Datasheet

ANT-GNFPC-SHL1 Series
Flexible Embedded L1 GNSS Antennas

The Linx ANT-GNFPC-SHL1 series are 25 mm x 25 mm adhesive flexible printed circuit (FPC) antennas for global navigation satellite system (GNSS), supporting GPS, Galileo, GLONASS, Beidou, NavIC and QZSS systems in the L1/E1/B1 bands.

The ANT-GNFPC-SHL1 antennas provide a ground plane independent dipole internal/embedded antenna solution. The flexibility and adhesive backing makes the ANT-GNFPC-SHL1 series easy to mount in RF transparent (e.g. plastic) enclosures, enabling environmental sealing and for protection from antenna damage.

Connection is made to the radio via a coaxial cable terminated in an MHF1/U.FL-type plug (female socket), or MHF4-type plug (female socket) connector.

Features

- Performance at 1575.42 MHz
  - VSWR: ≤ 1.9
  - Peak Gain: 3.2 dBi
  - Efficiency: 48%
- Performance at 1601/1602 MHz
  - VSWR: ≤ 1.6
  - Peak Gain: 2.6 dBi
  - Efficiency: 37%
- Ground plane independent dipole antenna
- Linear polarization
- Compact, low-profile
  - 25.0 mm x 25.0 mm x 0.1 mm
- Adhesive backing permanently adheres to non-metal enclosures using 3M 467MP™/200MP adhesive
- Flexible to fit in challenging enclosures

Applications

- Global navigation
  - GPS L1C, L1C/A
  - Galileo E1
  - GLONASS L1
  - Beidou B1C, B1I
  - QZSS L1
- Timing solutions

Ordering Information

Part Number	Cable Length	Connector
ANT-GNFPC-SHL150UF	50 mm (1.97 in)	U.FL
ANT-GNFPC-SHL1100UF	100 mm (3.94 in)	U.FL
ANT-GNFPC-SHL1150UF	150 mm (5.91 in)	U.FL
ANT-GNFPC-SHL1200UF	200 mm (7.87 in)	U.FL
ANT-GNFPC-SHL150M4	50 mm (1.97 in)	MHF4-type
ANT-GNFPC-SHL1100M4	100 mm (3.94 in)	MHF4-type
ANT-GNFPC-SHL1150M4	150 mm (5.91 in)	MHF4-type
ANT-GNFPC-SHL1200M4	200 mm (7.87 in)	MHF4-type

Available from Linx Technologies and select distributors and representatives.

Table 1. Electrical Specifications

Frequency	GPS Bands	VSWR (max.)	Peak Gain (dBi)	Average Gain (dBi)	Efficiency (%)
1561 MHz	Beidou B1I	1.9	3.2	-2.9	51
1575 MHz	GPS L1C, GPS L1C/A, Galileo E1, Beidou B1C, QZSS L1	1.9	3.2	-3.6	48
1601/1602 MHz	GLONASS L1	1.6	2.6	-4.3	37

Polarization	Linear
Radiation	Omnidirectional
Impedance	50 Ω
Wavelength	1/2-wave
Max Power	2 W
Electrical Type	Dipole

Electrical specifications and plots measured with the antenna on a 2 mm (0.08 in) thick plastic sheet.

Table 2. Mechanical Specifications

Part Number	Connection	Coaxial Cable, minimum inside bend radius	Weight
ANT-GNFPC-SHL150UF	MHF1/U.FL-type plug	1.13 mm: 5.0 mm (0.20 in)	0.4 g (0.01 oz)
ANT-GNFPC-SHL1100UF	MHF1/U.FL-type plug	1.13 mm: 5.0 mm (0.20 in)	0.6 g (0.02 oz)
ANT-GNFPC-SHL1150UF	MHF1/U.FL-type plug	1.13 mm: 5.0 mm (0.20 in)	0.7 g (0.03 oz)
ANT-GNFPC-SHL1200UF	MHF1/U.FL-type plug	1.13 mm: 5.0 mm (0.20 in)	0.9 g (0.03 oz)
ANT-GNFPC-SHL150M4	MHF4-type plug	1.13 mm: 5.0 mm (0.20 in)	0.4 g (0.01 oz)
ANT-GNFPC-SHL1100M4	MHF4-type plug	1.13 mm: 5.0 mm (0.20 in)	0.5 g (0.02 oz)
ANT-GNFPC-SHL1150M4	MHF4-type plug	1.13 mm: 5.0 mm (0.20 in)	0.7 g (0.02 oz)
ANT-GNFPC-SHL1200M4	MHF4-type plug	1.13 mm: 5.0 mm (0.20 in)	0.8 g (0.03 oz)
Operating Temp. Range	-40 °C to +85 °C (-40 °F to 185 °F)		
Storage Temp. Range	-40 °C to +85 °C (-40 °F to 185 °F)		
Dimensions	25.0 mm x 25.0 mm x 0.1 mm (0.98 in x 0.98 in x 0.004 in)		

