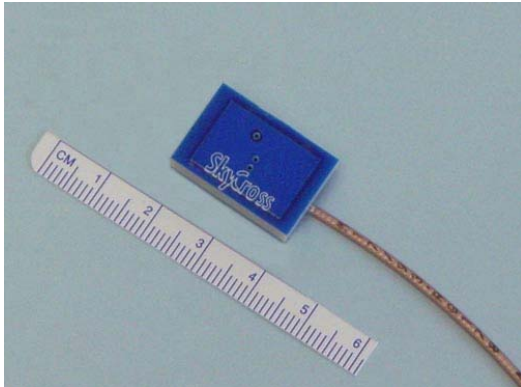


## WLAN Tri Band Antenna for 802.11b and 802.11a/HiperLAN2 Embedded Wireless Applications



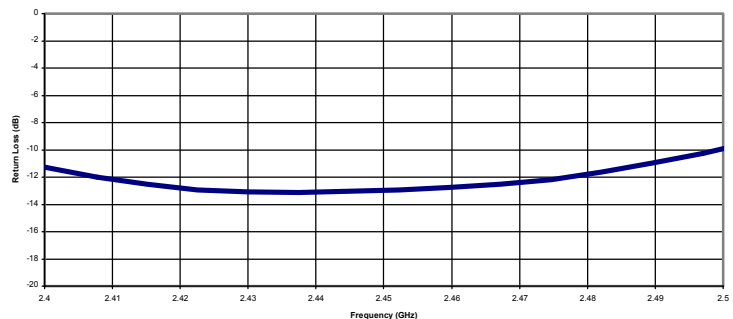
### Features

- *Very Efficient MLA Technology*
- *Covers all Three WLAN Bands:*
  - 802.11b (2.44 GHz)
  - 802.11a (5.25 GHz)
  - HiperLAN2 (5.8 GHz)
- *Very Low Profile for Embedded Applications*
- *Optimized for Remote Cable Mounting in Desktop/Laptop Applications*

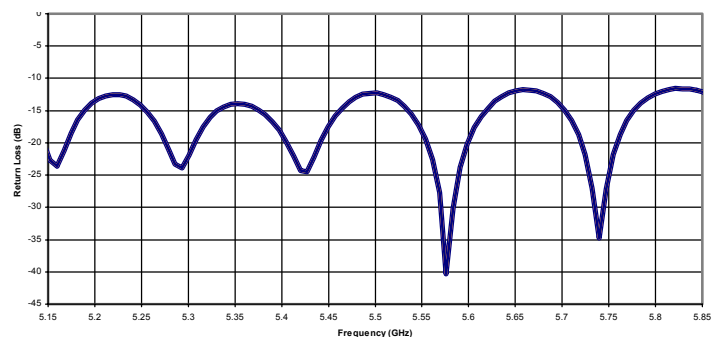
This tri band WLAN antenna provides exceptional performance in a compact package for embedded wireless applications implementing multiple frequencies. This Meander Line Antenna provides superior efficiency and gain directivity and is the best performance solution for developers implementing a multiple frequency WLAN system in both the lower and upper WLAN bands.

Electrical Specifications †	
Frequency Ranges	2400—2500 MHz 5150—5850 MHz
Gain	3.0 dBi Peak at 2440 MHz 3.25 dBi Peak at 5250 MHz 2.0 dBi Peak at 5800 MHz
VSWR	< 1.8:1 in the lower band < 2.0:1 in the upper band
Polarization	Linear
Patterns	2440 MHz Uni directional 5250 MHz Uni directional 5800 MHz Uni directional
Feed Impedance	50 Ohms Unbalanced
Mechanical Specifications	
Size	0.87 x 0.59 x 0.24 inches 22.3 x 14.9 x 6.2 mm
Weight*	3.9 g
Cable/Connectors	Customer to specify cable type, cable length and connector type
*weight with out cable	

