



RF Exposure Antenna Summary

Network Systems Organization

FCC ID: **H9PLA4121**

WLAN PC Card, 11 Mbps, T2

Source Based

Mobile DC Factor: 0.720

Output Power: 135 mW

Class II Permissive Change

Portable DC Factor: 0.710

Mobile Antennas (R>20cm)

Ant No	Model	Symbol P/N	Type	Gain (dBi)	Cabel Loss (dB)	Pout (dBm)	MPE (cm)	TR Status	Device Use
01.	3146BD	10-41359-01	F-Element	0.0	0.09	17.69	1.6	Tested	Hand Held Ocp
02.	6146D	10-41361-01	F-Element	0.0	0.23	21.07	2.3	See #1	Hand Held Ocp
03.	Yagi	ML-2499-YGA1-01	Yagi	15.0	5.00	16.30	7.5	Tested	Fixed
04.	PCI T2	S2402DDS80MMX	Fold Monopol	2.7	2.74	18.56	2.3	See # 3	Desktop
05.	Panel 8	50-21900-048	Patch	8.0	0.25	21.06	5.8	See # 3	Fixed
06.	Panel 9	50-21900-047	Patch	13.0	3.53	17.78	7.0	See # 3	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

Tx Limited configurations are for low power versions of the radio. See the specific antenna exhibit for

Monday, February 12, 2001 07:14 PM

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RF Exposure Configuration Summary

Network Systems Organization

FCC ID: **H9PLA4121**

WLAN PC Card, 11 Mbps, T2

Output Power: 135 mW

Class II Permissive Change

Ant #	Antenna Model	Terminal Mfgr.	Terminal Model	Use
01	3146BD	Symbol	PDT-3146BD	Hand Held Ocp
02	6146D	Symbol	PDT-6146-T2	Hand Held Ocp
03	Yagi	Symbol	AP-4121	Fixed
04	PCI T2	Symbol	PCI-4121	Desktop
05	Panel 8	Symbol	AP-4121	Fixed
06	Panel 9	Symbol	AP-4121	Fixed

5- R < 5 cm

5+ 5 cm < R < 20 cm

Ocp Occupational



Antenna List by FCC ID

Network Systems Organization

FCC ID: **H9PLA4121**

WLAN PC Card, 11 Mbps, T2

Output Power: 135 mW

Grant Date	Ant #:	Model	Symbol P/N	Mfg	Mfg P/N
7/31/00					
	01	Parapolic Grid	ML-2499-PGA1-	Conifer	26T-2400
	02	Pipe Bomb 11"x4'	50-11901-048P	Cushcraft	S2403BHPS48RBN
	02.1	Pipe Bomb 11"x15'	50-11901-180P	Cushcraft	S2403BHPS180RB
	03	Patch	ML-2499-PTA1-	UK	S2406P72PRBN
	04	Panel	ML-2499-PNA1-	Tecom	ML-2499-PNA1-01
	05	IEC T2	24-20776-02	UK	
	06	4140	50-11900-001	Dorne & Margol	DR10-2
	07	HS Dipole	50-21900-030	Huber Suhner	9090.16.0001
	08	Pipe Bomb 25"x20'	50-11902-240S	Cushcraft	S2406BHS240RBN
	08.1	Pipe Bomb 25"x30'	50-11902-360S	Cushcraft	S2406BHS360RBN
	09	Ceiling Panel	50-21900-015	Cushcraft	SQ2403PS72RBN
	10	Trilogy AP	21-20667-01	C&M Wauregan	
	11	Vocollect MMCX	50-21900-025	Austin Antenna	200215
	12	Toko	50-21900-022	Toko	DAC2450CT1
	13	6846D	10-41003-01	Tecom	703645
	14	End Cap "C"	10-20511-01	Tecom	822319
	15	Amtrak Omni	50-21900-027	Cushcraft	SQ2403PSNF
	16	Rubber DuckTNC-	50-21900-029	Cushcraft	RTN2400SXR
	16.1	Rubber Duck	50-21900-007	Cushcraft	RBN2400SXR
	17	PC04	50-11903-0115	Japan Electronic	JA-2400D-V4
	17.1	PC14	50-11903-0355	Japan Electronic	JA-2400-DV
	18	4342	50-21900-033	Telex	2420AW
	19	DASH 3000	50-21900-036	NCC	N2400MMCX1
	20	Mag Dipole	ML-2499-MGA1	Centurian	CAF95770
	21	Trilogy PCI, 72"	25-20728-01	C&M Wauregan	25-20728-01
	22	Novas	50-21900-034	Tecom	703562
	23	1742	703549-2	Tecom	703549-2
	24	2742	703624-2	Tecom	703624-2

