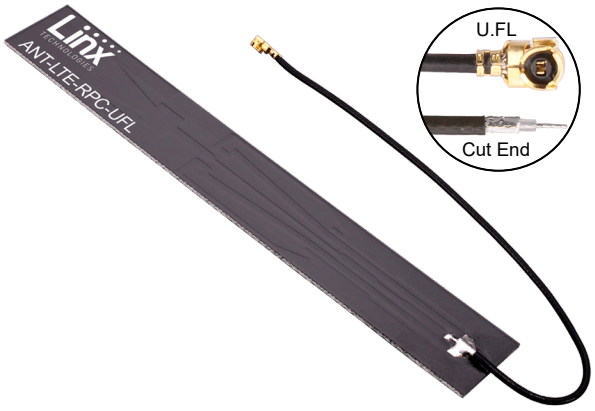
Datasheet

ANT-LTE-RPC-ccc
LTE/LPWA Embedded Dipole Antenna

The ANT-LTE-RPC-ccc (RPC) is a rigid, adhesive-backed, multiband cellular and cellular IoT antenna (LTE-M and NB-IoT) for embedded applications requiring excellent 600 MHz , 700 MHz and 800 MHz band performance. The RPC also supports low-power, wide-area (LPWA) networking at 868 MHz and 915 MHz, 2.4 GHz ISM, and global navigation systems (GNSS/GPS).

The RPC provides a ground plane independent dipole embedded antenna solution comparable in performance to an external antenna. The RPC's adhesive backing makes it easy to mount in plastic enclosures, while allowing an environmentally sealed enclosure and protection from tampering or accidental antenna damage.

Connection is made to the radio via a 100 mm long, 1.13 mm coaxial cable terminated in an MHF1/U.FL-compatible plug connector or unterminated, trimmed for PCB mounting.



Features

- 617 MHz to 960 MHz
  - VSWR: ≤ 2.5
  - Peak Gain: 6.3 dBi max.
  - Efficiency: 64%
- 1553 MHz to 1609 MHz (GNSS/GPS)
  - VSWR: ≤ 1.2
  - Peak Gain: 5.0 dBi max.
  - Efficiency: 77%
- Compact, low-profile
  - 98.4 mm x 14.9 mm x 0.8 mm
- MHF1/U.FL-compatible plug (female socket) on 100 mm of 1.13 mm coaxial cable
- 3M 9888T adhesive backing permanently adheres to a wide variety of materials

Applications

- Worldwide LTE, UMTS and GSM
- Cellular IoT:
  - LTE-M (Cat-M1)
  - NB-IoT
- Low-power, wide-area (LPWA) networks
  - LoRaWAN®
  - Sigfox®
  - Wi-Fi HaLow™
- Smart Home networking
  - Security systems
  - Home weather stations
- ISM: Bluetooth® and ZigBee®
- Global Navigation (GNSS)
  - GPS, GLONASS, Galileo, BeiDou

Ordering Information

Part Number	Description
ANT-LTE-RPC-UFL	Antenna with 100 mm of 1.13 mm coaxial cable and MHF1/U.FL-compatible plug (female socket)
ANT-LTE-RPC	Antenna with 100 mm of unterminated 1.13 mm coaxial cable

Available from Linx Technologies and select distributors and representatives.

Electrical Specifications

Select Bands	Frequency Range	VSWR (max.)	Peak Gain (dBi)	Avg. Gain (dBi)	Efficiency (%)
LTE 71	617 MHz to 698 MHz	2.5	3.6	-2.3	64
LTE 12, 13, 14, 17, 26, 28, 29	698 MHz to 803 MHz	1.8	4.9	-2.4	61
LTE 5, 8, 20	791 MHz to 960 MHz	2.4	6.3	-2.8	55
LTE 1, 2, 3, 4, 10, 25, 66	1710 MHz to 2200 MHz	1.8	5.1	-1.2	81
LTE 30, 40	2300 MHz to 2400 MHz	1.4	5.0	-1.4	73
LTE 7, 41	2496 MHz to 2690 MHz	2.1	4.6	-1.8	70
LTE 22, 42, 43, 48, 49, 52	3300 MHz to 3800 MHz	4.1	3.1	-5.9	35
GNSS/GPS	1553 MHz to 1609 MHz	1.2	5.0	-1.2	77
ISM	2400 MHz to 2485 MHz	1.5	4.8	-1.9	66

Polarization	Linear	**Wavelength**	1/2-wave
Radiation	Omnidirectional	**Electrical Type**	Dipole
Max Power	2 W	**Impedance**	50 Ω
Cable	100 mm of 1.13 mm coaxial cable		
Termination	ANT-LTE-RPC-UFL: MHF1/U.FL-compatible plug (female socket) ANT-LTE-RPC: unterminated, trimmed for PCB mounting		
Weight	3.2 g (0.11 oz)		
Dimensions	98.4 mm x 14.9 mm x 0.8 mm (3.87 in x 0.59 in x 0.03 in)		
Operating Temp. Range	-20 °C to +65 °C		
ESD Sensitivity	NOT ESD sensitive. As a best practice, Linx may use ESD packaging.		