Packaging Information

The ANT-GNFPC-SHL1 antenna is individually packaged in a plastic bag and placed in bags of 100 pcs. Distribution channels may offer alternative packaging options.

Antenna Mounting

The ANT-GNFPC-SHL1 antenna is a flexible, adhesive backed antenna that allows it to be permanently installed onto non-metallic surfaces. The adhesive backing is 3M 467MP™/200MP, which provides outstanding adhesion to high surface energy plastics. The adhesive delivers excellent shear strength to resist slippage and edge lifting, but can be repositioned before the adhesive cures, allowing for accurate positioning. This adhesive is highly resistant to solvents, humidity and moisture, as well as heat up to 204 °C (400 °F) for short periods.

The antenna should never be bent to the point of creating a crease or allowing the angle of the bend to fall below 90 degrees (i.e. become acute) as this will impair function and may cause permanent damage.

Product Dimensions

Figure 1 provides dimensions for the ANT-GNFPC-SHL1 series antenna.

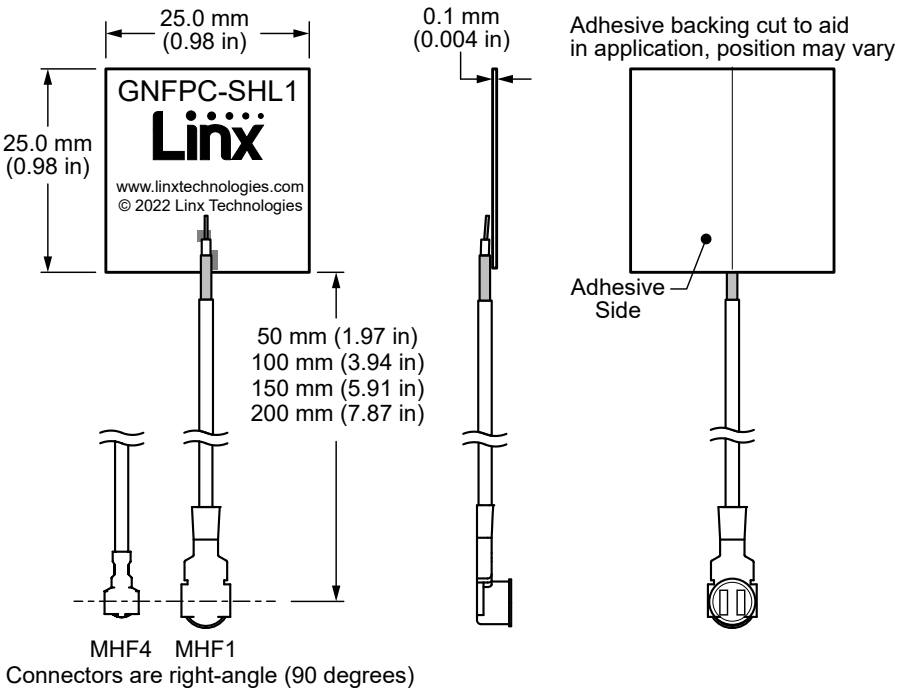


Figure 1. ANT-GNFPC-SHL1 Series Antenna Dimensions

VSWR

Figure 2 provides the voltage standing wave ratio (VSWR) across the antenna bandwidth. VSWR describes the power reflected from the antenna back to the radio. A lower VSWR value indicates better antenna performance at a given frequency. Reflected power is also shown on the right-side vertical axis as a gauge of the percentage of transmitter power reflected back from the antenna.

