



FCC Certification Report for the **LA3021-500** WLAN PC Card Class II Permissive Change

EXHIBIT 4

RF EXPOSURE INFO

Note: All effort has been made to correlate the Antenna Summary tables with the Antenna descriptions and data sheets. Where there is a conflict the Antenna Summary table takes precedence. The Antenna Summary table breaks out the gain of the antenna and the cable loss associated with the entire antenna/cable assembly. Some of the data sheets have gains listed that do not take cable loss into account. The Antenna Summary table does.



Antenna List by FCC ID

Network Systems Organization

FCC ID: **H9PLA3021-500**

WLAN PC Card, 2 Mbps, Proj. C, Hi Pwr

Output Power: 331 mW

Grant Date	Ant #:	Model	Symbol P/N	Mfg	Mfg P/N
3/14/00					
	01	Plane	50-21900-008	Tecom	505042C(48IN)
	02.A	Pipe Bomb 11"x4'	50-11901-048P	Cushcraft	S2403BHPS48RBN
	02.B	Pipe Bomb 11"x15'	50-11901-180P	Cushcraft	S2403BHPS180RB
	03	Rubber Duck	50-21900-007	Cushcraft	RBN2400SXR
	04	Yagi	ML-2499-YGA1-	Cushcraft	PC2415RBN240
	05	Patch	ML-2499-PTA1-	UK	S2406P72PRBN
	06	Panel	ML-2499-PNA1-	Tecom	ML-2499-PNA1-01
	07	End Cap "C"	10-20511-01	Tecom	822319
	08	4140	50-11900-001	Dorne & Margol	DR10-2
	09	4640	21-17486-01	AIL Systems Suf	21-17486-01
	10	2040	10-17577-01	Tecom	703117
	11	6140	10-35305-01	UK	
	12	6840	10-32290-01	UK	
	13	1040	10-32447-01	Tecom	
	14	HS Dipole	50-21900-030	Huber Suhner	9090.16.0001
	15	Parapolic Grid	ML-2499-PGA1-	Conifer	26T-2400
	16	Pipe Bomb 25"x20'	50-11902-240S	Cushcraft	S2406BHS240RBN
	17	Criticare BFA	50-21900-021	Tecom	703443-1
	18	Corner Patch	ML-2499-DLA1-	Tecom	505126C
	19	Ceiling Panel	ML-2499-SD24-	UK	
	20	6140 OBS	10-17577-02	Tecom	
	21	Mag Dipole	ML-2499-MGA1	Centurian	CAF95770
Applied For					
	01	Rubber DuckTNC-	50-21900-029	Cushcraft	RTN2400SXR
	02	XP	50-21900-024	Tecom	703611
	03	Toko	50-21900-022	Toko	DAC2450CT1
	04	Vocollect MMCX	50-21900-025	Austin Antenna	200215
	05	1742	703549-2	Tecom	703549-2

FCC ID: **H9PLA3021-500**

WLAN PC Card, 2 Mbps, Proj. C, Hi Pwr

Output Power: 331 mW

Grant Date	Ant #:	Model	Symbol P/N	Mfg	Mfg P/N
	06	2742	703624-2	Tecom	703624-2
	07	7242	10-35477-01	Tecom	
	08	6846	10-32290-02	Tecom	
	09	7546	10-38649-02	Tecom	



RF Exposure Antenna Summary

Network Systems Organization

FCC ID: **H9PLA3021-500**

WLAN PC Card, 2 Mbps, Proj. C, Hi Pwr

Source Based

Mobile DC Factor: 1.000

Output Power: 331 mW

Class II Permissive Change

Portable DC Factor: 0.680

Mobile Antennas

Ant No	Model	Symbol P/N	Type	Gain (dBi)	Cabel Loss (dB)	Pout (dBm)	MPE (cm)	TR Status	Device Type
01.	Rubber DuckTNC-RP	50-21900-029	Dipole	1.0	0.00	25.20	5.8	Tested	Vehicle Mount

Portable Antennas

Ant No	Model	Symbol P/N	Type	Gain (dBi)	Cabel Loss (dB)	Pout (dBm)	EIRP (mW)	TR Status	Device Type	Tx Limited
02.	XP	50-21900-024	Slot	0.0	0.58	24.62	197.1	Tested	Hand Held	
03.	Toko	50-21900-022	Puck	0.0	0.00	25.20	225.1	Tested	Hand Held	
05.	1742	703549-2	F-Element	0.0	0.11	25.08	219.2	Tested	Hand Held	
06.	2742	703624-2	F-Element	0.0	0.13	25.07	218.5	See # 5	Hand Held	
07.	7242	10-35477-01	F-Element	0.0	0.13	25.07	218.5	See # 5	Hand Held	
08.	6846	10-32290-02	F-Element	0.0	0.34	24.86	208.1	See # 5	Hand Held	
09.	7546	10-38649-02	F-Element	0.0	0.31	24.89	209.6	See # 5	Hand Held	

Body Worn Antennas

Ant No	Model	Symbol P/N	Type	Gain (dBi)	Cabel Loss (dB)	Pout (dBm)	EIRP (mW)	TR Status	Device Type	Tx Limited
04.	Vocollect MMCX	50-21900-025	Dipole	2.0	0.25	24.95	336.9	Tested + SAR	Body Worn	

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 detail

Saturday, June 24, 2000 03:36 PM

Page 1 of 1

Rubber Duck Antenna

The **Rubber Duck** antenna is 1 dBi omni-directional in azimuth plane. It is mounted internally on the top end of the terminal as shown in the attached photo. The **Rubber Duck** uses a BNC-RP connector while the **Rubber Duck TNC** uses the TNC-RP. 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.

<i>Location</i>	Hand Held Device
<i>Pattern</i>	Omni
<i>Type</i>	Dipole
<i>Max Gain</i>	1 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	none
<i>Symbol P/N</i>	ML-2499-APA1-00 ML-2499-APA2-00

“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 Photograph



1380

Portable Device Photo



Mobile Device Photo

[illegible]

THE FOLLOWING STI SPECIFICATIONS APPLY:

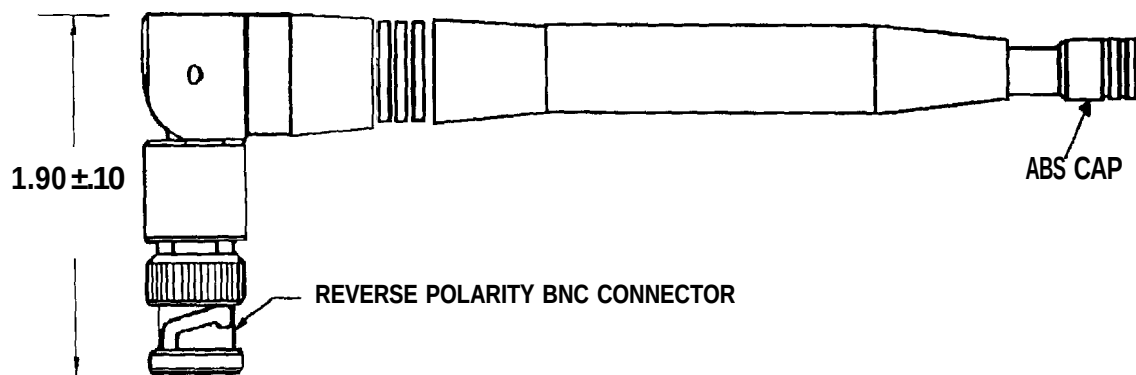
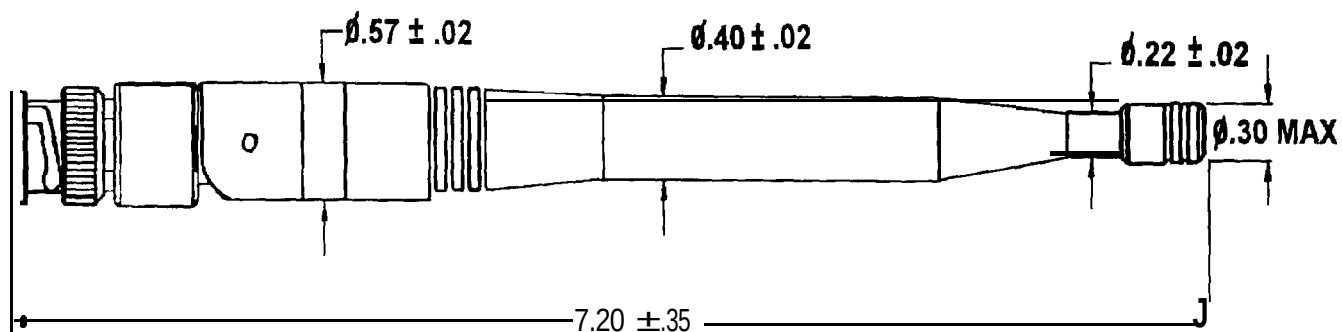
EN-I 0983-01 General Component Requirements

RELEASED

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APPROVAL	NAME	DATE	COMPONENT SPECIFICATION	
DRAWN	D.FORTIER	7/ 1/96	ANTENNA:RADIO,FLEX, 2.4-2.5GHz *REVERSE POLARITY BNC,50 OHM, ARTICULATE JOINT	
CHECKED	M.WELLS	7/26/96		
ENG	M. POPE			
CEG	T.SMURA	7/30/96	DOCUMENT No. 50-21900-007	REV B
				SHEET 1 of 2



DRAWING NOT TO SCALE

Bandwidth:	2.4 to 2.5 Ghz
VSWR:	1.5:1 Max. at resonance
Gain:	1.0 dBi
Power Rating:	50 Watts
Torque Test:	20 in-lbs.
Operating Temperature:	-40° - +85°C
Flex Test:	Per QEA0014
Pull Test:	20lbs Liner Pull

Dimensions are in inches unless otherwise noted

Tolerances are as follows $\text{XX} \pm .010$ unless otherwise noted.

SYMBOL TECHNOLOGIES, INC.

DOCUMENT No.50-21900-007

REV B

SHEET 2 of 2

Amity BFA / Amity MMCX Antenna

The Amity antenna is 0 dBi omni-directional in azimuth plane. It is available with either a MuRata 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.

<i>Location</i>	Hand Held Device
<i>Pattern</i>	Omni
<i>Type</i>	Slot
<i>Max Gain</i>	0 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	MXYH75, RG-178
<i>Symbol P/N</i>	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.”



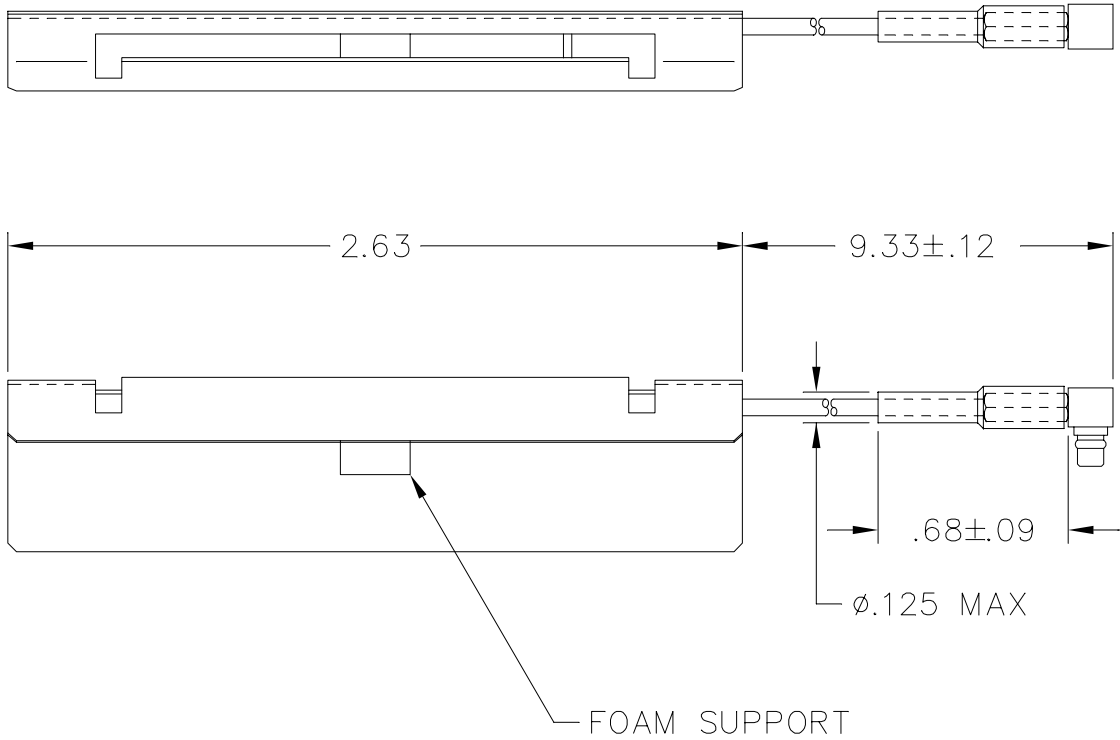
Antenna Installed in Device



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

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.

