Satellite IoT D2D Ready

TN & NTN Dual-Mode Antenna - Satellite IoT Direct to Device Ready

Panel Mount 5G/LTE Antenna

Covering 4G/5G/Satellite Band 25

The L001266-01 direct to device (D2D) antenna offers 4G/5G/ satellite band 25 cellular coverage through an external panel mount puck-style multiband antenna.

L001266-01 provides a ground plane independent antenna solution which mounts permanently to metallic and non-metallic surfaces. The antenna terminates in an SMA plug (male pin) connector on RG-174/U coaxial cable enabling an environmentally sealed enclosure and protection from tampering.

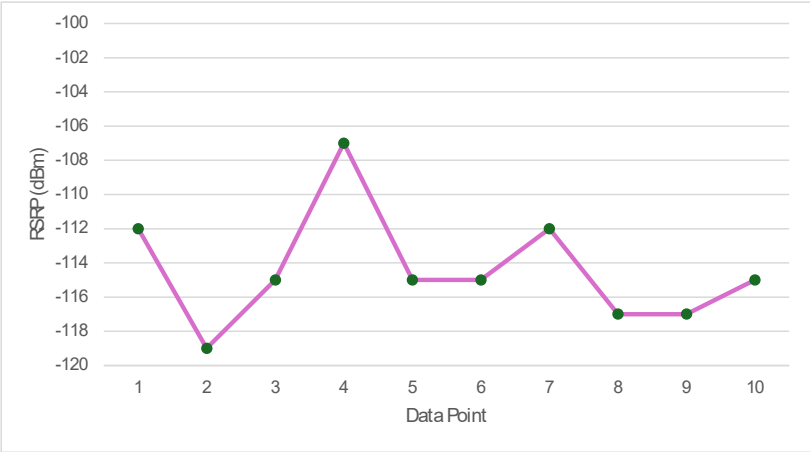
SATELLITE IOT D2D COMMUNICATIONS

Low Earth Orbit (LEO) satellites, positioned a few hundred km's above Earth, orbit rapidly and are ideal for IoT networks. A LEO satellite constellation can now support low data rate communications through specific LTE frequencies.

- Dual-mode capable - Supporting Terrestrial Networks (TN) and Non-Terrestrial Networks (NTN) from a single antenna
  - 410-5925 MHz terrestrial cellular coverage
  - Band 25 (1900 MHz) cellular satellite coverage
    - Testing available for other/future cellular satellite D2D frequency bands used by various network providers
- Enabling dual-mode communications via IoT devices
  - Prioritizing terrestrial networks but capable of automatically switching to satellite when the signal is weak or unavailable

REFERENCE SIGNAL RECEIVED POWER (RSRP) VALUES

The L001266-01 antenna was live-tested for receive signal strength. Data encompasses multiple satellite pass-overs, showing signal strength variation; exceeding the -120 dBm minimum for IoT devices.



An RSRP value of -120 dBm is generally the recognized minimum requirement suitable for the data rates of SMS, CAT-1, CAT-1 Bis connectivity.

RSRP can be susceptible to fluctuations for a variety of reasons. These can include: satellite elevation angle: antenna radiation patterns; solar flares; atmospheric conditions, and more.

FEATURES

- Wide Bandwidth: 617 MHz to 960 MHz
- Performance at 617 MHz to 5925 MHz
  - VSWR: ≤ 3.0
  - Peak Gain: 5.4 dBi
  - Efficiency: 27%
- Performance at 3300 MHz to 4200 MHz
  - VSWR: ≤ 1.6
  - Peak Gain: 2.7 dBi
  - Efficiency: 32%
- Ground plane independent dipole antenna
- External mount, includes all hardware for installation including M12x1 hex nut, washer and optional boot
- SMA plug (male pin) gold plated connection
- IP65/IP67 ratable
- Impact resistant UV stabilized ABS radome material

APPLICATIONS

- Worldwide 5G/4G/3G/2G
- Cellular IoT: LTE-M (Cat-M1) and NB-IoT
- Private cellular networks
  - Citizens Broadband Radio Service (CBRS)
- 410 MHz LTE
- 4.9 GHz Public Safety
- Emerging 5G C-Band applications
- Emerging 5G 2.5 GHz EBS applications
- Remote control, monitoring and sensing
- Internet of Things (IoT) devices
- ISM applications

