

# Part No. 9001169

## GPS FPC Embedded Antenna with LNA

**Center Frequency 1575.42 MHz**

Supports: GPS L1 band and Galileo E1, Tracking, Smart Home, Agriculture, Smart Metering, Healthcare, M2M, Industrial Devices



Ethertronics' active GPS Antenna delivers high RF performance and functionality in M2M designs where a more standard GPS patch approach is not possible. This innovative antenna provides compelling advantages for GPS enabled M2M / IoT applications such as vehicle tracking or asset tracking. Based on a flexible substrate, this active GPS antenna is able to maintain high efficiency in various device configurations. In addition, the 9001169 antenna embeds a low power consumption LNA that facilitates its integration in the end product.

### Electrical Specifications

Typical Characteristics, antenna with 100 mm cable mounted directly on plastic material

Frequency ( MHz )	1559 - 1591
Return Loss	> 9 dB
Average Efficiency	55%
Polarization	Linear
Radiation Pattern	Omni-directional
Filter / LNA at DC 3.0 V	
Gain (dB)	16.8
Noise Figure (dB)	< 1*
Current (mA)	3.9
Full System (Antenna + LNA and Filter)	
Average Gain	15.81dB @ 3.30 V 15.72 dB @ 2.70 V 14.84 dB @ 1.80 V
Feed Point Impedance	50 ohms unbalanced
Operation Voltage (V)	+1.5 to +3.5
Current (mA)	3.9
Environmental Specifications/ Conditions	
Operating Temperature Range	-40°C~+85°C
Storage Humidity Range	65±20% RH

### Mechanical Specifications & Ordering Part Number

Ordering Part Number	9001169
Dimensions (mm)	41.0 ± 0.2 length 15.5 ± 0.2 width
Connector Type	u.fl
Cable	100 mm

\*Value is calculated from the datasheet of the components

### Active GPS Antenna

GPS L1 Band : 1563 - 1587 MHz  
GALILEO E1 Band: 1559 - 1591 MHz

#### KEY BENEFITS

##### Reduced Costs and Time-to-Market

Standard antenna eliminates design fees and cycle time associated with a custom solution; getting products to market faster.

##### Greater Flexibility with Unique Form Factors

Ethertronics' technology helps you deliver more advanced ergonomic designs without adverse impact on product performance.

##### RoHS Compliant

Products are the latest RoHS version compliant.

#### APPLICATIONS

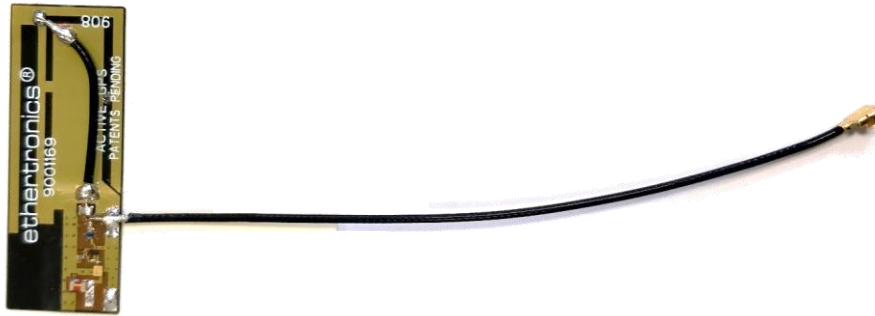
- Smart metering
- M2M
- Industrial devices
- IoT
- Tracking



**Ethertronics' External GPS Active Antenna Specifications**  
Ethertronics produces a wide variety of standard and custom antennas to meet user needs

