



125 Technology Parkway
Norcross, Georgia, US 30092

Direct Sequence
Spread Spectrum
Transmitter

Testing Performed by: LXE Inc.

Model: 480628-4096 Transceiver

FCC ID: KDZ480628-4096

LXE Project No.: 00-073

Issue Date: August 30, 2000

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1.0 GENERAL

1.1 Introduction

The purpose of this class 2 permissive change filing is to add the antennas below as options to the LXE model 480628-4096 transceiver and to report findings of compliance testing performed.

- 1) Hypergain model HG2415P 15dBi 180 degree sector panel antenna - LXE P/N: 480429-2712
- 2) Hypergain model HG2412P 12dBi 90 degree sector panel antenna - LXE P/N: 480429-2703
- 3) Hypergain model HG2415U 15dBi omnidirectional antenna - LXE P/N: 480429-0415
- 4) Mobile Mark model OD12-2400 12dBi omnidirectional antenna - LXE P/N: 480429-0411

Antenna specification sheets are included in the appendix following this report.

1.2 Product Description

The Equipment Under Test(EUT) is an OEM Direct Sequence Spread Spectrum PCMCIA radio card in combination with the antennas given in section 1.1 above. The radio card is manufactured by Lucent Technologies and is IEEE 802.11b compliant and operates in the band of 2400-2483.5 GHz. The radio is capable of 4 data rates and self adjusts to the most appropriate rate depending on the performance required. The data rates are 11, 5.5, 2 and 1 Mbps, where 11 Mbps gives the maximum throughput for data transfer, and 2 Mbps gives the best coverage where only small data packets are sent.

The radio has 2 ports. The main port is TX/RX and the auxiliary port is RX only. The card can be used either with a single antenna scheme in the main port, or a diverse antenna scheme using both ports.

The radio card can be integrated into individual components of the LXE product line, that together, make up a wireless LAN for various applications. The individual components are LXE PC based mini-computers equipped with PCMCIA slots to accommodate the various radio cards offered, or they can be used as batch terminals with no radio card at all. For batch operations, the PCMCIA slots are utilized as memory or storage space enhancements. Terminals currently targeted for integration of the 480628-4096 radio card are LXE Models: 1380, 1390, 1600, 2325, MX2, 2330, 2335, MX3, 6520, 6521, 6522, CX1, VX1, VX2 and the Mobile Clinical Work Station(MCWS).

Table 1: Specifications

Frequency Band	2400-2483.5 MHz
Number of Channels	11
Modulation Technique	Direct Sequence Spread Spectrum (DBPSK, DQPSK, CCK)
Spreading	11-chip sequence (Barker for 1, 2 Mbps)
Bit Error Rate	Better than 10E-5
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Interface	PC Card Type II Size
Dimensions	85.0 mm X 53.95 mm X 5.0 mm (PC Card)
Output power	15 dBm
Power Consumption PC Card	Doze mode – 15 mA
	Receive mode – 240 mA
	Transit mode – 280 mA
Temperature Range (operational)	0-55 0C 95% max. humidity (non condensing)
Compatibility	Novel Client 3.x & 4.x
	Windows 95/98 and Windows NT®(NDIS Miniport driver)
	Apple
	Windows/CE
Standards	IEEE 802.11b
Regulations	FCC Part 15 Subpart C
	RSS 139 & RSS 102
	ETS 300 328 & 300 826

2.0 LOCATION OF TEST FACILITY

The LXE test facility is located at the following address:

LXE, Inc.
An Electromagnetic Sciences Company
125 Technology Parkway
Norcross, GA US 30092-2993
Tel: (770) 447-4224
Fax: (770) 447-6928

Radiated emission tests were conducted at the manufacturer's test facility at a location specifically prepared for this testing. The radiated emissions test site meets the characteristics of ANSI C63.4:1992, CISPR 16 and EN 55022:1994. This site has been fully described and submitted to the FCC, and accepted in their letter marked 31040/SIT, 1300F2.

3.0 DESCRIPTION OF OPEN AREA TEST SITE

The open area test site(OATS) is located in the center of the rooftop of the building. The roof is located at a height of approximately 8 meters above the ground. The 3 meters radiated emissions test site is an open, flat area (open area) test site approximately 6.2m x 9.2m in dimension. All reflecting objects including test personnel lie outside the perimeter of the ellipse. The 3 meters test site ground plane is made of a 1/4" metal screen mesh which extends 2 meters past the mast and equipment under test(EUT). Material of the ground plane, comprised of individual 1/4" metal screen mesh rolls, were soldered at the seams with gaps smaller than 1/10 of the wavelength at 1000MHz. The ground plane is connected to the earth ground by ground rods. All wiring is done at floor level around the test site periphery. The radiated emissions test setup is shown in figure 1.

3.1 Radiated Emissions Testing Facility Drawing

All dimensions are in meters(m)

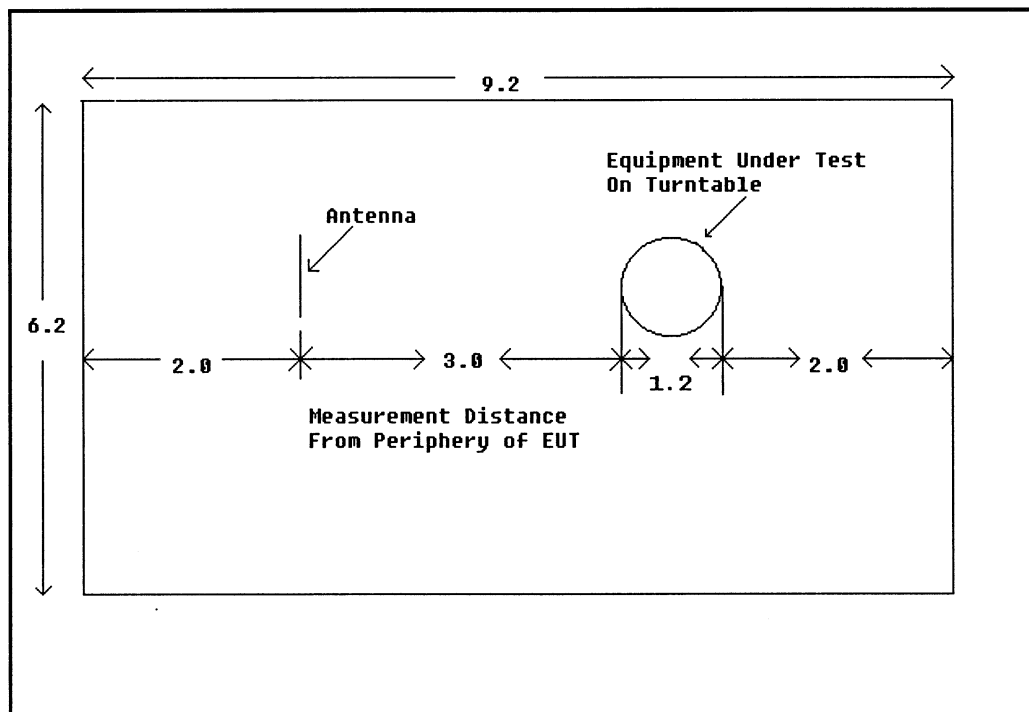


Figure 1: Open Area Test Site(OATS)

4.0 APPLICABLE STANDARD REFERENCES

The following standards were used to determine compliance:

- 1 - ANSI C63.4-1992: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- 2 - US Code of Federal Regulations (CRF): Title 47, Part 15, Radio Frequency Devices, Subpart C, Intentional Radiators (October 1997)
- 3 - FCC Report and Order 97-114: Amendment of Parts 2 and 15 of the Commission's rules regarding Spread Spectrum Transmitters.
- 4 - OET Bulletin 65, Supplement C, Section 3: RF Exposure Compliance for Spread Spectrum Transmitters.

5.0 LIST OF TEST EQUIPMENT

Radiated field strength measurements are taken with a spectrum analyzer. For peak measurements the spectrum analyzer was set with both the VBW and the RBW at 1MHz. Average measurements were taken with the RBW at 1MHz and the VBW at 10Hz. The sweep rate was set to auto to optimize the measurement. Adequate attenuation was used to protect the analyzer from damage.

Table 2: Test Equipment

Cal #	MFG Name	Item Name	Model #:	Serial #	Recal Date:
53	Hewlett Packard	Spectrum Analyzer	8563E	3304A00657	5/4/01
62	Compliance Design, Inc.	Antenna, Dipole	B1000	265	4/12/01
202	Hewlett Packard	Amp, .01-26.5 GHz	83006A	3104A00543	11/9/00
229	Electro-Metrics	Antenna	RGA-60	6166	4/10/01
230	EMCO	LISN	3810/2NM	9505-1024	5/16/01
233	EMCO	Antenna, Biconical	3104C	9012-4360	5/22/01
234	EMCO	Antenna, Log Periodic	3146	9011-2946	6/21/01
238	Hewlett Packard	Spectrum Analyzer	8591A	3131A02254	5/8/01
239	LXE	Pre-Amp	20-1000GHz	001	4/7/01
394	Microwave Circuits	High-Pass Filter	H3G020G2	0001 DC9853	1/27/01
399	Mini Circuits	High-Pass Filter	SHP-1000	none	N/A
450	LXE	RF Cables (High Freq. Short)	none	Copper	11/5/00
451	LXE	RF Cables (High Freq. Double)	7015/6986	MFR-57500	11/5/00
452	EMCO	Mast, Antenna, Mini	2075	PN399235	N/A
453	EMCO	Turntable	2065	PN399230	N/A
99998	Lindgren Enclosure	RF Enclosure	14-2/2-0	8147	N/A

6.0 TEST METHODOLOGY

For the radiated emissions tests, measurements were made over the frequency range of 30MHz to 10 times the highest fundamental frequency. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test(EUT) and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. A non-conductive remotely controlled turntable approximately 0.91m x 1.2m x 0.8m was used to measure radiated emissions from all sides of the EUT. The turntable has a center opening that allows cabling to be routed directly down to the conducting ground plane.

Radiated measurements were made with the Spectrum Analyzer's resolution bandwidth set to 120KHz for measurements above 30MHz and below 1000MHz, and 1MHz for measurements above 1000 MHz.

