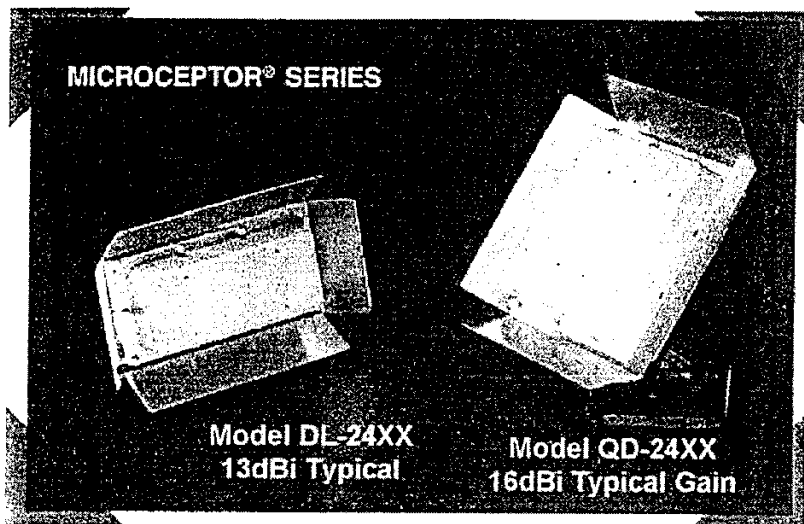


CONIFER 15.5 dBi PANEL ANT.

For World-Wide Applications
WLAN/ISM
2.4 - 2.5 GHz*

Microceptor® Series ANTENNAS



FEATURES

- Excellent Cross Pole Patterns
- Quick Mount "U" Bracket
- Tilt Mast Mount Option
- Broad Beam Width Option
- Light Weight But Durable
- Low Wind Loading
- Five Year Warranty

BENEFITS

- Superior Performance
- Easy To Install
- Optimize Signal Level
- Wide Area Coverage
- Saves On Shipping Costs
- Minimal Hardware Per Installation
- Guaranteed Reliability

MODELS

DL-2400

- 13dBi Typical G
- Standard Mast

DL-2402

- 13dBi Typical G
- Elevation Mast

QD-2400

- 16dBi Typical G
- Standard Mast

QD-2402

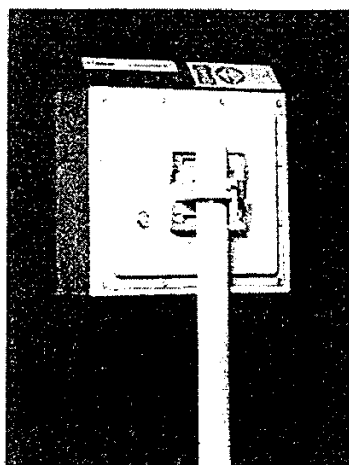
- 16dBi Typical G
- Elevation Mast

DL-2410

- 11dBi Typical G
- Standard Mast
- 75° 3 db Beam

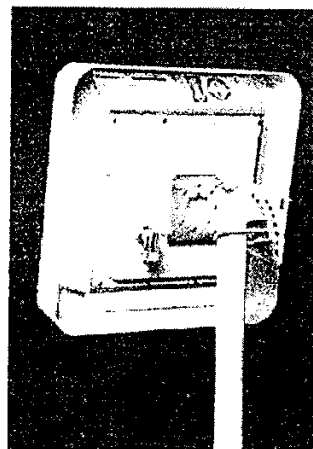
DL-2412

- 11dBi Typical G
- Elevation Mast
- 75° 3 dB Beam



Standard Mount Model
QD-2400.

The Standard Mount is
also available on Models
DL-2400 and DL-2410.



Elevation Mount Model
QD-2402.

The Microceptor is sold
with the Optional F
Male Adapter.

The Elevation Mount
also available on Models
DL-2402 and DL-2410.

CONIFER®
WIRELESS TELECOMMUNICATION TECHNOLOGY

1400 N Roosevelt, Burlington, IA 52601



*Contact Conifer's Sales Department for c

MICROCEPTOR®* ANTENNAS

MODELS QD AND DL

ELECTRICAL SPECIFICATIONS**

	DL-2400	DL-2402	QD-2400	QD-2402	DL-2410	DL-241
Gain	13dbi	13dBi	16dBi	16dBi	11dBi	11dB
3db Beamwidth						
--E Plane	47°	47°	27°	27°	27°	27°
--H Plane	27°	27°	27°	27°	75°	75°
F/B Ratio	>40dB	>40dB	>40dB	>40dB	>25dB	>25dB
Cross pole	>25dB	>25dB	>30dB	>30dB	>25dB	>25dB
VSWR	1.4:1	1.4:1	1.5:1	1.5:1	1.4:1	1.4:1
Impedance	50 OHMS	50 OHMS	50 OHMS	50 OHMS	50 OHMS	50 OHMS
Windloading						
@100MPH	25.0 lbs.	25.0 lbs.	39.4 lbs.	39.4lbs.	25.0lbs.	25.0lb
@140MPH	49.4 lbs.	49.4 lbs.	77.0 lbs.	77.0lbs.	49.4lbs.	49.4lb
Polarity	Dual	Dual	Dual	Dual	Dual	Dual
Input Power	50 Watts	50 Watts	50 Watts	50 Watts	50 Watts	50 Watts
Connector "N"	Female	Female	Female	Female	Female	Female
Right Angle Male	Optional	Optional	Optional	Optional	Optional	Optional
Standard Mount	1-2 in O.D. Pipe	--	1-2 in O.D. Pipe	--	1-2 in O.D. Pipe	--
Elevation Mount	--	60° in 10° increments or less	--	60° in 10° increments or less	--	60° in 10° increments or less

PHYSICAL FEATURES

	DL-24XX	QD-24XX
Size		
Inches	7.5 x 11	10.75 x 11
Millimeters	190 x 280	273 x 280
Weight		
Pounds	1.4	2.0
Kilograms	.64	.91
Reflector Material	Stamped Aluminum	Stamped Aluminum
Back Plate Bracket Material	Zinc-plated Steel	Zinc-plated Steel
Housing Material	High Impact ABS Plastic	High Impact ABS Plastic

*One or more Patents may apply: 5,229,782 • 5,523,768 • 5,402,138 • 5,394,115 • Patents Pending

**Specifications subject to change without notice.

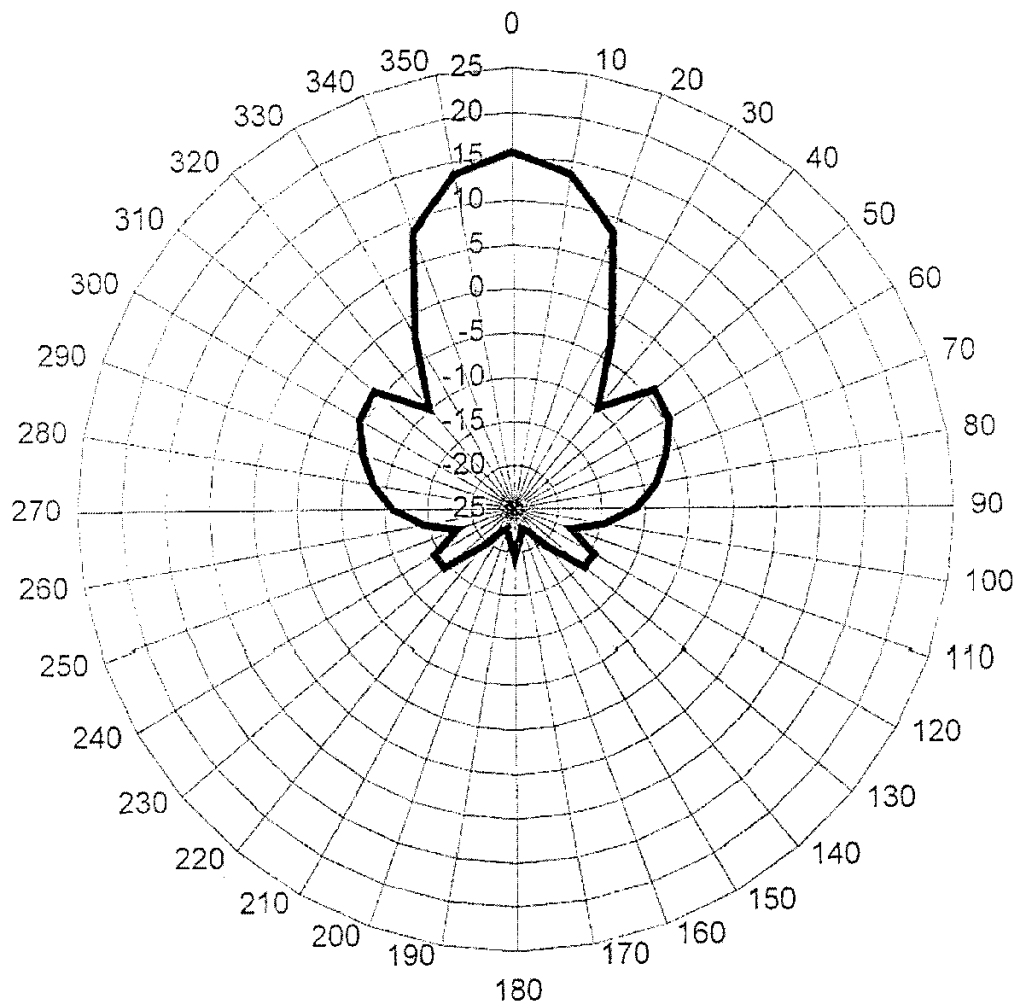
One 16 dBi Conifer flat panel Antenna

From Vendors Charts

<u>Degree</u>	<u>16dBi Panel</u>
0	15.5
10	13.5
20	8.5
30	-2.5
40	-10
50	-4
60	-4.5
70	-6.5
80	-8.5
90	-11
100	-14.5
110	-18
120	-14.5
130	-14.5
140	-19.5
150	-22
160	-22.5
170	-21.5
180	-19.5
190	-21.5
200	-22.5
210	-22
220	-19.5
230	-14.5
240	-14.5
250	-18
260	-14.5
270	-11
280	-8.5
290	-6.5
300	-4.5
310	-4
320	-10
330	-2.5
340	8.5
350	13.5

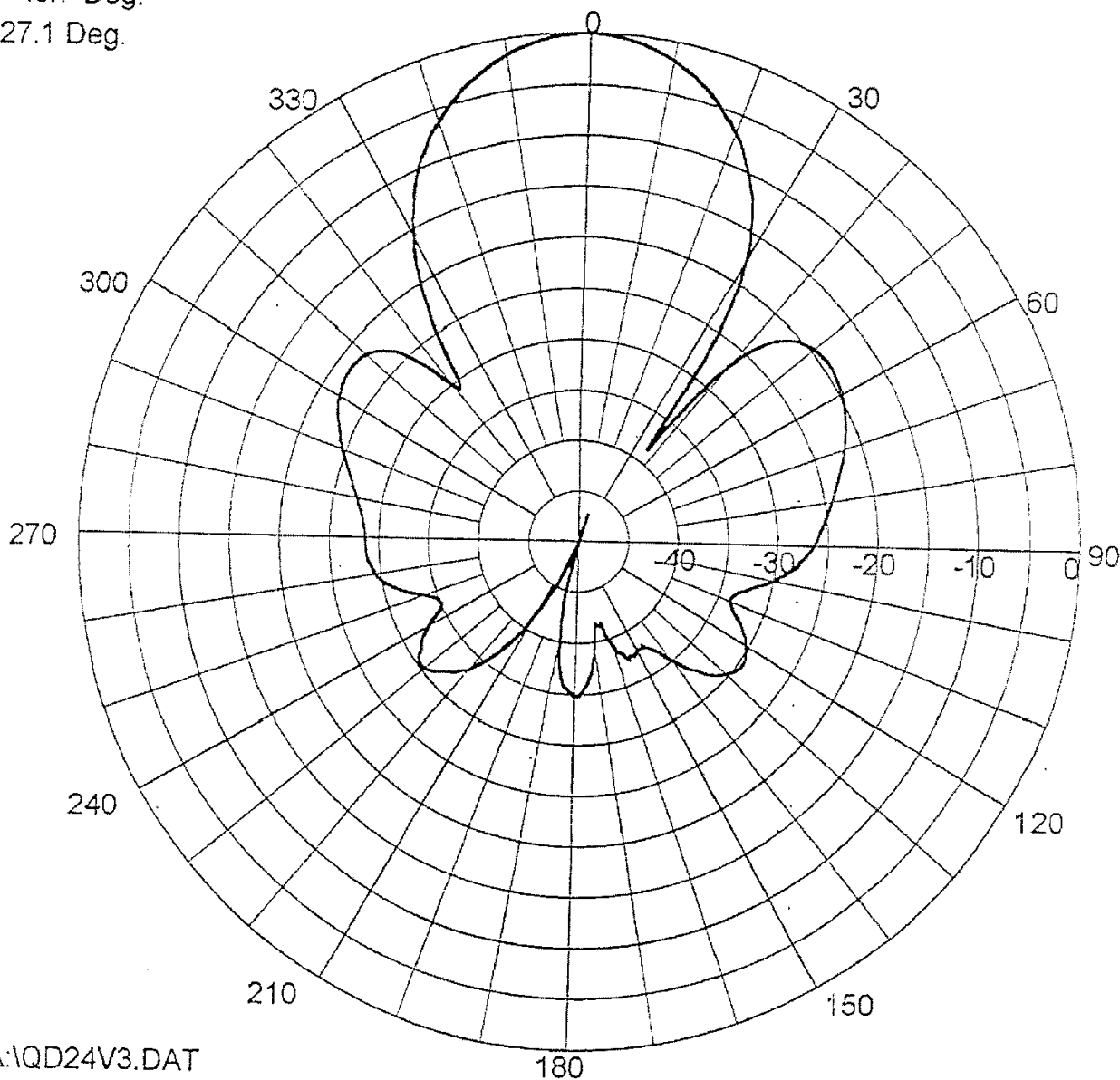
TEST96

Conifer 16dBi flat Panel -----
Test 96



Conifer Corporation Polar Plotter

15.35 dBi
ncy = 2.4 GHz
W = 48.7 Deg.
V = 27.1 Deg.



e = A:\QD24V3.DAT

ts: QD2400 VERTICAL 2.345-2.4835GHz

Conifer Corporation 1400 N. Roosevelt Avenue Burlington IA 52601 (319) 752-3607

TRADE SECRET

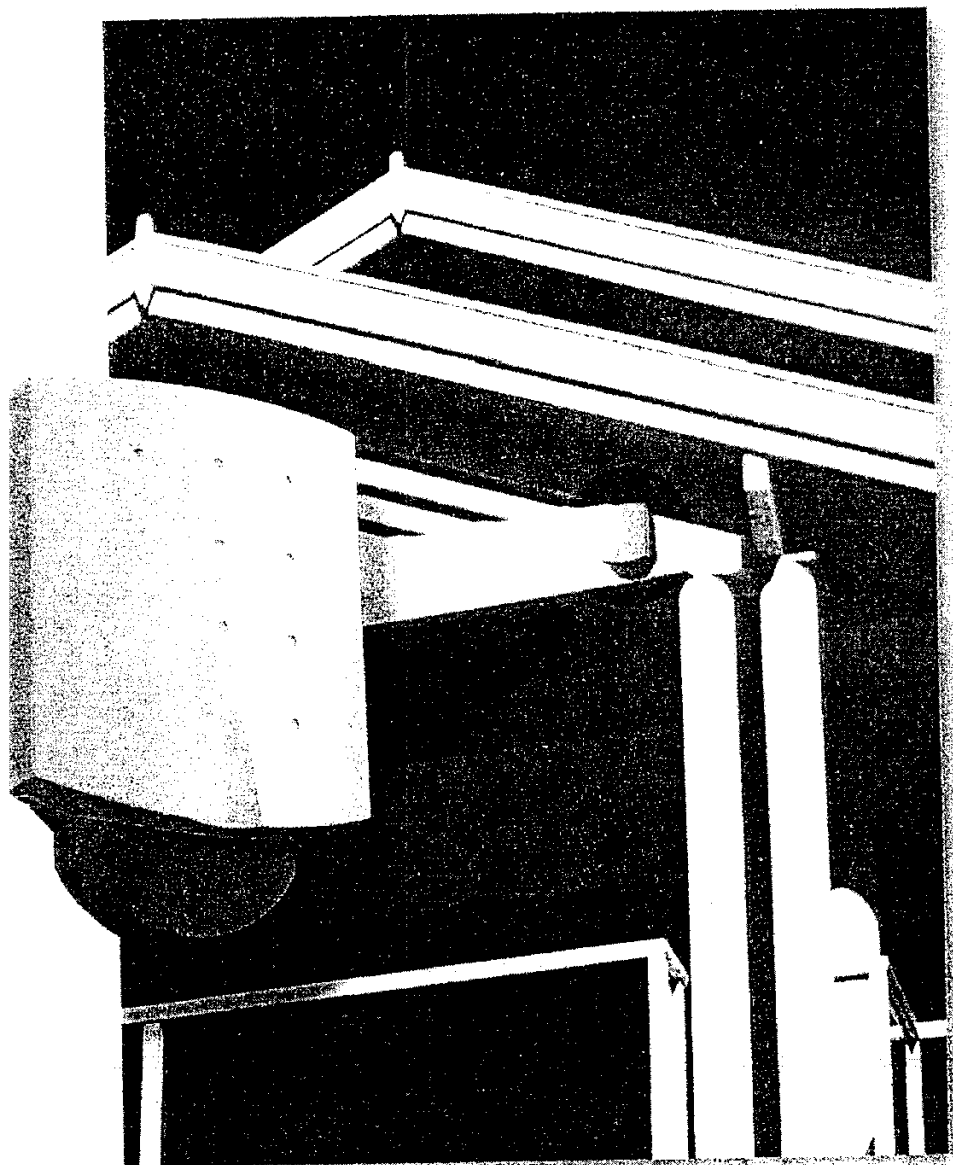
The information and data contained herein is secret and shall not be disclosed, used or duplicated for any purpose whatsoever without the prior written permission of Conifer Corp. 1400 N. Roosevelt P.O. Box 1005



CUSHCRAFT
COMMUNICATIONS ANTENNAS

DirectLink™

SERIES ANTENNAS



► **CONTEMPORARY
STYLING**

► **INDOOR/OUTDOOR
PERFORMANCE**

► **FLEXIBLE INSTALL
OPTIONS**

► **HIGH PERFORMANCE
AT AN ECONOMIC
PRICE**

DirectLink Antennas
When you need wired performance
for your wireless system.