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

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 INDUSTRIES INC. 9324 TOPANGA CYN BLVD CHATSWORTH, CA. 91311 <i>TECHNICAL EXCELLENCE COMMITTED TO QUALITY</i>			
				CONTRACTOR		TITLE ANTENNA, SLOT, 2.4 GHZ			
				DRAWN BY J. LOWE	DATE 10-11-99				
				CHECKER	MFG ENGR				
				QA	ENGR BI	SIZE C	CAGE CODE 52791	DWG NO 703611	
823283	CP90-065	HOLE TOLERANCES: .040 - .128 +.003 -.001 .136 - .228 +.004 -.001 .234 - .500 +.006 -.001		.515 - .750 +.008 -.001 .765 - 1.000 +.010 -.002 1.031 UP +.015 -.002	PRGM MGR	ENGR	SCALE 2/1	UNIT WT .	SHEET 1 OF 1
NEXT ASSY	USED ON	MATL ENGR	APPROVAL						
APPLICATION									

Toko Antenna

The Toko antenna is 0 dBi omni-directional in azimuth plane. It is mounted as a through hole device directly on the printed circuit board of a hand held device. 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.

<i>Location</i>	Hand Held Device
<i>Pattern</i>	Omni
<i>Type</i>	Dielectric Puck
<i>Max Gain</i>	2.15 dBi
<i>Physical</i>	See Attached Dwg.
<i>Cable</i>	none
<i>Symbol P/N</i>	50-21900-022

“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.”



Installed Antenna Photo



Terminal Use Photo



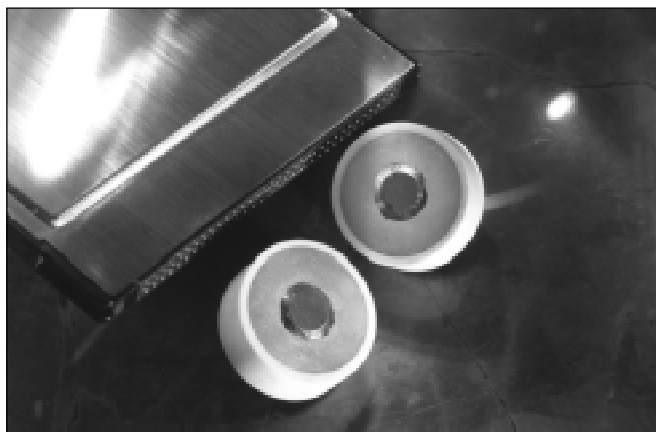
ANTENNA ELEMENT FOR 2.4 GHz

DESCRIPTION

The DAC Series is a miniature dielectric antenna element for 2.4 GHz wireless LAN systems. This antenna has vertical polarization characteristics. TOKO's proprietary ceramic dielectric material provides excellent stability and sensitivity. It is mountable in Type II extended PCMCIA cards.

FEATURES

- Vertical Polarization reception
- Low profile (6.5mm max)
- Omni-directional in azimuth
- Low interference design
- Central feeding point terminal
- Wide bandwidth
- Light weight

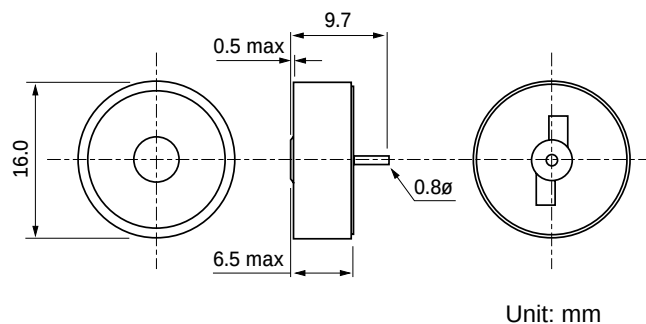


SPECIFICATIONS

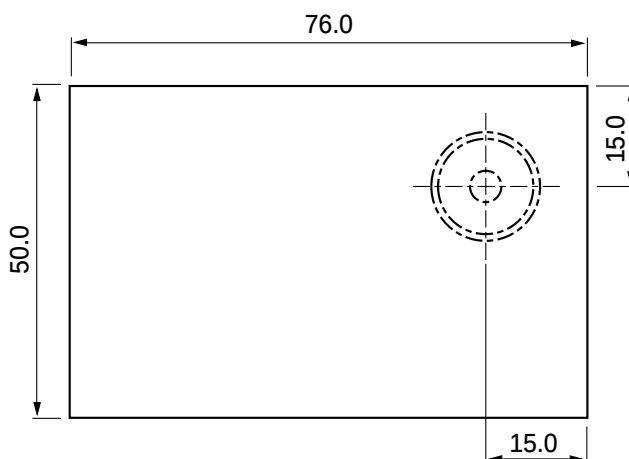
Part Number	DAC2450CT1
Center Frequency	2450 MHz
Receiving Bandwidth	±50 MHz min.
Impedance	50Ω
Peak Gain	2.15 dBi (0dBi typ.) max.
Operating Temperature	-10 ~ +60° C
Storage Temperature	-20 ~ +85° C
Weight	4g

DIMENSIONS

DAC SERIES



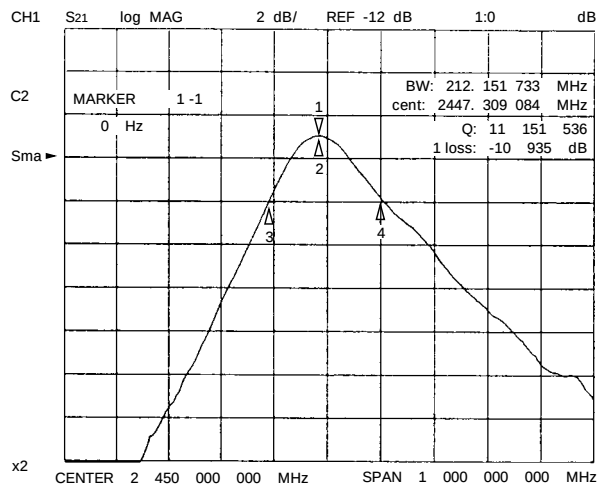
Mounted with Ground Plane



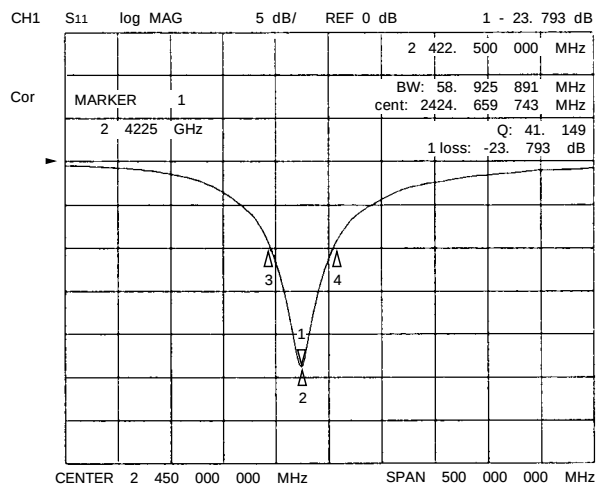
DAC Series

TYPICAL CHARACTERISTICS

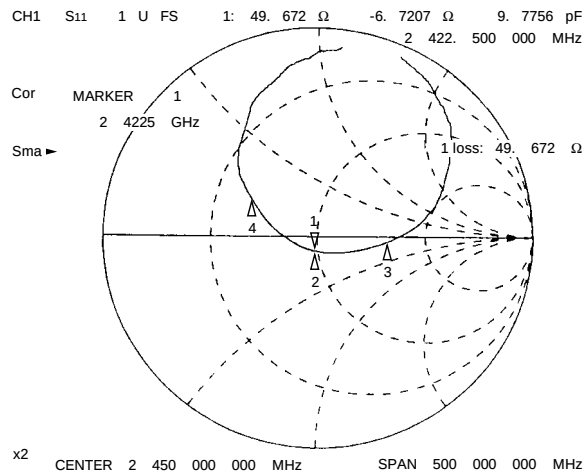
Receiving Signal Response vs Frequency



Return Loss

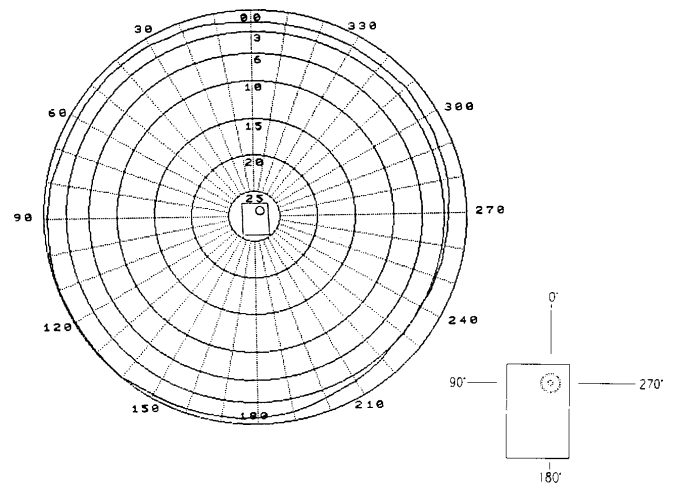


Smith Impedance

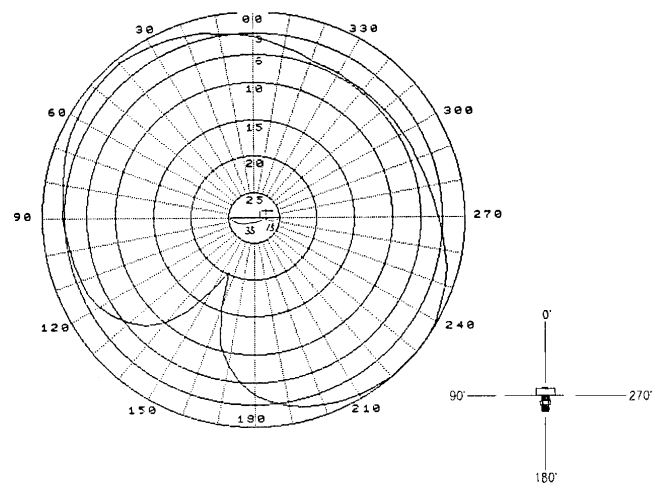


DIRECTIVITY CHART

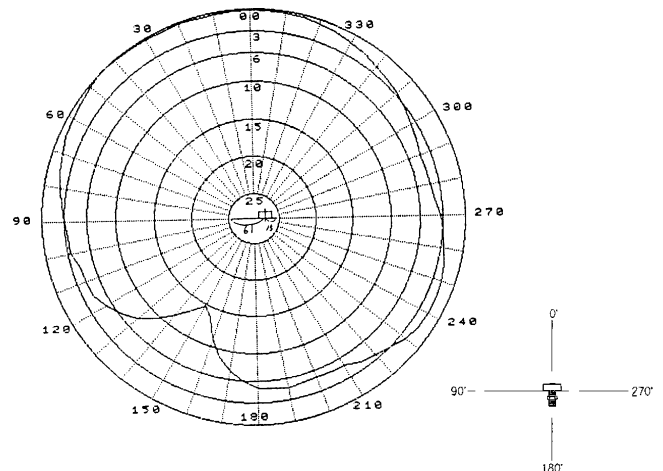
Horizontal Pattern



Vertical Pattern

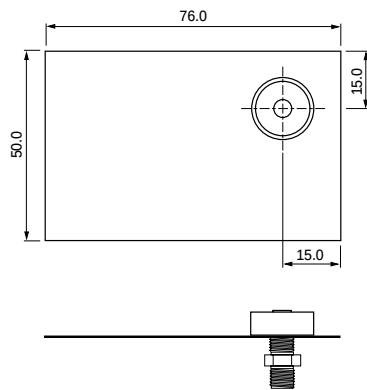


Vertical Pattern



INTERFERENCE COMPARISON OF DAC VS. PLANAR INVERTED F ANTENNA

DAC Set-up



Planar F Inverted Set-up

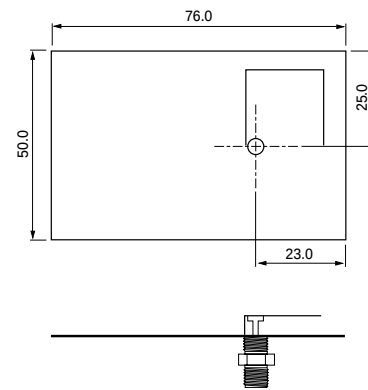


Fig.1

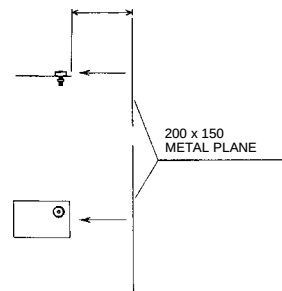
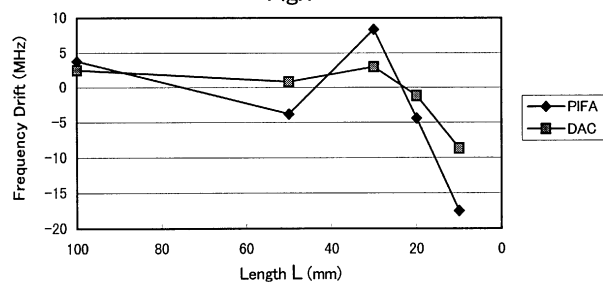


