



Cradlepoint

# Antenna Ordering and Installation Guide

October 21, 2015

## Preface

### Right of Revision

Cradlepoint reserves the right to revise this publication and to make changes in the content thereof without obligation to notify any person or organization of any revisions or changes.

### Revision Tracking

Revision	Date	Description	Author
1.0	October 13, 2014	New version with GPS antenna options	Jeremy Cramer
1.1	February	Added IBR350	David Rush
1.2	April 22, 2015	Added CBA850	Pat Burroughs
1.3	July 10, 2015	Added new Omni and Patch Antennas	Pat Burroughs
1.4	October 21, 2015	Added AER3100 and AER1600	Pat Burroughs

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## Introduction











Cradlepoint has tested and certified that the antennas included in this guide provide the best performance with Cradlepoint products.

The modem antennas work with the AER, ARC, and COR models that include an integrated modem. Some antennas may not be optimized for all frequency bands for a particular model (see individual antenna specifications). In some cases, a single antenna connected to the main (primary) antenna port will provide sufficient gain. To see “true” 4G speeds on LTE, or better performance, use two external antennas. For example, two antennas may provide 15 Mbps throughput and one antenna may only provide 8 Mbps throughput.

Use the following chart to help select the best antenna(s) for your Cradlepoint equipment. Clicking on a hyperlinked model name will take you to the reference pages for that model.

# Cradlepoint Antenna Ordering and Installation Guide

## Antenna Reference Guide

Antenna	Image	MSRP	Type	Mount, Connector, & Cabling
Universal 3G/4G/LTE (black) Part # 170649-000		\$14.99	Modem: SMA connector	Direct attach
Universal 3G/4G/LTE (white) Part # 170659-000		\$14.99	Modem: SMA connector	Direct attach
Dual-band 2.4/5.0 GHz WiFi Part # 170628-000		\$14.99	WiFi: RSMA connector	Direct attach
<a href="#">3-in-1 GPS &amp; Cellular Screw-mount</a> Part # 170653-000		\$374.99	Modem (x2): SMA connector GPS: SMA connector	<ul style="list-style-type: none"> <li>• Screw mount</li> <li>• Includes connectors</li> <li>• Includes 3 meter cables</li> </ul>
<a href="#">5-in-1 GPS-GLONASS, Two Cellular (3G/4G/LTE) &amp; Two WiFi 2.4/5 GHz Screw-mount Antenna with 3M Cables</a> Part # 170654-000		\$399.99	Modem (x2): SMA connector GPS: SMA connector WiFi (x2): RSMA connector	<ul style="list-style-type: none"> <li>• Screw mount</li> <li>• Includes connectors</li> <li>• Includes 3 meter cables</li> </ul>
<a href="#">GPS-GLONASS Screw-mount Antenna</a> Part # 170651-000		\$99.99	GPS: SMA connector	<ul style="list-style-type: none"> <li>• Screw mount</li> <li>• Includes connectors</li> <li>• Includes 3 meter cables</li> </ul>
<a href="#">GPS-GLONASS Mag-mount Antenna with 3M Cable</a> Part # 170652-000		\$34.99	GPS: SMA connector	<ul style="list-style-type: none"> <li>• Magnet mount</li> <li>• Includes connectors</li> <li>• Includes 3 meter cables</li> </ul>
<a href="#">12" Mag-mount</a> Part # 170605-000		\$44.99	Modem: SMA connector	<ul style="list-style-type: none"> <li>• Magnet mount</li> <li>• Includes connectors</li> <li>• Includes 12.5 ft cable</li> </ul>
<a href="#">4" Mini Mag-mount Antenna with 12.5-foot Cable</a> Part # 170606-000		\$29.99	Modem: SMA connector	<ul style="list-style-type: none"> <li>• Magnet mount</li> <li>• Includes connectors</li> <li>• Includes 12.5 ft cable</li> </ul>
<a href="#">Multi-band Omni-directional Antenna</a> Part # 170668-000		149.99	Modem: SMA connector	<ul style="list-style-type: none"> <li>• Pole/mast mount (pole not included)</li> <li>• * - Requires separate connectors/cabling (see page 6)</li> </ul>

# Cradlepoint Antenna Ordering and Installation Guide

Antenna	Image	MSRP	Type	Mount, Connector, & Cabling
<a href="#">Outdoor Panel Antenna (Directional Patch)</a> Part # 170669-000		\$149.99	Modem: SMA connector*	<ul style="list-style-type: none"> <li>Pole/mast mount (pole not included)</li> <li>* - Requires separate connectors/cabling (see page 6)</li> </ul>
<a href="#">700 MHz - 2700 MHz Wide Band Directional Antenna (Yagi/Log-Periodic)</a> Part # 170588-000		\$99.99	Modem: SMA connector*	<ul style="list-style-type: none"> <li>Pole/mast mount (pole not included)</li> <li>* - Requires separate connectors/cabling (see page 6)</li> </ul>

## Antenna Main and Auxiliary Ports

In most cases, a single antenna connected to the main antenna port will provide sufficient gain. To get "full" 4G speeds on LTE, or for enhanced performance on any modem, you may use two external antennas.

Take extra care while attaching the cable to the modem. Be careful not to over-torque the SMA connector on the modem. Finger tight is sufficient (the maximum torque is 7kgf-cm).

If you are using a single antenna, you may want to turn off the auxiliary antenna port. Log into the administration pages and go to Internet Connection Manager. Select the desired modem and click Edit. Select the Modem Settings tab. Deselect Enable Aux Antenna and click Submit.

### COR IBR1100/IBR1150 Models



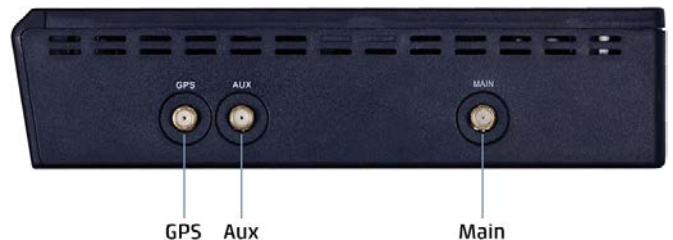
### AER3100 Models



### AER2100 Models



### AER1600 Models

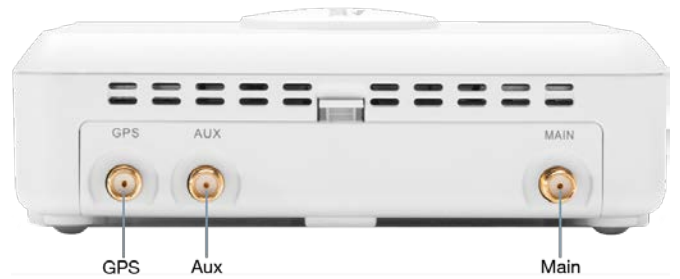


# Cradlepoint Antenna Ordering and Installation Guide

## COR IBR600/IBR650 Models (all)



## ARC CBA850



## COR IBR350 Models



## ARC Models – CBA750B and MBR1400



## Discontinued Models

### COR IBR600 Models – PWD versions (WiFi side)



### ARC Models – all other versions



## Additional Requirements & Recommendations

The following antennas require additional adapters and/or cabling:

- Multi-band Omni-directional (part # 170586-000)
- Directional Patch (part # 170587-000)
- Directional Yagi (part # 170588-000)

# Cradlepoint Antenna Ordering and Installation Guide

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These antennas require a low-loss coax cable with the N Male to SMA Male connectors OR an N Male to SMA Male adapter to attach to Cradlepoint equipment.

Cradlepoint recommends using JEFA Tech LL400-Flex cable with N Male, SMA Male connectors (not sold by Cradlepoint). Cradlepoint has tested and certified 20- and 50-foot cables from JEFA Tech ([jefatech.com/category/Cradlepoint](http://jefatech.com/category/Cradlepoint)). Loss is approximately 6 dB per 100 feet of cable (3 dB per 50 feet, 1 dB per 20 feet). For orders of 500+ units, Cradlepoint may be able to source cable at competitive prices.



If you don't require a longer cable, you can purchase an N Male to SMA Male adapter. JEFA Tech offers this one: [jefatech.com/category/Cradlepoint](http://jefatech.com/category/Cradlepoint). The pole/mast mount antennas come with approximately eight inches of cable.

Cradlepoint recommends using cable clamps or other cable-holding mechanisms to secure low-loss cable against a wall or pole. Use at least two clamps on the cable near the Cradlepoint router. This construction helps reduce stress on the cable/modem connector and increases product reliability. JEFA Tech provides this ½" cable clamp: [jefatech.com/category/Cradlepoint](http://jefatech.com/category/Cradlepoint).



Cradlepoint recommends adding lightning protection (ensure you have correct connections). See [jefatech.com/category/Cradlepoint](http://jefatech.com/category/Cradlepoint).





# Cradlepoint Antenna Ordering and Installation Guide

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## Warranty Information

### 30-Day Money-Back Guarantee

All Cradlepoint products are protected by Cradlepoint's 30-day money-back guarantee. If for any reason the performance of any product is not acceptable, simply return the product directly to the reseller with a dated proof of purchase.

### 90-Day Warranty

Cradlepoint antennas are warranted for ninety (90) days against defects in workmanship and/or materials. Warranty cases may be resolved by returning the product directly to the reseller with a dated proof of purchase.

Antennas may also be returned directly to Cradlepoint at the consumer's expense, with a dated proof of purchase and a Returned Material Authorization (RMA) number supplied by Cradlepoint. Cradlepoint shall, at its option, either repair or replace the product. Cradlepoint will pay for delivery of the repaired or replaced product back to the original consumer if located within the continental U.S.

This warranty does not apply to any antennas determined by Cradlepoint to have been subjected to misuse, abuse, neglect, or mishandling that altered or damaged its physical or electronic properties.

## 3-in-1 GPS-GLONASS & Two Cellular (3G/4G/LTE) Screw-mount Antenna with 3M Cables

Part # 170653-000



Cable, adapter, and mounts (pole not included)

- Includes 3m low loss CFD200 cable on cellular and RG-174 cable on GPS/Glonass, 3000mm ± 60mm long
- SMA(M) ST adapter
- Screw mount

### Features

- 2 x Cellular 2G/3G/4G Antennas (MIMO)
  - LTE/HSPA/GSM/GPRS/CDMA/UMTS
  - 698~960MHz/1710~2170MHz/2300~2700MHz/2900-3500MHz
- 1 x GPS/GLONASS 1575.42/1602MHz Active Antenna
- IP67 Waterproof
- High Efficiency/Peak Gain Outdoor Antenna
- RoHS Compliant

### How It Works

The 3-in-1 GPS-GLONASS and two cellular (3G/4G/LTE) bolt-mount antenna with 3M Cables is an omnidirectional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications. It includes two LTE MIMO antennas and one GPS/GLONASS antenna, in the highest efficiency and peak gain possible.

This antenna particularly finds its application in mobile video, vehicle communications, location and fleet management, safety & security, remote industrial equipment monitoring. The antenna consists of two LTE MIMO elements 698-960MHz, 1710-2170MHz, 2300~2700MHz, 2900-3500MHz. The antennas are designed to work equally well on LTE to deliver maximum dataspeed rates, or on legacy 2G and 3G frequencies where LTE is not available.

