

AC16100 2.4 GHz Tilt/Swivel Blade Antenna

The Antenna Company AC16100 tilt/swivel blade antennas provide robust indoor/outdoor, omnidirectional 2.4 GHz antenna solutions for all ISM applications including Bluetooth®, BLE and ZigBee®. The hinged base allows for fixed positioning of the antenna at 0 degrees (straight), 45 degrees and 90 degrees (right angle) to support use in many configurations from single-antenna (SISO) and MIMO IoT applications. The swivel connector allows for easy installation and firm positioning for optimal performance.

The 152 mm long (straight) by 25 mm max width provides appropriate size for performance on both metal enclosures or in free space including non-metallic enclosures while not being so large as to interfere with the deployment or dominating equipment aesthetics. Additionally, beyond the capability of most blade antennas, AC16100 blade antennas support IP67 and IP65 ingress protection and UV-resistant materials for outdoor applications.

The AC16100 blade antennas are available in black and white, with fine matte finish, and SMA or reverse-polarity SMA (RPSMA) connection.



2.4 GHz Tilt/Swivel Blade Antenna

Features

- Very high efficiency
- Performance at 2.4 GHz to 2.485 GHz
 - VSWR: 1.6
 - Peak Gain: 3.2
 - Efficiency: 91
- IP67/IP65 ingress protection
- UV resistance
- Ground plane independence
- Dimensions: 152 mm x 25 mm
- SMA and RPSMA termination options

Applications

- 2.4 GHz ISM applications
 - Bluetooth®
 - Bluetooth Low Energy (BLE)
 - ZigBee®
- Internet of Things (IoT) devices
- WLAN Gateways/Routers
- Customer Premise Equipment (CPE)

Ordering Information

Part Number	Description
AC16100-SMAB	Black SMA-connector hinge/swivel 2.4 GHz blade antenna
AC16100-RPSB	Black RPSMA-connector hinge/swivel 2.4 GHz blade antenna
AC16100-SMAW	White SMA-connector hinge/swivel 2.4 GHz blade antenna
AC16100-RPSW	White RPSMA-connector hinge/swivel 2.4 GHz blade antenna

Available from The Antenna Company (sales@antennacompany.com) and select distributors and representatives.

RF/Electrical Specifications

AC16100	WiFi/U-NII 5-8
Parameter	2400 MHz to 2485 MHz
VSWR (max)	1.6
Peak Gain (dBi)	3.2
Average Gain (dBi)	-0.6
Average Efficiency (%)	88
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omnidirectional
Wavelength	$\frac{1}{2}$ -wave
Max Power	10 W
Electrical Type	Dipole

Electrical specifications and plots measured with the antenna mounted at the edge of a 100 mm x 100 mm ground plane.

Mechanical Specifications

Parameter	Value
Connection	SMA or RPSMA
Ingress Protection	IP67, IP65
Operating Temp. Range	-40 °C to +85 °C (-40 °F to 185 °F)
Weight	23.0 g (0.81 oz)
Dimensions	151.6 mm x 25.0 mm x 13.0 mm (Straight) (5.97 in x 0.98 in x 0.51 in)

Antenna Dimensions

Figure 1 provides dimensions of the AC16100 antenna. The antenna whip can be tilted 90 degrees, with a detent at 45 degrees enabling the antenna to be oriented in any direction. The rotating base allows for continuous positioning through 360 degrees even while installed.

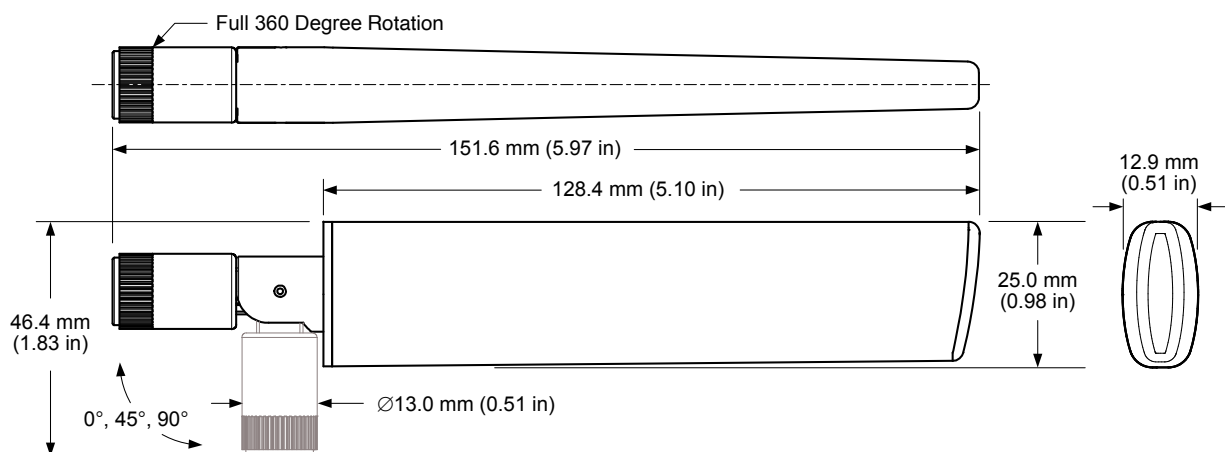


Figure 1. AC16100 Antenna Dimensions

Antenna Test Orientations

The AC16100 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 (100 mm x 100 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 Bent 90 Degrees at Edge of Ground Plane



Antenna in Free space

Figure 2. AC16100 Test Orientations

Edge of Ground Plane

The charts on the following pages represent data taken with the antenna oriented at the edge of a 100 mm x 100 mm ground plane as shown in Figure 3.