ORDERING INFORMATION

Part Number	Description
L001266-01	1 meter (39.37 in) 5G/LTE panel mount antenna with SMA plug (male pin) on RG-174/U coaxial cable and mounting hardware, including M12x1 hex nut, washer and rubber boot

TABLE 1. ELECTRICAL SPECIFICATIONS

Bands	Frequency Range	VSWR (max.)	Peak Gain (dBi)	Avg. Gain (dBi)	Efficiency (%)
87, 88	410 MHz to 426 MHz	1.8	-0.1	-5.1	33
72, 73	450 MHz to 470 MHz	2.9	-4.2	-12.8	8
5, 8, 12, 13, 14, 17, 18, 19, 20, 26, 27, 28, 29, 44, 67, 69, 81, 82, 83, 89	617 MHz to 960 MHz	3.0	5.4	-6.9	27
1, 2, 3, 4, 9, 10, 25, 33, 34, 35, 36, 37, 39, 65, 66, 80, 84, 86, 95	1695 MHz to 2200 MHz	2.2	3.8	-10.4	26
30, 40	2300 MHz to 2400 MHz	1.3	4.2	-3.1	52
7, 41	2496 MHz to 2690 MHz	1.6	2.7	-5.2	33
22, 42, 43, 48, 49, 52, n77, n78	3300 MHz to 4200 MHz	1.6	2.7	-5.7	32
n79	4400 MHz to 5925 MHz	1.6	5.1	-4.6	39

Electrical specifications and plots measured with the antenna in a free space orientation.

Electrical specifications and plots measured with a 300 mm x 300 mm (11.8 in x 11.8 in) ground plane.

TABLE 2. MECHANICAL SPECIFICATIONS

Parameter	Value
Operating Temperature Range	-40 °C to +70 °C
Weight	63.4 g (2.24 oz)
Dimensions	23.3 mm x Ø54.7 mm (0.92 in x Ø2.15 in)
Connection	SMA Plug (male pin)
Cable	1 meter (39.37 in), 2 meters (78.74 in)
IP Rating	IP65/IP67 Ratable
Fire rating	UL94 HB

PACKAGING INFORMATION

The L001266-01 antenna is individually sealed in a clear plastic bag. Plastic bags are sealed in a larger plastic bag in quantities of 50 pcs. Distribution channels may offer alternative packaging options.

PRODUCT DIMENSIONS

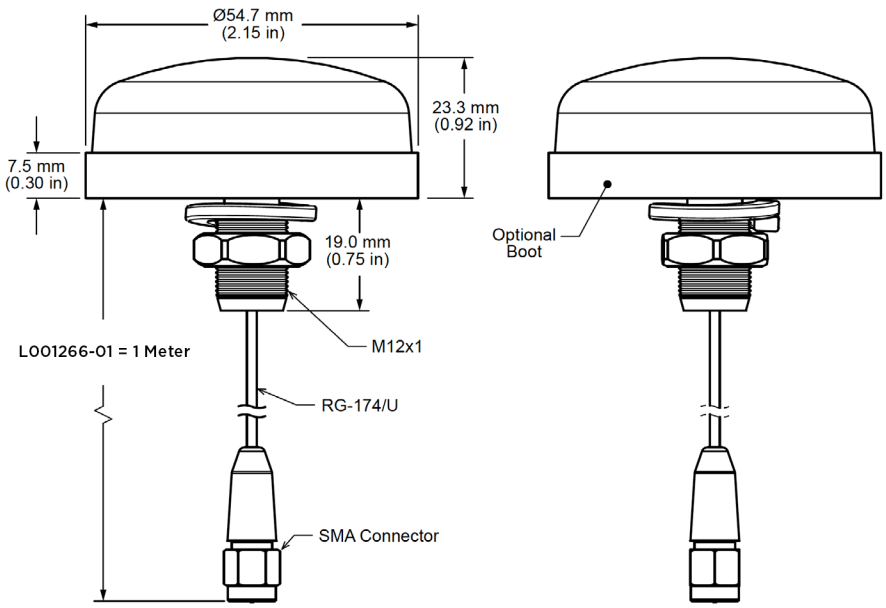


Figure 1. L001266-01 Dimensions

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.