Fig.2

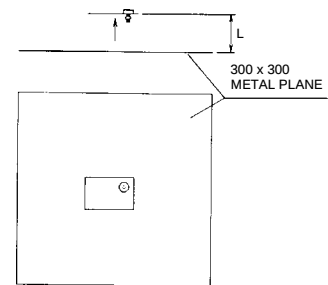
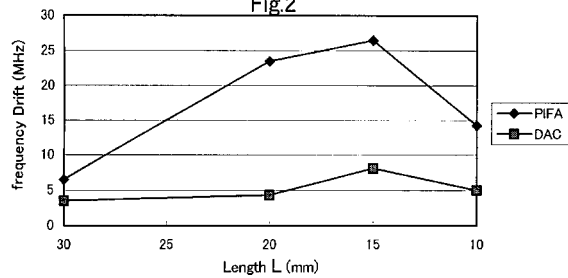


Fig.3

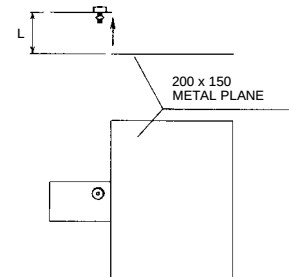
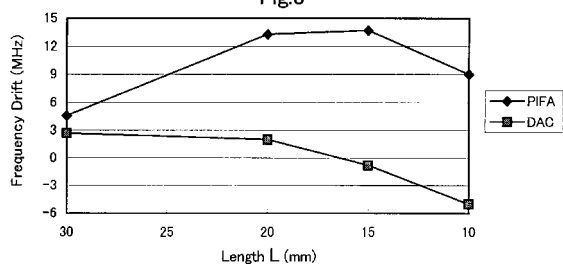
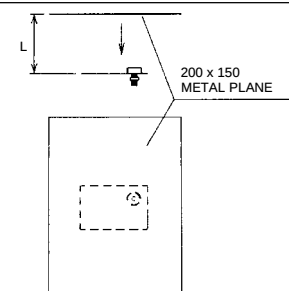
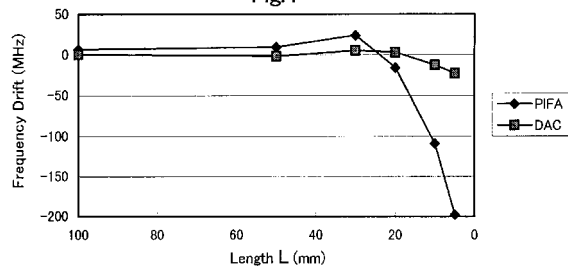


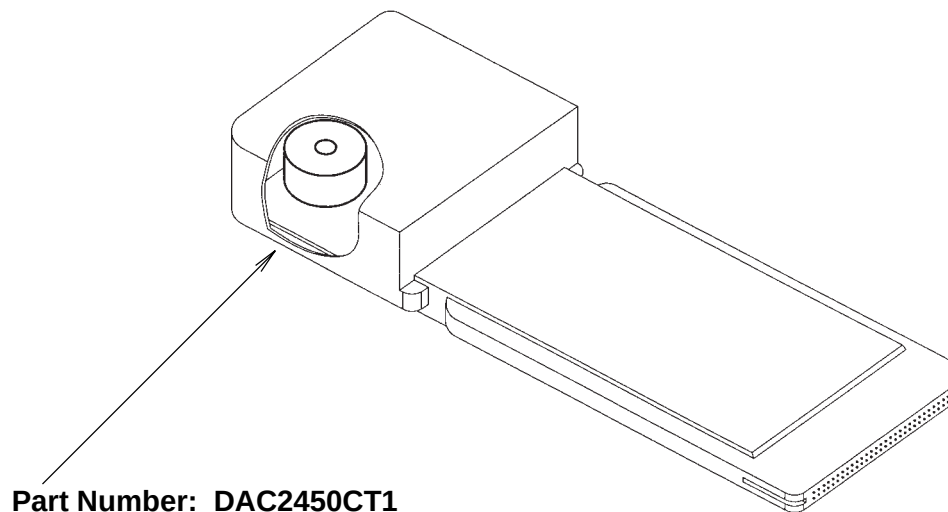
Fig.4



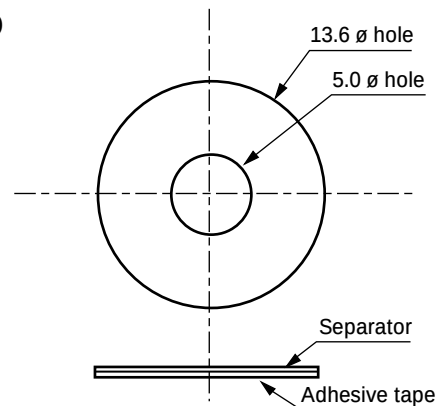
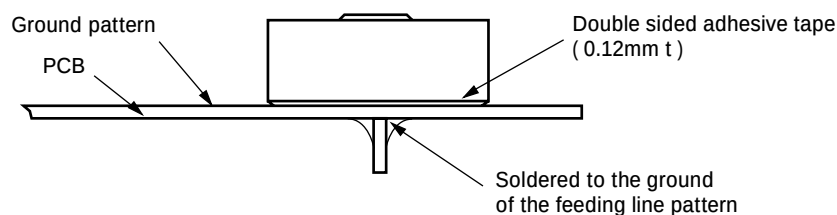
DAC Series

TYPICAL APPLICATION

MOUNTED IN PCMCIA TYPE II EXTENDED CARD



TYPICAL MOUNTING TO PRINTED CIRCUIT BOARD



Notes:

- Fix the antenna element on PCB using double sided adhesive tape of 0.12mm thickness. (Recommend No. 5015 : NITTO DENKO CORP.)
- Solder the antenna terminal pin on the bottom side of PCB to the ground of the feeding line pattern.
- The terminal pin should be separated from the ground pattern.

Unit: mm

Material: Nitto N5015

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Fax: (847) 699-7864

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Toko America, Inc.
2480 North First Street, Suite 260
San Jose, CA 95131
Tel: (408) 432-8281
Fax: (408) 943-9790

Eastern Regional
Office
Toko America, Inc.
107 Mill Plain Road
Danbury, CT 06811
Tel: (203) 748-6871
Fax: (203) 797-1223

Vocollect Antenna

The **Vocollect** antenna is 2 dBi omnidirectional in azimuth plane. It is mounted internally as shown in the attached photo. The **Vocollect** uses either a Murata Erie BFA or a MMCX connector. In its use it would be within 5 cm of a persons body. It is used in portable devices. This antenna / device combination was SAR tested and results filed with a Class II permissive change for the H9PLA3020. The antenna was driven by 240 mW of transmitter power. This produces an EIRP limit of 380 mW.

<i>Location</i>	Body worn device
<i>Pattern</i>	Omni
<i>Type</i>	Dipole
<i>Max Gain</i>	2 dBi
<i>Physical</i>	See attached dwg
<i>Cable</i>	MXYP75, RG-178
<i>Symbol P/N</i>	50-21900-025, 50-21900-026

Note: This antenna / terminal configuration is only to be used with a transmitter that produces an EIRP of less than 380 mW. For an EIRP of more than 380 mW a SAR test must be performed.



Antenna Photo

Talkman Open – 2.4 GHz Symbol Radio Information

Vocollect Antenna Specifications

Type:	Dipole
Gain:	2 dBi
Polarization:	Circular
Physical description:	Implemented on flat and rigid printed circuit board, internally mounted, parallel to the belt mounting loop.
Min distance from skin:	2.1 inches (1.70 inches to inside to belt loop plus 0.40 inches of padded belt)

Table 1: Bill of Materials- Talkman Open – Symbol Radio and Antenna

Item	Qty	Vocollect Part #	Vendor Part #	Supplier	Description
1	1	656022		Austin Antenna	ANTENNA PCB
2	1	606012	90174601	Huber-Suhner	CABLE ASSY, ANTENNA

Image 1: 2.4 GHz Antenna PC Board

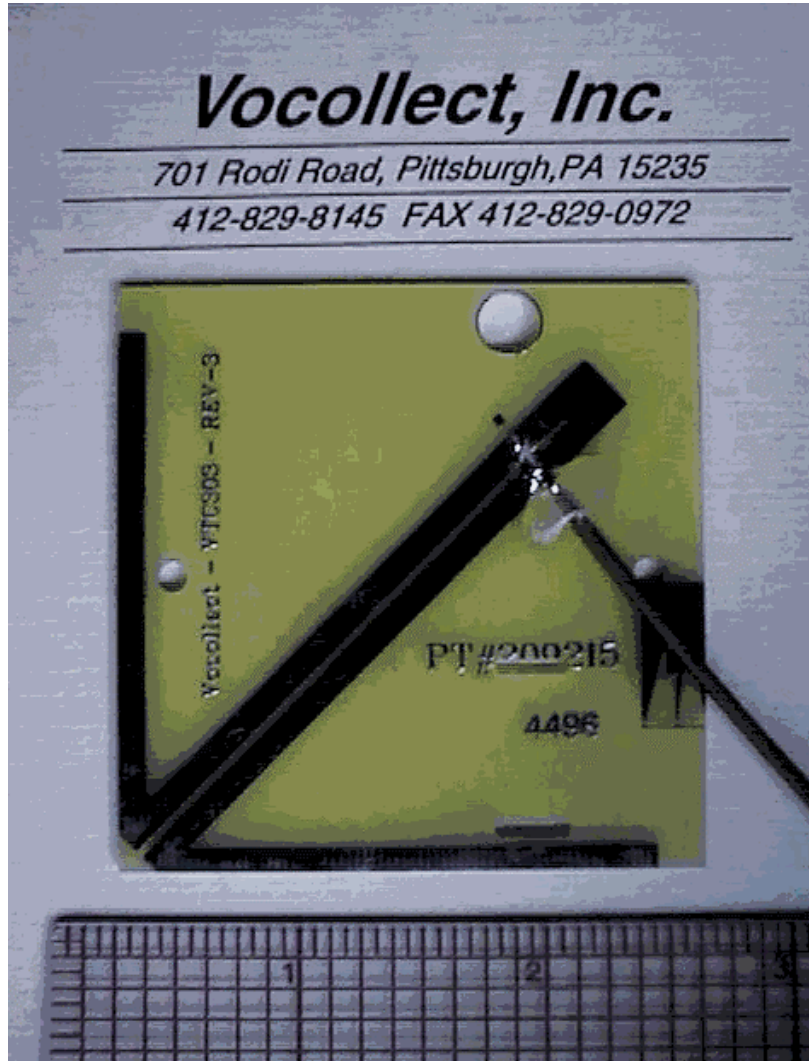


IMAGE 2: Beltworn Terminal - Drawing



IMAGE 3: Beltworn Terminal

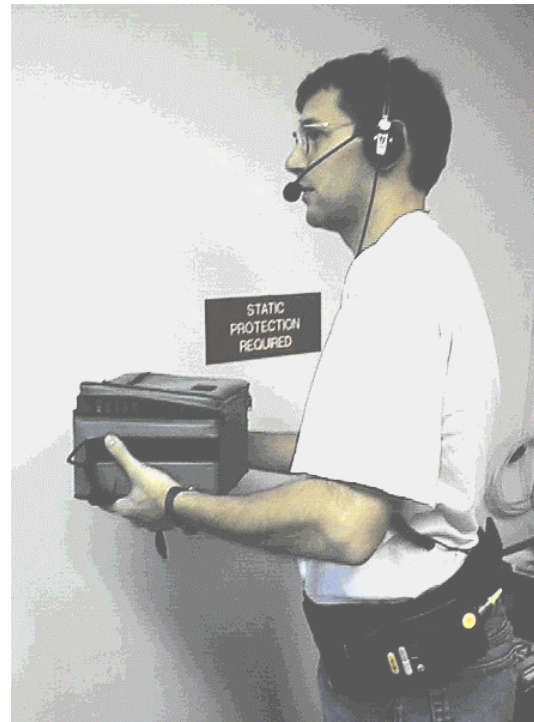


IMAGE 4: Drawing of Antenna Placement Inside Unit.

The antenna is mounted in the plane parallel to the belt loop and waist, 1.70 inches away from the belt loop used to connect the terminal to the padded mounting belt. Including the belt thickness, the radio is at least 2.1 inches distant from the skin.