Figure 3. AC16100 Antenna at Edge of Ground Plane, Bent 90 Degrees

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.

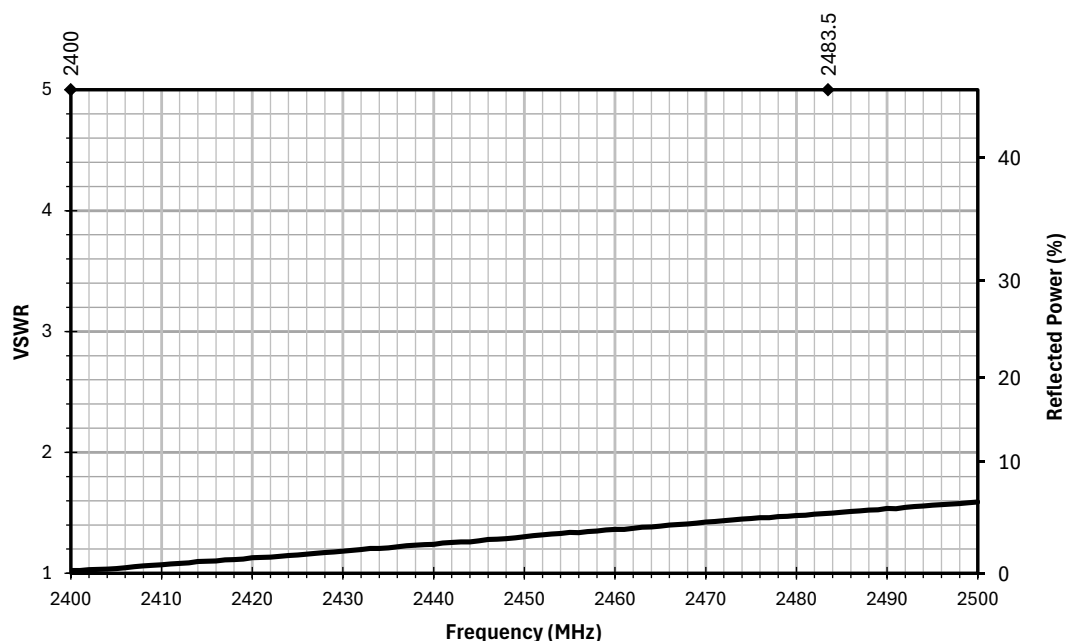


Figure 4. AC16100 Antenna VSWR at edge of Ground Plane

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.

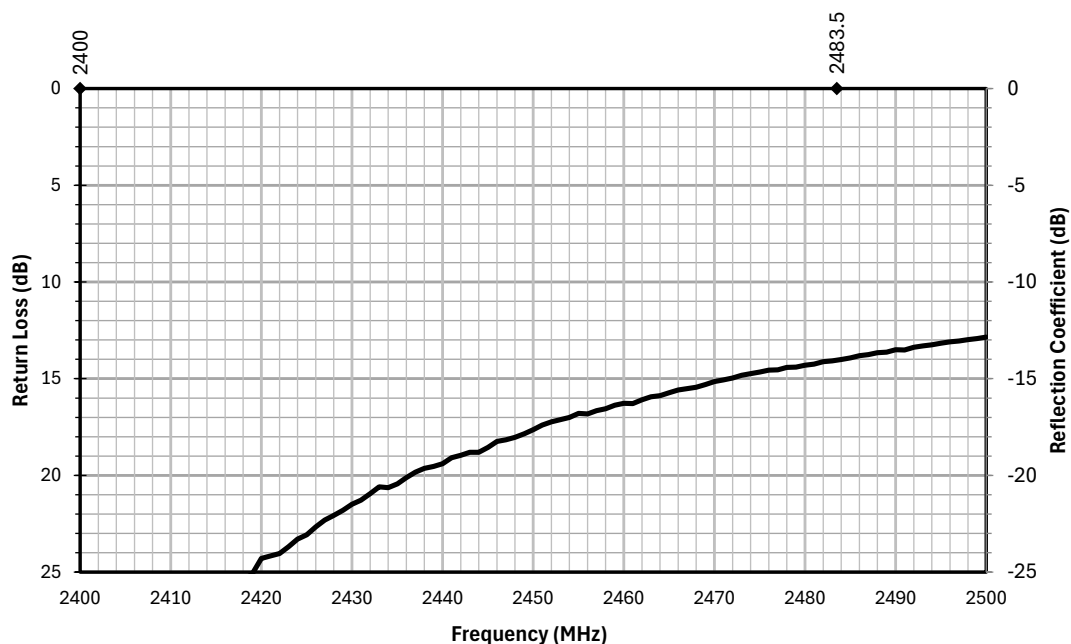


Figure 5. AC16100 Antenna Return Loss at edge of Ground Plane

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.

