

**CFR Title 47 Parts
15.247 certification**

FCC ID: EV9WAL2-4S1-01

EMI TEST REPORT

on

Access Link

**California Amplifier 21dBi Parabolic Antenna
California Amplifier 24dBi Parabolic Antenna
Gabriel 26 dBi Parabolic Antenna
Gabriel 21 dBi Parabolic Antenna
Gabriel 17 dBi Panel Antenna
Cushcraft 7 dBi Panel Antenna
Andrew 24 dBi Parabolic Antenna
COMSAT RSI 21 dBi Parabolic Antenna**

Prepared For

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Prepared by

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Test Report Number: A801005

Date of Test: April 14, 15, and 18, 1998

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1.0 Certification of Compliance

Description: Access Link
The EUT consists of the following:
Access Link 1 x DS1 Terminal unit (TU)
RG-8 Type N coaxial cable TU to antenna jumper
California Amplifier 21dBi QLP Parabolic Antenna P/N 130093
California Amplifier 24dBi QLP Parabolic Antenna P/N 130094
Gabriel 26 dBi Grid Parabolic Antenna P/N GHF4-23A
Gabriel 21 dBi Solid Parabolic Antenna P/N RFF2-23BSE
Gabriel 17 dBi Panel Antenna P/N SSFP23-17
Cushcraft 7 dBi Panel Antenna P/N S2307
Andrew 24 dBi Grid Parabolic Antenna P/N KPR3F-23
COMSAT RSI 21 dBi Solid Parabolic Antenna P/N P-24A24N-1

Model Number: 1 x DS1 2.4 GHz

Serial Number: 00001

Applicant: Mutlipoint Networks

Type of Test: FCC-15, Class B (Certification) part 15.247;

Date of Test: April 14, 15 and 18, 1998

Tested By: Suresh Kondapalli

The above equipment was tested by Electronic Compliance Laboratories, Inc. and found to be in compliance with the requirements set forth in the FCC Rules and Regulations, Part 15, Subpart C (15.203, 15.205, 15.207, 15.209, 15.247). The equipment, in the configuration described in this report, shows that the maximum emission levels emanating from this equipment are within the compliance requirements.

Chris Byleckie
Technical Director

Date

2.0 General Information

Applicant: Mutlipoint Networks
19 Davis Drive.
Belmont, CA 94002-3001

Contact Person: Bob Czerwinski

Equipment Under Test: Access Link

Model Number: 1 x DS1 2.4 GHz

Serial Number: 00001

FCC ID#: **WEGWAL2-4S1-01**

Report Number: A801005

Date of Test: April 14,15 and 18, 1998

Manufacturer: Mutlipoint Networks

Type of Test: FCC part 15, Subpart C, (15.203, 15.205, 15.209, 15.247), Class A Digital Device.

Frequency Range: 30 MHz to 1000 MHz - Radiated Emissions, Class A
2400 MHz to 2483.5 MHz - part 15.247
Up to the 10th harmonic of the fundamental (24.835 GHz) part 15.35(a)

Summary

Pass/Fail: Passed

15.209 Radiated Emissions:

The Access Link meet all the requirements for Part 15.209 Class A limit. **See Appendix D for Data Sheet and plots.**

15.247 Operation within the 2400 - 2483.5 MHz band:

The Access Link met all the requirements for 15.247. **See attached data and plots in Appendix A and Appendix B.**

3.0 Test Facility

Name: Electronic Compliance Laboratories
Location: 1249 Birchwood Drive
Sunnyvale, CA 94089
Site Filing: A site description is on file at the Federal Communications Commission
P.O. Box 429
Columbia, MD 21045
Types of Sites: Open Field Radiated and Indoor (Screen Room).
Line Conducted: All sites are constructed and calibrated to meet
ANSI C63.4-1994 requirements.
Test facility is recognized by the National Voluntary Laboratory
Accreditation Program for satisfactory compliance with criteria
established in Title 15, Part 285 Code of Federal Regulations.
NVLAP Code: 20089 effective through: March 31, 1998

4.0 Test Equipment

The following list contains equipment used at EC Laboratories, Inc. for compliance testing. The equipment conforms to the American National Standard Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1000 MHz.

Description	Manufacturer	S/N	Model No.	Cal. Due Date
EMI Receiver	HP	3325A00137	8456A	5/3/98
Pre-amp	HP	313A06829	8447F	5/10/98
Pre-amp	HP	3008A00527	8449B	4/5/99
LISN	EM	2532	ANS-25/2	6/12/98
Spectrum Analyzer	HP	3137A01183	8563A	5/22/98
Plotter	HP	2644V00365	7470A	N/A
Power Meter	HP	2342A07307	435B	4/4/99
Power Sensor	HP	N/A	8482A	4/12/99
Biconical Antenna	EM	677	EM-6912	3/3/99
Log-Periodic Antenna	EM	858	EM-6950	4/18/99
Horn Antenna	EM	6231	RGA-60	6/6/98
1.2 - 4GHz Filter	FSY	001	HM1160-11SS	3/25/99
4 - 10 GHz Filter	FSY	001	HM2950-15SS	3/25/99
10 - 18 GHz Filter	FSY	001	HP8601-7SS	3/25/99

HP = Hewlett Packard

EM = Electro Metrics

The antenna used at the time the data was taken is indicated on each data page. The antenna height and polarization are also noted on the data pages.

The calibration of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

5.0 Data Reporting Format

The measurement results are expressed in accordance with FCC Part-15, Subpart B Class B limits, where applicable, are presented in tabular or graphical form.

6.0 Detector Functions

On any frequency or frequencies below or equal to 1000 MHz, the limits shown below are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths.

On any frequency or frequencies above 1000 MHz, the radiated limits shown below are based on the use of measuring equipment employing an average detector function.

EC Laboratories uses the Peak detection mode for normal testing and initial screening of the Access Link. The Peak detection mode will produce a measurement value that is always greater than, or equal to, the quasi-peak or average detection mode. Whenever the measurement value is 6 dB below the applicable limit or greater, the appropriate detector function will be employed and recorded.

7.0 Frequency Range of Investigation

The spectrum was investigated up to the frequency specified in the following table according to the highest clock frequency generated in the device.

<u>Highest Frequency Used (Clock)</u>	<u>Upper Limit of Range Measured</u>
Below 1.705 MHz	30 MHz
1.705 to 108 MHz	1000 MHz
108 to 500 MHz	2000 MHz
500 to 1000 MHz	5000 MHz
Above 1000 MHz	5th Harmonic or 40 GHz (Whichever is Lower)

8.0 FCC Class Types

Class A Digital Device

A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

Class B Digital Device

A digital device that is marketed for use in a residential environment notwithstanding use in a commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

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

(Code of Federal Regulations, 47, Part 15, Subpart A, Sect. H&I)

(CFR 47, Parts 0 TO 19, Revised as of October 1,1990)

9.0 FCC Limits

9.1 Conducted Emission Limits

For a digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back into the AC power line on any frequency or frequencies within the band 450 kHz to 30 MHz shall not exceed the limits in the following table for the appropriate class. Compliance shall be based on the measurement of the Radio Frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.

<u>Frequency</u> (MHz)	<u>Class A Limit</u> (μ V)	<u>Class A Limit</u> (dB μ V)	<u>Class B Limit</u> (μ V)	<u>Class B Limit</u> (dB μ V)
0.45 to 1.705	1000	60.0	250	48.0
1.705 to 30.0	3000	69.5	250	48.0

9.2 Radiated Emission Limits

The field strength of radiated emissions for a Class A Digital Device, when measured at a distance of 10 meters, shall not exceed the limits given in the table below. The lower limit applies at the band edge.

The field strength of radiated emissions for a Class B Digital Device, when measured at a distance of 3 meters, shall not exceed the limits given in the table below. The lower limit applies at the band edge.

<u>Frequency</u> (MHz)	<u>Class A</u> <u>(3m) Limit</u> (μ V/m)	<u>Class A</u> <u>(3m) Limit</u> (dB μ V/m)	<u>Class A</u> <u>(10m) Limit</u> (μ V/m)	<u>Class A</u> <u>(10m) Limit</u> (dB μ V/m)	<u>Class B</u> <u>(3m)</u> <u>Limit</u> (μ V/m)	<u>Class B</u> <u>(3m)</u> <u>Limit</u> (dB μ V/m)
30-88	300	49.6	90	39.1	100	40.0
88-216	500	54.0	150	43.5	150	43.5
216-960	700	56.0	210	46.4	200	46.0
Above 960	1000	60.0	300	49.5	500	54.0

10.0 Test Methods

10.1 Line Conducted Emissions Test Procedure

1. EUT and any other equipment and cables were placed on a wood table one meter above a ground screen.
2. The EUT's Input Power line cord was connected to a Line Impedance Stabilization Network (LISN) under the table.
3. All other (Non-EUT) equipment received power from a separate AC Power Source. The LISN assembly has two monitoring points: Line 1 (AC-Hot) and Line 2 (AC-Neutral). Each monitoring point was scanned by the measuring equipment (the other point was terminated in 50 ohms) over the frequency range of 450 kHz to 30 MHz for conducted emissions.
4. When an emission is found, the following takes place:
 - a. The emission levels are maximized by equipment/cable placement.
 - b. Frequency and emission level data are entered into computer in dBm.
 - c. The monitoring point (Line 1 or 2) is entered into the computer.
 - d. The computer converts dBm to micro volts and uses a look-up table to find cable losses (in dB) at that frequency, calculates a corrected emission level, and compares the corrected emission level to the appropriate limit. The data is then printed out in tabular form.

An example of the printout and definitions follows below.

10.2 Line Conducted Emissions Test Example

	Site	FCC Limit		EUT Level (L1)	
Freq.	Reading	A	B	A	B
(MHz)	(dBμV)	(dBμV)		(dB)	
1.85	-57	69.5	48.0	-4.5	+17

Freq. = Frequency of emission in MHz

Reading dBμV = Reading at Spectrum Analyzer (Uncorrected)

FCC Limit A/B = Conducted Emission level limit in dBμV

EUT Level A* = Emission relative to the FCC Class A Limit

EUT Level B* = Emission relative to the FCC Class B Limit

Note = L1 is AC-Hot, L2 is AC-Neutral

QP is a Quasi-Peak value

AV is an average value

*A negative value indicates that the emission is below (or meets) the limit and a positive value indicates that the emission is above (or exceeds) the limit.

10.3 Radiated Emissions Test Procedure

1. EUT and any other equipment and cables used with the EUT were placed on a wood table one-meter above a ground screen.
2. The EUT receives the normal AC Power at the base of the table.
3. All equipment and cables are placed in a manner which tends to maximize their emission characteristics in a typical application.
4. The table was rotated 360 degrees to determine the maximum radial emissions.
5. The antenna was varied in height between 1 meter and 4 meters above the ground plane to determine the maximum emissions. Various antennas are used during the test in both the vertical and horizontal polarization.
6. The Spectrum Analyzer is scanned from 30 MHz to 1000 MHz for emissions. The applicable spectrum analyzer settings are:
 - a. Resolution Bandwidth = 100 kHz,
 - b. Normal Detector Mode = Peak (The Quasi-Peak is used when the emissions are near, or over the limit).
7. When an emission is found and maximized, the following actions are performed:
 - a. The emission frequency is entered into the computer.
 - b. The emission level is read from the spectrum analyzer in dBm and entered into the computer.
 - c. The antenna polarization is entered into the computer.
 - d. The computer converts the level in dBm to dB μ V and uses lookup tables to determine the coax cable loss, antenna factor, and pre-amp gain. A site correction factor is calculated for that particular frequency, and the data is printed out in tabular form.

10.4 Radiated Test Example

	Site	FCC Limit		EUT Level (QP)	
Freq.	Reading	A	B	A	B
(MHz)	(dB μ V)	(dB μ V)		(dB)	
65.4	-58	39.1	40.0	-4.6	-5.5

Freq. = Frequency of emission in MHz.

Reading dB μ V = Reading at Spectrum Analyzer (Uncorrected)

FCC Limit A/B = Limit in dB μ V as stated in Part-15, Subpart B

EUT Level A* = Emission level relative to the FCC Class A limit

EUT Level B* = Emission level relative to the FCC Class B limit.

Note = V/H is the antenna polarization (Vertical or Horizontal)

PK indicates a Peak Value

QP indicates the Quasi-Peak value.

*A negative value indicates that the emission is below (or meets) the limit and a positive value indicates that the emission is above (or exceeds) the limit.

11.0 Labeling Requirements

Product Label:

A Class A Digital Device subject to Certification by the FCC shall bear the following statement in a conspicuous location on the device.

(Name of Grantee)

FCC ID:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label is to be located in a "conspicuous location". This is any location readily visible to the user of the device without the use of tools.

The label is to be permanently attached to the equipment in such a manner that the label can normally be expected to remain fastened and legible during the equipment's expected useful life.

Where the device is constructed in two or more sections connected by wires and marketed together, the statement specified in this section is required to be affixed only to the main control unit.

When the device is so small or for such use that it is not practicable to place the statement specified above on it, this required information shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier must be displayed on the device.

Users Manual Statement:

For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the user's operation manual.

NOTE: This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense:

Sample Label Drawing and Label location drawing are in Appendix E.

12.0 Summary of Measurements

Summary of Measurements for a Spread-Spectrum System, 2400-2483.5 MHz

CFR Title 47, Part 15.247

Manufacturer: Mutlipoint Networks
19 Davis Drive.
Belmont, CA 94002-3001
Contact: Bob Czerwinski
FCC ID: **WEGWAL2-4S1-01**
Test Report Number: A801005

The Wireless Access Link provides the capability to send and receive voice, data, and video via a direct sequence spread spectrum (DSSS) radio operating in the 2400 - 2483.5 MHz ISM band.

15.247 for Direct Sequence Systems

15.247 (a) (2) 6 dB Bandwidth

The Access Link card uses 2 channels, 2417 and 2466.5 MHz. The minimum 6 dB bandwidth of each channel is at least 500 kHz. **Plots labeled "Bandwidth" are shown in Appendix A.**

15.247 (b) Maximum Peak Output Power

The Access Link was placed in continuous transmit mode and tested at 2417 and 2466.5 MHz. Table 1 shows the maximum peak power of the transmitter at these three frequencies, respectively. The highest level (at 2466.5 MHz) is at +18.86 dBm, or 76.9milliwatts. Maximum permitted is 1.0 watts, or +30 dBm. The Access Link output was connected to a Spectrum Analyzer through a 30dB pad.

Frequency, MHz	Reading, dBm	Pad & Cable Loss, dB	Corrected Reading, dBm / mW
2417.0	-2.50	20.4	17.90 dBm / 61.6 mW
2466.5	-1.50	20.4	18.86 dBm / 76.9 mW

Table 1. Summary of Access Link Output Power(Conducted)

The Access Link was tested with 8 different antennas. The maximum EIRP (Equivalent Isotropically Radiated Power) for each antenna is :

California Amplifier 21dBi QLP Parabolic Antenna

Power = 18.86 dBm (peak reading) + 21 dBi (ant. gain) = +39.86 dBm / 9.68 W EIRP

California Amplifier 24dBi QLP Parabolic Antenna

Power = 18.86 dBm (peak reading) + 24 dBi (ant. gain) = +42.86 dBm / 19.3 W EIRP

Gabriel 26 dBi Grid Parabolic Antenna

Power = 18.86 dBm (peak reading) + 26 dBi (ant. gain) = +44.86 dBm / 30.6 W EIRP

Gabriel 21 dBi Solid Parabolic Antenna

Power = 18.86 dBm (peak reading) + 21 dBi (ant. gain) = +39.86 dBm / 9.68 W EIRP

Gabriel 17 dBi Panel Antenna

Power = 18.86 dBm (peak reading) + 17 dBi (ant. gain) = +35.86 dBm / 3.85 W EIRP

Cushcraft 7 dBi Panel Antenna

Power = 18.86 dBm (peak reading) + 7 dBi (ant. gain) = +25.86 dBm / 385 mW EIRP

Andrew 24 dBi Grid Parabolic Antenna

Power = 18.86 dBm (peak reading) + 24 dBi (ant. gain) = +42.86 dBm / 19.3 W EIRP

COMSAT RSI 21 dBi Solid Parabolic Antenna

Power = 18.86 dBm (peak reading) + 21 dBi (ant. gain) = +39.86 dBm / 9.68 W EIRP

Manufacturers antenna drawings are in Appendix F.

15.247 (c) Out Of Band Emissions (Not Falling within Restricted Bands)

The Access Link was placed in transmit mode at the low (2417 MHz) and the high (2466.5 MHz) channels. The spectrum analyzer was placed in the MAX HOLD mode. Out of Band emissions were investigated and found to be better than 20 dB (in power) below the highest in-band emission. In addition, out of band emissions (radiated) were below the limits specified in 15.209. **See Plots in Appendix A.**

Plot Title	Frequency Range of Plot, MHz	Purpose of Plot
Out Of Band Emissions Lower Edge	2400 - 2440	Show Emissions are down by 20 dB
Out Of band Emissions Upper Edge	2440 - 2483.5	Show Emissions are down by 20 dB
Out Of band Emissions 2417 MHz	0 - 1000 1000 - 2750 2750 - 26,500	Show Emissions are down by 20 dB
Out Of band Emissions 2466.5 MHz	0 - 1000 1000 - 2750 2750 - 26,500	Show Emissions are down by 20 dB

15.247 (d). Transmitted Power Density

The Access Link exhibits a transmitted power density of less than +8 dBm in any 3 kHz bandwidth over any one second interval. This test was performed in accordance with the guidelines set forth in "Guidance on Measurements for Direct Sequence Spread Spectrum Systems", as published by Federal Communication, Authorization and Evaluation Division. **Please refer to a copy of this document in Appendix J.**

The Access Link was connected to the Spectrum Analyzer via a short length of test cable (4 inches RG214). The detector in the Spectrum Analyzer was set to Peak mode, the resolution and video bandwidths were set to 3 kHz, and the sweep time was set per the following relation:

$$\text{Sweep Time (seconds)} = \frac{\text{Spectrum Analyzer Span in Hertz}}{\text{Resolution Bandwidth, Hertz}}$$

For this case, We have a sweep time of $250\text{kHz}/3\text{kHz} = \mathbf{83.3 \text{ seconds}}$. Note that the peak level of the Access Link's Spectral Mask was selected prior to reducing the span to 250 kHz. In this manner, the maximum level was observed and selected for this test. **Table 2** below summarizes the results, **Plots labeled "Spectral Power Density" are in Appendix A.**

Frequency, MHz	Reading dBm
2417.0	8.00
2466.5.0	7.00

note; FCC LIMIT < than + 8 dBm

Table 2. Summary of Spectral Power Density measurements for the Access Link

15.247 (e) Processing Gain

The Minimum Processing Gain (PG) for the Access Link unit is greater than 12 dB. This meets the minimum requirements of 10.0 dB. Please refer to Appendix A for additional measurements on Processing Gain performed by Proxim involving the comparison of signal to noise ratios at the receiver output, with and without the system spreading code turned on. **See Appendix K.**

15.209 RADIATED EMISSIONS

The attached table shows that the Class A radiated limits from 30 - 1000 MHz are not exceeded by the Access Link. The Access Link was operating normally with a combination of transmission and reception. The Access Link was placed near one edge of a wooden table resting on a turntable. The wooden table was approximately 1 meter above the groundplane of the 3 meter test site. The search antennas were located at 3 meters. Measurements were made in accordance with ANSI C63.4-1994. **Test Data is in Appendix C.**

15.207 AC LINE CONDUCTED EMISSIONS

The Access Link RF line conducted levels for emissions in the 0.45 - 30 MHz band must not exceed 250 μ V when measured with a LISN. Attached graphs and tabular data show that emissions are below the 250 μ V (48 dB μ V) maximum allowed level. **Test Data is in Appendix D.**

15.205 Restricted Bands - Emissions Within Restricted Bands

The Access Link was placed on a wooden table resting on a turntable. The wooden table was approximately 1 meter above the ground plane of the 3 meter portion of the 10 meter OATS test site.

