

ANT-433-FPC-UFL-100 Flexible Embedded 433 MHz Antenna

The Linx ANT-433-FPC antenna is a flexible embedded 433 MHz antenna for Sub-1 GHz and low-power, wide-area (LPWA) applications including LoRaWAN® and remote control applications. The 433-FPC also performs well in LTE cellular bands 87 and 88 at 410 MHz and LTE cellular bands 31, 72 and 73 at 450 MHz.

The ANT-433-FPC provides a ground plane independent dipole embedded antenna solution comparable in performance to an external antenna. The flexibility and adhesive backing makes the ANT-433-FPC antenna easy to mount in unique and custom enclosures, while enabling an environmentally sealed enclosure and protection from tampering or accidental antenna damage.

Connection is made to the radio via a 100 mm (3.94 in) long, 1.13 mm coaxial cable terminated in a U.FL-type plug (female socket).



Features

- Performance at 433 MHz
 - VSWR: ≤ 2.5
 - Peak Gain: -6.0 dBi
 - Efficiency: 9%
- Ground plane independent dipole antenna
- Compact, low-profile
 - 47 mm x 17 mm x 0.2 mm
- U.FL-type plug (female socket) Compatible with MHF1, AMC, UMCC
- Adhesive backing permanently adheres to non-metal enclosures using 3M 467MP™/200MP adhesive
- Flexible to fit in challenging enclosures

Applications

- Low-power, wide-area (LPWA) applications
 - LoRaWAN®, ITU-T Y.4480
- Internet of Things (IoT) devices
- Smart Home networking
- Remote control, monitoring and sensing
- 410 MHz LTE cellular bands 87 and 88
- 450 MHz LTE cellular bands 31, 72 and 73

Ordering Information

Part Number	Description
ANT-433-FPC-UFL-100	433 MHz antenna with 100 mm of 1.13 mm coaxial cable and U.FL-type plug (female socket)

Available from Linx Technologies and select distributors and representatives.

Table 1. Electrical Specifications

ANT-433-FPC-UFL	410 MHz	433 MHz	450 MHz
Frequency Range	410 MHz to 430 MHz	430 MHz to 435 MHz	450 MHz to 470 MHz
VSWR (max.)	4.1	2.5	3.4
Peak Gain (dBi)	-5.4	-6.0	-2.4
Average Gain (dBi)	-10.5	-10.8	-10.8
Efficiency (%)	10	9	15
Polarization	Linear	Radiation	Omnidirectional
Impedance	50 Ω	Max Power	2 W
Wavelength	1/2-wave	Electrical Type	Dipole

Electrical specifications and plots measured on a 2.0 mm (0.08 in) thick acrylic sheet

Table 2. Electrical Specifications

Parameter	Value
Operating Temp. Range	-40 °C to +75 °C
Weight	0.6 g (0.02 oz)
Connection	U.FL-type plug (female socket) on 100 mm (3.94 in) of 1.13 mm coaxial cable.
Coaxial Cable, minimum inside bend radius	1.13 mm: 5.0 mm (0.20 in)
Dimensions	47.0 mm x 17.0 mm x 0.2 mm (1.85 in x 0.67 in x 0.01 in)