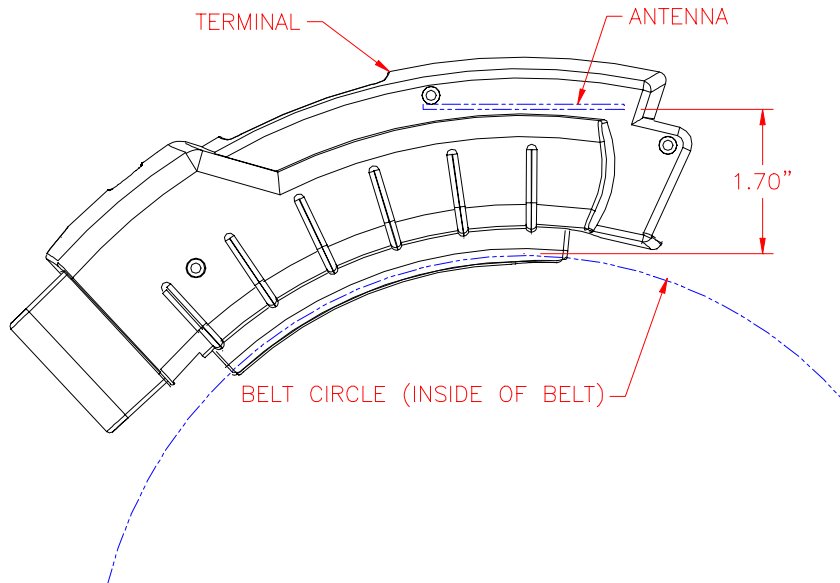


IMAGE 5: The unit mounts on a padded belt ½" thick.

The unit is connected to the belt by a secondary strap secured to the belt. The full width of the main padded belt remains between the terminal and user's body.

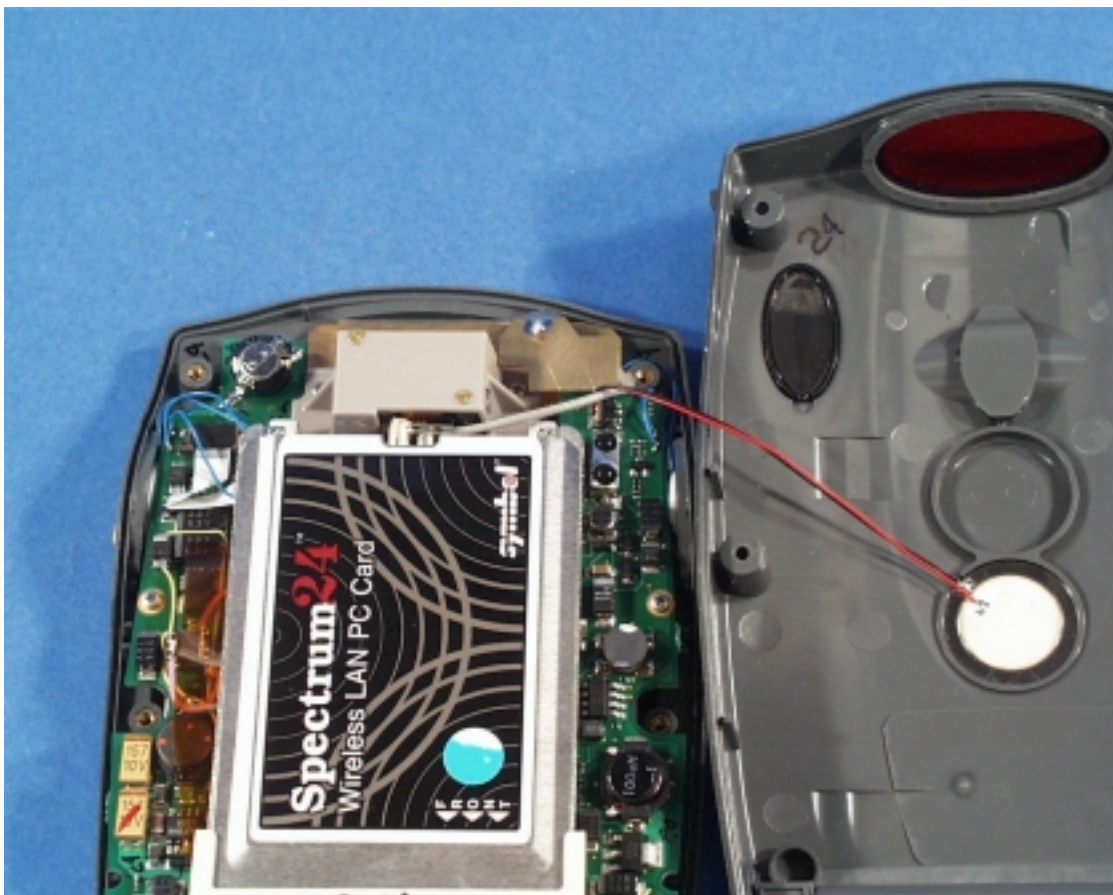


1740 / 1742 Antenna

The **1740** 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. 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 **1742** uses the MMCX connector instead of the MuRata BFA. 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.

<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>	MXYH75, RG-178
<i>Symbol P/N</i>	703549-1

“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.”

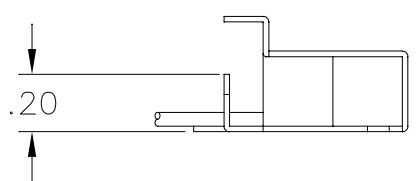
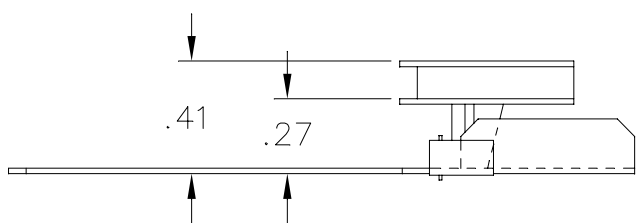
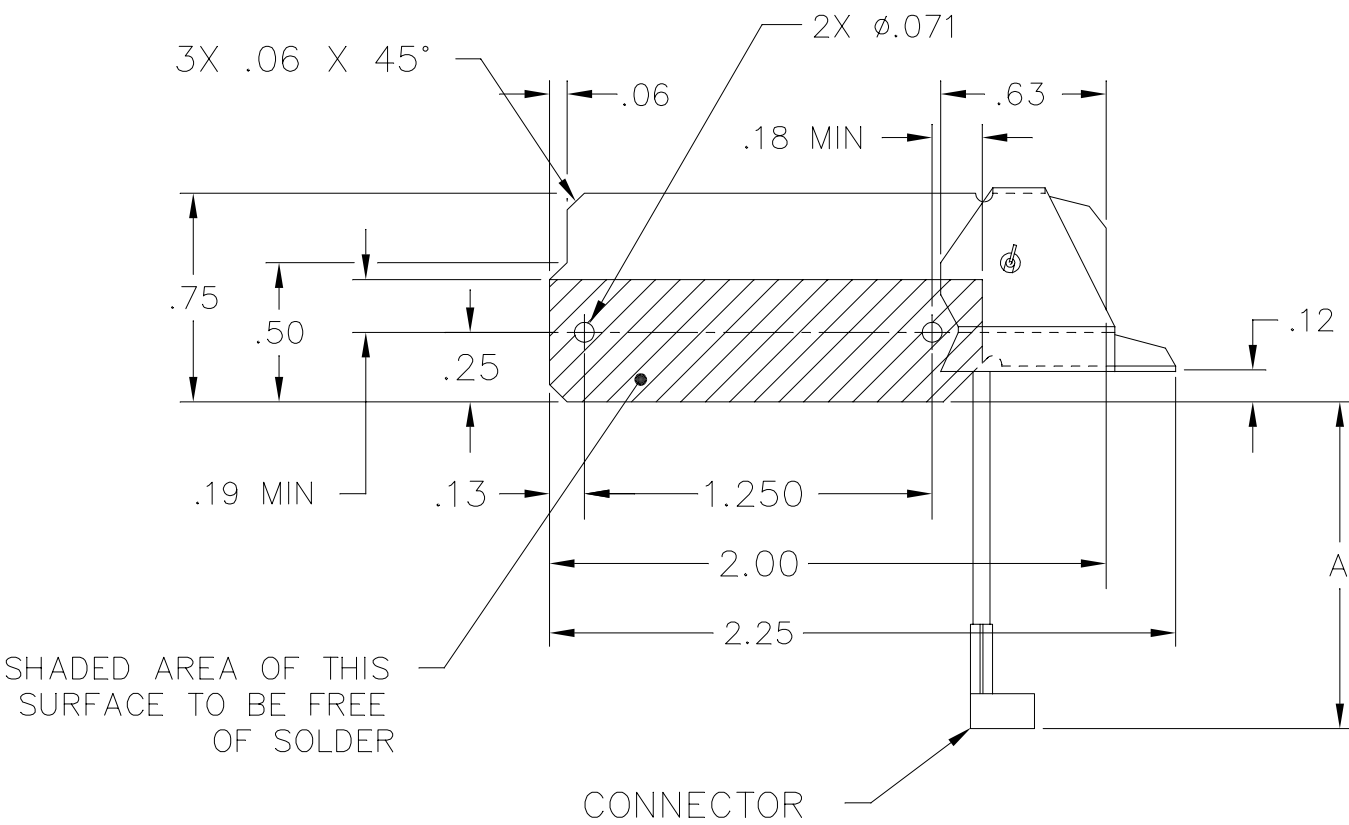


Antenna Installed in Device



Terminal Use Photo

TECOM PROPRIETARY:
INFORMATION CONTAINED HEREIN SHALL NOT BE DISCLOSED TO
A THIRD PARTY WITHOUT WRITTEN PERMISSION FROM TECOM.



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
.	B	1.16±.12 WAS 2.06±.12. .63 WAS .750 ADDED .71, .41, .20. CHANGED PICTORIALY. REDRAWN. WD 2357, 2372	3-26-99 JL	BI MMZ JK
4C-D	C	ADDED .38, R.09. NOTCH WAS .06 (IS .13). WD CP90-476	6-10-99 <i>Alan</i>	BI JK
.	D	DELETED .38, R .09 NOTCH ADDED .06 & .50 3X .06 X 45° WAS 2X ... ADDED .18 MIN, .19 MIN ADDED " NO SOLDER CALLOUT" UPDATED NOTES REDRAWN	7-23-99 JL	
B4	E	ADDED -2 CONFIG & TAB. BLOCK CALLOUT WAS: CONNECTOR, MURATA TYPE BFA WD CP90-924	12-8-99 JL	

-2	MMCX MALE RT ANGLE	1.85±.12	E
-1	MURATA TYPE BFA	1.16±.12	D
DASH NO	CONNECTOR	A	REV

SPECIFICATIONS

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

2. ALTERNATE:
MATERIAL: CRS 1008, .010 THK.
FINISH: BRIGHT TIN PLATE PER
MIL-T-10727A, TYPE 1, ELECTRO
DEPOSITED .00010-.00025 IN.

1. MATERIAL: ELECTROLYTIC TIN
PLATED STEEL SHEET, .010 THK.

NOTES : UNLESS OTHERWISE SPECIFIED



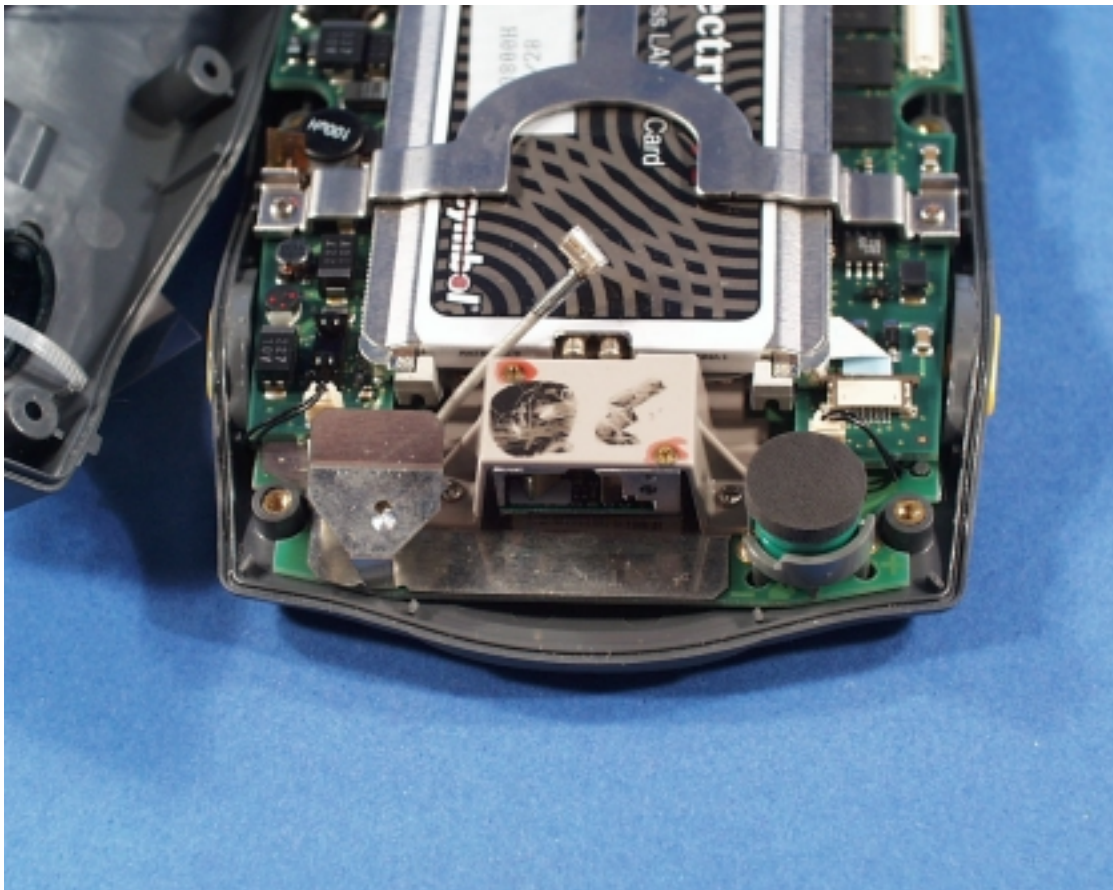
PMIC		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES. TOLERANCES: .XX ± .03 .XXX ± .010 ANGLES ± 0°30' MACHINED SURFACE ROUGHNESS 125✓ REMOVE BURRS, SHARP EDGES R.005-.015 MACHINED FILLETS R.005-.015 DIMENSIONS ARE AFTER PLATING. MACHINED DIA'S ON COMMON CENTERLINE CONCENTRIC WITHIN .005 TIR. INTERPRET PER ANSI Y14.5M-1982.	CONTRACT NUMBER		TECOM INDUSTRIES INC. 9324 TOPANGA CYN BLVD CHATSWORTH, CA. 91311 <i>TECHNICAL EXCELLENCE COMMITTED TO QUALITY</i>				
			CONTRACTOR		TITLE ANTENNA, 2.4 GHZ				
			DRAWN BY J. LOWE	DATE 1-15-99					
			CHECKER	MFG ENGR					
			QA	ENGR					
	(10-36063-01)		HOLE TOLERANCES:		PRGM MGR	ENGR	SIZE C	CAGE CODE 52791	DWG NO 703549
	(DRAGON)	.040 - .128 +.003 -.001	.515 - .750 +.008 -.001						
822903	CP80-875	.136 - .228 +.004 -.001	.765 - 1.000 +.010 -.002						
NEXT ASSY	USED ON	.234 - .500 +.006 -.001	1.031 UP +.015 -.002						
APPLICATION		MATL ENGR	APPROVAL			SCALE	2/1	UNIT WT	SHEET 1 OF 1