The GNSS antenna is a wide-band GPS/ GLONASS element tuned to have optimum gain at 1575.42 MHz GPS and 1602MHz Glonass frequencies.

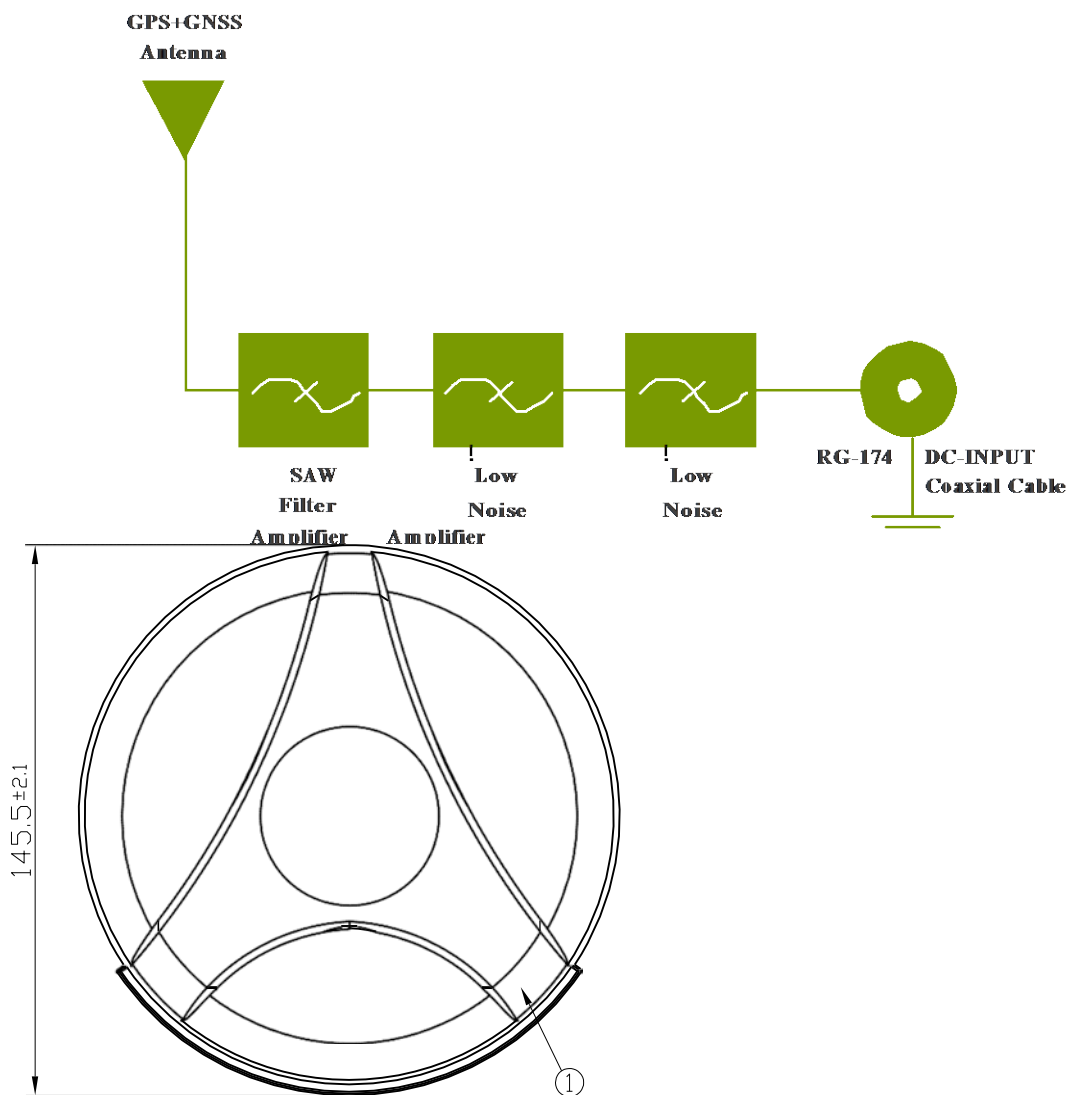
# Cradlepoint Antenna Ordering and Installation Guide

Mechanically, the unit has three high efficiency and gain antennas packed in an extremely robust IP67 direct mount antenna package with excellent isolation (20dB+). The strengthened domed housing is designed to deflect tree branches and wires that tend to catch and break shark fin or rigid whip antennas.

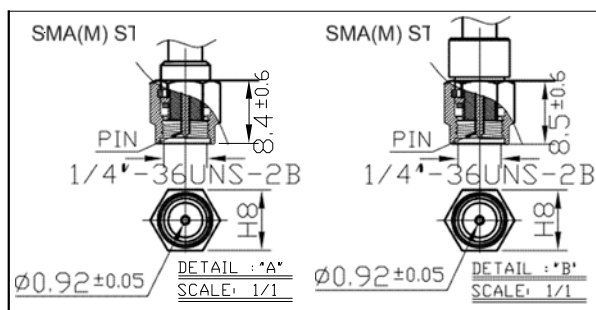
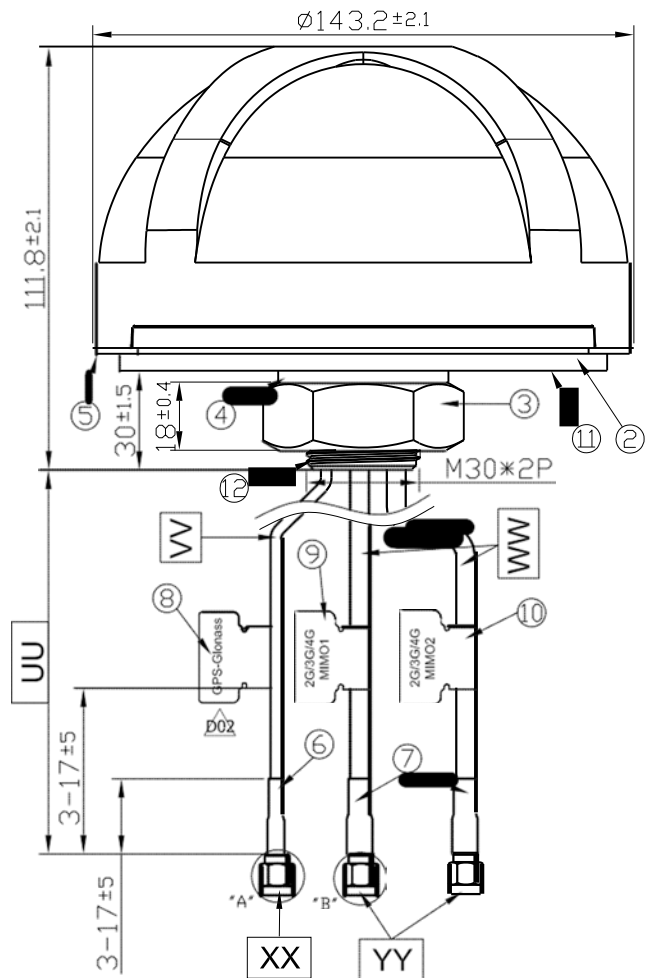
The antenna has its own internal ground-plane and can radiate on any mounting environment such as metal or plastic without affecting performance. The internal components are individually screwed down onto a robust plate, preventing damage from regular vehicle vibrations.

A completely waterproof mounting seal prevents water from leaking under the housing.

Installing the 3-in-1 GPS-GLONASS & Two Cellular (3G/4G/LTE) Screw-mount Antenna with 3M Cables:



# Cradlepoint Antenna Ordering and Installation Guide



# Cradlepoint Antenna Ordering and Installation Guide

Designation	Name	Material	Finish	QTY
1	Housing	PC 540	Black	1
2	Closed Cell Foam	CR 4305	Black	1
3	M30 Nut	Steel AISI 1215	Ni Plated	1
4	Washer	Steel AISI 1215	Ni Plated	1
5	Waterproof Gasket	Silicone Rubber	Black	1
6	Heat Shrink Tube	PE (RG174)	Black	1
7	Heat Shrink Tube	PE (CFD200)	Black	2
8	GPS-Glonass Label	Coated Paper	Orange	1
9	2G/3G/4G MIMO1	Coated Paper	Gray	1
10	2G/3G/4G MIMO2	Coated Paper	White	1
11	3M Double Adhesive	3M 9448 HK	White Liner	1
12 M30x 2 Thread 32L	Zinc Alloy		Ni Plated	1
UU	Cable Length	3000mm ± 60mm		
VV	Cable Type	RG174	Black	1
WW	Cable Type	CFD200	Black	2
XX	Connector Type	SMA(M) ST	Gold	1
YY	Connector Type	SMA(M) ST	Gold	2

# Cradlepoint Antenna Ordering and Installation Guide

## Antenna Specifications

2G/3G/4G MIMO									
	LTE	GSM 850	GSM 900	DCS	PCS	WCD	A I	ISM	LTE
Frequency	698~787	824~896	880~960	1710~1880	1850~1990	1920~	2170 2400~2500	2600~3500	MHz
<b>MIMO 1</b>									
NOTE: The antennas attached to cables labeled "MIMO1" have significantly better gain and less orientation dependence than their "MIMO2" counterparts. Therefore, the MIMO1 cable should go to MAIN cellular.									
VSWR (max.)	2.5	2.5	3	2.5	2.5	2.5	3	2.5	
Efficiency	66.17	51.88	47.87	39.97	47.67	45.97	28.73	38.35	%
Peak Gain	2.52	1.48	1.15	1.03	1.22	1.22	0.15	3.20	dBi
<b>MIMO 2</b>									
NOTE: The antennas attached to cables labeled "MIMO1" have significantly better gain and less orientation dependence than their "MIMO2" counterparts. Therefore, the MIMO1 cable should go to MAIN cellular.									
VSWR (max.)	3.5	3.5	3.5	2.5	2.5	2.5	2	2.5	
Efficiency	35.98	18.41	20.24	40.85	35.42	37.68	42.27	35.24	%
Peak Gain	1.56	-2.08	-2.31	1.69	0.86	2.06	2.99	2.97	dBi
Polarization	Vertical								
Impedance	50Ω								Ω

GPS/GLONASS	
Centre Frequency	1575.42 MHz / 1602 MHz
Bandwidth	10 MHz
Radiation Efficiency	50% (without cable)
Passive Gain @ Zenith	4.0 dBi typ. (with $\psi = 140\text{mm}$ ground)
VSWR	2
Impedance	50Ω
DC Power Input Range	1.8V ~ 5V

# Cradlepoint Antenna Ordering and Installation Guide

DC input	1.8V	3.3V			4.0V		5.5V	
MHz	1575.42	1602	1575.42	1602	1575.42	1602	1575.42	1603
VSWR	2	2	2	2	2	2	2	2
LNA Gain	17	17	29.2	29	31	31	32.3	32
Noise Figure	3.4	3.4	3.1	3.1	3.2	3.2	3.4	3.4
Power Consumption	3.2	3.2	7.5	7.5	9.4	9.4	15	15
Band Attenuation	1535MHz: -20dB		1520MHz: -20dB		1520MHz: -20dB		1520MHz: -20dB	
	1642MHz: -20dB		1642MHz: -20dB		1642MHz: -20dB		1642MHz: -20dB	
Cable	3m RG174 standard							
Connector	SMA(M) standard							
<b>Mechanical</b>								
Antenna Dimensions	Height 85.7mm x Diameter 145.6mm							
Casing	Wonderloy PC-540 PC/ABS Alloy							
Waterproof	IP67							
2G/3G/4G MIMO 1	3M Low Loss CFD-200 SMA(M)							
2G/3G/4G MIMO 2	3M Low Loss CFD-200 SMA(M)							
GPS/GLONASS	3M RG-174 SMA(M)							
<b>Environmental</b>								
Operation Temperature	-40°C to 85°C							
Storage Temperature	-40°C to 90°C							
Humidity	Non-condensing 65°C 95% RH							

NOTE: All measurements were conducted with 3m low loss CFD200 cable on cellular and RG-174 cable on GPS/Glonass.