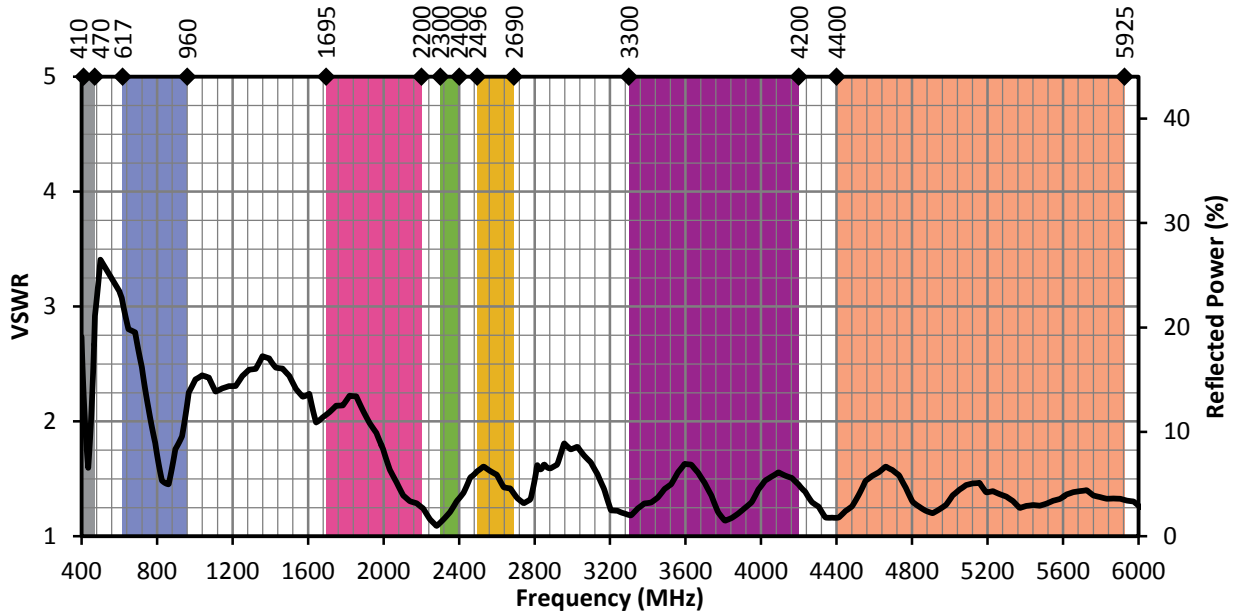


Figure 2. L001266-01 VSWR

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.

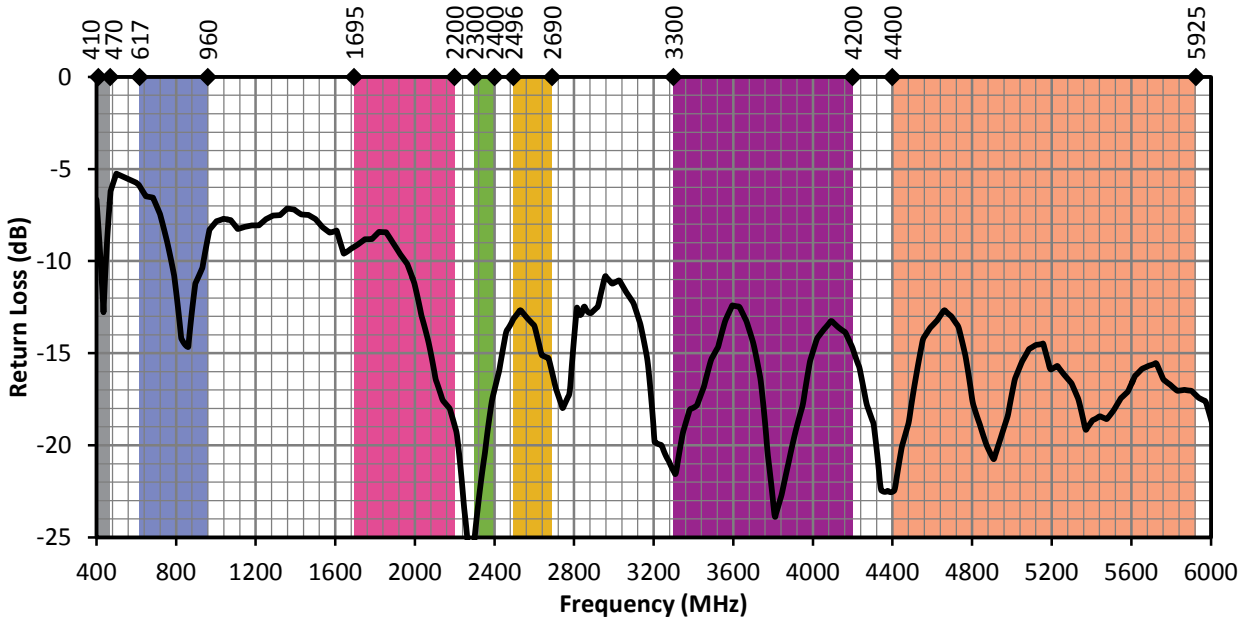


Figure 3. L001266-01 Return Loss

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.