The search antenna was located 3 meters from the Access Link. With the Access Link in the TRANSMIT mode and transmitting continuously, with the spectrum analyzer in the MAX HOLD mode, the turntable was rotated and the search antenna was raised and lowered in an attempt to maximize the received radiated emissions level. The Access Link was set in the continuous transmit mode at the low (2417 MHz) and the high (2466.5 MHz) channels. The attached chart entitled "FCC Radiated Data Sheet" shows that emissions falling into restricted bands are below the limit of 54 dB μ V/m. Peak measurements were made using 12BW=VBW=1MHz. Avg. measurements were made with AY RBW= 1MHz and VBW=10Hz. **Data Sheets are in Appendix B**

15.203 Antenna Connector

The Access Link uses a standard N connector to provide coupling from the intentional radiator to the antenna. This product is only installed by trained personnel and is exempt from the unique connector requirement.

APPENDIX A
Spread Spectrum Plots

6dB Bandwidth 2417 MHz

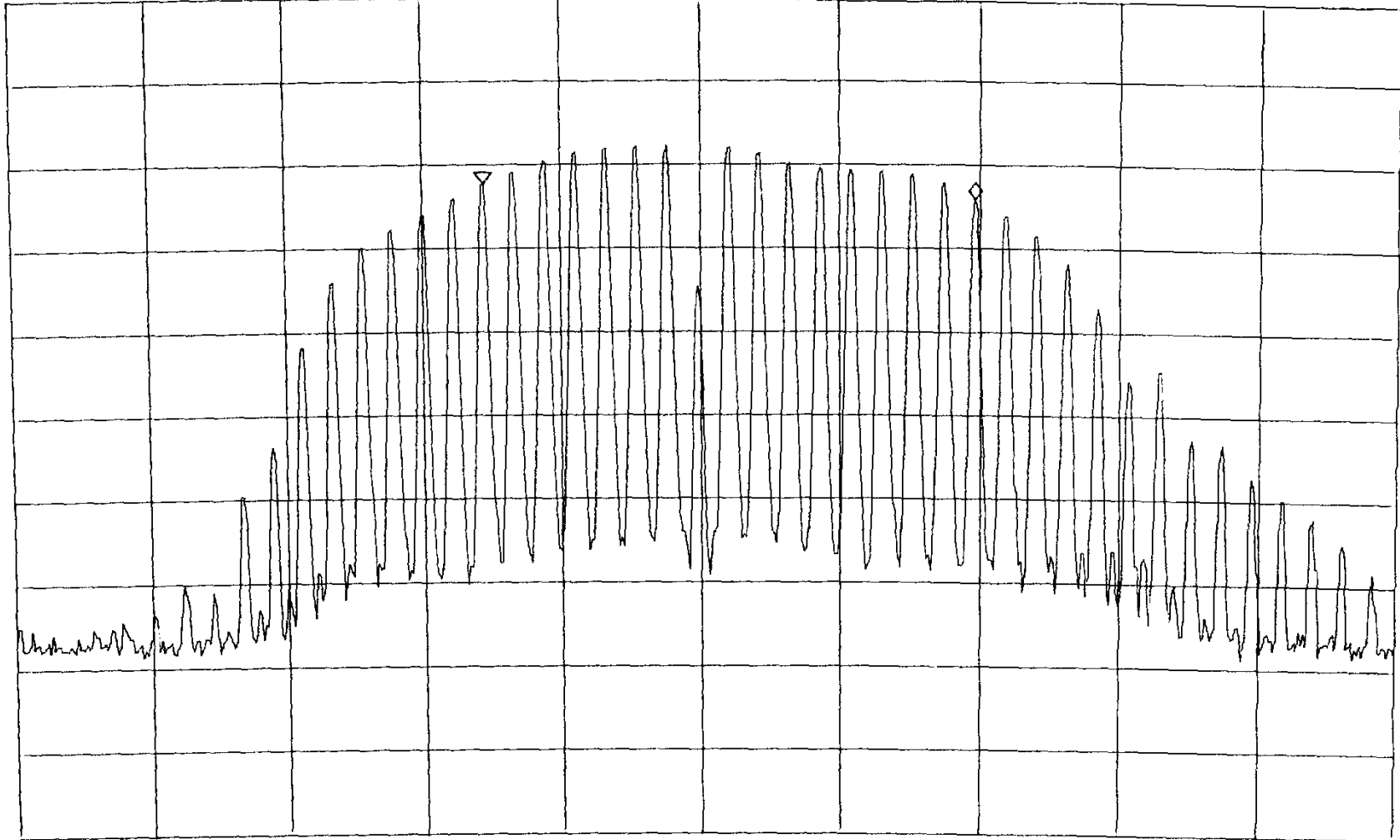
ATTEN 10dB

RL 0dBm

10dB/

$$\Delta MKR = -1.83 \text{ dB}$$

17.58MHz



CENTER 2.41833GHz

```
*RBW 100kHz
```

VBW 100kHz

SPAN 50.00MHz

SWP 50.0ms

6 dB Bandwidth 2466.5 MHz

[G] 18:46:02 APR 17, 1998

MKR 18.63 MHz

AFF 1.0 dBm

AT 10 dB

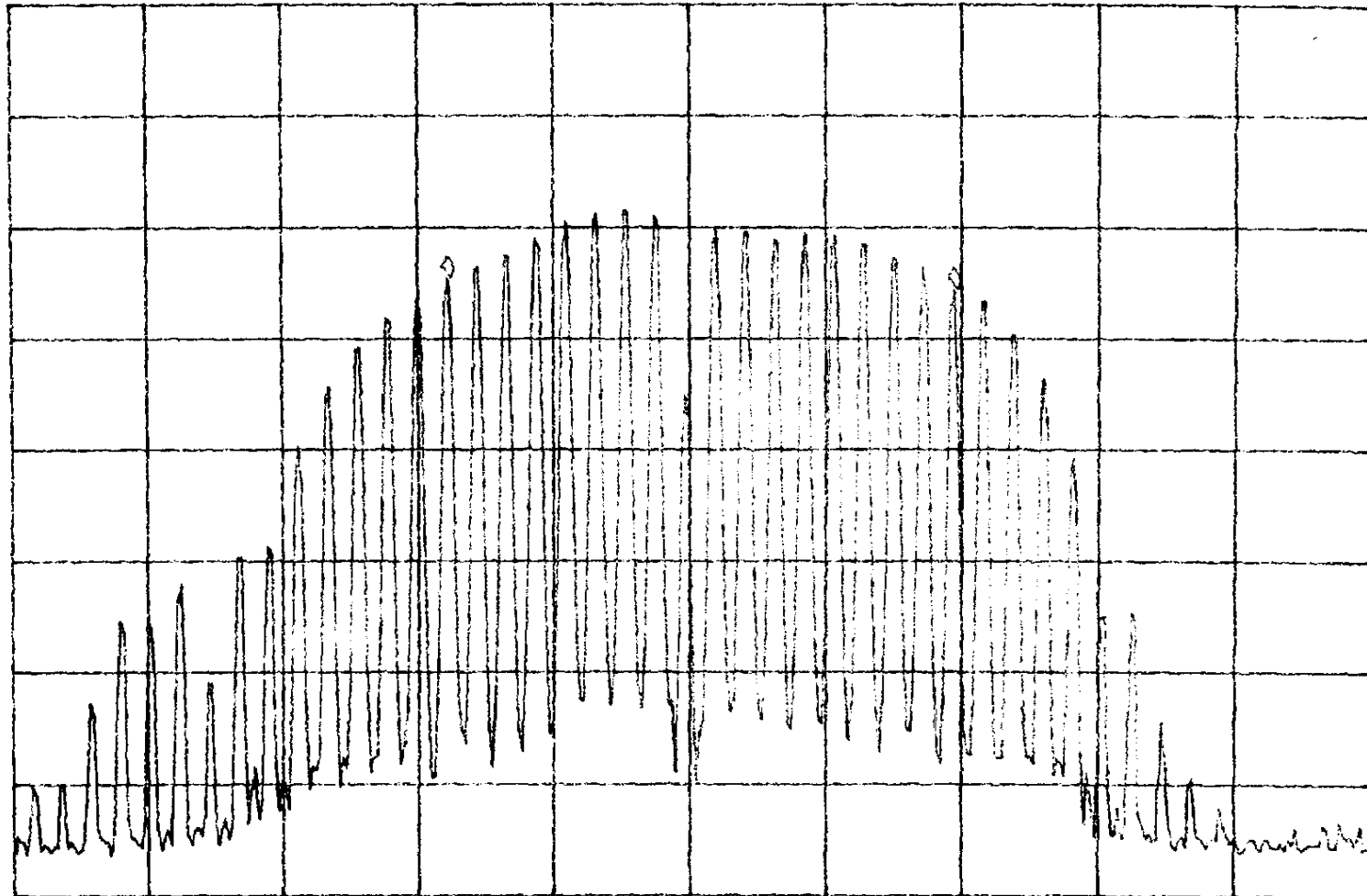
-1.00 dB

PEAK

100

10

dB



VA SB
SC FC
CORR

CENTER 2.46579 GHz

#RES BW 100 kHz

VBW 100 kHz

SPAN 50.00 MHz

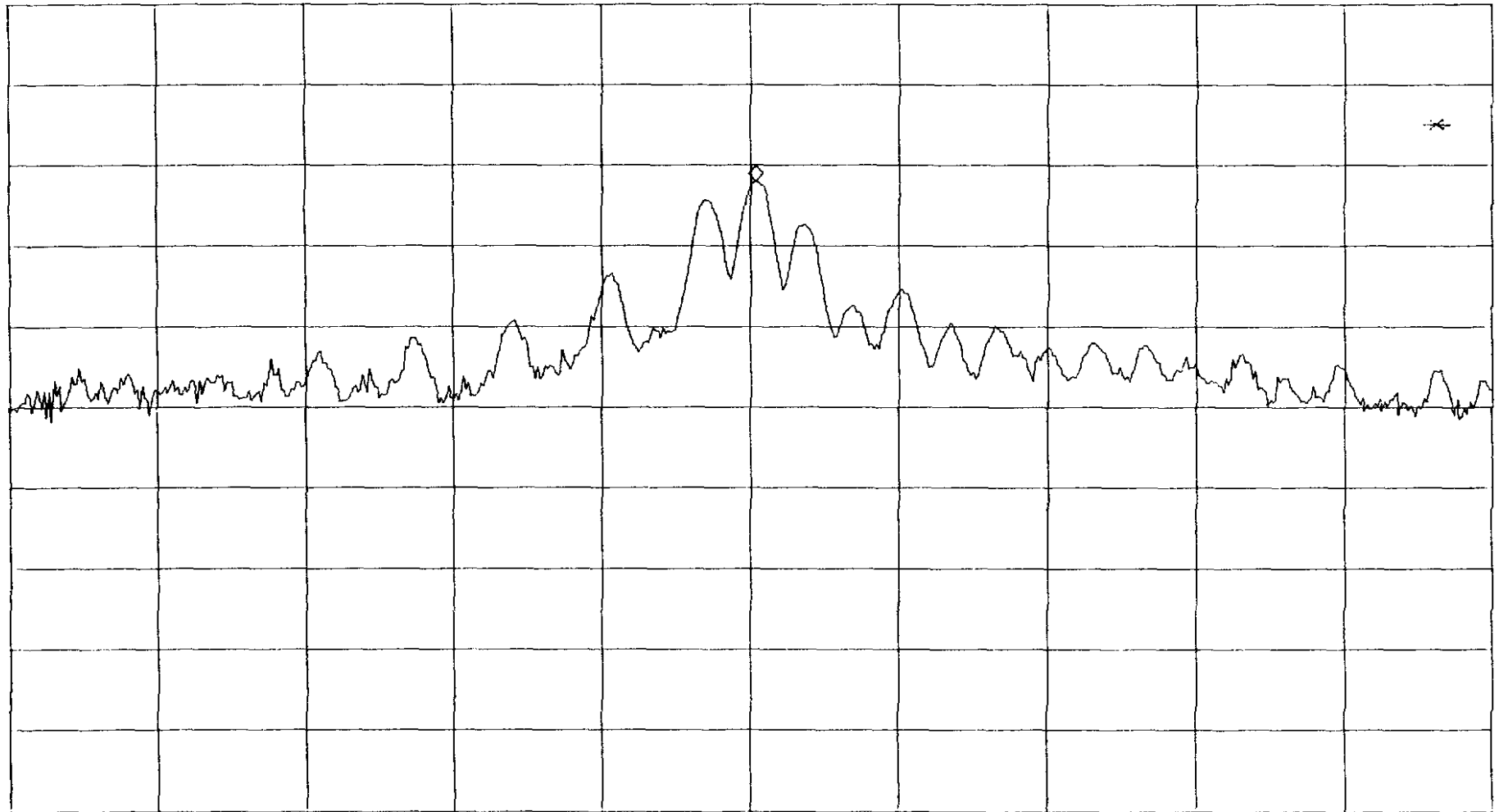