2740 / 2742 Antenna

The 2740 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 2740 uses a Murata Erie BFA connector while the 2742 uses the MMCX. 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.

<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>	MXYPH75, RG-178
<i>Symbol P/N</i>	703624-1, 703624-2

“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.”

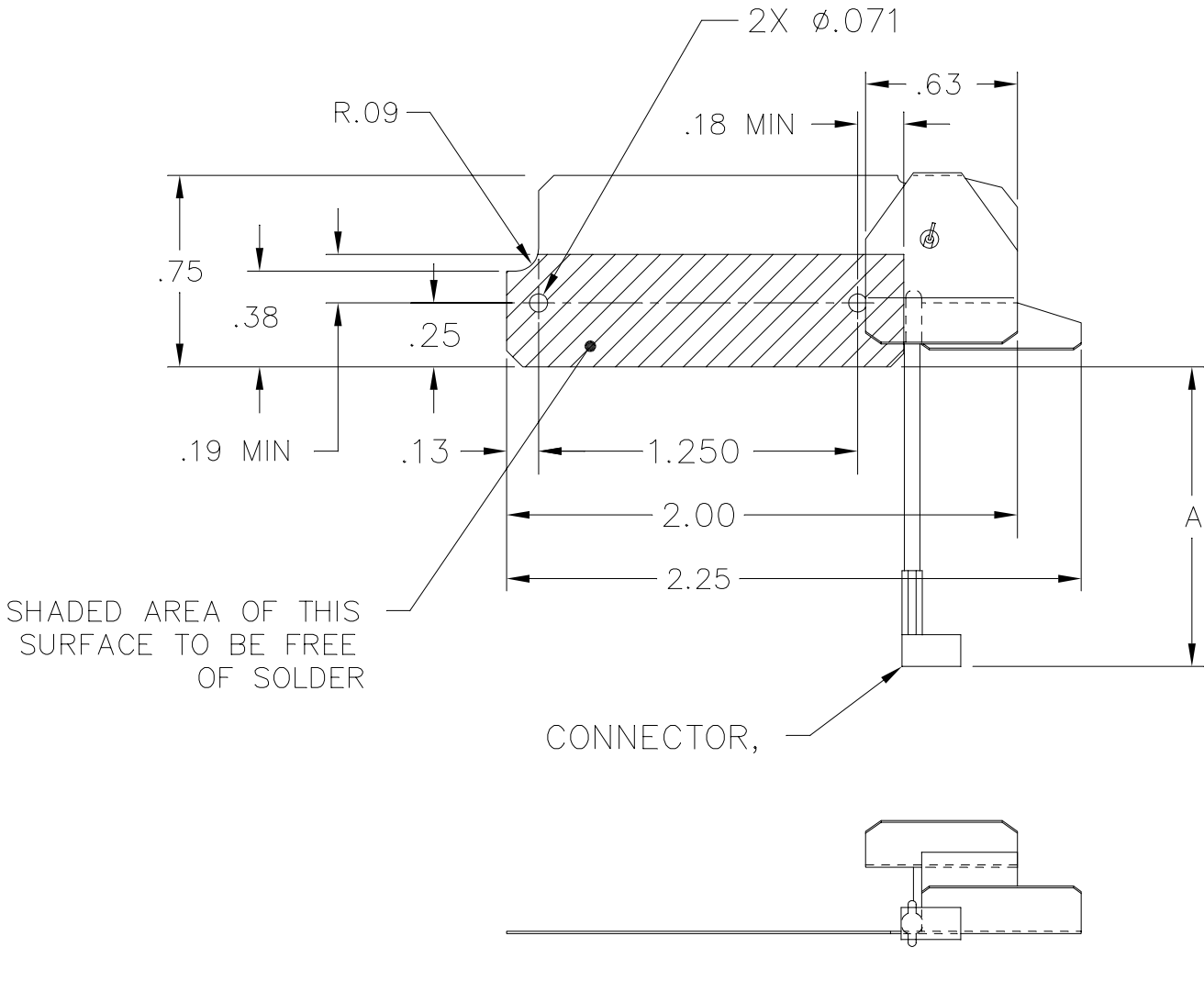


Antenna Installed in Device



Terminal Use Photo

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE
APPROVED			



SPECIFICATIONS

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

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, .010 THK.
FINISH: BRIGHT TIN PLATE PER MIL-T-10727A, TYPE 1, ELECTRO DEPOSITED .00010-.00025 IN.

1. MATERIAL: ELECTROLYTIC TIN PLATED STEEL SHEET, .010 THK.

-2	MMCX MALE RT ANGLE	1.85±.12	-
-1	MURATA TYPE BFA	1.16±.12	-
DASH NO	CONNECTOR	A	REV

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 INDUSTRIES INC. 9324 TOPANGA CYN BLVD CHATSWORTH, CA. 91311 <i>TECHNICAL EXCELLENCE COMMITTED TO QUALITY</i>									
				CONTRACTOR		TITLE ANTENNA, 2.4 GHZ									
				DRAWN BY J. LOWE						DATE 12/1/99					
				CHECKER						MFG ENGR					
				QA		ENGR		SIZE C		CAGE CODE 52791		DWG NO 703624			
823335	CP90-924	HOLE TOLERANCES: .040 - .128 +.003 -.001 .136 - .228 +.004 -.001 .234 - .500 +.006 -.001		.515 - .750 +.008 -.001 .765 - 1.000 +.010 -.002 1.031 UP +.015 -.002		PRGM MGR		ENGR		SCALE 2/1		UNIT WT .		SHEET 1 OF 1	
NEXT ASSY	USED ON	MATL ENGR		APPROVAL											
APPLICATION															

NOTES : UNLESS OTHERWISE SPECIFIED

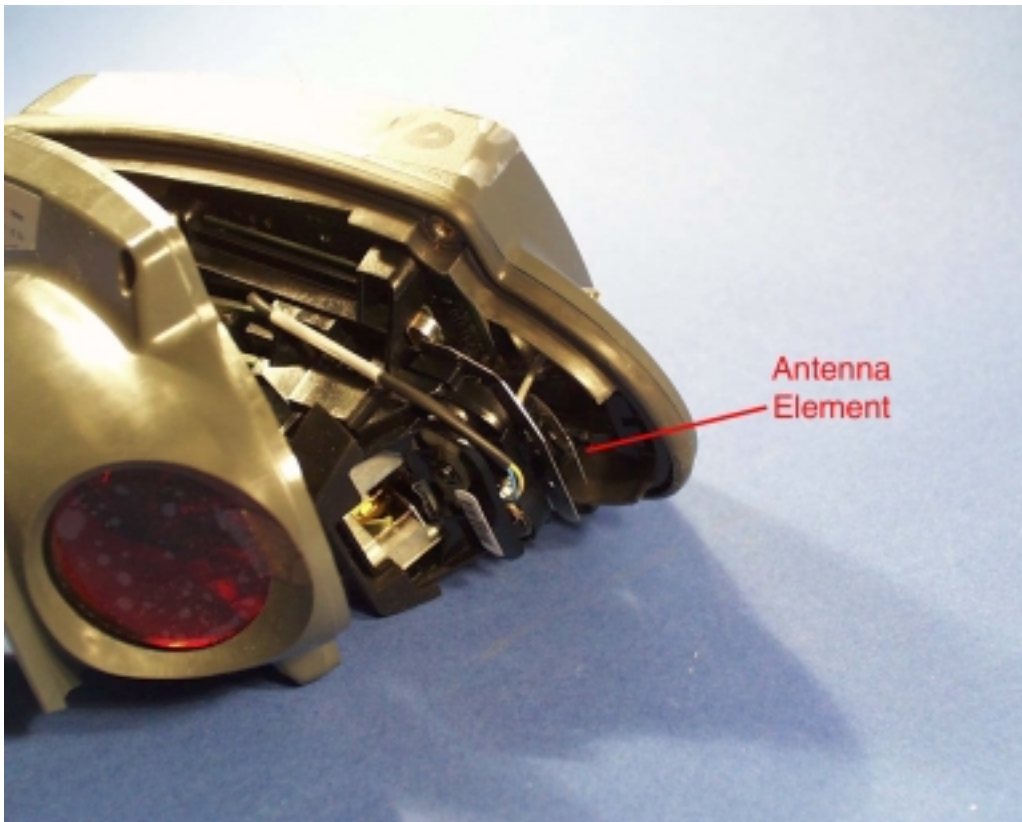


7240 / 7242 Antenna

The **7240** 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 **7240** uses the MuRatta BFA connector. The **7242** is identical to the **7240** but 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.

<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>	MXYP75, RG-178
<i>Symbol P/N</i>	10-35475-01, 10-35477-01

“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.”

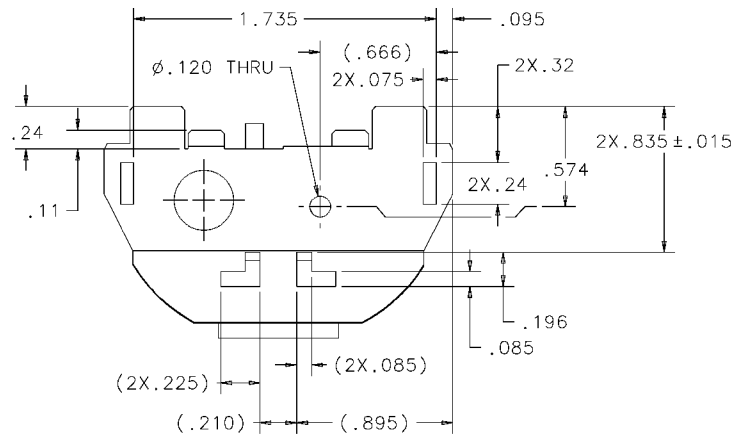
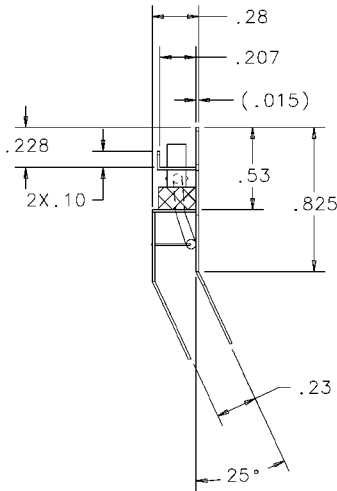
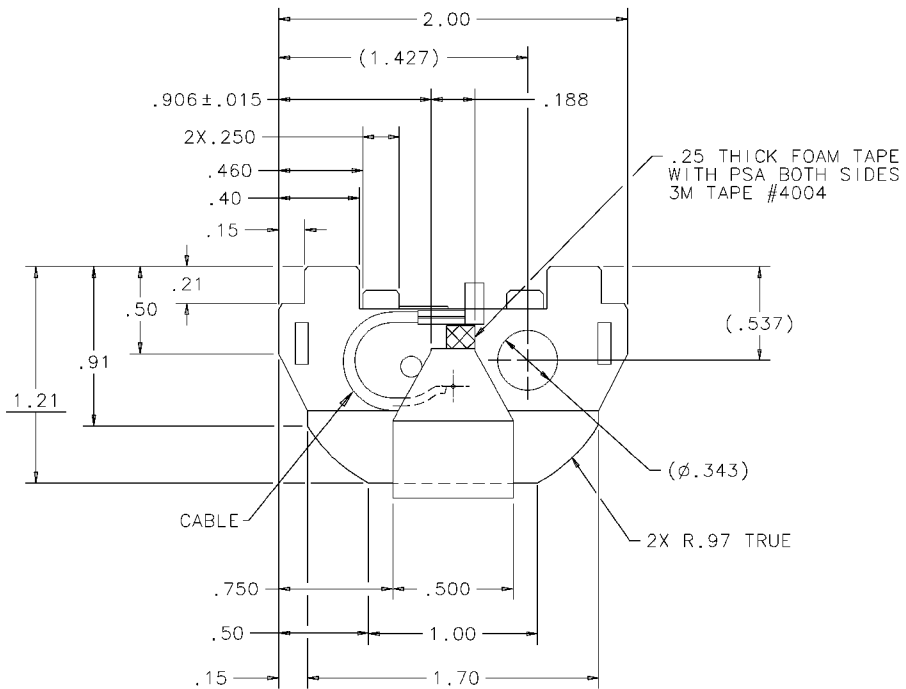