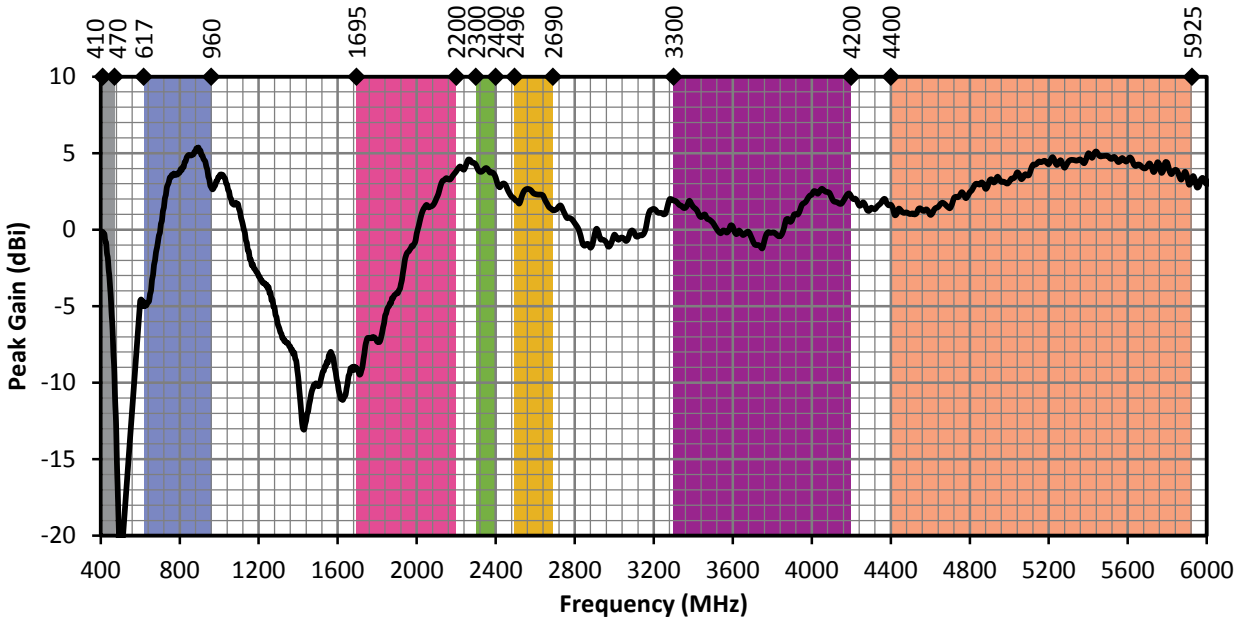


Figure 4. L001266-01 Peak Gain

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.