**Test Setup – Passive Antenna Only**

Typical performance with 100 mm u.fl cable

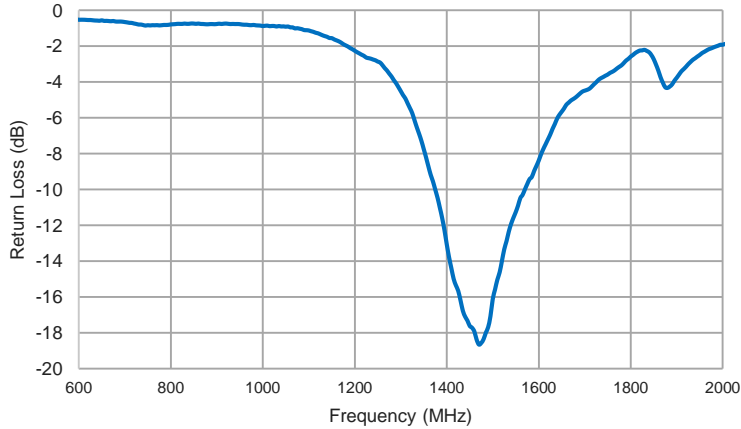


The location of the cable is changed to evaluate only the performance of the passive FPC antenna. Antenna is stuck to a piece of plastic made of ABS.

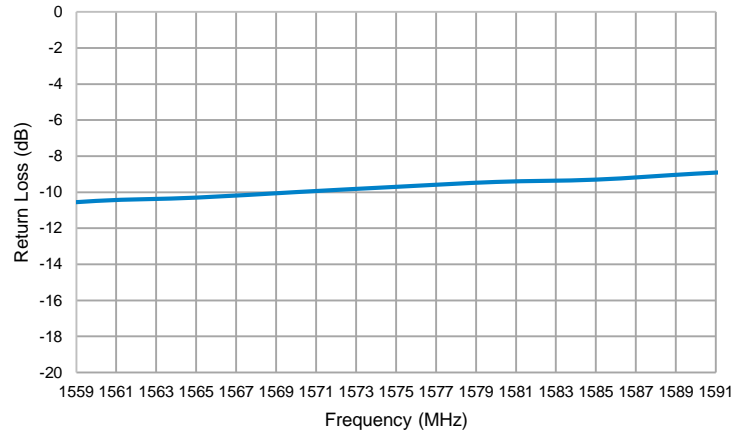
**Return Loss, Efficiency and Peak Gain Plots**

Typical performance antenna with 100 mm cable mounted directly on plastic material