### Typical Return Loss (Low Band)

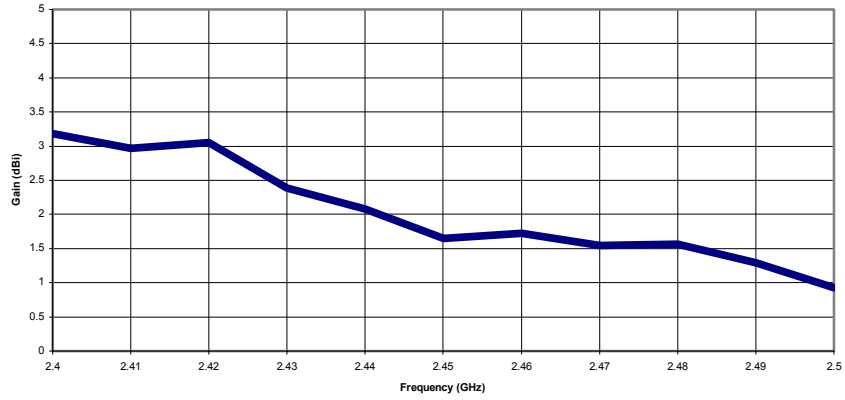


### Typical Return Loss (High Bands)

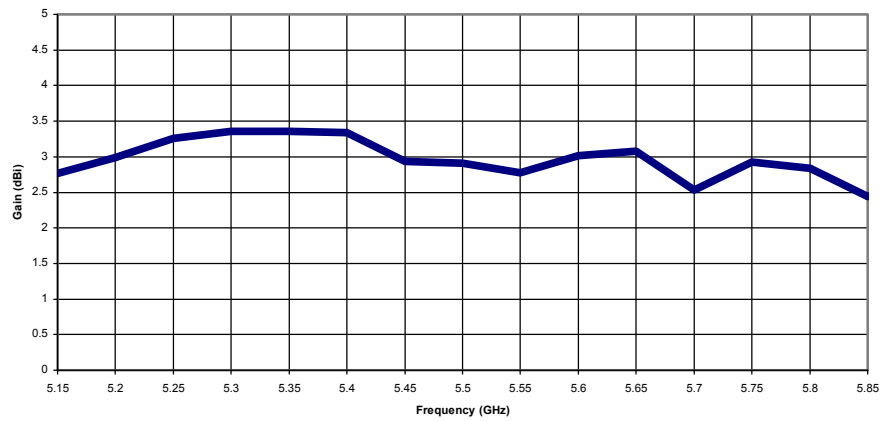


† Electrical performance as measured when mounted onto a 48 x 19 cm desktop chassis with a MMCX connector on a 60 cm RG178 test cable.