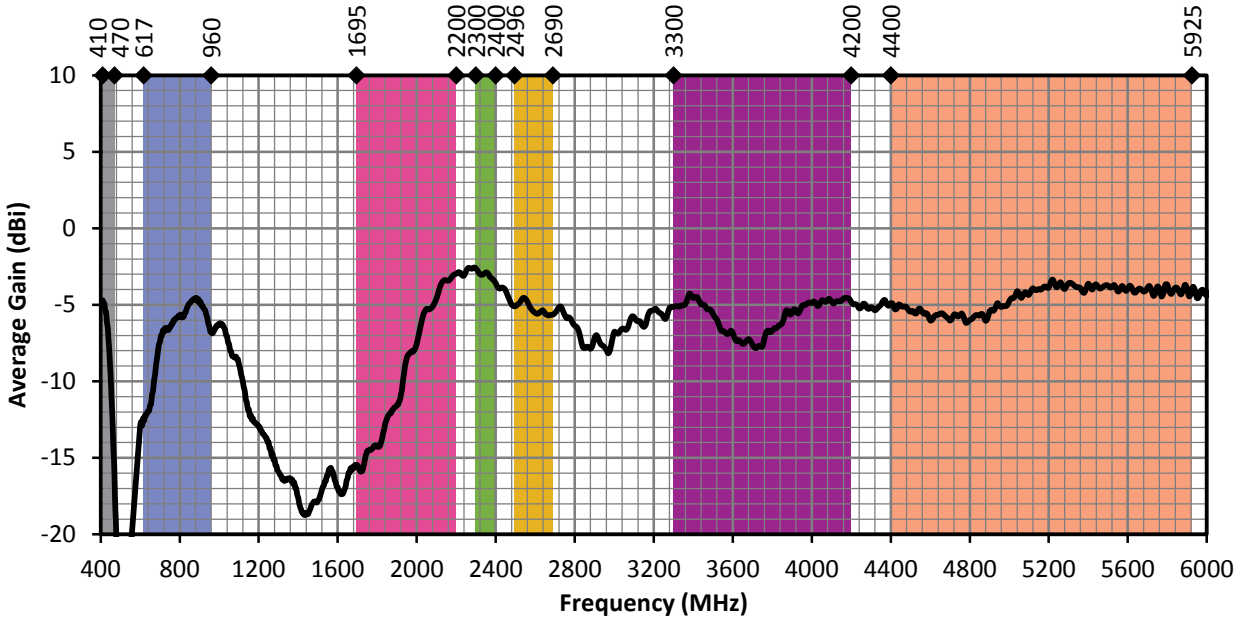


Figure 5. L001266-01 Antenna Average Gain

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.

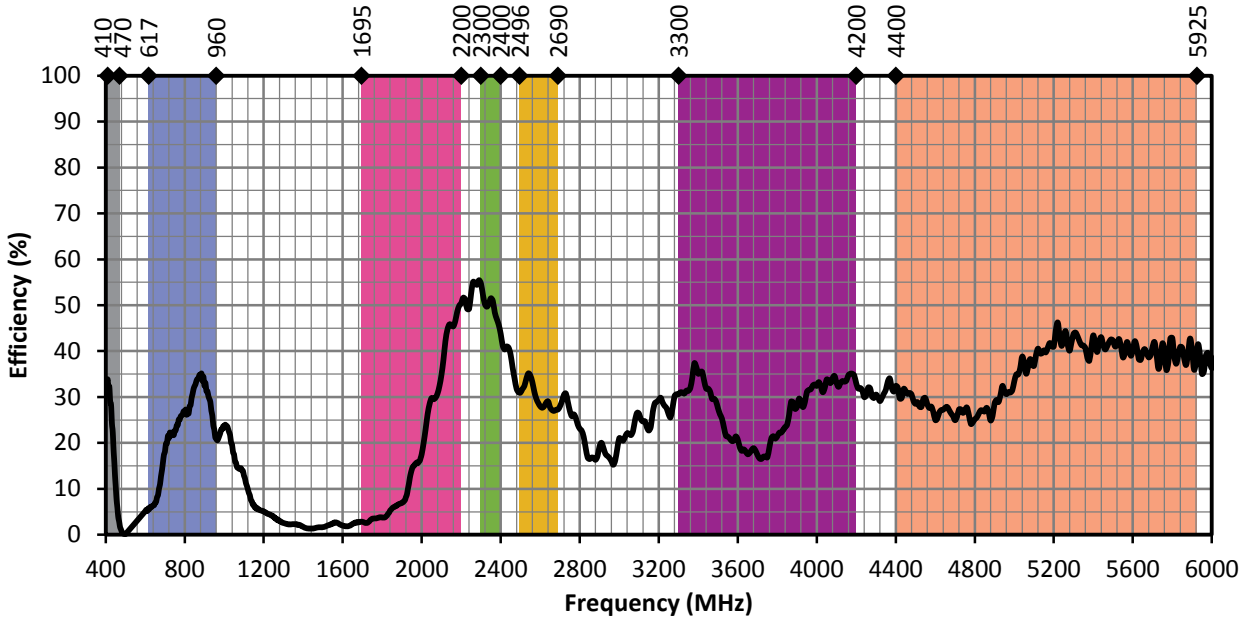


Figure 6. L001266-01 Antenna Efficiency

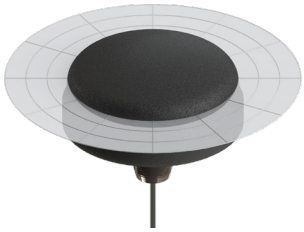
RADIATION PATTERNS

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 for a straight orientation are shown in Figure 9 using polar plots covering 360 degrees. The antenna graphic at the top of the page 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 - STRAIGHT

