6140 / 6146 Antenna

The 6146 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. The 6140 uses the Muratta Erie BFA connector. The 6146 uses the 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 OET Bulletin 65, Supplement C for EIRP greater than 200 mW.

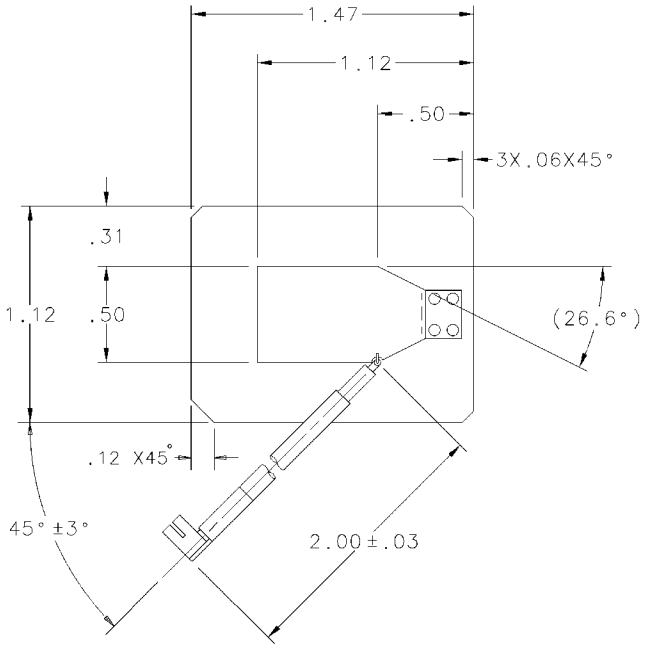
Location	Hand Held Device
Pattern	Omni
Type	F-Element
Max Gain	0 dBi
Physical	See attached dwg
Cable	MXYH75, RG-178
Symbol P/N	10-35305-01, -02

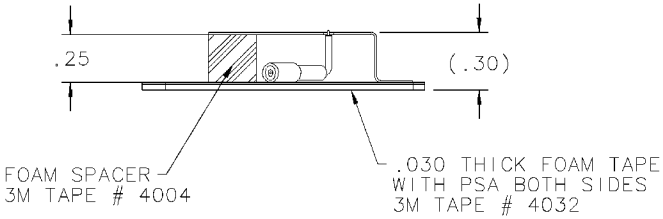
"Important Note: To comply with FCC RF exposure requirements, this hand-held device is approved for operation in a user's hand when there is 20 cm or more between the antenna and everyone's body."

Antenna Installed in Device

Terminal Use Photo

REVISIONS							
REV.	ZONE	No.	DESCRIPTION	E.C.	BY	APVD.	DATE
A			RELEASED PER EDR #40629		LM		6-26-98
B			REVISED PER EC #E5139		MB		9/15/98
C			REVISED PER EC #E5338		JKW		10/5/98





SPECIFICATIONS

FREQUENCY:	2400-2485 MHz
VSWR:	2:1
GAIN:	0dbi NOMINAL
CABLE/ CONNECTOR	TECOM 817283-19 MXYH62XXXXXXXX

NOTES: UNLESS OTHERWISE SPECIFIED:

1. MATERIAL: CRS 1008, .010±.001 THICK.
2. FINISH: BRIGHT TIN PLATE PER MIL-T 10727A, TYPE 1 ELECTRO DEPOSITED .00010-.00025 INCHES. FINISH SHALL BE UNIFORM AND EXHIBIT NO EVIDENCE OF COROSION OR OXIDATION WHEN VIEWED WITH THE UNAIDED EYE. EDGE PLATING ON CUT OR SHEARED SURFACES IS NOT REQUIRED.
3. BREAK AND DEBUR ALL SHARP CORNERS AND EDGES .005 MAX PRIOR TO PLATING.
4. OPERATING TEMPERATURE: -20 TO +50°C. STORAGE TEMPERATURE: -40 TO +70°C. HUMIDITY: 95% NON CONDENSING
5. PACKAGE ITEMS IN ACCORDANCE WITH STI GENERAL PACKAGING SPEC #50-04100-013.

