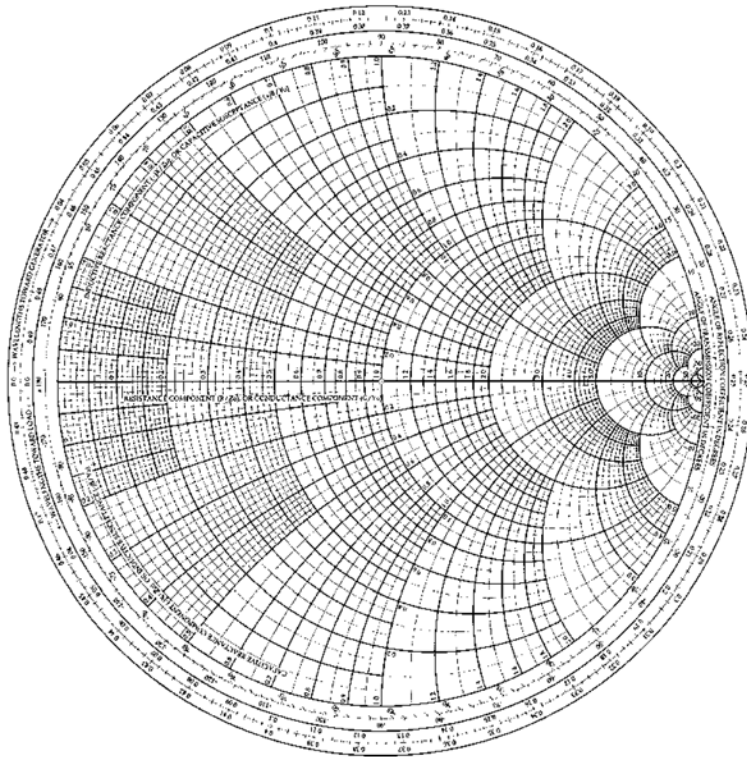




# Antenna & Accessory Guide

For HotPort Mesh Nodes and  
HotPoint Access Points



Version 4.0 October 2014

The contents of this manual are subject to change without notice. Please refer to the Firetide website, [www.firetide.com](http://www.firetide.com), for current information.

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# Antenna Selection Guide

Firetide offers the following tested and approved antennas. It is the user's responsibility to insure compliance with all applicable laws in the country of operation. Note that some high gain antennas may exceed EIRP limits in some countries. Indoor antennas have RP-SMA connectors, compatible with Firetide HotPort indoor mesh nodes and HotPoint indoor access points. The outdoor antennas have N connectors.

Band	Omni			Panel			Sector		
	Model	Gain	Page	Model	Gain	Page	Model	Gain	Page
Staging	ships w product	3 dBi	6						
2.4 GHz	AO-024-MIMO-8	9 dBi	8						
	AOI 245-MIMO-25	2.5 dBi	10						
	4000-1111	7.5 dBi	11						
5 GHz	AOI 245-MIMO-25	4.5 dBi	10	AP-050-N	23 dBi	16	AS-050-N	16 dBi	23
	AO-050-MIMO-9	8 dBi	12	AP20-050-MIMO-19	19 dBi	18	AS90-050-MIMO-16T	14 dBi	24
	AO-050-N	10 dBi	14	AP10-050-MIMO-23	23 dBi	20			
				AP5-50-MIMO-28	28 dBi	21			

## Firetide Connector Chart

Firetide Model Number	Antenna Connector Type	Firetide Model Number	Antenna Connector Type
		HotPort 5020-LNK	N-female
HotPoint 5100 Indoor AP	RP-SMA	HotPoint 5200 Outdoor AP	N-female
HotPort 7010 Indoor Mesh Node	RP-SMA	HotPort 7020 Outdoor Mesh Node	N-female

# Accessory Guide

Cable Assembly	
CB-015-N	Antenna Cable Assembly, 1.5 meter LMR-400 w/ Integrated lightning suppressor N-type connector
CB-015-N-MIMO	MIMO Antenna Cable Assembly for 5200 & 7020. 3 in 1 bundled 1.5 meter LMR-400 cables w/ Integrated lightning suppressor N-type connector
CB-025-N-MIMO	MIMO Antenna Cable Assembly for 5200 & 7020. 3 in 1 bundled 2.5 meter LMR-400 cables w/ Integrated lightning suppressor N-type connector
CB-050-N	Antenna Cable Assembly, 5 meter LMR-400 w/ Integrated lightning suppressor N-type connector
CB-C-015-N	Antenna Cable Assembly, 1.5 meter LMR-400
CB-C-015-N-MIMO	MIMO Antenna Cable Assembly for 5200 & 7020. 3 in 1 bundled 1.5 meter LMR-400 cables
CB-C-025-N-MIMO	MIMO Antenna Cable Assembly for 5200 & 7020. 3 in 1 bundled 2.5 meter LMR-400 cables
CB-C-050-N	Antenna Cable Assembly, 5 meter LMR-400

Power Source & Cables	
PO-010-N	7000 series outdoor rated 10 meter North America AC power cable
PO-010-E	7000 series outdoor rated 10 meter EU and Korea AC power cable
PO-010-C	7000 series outdoor rated 10 meter China, Australia and New Zealand AC power cable
PO-010-U	7000 series outdoor rated 10 meter UK, Singapore AC power cable
7020-1001	6 pin Female DC power connector for HotPort 7000 series
7020-1002	RF Terminator - 50 ohms - N male
SP-POE-1	Indoor power injector for powering 5200/ 5020 series products

Mounting Solutions	
MT-7100	HotPort 7000 family indoor mounting kit for wall, upright, ceiling and office panel installation, 10 machine screws
SP-MNT-01	Replacement part for new panel antenna mounting bracket

Spare Parts (Replacement Parts)	
SP-7200-03	7020 series Replacement outdoor clawtooth mounting kit
SP-7200-04	7020 series outdoor rated replacement 5 meter North America AC Power cable
SP-7100-01	7000 series Replacement indoor Power Supply Desktop Brick 12VDC
SP-7200-02	7020 series Replacement weatherized field installable ethernet RJ45 connector

# Waterproofing Instructions

Most antenna problems are caused by coaxial cable connections that loosen due to vibration, allowing moisture to penetrate the connector interface. Firetide recommends that all outdoor cable connections be weatherproofed using butyl mastic, shown in Figure 1. Butyl mastic is a stretchy, slightly sticky material which bonds to itself and remains flexible. A layer of electrical tape is used underneath to keep the connection clean and make disassembly easier.

Materials Needed:

- Pliers
- Utility knife
- Vinyl electric tape
- Rubber splicing/mastic tape (a.k.a. self-amalgamating, self-sealing, self-fusing, non-vulcanized)

## Waterproofing the Antenna Connection

### Step 1

Ensure the connector and cables are free of foreign substances such as oil, water, grease, or dirt. Fasten connectors securely together. Use pliers to tighten. Then verify that Firetide node is working, using HotView™ mesh management software.

### Step 2

*Tightly* wrap a layer of electrical tape, STICKY SIDE OUT, over the connector from base of unit to one inch over the cable. When wrap-ping, the tape should overlap about 40% of the previous turn on each turn. This layer of electrical tape will ease removal of the mastic tape from the connector if required. Figure 2 shows the use of a pencil as a wrapping aid if space is tight.

### Step 3

*Tightly* wrap a layer of butyl rubber splicing (mastic) tape over the electrical tape. Overlapping the tape about 40% on each turn, start from base of unit and extend at least one inch on to the cable sheath, as shown in Figure 3.

The key to a good watertight connection is to maintain a high level of tension and stretch in the butyl rubber.

### Step 4

*Tightly* wrap a layer of electrical tape over the butyl rubber mastic layer. Then wrap a second layer of electrical tape. The result should look like Figure 4. The outer layers of electrical tape prevent the mastic from melting in very hot weather.

Your antenna connector is now weatherized. Next, weatherize the connection from the cable to the Firetide node.

Fig. 1



Fig. 2



Fig. 3



Fig. 4





Fig. 5a

## Waterproofing the Cable to Node Connections

Waterproofing the connection of the cable to the lightning suppressor and the lightning suppressor to the Firetide node is essentially the same process as the antenna connector.

### Step 5

Wrap a layer of electrical tape, STICKY SIDE OUT, around the suppressor-to-node connection, as shown in Figure 5b and 5c. Repeat for the cable-to-suppressor connection.



Fig. 5b

### Step 6

Using plenty of tension, *tightly* wrap a layer of butyl rubber splicing (mastic) tape over the electrical tape. Overlapping the tape about 40% on each turn, start from base of unit and extend at least one (1) inch on to the cable sheath, as shown in Figure 6.

The key to a good watertight connection is to maintain a high level of tension and stretch in the butyl rubber.

### Step 7

*Tightly* wrap two layers of electrical tape over the butyl mastic, sticky side in, as shown in Figure 7.

Your system is weatherized. Don't forget to leave a drip loop when installing the Firetide node and antenna.



Fig. 5c



Fig. 6



Fig. 7

# Firetide 2.4 and 5.X GHz Dipole Staging Antenna

The Firetide 2.4 and 5.X GHz Dipole staging antenna is shipped with the Firetide HotPort and HotPoint product line. These 3dBi indoor omnidirectional antennas assist in the network staging process and their easy-on-eye appearance blends smoothly with the Firetide hardware.

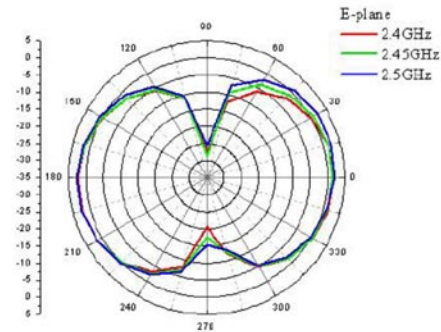
NOTE: Staging antenna designed for indoor use only and recommend-ed application is to use in network staging process.

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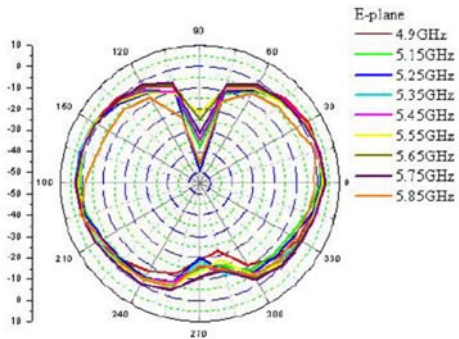


Order Number
2.4 and 5.X GHz Dipole*

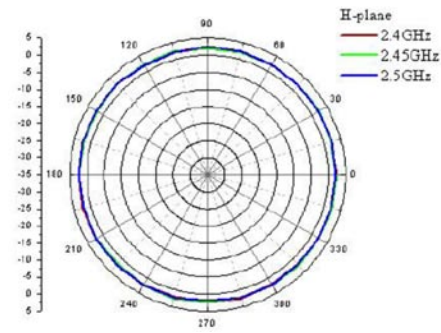
\*staging antenna ships with products



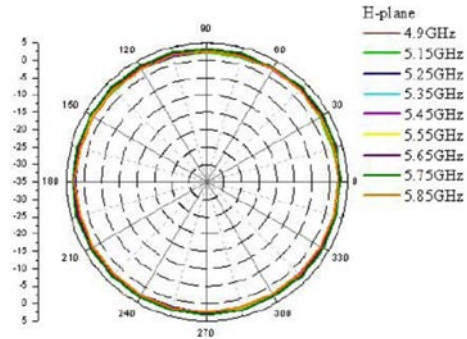
2300–2500 MHz: VPol.