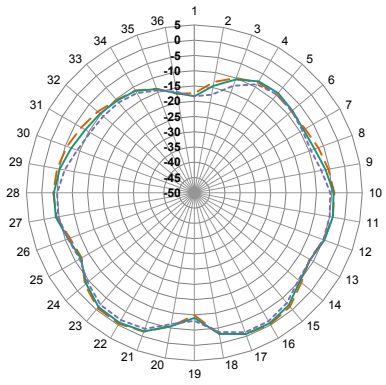
XZ-Plane Gain

YZ-Plane Gain

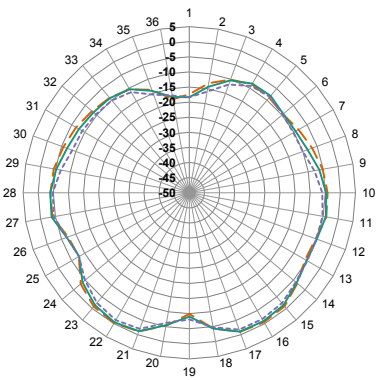


XY-Plane Gain

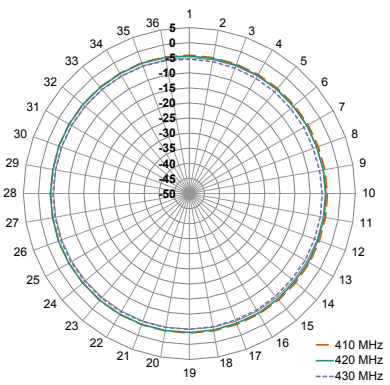
410 MHz TO 426 MHz (420 MHz)



XZ-Plane Gain

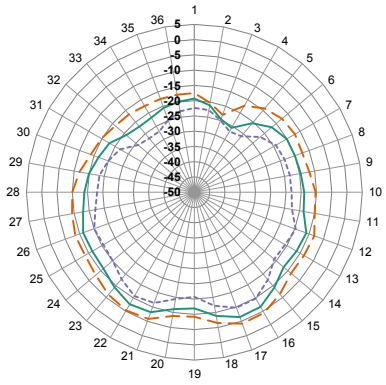


YZ-Plane Gain

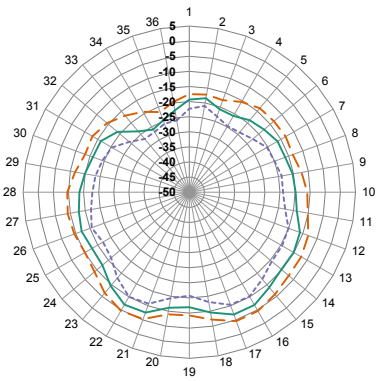


XY-Plane Gain

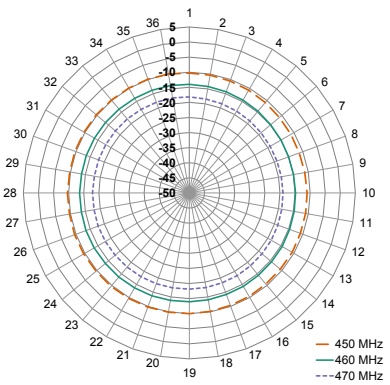
450 MHz TO 470 MHz (460 MHz)



XZ-Plane Gain



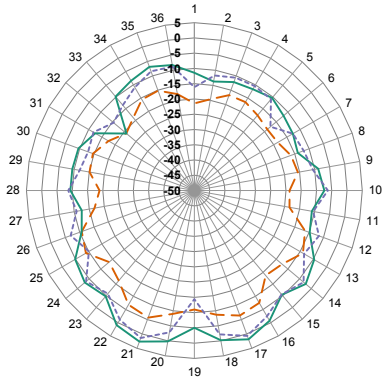
YZ-Plane Gain



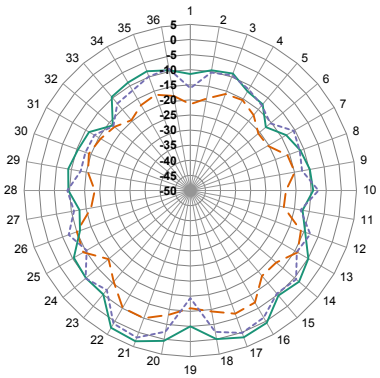
XY-Plane Gain

RADIATION PATTERNS - STRAIGHT

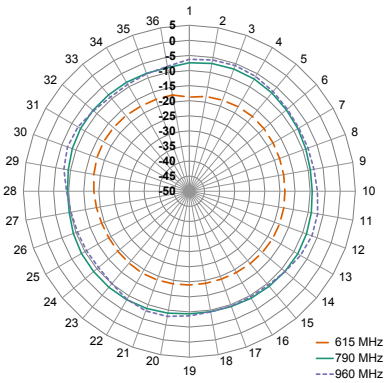
617 MHz TO 960 MHz (790 MHz)