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

Product Dimensions

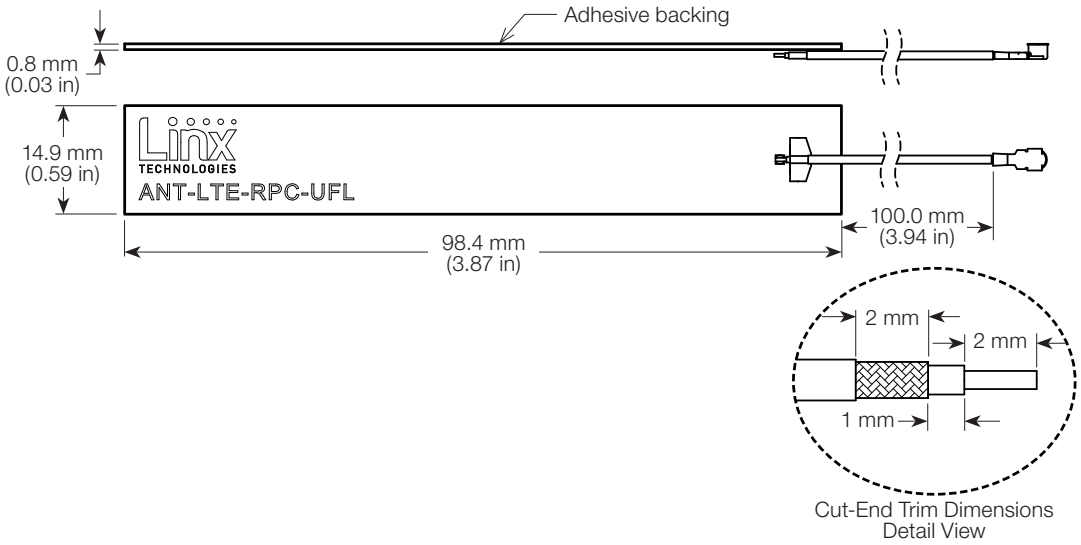


Figure 1. ANT-LTE-RPC-ccc Product Dimensions

Antenna Mounting

The ANT-LTE-RPC-ccc is an adhesive backed, embedded antenna that may be permanently installed onto a wide variety of materials. The adhesive backing is 3M 9888T, which provides outstanding adhesion to low surface energy plastics.

- 3M 9888T features a medium-soft acrylic pressure sensitive adhesive system. The key characteristics of this adhesive include a combination of high initial adhesion and good shear and bonding power to a wide variety of materials, including many plastics including polyethylene and polypropylene.
- 3M 9888T is UL-recognized (File MH28421). Please see UL listing for details.

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.