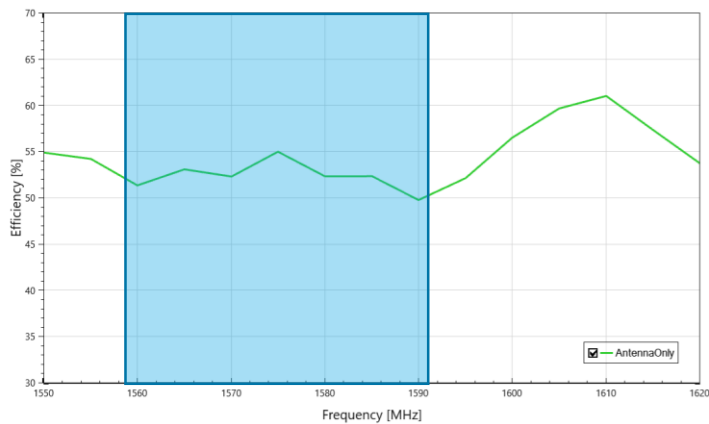
**Return Loss wide band**



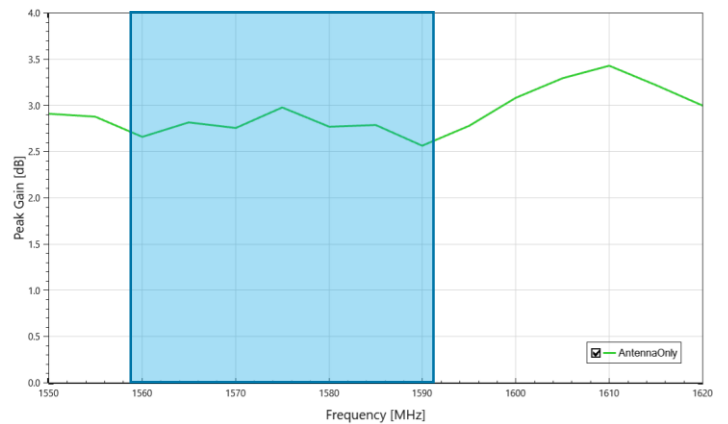
**Return Loss narrow band**



**Efficiency (%)**



**Peak Gain (dB)**

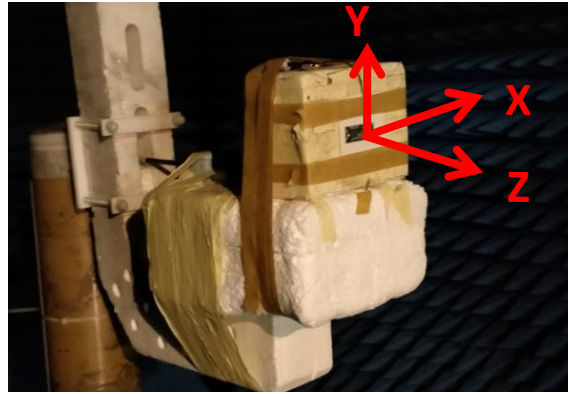




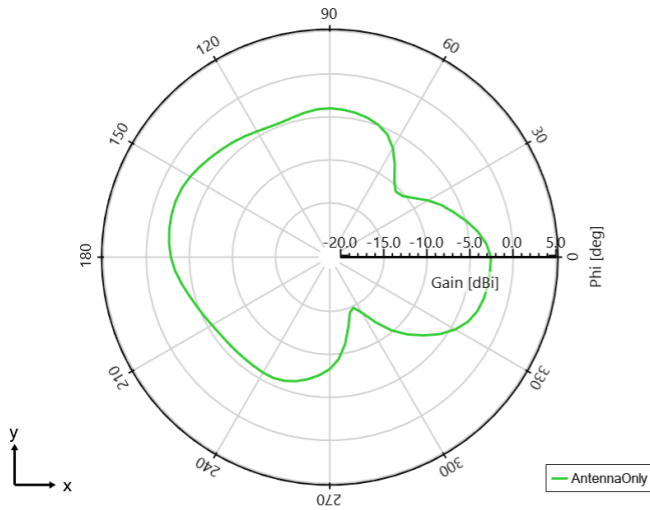
Ethertronics' External GPS Active Antenna Specifications.  
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### Radiation Patterns - Passive Antenna Only

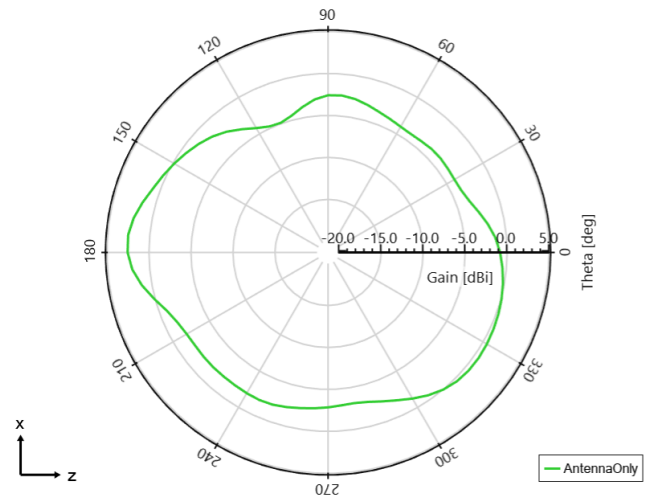
Typical performance with 100 mm u.fl cable