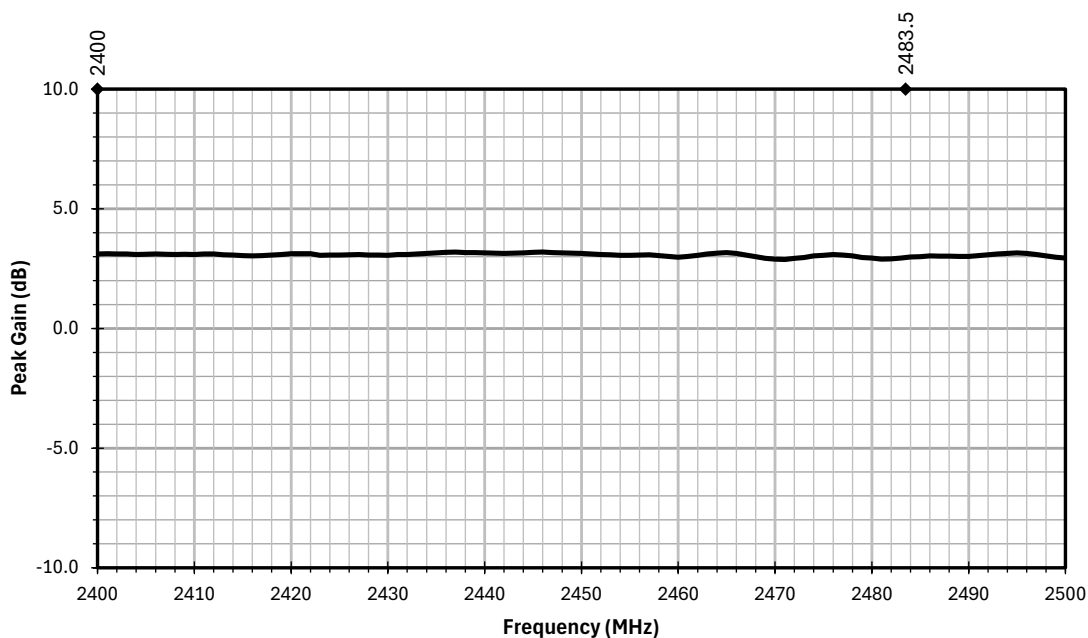


Figure 6. AC16100 Antenna Peak Gain at edge of Ground Plane

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.

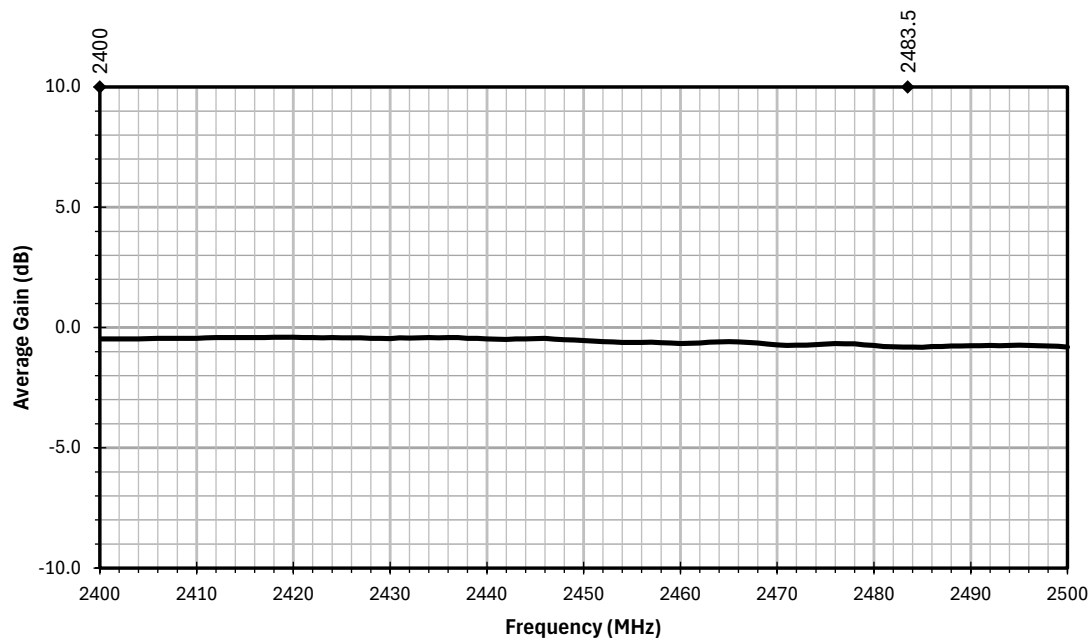


Figure 7. AC16100 Antenna Average Gain at edge of Ground Plane

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.