SWP 20.0 msec

Spectral Power Density 2417 MHz

ATTEN 20dB
RL 10.00dBm

10dB/

MKR -12.00dBm
2.4150200GHz



CENTER 2.4150192GHz
*RBW 3.0kHz VBW 3.0kHz

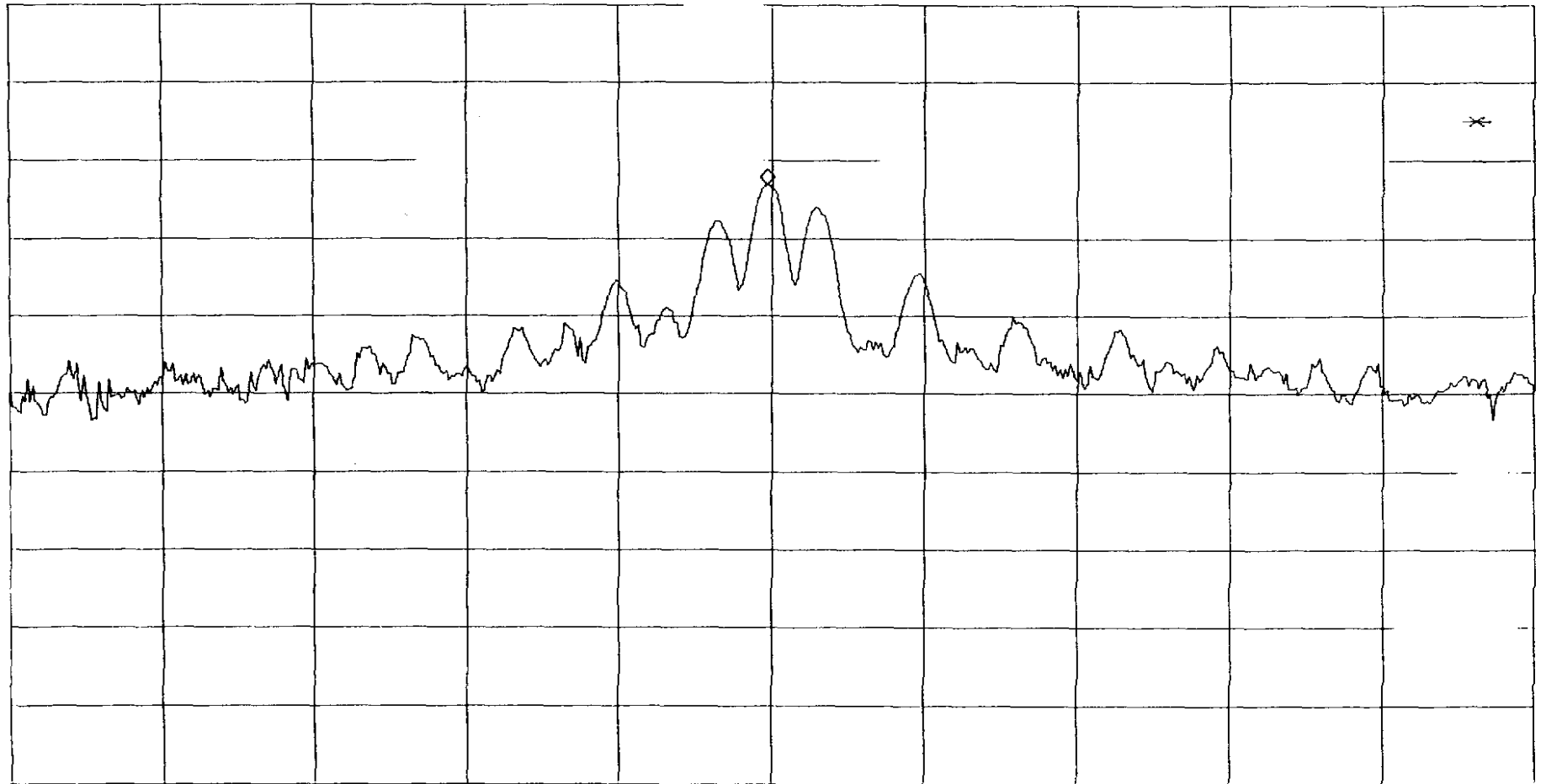
SPAN 250.0kHz
*SWP 100sec

Spectral Power Density 2466.5 MHz

ATTEN 20dB
RL 10.00dBm

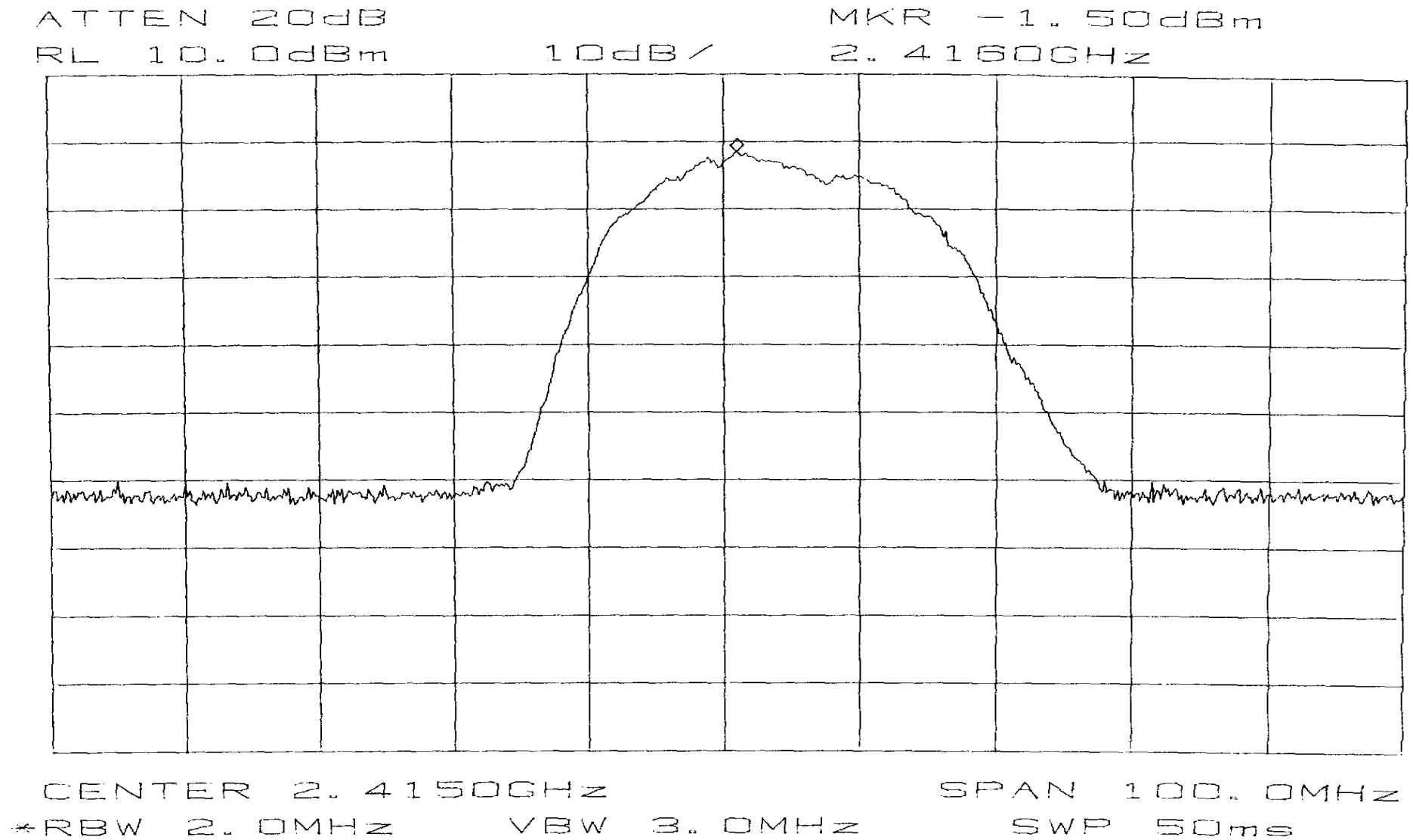
10dB/

MKR -13.00dBm
2.4669871GHz



CENTER 2.4669879GHz SPAN 250.0kHz
*RBW 3.0kHz VBW 3.0kHz *SWP 100sec

Out of Band Emissions Lower Band Edge



Out of Band Emissions Upper Band Edge

[22] 14:53:08 APR 17, 1999

REF 1.0 dBm

AT 10 dB

MKR 21.03 MHz
-55.10 dB

PERF

100

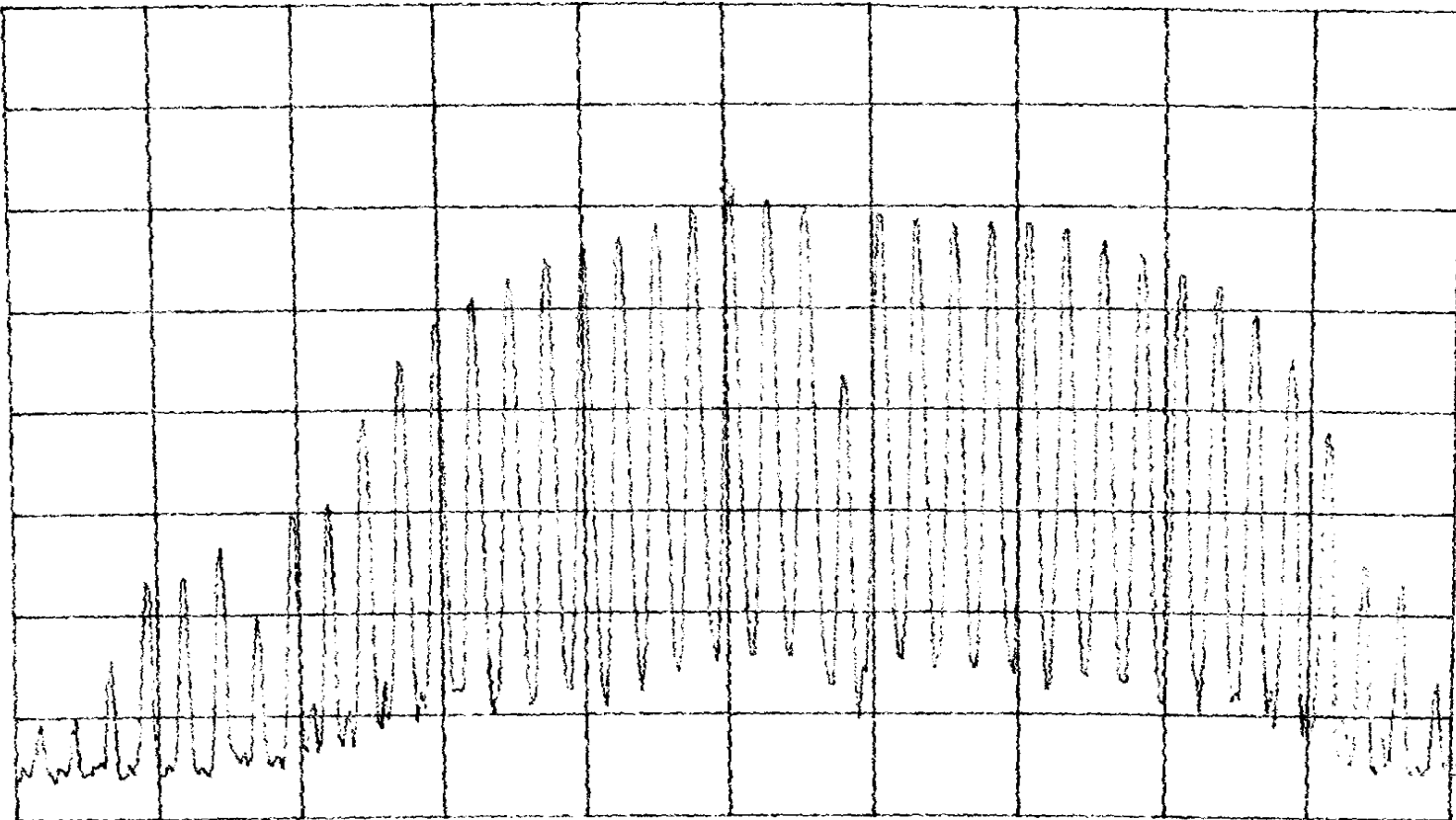
10

0.1

VB 50

SB 20

0.001



START 2.48000 MHz

#RES BW 100 kHz

VBW 100 kHz

STOP 2.48350 MHz

SKP 20.0 msec

Out of Band Emissions 30MHz – 2.75 GHz (2417 MHz)

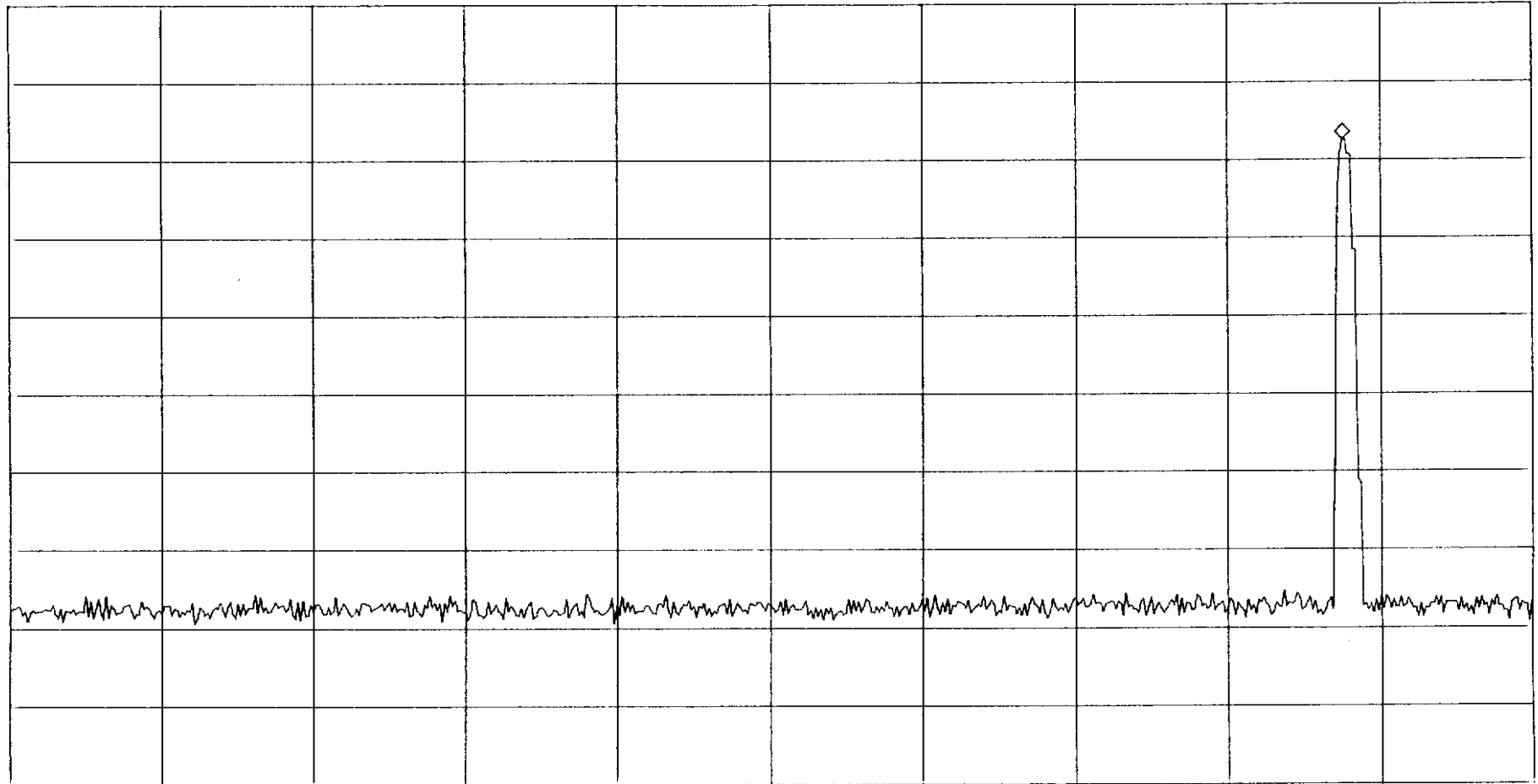
ATTEN 10dB

MKR -17.33dBm

RL 0dBm

10dB/

2.410GHz



START 30MHz

STOP 2.750GHz

*RBW 100kHz

VBW 100kHz

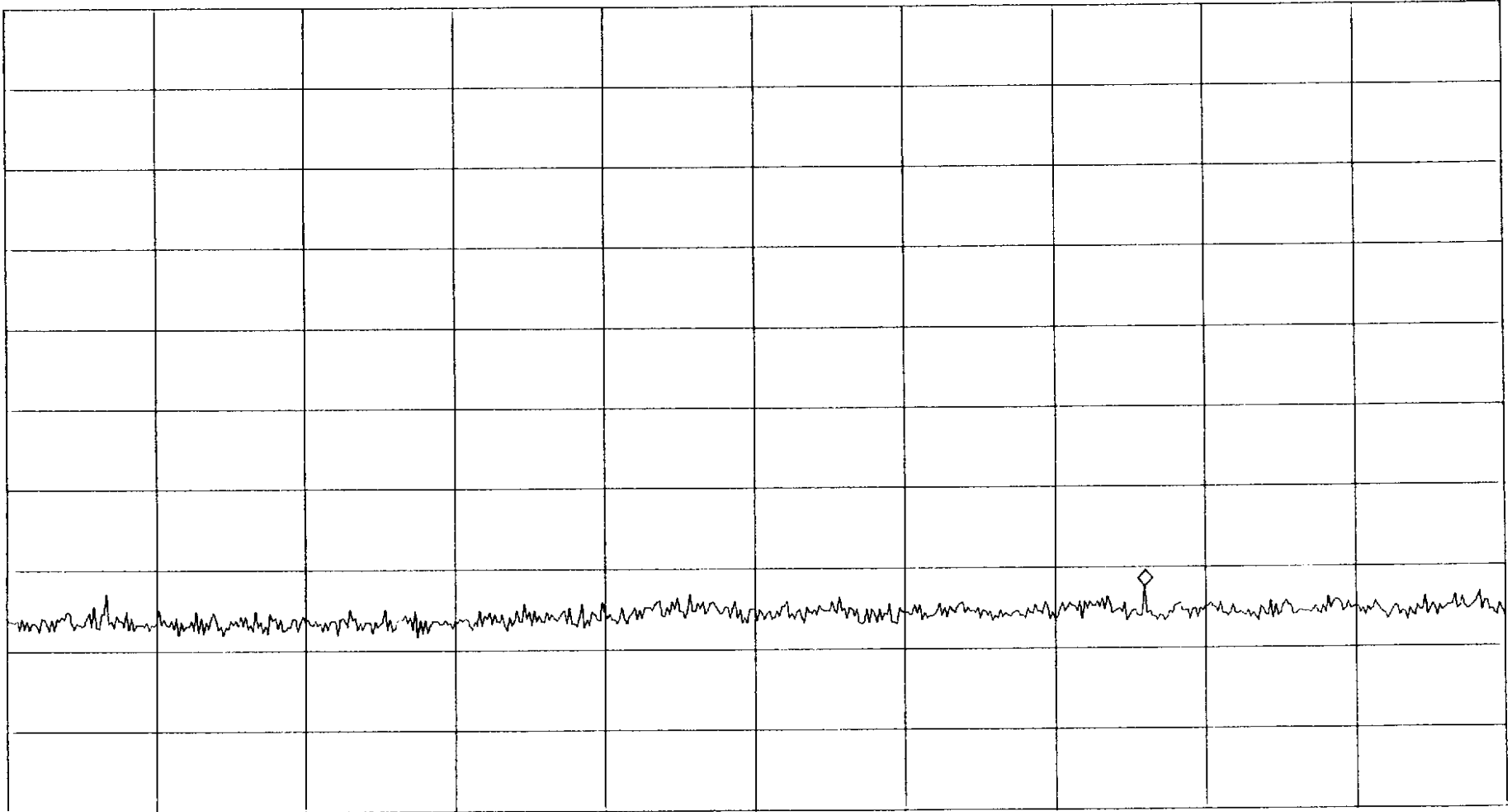
SWP 680ms

Out of Band Emissions 2.75 - 13.0 GHz (2417 MHz)

ATTEN 10dB
RL 0dBm

10dB/

MKR -72.33dBm
10.54GHz



START 2.75GHz

STOP 13.00GHz

*RBW 100kHz

VBW 100kHz

SWP 2.60sec

Out of Band Emissions 13.0 – 26.5 GHz (2417 MHz)

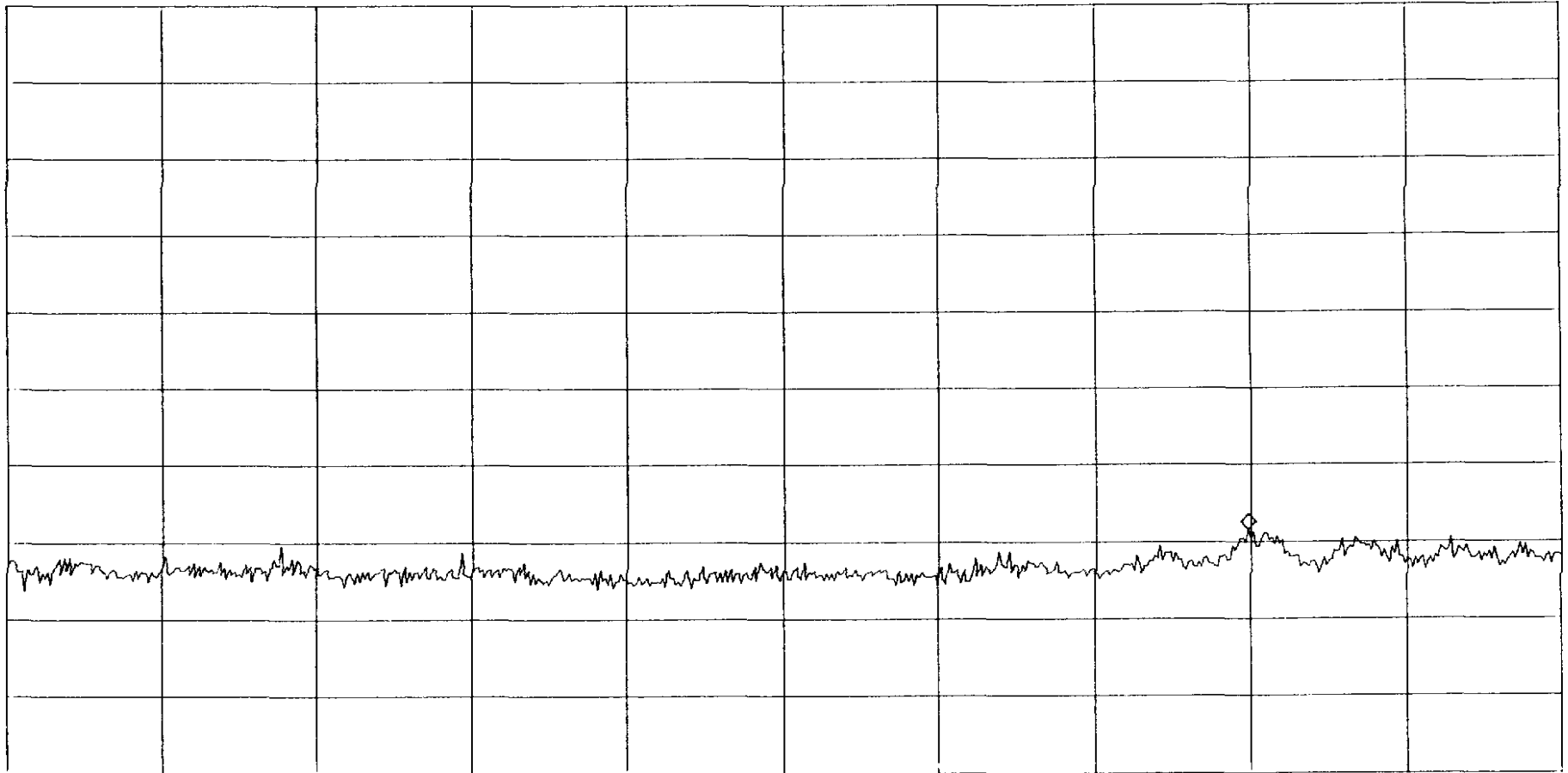
ATTEN 10dB

MKR -68.33dBm

RL 0dBm

10dB/

23.78GHz



START 13.00GHz

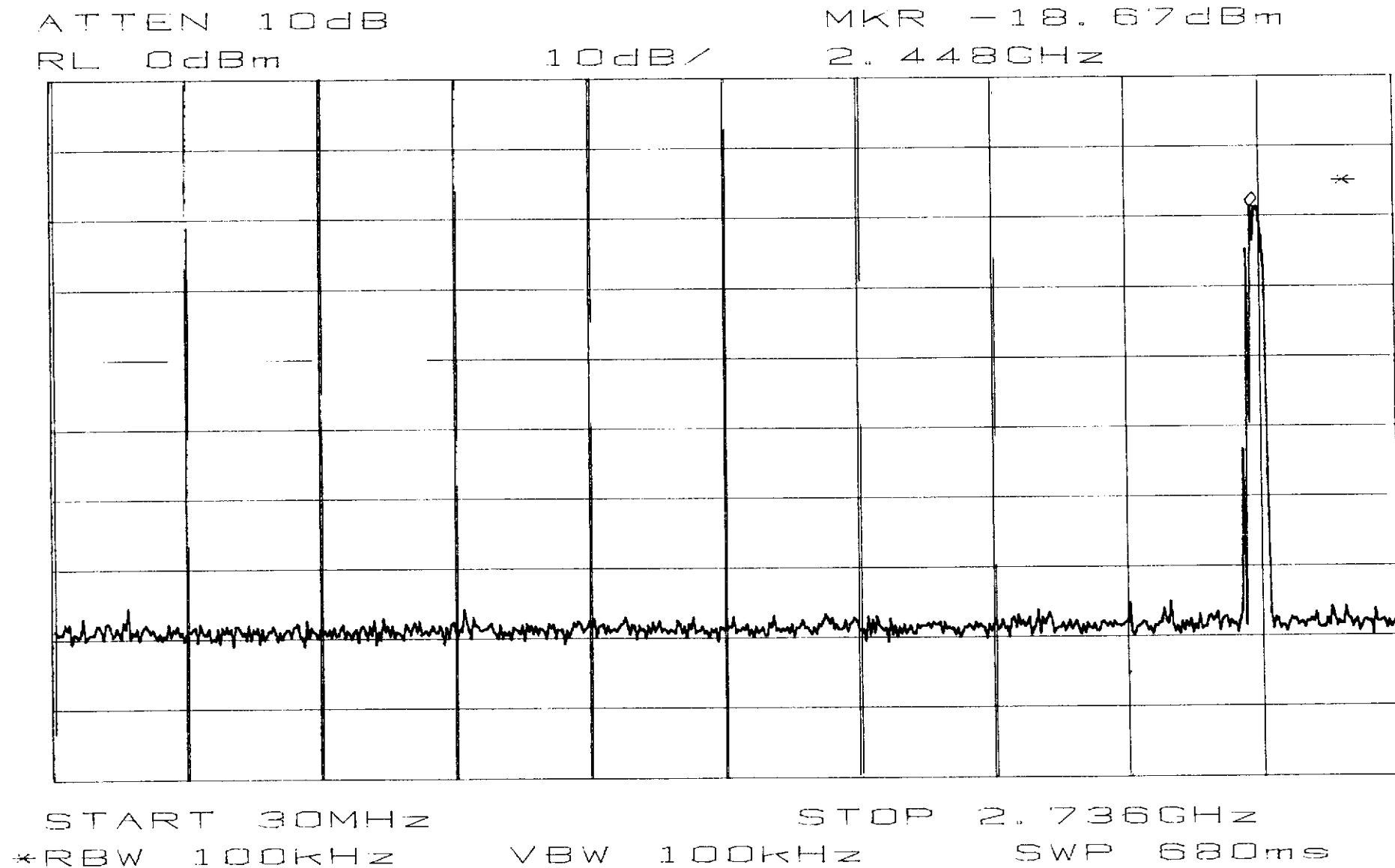
STOP 26.50GHz

*RBW 100kHz

VBW 100kHz

SWP 3.40sec

Out of Band Emissions 30 MHz – 2.75 GHz (2466.5 MHz)



