Datasheet

AC15001-NM
WiFi Compact Dome Panel-Mount Antenna

The AC15001 NMO-connector dome antennas provide robust compact, outdoor, omnidirectional WiFi antenna solutions for all WiFi applications including WiFi 6 and WiFi 7. Each antenna supports IP67 and IP65 ingress protection as well as IK-10 impact resistance, all under an attractive, UV-resistant, dome. The 82 mm x 40mm mounted size combines excellent antenna performance with a compact low-profile that fits in many applications from mobile/vehicular roof-mount to fixed vending machine use, and supports use on both metal enclosures or in free space including non-metallic enclosures.

The AC15001-NM NMO compact dome antennas are available in two colors, black and white, with fine matte finish. Similar-performing N-jack-terminated (AC15001-NJ) and cabled (AC17001) compact dome antennas are also available.

AC15001-NMB Compact Dome NMO-Mount Antenna

Features

- Very high efficiency
- IP67/IP65 ingress protection
- IK10 impact resistance
- O-ring mounting seal
- UV resistance
- Dimensions: 82 mm x 40 mm
- Ground plane independence
- Performance at 5.15 GHz to 5.85 GHz
  - VSWR: 1.6
  - Peak Gain: 7.6 dBi
  - Efficiency: 88%
- NMO termination

Applications

- WiFi/WLAN Coverage
  - WiFi 7 (802.11be)
  - WiFi 6E (802.11ax)
  - WiFi 6 (802.11ax)
  - WiFi 5 (802.11ac)
  - WiFi 4 (802.11n)
  - 802.11b/g
- 2.4 GHz ISM applications
  - Bluetooth®
  - ZigBee®
- U-NII bands 1-8
- Internet of Things (IoT) devices
- WLAN Gateways/Routers
- Customer Premise Equipment (CPE)
  - Fixed wireless
  - Outdoor CPE
- Automotive/vehicular/OHV

Ordering Information

Part Number	Description
AC15001-NMB	Black NMO WiFi compact dome antenna
AC15001-NMW	White NMO WiFi compact dome antenna

See the AC17001 series compact dome antennas for cabled options and AC15001-NJ for N connector termination options.
Available from The Antenna Company (sales@antennacompany.com) and select distributors and representatives.

RF/Electrical Specifications

AC15001-NM	ISM/WiFi	WiFi/U-NII 1-4	WiFi/U-NII 5-8
Parameter	2400 MHz to 2500 MHz	5150 MHz to 5850 MHz	5900 MHz to 7150 MHz
VSWR (max)	1.7	1.6	1.8
Peak Gain (dBi)	3.8	7.6	7.1
Average Gain (dBi)	-1.2	-0.5	-1.1
Average Efficiency (%)	75	88	78

Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omnidirectional
Wavelength	½-wave
Maximum Input Power	10W
Electrical Type	Dipole

Electrical specifications and plots measured with the antenna mounted at the center of a 300 mm x 300 mm ground plane using NMO to N-connector test adapter.

Mechanical Specifications

Parameter	Value
Antenna Connection (Termination)	NMO
Mounting Torque	Hand tighten, 2.0 Nm typical
Mating Connector	Commercially available NMO connectors vary widely. An NMO connector designed for high frequency (i.e. > 700 MHz) is recommended
Weight	AC15001-NMx = 56.7 g (2.0 oz)
Dimensions (mounted)	82.0 mm x Ø40.0 mm (3.23 in x Ø1.57 in)

Environmental Specifications

Parameter	Value
Operating Temp. Range	-40 °C to +85 °C (-104 °F to 185 °F)
Operating Relative Humidity	≤ 98%
Ingress Protection	IP67, IP65
Impact Resistance	IK10
Flammability Rating	UL 94-HB
Salt Spray	MIL-STD 810F/STM B117
Wind Resistance (max.)	300 km/hr (186 mi/hr)

Antenna Dimensions

The dimensions for the AC15001 are shown below in Figure 1.

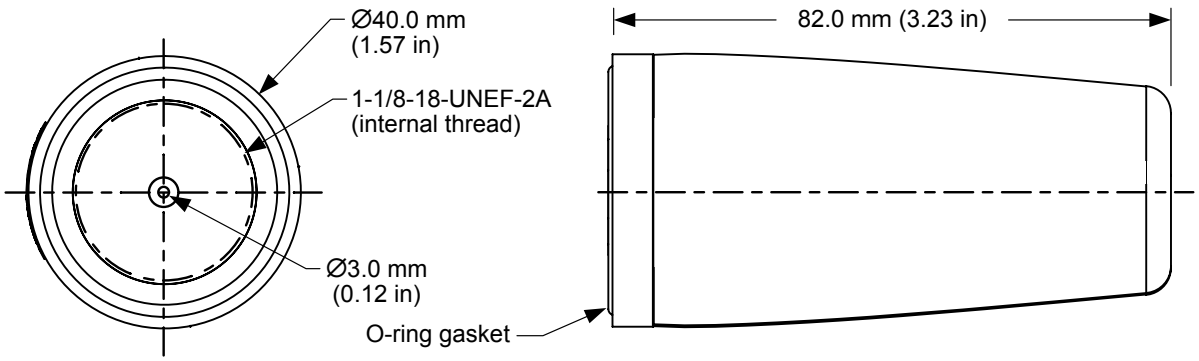
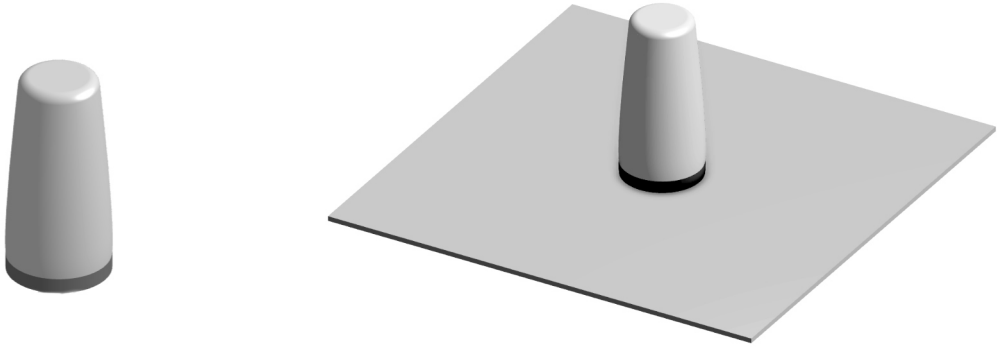