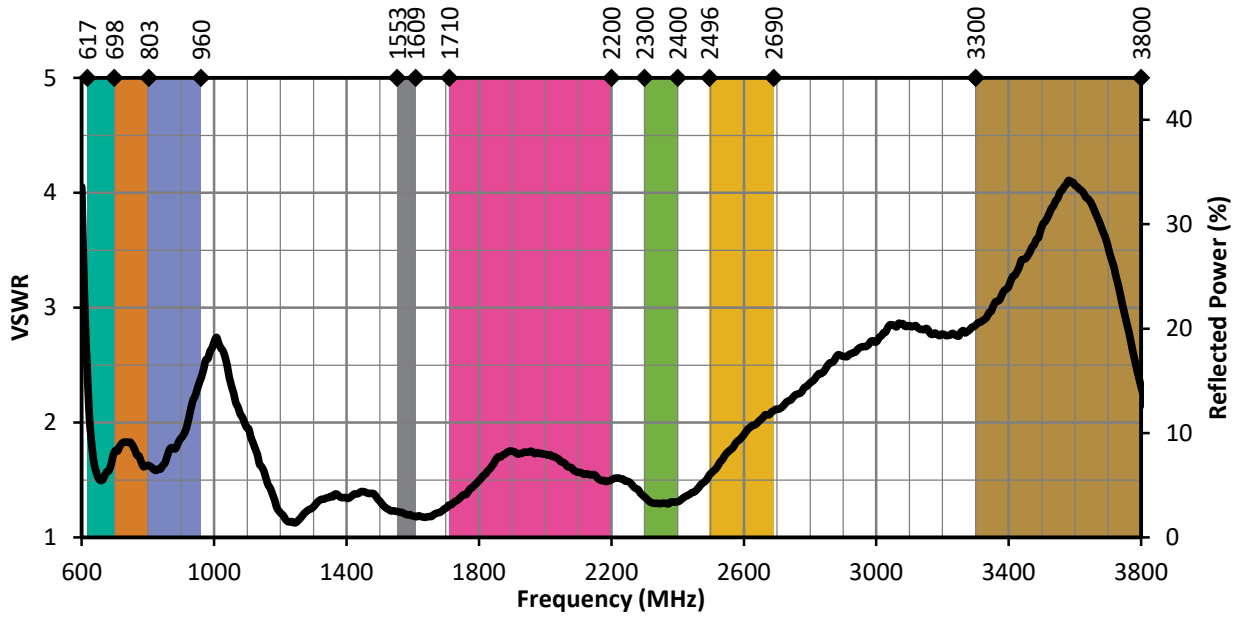


Figure 2. RPC Antenna VSWR with Frequency Band Highlights

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.

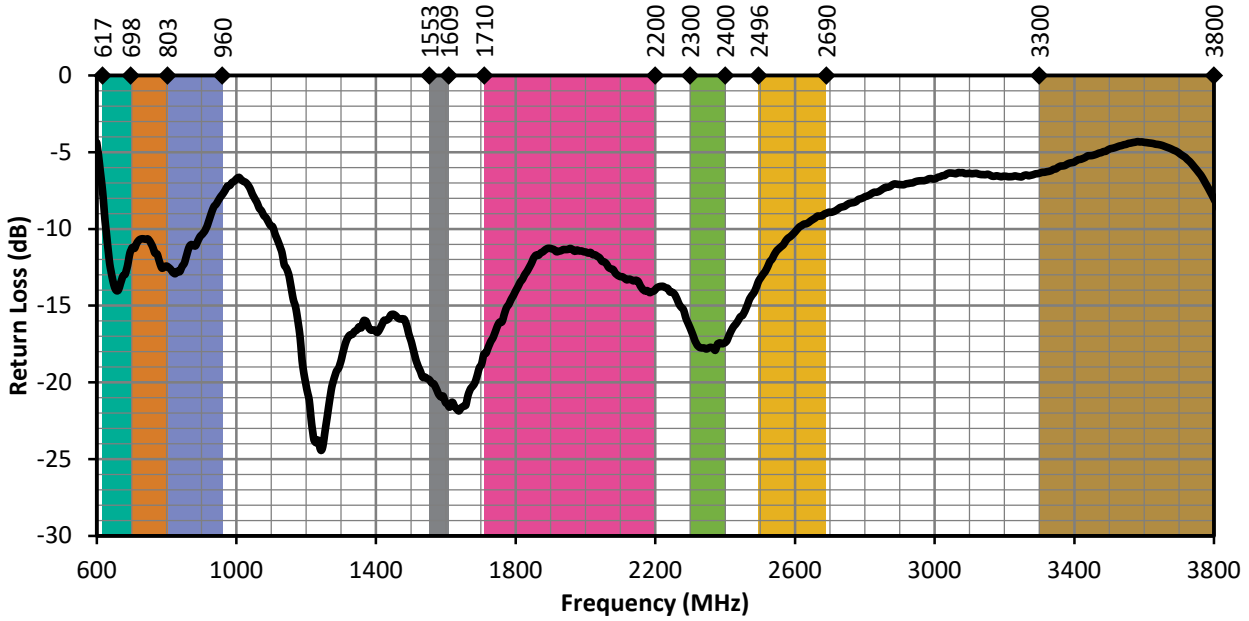


Figure 3. RPC Antenna Return Loss with Frequency Band Highlights

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.