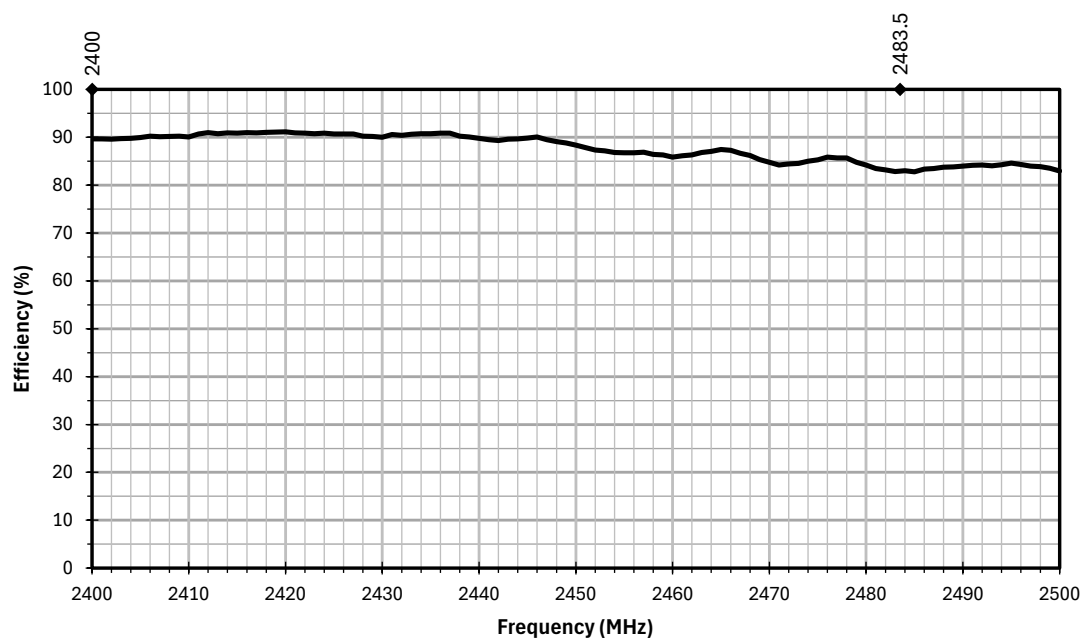
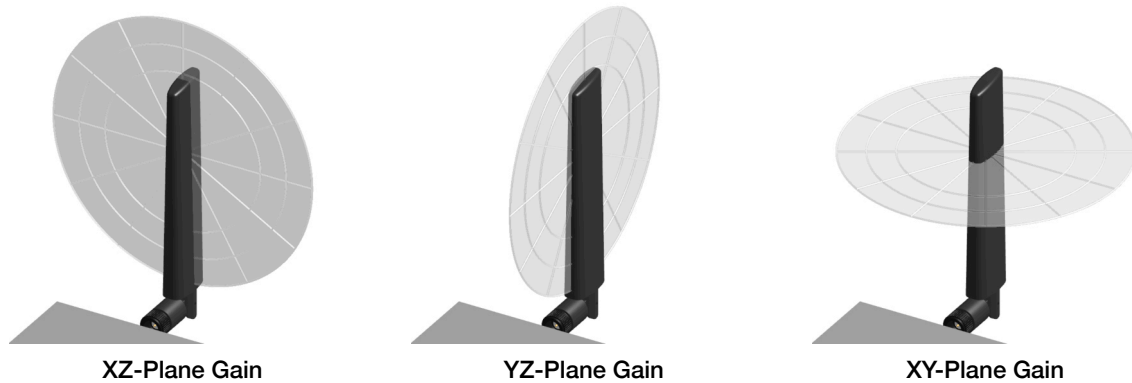


Figure 8. AC16100 Antenna Efficiency at edge of Ground Plane

Radiation Patterns - Edge of 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.



