



RF Exposure Antenna Summary

Network Systems Organization

FCC ID: **H9PLA4131M**

WLAN PC Card, 11 Mbps, T3

Source Based

AP DC Factor: 0.720

Output Power: 60 mW

Original Equip.

Remote DC Factor: 0.710

Mobile Antennas (R>2m)

Ant No	Model	Symbol P/N	Type	Gain (dBi)	Cable Loss (dB)	Net Gain	Pout (dBm)	MPE (cm)	TR Status	Device Use
01.	Ceiling Panel	50-21900-015	Plane	3.3	1.50	1.8	16.28	2.3	Tested	Fixed
02.	Panel 7.5	ML-2499-PNA1-01	Panel	11.0	3.48	7.5	14.30	4.4	Tested	Fixed
03.	Panel 9	50-21900-047	Patch	13.0	3.53	9.5	14.26	5.5	Tested	Fixed
04.	Pipe Bomb 11"x4'	50-11901-048P	Dipole Array	5.2	1.00	4.2	16.78	3.0	Tested	Fixed
05.	Yagi	ML-2499-YGA1-00	Yagi	13.9	2.50	11.4	15.28	6.9	Tested	Fixed

Antenna Gain listed without cable

TR Status refers to whether the antenna was tested. If not refer to the directed antenna test data

Duty Cycle Factors are applied to MPE and EIRP

Thursday, July 05, 2001 01:51 PM

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Ceiling Panel Antenna

The **Ceiling Panel** antenna is 1.8 dBi omnidirectional in azimuth plane. The **Plane** uses a reverse polarity BNC connector. It is mounted on a horizontal surface. In its use it would be mounted on a ceiling farther than 20 cm from a person's body. It is used with mobile devices.

The following RF exposure information is included in a prominent place in the device's user manual to inform the user of safety issues as required by OET Bulletin 65, Supplement C whenever the device configuration could reduce the MPE distance to be less than 20 cm.

<i>Location</i>	Horizontal Surface
<i>Pattern</i>	Omni
<i>Type</i>	Plane
<i>Max Gain</i>	1.8 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	6 ft (Plenum-rated)
<i>Symbol P/N</i>	ML-2499-SD24-00
<i>MPE Distance</i>	See summary table

“Important Note: To comply with FCC RF exposure requirements, no one may remain within 20 cm of the antenna for extended periods of time.”