2500–2700 MHz: VPol.



H Plane

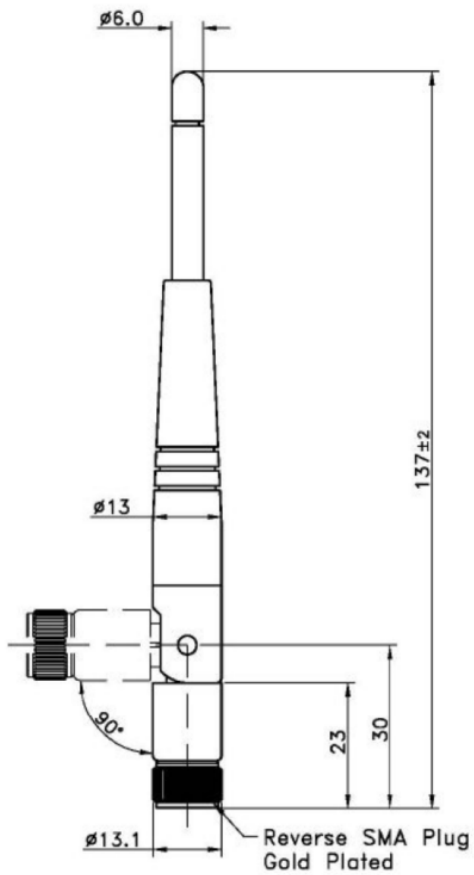


E Plane

Electrical Specifications	Value
Frequency Range	2.4 - 5.X GHz
Gain	3 dBi
Radiation Pattern	Omnidirectional
VSWR (Voltage Standing Wave Ratio)	≤ 2.0
Impedance	50 Ω
Polarization	Vertical
Operating Temperature	-20°C - 65°C
Mechanical Specifications	
Connector Type	RP-SMA

# Firetide 2.4 and 5.X GHz Dipole Staging Antenna

*continued from previous page*



# Firetide A0-024 MIMO-8 Omnidirectional Antenna

The Firetide A0-024-MIMO-8 8dBi omnidirectional antenna is designed to provide maximum performance and reliability under the toughest weather conditions. The antenna features a UV-stable, vented radome that provides ultimate protection against weather elements. This antenna can be mast or ceiling mounted.

## Benefits

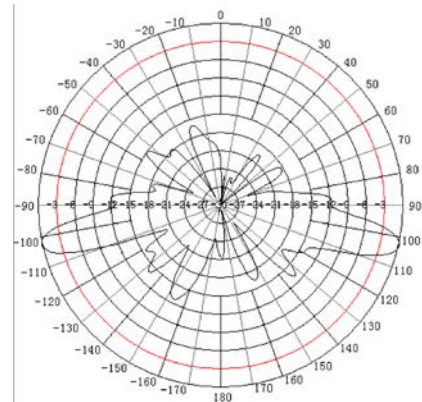
- Vented system design. Provides reliable performance by protecting the electrical design against extreme moisture and/or temperatures.
- Thread relief on connector. Improved accessibility for taping reduces installation time and improves overall effectiveness.
- Internal o-ring seal in the base of the antenna with integrated connector at the base. Assures a watertight seal to prevent water from migrating into the antenna connector.

## Features

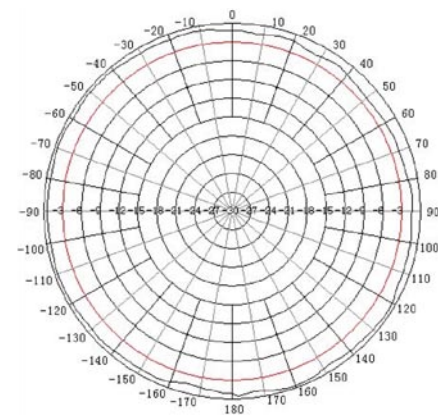
- High gain, low VSWR
- Small size, light-weight
- Sealed with fiberglass
- Suitable for 2.4 GHz WLAN, Wi-Fi system
- Wireless interface supported: IEEE802.11b,g,n
- Three 2.4 GHz ports

*continued on next page*

Order Number
AO-024 MIMO-8



E-Plane



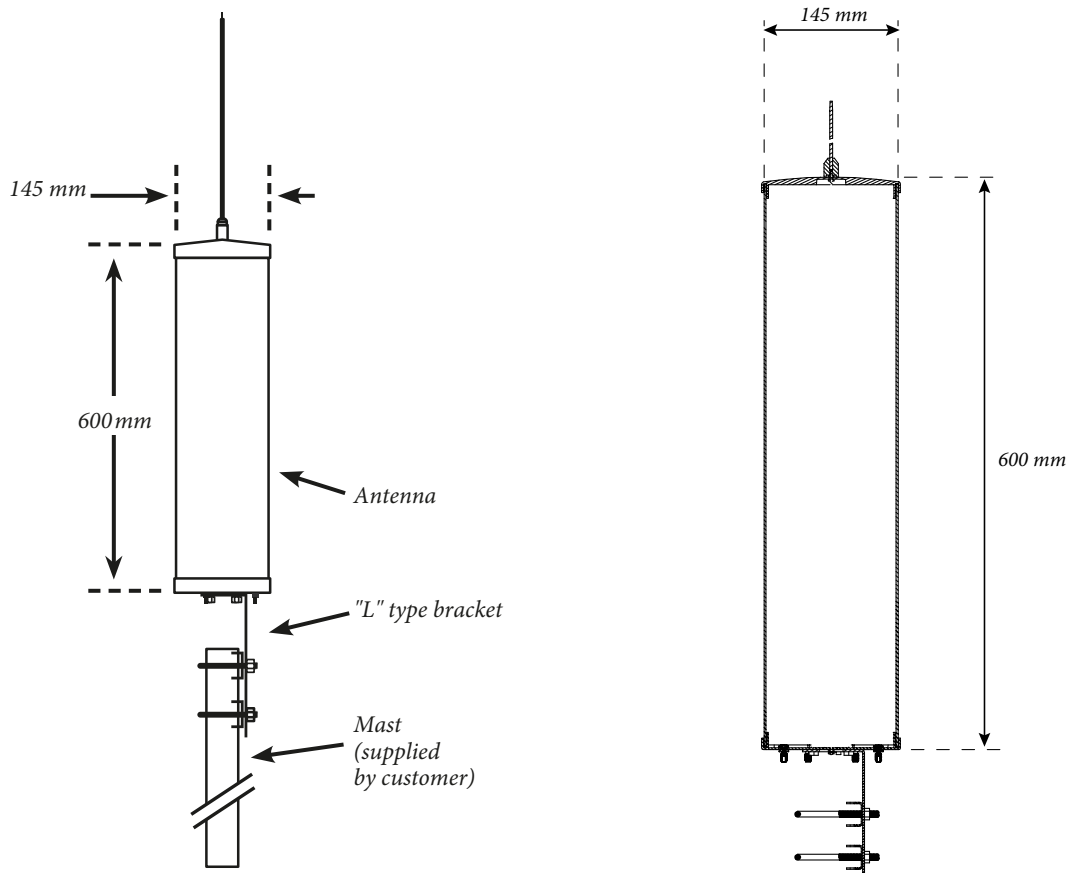
H-Plane

Electrical Specifications	Value
Frequency Range	2400—2500 MHz
Bandwidth	100 MHz
Gain	9 dBi
Beamwidth	E-Plane 10° H-Plane 360°
Electrical Downtilt	10°
Isolation	≤ 25 dB
VSWR (Voltage Standing Wave Ratio)	≥ 1.5
Impedance	50 Ω
Polarization	Vertical
Max. Power	20 W
Mechanical Specifications	
Connector Type	N-Female
Dimensions	Ø145 mm x 600 mm
Weight	2 Kg
Pole Diameter	Ø40 mm – Ø79 mm



# Firetide A0-024 MIMO-8 Omnidirectional Antenna

continued from previous page



# Firetide AOI-245 MIMO-25 Antenna

Firetide AOI-245-MIMO-25 antenna is a dual-band, MIMO, ceiling mount antenna designed to provide maximum vertical polarization. This high performance antenna reduces overhead clearance requirements and comes in an attractive enclosure. At an affordable price, this antenna is an ideal choice for building public safety, retail establishments, enterprise networks, public “hot spots” and facilities anagement. It comes with a steel mounting kit.

## Applications

- 2.4G/5G WLAN system
- Support IEEE802.11a/b/g/n
- Indoor hotspot coverage

## Features

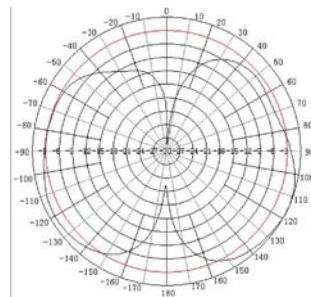
- Suitable for indoor use
- Ceiling mount
- Space diversity, MIMO technique

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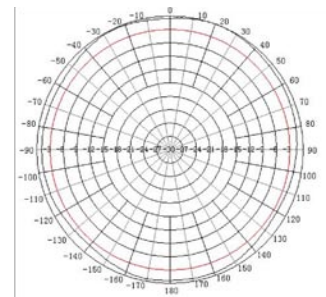
Order Number
AOI-245 MIMO-25



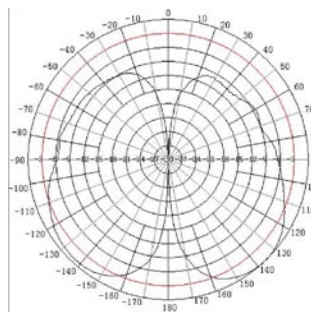
Electrical Specifications	Value
Frequency Range	2400–2500/5150–5850 MHz
Bandwidth	100/700 MHz
Gain	2.5/4.5 dBi
VSWR (Voltage Standing Wave Ratio)	≤ 1.8/2.0
Impedance	50 Ω
Polarization	Vertical
Max. Power	50 W
Mechanical Specifications	
Connector Type	RP-TNC Male/Custom
Dimensions	145 mm x 42 mm
Weight	300 g
Mounting	Ceiling Mount