7.0 SUPPORT EQUIPMENT

Table 3: Support Equipment

Piece Number	Manufacturer	Equipment Type	Model Number	Serial Number	FCC ID
1	LXE	Transceiver	480824-3300	00UT01426005	KDZ4804243300M
2	Compaq	Laptop Computer	2860B	7452HPM70016	CNT75MB2CB
3	Compaq	AC/DC Power Supply	2862A	None	None
4	See Section 1.1	Antenna	See Section 1.1	None	None

7.1 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

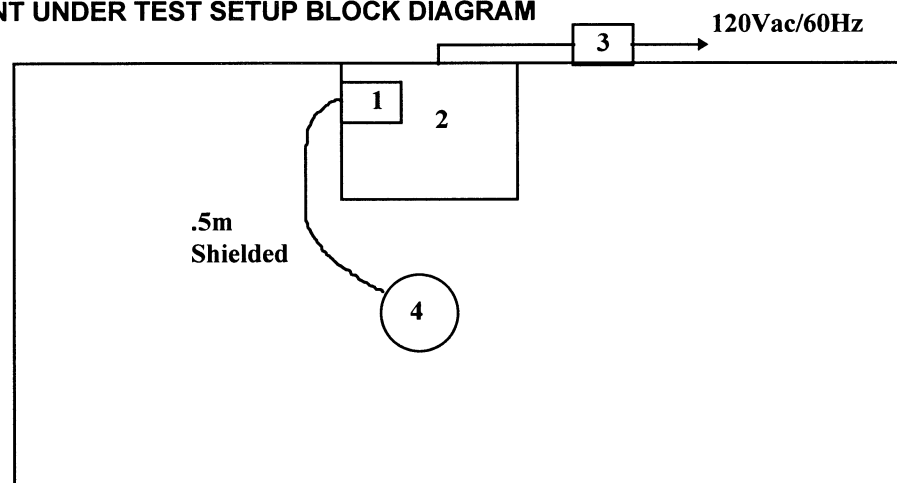


Figure 2

8.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were also taken of all signals deemed important enough to document. Plots are included in the appendix.

8.1 Antenna Requirement - FCC Section 15.203

The antennas employ either a Reverse TNC or standard N-Type connectors. Use of these connectors is justified since all LXE systems are professionally installed by LXE personnel or qualified subcontractors.

8.2 Radiated Spurious Emissions(Restricted Bands)

Radiated spurious emissions found in the restricted bands are reported below in table 4 and plots of each significant point can be found in the appendix. The EUT was evaluated on three channels representing the lower, middle and upper parts of the band. Additionally, the EUT was evaluated at the extreme data rates of 1 Mbps and 11 Mbps.

Justification

Only 3 of the 4 antennas declared in section 1.1 were tested. The Mobile Mark Model OD12-2400, 12dBi omnidirectional is assumed compliant based on satisfactory data received from the Hypergain Model HP2415U omnidirectional antenna.

Table 4: Radiated Spurious Emissions in Restricted Bands

Frequency (MHz)	Antenna Distance (m)	Level (dBm)	Detector Function (P/A)	Correction Factors (dB)	Corrected Level (dBm)	Corrected Level (uV/m)	Limit (uV/m)	Margin (uV)	Final Result (Pass/Fail)
Hypergain Model HG2415P									
Channel 1 @ 1Mbps									
4824	3	-82.00	a	18.91	-63.09	156.82	500	343.18	PASS
7236*	3	-83.67	a	22.40	-61.27	193.37	500	306.63	PASS
Channel 1 @ 11Mbps									
4824	3	-84.00	a	18.91	-65.09	124.57	500	375.43	PASS
7236*	3	-83.00	a	22.40	-60.60	208.88	500	291.12	PASS
Channel 7 @ 1Mbps									
4884	3	-81.00	a	19.18	-61.82	181.51	500	318.49	PASS
7326*	3	-83.50	a	22.64	-60.86	202.70	500	297.30	PASS
Channel 7 @ 11Mbps									
4884	3	-83.17	a	19.18	-63.99	141.38	500	358.62	PASS
7326*	3	-83.50	a	22.64	-60.86	202.70	500	297.30	PASS
Channel 11 @ 1Mbps									
4924	3	-81.50	a	19.36	-62.14	174.94	500	325.06	PASS
7386*	3	-83.83	a	22.80	-61.03	198.76	500	301.24	PASS
Channel 11 @ 11Mbps									
4924	3	-83.67	a	19.36	-64.31	136.27	500	363.73	PASS
7386*	3	-83.83	a	22.80	-61.03	198.76	500	301.24	PASS
Hypergain Model HG2415U									
Channel 1 @ 1Mbps									
4824	3	-78.67	a	18.91	-59.76	230.09	500	269.91	PASS
7236*	3	-83.33	a	22.40	-60.93	201.09	500	298.91	PASS
Channel 1 @ 11Mbps									
4824	3	-83.50	a	18.91	-64.59	131.95	500	368.05	PASS
7236*	3	-83.50	a	22.40	-61.10	197.19	500	302.81	PASS
Channel 7 @ 1Mbps									
4884	3	-77.17	a	19.18	-57.99	282.10	500	217.90	PASS
7326*	3	-83.50	a	22.64	-60.86	202.70	500	297.30	PASS
Channel 7 @ 11Mbps									
4884	3	-83.00	a	19.18	-63.82	144.18	500	355.82	PASS
7326*	3	-83.50	a	22.64	-60.86	202.70	500	297.30	PASS
Channel 11 @ 1Mbps									
4924	3	-80.67	a	19.36	-61.31	192.49	500	307.51	PASS
7386*	3	-83.50	a	22.80	-60.70	206.46	500	293.54	PASS
Channel 11 @ 11Mbps									
4924	3	-83.67	a	19.36	-64.31	136.27	500	363.73	PASS
7386*	3	-83.33	a	22.80	-60.53	210.54	500	289.46	PASS

Hypergain Model HG2412P									
Channel 1 @ 1 Mbps									
4824	3	-82.50	a	18.91	-63.59	148.05	500	351.95	PASS
7236*	3	-83.67	a	22.40	-61.27	193.37	500	306.63	PASS
Channel 1 @ 11Mbps									
4824	3	-84.82	a	18.91	-65.91	113.34	500	386.66	PASS
7236*	3	-83.50	a	22.40	-61.10	197.19	500	302.81	PASS
Channel 7 @ 1 Mbps									
4884	3	-80.17	a	19.18	-60.99	199.71	500	300.29	PASS
7326*	3	-83.33	a	22.64	-60.69	206.71	500	293.29	PASS
Channel 7 @ 11Mbps									
4884	3	-84.17	a	19.18	-64.99	126.01	500	373.99	PASS
7326*	3	-83.50	a	22.64	-60.86	202.70	500	297.30	PASS
Channel 11 @ 1 Mbps									
4923	3	-82.83	a	19.35	-63.48	150.03	500	349.97	PASS
7386*	3	-83.67	a	22.80	-60.87	202.46	500	297.54	PASS
Channel 11 @ 11 Mbps									
4924	3	-83.83	a	19.36	-64.47	133.78	500	366.22	PASS
7386*	3	-83.83	a	22.80	-61.03	198.76	500	301.24	PASS

* Measurement system noise floor - No plot taken

Correction Factors

Correction factors include Antenna Factor, Cable Attenuation, High Pass Filter Insertion Loss and pre-amp gain.

Sample Calculations

Corrected Level(dBm) = Receiver Level + Correction Factors

Conversion from dBm to uV/m = Antilog(dBm + 107)/20)

9.0 RF Safety

Portable Devices

The LXE products listed below, when integrated with radio cards, are considered Portable Devices according to the definition found in section 2.1093(b) of the rules.

- 1600
- 2325
- 2330
- 2335
- 2381
- MX2
- MX3
- CX1

According to section 3 of Supplement C to OET Bulletin 65, part 15 transmitters are categorically excluded from routine environmental evaluation by measurement or precise computations unless otherwise required by the commission.

Due to the low power of the EUT, environmental evaluation is deemed to be unnecessary.

Mobile Devices

All other LXE products in section 1.1 are considered Mobile Devices. The following statement appears in the installation and/or operator's guide of all mobile devices:

"This device is intended to transmit RF energy. For protection against excessive RF exposure to humans and in accordance with FCC rules, operator's of this equipment should maintain a separation distance of at least 20cm"

10.0 CONCLUSION

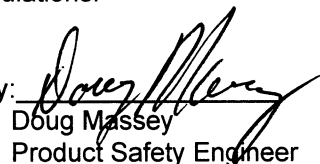
The product covered by this report has been tested and found to comply with the requirements as described in Part 15, Subpart C, Section 15.247 of the FCC Code of Federal Regulations.