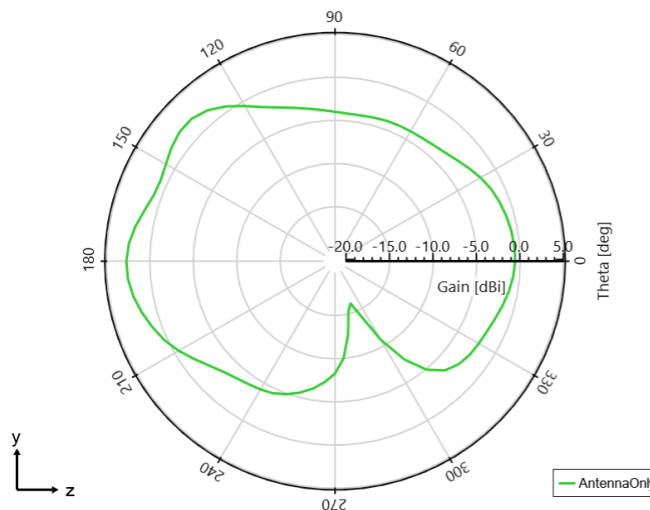
Gain (Total) -  $\theta = 90$  deg - 1575 MHz [Plane XY]



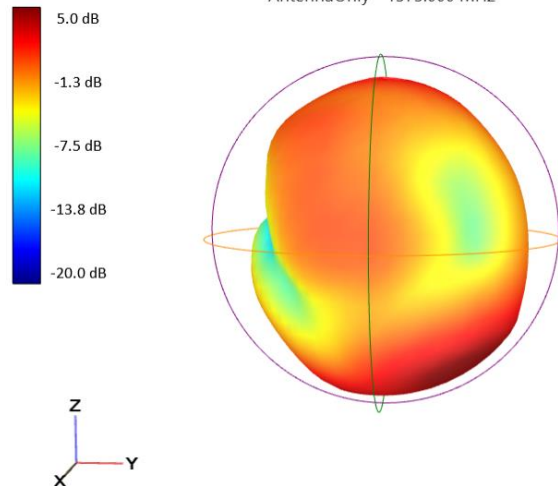
Gain (Total) -  $\phi = 0$  deg - 1575 MHz [Plane XZ]



Gain (Total) -  $\phi = 90$  deg - 1575 MHz [Plane YZ]



AntennaOnly - 1575.000 MHz

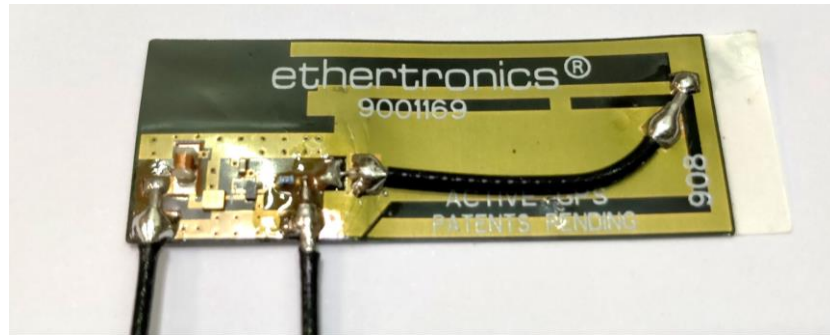




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Test Setup – Filter and LNA Only