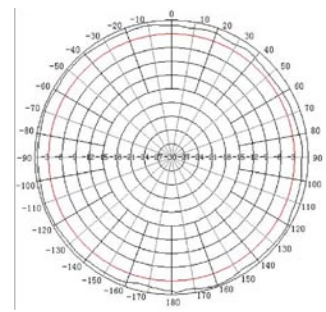
2.4 GHz E Plane



2.4 GHz H Plane



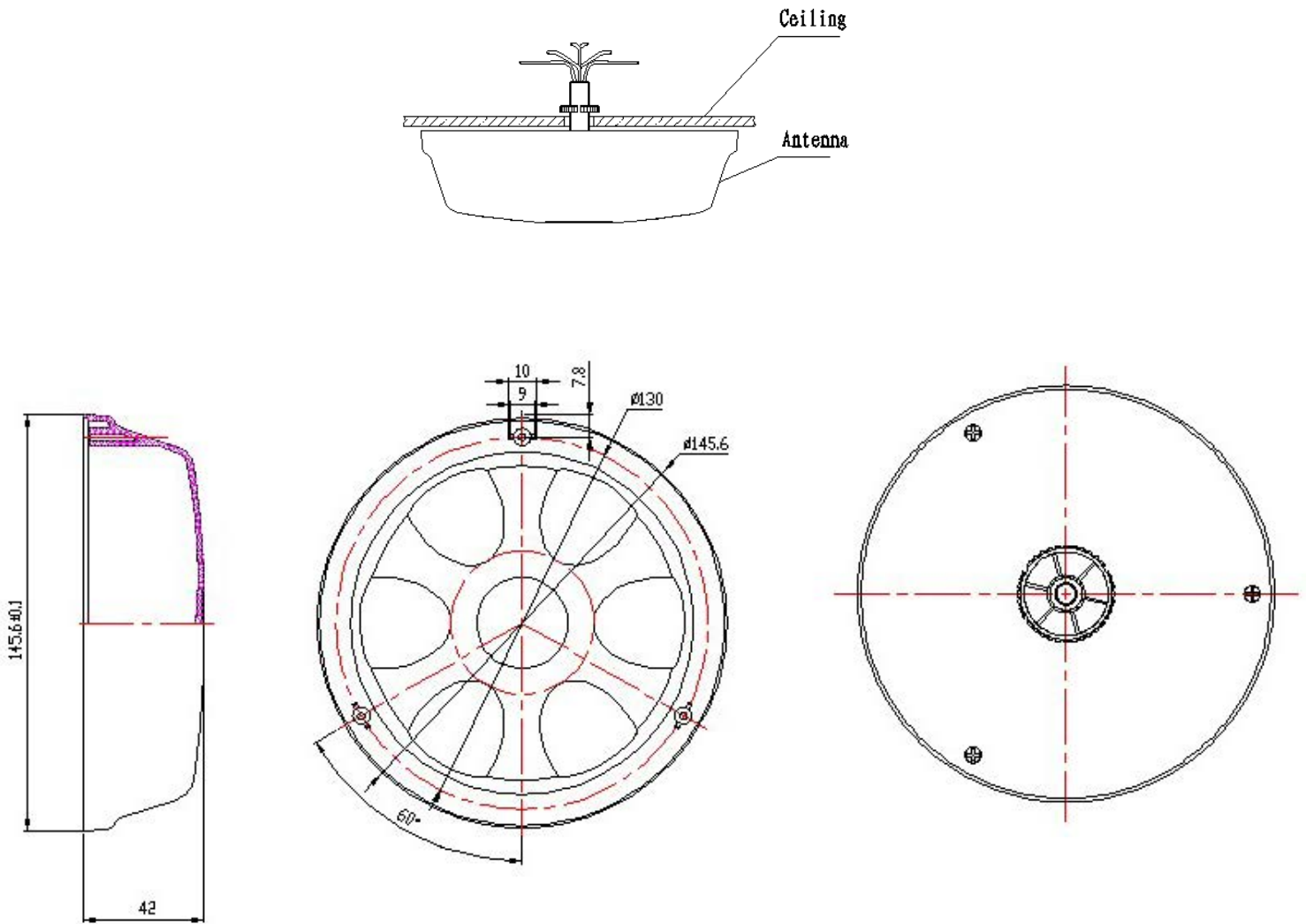
5 GHz E Plane



5 GHz H Plane

# Firetide AOI-245 MIMO-25 Antenna

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# Firetide 4000-1111 2.4 GHz Omnidirectional Antenna

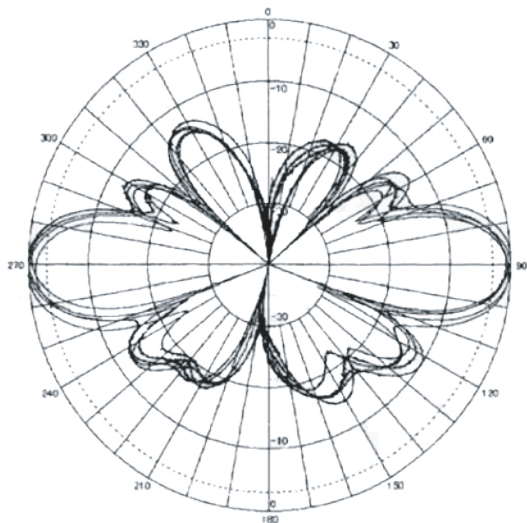
This 7 dBi omnidirectional antenna is designed to provide maximum performance and reliability under the toughest weather conditions. The antenna features a UV-stable radome that provides protection against weather.

Order Number
4000-1111

Electrical Specifications	Typical Value
Frequency Range	2.4-2.5 GHz
Gain	7.4 dBi
Nominal Impedance	50 ohms
VSWR	1.5 Max
Radiation Pattern	Omnidirectional
Vertical Beam Width	20°
Polarization	Vertical
Mechanical Specifications	
Connector	N, female
Operating Temp Range	-20°C to 65°C
Wind Survival	150 MPH
Equivalent Flat Plate Area	7.1 sq. in.
Lateral Thrust @ 125 MPH	NA
Bending Moment @ 125 MPH	NA
Height	17.5 inches (440 mm)
Mounting Base Diameter	1 inch (25 mm)
Weight	0.3 lbs (0.12 kg)



Side View Beam Pattern



# Firetide A0-050-MIMO-9 Omnidirectional Antenna

The Firetide A0-050-MIMO-9 omnidirectional antenna is designed to provide maximum performance and reliability under the toughest weather conditions. The antenna features a UV-stable, vented radome that provides ultimate protection against weather elements. This antenna can be can be mast or ceiling mounted.

## Benefits:

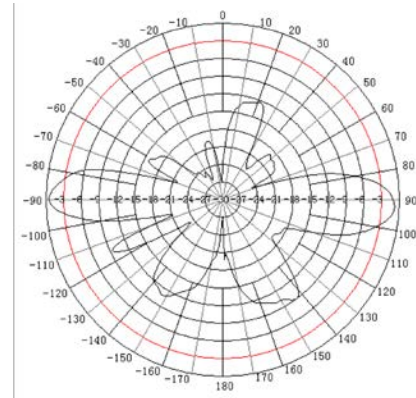
- Vented system design. Provides reliable performance by protecting the electrical design against extreme moisture and/or temperatures.
- Thread relief on connector. Improved accessibility for taping reduces installation time and improves overall effectiveness.
- Internal o-ring seal in the base of the antenna with integrated connector at the base. Assures a watertight seal to prevent water from migrating into the antenna connector.

## Applications:

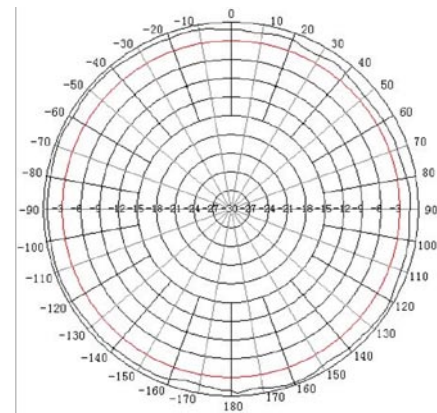
- 5 GHz Wlan, Wi-Fi system
- IEEE 802.11a,n
- Three 5 GHz ports

*continued on next page*

Order Number
AO-050 MIMO-9



5 GHz E-Plane

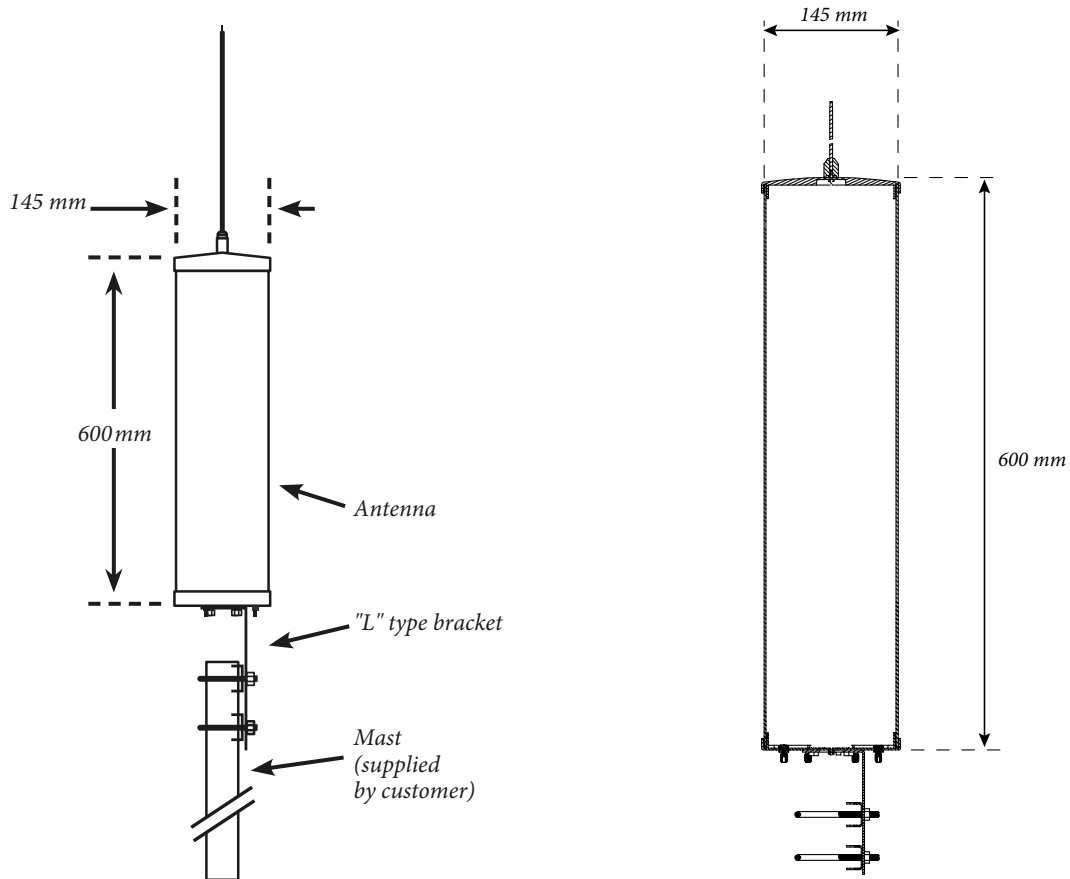


5 GHz H-Plane

Electrical Specifications	Value
Frequency range	4900 – 6100 MHz
Bandwidth	700 MHz
Gain	8 dBi
Beamwidth	E-Plane 17° H-Plane 360°
Electrical Downtilt	10°
Isolation	≤ 25 dB
VSWR (Voltage Standing Wave Ratio)	≥ 1.8
Impedance	50 Ω
Polarization	Vertical
Max. Power	20 W
Mechanical Specifications	
Connector Type	N-Female
Dimensions	Ø145 mm x 200 mm
Weight	2 Kg
Pole Diameter	Ø40 mm – Ø70 mm

# Firetide A0-050-MIMO-9 Omnidirectional Antenna

*continued from previous page*



# Firetide AO-050-N Antenna

The Firetide AO-050-N antenna is a 12 dBi omnidirectional antenna designed to provide maximum performance and reliability under the toughest weather conditions. This antenna features a UV-stable that provides ultimate protection against weather elements. They can be mast or ceiling mounted.