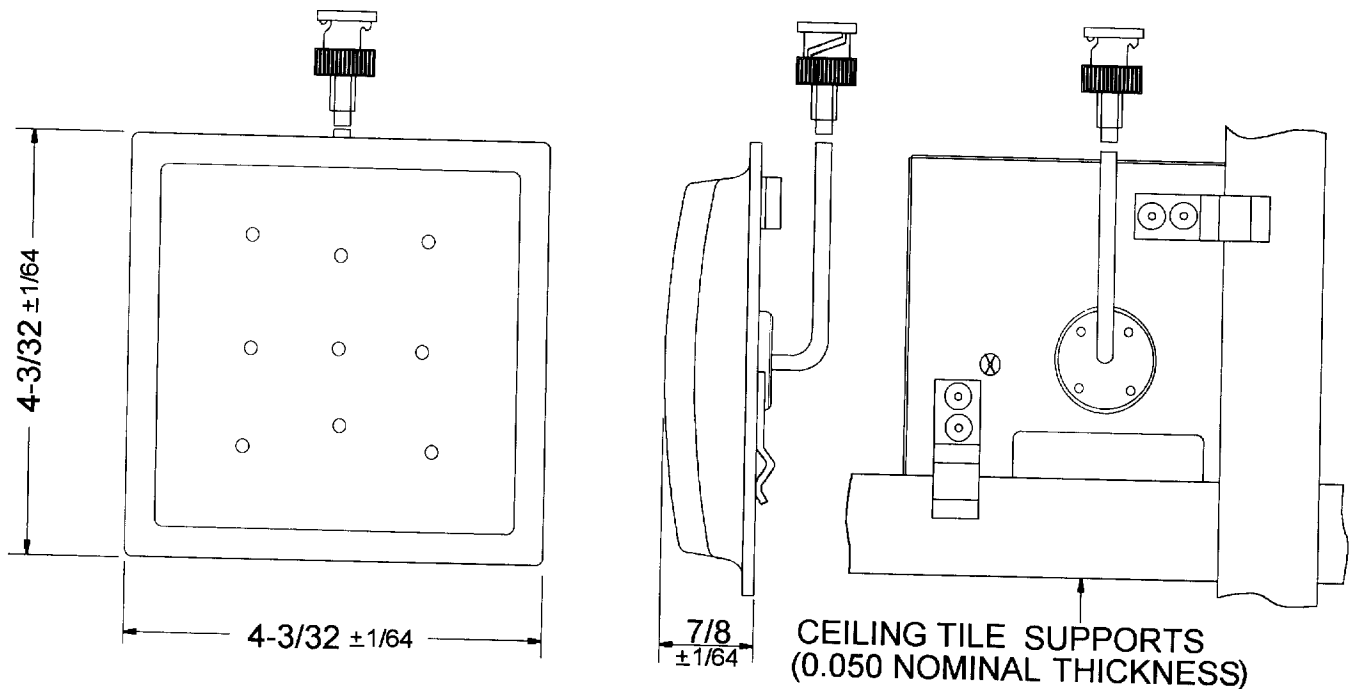


Antenna Photograph



Ceiling Configuration

DIMENSIONS



DRAWING NOT TO SCALE

SPECIFICATION

PARAMETER	PERFORMANCE
Frequency	2400 – 2500MHz
Gain	1.8 dBi
Polarization	Vertical Linear
VSWR	1.5:1 Nominal (2.0:1 Max.)
Azimuth Plane Beamwidth	Omnidirectional
Elevation Plane 3 dB Beamwidth	45° (Peak at 53°)
Cable Type	Plenum rated RG-58
Cable Length	72 in.
RF Connector	Reverse BNC
Power	10 Watts
Antenna Weight (excluding cable)	3.2 oz.

Dimensions are in inches unless otherwise noted.

Panel Antenna

The **Panel** is a 7.5 dBi antenna with a 44° beamwidth in azimuth plane. The **Panel** uses a reverse polarity BNC connector. It is mounted on a vertical surface. In its use it would be mounted on a wall near a ceiling farther than 20 cm from a person's body. It is used with mobile devices.

The following RF exposure information is included in a prominent place in the device's user manual to inform the user of safety issues as required by OET Bulletin 65, Supplement C when ever the device configuration could reduce the MPE distance to be less than 20 cm.

<i>Location</i>	Vertical Surface
<i>Pattern</i>	Directional
<i>Type</i>	Panel
<i>Max Gain</i>	7.5 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	20 ft (Plenum-rated)
<i>Symbol P/N</i>	ML-2499-PNA1-01
<i>MPE Distance</i>	See summary table

“Important Note: To comply with FCC RF exposure requirements, no one may remain within 20 cm of the antenna for an extended period of time.”