2400 MHz to 2485 MHz (2445 MHz)

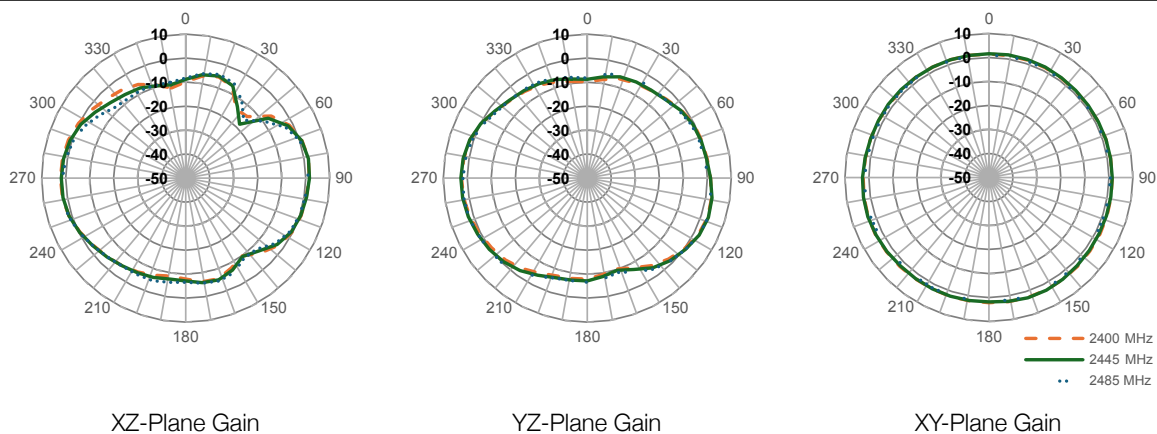


Figure 9. Radiation Patterns for the AC16100 Antenna

Straight, 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. AC16100 Antenna in Free Space

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.

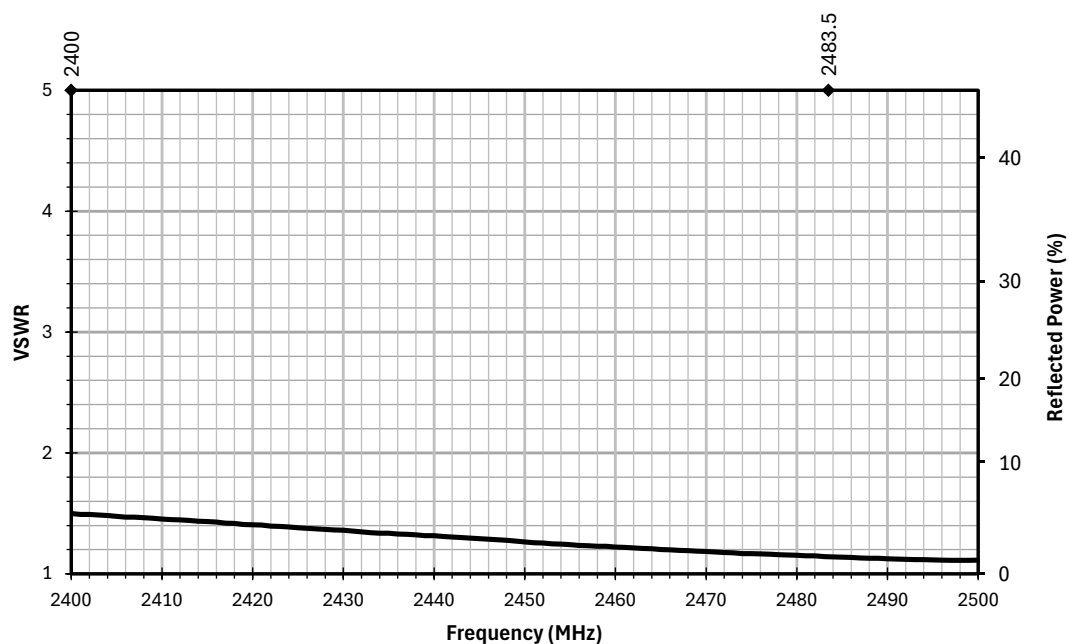


Figure 11. AC16100 Antenna VSWR, Free Space

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.

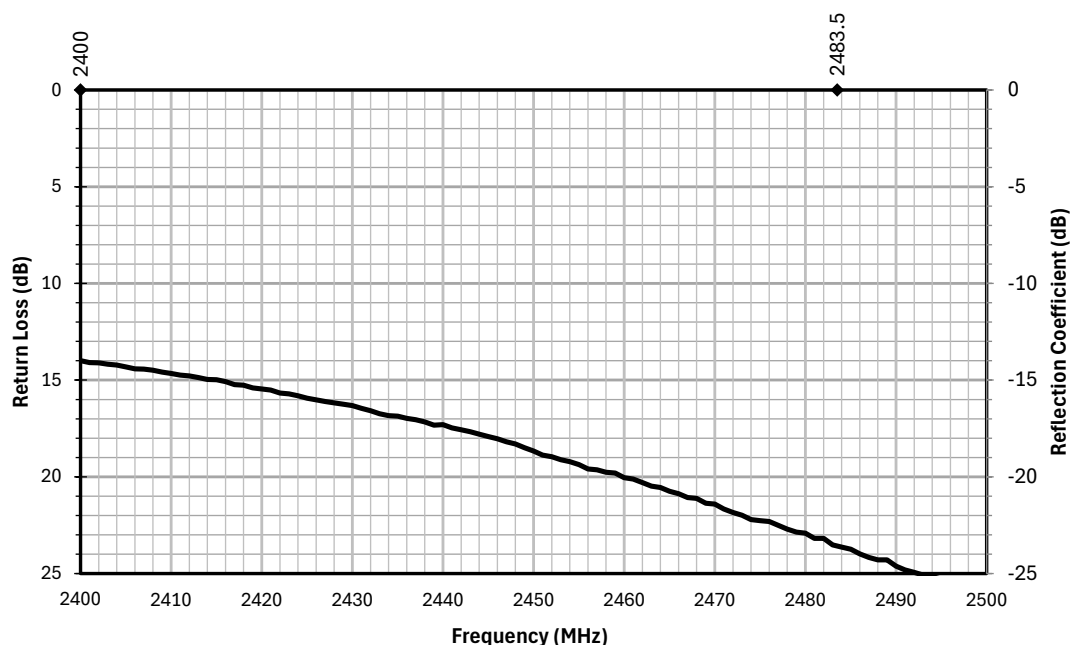


Figure 12. AC16100 Antenna Return Loss, Free Space

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.