Product Dimensions

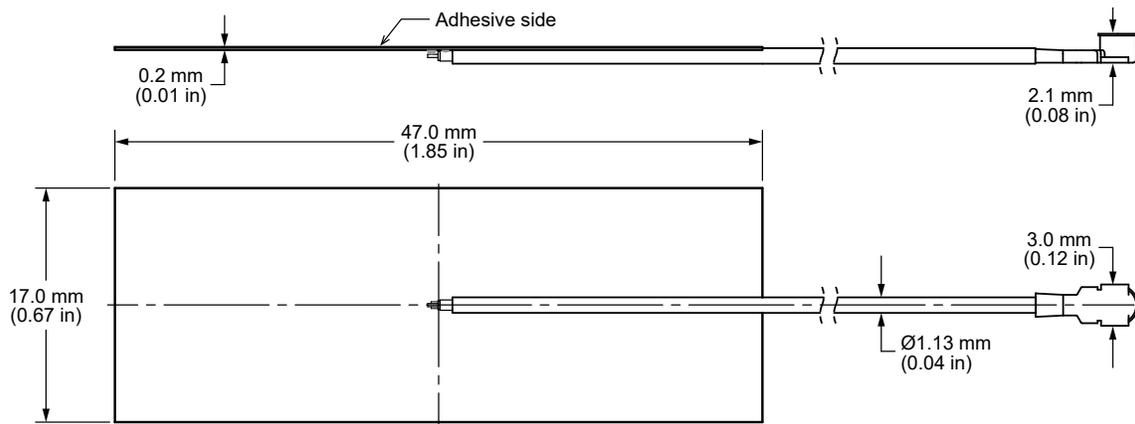


Figure 1. ANT-433-FPC-UFL-100 Dimensions

Antenna Mounting

The ANT-433-FPC-UFL-100 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 temporarily to allow for repositioning. 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.

Packaging Information

The ANT-433-FPC-UFL-100 antennas are individually sealed in a clear plastic sleeve. Individual sleeves are packed in a bags of 100 pcs. Distribution channels may offer alternative packaging options.

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.

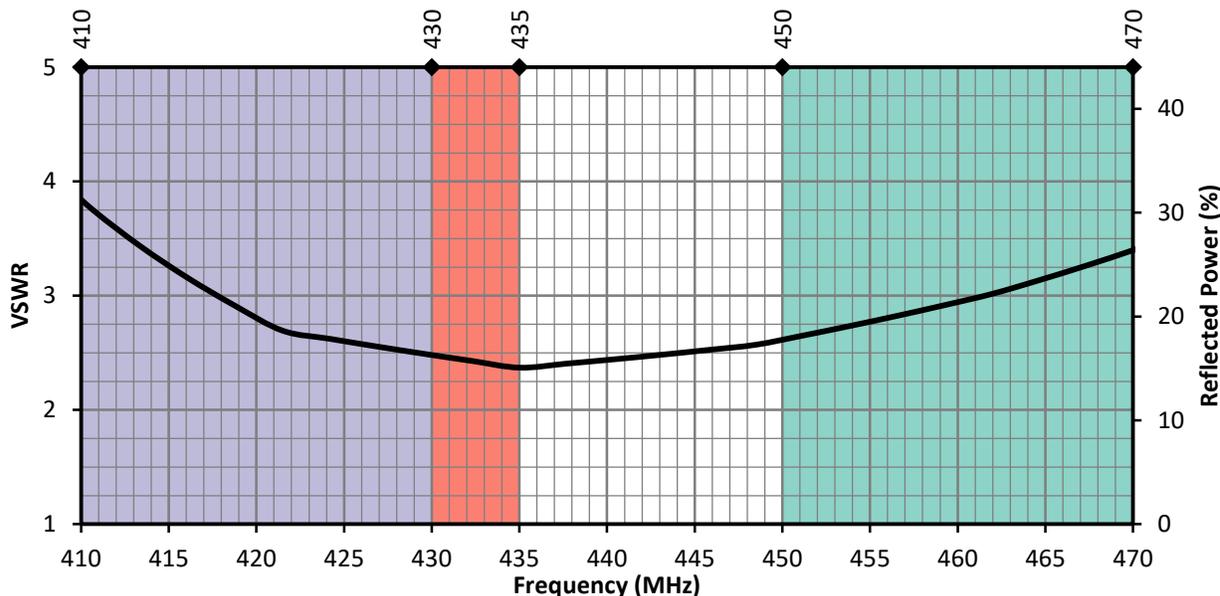


Figure 2. ANT-433-FPC Antenna VSWR with Frequency Band Highlights

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.