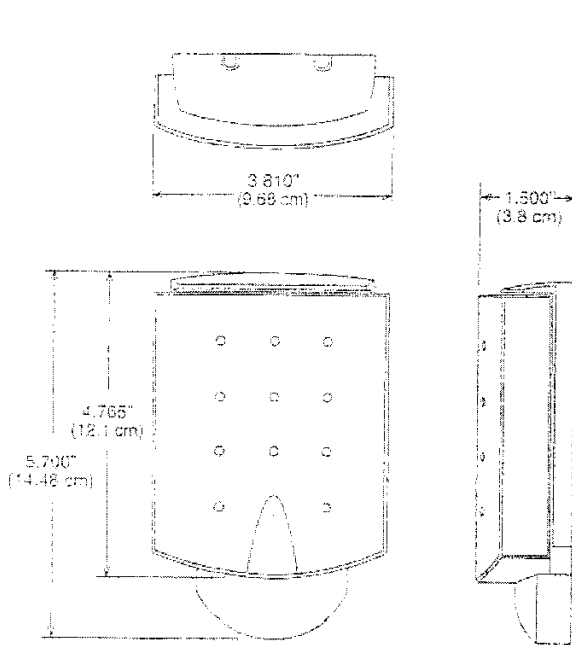
Models for:

1500 1500 1500

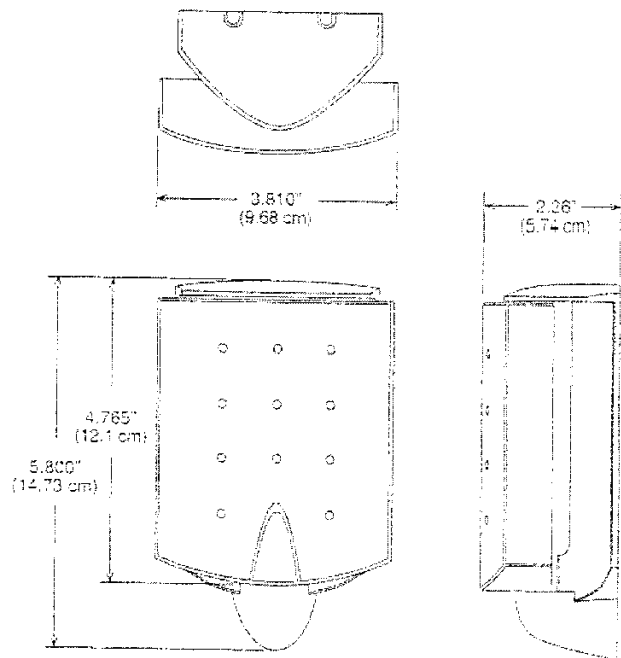


**Antenna
Version
Establishes
Quality
With Low
Installation**

DirectLink Series Antennas



STANDARD WALL MOUNT



ARTICULATING MOUNT
(±30 degrees)

FREQUENCY MHz	MODEL	GAIN dBi	SWR	VOL. EFF.	AXIAL RATIO dB	REFL. COEFF.	CONNECTOR	REMARKS
1710-1880	S1718AMP10SMF	7.5	80	85	1.5:1	12	SMA	Yes
1710-1880	S1718MP10SMF	7.5	80	85	1.5:1	12	SMA	No
1710-1880	S1718AMP10TNF	7.5	80	85	1.5:1	12	TNC	Yes
1710-1880	S1718MP10TNF	7.5	80	85	1.5:1	12	TNC	No
1850-1990	S1857AMP10SMF	7.5	55	80	1.5:1	12	SMA	Yes
1850-1990	S1857MP10SMF	7.5	55	80	1.5:1	12	SMA	No
1850-1990	S1857AMP10TNF	7.5	55	80	1.5:1	12	TNC	Yes
1850-1990	S1857MP10TNF	7.5	55	80	1.5:1	12	TNC	No
2300-2500	S2307AMP10SMF	7.5	50	65	1.5:1	12	SMA	Yes
2300-2500	S2307MP10SMF	7.5	50	65	1.5:1	12	SMA	No
2300-2500	S2307AMP10TNF	7.5	50	65	1.5:1	12	TNC	Yes
2300-2500	S2307MP10TNF	7.5	50	65	1.5:1	12	TNC	No
5150-5350	S5150	12	35	60	1.5:1	12		Yes
5725-5925	S5725	12	35	60	1.5:1	12		Yes

Specifications subject to change without notice.

Power Handling: 50 Watts (25 Watts at 5 GHz)

Polarization: Linear

Dimensions & Weight:

Articulating versions - 5.80 x 3.81 x 2.26 in. (14.73 x 9.68 x 5.74 cm),
8 oz (.23 kg)

Non-Articulating versions - 5.70 x 3.81 x 1.50 in. (14.48 x 9.68 x 3.80 cm),
5 oz (.14 kg)

Connectors: SMA, TNC. Other connector types available on special request.

Mounting: Standard units for wall mounted. Mast mount kits available.

Custom mount configurations available for volume users.

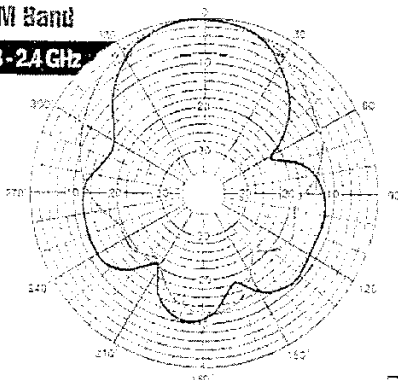
Cable: Low loss "pigtail" provided

Product also available in private labeled versions for volume users.

Notes: Specifications for 5 GHz versions are preliminary. First availability second half 1997.

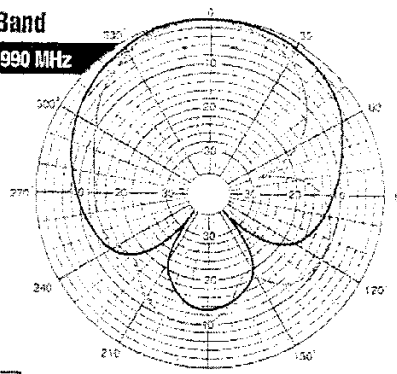
ISM Band

23-24 GHz



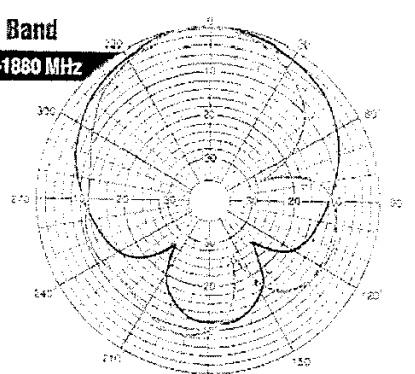
PCS Band

1850-1990 MHz



PCN Band

1710-1880 MHz



— E-Plane
— H-Plane

Cushcraft Corporation

48 Perimeter Road
Manchester, NH 03013
1-800-258-3860

Fax: 1-800-258-3868

Error! Bookmark not defined.

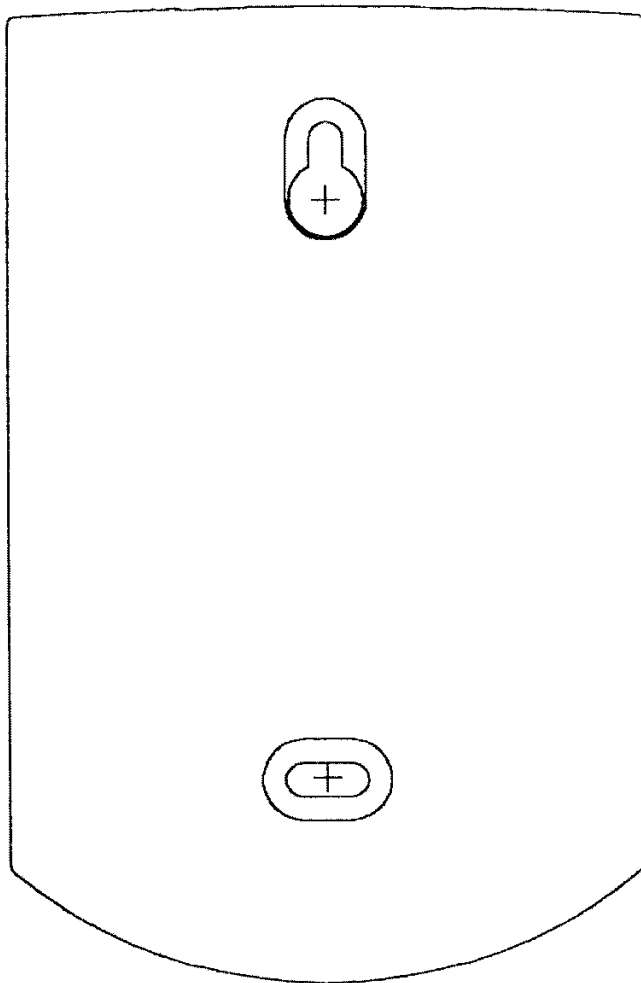
DirectLink™

following pages present technical data and actual measured radiation patterns for the Cushcraft DirectLink series antenna. Amplitude radiation patterns are presented in polar format. Gain values are realized to 0 dB. Both E- and H-plane data is presented for the low, mid and high frequency points in VHF, UHF, PCS and ISM bands. (Please note that the actual ASCII data contained in the ascii directory on the disk is in actual dBi)

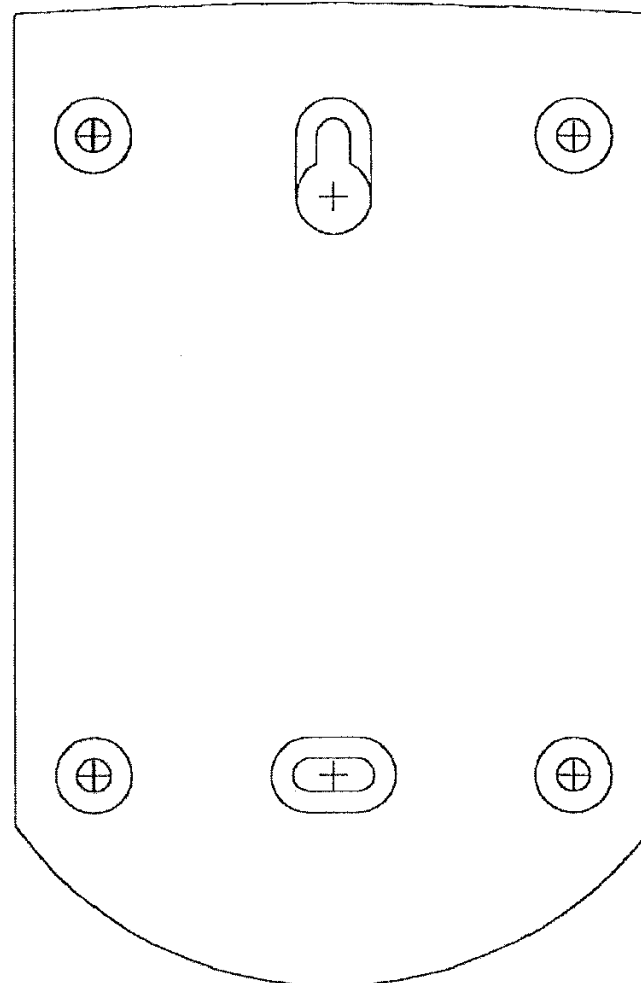
Frequency	Gain	E-Plane BW	H-Plane BW	Front/Back	VSWR
1710 MHz	7.5 dBi min	69 deg. typ	81 deg. typ	18 dB typ	<1.5:1
1795 MHz	7.5 dBi min	67 deg. typ	79 deg. typ	18 dB typ	<1.5:1
1880 MHz	7.5 dBi min	65 deg. typ	75 deg. typ	18 dB typ	<1.5:1
1850 MHz	7.5 dBi min	60 deg. typ	84 deg. typ	15 dB typ	<1.5:1
1920 MHz	7.5 dBi min	56 deg. typ	87 deg. typ	15 dB typ	<1.5:1
1990 MHz	7.5 dBi min	56 deg. typ	95 deg. typ	15 dB typ	<1.5:1
2300 MHz	7.5 dBi min	56 deg. typ	78 deg. typ	15 dB typ	<1.5:1
2300 MHz	7.5 dBi min	58 deg. typ	75 deg. typ	15 dB typ	<1.5:1
2500 MHz	7.5 dBi min	58 deg. typ	70 deg. typ	15 dB typ	<1.5:1

WALL ANCHOR HOLE TEMPLATE

ARTICULATING MOUNT

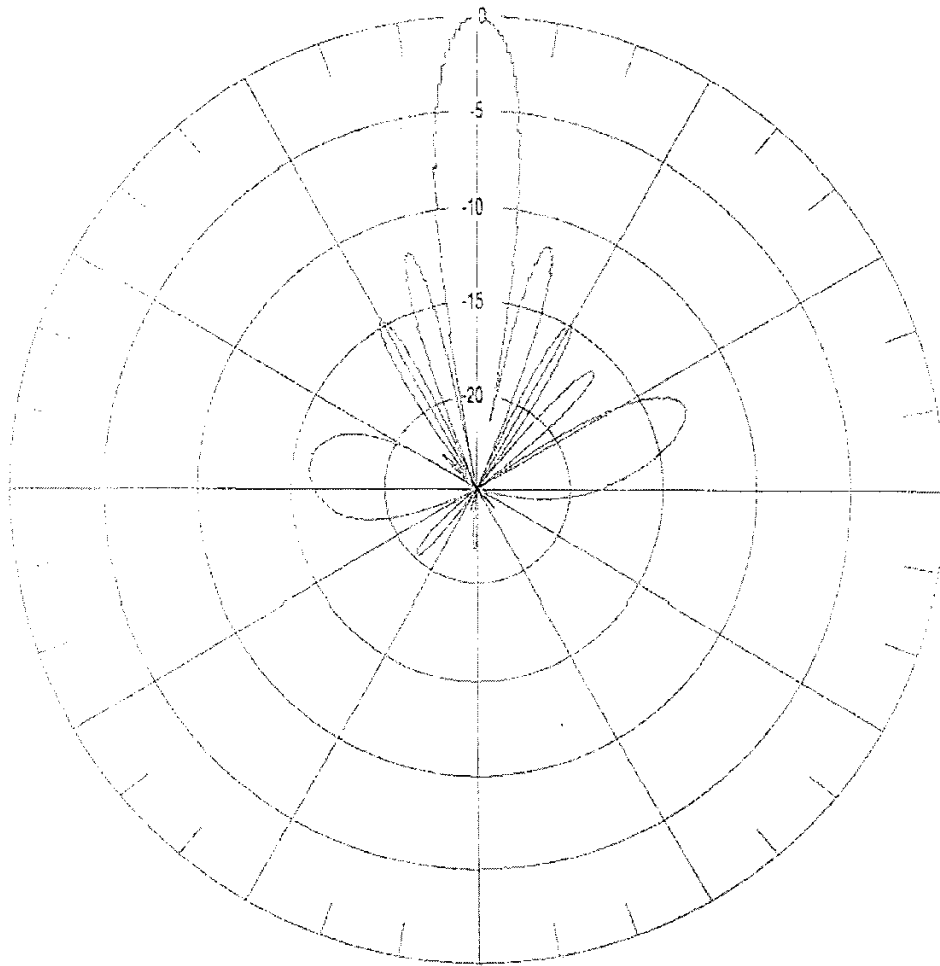


WALL MOUNT

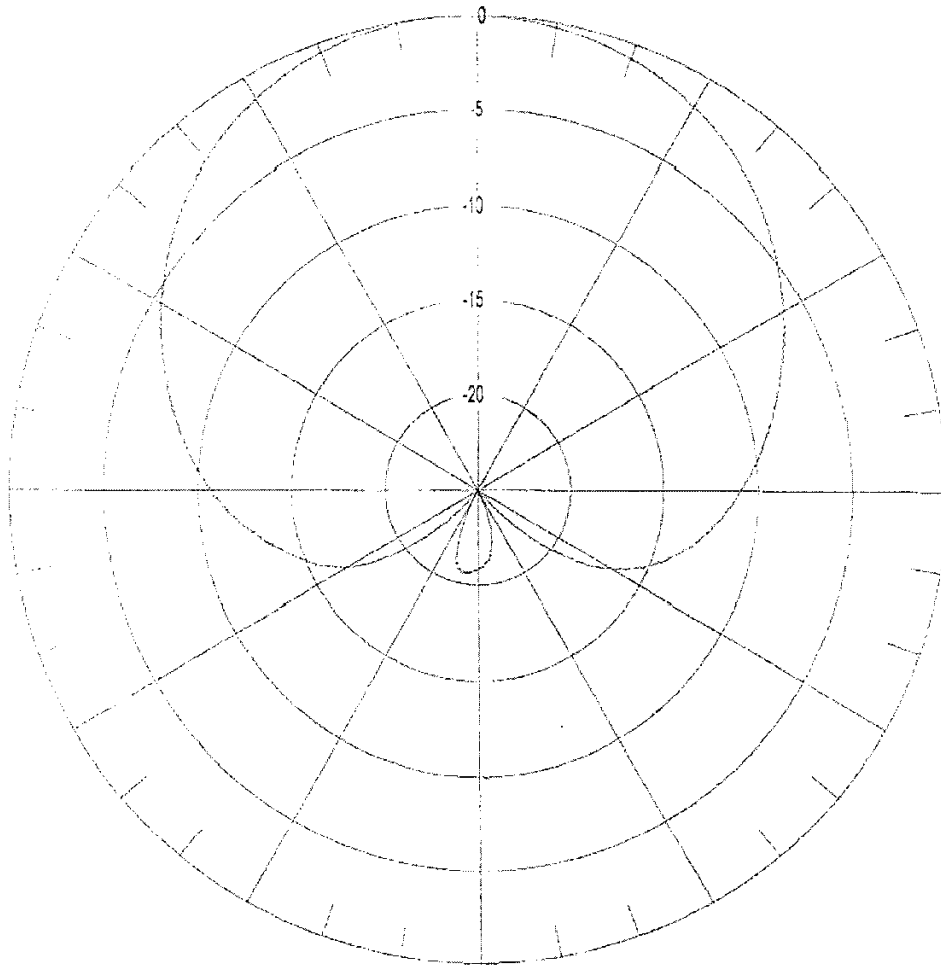


DRILL DESIRED HOLES 3/16 DIA. (M4.75)