Figure 1. AC15001 Antenna Dimensions

Antenna Test Orientations

The AC15001 antenna is characterized in two antenna orientations as shown in Figure 2. Although the antenna does not require a ground plane to function, characterization on an adjacent ground plane (300 mm x 300 mm) provides insight into antenna performance when attached directly on a metal enclosure. The antenna free space orientation characterizes use of an antenna attached to a non-metallic enclosure. These two orientations represent common end-product use cases.



Antenna in Free space Antenna on Ground Plane

Figure 2. AC15001 Antenna Test Orientations

On Ground Plane

The charts on the following pages represent data taken with the antenna oriented at the center of the 300 mm x 300 mm metal plate as shown in Figure 3.

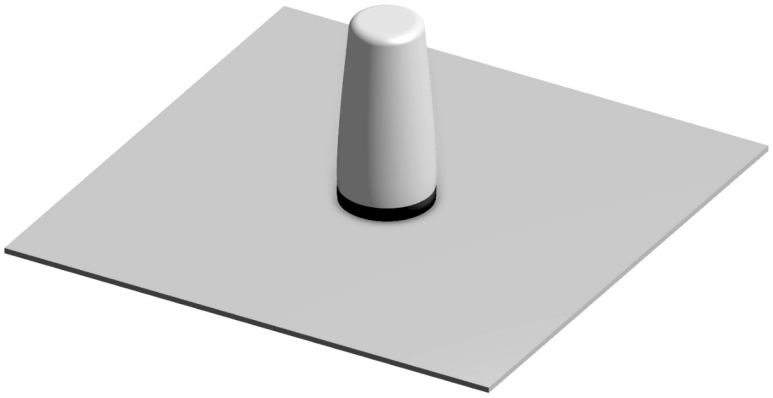


Figure 3. AC15001 Antenna On Ground Plane

VSWR

Figure 4 provides the voltage standing wave ratio (VSWR) across the antenna bandwidth. VSWR characterizes the power reflected from the antenna back to the transmitter. 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 measure of the percentage of transmitter power reflected back from the antenna.

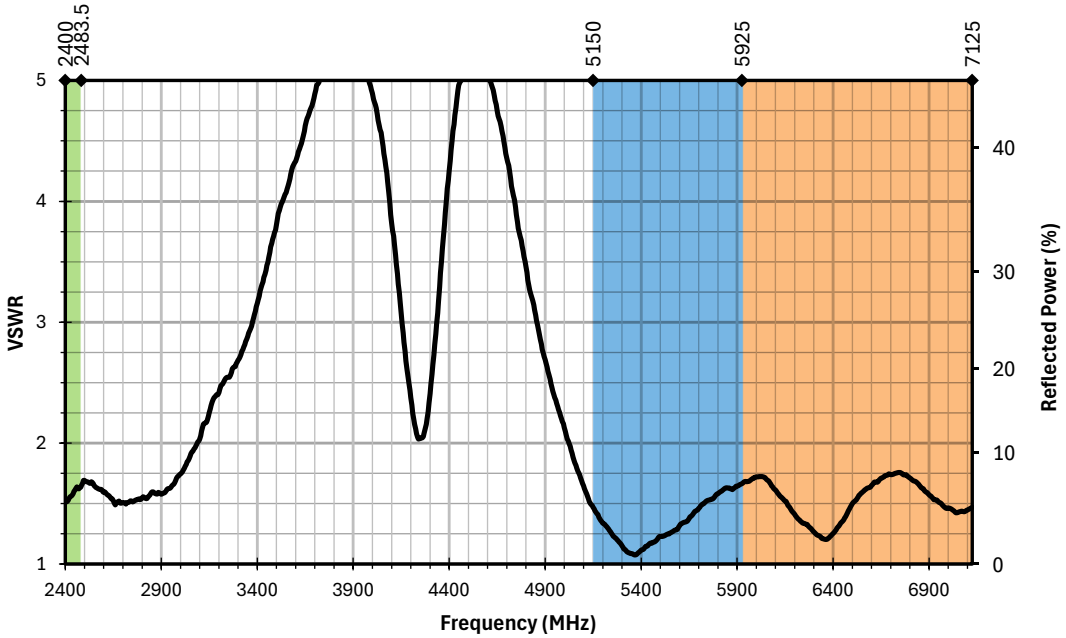


Figure 4. AC15001 Antenna VSWR on Ground Plane

Return Loss

Return loss (Figure 5) represents the loss in power at the antenna due to reflected signals. A higher magnitude return loss indicates better performance. Return loss is the negative of input reflection coefficient, in decibels (dB), and the two values are often used interchangeably.