## 5-in-1 GPS-GLONASS, Two Cellular (3G/4G/LTE) & Two WiFi 2.4/5 GHz Screw-mount Antenna with 3M Cables

Part # 170654-000



### Cable, adapter, and mounts

- Low-loss cable, allowing for lengths of up to 10 meters (32' and 9.70 "), critical for buses, trains, and other commercial transport applications
- 3m RG-174 standard, fully customizable
- SMA (M) standard, fully customizable adapter
- Screw mount

### Features

- 2 x Cellular (2G/3G/4G) Antennas (MIMO) 698-960MHz, 1710-2170MHz, 2300-2700MHz, 2900-3500MHz
  - 1 MIMO main antenna
  - 1 MIMO diversity antenna
- 1 x GPS/GLONASS 1575.42/1602MHz Active Antenna
- 2 x 2.4GHZ/ 5GHz Antennas (MIMO)
  - 1 MIMO main antenna
  - 1\*MIMO diversity antenna
- IP67 Waterproof
- Front End SAW Filter
- High Efficiency/Peak Gain Outdoor Antenna
- RoHS Compliant

### How It Works



# Cradlepoint Antenna Ordering and Installation Guide

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The 5-in-1 GPS-GLONASS, two cellular (3G/4G/LTE) and two WiFi 2.4/5 GHz screw-mount antenna with 3M cables is an omni-directional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

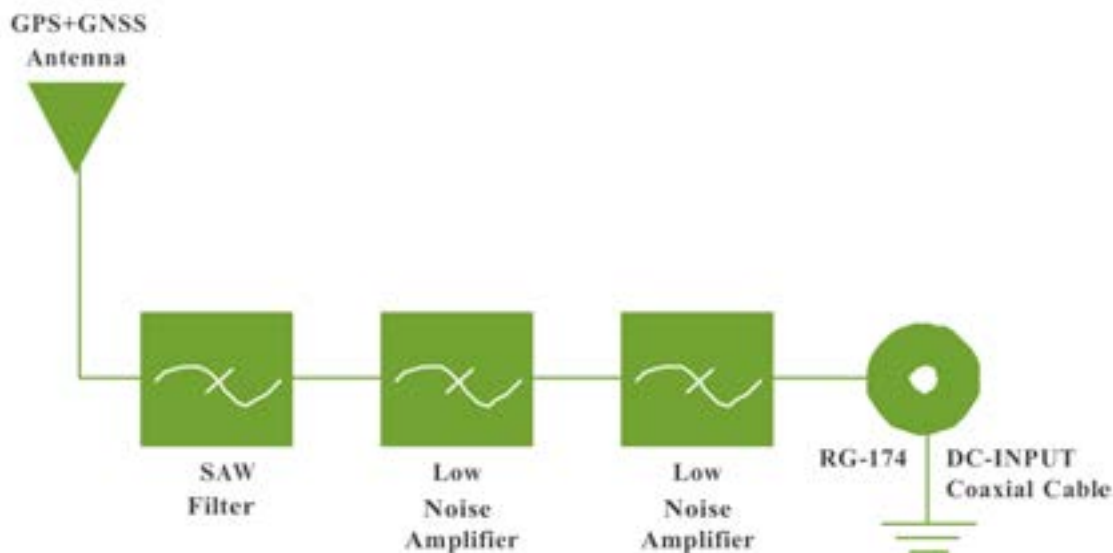
This unique antenna delivers powerful MIMO antenna technology for cellular/LTE and WiFi 802.11n and emerging 802.11ac, plus GPS/GLONASS for next generation multiple wireless technology systems, such as telematics. The GPS/GLONASS antenna has a Front End SAW Filter.

Examples are new fleet management and real time video applications that demand high speed video uplink and downlink. High efficiency and high gain MIMO antennas are necessary to achieve the required signal to noise ratio and throughput required to solve these challenges.

Five (5) high performance antennas are integrated into an extremely robust IP67 direct/permanent mount antenna package with excellent isolation (20dB+).

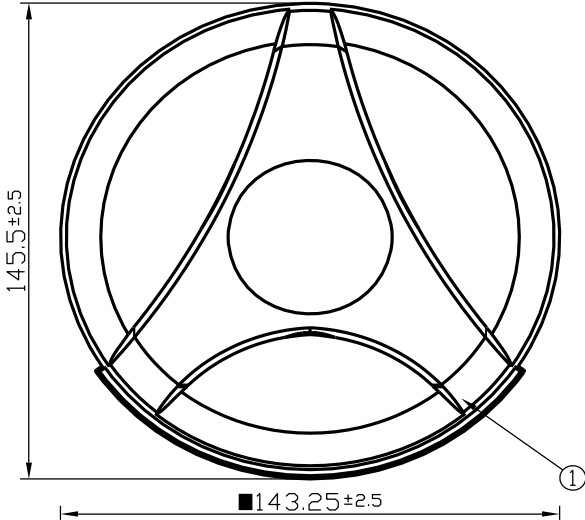
The antenna has its own ground-plane and can radiate on any mounting environment like metal or plastic without affecting performance. The cables are low loss allowing for lengths of up to 10 meters (32' and 9.70"), critical for buses, trains and other commercial transport applications.

Installing the 5-in-1 GPS-GLONASS, Two Cellular (3G/4G/LTE) & Two WiFi 2.4/5 GHz WiFi Screw-mount Antenna with 3M Cables:

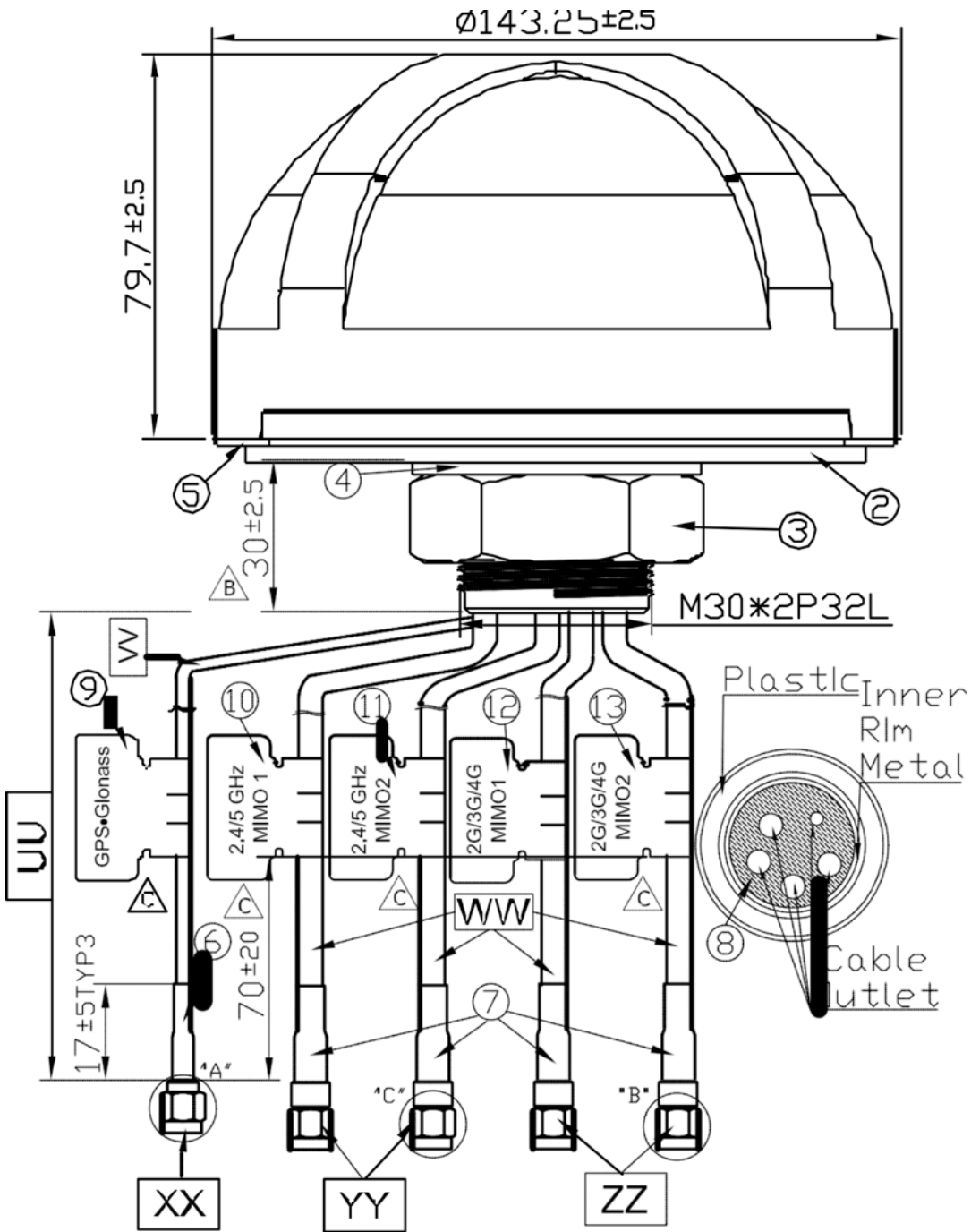


# Cradlepoint Antenna Ordering and Installation Guide

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# Cradlepoint Antenna Ordering and Installation Guide