Out of Band Emissions 2.75 - 13.0 GHz (2466.5 MHz)

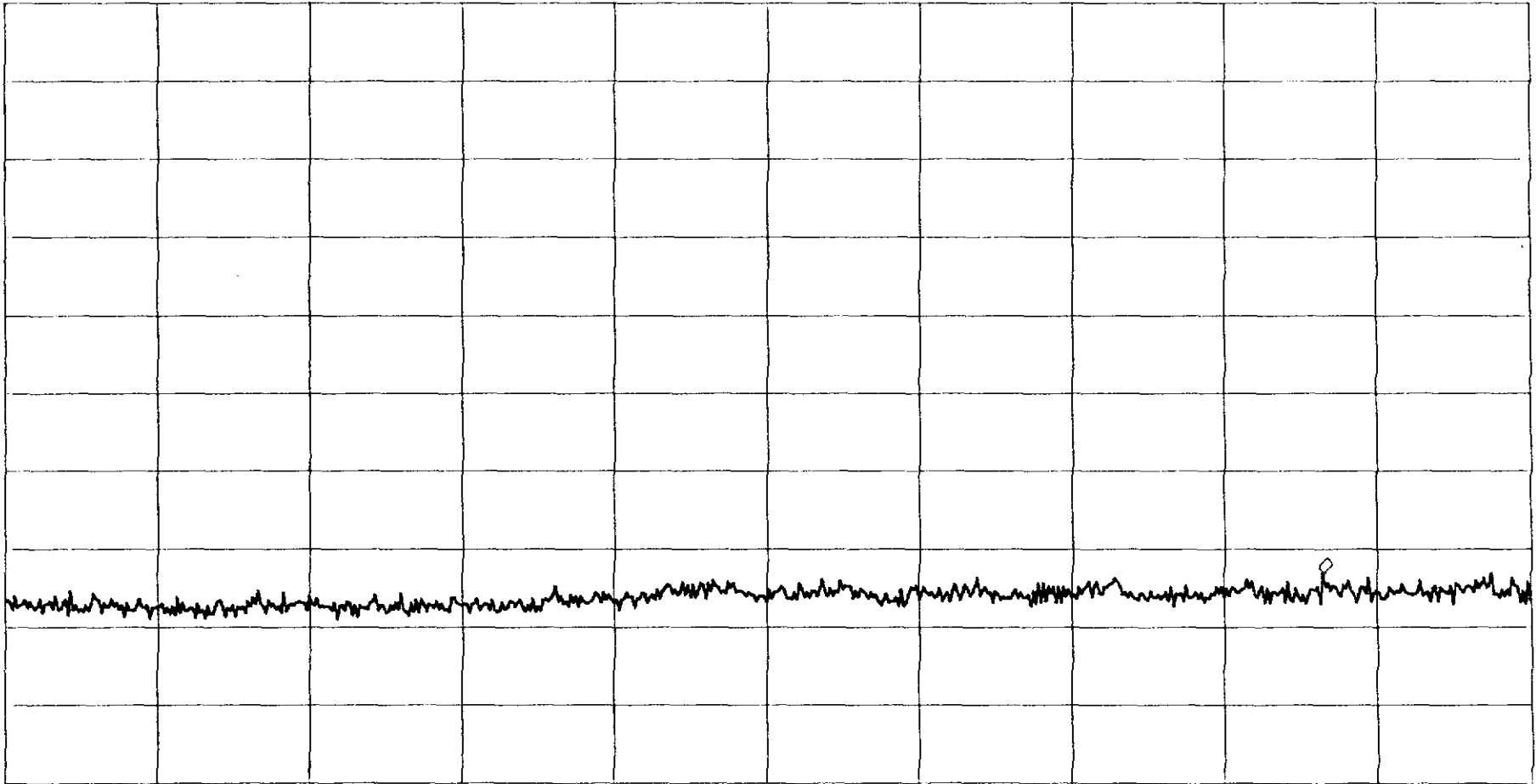
ATTEN 10dB

MKR -73.00dBm

RL 0dBm

10dB/

11.62GHz



START 2.75GHz

STOP 13.00GHz

*RBW 100kHz

VBW 100kHz

SWP 2.60sec

Out of Band Emissions 13.0 – 26.5 GHz (2466.5 MHz)

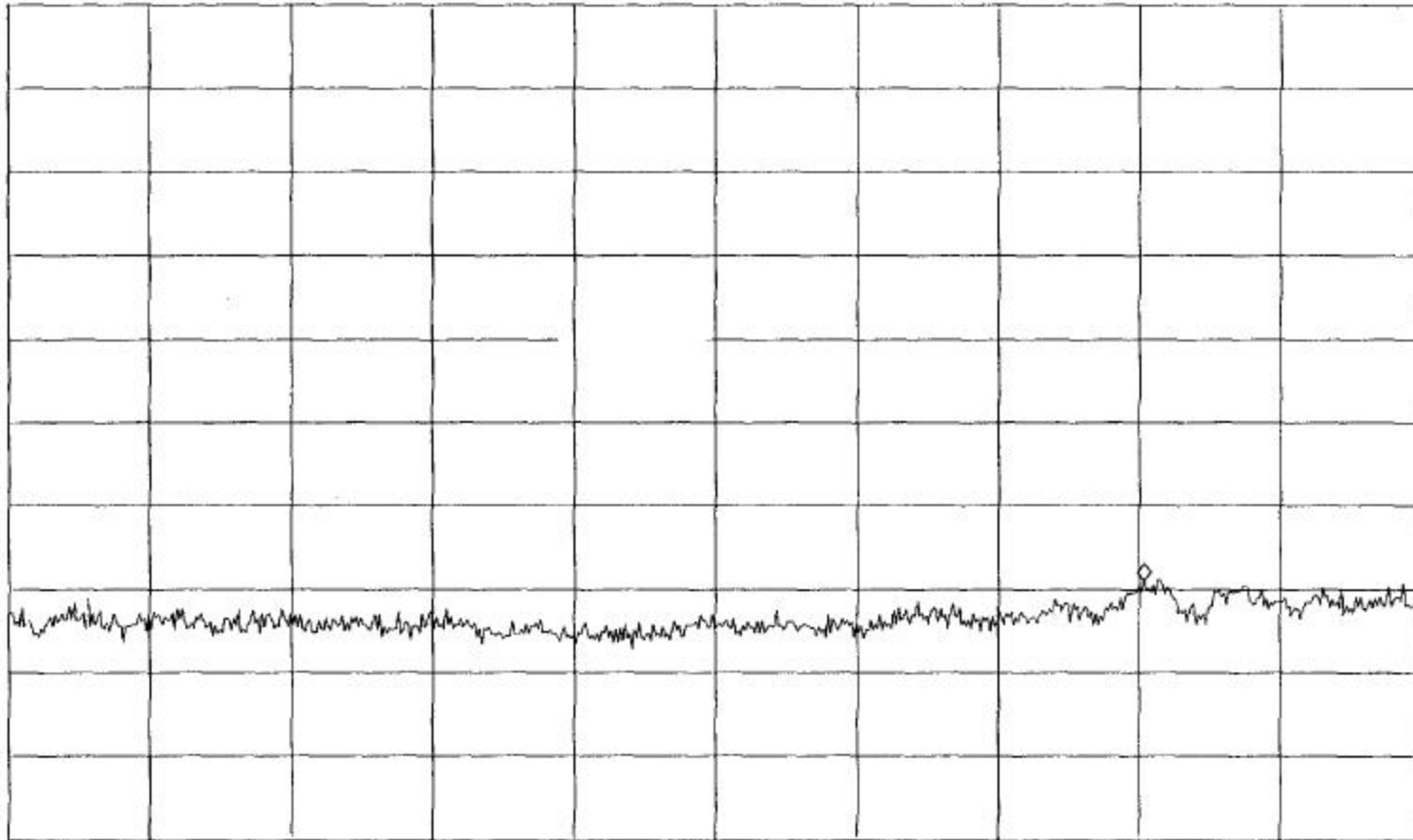
ATTEN 10dB

MKR -68.83dBm

RL 0dBm

10dB/

23.85GHz



START 13.00GHz

STOP 26.50GHz

*RBW 100kHz

VBW 100kHz

SWP 3.40sec

APPENDIX B

15.205 Restricted Band Data

EUT:	Accesslink	CUSTOMER NAME:					Wireless			
RULE PART:	15.247	WORK ORDER:					8041401			
		FILE:					8041401a.xls			
ANTENNA:	Horn	ATTN dB: 0								
		DUTY dB: 0								
TESTED BY:	Donnie	HP IL dB: 0								
COMMENT:	California Amplifier	DIST dB: 0								
	21 dBi QLP parabolic									
FREQ.	READING	Pk	A.F.	Cbl	FLTR	AMP	TOTAL,	LIMIT	DELTA	
MHz	dB(uV)	NF or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB	
2417										
4834.00	44.00	Pk	31.4	-7.0	-0.4	35.0	47.8	74.0	-26.2	
4834.00	26.83	Avg	31.4	-7.0	-0.4	35.0	30.6	54.0	-23.4	
7251.00	47.33	* Pk	34.5	-10.6	-0.5	35.5	57.5	74.0	-16.5	
7251.00	28.83	* Avg	34.5	-10.6	-0.5	35.5	39.0	54.0	-15.0	
9668.00	47.50	* Pk	36.8	-13.0	-0.5	35.5	62.3	74.0	-11.7	
9668.00	29.00	* Avg	36.8	-13.0	-0.5	35.5	43.8	54.0	-10.2	
12085.00	47.50	* Pk	39.0	-13.6	-0.5	34.3	66.3	74.0	-7.7	
12085.00	28.00	* Avg	39.0	-13.6	-0.5	34.3	46.8	54.0	-7.2	
14502.00	43.30	* Pk	41.9	-15.5	-0.5	34.3	66.9	74.0	-7.1	
14502.00	27.33	* Avg	41.9	-15.5	-0.5	34.3	51.0	54.0	-3.0	
16919.00	42.33	* Pk	38.8	-16.8	-0.5	34.3	64.1	74.0	-9.9	
16919.00	28.67	* Avg	38.8	-16.8	-0.5	34.3	50.4	54.0	-3.6	
2466.5										
4933.00	44.00	Pk	31.4	-7.0	-0.4	35.0	47.8	74.0	-26.2	
4933.00	27.17	Avg	31.4	-7.0	-0.4	35.0	31.0	54.0	-23.0	
7399.50	48.67	Pk	34.5	-10.6	-0.5	35.4	58.9	74.0	-15.1	
7399.50	28.00	Avg	34.5	-10.6	-0.5	35.4	38.2	54.0	-15.8	
9866.00	47.67	* Pk	36.8	-13.0	-0.5	35.5	62.5	74.0	-11.6	
9848.00	27.33	* Avg	36.8	-13.0	-0.5	35.5	42.1	54.0	-11.9	
12332.50	47.83	* Pk	39.0	-13.6	-0.5	34.3	66.6	74.0	-7.4	
12332.50	26.67	* Avg	39.0	-13.6	-0.5	34.3	45.4	54.0	-8.6	
14799.00	45.67	* Pk	41.9	-15.5	-0.5	34.3	69.3	74.0	-4.7	
14799.00	27.33	* Avg	41.9	-15.5	-0.5	34.3	51.0	54.0	-3.0	
17265.50	43.83	* Pk	41.9	-16.9	-0.5	34.3	68.8	74.0	-5.2	
17265.50	27.17	* Avg	41.9	-16.9	-0.5	34.3	52.2	54.0	-1.8	

EUT:	Accesslink	CUSTOMER NAME:					Wireless			
RULE PART:	15.247	WORK ORDER:					8041401			
		FILE:					8041401b.xls			
ANTENNA:	Horn	ATTN dB: 0								
		DUTY dB: 0								
TESTED BY:	Donnie	HP IL dB: 0								
COMMENT:	COMSAT RSI	DIST dB: 0								
	21 dBi Solid parabolic									
FREQ.	READING		Pk	A.F.	Cbl	FLTR	AMP	TOTAL,	LIMIT	DELTA
MHz	dB(uV)	NF	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
2417										
4834.00	44.33		Pk	31.4	-7.0	-0.4	35.0	48.1	74.0	-25.9
4834.00	25.00		Avg	31.4	-7.0	-0.4	35.0	28.8	54.0	-25.2
7251.00	49.00	*	Pk	34.5	-10.6	-0.5	35.5	59.1	74.0	-14.9
7251.00	26.67	*	Avg	34.5	-10.6	-0.5	35.5	36.8	54.0	-17.2
9668.00	47.50	*	Pk	36.8	-13.0	-0.5	35.5	62.3	74.0	-11.7
9668.00	26.83	*	Avg	36.8	-13.0	-0.5	35.5	41.6	54.0	-12.4
12085.00	47.17	*	Pk	39.0	-13.6	-0.5	34.3	65.9	74.0	-8.1
12085.00	25.83	*	Avg	39.0	-13.6	-0.5	34.3	44.6	54.0	-9.4
14502.00	42.00	*	Pk	41.9	-15.5	-0.5	34.3	65.6	74.0	-8.4
14502.00	25.67	*	Avg	41.9	-15.5	-0.5	34.3	49.3	54.0	-4.7
16919.00	43.17	*	Pk	38.8	-16.8	-0.5	34.3	64.9	74.0	-9.1
16919.00	27.67	*	Avg	38.8	-16.8	-0.5	34.3	49.4	54.0	-4.6
2466.5										
4933.00	43.83		Pk	31.4	-7.0	-0.4	35.0	47.6	74.0	-26.4
4933.00	25.00		Avg	31.4	-7.0	-0.4	35.0	28.8	54.0	-25.2
7399.50	48.50		Pk	34.5	-10.6	-0.5	35.4	58.7	74.0	-15.3
7399.50	27.50		Avg	34.5	-10.6	-0.5	35.4	37.7	54.0	-16.3
9866.00	48.50	*	Pk	36.8	-13.0	-0.5	35.5	63.3	74.0	-10.7
9848.00	27.50	*	Avg	36.8	-13.0	-0.5	35.5	42.3	54.0	-11.7
12332.50	48.83	*	Pk	39.0	-13.6	-0.5	34.3	67.6	74.0	-6.4
12332.50	28.33	*	Avg	39.0	-13.6	-0.5	34.3	47.1	54.0	-6.9
14799.00	39.33	*	Pk	41.9	-15.5	-0.5	34.3	63.0	74.0	-11.0
14799.00	27.33	*	Avg	41.9	-15.5	-0.5	34.3	51.0	54.0	-3.0
17265.50	47.83	*	Pk	41.9	-16.9	-0.5	34.3	72.8	74.0	-1.2
17265.50	27.17	*	Avg	41.9	-16.9	-0.5	34.3	52.2	54.0	-1.8

EUT:	Accesslink	CUSTOMER NAME:					Wireless			
RULE PART:	15.247	WORK ORDER:					8041401			
		FILE:					8041401c.xls			
ANTENNA:	Horn	ATTN dB: 0								
		DUTY dB: 0								
TESTED BY:	Donnie	HP IL dB: 0								
COMMENT:	California Amplifier	DIST dB: 0								
	24 dBi QLP parabolic									
FREQ.	READING		Pk	A.F.	Cbl	FLTR	AMP	TOTAL,	LIMIT	DELTA
MHz	dB(uV)	NF	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
2417										
4834.00	43.17		Pk	31.4	-7.0	-0.4	35.0	47.0	74.0	-27.0
4834.00	25.33		Avg	31.4	-7.0	-0.4	35.0	29.1	54.0	-24.9
7251.00	47.50	*	Pk	34.5	-10.6	-0.5	35.5	57.6	74.0	-16.4
7251.00	27.83	*	Avg	34.5	-10.6	-0.5	35.5	38.0	54.0	-16.0
9668.00	47.33	*	Pk	36.8	-13.0	-0.5	35.5	62.1	74.0	-11.9
9668.00	29.33	*	Avg	36.8	-13.0	-0.5	35.5	44.1	54.0	-9.9
12085.00	48.67	*	Pk	39.0	-13.6	-0.5	34.3	67.4	74.0	-6.6
12085.00	28.50	*	Avg	39.0	-13.6	-0.5	34.3	47.3	54.0	-6.7
14502.00	43.00	*	Pk	41.9	-15.5	-0.5	34.3	66.6	74.0	-7.4
14502.00	27.00	*	Avg	41.9	-15.5	-0.5	34.3	50.6	54.0	-3.4
16919.00	43.17	*	Pk	38.8	-16.8	-0.5	34.3	64.9	74.0	-9.1
16919.00	27.67	*	Avg	38.8	-16.8	-0.5	34.3	49.4	54.0	-4.6
2466.5										
4933.00	44.33		Pk	31.4	-7.0	-0.4	35.0	48.1	74.0	-25.9
4933.00	26.67		Avg	31.4	-7.0	-0.4	35.0	30.5	54.0	-23.5
7399.50	48.17		Pk	34.5	-10.6	-0.5	35.4	58.4	74.0	-15.6
7399.50	27.50		Avg	34.5	-10.6	-0.5	35.4	37.7	54.0	-16.3
9866.00	48.33	*	Pk	36.8	-13.0	-0.5	35.5	63.1	74.0	-10.9
9848.00	27.83	*	Avg	36.8	-13.0	-0.5	35.5	42.6	54.0	-11.4
12332.50	48.67	*	Pk	39.0	-13.6	-0.5	34.3	67.4	74.0	-6.6
12332.50	27.83	*	Avg	39.0	-13.6	-0.5	34.3	46.6	54.0	-7.4
14799.00	44.50	*	Pk	41.9	-15.5	-0.5	34.3	68.1	74.0	-5.9
14799.00	28.33	*	Avg	41.9	-15.5	-0.5	34.3	52.0	54.0	-2.0
17265.50	45.50	*	Pk	41.9	-16.9	-0.5	34.3	70.5	74.0	-3.5
17265.50	26.83	*	Avg	41.9	-16.9	-0.5	34.3	51.8	54.0	-2.2