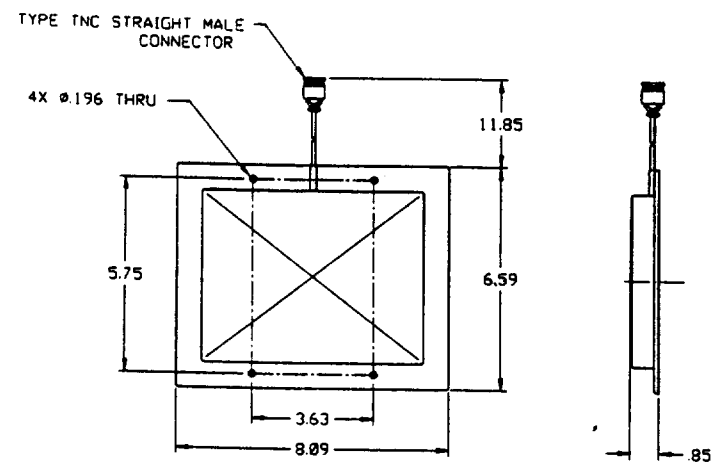


Antenna Photograph

2.4 GHz ANTENNAS



Type 505021 HIGH-GAIN CP PANEL



SPECIFICATIONS

Frequency:	2.4 To 2.485 GHz
VSWR:	2:1 Max.
Gain:	+11 dBic
3 dB Beamwidth:	±22° (Typ) E-Plane ±18° (Typ) H-Plane
Side Lobe Level:	≥ dB E-Plane ≥15 dB H-Plane
Front/Back:	≥20 dB
Polarization:	RHCP (LHCP)

Gain with Cable: 7.5 dBi
Cable loss @ 20 ft: 3.5 dB



RELEASED

PART IS PACKAGED ACCORDING TO STI SPECIFICATION :50-04100-013
3rd Party PRODUCT

SYMBOL TECHNOLOGIES
PART NO. ML-2499-PNA1-01
ANTENNA: PANEL, 2.4, 7 DBI, 20 FT
REV .A
PAGE 1 OF 2

I. CONSTRUCTION**DIAMETER**

Center Conductor: Solid Bare Copper
 Dielectric: Gas Injected Foam Polyethylene
 Shield: Bonded Aluminum-Polyester-Aluminum Tape
 36 GA Tinned Copper Braid(90%k)
 Jacket: Black Low Smoke Low Toxicity FR Polyethylene

.044"
 .116"
 .121"
 .144"
 .195"

II. ENVIRONMENTAL AND MECHANICAL PROPERTIES

Weight: 34 lbs per 1000 feet
 Operating Temperature: -40°C to +85°C
 Minimum Bend Radius: 1/2"
 Flame Resistance: Passes IEEE-383

I. ELECTRICAL PROPERTIES

Impedance: 50 ohms
 Capacitance: 24.5 pF per foot
 Velocity: 83%
 Attenuation @ (typical)

30 MHz:	1.8 dB per 100 feet
50 MHz:	2.4 dB per 100 feet
150 MHz:	4.1 dB per 100 feet
220 MHz:	5.0 dB per 100 feet
450 MHz:	7.2 dB per 100 feet
900 MHz:	10.4 dB per 100 feet
1500 MHz:	13.5 dB per 100 feet
2000 MHz:	15.7 dB per 100 feet

Cable Loss @ 2440 MHz
 17.3 dB/100 ft.

**IV. NOTES**

1) All tests performed in accordance with MIL-C-17(current issue).

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 3rd Party PRODUCT

ORIGINAL

SYMBOL TECHNOLOGIES
 PART NO. ML-2499-PNA1-01
 ANTENNA: PANEL, 2.4, 7 DBI, 20 FT
 REV .A
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Panel 9 Antenna

The **Panel 9** antenna is 9 dBi directional in azimuth plane. The **Plane** uses a reverse polarity BNC connector. It is mounted on a horizontal surface. In its use it would be mounted on a wall or mast farther than 20 cm from a person's body. It is used with mobile devices.

<i>Location</i>	Wall, Mast
<i>Pattern</i>	Directional
<i>Type</i>	Panel
<i>Gain</i>	9.5 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	430cm RG-58
<i>Symbol P/N</i>	50-21900-047
<i>MPE Distance</i>	See summary table

The following RF exposure information is included in a prominent place in the device's user manual to inform the user of safety issues as required by OET Bulletin 65, Supplement C.

"CAUTION: Exposure to Radio Frequency radiation. To comply with FCC RF exposure requirements this antenna shall be installed to ensure a minimum separation distance of 20 cm from all persons during normal operating conditions."