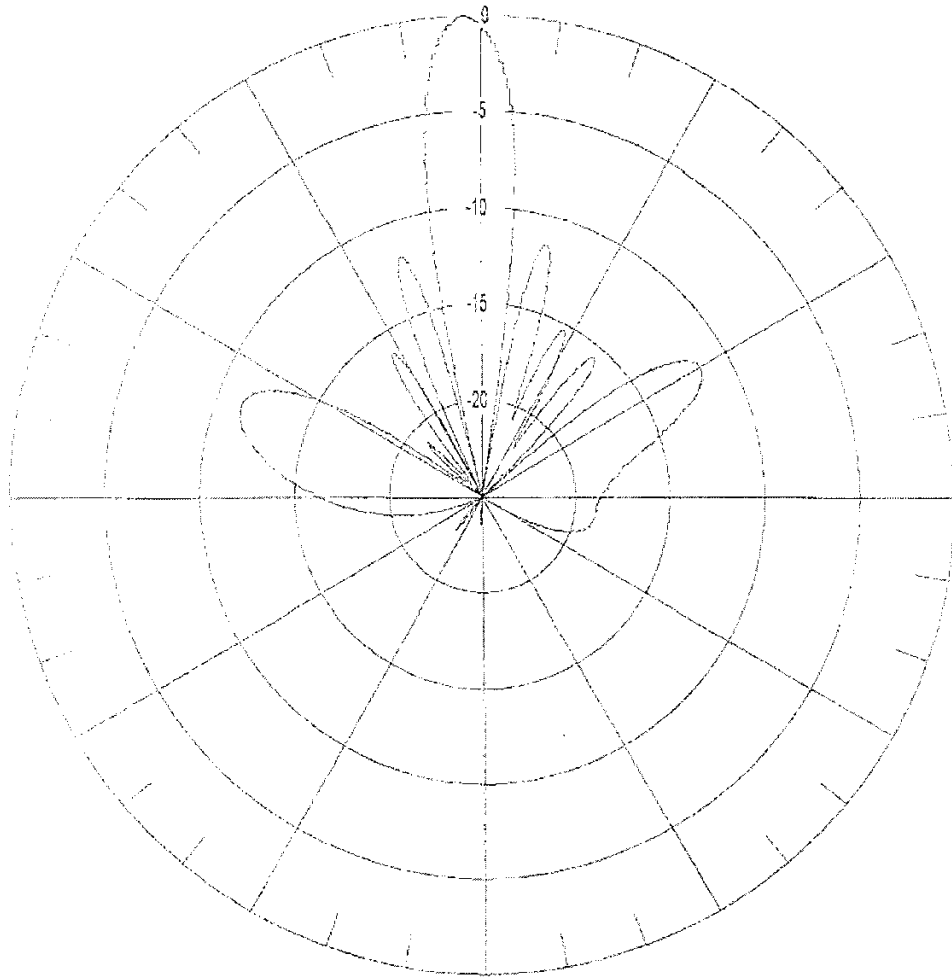
S241290P12NF



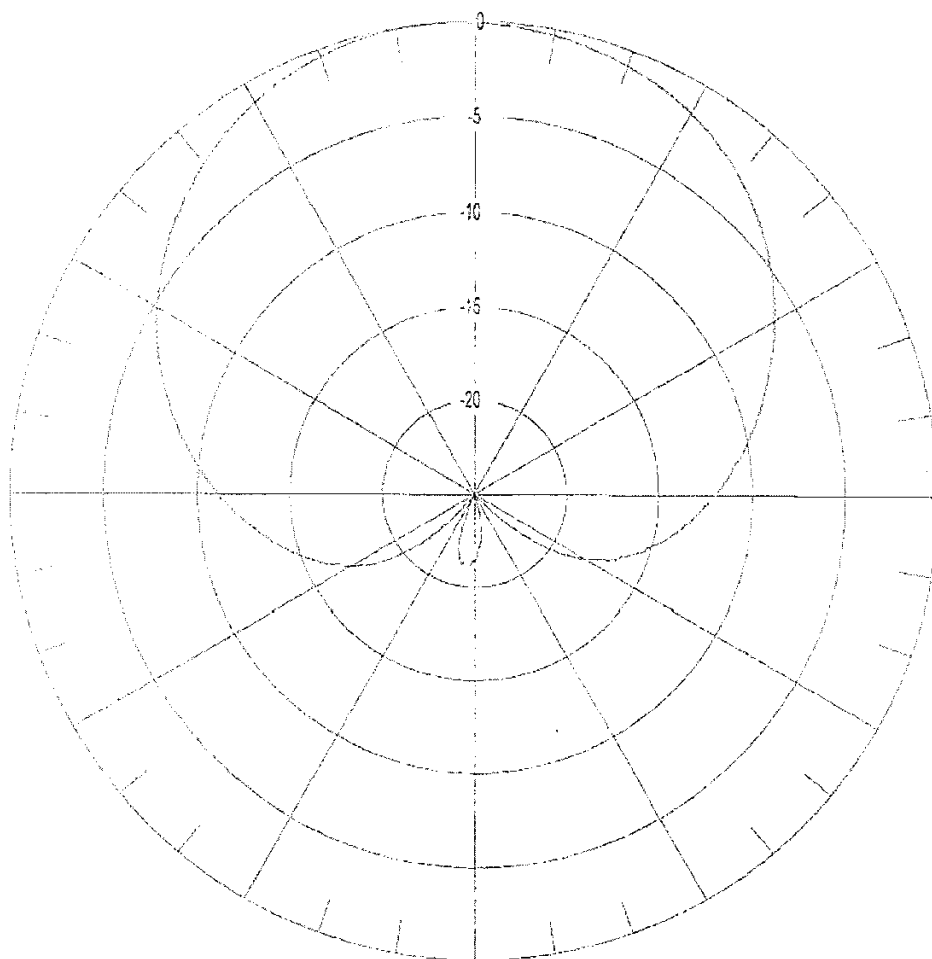
E plane 2400 MHz



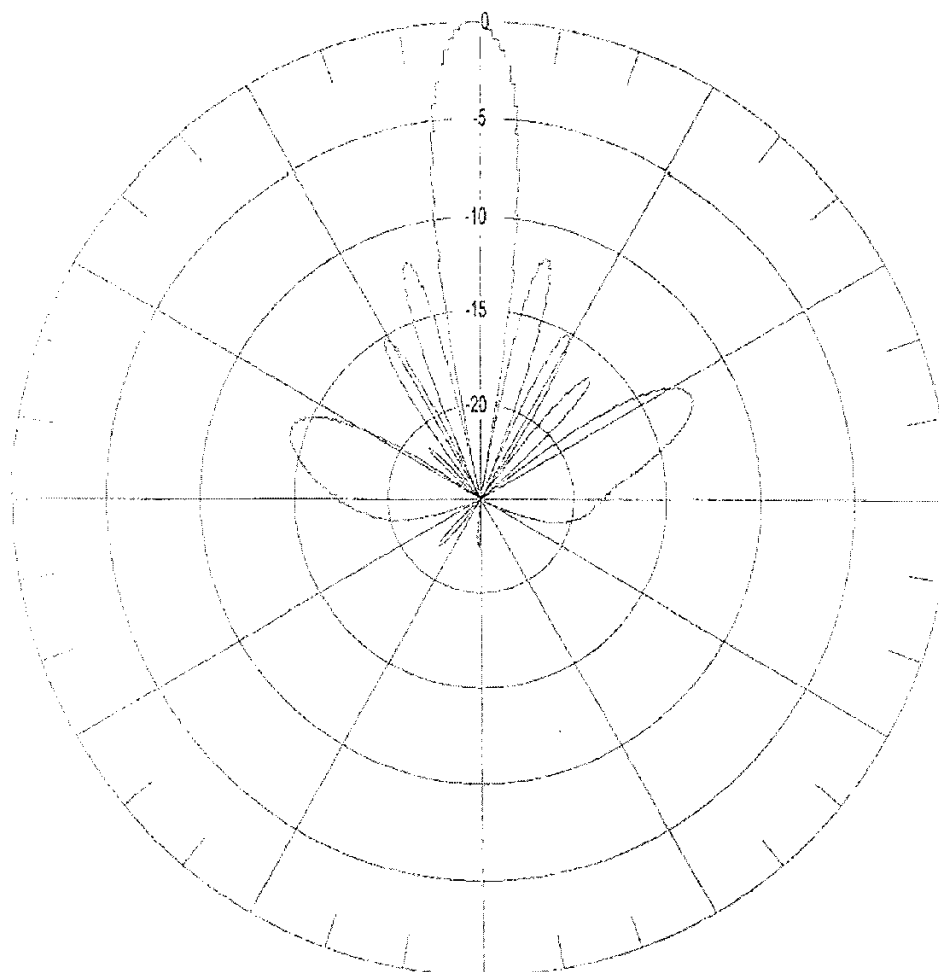
H plane 2400 MHz



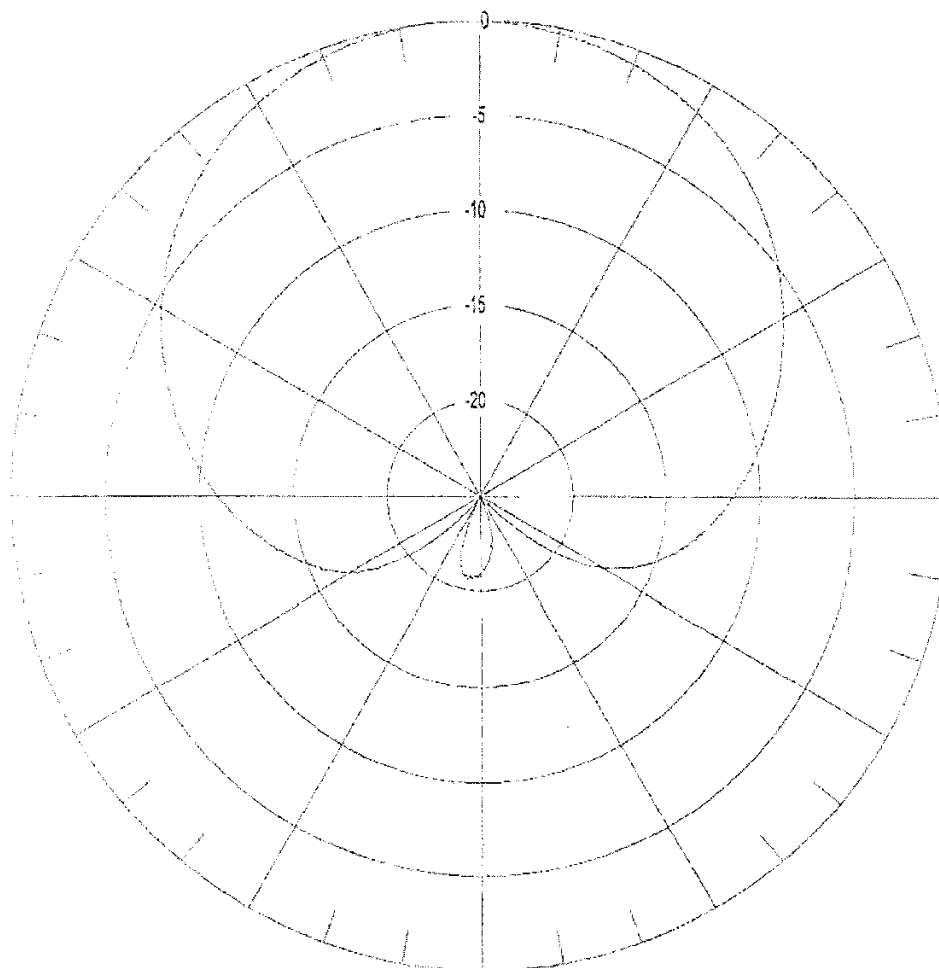
E plane 2500MHz



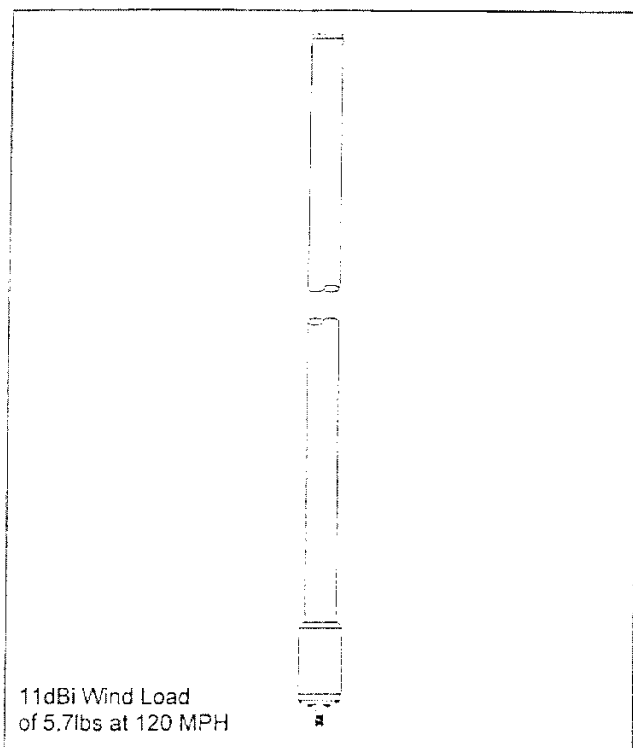
H plane 2500 MHz



E plane 2450 MHz



H plane 2450 MHz



11dBi Wind Load
of 5.7lbs at 120 MPH

E-5030 Series

2.4 GHz Omnidirectional Antennas

Frequency:	2.4 - 2.5 GHz		
Polarization:	Vertical		
Pattern:	Omnidirectional		
Gain,	E-5030,1	6 dBi	13.0 in.
Length	E-5032	8 dBi	18.8 in.
	E-5033	11 dBi	37.0 in.
Connector:	E-5030	N-male	
	E-5031,2,3	N-female	
Power Handling:	100 Watts		
SWR	1.5:1		
Wind Rating (Sustained)	135 mph		

Richard Hirschmann of America, Inc.

30 Hook Mountain Road – P.O. Box 654

Pine Brook, New Jersey 07058 USA

(973) 830-2000 Fax: (973) 830-1470

E-mail: ant-sales@hirschmann-usa.com

2.4 GHz ISM Band

Omnidirectional Antennas

These lightweight but rugged antennas are excellent choices use in the low power ISM band. Offering exceptional value and service, The E-5030 family provides good gain characteristics, moderate cost, and superb coverage.

The E-5030 series offers the system operator a choice of gain to accommodate a variety of requirements and situations. Each is a collinear design fabricated from the latest of low loss microwave dielectric materials and pure copper radiating elements. Models are available with both N-male and -female connectors to allow for direct connection to system equipment, thus avoiding feed line losses.

The E-5030 Series has been designed to provide low side lobes, improving coverage on the horizon. Each model has been optimized for aperture efficiency, resulting in minimum length for its gain point.

Each antenna is in a sleek white UV resistant radome that blends well in many mounting locations.

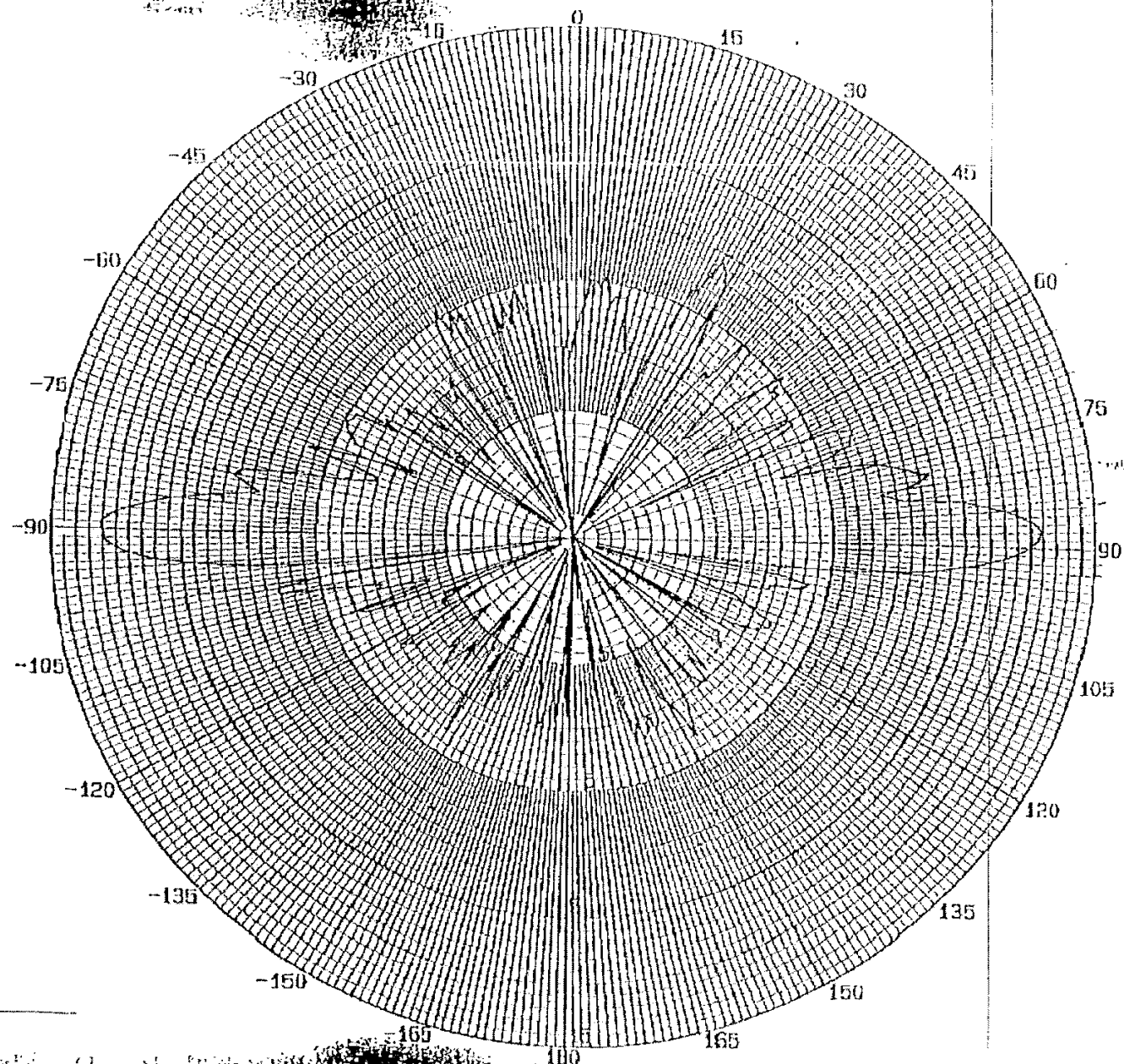
Other frequency ranges can be provided. Contact the factory for details.

With over 60 years in the communications industry, Hirschmann leads the way with quality, innovation, and a dedication to the future