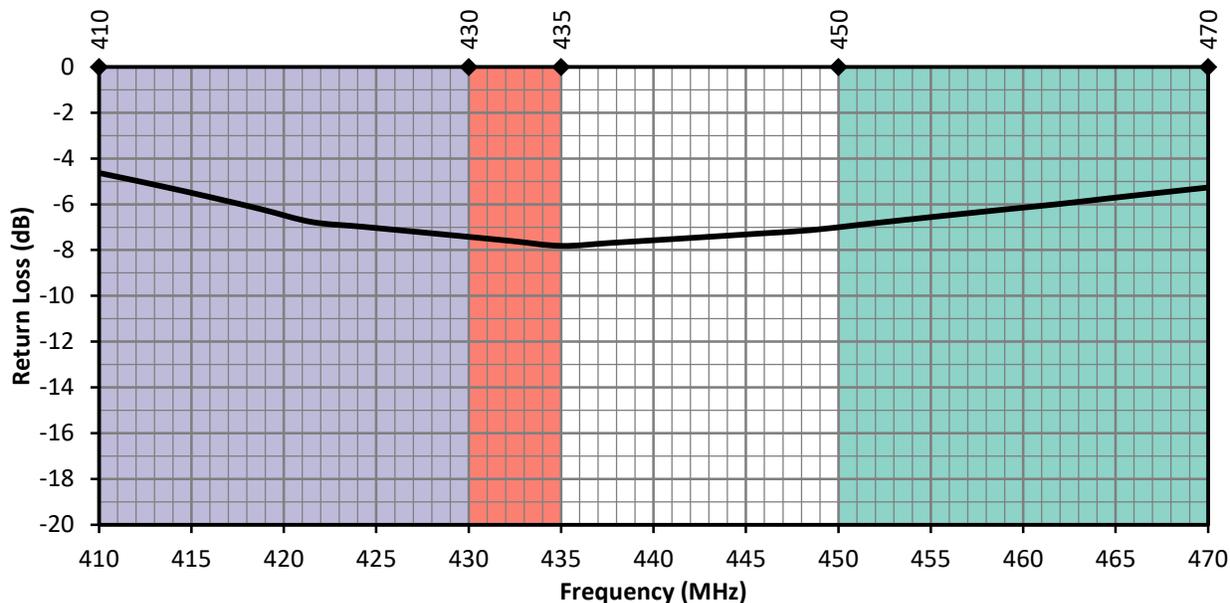


Figure 3. ANT-433-FPC Antenna Return Loss with Frequency Band Highlights

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.

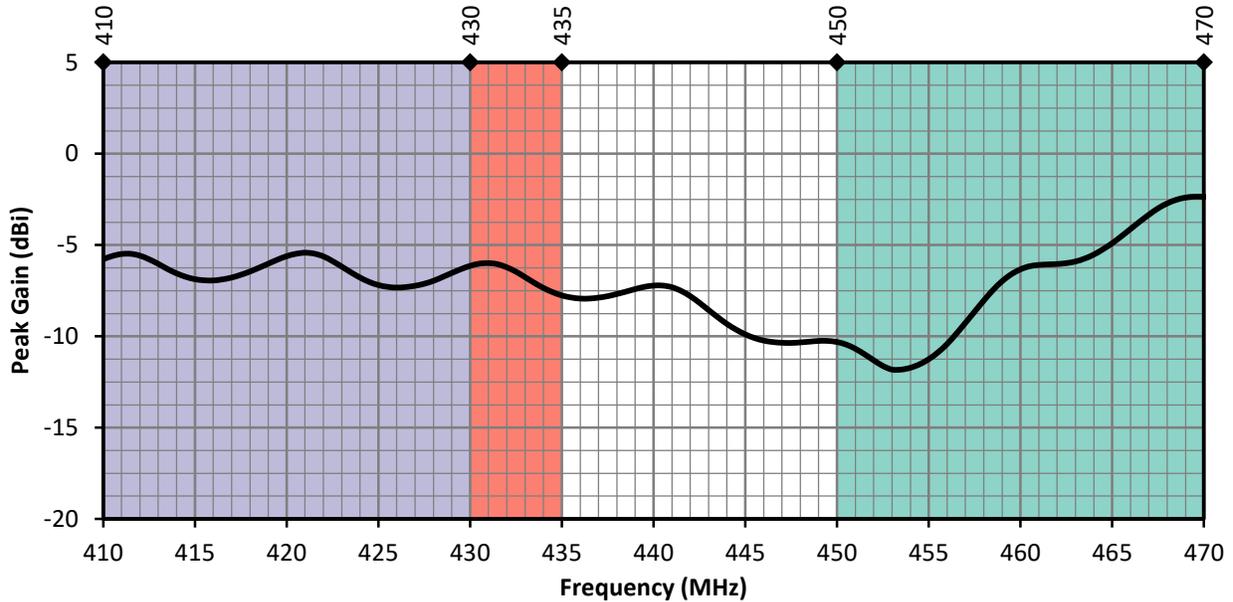


Figure 4. ANT-433-FPC Antenna Peak Gain with Frequency Band Highlights

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.