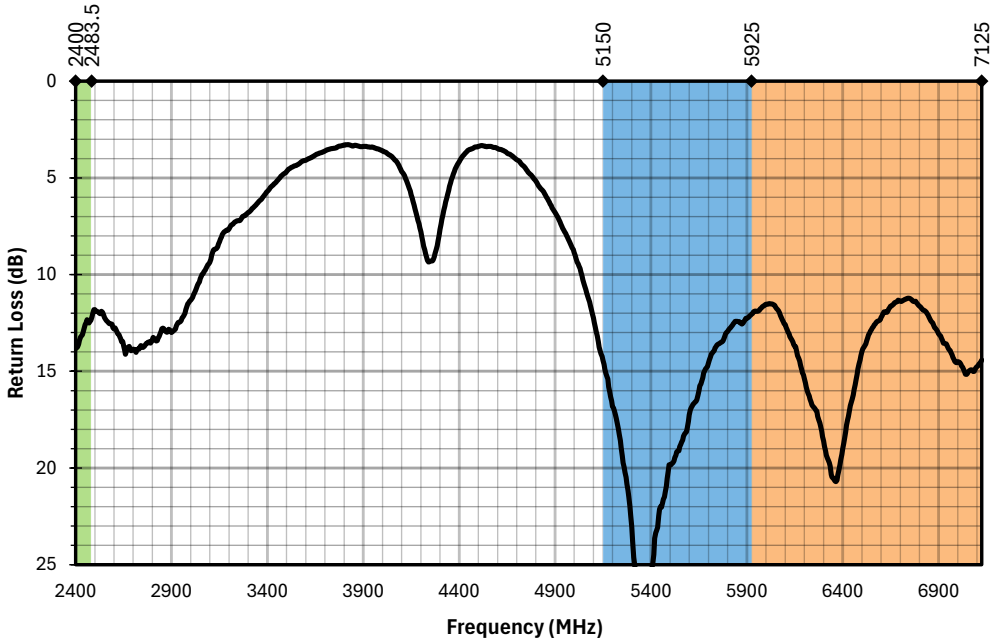


Figure 5. AC15001 Antenna Return Loss on Ground Plane

Peak Gain

Peak gain (Figure 6) provides a measure of the maximum conversion of antenna input power to radio waves at a given frequency. Peak gain does not account for the directionality of gain in 3-dimensional space.

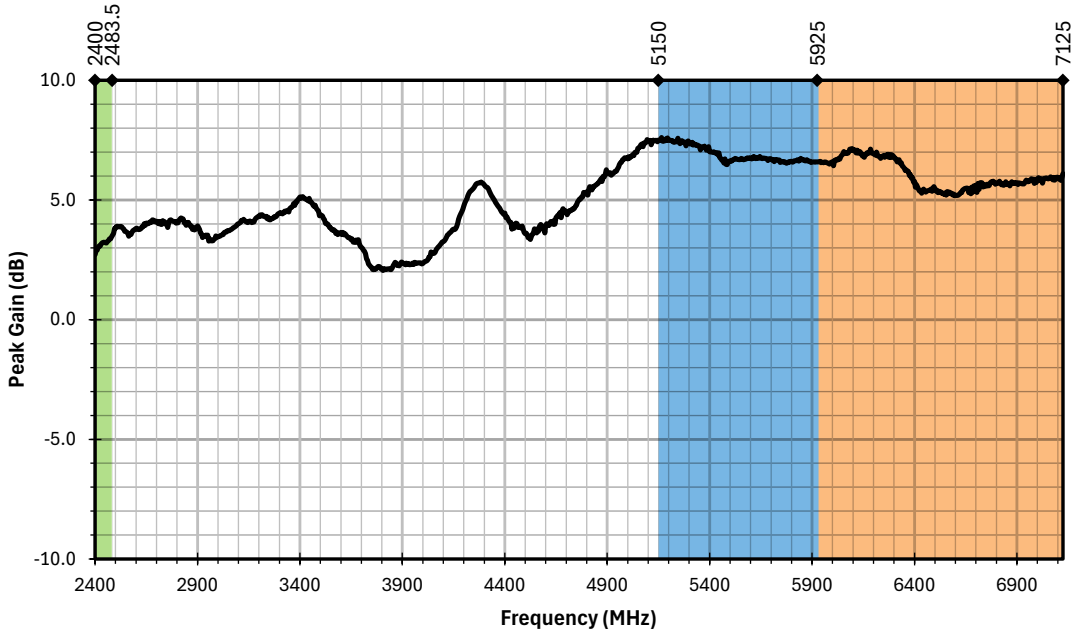


Figure 6. AC15001 Antenna Peak Gain on Ground Plane

Average Gain

Average gain (Figure 7) is the average of all antenna gain in 3-dimensional space at each frequency, providing an indication of overall performance without expressing antenna directionality.

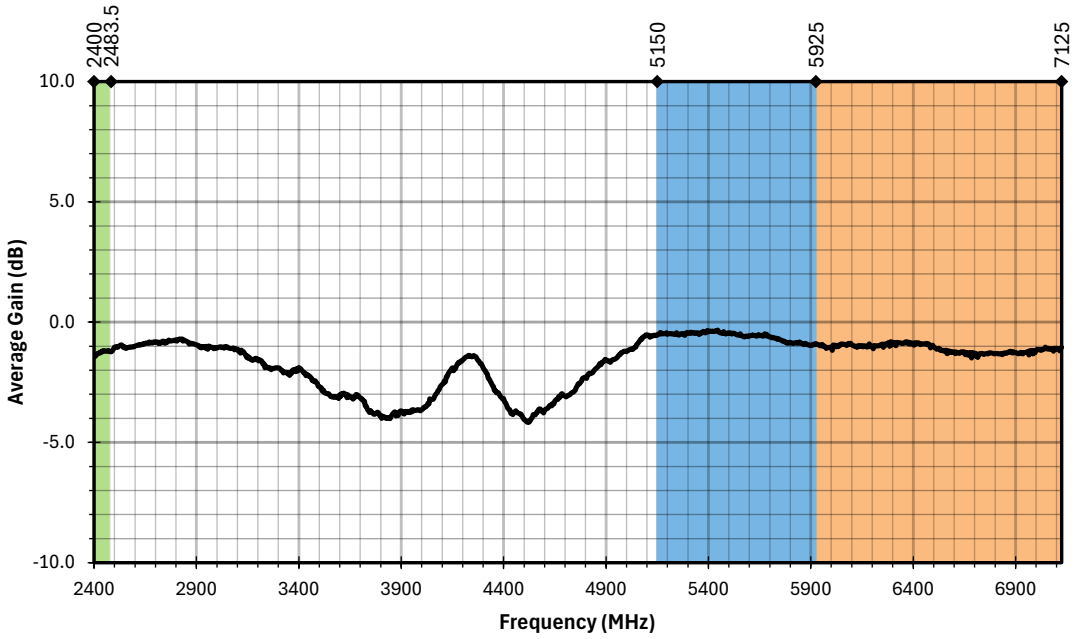


Figure 7. AC15001 Antenna Average Gain on Ground Plane

Efficiency

Efficiency (Figure 8) is 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.