FILENAME: 90406097002
FREQ: 2.400 GHz
POLARIZATION: E-PLANE

04/06/99 11:08:39

PLOT: Channel 1

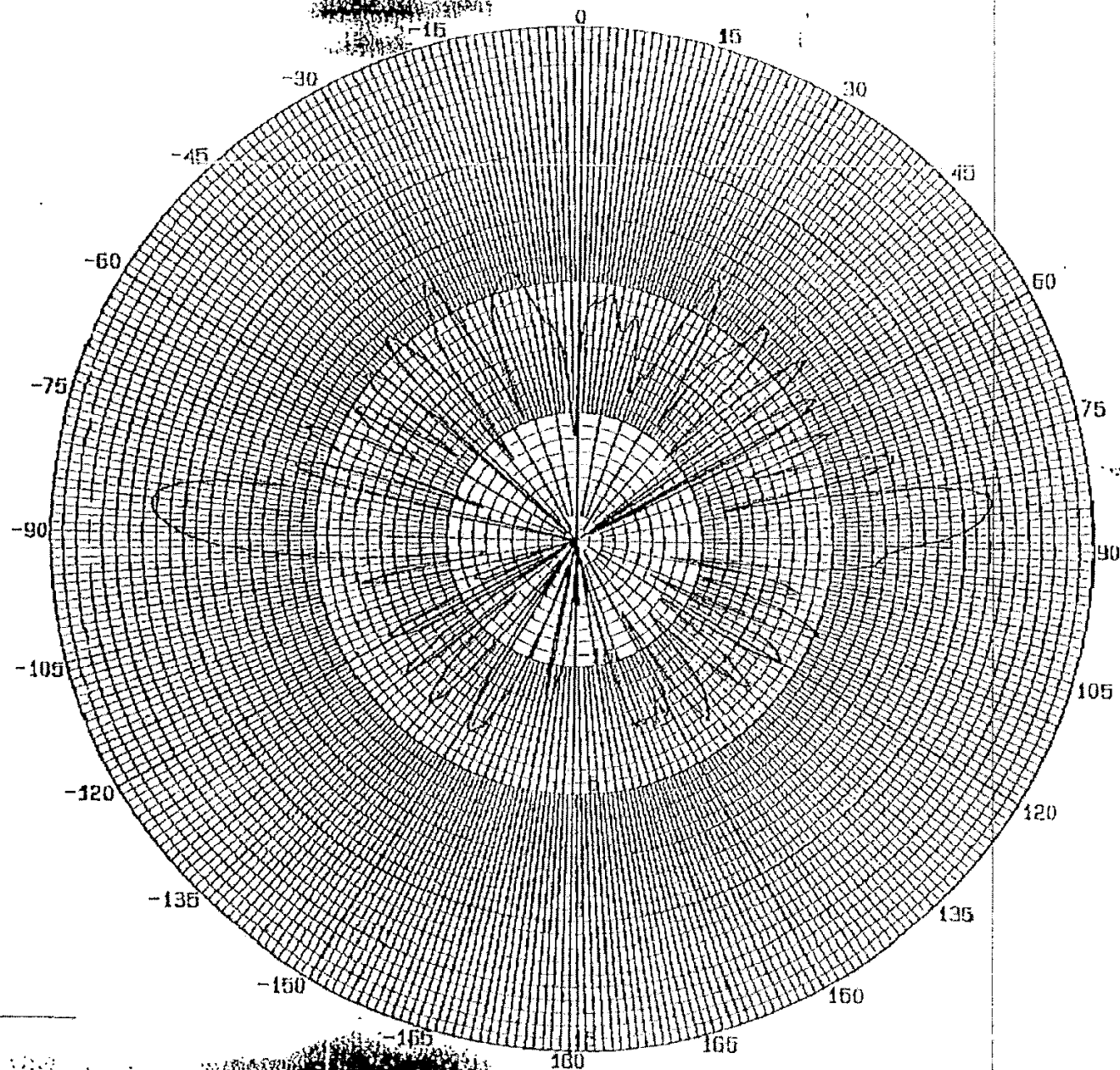


Data: _____

FILENAME: 9040603.004
FREQ: 2.490 GHz
POLARIZATION: E-PLANE

04/06/99 11:13:50

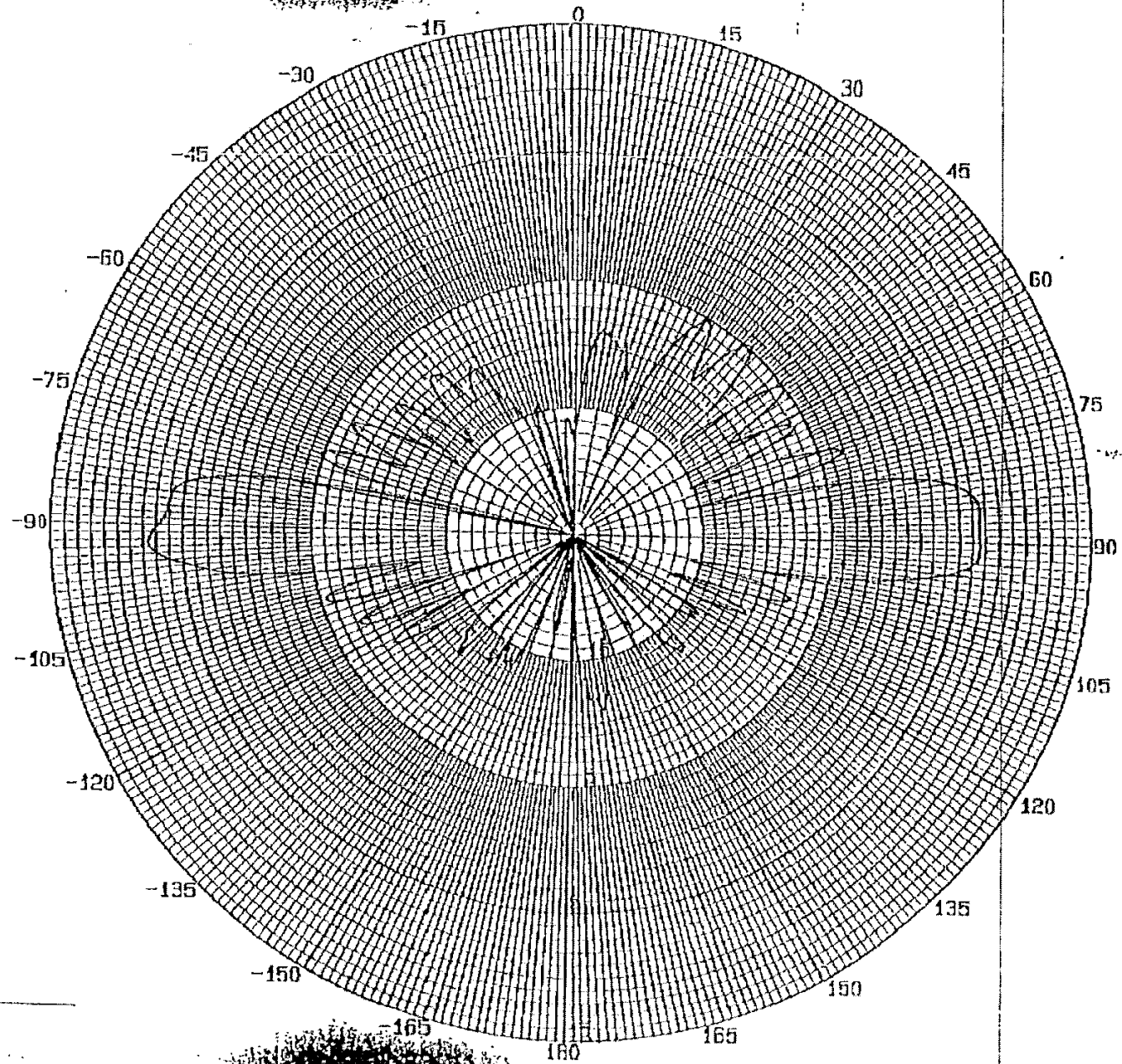
PLOT: Channel 1



Data: _____

2.310 GHZ
POLARIZATION: E-PLANE

PLOT: Channel 1

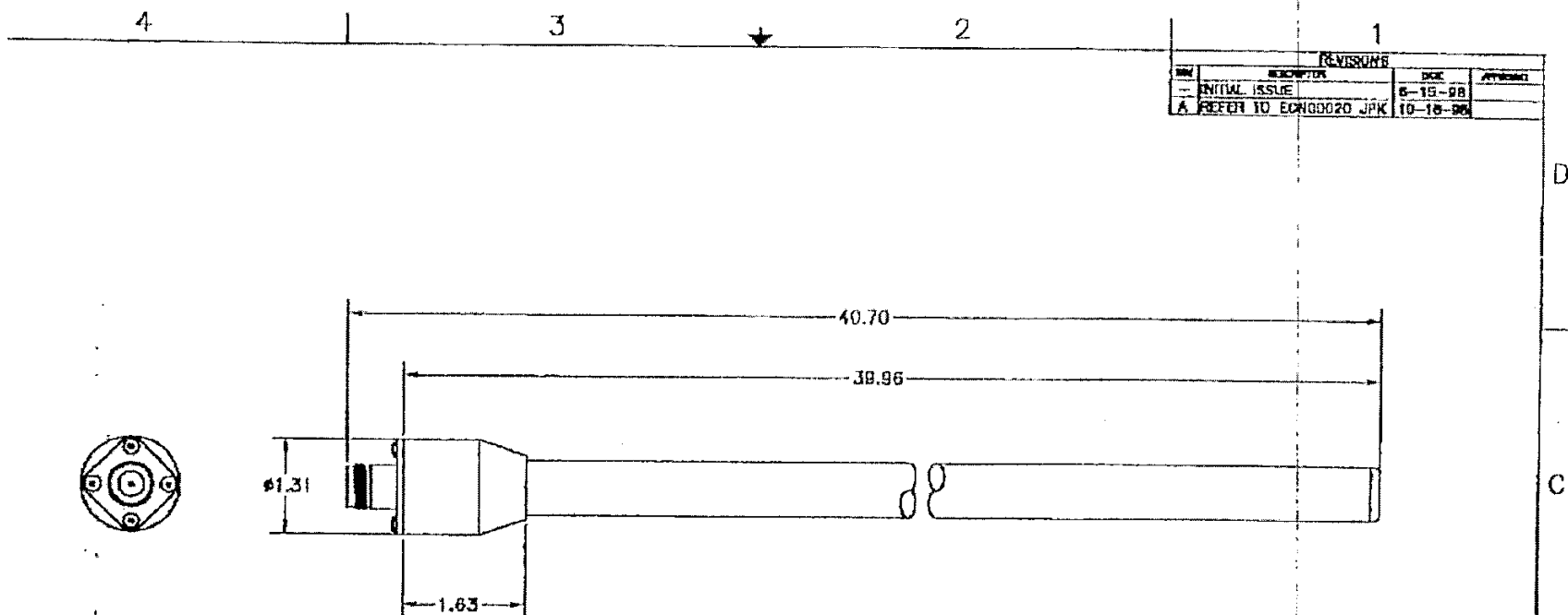


Data: _____

DATE: 10/10/68
TIME: 10:00 AM

1000 dBi Vs Azimuth

10/10/68



REVISIONS		
REV	DESCRIPTION	DATE
-	INITIAL ISSUE	8-15-98
A	REFER TO ECH00020 JPK	10-18-98

ELECTRICAL SPECIFICATIONS: FREQUENCY: 2.4-2.5 GHz
 GAIN: 11dBi NOMINAL
 VSWR: 2.0:1
 RADIATION PATTERN: OMNI-DIRECTIONAL
 POLARIZATION: VERTICAL

MECHANICAL SPECIFICATIONS: CONNECTOR: "N" FEMALE
 MAXIMUM WEIGHT: 8 oz.
 RADOME COLOR: WHITE (UV INHIBITED)
 WIND LOAD: 120MPH
 RAIN: MIL-T-28800C 4.5.5.5.1

NOTES: 1. ANTENNA SUPPLIED WITH MOUNTING HARDWARE KIT
 PART #827965-037

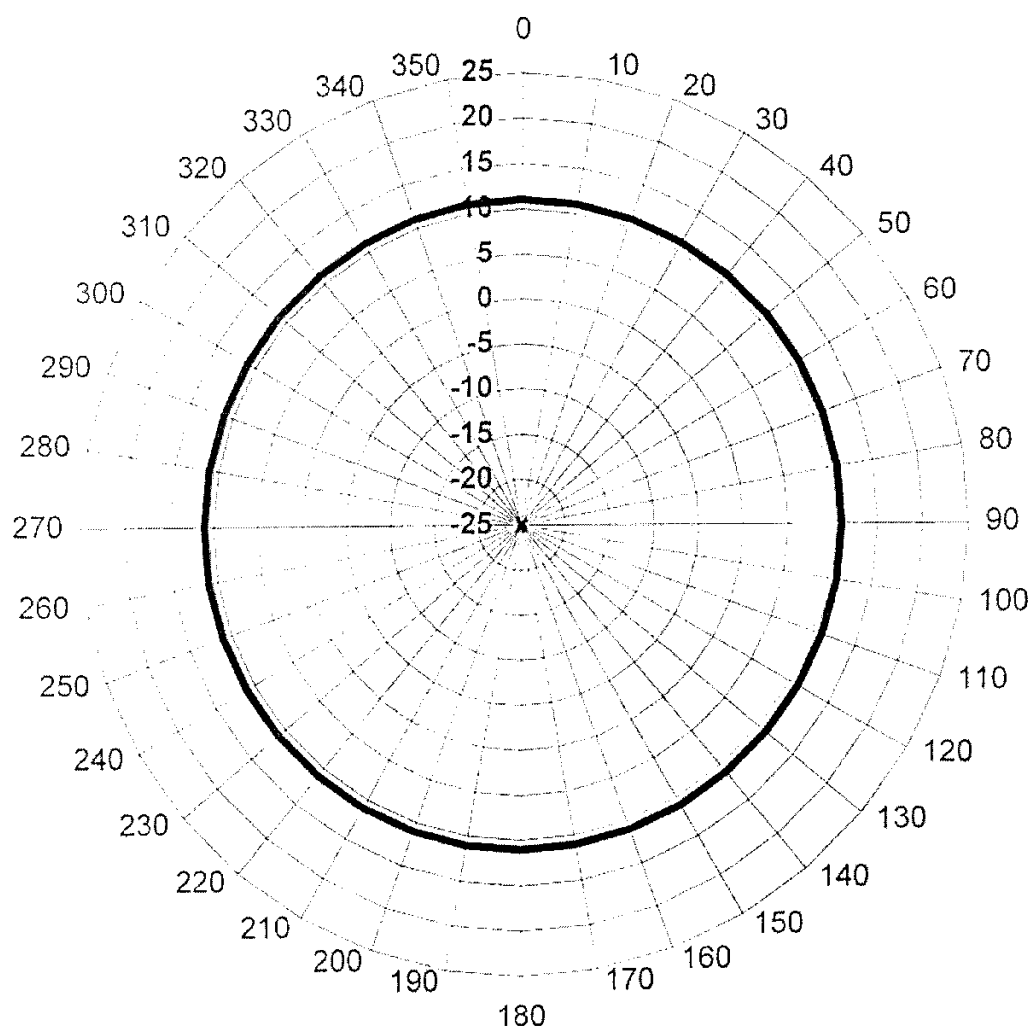
HIRSCHMANN Edward Hirschmann of America, Inc. Electronic Equipment San Diego, Calif.	
2.4 GHz, 11 dBi OMNIDIRECTIONAL ANTENNA W/FEMALE "N" CONNECTOR	
PART #827965-037 QTY 1	DATE 08/15/98 BY JPK

One 11 dBi Hirshmann omni Antenna

From Vendors Charts

<u>Degree</u>	<u>11 dBi</u> <u>Omni</u>	<u>TEST 07</u>
0	11	
10	11	
20	11	
30	11	
40	11	
50	11	
60	11	
70	11	
80	11	
90	11	
100	11	
110	11	
120	11	
130	11	
140	11	
150	11	
160	11	
170	11	
180	11	
190	11	
200	11	
210	11	
220	11	
230	11	
240	11	
250	11	
260	11	
270	11	
280	11	
290	11	
300	11	
310	11	
320	11	
330	11	
340	11	
350	11	

11 dBi Hirshmann omni
Test 07



MAXRAD
STATE OF THE ART ANTENNAS**MAXRAD Dataspecs**[Home](#) [Overview](#) [Products](#) [Bulletin Board](#) [Price List](#) [Contacts](#) [Press Releases](#)

Revision date: July 11, 1999

Get the most up to date version of this document (rev. May '99) in PDF format. (July 13, 1999)**2.4 GHz ISM - MFB Omni-Directional Antenna Series**

The MAXRAD MFB24004, MFB24006, and MFB24008 are omni-directional base station antennas for ISM applications. They are designed to cover the entire 2.4 ISM frequency band with a VSWR of less than 1.5:1. The antennas have 4, 6, and 8 dBi of gain and their built-in matching networks eliminate the need for a ground plane. antennas can be mounted in a wide variety of locations, including walls, ceilings, and pipes.

General Specifications**Radome Material:**

5/8 inch diameter pultruded UV-stable fiberglass

Termination:

N Female

Polarization:

Vertical

Wind Survival:

125 mph

Mounting Base Diameter:

1 1/4 inches

Maximum Power:

25 watts

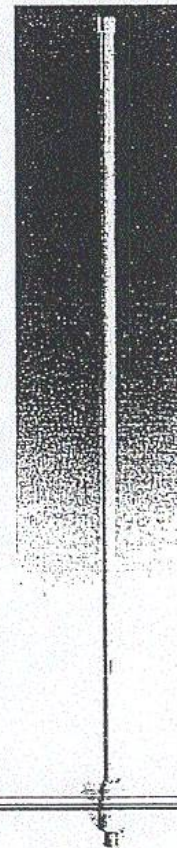
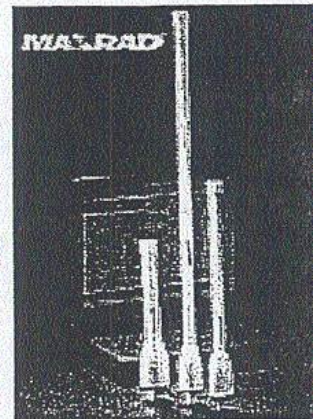
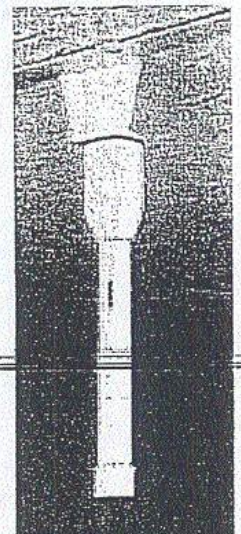
Mounting Hardware:

MMK1924 - L-bracket mount for wall or pipe mount (sold separately)

MMK8 - Stainless steel bracket for mast mounting (sold separately)

Nominal Impedance:

50 ohms

**MFB Model
24010****MFB Models 24004,
24008, 24006****MFB Model 24004CN**

Electrical Specifications**2.4 GHz ISM - MFB Omni-directional Antenna Series**

Model #	Frequency Range	Factory Tuned Frequency	Gain	Bandwidth @ 1.5:1 VSWR	Vertical Beamwidth @ 1/2 Power	VSWR	Downtilt Options
MFB24004	2.400-2.4835 GHz	2.45 GHz	4 dBi	100 MHz	30°	<1.5:1	N/A
MFB24004CM*	2.400-2.4835 GHz	2.45 GHz	4 dBi	100 MHz	30°	<1.5:1	N/A
MFB24006	2.400-2.4835 GHz	2.45 GHz	6 dBi	100 MHz	20°	<1.5:1	N/A
MFB24008	2.400-2.4835 GHz	2.45 GHz	8 dB	100 MHz	13°	<1.5:1	3°, 5° or 7°
MFB240010	2.400-2.4835 GHz	2.45 GHz	10 dB	100 MHz	9°	<1.5:1	TBD**

**MMK1924**

* MFB24004 antenna with MMK11 ceiling mount ** Consult the factory for downtilt options

Mechanical Specifications**2.4 GHz ISM - MFB Omni-directional Antenna Series**

Model #	Equivalent Flat Plate Area	Lateral Thrust @ Rated Wind	Bending Moment @ Rated Wind	Height	Weight	List Price
MFB24004	0.04 ft²	3.2 lbs	1.1 ft-lbs	8 inches	0.34 lbs	\$99.98
MFB24004CM	0.04 ft²	3.2 lbs	1.1 ft-lbs	10 inches	0.34 lbs	\$106.00
MFB24006	0.05 ft²	4.5 lbs	2.2 ft-lbs	11.5 inches	0.38 lbs	\$136.61
MFB24008	0.09 ft²	8 lbs	6.7 ft-lbs	20 inches	0.5 lbs	\$149.80
MFB240010	0.17 ft²	15.4 lbs	22.6 ft-lbs	36 inches	0.65 lbs	\$275.00

**MMK8**

* MFB24004 antenna with MMK11 ceiling mount

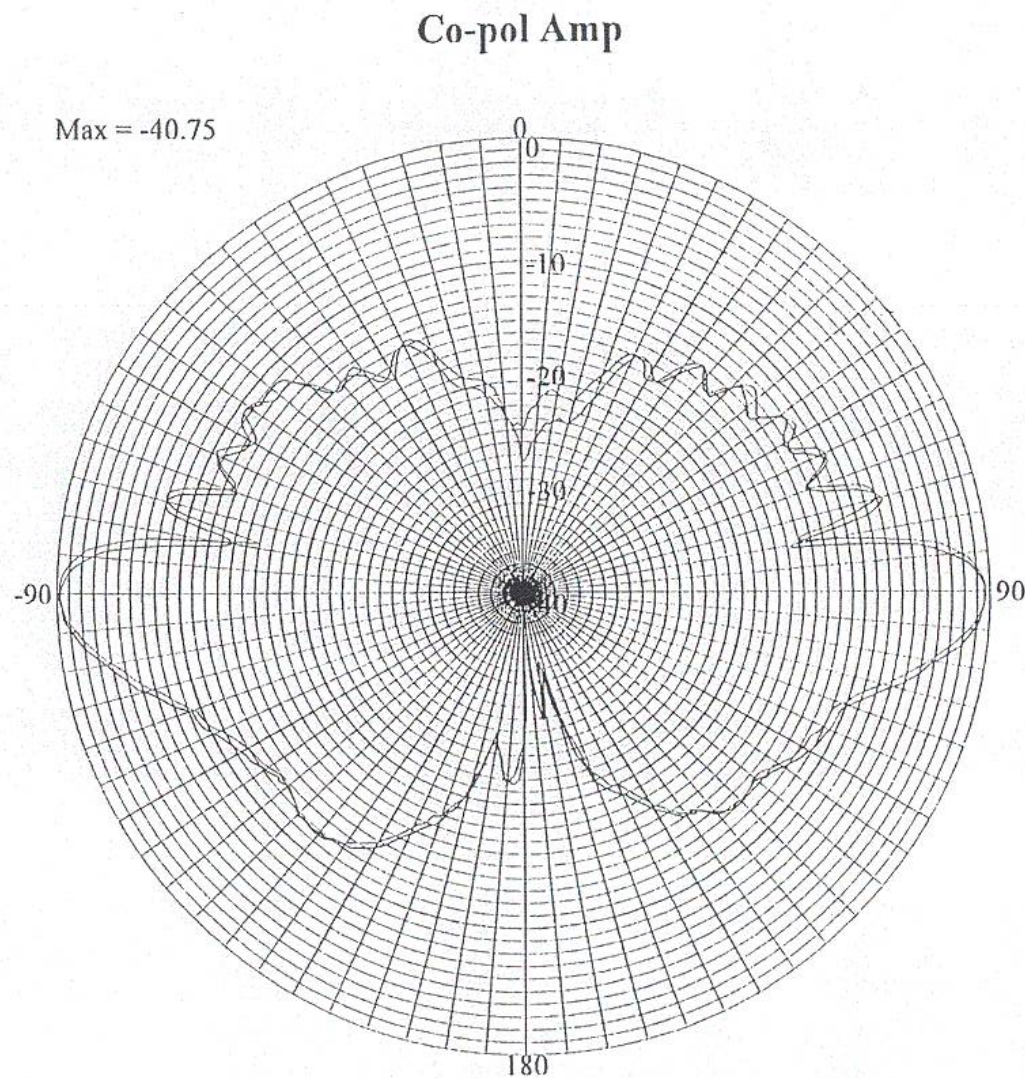
Mounting Hardware**2.4 GHz ISM - MFB Omni-directional Antenna Series**

Model #	Description	List Price
MMK1924	Stainless steel L-bracket for wall mounting or for mounting an antenna with a base connector to a mast of up to 2" in diameter	\$13.13
MMK8	Stainless steel bracket for mounting a 1-1/4" diameter antenna to a 2" maximum diameter mast	\$17.35
MMK11	Ceiling mount bracket for 2.4 GHz MFB omni-directional antennas	\$11.60

MAXRAD[®]
STATE OF THE ART ANTENNAS

MAXRAD, Inc.
4350 Chandler Drive
Hanover Park, IL 60103-6763

Orders: (800) 323-9122
Phone: (630) 372-6800
Fax: (630) 372-8077



MFB24010 Elevation Pattern

Data/Spec Sheet**ORDER (800) 323-9122 FAX (630) 372-****2.4 GHz ISM - MFB Omni-Directional Antenna Series**

The MAXRAD MFB24004, MFB24006, and MFB24008 are omni-directional base station antennas for ISM applications. They are designed to cover the entire 2.4 ISM frequency band with a VSWR of less than 1.5:1. The antennas have 4, 6, and 8 dBi of gain and their built-in matching networks eliminate the need for a ground plane. The antennas can be mounted in a wide variety of locations, including walls, ceilings, and pipes.