### Swept Gain for Low Band †

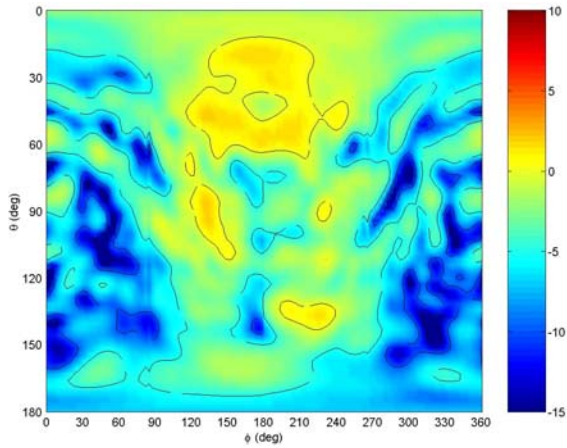


### Swept Gain for High Band †

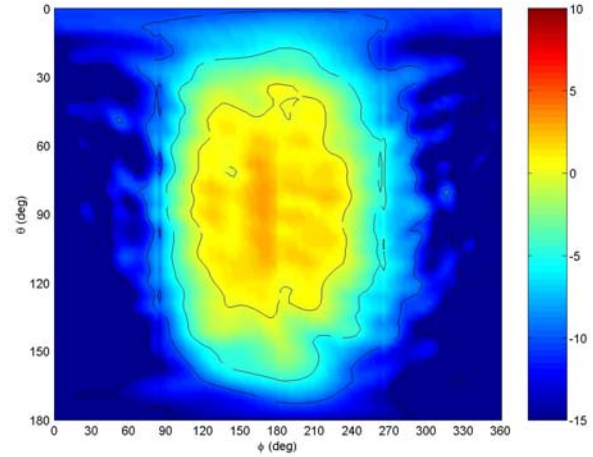


† Electrical performance as measured when mounted onto a 48 x19 cm desktop chassis with a MMCX connector on a 60 cm RG178 test cable. 2

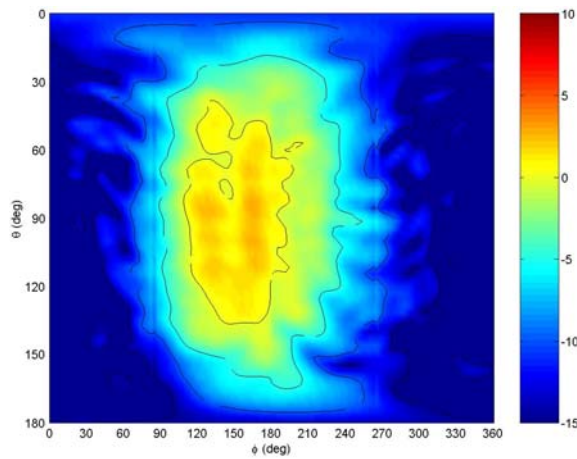
**Spherical Gain Contour Maps †**



**2.44 GHz**



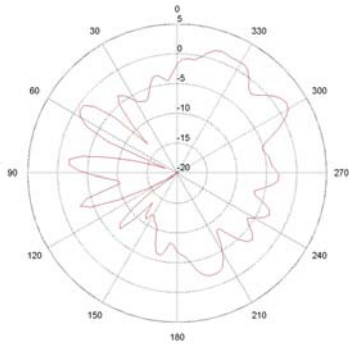
**5.25 GHz**



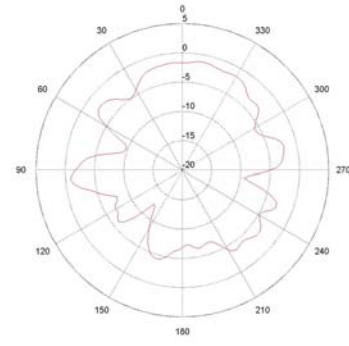
**5.8 GHz**

† Electrical performance as measured when mounted onto a 48 x19 cm desktop chassis with a MMCX connector on a 60 cm RG178 test cable. 3