Testing Performed By:



Sam Wismer
Lead Approvals Engineer

Report Reviewed By:



Doug Massey
Product Safety Engineer

APPENDIX

This Appendix Includes:
Antenna Specification
Spurious Emissions Plots

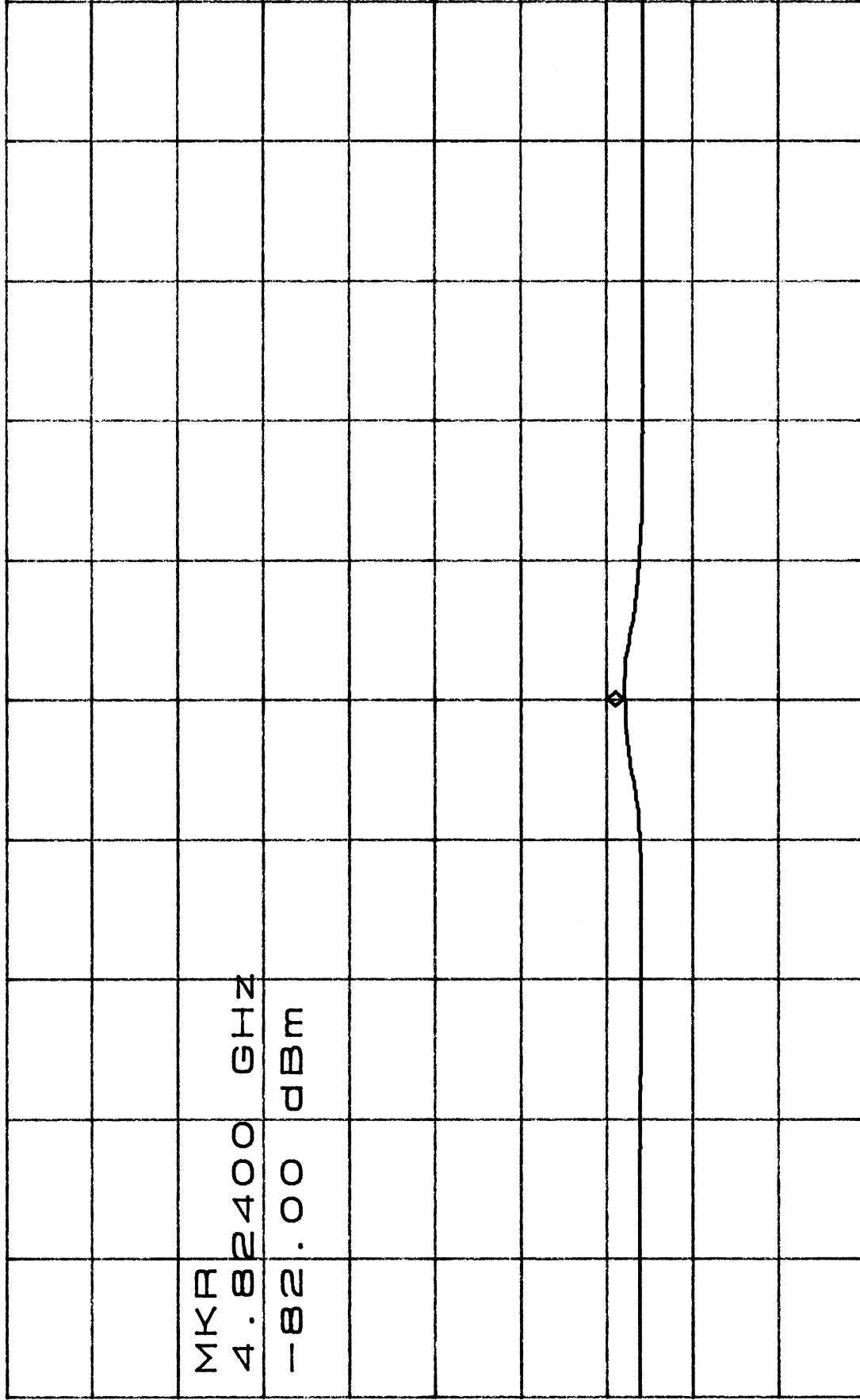
*ATTEN 0dB

MKR -82.00dBm

RL -10.00dBm

10dB/

4.82400GHZ



D

MKR
4.82400 GHZ
-82.00 dBm

CENTER 4.82400GHZ

SPAN 10.00MHZ

*RBW 1.0MHZ *VBW 10HZ

SWP 5.0sec

HyperGain Model: HG2415P
Channel 1 at 1 Mbps

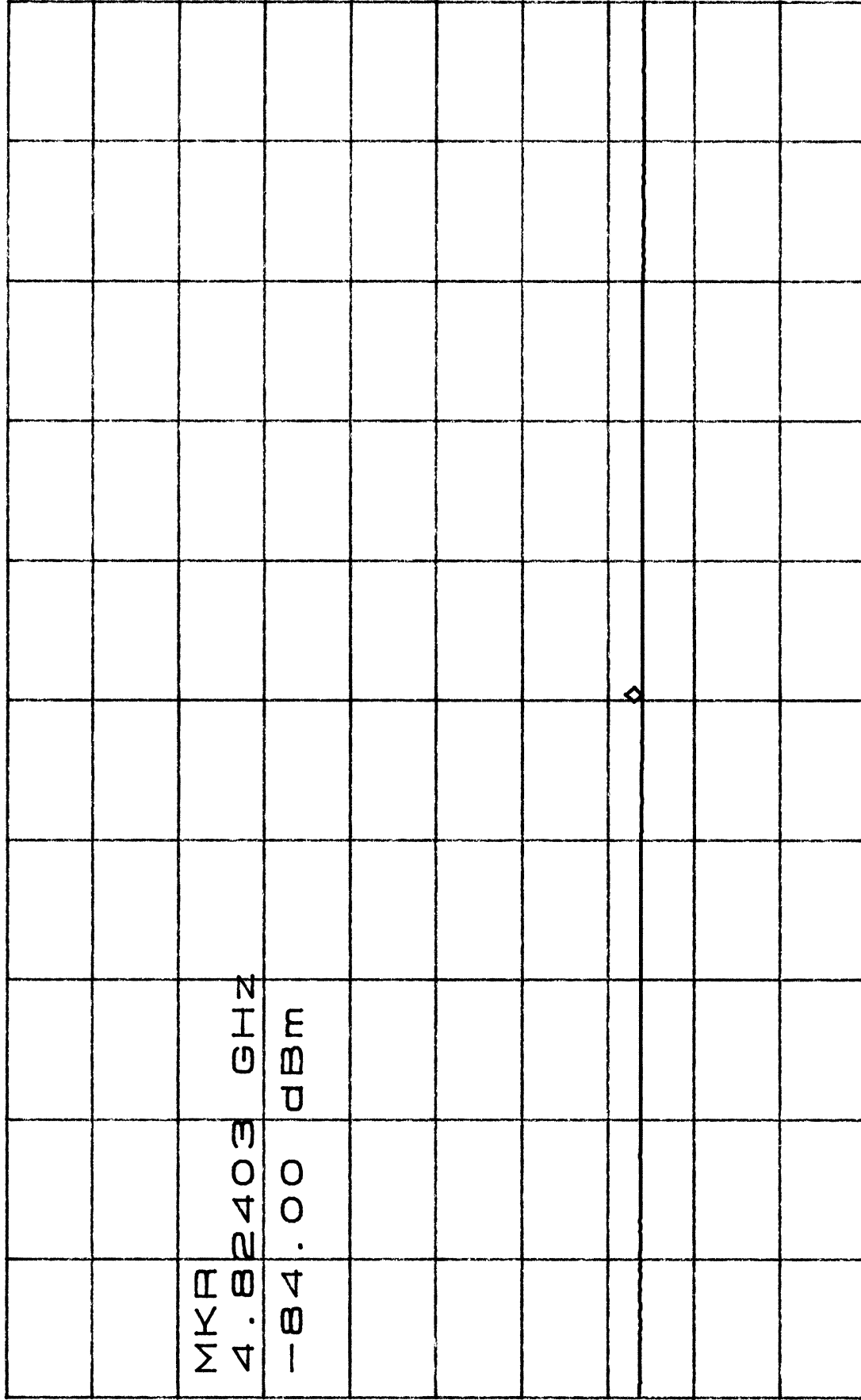
*ATTEN 0dB

MKR -84.00dBm

RL -10.00dBm

10dB/

4.82403GHz



D

CENTER 4.82400GHz

SPAN 10.00MHz

*RBW 1.0MHz

*VBW 10Hz

SWP 5.0sec

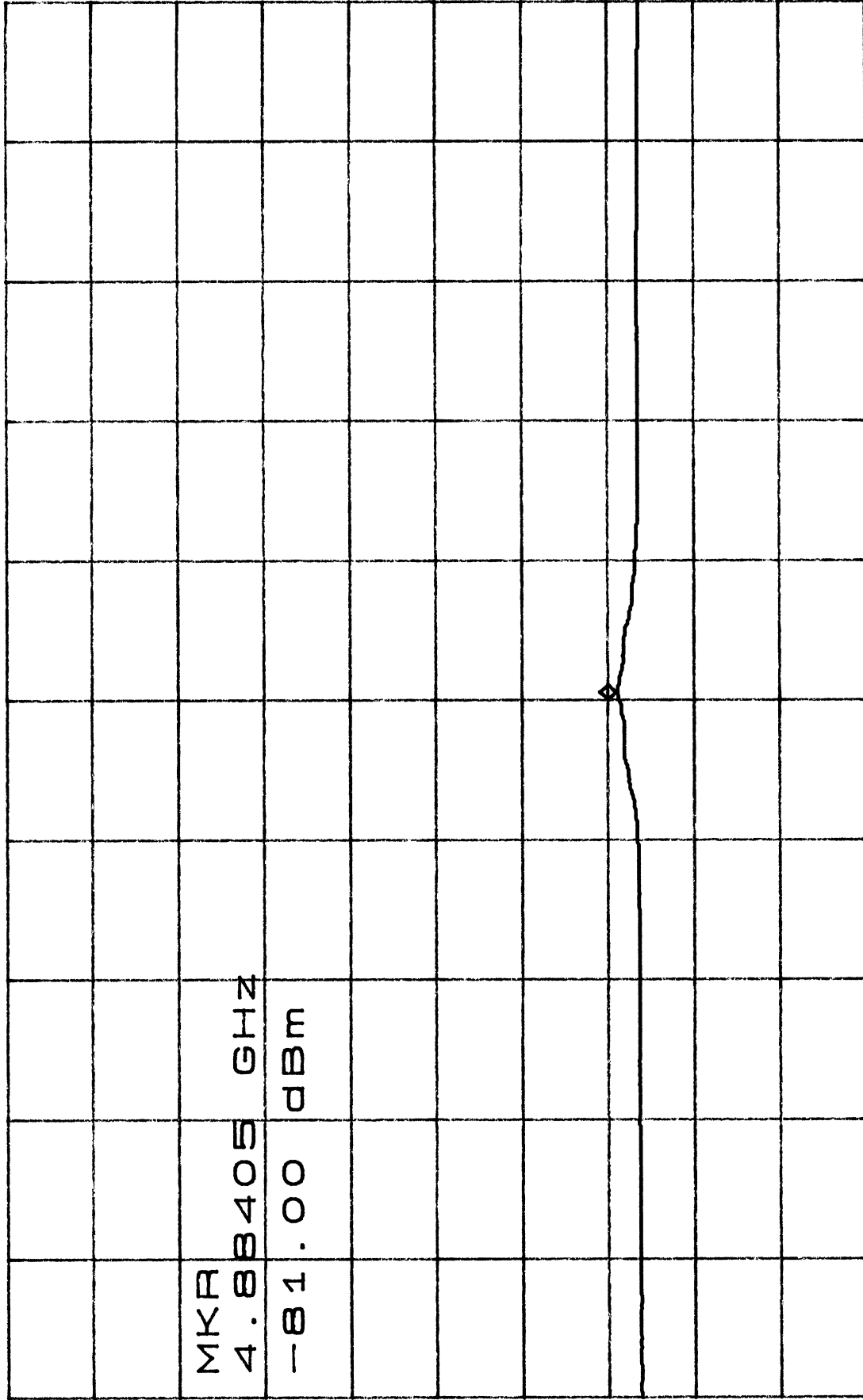
*ATTEN 0dB

MKR -81.00dBm

RL -10.00dBm

10dB/

4.88405GHz



D