Antenna Photograph



Typical Antenna Installation Scheme

Pipe Bomb 11” Antenna

The **Pipe Bomb 11”** antenna is 4.2 dBi omnidirectional in azimuth plane. The **Pipe Bomb 11”** uses a reverse polarity BNC connector. It is mounted on the ceiling or on a wall near the ceiling. In its use it would be farther than 20 cm from a person's body. It is used with mobile devices. It is available with either a 4' or 15' cable.

The following RF exposure information is included in a prominent place in the device's user manual to inform the user of safety issues as required by OET Bulletin 65, Supplement C whenever the device configuration could reduce the MPE distance to be less than 20 cm.

<i>Location</i>	Near ceiling
<i>Pattern</i>	Omni
<i>Type</i>	Dipole Array
<i>Max Gain</i>	4.2 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	4, 15 ft (Plenum-rated)
<i>Symbol P/N</i>	ML-2499-HPA1-00 ML-2499-HPA2-00
<i>MPE Distance</i>	See summary table

“Important Note: To comply with FCC RF exposure requirements, no one may remain within 20 cm of the antenna for extended periods of time.”



Antenna Photograph



Mounting Configuration

REVISIONS

REV	DESCRIPTION	DATE	APPVL
A	DOCUMENT RELEASED PER EDR# 16847	1/2/95	TS
B	CHANGE DIM. PER MFGR. & UPDATE FAMILY DWG PER EC#E6375	4/14/00	D. J. [Signature]

General Notes:

THE FOLLOWING STI SPECIFICATIONS APPLY:

50-04100-013: **Specification: Supplier Packaging and Labeling Requirements**



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APPROVAL	NAME	DATE	COMPONENT SPECIFICATION	
DRAWN	S. VanNoy	12/15/95	TITLE: ANT:OMNI ASSY, 2.4-2.5GHz , 3dBd W/CBL, W/REV BNC, OPTIONAL PLENUM DOC. NO. 50-11901-XXX REV B	
CHECKED	T. SMURA	2/1/95		
ENG.	T. HOFBAUER	1/18/96		
OPERATIONS	S. SPITERI	1/15/96		
			SHEET 1 of 5	

OMNIDIRECTIONAL ANTENNA ASSEMBLY

Features:

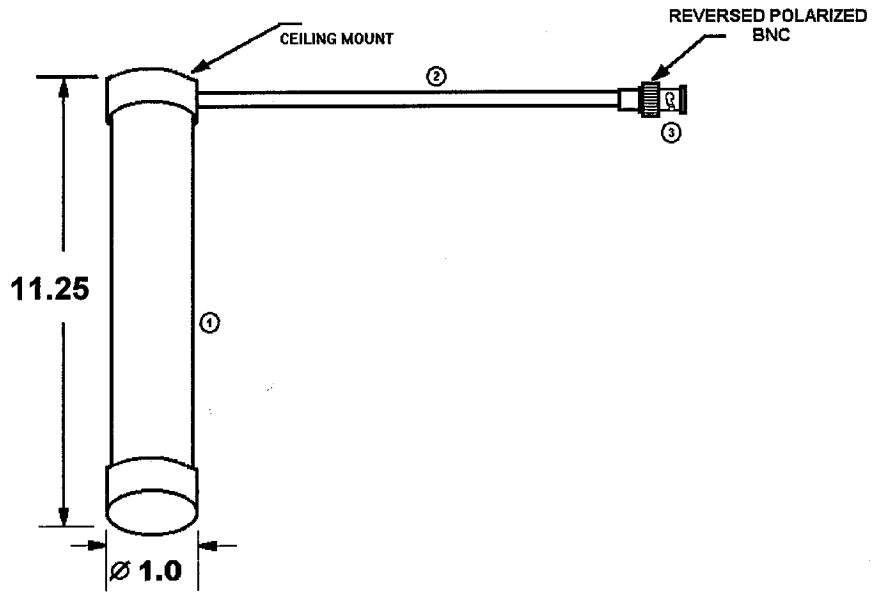
- Weatherproof designs with UltraLink pigtail
- DC grounded
- Plated copper laminated radiator

