



權億科技股份有限公司  
Master Wave Technology Co., Ltd.

## 承認書

## APPROVAL SHEET

Customers: 啟碁科技股份有限公司


Customer Model No.:

Master Wave Model No.: 98151MRSX004-220

Product Description: 8151 Replacement Ant.

Issue Date: 2009/2/10

REV.: 00

客戶承認用印 Customer Approved		權億承認用印 Confirmation Signature	
			
核准 Approve	主管 Chief	承辦 Responsible	
Hero	Hero	S. Y. Liu	

中壢：桃園縣中壢市南園二路1巷20號2樓

電話：03-451-9540

FAX：03-451-9542

東莞廠：廣東省東莞市常平鎮木埒工業區

蘇州廠：江蘇省蘇州市角直鎮吳淞南路95號

**Antenna Total Solution Provider**



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- Drawing
  - Electrical Properties
  - Mechanical Properties
- 

#### 2. Test Report

- Electrical test
  - Pattern test
- 

#### 3. Material Certifications

- Connector
- 

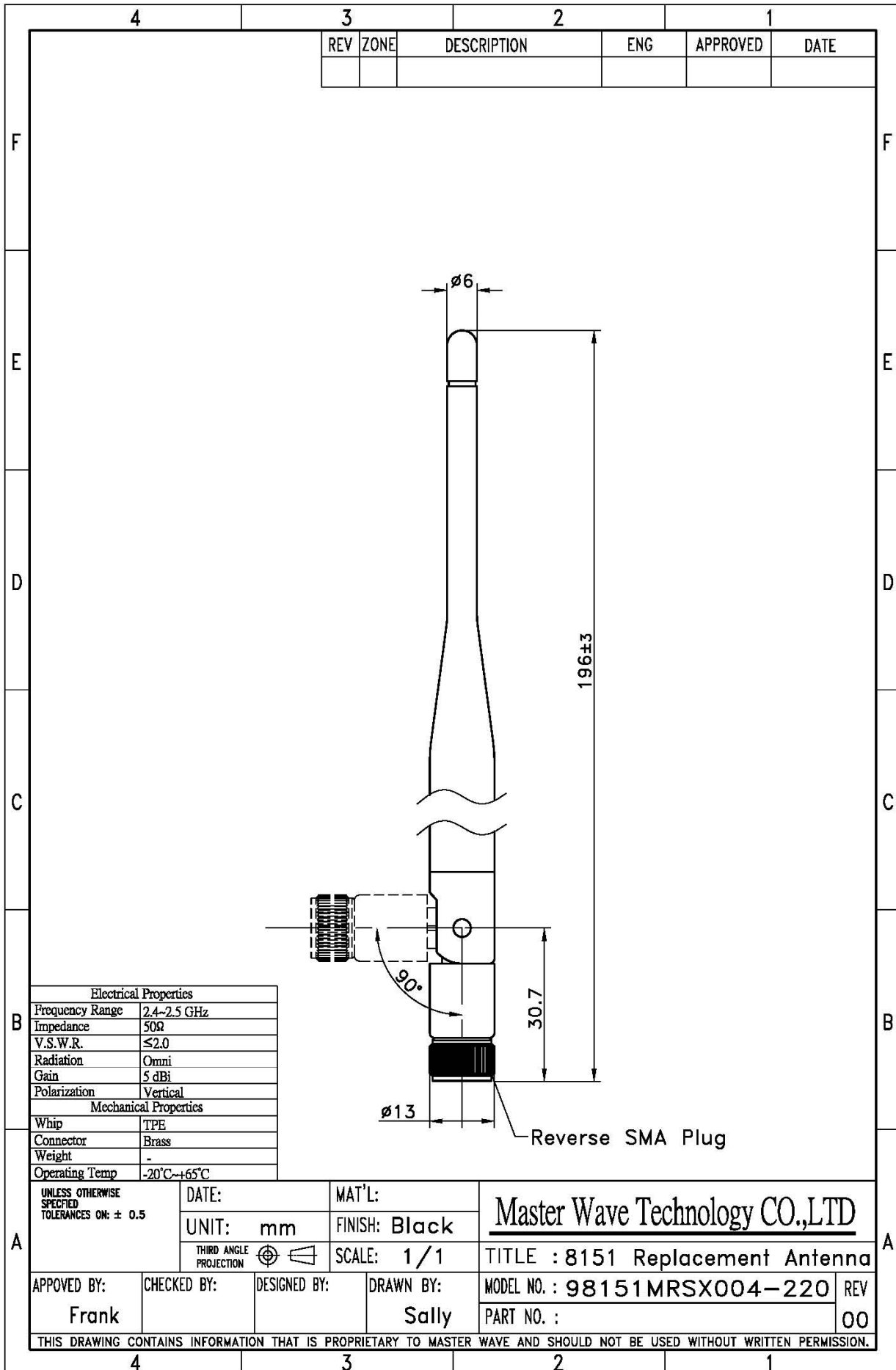
#### 4. Packing

- PE Bag
- Carton

### Modification History:

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REV.	Date	Content
00	2009/2/10	





## Electrical Properties

Type	Replacement Antenna
Frequency range	2.4~2.5 GHz
Impedance	50 Ohms
VSWR	$\leq 2.0$