Order Number
AO-050-N

## Features and Benefits:

- Vented system design. Provides reliable performance by protecting the electrical design against extreme moisture and/or temperatures.
- Down-tilt Mast mount kit reduces installation time and improves overall effectiveness.
- Internal o-ring seal in the base of the antenna with integrated connector at the base. Assures a watertight seal to prevent water from migrating into the antenna connector.

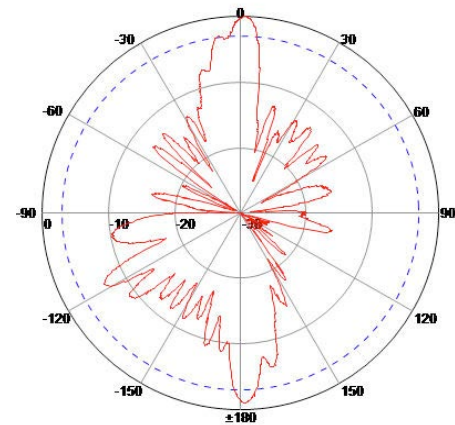
## Applications:

- 5.1/5.5/5.8 GHz WLAN System
- 5.8GHz UNII/ISM System
- WiFi Systems
- Multipoint Applications

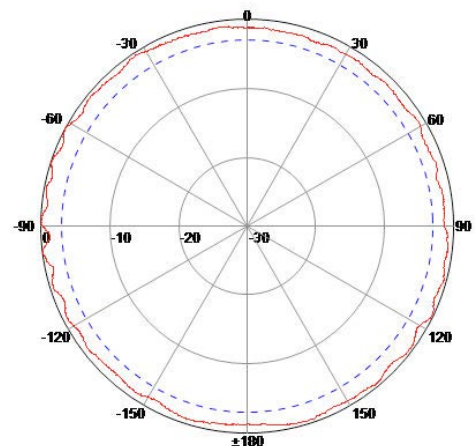
## Features:

- 5.1/5.5/5.8GHz Tri-band
- High Gain, Low VSWR
- Supplied With a Down-tilt Mast Mount Kit

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E-Plane

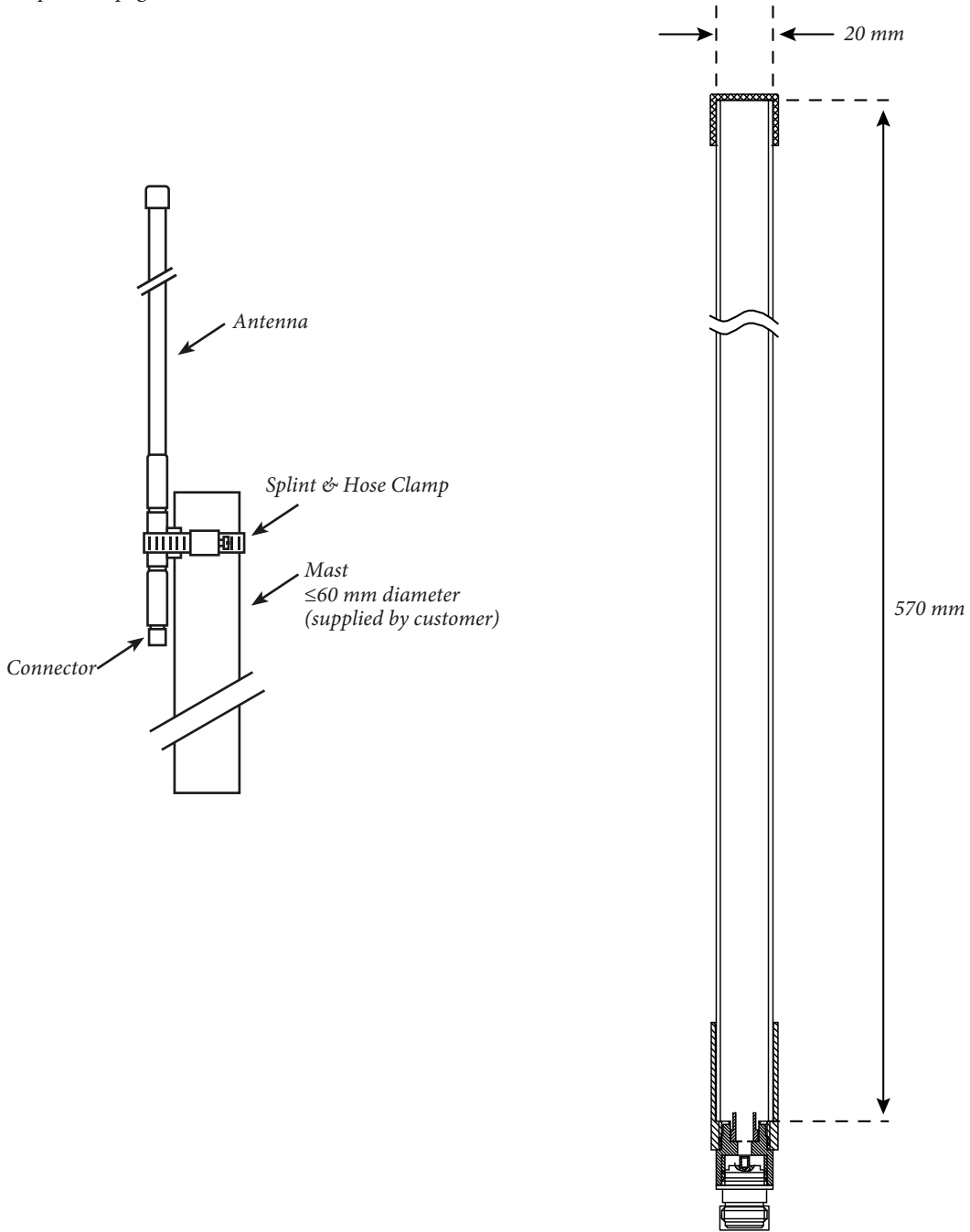


H-Plane

Electrical Specifications	Value
Frequency Range	5150—5850 MHz
Bandwidth	700 MHz
Gain	12 dBi
Beamwidth	E-Plane 10° H-Plane 360°
VSWR (Voltage Standing Wave Ratio)	≥ 2.0
Impedance	50 Ω
Polarization	Vertical
Max. Power	100 W
Mechanical Specifications	
Connector Type	N-Female or N-Male
Dimensions	Ø25 mm x 600 mm
Weight	550 g
Pole Diameter	≤ Ø60 mm

# Firetide AO-050-N Antenna

continued from previous page





# Firetide AP-050-N Antenna

The Firetide AP-050-N is a directional panel antenna with wide spectrum coverage that provides a cost effective solution for high volume deployments. With an aluminum frame and polycarbonate radome, it is rugged and highly sun and weather resistant, with an expected service life in excess of ten years.

It is aesthetic; its small and unobstrusive profile blends easily with any environment. DC grounding for lightning protection helps to meet local building codes.

## Applications

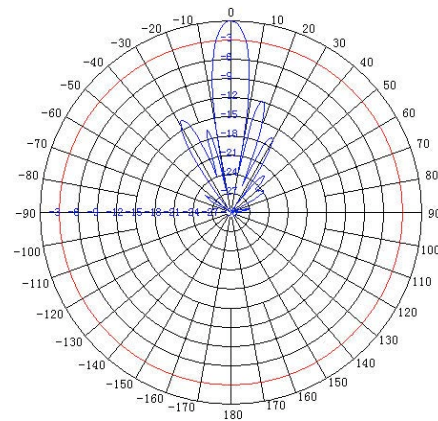
- 5.1/5.5/5.8GHz WLAN
- Wireless Access systems
- 5.8 GHz ISM applications
- IEEE802.11a,g
- WiFi
- Wireless Bridges
- Client Antenna

## Features

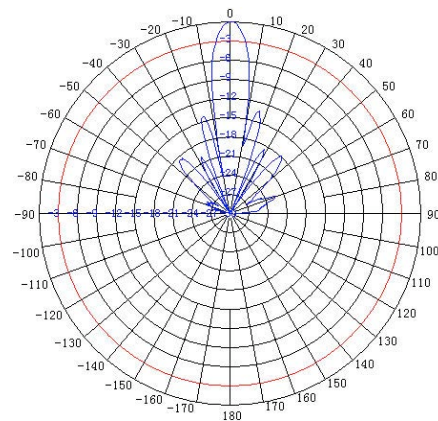
- 5.1/5.5/5.8 GHz Tri-band
- High gain
- Low profile
- Light weight
- All weather operation
- DC Ground for lightning protection
- Supplied with a tilt and swivel mast mount kit

*continued on next page*

Order Number
AP-050-N



E-Plane

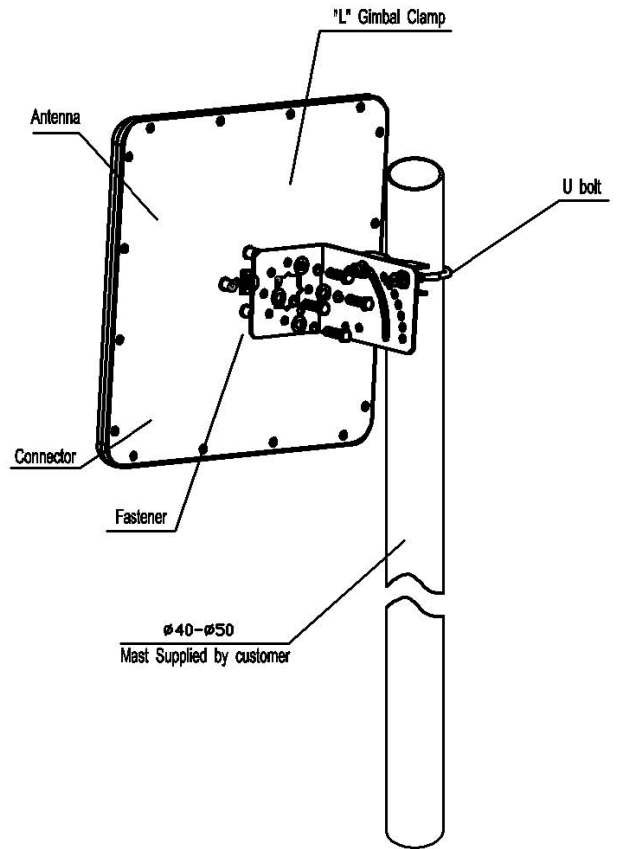
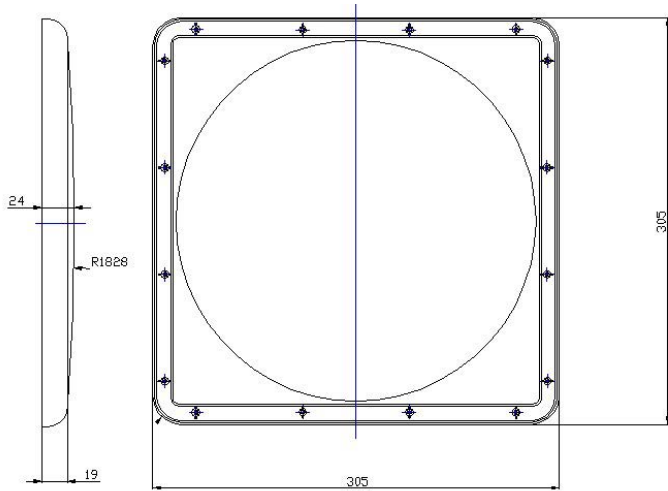


H-Plane

Electrical Specifications	Value
Frequency Range	4900–5875 MHz
Gain	≥ 23 dBi
Beamwidth	E: 11° V: 11°
VSWR (Voltage Standing Wave Ratio)	≤ 1.5
Impedance	50 Ω
Polarization	Vertical or Horizontal
Max. Power	50 W
Mechanical Specifications	
Connector Type	N-Female
Dimensions	306x306x25 mm
Weight	1.4 Kg (with brackets)
Color	White
Mounting	Pole

# Firetide AP-050-N Antenna

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# Firetide AP20-050 MIMO-19 Antenna

AP20-050-MIMO-19 is a 19 dBi panel antenna that is best suited to 5 GHz deployments making it an ideal candidate for the large city-wide and other video surveillance applications. This low-profile antenna features rugged design with UV-coated Aluminum alloy and withstands the challenging outdoor conditions easily.