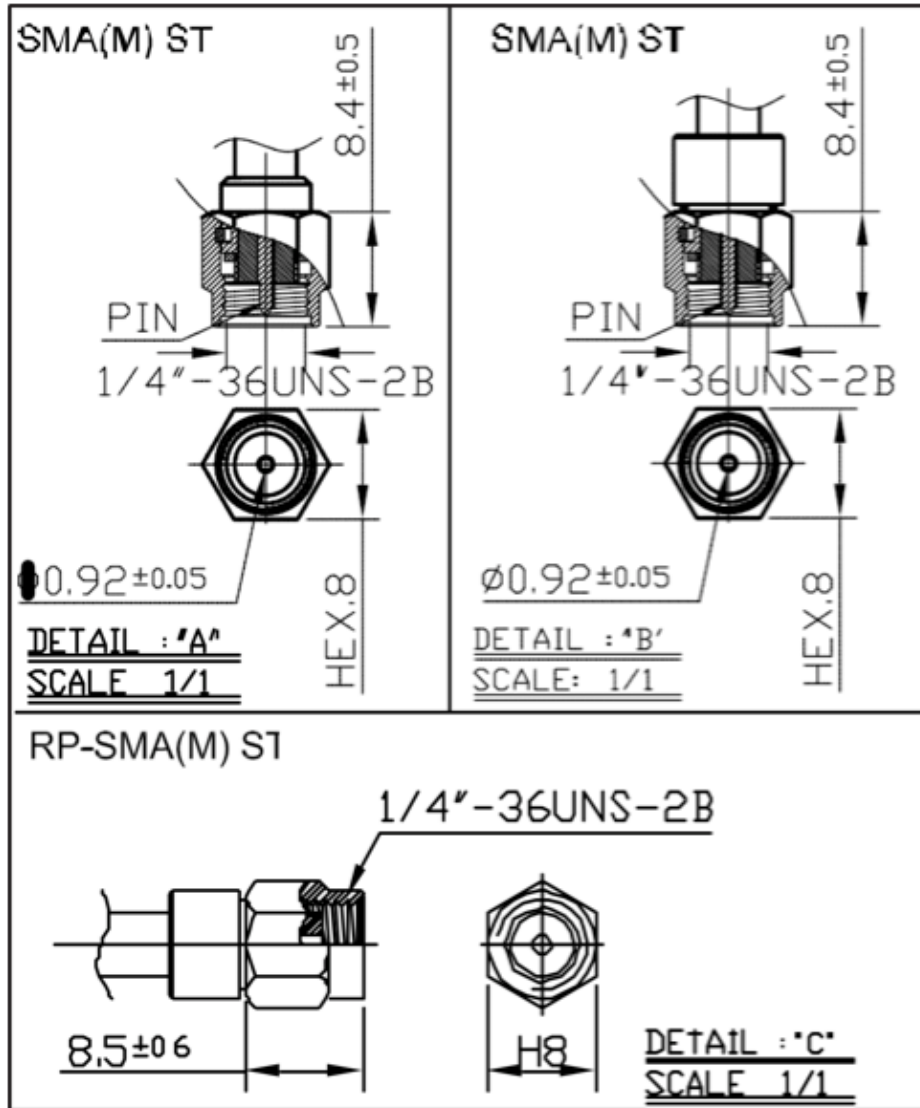


Designation	Name	Material	Finish	QTY
1	Housing	PC 540	Black	1
2	Closed Cell Foam	CR 4305	Black	1

# Cradlepoint Antenna Ordering and Installation Guide

Designation	Name	Material	Finish	QTY
3	M30 Nut	Steel AISI 1215	Ni Plated	1
4	Washer	Steel AISI 1215	Ni Plated	1
5	Waterproof Gasket	Silicon Rubber	Black	1
6	Heat Shrink Tube	PE (RG174)	Black	1
7	Heat Shrink Tube	PE (CFD200)	Black	4
8	Rubber Stopper	Silicon Rubber	Black	1
9	GPS-Glonass Label	Coated Paper	Orange	1
10	2.4/5 GHz MIMO1 Label	Coated Paper	Green	1
11	2.4/5 GHz MIMO2 Label	Coated Paper	Light green	1
12	2G/3G/4G MIMO1 Label	Coated Paper	Gray	1
13	2G/3G/4G MIMO2 Label	Coated Paper	White	1
UU	Cable Length	3000mm ± 30mm		
VV	Cable Type	RG174	Black	1
WW	Cable Type	CFD200	Black	4
XX	Connector Type	SMA(M) ST	Gold	1
YY	Connector Type	RP-SMA(M) ST	Gold	2
ZZ	Connector Type	SMA(M) ST	Gold	2

# Cradlepoint Antenna Ordering and Installation Guide



## Antenna Specifications

2G/3G/4G MIMO						
Frequency (MHz)	698~960	1710~2170	2300~2700	2900-3500		
VSWR	3 Max					
Polarization	Vertical					

# Cradlepoint Antenna Ordering and Installation Guide

Impedance	50Ω					
2.4GHz/ 5GHz MIMO						
Frequency (GHz)	2.4~2.5	4.5~5.85				
VSWR	2 Max					
Polarization	Linear					
Impedance	50Ω					
GPS/GLONASS						
Centre Frequency	1575.42MHz / 1602MHz					
Bandwidth	10MHz					
Radiation Efficiency	50 (without cable)					
Passive Gain @ Zenith	4.0 typ (with $\psi=140\text{mm}$ ground)					
VSWR	2					
Impedance	50Ω					
DC Power Input Range	3 ~ 5V					
DC Input	3.5V		4.0V		5.5V	
MHz	1575.42	1602	1575.42	1602	1575.42	1602
VSWR	2	2	2	2	2	2
LNA Gain	29.2	29	31	31	32.3	32
Noise Figure	3.1	3.1	3.2	3.2	3.4	3.4
Power Consumption	7.5	7.5	9.4	9.4	15	15
Band Attenuation	1520MHz: -20dB	1520MHz: -20dB	1520MHz: -20dB			
	1642MHz: -20dB	1642MHz: -20dB	1642MHz: -20dB			
Cable	3m RG-174 standard, fully customizable					

# Cradlepoint Antenna Ordering and Installation Guide

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Connector	SMA (M) standard, fully customizable					
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## GPS-GLONASS Screw-mount Antenna with 3M Cable

Part # 170651-000

### Cable, adapter, and mounts

- RG-174, 3000±30mm long (fully customizable) cable
- SMA Male (fully customizable) adapter
- Thread mount for pole or mast

### Features

- Height 28.5mm Diameter 47.8mm
- Heavy duty screw mount
- IP67 & IP69K Waterproof Rating  
GPS/GLONASS - 3M RG174 SMA(M)  
Customizable
- ROHS Compliant

### How It Works

The GPS-GLONASS is a high-performance, bolt-mount GPS-GLONASS antenna designed for external use on vehicles and outdoor assets. Designed for heavy duty work with one piece C&C machined nickel plated steel base and threads, there are also convenient side slots for running cables laterally. Durable UV resistant PC housing is resistant to vandalism and direct attack. At only 29mm high it complies with the latest EU directives for height restrictions, while also enabling covert operation with a diameter of only 49mm. The antenna is completely waterproof with an IP67 rating, plus an additional IP69K rating for waterproof resistance against high-pressure water jets used in cleaning.

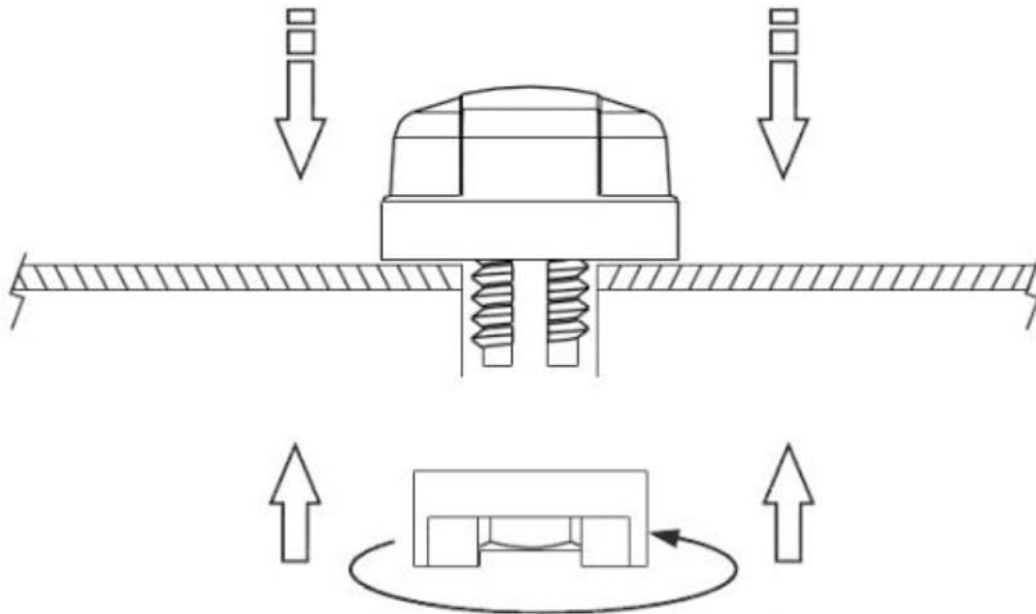
An advanced front end SAW circuit noise filtering design is used to reduce potential interference common in such applications from other nearby high power radio transmitters.



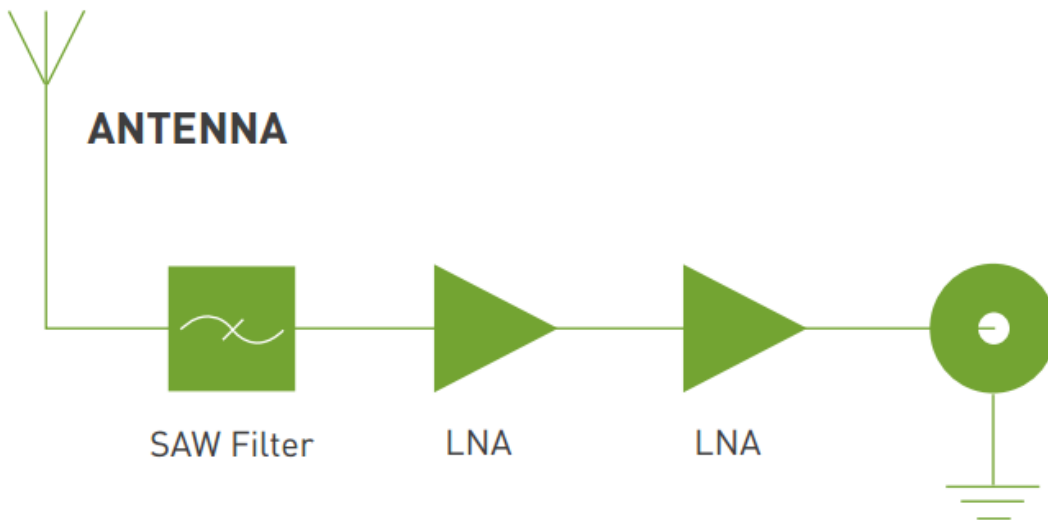


# Cradlepoint Antenna Ordering and Installation Guide

Installing the GPS-GLONASS Screw-mount Antenna:



Recommended torque for Mounting is 24.5N·m  
Maximum torque for mounting is 29.4N·m