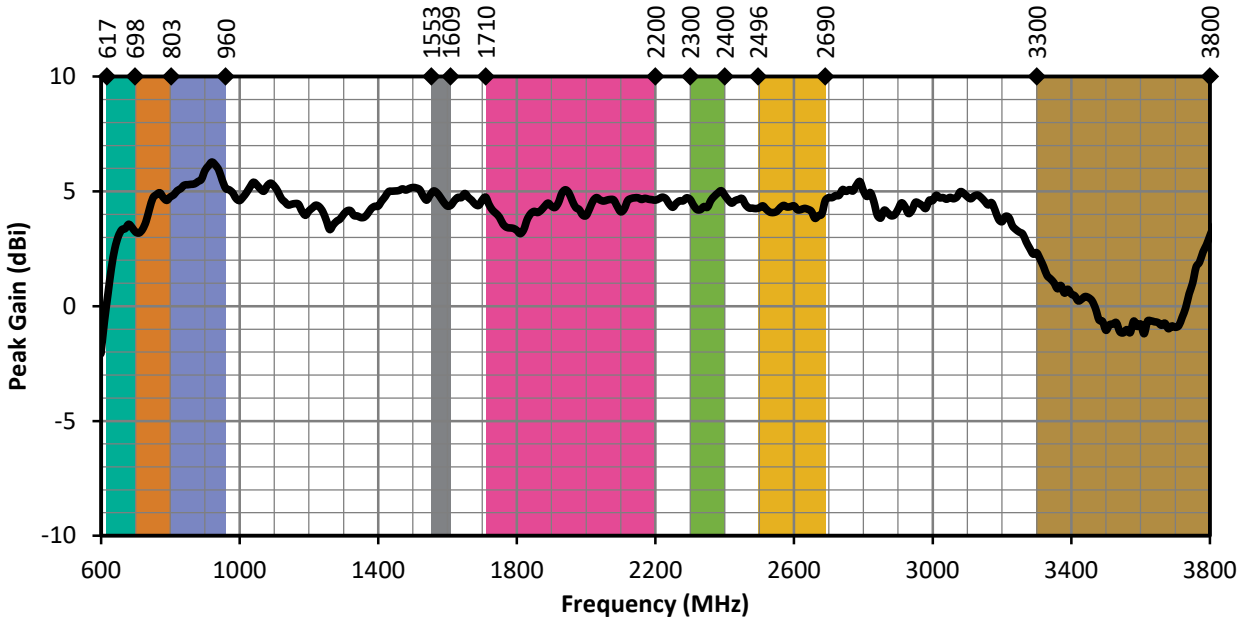


Figure 4. RPC Antenna Peak Gain with Frequency Band Highlights

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.

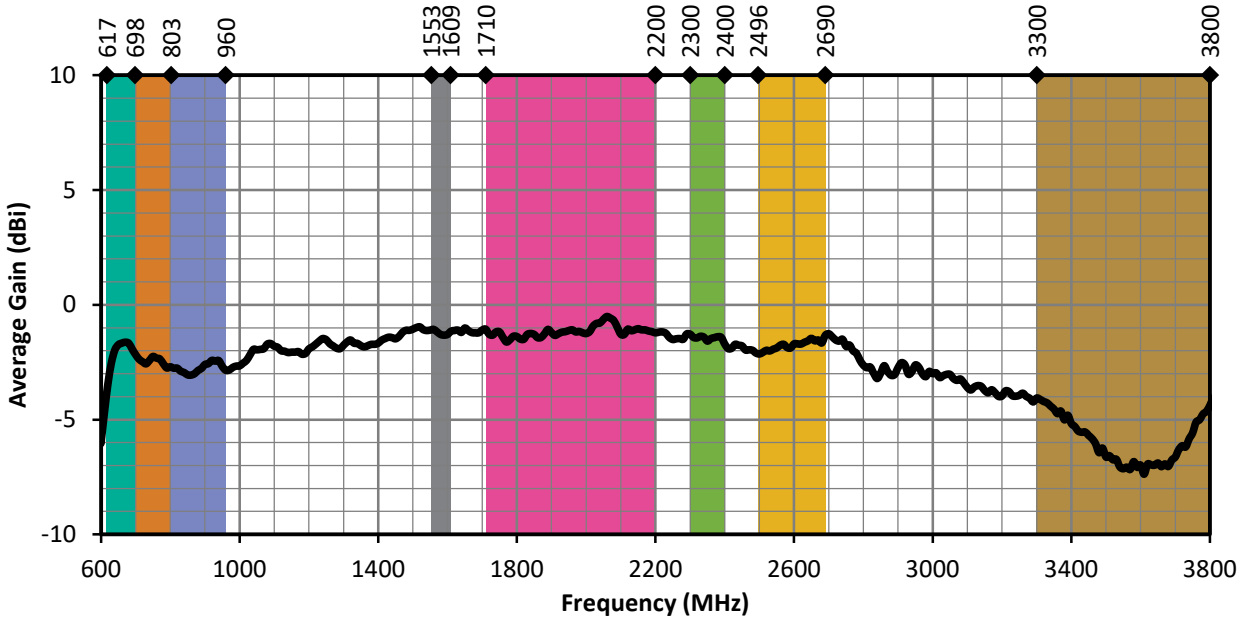


Figure 5. RPC Antenna Average Gain with Frequency Band Highlights

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.