## Applications

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

## Features

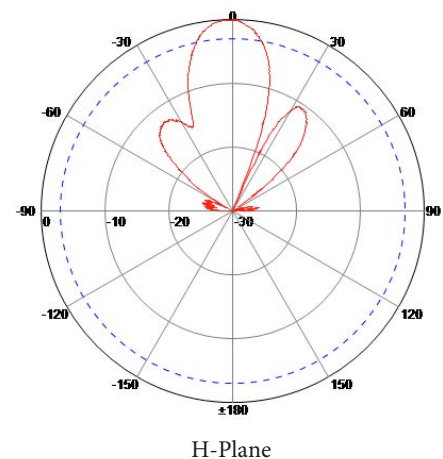
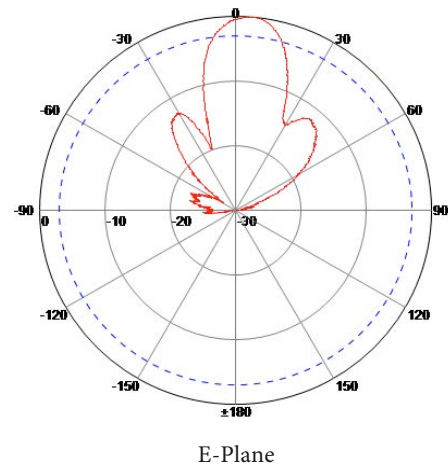
- Broad band. 5.1/5.5/5.8/6.1 GHz
- Triple polarization
- MIMO application
- High gain, Low VSWR
- Strong corrosion resistance ability

*continued on next page*

Order Number
AP20-050 MIMO-19

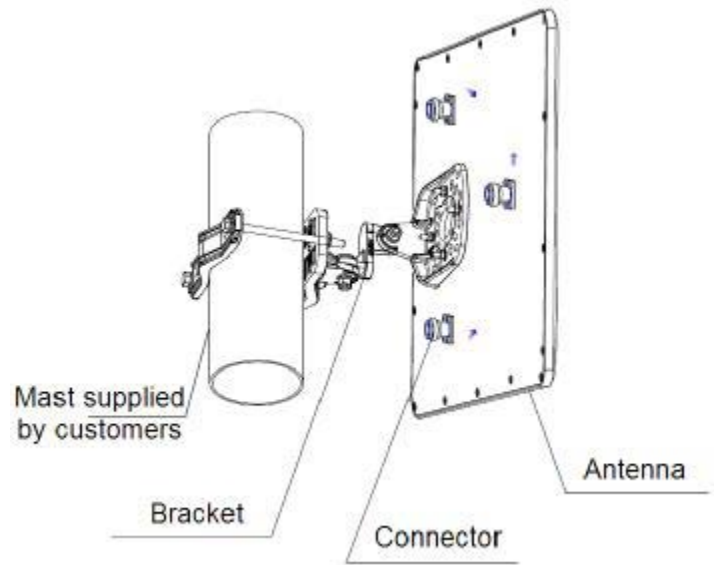
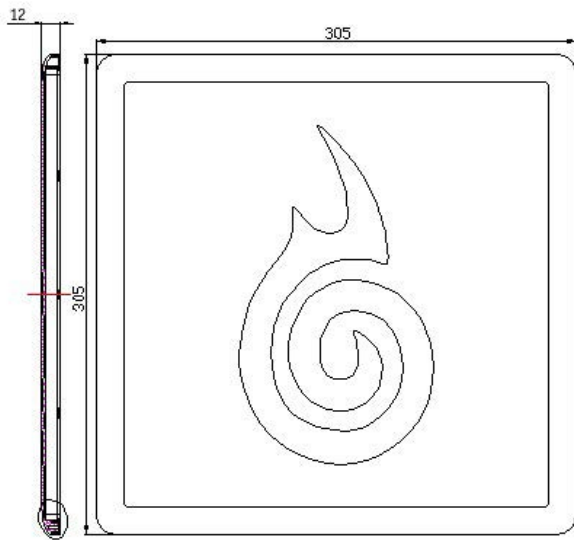


Electrical Specifications	Value
Frequency Range	4900—6100 MHz
Bandwidth	975 MHz
Gain	Vertical 19 dBi Dual Slant 16 dBi
Horizontal Beamwidth	Vertical 22° Dual Slant 20°
Vertical Beamwidth	Vertical 14° Dual Slant 19°
F/B Ratio	≥ 25 dB
Isolation	≥ 25 dB
VSWR (Voltage Standing Wave Ratio)	≤ 1.8
Impedance	50 Ω
Polarization	±45° and Vertical
Max. Power	10 W
Mechanical Specifications	
Connector Type	3XN-type Female
Dimensions	305x305x12 mm
Weight	0.8 Kg (w/o clamps)
Mounting	Pole



# Firetide AP20-050 MIMO-19 Antenna

*continued from previous page*



# Firetide AP10-050-MIMO-23 Antenna

AP10-050 MIMO-23 is a dual polarization MIMO antenna that is best suited to 5 GHz deployments making it an ideal candidate for the large city-wide and other video surveillance applications. This low-profile antenna features rugged design with UV-coated Aluminum alloy and withstands the challenging outdoor conditions easily.

## Order Number

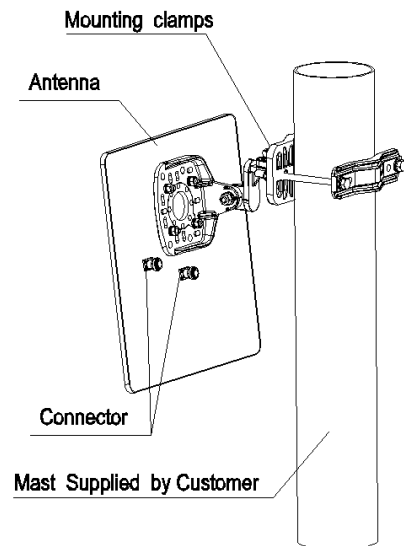
AP10-050 MIMO-23

## Applications

- 5.8 GHz WLAN system
- 5 GHz UNII/ISM system
- Point to point, or point to multipoint
- Broad band. 4.9/ 5.1/ 5.5/ 5.8 GHz
- MIMO application
- High gain, Low VSWR
- Strong corrosion resistance ability



Electrical Specifications	Value		
Frequency Range-MHz	4900— 5150	5150— 5500	5500— 5900
Bandwidth	1000 MHz		
Gain	20.5 dBi	22 dBi	23 dBi
Horizontal Beamwidth	12 °	11 °	10 °
Vertical Beamwidth	12 °	11 °	10 °
F/B Ratio	≥ 30 dB		
Isolation	≥ 27 dB		
VSWR	≤ 2.0		
Impedance	50 Ω		
Polarization	Horizontal and Vertical		
Max. Power	10 W		
Mechanical Specifications			
Connector Type	2 X N-type Female		
Dimensions	305 x 305 x 12 mm		
Weight	1 Kg (w/o clamps)		
Clamp	JM-RE +/- 30 ° ele. adj.		
Mounting	Up to 12 cm diameter		



# Firetide AP5-50 MIMO-28 Antenna

The dual polarized AP5-50-MIMO-28 is a high precision parabolic dish antenna. The main advantage of this high gain antenna is the amazing precision for high directivity with narrow bandwidth. This makes it ideal for point-to-point links and for WLAN data communications. The antenna features rugged design with UV-coated aluminum alloy.

## Order Number

AP5-050 MIMO-28

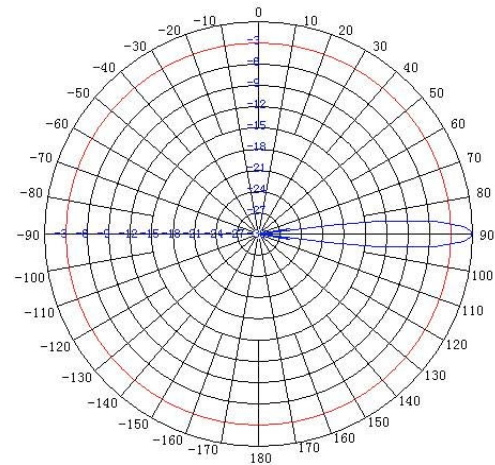
### Applications

- 4.9GHz Public Safety System
- 5.1/5.5/5.8 GHz WLAN
- Client Antenna
- Wireless Bridge

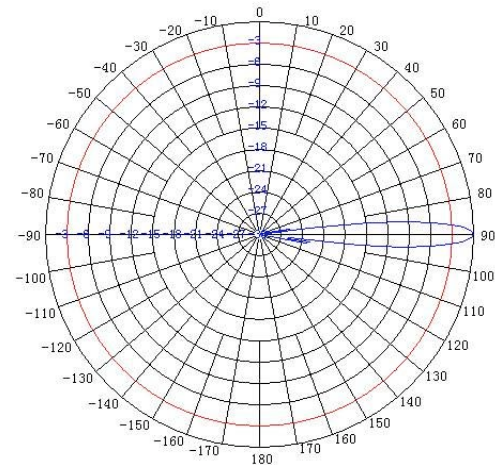
### Features

- High Precise Parabolic Dish
- UV-Coated Aluminum Alloy
- V/H Dual Polarization
- Standard Mounting Kits