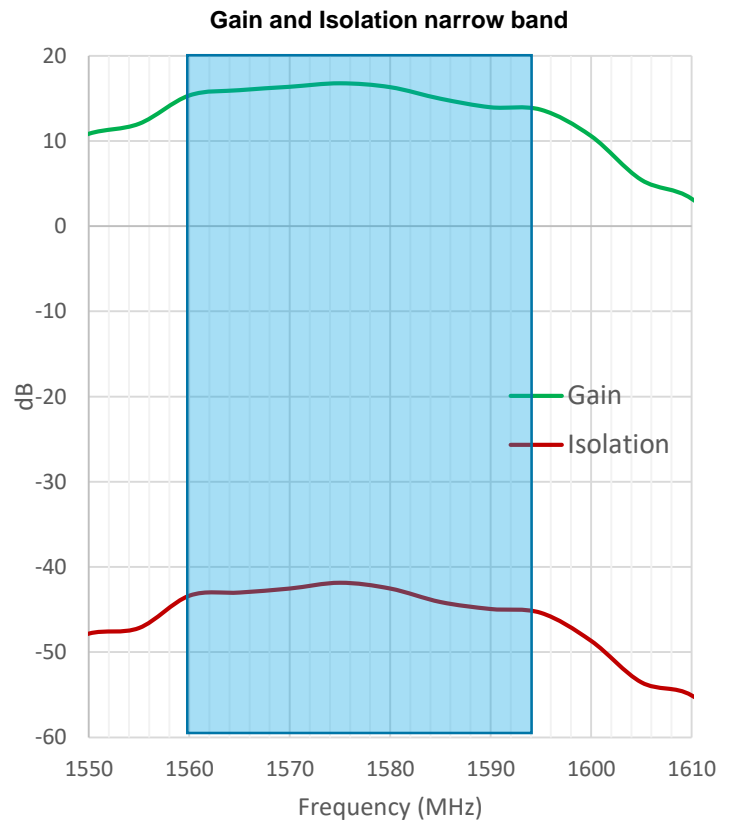
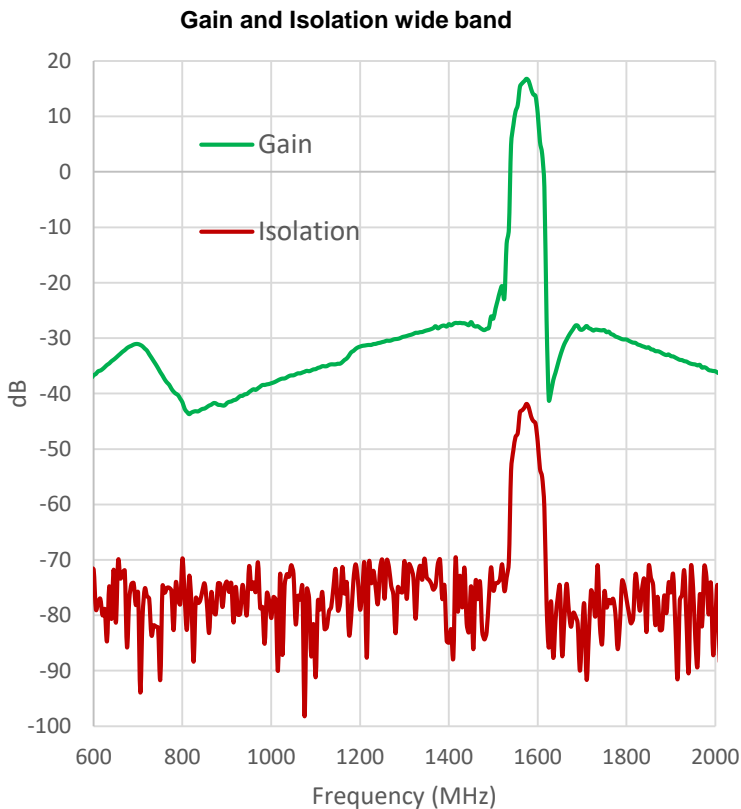
Typical performance – VNA RF power -20dBm, DC Supply 3.0V



Additional 100mm u.fl cable is soldered to evaluate the active circuitry.