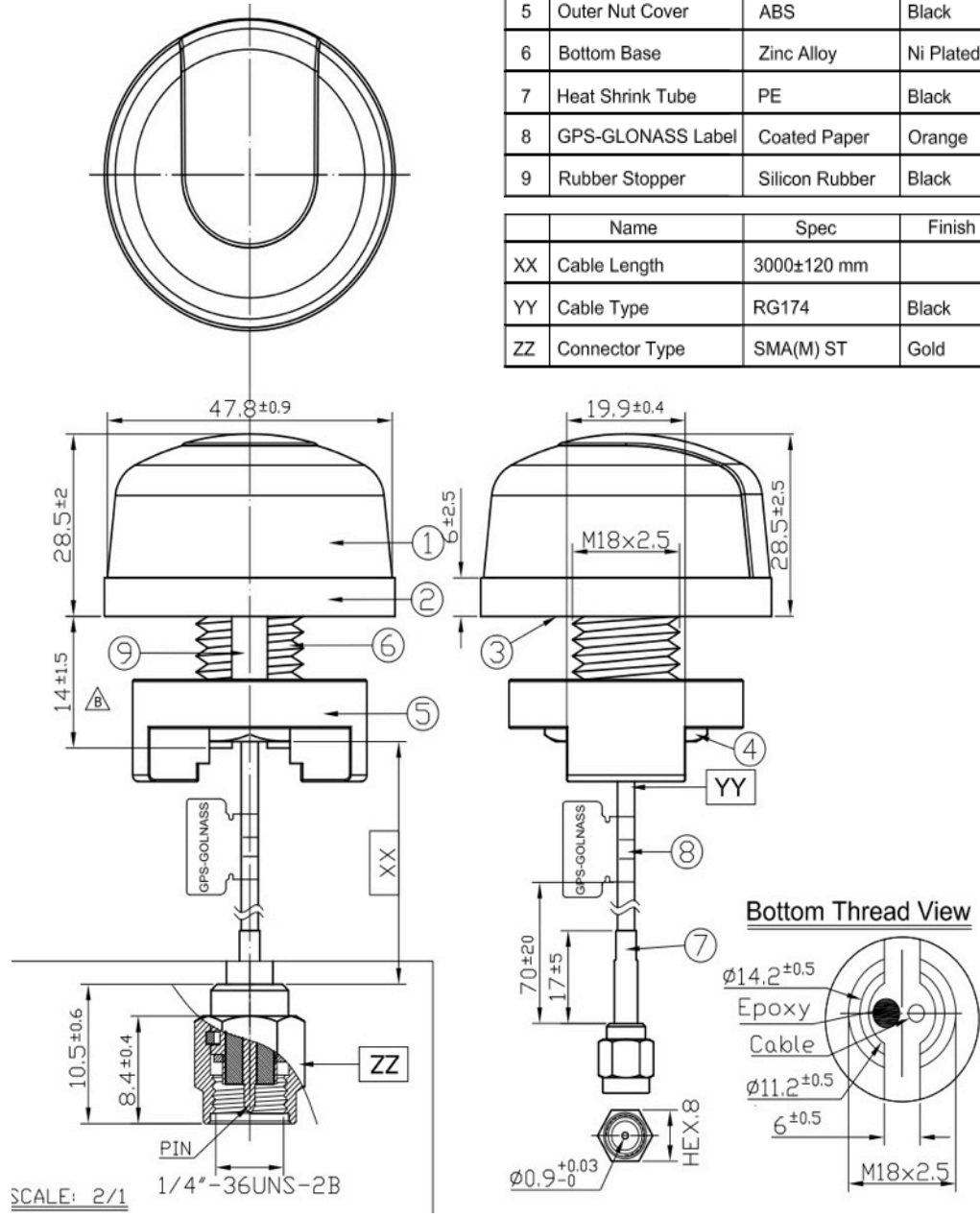


# Cradlepoint Antenna Ordering and Installation Guide

## Package Contents

	Name	Material	Finish	QTY
1	Housing	PC	Black	1
2	Closed Cell Foam	CR 4305	Black	1
3	3M Double Adhesive	3M 9448 HK	White Liner	1
4	M18 Inner Nut	Steel Carbon	Ni Plated	1
5	Outer Nut Cover	ABS	Black	1
6	Bottom Base	Zinc Alloy	Ni Plated	1
7	Heat Shrink Tube	PE	Black	1
8	GPS-GLONASS Label	Coated Paper	Orange	1
9	Rubber Stopper	Silicon Rubber	Black	1

	Name	Spec	Finish	QTY
XX	Cable Length	3000±120 mm		1
YY	Cable Type	RG174	Black	1
ZZ	Connector Type	SMA(M) ST	Gold	1



# Cradlepoint Antenna Ordering and Installation Guide

## Antenna Specifications

ELECTRICAL GPS/GLONASS	
Frequency(MHz)	1574~1606MHz
Impedance(Ohm)	50Ω
GPS Patch Gain@ Zenith GLONASS Patch Gain@ Zenith	-1.4dB Passive Gain @ Zenith -1.3dBi Gain @ Zenith
VSWR	2.0 max
Axial ratio	3.0dB max
Polarization	RHCP
Out Band Rejection	fo = 1575.42MHz fo ± 30 MHz 5dB Min. fo ± 50 MHz 20dB Min. fo ± 100 MHz 25dB Min.
Input Voltage(V)	Typ. 2.5~5.5V
Total Gain @ Zenith	27dB typical at 3.0V
Current consumption(mA)	10mA typical at 3.0V
Noise figure	1.3dB typical
MECHANICAL	
Dimensions	Φ49mm , Height 28.5mm
Cable type	RG174
Cable length	3000±30mm
Casing	UV Resistant PC
Connector	SMA Male
Recommended Mounting Torque	24.5N·m
Maximum Mounting Torque	29.4N·m
ENVIRONMENTAL	
Temperature Range	-40°C to 85°C
Waterproof	IP67 and IP69K
Thermal Shock	100 cycles -40°C to +85°C
Shock (drop test)	1m drop on concrete 6 axes
Humidity	Non-condensing 65°C 95% RH

## GPS-GLONASS Mag-mount Antenna with 3M Cable

Part # 170652-000



### Cable, adapter, and mounts

- 3M RG174 3000±50mm long, fully customizable cable
- SMA(M), fully customizable adapter
- Magnetic mount

### Features

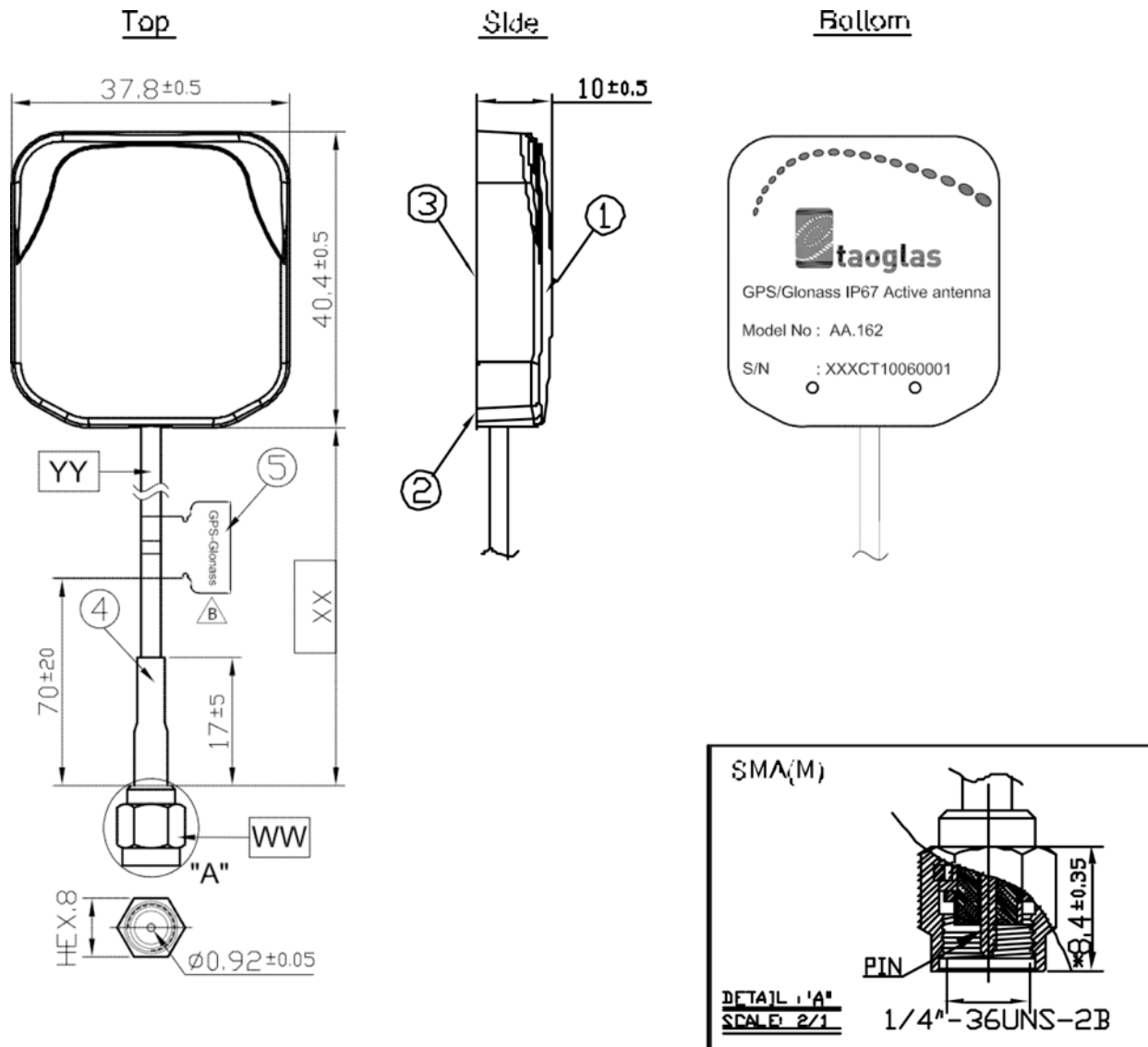
- 1575MHz - 1610MHz
- 40mm\*38mm\*10mm
- 1.8-5.5V
- 3m RG174 SMA(M) IP67 Rated
- Custom cables and connectors available
- RoHS Compliant

### How It Works

The GPS-GLONASS Mag-mount Antenna with 3M Cable has a miniature, super low profile (only 10mm in height). It is designed for applications which require high positioning accuracy by combining signals from GPS and GLONASS systems. A high gain wide-band patch antenna on an integral ground delivers reliable performance. Fully IP67 waterproof rating allows use in outdoors environments. Front end SAW filter configuration eliminates potential LNA burn-out

# Cradlepoint Antenna Ordering and Installation Guide

from nearby out of band radiated power bursts from other antennas that may be co-located nearby.



## Installing the GPS-GLONASS Mag-mount Antenna with 3M Cable:

Designation	Name	Material	Finish	QTY
1	AA.162 Antenna Housing Top	ABS	Black	1
2	AA.162 Antenna Housing Bottom	ABS	Black	1
3	AA.162 Sticker	Gloss Silver PET	Silver	1
4	Heat Shrink Tube	PE	Black	1

# Cradlepoint Antenna Ordering and Installation Guide

5	GPS-Glonass Label	Coated Paper	Orange	1
WW	Connector Type	SMA(M) ST	Gold	1
XX	Cable Length	3000±50mm	1	
YY	Cable Type	RG174	Black	1

## Antenna Specifications

Electrical			
Centre Frequency	1574~1610MHz		
Antenna Gain	26 ± 3dBic @ Zenith @ 1575.42MHz 27 ± 3dBic @ Zenith @ 1602MHz		
VSWR	2.0 max.		
Impedance	50Ω		
Bandwidth	1592±140MHz 15dB Min		
Outer Band Attenuation	-6dBm Min. -2dBm Typ.		
Pout at 1dB Gain Compression Point	1.8V (min.)	3.0V (typ.)	5.5V (max.)
DC input			
LNA Gain	22dB	28dB	31dB
Noise Figure	2.6dB	2.6dB	2.9dB
Power Consumption	5mA	10mA	23mA
Mechanical			
Antenna Dimensions	37.8 x 40.4 x 10mm		
Housing Material	UV Resistant ABS		
Cable	3M RG174 (fully customizable) SMA(M)		
Connector	(fully customizable)		
Environmental			
Operation Temperature	-40° C to 85° C		
Storage Temperature	-40° C to 105° C		
Storage Humidity	40% to 95%		

# Cradlepoint Antenna Ordering and Installation Guide

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Temperature		
Relative Humidity		

## 12" Mag-mount Antenna with 12.5-foot Cable

Part # 170605-000

6.1 dBi gain max

For use with all AER, ARC, and COR products with integrated modems.