ITEM	QTY.	PART NO.	DESCRIPTION	REMARKS/REF. SYMBOL

DIMENSIONS ARE IN INCHES
UNLESS OTHERWISE SPECIFIED

	MM	INCH
.XX	+/-	+/- .01
.XXX	+/-	+/- .005

ANGLES ± 1° FRACTIONS ± 1/64

MATERIAL: SEE NOTE

FINISH: SEE NOTE

APPROVALS	DATE
DRAWN LJM	1/22/98
CHECKED F GONG	
ENGINEER F GONG	
MFG. ENG. F MAZURKIEWICZ	
PRODUCT T HOFBAUER	
QUALITY	

SYMBOL TECHNOLOGIES INC.
Bohemia, New York

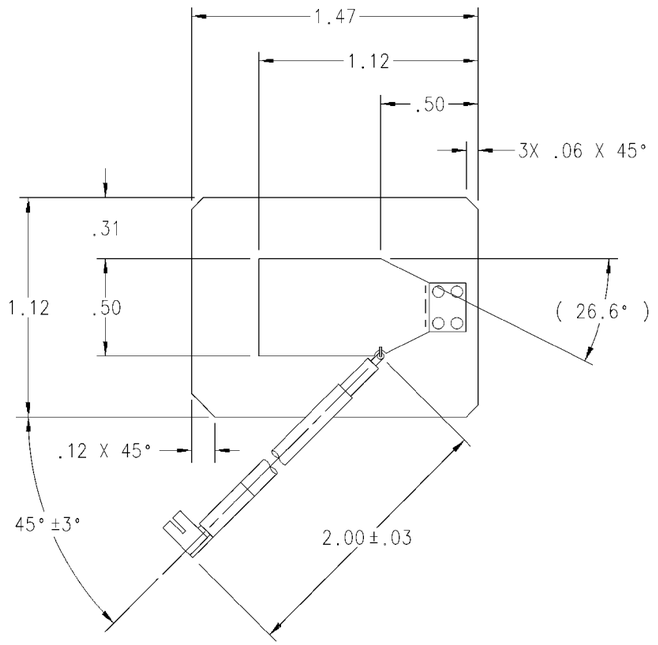
ANTENNA: TYPE F,S24, COBALT

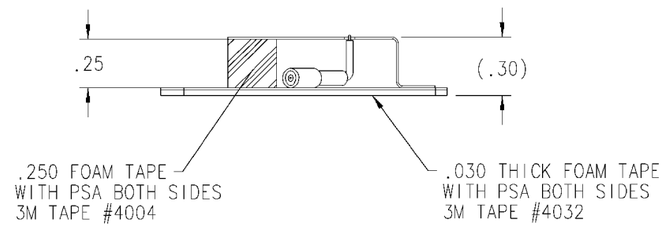
SIZE C | DWG. NO. 10-35305-01 | REV. C

SCALE: 2/1 | SOLID MODEL YES / NO X | SHEET 1 OF 1

NEXT ASSY	USED ON	DO NOT SCALE DRAWING

REVISIONS							
REV.	ZONE	No.	DESCRIPTION	E.C.	BY	APVD.	DATE
A			RELEASED PER EDR #53453		JS		1/13/00





NOTES: UNLESS OTHERWISE SPECIFIED.

1. MATERIAL: CRS 1008, .010±.001 THICK.
2. FINISH: BRIGHT TIN PLATE PER MIL-T 10727A, TYPE 1 ELECTRO DEPOSITED .00010-.00025 INCHES. 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.
3. BREAK AND DEBUR ALL SHARP CORNERS AND EDGES .005 MAX PRIOR TO PLATING.
4. OPERATING TEMPERATURE: -20 TO +50°C.
   STORAGE TEMPERATURE: -40 TO +70°C.
   HUMIDITY: 95% NON CONDENSING.
5. PACKAGE ITEMS IN ACCORDANCE WITH STI GENERAL PACKAGING SPEC #50-04100-013.

SPECIFICATIONS:

FREQUENCY:	2400-2485 MHz
VSWR;	2:1
GAIN:	0dbi NOMINAL
CABLE:	RG178
CONNECTOR:	50-22100-029

ITEM	QTY.	PART NO.	DESCRIPTION	REMARKS/REF. SYMBOL

	PDT6140
NEXT ASSY	USED ON

DO NOT SCALE DRAWING

DIMENSIONS ARE IN INCHES
UNLESS OTHERWISE SPECIFIED

	MM	INCH
.XX	+/-	+/- .01
.XXX	+/-	+/- .005

ANGLES ± 1° FRACTIONS ± 1/64

MATERIAL: SEE NOTE 1

FINISH: SEE NOTE 2

APPROVALS	DATE
DRAWN J.SIMMONS	1/13/00
CHECKED M.SAVONA	1/13/00
ENG. B.ROSENGRANT	1/13/00
MFG. ENG.	
PRODUCT	
QUALITY	

SYMBOL TECHNOLOGIES INC.
Bohemia, New York

ANTENNA: TYPE F,S24, COBALT, MMCX

SIZE C | DWG. NO. 10-35305-02 | REV. A

SCALE: 2:1 | SOLID MODEL | YES | NO X | SHEET 1 OF 1

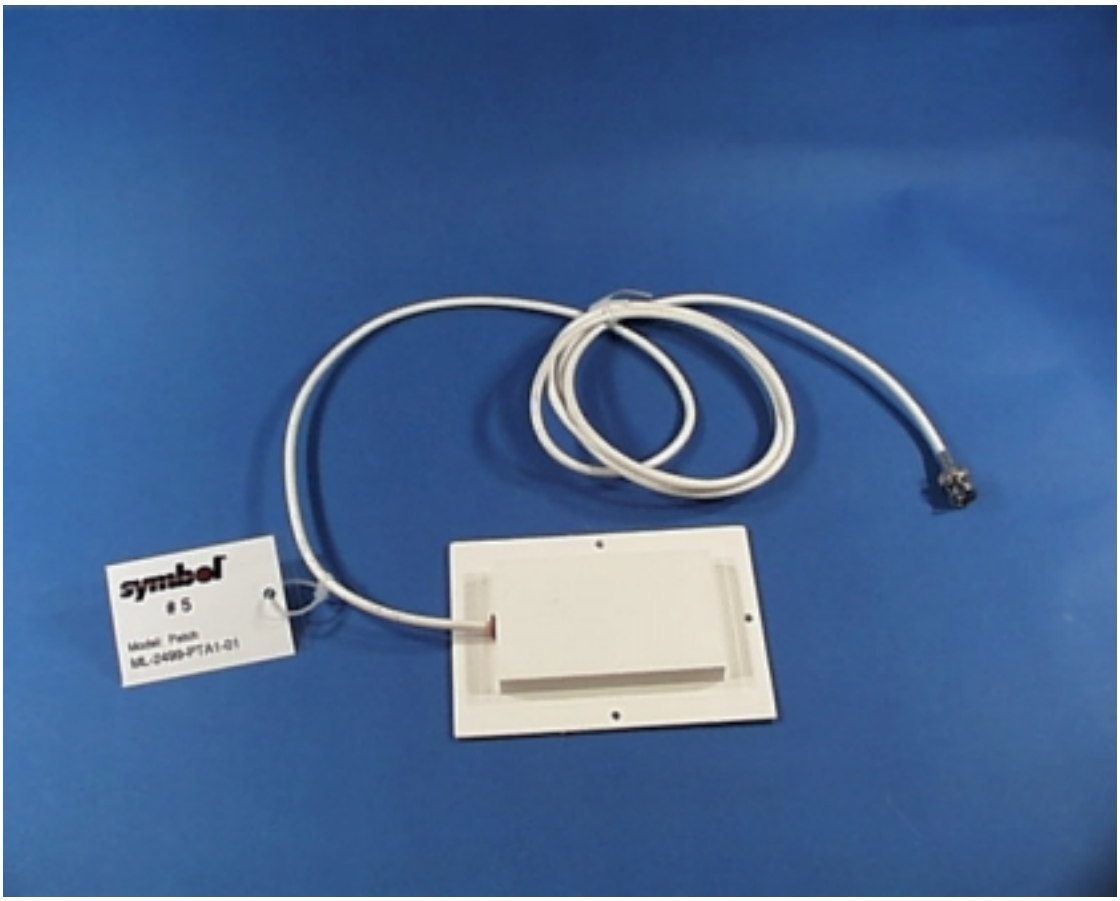
Patch Antenna

The **Patch** antenna is 5 dBi 70° directional in azimuth plane The **Patch** uses a reverse polarity BNC connector. It is mounted on a wall near the ceiling. In its use it would be farther than 20 cm from a persons body. It is used with mobile devices.

Location	Vertical Surface
Pattern	Directional 70°beam
Type	Patch
Max Gain	5 dBi
Physical	See attached dwg
Cable	6 ft (Plenum-rated)
Symbol P/N	ML-2499-PTA1-00
MPE Distance	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 when ever the device configuration could reduce the MPE distance to be less than 20 cm.

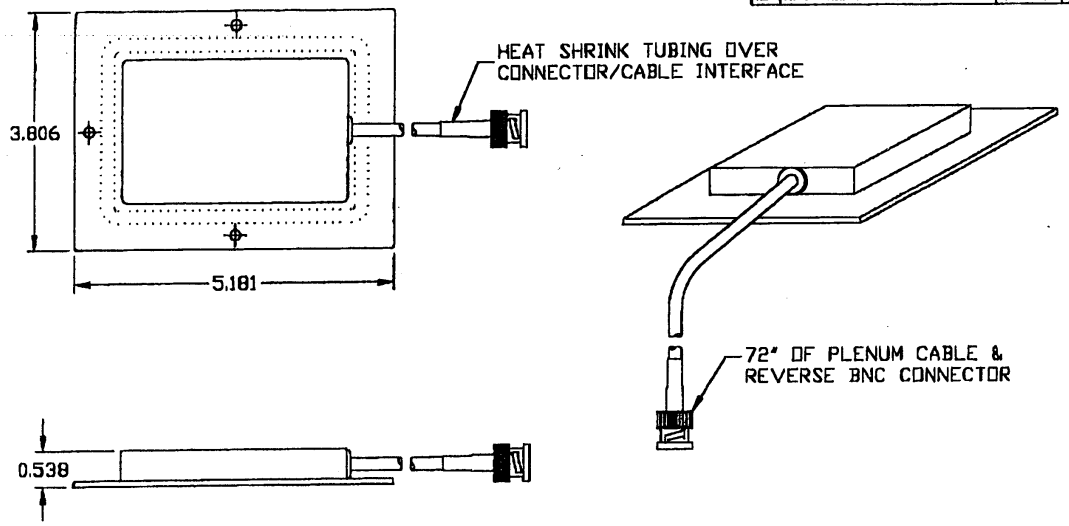
"Important Note: To comply with FCC RF exposure requirements, no one may remain within 20 cm of the antenna for extended periods of time."



Antenna Photograph

.A	RELEASE PER EDR # 20049	03/18/97
.B	ADD TUBING PER EC# D4429	01/27/99

REVISION			
LTR	DESCRIPTION	DATE	INITIAL
AA	ORIGINAL	1-28-97	SWJ
AB	REDRAWN & ADDED SPECIFICATIONS	10-23-98	DH
AC	ADDED HEAT SHRINK TUBING	10-28-98	



SYMBOL PN #ML2499-PTA1-01

Parameter	Performance
Frequency	2400–2500 MHz
Gain (w/12" cable)	6 dBi Minimum
Polarization	Vertical Linear
VSWR	1.5:1 Maximum
E Plane 3 dB Beamwidth	66°
H Plane 3 dB Beamwidth	75°
Front to Back Ratio	18 dB
Power	5 Watts
Weight (W/12" COAX)	0.5 lb.