FCC ID: **H9PLA4121**

WLAN PC Card, 11 Mbps, T2

Output Power: 135 mW

Grant Date	Ant #:	Model	Symbol P/N	Mfg	Mfg P/N
7/31/00					
	25	7242	10-35477-01	Tecom	
	26	Criticare BFA	50-21900-021	Tecom	703443-1
	27	7546D	10-40948-01	Tecom	703634
	28	7546	10-38649-02	Tecom	
	29	6846	10-32290-02	Tecom	
	30	2042	10-17577-03	Tecom	703117-2
	31	6146	10-35305-02	Tecom	10-35305-02
	32	Corner Patch	ML-2499-DLA1-	Tecom	505126C
	33	Plane	50-21900-008	Tecom	505042C(48IN)
	34	Oniel MMCX	50-21900-031	Tecom	703620-2
	35	XP	50-21900-024	Tecom	703611
Applied For					
	01	3146BD	10-41359-01	Symbol	10-41359-01
	02	6146D	10-41361-01	Tecom	703652
	03	Yagi	ML-2499-YGA1-	Cushcraft	PC2415RBN240
	04	PCI T2	S2402DDS80M	Cushcraft	S2402DDS80MMX
	05	Panel 8	50-21900-048	Maxrad	MP24008
	06	Panel 9	50-21900-047	Maxrad	MP24013



3146BD Antenna

The 3146BD antenna is used in the PDT 3140 series of portable data terminals. The 3146BD antenna is 0 dBi omni-directional in azimuth plane. It is mounted internally on the top end of the terminal as shown in the attached photo. It is mounted to a radio board with out covers (Bare) and has two elements for Diversity hence the BD designation. The 3146BD uses two MMCX connectors. In its use it would be within 20 cm of a persons hand but more than 20 cm from the users body. It is used as mobile devices. The following RF exposure information is included in a prominent place in the terminals user's manual to inform the user of safety issues as required by FCC regulations.

<i>Location</i>	Hand Held Device
<i>Pattern</i>	Omni
<i>Type</i>	F-Element
<i>Max Gain</i>	0 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	RG-178
<i>Symbol P/N</i>	10-41359-01
<i>MPE</i>	See Summary Tbl

"CAUTION: Exposure to Radio Frequency radiation. To comply with FCC RF exposure requirements this hand held device is only approved for use in the user's hand when there is 20 cm or more between the antenna and any persons body during normal operating conditions."

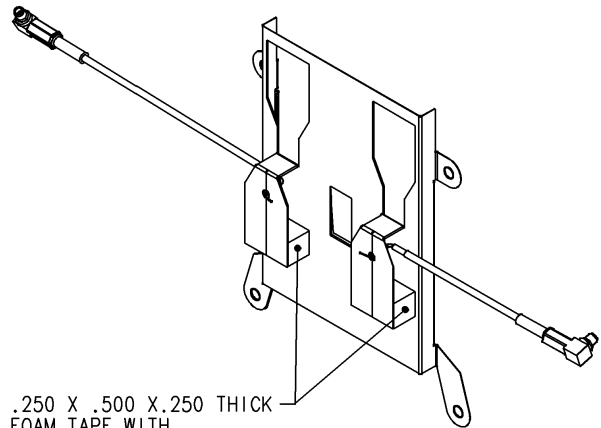
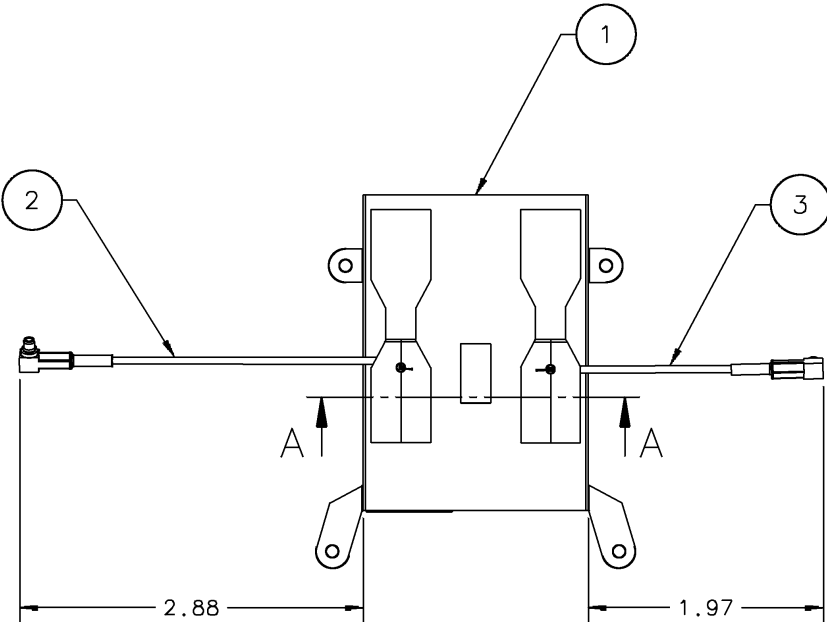