Enclosure Material:	Ultraviolet-stabilized Polycarbonate
Mount Style:	Ceiling
Performance:	Omnidirectional
Frequency:	2.4 - 2.5 GHz
Gain:	3 dBd
Bandwidth (1.5:1):	100 MHz
-3dB bandwidth:	38 E-Plane ⁰
Weight:	.31 lb.
W/sur Area:	0.08 ft ²
W/survival:	125 mph
Power:	50W
Operating Temperature:	-30°C - 70°C

Note:

Common Specifications: VSWR - 1.2: nominal; Connector Type -N-female; Element material - printed circuit

OUTLINE DRAWING



DRAWING NOT TO SCALE

TABULATION:	50-11901-XXX	XXX = Cable Length in Inches
OPTIONS:	Plenum Rating ¹	Add "P" to Part Number (Rating applies to Cable not Antenna)
	Color	Add single character for color e.g. Y = Yellow, without color is white.
	Private Label	Add "S" for private label.
EXAMPLE:	50-11901-048P	048 = 48 Inches or 4 FT., P = with Plenum Rating

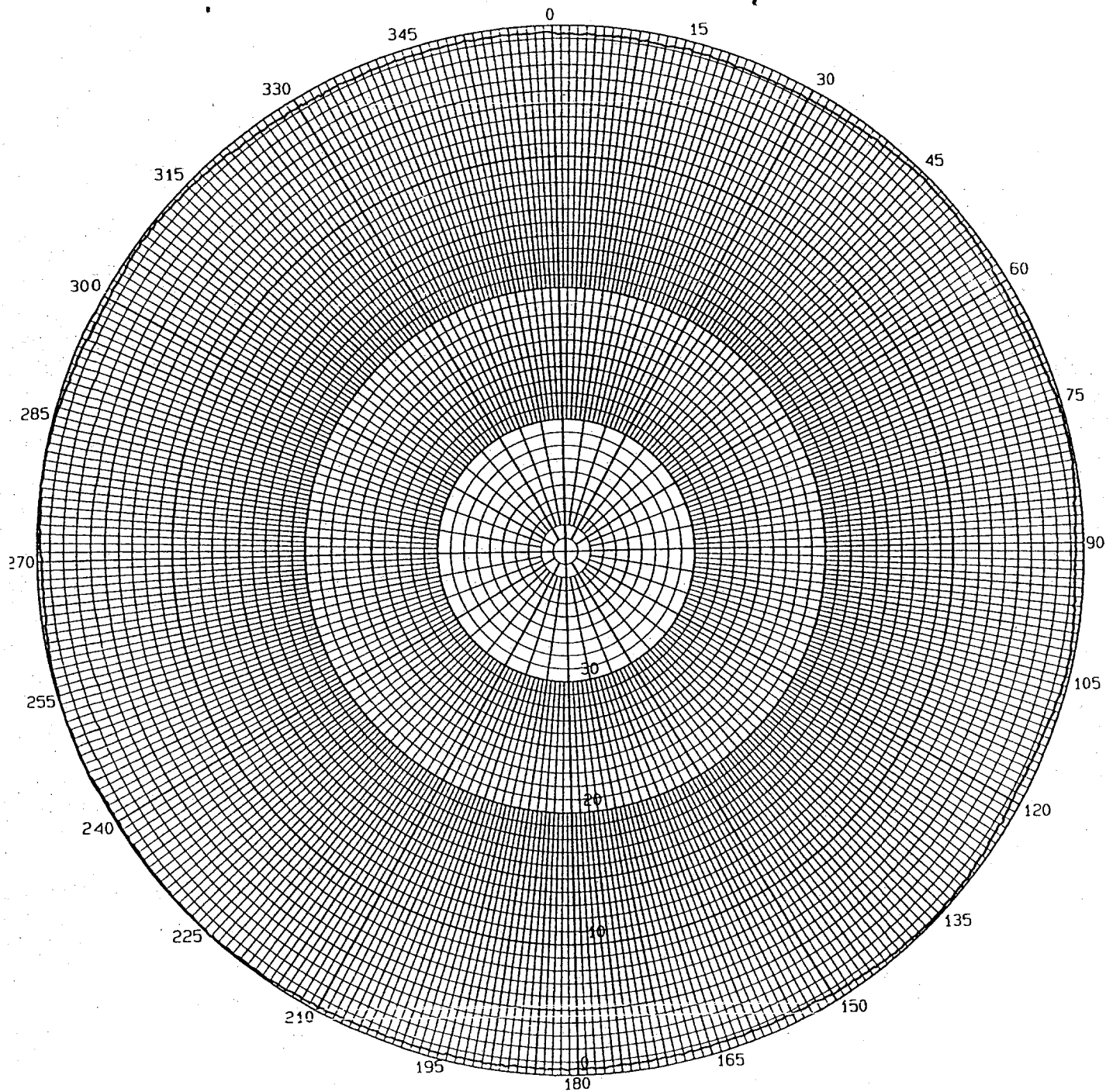
Note:
 1. Modified Steiner Tunnel Flame Test (UL-910). Plenum is a closed area, such as between drop ceiling and true ceiling. With rating coax can be run in plenum without conduit.

