

# 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



KYOCERA AVX' 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

KYOCERA AVX' 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

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

**Test Setup – Passive Antenna Only**

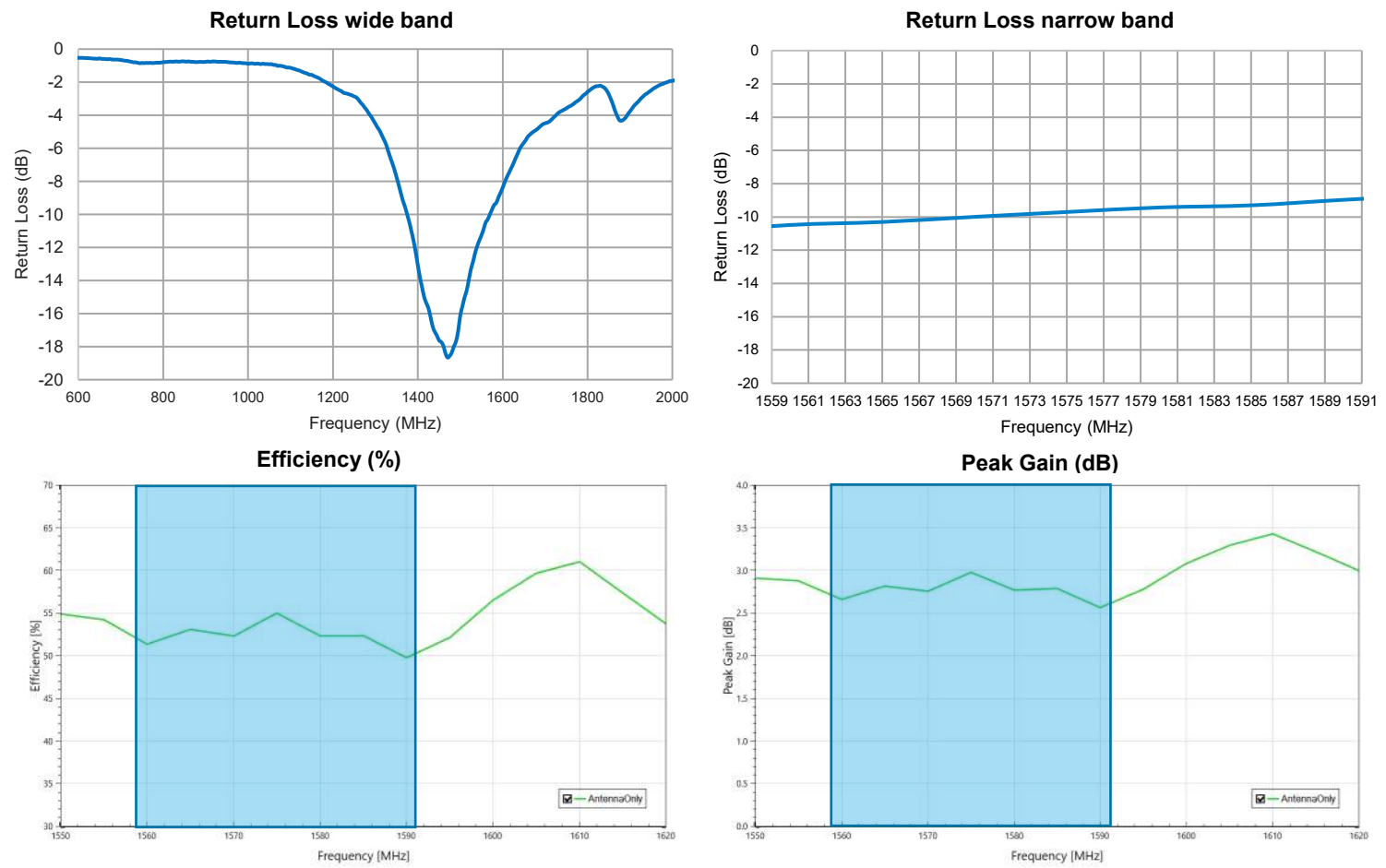
Typical performance with 100 mm u.fl cable