CENTER 4.88400GHz

SPAN 10.00MHz

*RBW 1.0MHz *VBW 10Hz

SWP 5.0sec

HyperGain Model: HG2415P
Channel 7 at 1 Mbps

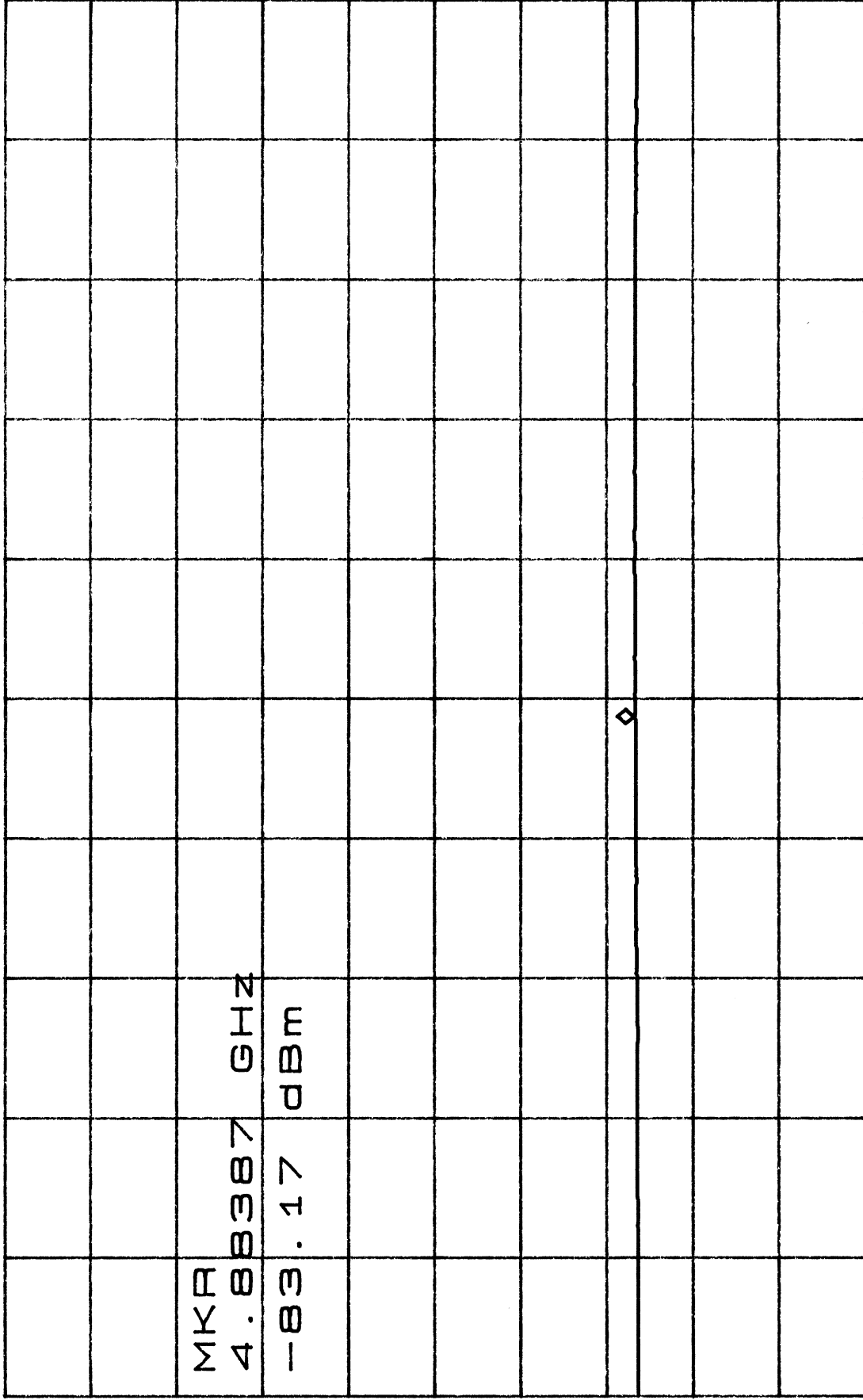
*ATTEN 0dB

MKR -83.17dBm

RL -10.0dBm

10dB/

4.88387GHz



MKR

4.88387

GHz

-83.17

dBm

D

CENTER 4.88400GHz

SPAN 10.00MHz

*RBW 1.0MHz

*VBW 10Hz

SWP 5.0sec

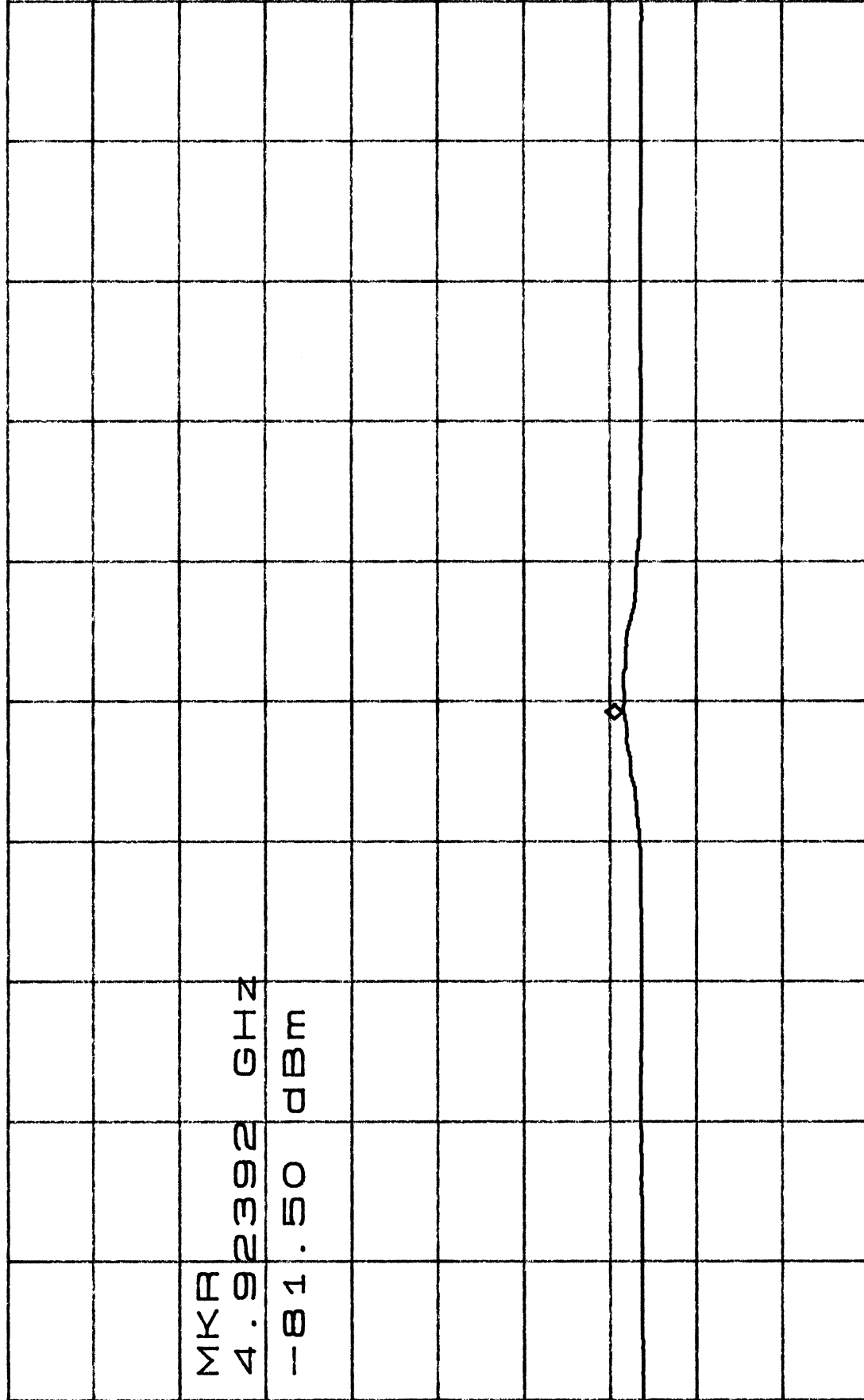
*ATTEN 0dB

MKR -81.50dBm

RL -10.0dBm

10dB/

4.92392GHz



D

CENTER 4.92400GHz

SPAN 10.00MHz

*RBW 1.0MHz *VBW 10Hz

SWP 5.0sec

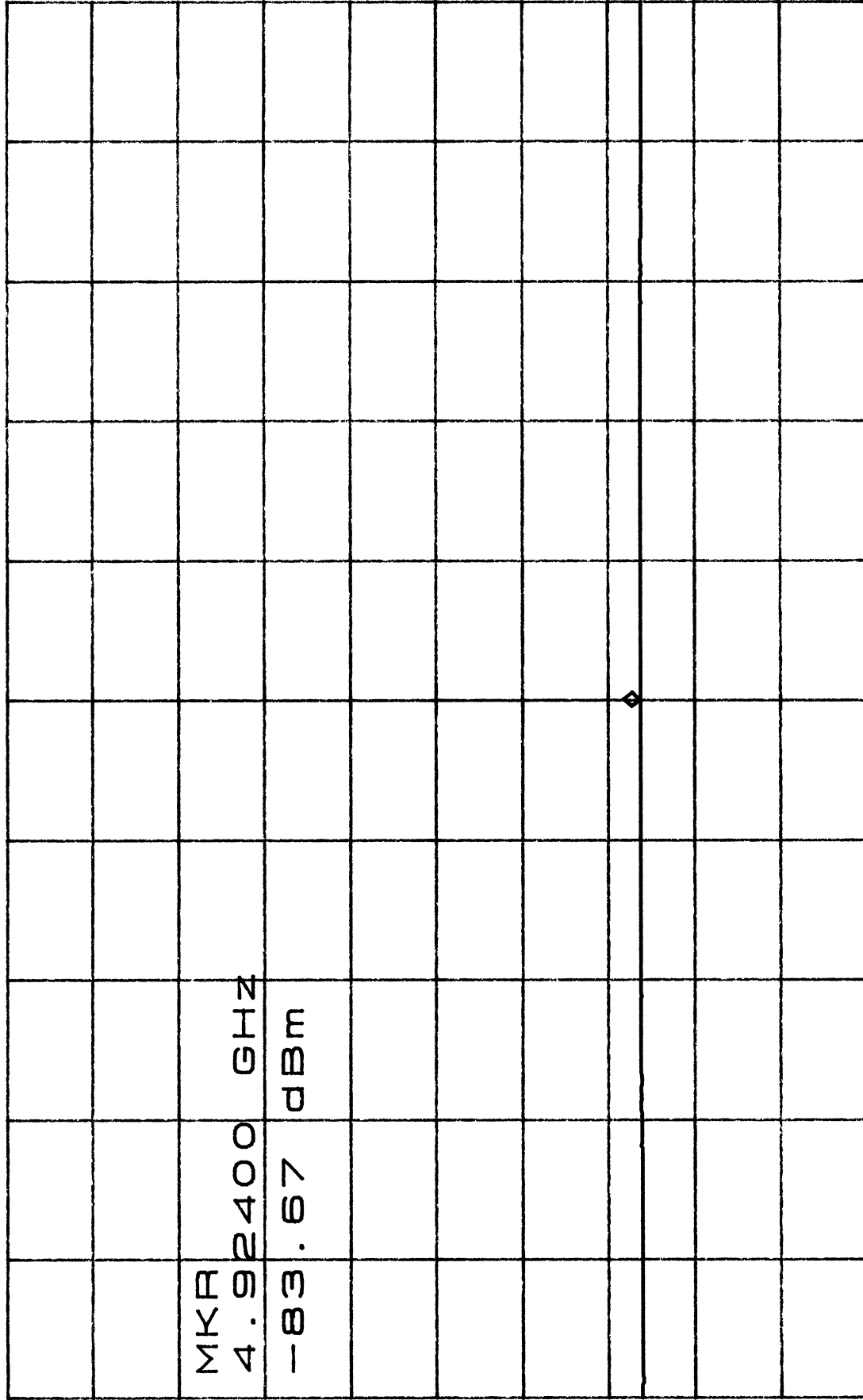
*ATTEN 0dB

MKR -83.67dBm

RL -10.0dBm

10dB/

4.92400GHz



MKR

4.92400

GHz

-83.67

dBm

D

CENTER 4.92400GHz

SPAN 10.00MHz

*RBW 1.0MHz

*VBW 10Hz

SWP 5.0sec

HyperGain Model: HG2415P