ITEM	PART#	QTY	DESCRIPTION
1	S2403BH	1	CUSHCRAFT/Signals Omnidirectional Antenna
2	N/A	1	Coaxial Cable (RG58)
3	50-12100-093	1	Reversed Polarized Female BNC Connector

Dimensions are in inches unless otherwise noted

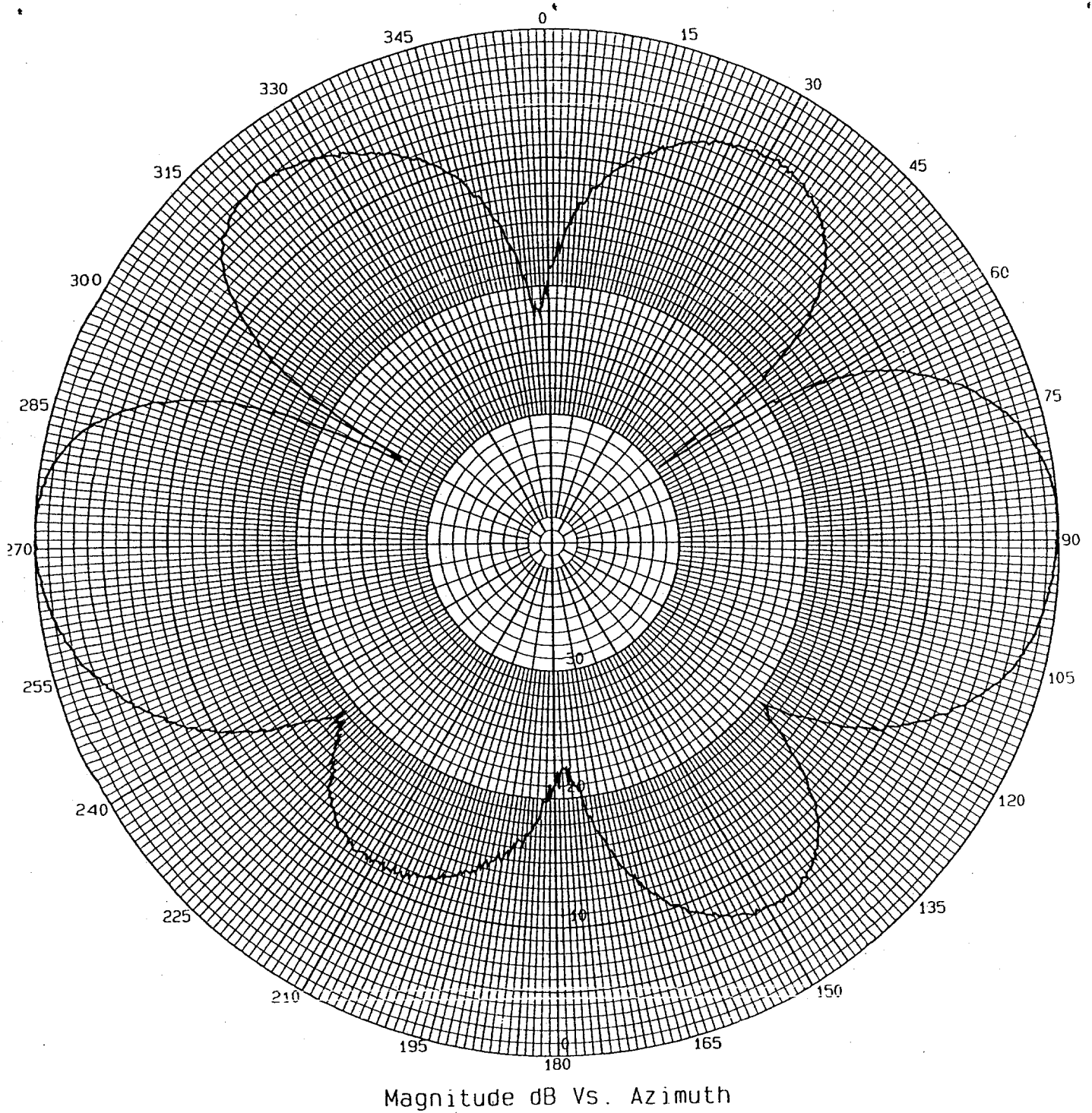
SYMBOL TECHNOLOGIES, INC.	DOCUMENT No.50-11901-XXX	REV B
	SHEET 3 of 5	

Typical Radiation Pattern
Freq: 2.45 GHz
Polarization: H-Plane



Magnitude dB Vs. Azimuth

Typical Radiation Pattern
Freq: 2.45 GHz
Polarization: E-Plane



Yagi Antenna

The **Yagi** antenna is 11dBi directional in azimuth plane. The **Yagi** uses a reverse polarity BNC connector. It is mounted on a mast or wall. In its use it would be mounted farther than 20 cm from a person's body. It is used with mobile devices.