General Specifications:**2.4 GHz ISM - MFB omni-directional antenna series****Radome Material:**

5/8 inch diameter pultruded UV-stable fiberglass

Termination:

N Female

Polarization:

Vertical

Wind Survival:

125 mph

Mounting Base Diameter:

1 1/4 inches

Maximum Power:

25 watts

Mounting Hardware:

MMK1924 - L-bracket mount for wall or pipe mount (sold separately)

Nominal Impedance:

50 ohms



MFB24004

Electrical Specifications**2.4 GHz ISM - MFB Omni-directional Antenna Series**

Model #	Frequency Range	Factory Tuned Frequency	Gain	Bandwidth @ 1.5:1 VSWR	Vertical Beamwidth @ 1/2 Power	VSWR
MFB24004	2.400-2.4835 GHz	2.45 GHz	4 dBi	100 MHz	30°	< 1.5:1
MFB24006	2.400-2.4835 GHz	2.45 GHz	6 dBi	100 MHz	20°	< 1.5:1
MFB24008*	2.400-2.4835 GHz	2.45 GHz	8 dBi	100 MHz	13°	< 1.5:1

* Model available with an electrical downtilt feature. Consult the factory for downtilt options.

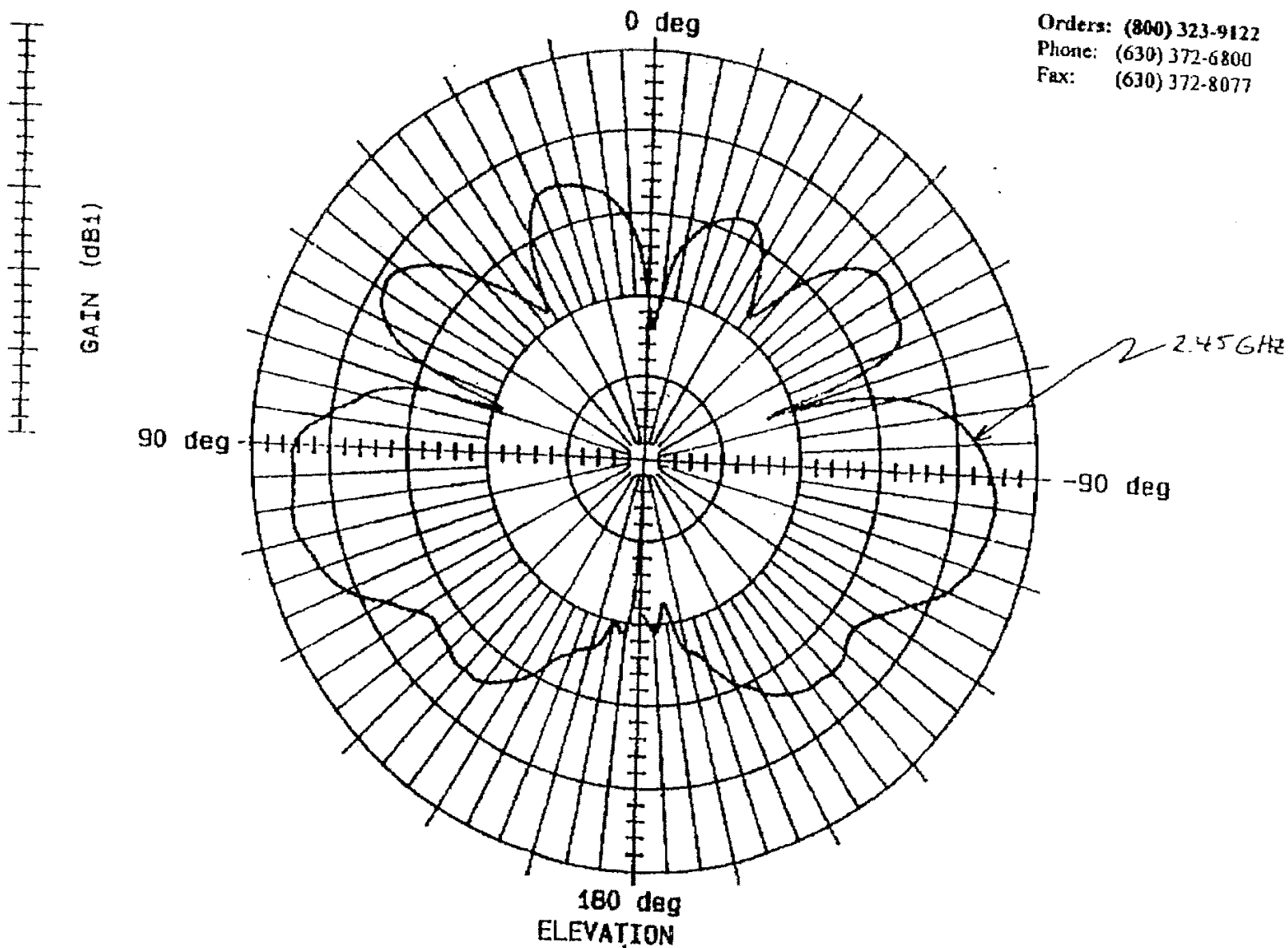
Mechanical Specifications**2.4 GHz ISM - MFB Omni-directional Antenna Series**

Model #	Equivalent Flat Plate Area	Lateral Thrust @ Rated Wind	Bending Moment @ Rated Wind	Height	Weight	List Price
MFB24004	0.04 sq. ft.	3.201 lbs	1.32 ft-lbs	7 inches	0.30 lbs	\$99.98
MFB24006	0.055 sq. ft.	3.780 lbs	2.39 ft-lbs	10.5 inches	0.35 lbs	\$135.61
MFB24008	0.08 sq. ft.	5.530 lbs	5.94 ft-lbs	17 inches	0.45 lbs	\$149.80

Mounting Hardware**2.4 GHz ISM - MFB Omni-directional Antenna Series**

MAXRAD, Inc.
4350 Chandler Drive
Hanover Park, IL 60103-6763

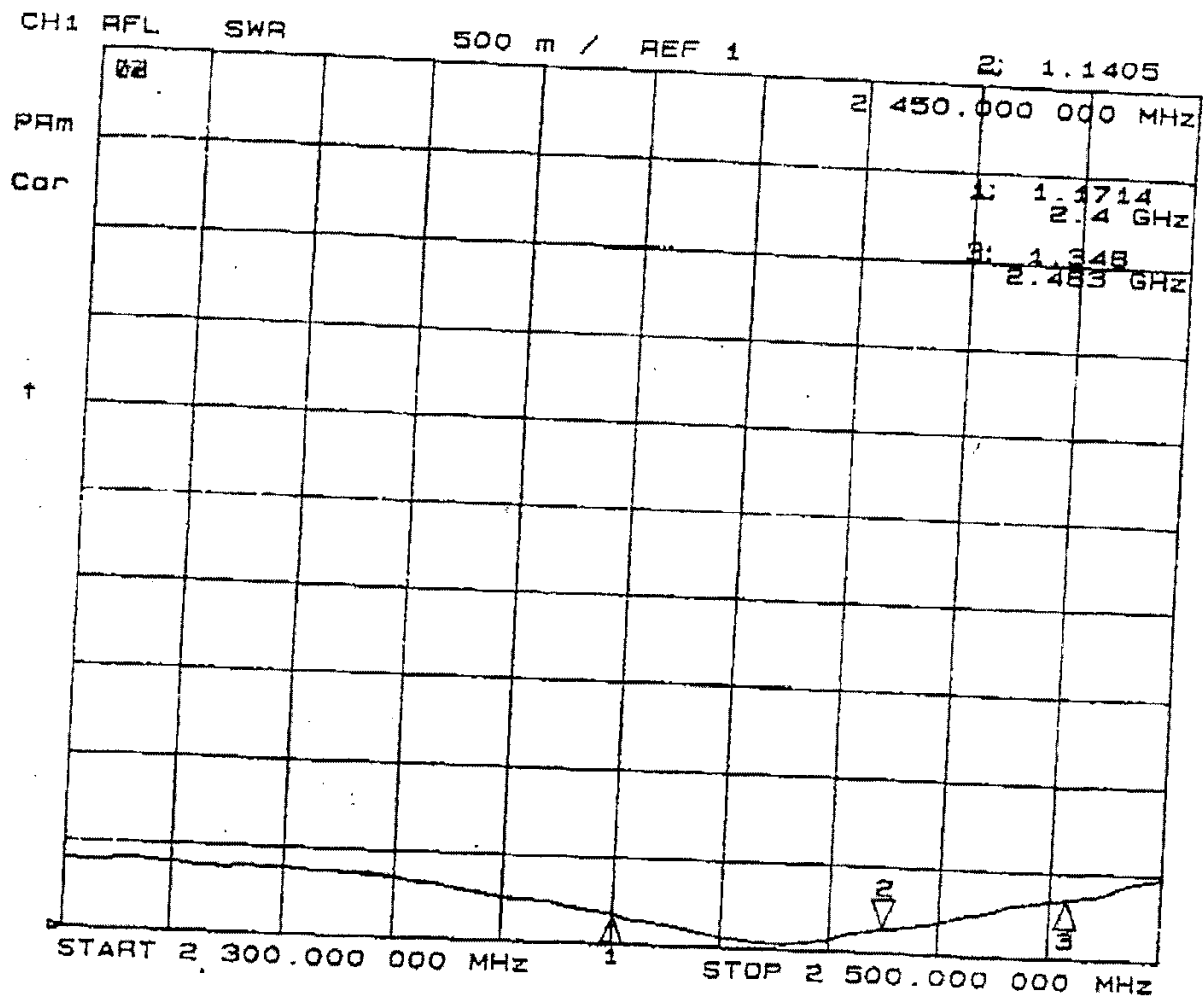
Orders: (800) 323-9122
Phone: (630) 372-6800
Fax: (630) 372-8077





MAXRAD, Inc.
4350 Chandler Drive
Hanover Park, IL 60103-6763

Orders: (800) 323-9122
Phone: (630) 372-6800
Fax: (630) 372-8077



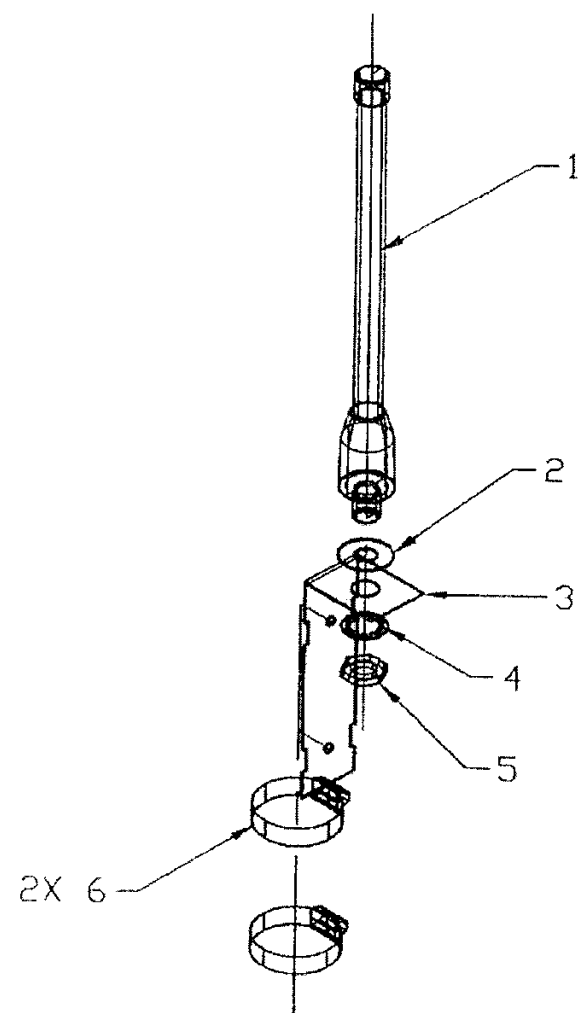
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

6	2	AHC-4060	H2BSS HOSE CLAMP	P/O MMK1924
5	1	AHW-5000	5/8-24 JAM NUT	P/O MMK1924
4	1	AHV-4001	5/8 INT LOCK WASHER	P/O MMK1924
3	1	ALB-1058	"L" BRACKET	P/O MMK1924
2	1	AMW-1066	BASE SEAL WASHER	P/O ITEM 1
1	1	Z1-MFB24006	MFB24006 WITH 6.3-KOHM / SENSING RESISTOR	
ITEM	QTY	PART NO.	DESCRIPTION	COMMENTS

MATERIAL	TOLERANCES: X.X - ±0.1 X.XX - ±0.01 X.XXX - ±0.005 FRACTIONAL - ±1/64 ANGULAR - ±0.5 UNLESS OTHERWISE SPECIFIED	MAXRAD® STATE OF THE ART ANTENNAS MAXRAD, INC. 4330 CHANDLER DR. PH. 800-323-9122 HANOVER PARK, IL 60133 FAX 630-372-8077
	CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DOCUMENT IS OF A PROPRIETARY NATURE. IT MAY NOT BE REPRODUCED OR USED WITHOUT EXPRESS WRITTEN PERMISSION OF MAXRAD INC., HANOVER PARK, IL 60133.	
FINISH		MFB24006 (WITH 6.3 KOHM SENSING RESISTOR) MMK1924 MOUNT <i>115K2 or 316K2</i>
APPROVED	DRAWN BY: BRIAN SKEENGE	SIZE: B PROJ. NO.
APPROVED	DATE: 06/21/99	DWG. NO. 2526 REV
		SCALE: NONE WEIGHT: SHEET:

B

C



A

B

C

A

B

C

This is a partial listing of wireless data antennas available from Maxrad.
For a complete listing please refer to our product catalog.

Model Number	Frequency Range	Style	Description	Gain
MFR-2400a	2.4-2.4835 GHz	Parabolic Reflector Antenna	24" Aluminum Dish	20 dBi
MFR-3000a	2.4-2.4835 GHz	Parabolic Reflector Antenna	30" Aluminum Dish	22 dBi
MFR-3600a	2.4-2.4835 GHz	Parabolic Reflector Antenna	36" Aluminum Dish	24 dBi
MFR-2400b	2.4-2.4835 GHz	Yagi Antenna	Totally Enclosed 6 Element	8.8 dBi
MFR-2400c	2.4-2.4835 GHz	Yagi Antenna	Totally Enclosed 16 Element	13.5 dBi
MFR-9000a	902-928 MHz	Yagi Antenna	Aluminum; 3 Element	6 dBd
MFR-9000b	902-928 MHz	Yagi Antenna	Aluminum; 6 Element	9 dBd
MFR-9000c	902-928 MHz	Yagi Antenna	Aluminum; 9 Element	10 dBd
MFR-9000d	902-928 MHz	Yagi Antenna	Aluminum; 12 Element	11 dBd
MFR-9000e	902-928 MHz	Yagi Antenna	Gold Anodized; Welded	9 dBd
MFR-9000f	902-928 MHz	Yagi Antenna	Gold; Welded; Enclosed Driver	9 dBi
MFR-9000g	902-928 MHz	Yagi Antenna	Gold; Welded; Fully Encapsulated	9 dBd
MFR-9000h	902-928 MHz	Omni Directional Antenna	Fiberglass	Unity
MFR-9000i	902-928 MHz	Omni Directional Antenna	Fiberglass	3 dBd
MFR-9000j	902-928 MHz	Omni Directional Antenna	Fiberglass	5 dBd
MFR-9000k	902-928 MHz	Omni Directional Antenna	Fiberglass	7 dBd
MFR-2400d	2.4-2.4835 GHz	Omni Directional Antenna	Fiberglass	4 dBi
MFR-2400e	2.4-2.4835 GHz	Omni Directional Antenna	Fiberglass	6 dBi
MFR-2400f	2.4-2.4835 GHz	Omni Directional Antenna	Fiberglass	8 dBi
MFR-9000l	902-928 MHz	Portable Antenna	1/2 Wave Portable; Right Angle TNC	Unity
MFR-2400g	2.4-2.4835 GHz	Portable Antenna	1/2 Wave Portable	1 dBi
MFR-2400h	2.4-2.4835 GHz	Portable Antenna	1/2 Wave Portable; Right Angle TNC	1 dBi
MFR-2400i	2.4-2.4835 GHz	Mobile Antenna	Max Base	3 dBi
MFR-2400j	2.4-2.4835 GHz	Mobile Antenna	Max Base	5 dBi
MFR-9000m	902-928 MHz	Mini-Mag Antenna	Magnetic Mount	Unity
MFR-9000n	902-928 MHz	Mini-Mag Antenna	Magnetic Mount	3 dBd
MFR-2400k	2.4-2.4835 GHz	Mini-Mag Antenna	Magnetic Mount	Unity
MFR-2400l	2.4-2.4835 GHz	Mini-Mag Antenna	Magnetic Mount	3 dBi
MFR-2400m	2.4-2.4835 GHz	Mini-Mag Antenna	Magnetic Mount	5 dBi

*Choose vertical or horizontal **Several connector options available

WE CAN BUILD TO YOUR SPECS

If you do not see the antenna you need in our regular product line, let us know. We specialize in manufacturing custom antennas to meet the particular needs of our customers.

MAXRAD®
STATE OF THE ART ANTENNAS

Maxrad, Inc.
4350 Chandler Drive
Hanover Park, IL 60103
(800) 323-9122 (Toll Free)
(630) 372-8077 (Fax)

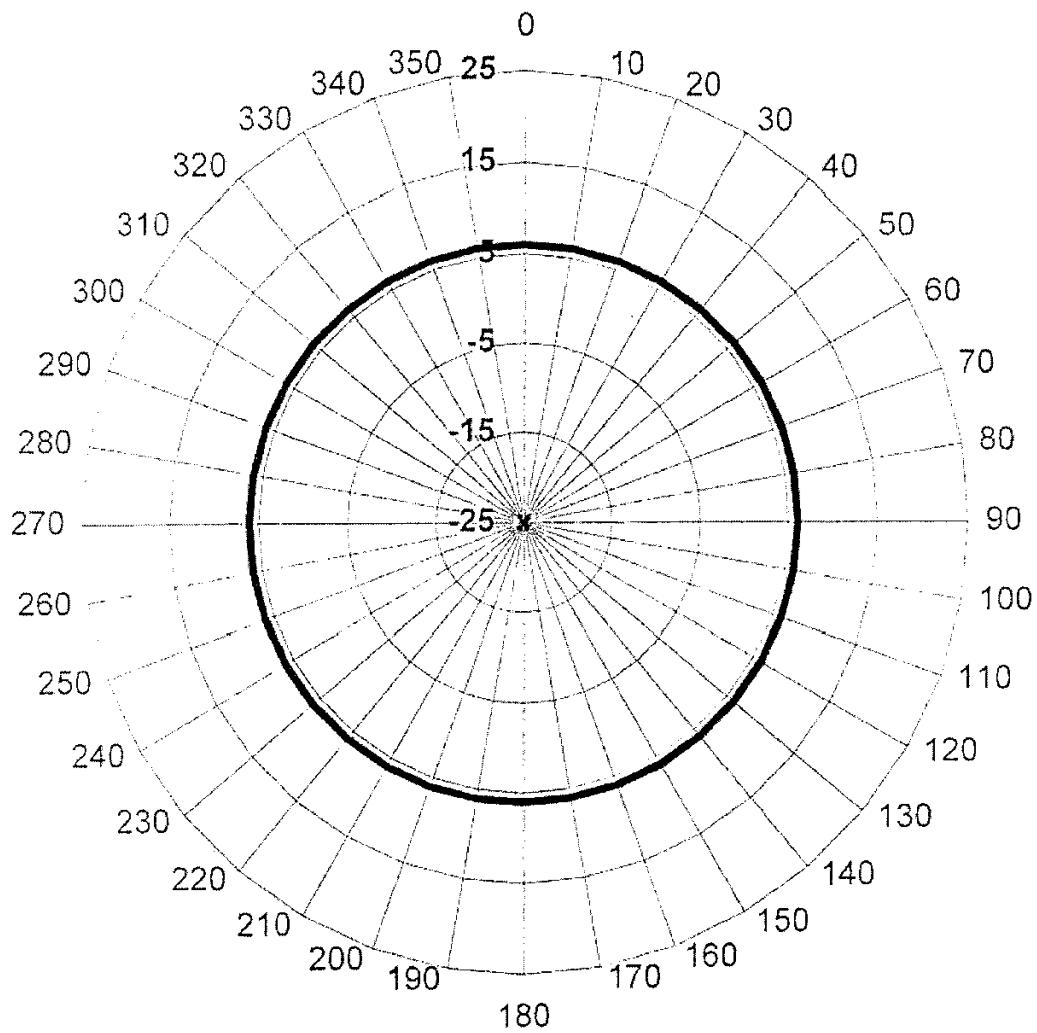
FCC ID: KA324WAN4

One 6 dBi MaxRad Omni Antenna

From Vendors Charts

<u>Degree</u>	<u>6 dBi</u> <u>Omni</u>	<u>TEST 06</u>
0	6	
10	6	
20	6	
30	6	
40	6	
50	6	
60	6	
70	6	
80	6	
90	6	
100	6	
110	6	
120	6	
130	6	
140	6	
150	6	
160	6	
170	6	
180	6	
190	6	
200	6	
210	6	
220	6	
230	6	
240	6	
250	6	
260	6	
270	6	
280	6	
290	6	
300	6	
310	6	
320	6	
330	6	
340	6	
350	6	

MaxRad 6 dBi Omni Test 06



MAXRAD 8 dBi PATCH ANTENNA

Data/Spec Sheet

ORDER (800) 323-9122 FAX (630) 372-8077

2.4 GHz ISM MP Series Antennas

The MAXRAD directional panel antennas are designed to cover frequencies between 2300 and 2500 MHz with a VSWR of less than 1.5:1. The series is designed to obtain maximum gain with a small, low-profile package. It includes five antenna models offering 8, 11, 13, 15 and 17.7 dBi of gain, each providing efficient and stable performance across the band. These rugged, low profile antennas can be mounted in a wide variety of locations and can be ordered with a pigtail and various connector options.