XZ-Plane Gain

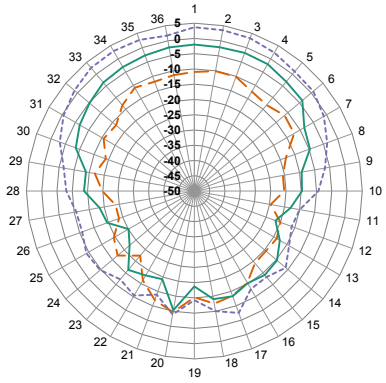


YZ-Plane Gain

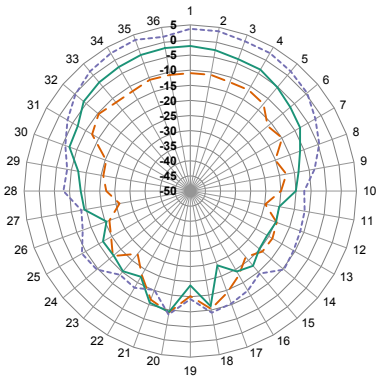


XY-Plane Gain

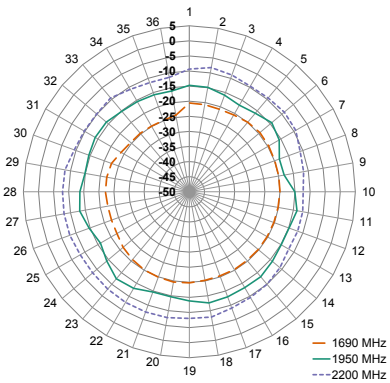
1695 MHz TO 2200 MHz (1950 MHz)



XZ-Plane Gain

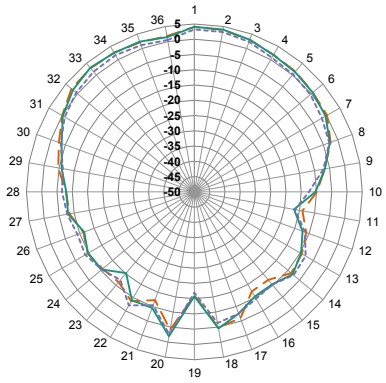


YZ-Plane Gain

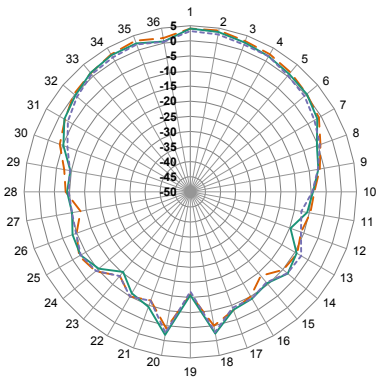


XY-Plane Gain

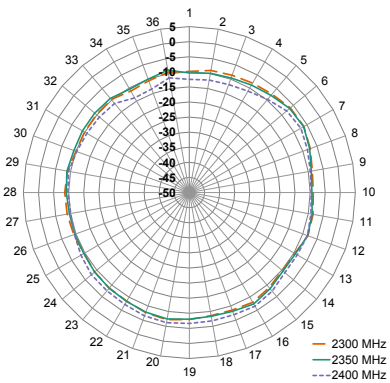
2300 MHz TO 2400 MHz (2350 MHz)



