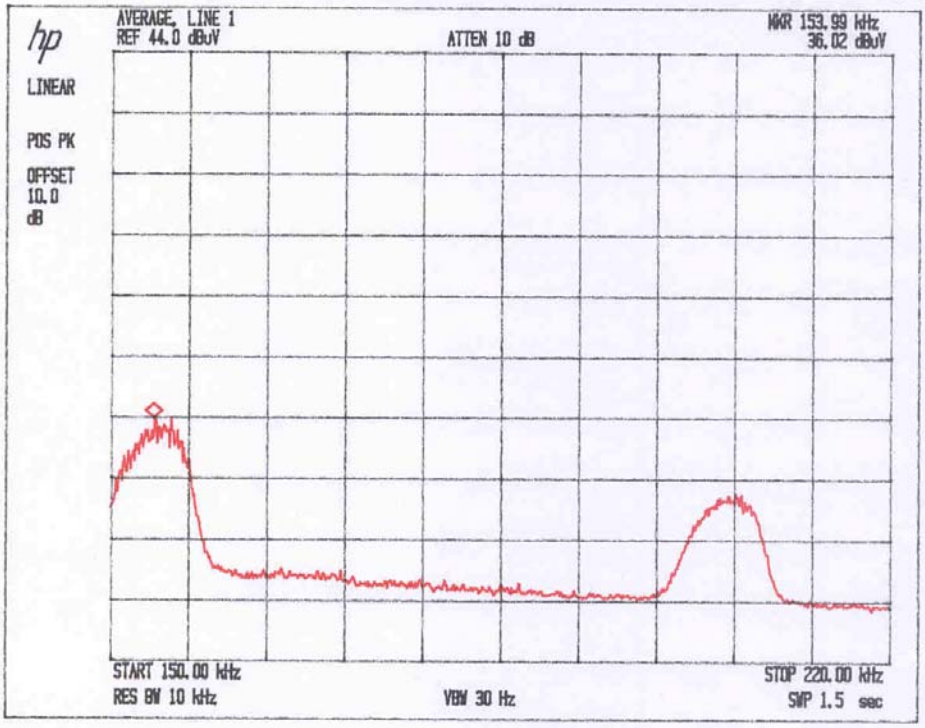
Not required - EUT operation above 960 MHz only.

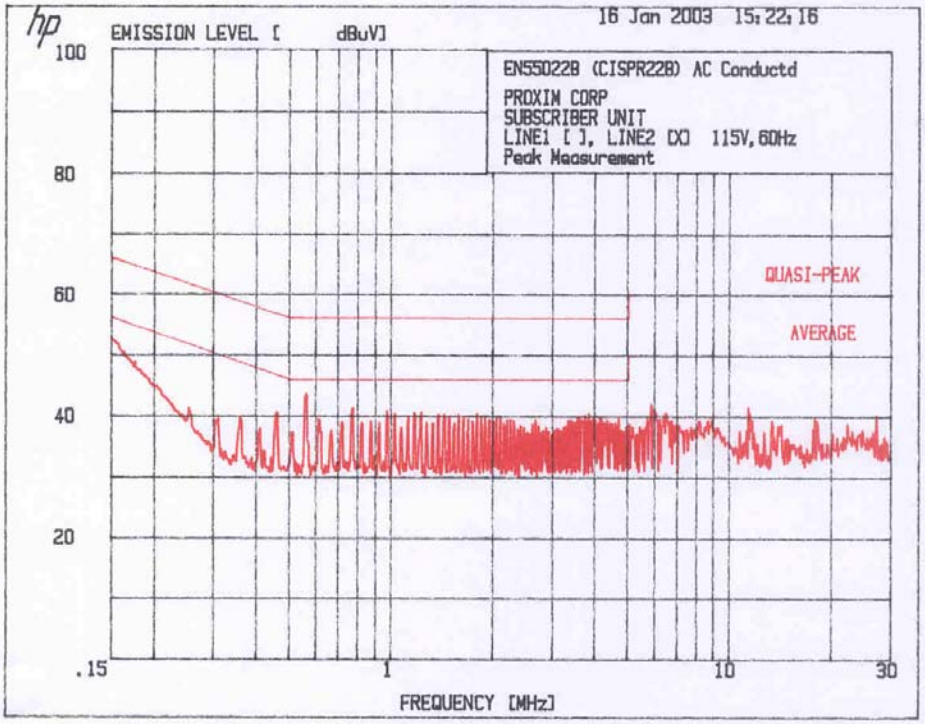
4.9 AC Line Conducted Emission
FCC Rule 15.207:

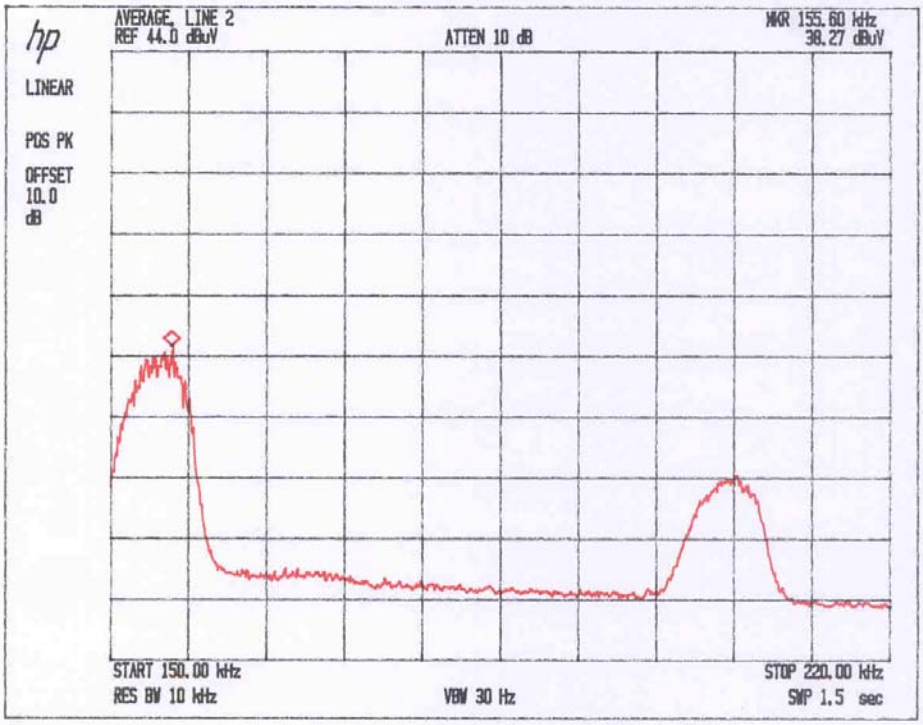
AC line conducted emission test was performed according the ANSI C63.4 standard. The EUT was connected to AC Line through the LISNs.

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


EMISSION LEVEL [dBuV]
16 Jan 2003 15:08:25
EN55022B (CISPR22B) AC Conductd
PROXIM CORP
SUBSCRIBER UNIT
LINE1 [X], LINE2 [ ] 115V,60Hz
Peak Measurement
QUASI-PEAK
AVERAGE
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


AVERAGE, LINE 1
REF 44.0 dBuV
ATTEN 10 dB
MKR 153.99 kHz
36.02 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
START 150.00 kHz
RES BW 10 kHz
VBW 30 Hz
STOP 220.00 kHz
SWP 1.5 sec


hp
EMISSION LEVEL [dBuV]
16 Jan 2003 15:22:16
EN55022B (CISPR22B) AC Conductd
PROXIM CORP
SUBSCRIBER UNIT
LINE1 [ ], LINE2 [X] 115V,60Hz
Peak Measurement
QUASI-PEAK
AVERAGE
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


hp
AVERAGE, LINE 2
REF 44.0 dBuV
ATTEN 10 dB
MKR 155.60 kHz
38.27 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
START 150.00 kHz
RES BW 10 kHz
VBW 30 Hz
STOP 220.00 kHz
SWP 1.5 sec

5.0 List of test Equipment

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
BI-Log Antenna	EMCO	3143	9509-1160	12	9/19/03
Horn Antenna	EMCO	3115	8812-3049	12	4/03/03
Horn Antenna	EMCO	3160-09	ITS51	#	#
Horn Antenna	EMCO	3160-10	ITS52	#	#
Pre-Amplifier	ITS	ITSPA-1	44156	12	4/16/03
Pre-amplifier	CTT	ACO/400	47526	12	10/5/03
Pre-Amplifier	Avantek	AFT-18855	8723H705	12	10/5/03
Power Meter	Hewlett Packard	8900D	3607U00673	12	1/02/04
Spectrum Analyzer w/85650 QP Adapter	Hewlett Packard	8566B	2416A00317 2043A00251	12	4/06/03
Spectrum Analyzer Display w/85650 QP Adapter	Hewlett Packard	85662B	2403A06796	12	4/06/03
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	7/16/03
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	7/16/03
Spectrum Analyzer w/8650 QP Adapter	Hewlett Packard	8568B	1912A0053 2521A01021	12	11/20/03
Spectrum Analyzer	Hewlett Packard	8565E	-	12	4/30/03
LISN	FCC	FCC-LISN-50-50-M-H	2012	12	1/23/04
Pulse Limiter	Hewlett Packard	11947A	2820A00184	12	9/3/03

No Calibration Required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3036184	SS	Junuary 25, 2003	Original document