Antenna Installed in 3140 Device

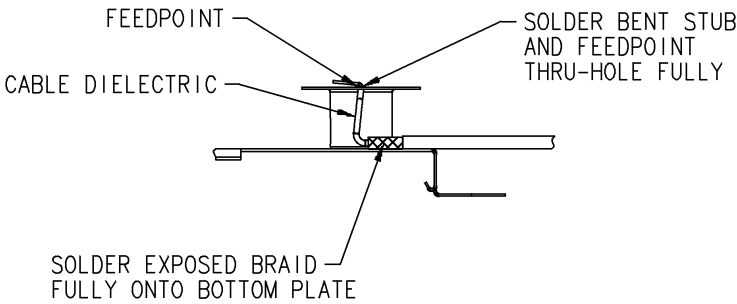


PDT 3140 terminal Use Photo

REVISIONS						
REV	ZONE		DESCRIPTION	E.C.	BY	APVD.
1			INITIAL RELEASE PER PPD #58738		JS	6/27/00



.250 X .500 X .250 THICK
FOAM TAPE WITH
PSA BOTH SIDES
3M TAPE #4004



PARTIAL SECTION A-A
SCALE 2:1

SPECIFICATIONS

FREQUENCY: 2.4-2.485 GHZ
VSWR: 2.0:1 MAX
GAIN: 0dBi NOMINAL
POLARIZATION: LINEAR
CABLE: RG 178
CONNECTOR: MMCX MALE

SEE SEPARATE PARTS LIST 21-41359-01
AND SUBSEQUENT PARTS LISTS.

- NOTES: UNLESS OTHERWISE SPECIFIED.
- 1. PART SHALL MEET THE CRITERIA PER STI WORKMANSHIP STANDARD #SS-03800-57.
 - 2. PACKAGE IAW STI GENERAL PACKAGING SPECIFICATION #50-04100-013.

APPROVALS		DATE	SYMBOL TECHNOLOGIES, INC.		
DRAWN	J.SIMMONS	6/27/00	One Symbol Plaza		
CHECKED	M.SAVONA	6/27/00	Holtsville, NY 11742		
ENG.	E.KOGAN	6/27/00	ASSEMBLY: DIVERSITY, COBALT		
ANALYST	L.DOBKOWSKI	6/27/00			
MFG. ENG.			SIZE	DWG. NO.	REV
PRODUCT			C	10-41359-01	1
QUALITY			SCALE: 1:1	SOLID MODEL ☒	SHEET 1 OF 1

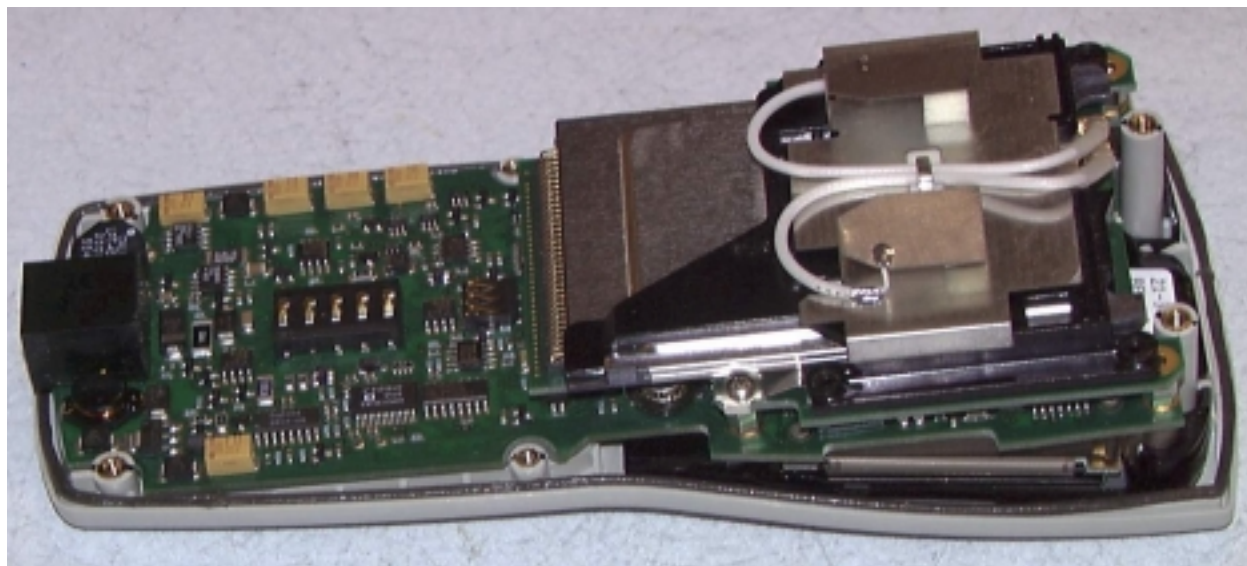
PROPRIETARY CONTENT	TOLERANCE CHART		
THE DRAWING CONTENT AND SPECIFICATIONS CONTAINED HEREIN ARE PROPRIETARY AND MUST NOT BE USED, COPIED, REPRODUCED OR OTHERWISE DEALT WITH OR COMMUNICATED TO OTHERS EXCEPT IN ACCORDANCE WITH WRITTEN INSTRUCTIONS RECEIVED FROM SYMBOL TECHNOLOGIES, INC.	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES		
		INCH	MM
	.XX	+/- .01	+/- .25
	.XXX	+/- .005	+/- .125
COMPUTER GENERATED DRAWING DO NOT SCALE	ANGLES ± 1°	FRACTIONS ± 1/64	