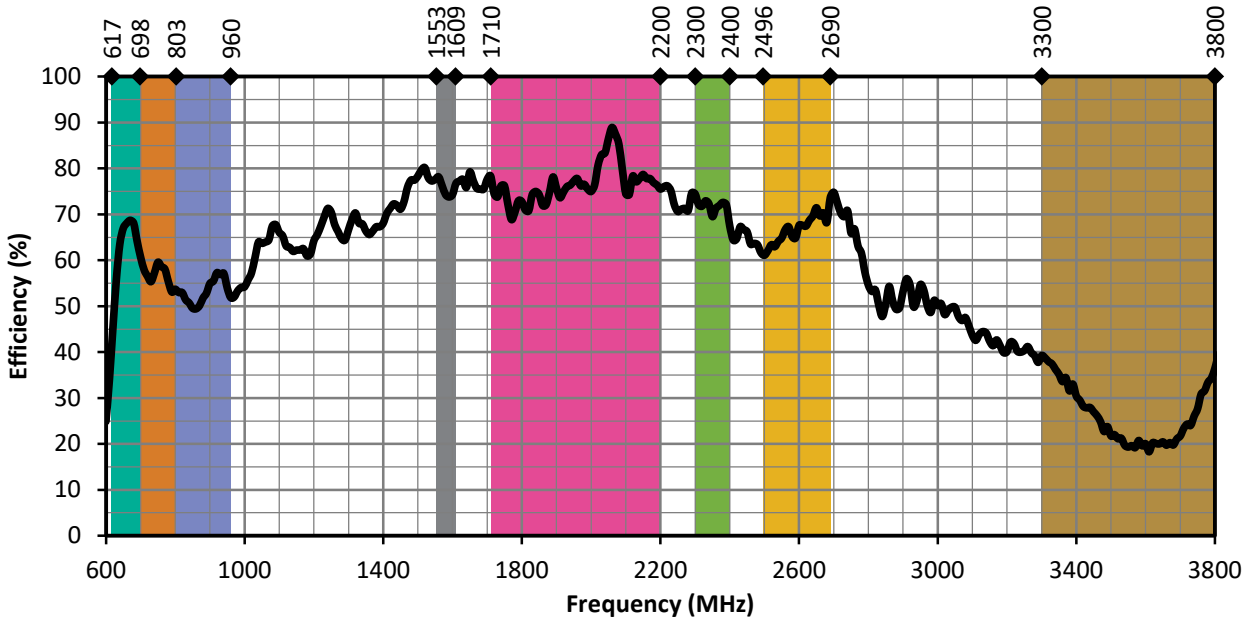
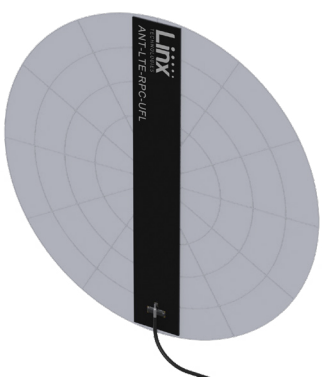


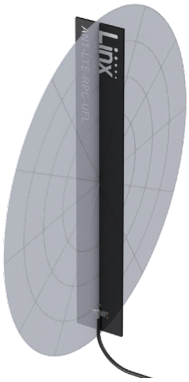
Figure 6. RPC Antenna Radiation Efficiency with Frequency Band Highlights

Radiation Patterns

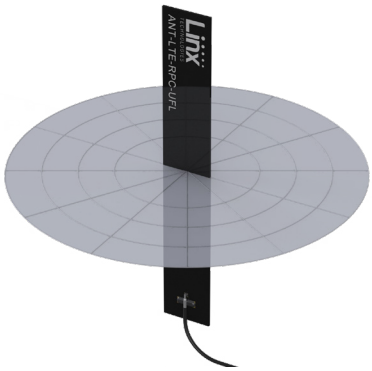
Radiation patterns provide information about the directionality and 3-dimensional gain performance of the antenna by plotting gain at specific frequencies in three orthogonal planes. Antenna radiation patterns (Figure 7), are shown using polar plots covering 360 degrees. The antenna graphic above the 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.



XZ-Plane Gain

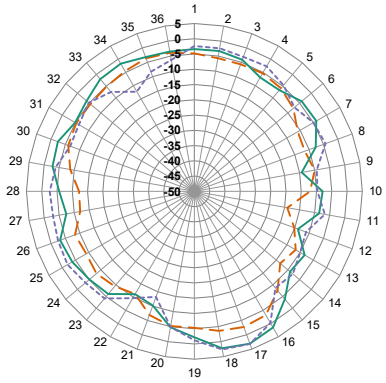


YZ-Plane Gain

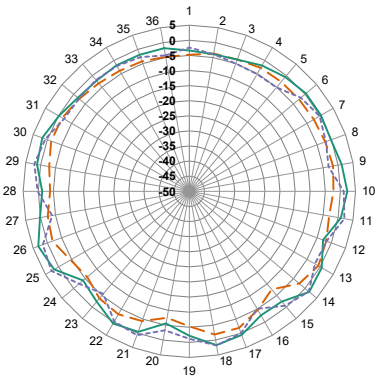


XY-Plane Gain

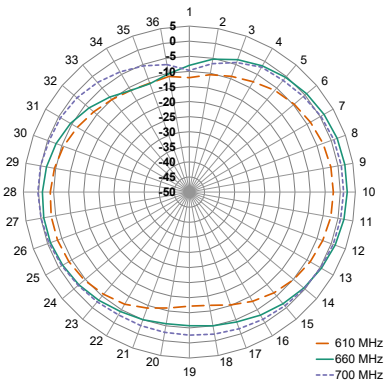
617 MHz to 698 MHz (658 MHz)