Channel 11 at 11 Mbps

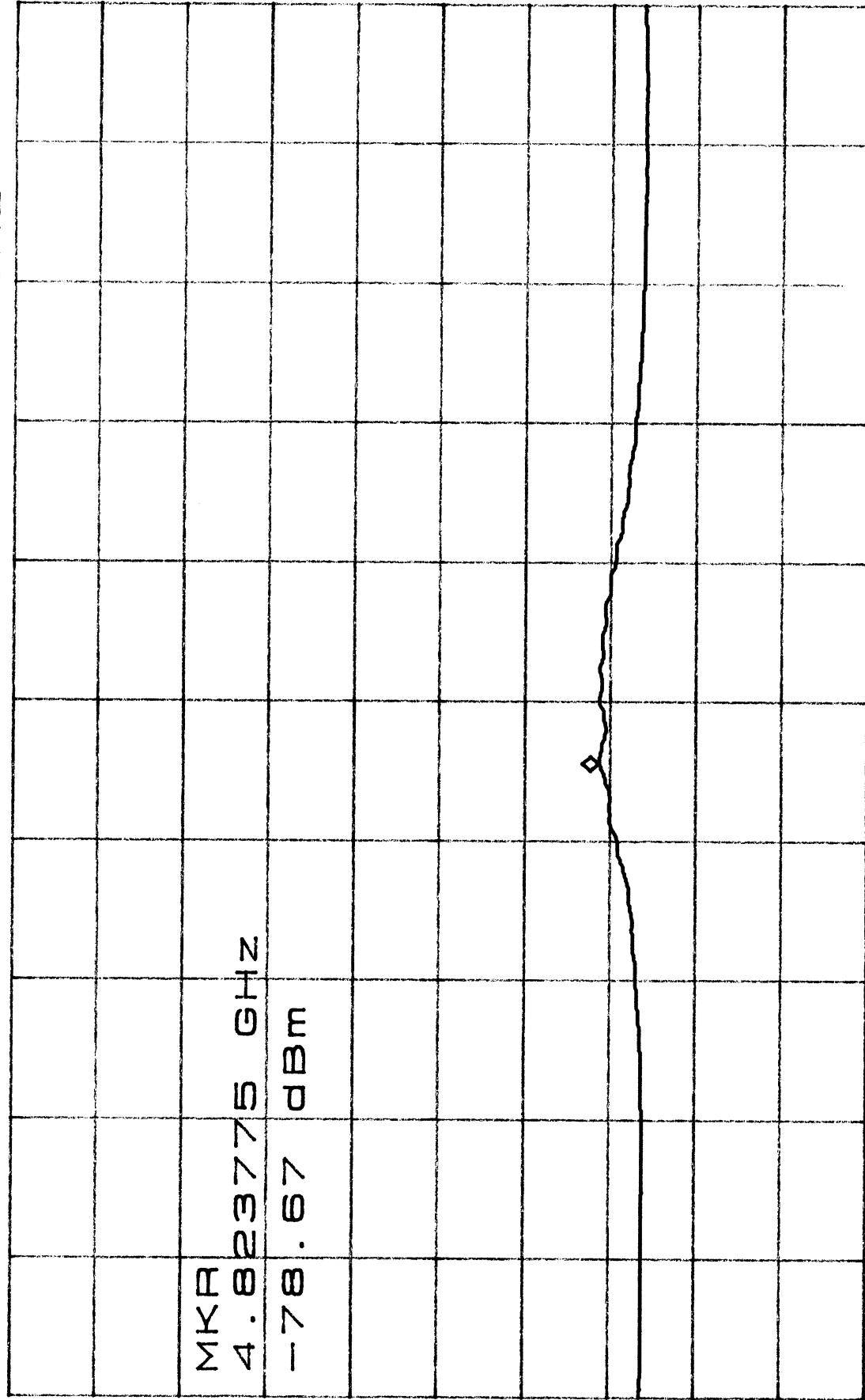
*ATTEN 0dB

RL -10.0dBm

10dB/

MKR -78.67dBm

4.823775GHz



MKR
4.823775 GHz
-78.67 dBm

D

CENTER 4.824000GHz

*RBW 1.0MHz *VBW 10Hz

SPAN 5.000MHz

SWP 5.0sec

HyperGain Model: HG2415U
Channel 1 at 1 Mbps

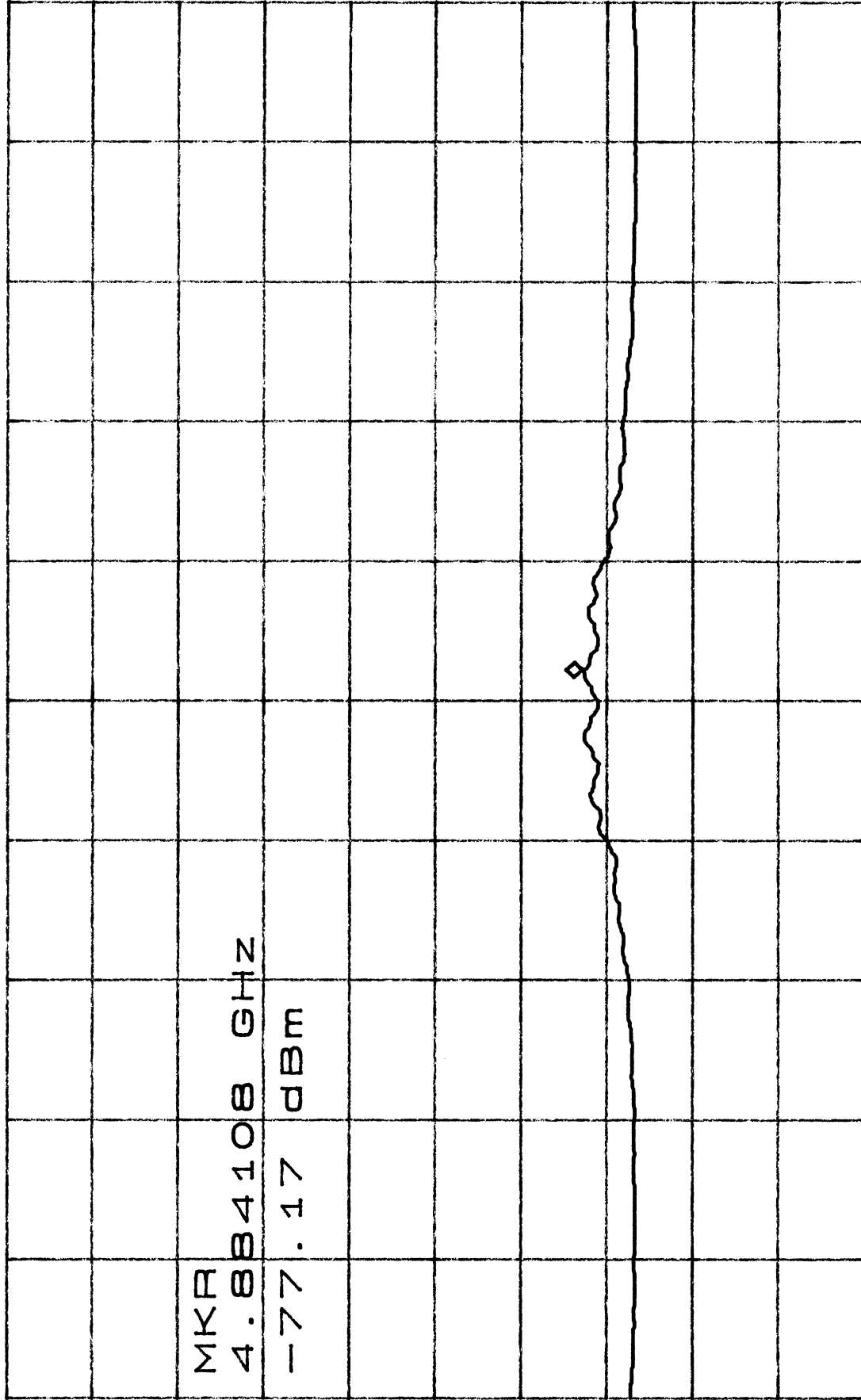
*ATTEN 0dB

MKR -77.17dBm

RL -10.0dBm

10dB/

4.884108GHz



CENTER 4.884000GHz

SPAN 5.000MHz

*RBW 1.0MHz

*VBW 10Hz

SWP 5.0sec

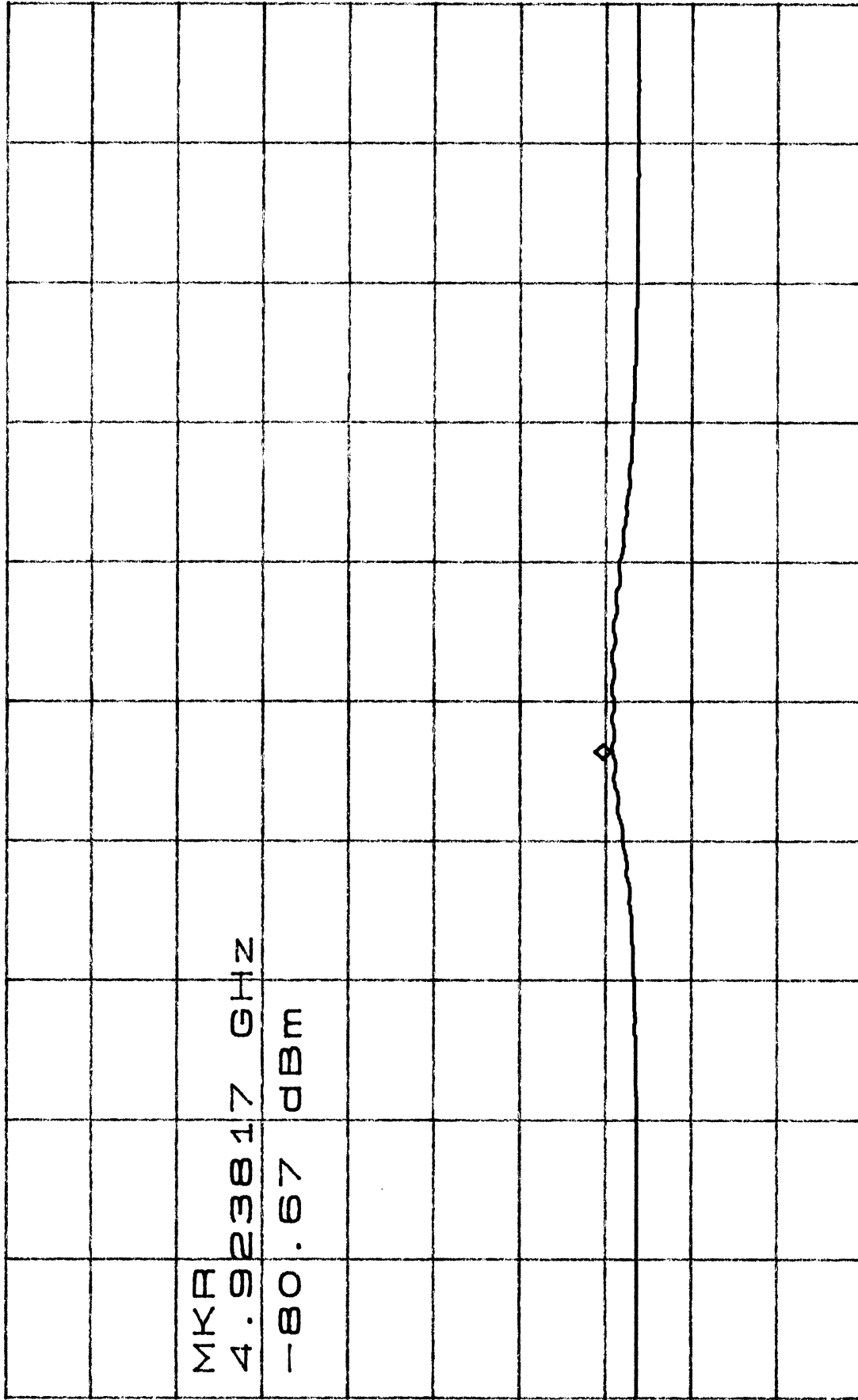
*ATTEN 0dB

MKR -80.67dBm

RL -10.0dBm

10dB/

4.923817GHz



MKR
4.923817 GHz
-80.67 dBm

D

CENTER 4.924000GHz

SPAN 5.000MHz

*RBW 1.0MHz *VBW 10Hz

SWP 5.0sec

HyperGain Model: HG2415U
Channel 11 at 11 Mbps

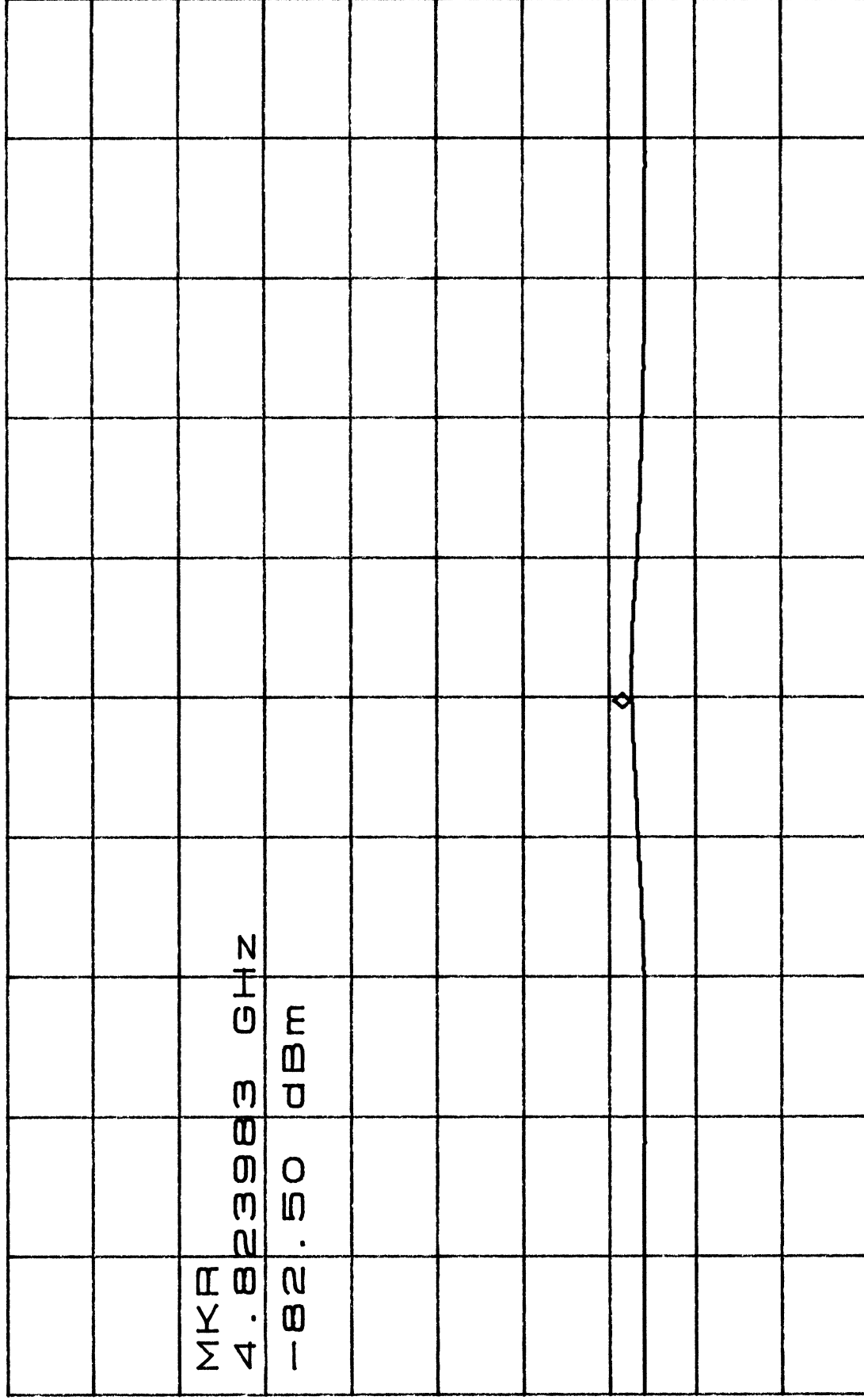