MATERIAL:

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:
ANGLES ±0.5°
FRACTIONS ±1/64"
.XX ±0.010"
.XXX ±0.005"

DRAWN S JOHNSON DATE 1-28-97
ENGINEER D HARRIS DATE 10-23-98
ENGINEERING MGR A ALEVY DATE 10-23-98
FINISH:

CUSHCRAFT
48 PERIMETER ROAD MANCHESTER NH. 03108

TITLE:
S2406P72PRBN
OUTLINE

DRAWING NO. S2406P72PRBNMO REV AC
SCALE 1:1 SIZE A SHEET 1 OF 1

2. SYMBOL PART NUMBER: **ML-2499-PTA1-01**

1. PART TO BE PACKAGED IN ACCORDANCE WITH STI SPECIFICATION 50-04100-013

UNLESS OTHERWISE SPECIFIED:

THIRD PARTY PRODUCT
CUSHCRAFT

SYMBOL TECHNOLOGIES
PART NO. ML-2499-PTA1-01
ANTENNA,VA: PATCH, 2.4, 6 DBI, 6 FT:
REV .B
PAGE 1 OF 2

Patches for both 902, 2400 and 5800
Linear and Circular Polarization

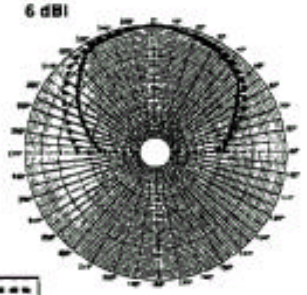
Patch antennas lend themselves well to many data collection applications. They are flat and unobtrusive in most environments. Their patterns are much like a short Yagi. Patches are available in either linear or circular polarity. The choice of polarity and the convenient shape of the patch makes it the right choice for many applications. Patches are most commonly wall mounted. Occasionally ceiling mounted patches are the right answer. We can also design patches so that they may be an integral part of the enclosure for data transceivers.

PATCHES

Model	S2406PL
Type	Patch
Polarity	Linear
Frequency, MHz	2400-2500
Gain	6 dBi
Front to Back, dB	18
Bandwidth 1.5:1, MHz	100
-3 dB beamwidth	
E-Plane, degrees	60
H-Plane, degrees	75
Connector Type	N-female
Enclosure Material	ABS plastic
Dimensions, in (cm)	5 x 5 x 7/16 (12.7 x 12.7 x 1.1)
Weight, oz.(g)	8 (224)
Mount Style	Optional

S2406PL

6 dBi



SYMBOL TECHNOLOGIES
PART NO. ML-2499-PTA1-01
ANTENNA,VA: PATCH, 2.4, 6 DBI, 6 FT REV .B

Corner Patch Antenna

The **Corner Patch** antenna is 6 dBi directional in azimuth plane The **Corner Patch** uses a reverse polarity BNC connector. It is mounted on a vertical surface. In its use it would be mounted on a wall near the ceiling farther than 20 cm from a persons body. It is used with mobile devices.

Location	Horizontal Surface
Pattern	Directional
Type	Patch
Max Gain	6 dBi
Physical	See attached dwg
Cable	6 ft (Plenum-rated)
Symbol P/N	ML-2499-DLA1-00
MPE Distance	See summary table

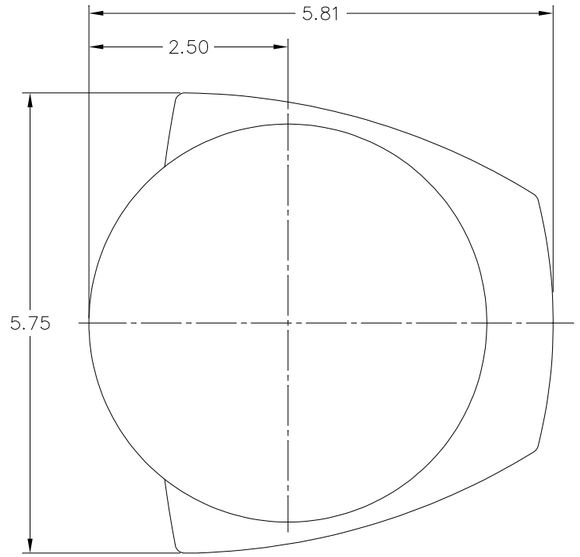
The following RF exposure information is included in a prominent place in the device's user manual to inform the user of safety issues as required by OET Bulletin 65, Supplement C when ever the device configuration could reduce the MPE distance to be less than 20 cm.

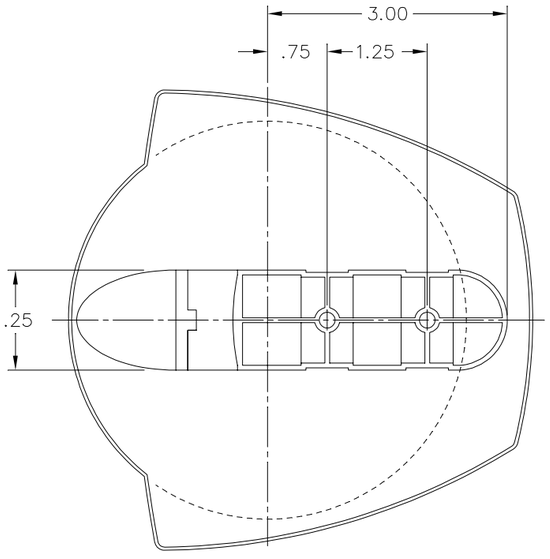
"Important Note: To comply with FCC RF exposure requirements, no one may remain within 20 cm of the antenna for extended periods of time."