Gain, Out of band Rejection and Isolation Plots

Typical performance – VNA RF power -20dBm, DC Supply 3.0V





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Test Setup – Full System (Antenna + Filter and LNA)

Typical performance with various DC voltage level supplies

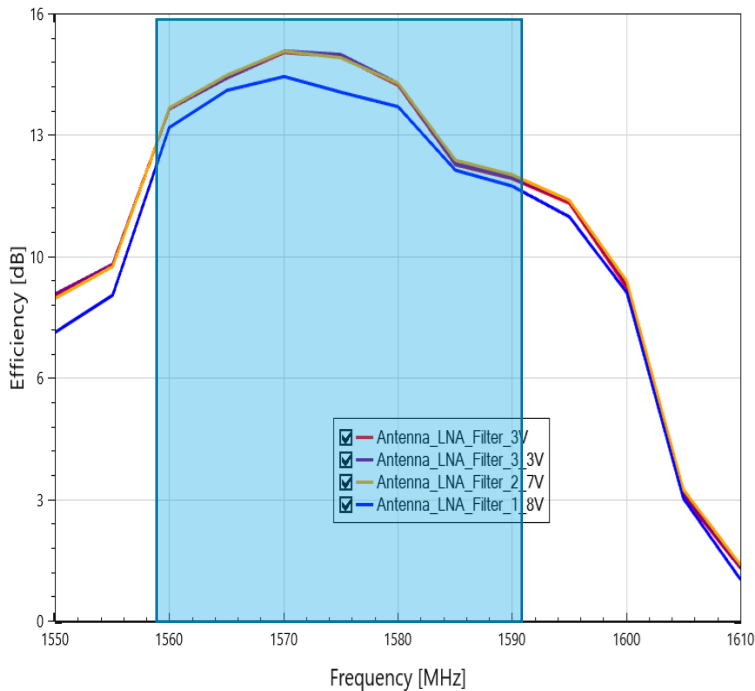


Antenna is stuck to a piece of plastic made of ABS

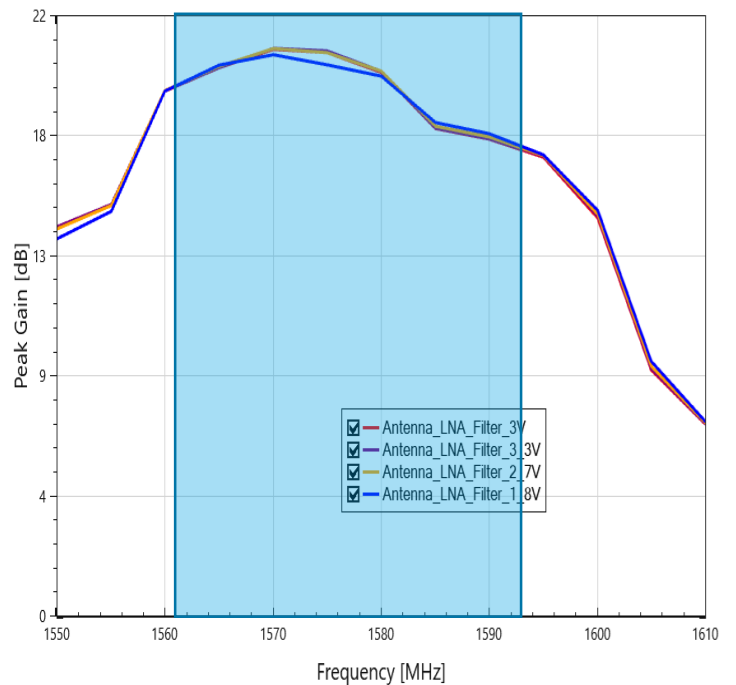
Efficiency and Peak Gain Plots

Typical performance with various DC voltage level supplies

Efficiency (with LNA)



Peak Gain (with LNA)