*ATTEN 0dB

MKR -82.50dBm

RL -10.0dBm

10dB/

4.823983GHz



MKR
4.823983 GHz
-82.50 dBm

D

CENTER 4.824000GHz

SPAN 5.000MHz

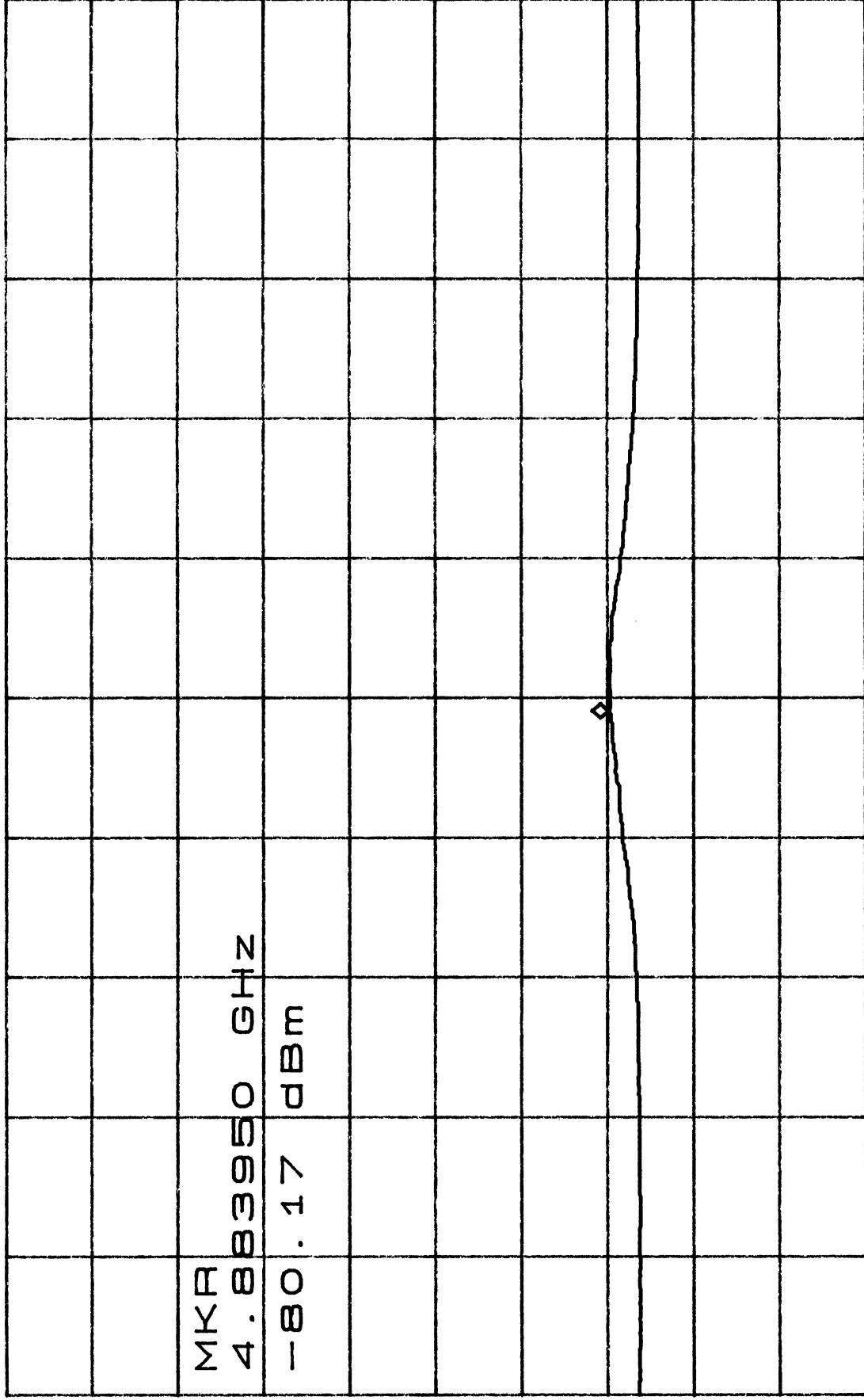
*RBW 1.0MHz *VBW 10Hz

SWP 5.0sec

HyperGain Model: HG2412P
Channel 1 at 1 Mbps

*ATTEN 0dB MKR -80.17dBm

RL -10.0dBm 10dB/ 4.883950GHZ



D

CENTER 4.884000GHZ

*RBW 1.0MHZ *VBW 10HZ

SPAN 5.000MHZ

SWP 5.0sec

HyperGain Model: HG2412P
Channel 7 at 1 Mbps

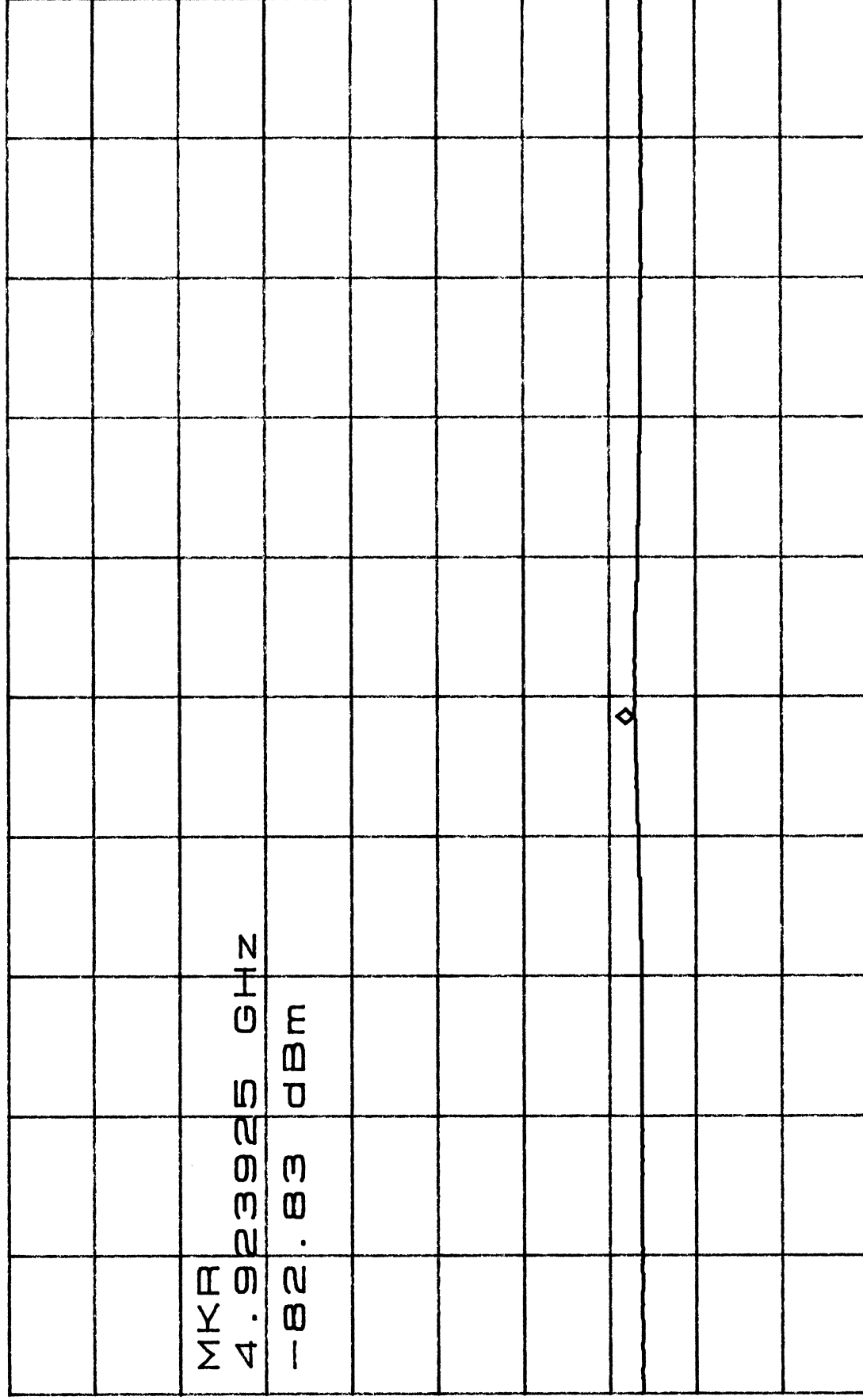
*ATTEN 0dB

MKR -82.83dBm

RL -10.0dBm

10dB/

4.923925GHz



D

CENTER 4.924000GHz

SPAN 5.000MHz

*RBW 1.0MHz

*VBW 10Hz

SWP 5.0sec

HyperGain Model: HG2412P
Channel 11 at 1 Mbps

HyperGain™ Model HG2415P

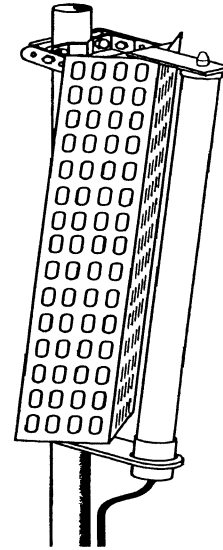