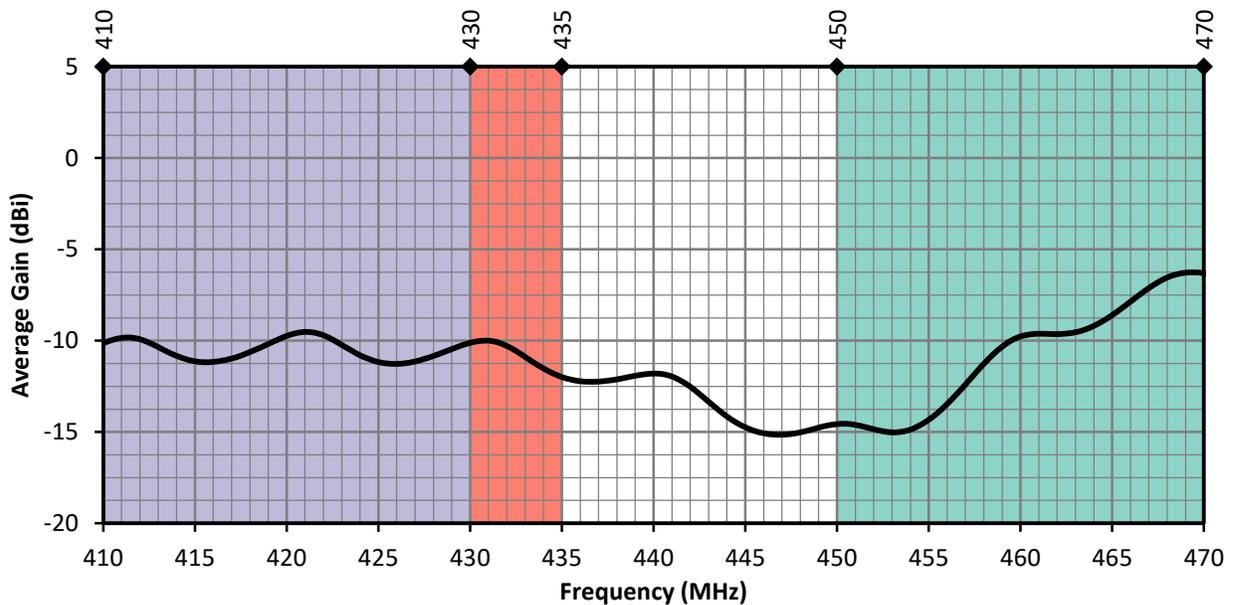


Figure 5. ANT-433-FPC Antenna Average Gain with Frequency Band Highlights

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.