## Mechanical Properties

Material	TPE
Connector	Reverse SMA Plug
Dimension(L*W*H)	196* $\varnothing$ 13.0



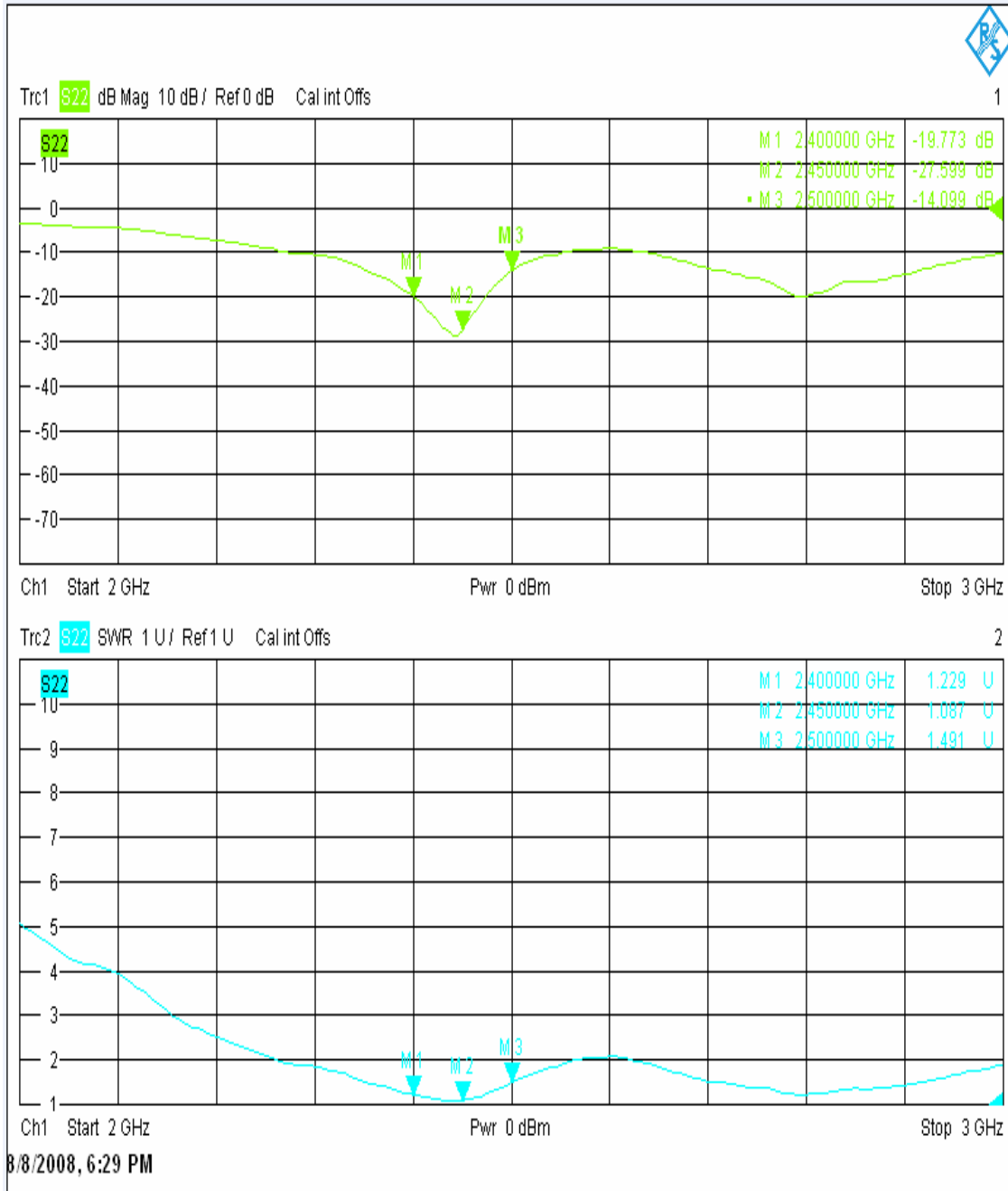
## Connector

## SMA

Electrical Properties	Impedance	50 ohm
	Frequency Range	0~6 GHz
	V.S.W.R	$\leq 1.5$
	Working Voltage	$\leq 250V_{rms}$
	Dielectric Withstanding	$\leq 670 V_{rms}$
	Voltage Insulation Resistance	$\geq 2000$ Megohms
	Contact Resistance	Center contact: 3.0 Milliohms (Max.) Outer contact: 2.0 Milliohms (Max.)
	Recommended coupling nut torque	4.0 in. lbs. ~ 8.8in. lbs.
	Coupling nut retention force	$\geq 50$ lbs.
	Contact captivation axial	$\geq 5$ lbs.
	Durability (mating)	$\geq 500$ cycles
Environmental Ratings	Operating Temperature	-65°C ~ +165°C
	Thermal shock	MIL-STD-202,METHOD 107,Condition B
	Corrosion	MIL-STD-202,METHOD 101,Condition B
	Shock	MIL-STD-202,METHOD 213,Condition I
	Vibration	MIL-STD-202,METHOD 204,Condition D
	Moisture Resistance	MIL-STD-202,METHOD 106
Material Specifications	Material Data	Material
	Body	Brass
	Center Contact	Phosphor Bronze
	Insulator	Teflon or Delrin

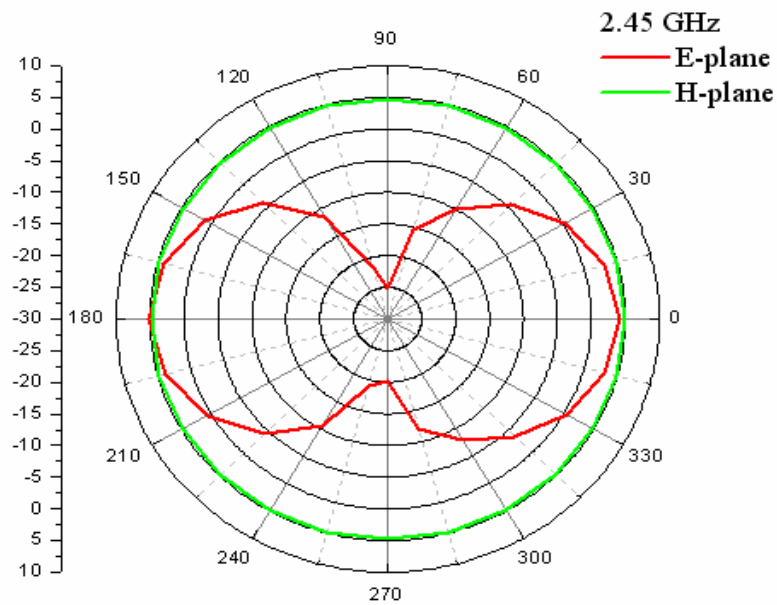
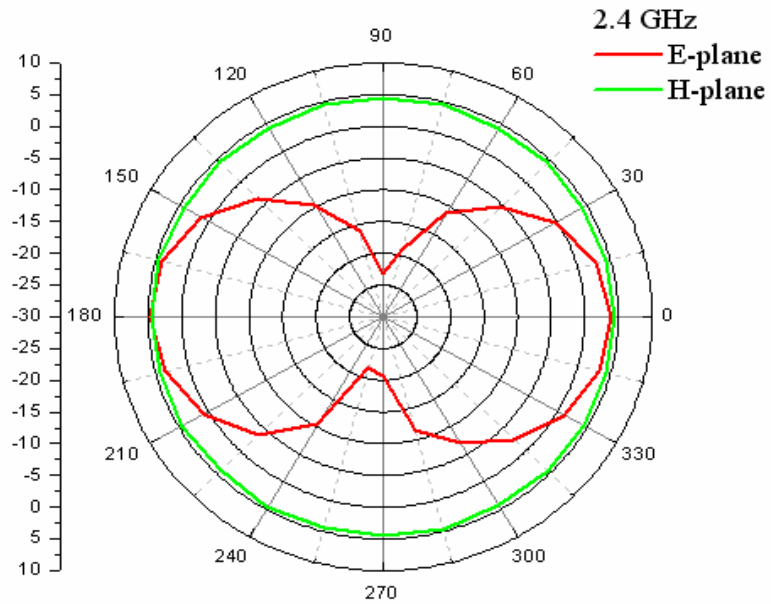