6146D Antenna

The 6146D antenna is 0 dBi omnidirectional in azimuth plane. It is mounted internally on the top end of the PDT 6140 terminal as shown in the attached photo. The 6146D uses a MMCX connector. In its use it would be within 20 cm of a persons hand but more than 20 cm from the users body. It is used in portable 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 FCC rules.

<i>Location</i>	Hand Held Device
<i>Pattern</i>	Omni
<i>Type</i>	F-Element
<i>Max Gain</i>	0 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	RG-178
<i>Symbol P/N</i>	10-41361-01
<i>MPE</i>	See Summary Tbl

“Important Note: To comply with FCC RF exposure requirements, this hand-held device is approved for operation in a user’s hand when there is 20 cm or more between the antenna and the user’s body.”



Antenna Installed in Device



Terminal Use Photo

PROPOSAL DRAWING

WITH THIS
PARTS
OF
ON ANY
SUBJECT

2.406

1.820

.460

.530

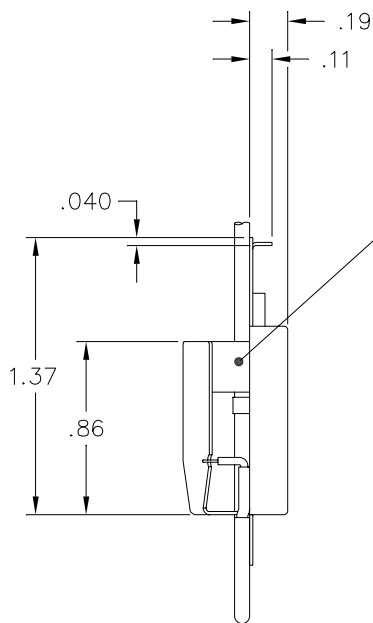
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1.620

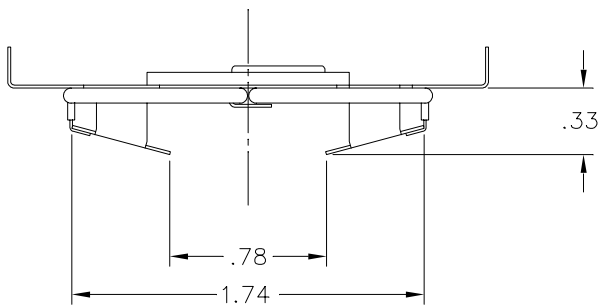
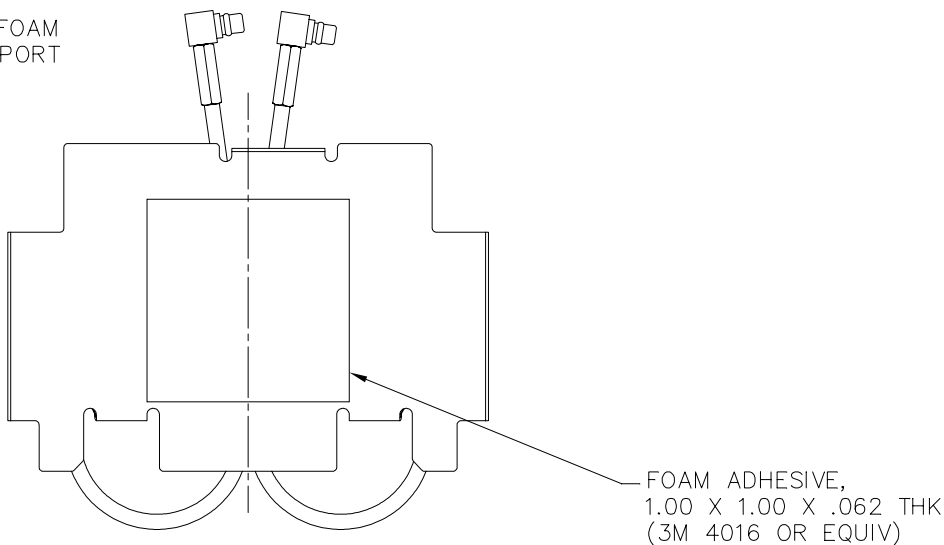
.932