Antenna Installed in Device



Terminal Use Photo

REVISIONS							
REV	ZONE	NO.	DESCRIPTION	E.C.	BY	APVD.	DATE
A			RELEASED PER EDR #54642		MB		02/17/00



NOTES: UNLESS OTHERWISE SPECIFIED:

- 1) MATERIAL: CRS 1008, .015 ± .001 THK, SHARP CORNERS AND EDGES .005 MAX.
ALTERNATE: ELECTROLYTIC TIN COATED COLD ROLLED STEEL .015 THICK.
NON-PLATED EDGES ARE PERMISSIBLE.
- 2) FINISH: BRIGHT TIN PLATE PER MIL-T-10727A, TYPE 1, ELECTRO DEPOSITED .00010-.00025 IN. FINISH SHALL BE UNIFORM EXHIBIT NO EVIDENCE OF CORROSION OR OXIDATION WHEN VIEWED WITH THE UNAIDED EYE. EDGE PLATING ON CUT OR SHEARED SURFACES IS NOT REQUIRED.
- 3) PACKAGE ITEMS IN ACCORDANCE WITH STI GENERAL PACKAGING SPEC #50-04100-013.
- 4) PARTS SHALL MEET THE CRITERIA PER STI WORKMANSHIP STANDARD SS-03800-57.

SPECIFICATIONS

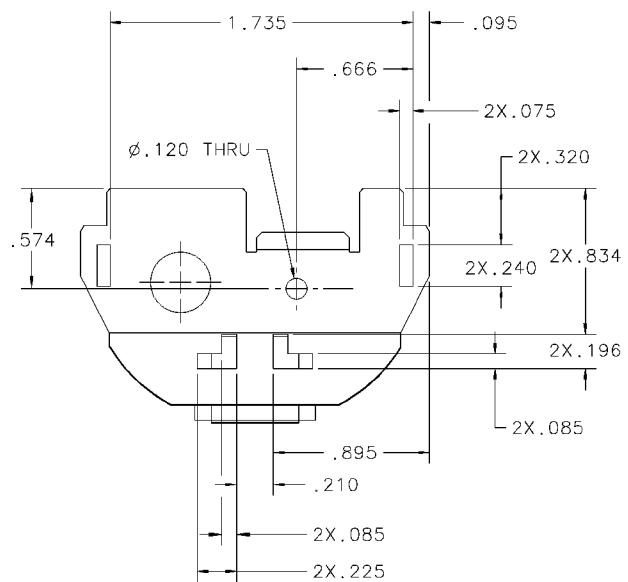
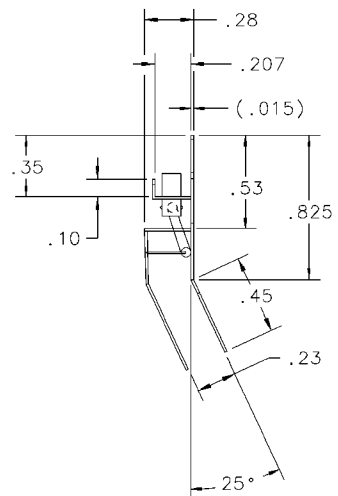
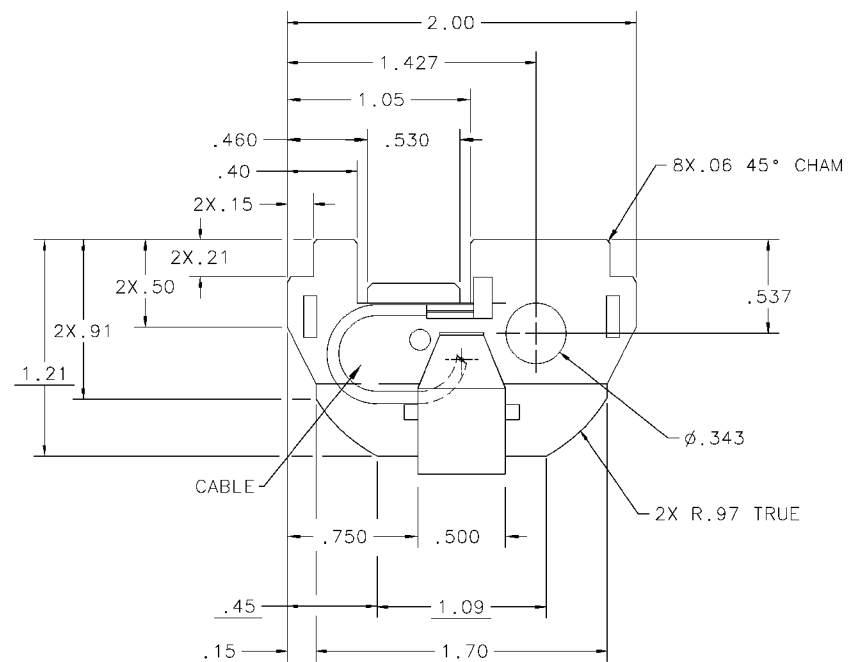
FREQUENCY: 2.4-2.485 GHz
VSWR: 2.0:1
GAIN: 0dbi NOMINAL
POLARIZATION: LINEAR
CABLE: MURATA MXYH75
CONNECTOR: TYPE BFA

* PROPRIETARY CONTENT *
THE DRAWING CONTENT AND SPECIFICATION
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.
COMPUTER GENERATED DRAWING
DO NOT SCALE

TOLERANCE CHART
* UNLESS OTHERWISE SPECIFIED *
DIMENSIONS ARE IN INCHES
INCH MM
XX +/- .01 +/- .25
XXX +/- .005 +/- .125
ANGLES ± 1° FRACTIONS ± 1/64
QUALITY

APPROVALS		DATE	SYMBOL TECHNOLOGIES INC.			
DRAWN	JKW	05-05-99	One Symbol Plaza Holtsville, NY 11742			
CHECKED	M.SAVONA	05-05-99	ANTENNA: 2.4GHZ			
ENGINEER	J.CONNELLY	05-05-99				
ANALYST	L.DOBKOWSKI	05-05-99				
MFG. ENG.			SIZE	DWG. NO.	REV	
PRODUCT			D	10-35475-01	A	
QUALITY			SCALE: 2/1	SOLID MODEL	YES ☒ NO ☐	SHEET 1 OF 1

REVISIONS						
REV	ZONE	Mod	DESCRIPTION	E.C.	BY	APVD., DATE
			INITIAL RELEASE PER PPD # 51859		JKW	11-03/99
2			REVISED PER PPD #52781 1) REVISED PER TECOM'S DWG		MB	12/8/99
3			REVISED PER PPD #53240 1) DIM .45 WAS .42 2) ADDED NOTE 5		MB	12/8/99



SPECIFICATIONS

NOTES: UNLESS OTHERWISE SPECIFIED:

1. MATERIAL: CRS 1008, .015 THK, SHARP CORNERS AND EDGES .005 MAX.
ALTERNATE: ELECTROLYTIC TIN.
2. FINISH: BRIGHT TIN PLATE PER MIL-T-10727A, TYPE 1, ELECTRO
DEPOSITED .00010-.00025 IN. FINISH SHALL BE UNIFORM
EXHIBIT NO EVIDENCE OF CORROSION OR OXIDATION WHEN
VIEWED WITH THE UNAIDED EYE. EDGE PLATING ON CUT OR
SHEARED SURFACES IS NOT REQUIRED.
3. PACKAGE ITEMS IN ACCORDANCE WITH STI GENERAL PACKAGING
SPEC #50-04100-013.
4. WORKMANSHIP PER STI STANDARD SS-03800-57.
5. ALL UNDERLINED DIMENSIONS ARE OUT OF SCALE AND ARE NOT
REFLECTED IN THE 3-D DATA BASE

FREQUENCY: 2.4-2.485 GHz
VSWR: 2.0:1
GAIN: 0dbi NOMINAL
POLARIZATION: LINEAR
CABLE: RG178
CONNECTOR: 50-22100-029 (MMCX)

ITEM	QTY	PART NO.	DESCRIPTION	REMARKS/REF. SYMBOL	
PARTS LIST					
THE DRAWING & SPECIFICATION CONTAINED HEREIN ARE PROPRIETARY AND MUST NOT BE USED, REPRODUCED, COPIED, OR OTHERWISE DEALT WITH NOR ITS CONTENTS COMMUNICATED TO OTHERS EXCEPT IN ACCORDANCE WITH WRITTEN INSTRUCTIONS RECEIVED FROM SYMBOL TECHNOLOGIES INC.		DIMENSIONS ARE IN UNLESS OTHERWISE SPECIFIED	APPROVALS DATE DRAWN JKW 11-03-99 CHECKED W.SAVONA 11-03-99 ENG/INLNR J.CONNELLY 11-03-99 MFG. ENG.	SYMBOL TECHNOLOGIES INC. Bohemia, New York ANTENNA: 2.4GHZ, 11/2MBPS,PDT7200	
		XX MM INCH +/- .03 XXX +/- .010	ANGLES +/- 0°30' FRACTIONS +/- 1/64	PRODUCT QUALITY	SIZE ENG. NO. 10-35477-01 REV 3
	0	DO NOT SCALE DRAWING	MATERIAL: SEE NOTE 1 FINISH: SEE NOTE 2	ANALYST L.DOBKOWSKI 12-29-99	SCALE 2:1 SOLID MODEL ☒ ☐ SHEET 1 OF 1

6840/ 6846 Antenna

The **6840** 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 **6840** uses a Murata Erie BFA connector while the **6846** uses the MMCX. 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.

<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>	MXYH75, RG-178
<i>Symbol P/N</i>	10-32290-01, -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.”