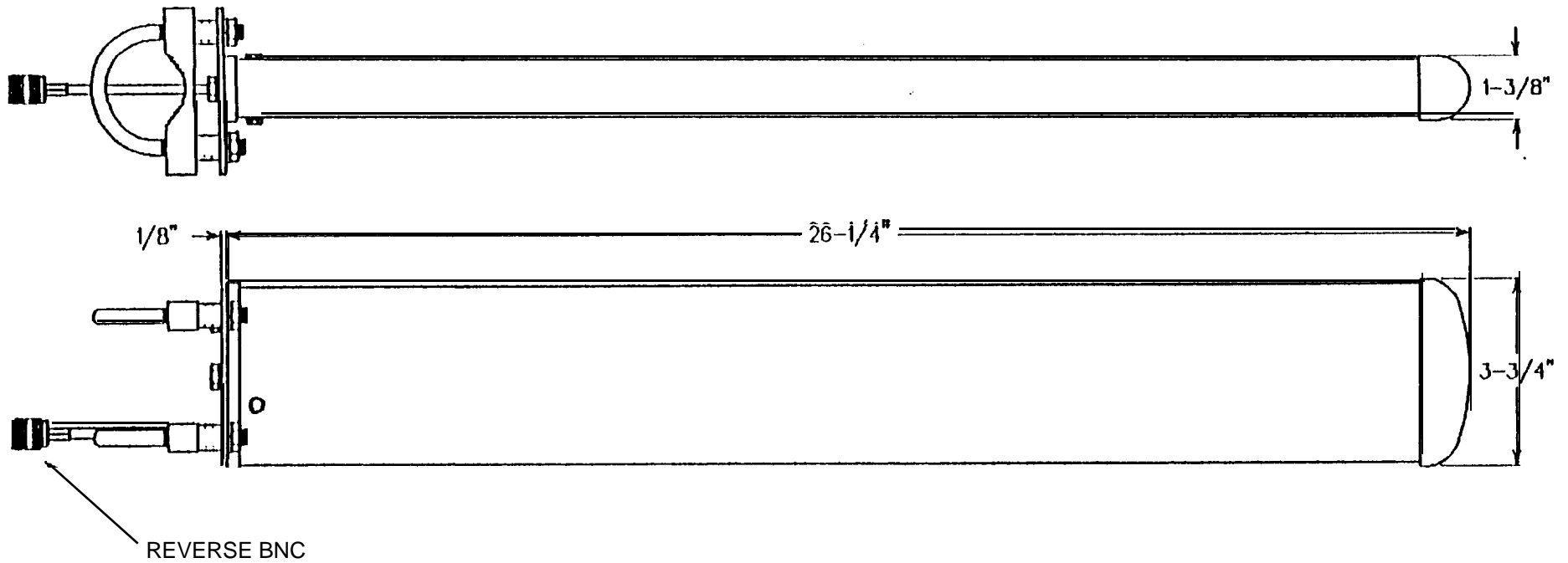
<i>Location</i>	Vertical Surface
<i>Pattern</i>	Directional
<i>Type</i>	Yagi
<i>Max Gain</i>	10 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	11 ft (Plenum-rated)
<i>Symbol P/N</i>	ML-2499-YGA1-10
<i>MPE Distance</i>	See summary table

The following RF exposure information is included in a prominent place in the device's user manual to inform the user of safety issues as required by FCC rules.

"CAUTION: Exposure to Radio Frequency radiation. To comply with FCC RF exposure requirements this antenna shall be installed to ensure a minimum separation distance of 20 cm from all persons during normal operating conditions."



Antenna Photograph



RELEASED

PART IS PACKAGED ACCORDING TO STI SPECIFICATION :50-04100-013
3rd Party PRODUCT

<date/time>

SYMBOL TECHNOLOGIES
PART NO. ML-2499-YGA1-10
ANTENNA:YAGI, 2.4, 10FT
REV .A
PAGE 1 OF 2