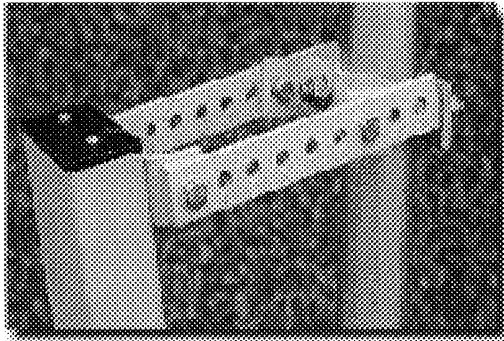
2.4 GHz 15 dBi 180 Degree Sector Panel Antenna

Superior Performance:

The HyperGain™ HG2415P Sector Panel Antenna combines 15 dB gain with a very wide 180° beam-width. It is a professional quality "cell site" antenna designed primarily for service providers in the 2.4 GHz ISM band.

Rugged and Versatile:

This antenna features a heavy-duty UV protected epoxy-fiberglass radome for all-weather operation. The included mounting system adjusts from 0 to 5 degrees downtilt.



Ideal for WIPOPs:

This antenna is an ideal choice for WIPOP (Wireless Internet Point-of-Presence) sites since the cell size can be easily determined by adjusting the down-tilt angle. Horizontal coverage is a full 180 degrees.