General Specifications:

Directional panel antenna for wireless access applications

Radome Material:

UV-stable, beige ASA - ABS

Back Plate Material:

Weather resistant, black powder coated aluminum

Polarization:

Vertical, linear (can be adjusted with an optional MPAB mount)

Lightning Protection:

DC grounded

Mounting Hardware:

Clamp set (included)

Adjustable mounts (sold separately)

Nominal Impedance:

50 Ohms

Connector Options for Pigtail Models (add connector part # after PT):

Example: MP24008PTBN (Model 24008PT with a pigtail and BNC connector)

BNC (part #BN); N, female (part #NF); N, male (part #NM); female SMA (part #FSMA); male SMA (part #MSMA); female SMA, reverse threaded (part #FSMART); male SMA, reverse threaded (part #MSMART); reverse polarity TNC plug (part #MRPC); TNC plug (part #C); Mini-UHF (part #PL); FME (part #FFME).



MP Panels for WLAN



Electrical Specifications

Directional Panel Antennas for WLAN

Model #	Frequency Range	Gain	Front to Back Ratio	3 dB Horizontal Beamwidth	3 dB Vertical Beamwidth	VSWR	Max. Power Input	Connector
MP24008FSMA	2300 - 2500 MHz	8 dBi	> 15 dB	70°	60°	< 1.4:1	> 20 W	Female SMA, Bottom Feed
MP24008PT*	2300 - 2500 MHz	7.7 dBi	> 15 dB	70°	60°	< 1.5:1	> 20 W	Various options available
MP24011FC	2300 - 2500 MHz	11 dBi	> 18 dB	35°	55°	< 1.4:1	> 20 W	Female TNC, Bottom Feed
MP24011PT*	2300 - 2500 MHz	10.7 dBi	> 18 dB	35°	55°	< 1.5:1	> 20 W	Various options available
MP24013FC	2300 - 2500 MHz	12.7 dBi	> 18 dB	35°	35°	< 1.3:1	> 20 W	Female TNC, Bottom Feed
MP24013PT*	2300 - 2500 MHz	12.7 dBi	> 18 dB	35°	35°	< 1.5:1	> 20 W	Various options available
MP24015PT*	2300 - 2500 MHz	15 dBi	> 25 dB	40°	19°	< 1.5:1	> 20 W	Various options available
MP24018PT*	2300 - 2500 MHz	17.7 dBi	> 25 dB	18°	19°	< 1.5:1	> 20 W	Various options available

*Pigtail version with 12" of RG58U cable and choice of connector.

Mechanical Specifications

Directional Panel Antennas for WLAN

Model #	Wind Loading (Frontal) @100 mph Wind	Temperature Range	Dimensions	Weight	List Price
MP24008FSMA	9.3 lbs.	-51°C to +71°C (-60°F to +160°F)	5.0 x 4.6 x 1.4 in	0.22 lbs	\$99.98
MP24008PT*	9.3 lbs.	-51°C to +71°C (-60°F to +160°F)	5.0 x 4.6 x 1.4 in	0.22 lbs	\$99.98
MP24011FC	17.5 lbs.	-51°C to +71°C (-60°F to +160°F)	8.7 x 4.9 x 1.4 in	0.44 lbs	\$147.72
MP24011PT*	17.5 lbs.	-51°C to +71°C (-60°F to +160°F)	8.7 x 4.9 x 1.4 in	0.44 lbs	\$147.72
MP24013FC	27.9 lbs.	-51°C to +71°C (-60°F to +160°F)	8.7 x 7.9 x 1.4 in	0.77 lbs	\$163.31
MP24013PT*	27.9 lbs.	-51°C to +71°C (-60°F to +160°F)	8.7 x 7.9 x 1.4 in	0.77 lbs	\$163.31
MP24015PT*	39.8 lbs.	-51°C to +71°C (-60°F to +160°F)	7.3 x 13.8 x 1.5 in	1.2 lbs	\$191.00
MP24018PT*	79.7 lbs.	-51°C to +71°C (-60°F to +160°F)	14.7 x 13.5 x 1.5	2.3 lbs	\$307.00

Adjustable Mounting Bracket for MP Series		
Model #	Description	List Price
MPAB1	Adjustable mounting bracket, interface plate and hardware for 8 dBi MP panel antenna	\$39.82
MPAB2	Adjustable mounting bracket, interface plate and hardware for 11 dBi MP panel antenna	\$39.82
MPAB3	Adjustable mounting bracket, interface plate and hardware for 13 dBi MP panel antenna	\$39.82
MPAB4	Adjustable mounting bracket, interface plate and hardware for 15 and 18 dBi MP panel antennas	TBD

2.4 GHz ISM MP Series Antennas

Feature / Benefit List

Feature:	Patent pending printed-circuit antenna design
Benefit:	<i>Exclusive engineering design that provides superior coverage in a compact package</i>
Feature:	Extremely wide bandwidth performance with a low VSWR
Benefit:	<i>One model can cover the 2300-2500 MHz which includes the 2.4 GHz ISM frequency band, considerably reducing inventory requirements</i>
Feature:	Unmatched industry gain flatness vs. frequency
Benefit:	<i>Consistently conforms to MAXRAD's high performance specifications</i>
Feature:	U.V. stabilized radome
Benefit:	<i>Long-lasting, robust design. Protects the antenna from outdoor elements</i>
Feature:	Low profile
Benefit:	<i>Keeps the antenna out of sight; blends well in office environments</i>
Feature:	Impervious to manufacturing tolerances
Benefit:	<i>Excellent value - superior design at very competitive prices</i>

2.4 GHz ISM MP Series Antennas

Frequently Asked Questions

Question:	Can the radome be painted to blend with the background?
Answer:	<i>Yes, as long as a non-metallic paint is used.</i>
Question:	Does MAXRAD offer reverse polarity connectors with these antennas?
Answer:	<i>Yes. In addition, a wide variety of connector options is available. If you don't see the connector you need listed, please contact the factory. We can probably get it for you.</i>
Question:	For what type of applications are panels used?
Answer:	<i>Any wireless data application that requires a directional antenna. Panel antennas from MAXRAD are also available for 800/900 MHz, PCS and wireless cable bands.</i>
Question:	Can these panels be mounted outdoors?
Answer:	<i>Yes. The U.V. stabilized radome provides a robust, water resistant covering for outdoor protection.</i>
Question:	Are these panels available with a downtilt option?
Answer:	<i>The 15 dBi and 17.7 dBi panels can be mounted on an adjustable mount that provides a downtilt when this feature is necessary.</i>



Maxrad, Inc.
4350 Chandler Dr.
Hanover Park, IL 60103-6763

Orders: (800) 323-9122

Phone: (630) 372-6800

Fax: (630) 372-8077

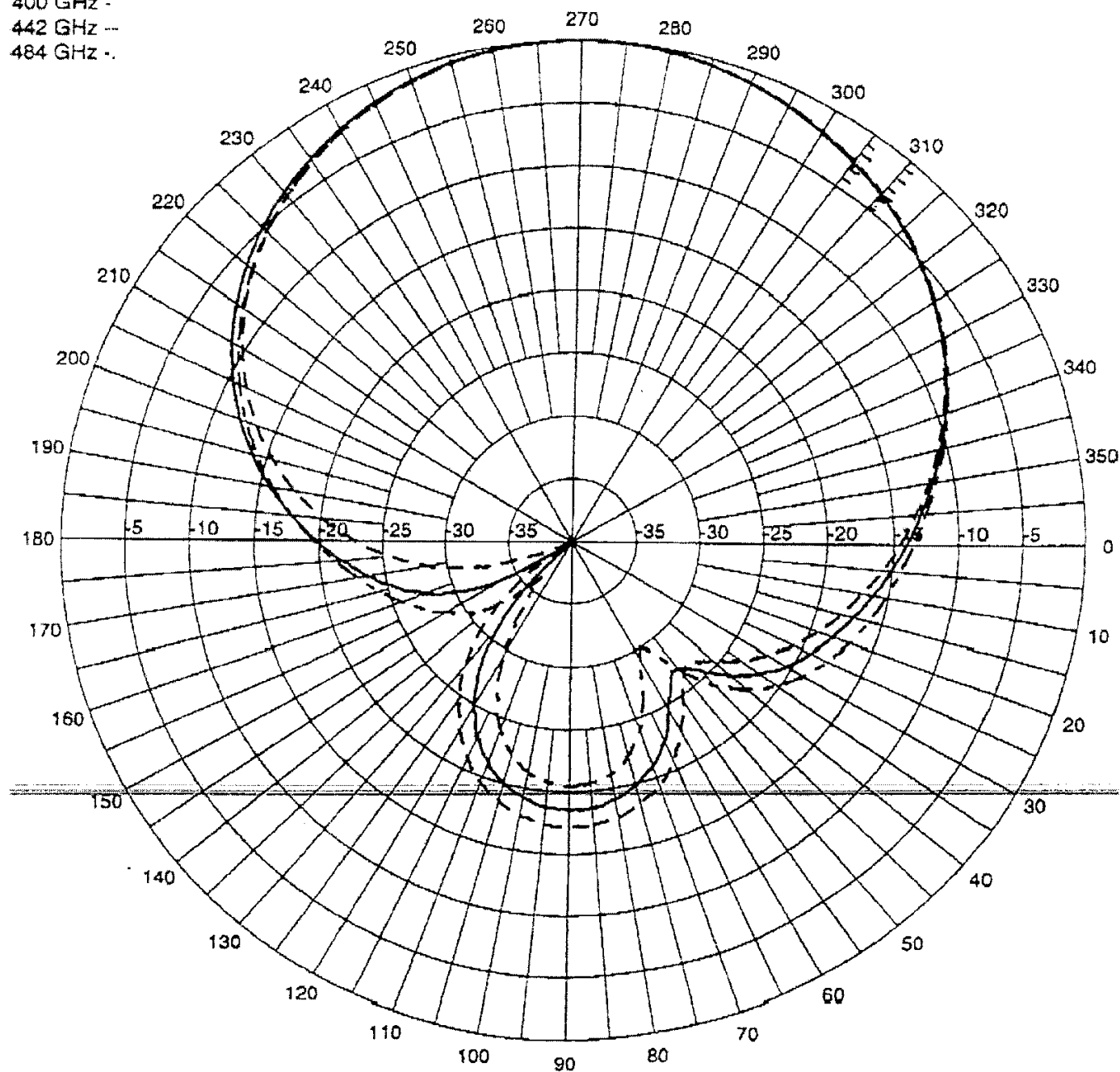
email: sales@maxrad.com

Low-gain Panel - Azimuth Plane Cut

400 GHz -

442 GHz --

484 GHz -.





Maxrad, Inc.
4350 Chandler Dr.
Hanover Park, IL 60103-67

Orders: (800) 323-9122

Phone: (630) 372-6800

Fax: (630) 372-8077

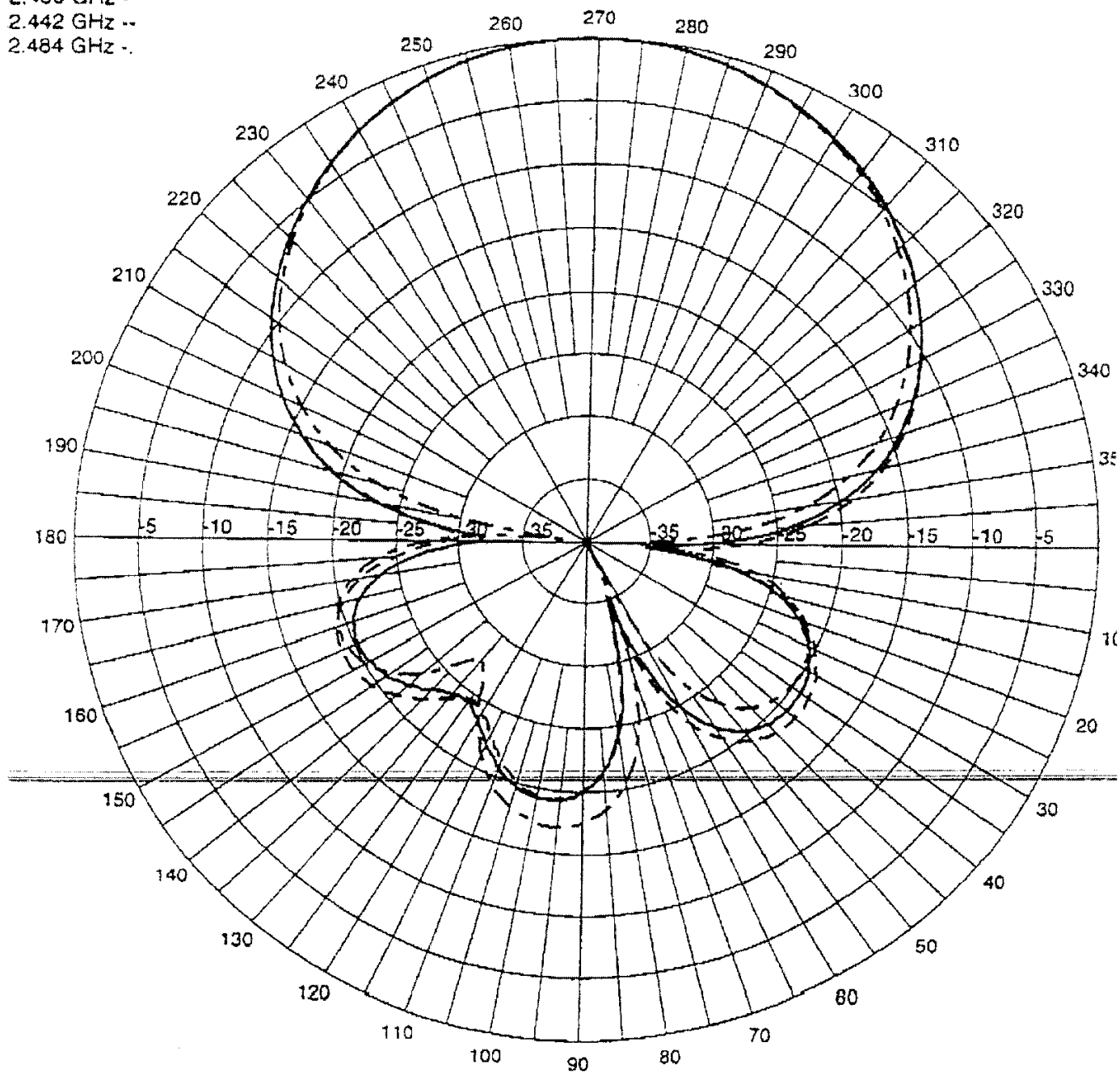
email: sales@maxrad.com

Low-gain Panel - Elevation Plane Cut

2.400 GHz -

2.442 GHz --

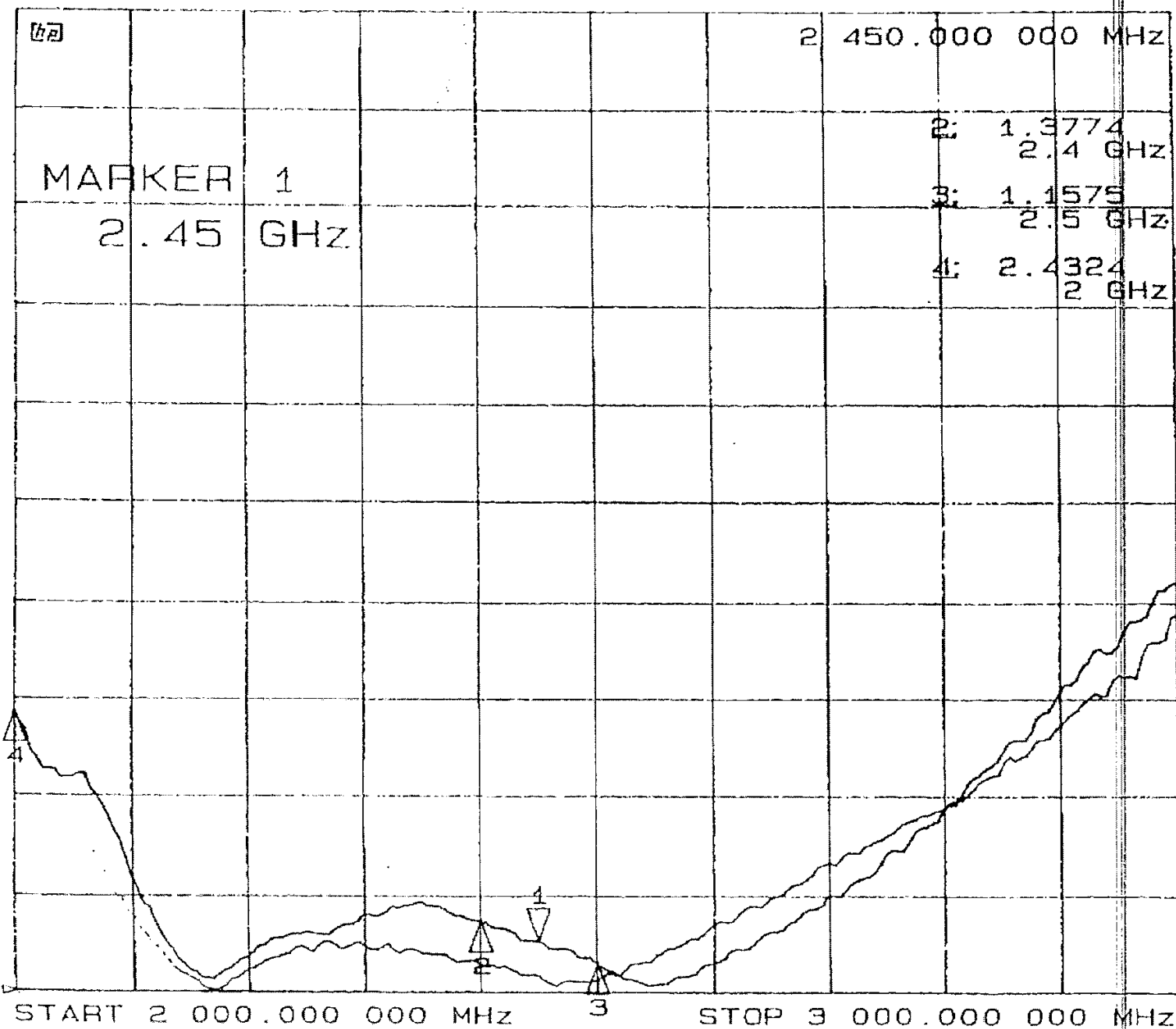
2.484 GHz -.



HFL&M SWR

500 m / REF 1

1: 1.268



Phone: (630) 372-6800
Fax: (630) 372-8077
email: sales@maand.com

Specification

FLAT PANEL DIRECTIONAL ANTENNA MT-30081/A

THE ANTENNA COMPLIES WITH ESTI DE/TM -4060 - ANTENNAS
FOR PMP RADIO SYSTEMS IN FREQ. BAND 1-3 GHz, TS2

1. ELECTRICAL	
FREQUENCY	2.4-2.48 GHz
GAIN	15.5 dBi MIN
VSWR	1.7 : 1 MAX
3 dB BEAMWIDTH	20° TYP
POLARIZATION	LINEAR
POWER	2 W
INPUT IMPEDANCE	50 Ohms
FRONT TO BACK	26 dB min
2. MECHANICAL	
DIMENSIONS (L×W×H)	304.8 × 304.8 × 50 mm
WEIGHT	1.5 Kg
CONNECTOR	N-TYPE CONNECTOR FEMALE
RADOME	Plastic, gray polycarbonate
BASE PLATE	Aluminum
3. ENVIRONMENTAL	
TEMPERATURE	Operating -40 ° C to + 71 ° C including solar radiation
VIBRATION	ETS 300 019-1-4 (Feb.92);class 4.1 Sweep rate =0.1 octave/min; 10 cycles
SHOCK	ETS 300 019-2-2,Table 7
WIND LOAD	EN 302-085,Table A.1,Table A.2 (Heavy duty).
HUMIDITY	ETS 300 019-1-4 EN 302 085 (Annex A.1.1)
SALT FOG	MIL-STD-810E.Method 509.3 for 200 hours
ICE LOADING	EN 302-085, Table A.1, Table A.2 (Heavy duty).
SOLAR RADIATION	ETS 300 019-1-4
SERVICE LIFE	> 20 years
LIGHTNING PROTECTION	DC grounded

SIZE		DWG NO	REV
A		RD40791400C	A
SCALE NONE		SHEET 2 OF 2	

CH1 S11

log MAG

0A
001

2 dB/

REF -11.7 dB

11-000004
S/N 0020
B. GLASS
ANTENNAS LAB

V.S.W.R. 2.2

31.05.00

C?