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**

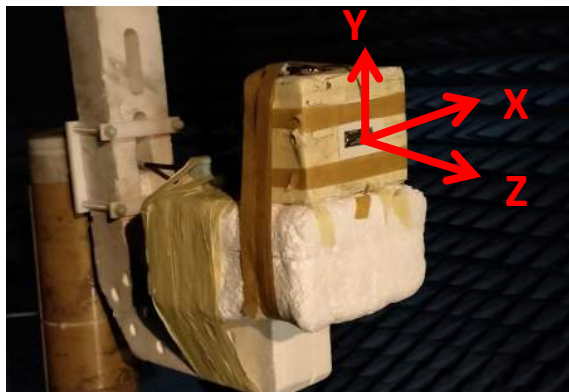
Typical performance antenna with 100 mm cable mounted directly on plastic material



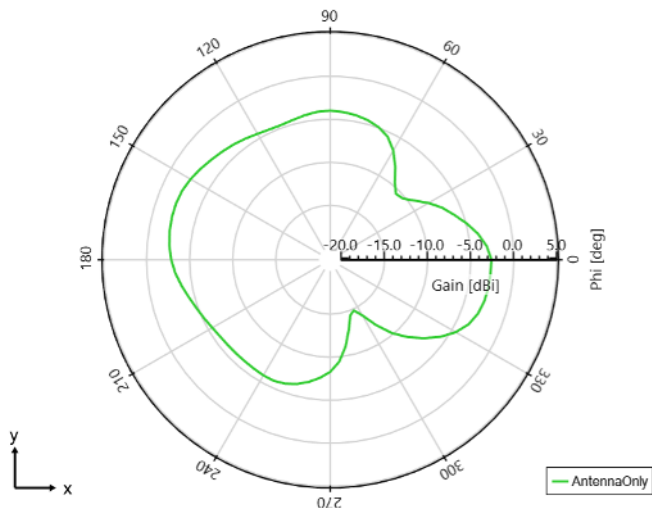
KYOCERA AVX' External GPS Active Antenna Specifications.  
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**Radiation Patterns - Passive Antenna Only**

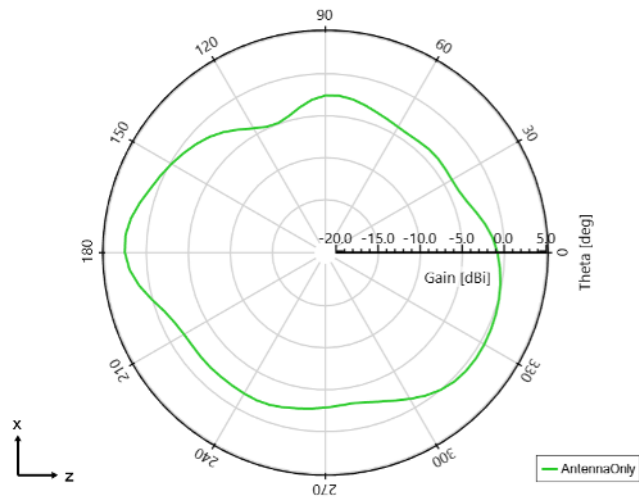
Typical performance with 100 mm u.fl cable



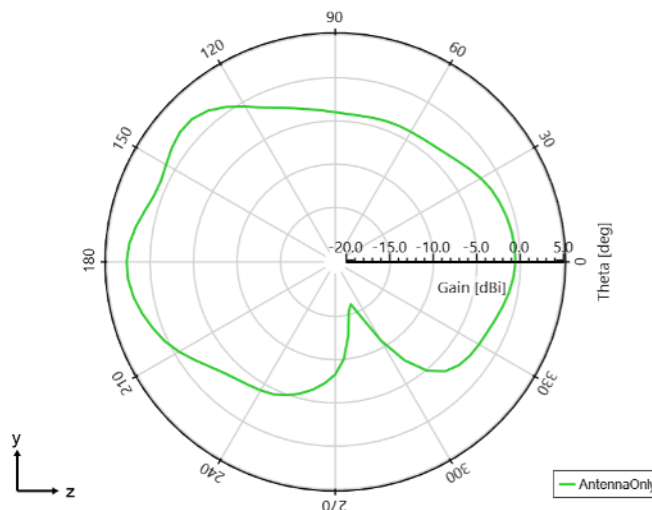
Gain (Total) -  $\theta = 90$  deg - 1575 MHz [Plane XY]