2.066

2X 3.25±.06



2X FOAM
SUPPORT



FREQUENCY:	2.4-2.485 GHz
VSWR	2.0:1 MAX
GAIN	0dBi NOMINAL
POLARIZATION	LINEAR
CABLE:	RG 178
CONNECTOR:	MMCX MALE

5. TOLERANCES ON: .XX $\pm$.03, .XXX $\pm$.010, ANGLES $\pm$ 0°30'
4. SHARP CORNERS & EDGES .005 MAX.
3. FINISH SHALL BE UNIFORM AND EXHIBIT NO EVIDENCE OF CORROSION OR OXIDATION WHEN VIEWED WITH THE UNAIDED EYE. EDGE PLATING ON CUT OR SHEARED SURFACES IS NOT REQUIRED.
2. ALTERNATE:
MATERIAL: CRS 1008, .015 THK.
FINISH: BRIGHT TIN PLATE PER MIL-T-10727A, TYPE 1,
ELECTRO DEPOSITED .00010-.00025 IN.
1. MATERIAL: ELECTROLYTIC TIN PLATED STEEL SHEET, .015 THK.

NOTES : UNLESS OTHERWISE SPECIFIED

PMIC		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ± .03 .XXX ± .010 ANGLES ± 0°30' MACHINED SURFACE ROUGHNESS 125 ✓ REMOVE BURRS, SHARP EDGES R.005-.015 MACHINED FILLETS R.005-.015 DIMENSIONS ARE AFTER PLATING. MACHINED DIA'S ON COMMON CENTERLINE CONCENTRIC WITHIN .005 TIR. INTERPRET PER ANSI Y14.5M-1982.		CONTRACT NUMBER		TECOM TECOM INDUSTRIES INC. 9324 TOPANGA CYN BLVD CHATSWORTH, CA 91311 TECHNICAL EXCELLENCE COMMITTED TO QUALITY											
				CONTRACTOR						TITLE							
				DRAWN BY J. LOWE		DATE 3-7-00		ANTENNA, 2.4 GHZ									
	COBALT DIVERSITY			CHECKER		MFG ENGR											
	CP00-021			QA		ENGR											
NEXT ASSY		USED ON		MATL ENGR		APPROVAL		PRGM MGR		ENGR		SIZE D	CAGE CODE 52791	DWG NO 703652			
APPLICATION												SCALE 2/1		UNIT WT .		SHEET 1 OF 1	

Yagi Antenna

The **Yagi** antenna is 10dBi 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.

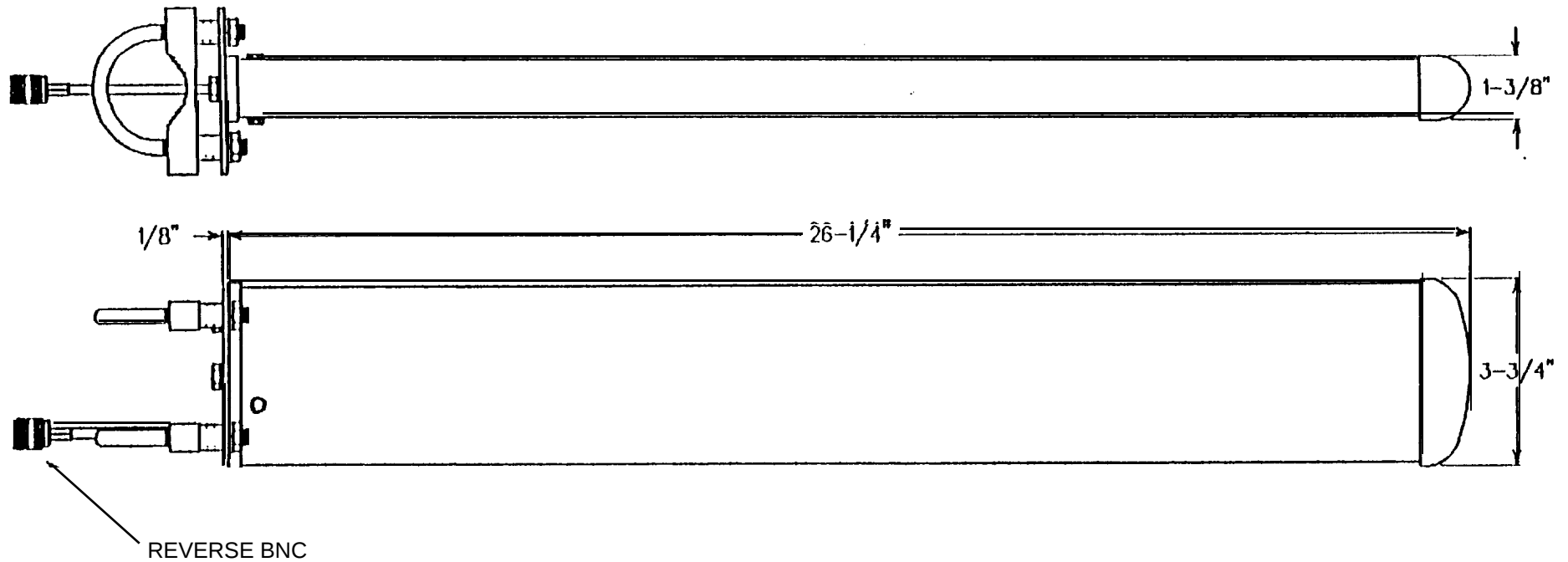
The following RF exposure information is included in a prominent place in the device's user manual to inform the user of safety issues as required by FCC rules.