EUT:	Accesslink	CUSTOMER NAME:					Wireless			
RULE PART:	15.247	WORK ORDER:					8041401			
		FILE:					8041401d.xls			
ANTENNA:	Horn	ATTN dB: 0								
		DUTY dB: 0								
TESTED BY:	Donnie	HP IL dB: 0								
COMMENT:	Andrew	DIST dB: 0								
	24 dBi Grid parabolic									
FREQ.	READING	Pk	A.F.	Cbl	FLTR	AMP	TOTAL,	LIMIT	DELTA	
MHz	dB(uV)	NF or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB	
2417										
4834.00	44.50	Pk	31.4	-7.0	-0.4	35.0	48.3	74.0	-25.7	
4834.00	26.67	Avg	31.4	-7.0	-0.4	35.0	30.5	54.0	-23.5	
7251.00	47.17	* Pk	34.5	-10.6	-0.5	35.5	57.3	74.0	-16.7	
7251.00	28.83	* Avg	34.5	-10.6	-0.5	35.5	39.0	54.0	-15.0	
9668.00	48.17	* Pk	36.8	-13.0	-0.5	35.5	63.0	74.0	-11.1	
9668.00	27.83	* Avg	36.8	-13.0	-0.5	35.5	42.6	54.0	-11.4	
12085.00	48.17	* Pk	39.0	-13.6	-0.5	34.3	66.9	74.0	-7.1	
12085.00	29.17	* Avg	39.0	-13.6	-0.5	34.3	47.9	54.0	-6.1	
14502.00	43.33	* Pk	41.9	-15.5	-0.5	34.3	67.0	74.0	-7.0	
14502.00	27.83	* Avg	41.9	-15.5	-0.5	34.3	51.5	54.0	-2.5	
16919.00	44.83	* Pk	38.8	-16.8	-0.5	34.3	66.6	74.0	-7.4	
16919.00	28.17	* Avg	38.8	-16.8	-0.5	34.3	49.9	54.0	-4.1	
2466.5										
4933.00	44.50	Pk	31.4	-7.0	-0.4	35.0	48.3	74.0	-25.7	
4933.00	25.67	Avg	31.4	-7.0	-0.4	35.0	29.5	54.0	-24.5	
7399.50	47.67	Pk	34.5	-10.6	-0.5	35.4	57.9	74.0	-16.1	
7399.50	28.17	Avg	34.5	-10.6	-0.5	35.4	38.4	54.0	-15.6	
9866.00	47.33	* Pk	36.8	-13.0	-0.5	35.5	62.1	74.0	-11.9	
9848.00	27.50	* Avg	36.8	-13.0	-0.5	35.5	42.3	54.0	-11.7	
12332.50	47.33	* Pk	39.0	-13.6	-0.5	34.3	66.1	74.0	-7.9	
12332.50	27.50	* Avg	39.0	-13.6	-0.5	34.3	46.3	54.0	-7.7	
14799.00	43.50	* Pk	41.9	-15.5	-0.5	34.3	67.1	74.0	-6.9	
14799.00	27.50	* Avg	41.9	-15.5	-0.5	34.3	51.1	54.0	-2.9	
17265.50	43.67	* Pk	41.9	-16.9	-0.5	34.3	68.7	74.0	-5.3	
17265.50	28.33	* Avg	41.9	-16.9	-0.5	34.3	53.3	54.0	-0.7	

EUT:	Accesslink	CUSTOMER NAME:					Wireless			
RULE PART:	15.247	WORK ORDER:					8041401			
		FILE:					8041401e.xls			
ANTENNA:	Horn	ATTN dB: 0								
		DUTY dB: 0								
TESTED BY:	Donnie	HP IL dB: 0								
COMMENT:	Gabriel	DIST dB: 0								
	21 dBi Solid parabolic									
FREQ.	READING		Pk	A.F.	Cbl	FLTR	AMP	TOTAL,	LIMIT	DELTA
MHz	dB(uV)	NF	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
2417										
4834.00	42.17		Pk	31.4	-7.0	-0.4	35.0	46.0	74.0	-28.0
4834.00	26.83		Avg	31.4	-7.0	-0.4	35.0	30.6	54.0	-23.4
7251.00	48.67	*	Pk	34.5	-10.6	-0.5	35.5	58.8	74.0	-15.2
7251.00	29.17	*	Avg	34.5	-10.6	-0.5	35.5	39.3	54.0	-14.7
9668.00	46.83	*	Pk	36.8	-13.0	-0.5	35.5	61.6	74.0	-12.4
9668.00	26.83	*	Avg	36.8	-13.0	-0.5	35.5	41.6	54.0	-12.4
12085.00	48.17	*	Pk	39.0	-13.6	-0.5	34.3	66.9	74.0	-7.1
12085.00	27.67	*	Avg	39.0	-13.6	-0.5	34.3	46.4	54.0	-7.6
14502.00	43.67	*	Pk	41.9	-15.5	-0.5	34.3	67.3	74.0	-6.7
14502.00	28.00	*	Avg	41.9	-15.5	-0.5	34.3	51.6	54.0	-2.4
16919.00	44.83	*	Pk	38.8	-16.8	-0.5	34.3	66.6	74.0	-7.4
16919.00	27.67	*	Avg	38.8	-16.8	-0.5	34.3	49.4	54.0	-4.6
2466.5										
4933.00	43.67		Pk	31.4	-7.0	-0.4	35.0	47.5	74.0	-26.5
4933.00	25.17		Avg	31.4	-7.0	-0.4	35.0	29.0	54.0	-25.0
7399.50	49.67		Pk	34.5	-10.6	-0.5	35.4	59.9	74.0	-14.1
7399.50	27.17		Avg	34.5	-10.6	-0.5	35.4	37.4	54.0	-16.6
9866.00	48.83	*	Pk	36.8	-13.0	-0.5	35.5	63.6	74.0	-10.4
9848.00	28.17	*	Avg	36.8	-13.0	-0.5	35.5	43.0	54.0	-11.1
12332.50	47.83	*	Pk	39.0	-13.6	-0.5	34.3	66.6	74.0	-7.4
12332.50	28.67	*	Avg	39.0	-13.6	-0.5	34.3	47.4	54.0	-6.6
14799.00	38.50	*	Pk	41.9	-15.5	-0.5	34.3	62.1	74.0	-11.9
14799.00	29.33	*	Avg	41.9	-15.5	-0.5	34.3	53.0	54.0	-1.0
17265.50	47.67	*	Pk	41.9	-16.9	-0.5	34.3	72.7	74.0	-1.3
17265.50	27.33	*	Avg	41.9	-16.9	-0.5	34.3	52.3	54.0	-1.7

EUT:	Accesslink	CUSTOMER NAME:						Wireless		
RULE PART:	15.247	WORK ORDER:						8041401		
		FILE:						8041401f.xls		
ANTENNA:	Horn	ATTN dB: 0								
		DUTY dB: 0								
TESTED BY:	Donnie	HP IL dB: 0								
COMMENT:	Gabriel	DIST dB: 0								
	17 dBi Panel									
FREQ.	READING		Pk	A.F.	Cbl	FLTR	AMP	TOTAL,	LIMIT	DELTA
MHz	dB(uV)	NF	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
2417										
4834.00	43.50		Pk	31.4	-7.0	-0.4	35.0	47.3	74.0	-26.7
4834.00	25.50		Avg	31.4	-7.0	-0.4	35.0	29.3	54.0	-24.7
7251.00	47.33	*	Pk	34.5	-10.6	-0.5	35.5	57.5	74.0	-16.5
7251.00	28.67	*	Avg	34.5	-10.6	-0.5	35.5	38.8	54.0	-15.2
9668.00	47.33	*	Pk	36.8	-13.0	-0.5	35.5	62.1	74.0	-11.9
9668.00	27.50	*	Avg	36.8	-13.0	-0.5	35.5	42.3	54.0	-11.7
12085.00	47.00	*	Pk	39.0	-13.6	-0.5	34.3	65.8	74.0	-8.2
12085.00	28.00	*	Avg	39.0	-13.6	-0.5	34.3	46.8	54.0	-7.2
14502.00	42.50	*	Pk	41.9	-15.5	-0.5	34.3	66.1	74.0	-7.9
14502.00	27.83	*	Avg	41.9	-15.5	-0.5	34.3	51.5	54.0	-2.5
16919.00	41.83	*	Pk	38.8	-16.8	-0.5	34.3	63.6	74.0	-10.4
16919.00	28.00	*	Avg	38.8	-16.8	-0.5	34.3	49.8	54.0	-4.2
2466.5										
4933.00	44.33		Pk	31.4	-7.0	-0.4	35.0	48.1	74.0	-25.9
4933.00	26.00		Avg	31.4	-7.0	-0.4	35.0	29.8	54.0	-24.2
7399.50	48.17		Pk	34.5	-10.6	-0.5	35.4	58.4	74.0	-15.6
7399.50	29.00		Avg	34.5	-10.6	-0.5	35.4	39.2	54.0	-14.8
9866.00	47.17	*	Pk	36.8	-13.0	-0.5	35.5	62.0	74.0	-12.1
9848.00	27.83	*	Avg	36.8	-13.0	-0.5	35.5	42.6	54.0	-11.4
12332.50	48.50	*	Pk	39.0	-13.6	-0.5	34.3	67.3	74.0	-6.7
12332.50	28.00	*	Avg	39.0	-13.6	-0.5	34.3	46.8	54.0	-7.2
14799.00	43.17	*	Pk	41.9	-15.5	-0.5	34.3	66.8	74.0	-7.2
14799.00	27.17	*	Avg	41.9	-15.5	-0.5	34.3	50.8	54.0	-3.2
17265.50	43.50	*	Pk	41.9	-16.9	-0.5	34.3	68.5	74.0	-5.5
17265.50	27.50	*	Avg	41.9	-16.9	-0.5	34.3	52.5	54.0	-1.5

EUT:	Accesslink	CUSTOMER NAME:						Wireless		
RULE PART:	15.247	WORK ORDER:						8041401		
		FILE:						8041401g.xls		
ANTENNA:	Horn	ATTN dB: 0								
		DUTY dB: 0								
TESTED BY:	Donnie	HP IL dB: 0								
COMMENT:	Cushcraft	DIST dB: 0								
	7 dBi Panel									
FREQ.	READING	Pk	A.F.	Cbl	FLTR	AMP	TOTAL,	LIMIT	DELTA	
MHz	dB(uV)	NF or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB	
2417										
4834.00	33.83	Pk	31.4	-7.0	-0.4	35.0	37.6	74.0	-36.4	
4834.00	25.67	Avg	31.4	-7.0	-0.4	35.0	29.5	54.0	-24.5	
7251.00	48.50	* Pk	34.5	-10.6	-0.5	35.5	58.6	74.0	-15.4	
7251.00	27.83	* Avg	34.5	-10.6	-0.5	35.5	38.0	54.0	-16.0	
9668.00	47.33	* Pk	36.8	-13.0	-0.5	35.5	62.1	74.0	-11.9	
9668.00	28.17	* Avg	36.8	-13.0	-0.5	35.5	43.0	54.0	-11.1	
12085.00	47.67	* Pk	39.0	-13.6	-0.5	34.3	66.4	74.0	-7.6	
12085.00	28.67	* Avg	39.0	-13.6	-0.5	34.3	47.4	54.0	-6.6	
14502.00	43.00	* Pk	41.9	-15.5	-0.5	34.3	66.6	74.0	-7.4	
14502.00	28.17	* Avg	41.9	-15.5	-0.5	34.3	51.8	54.0	-2.2	
16919.00	42.67	* Pk	38.8	-16.8	-0.5	34.3	64.4	74.0	-9.6	
16919.00	27.00	* Avg	38.8	-16.8	-0.5	34.3	48.8	54.0	-5.2	
2466.5										
4933.00	45.00	Pk	31.4	-7.0	-0.4	35.0	48.8	74.0	-25.2	
4933.00	24.50	Avg	31.4	-7.0	-0.4	35.0	28.3	54.0	-25.7	
7399.50	49.00	Pk	34.5	-10.6	-0.5	35.4	59.2	74.0	-14.8	
7399.50	27.17	Avg	34.5	-10.6	-0.5	35.4	37.4	54.0	-16.6	
9866.00	48.83	* Pk	36.8	-13.0	-0.5	35.5	63.6	74.0	-10.4	
9848.00	28.00	* Avg	36.8	-13.0	-0.5	35.5	42.8	54.0	-11.2	
12310.00	46.83	* Pk	39.0	-13.6	-0.5	34.3	65.6	74.0	-8.4	
12332.50	26.50	* Avg	39.0	-13.6	-0.5	34.3	45.3	54.0	-8.7	
14799.00	44.50	* Pk	41.9	-15.5	-0.5	34.3	68.1	74.0	-5.9	
14799.00	28.17	* Avg	41.9	-15.5	-0.5	34.3	51.8	54.0	-2.2	
17265.50	45.83	* Pk	41.9	-16.9	-0.5	34.3	70.8	74.0	-3.2	
17265.50	26.00	* Avg	41.9	-16.9	-0.5	34.3	51.0	54.0	-3.0	

EUT:	Accesslink	CUSTOMER NAME:						Wireless		
RULE PART:	15.247	WORK ORDER:						8041401		
		FILE:						8041401h.xls		
ANTENNA:	Horn	ATTN dB: 0								
		DUTY dB: 0								
TESTED BY:	Donnie	HP IL dB: 0								
COMMENT:	Gabriel	DIST dB: 0								
	26 dBi Grid Parabolic									
FREQ.	READING		Pk	A.F.	Cbl	FLTR	AMP	TOTAL,	LIMIT	DELTA
MHz	dB(uV)	NF	or Av	dB	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB
2417										
4834.00	44.00		Pk	31.4	-7.0	-0.4	35.0	47.8	74.0	-26.2
4834.00	26.33		Avg	31.4	-7.0	-0.4	35.0	30.1	54.0	-23.9
7251.00	48.17	*	Pk	34.5	-10.6	-0.5	35.5	58.3	74.0	-15.7
7251.00	28.17	*	Avg	34.5	-10.6	-0.5	35.5	38.3	54.0	-15.7
9668.00	47.00	*	Pk	36.8	-13.0	-0.5	35.5	61.8	74.0	-12.2
9668.00	28.33	*	Avg	36.8	-13.0	-0.5	35.5	43.1	54.0	-10.9
12085.00	48.67	*	Pk	39.0	-13.6	-0.5	34.3	67.4	74.0	-6.6
12085.00	28.00	*	Avg	39.0	-13.6	-0.5	34.3	46.8	54.0	-7.2
14502.00	37.33	*	Pk	41.9	-15.5	-0.5	34.3	61.0	74.0	-13.0
14502.00	22.17	*	Avg	41.9	-15.5	-0.5	34.3	45.8	54.0	-8.2
16919.00	43.17	*	Pk	38.8	-16.8	-0.5	34.3	64.9	74.0	-9.1
16919.00	28.50	*	Avg	38.8	-16.8	-0.5	34.3	50.3	54.0	-3.7
2466.5										
4933.00	44.83		Pk	31.4	-7.0	-0.4	35.0	48.6	74.0	-25.4
4933.00	24.83		Avg	31.4	-7.0	-0.4	35.0	28.6	54.0	-25.4
7399.50	47.67		Pk	34.5	-10.6	-0.5	35.4	57.9	74.0	-16.1
7399.50	27.50		Avg	34.5	-10.6	-0.5	35.4	37.7	54.0	-16.3
9866.00	46.83	*	Pk	36.8	-13.0	-0.5	35.5	61.6	74.0	-12.4
9848.00	27.67	*	Avg	36.8	-13.0	-0.5	35.5	42.5	54.0	-11.6
12310.00	48.50	*	Pk	39.0	-13.6	-0.5	34.3	67.3	74.0	-6.7
12332.50	28.33	*	Avg	39.0	-13.6	-0.5	34.3	47.1	54.0	-6.9
14799.00	45.00	*	Pk	41.9	-15.5	-0.5	34.3	68.6	74.0	-5.4
14799.00	26.83	*	Avg	41.9	-15.5	-0.5	34.3	50.5	54.0	-3.5
17265.50	43.83	*	Pk	41.9	-16.9	-0.5	34.3	68.8	74.0	-5.2
17265.50	27.50	*	Avg	41.9	-16.9	-0.5	34.3	52.5	54.0	-1.5

APPENDIX C

15.209 Radiated Emissions Data

Electronic Compliance Laboratories, Inc.
1249 Birchwood Ave.
Sunnyvale, CA

Radiated Emissions
Frequency range: 30MHz-1000MHz

3 Meter Open Site
Site Calibrated: June 1997

Government Agency and Limit: FCC Class B

QP = Quasi-Peak Note: Ignore peak readings when Quasi-Peak reading exists
PK = Peak

Customer: WIRELESS, INC Operator: DONNIE
Date: 04-15-1998 Time: 16:15:28
Temperature Range: 75 Deg F Percent Humidity: 35
E.U.T.: ACCESSLINK
Serial Number:
Support Devices: HP Power Supply
Modifications: None
Report File Name: F:\TESTDATA\8041001.RF

Antenna Type: BICONICAL

TEST FREQ =====	TEST dBuV =====	ACTUAL dBuV/m =====	CLASS B LIMIT =====	VERSUS B LIMIT =====	TABLE DEGREES =====	ANTENNA HEIGHT =====	POLAR- IZATION =====	DETECTOR Type =====
196.610	38.2	29.8	43.5	-13.7	180	1.5	H	PK
213.000	36.8	28.9	43.5	-14.6	60	1.5	H	PK
245.760	50.9	43.3	46.0	-2.7	270	1.3	H	PK
245.760	50.4	42.8	46.0	-3.2	270	1.3	H	QP
257.795	31.9	24.8	46.0	-21.2	90	1.3	H	PK
259.365	35.0	27.9	46.0	-18.1	45	1.2	H	PK
262.145	31.9	25.1	46.0	-20.9	270	1.2	H	PK
278.545	37.5	32.0	46.0	-14.0	180	1.3	H	PK
108.080	47.7	35.4	43.5	-8.1	0	1.0	V	PK
245.760	43.0	35.4	46.0	-10.6	180	1.	V	PK
278.540	33.0	27.5	46.0	-18.5	315	1.0	V	PK