XZ-Plane Gain

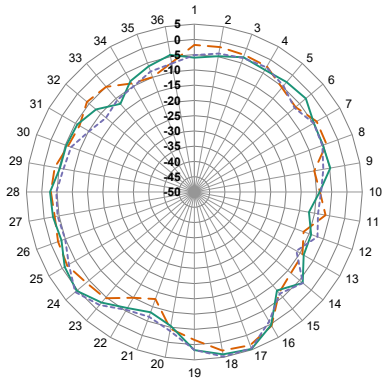


YZ-Plane Gain

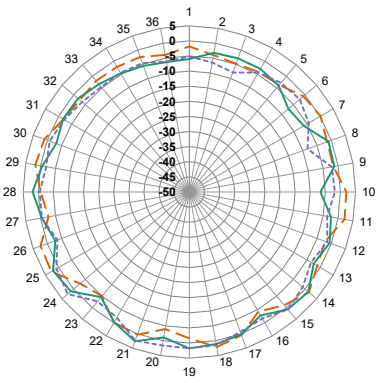


XY-Plane Gain

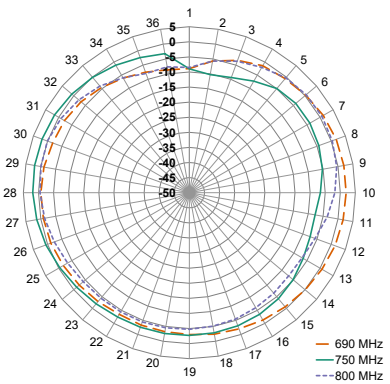
698 MHz to 803 MHz (750 MHz)



XZ-Plane Gain



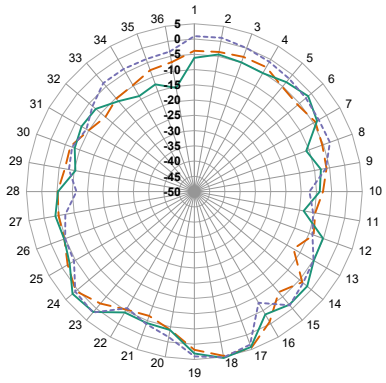
YZ-Plane Gain



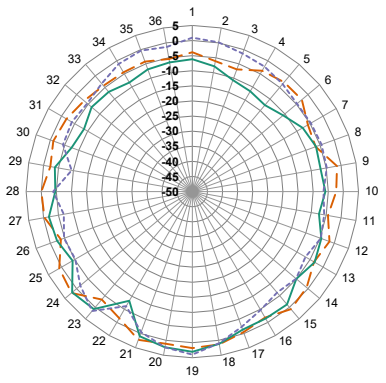
XY-Plane Gain

Radiation Patterns

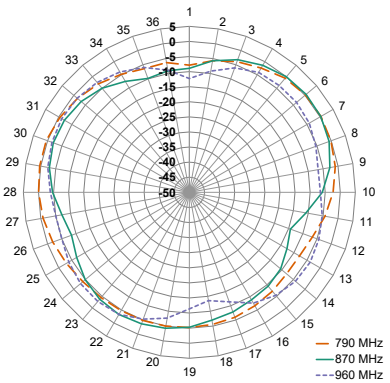
790 MHz to 960 MHz (870 MHz)