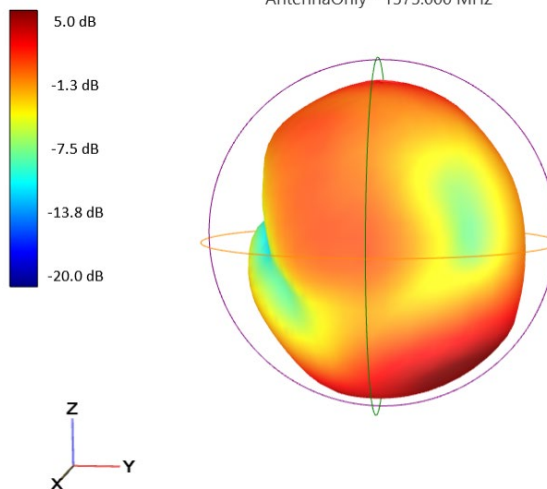
Gain (Total) -  $\phi = 0$  deg - 1575 MHz [Plane XZ]



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



AntennaOnly - 1575.000 MHz



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**Test Setup – Filter and LNA Only**

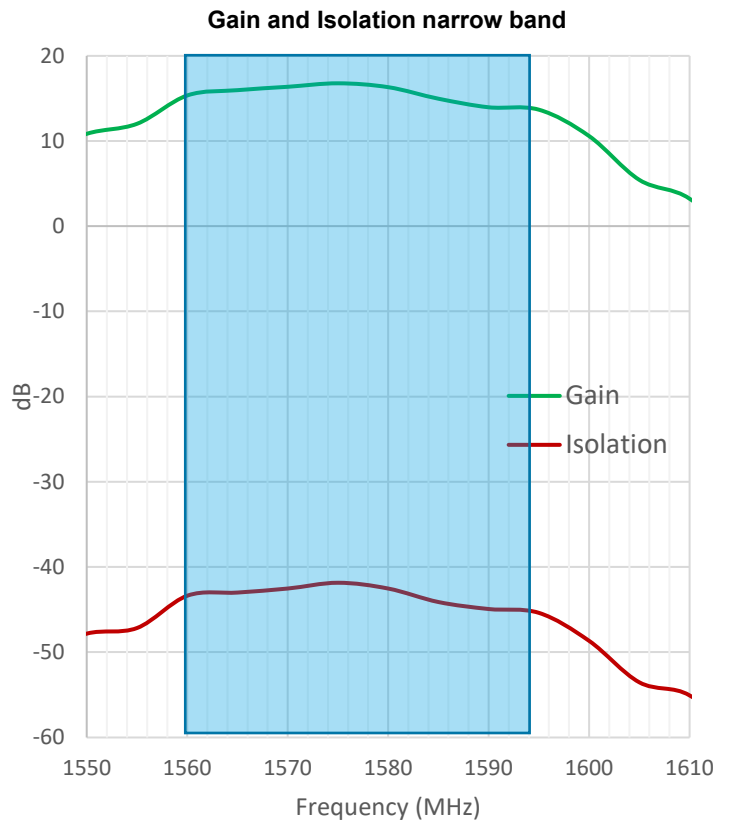
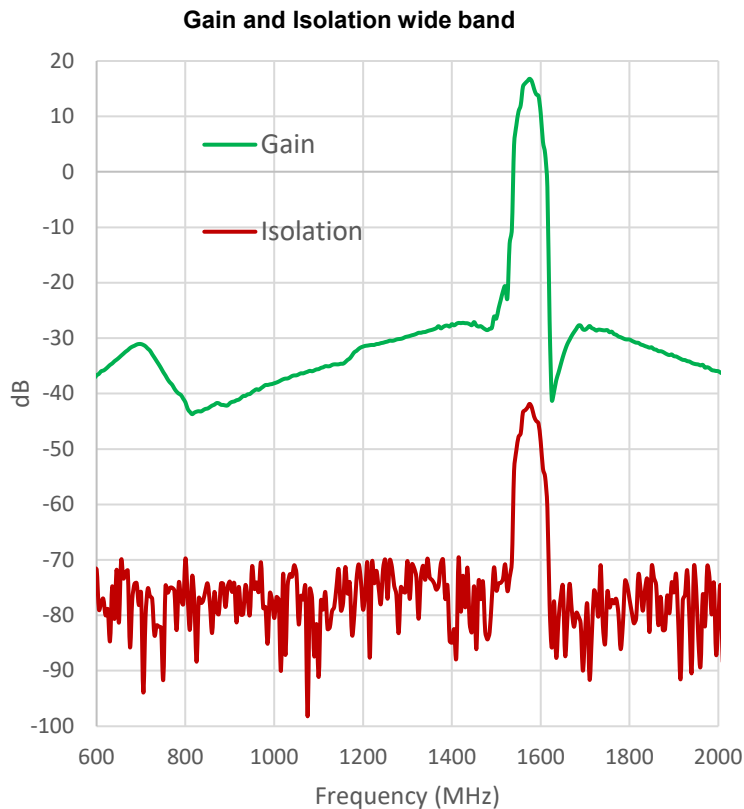
Typical performance – VNA RF power -20dBm, DC Supply 3.0V