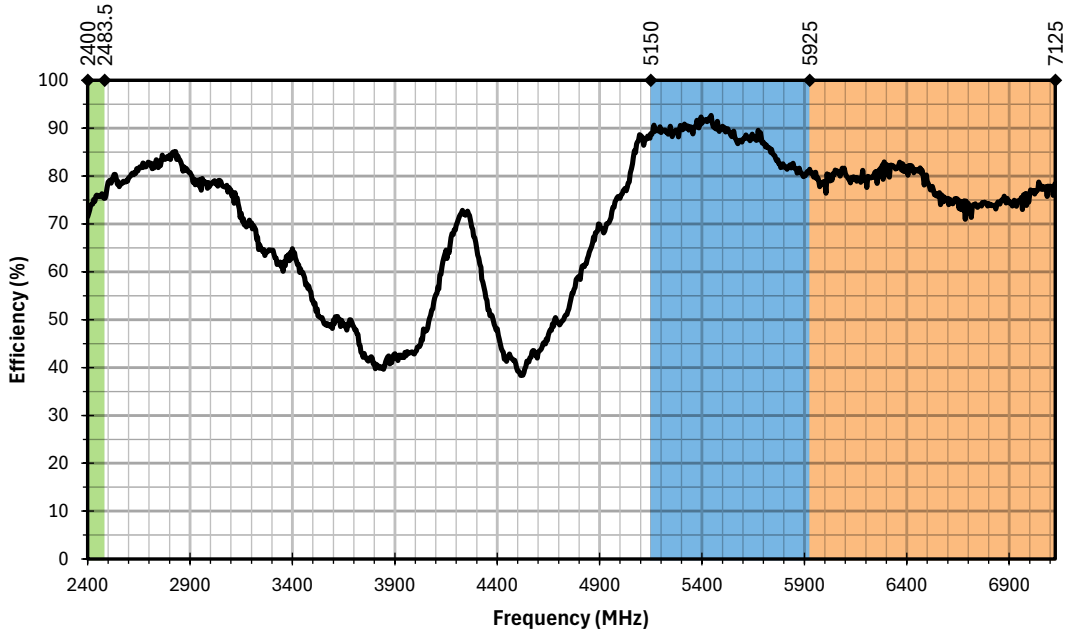
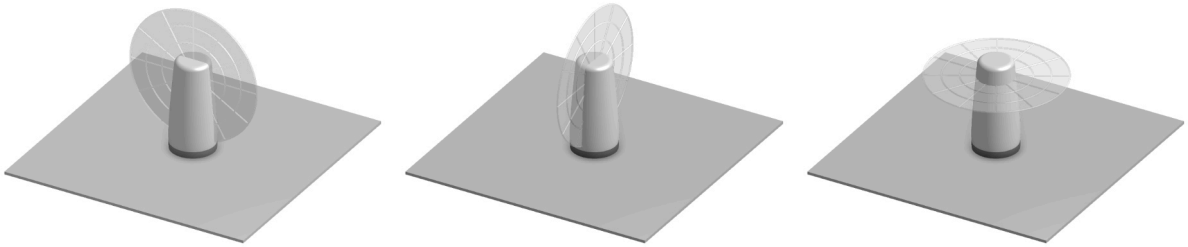


Figure 8. AC15001 Antenna Efficiency on Ground Plane

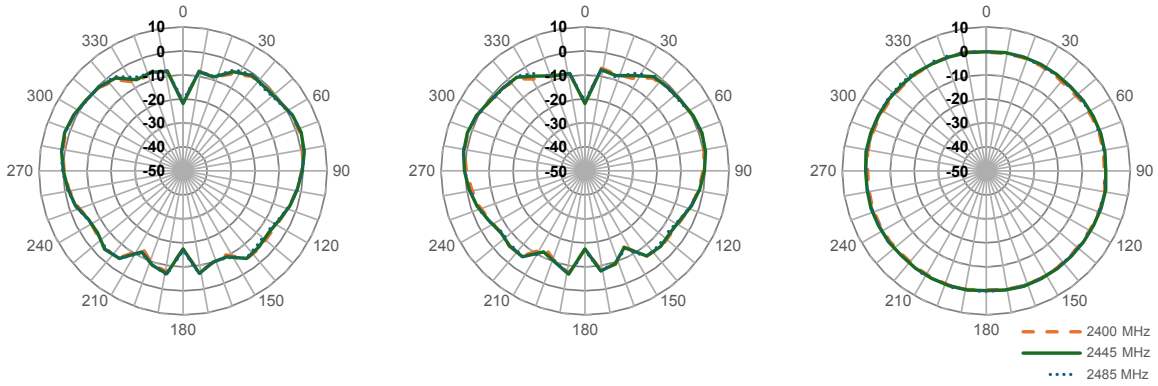
Radiation Patterns - On Ground Plane

Radiation patterns provide information about the directional performance of the antenna by plotting gain in three orthogonal planes at the high-, low- and center-frequencies of an antenna frequency band. Antenna radiation patterns (Figure 9) are shown using polar plots covering 360 degrees with the plane of reference depicted above the plots. Note: when viewed with typical PDF viewing software, zooming into radiation patterns is possible to reveal fine detail.