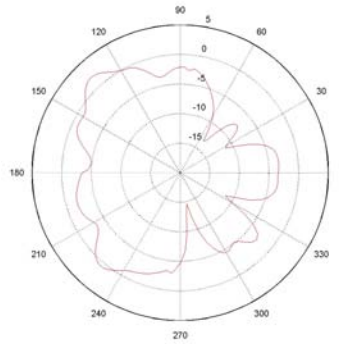
## Gain Pattern at 2.45



**Phi = 0 degrees**

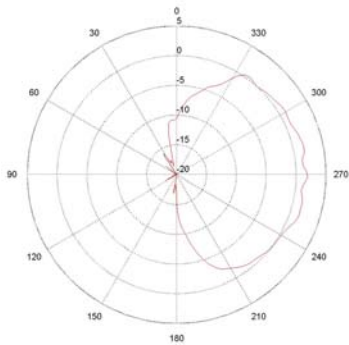


**Phi = 90 degrees**

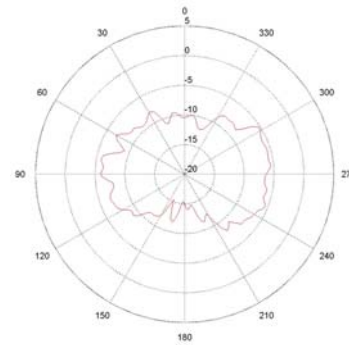


**Theta = 90 degrees**

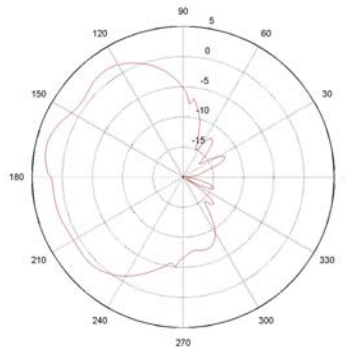
## Gain Pattern at 5.25



**Phi = 0 degrees**

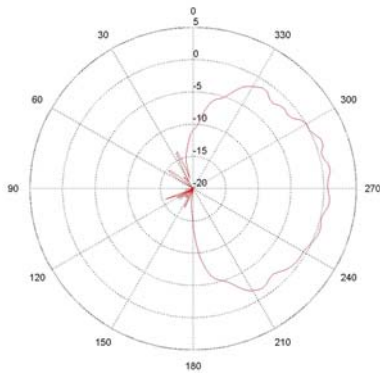


**Phi = 90 degrees**

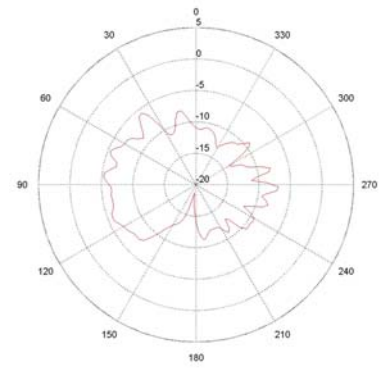


**Theta = 90 degrees**

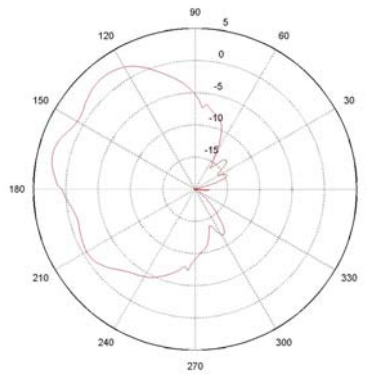
### Gain Pattern at 5.8



**Phi = 0 degrees**



**Phi = 90 degrees**



**Theta = 90 degrees**

© 2002 SkyCross, Inc. SkyCross is a trademark of SkyCross, Inc. All rights reserved. Protected by one or more US Patents, including No. 5,790,080. Additional US and Foreign patents pending. Specification subject to change without notice.

For information regarding SkyCross Inc. and its products, see website at [www.skycross.com](http://www.skycross.com), email [info@skycross.com](mailto:info@skycross.com) or call 321-308-6600

**1. Description:**

The Antenna is Tri-band flying lead and straight antenna. Which is useful for the construction of an Access Point.

**2. Electrical Properties**

2-1 Frequency Range.....	2.4~2.4835GHz 5.15~5.35GHz 5.725~5.85GHz
2-2 Impedance.....	50 Ohms nominal
2-3 SWR.....	$\leq 2.0$
2-4 Return Loss.....	$\leq -9.6$ dB
2-5 Gain.....	5.0 dBi (peak) 4.5dBi (av.)
2-6 Polarization.....	Vertical

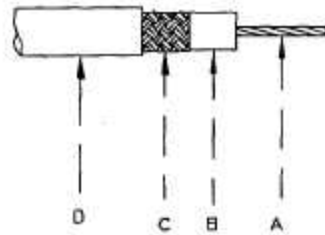
**3. Mechanical Properties :**

3-1 Connector.....	MMCX PLUG
3-2 Cable.....	M17/113-RG316
3-3 Houshing.....	Cycloy-C2800
3-4 PCB.....	Ro4003
3-5 Attachment Strength.....	5.0 Kg-cm



c:\data\drawings\block

Rev	Change	Date



Construction:

- A) Center Conductor:  
26 7/.0067 SPCW  
OD .020" ± .001"
- B) Dielectric:  
Extruded PTFE  
OD .060" ± .003"
- C) Shield:  
38 AWG SPC  
OD .078" Nom.
- D) Jacket:  
FEP - Brown Tint  
OD .098" ± .005"  
Surface Printed: "RG316HF HARBOUR INDUSTRIES 27478"

Electricals:

- Impedance: 50 ± 2 Ohms
- Capacitance: 32 pF/ft Max.
- Velocity of Prop.: 70% Nom.
- Cut off Frequency: 65 GHz

Physical Properties:

- Weight per 1000 ft: 12.2 lbs Max.
- Minimum Bend Radius: .5"
- Operating Temperature Range: -55° C to +200° C

Attenuation

1.0 GHz	25.7 dB/100ft.
2.0 GHz	37.0 dB/100ft.
3.0 GHz	46.0 dB/100ft.
4.0 GHz	53.8 dB/100ft.
5.0 GHz	60.9 dB/100ft.
6.0 GHz	67.3 dB/100ft.

<i>Harbour Industries</i>		
Date: 12/17/01	Scale: None	Drawn By: NTPiner
Drawing Name: RG316HF		Approved By: <i>MTPiner</i>
Part Number: TBD		Rev: Sheet 1 of 1
		Drawing Number: 121701



**1. Description:**

The Connector is a MMCX right angle plug crimp for RG 316 cable.

**2. Electrical Properties**

2-1 Impedance.....	50 Ohms
2-2 Frequency Range.....	0~6 GHz
2-3 SWR.....	1.30 (Max.)
2-4 Working Voltage.....	170 V rms (Max.)
2-5 Dielectric Withstanding Voltage.....	500 V rms (Min.)
2-6 Insulation Resistance.....	1000 Megohms
2-7 Contact Resistance.....	Center contact: 5.0 Milliohms (Max.) Outer contact: 2.5 Milliohms (Max.)
2-8 Insertion Loss.....	0.3 dB

**3. Mechanical Properties :**

3-1 Engagement Force.....	8 lbs. (Max.)
3-2 Disengagement Force.....	1.4 lbs. (Min.)
3-3 Contact Retention.....	2.0 lbs. (Min.) axial force
3-4 Durability.....	500 Cycles (Min.)

**4. Environmental Ratings**

4-1 Operating Temperature.....	-65°C ~ +165°C
4-2 Thermal Shock.....	MIL-STD-202, Method 107, Condition C, Except -55°C ~ +155°C
4-3 Corrosion.....	MIL-STD-202, Method 101, Condition B
4-4 Shock.....	MIL-STD-202, Method 213, Condition B
4-5 Vibration.....	MIL-STD-202, Method 204, Condition D
4-6 Moisture Resistance.....	MIL-STD-202, Method 106