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

**Gain, Out of band Rejection and Isolation Plots**

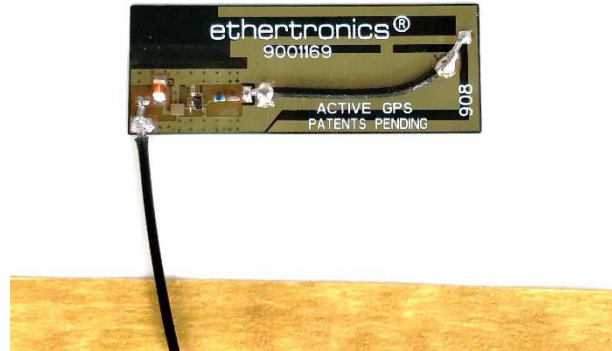
Typical performance – VNA RF power -20dBm, DC Supply 3.0V



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

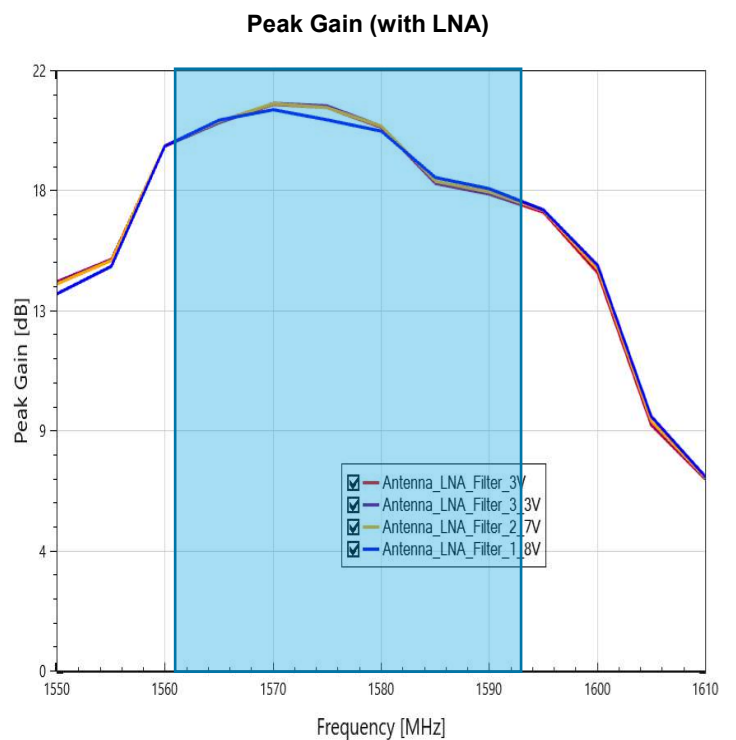
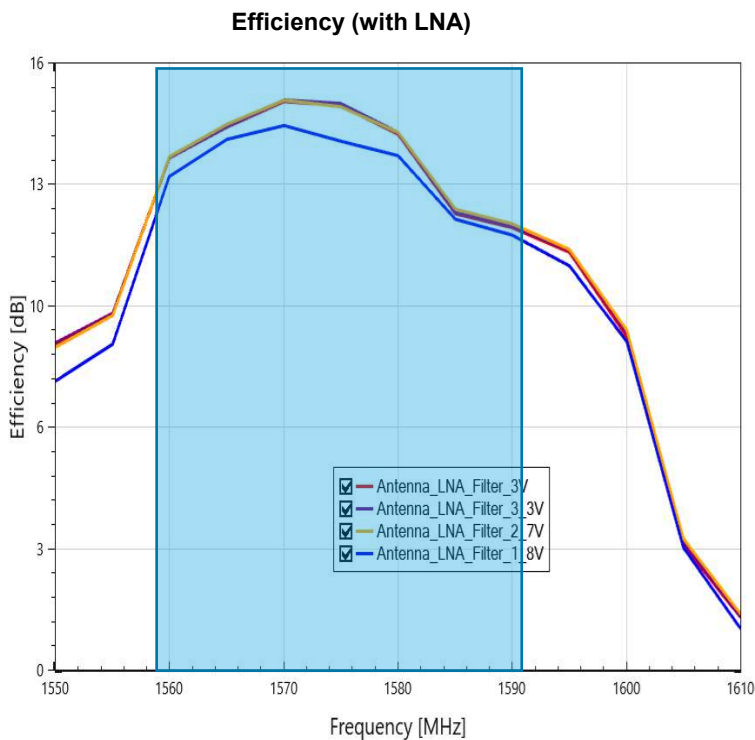
Typical performance with various DC voltage level supplies