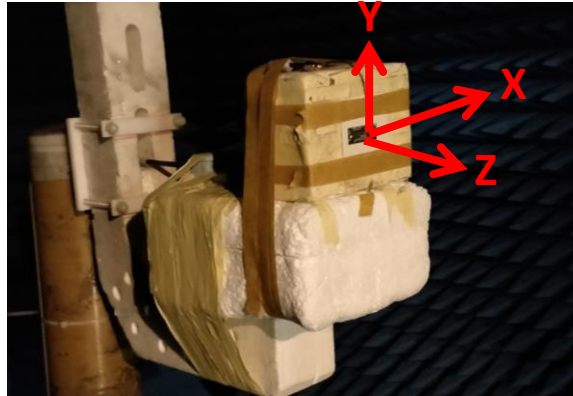




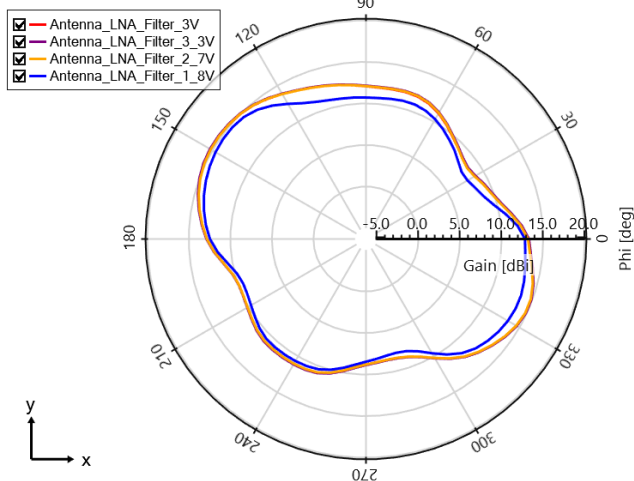
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**Radiation Patterns - Full System (Antenna + Filter and LNA)**

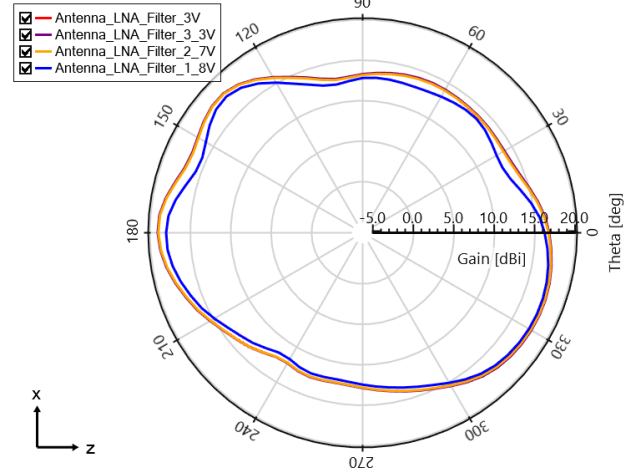
Typical performance with various DC voltage level supplies



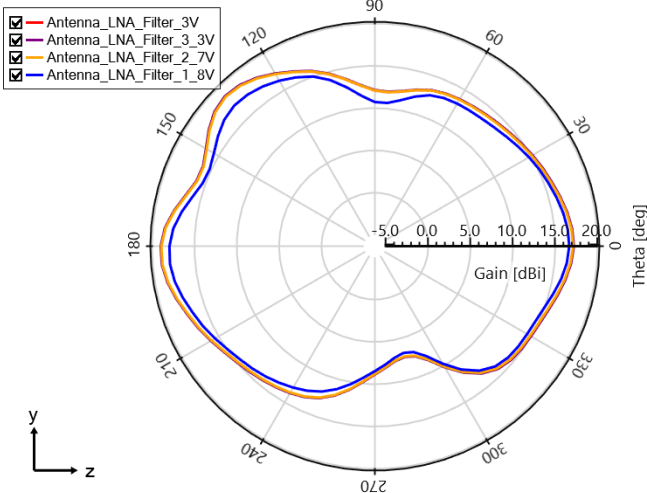
Gain (Total) -  $\theta = 90$  deg - 1575 MHz [Plane XY]