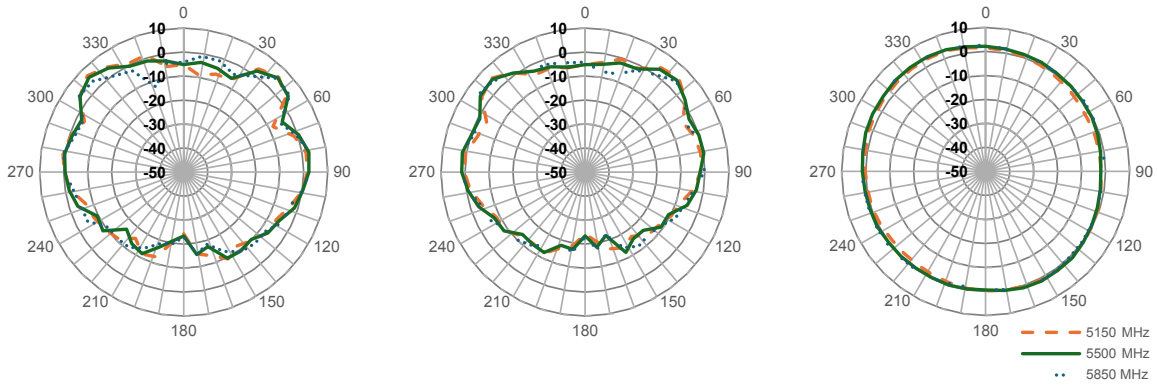
XZ-Plane Gain **YZ-Plane Gain** **XY-Plane Gain**

2400 MHz to 2500 MHz (2450 MHz)



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

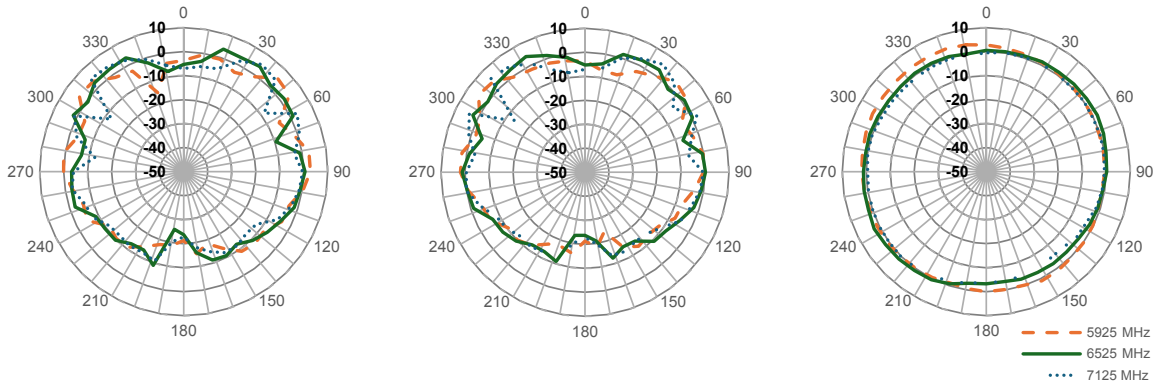
5150 MHz to 5895 MHz (5520 MHz)



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

Radiation Patterns

5925 MHz to 7125 MHz (6525 MHz)



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

Figure 9. Radiation Patterns for AC15001 Antenna on Ground Plane

Free Space, No Ground Plane

The charts on the following pages represent data taken with the antenna in free space as shown in Figure 10.

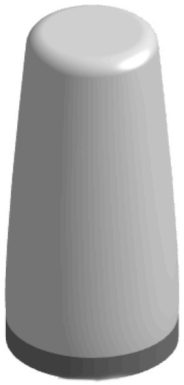


Figure 10. AC15001 Antenna, Free Space, no Ground Plane

VSWR

Figure 11 provides the voltage standing wave ratio (VSWR) across the antenna bandwidth. VSWR characterizes the power reflected from the antenna back to the transmitter. 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 measure of the percentage of transmitter power reflected back from the antenna.

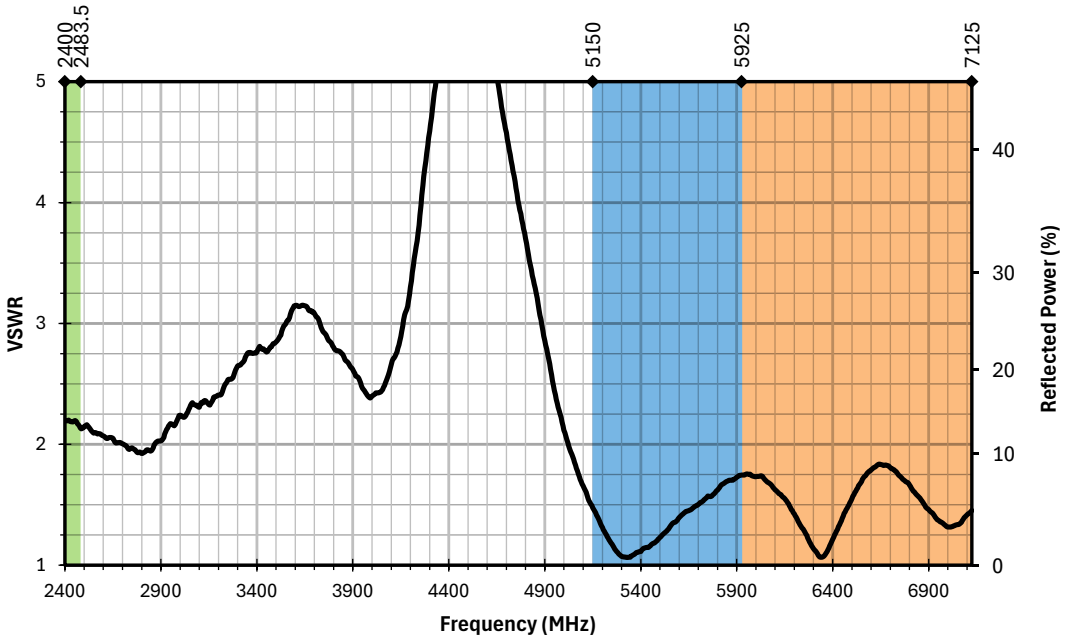


Figure 11. AC15001 Antenna VSWR, Free Space

Return Loss

Return loss (Figure 12) represents the loss in power at the antenna due to reflected signals. A higher magnitude return loss indicates better performance. Return loss is the negative of input reflection coefficient, in decibels (dB), and the two values are often used interchangeably.