Antenna Photograph

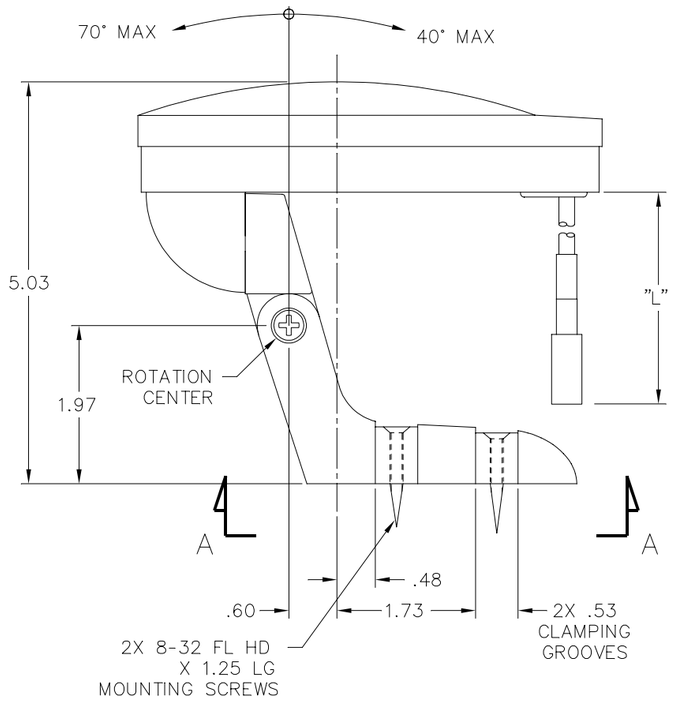
DEV ECO 5989

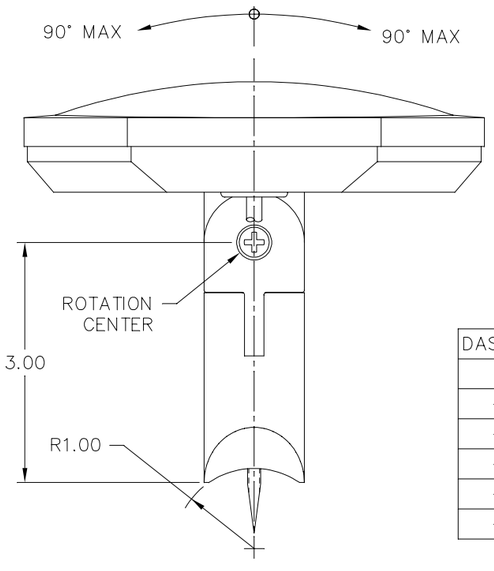
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
.	A	ADDED -3 CONFIG. CONNECTOR WAS: TNC PLUG.	3-15-99 ML	
.	B	ADDED -4 CONFIG. WO 2409, 6798	4-26-99 TT	
.	C	ADDED -5 CONFIG. WO 2425	5-11-99 ML	
.	D	ADDED -6 CONFIG WO 2704	1-27-00 JL	





VIEW A-A





SPECIFICATIONS

FREQUENCY: _____ 2.4-2.5 GHz
VSWR: _____ 2.0:1 MAX
GAIN: _____ +7 dBi
CABLE: _____ LMR-200 LOW LOSS

DASH NO	TYPE NO	POLARIZATION	DIM "L"	CONNECTOR	REV
-1	505126AR	RHCP	24"±1	TNC-FEMALE	C
-2	505126AL	LHCP	24"±1	TNC-FEMALE	C
-3	505126A	LINEAR	24"±1	TNC-FEMALE	C
-4	505126D	LINEAR	96"±1	N-MALE	C
-5	505126DR	RHCP	96"±1	N-MALE	C
-6	505126DS	LINEAR	120"±1	N-MALE	D

NOTES : UNLESS OTHERWISE SPECIFIED

1.000
SCALE

PMIC	
822694	2218,6767
NEXT ASSY	USED ON
APPLICATION	

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.

HOLE TOLERANCES:

.040 – .128	+.003 −.001	.515 – .750	+.008 −.001
.136 – .228	+.004 −.001	.765 – 1.000	+.010 −.002
.234 – .500	+.006 −.001	1.031 UP	+.015 −.002

MATL ENGR | APPROVAL

CONTRACT NUMBER
CONTRACTOR

DRAWN BY Bill McLEAN | DATE 4-27-98
CHECKER | MFG ENGR
QA | ENGR
PRGM MGR | ENGR

TECOM INDUSTRIES INC.
9324 TOPANGA CYN BLVD CHATSWORTH, CA. 91311
TECHNICAL EXCELLENCE COMMITTED TO QUALITY

TITLE
ANTENNA, WIRELESS LOCAL LOOP

SIZE	CAGE CODE	DWG NO
D	52791	703548

SCALE 1/1 | UNIT WT . | SHEET 1 OF 1

(703509) 1

Plane Antenna

The **Plane** antenna is -1 dBi omni-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 ceiling farther than 20 cm from a persons body. In its use on a computer it would probably not, but it could come, within 20 cm of a person. It is used with mobile devices.