<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>	10 ft (Plenum-rated)
<i>Symbol P/N</i>	ML-2499-YGA1-10
<i>MPE Distance</i>	See summary table

"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



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

RELEASED

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 15RBN120	4.5"x4.5"x3"	1" 2.5 x 4" Bar Code Label	\$112.62	ML-2499-YGA1-10

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

SYMBOL TECHNOLOGIES
PART NO. ML-2499-YGA1-10
ANTENNA:YAGI, 2.4, 10FT
REV .A
PAGE 20F 2

PCI T2 Antenna

The **PCI T2** antenna is 0 dBi omnidirectional in azimuth plane. The **PCI T2** uses a pair of MMCX connectors in an over-moulded plug. It is mounted with hook and loop tape on a horizontal surface usually the top edge of cubical walls in an office environment or on a desktop. 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>	Horizontal Surface
<i>Pattern</i>	Omni
<i>Type</i>	Plane
<i>Gain</i>	0 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	2m RG-316
<i>Symbol P/N</i>	S2402DDS80MMX
<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



Typical Installation

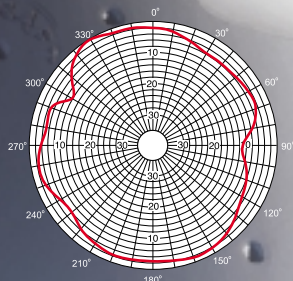
PRODUCT DATA SHEET

COMMUNICATIONS ANTENNAS



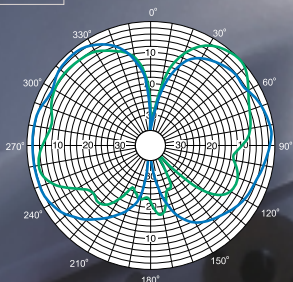
DIVERSITY ANTENNA

- Two Antennas In One Low Profile Housing
- Desktop or Office Partition Top Rail Mount
- PCI application usage



S2402DDS80MMX

■ H-Plane
■ E-Plane
■ E-Plane



S2402DDS80MMX

S2402DDS80MMX



Diversity Omnidirectional Antenna

Cushcraft's integrated diversity antenna designs feature two separate 2 dBi omnidirectional radiating elements sharing a common backplane and enclosure. The antenna has been designed for use in PCI applications and can be mounted either to an office desktop or office partition top rail.