*NOTE: LTE band 7 (2600 MHz) is not covered, which affects some international versions (LP2 and LP3 models).*

Cable, adapter, and mounts (pole not included)

- 12.5' cable
- SMA Male adapter
- Optional magnetic wall mount; cable clamps must be vertical

Features

- Connects directly to Cradlepoint modem with included cable and connector
- Multi-band versatility
- Easy to install 12" Magnet Mount Antenna
- Removable - transfer from one vehicle to another
- Omni-directional
- Weatherproof
- Made of stainless steel
- Requires metal mount plane (minimum 3.5 in. diameter)
- 12.5 feet of cable

How It Works

Cradlepoint's dual-band, omni-directional Magnet-Mount Antenna will collect the cell tower signal and send it through the cable to the integrated or embedded Cradlepoint modem and router. When the modem transmits, the signal is transferred directly to the antenna and broadcast back to the cell tower.

Installing the Magnet-Mount Antenna

Attach the Magnet-Mount Antenna to any metal area on top of the roof of the vehicle. The best location is one clear of obstacles and as high on the vehicle as possible. Although small, the rare earth magnet is quite strong and won't fall off at high speeds. Make sure the area under the magnet is clean so as not to damage the vehicle's paint and to ensure a strong connection. Bring the cable into the vehicle through a door frame - the cable is protected by the door's rubber molding. Do not run the cable through a window because when the window is rolled up and the door is opened the antenna cable will be pulled - this is likely to destroy your antenna and/or scratch your paint. Connect the magnet-mount antenna cable to the Cradlepoint router antenna port.





# Cradlepoint Antenna Ordering and Installation Guide

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## Antenna Specifications

**Part Number:** 170605-000

**Frequency Range:** 700-800 MHz, 824-894 MHz, 880-960 MHz, 1710-1880 MHz, 1850-1990 MHz, 2110-2170 MHz

**Impedance:** 50 ohms

**Antenna Gain:** 700-800 MHz, 1.9 dBi / 824-894 MHz, 5.12 dBi / 880-960 MHz, 3.1 dBi / 1710-1880 MHz, -4.0 dBi / 1850-1990 MHz, 6.12 dBi / 2110-2170 MHz, 2.3 dBi

**Radiation:** Omni-directional

**Polarization:** Vertical

**Ground Plane:** Metal Ground Plane required (minimum 3.5 inch diameter)

**Connector:** SMA Male

**Material:** Whip - Stainless Steel

**Coaxial Cable:** RG174 12.5 feet / 3.8 meters

**Height:** 12.25 inches / 31 cm

**Mount:** Rare earth magnet

# Cradlepoint Antenna Ordering and Installation Guide

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## 4" Mini Mag-mount Antenna with 12.5-foot Cable

Part # 170606-000

3.12 dBi gain max

For use with all AER, ARC, and COR products with integrated modems.

*NOTE: LTE band 7 (2600 MHz) not covered, which affects some international versions (LP2 and LP3 models).*

Cable, adapter, and mounts (pole not included)

- 12.5' cable: <http://www.jefatech.com/category/Cradlepoint>
- SMA Male adapter
- Cable clamps must be vertical.

### Features

- Connect directly to Cradlepoint with included cable and connector
- Multi-band versatility
- Easy to install 4" Magnet Mount Antenna
- Removable: transfer from one vehicle to another
- Omni-directional
- Weatherproof
- Requires Metal Mount Plane (minimum 3.5" diameter)
- 12.5 feet of cable



### How It Works

Cradlepoint's Dual-Band Omni-Directional Antenna will collect the cell tower signal and send it through the cable to the integrated or embedded Cradlepoint modem and router. When the modem transmits, the signal is transferred directly to the antenna and broadcast back to the cell tower.

### Installing the Magnet-Mount Antenna

Attach the Magnet-Mount Antenna to any metal area on top of the roof of the vehicle. The best location is one clear of obstacles and as high on the vehicle as possible. Although small, the rare earth magnet is quite strong and won't fall off at high speeds. Make sure the area under the magnet is clean so as not to damage the vehicle's paint and to ensure a strong connection. Bring the cable into the vehicle through a door frame; the cable is protected by the door's rubber molding. Do not run the cable through a window because when the window is rolled up and the door is opened, it will pull the antenna cable. This is likely to destroy your antenna and/or scratch your paint. Connect the magnet-mount antenna cable to the Cradlepoint router antenna port.

# Cradlepoint Antenna Ordering and Installation Guide

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## Antenna Specifications

**Part Number:** 170606-000

**Frequency Range:** 700-800 MHz, 824-894 MHz, 880-960 MHz, 1710-1880 MHz, 1850-1990 MHz, 2110-2170 MHz

**Impedance:** 50 ohms

**Antenna Gain:** 700-800 MHz, 1.7 dBi / 824-894 MHz, 2.12 dBi / 880-960 MHz, 1.5 dBi / 1710-1880 MHz, 3.12 dBi / 1850-1990 MHz, 3.12 dBi / 2110-2170 MHz, 1.4 dBi

**Radiation:** Omni-directional

**Polarization:** Vertical

**Ground Plane:** Metal Ground Plane required (minimum 3.5 inch diameter)

**Connector:** SMA Male

**Material:** Whip - Plastic-coated steel wire

**Coaxial Cable:** RG174 12.5 feet / 3.8 meters

**Height:** 4.2 inches / 10.6 cm

**Mount:** Rare earth magnet

## Multi-band Omni-directional Antenna

Part # 170668-000

50 ohm

For use with all AER, ARC, and COR products with integrated modems.

*NOTE: LTE band 7 (2600 MHz) is not covered, which affects some international versions (LP2 and LP3 models), and causes poor performance for 2100 MHz, which affects some U.S. versions (LPE). Do not use with Verizon XLTE.*

Cable, adapter, and mounts sold separately

- N Male/SMA Male adapter
- Includes optional wall mount
- Cable clamps sold separately

Features

- High-gain
- Weather resistant
- Built-in ground plane
- Slim and unobtrusive
- Mounting bracket included
- Installs easily
- For fixed installations
- About 8" of cable

How It Works

Cradlepoint's Multi-band Omni-directional Antenna will collect the cell tower signal and send it through the cable to the integrated or embedded Cradlepoint modem and router. When the modem transmits, the signal is transferred directly to the antenna and broadcast back to the cell tower.

Thank You for Purchasing a Cradlepoint Antenna

Please read all instructions before installing your antenna and check the parts supplied against those listed in this guide.

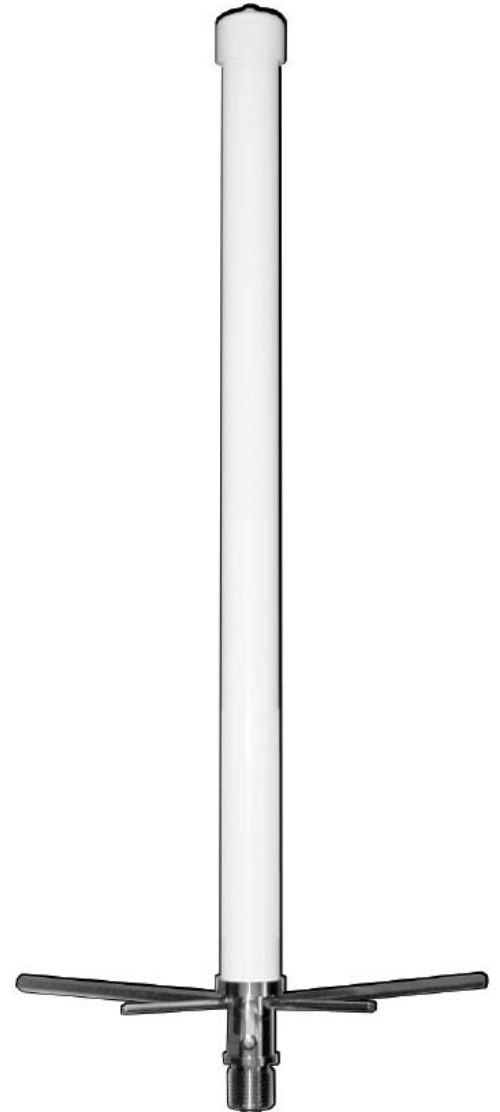
Cradlepoint's weatherproof, fiberglass-encased antenna is omni-directional and ideal for many exterior building locations, such as homes, offices, stores, and warehouses.

The innovative design results in high efficiency and low signal loss, which means more signal supplied to your router's modem. This multi-band, high-performance, omni-directional antenna supports multiple frequencies (specifications below).

Package Contents

1 - Multi-Band Omni-Directional Antenna

1 - L-Bracket



# Cradlepoint Antenna Ordering and Installation Guide

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- 1 - U-bolt assembly
- 1 - N Female - FME Male Connector
- 6 - Radials (3 short, 3 long)
- 4 - 10x1 Phillips round screws
- 1 - Thread-locker liquid

## Determine Your Mounting Location

The antenna should be mounted high on the building with no obstructions. There is a compromise between installing the antenna as high as possible and keeping the cable run short to reduce signal loss. (The longer the cable, the greater the signal loss will be.) For cable runs of less than 20 feet (recommended), Cradlepoint recommends JEFA Tech LL400 cable with N Male, SMA Male connectors (not sold by Cradlepoint). Cradlepoint has tested 20- and 50-foot cables from JEFA Tech and suggests using this configuration. Using less expensive (often higher loss) cables or using extra adapters with other cables may result in significantly reduced performance.

Make sure your mounting location is as far away as possible from other antennas and upright objects such as flagpoles. Be careful not to kink or crush the antenna cable or bend it tightly during installation. This can lead to poor performance and signal loss. It is important to mount the antenna vertically; mounting horizontally or at an angle will significantly degrade performance.

When two antennas are used, there must be at least 1' (12 inches) separation between the edges of the two antennas. This spacing will provide enough spatial diversity in an outdoor environment for MIMO/diversity operation.

## Mount the Antenna

Apply a small amount of thread-locker liquid to the threads on each of the six radials and screw them into the holes at the base of the antenna. Attach the supplied L-bracket to a sturdy vertical surface using four screws. The antenna may also be attached to a pole with the supplied U-bolt assembly (Figure 1). Remove the hex nut and lock washer from the base of the antenna, thread the antenna cable through the large hole in the L-bracket, slip the lock washer and hex nut over the end of the cable, and tighten against the underside of the L-bracket to hold the antenna securely (Figure 2).

**WARNING:** Cradlepoint recommends lightning protection for all installations (not sold by Cradlepoint). JEFA Tech offers one: [jefatech.com/category/Cradlepoint](http://jefatech.com/category/Cradlepoint). Wilson Electronics offers one compatible with this device: Wilson Part# 859988. Take extreme care to ensure that neither you nor the antenna come near any electric power lines.