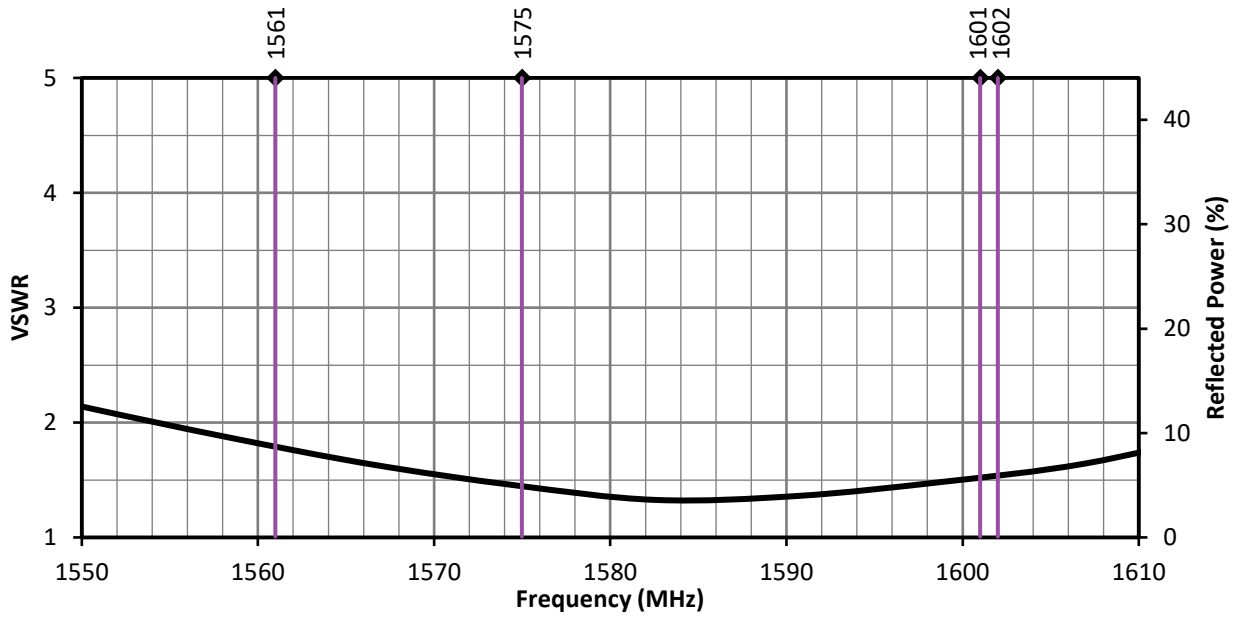


Figure 2. ANT-GNFPC-SHL1 Antenna VSWR with Frequency Band Highlights

Return Loss

Return loss (Figure 3), represents the loss in power at the antenna due to reflected signals. Like VSWR, a lower return loss value indicates better antenna performance at a given frequency.