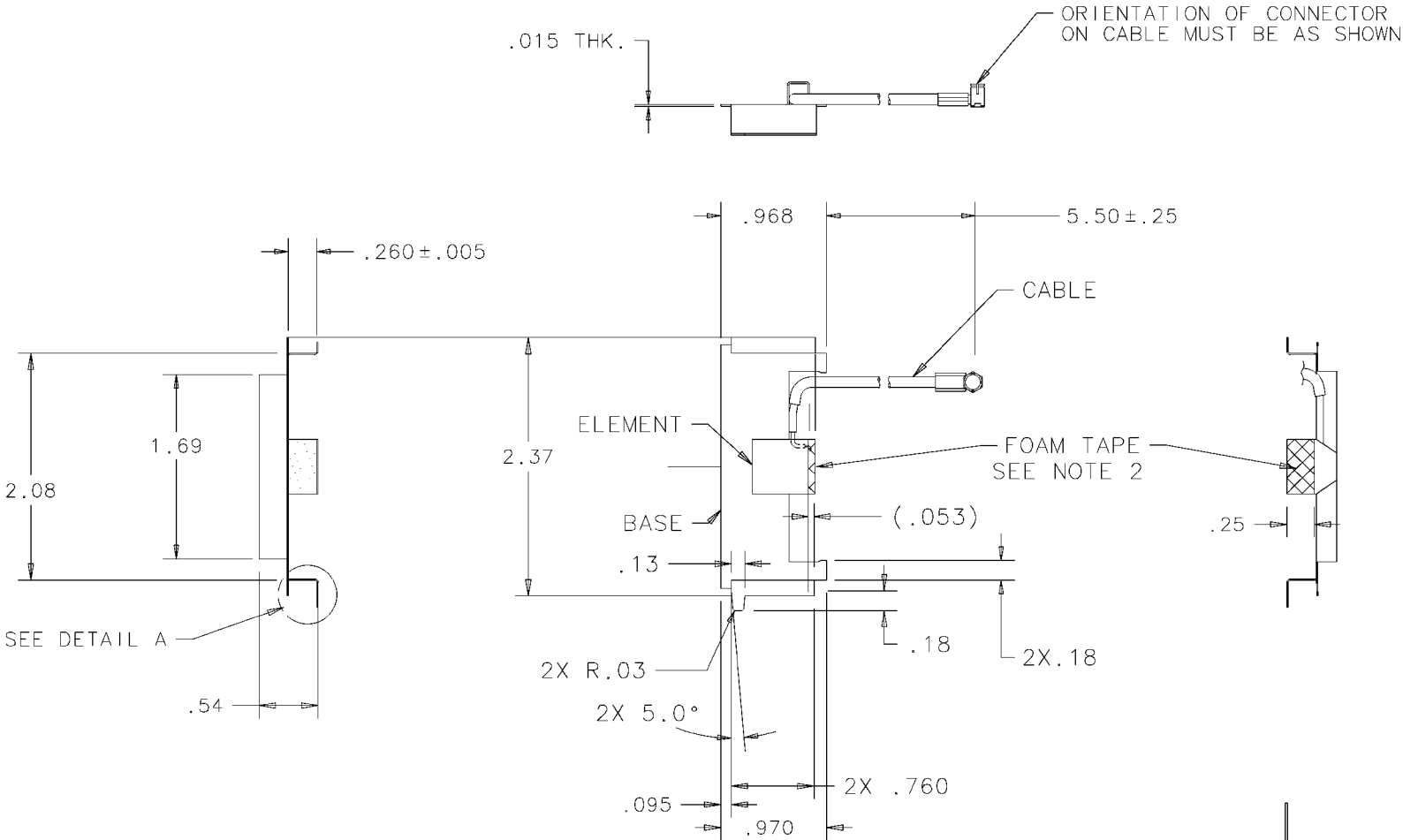


Antenna Installed in Device



Terminal Use Photo

REVISIONS							
REV.	ZONE	△	DESCRIPTION	E.C.	BY	APVD.	DATE
A	ALL	~	RELEASED PER EDR 39215	~	LM		
B	~	~	REVISED PER ECN	4418	RM		
C	~	~	DIM 2.37 WAS 2.30	E4874	LM		
D	~	~	ADDED DIM 2X.18 PER EC	E5856	MB		



SPECIFICATIONS

FREQUENCY: 2.4 TO 2.485 GHZ
VSWR: 2.0:1
GAIN: 0 dBi NOM
IMPEDANCE: 50 OHMS
CABLE/CONNECTOR: TECOM 817283-X
MURATA ERIE
MXYH62-XX-XXXX

- NOTE:
- PACKAGE ITEMS IN ACCORDANCE WITH STI GENERAL PACKAGING SPEC 50-04100-013.
 - ADHESIVE TO BE 3M DOUBLE-SIDED SCOTCH 4026 URETHANE FOAM TAPE(.062 THICK) WITH POLY COATED LINER OR EQUIVALENT.

DETAIL A
(2 PL)

ITEM	QTY.	PART NO.		DESCRIPTION		REMARKS/REF. SYMBOL					
THE DWG. & SPECIFICATION CONTAINED HEREON ARE PROPRIETARY AND MUST NOT BE USED, COPIED, REPRODUCED NOR ITS CONTENTS COMMUNICATED TO OTHERS EXCEPT IN ACCORDANCE WITH WRITTEN INSTRUCTIONS RECEIVED FROM SYMBOL TECHNOLOGIES INC.		DIMENSIONS ARE IN INCHES		APPROVALS		DATE		SYMBOL TECHNOLOGIES INC. Bohemia, New York			
		UNLESS OTHERWISE SPECIFIED		DRAWN LJM		12/23/97					
				CHECKED J CHAN		ANTENNA:2.4 GHZ					
				ENGINEER J CHAN							
				MFG. ENG. S SPITERI							
				PRODUCT M SAVONA							
				QUALITY		SIZE C		DWG. NO. 10-32290-01		REV. D	
						SCALE: FULL		SOLID MODEL	YES NO	SHEET 1 OF 1	
		DO NOT SCALE DRAWING		SEE NOTE							

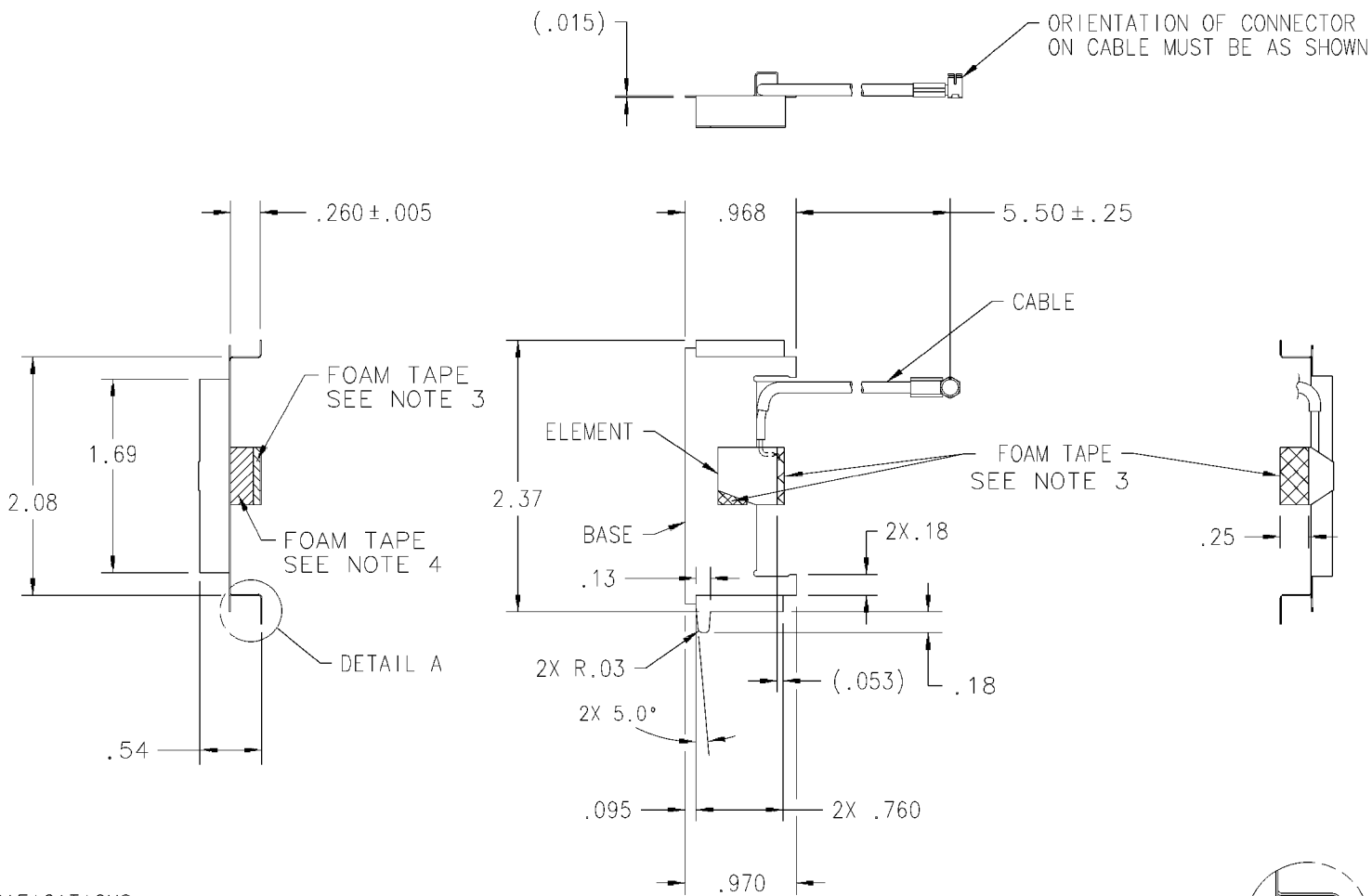
4

3

2

1

REVISIONS							
REV.	ZONE	DESCRIPTION	E.C.	BY	APVD.	DATE	
A		RELEASED PER EDR #53958		MB		01/27/00	

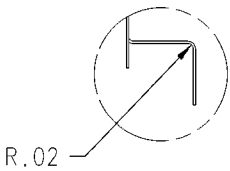


SPECIFICATIONS:

FREQUENCY: 2.4 TO 2.485 GHz
VSWR: 2.0:1
GAIN: 0 dBi NOM
IMPEDANCE: 50 OHMS
CABLE/CONNECTOR: RG178
50-22100-029 (MMCX)

NOTES: UNLESS OTHERWISE SPECIFIED.

- 1) MATERIAL: CRS 1008, .015 ± .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) FOAM TAPE TO BE 3M DOUBLE-SIDED SCOTCH 4026
(.062 THICK) WITH POLY COATED LINER OR EQUIVALENT.
- 4) FOAM TAPE TO BE DOUBLE-SIDED SCOTCH 4008
(.125 THICK) WITH POLY COATED LINER OR EQUIVALENT.
- 5) PARTS SHALL MEET THE CRITERIA PER STI
WORKMANSHIP STANDARD SS-03800-57.
- 6) PACKAGE ITEMS IN ACCORDANCE WITH STI
GENERAL PACKAGING SPEC #50-04100-013.



DETAIL A
SCALE 2:1
2 PLACES

* PROPRIETARY CONTENT *			
THE DRAWING CONTENT AND SPECIFICATION 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.			
COMPUTER GENERATED DRAWING DO NOT SCALE			
TOLERANCE CHART			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES			
	INCH	MM	
.XX	+/- .01	+/- .25	
.XXX	+/- .005	+/- .125	
ANGLES ±	1°	FRACTIONS ±	1/64

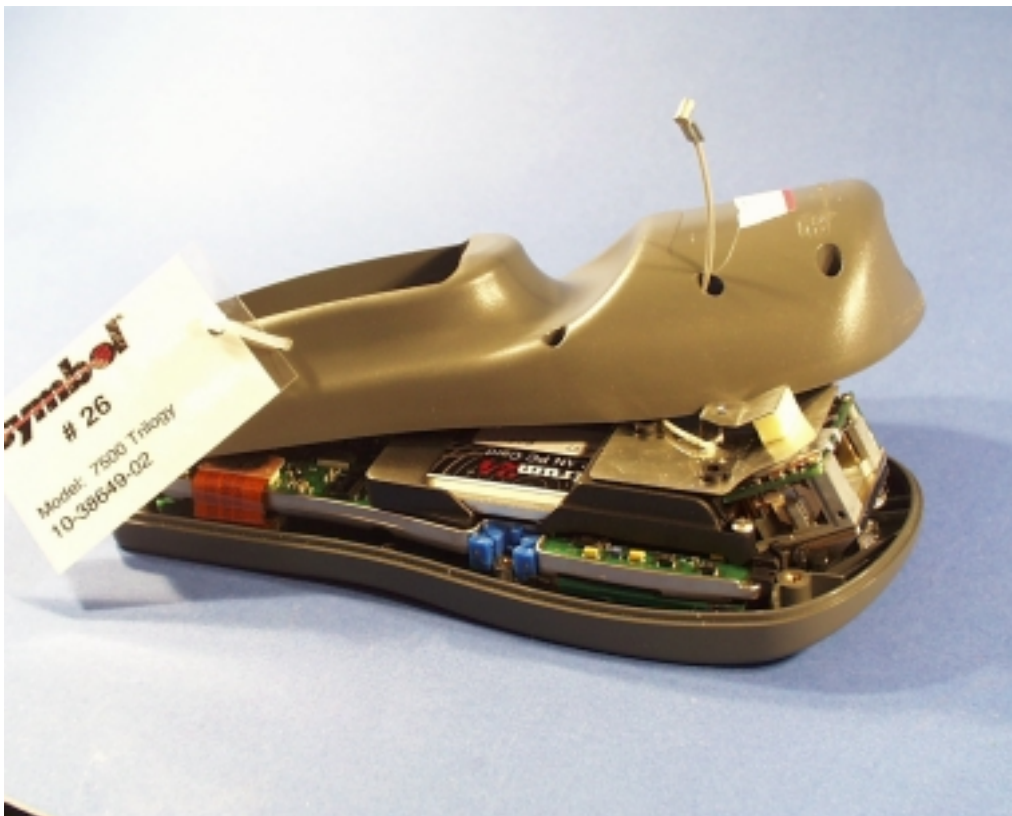
APPROVALS		DATE	SYMBOL TECHNOLOGIES INC. One Symbol Plaza Holtsville, NY 11742	
DRAWN	J. SIMMONS	11/3/99		
CHECKED	M. SAVONA	11/3/99		
ENGINEER	B. ROSENCRANTZ	11/3/99		
ANALYST	L. DOBKOWSKI	11/3/99	ANTENNA: 2.4 GHZ, MMCX	
MFG. ENG.				
PRODUCT				
QUALITY				
SIZE	DWG. NO.	10-32290-02	REV	A
SCALE: 1:1	SOLID MODEL	YES NO	SHEET 1 OF 1	

7540 / 7546 Antenna

The **7540** 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 **7540** uses the MuRatta BFA connector while the **7546** is identical to the **7540** but 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.