*continued on next page*



E-Plane

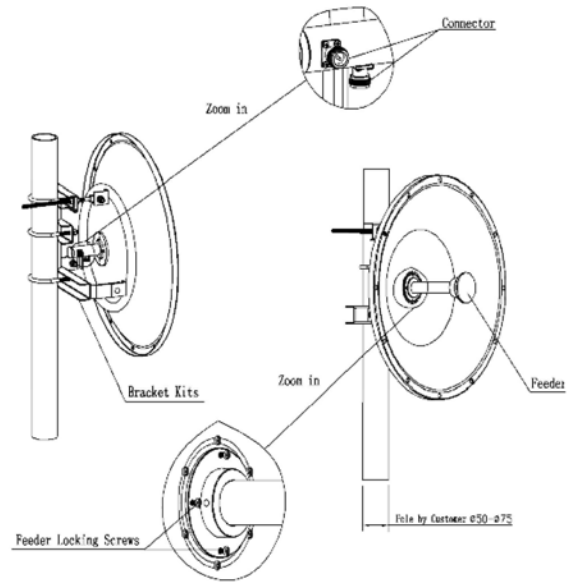
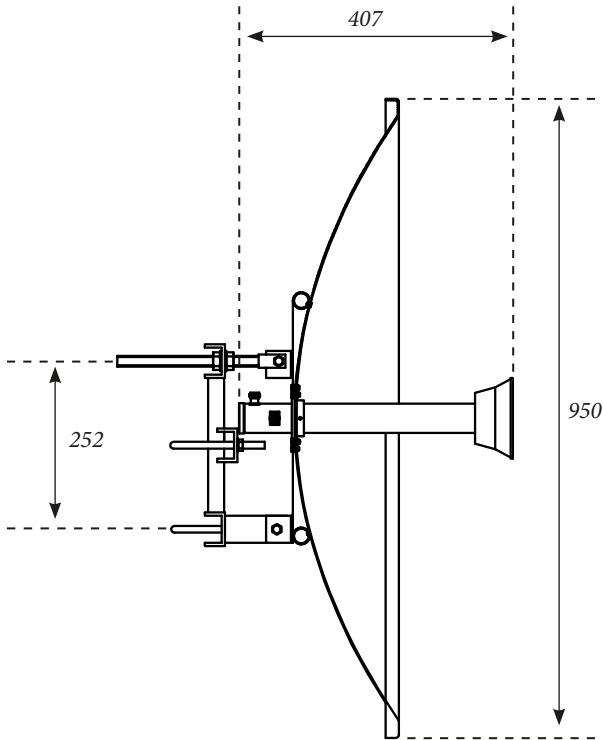


H-Plane

Electrical Specifications	Value
Frequency Range	4900—6100 MHz
Bandwidth	950 MHz
Gain	28 dBi
Beamwidth	Vertical 5° Horizontal 5°
F/B Ratio	≥ 35 dB
Isolation	≥ 28 dB
VSWR (Voltage Standing Wave Ratio)	≤ 2.0
Impedance	50 Ω
Polarization	Vertical and Horizontal
Max. Power	100 W
Mechanical Specifications	
Connector Type	N-Female / N-Female
Caliber Size	Ø0.6 m
Weight	5.5 Kg
Pole Diameter	Ø50–75 mm

# Firetide AP5-50 MIMO-28 Antenna

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# Firetide AS-050 Specifications

The Firetide AS-050-N is a directional 90-degree sector antenna with wide spectrum coverage that provides a cost effective solution for high volume deployments. To insure good coverage, it offers null fill in the elevations plane. With an aluminum frame and plastic radome, it is rugged and highly sun and weather resistant, with an expected service life in excess of ten years.

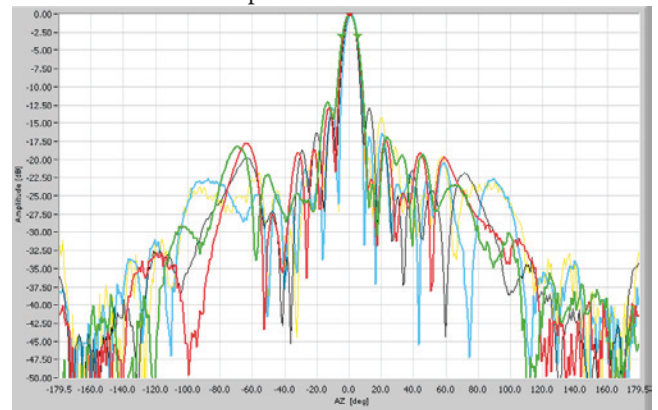
It is aesthetic; its small and unobtrusive profile blends easily with any environment. DC grounding for lightning protection helps to meet local electrical building codes.

Order Number
AS-050-N

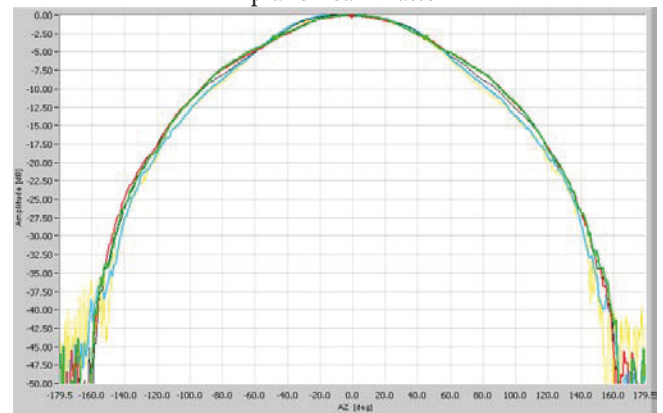


Electrical Specifications	Typical Value
Frequency Range	4.9–6.1 GHz
Gain	16 dBi
Nominal Impedance	50 ohms
VSWR	1.8 Max
Radiation Pattern	Directional
Vertical Beamwidth	8°
Horizontal Beamwidth	90°
Beamwidth Front-Back Ratio	25 dB
Polarization	Linear, Vertical
Mechanical Specifications	
Connector	N type
Operating Temp Range	-40°C to 70°C
Wind Survival	NA
Equivalent Flat Plate Area	NA
Lateral Thrust @ 125 MPH	NA
Bending Moment @ 125 MPH	NA
Size	22.6 × 3.7 × 2.1 inches (573 × 95 × 53 mm)
Mounting Base	MNT-22 (pole)
Weight	NA

E-plane Beam Pattern



H-plane Beam Pattern





# Firetide AS90-050 MIMO-16T Antenna

AS90-050-MIMO-16T is a triple polarized directional 90-degree sector antenna. The triple polarization provides highest level of efficiency with minimum interference for optimum decorrelation. The radome is made of strong corrosion-resistant material to withstand tough outdoor environment.

## Order Number

AS90-050 MIMO-16T

## Applications

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

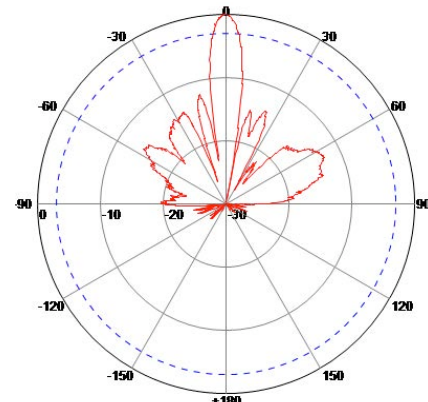
## Features

- 4.9/5.5/5.8/6.1 GHz
- Triple polarization
- MIMO application
- Medium gain, Low VSWR
- Strong corrosion resistance ability

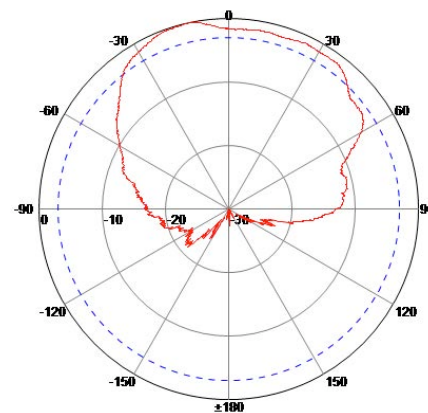
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Electrical Specifications	Value
Frequency Range	4900–6100 MHz
Bandwidth	1200 MHz
Gain	14 dBi
Beamwidth	Vertical 8° Horizontal 90°
Isolation	≥ 25 dB
VSWR (Voltage Standing Wave Ratio)	≤ 1.8
F/B Ratio	≥ 20 dB
Impedance	50 Ω
Polarization	±45° and Vertical
Max. Power	10 W
Mechanical Specifications	
Connector Type	3 × N-Female
Dimensions	270 × 270 × 36 mm
Weight	1.8 Kg (without clamps)
Mounting	Pole



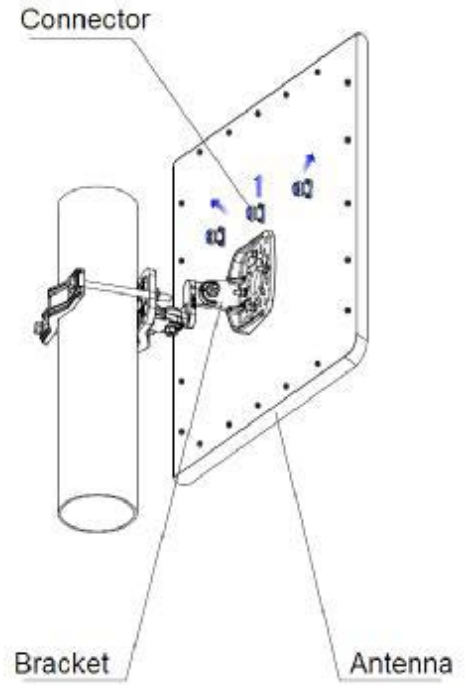
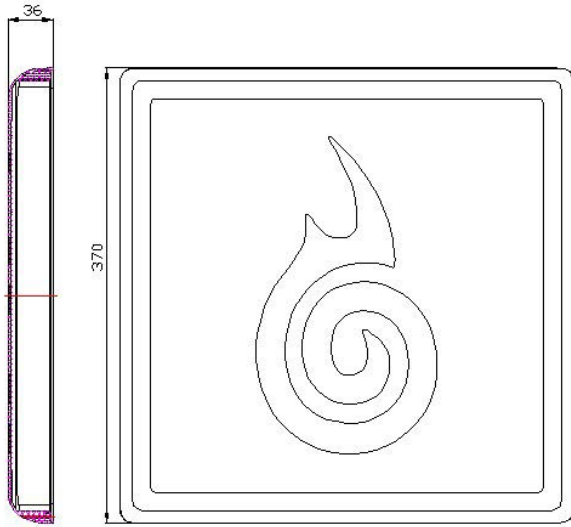
E-Plane



H-Plane

# Firetide AS90-050 MIMO-16T Antenna

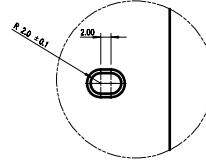
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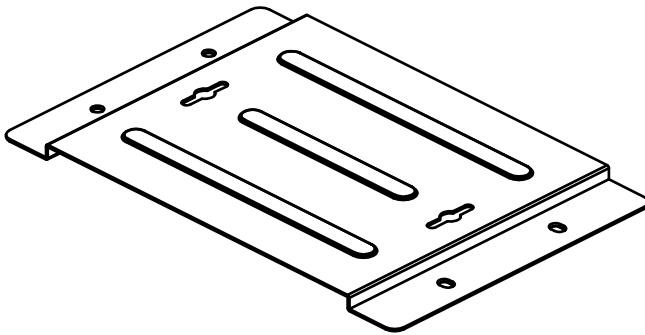
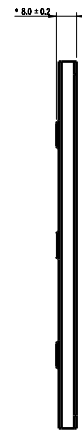
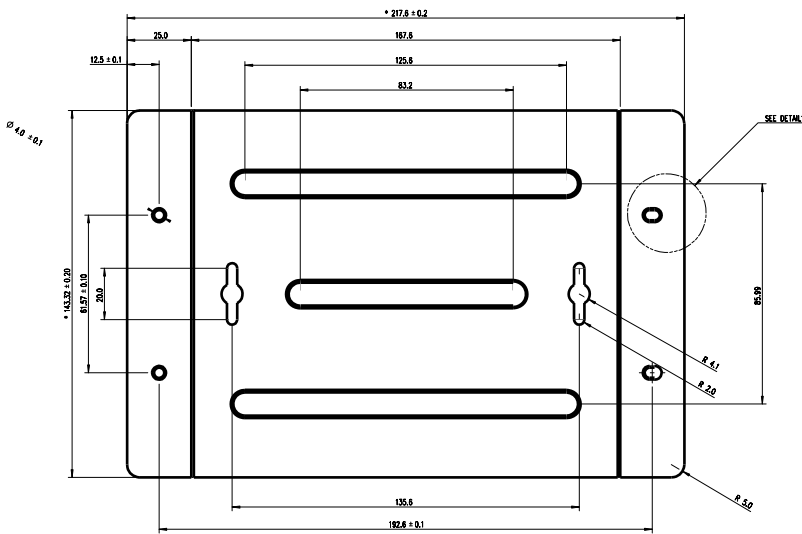
# Firetide MT-7100 Bracket