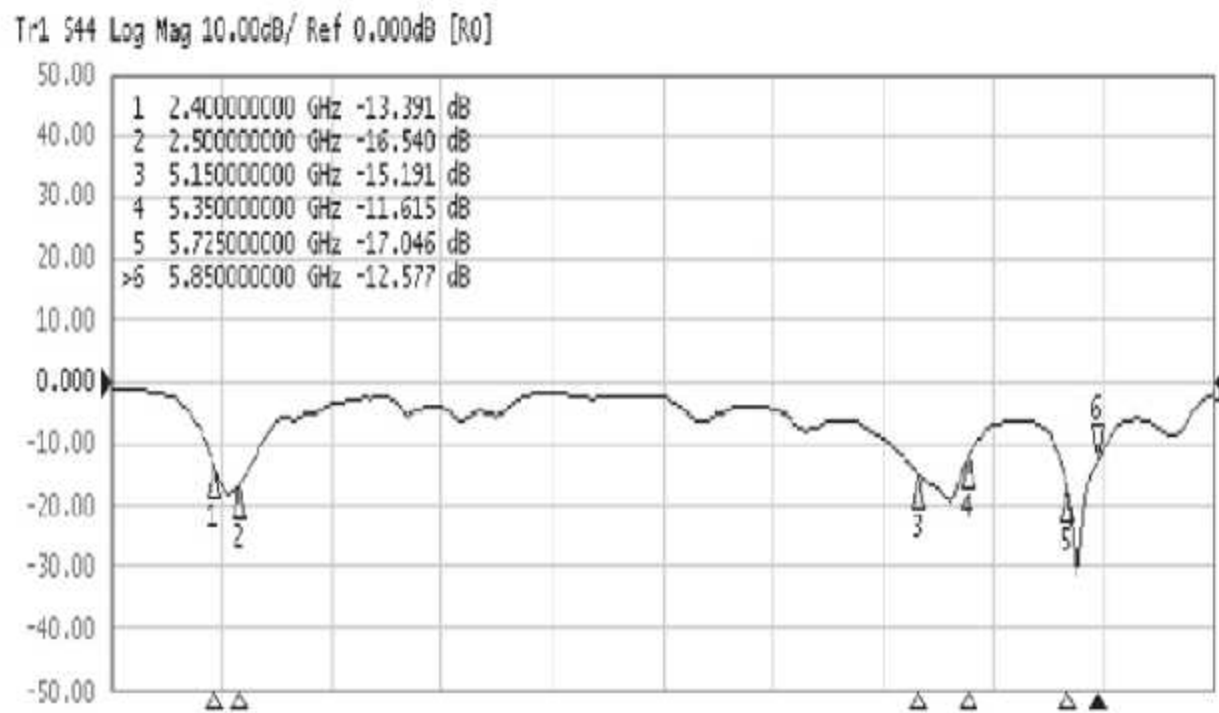
**5. Material Specifications**

5-1 Body.....	Brass Per JIS H3250 C3604 BD, Gold Plated Per MIL-G-45204
5-2 Contact.....	Beryllium Copper Per QQ-C-530, Gold Plated Per MIL-G-45204
5-3 Insulator.....	PTFE Fluorocarbon Per ASTM D 1710
5-4 C-Ring.....	Beryllium Copper Per QQ-C-530, Gold Plated Per MIL-G-45204