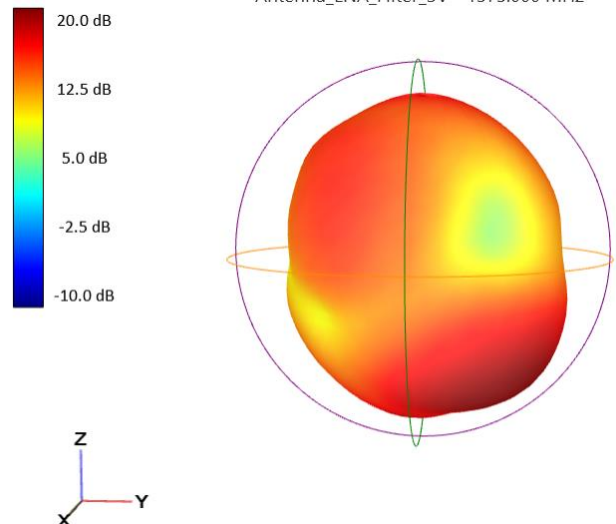
Gain (Total) -  $\phi = 0$  deg - 1575 MHz [Plane XZ]



Gain (Total) -  $\phi = 90$  deg - 1575 MHz [Plane YZ]



Antenna\_LNA\_Filter\_3V - 1575.000 MHz





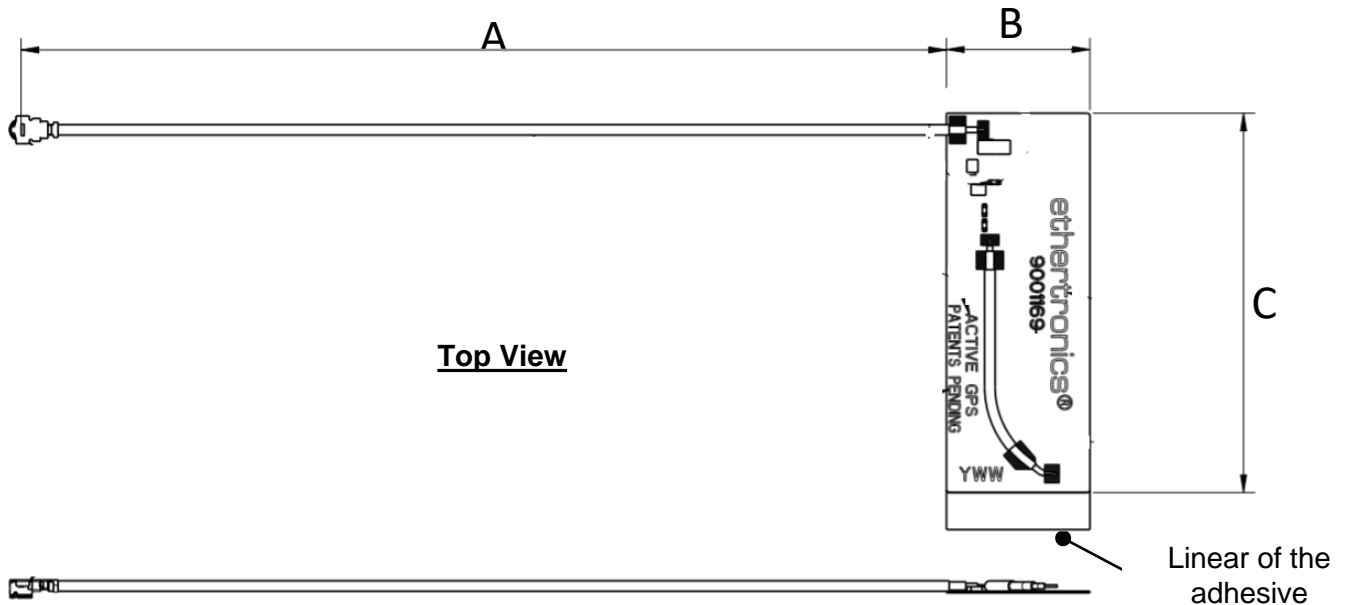


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**Mechanical Dimensions**

Typical antenna dimensions (mm)

Ordering Part Number	A (mm)	B (mm)	C (mm)	Connector
9001169	100.0 ± 3.0	15.5 ± 0.2	41.0 ± 0.2	u.fl compatible



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