## Electrical Test



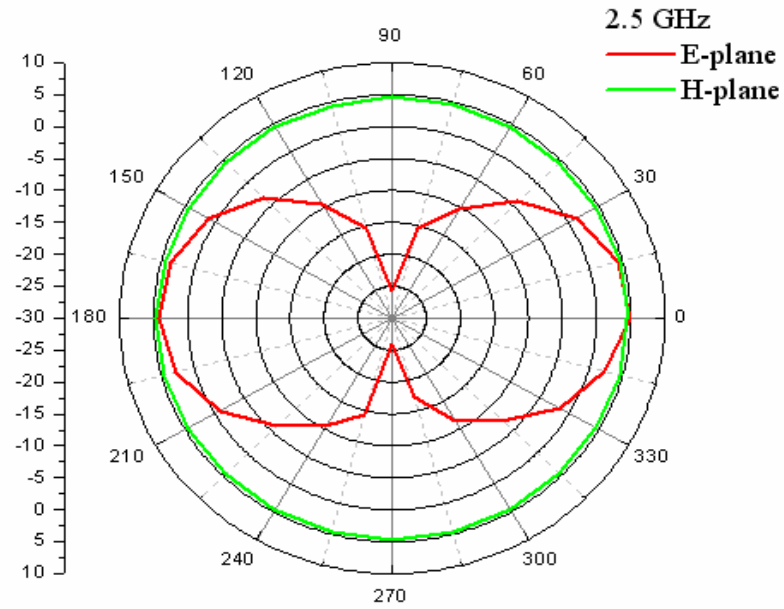


## Pattern Test





## Pattern Test







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## 承認書

## APPROVAL SHEET

Customers: 啟碁科技股份有限公司


Customer Model No.:

Master Wave Model No.: 98620ZRSX000-220

Product Description: 8620 Replacement Ant.

Issue Date: 2009/2/12

REV.: 00

客戶承認用印 Customer Approved		權億承認用印 Confirmation Signature	
			
核准 Approve	主管 Chief	承辦 Responsible	
Hero	Hero	S. Y. Liu	

中壢：桃園縣中壢市南園二路1巷20號2樓

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**Antenna Total Solution Provider**



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1. Antenna Specifications

-Drawing

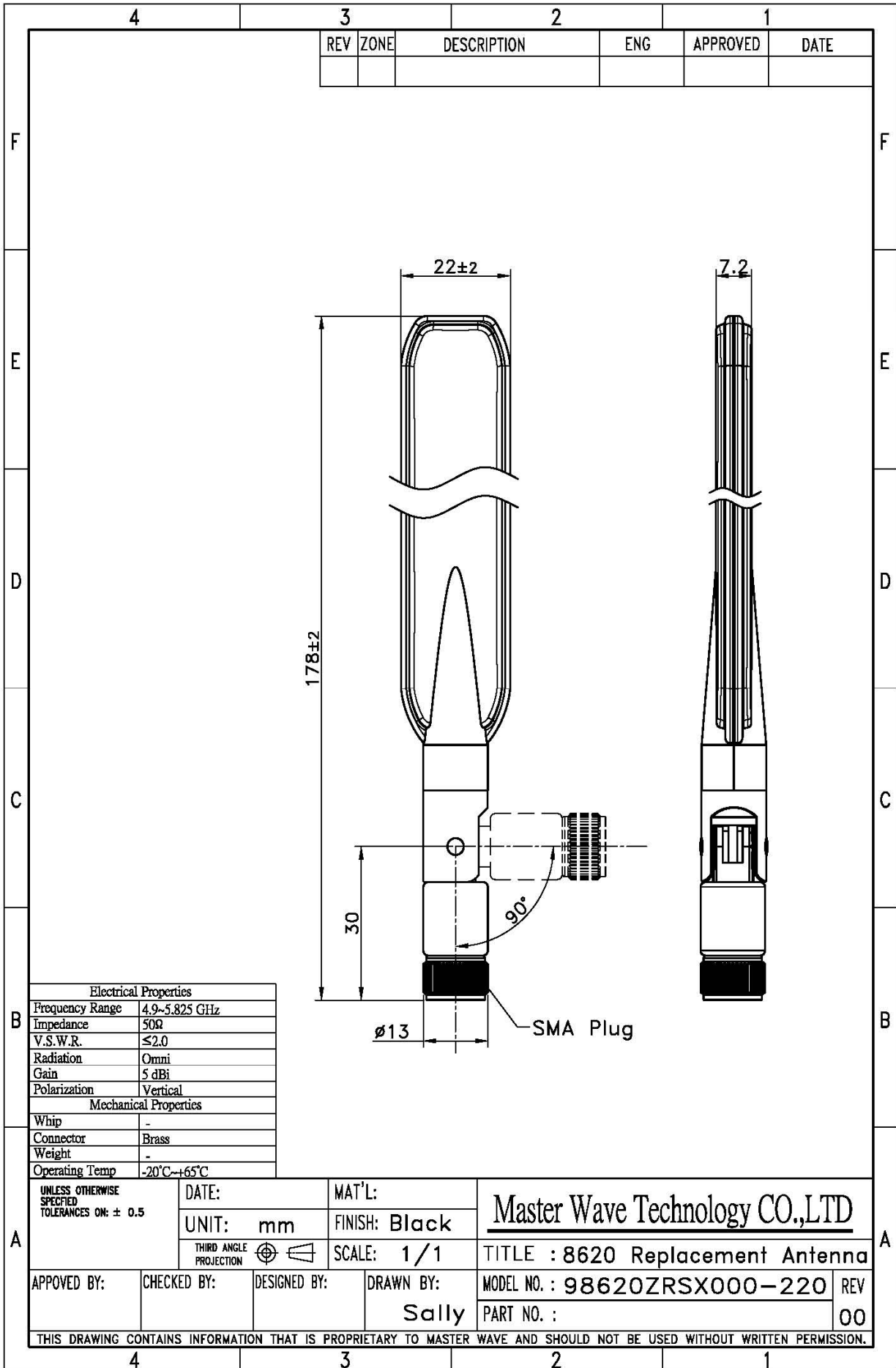
2. Material Certifications

-Connector

### Modification History:

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REV.	Date	Content
00	2009/2/12	





## Connector

## SMA

Electrical Properties	Impedance	50 ohm
	Frequency Range	0~6 GHz
	V.S.W.R	$\leq 1.5$
	Working Voltage	$\leq 250V_{rms}$
	Dielectric Withstanding	$\leq 670 V_{rms}$
	Voltage Insulation Resistance	$\geq 2000$ Megohms
	Contact Resistance	Center contact: 3.0 Milliohms (Max.) Outer contact: 2.0 Milliohms (Max.)
	Recommended coupling nut torque	4.0 in. lbs. ~ 8.8in. lbs.
	Coupling nut retention force	$\geq 50$ lbs.
	Contact captivation axial	$\geq 5$ lbs.
	Durability (mating)	$\geq 500$ cycles
Environmental Ratings	Operating Temperature	-65°C ~ +165°C
	Thermal shock	MIL-STD-202,METHOD 107,Condition B
	Corrosion	MIL-STD-202,METHOD 101,Condition B
	Shock	MIL-STD-202,METHOD 213,Condition I
	Vibration	MIL-STD-202,METHOD 204,Condition D
	Moisture Resistance	MIL-STD-202,METHOD 106
Material Specifications	Material Data	Material
	Body	Brass
	Center Contact	Brass
	Insulator	Teflon or Delrin