XZ-Plane Gain

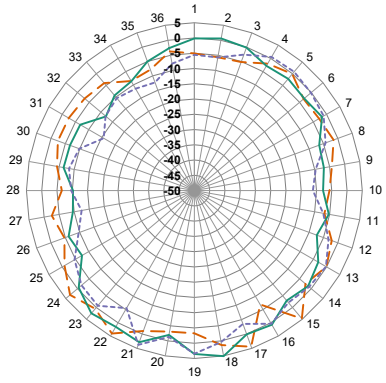


YZ-Plane Gain

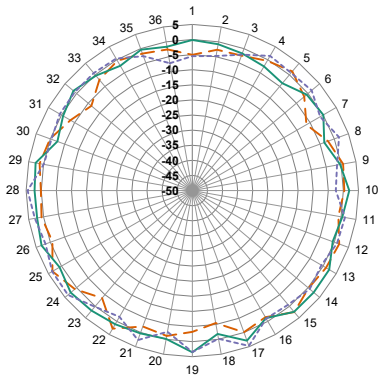


XY-Plane Gain

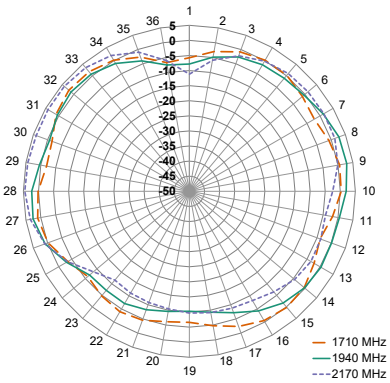
1710 MHz to 2200 MHz (1950 MHz)



XZ-Plane Gain

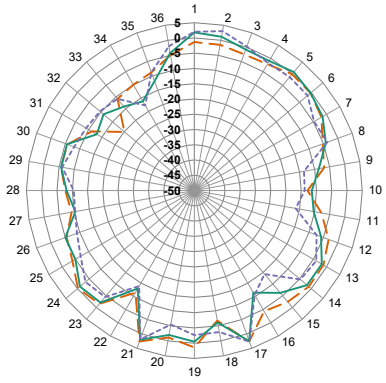


YZ-Plane Gain

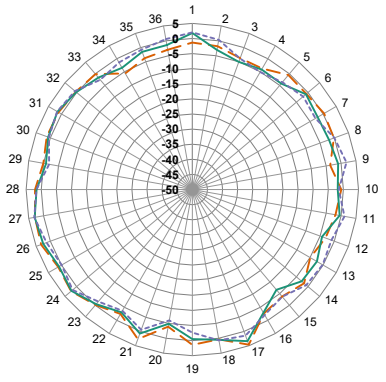


XY-Plane Gain

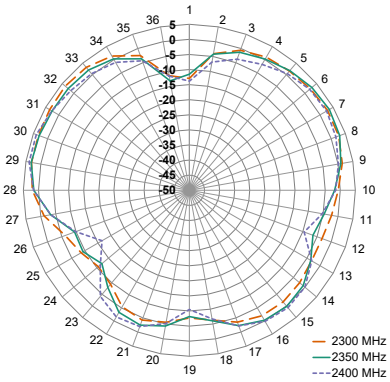
2300 MHz to 2400 MHz (2350 MHz)