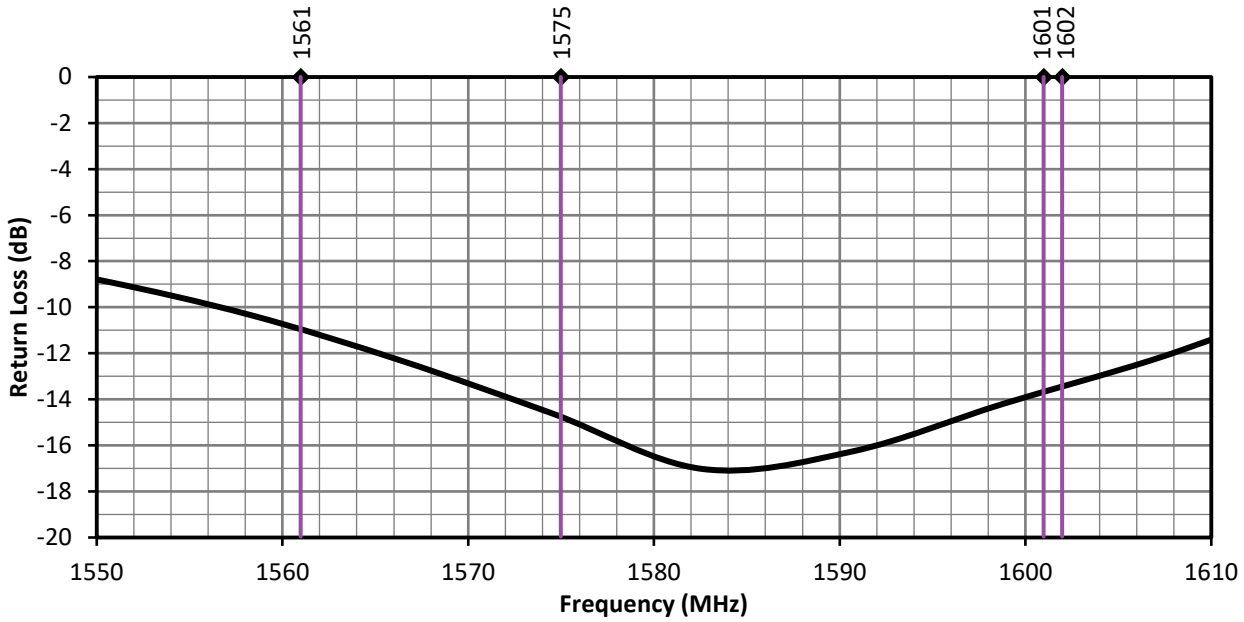


Figure 3. ANT-GNFPC-SHL1 Antenna Return Loss with Frequency Band Highlights

Peak Gain

The peak gain across the antenna bandwidth is shown in Figure 4. Peak gain represents the maximum antenna input power concentration across 3-dimensional space, and therefore peak performance, at a given frequency, but does not consider any directionality in the gain pattern.

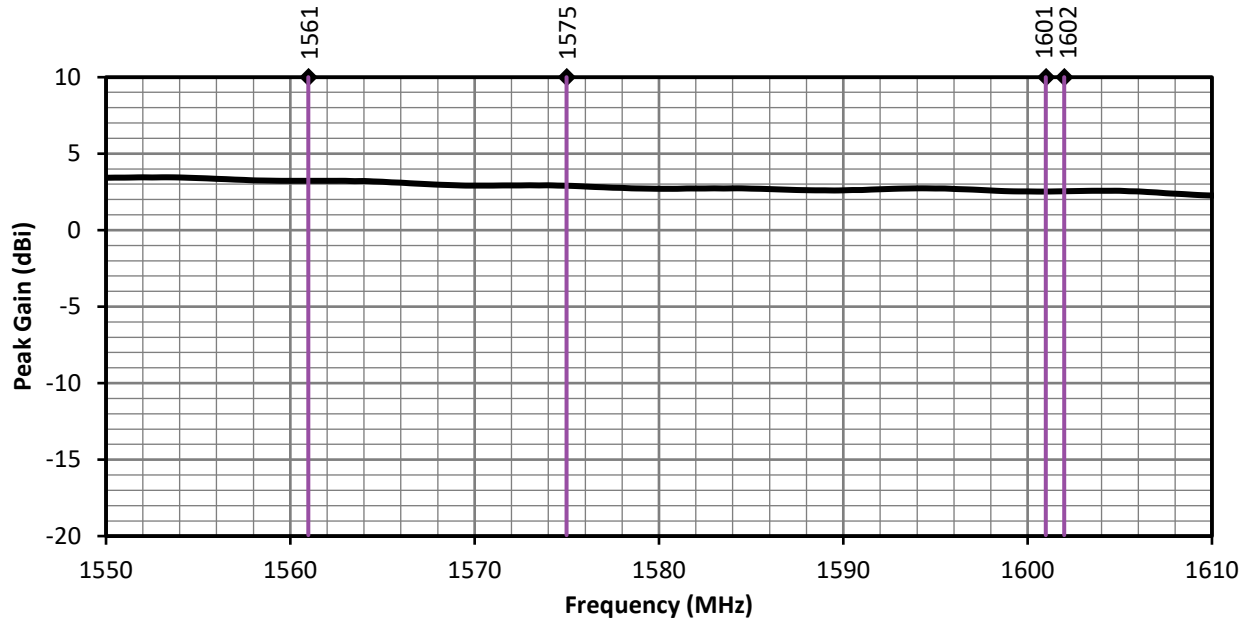


Figure 4. ANT-GNFPC-SHL1 Antenna Peak Gain with Frequency Band Highlights

Average Gain

Average gain (Figure 5), is the average of all antenna gain in 3-dimensional space at each frequency, providing an indication of overall performance without expressing antenna directionality.