Electrical Specifications		Mechanical Specifications	
Frequency	2400 - 2500 MHz	Weight (with mount)	14 lbs.
Gain	15 dBi	Dimensions	32" x 9" x 2"
Beam Width (Horiz.)	180 degrees	Radome Material	UV Epoxy-Fiberglass
Beam Width (Vert.)	+/-10 degrees	Reflector Material	Aluminum
Impedance	50 Ohm	Mounting	2.75" O.D. pipe max.
Max. Input Power	300 Watts	Polarization	Vertical
VSWR	< 1.5:1 avg.	Wind Survival	150 MPH
Connector	N Female	Downtilt (mechanical)	0° to 5° (adjustable)

HyperGain™ HG2415P List Price \$795

Warranty: 2 Years

Jami



**1201 Clint Moore Road
Boca Raton, FL 33487 USA
Tel: 561-995-2256 Fax: 561-995-2432
Website: <http://www.hyperlinktech.com>
email: Sales@Hyperlinktech.com**

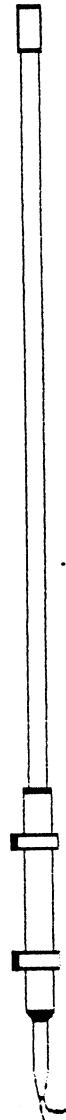
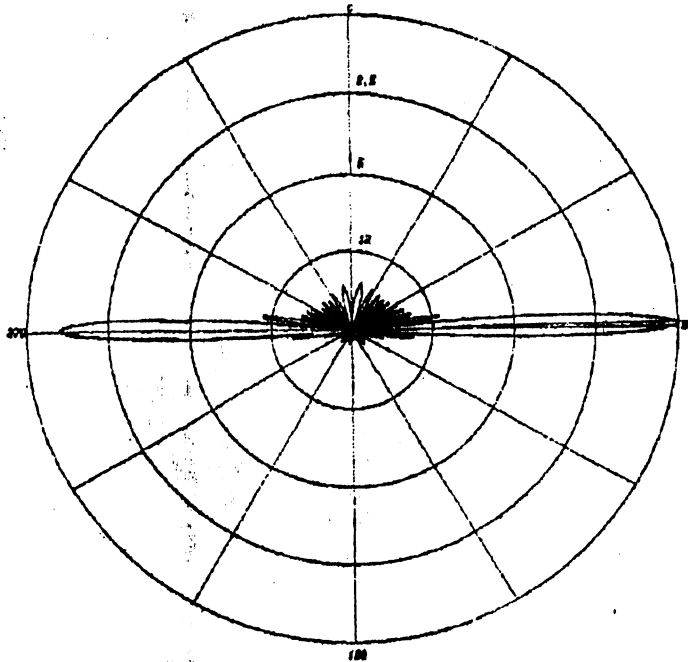
HyperGain™ Model HG2415U

2.4 GHz 15 dBi Omnidirectional Antenna

Electrical Characteristics

Frequency	2400 - 2483.5 MHz
Gain	15 dBi
Impedance	50 Ohm
VSWR	1 : 1.5 max
Maximum Input Power	100 W

Vertical Pattern (dB)



Mechanical Characteristics

Weight	1.16 kg
Length	1.78 m
Radome Material	Fiberglass
Finish	Powdercoat
Mounting	2.5" diameter mast max.

HyperGain™ Model HG2412P

2.4 GHz 12.5 dBi 90 Degree Sector Panel Antenna

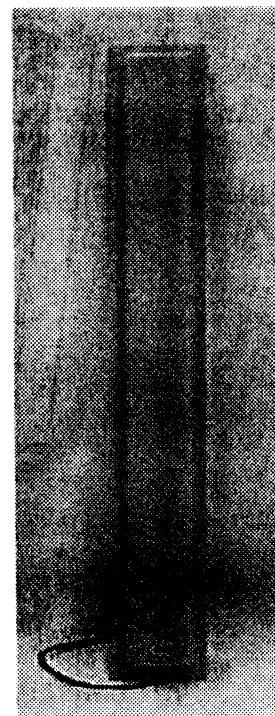
Superior Performance:

The HG2412P sectorized panel antenna provides 12.5 dBi gain with a full 90 degree coverage. It is ideally suited for applications requiring broad directional coverage including micro-"cells" for wireless ISP and enterprise network applications.

Rugged and Weatherproof:

This antenna's construction features sealed internal elements and an aesthetic UV-stable gray plastic radome. It is suitable for wall or mast-mounting, and can be used indoors or outdoors.

Electrical Specifications		Mechanical Specifications	
Frequency	2400 - 2500 MHz	Weight	< 1.5 lbs.
Gain	12.5 dBi	Dimensions	26.0" x 3.5" x 0.8"
Horizontal Beam Width	90 degrees	Radome Material	UV-Inhibited Polymer
Vertical Beam Width	10 degrees	Mounting	Mast or Wall
Impedance	50 Ohm	Polarization	Horizontal & Vertical
VSWR	< 1.5:1 avg.	Wind Survival	>150 MPH



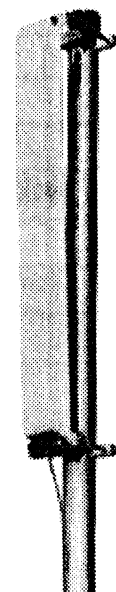
Available Connectors:

This antenna is supplied with a 6" pigtail with any of the connectors listed in the table at right. Specify the desired connector by adding the appropriate suffix to the part number:

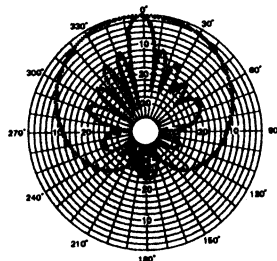
Example: **HG2412P-NF**

Connector Type	Suffix
N Female	NF
N Male	NM
Reverse Polarity N Female	RNF
Reverse Polarity N Male	RNM
Reverse Thread N Male	NRM
Reverse Thread N Female	NRF
TNC Male	TM
TNC Female	TF
Reverse Polarity TNC Female	RTF
Reverse Polarity TNC Male	RTM

Mast Mountable



Radiation Pattern

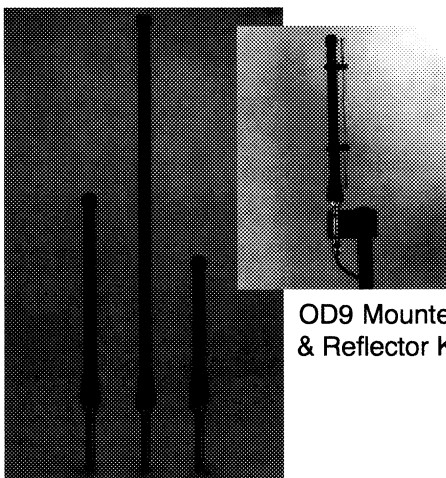


E-Plane
H-Plane

Guaranteed Quality: All HyperGain antennas are tested & backed by HyperLink's Two Year Warranty.



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OD9, OD12, OD6 Shown

OD9 Mounted
& Reflector Kit

OD Series Omni Antenna

For WLAN, Video, PCS, and Data Systems

- 3 dBi, 6 dBi, 9 dBi & 12 dBi antennas provide uniform omni coverage
- Unique design allows economical build out
- Mounting kit includes all hardware needed
- Reflector option provides directional beamshaping & increased performance

The OD Series Antennas are optimized for use in a wide variety of wireless systems. Typical uses include WLAN access points or bridge, PCS Microcell, WLL and surveillance transmitters.

These antennas consist of a collinear array with elements stacked vertically. Unique phasing cancels out-of-phase current distribution, improving system performance. This design maintains an omni pattern in the horizontal plane. The OD Series are free space antennas; no ground plane is required.

An option for the OD series is a reflector kit that beam shapes the omni pattern into a directional cardioid shape. This can result in improved directional gain, and isolation for reduced interference.

The low profile black radome (1" diameter) makes the antennas durable and rugged. They can withstand the harshest environments of snow, wind, rain and ice. The feed assembly is made of precision machined aluminum components and is irridited for weather protection. The antennas comes with all the hardware needed to install it to a mast. The OD antennas normally terminate with a female N connector. Optional models include pigtail cable

with connector. For ISM, Part 15 compliant connectors are available (reverse polarized), please consult factory.

Model Numbers

Model	Freq.(MHz)	Gain	Applications
OD6-1800	1700-1900	6 dBi	PCN, Surveillance
OD9-1800	1700-1900	9 dBi	PCN, Surveillance
OD6-1900	1850-1990	6 dBi	PCS, CDMA/TDMA
OD9-1900	1850-1990	9 dBi	PCS, CDMA/TDMA
OD3-2400	2400-2485	3 dBi	WLAN, ISM, Video
OD6-2400	2400-2485	6 dBi	WLAN, ISM, Video
OD9-2400	2400-2485	9 dBi	WLAN, ISM, Video
OD12-2400	2400-2485	12 dBi	WLAN, ISM, Video

Frequencies subject to bandwidth constraints; confirm desired frequencies at time of order. For pigtail cable options and special frequencies, please consult factory for latest model numbers and configurations.

Reflector Options

Reflector Options	Model
Add-on kit for 6 dBi models	ODR6-Kit
Add-on kit for 9 dBi models	ODR9-Kit
Add-on kit for 12 dBi models	ODR12-Kit

Specifications

Frequency & Gain:	See above	Material:	Polycarbonate radome, aluminum feed
Bandwidth @2:1 SWR:	140 MHz, 85 MHz for OD12	Length/Weight:	
Nominal Impedance:	50 ohms	3 dBi Models	16 inches, 1.5 lbs
Max. Power (continuous):	100 watts	6 dBi Models	19 inches, 1.5 lbs
Vertical Beamwidth (-3 dB point):		9 dBi Models	27 inches, 2.0 lbs
3 dBi Model	55 degrees	12 dBi Model	41 inches, 2.5 lbs
6 dBi Models	25 degrees	Antenna Diameter:	1", main mast
9 dBi Models	14 degrees	OD Series Interface:	N female connector
12 dBi Model	7 degrees	Mounting Kit:	Mast mount kit included
Wind Loading (flat plate equiv.):	30-40 sq. inches	Mounting Dimensions:	Use mast up to 2" OD
Rated Wind Velocity:	100+ mph	Options:	Reflector Option Kit
Lightning Protection:	External suggested		Pigtail Cable Option
			Part 15 Reverse Connectors