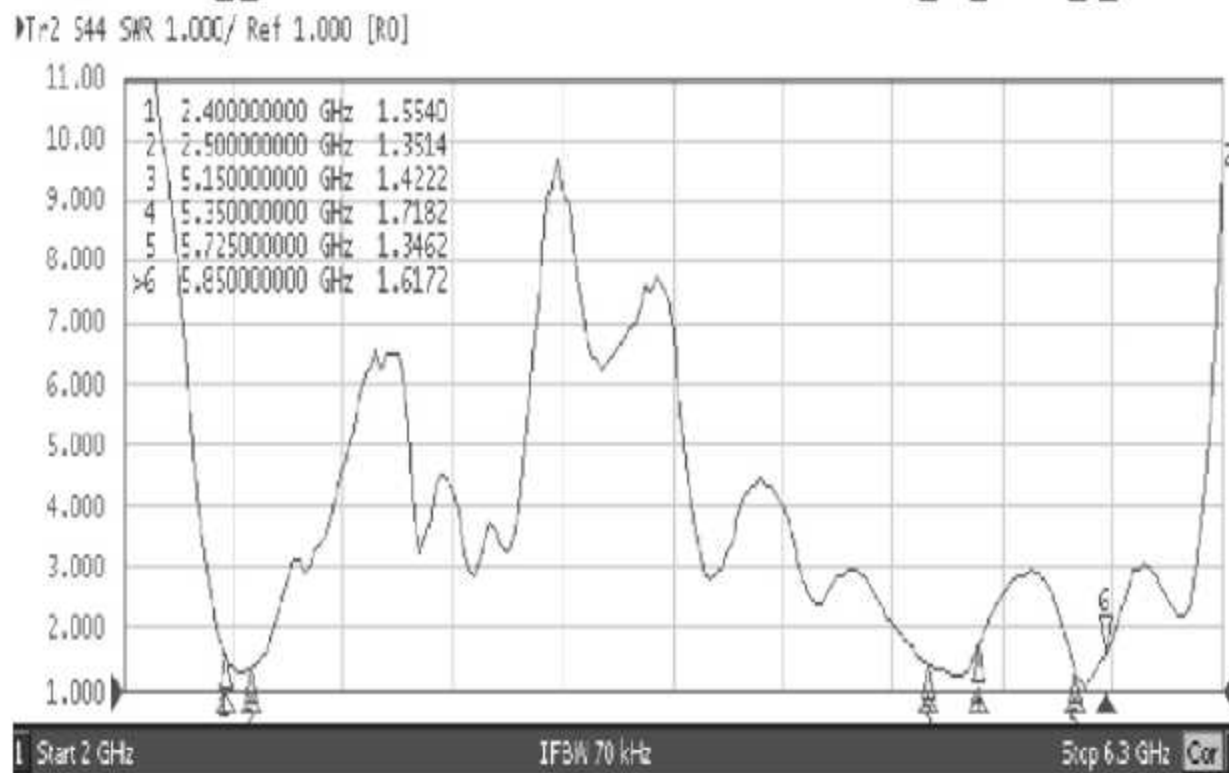


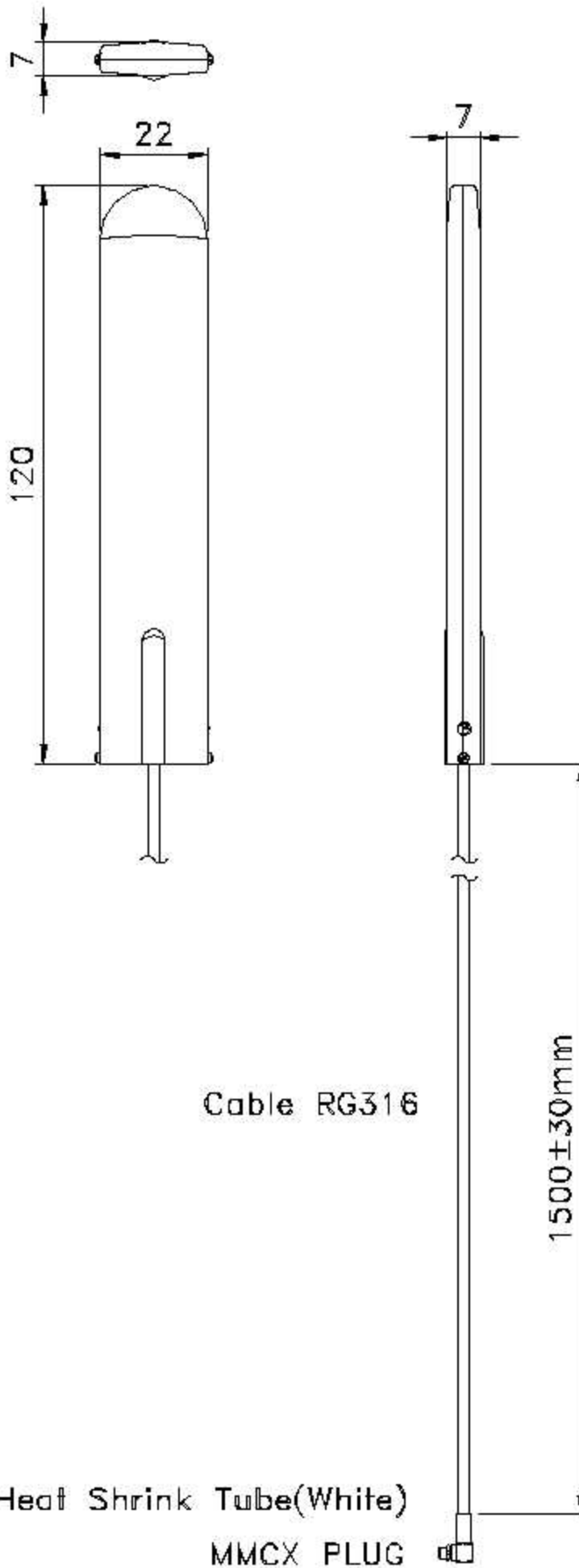


**Return Loss**



**SWR**





TOLERANCES:	
X	± 1
X.X	± 0.5
X.XX	± 0.25
ANG.	± 2.0°

REV DESCRIPTION	MATERIAL	MODEL: THF-6180-120-1(灰)		
	FINISH	NAME: Straight Antenna		
	UNIT: mm SCALE: 1/ 1.5	PART No: THF-6180-120-1(灰)		
	DATE: 12/6/2002	DESIGN K.Y.Liu	APPROVE	REV 00

OP0502-01-01



## RO4000® Series Laminate Product Information:

PROPERTY	TYPICAL VALUES		DIRECTION	UNITS	CONDITION	TEST METHOD
	RO4003 <sup>(1)</sup>	RO4350B <sup>(1)</sup>				
Dielectric Constant $\epsilon_r$	3.38 ± 0.05	3.48 ± 0.05	Z		10 GHz/23°C	IPC-TM-650 2.5.5.5
Dissipation Factor, tan ( $\delta$ )	0.0027	0.0040	Z	-	10 GHz/23°C	IPC-TM-650 2.5.5.5
Thermal Coefficient of $\epsilon_r$	+40	+50	Z	ppm/°C	-100°C to 250°C	IPC-TM-650 2.5.5.5
Volume Resistivity	1.7 x 10 <sup>10</sup>	1.2 x 10 <sup>10</sup>	-	M	COND A	IPC-TM-650 2.5.17.1
Surface Resistivity	4.2 x 10 <sup>9</sup>	5.7 x 10 <sup>9</sup>	-	M	COND A	IPC-TM-650 2.5.17.1
Electrical Strength	25.6 (650)	31.5 (800)	Z	KV/mm (V/mil)	0.51mm (0.020")	IPC-TM-650 2.5.6.2
Tensile Modulus	26,889 (3900)	11,473 (1664)	Y	MPa (kpsi)	RT	ASTM D638
Tensile Strength	141 (20.4)	175 (25.4)	Y	MPa (kpsi)	RT	ASTM D638