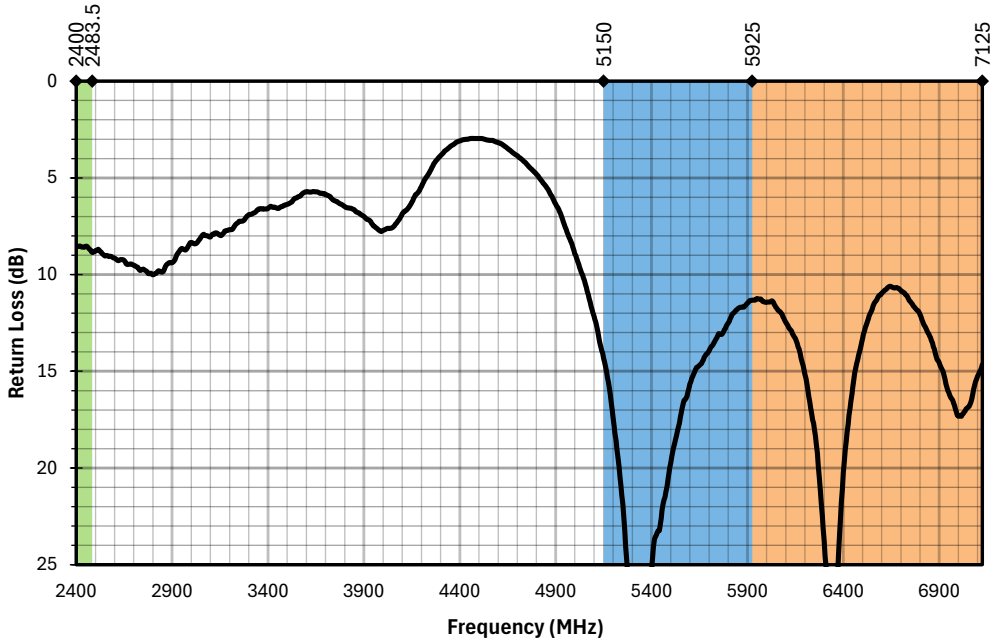


Figure 12. AC15001 Antenna Return Loss, Free Space

Peak Gain

Peak gain (Figure 13) provides a measure of the maximum conversion of antenna input power to radio waves at a given frequency. Peak gain does not account for the directionality of gain in 3-dimensional space.

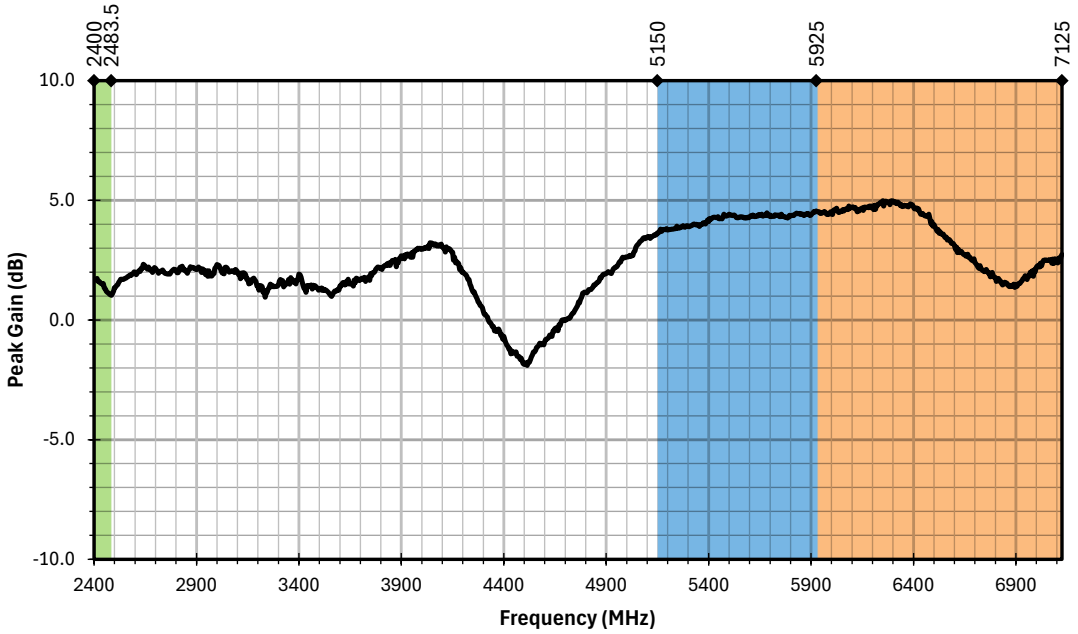


Figure 13. AC15001 Antenna Peak Gain, Free Space

Average Gain

Average gain (Figure 14) is the average of all antenna gain in 3-dimensional space at each frequency, providing an indication of overall performance without expressing antenna directionality.