CHANGED ANTENNA TO LOG PERIODIC

311.320	33.4	24.6	46.0	-21.4	0	1.0	H	PK
344.060	38.3	29.7	46.0	-16.3	180	1.0	H	PK
376.820	36.5	28.2	46.0	-17.8	90	1.0	H	PK
393.120	39.6	31.3	46.0	-14.7	270	1.0	H	PK
409.605	41.6	33.8	46.0	-12.2	0	1.0	H	PK
589.830	38.4	35.0	46.0	-11.0	270	1.0	H	PK
622.600	35.2	33.7	46.0	-12.3	225	1.0	H	PK
671.770	37.7	36.1	46.0	-9.9	90	1.0	H	PK
688.140	37.1	36.0	46.0	-10.0	30	1.2	H	PK
720.900	36.7	36.2	46.0	-9.8	45	1.0	H	PK
802.810	41.9	41.9	46.0	-4.1	315	1.0	H	PK
802.810	40.0	40.0	46.0	-6.0	315	1.0	H	QP

TEST FREQ =====	TEST dBuV =====	ACTUAL dBuV/m =====	CLASS B LIMIT =====	VERSUS B LIMIT =====	TABLE DEGREES =====	ANTENNA HEIGHT =====	POLAR- IZATION =====	DETECTOR Type =====
802.830	39.4	39.4	46.0	-6.6	270	1.0	V	PK
770.040	38.3	39.7	46.0	-6.3	315	1.0	V	PK
770.040	38.1	39.5	46.0	-6.5	315	1.0	H	PK
720.900	39.3	38.8	46.0	-7.2	0	1.0	V	PK
688.140	34.8	33.7	46.0	-12.3	180	1.0	V	PK
671.770	38.9	37.3	46.0	-8.7	0	1.2	V	PK
622.590	38.2	36.7	46.0	-9.3	180	1.2	V	PK
589.830	44.5	41.1	46.0	-4.9	180	1.3	V	PK
589.830	41.1	37.7	46.0	-8.3	180	1.3	V	QP
409.600	47.0	39.2	46.0	-6.8	180	1.3	V	PK
393.220	39.6	31.3	46.0	-14.7	180	1.5	V	PK
376.830	35.0	26.7	46.0	-19.3	225	1.2	V	PK
344.070	39.5	30.9	46.0	-15.1	180	2.0	V	PK
311.320	36.8	28.0	46.0	-18.0	0	1.0	V	PK

APPENDIX D

Antenna and Connector Drawings

2.3 - 2.5 GHz (Continued)

2.2 - 2.5 GHz (Continued)

NEW

Type	Number	Diameter ft (m)	Input Flanges	Gain, dBi			Beamwidth Degrees	Cross Pol Disc., dB	F/D Ratio dB	VSWR max (R.L., dB)
				Bottom	Mid-Band	Top				
GRIDPAK® Antennas - Rural Telephony										
Unpressurized Single Polarized	KPR3F-23	3 (0.9)	Type N Female	24.2	23.6	23.6	8.7V/7.9H	25	24	1.35 (16.5)
	KPR4F-23	4 (1.2)	or 7/8" EIA	27.3	27.8	27.6	6.4V/6.4H	28	30	1.35 (16.5)
	KPR6F-23	6 (1.8)	F Flange Female	30.9	31.4	31.3	4.2V/4.2H	30	35	1.35 (16.5)
	KPR8F-23	8 (2.4)	7-16 DIN Female	32.6	32.5	32.9	3.4V/3.4H	30	36	1.30 (17.7)
	KPR10F-23	10 (3.0)		34.0	33.8	34.1	2.9V/2.9H	30	38	1.30 (17.7)
	KPR13F-23	13 (4.0)		36.6	37.0	37.1	2.3V/2.3H	30	40	1.30 (17.7)

2.45 - 2.5 GHz

2.45 - 2.5 GHz											
Type	Diameter	Input	Regulatory	Gain, dBi	Beamwidth	Cross	F/B	VSWR			
Number	ft (m)	Flanges	Compliance†	Bottom	Mid-Band	Top	Pol. Disc., dB	Ratio	max.		
								dB	(R.L., dB)		
Standard Antennas											
F-Series	PF6-24C	6 (1.8)	"F"	B	30.9	31.0	31.1	4.3	28	36	1.30 (17.7)
Unpressurized	PF8-24C	8 (2.4)	Flange	A	33.4	33.5	33.6	3.2	28	39	1.30 (17.7)
Single Polarized			Female								

† U.S. FCC Part 94

2.48 - 2.7 GHz

2.48 - 2.7 GHz

Type Number	Diameter ft (m)	Input Flanges	Regulatory Compliance†	Bottom	Gain dBi Mid-Band	Top	Beamwidth Degrees	Cross Pol. Disc., dB	F/D Ratio dB	VSWR max. (R.L., dB)
 High Performance Antennas – Hypalon (Except 4 ft Is TEGLAR®) Radome Included										
Air Dielectric	HP4-25A	4 (1.2)	7/8" EIA	-	27.0	27.3	27.6	6.7	30	43 1.15 (23.1)
Single	HP6-25E	6 (1.8)		-	31.2	31.5	31.8	4.6	28	50 1.10 (26.4)
Polarized	HP8-25D	8 (2.4)		-	33.7	34.0	34.3	3.1	30	52 1.08 (28.3)
	HP10-25D	10 (3.0)		-	35.7	36.0	36.3	2.7	30	55 1.08 (28.3)
	HP12-25D	12 (3.7)		-	37.2	37.5	37.8	2.3	30	54 1.08 (28.3)

Focal Plane Antennas

FPX												
Air Dielectric	FP4-25D	4 (1.2)	7/8" EIA	-	26.9	27.2	27.6	7.2	30	41	1.20 (20.8)	
Single	FP6-25D	6 (1.8)		-	30.6	30.7	31.1	4.9	28	44	1.15 (23.1)	
Polarized	FP8-25D	8 (2.4)		-	33.0	33.5	33.6	3.9	30	52	1.10 (26.4)	
	FP10-25D	10 (3.0)		-	35.3	35.6	35.9	3.2	30	55	1.08 (28.3)	
	FP12-25D	12 (3.7)		-	36.6	37.0	37.4	2.6	30	57	1.08 (28.3)	
Air Dielectric	FPX6-25C	6 (1.8)	7/8" EIA	-	29.6	30.0	30.3	5.0	27	42	1.15 (23.1)	
Dual	FPX8-25C	8 (2.4)		-	32.3	32.6	32.7	3.9	27	52	1.10 (26.4)	
Polarized	FPX10-25C	10 (3.0)		-	34.2	34.6	34.9	3.1	30	54	1.08 (28.3)	
	FPX12-25C	12 (3.7)		-	35.9	36.3	36.8	2.6	30	56	1.08 (28.3)	
F-Series	FP4F-25D	4 (1.2)	"F"	-	26.8	27.1	27.5	7.2	30	41	1.30 (17.7)	
Unpressurized	FP6F-25D	6 (1.8)	Flange	-	30.5	30.6	31.0	4.9	28	44	1.25 (19.0)	
Single	FP8F-25D	8 (2.4)	Female	-	32.8	33.4	33.5	3.9	30	52	1.20 (20.8)	
Polarized	FP10F-25D	10 (3.0)		-	35.2	35.5	35.8	3.2	30	55	1.16 (23.1)	
	FP12F-25D	12 (3.7)		-	36.5	36.9	37.3	2.6	30	57	1.15 (23.1)	

* Safety U.S. FCC requirements on Parts 94 and 74. † Part 94

Continued on next page

• U.K. 0800-250055 • Republic of Ireland 1-800-535358 • Australia 1800-803 219 • New Zealand 0800-441-747

ANDREW

75



QLP PARABOLIC ANTENNA ASSEMBLY

21 dBi

PRODUCT SPECIFICATION

Part Number: 130093/130120

ELECTRICAL

	2150-2162 MHz	2400-2483 MHz	2500-2700 MHz
Frequency Range	2150-2162 MHz	2400-2483 MHz	2500-2700 MHz
Gain	19 dB $\pm$ 1 dB	20.5 $\pm$ 1 dB	21 dB $\pm$ 1 dB
Efficiency	43% Typical	44% Typical	45% Typical
VSWR	1.5:1 Max.	1.5:1 Max.	1.5:1 Max.
3-dB Beamwidth	14.8° $\pm$ 1.2°	13.0° $\pm$ 1.5°	12.5° $\pm$ 1.5°
Side Lobe Level	-18 dB $\pm$ 2 dB	-19 dB $\pm$ 3 dB	-19 dB $\pm$ 3 dB
Front to Back Ratio			
over near hemisphere	18 dB Min.	18 dB Min.	18 dB Min.
at 180 degrees	22 dB Min.	25 dB Min.	27 dB Min.
Polarization	Vertical or Horizontal		
Cross Polarization Rejection	25 dB Min.	25 dB Min.	28 dB Min.

MECHANICAL

Reflector Type	Wire Grid Parabola
Size	20" x 24"
Weight	3.6 lbs
Surface Accuracy	0.05" RMS
Focal Length	11"
F/D Ratio	0.46 - 0.56
Feed Type	Quasi Log Periodic End Fire Array
Mounting	Stainless Steel Hardware for 3/4"-2" O.D. Mast
Azimuth Adjustment	Continuous
Finish	Powder Coat Paint, Gray
Connector	"N" Type Male Environmentally Sealed

ENVIRONMENTAL

Operating Temperature	-40°C to +80°C
Humidity	100%

PRODUCTION TESTING

VSWR	100%
Water Leakage	100%

California Amplifier, Inc. Subject to change without notice.
 460 Calle San Pablo, Camarillo, CA 93012 Tel: (805) 987-9000 FAX: (805) 987-8539
 European & Middle East Sales: California Amplifier s.a.r.l., 15 rue de la belle borne B.P. 10 003
 95722 Roissy Airport CDG Cedex, FRANCE Tel: (33) 1 49 19 89 20 FAX: (33) 1 48 64 52 55

SPEC FORM: M130093
 REV: B
 DATE: 10/96

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QLP PARABOLIC ANTENNA ASSEMBLY

24 dBi

PRODUCT SPECIFICATION

Part Number: 130094/130135

ELECTRICAL

Frequency Range	2150-2162 MHz	2400-2483 MHz	2500-2700 MHz
Gain	22 dB $\pm$ 1 dB	23.5 $\pm$ 1 dB	24 dB $\pm$ 1 dB
Efficiency	47% Typical	48% Typical	50% Typical
VSWR	1.5:1 Max.	1.5:1 Max.	1.5:1 Max.
3-dB Beamwidth	12.5° $\pm$ 0.5°	10.0° $\pm$ 1.0°	9.75° $\pm$ 0.75°
Side Lobe Level	-18 dB $\pm$ 2 dB	-20 $\pm$ 3 dB	-20 dB $\pm$ 3 dB
Front to Back Ratio			
over rear hemisphere	21 dB Min.	21 dB Min.	21 dB Min.
at 180 degrees	28 dB Min.	28 dB Min.	28 dB Min.
Polarization	Vertical or Horizontal		
Cross Polarization Rejection	28 dB Min.	28 dB Min.	28 dB Min.

MECHANICAL

Reflector Type	Wire Grid Parabola
Size	27" x 31.5"
Weight	5.3 lbs
Surface Accuracy	0.05" RMS
Focal Length	15"
F/D Ratio	0.46 - 0.56
Feed Type	Quasi Log Periodic End Fire Array
Mounting	Stainless Steel Hardware for 3/4"-2" O.D. Mast
Azimuth Adjustment	Continuous
Finish	Powder Coat Paint, Gray
Connector	"N" Type Male Environmentally Sealed

ENVIRONMENTAL

Operating Temperature	-40°C to +80°C
Humidity	100%

PRODUCTION TESTING

VSWR	100%
Water Leakage	100%

California Amplifier, Inc. Subject to change without notice.
480 Calle San Pablo, Camarillo, CA 93012 Tel: (805) 987-9000 FAX: (805) 987-8539
European & Middle East Sales: California Amplifier s.r.l., 15 rue de la belle borne B.P. 10 003
95722 Roissy Aeroport CDG Cedex, FRANCE Tel: (33) 1 49 19 89 20 FAX: (33) 1 48 64 52 55

SPEC FORM: M130094
REV: B
DATE: 10/96

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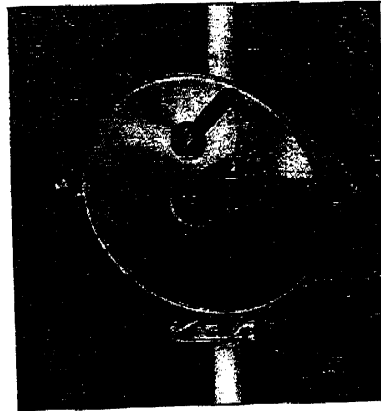
COMSAT
Wireless Antennas

SPREAD SPECTRUM ANTENNAS

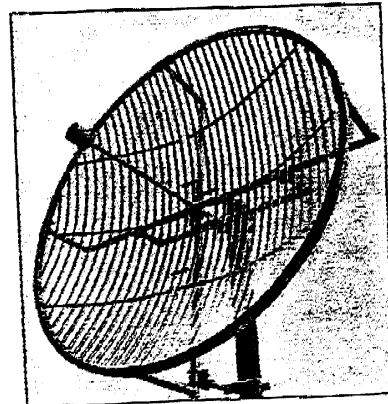
Demand for Spread spectrum radios is increasing dramatically with the wide range of applications around the world. Quick installation and cost-efficiency are some of the driving factors for radio and antenna selection.

COMSAT RSI has a line of antennas specifically designed to meet the needs of Spread Spectrum systems with flexibility, budget considerations, ease-of-installation and application flexibility built in resulting in a lower system implementation cost.

With over 45 years of experience, the COMSAT RSI "Mark" antenna line is continually being improved to meet changing customer needs and is innovation you can rely on.



- High reliability in a cost efficient design
- Field changeable Horizontal / Vertical polarization
- Multiple connector options
- Grid and Compact Grid for ease of transportation
- Full range of spread spectrum frequencies





COMSAT RSL

Model Number	Size		Low	Gain (dBi)		HPBW (degrees)	F/B Ratio (dB)	XPD (dB)	VSWR (max)	Low VSWR
	ft	m		Midband	High					

875-960 MHz

Grid Antennas

P-8A48G†	4	1.2	19.1	19.5	19.9	17.75	21	40	1.5	NA
P-8A72G†	6	1.8	21.6	22	22.4	12.25	22	40	1.3	NA
P-8A96G†	8	2.4	23.9	24.5	24.7	9.5	24	40	1.3	NA
P-8A120G†	10	3.0	26.6	27	27.4	7.3	27	40	1.3	NA
P-8A144G†	12	3.7	27.5	27.9	28.3	6.4	28	40	1.3	NA
P-8A180G†	15	4.6	28.4	28.8	29.2	4.9	30	40	1.3	NA

2300-2500 MHz

Grid Antennas

P-24A36G†	3	.9	25.3	25.7	26	8.4	28	32	1.5	NA
P-24A48G†	4	1.2	26.8	27.5	27.7	6.75	34	40	1.3	1.15
P-24A72G†	6	1.8	30.1	30.8	31.1	4.4	37	30	1.3	1.10
P-24A96G†	8	2.4	32.6	33.5	33.8	3.5	38	32	1.1	1.08
P-24A120G†	10	3.0	34.7	35.1	35.6	2.8	42	32	1.1	1.08
P-24A144G†	12	3.7	36.1	36.8	37.3	2.4	40	31	1.1	1.08
P-24A180G†	15	4.6	38.1	38.6	39.1	1.9	48	30	1.1	1.08

Solid Antennas

P-24A24†	2	.6	20.7	21.1	21.5	14	35	24	1.5	1.30
P-24A48†	4	1.2	26.8	27.1	27.5	7.2	33	26	1.3	1.15
P-24A72†	6	1.8	30.3	30.6	31	4.8	36	26	1.3	1.10
P-24A96†	8	2.4	32.7	33.1	33.4	3.6	39	27	1.1	NA
P-24A120†	10	3.0	34.7	35.1	35.4	2.85	43	30	1.1	NA
P-24A144†	12	3.7	36.4	36.8	37.1	2.8	43	30	1.1	NA
P-24A180†	15	4.6	38.2	38.6	38.9	1.9	48	27	1.1	NA
S-24A4	4"	0.1	9.7	10.2	10.4	60	15	30	1.3	NA

5725-5850 MHz

Solid Antennas

P-57B24†	2	.6	28.9	29	29.1	5.8	39	30	1.15	NA
P-57B48†	4	1.2	34.6	34.7	34.8	2.8	41	30	1.15	NA
P-57B72†	6	1.8	38.1	38.2	38.3	2	46	30	1.1	NA
P-57A96†	8	2.4	40.7	40.8	40.9	1.45	52	30	1.08	NA
P-57A120†	10	3.0	42.4	42.5	42.6	1.2	52	30	1.06	NA
P-57C24††	2	.6	28.9	29	29.1	5.8	39	30	1.3	NA
P-57A48††	4	1.2	34.6	34.7	34.8	2.8	41	30	1.3	NA
P-57A72††	6	1.8	38.1	38.2	38.3	2	46	30	1.3	NA
P-57A96††	8	2.4	40.7	40.8	40.9	1.45	52	30	1.3	NA
P-57A120††	10	3.0	42.4	42.5	42.6	1.2	52	30	1.3	NA

† Available Flanges
 - 7/8 EIA (Pressurized)
 E 7/16 DIN (Unpressurized)
 F 7/8 EIA (Unpressurized)
 N N Female (Unpressurized)
 L 7/8 EIA (Pressurized) Low VSWR

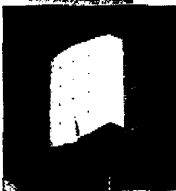
† Available Flanges
 N N Female (Unpressurized)
 E 7/16 DIN (Unpressurized)

†† Available Flange
 CPR 137G

TOTAL P.89

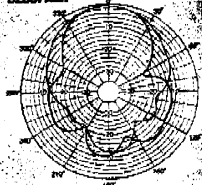
CONTEMPORARY PATCH

- Indoor / outdoor
- Attractive styling
- Articulating
- Wall mountable

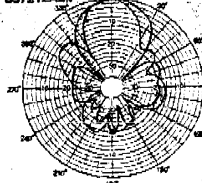


— E-Plane
— H-Plane

S2307AMP



S57212AMP



CUSHCRAFT
COMMUNICATIONS ANTENNAS

DirectLink™ Series Antennas

DirectLink has been designed to eliminate concerns over aesthetics in professional workplaces and neighborhoods. DirectLink's contemporary design and neutral color make it a perfect choice for these applications.

Ease of Installation

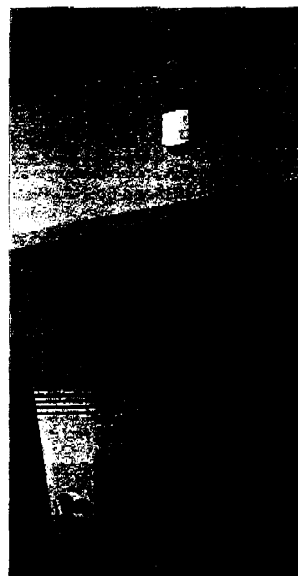
DirectLink is available in either a Standard Wall Mount or an Articulating Wall Mount Version. The Standard Wall Mount attaches flush to any interior or exterior wall surface. The Articulating Wall Mount allows the antenna to be wall mounted and adds the ability to steer the antenna's main lobe +/- 30 degrees in the horizontal plane. Adjustments can be made quickly and easily minimizing installation time while achieving peak performance. DirectLink's versatile mounting hardware kits not only allow the antenna to be mounted to virtually any structure available but they also allow the antenna's pattern to be directed precisely into the desired coverage area.