Antenna is stuck to a piece of plastic made of ABS

**Efficiency and Peak Gain Plots**

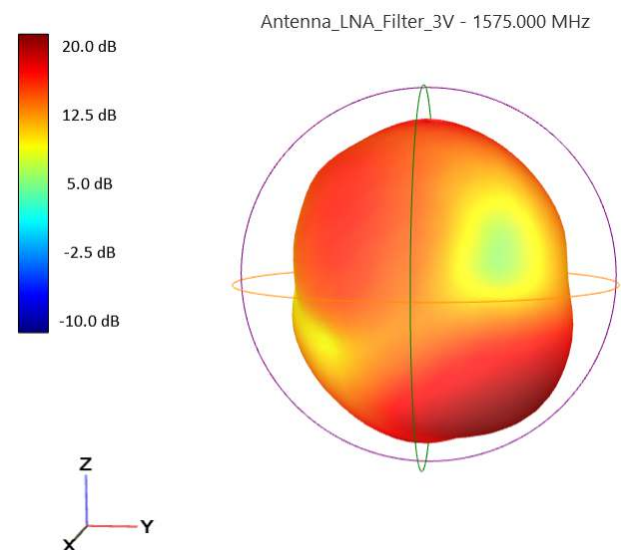
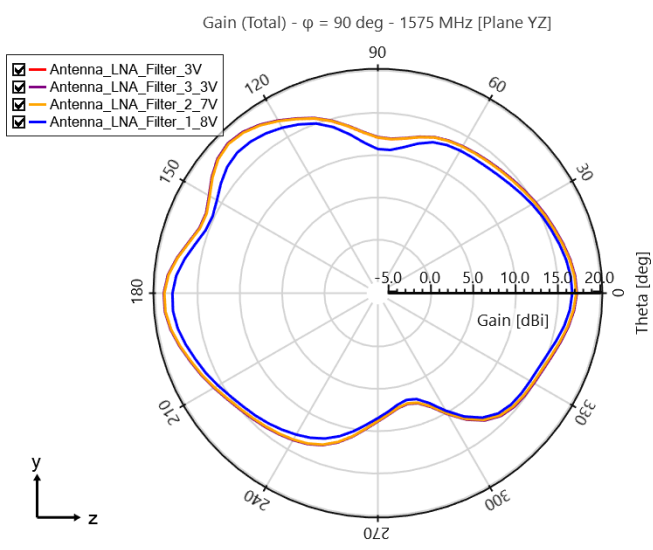
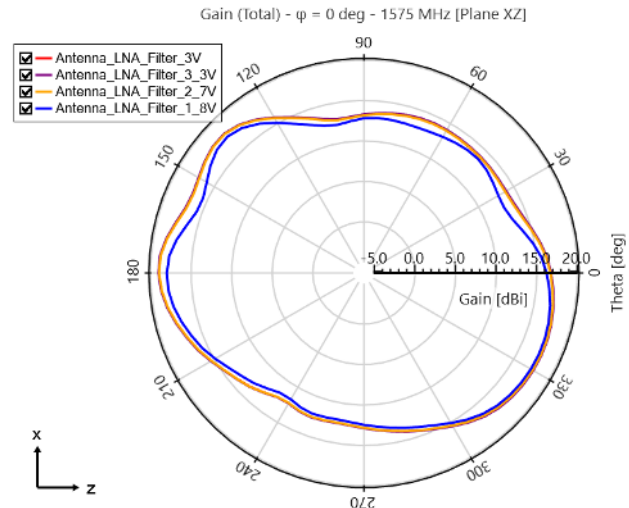
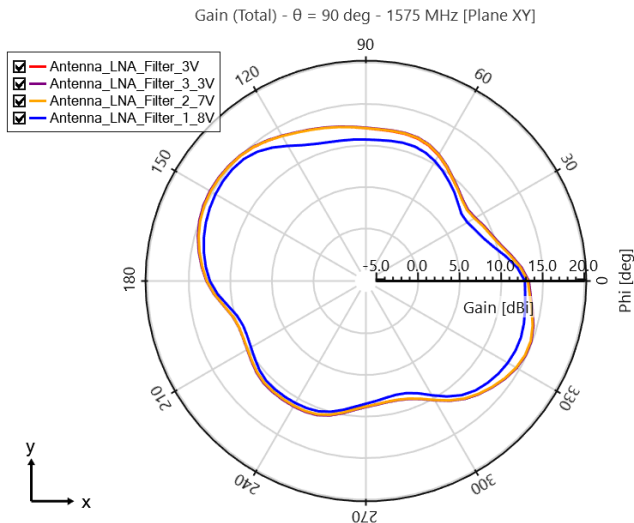
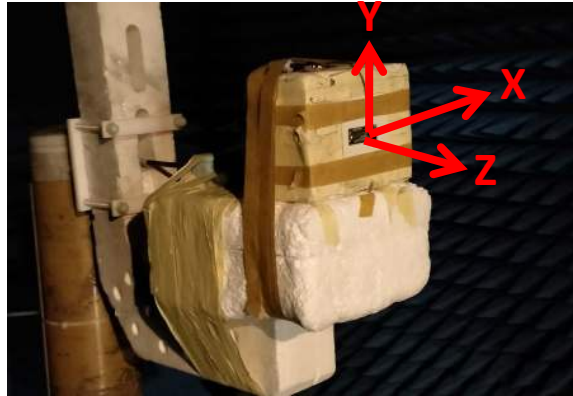
Typical performance with various DC voltage level supplies



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

Typical performance with various DC voltage level supplies



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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