REFERENCE VALUE

-11.7 dB

START 2.4000 GHz

STOP 2.4800 GHz

MT - 30081-A

S/N 00020

►P1:b1/a1/M1 log MAG

REF 0.0 dB

3 2.0 dB/

▽ -0.0248 dB

Y.MILLER
ANTENNA'S LAB

O.A.
001

PEAK CAI✓

MARKER 1

2.4 GHz

-0.4090 dB

MARKER 2

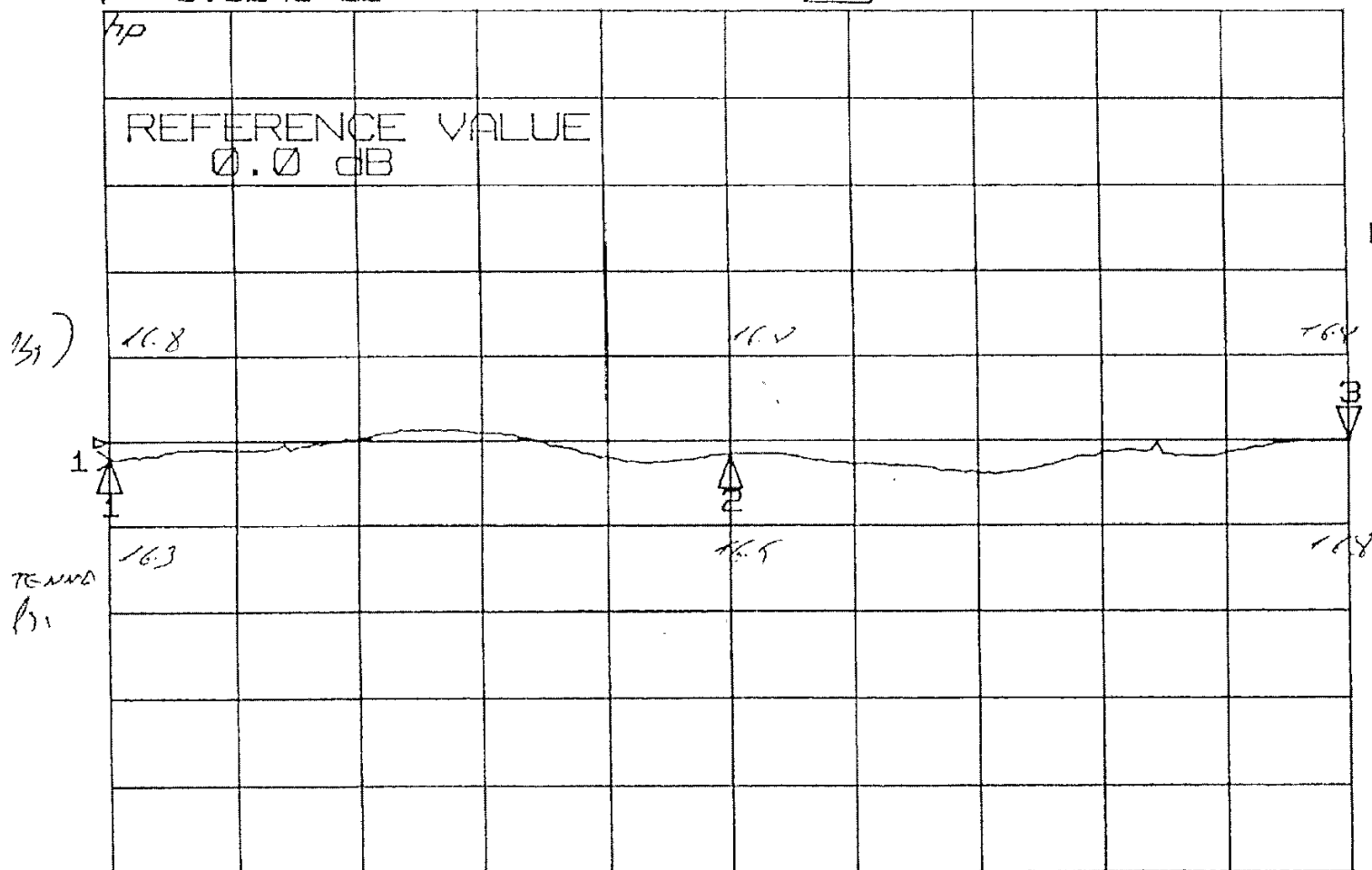
2.44 GHz

-0.3341 dB

►MARKER 3

2.48 GHz

-0.0248 dB



START 2.400000000 GHz
STOP 2.480000000 GHz

POSITION

-102.74°

31 MAY 00

13:38:20

0008117

S/N 00020

→
POLAR.

►P1:b1/a1 & M1 log MAG Y.MILLER
REF 1.197 dB
5 3.0 dB/
▽ 0.0000 dB

ANTENNA'S LAB.

Q.A.
001

E- PLANE

MARKER 1-4
-93.464 °
-43.251 dB

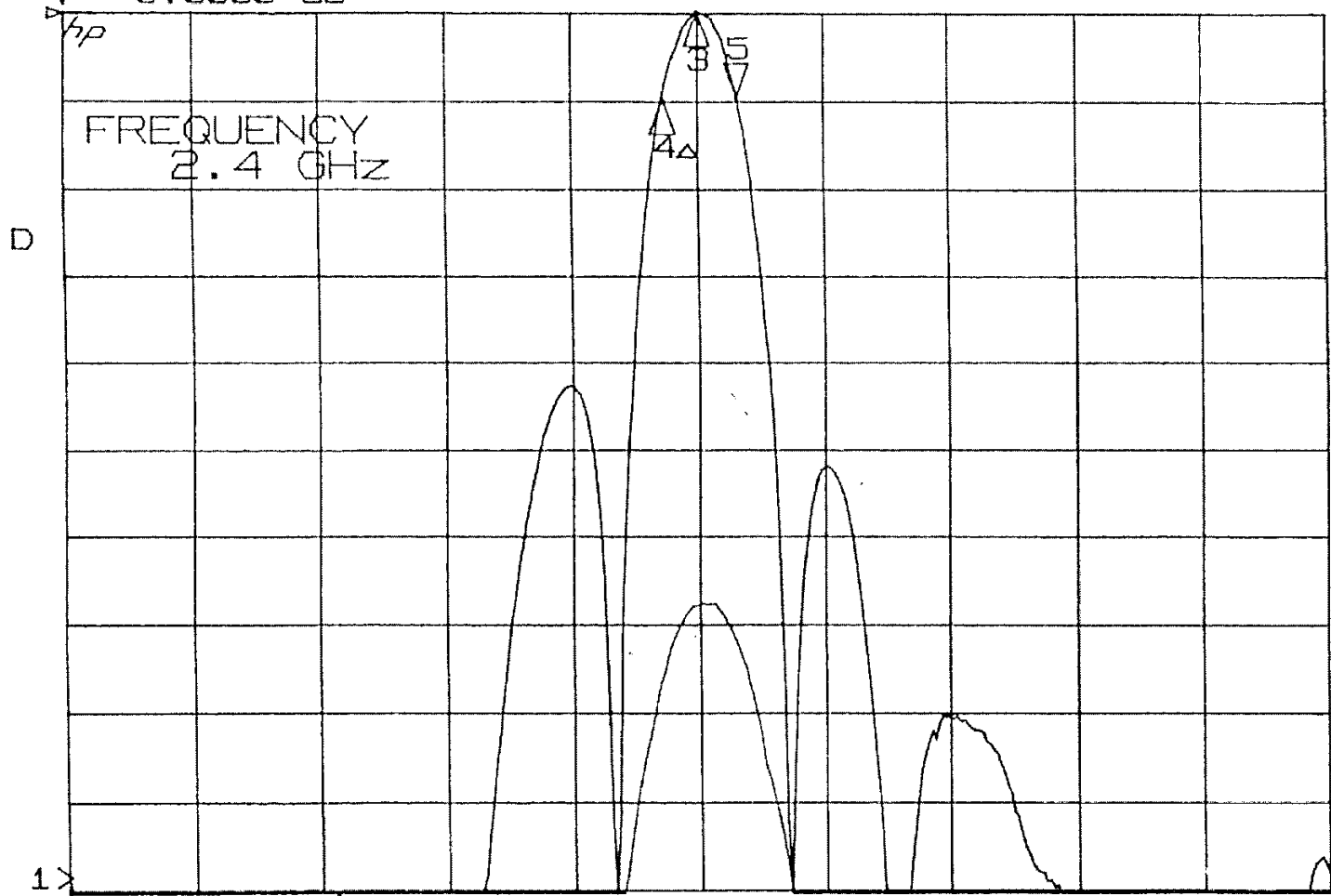
MARKER 3-4
10.070 °
3.0 dB

MARKER 4-4
0.0 °
0.0 dB

►MARKER 5-4
21.286 °
0.0000 dB

POSITION
-171.30°

30 MAY 00
14:54:36



1 START -180.000°
STOP 180.000°

00001771

—E
polar

►P1:b1/a1 & M2 log MAG

Y.MILLER
ANTENNA'S LAB

S/N 00020

E- PLANE

REF 2.256 dB
3.0 dB/
0.0000 dB

Q.A.
001

MARKER 1-4
-93.478 °
-47.217 dB

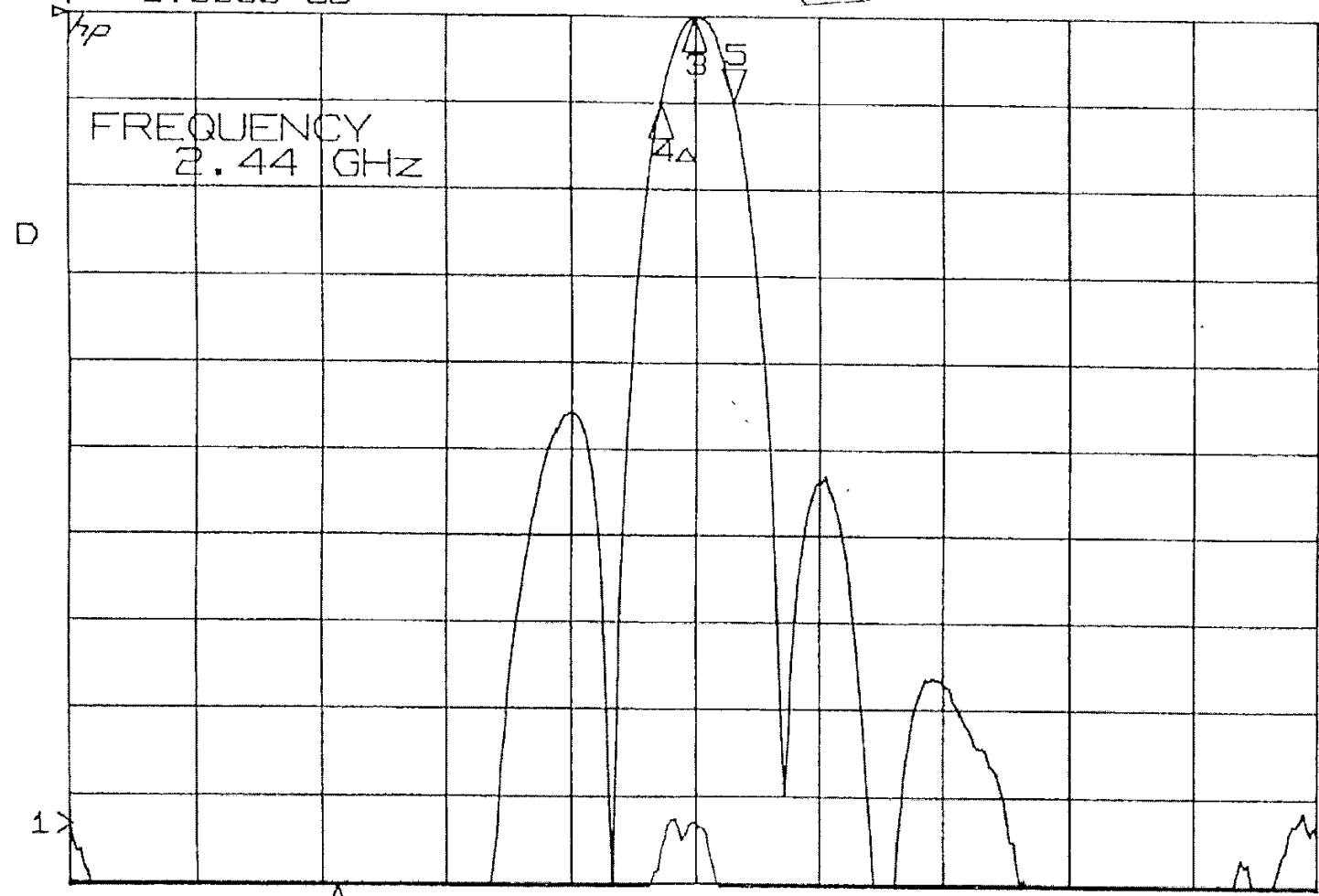
MARKER 3-4
10.056 °
3.0 dB

MARKER 4-4
0.0 °
0.0 dB

►MARKER 5-4
21.440 °
0.0000 dB

POSITION
-171.30°

30 MAY 00
14:51:08



1 START -180.000°
STOP 180.000°

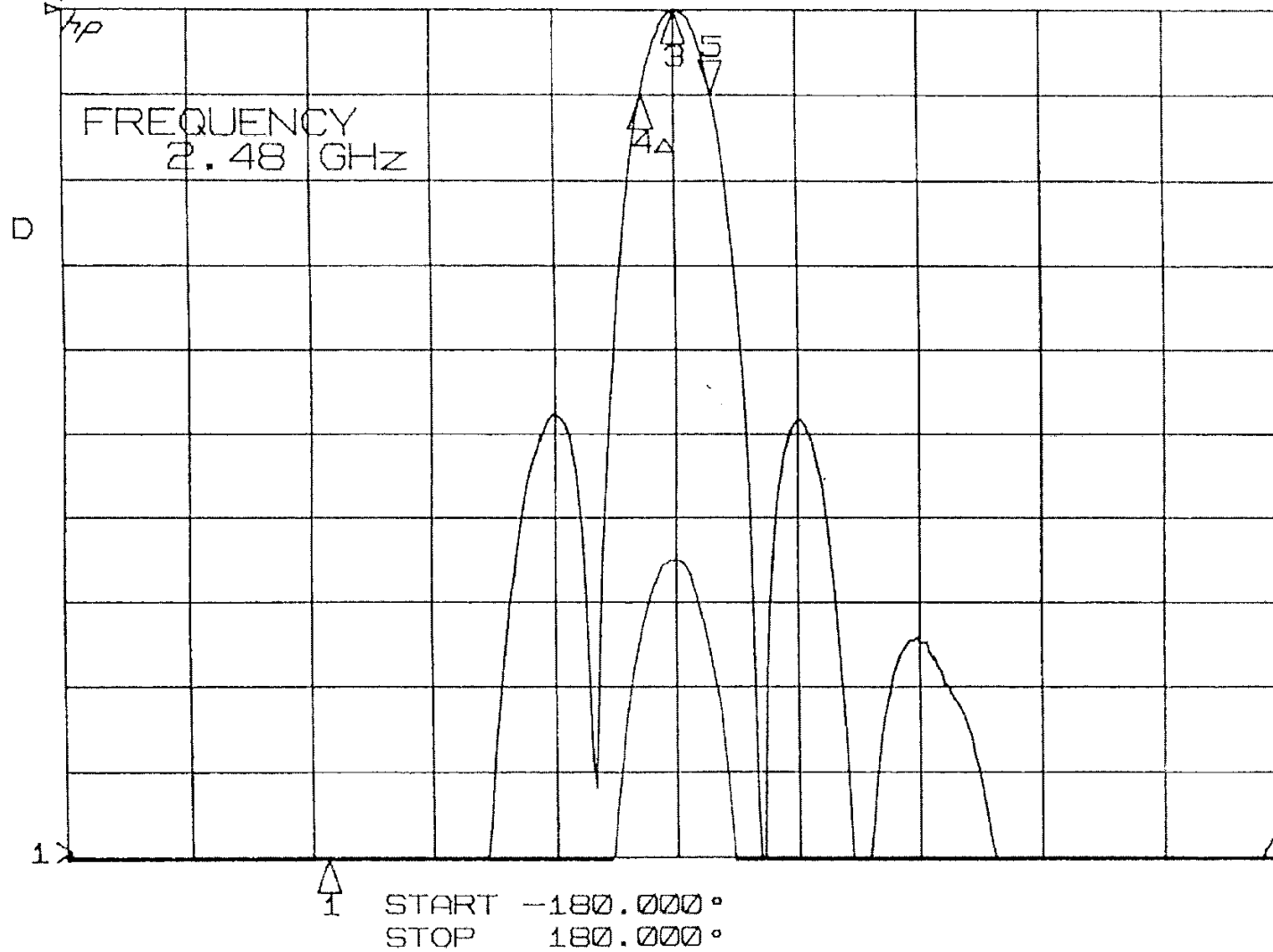
Y.MILLER
ANTENNA'S LAB

S/N 00020
E- PLANE

POLAR

►P1:b1/a1 & M3 log MAG
REF 2.682 dB
5 3.0 dB/
▽ 0.0000 dB

0 A.
001



MARKER 1-4
-93.503 °
-48.565 dB

MARKER 3-4
10.031 °
3.0 dB

MARKER 4-4
0.0 °
0.0 dB

►MARKER 5-4
21.000 °
0.0000 dB

POSITION
-171.30°

30 MAY 00
14:47:49

Y. MILLER
ANTENNA'S LAB.

S/N 00020

H- PLANE

Pat:

►P1:b1/a1 & M1 log MAG

REF 1.515 dB

5 3.0 dB/

▽ 0.0000 dB

Q.A.
001

MARKER 1-4

93.798 °

-20.108 dB

MARKER 3-4

10.736 °

3.0 dB

MARKER 4-4

0.0 °

0.0 dB

►MARKER 5-4

20.217 °

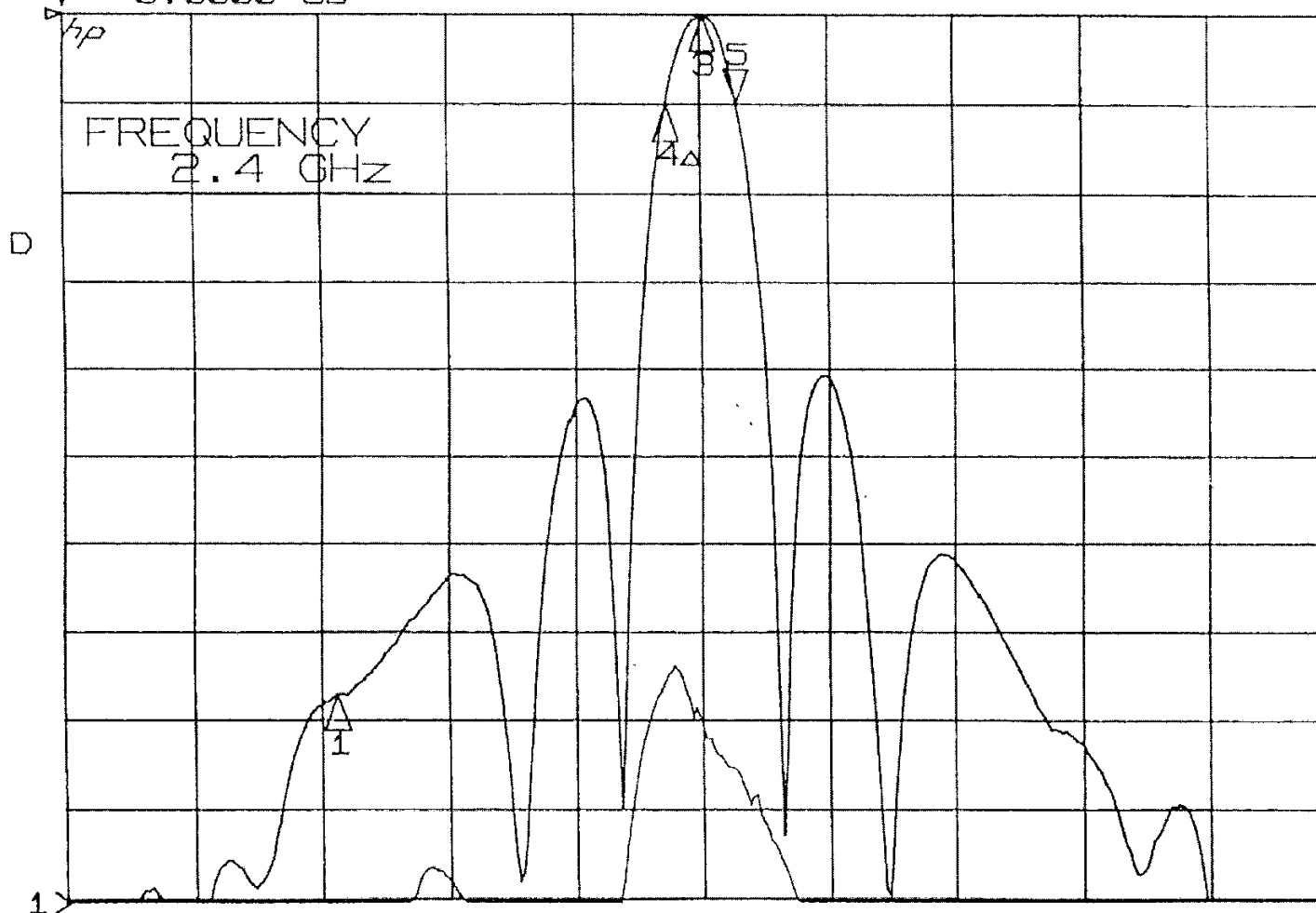
0.0000 dB

POSITION

-171.30 °

30 MAY 00

14:39:32



START -180.000 °

STOP 180.000 °

DOUG

SN 00020

►P1:b1/a1 & M2 log MAG
REF 2.403 dB
5 3.0 dB/
▽ 0.0000 dB

Y.MILLER
ANTENNA'S LAB

Q.A.
001

H- PLANE

MARKER 1-4
93.885 °
-21.749 dB

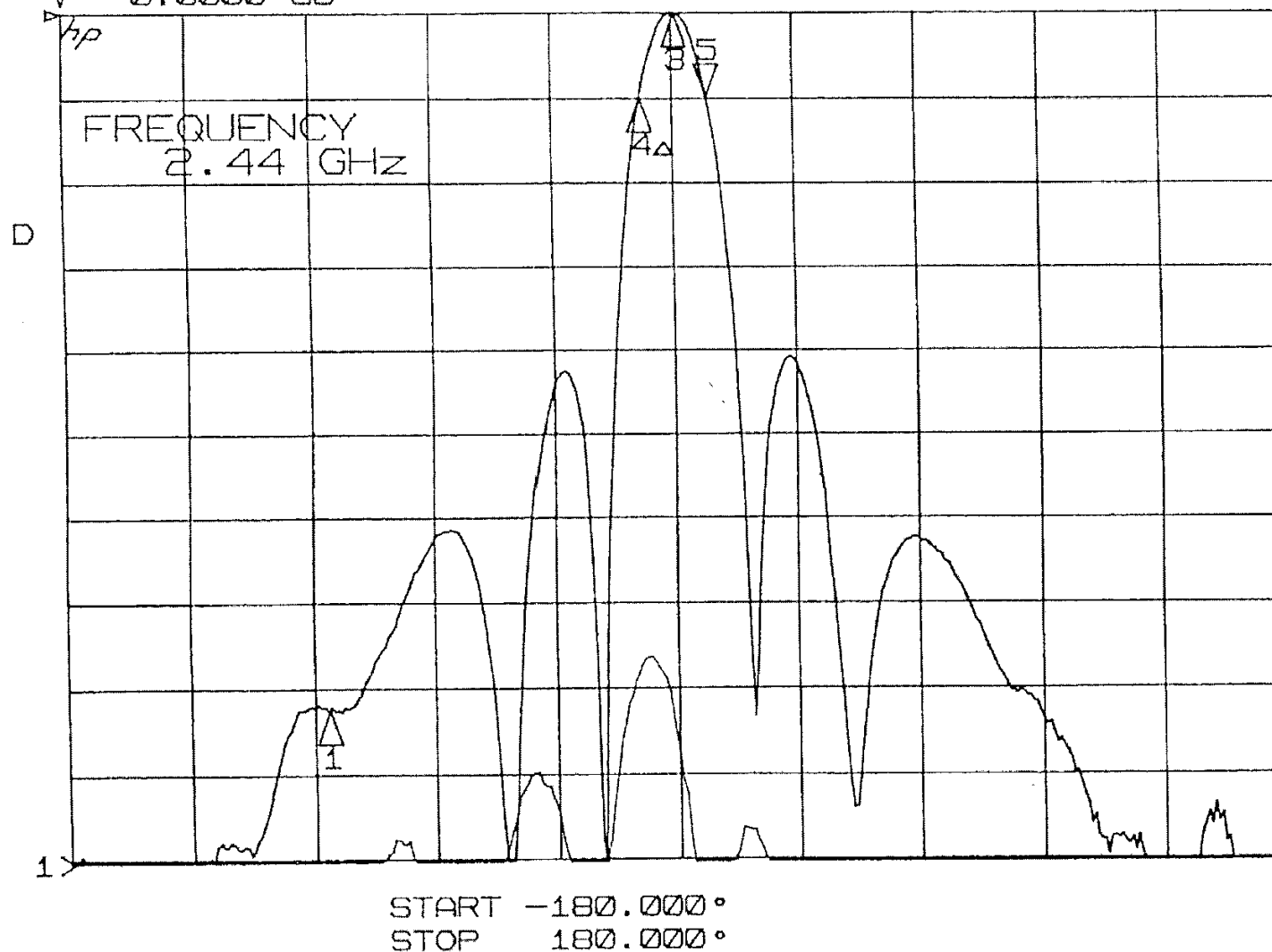
MARKER 3-4
10.650 °
3.0 dB

MARKER 4-4
0.0 °
0.0 dB

►MARKER 5-4
20.124 °
0.0000 dB

POSITION
-171.30 °

30 MAY 00
14:35:55



MI- 50081/17

DATA

S/N 00020

►P1:b1/a1 & M3 log MAG

REF 1.71 dB

5 3.0 dB/

▽ 0.0000 dB

H-PLANE
Y. MILLER
ANTENNA'S LAB.

Q.A.
001

MARKER 1-4
-94.607 °
-20.869 dB

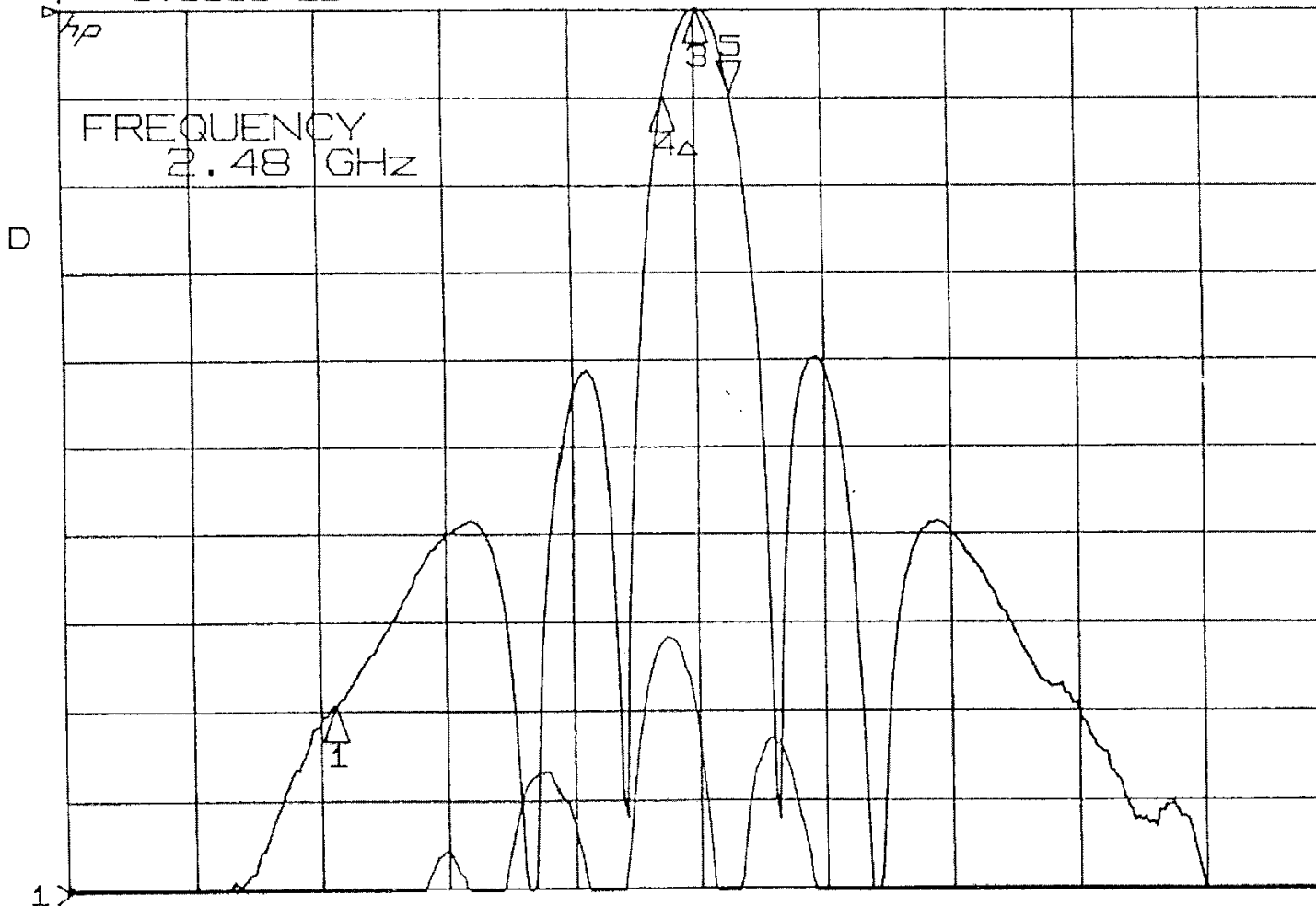
MARKER 3-4
9.9278 °
3.0 dB

MARKER 4-4
0.0 °
0.0 dB

►MARKER 5-4
19.318 °
0.0000 dB

POSITION
-171.30 °

30 MAY 00
14:31:21

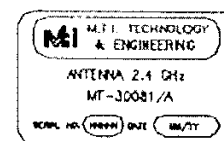
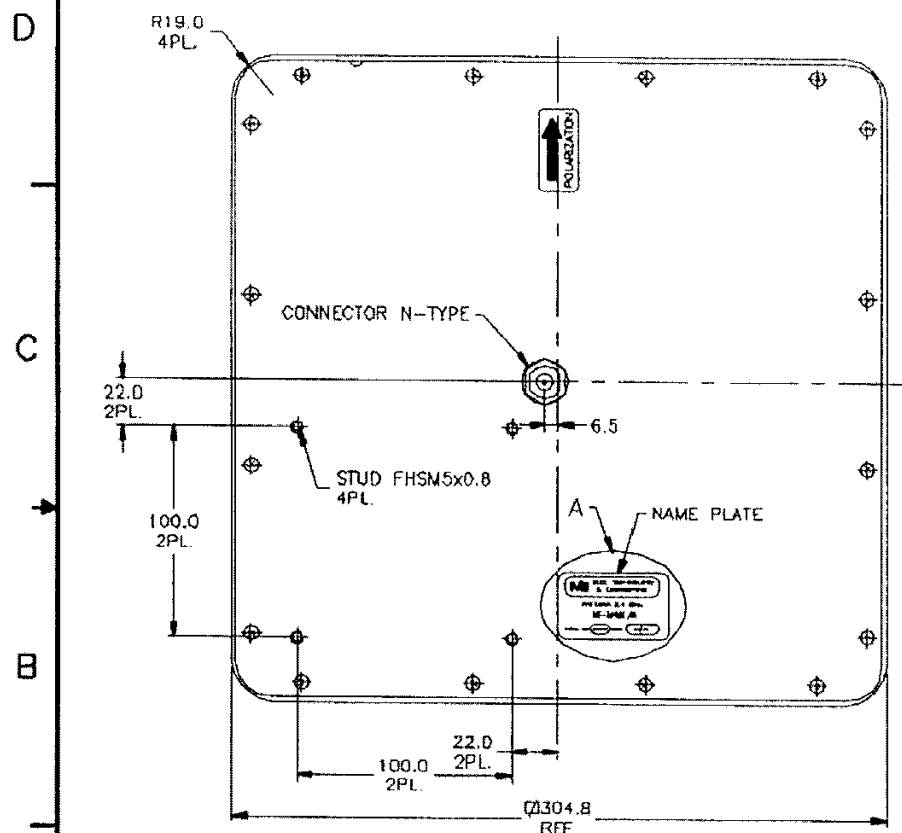


START -180.000 °
STOP 180.000 °

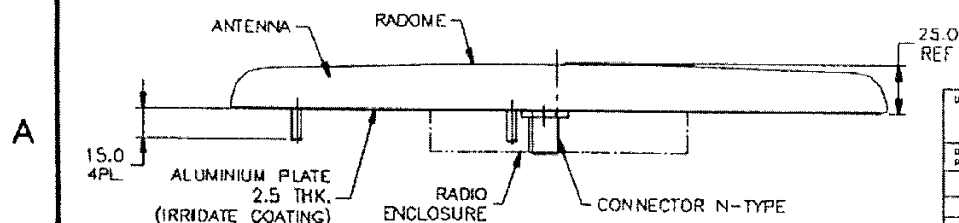
THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN IS UNCLASSIFIED AND CONFIDENTIAL TO M.T.J. NO PERSON IS ALLOWED TO COPY, REPRODUCE OR PUBLISH ANY PART OF THIS DOCUMENT, NOR DISCLOSE ITS CONTENTS TO OTHERS, NOR MAKE ANY USE OF IT, NOR ALLOW OR ASSIST OTHERS TO MAKE ANY USE OF IT - UNLESS BY THE PRIOR WRITTEN EXPRESS AUTHORIZATION OF M.T.J. AND THEN ONLY TO EXTENT AUTHORIZED. (C) COPYRIGHT - M.T.J. TECHNOLOGY AND ENGINEERING (1993) LTD.

SHEET REVISION STATUS					SHEET NO
0	4	3	2	1	LATEST REV

REVISION RECORD				
REV	ECO	DESCRIPTION	APVD	DATE



DETAIL A



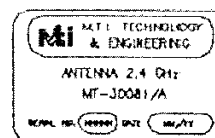
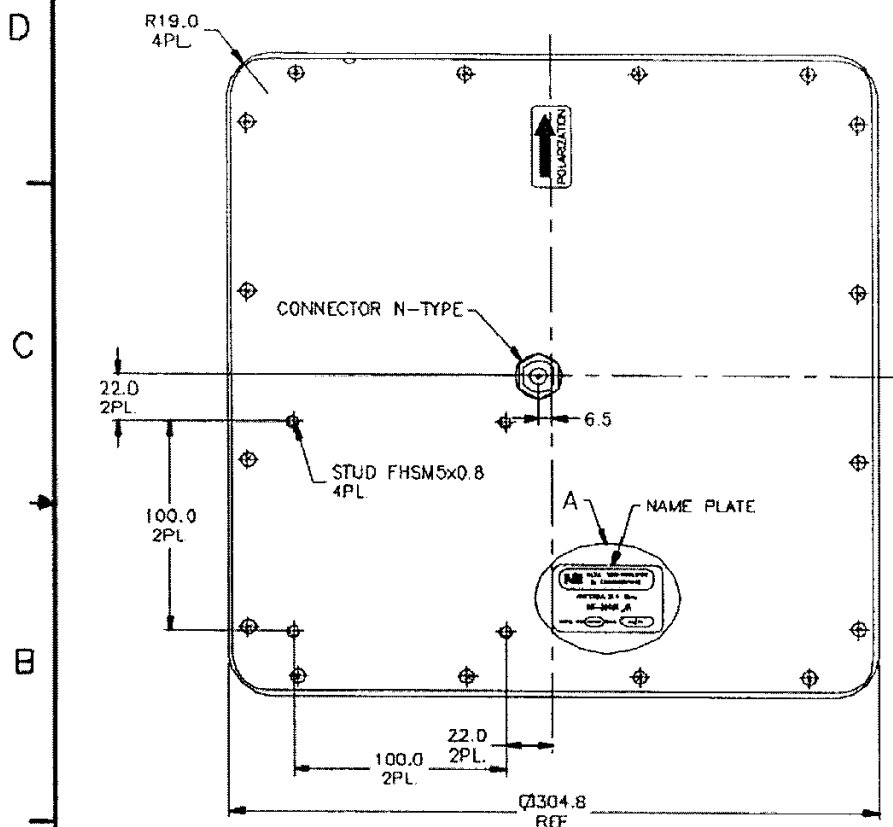
UNLESS OTHERWISE SPECIFIED		DRAWING TO		M.T.J. TECHNOLOGY AND ENGINEERING (1993) LTD. ANTENNA DESIGN	
DIMENSIONS ARE IN mm FOR PARTS 1/16" & 1/8"		DWG	CHKD	DATE	TITLE
TOLERANCE		PROJ	DATE	DATE	ANTENNA 2.4 GHz (N-TYPE) MT-30081/A ICD
LINEAR ±0.2		MFG	DATE	DATE	
ANGULAR		QA	DATE	DATE	
1st ANGLE PROJECTION		SCALE 1/2		SHEET 1 OF 1	
SURFACE FINISH IN mm		DWC NO		RD40791300C	

NEXT ASSY

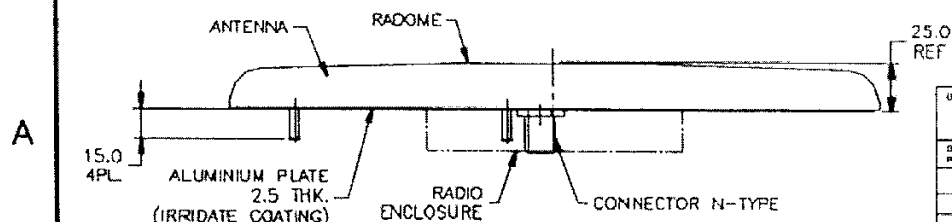
THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN ARE PROPRIETARY AND CONFIDENTIAL TO M.T.J. NO PERSON IS ALLOWED TO COPY, REPRODUCE OR PUBLISH ANY PART OF THIS DOCUMENT, NOR DISCLOSE ITS CONTENTS TO OTHERS, NOR MAKE ANY USE OF IT, NOR ALLOW OR ASSIST OTHERS TO MAKE ANY USE OF IT - UNLESS BY THE PRIOR WRITTEN EXPRESS AUTHORIZATION OF M.T.J. AND THEY GO ON TO OBTAIN AUTHORIZED (S) COPYRIGHT - M.T.J. TECHNOLOGY AND ENGINEERING (1993) LTD.

SHEET REVISION STATUS					SHEET NO
5	4	3	2	1	LATEST REV

REVISION RECORD				
REV	ECO	DESCRIPTION	APVD	DATE



DETAIL A



UNLESS OTHERWISE SPECIFIED		CONTRACT NO.	
DIMENSIONS ARE IN MM PER ISO 11434-1:1983		DWG. NO.	
TOLERANCE		CHKD.	
LINEAR ±0.2		DSGN.	
ANGULAR		PROJ.	
1st ANGLE PROJECTION		MFG.	
SURFACE TEXTURE IN MICRO IN		QA	

M.T.J. TECHNOLOGY AND ENGINEERING (1993) LTD. NOBIS ANTENNA		TITLE	
ANTENNA 2.4 GHz (N-TYPE)		MT-30081/A ICD	
SIZE C		DWG. NO. RD40791.300C	
SCALE 1/2		SHEET 1 OF 1	

NEXT ASSY