# AO-024-MIMO-8

## MIMO Omni Antenna

### Technical Sheet



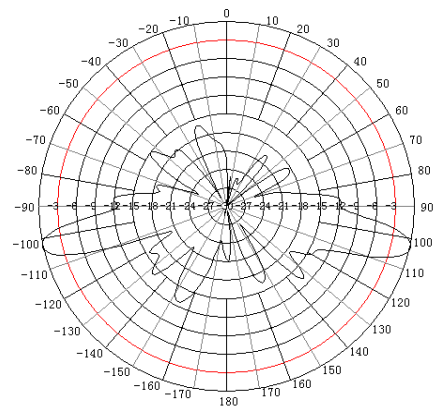
#### Applications

- 2.4GHz Wlan,Wi-Fi system
- IEEE802.11b,g,n
- three 2.4GHz ports

#### Features

- high Gain, Low VSWR
- Small Size, Light weight
- Sealed with Fiberglass

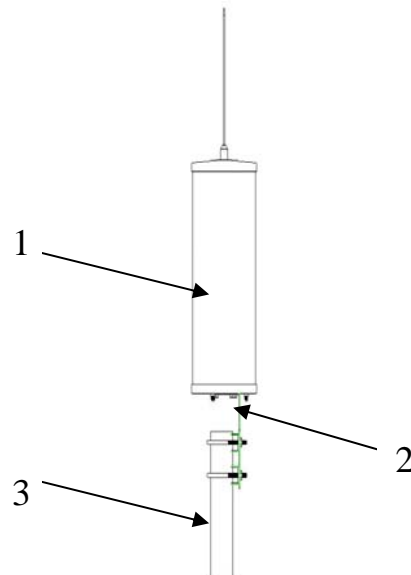
#### Typical E-Plane Field Pattern



#### Specifications

Model	AO-024-MIMO-8
Freq. Range-MHz	2400~2500
Bandwidth-MHz	100
Gain-dBi	9
Beamwidth-°	E:10 H:360
Electrical Downtilt-°	10
Isolation-dB	≥25
VSWR	≤1.5
Impedance-Ω	50
Polarization	Vertical
Max. Power-W	20
Connector Type	N Female
Dimensions-mm	Φ145×600
Weight-Kg	2
Pole Diameter-mm	φ40~φ70

#### Install Sketch



1. Antenna
2. "L" type bracket
3. Mast supplied by customer

## AP20-050-MIMO-19

### MIMO Directional Antenna

## Technical Sheet

### Specifications

Model	AP20-050-MIMO-19
Freq.Range-MHz	5125-6100
Bandwidth-MHz	975
Gain-dBi	19(Vertical)
	16(dual slant)
Hor.Beamwidth-°	22(Vertical)
	20(dual slant)
Ver.Beamwidth-°	14(Vertical)
	19(dual slant)
VSWR	≤1.8
Isolation-dB	≥25
F/B Ratio-dB	≥25
Max.power-W	10
Impedance-Ω	50
Polarization	±45° and vertical
Connector	3×N-type female
Dimensions-mm	305×305×12
Weight-Kg	0.8(without clamps)
Mounting	pole

### Applications

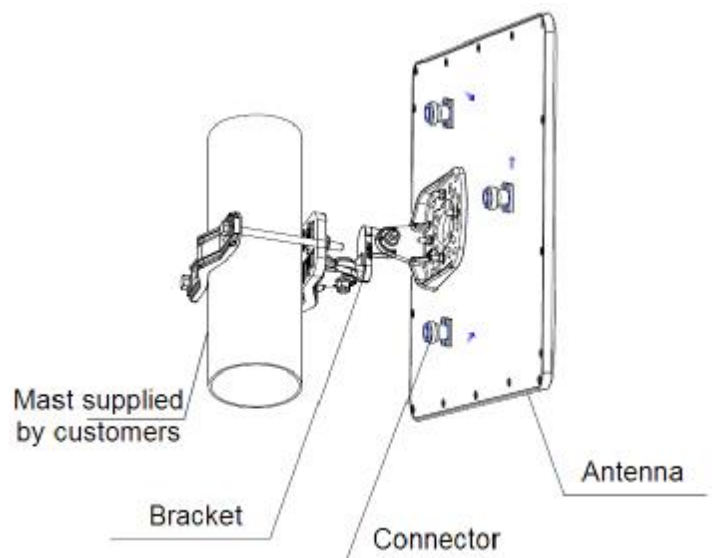
- I 5.8GHz WLAN system
- I 5.8GHz UNII/ISM system
- I Point to point or point to multipoint

### Features

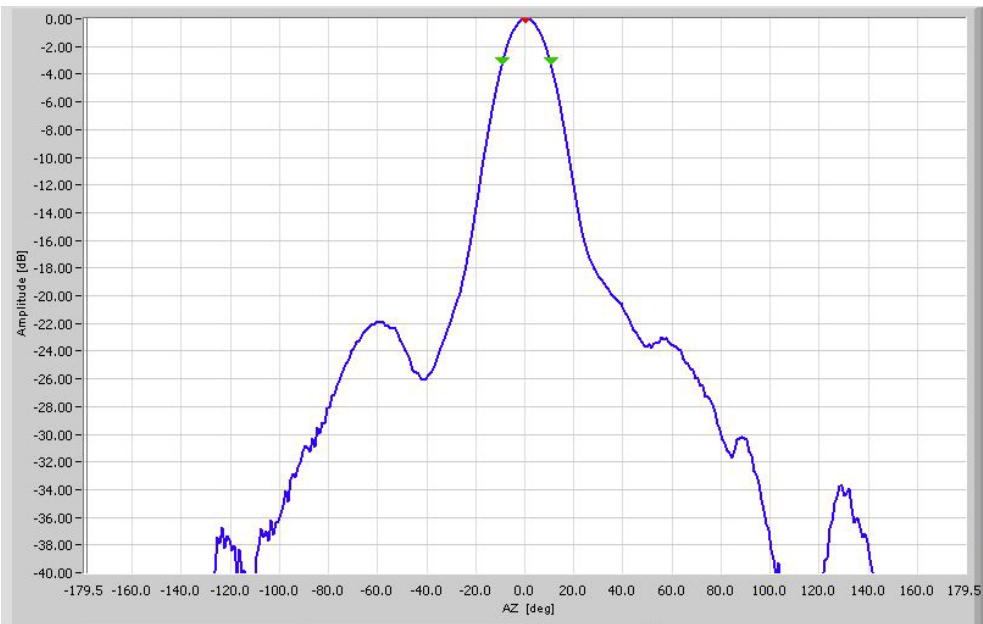
- I Broad band, 5.1/5.5/5.8/6.1GHz
- I Triple polarization
- I MIMO application
- I High gain, Low VSWR
- I Strong corrosion resistance ability