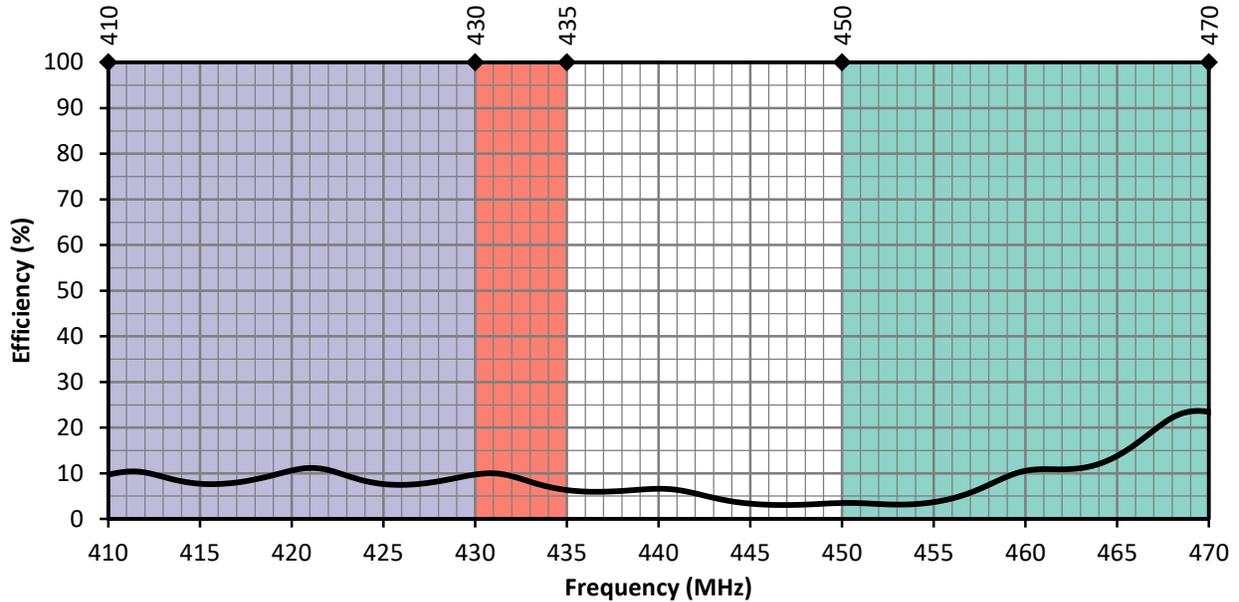
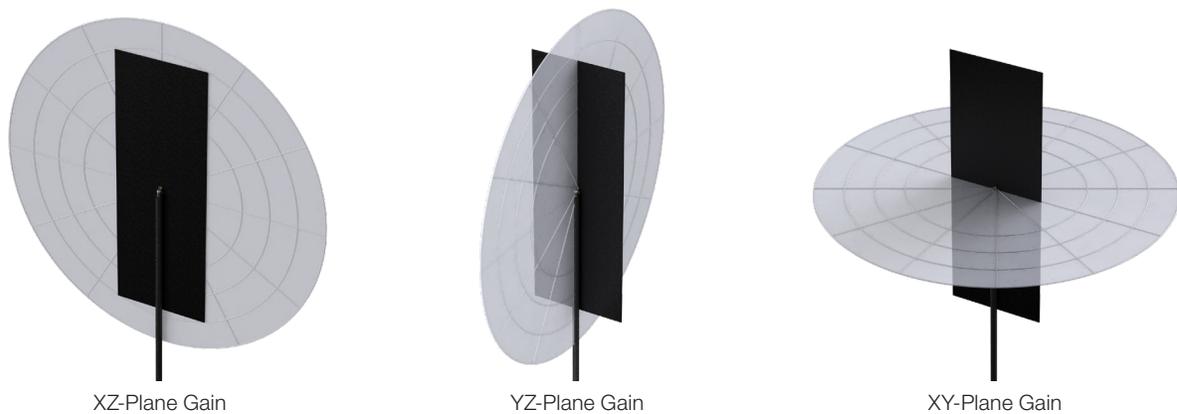


Figure 6. ANT-433-FPC Antenna Radiation Efficiency with Frequency Band Highlights

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.