Both versions allow the feed cable to be routed to a terminal or base station mounted above or below the antenna and even allow the feed cable to be hidden behind the antenna and routed through the wall. In addition, the Standard Wall mount version may be mated with two optional mounting brackets for even greater installation flexibility. The Mast Mount Bracket is used for installations on masts from 1 to 2.5 inches (25 mm to 64 mm) in diameter. The Universal Mount Bracket permits up to 210 degrees of tilt and 360 degrees of rotation for main lobe steering and can be attached to a mast or a flat surface. Both mounts are suitable for indoor and outdoor installations.

Performance and Durability

DirectLink Patch antennas are uniquely designed to provide superior performance. The antenna employs patch technology without the usual reliance on expensive and lossy dielectric substrates. Instead, an air dielectric technology, called MicroAir™, is used to decrease material cost and increase radiation efficiency. Each antenna is provided with a standard low loss cable pigtail. A choice of SMA or TNC connectors is available. Other connector types are available upon request.

Solid brass elements are rigidly supported by the injection molded ultraviolet resistant enclosure. The enclosure components are designed to nest together during assembly creating a moisture barrier. The antenna will provide years of reliable, trouble free service.



FREQUENCY MHz	MODEL	GAIN dBi	3dB Beamwidth, deg. E-Plane H-Plane	VSWR	FRONT-TO-BACK dB	Connector (Standard)	Articulating Version
2300-2500	S2307AMP10TNE	7.5	60 65	1.5:1	12	TNC	Yes
2300-2500	S2307AMP10TNE	7.5	50 65	1.5:1	12	TNC	No
2300-2500	S2307AMP10SMF	7.5	50 65	1.5:1	12	SMA	Yes
2300-2500	S2307AMP10SMF	7.5	50 65	1.5:1	12	SMA	No
5150-5350	S51510AMP10TNE	10	27 58	1.5:1	15	TNC	Yes
5150-5350	S51510AMP10TNE	10	27 58	1.5:1	15	TNC	No
5150-5350	S51510AMP10SMF	10	27 58	1.5:1	15	SMA	Yes
5150-5350	S51510AMP10SMF	10	27 58	1.5:1	15	SMA	No
5180-5350	S51512AMP10TNE	12	27 45	1.5:1	15	TNC	Yes
5180-5350	S51512AMP10TNE	12	27 45	1.5:1	15	TNC	No
5180-5350	S51512AMP10SMF	12	27 45	1.5:1	15	SMA	Yes
5180-5350	S51512AMP10SMF	12	27 45	1.5:1	15	SMA	No
5725-5825	S57210AMP10TNE	10	27 58	1.5:1	15	TNC	Yes
5725-5825	S57210AMP10TNE	10	27 58	1.5:1	15	TNC	No
5725-5825	S57210AMP10SMF	10	27 58	1.5:1	15	SMA	Yes
5725-5825	S57210AMP10SMF	10	27 58	1.5:1	15	SMA	No
5725-5825	S57212AMP10TNE	12	27 45	1.5:1	15	TNC	Yes
5725-5825	S57212AMP10TNE	12	27 45	1.5:1	15	TNC	No
5725-5825	S57212AMP10SMF	12	27 45	1.5:1	15	SMA	Yes
5725-5825	S57212AMP10SMF	12	27 45	1.5:1	15	SMA	No

COMMON SPECIFICATIONS

Power: 75 Watts (25 Watts at 5 GHz)

Polarization: Linear

Dimensions & Weight:

Standard wall mount -

5.70 x 3.81 x 1.50 in.

(14.48 x 9.68 x 3.80 cm)

5 oz (1.4 kg)

Articulating wall mt -

5.90 x 3.81 x 2.26 in.

(14.73 x 9.68 x 5.74 cm)

8 oz (23 kg)

Connectors:

SMA, TNC. Other connector

types available on special request.

Mounting:

Standard units for wall mounting.

Mast mount bracket kits

available Custom mount

configurations for volume users.

Cable: Low loss pigtail provided

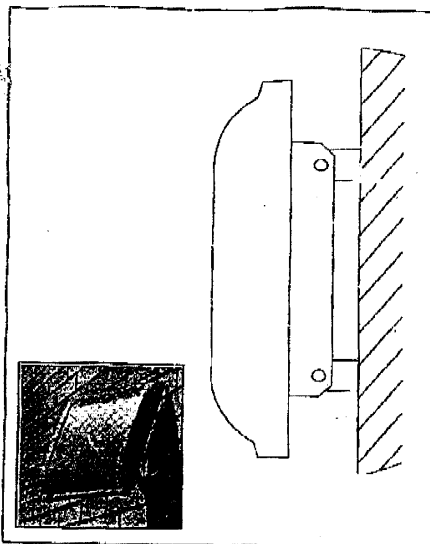
NEW

Spread Spectrum Panel Antenna

Facts & Features

- Gabriel Quality and Dependability.
- Vertical or Horizontal Polarization.
- Flat Construction.
- Lightweight and durable construction.
- Quick and easy installation.
- DC grounded for lightning protection.
- Paintable UV Stabilized Fiberglass Radome.
- Optional Mounting hardware for 3-D Orientation.
- One year extended warranty.

Flat Panel Antenna



Gabriel Spread Spectrum Flat Panel Antenna

Electrical Specifications

SSFP23-17

Frequency Range (GHz)	2.300 - 2.500
Bandwidth (MHz)	200
Gain, dBi (dBd)	17.1 (15.0)
Nominal Beamwidth @ -3 dB	
(E-Plane)	32°
(H-Plane)	27°
Cross Polar	-23 dB
F/B Ratio	-26 dB
VSWR Max. (R.L.)	1.50:1 (14.0)
Impedance (Ohms)	50
Maximum Power in Watts	100 W
Input Connector Type (other types available)	TNC / N / SMA

Mechanical Specifications

Dimensions H x W x L	in.	12.1 x 8 x 2.2
	(mm)	(310 x 203 x 57)
Front Windload	lbs. (N)	19.6 (87)
Side Windload	lbs. (N)	4 (18)
Survival Rating	mph (km/h)	93 (150)
Weight	lbs. (kg)	4 (1.7)
Mast Mounting Max./Min.	in. (mm)	1.2 - 2.3 (30 - 60)
Connector Position		back
Radome Material		Fiberglass
Radome Color		RAL 9002 (standard)
Chassis Material		aluminum
Screws		Stainless Steel

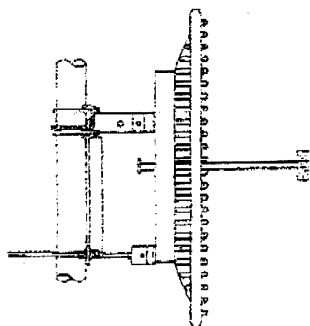
Product information subject to change without notice.

 **Gabriel electronics**
INCORPORATED

23-2EX
0826/97

P.O. Box 70, Scarborough, Maine 04070 USA
Tel (207) 883-5161 Fax (207) 883-4469
email info@gabrielnet.com
web site www.gabrielnet.com

Spread Spectrum



4 ft (1.2 m) Parabolic Grid Antenna

Parabolic Antennas

NEW

2.300 - 2.500 GHz Unpressurized Foam Dielectric Feeds

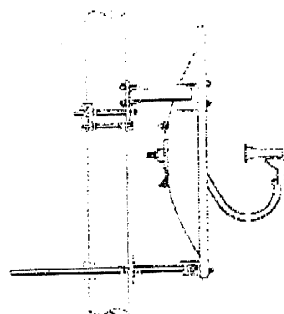
Facts & Features

- Type N Female coax connector, 50 ohm.
- Most feeds are easily installed from the front of the antenna, while allowing inspection or replacement from rear. Smooth polarization adjustment or change is obtained from the rear of the antenna.
- Gabriel antennas meet or exceed Standards EIA-195-C and EIA-222-E.
- Grid antenna design offers lower windloading, typically reduced 40% or more (without ice) from comparable sized solid antenna.

- 2.300 - 2.500 GHz Spread Spectrum Panel Antenna available.

Electrical Specifications

Frequency GHz	Model Number	Diameter ft. (m)	Standard	Low	Mid dB	High	Nominal Mid-Band Beamwidth Degrees	XPD dB	T/D ratio dB	VSWR max	(R.L. dB)
Grid Parabolic - Plane Polarized - Unpressurized											
2.300 - 2.500	SSG3-23	3 (0.9)	-	23.8	24.2	24.6	9.4	30	25	1.50	(14.0)
	SSG4-23	4 (1.2)	-	25.3	25.7	27.1	7.2	30	29	1.50	(14.0)
	SSG6-23	6 (1.8)	This product to be released soon								
Standard Parabolic - Plane Polarized - Unpressurized											
2.300 - 2.500	SSP2-23	2 (0.6)	-	20.3	20.7	21.1	14.5	26	21	1.50	(14.0)
	SSP4-23	4 (1.2)	-	25.3	25.7	27.1	7.2	30	29	1.50	(14.0)
	SSP6-23	6 (1.8)	This product to be released soon								



2 ft (0.6 m) Standard Parabolic Antenna

NEW

5.690 - 5.925 GHz

Facts & Features

- Type N Female coax connector, 50 ohm.
- Most feeds are easily installed from the front of the antenna, while allowing inspection or replacement from rear. Smooth polarization adjustment or change is obtained from the rear of the antenna.
- Gabriel antennas meet or exceed Standards EIA-195-C and EIA-222-E.
- Antenna features independent azimuth and elevation adjustments.
- All aluminum backstructure is designed for most advantageous strength and weight combination.

Standard Parabolic - Plane Polarized										
5.690 - 5.925	SSP2-57	2 (0.6)	-	28.3	28.5	28.5	5.9	26	39	1.35 (16.5)
	SSP4-57	4 (1.2)	-	34.2	34.4	34.5	3.0	30	44	1.35 (16.5)
	SSP6-57	6 (1.8)	-	<i>This product to be released soon</i>						

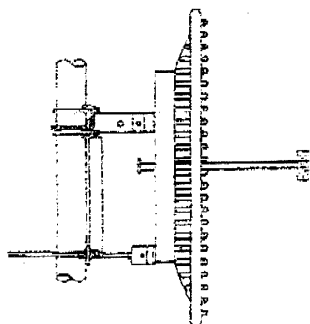
NOTE: Product information subject to change without notice.



23-25X
971787

P O Box 70, Scarborough, Maine 04070 USA
Tel (207) 883-5161 Fax (207) 883-4659
email info@gabrielnet.com
website www.gabrielnet.com

Spread Spectrum



4 ft (1.2 m) Parabolic Grid Antenna

Parabolic Antennas

NEW

2.300 - 2.500 GHz Unpressurized Foam Dielectric Feeds

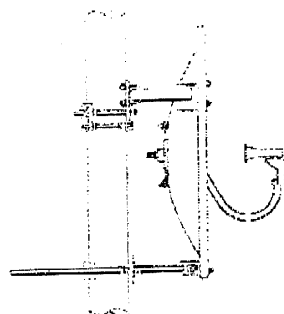
Facts & Features

- Type N Female coax connector, 50 ohm.
- Most feeds are easily installed from the front of the antenna, while allowing inspection or replacement from rear. Smooth polarization adjustment or change is obtained from the rear of the antenna.
- Gabriel antennas meet or exceed Standards EIA-195-C and EIA-222-E.
- Grid antenna design offers lower windloading, typically reduced 40% or more (without ice) from comparable sized solid antenna.

• 2.300 - 2.500 GHz Spread Spectrum Panel Antenna available.

Electrical Specifications

Frequency GHz	Model Number	Diameter ft. (m)	Standard	Low	Gain at Mid dB	High	Nominal Mid-Band Beamwidth degrees	XPD dB	T/D ratio dB	VSWR max.	(R.L. dB)
Grid Parabolic - Plane Polarized - Unpressurized											
2.300 - 2.500	SSG3-23	3 (0.9)	-	23.8	24.2	24.6	9.4	30	25	1.50	(14.0)
	SSG4-23	4 (1.2)	-	25.3	25.7	27.1	7.2	30	29	1.50	(14.0)
	SSG6-23	6 (1.8)	This product to be released soon								
Standard Parabolic - Plane Polarized - Unpressurized											
2.300 - 2.500	SSP2-23	2 (0.6)	-	20.3	20.7	21.1	14.5	26	21	1.50	(14.0)
	SSP4-23	4 (1.2)	-	25.3	25.7	27.1	7.2	30	29	1.50	(14.0)
	SSP6-23	6 (1.8)	This product to be released soon								



2 ft (0.6 m) Standard Parabolic Antenna

NEW

5.690 - 5.925 GHz

Facts & Features

- Type N Female coax connector, 50 ohm.
- Most feeds are easily installed from the front of the antenna, while allowing inspection or replacement from rear. Smooth polarization adjustment or change is obtained from the rear of the antenna.
- Gabriel antennas meet or exceed Standards EIA-195-C and EIA-222-E.
- Antenna features independent azimuth and elevation adjustments.
- All aluminum backstructure is designed for most advantageous strength and weight combination.

Standard Parabolic - Plane Polarized											
5.690 - 5.925	SSP2-57	2 (0.6)	-	28.3	28.5	28.5	5.9	26	39	1.35	(16.5)
	SSP4-57	4 (1.2)	-	34.2	34.4	34.5	3.0	30	44	1.35	(16.5)
	SSP6-57	6 (1.8)	-	<i>This product to be released soon</i>							

NOTE: Product information subject to change without notice.

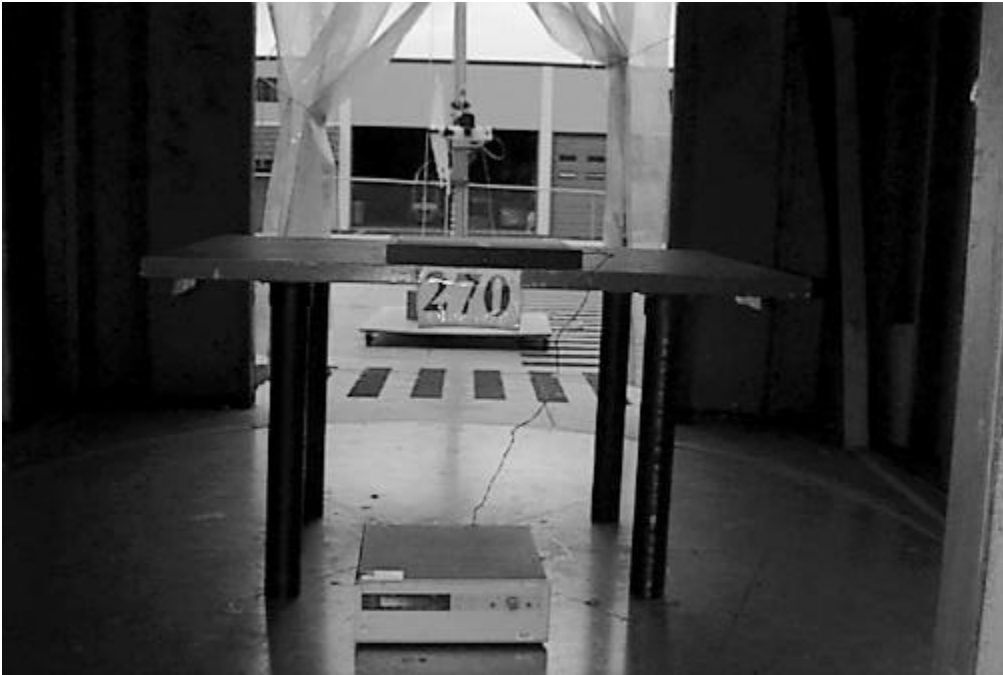


23-25X
971787

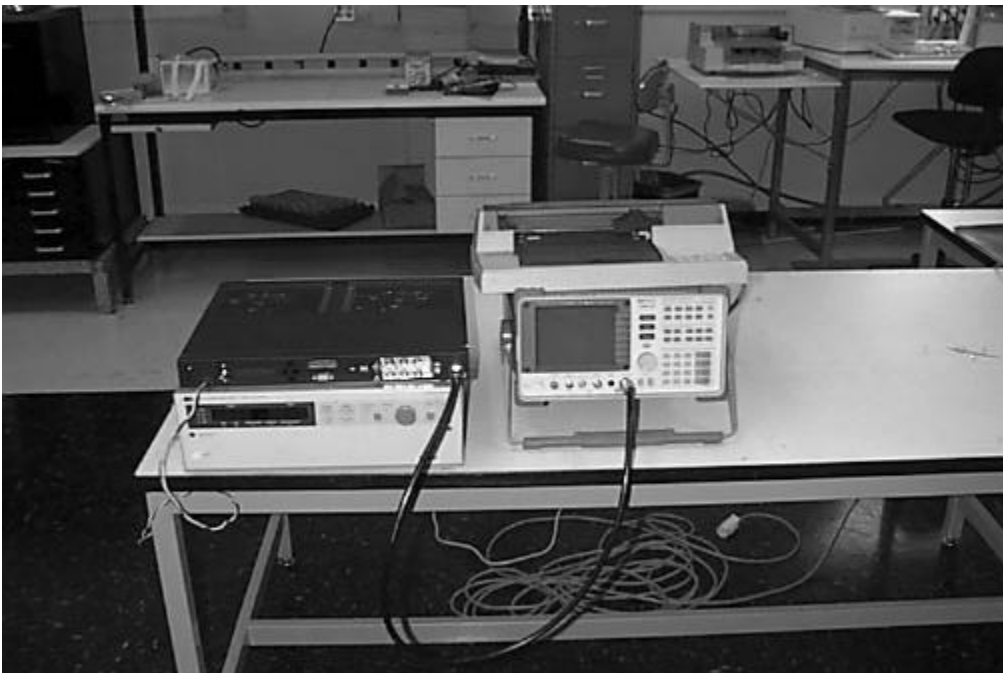
P O Box 70, Scarborough, Maine 04070 USA
Tel (207) 883-5161 Fax (207) 883-4659
email info@gabrielnet.com
website www.gabrielnet.com

APPENDIX E

SET- UP PHOTOGRAPHS



FCC B 15.209 Radiated Emissions



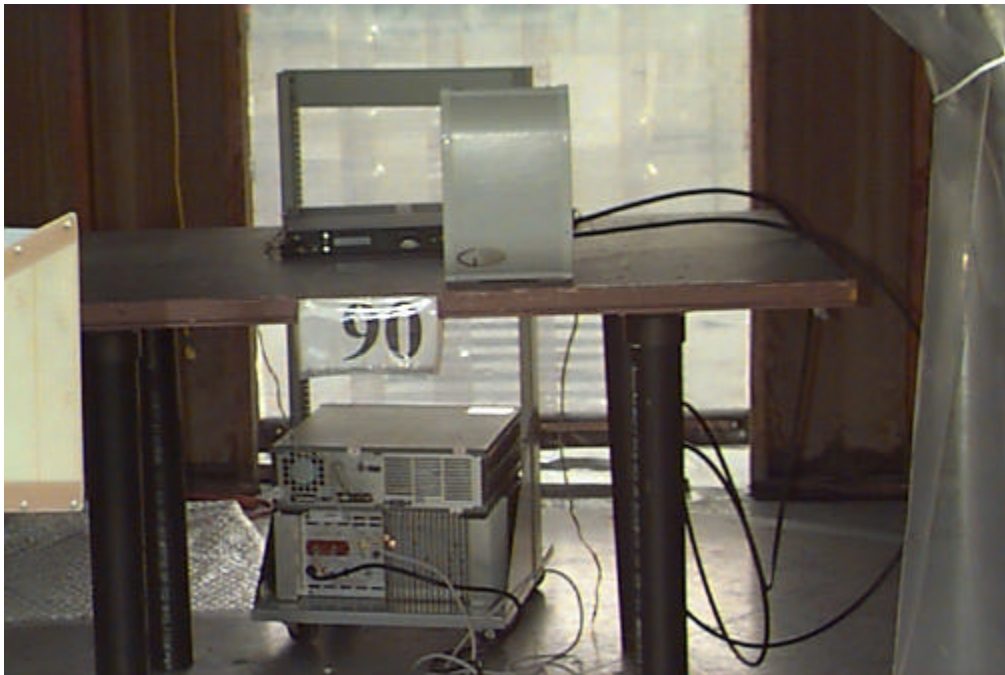
FCC 15.247 Conducted RF at Antenna Terminals