PC2415RBN120P**SPECIFICATIONS**

15 Element Yagi

Frequency: 2400-2500 MHz

Gain: 15 dBi

Beamwidth H-plane: 34 degrees

E-plane: 30 degrees

Front to Back: >17 dB

Weight: <1 lb.

Wind Load: .4 ft²

- Radome Length: 25 in. max.

Thickness: .725 in.

Radome Material: Lexan

Color: NEUTRAL

Mounting Hardware: Stainless Steel

Mounting Plate: 4" x 3-7/16"

CONNECTOR: BNC REVERSE Cable

10 ft (Plenum-rated)



Re: Modified Packaging for antennas

Below is the information that you requested.

Part#	Box Size		Budgetary Price	STI P/N#
S2406P72PRBN	6.5"x5"x3"	2.5 x 4" Bar Code Label	\$ 42.13	ML-2499-PTA1-01
PC24 1 5RBN120	4.5"x4.5"x3"	1" 2.5 x 4" Bar Code Label	\$112.62	ML-2499-YGAI-10

PART IS PACKAGED ACCORDING TO STI SPECIFICATION :50-04100-013
3rd Party PRODUCT

SYMBOL TECHNOLOGIES
PART NO. ML-2499-YGAI-10
ANTENNA:YAGI, 2.4, 10FT
REV .A
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