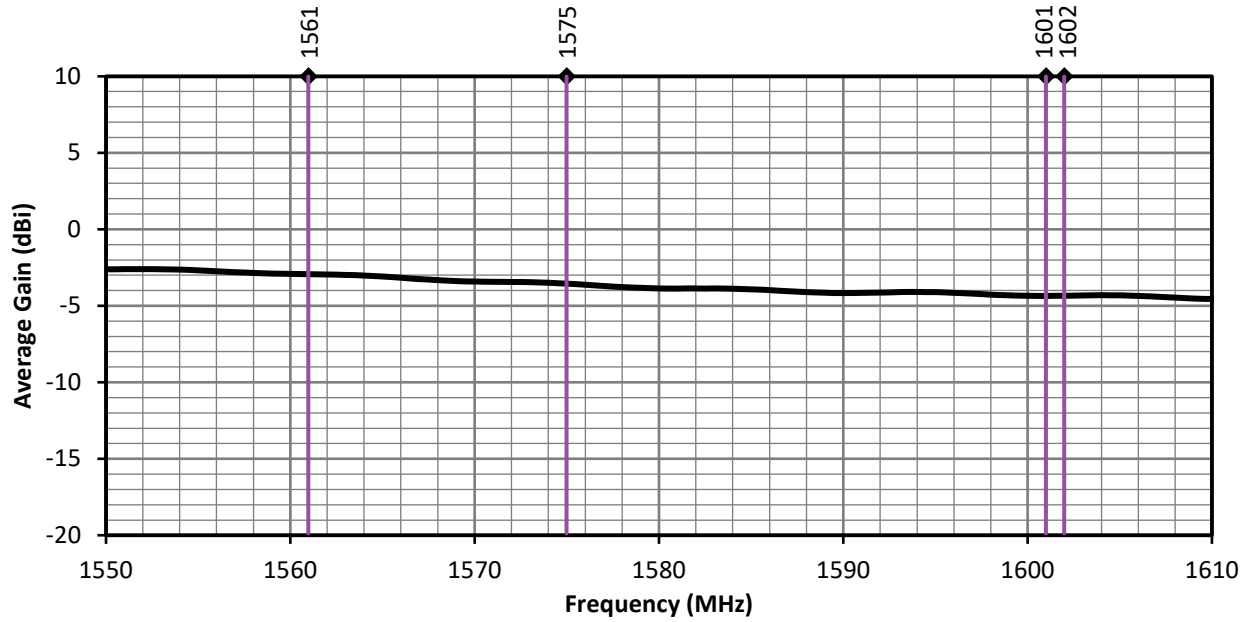


Figure 5. ANT-GNFPC-SHL1 Antenna Average Gain with Frequency Band Highlights

Radiation Efficiency

Radiation efficiency (Figure 6), shows the ratio of power delivered to the antenna relative to the power radiated at the antenna, expressed as a percentage, where a higher percentage indicates better performance at a given frequency.