# Cradlepoint Antenna Ordering and Installation Guide

Figure 1

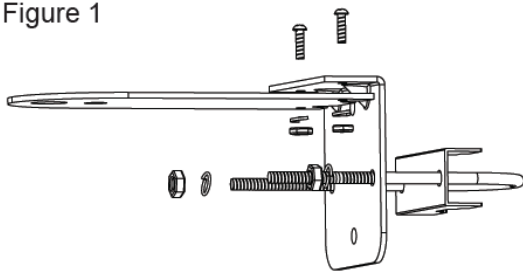
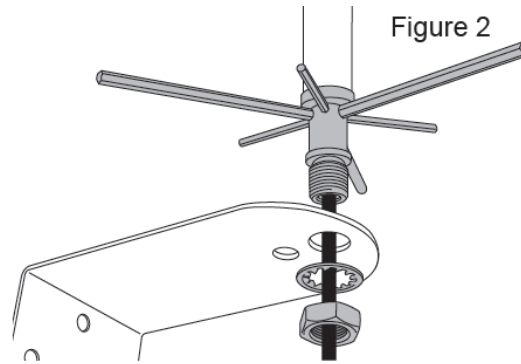


Figure 2



## Connect the Cable

Attach the FME male to N female adapter to the antenna cable connector **FINGER TIGHT ONLY**. Connect the coax extension cable (sold separately) to the antenna cable (N male side), route the extension cable to the router location, and connect to the modem antenna connectors (SMA male side).

## Technical Support

Visit [knowledgebase.Cradlepoint.com](http://knowledgebase.Cradlepoint.com)

**Disclaimer:** The information provided by Cradlepoint is believed to be complete and accurate. However, no responsibility is assumed by Cradlepoint, Inc. for any business or personal losses arising from its use, or for any infringements of patents or other rights of third parties that may result from its use.

## Antenna Specifications

**Part Number:** 170668-000

**Frequency Range:** 698-960 MHz / 1710-2170 MHz / 2496-2690 MHz

**Impedance:** 50 ohms

**Antenna Gain:** 3.5 dBi 698-960 MHz / 4.5 dBi 1710-2170 MHz / 3.1 dBi 2496-2690

**Radiation:** Omni

**Polarization:** Vertical

**Ground Plane:** Built-in

**Connector:** N Type Female

# Cradlepoint Antenna Ordering and Installation Guide

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**Material:** Whip - stainless steel / Casing - Fiberglass

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**Height:** 12.6 inches / 32 cm

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## Outdoor Panel Antenna (Directional Patch)

Part # 170669-000

For use with all AER, ARC, and COR products with integrated modems

Cable, adapter, and mounts sold separately

- N Male/SMA Male adapter
- Includes mount for pole or mast
- Optional wall mount sold separately. This includes pole to mount to wall.
- Cable clamps sold separately

Features

- High-gain
- Directional
- Pipe mounting hardware included
- Installs easily
- Weather resistant
- Wide bandwidth
- 50 Ohms
- VSWR: 2.0 max
- About 8" of cable



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How It Works

Cradlepoint's Outdoor Directional Panel Antenna (Patch) will collect the cell tower signal and send it through the cable to the integrated or embedded Cradlepoint modem and router. When the modem transmits, the signal is transferred directly to the antenna and broadcast back to the cell tower.

Thank You for Purchasing a Cradlepoint Antenna

Please read all instructions before installing your antenna and check the parts supplied against those listed in this guide. Cradlepoint's weather-resistant, encased antenna is an outdoor directional panel antenna ideal for many exterior building locations, such as homes, offices, stores, and warehouses.

The innovative design results in high efficiency and low signal loss, which means more signal supplied to your router's modem. This multi-band, high-performance, directional antenna supports multiple frequencies (specifications below).

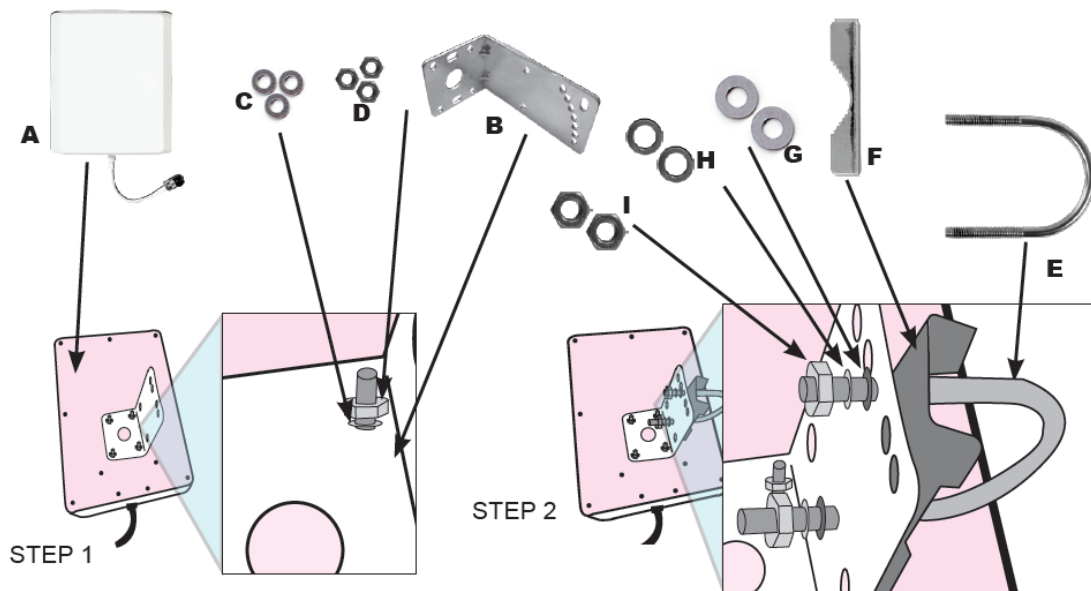
Package Contents

- (A) Outdoor Panel Antenna
- (B) Pole Mounting Bracket



# Cradlepoint Antenna Ordering and Installation Guide

- (C)3 - Small Washers
- (D)3 - Bracket nuts
- (E)1 - U-Bolt
- (F)1 - Pipe Bracket
- (G)2 - Washers
- (H)2 - 1/4" Split-Lock Washers
- (I)2 - 2 - 1/4"-20 nuts



## Antenna Installation

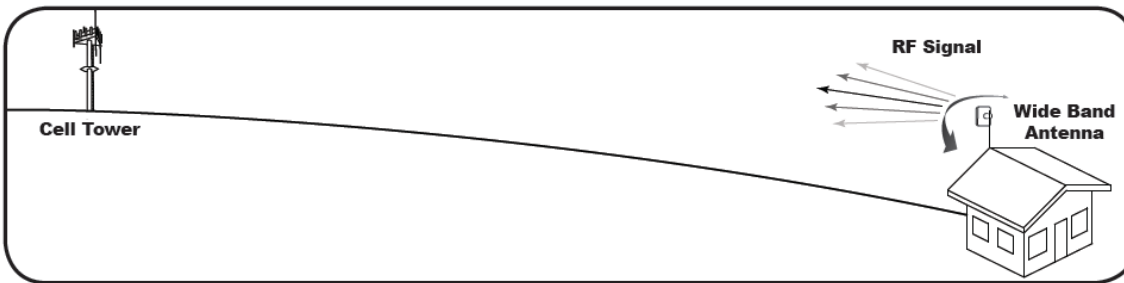
The antenna should be mounted as shown in the illustration above. The included mounting bracket is adjustable and will accommodate pipe diameters from 1.25" to 2" (pipe not included). Mount the antenna so that there is at least a 3' (36 inches) clearance in all directions around it. Position the antenna so that it has the most unobstructed line of sight to the cellular service provider's strongest signal. There is a compromise between installing the antenna as high as possible and keeping the cable run short to reduce signal loss (the longer the cable, the greater the signal loss will be).

For cable runs of less than 20 feet (recommended), Cradlepoint recommends JEFA Tech LL400 cable with N Male, SMA Male connectors (not sold by Cradlepoint). Cradlepoint has tested 20- and 50-foot cables from JEFA Tech and suggests using this configuration. FINGER TIGHT ONLY. Using less expensive (often higher loss) cables or using extra adapters with other cables may result in significantly reduced performance. When two antennas are used, there must be at

# Cradlepoint Antenna Ordering and Installation Guide

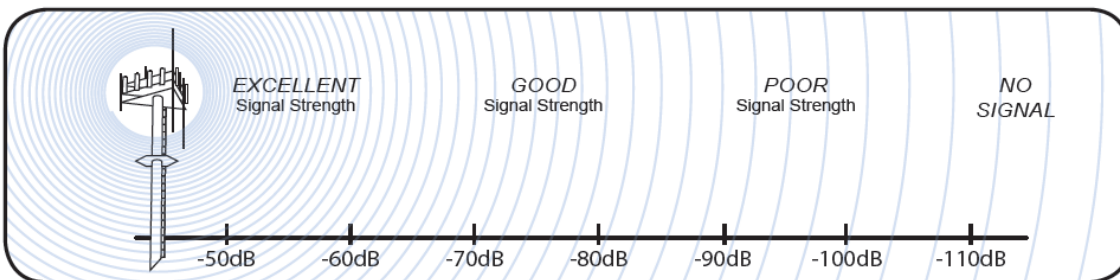
least 1' (12 inches) separation between edges of two antennas. This spacing will provide enough spatial diversity in outdoor environment for MIMO/diversity operation. Both antennas should focus the main beam in the same direction of strong cellular signal.

**WARNING:** Cradlepoint recommends lightning protection for all installations (not sold by Cradlepoint). JEFA Tech offers one: [jefatech.com/category/Cradlepoint](http://jefatech.com/category/Cradlepoint). Wilson Electronics offers one compatible with this device: Wilson Part# 859988. Take extreme care to ensure that neither you nor the antenna come near any electric power lines.



## Adjusting the Antenna for Maximum Performance

To adjust the antenna for best performance, connect it to your router and log into the router (<http://192.168.0.1>) and access the modem signal strength page. Turn the antenna in 10-degree increments while checking the signal level (dBi). At each point you may need to wait a few seconds as the display updates. Signal readings appear as a negative number (for example, -86). The larger the number, the more powerful the signal (-75 is stronger than -84). Once you have obtained the strongest signal, fully tighten the mounting hardware. Disconnect the cable and route the extension cable to the router location and reconnect. Weatherproof all connections.



## Antenna Specifications

Part Number: 170669-000

Frequency Range: 698-824 MHz / 824-894 MHz / 880-960 MHz / 1710-1880 MHz / 1850-1990 MHz / 1920-2170 MHz / 2490-2690 MHz

Nominal Impedance: 50 ohms

# Cradlepoint Antenna Ordering and Installation Guide

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**Antenna Gain:** 4.76 dBi 698-824 MHz / 3.42 dBi 824-894 MHz / 3.07 dBi 880-960 MHz / 5.04 dBi 1710-1880 MHz / 5.12 dBi 1850-1990 MHz / 5.08 dBi 1920-2170 MHz / 2.41 dBi 2490-2690 MHz

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**Horizontal Beamwidth:** 70 degrees

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**Vertical Beamwidth:** 50 degrees

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**Polarization:** Vertical

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**Maximum Power:** 100 watts

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**Connector:** SMA Male Standard

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**Dimension:** 164 x 164 x 36.5 mm

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**Weight:** 400 g

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**Radome Material:** UV Protection ABS

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## 700 MHz - 2700 MHz Wide Band Directional Antenna (Yagi/Log-Periodic)

Part # 170588-000

For use with all AER, ARC, and COR products with integrated modems.