Order Number

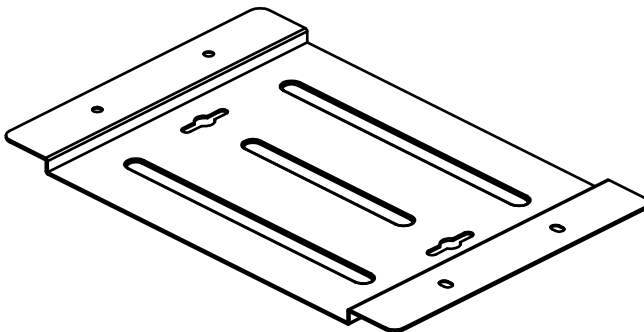
MT-7100



DETAIL 1  
SCALE 2/1



ISOMETRIC VIEW

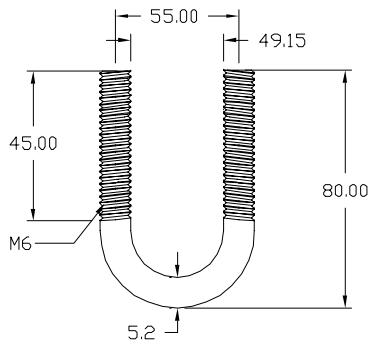


# Firetide SP-7200-03 Mounting U-bolt Kit

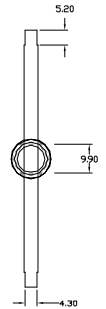
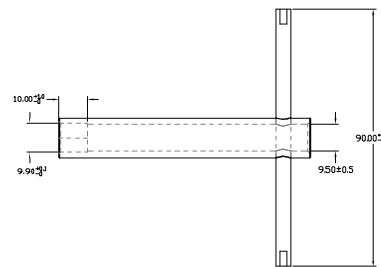
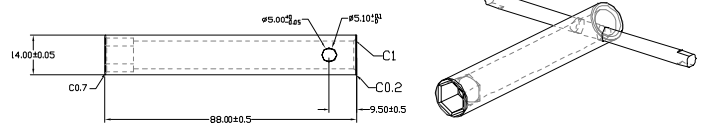
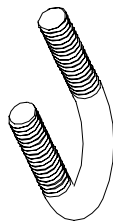
- M6x1.0, 40mm hex bolts
- M6x1.0, 20mm hex bolts
- M6 Nuts, SS
- M6 Flat Washers
- M6 Split Lock Washers
- Mounting U-bolts, 80mm
- Claw-tooth Pole Gripper Saddles
- M6 Wrench

Order Number

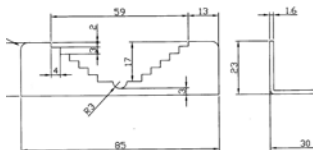
SP-7200-03



Mounting U-bolt, 80 mm



M6 Wrench



Claw-tooth Pole Gripper Saddle

# 7020 Universal Mounting Bracket Install Guide

## Planning Your Installation

### Staging Considerations

Using the provided temporary staging antennas, set up and test the HotPort nodes indoors, on a bench or table, before mounting them onto an exterior wall or pole. Pre-configure the nodes so that they are all on the same RF channel, etc. Use HotView Pro to configure the HotPort nodes and create a small mesh network. Test the network settings you plan to use. Check to see that all nodes are visible in HotView Pro. If not, troubleshoot per directions in the HotView Reference Guide.

2. Set the Country Code for your country of operation.
3. Re-verify that all nodes are visible, and verify that dual-radio nodes have both radios correctly meshed.

**Important!** The staging antennas provided with Firetide outdoor HotPort nodes are for temporary use only. They MUST be replaced with outdoor-rated antennas as soon as the mesh is staged and operational. The staging antennas are NOT waterproof and NOT moisture resistant. If used outdoors, the antennas may fail.

Contact your Firetide Reseller for assistance in selecting and ordering outdoor antennas suitable for your applications. For reference, your Firetide CD has a copy of Firetide's Antenna & Accessory Guide.

### Other Important Considerations

- It is often easier to install all devices onto a pole, and then attach the pole to the roof. In many cases, connecting the devices to a pole already attached to the roof top can be difficult and dangerous.
- A lightning surge suppressor MUST be used. Some antennas include one, otherwise contact your Firetide Reseller to order a suitable suppressor.
- Locate the HotPort close to the antenna; a short antenna cable gives better performance than a longer one. Firetide recommends antenna cables less than 3 meters.
- The HotPort node and its antenna must both be grounded.
- Use non-vulcanized rubber weatherproofing kits to weatherproof connectors and antennas.

### Preparing Earth Ground

The HotPort node must be properly connected to earth ground. Failure to do so may result in equipment damage, injury, or death. The product warranty does not cover damages resulting in part or in whole from improper grounding. Consult your location's building and electrical codes regarding antennas and follow them, or consult the National Electric Code (NEC).

- If connecting HotPort to a tower or pole, connect the base of the tower pole directly to the building's ground or to one or more approved grounding rods using 10 AWG ground wire and corrosion-resistant connectors.
- Connect the grounding cable to rain gutters only if the rain gutter is properly connected to earth ground.

- Ground rods should be copper, 1.8–2.4 m (6–8 ft) long.
- Install all grounding components in straight lines. If bends are unavoidable, do not make sharp turns.
- Earth-to-ground should not be more than 10 ohms.

### Antenna Placement

Firetide recommends the use of antennas specifically designed for MIMO applications. While it is possible to select and mount six individual antennas, determining correct placement and spacing is difficult. Use an antenna engineered for best results with MIMO.

## Mounting Bracket

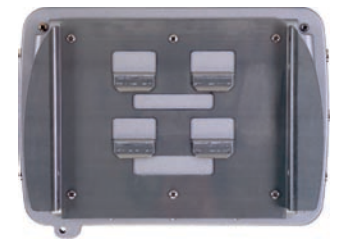
HotPort node ships with a two-piece mounting bracket. This bracket is of the same design as the HotPort 6202 outdoor bracket, so you can install a 7020 in place of a 6201 or 6202. The assembly is shown below.

The outer piece (the universal mounting bracket) is secured by tabs and four thumb screws to the inner bracket, as shown below.

*Bottom view of a Firetide HotPort*



*The universal mounting bracket is the outer of the two-piece mounting bracket attached to the back of the HotPort unit.*



*The universal mounting bracket is secured by tabs and thumb screws to the above shown inner bracket.*

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## Mounting the HotPort Using the Universal Mounting Bracket

Firetide's HotPort can be mounted to a wall or onto a vertical or horizontal pole. The HotPort's universal mounting bracket provides holes and slots for use with the provided mounting kit or for straps (not included) or other mounting methods. Before mounting, keep in mind that adequate space is needed around the mounting bracket to allow the HotPort unit to slide onto it and to enable cable connections.

**Remove the Universal Mounting Bracket from the HotPort** The universal mounting bracket is shipped attached to the HotPort node. To remove the universal bracket, first loosen the four thumb screws, two on each side, then slide the universal bracket toward the connector side of the HotPort node and lift off.

### Wall Mounting

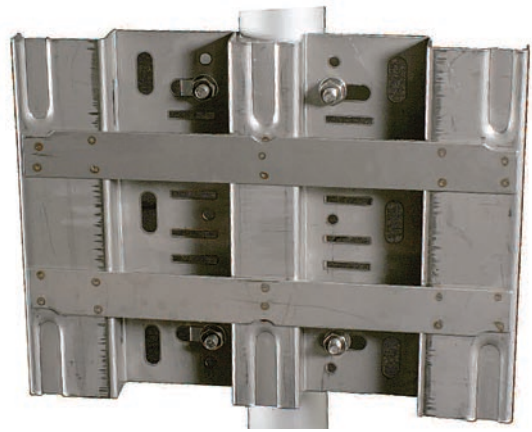
Mount the universal mounting bracket to a wall using two holes near the top and two holes near the bottom of the universal bracket. Use appropriate screws (not provided) and anchors as required by wall construction and materials to safely and securely support the HotPort. Once the universal bracket has been mounted, attach the HotPort by reversing the bracket removal procedure.

### Pole Mounting

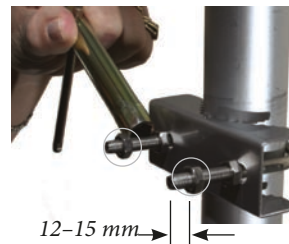
#### POLE 37–50 MM DIAMETER

Use Firetide's SP-7200-03 u-bolt mounting kit, provided with each HotPort, to mount the universal mounting bracket onto a 37–50 mm diameter pole.

1. Using claw-tooth gripper saddles, washers, split washers then nuts, install the two u-bolts onto the mounting pole. Temporarily allow enough play to snugly slide or spin the u-bolts on the pole.
2. Use the position of screw slots in the universal mounting bracket as a guide to correctly position the two u-bolts on the pole. For mounting stability, target screw slots that will allow the u-bolts to be positioned far from each other.
3. Once properly positioned, securely tighten the two u-bolts to the pole.
4. There should be about 12–15 mm (1/2–5/8") of u-bolt threaded end sticking out beyond each nut. This is the bolt length needed to mount the universal bracket. If the lengths are longer, then on each u-bolt end, install a second nut until there is 12-15 mm of thread between the second nut and u-bolt end (see photos at right).
5. Slip a flat washer onto each of four u-bolt ends.
6. Attach the universal bracket by positioning the u-bolt ends into the bracket's screw slots. Use washers, then lock washers and nuts to secure the universal bracket to the u-bolts.
7. Recheck all nuts for adequate tightness. Confirm that the universal bracket does not slip or turn on the pole.
8. Attach the HotPort to the universal mounting bracket by reversing the bracket removal procedure.



Universal mounting bracket attached to pole using u-bolts



12–15 mm

U-bolt\* mounted on pole—note addition of secondary nuts (circled) to meet 12–15 mm bolt length required by the universal mounting bracket.



The HotPort universal mounting bracket can be mounted on vertical and horizontal poles using u-bolts\* or other proper fastening hardware.