Flexural Strength	276 (40)	255 (37)	-	MPa (kpsi)	-	IPC-TM-650 2.4.4.
Dimensional Stability	<0.3	<0.5	X,Y	mm/m (mils/inch)	After etch +E2/150	IPC-TM-650 2.2.4
Coefficient of Thermal Expansion	11 14 46	14 16 50	X Y Z	ppm/°C	-55 to 288°C	IPC-TM-650 2.1.4.1
Tg	>280	>280	-	°C	2.4.24	TMA
Thermal Conductivity	0.64	0.62	-	W/m <sup>2</sup> K	100°C	ASTM F433
Specific Gravity	1.79	1.86	-	-	23°C	ASTM D792
Water Absorption	0.04	0.02	-	%	48 hrs. immersion 0.060" sample Temperature 50°C	ASTM D570
Copper Peel Strength	1.05 (6.0)	0.88 (5.0)	-	N/mm (pli)	after solder float	IPC-TM-650 2.48
Flammability	N/A	UL 94V-0	-	-	-	

<sup>(1)</sup> Dielectric constant and loss tangent are reported based on IPC-TM-2.5.5.5 @ 10 GHz (stripline resonator). Departure from this test method or frequency may yield different values. It has been reported that in some microstrip applications, a Delta ( $\Delta$ ) of +0.2 in dielectric constant has been observed for both RO4003 and RO4350B based on actual circuit measurement and circuit modeling comparisons. It is up to the user to determine which value best fits the application and modeling software used during the design process while Rogers ensures the repeatability of the product received.