Cable, adapter, and mounts sold separately

- N Male/SMA Male adapter
- Includes mount for pole or mast
- Cable clamps sold separately

### Features

- High-gain
- Directional
- Pipe mounting hardware included
- Installs easily
- Weather resistant
- Wide bandwidth
- 50 Ohms
- VSWR: 1.5 Max
- About 8" of cable



**Disclaimer:** The information provided by Cradlepoint is believed to be complete and accurate. However, no responsibility is assumed by Cradlepoint, Inc. for any business or personal losses arising from its use, or for any infringements of patents or other rights of third parties that may result from its use.

### How It Works

Cradlepoint's Wide Band Directional Antenna (Log-Periodic) will collect the cell tower signal and send it through the cable to the integrated or embedded Cradlepoint modem and router. When the modem transmits, the signal is transferred directly to the antenna and broadcasted back to the cell tower.

### Thank You for Purchasing a Cradlepoint Antenna

Please read all instructions before installing your antenna, and check the parts supplied against those listed in this guide. Cradlepoint's weather resistant, encased antenna is wide band log periodic directional and ideal for many exterior building locations, such as homes, offices, stores and warehouses.

# Cradlepoint Antenna Ordering and Installation Guide

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The innovative design results in high efficiency and low signal loss, which means more signal to your router's modem. This multi-band, high-performance, directional antenna supports multiple frequencies (Specifications below).

## Package Contents

(A) Wide Band Log Periodic Directional Antenna & L Bracket

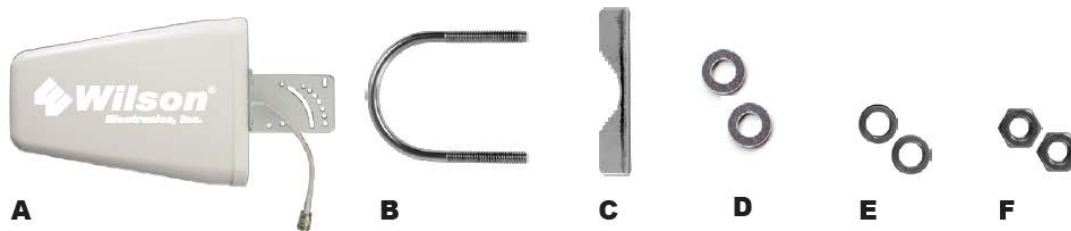
(B) 2 - U-Bolts

(C) 2 - Pipe Brackets

(D) 4 - 1/4" Washers

(E) 4 - 1/4" Split-Lock Washers

(F) 4 - 1/4"-20 nuts



## Antenna Mounting Instructions

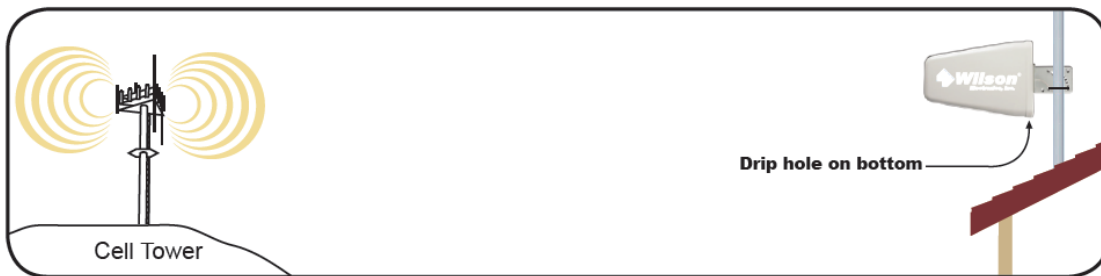
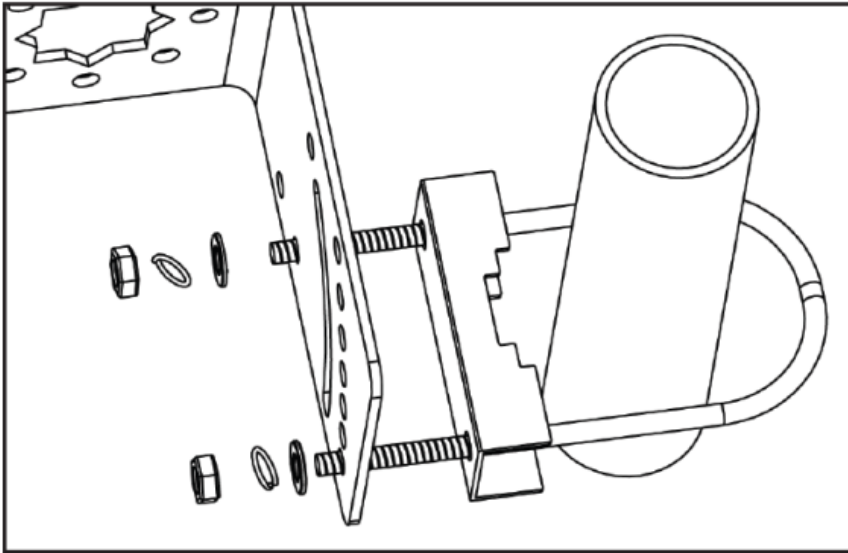
- 1 - Install U-Bolt (B) on pole.
- 2 - Slide Pipe Clamp (C) over U-Bolt (B) Flat side away from pipe.
- 3 - Slide antenna bracket (A) onto U-Bolt (B) in desired location.

*NOTE: Antenna may be installed on a variety of pipe angles; ensure antenna is pointing at cell tower and is vertical with the drip hole at the bottom.*

- 4 - Install Flat washer (D), split lock washer (E) and nut (F), tighten as appropriate.

# Cradlepoint Antenna Ordering and Installation Guide

*NOTE: A second U-Bolt assembly has been included to strengthen antenna mounting in windy areas. Repeat steps 1 through 4 to install.*



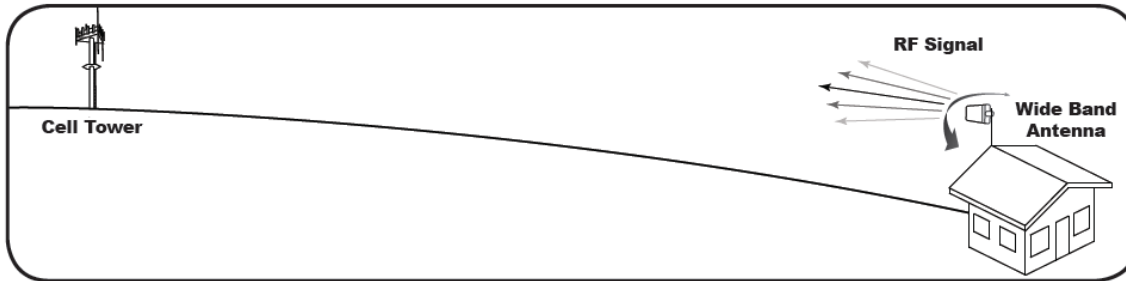
## Antenna Installation

The antenna should be mounted as shown in the illustration above. The included mounting bracket is adjustable and will accommodate pipe diameters from 1.25" to 2" (pipe not included). Mount the antenna so that there is at least 3 feet of clearance in all directions around it. Position the antenna so that it has the most unobstructed line of sight to the cellular service provider's strongest signal. There is a compromise between installing the antenna as high as possible and keeping the cable run short to reduce signal loss. (The longer your cable, the greater the signal loss will be.)

For cable runs of less than 20 feet (recommended), Cradlepoint recommends JEFA Tech LL400 cable with N Male, SMA Male connectors (not sold by Cradlepoint). Cradlepoint has tested 20 and 50 foot cables from JEFA Tech and suggests using this configuration. FINGER TIGHT ONLY. Using less expensive (often higher loss) cables or using extra adapters with other cables may result in significantly reduced performance. When two antennas are used, there must be at least 1' (12 inches) separation between the edges of the two antennas. This spacing will provide enough spatial diversity in outdoor environments for MIMO/diversity operation. Both antennas should focus the main beam in the same direction of strong cellular signal.

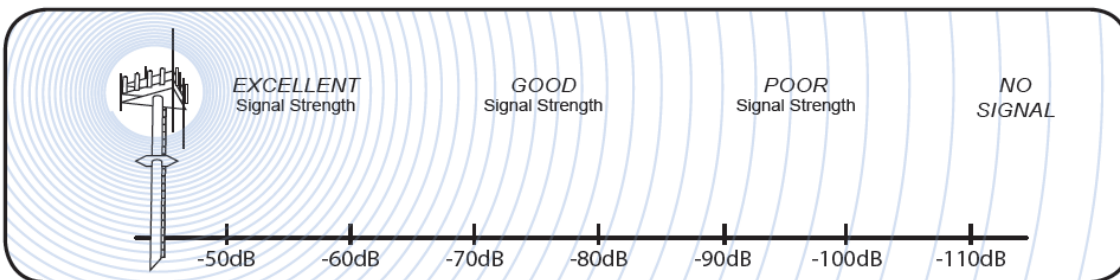
# Cradlepoint Antenna Ordering and Installation Guide

**WARNING:** Lightning protection is recommended for all installations (not sold by Cradlepoint). JEFA Tech offers one: [jefatech.com/category/Cradlepoint](http://jefatech.com/category/Cradlepoint). Wilson Electronics offers one compatible with this device: Wilson Part# 859988. Take extreme care to ensure that neither you nor the antenna come near any electric power lines.



## Adjusting the Antenna for Maximum Performance

To adjust the antenna for best performance, connect it to your router, log into the router (<http://192.168.0.1>) and access the modem signal strength page. Turn the Antenna in 10-degree increments while checking the signal level (dBi). At each point you may need to wait a few seconds as the display updates. Signal readings appear as a negative number (for example, -86). The larger the number, the more powerful the signal (-75 is stronger than -84). Once you have obtained the strongest signal, fully tighten the mounting hardware. Disconnect the cable, route the extension cable to the router location, and reconnect. Weatherproof all connections.



## 700 MHz - 2700 MHz Wide Band Directional Antenna (Yagi/Log-Periodic)

### Antenna Specifications

Part Number: 170589-000

Frequency Range: 700-800 MHz / 800-915 MHz / 915-1710 MHz / 1710-1850 MHz / 1850-1990 MHz / 1990-2700 MHz

Nominal Impedance: 50 ohms

# Cradlepoint Antenna Ordering and Installation Guide

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**Antenna Gain:** 8.0 dBi 700-800 MHz / 8.0 dBi 800-915 MHz / 7.0 dBi 915-1710 MHz / 9.0 dBi 1710-1850 MHz / 10.5 dBi 1850-1990 MHz / 10.0 dBi 1990-2700 MHz

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**Horizontal Beamwidth:** 70 to 90 degrees

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**Vertical Beamwidth:** 85 to 110 degrees

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**F/B ratio:** >20 dB

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**Polarization:** Vertical

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**Maximum Power:** 100 watts

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**Connector:** N-Female (requires cable to connect to Cradlepoint router)

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**Dimension:** 11.4" x 8.3" x 2.6"

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**Weight:** 3.3 lbs

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**Temperature Range:** -40 to 158 °F (-40 to 70 °C)

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**Rated Wind Velocity:** 134 MPH

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**Lightning protection:** DC grounded

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