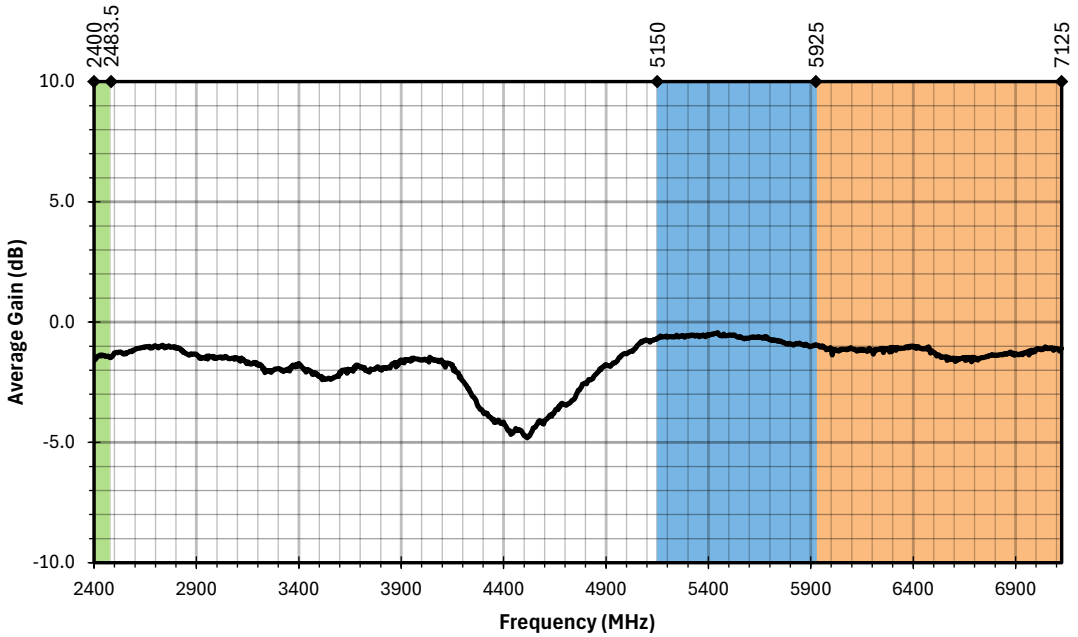


Figure 14. AC15001 Antenna Average Gain, Free Space

Efficiency

Efficiency (Figure 15) is 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.

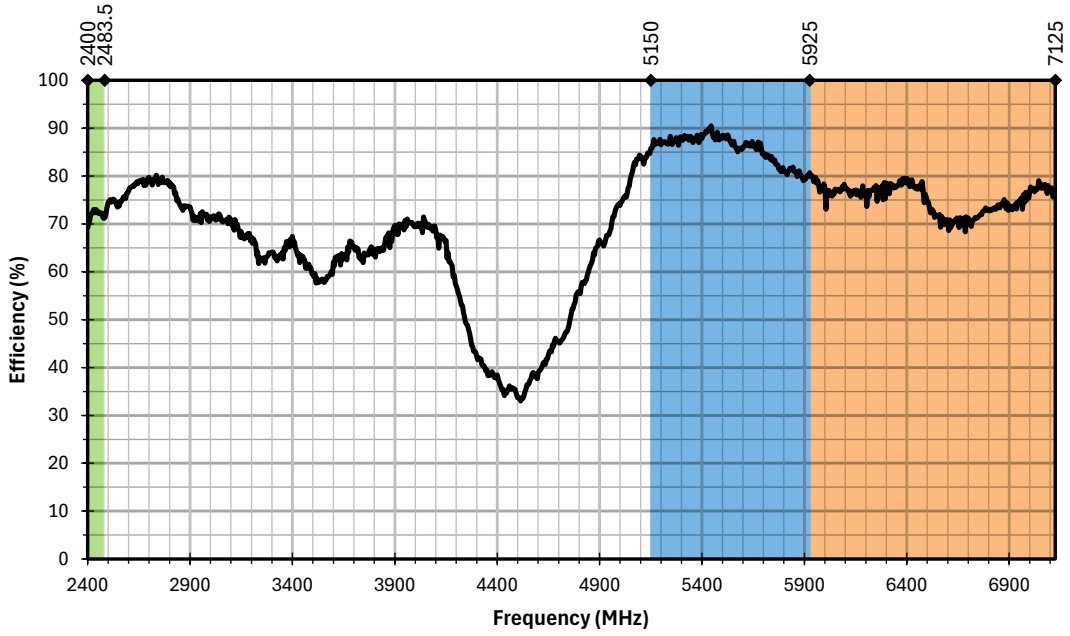
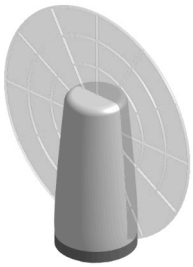


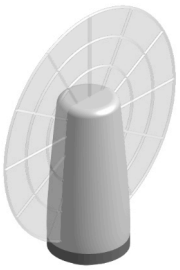
Figure 15. AC15001 Antenna Efficiency, Free Space

Radiation Patterns - Free Space

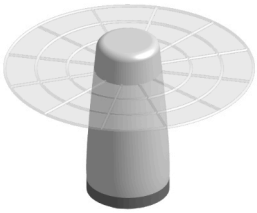
Radiation patterns provide information about the directional performance of the antenna by plotting gain in three orthogonal planes at the high-, low- and center-frequencies of an antenna frequency band. Antenna radiation patterns (Figure 16) are shown using polar plots covering 360 degrees with the plane of reference depicted above the plots. Note: when viewed with typical PDF viewing software, zooming into radiation patterns is possible to reveal fine detail.