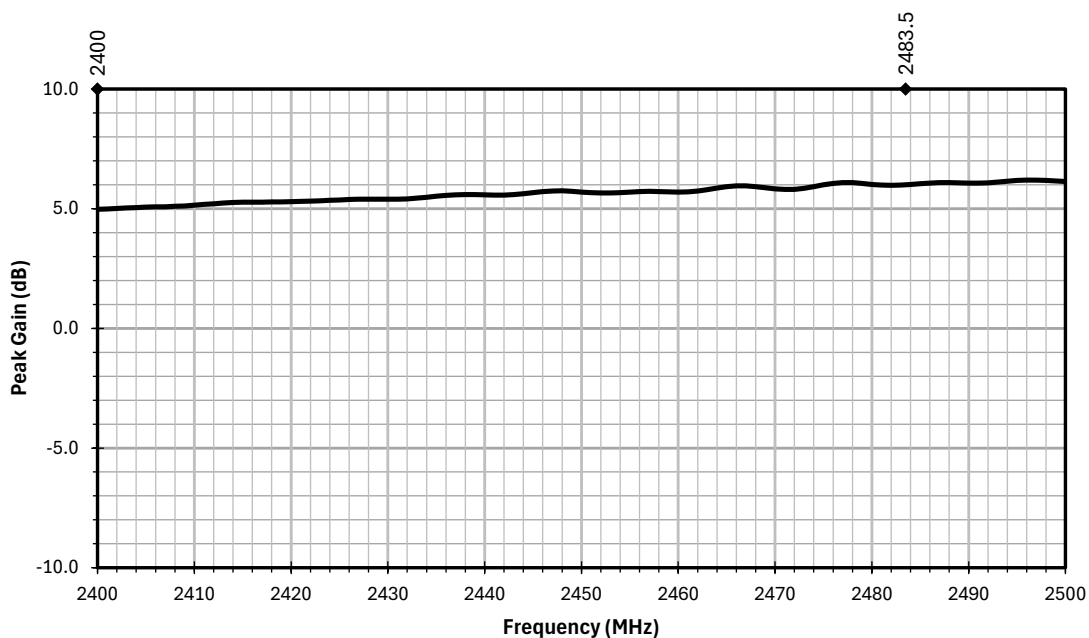


Figure 13. AC16100 Antenna Peak Gain, Free Space

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.

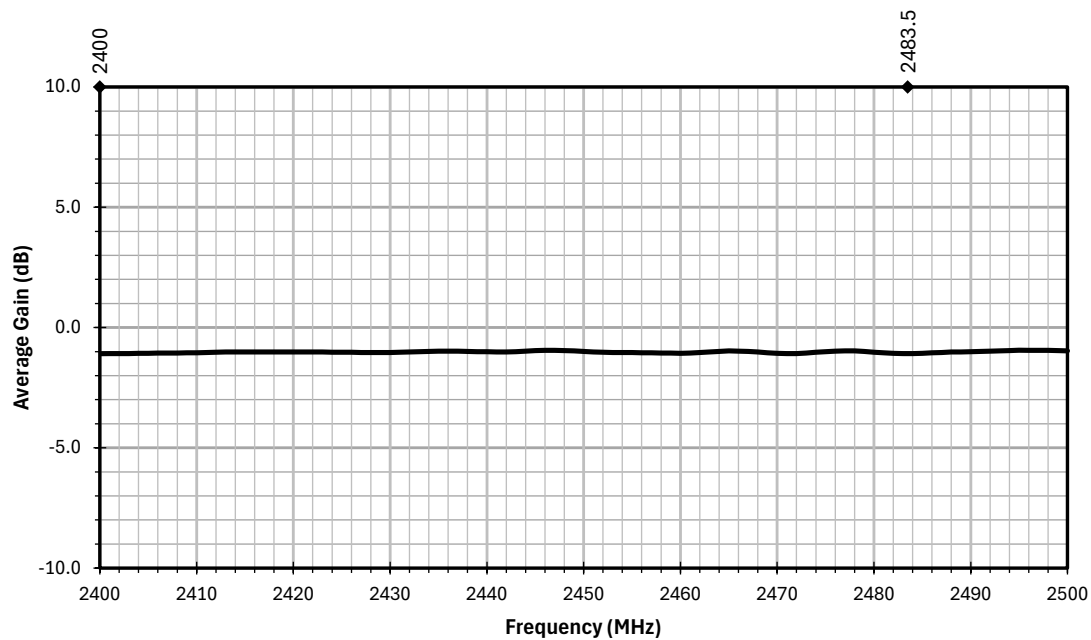


Figure 14. AC16100 Antenna Average Gain, Free Space

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.