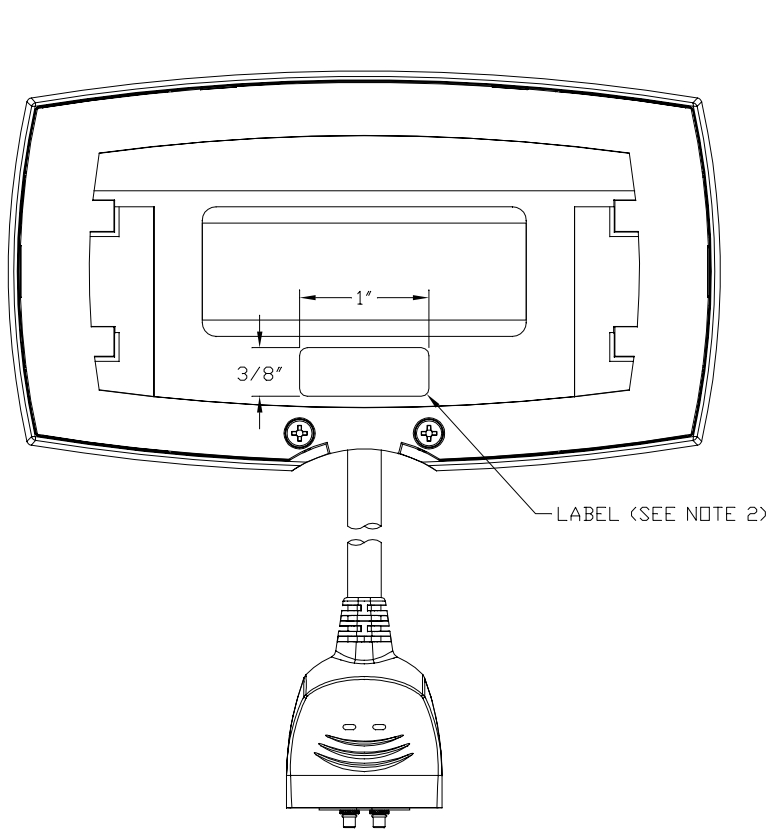
The complete package dimensions are 5.5" X 3.1" X 1". The antenna has an integral 80" coax pigtail terminated with two mmcx connectors. Offices, Healthcare facilities, educational or industrial campuses are a few of the more common applications for this antenna design.

SPECIFICATION CHART

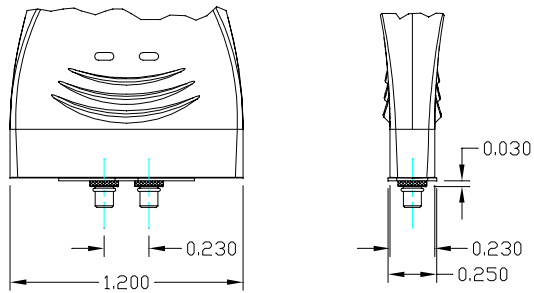
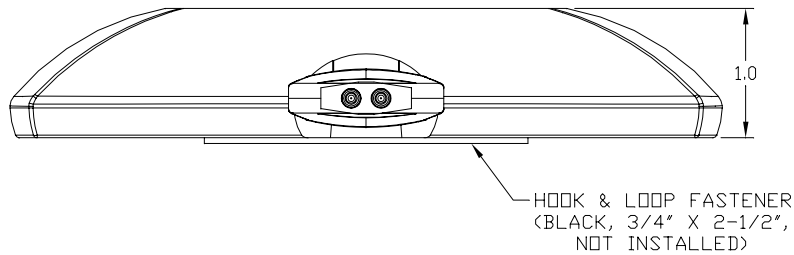
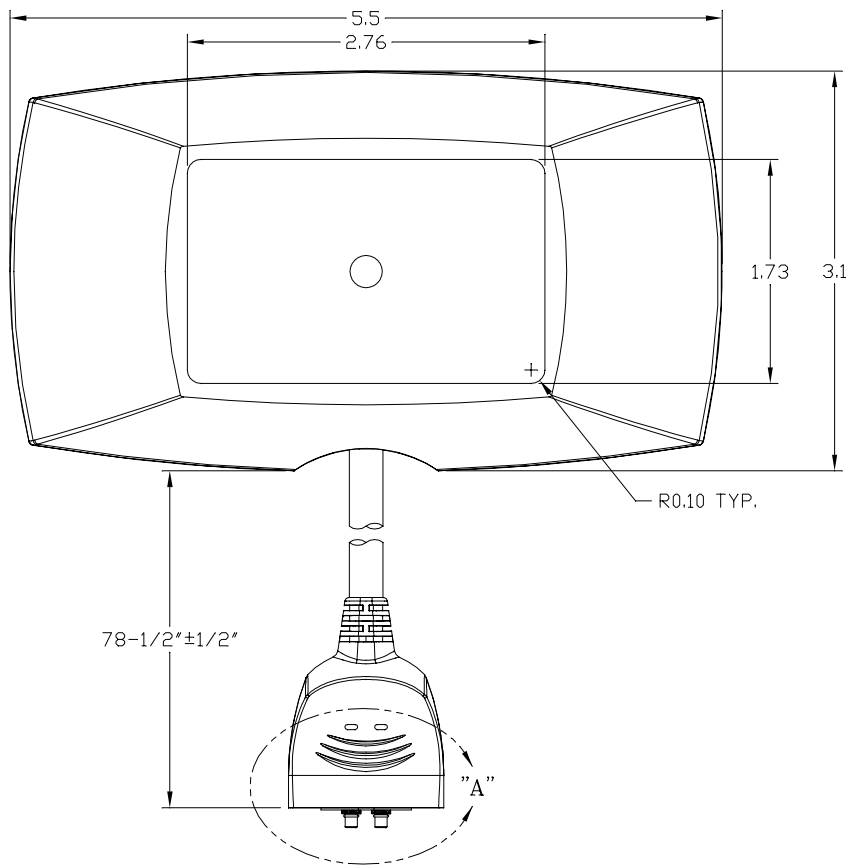
Model	Freq. MHz	Gain * dBi	3dB bandwidth E-Plane H-Plane	Weight oz. (kg)	Power (Watts)	Enclosure Material	Mount Style
S2402DDS80MMX	2400 - 2500	2	80° Omnidirectional	6 (.17)	2	ABS	Desktop / Top Rail