XZ-Plane Gain

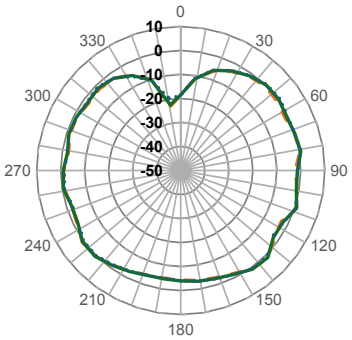


YZ-Plane Gain

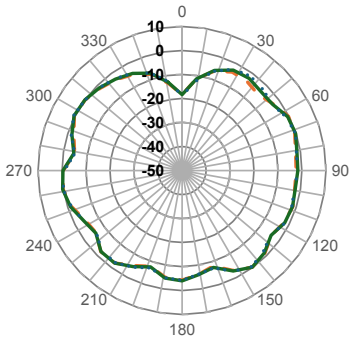


XY-Plane Gain

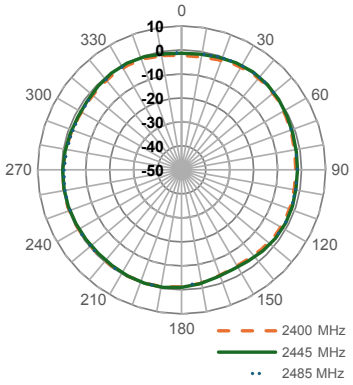
2400 MHz to 2500 MHz (2450 MHz)



XZ-Plane Gain

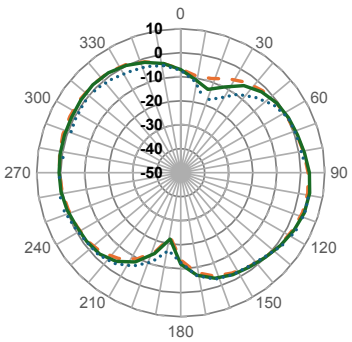


YZ-Plane Gain

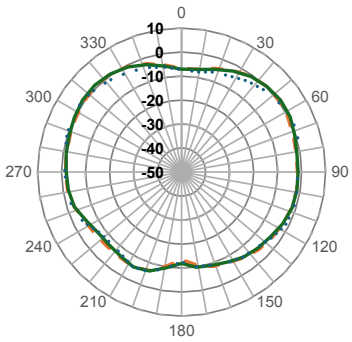


XY-Plane Gain

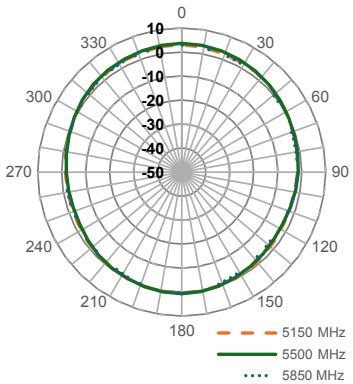
5150 MHz to 5895 MHz (5520 MHz)



XZ-Plane Gain



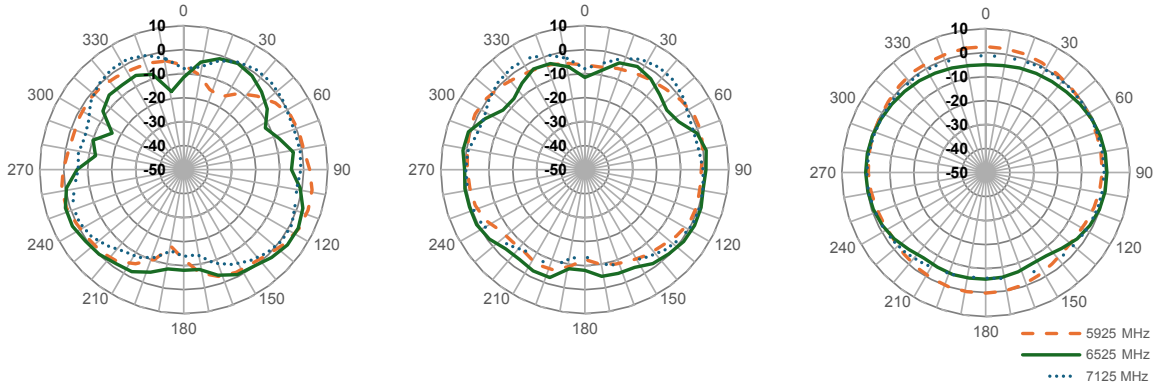
YZ-Plane Gain



XY-Plane Gain

Radiation Patterns

5925 MHz to 7125 MHz (6525 MHz)



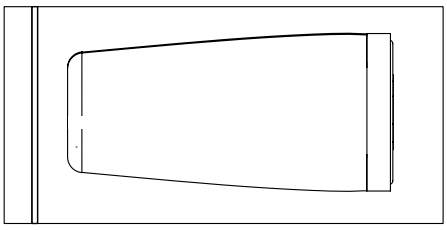
XZ-Plane Gain YZ-Plane Gain XY-Plane Gain

Figure 16. Radiation Patterns for AC15001 Antenna in Free Space

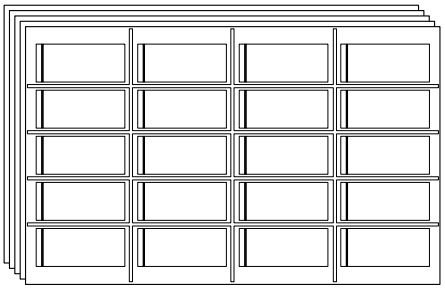
Packaging Information

The AC15001 antennas are individually packaged in a resealable polyethylene bag. Bagged antennas are placed in “honeycomb” divided pockets in a carton at 100 antennas per carton. 5 layers of 20 antennas per layer. Layers are separated by protective sheets. Carton dimensions are 590 mm x 290 mm x 270 mm, 23.2 in x 11.4 in x 10.6 in.

Table 1. Packing Materials and Specifications



Antenna in resealable bag



Antennas arranged in layers

Regional Environmental Regulation Compliance

Table 2. Environmental Compliance Data

Region	Regulation	Reference
United States	US EPA Toxic Substances Control Act amended December 2020 Declaration	TSCA Section 6(h)
United States	California Proposition 65 Safe Drinking Water & Toxic Enforcement Act of 1986 Declaration	HSC division 20 chapter 6.6
European Union	RoHS 3	EU 2015/863
European Union	EU REACH	EU 1907/2006
Worldwide	Responsible Minerals Initiatives	Dodd Frank act 1502; EU 2017/821
European Union	Persistent Organic Pollutants	(EU) 2019/1021
European Union	Packaging Directive	94/62/EC
European Union	PFOA Free	2006/122/ECOF

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Series: Compact Dome.

Patent Pending.

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