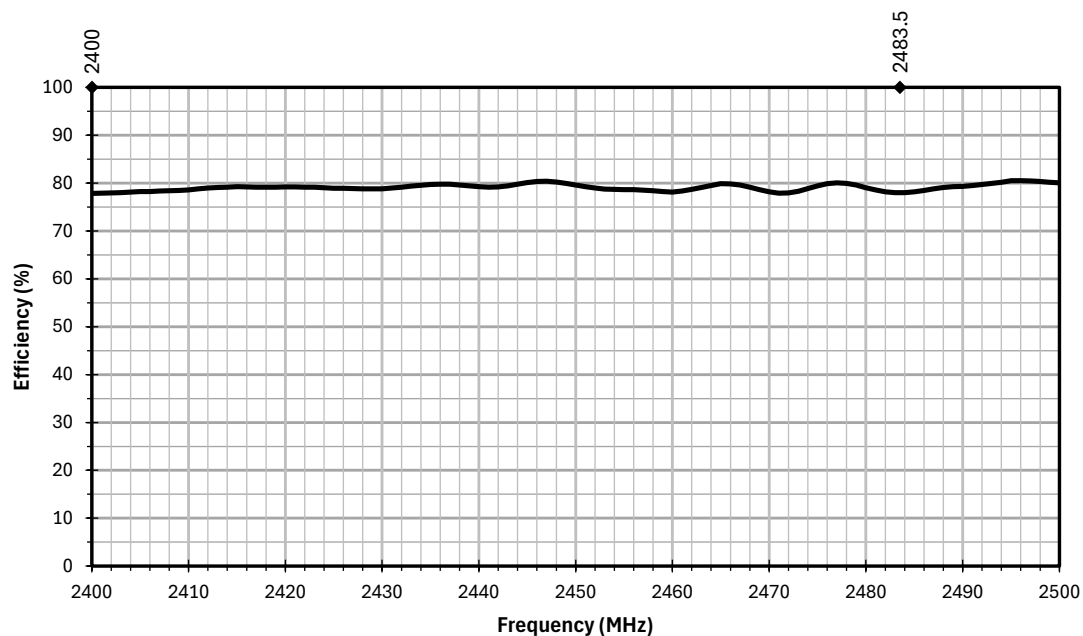
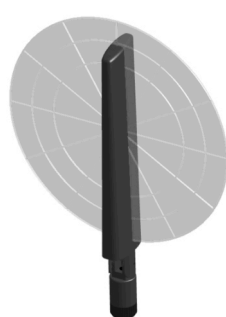


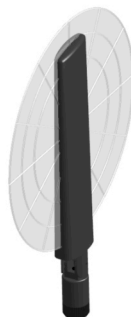
Figure 15. AC16100 Antenna Efficiency, Free Space

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

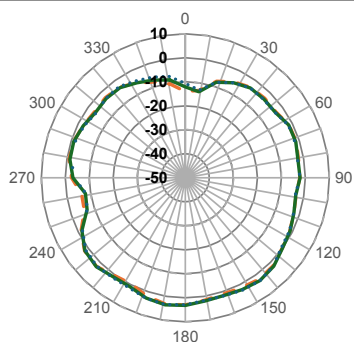


YZ-Plane Gain

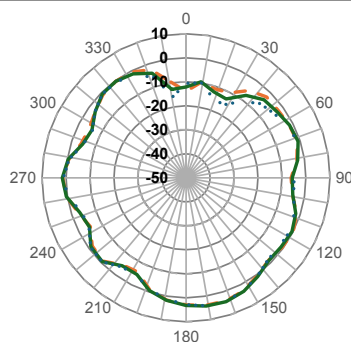


XY-Plane Gain

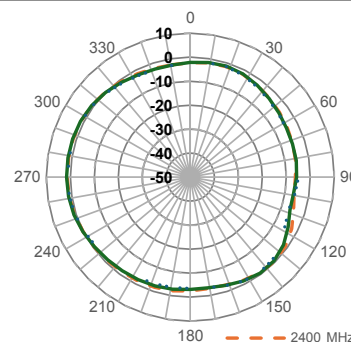
2400 MHz to 2500 MHz (2450 MHz)



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

Figure 16. Radiation Patterns for the AC16100 Antenna, in Free Space

Packaging Information

The AC16100 antenna is individually packaged in a polyethylene bag as shown in Figure 17 and then packaged in a larger polyethylene bag in quantities of 5 each. These bags are placed in (honeycomb) pockets in a carton of 2 layers totaling 500 pieces. Carton dimensions are 335 mm x 295 mm x 360 mm (13.2 in x 11.6 in x 14.2 in).