### Installation sketch



### MIMO E-plane Dual Slant



Side lobes Database Az. Ratio

No.	Ampl	Deg

AZ [deg]

Amplitude [dB]

Phase [deg]

Amplitude [dB]

Phase [deg]

Not Aligned

Normalized

Phase wrapped

Log Display

No Skirt

A	P	File Name	POL [deg]	Freq. [GHz]	ROLL [deg]	Ch.	Beam	Switch	Beam Peak [dB]			Beam Width [deg]			Null Depth [dB]		GainA dBi
									Value	[deg]	P	Value	At dB	P	Value	[deg]	
		v:\AWS55-PRO\MON-file#2-CAL.nff	90.00	5.500 G	90.00	CH1			17.82	0.50	P	19.20	3.00	P		17.82	





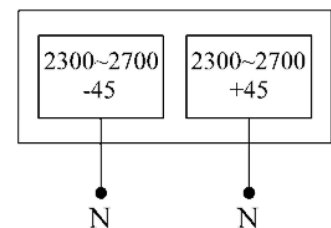
<b>Wide-band Panel</b>	<b>2300~2700</b>
<b>Dual Polarization</b>	<b>X</b>
<b>Half-power Beam Width</b>	<b>90°</b>
<b>Fixed Electrical Downtilt</b>	<b>0°</b>

XPo1 2300~2700MHz 90° 14dBi 0° Tilt

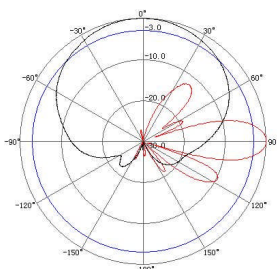
Electrical specifications	AS90-024-MIMO-13	
Frequency range (MHz)	2300~2500	2500~2700
Polarization	±45°	
Gain (dBi)	2×13.5	2×14
Electrical Downtilt (°)	0	
Half-power beam width (°)	Horizontal:90 Vertical:15.5	Horizontal:88 Vertical:15
Sidelobe suppression for first sidelobe above main beam (dB)	≥15	
Front-to-back ratio (dB)	≥23	
Cross-polar discrimination (dB)	≥15(±60°≥10)	
Isolation (dB)	≥30	
Impedance (Ω)	50	
VSWR	≤1.5	
Intermodulation IM3 (2×43dBm carrier)	≤-150dBc	
Maximum power (W)	200	
Lighting protection	DC Ground	



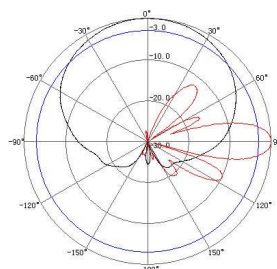
Mechanical specifications	
Connector	2×N Female
Connector position	Bottom
Height/width/depth (mm)	500×128×56
Packing size (mm)	600×230×160
Weight (kg)	1.5
Radome material	UPVC
Radome color	Gray
Mechanical tilt (°)	0~15
Operating temperature (°C)	-40~60
Rated wind velocity (m/s)	60
Suitable pole diameter (mm)	35~75
Mounting kit	JM-2400RZ1



**2300~2500MHz: ±45° Polarization**



**2500~2700MHz: ±45° Polarization**



**AS90-050-MIMO-16-T 4.9-6.1 GHz Triple Polarizations MIMO Base Station Antenna, 90**



The Triple Polarization Sector antenna provides coverage of 4.9-6.1 GHz frequency band in a single antenna radome.

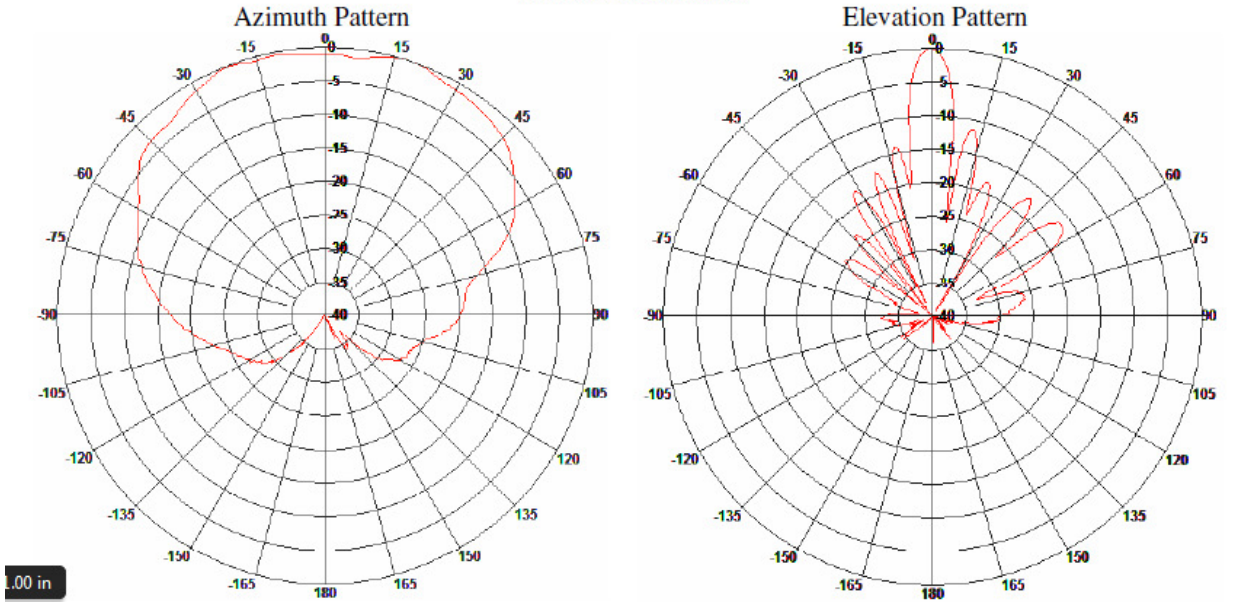
- light weight and durable construction
- 3 Ports: Dual Slant ( $\pm 45^\circ$ ) and Vertical Polarization
- UV protected radome made of plastic
- specially designed for MIMO applications for optimal decorrelation