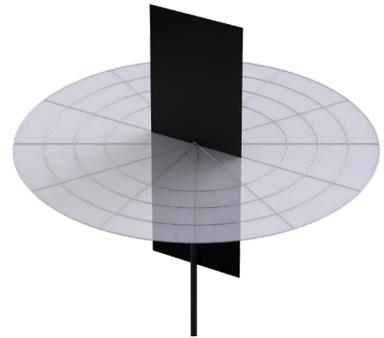
Radiation Patterns



XZ-Plane Gain

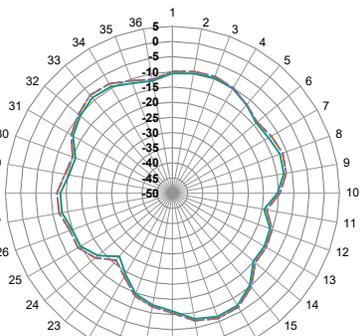


YZ-Plane Gain

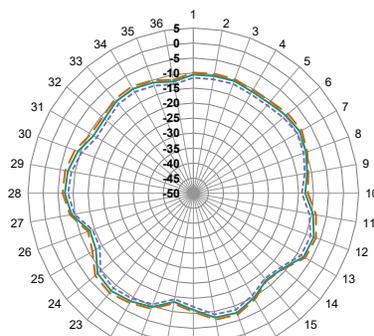


XY-Plane Gain

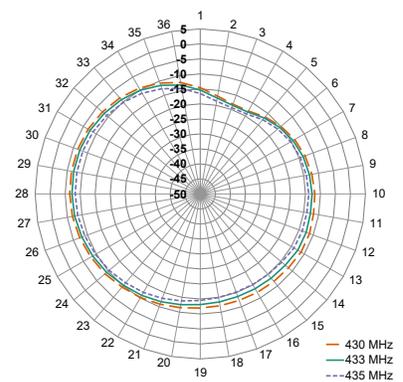
430 MHz to 435 MHz (433 MHz)



XZ-Plane Gain

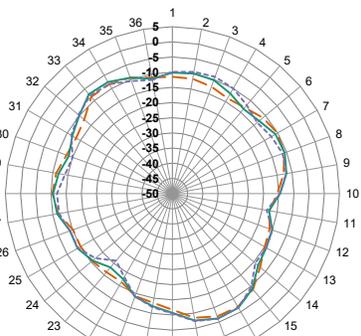


YZ-Plane Gain

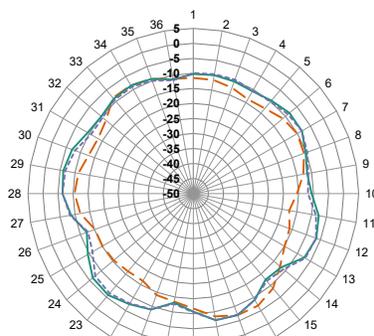


XY-Plane Gain

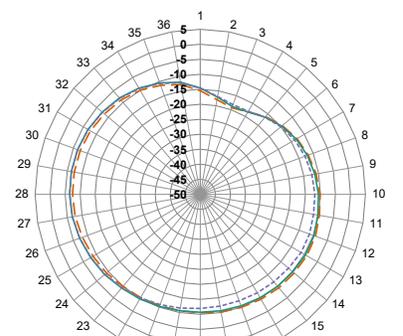
410 MHz to 430 MHz (420 MHz)



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

Radiation Patterns



450 MHz to 470 MHz (460 MHz)

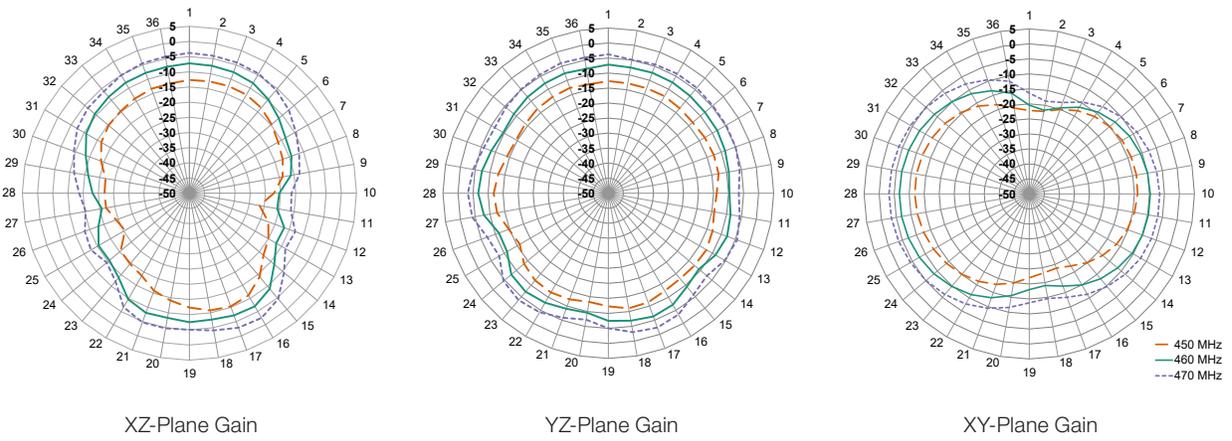


Figure 7. Radiation Patterns for ANT-433-FPC-UFL-100 Antenna

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Doc# DS22004-65ANT Replaces (DS20265-65ANT)