Location	Horizonlat Surface
Pattern	Omni
Type	Plane
Max Gain	-1 dBi
Physical	See attached dwg
Cable	4 ft (Plenum-rated)
Symbol P/N	ML-2499-PSA1-00
MPE Distance	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 when ever the device configuration could reduce the MPE distance to be less than 20 cm.

"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

Laptop Configuration

Ceiling Configuration

REVISIONS			
REV	DESCRIPTION	DATE	APPVL
A	DOCUMENT RELEASED PER EDR# 15806	8/25/95	BK
B	CHANGE TO NOTES ON PAGE 2 PER EC# D4090	2/6/95	TS
C	WIDEN WINDOW DIMENSIONS/ADD TOLERANCES PER EC# D9735	10/14/96	

General Notes:

THE FOLLOWING STI SPECIFICATIONS APPLY:

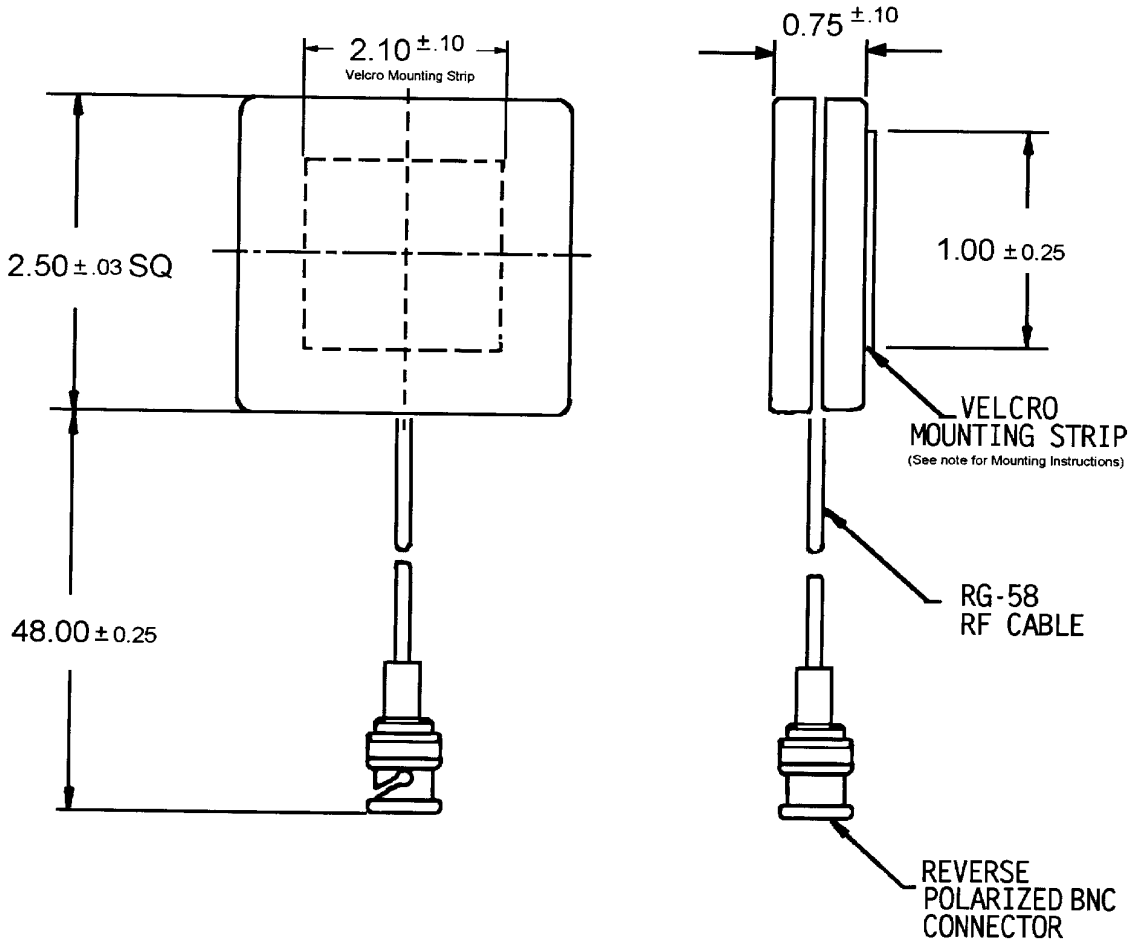
50-04100-013: **Component Packaging**

RELEASED

ORIGINAL

APPROVAL	NAME	DATE	COMPONENT SPECIFICATION	
DRAWN	T. MIGLANI	8/24/95	**ANTENNA:2.4GHz,48IN,WPOS *REVERSED POLARIZED BNC FEMALE CONNECTOR**	
CHECKED	B. KOGLER	8/25/95		
ENG.	S. TAM	8/14/95		
MFG. ENG.	A. MOSALLEI	9/6/95	DOC. NO. 50-21900-008	REV C
Q.A.	G. MCKENNA		SHEET 1 of 2	

DIMENSIONS



DRAWING NOT TO SCALE

SPECIFICATIONS

FREQUENCY	2400-2485 MHZ
VSWR	2:1
GAIN	0 DBI NOMINAL
PATTERN COVERAGE	HEMISPHERICAL
POLARIZATION	LINEAR
HOUSING COLOR:	WHITE
CABLE COLOR:	WHITE

Note:
1. Attached velcro mounting strip (hook side) onto antenna housing.