<b>Specifications:</b>	
<b>Electrical</b>	
<b>Frequency range</b> <b>GAIN : Vertical Pol.</b> <b>          Dual Slant Pol.</b> <b>VSWR, max.</b> <b>Polarization</b> <b>3 dB Beam-Width-Azimuth, typ.</b> <b>3 dB Beam-Width-Elevation, typ.</b> <b>Front to Back Ratio, min.</b> <b>Port to Port Isolation, min.</b> <b>Input power, max</b> <b>Input Impedance</b> <b>Lightning Protection</b>	<b>4.9- 6.1 GHz</b> <b>16 dBi</b> <b>16 dBi</b> <b>1.7 : 1</b> <b>Dual Slant <math>\pm 45^\circ</math> and Vertical</b> <b>Dual Slant : <math>90^\circ</math> ; V- Pol <math>90^\circ</math></b> <b>Dual Slant : <math>8^\circ</math> ; V- Pol <math>8^\circ</math></b> <b>-30 dB</b> <b>-30 dB</b> <b>10 Watt</b> <b>50 Ohm</b> <b>DC Grounded</b>
<b>Mechanical</b>	
<b>Dimensions (HxWxD)</b> <b>Connector</b> <b>Weight</b> <b>Mounting</b> <b>Radome</b> <b>Back Plane</b>	<b>370 x 370 x 40 mm (14.5" x14.5" x1.6")</b> <b>3 x N-Type Female</b> <b>2.1 Kg</b> <b>MNT-22</b> <b>UV Protected Polycarbonate</b> <b>Aluminum protected through chemical passivation</b>
<b>Environmental</b>	
<b>Operating Temperature Range</b> <b>Vibration</b> <b>Wind Load</b> <b>Flammability</b> <b>Water Proofing</b> <b>Humidity</b> <b>Salt Fog</b>	<b>- 40°C to + 65°C</b> <b>According to IEC 60721-3-4</b> <b>200 Km/h (Survival)</b> <b>UL94</b> <b>IP-67</b> <b>ETS 300 019-1-4,EN 302 085 (Annex A.1.1)</b> <b>According to IEC 68-2-11</b>

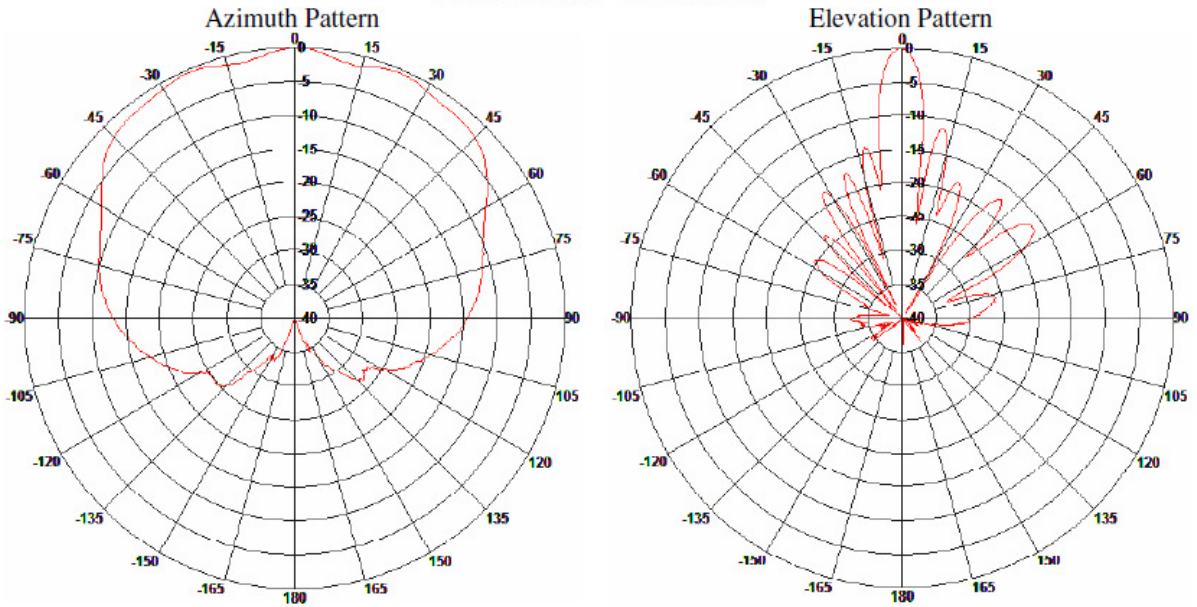
AS90-050-MIMO-16-T 4.9–6.1 GHz Triple Polarizations MIMO Base Station Antenna, 90

Radiations Patterns	
Frequency	5500 MHz
Gain, typ.	16 dBi

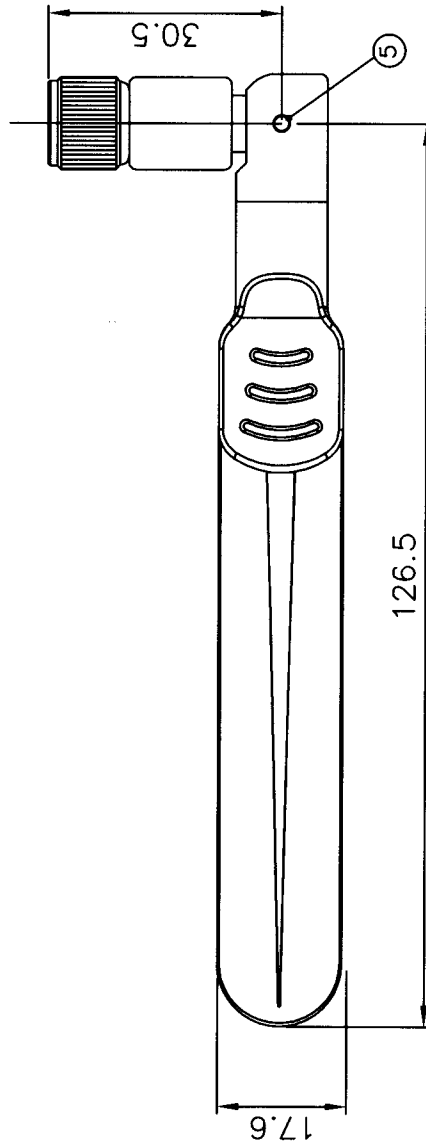
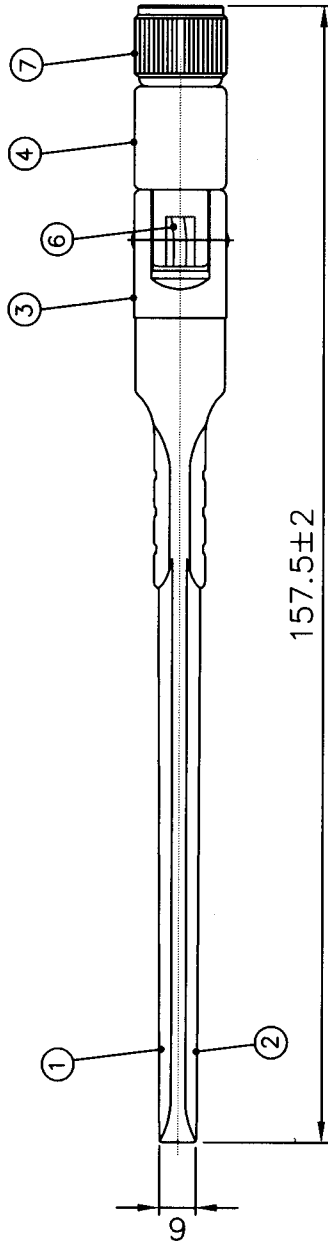
Vertical Polarization