<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>	MXYH75, RG-178
<i>Symbol P/N</i>	10-38649-01, -02

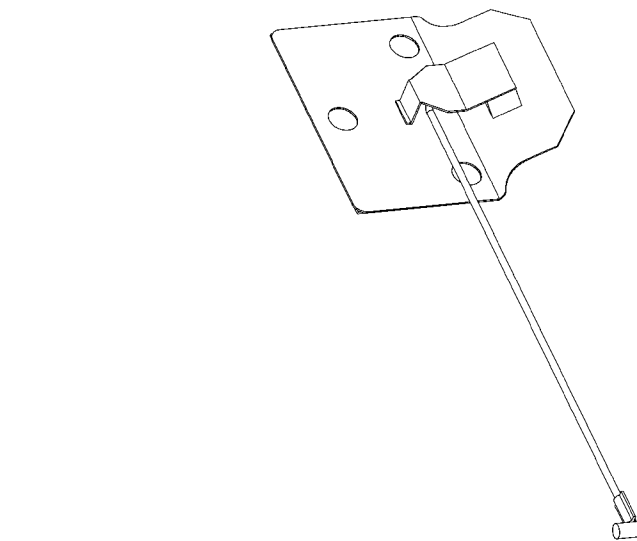
“Important Note: To comply with FCC RF exposure requirements, this hand-held device is approved for operation in a user’s hand when there is 20 cm or more between the antenna and everyone’s body.”



Antenna Installed in Device



Terminal Use Photo



SPECIFICATIONS

ITEM	QTY.	PART NO.	DESCRIPTION				REMARKS/REF. SYMBOL				
THE DWG. & SPECIFICATION CONTAINED HEREON ARE PROPRIETARY AND MUST NOT BE USED, COPIED, REPRODUCED NOR ITS CONTENTS COMMUNICATED TO OTHERS EXCEPT IN ACCORDANCE WITH WRITTEN INSTRUCTIONS RECEIVED FROM SYMBOL TECHNOLOGIES INC.		DIMENSIONS ARE IN INCHES		APPROVALS	DATE	SYMBOL TECHNOLOGIES INC.					
		UNLESS OTHERWISE SPECIFIED		DRAWN	C.THELEMANN	10/5/99	Bohemia, New York				
		MM	INCH	CHECKED	M.SAVONA	10/5/99	ANTENNA: 2.4 GHz TYPE F 7500				
		.XX +/-	+/-. .01	ENGINEER	C.THELEMANN	10/5/99					
		.XXX +/-	+/-. .005	MFG. ENG.	M.LOSPINUSO	10/5/99					
		ANGLES ± 1' FRACTIONS ± 1/64		PRODUCT	T.HOFBAUER	10/5/99	SIZE	DWG. NO.	10-38649-01		REV. A
		MATERIAL: -----		QUALITY	B.WATSON	10/5/99	C				
FINISH: -----					SCALE: 1/1		SOLID MODEL	YES NO X	SHEET 1 OF 1		

5. BREAK AND DEBUR ALL SHARP EDGES .005 MAX
PRIOR TO PLATING

THE DWG. & SPECIFICATION
CONTAINED HEREON ARE PRO-
PRIETARY AND MUST NOT BE
USED, COPIED, REPRODUCED
NOR ITS CONTENTS COMMUN-
ICATED TO OTHERS EXCEPT IN
ACCORDANCE WITH WRITTEN
INSTRUCTIONS RECEIVED FROM
SYMBOL TECHNOLOGIES INC.

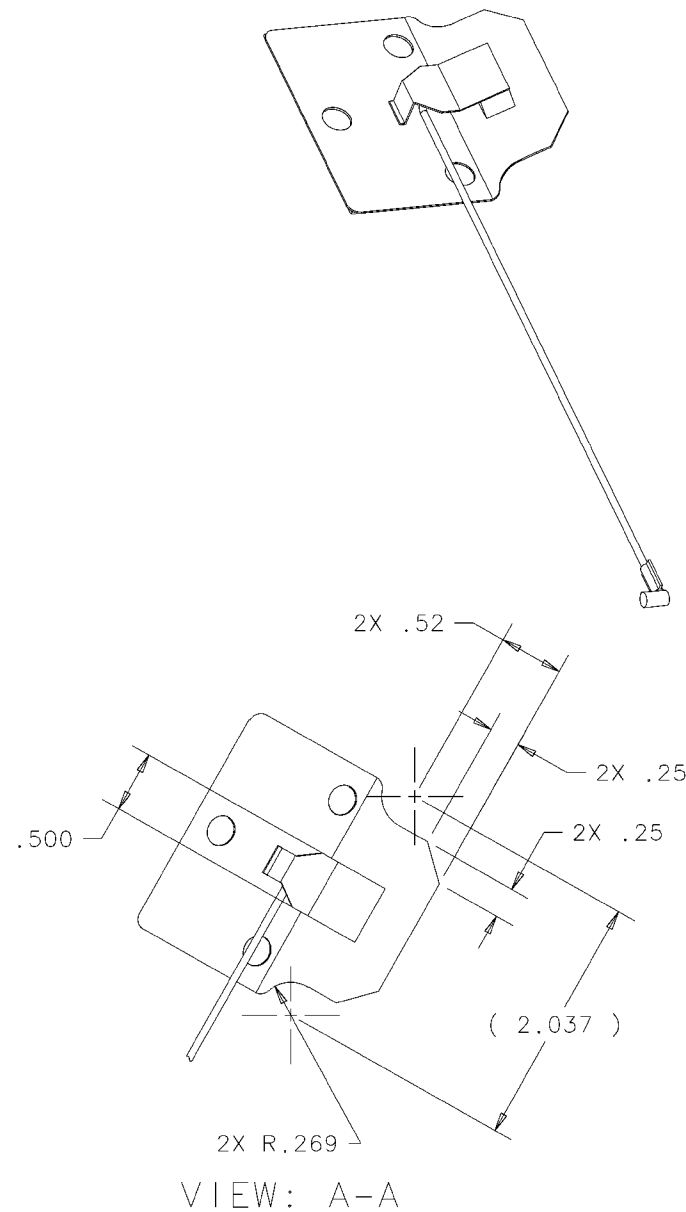
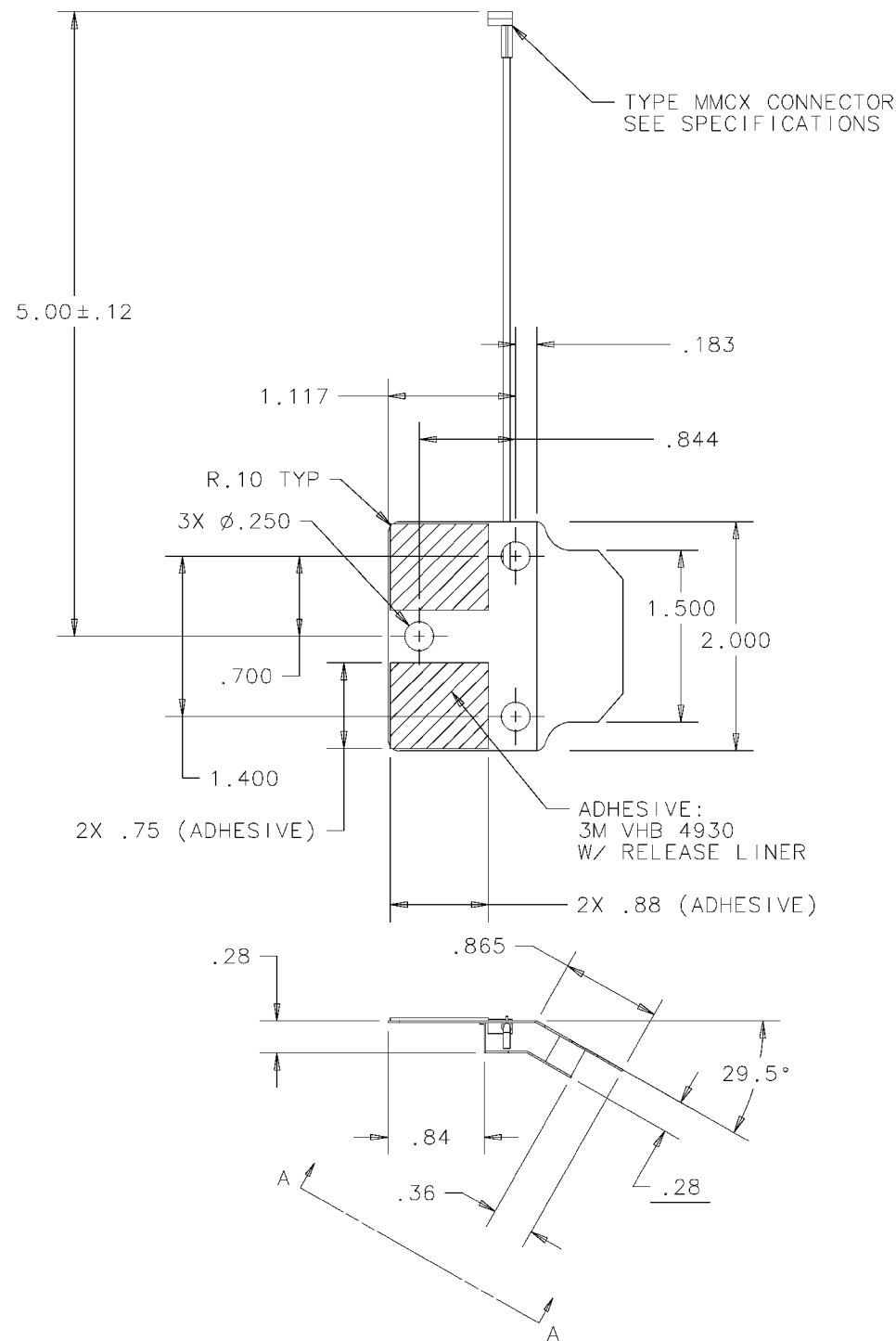
DIMENSIONS ARE IN INCHES		
UNLESS OTHERWISE SPECIFIED		
	MM	INCH
.XX	+/-	+/- .01
.XXX	+/-	+/- .005
ANGLES ± 1° FRACTIONS ± 1/64		
MATERIAL: _____		
FINISH: _____		

APPROVALS		DATE
DRAWN	C. THELEMANN	10/5/99
CHECKED	M. SAVONA	10/5/99
ENGINEER	C. THELEMANN	10/5/99
MFG. ENG.	M. LOSPINUSO	10/5/99
PRODUCT	T. HOFBAUER	10/5/99
QUALITY	B. WATSON	10/5/99

	SYMBOL TECHNOLOGIES INC.		
	Bohemia, New York		
	ANTENNA: 2.4 GHz TYPE F		
	7500		
SIZE	DWC. NO.	10-38649-01	REV.
C			A

99	SIZE C	DWG. NO. 10-38649-01	REV. A
9			

REVISIONS						
REV.	ZONE	△	DESCRIPTION	E.C.	BY	APVD. DATE
A			RELEASED PER EDR #53455		MB	01/10/00



SPECIFICATIONS

FREQUENCY: 2.4-2.485 GHZ
VSWR: 2.0:1 MAX
GAIN: 0dBi NOMINAL
POLARIZATION: LINEAR
CABLE: RG178
CONNECTOR: TYPE MMCX, 50-22100-029

NOTES: UNLESS OTHERWISE SPECIFIED

- MATERIAL: CRS 1008, .015 ± .001THK
- FINISH: BRIGHT TIN PLATE PER MIL-T-10727A, TYPE1, 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.
- TOLERANCES: .XX ± .03
.XXX ± .010
ANGLES ± 1°
- PACKAGE IAW SYMBOL PACKAGING SPECIFICATION 40-04100-013
- BREAK AND DEBUR ALL SHARP EDGES .005 MAX PRIOR TO PLATING

ITEM	QTY.	PART NO.	DESCRIPTION				REMARKS/REF. SYMBOL					
THE DWG. & SPECIFICATION CONTAINED HEREON ARE PROPRIETARY AND MUST NOT BE USED, COPIED, REPRODUCED NOR ITS CONTENTS COMMUNICATED TO OTHERS EXCEPT IN ACCORDANCE WITH WRITTEN INSTRUCTIONS RECEIVED FROM SYMBOL TECHNOLOGIES INC.		DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED		APPROVALS		DATE	SYMBOL TECHNOLOGIES INC. Bohemia, New York					
				DRAWN	M. BUNYON	01/10/00						
		MM		INCH		CHECKED	M. SAVONA	01/10/00	ANTENNA: 2.4 GHz TYPE F			
		.XX	+/-	+/- .01	ENGINEER	C. THELEMAN	01/10/00					
		.XXX	+/-	+/- .005	MFG. ENG.							
		ANGLES ± 1° FRACTIONS ± 1/64		PRODUCT		SIZE	DWG. NO.	REV.				
		MATERIAL:		QUALITY		C	10-38649-02	A				
		FINISH:		ANALYST		SCALE: 1 : 1		SOLID MODEL	YES	NO	SHEET 1 OF 1	
				L. DOBKOWSKI		01/10/00						
		DO NOT SCALE DRAWING										

	PDT 754X	
NEXT ASSY	USED ON	DO NOT SCALE DRAWING