**FCC 15.205 Restricted Band Emissions
24 dBi QLP Parabolic Antenna**



**FCC 15.205 Restricted Band Emissions
24 dBi Grid Parabolic Antenna**



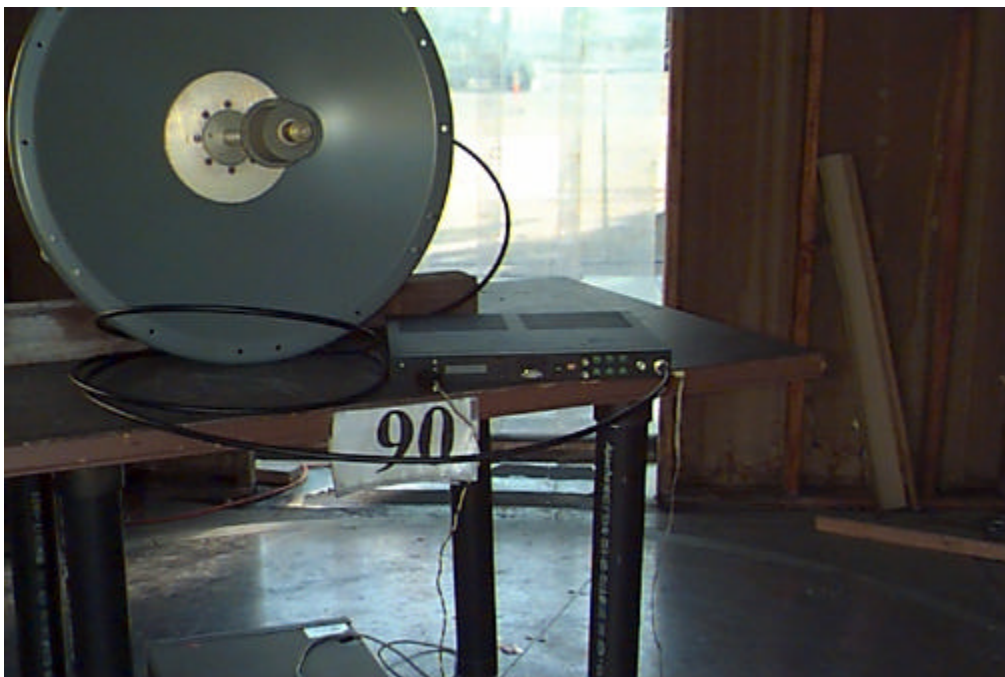
**FCC 15.205 Restricted Band Emissions
17 dBi Panel Antenna**



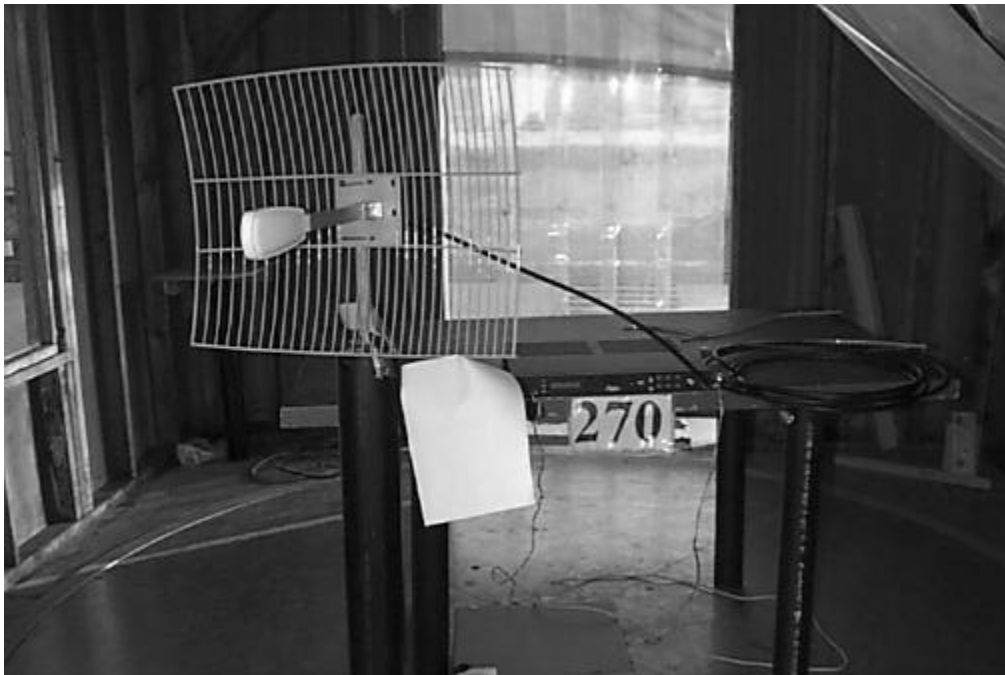
**FCC 15.205 Restricted Band Emissions
21 dBi Solid Parabolic Antenna**



**FCC 15.205 Restricted Band Emissions
7 dBi Panel Antenna**



**FCC 15.205 Restricted Band Emissions
21 dBi Solid Parabolic Antenna**



**FCC 15.205 Restricted Band Emissions
21 dBi QLP Parabolic Antenna**



**FCC 15.205 Restricted Band Emissions
26 dBi Grid Parabolic Antenna**

APPENDIX F

Direct Sequence Measurement Techniques

FEDERAL COMMUNICATIONS COMMISSION

Equipment Authorization Division
7435 Oakland Mills Road
Columbia, MD 21046
Telephone: (301) 725-1585
Facsimile: (301) 344-2050

Guidance on Measurements for Direct Sequence Spread Spectrum Systems

Part 15 of the FCC Rules provides for operation of direct sequence spread spectrum transmitters. Examples of devices that operate under these rules include radio local area networks, cordless telephones, wireless cash registers, and wireless inventory tracking systems.

The Commission frequently receives requests for guidance as to how to perform measurements to demonstrate compliance with the technical standards for such systems. No formal measurement procedure has been established for determining compliance with the technical standards. Such tests are to be performed following the general guidance in Section 15.31 of the FCC Rules and using good engineering practice. The following provides information on the measurement techniques the Commission has accepted in the past for equipment authorization purposes. Alternative techniques may be acceptable upon consultation and approval by the Commission staff. The information is organized according to the pertinent FCC rule sections.

Section 15.31(m): This rule specifies the number of operating frequencies to be examined for tunable equipment.

Section 15.207: Power line conducted emissions. If the unit is AC powered, an AC power line conducted test is also required per this rule.

Section 15.247(a)(2): Bandwidth. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span $\gg$ RBW.

Section 15.247(b): Power output. This is an RF conducted test. Use a direct connection between the antenna port of the transmitter and the spectrum analyzer, through suitable attenuation. Set the RBW $>$ 6 dB bandwidth of the emission or use a peak power meter.

Section 15.247(c): Spurious emissions. The following tests are required :

(1) RF antenna conducted test: Set RBW = 100 kHz, Video bandwidth (VBW) $>$ RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band *as measured with a 100 kHz RBW*.

(2) Radiated emission test: Applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp (and possibly a high-pass filter) is necessary for this measurement. For measurements above 1 GHz, set RBW = 1 MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation, use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See Section 15.35(b) and (c).

Section 15.247(d): Power spectral density. Locate and zoom in on emission peak(s) within the passband. Set RBW = 3 kHz, VBW > RBW, sweep = (SPAN/3 kHz) e.g., for a span of 1.5 MHz, the sweep should be $1.5 \times 10^6 \div 3 \times 10^3 = 500$ seconds. The peak level measured must be no greater than +8 dBm. If external attenuation is used, don't forget to add this value to the reading. Use the following guidelines for modifying the power spectral density measurement procedure when necessary.

- For devices with spectrum line spacing greater than 3 kHz no change is required.
- For devices with spectrum line spacing equal to or less than 3 kHz, the resolution bandwidth must be reduced below 3 kHz until the individual lines in the spectrum are resolved. The measurement data must then be normalized to 3 kHz by summing the power of all the individual spectral lines within a 3 kHz band (in linear power units) to determine compliance.
- If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz.
- Should all the above fail or any controversy develop regarding accuracy of measurement, the Laboratory will use the HP 89440A Vector Signal Analyzer for final measurement unless a clear showing can be made for a further alternate.

Section 15.247(e): Processing Gain. The Processing Gain may be measured using the CW jamming margin method. Figure 1 shows the test configuration. The test consists of stepping a signal generator in 50 kHz increments across the passband of the system. At each point, the generator level required to produce the recommended Bit Error Rate (BER) is recorded. This level is the jammer level. The output power of the transmitting unit is measured at the same point. The Jammer to Signal (J/S) ratio is then calculated. Discard the worst 20% of the J/S data points. The lowest remaining J/S ratio is used when calculating the Processing Gain.

In a practical system, there are always implementation losses which degrade the performance below that of an optimal theoretical system of the same type. Losses occur due to non-optimal filtering, lack of equalization, LO phase noise, "corner cutting in digital processing", etc. Total losses in a system, including transmitter and receiver, should be assumed to be no more than 2 dB.

The signal to noise ratio for an ideal non-coherent receiver is calculated from:

$$(1) \quad Pe = \frac{1}{2}e^{(-\frac{1}{2}(S/N)_o)}$$

where : Pe = probability of error (BER)

$(S/N)_o$ = the required signal to noise ratio at the receiver output for a given received signal quality

This is an example. You should use the equation (or curve) dictated by your demodulation scheme.

Ref.: Viterbi, A. J. Principles of Coherent Communications, (New York: McGraw-Hill 1966), Pg. 207

Using equation (1) shown above, calculate the signal to noise ratio required for your chosen BER. This value and the measured J/S ratio are used in the following equation to calculate the Processing Gain (G_p) of the system.

$$G_p = (S/N)_o + M_j + L_{sys}$$

where: $(S/N)_o$ = Signal to noise ratio

M_j = J/S ratio

L_{sys} = System losses.

Ref.: Dixon, R., Spread Spectrum Systems (New York: Wiley, 1984), Chapter 1.

APPENDIX G

Processing Gain

Processing Gain on the Access System, Low Channel

Frequency, MHz of Interferer	CW level of Interferer	Level of desired signal	J/S ratio	(S/N) ₀	System Losses	PG
2406.0	-80.0	-88	0.414	10.5	1.5	12.41
2406.5	-80.8	-88	0.371	10.5	1.5	12.37
2407.0	-80.8	-88	0.371	10.5	1.5	12.37
2407.5	-81.0	-88	0.360	10.5	1.5	12.38
2408.0	-80.4	-88	0.392	10.5	1.5	12.39
2408.5	-80.6	-88	0.381	10.5	1.5	12.38
2409.0	-80.6	-88	0.381	10.5	1.5	12.38
2409.5	-80.6	-88	0.381	10.5	1.5	12.38
2410.0	-80.4	-88	0.392	10.5	1.5	12.39
2410.5	-79.8	-88	0.425	10.5	1.5	12.42
2411.0	-80.0	-88	0.414	10.5	1.5	12.41
2411.5	-80.4	-88	0.392	10.5	1.5	12.39
2412.0	-80.2	-88	0.403	10.5	1.5	12.40
2412.5	-80.8	-88	0.371	10.5	1.5	12.37
2413.0	-80.0	-88	0.414	10.5	1.5	12.41
2413.5	-80.1	-88	0.409	10.5	1.5	12.41
2414.0	-80.0	-88	0.414	10.5	1.5	12.41
2414.5	-79.6	-88	0.436	10.5	1.5	12.44
2415.0	-79.5	-88	0.441	10.5	1.5	12.44
2415.5	-80.0	-88	0.414	10.5	1.5	12.41
2416.0	-79.0	-88	0.469	10.5	1.5	12.47
2416.5	-78.5	-88	0.496	10.5	1.5	12.50
2417.0	-78.4	-88	0.502	10.5	1.5	12.50
2417.5	-78.6	-88	0.491	10.5	1.5	12.49
2418.0	-78.1	-88	0.518	10.5	1.5	12.52
2418.5	-78.2	-88	0.513	10.5	1.5	12.51
2419.0	-78.0	-88	0.524	10.5	1.5	12.52
2419.5	-78.0	-88	0.524	10.5	1.5	12.52
2420.0	-77.6	-88	0.546	10.5	1.5	12.55
2420.5	-77.2	-88	0.569	10.5	1.5	12.57
2421.0	-77.2	-88	0.569	10.5	1.5	12.57
2421.5	-77.2	-88	0.569	10.5	1.5	12.57
2422.0	-77.3	-88	0.563	10.5	1.5	12.56
2422.5	-77.8	-88	0.535	10.5	1.5	12.54
2423.0	-78.1	-88	0.518	10.5	1.5	12.52
2423.5	-78.0	-88	0.524	10.5	1.5	12.52
2424.0	-78.5	-88	0.496	10.5	1.5	12.50
2424.5	-78.2	-88	0.513	10.5	1.5	12.51
2425.0	-79.0	-88	0.469	10.5	1.5	12.47
2425.5	-78.5	-88	0.496	10.5	1.5	12.50
2426.0	-78.8	-88	0.480	10.5	1.5	12.48
2426.5	-79.4	-88	0.447	10.5	1.5	12.45

2427.0	-79.0	-88	0.469	10.5	1.5	12.47
2427.5	-79.2	-88	0.458	10.5	1.5	12.46
2428.0	-79.5	-88	0.441	10.5	1.5	12.44
2428.5	-79.2	-88	0.458	10.5	1.5	12.46
2429.0	-78.5	-88	0.496	10.5	1.5	12.50
2429.5	-78.8	-88	0.480	10.5	1.5	12.48
2430.0	-78.5	-88	0.496	10.5	1.5	12.50
2430.5	-78.0	-88	0.524	10.5	1.5	12.52
2431.0	-78.5	-88	0.496	10.5	1.5	12.50
2431.5	-78.7	-88	0.485	10.5	1.5	12.49
2432.0	-78.2	-88	0.513	10.5	1.5	12.51
2432.5	-77.8	-88	0.535	10.5	1.5	12.54
2433.0	-78.6	-88	0.491	10.5	1.5	12.49
2433.5	-78.3	-88	0.507	10.5	1.5	12.51
2434.0	-77.5	-88	0.552	10.5	1.5	12.55
2434.5	-77.8	-88	0.535	10.5	1.5	12.54
2435.0	-78.0	-88	0.524	10.5	1.5	12.52
2435.5	-77.5	-88	0.552	10.5	1.5	12.55
2436.0	-77.2	-88	0.569	10.5	1.5	12.57

Actual channel is centered on 2421 MHz.

Processing Gain on the Access System, High Channel

Frequency, MHz of Interferer	CW level of Interferer	Level of desired signal	J/S ratio	(S/N) _o	System Losses	PG
2446.0	-78.5	-87	0.446	10.5	1.5	12.45
2446.5	-78.0	-87	0.474	10.5	1.5	12.47
2447.0	-77.8	-87	0.485	10.5	1.5	12.49
2447.5	-77.8	-87	0.485	10.5	1.5	12.49
2448.0	-79.0	-87	0.419	10.5	1.5	12.42
2448.5	-80.0	-87	0.364	10.5	1.5	12.36
2449.0	-79.2	-87	0.408	10.5	1.5	12.41
2449.5	-79.6	-87	0.386	10.5	1.5	12.39
2450.0	-78.8	-87	0.430	10.5	1.5	12.43
2450.5	-78.9	-87	0.424	10.5	1.5	12.42
2451.0	-77.7	-87	0.491	10.5	1.5	12.49
2451.5	-79.0	-87	0.419	10.5	1.5	12.42
2452.0	-79.4	-87	0.397	10.5	1.5	12.40
2452.5	-79.9	-87	0.370	10.5	1.5	12.37
2453.0	-79.0	-87	0.419	10.5	1.5	12.42
2453.5	-78.8	-87	0.430	10.5	1.5	12.43
2454.0	-79.0	-87	0.419	10.5	1.5	12.42
2454.5	-79.6	-87	0.386	10.5	1.5	12.39
2455.0	-78.8	-87	0.430	10.5	1.5	12.43
2455.5	-79.0	-87	0.419	10.5	1.5	12.42
2456.0	-78.6	-87	0.441	10.5	1.5	12.44
2456.5	-78.5	-87	0.446	10.5	1.5	12.45
2457.0	-78.4	-87	0.452	10.5	1.5	12.45
2457.5	-77.8	-87	0.485	10.5	1.5	12.49
2458.0	-77.0	-87	0.530	10.5	1.5	12.53
2458.5	-77.8	-87	0.485	10.5	1.5	12.49
2459.0	-77.6	-87	0.497	10.5	1.5	12.50
2459.5	-77.0	-87	0.530	10.5	1.5	12.53
2460.0	-76.8	-87	0.542	10.5	1.5	12.54
2460.5	-77.2	-87	0.519	10.5	1.5	12.52
2461.0	-77.2	-87	0.519	10.5	1.5	12.52
2461.5	-77.0	-87	0.530	10.5	1.5	12.53
2462.0	-77.0	-87	0.530	10.5	1.5	12.53
2462.5	-76.8	-87	0.542	10.5	1.5	12.54
2463.0	-78.0	-87	0.474	10.5	1.5	12.47
2463.5	-77.0	-87	0.497	10.5	1.5	12.50
2464.0	-77.4	-87	0.508	10.5	1.5	12.51
2464.5	-77.7	-87	0.491	10.5	1.5	12.49
2465.0	-78.0	-87	0.474	10.5	1.5	12.47
2465.5	-77.9	-87	0.480	10.5	1.5	12.48
2466.0	-78.0	-87	0.474	10.5	1.5	12.47
2466.5	-78.2	-87	0.463	10.5	1.5	12.46

2467.0	-78.0	-87	0.474	10.5	1.5	12.47
2467.5	-78.0	-87	0.474	10.5	1.5	12.47
2468.0	-78.3	-87	0.458	10.5	1.5	12.46
2468.5	-78.3	-87	0.458	10.5	1.5	12.46
2469.0	-78.5	-87	0.446	10.5	1.5	12.45
2469.5	-77.8	-87	0.485	10.5	1.5	12.49
2470.0	-78.5	-87	0.446	10.5	1.5	12.45
2470.5	-78.0	-87	0.474	10.5	1.5	12.47
2471.0	-78.2	-87	0.463	10.5	1.5	12.46
2471.5	-78.0	-87	0.474	10.5	1.5	12.47
2472.0	-77.8	-87	0.485	10.5	1.5	12.49
2472.5	-77.8	-87	0.485	10.5	1.5	12.49
2473.0	-77.8	-87	0.485	10.5	1.5	12.49
2473.5	-77.0	-87	0.530	10.5	1.5	12.53
2474.0	-77.5	-87	0.502	10.5	1.5	12.50
2474.5	-77.7	-87	0.491	10.5	1.5	12.49
2475.0	-77.3	-87	0.513	10.5	1.5	12.51
2475.5	-77.5	-87	0.502	10.5	1.5	12.50
2476.0	-77.0	-87	0.530	10.5	1.5	12.53

Actual channel is centered on 2462 MHz.

TOTAL P.05