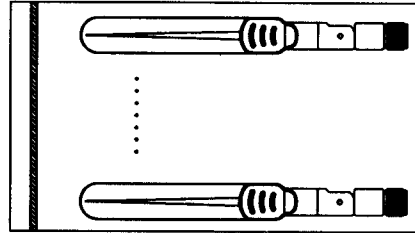
Dual Slant  $\pm 45^\circ$  Polarization



REV	DATE	DESCRIPTION
X1	6/24-2005	New Issue
X2	7/4-2005	Modify all



PE Bag  
Shrink Line



Packing : 10 pcs/bag

7	Connector	SMA Plug Straight Reverse	1	REMARK
6	Cable	RG-178 Cable	1	
5	Rivet	POM ; Black	1	
4	Antenna Base	PBT Color : Black	1	
3	Antenna Base	PC+ABS , Color : Black	1	
2	Antenna Housing(S)	PC+ABS , Color : Black	1	
1	Antenna Housing(M)	PC+ABS , Color : Black	1	
NO	DESCRIPTION		QTY	REMARK

CUSTOMER:	Fire tide
PART NO :	
PARTNAME:	RF Antenna Assembly
W.Y/PNO :	C812-510012-A
REV	UNIT FILE :
X2	m/m SHEET :
	1/1

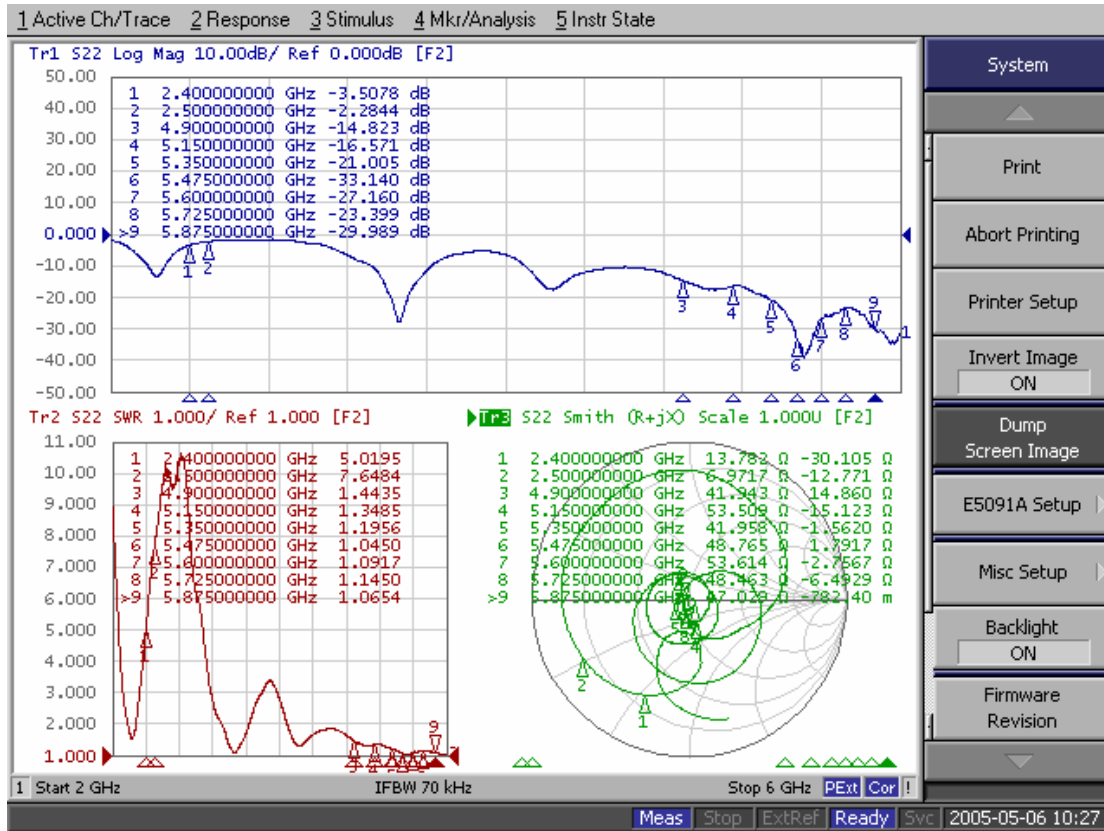
CUSTOMER'S SIGNATURE

APPROVED  
CHECKED  
DRAWING

**Wha Yu**  
**INDUSTRIAL CO.,LTD.**  
**講裕實業股份有限公司**

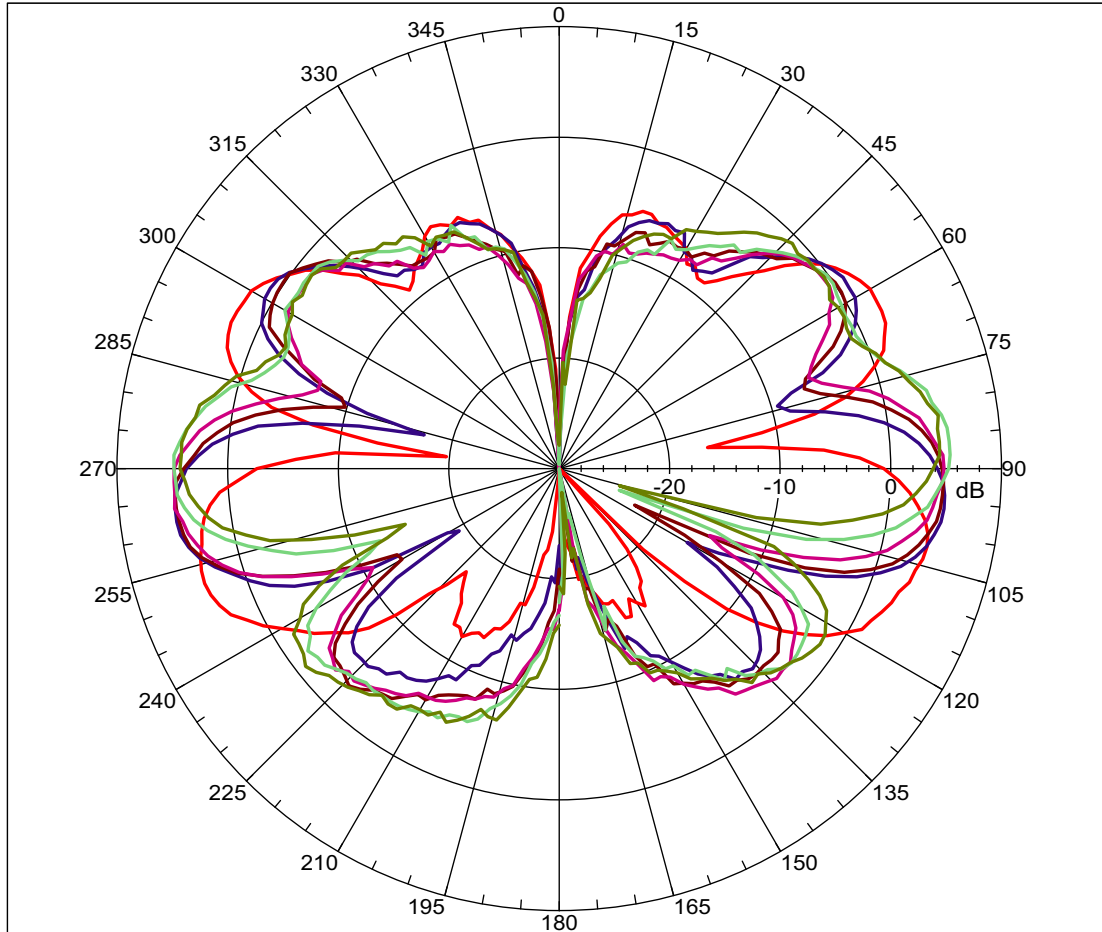
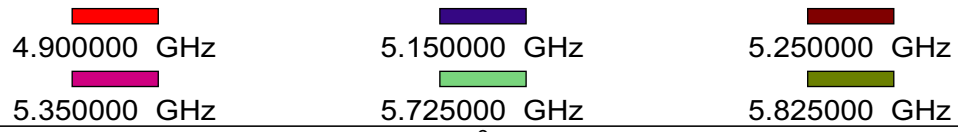
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**RF Antenna Assembly**  
**P/NO :C812-510012-A SPEC : 5GHz**





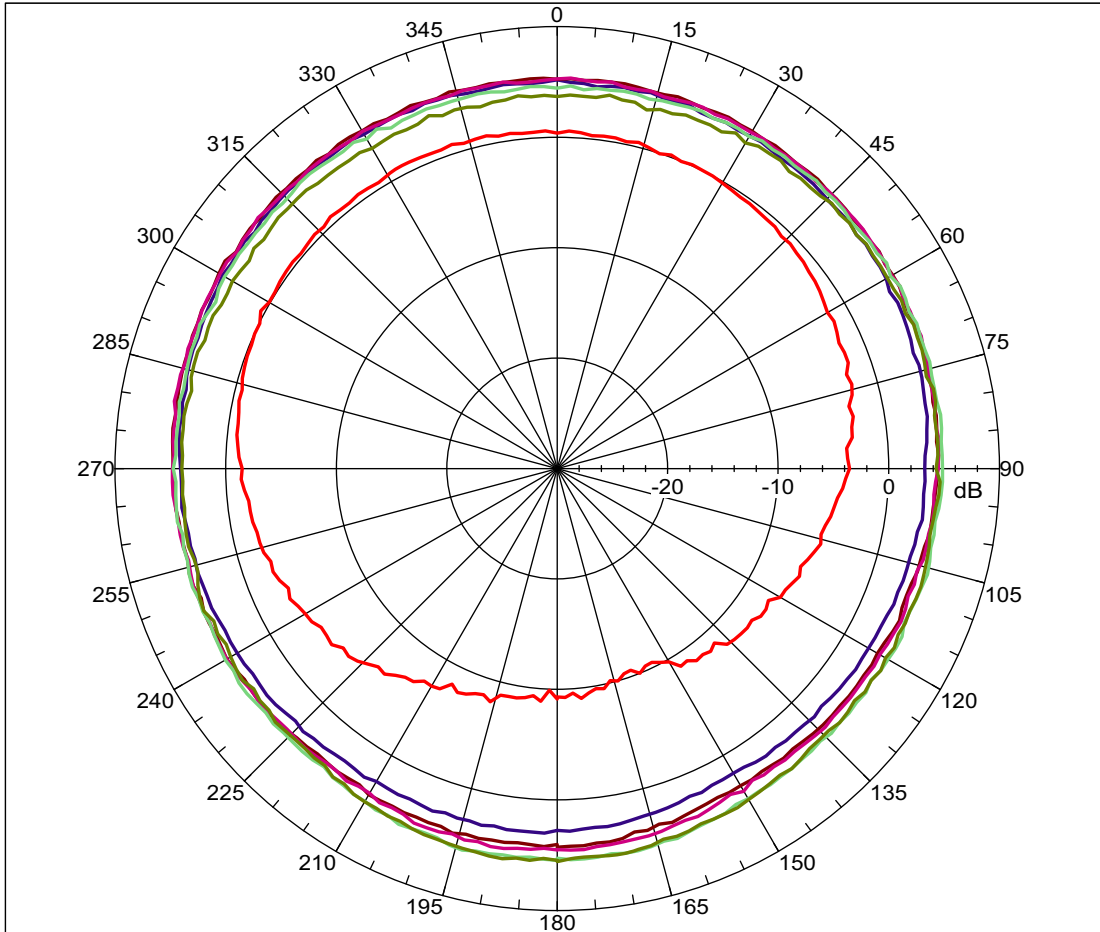
Far-field amplitude of C812-510012-A.nsi