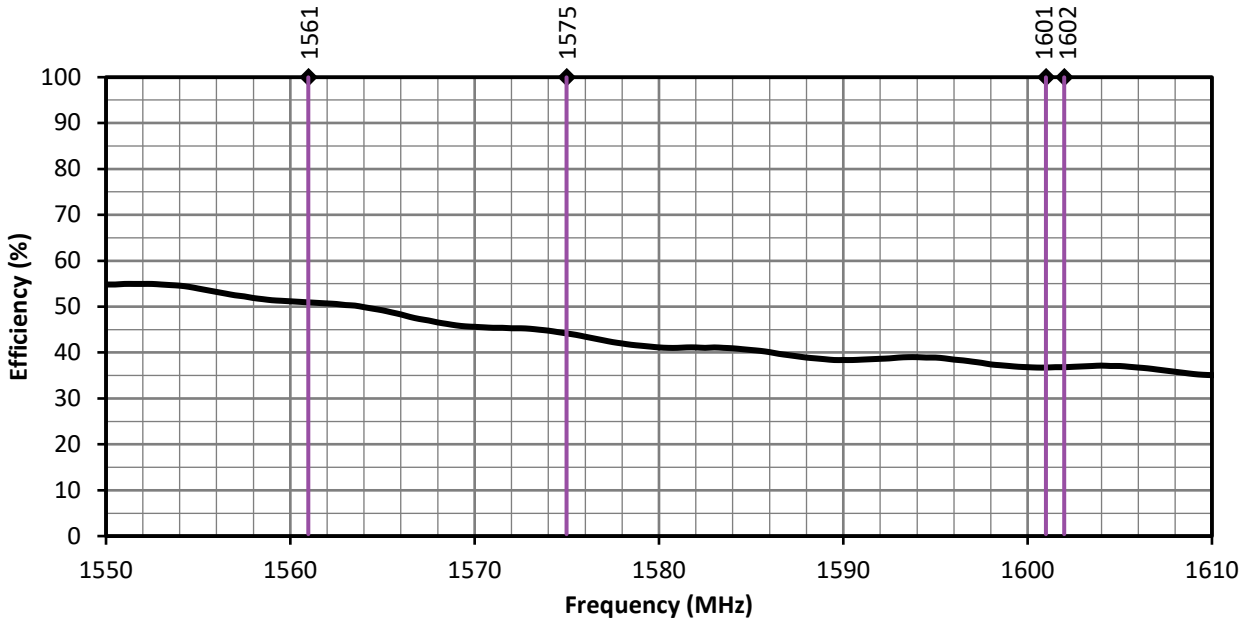
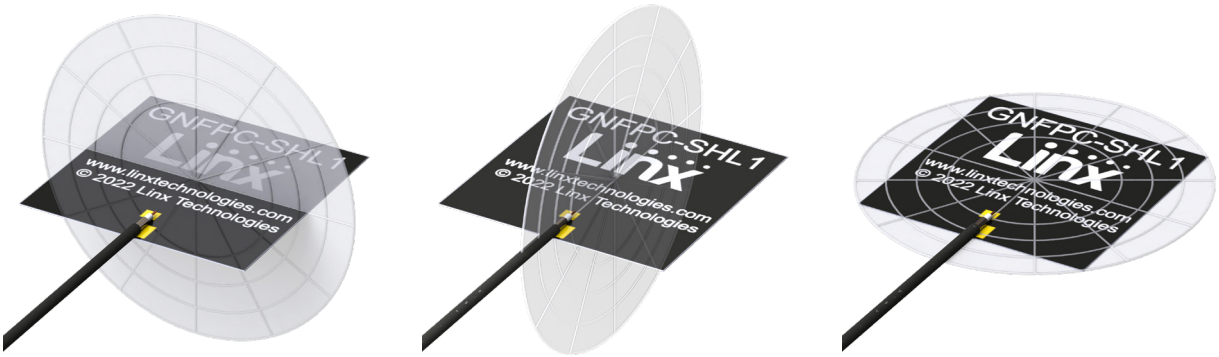


Figure 6. ANT-GNFPC-SHL1 Antenna Radiation Efficiency with Frequency Band Highlights

Radiation Patterns

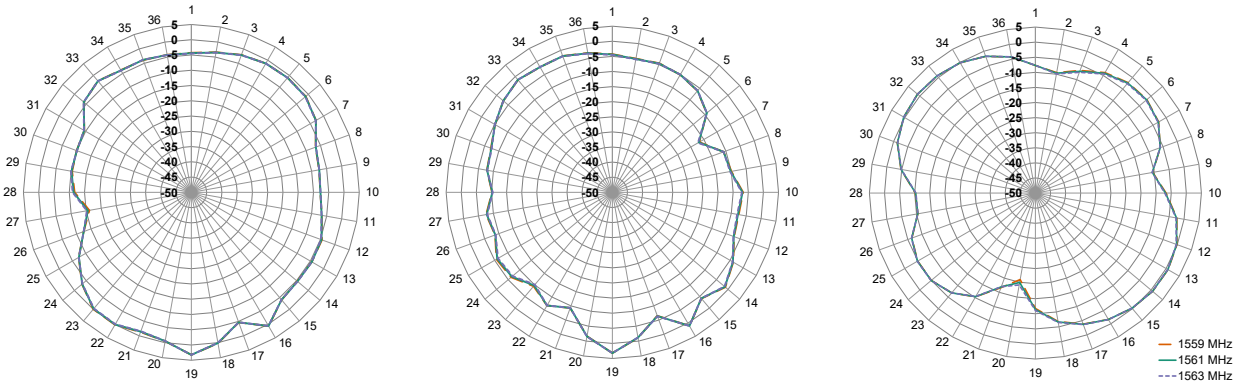
Radiation patterns provide information about the directionality and 3-dimensional gain performance of the antenna by plotting gain at specific frequencies in three orthogonal planes. Antenna radiation patterns (Figure 7), are shown using polar plots covering 360 degrees. The antenna graphic above the plots provides reference to the plane of the column of plots below it. Note: when viewed with typical PDF viewing software, zooming into radiation patterns is possible to reveal fine detail.