XZ-Plane Gain



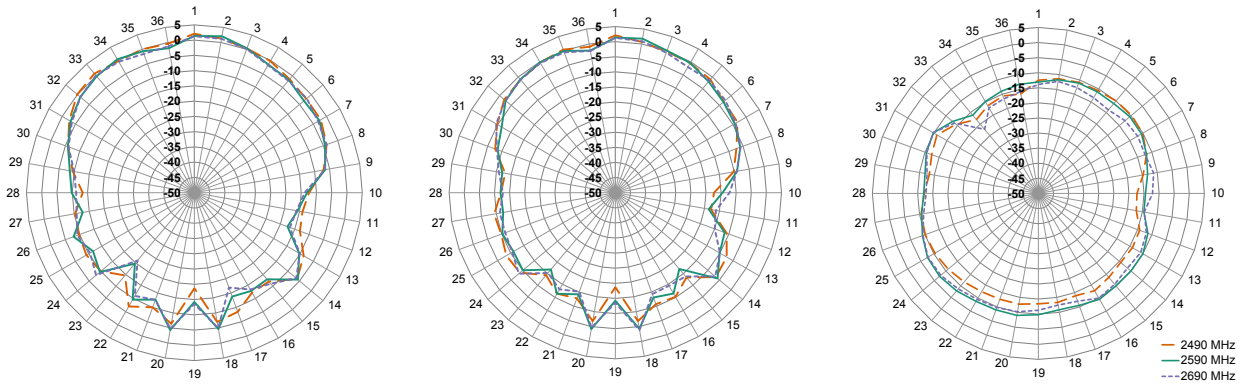
YZ-Plane Gain



XY-Plane Gain

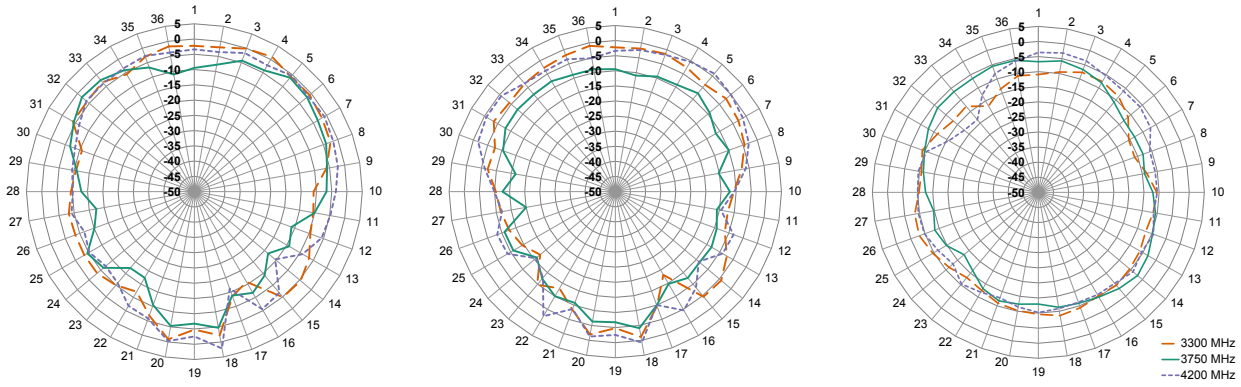
RADIATION PATTERNS - STRAIGHT

2496 MHz TO 2690 MHz (2590 MHz)



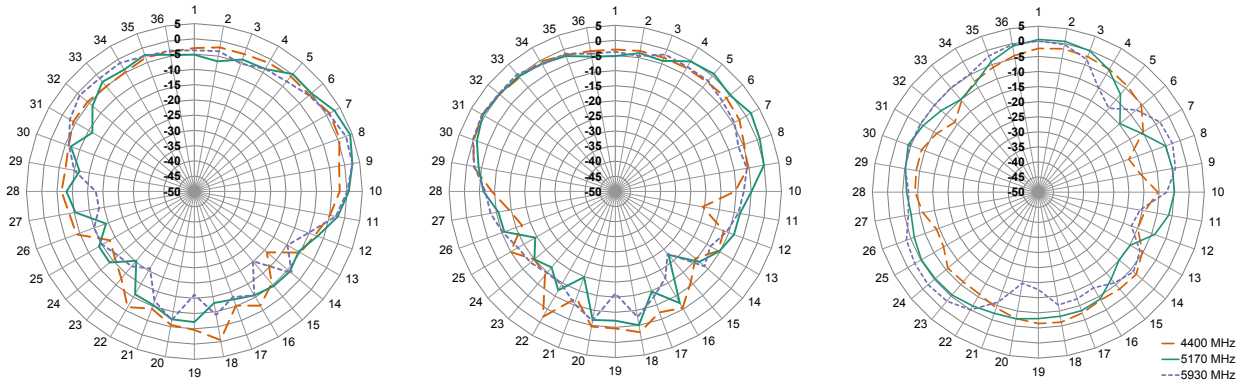
XZ-Plane Gain | YZ-Plane Gain | XY-Plane Gain

3300 MHz TO 4200 MHz (3750 MHz)



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

4400 MHz TO 5925 MHz (5170 MHz)



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

Figure 7. L001266-01 Radiation Patterns

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