### Far-field amplitude of C812-510012-A.nsi

4.900000 GHz      5.150000 GHz      5.250000 GHz  
5.350000 GHz      5.725000 GHz      5.825000 GHz



**4.9 - 5.875 GHz MIMO Omni – Directional Base Station Antenna**  
**Mars P/N: MA-W055-MIMONHFT9 Firetide P/N: AO-050-MIMO-9**



**Specifications:**

<b>Electrical</b>	
Frequency range	4.9 - 5.875 GHz
GAIN, typ.	3 x 9 dBi
VSWR, max.	2 : 1
Polarization	Linear, Vertical
3 dB Beam-Width, H-Plane, typ.	Omni - Directional
3 dB Beam-Width, E-Plane, typ.	10°
Input power, max	50 Watt
Input Impedance	50 Ohm
<b>Mechanical</b>	
Dimensions (HxDia.)	330 x 200 mm
Weight	600 gr
Connector	3 x N-Type, Female
Radome	UV Protected , Plastic
Mount	Provision for Fire Tide MIMO
<b>Environmental</b>	
Operating Temperature Range	- 40°C to + 65°C
Vibration	According to IEC 60721-3-4
Wind Load	200 km/h (survival)
Flammability	UL94
Water Proofing	IP-65
Humidity	ETS 300 019-1-4, EN 302 085 (annex A.1.1)
Salt Fog	According to IEC 68-2-11
Ice and Snow	25mm radial (survival)

Specifications subject to change without notice