Radiation Patterns - Horizontal



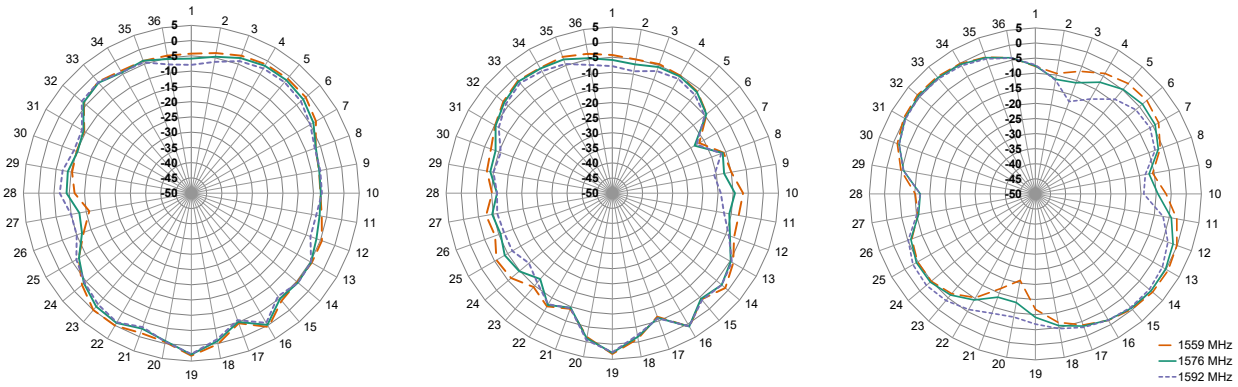
XZ-Plane Gain YZ-Plane Gain XY-Plane Gain

1559 MHz to 1563 MHz (1561 MHz)



XZ-Plane Gain YZ-Plane Gain XY-Plane Gain

1559 MHz to 1592 MHz (1575 MHz)



XZ-Plane Gain YZ-Plane Gain XY-Plane Gain

Radiation Patterns

1598 MHz to 1606 MHz (1601 MHz)

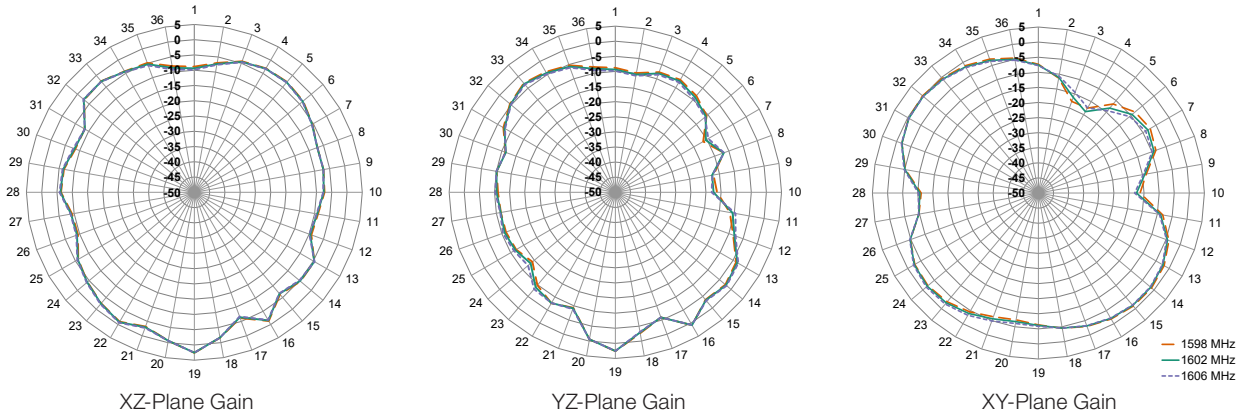


Figure 7. Radiation Patterns for ANT-GNFPC-SHL1 Series Antenna

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