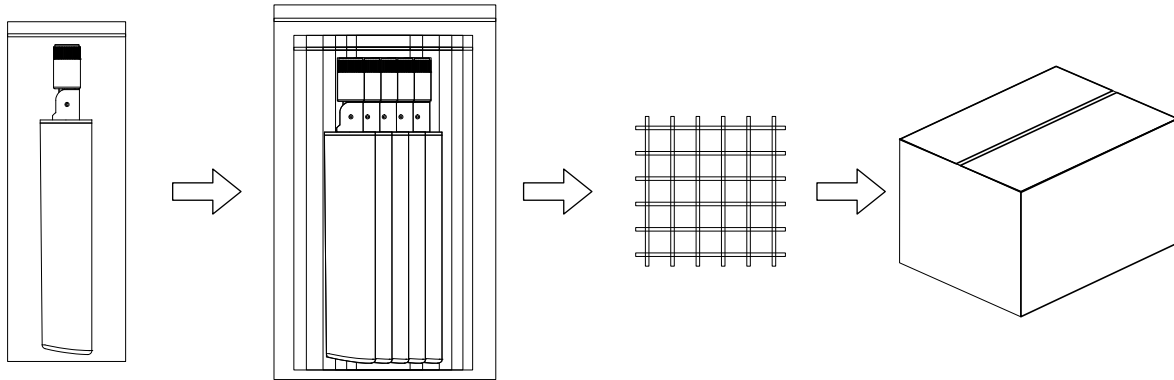


Figure 17. Packaging Details for the AC16100 Antenna

Antenna Definitions and Useful Formulas

VSWR - Voltage Standing Wave Ratio. VSWR is a unitless ratio that describes the power reflected from the antenna back to the radio. A lower VSWR value indicates better antenna performance at a given frequency. VSWR is easily derived from Return Loss.

$$VSWR = \frac{10^{\left[\frac{\text{Return Loss}}{20}\right]} + 1}{10^{\left[\frac{\text{Return Loss}}{20}\right]} - 1}$$

Return Loss - Return loss represents the loss in power at the antenna due to reflected signals, measured in decibels. A larger magnitude return loss value indicates better antenna performance at a given frequency. Return Loss is easily derived from VSWR.

$$\text{Return Loss} = -20 \log_{10} \left[\frac{VSWR - 1}{VSWR + 1} \right]$$

Efficiency (η) - The total power radiated from an antenna divided by the input power at the feed point of the antenna as a percentage.

Total Radiated Efficiency - (TRE) The total efficiency of an antenna solution comprising the radiation efficiency of the antenna and the transmitted (forward) efficiency from the transmitter.

$$TRE = \eta \cdot \left(1 - \left(\frac{VSWR - 1}{VSWR + 1} \right)^2 \right)$$

Gain - The gain of an antenna is the ratio of its radiation intensity in a given direction (G) to the radiation intensity that would be obtained if the total power accepted by the antenna were radiated isotropically (identically in all directions). Realized gain is antenna gain accounting for input reflection and mismatch losses. Realized gain is typically labeled simply as “gain” in antenna datasheets.

$$G_{db} = 10 \log_{10}(G)$$

$$G_{dBd} = G_{dBi} - 2.51\text{dB}$$

Peak Gain - The highest antenna gain across all directions for a given frequency range. A directional antenna will have a very high peak gain compared to average gain.

Average Gain - The average gain across all directions for a given frequency range.

Maximum Power - The maximum signal power which may be applied to an antenna feed point, typically measured in watts (W).

Reflected Power - A portion of the forward power reflected back toward the amplifier due to a mismatch at the antenna port.

$$\left(\frac{VSWR - 1}{VSWR + 1} \right)^2$$

decibel (dB) - A logarithmic unit of measure of the power of an electrical signal.

decibel isotropic (dBi) - A comparative measure in decibels between an antenna under test and an isotropic radiator.

decibel relative to a dipole (dBd) - A comparative measure in decibels between an antenna under test and an ideal half-wave dipole.

Dipole - An ideal dipole comprises a straight electrical conductor measuring 1/2 wavelength from end to end connected at the center to a feed point for the radio.

Isotropic Radiator - A theoretical antenna which radiates energy equally in all directions as a perfect sphere.

Omnidirectional - Term describing an antenna radiation pattern that is uniform in all directions. An isotropic antenna is the theoretical perfect omnidirectional antenna. An ideal dipole antenna has a donut-shaped radiation pattern and other practical antenna implementations will have less perfect but generally omnidirectional radiation patterns which are typically plotted on three axes.

Website: <http://www.antennacompany.com>
Offices: Eindhoven, The Netherlands
EMAIL: sales@antennacompany.com

The Antenna Company reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

Bluetooth is a registered trademark of Bluetooth SIG, Inc. ZigBee is a registered trademark of ZigBee Alliance, Inc. Other product and brand names may be trademarks or registered trademarks of their respective owners.

Copyright © 2026 The Antenna Company International N.V.

All Rights Reserved

DOC# DS26209-057ANT