Oneil BFA / Oneil MMCX Antenna

The **Oneil** antenna is 0 dBi omni-directional in azimuth plane. It is available with eirher a MuRatta BFA or MMCX connector. It is mounted as an internal antenna on the O'Neil MicroFlash series of portable belt worn printers. In its use it would be within 5 cm of a users body. It is used in portable devices.

Location	Body worn
Pattern	Omni
Type	Slot
Max Gain	0 dBi
Physical	See attached dwg
Cable	MXYH75 or RG-178
Symbol P/N	50-21900-023 50-21900-031
EIRP	See Summary Tbl

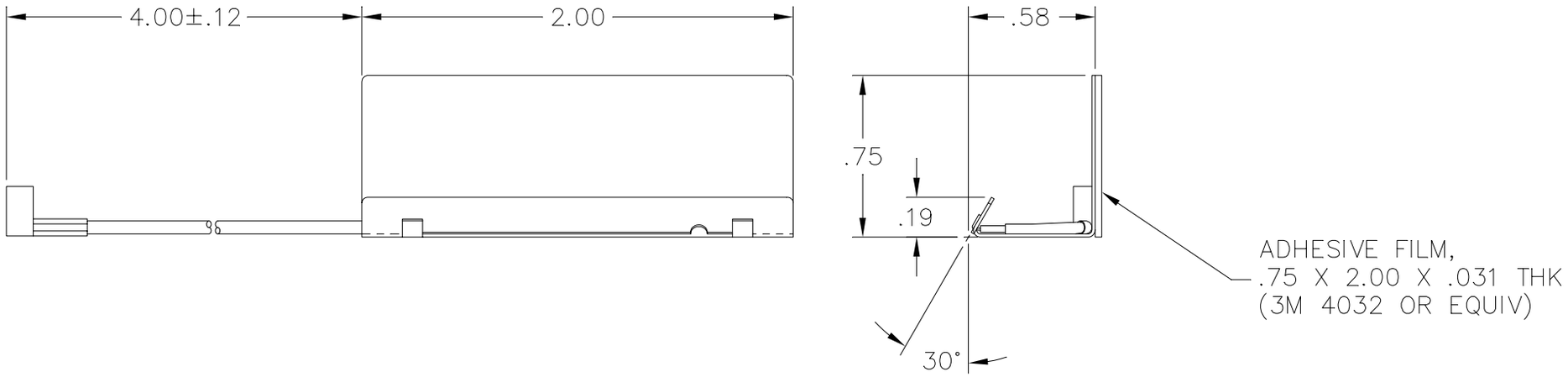
Note: This antenna is only to be used with a transmitter that produces an EIRP of less than 200 mW. For an EIRP of more than 200 mW a SAR test must be performed.

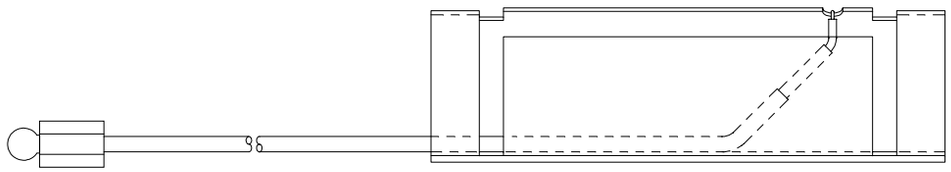
Antenna Installation Photo

Device use Photograph.

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
. C2	A	.58 WAS .42 ADHESIVE CALLOUT WAS: ... X .025 THK (3M 4930 OR EQUIV) WO 2675 REDRAWN	1-4-00 JL	





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.

SPECIFICATIONS

FREQUENCY:	2.4-2.485 GHZ
VSWR	2.0:1 MAX
GAIN	0dBi NOMINAL
POLARIZATION	LINEAR
CABLE:	MURATA MXYH75
CONNECTOR:	TYPE BFA

NOTES : UNLESS OTHERWISE SPECIFIED

.500
SCALE

PMIC	
823362	C090-874
NEXT ASSY	USED ON
APPLICATION	

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.

HOLE TOLERANCES:

.040 – .128	+.003 –.001	.515 – .750	+.008 –.001
.136 – .228	+.004 –.001	.765 – 1.000	+.010 –.002
.234 – .500	+.006 –.001	1.031 UP	+.015 –.002

MATL ENGR | APPROVAL

CONTRACT NUMBER

CONTRACTOR

DRAWN BY	DATE
J. LOWE	11-8-99
CHECKER	MFG ENGR
QA	ENGR BI
PRGM MGR	ENGR

TECOM INDUSTRIES INC.
9324 TOPANGA CYN BLVD CHATSWORTH, CA. 91311
TECHNICAL EXCELLENCE COMMITTED TO QUALITY

TITLE
ANTENNA, 2.4 GHZ

SIZE	CAGE CODE	DWG NO
C	52791	703620

SCALE 2/1 | UNIT WT . | SHEET 1 OF 1

Amity BFA / Amity MMCX Antenna

The Amity antenna is 0 dBi omni-directional in azimuth plane. It is available with either a MuRatta BFA or MMCX connector. It is mounted internally on the top end of the terminal as shown in the attached photo. 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 OET Bullitin 65, Supplement C for EIRP greater than 200 mW.