Universal mounting bracket mounted onto a pole using two u-bolts\* with additional secondary nuts.

\*photos for quick reference only—all u-bolts should be secured using proper washers & lock washers in addition to nuts.



#### POLE GREATER THAN 50 MM DIAMETER

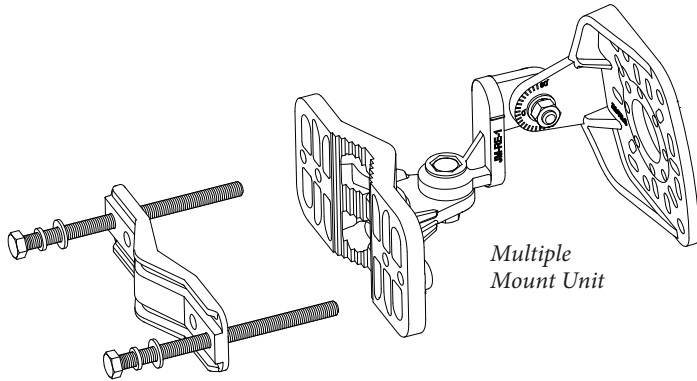
Use appropriate mounting straps (not included) or other secure means to mount a HotPort universal mounting bracket onto a 50 mm (2.0") or larger diameter pole, irregularly shaped pole, or light pole.

1. Position the universal mounting bracket against the pole.
2. Wrap a mounting strap around the pole and through the vertical slots located near the top of the universal mounting bracket.
3. Do the same with a second strap but this time use the vertical slots near the bottom of the universal bracket.
4. Secure the mounting straps so that the bracket will not slip or turn on the pole.
5. Attach the HotPort to the universal mounting bracket by reversing the bracket removal procedure.

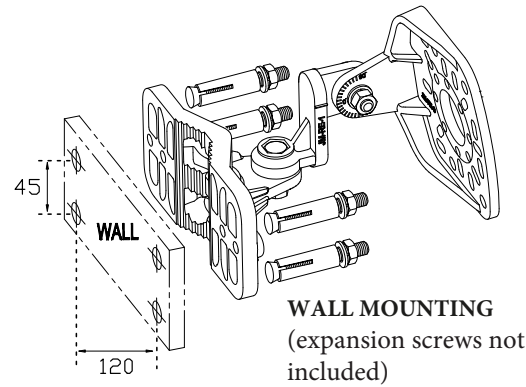
# Firetide Multiple Mount

- Mount
- Mounting Clamp Saddle
- M8x140 Bolts, with Flat and Lock Washers
- Does not include wall mounting expansion bolts or pole straps/worm gear clamps

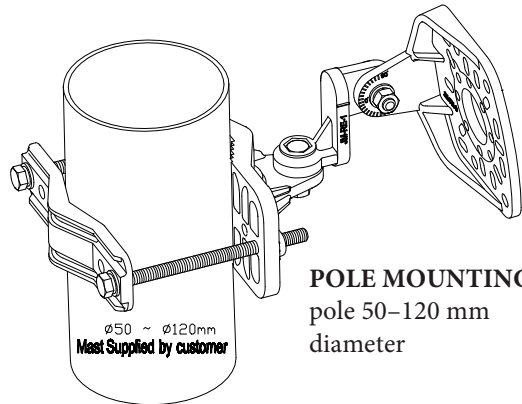
Order Number
SP-MNT-01



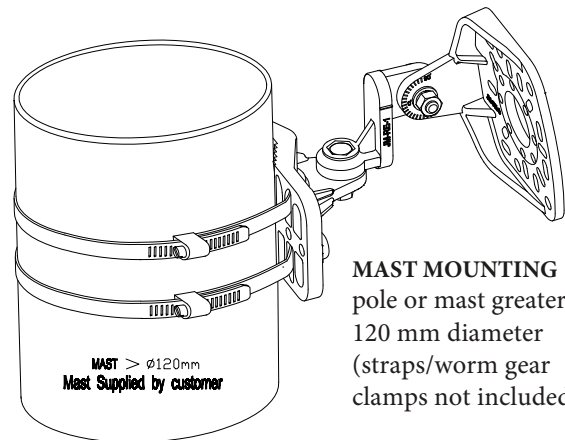
Mounting Clamp Saddle with M8x140 bolts, flat and lock washers



**WALL MOUNTING**  
(expansion screws not included)



**POLE MOUNTING**  
pole 50–120 mm diameter



**MAST MOUNTING**  
pole or mast greater than 120 mm diameter  
(straps/worm gear clamps not included)

# Installation Tips

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An antenna is one of the most critical components in any RF communications system. Its performance determines the quality and the continuity of data flow in both directions.

## Antenna Basics

The ideal antenna radiates the signal in all directions equally, like a sphere. Most real-world antennas are designed to concentrate or focus the radio signal in the preferred direction(s). The areas of focus are called beams or lobes. A common analogy is to compare an antenna to a sprinkler at the end of a hose. There is only so much water coming out of the hose but we can spread the water out or focus it to throw the water farther in a specific direction. The total is the same. The spray pattern can vary.

The gain of an antenna is the degree of concentration it has. This is usually expressed as a ratio, comparing the antenna to the ideal spherical one. This ratio is called 'dBi'. Real-world measurements of gain takes into consideration the losses in the antenna as well as its directional capabilities.

A High Gain Antenna has greater directivity, i.e. it propagates RF energy more in one direction than others. This increases range and reduces the possibility of RF interference with other systems.

## Antenna Characteristics

- **Radiation Pattern (Far Field):** The field pattern at large distances. The far-field is also called the radiation field and is most important.
- **Main Lobe/Beam -** The direction of maximum intensity.
- **Side Lobes/Beam -** The radiation lobes in any direction other than that of the main lobe.
- **Beamwidth:** The angle where the majority of the power is radiated, usually defined as the angle between two half-power (-3 dB) points on either side of the main lobe of radiation.
- **Frequency Bandwidth:** The range of frequencies within which the performance of the antenna, with respect to some characteristics, conforms to a specified standard. i.e. 802.11a,b&g

## Physical Obstacles

Any physical object in the path between two antennas can cause signal attenuation. Common obstructions for outdoor installations include buildings and trees. Walls, whiteboards, metal objects and reflective glass between the two antennas are physical obstructions.

## Selecting Antennas

In general, use the lowest-gain antenna adequate for the application. Do not go for gain indiscriminately. Choose an antenna that has an elevation beamwidth sufficient to cover all nodes, both near and far away.

For long distances - 1/2 mile or more - directional high gain antennas must be used. These antennas must be as high as possible, and above obstructions such as trees and buildings. They must be aligned so their main lobes are directed at each other. High gain directionals have to be carefully aimed both in direction and elevation. Regulations regarding maximum antenna gains vary from country to country. It is the responsibility of the end user to operate within the limits of these regulations.





# Caution! Risk of electric shock!

## POWER LINES CAN BE LETHAL

Every year, people are killed by touching overhead power lines with metal poles or objects. Don't be one of them.

Do not install any HotPort product where contact with power lines can be made. People may be injured or killed if they are touching or holding any part of equipment when it contacts electric lines. Make sure there is NO possibility that equipment or personnel can come in contact directly or indirectly with power lines.

## ASSUME ALL OVERHEAD LINES ARE POWER LINES

The distance from a pole or antenna to the nearest power line should be at least twice the total length of the pole/antenna combination. This will ensure that the pole will not contact power if it falls either during or after installation.

## TO AVOID FALLING, USE SAFE PROCEDURES WHEN WORKING AT HEIGHTS ABOVE GROUND

- Select locations that will allow a safe and simple installation.
- Assemble and test the antenna, HotPort unit, and all clamps and cables on the ground, before putting the mast or tower up.
- Don't work alone.

## Firetide Limited End User Product Warranty

Pursuant to all provisions described herein, Firetide antennas are warranted for one (1) year from the date of purchase against defects in the build materials and workmanship. Firetide does not warrant that the Products will meet any requirements or specifications of any End User Customer. This warranty applies to Firetide antennas.

The above warranties are void if the alleged defect cannot be verified by Firetide or if, as determined by Firetide, the product failure was due to tampering, abuse, misuse, accident, shipping, handling, or storage; or if the product has been installed, used, or maintained in a manner not described in the product user manual; or if the product has been altered in any way; or if product serialization has been altered. Any attempt to disassemble or repair the product by anyone other than Firetide immediately voids this warranty.

This warranty applies only to the original End User purchaser of the product and may not be transferred to any other individual or entity.

THE FOREGOING ARE THE EXCLUSIVE WARRANTIES APPLICABLE TO THE PRODUCT INCLUDING THE SOFTWARE, AND THE EXCLUSIVE REMEDY FOR DEFECTS IN THE PRODUCT. FIRETIDE DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE. SOME LAWS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES SO TO THAT EXTENT THIS LIMITATION MAY NOT APPLY TO YOU.

In no event will Firetide be liable for any special, incidental, consequential, punitive or indirect damages whatsoever

- Use approved non-conducting ladders, shoes, and other safety equipment. Make sure all equipment is in good repair.
  - If a tower or pole begins falling, don't attempt to catch it. Stand back and let it fall.
  - If anything such as a wire or pole does come in contact with a power line, DON'T TOUCH IT OR ATTEMPT TO MOVE IT. Instead, save your life by calling the power company.
  - MAKE SURE ALL TOWERS AND POLES ARE SECURELY GROUNDED AND ELECTRICAL CABLES CONNECTED TO ANTENNAS HAVE LIGHTNING ARRESTORS.
  - The base of the antenna pole or tower must be connected directly to the building protective ground or to one or more approved grounding rods, using 10 AWG ground wire and corrosion-resistant connectors.
  - Refer to the National Electrical Code for grounding details.
- ### IF AN ACCIDENT SHOULD OCCUR WITH THE POWER LINES
- DON'T TOUCH THAT PERSON, OR YOU MAY BE ELECTROCUTED. Have someone call for medical help immediately!
  - Use a non-conductive dry board, stick, or rope to push or drag them so they no longer are in contact with electrical power.

(including, without limitation, damages for loss of profits, business interruption, loss of information, or other pecuniary loss) arising out of the use or inability to use the product or the performance, interruption or failure of the product, irrespective of the cause of action, even if Firetide has been advised of the possibility of such damages. Firetide's cumulative liability for all claims arising out of or in connection with this warranty will not exceed the amount paid by the original End User purchaser to purchase the product. The amounts payable for the product are based in part on these limitations and these limitations shall apply notwithstanding the failure of essential purpose of any remedy. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so to that extent the above limitations or exclusions may not apply to you.

By using the product the original End User purchaser agrees to and is bound by these terms and conditions.

In the event that a product fails to meet this warranty and Firetide's authorized reseller is notified in writing of such failure within the warranty period, Firetide shall, at its own discretion, either repair the product or replace it with the same or a functionally-equivalent product free of charge. Replacement products may contain refurbished materials in whole or in part. Firetide will honor this warranty provided the product is returned through an authorized Firetide reseller or dealer with shipping charges prepaid, along with a proof of purchase describing the original purchase date and product serial numbers if applicable. The authorized reseller must acquire a Return Materials Authorization (RMA) number from Firetide prior to returning any product. Firetide does not accept shipments of defective products without shipping charges prepaid.