XZ-Plane Gain



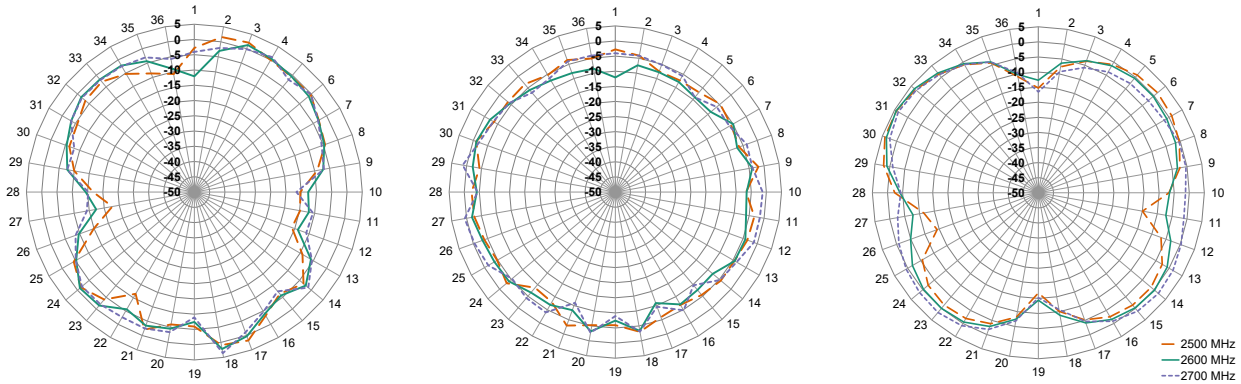
YZ-Plane Gain



XY-Plane Gain

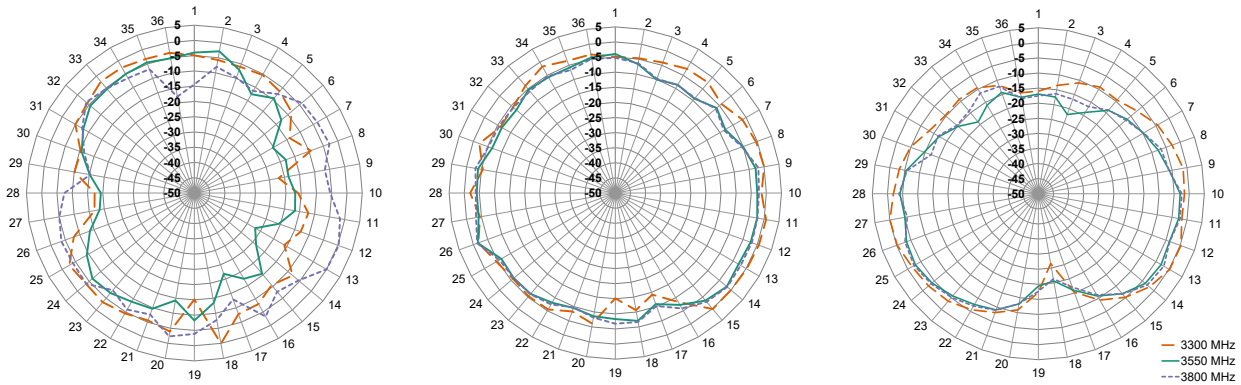
Radiation Patterns

2496 MHz to 2690 MHz (2600 MHz)



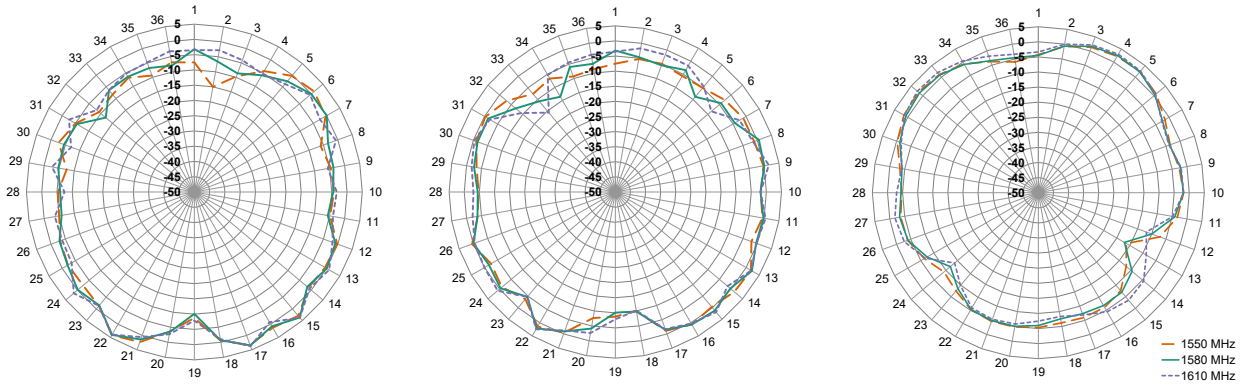
XZ-Plane Gain YZ-Plane Gain XY-Plane Gain

3300 MHz to 3800 MHz (3550 MHz)



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

1553 MHz to 1609 MHz (1580 MHz)

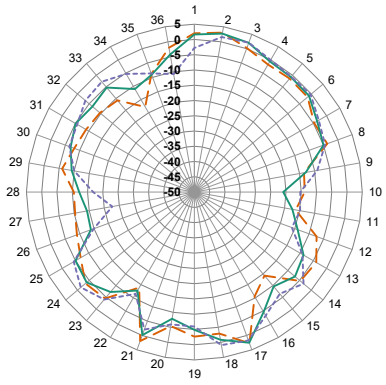


XZ-Plane Gain YZ-Plane Gain XY-Plane Gain

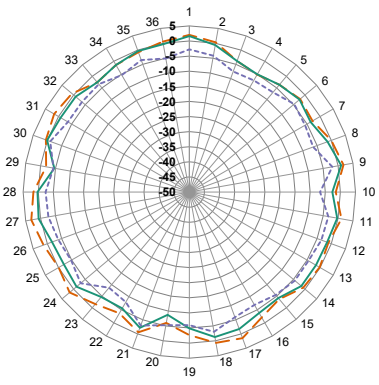
Figure 7. Radiation Patterns for ANT-LTE-RPC-ccc Antenna

Radiation Patterns

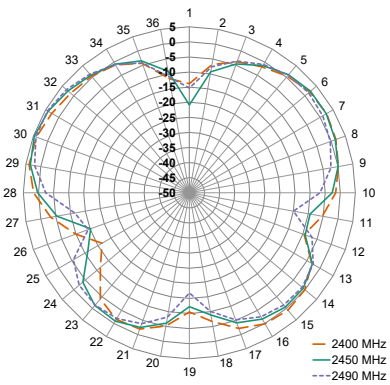
2400 MHz to 2490 MHz (2450 MHz)



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

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Doc # DS19337-46ANT