* excluding cable

REVISION			
LTR	DESCRIPTION	DATE	INITIAL
AA	ORIGINAL	8-25-00	SWJ
AB	ADDED LABEL AREA DIM'S (ECR#492)	9-5-00	AMA
AC	REMOVED NOTE ON P/N (ECR#501)	9-14-00	AMA
AD	ADDED NOTES & BOTTOM VIEW (ECR#506)	10-4-00	AMA



BOTTOM VIEW



- NOTES:
1. ANTENNA ASSEMBLY AND HOOK & LOOP FASTENER TO BE INSERTED INTO CLEAR PLASTIC BAG FOR SHIPMENT.
 2. LABEL ASSEMBLY AS SHOWN WITH PART NUMBER, "MADE IN USA", AND DATE OF MANUFACTURE.

PARAMETER	PERFORMANCE
Frequency	2400 - 2500 MHz
Gain	0 dBi
Polarization	Vertical Linear
VSWR	2.0:1
Azimuth Plane Beamwidth	Omni Directional
Elevation Plane 3 dB Beamwidth	80° Nominal
Cable Type	Dual LMR-100 or equivalent
Cable Length	2 Meters
RF Connector	Dual MMCX Straight Plug
Power	2 Watts
Antenna Weight	6oz (170g)
Radome Color	Pantone 427 (Light Gray)
Connector Overmold Color	Pantone 427 (Light Gray)
Cable Color	Pantone 429 (Light Gray)

MATERIAL:	DRAWN S JOHNSON	DATE 8-25-00	CUSHCRAFT 48 PERIMETER ROAD MANCHESTER NH. 03108	
	ENGINEER	DATE		
DO NOT SCALE DRAWING	ENGINEERING MGR A ALEVY	DATE 8-31-00	TITLE: S2402DDS80MMX MOUNTING & OUTLINE	
UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: ANGLES ±0.5° FRACTIONS ±1/64" .XX ±0.010" .XXX ±0.005"	FINISH:		DRAWING NO. S2402DDS80MMXMO	REV AD
			SCALE 1:1	SHEET 1 OF 1

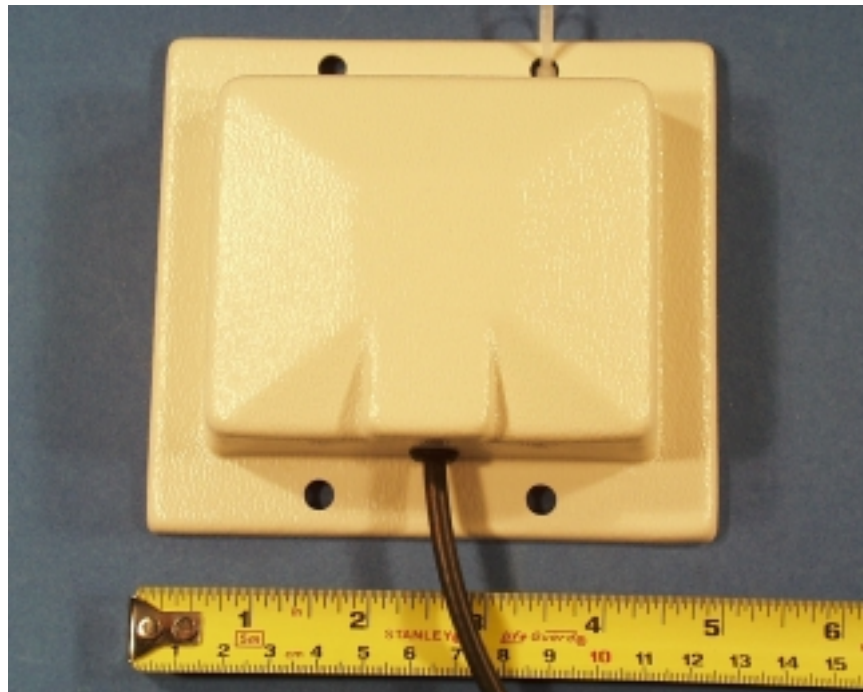
Panel 8 Antenna

The **Panel 8** antenna is 8 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>	8 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	30cm RG-58
<i>Symbol P/N</i>	50-21900-048
<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

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 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