Location	Hand Held Device
Pattern	Omni
Type	Slot
Max Gain	0 dBi
Physical	See attached dwg
Cable	MXYH75, RG-178
Symbol P/N	703611-1, 2

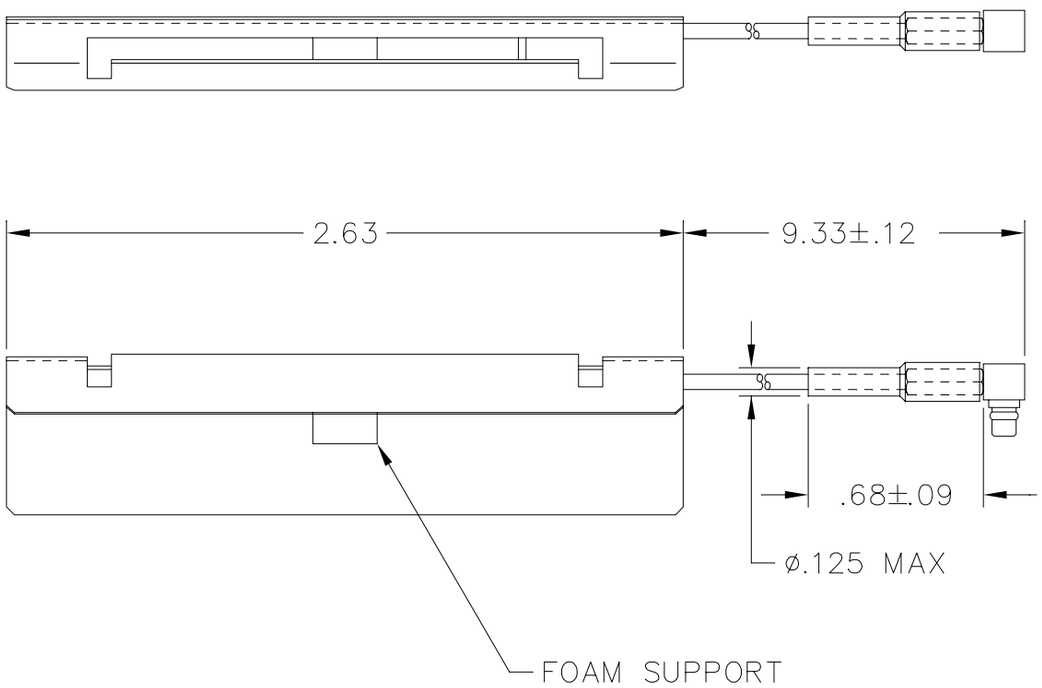
"Important Note: To comply with FCC RF exposure requirements, this hand-held device is approved for operation in a user's hand when there is 20 cm or more between the antenna and everyone's body."

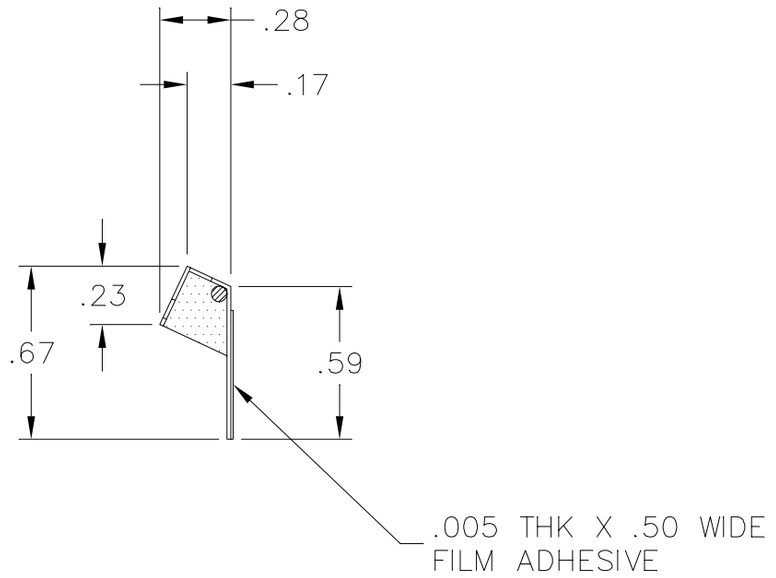
Antenna Installed in Device

Terminal Use Photo

PROPOSAL DWG

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
.	A	9.33±.12 WAS TBD±.12 ADDED Ø.125 MAX & .68±.09 ADDED STRAIN RELIEF SLEEVE (PICTURE CHG) ADDED FOAM SUPPORT (PICTURE & CALLOUT) REDRAWN WO 2654	11-5-99 JL	





SPECIFICATIONS

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

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

.500
SCALE

PMIC	
823283	CP90-065
NEXT ASSY	USED ON
APPLICATION	

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.

HOLE TOLERANCES:

.040 – .128	+.003 −.001	.515 – .750	+.008 −.001
.136 – .228	+.004 −.001	.765 – 1.000	+.010 −.002
.234 – .500	+.006 −.001	1.031 UP	+.015 −.002

MATL ENGR | APPROVAL

CONTRACT NUMBER

CONTRACTOR

DRAWN BY J. LOWE	DATE 10-11-99
CHECKER	MFG ENGR
QA	ENGR BI
PRGM MGR	ENGR

TECOM INDUSTRIES INC.
9324 TOPANGA CYN BLVD CHATSWORTH, CA. 91311
TECHNICAL EXCELLENCE COMMITTED TO QUALITY

TITLE
ANTENNA, SLOT, 2.4 GHZ

SIZE	CAGE CODE	DWG NO
C	52791	703611

SCALE 2/1 | UNIT WT . | SHEET 1 OF 1