Datasheet

WRT Series
Dual-Band WiFi External Panel-Mount Antenna

The ANT-DB1-WRT is a low-profile, panel-mount dipole antenna designed for WiFi/WLAN and other 2.4 GHz or 5 GHz ISM/U-NII frequency band applications.

The ANT-DB1-WRT antenna's compact size and tamper-resistant design allow it to be mounted securely in enclosures requiring added security.

The ANT-DB1-WRT antenna is designed with an integrated counterpoise that eliminates the need for additional ground plane in the product making it ideal for applications with non-conductive or RF-transparent enclosures.

The antenna connects to the radio via SMA plug (male pin), RP-SMA plug (female socket), MHF1/U.FL-type plug (female socket) or MHF4-type plug (female socket) on coaxial cable.

ANT-DB1-WRT-UFL shown

Features

- Performance at 2.4 GHz to 2.485 GHz
  - VSWR: ≤ 1.9
  - Peak Gain: 3.2 dBi
  - Efficiency: 48%
- Performance at 5.725 GHz to 5.85 GHz
  - VSWR: ≤ 1.7
  - Peak Gain: 6.6 dBi
  - Efficiency: 66%
- Low-profile
  - Height: 10.0 mm (0.40 in)
- Tamper resistant design mounts permanently with pressure sensitive adhesive ring and provided hex nut

Applications

- Single- and dual-band WiFi/WLAN/802.11
  - WiFi 6 (802.11ax)
  - WiFi 5 (802.11ac)
  - WiFi 4 (802.11n)
- 2.4 GHz ISM applications
  - Bluetooth®
  - ZigBee®
- U-NII and ISM applications
- Internet of Things (IoT) devices
- Smart Home networking
- Sensing and remote monitoring
  - Wireless vending
  - Security

Ordering Information

Part Number	Description
ANT-DB1-WRT-SMA	Antenna with 216 mm (8.5 in) of RG-174 coaxial cable with an SMA plug (male pin)
ANT-DB1-WRT-RPS	Antenna with 216 mm (8.5 in) of RG-174 coaxial cable with an RP-SMA plug (female socket)
ANT-DB1-WRT-UFL	Antenna with 216 mm (8.5 in) of 1.32 mm coaxial cable with an MHF1/U.FL-type plug (female socket)
ANT-DB1-WRT-MHF4	Antenna with 216 mm (8.5 in) of 1.13 mm coaxial cable with an MHF4-type plug (female socket)

Available from Linx Technologies and select distributors and representatives.

Table 1. Electrical Specifications

ANT-DB1-WRT	2.4 GHz ISM	U-NII-1, U-NII-2	5.8 GHz ISM/ U-NII-3
Frequency Range	2.40 GHz to 2.485 GHz	5.150 GHz to 5.725 GHz	5.725 GHz to 5.850 GHz
VSWR (max)	1.9	3.7	1.7
Peak Gain (dBi)	3.2	6.4	6.6
Average Gain (dBi)	-3.3	-3.5	-1.9
Efficiency (%)	48	54	66
Polarization	Linear	Radiation	Omnidirectional
Impedance	50 Ω	Max Power	5 W
Wavelength	1/2-wave	Electrical Type	Dipole

Electrical specifications and plots measured in free space.

Table 2. Mechanical Specifications

ANT-DB1-WRT	
Operating Temp. Range	-40 °C to +90 °C
Weight	-RPS & -SMA = 10.1 g (0.36 oz), -UFL = 5.7 g (0.20 oz), -MHF4 = 5.0 g (0.18 oz)
Connection	SMA plug (male pin) on RG-174 coax cable RP-SMA plug (female socket) on RG-174 coax cable MHF1/U.FL-type plug (female socket) on 1.32 mm coax cable MHF4-type plug (female socket) on 1.13 mm coaxial cable
Coaxial Cable, minimum inside bend radius	RG-174: 9.9 mm (0.40 in), 1.13 mm: 4.5 mm (0.18 in), 1.32 mm: 5.5 mm (0.22 in)
Dimensions	Height: 10.0 mm (0.40 in), Diameter: 19.0 mm (0.75 in)

Product Dimensions

Figure 1 provides dimensions for the ANT-DB1-WRT series antennas.

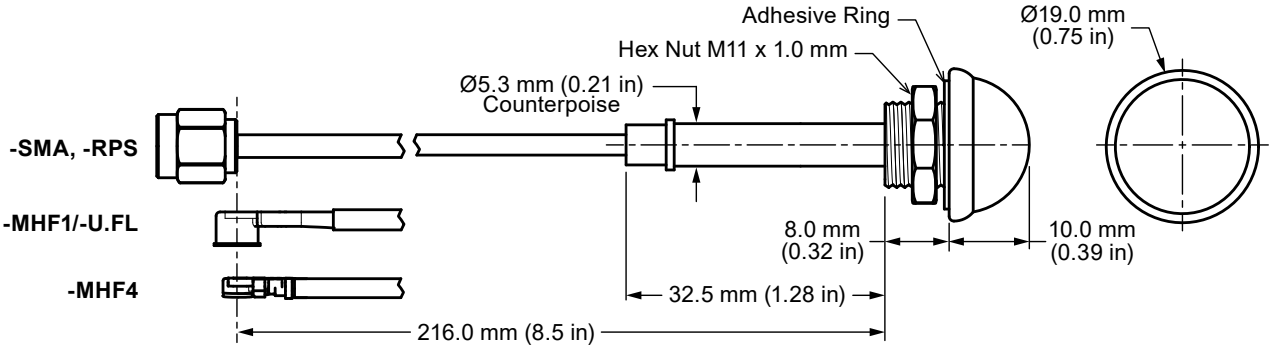


Figure 1. DB1-WRT Antenna Dimensions

Packaging Information

The ANT-DB1-WRT-ccc antenna is placed in a clear plastic sleeve and sealed in clear plastic bags in quantities of 50 pcs. Bags are packaged in cartons of 250 (5 bags). Distribution channels may offer alternative packaging options.

Recommended Mounting

The recommended enclosure mounting dimensions are shown in Figure 2. The ANT-DB1-WRT series antenna is supplied with an integrated closed-cell pressure sensitive adhesive ring which helps seal enclosures against external elements. The adhesive ring has a protective plastic backing that must be removed prior to installation. A pull tab has been provided for easy removal of the protective backing. The antenna can be permanently mounted using the provided hex nut which should be tightened to 3.0 kgf/cm (5 in/lbs) max. The recommended maximum enclosure wall thickness is 3.18 mm (0.125 in).

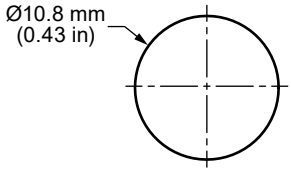


Figure 2. ANT-DB1-WRT Series Antenna Recommended Enclosure Mounting Dimensions

Antenna Orientation

The ANT-DB1-WRT antenna is characterized in two antenna orientations as shown in Figure 3. The antenna in freespace characterizes use of an antenna attached to an enclosure-mounted connector which is connected by cable to a printed circuit board. Although the antenna is a dipole not requiring a ground plane for function, characterizaton with an adjacent ground plane (102 mm x 102 mm) provides insight into antenna performance when attached directly to a printed circuit board mounted connector. The two orientations represent the most common end-product use cases.

Free space

Centered on ground plane

Figure 3. ANT-DB1-WRT-ccc Test Orientations

Freespace, No Ground Plane

The charts on the following pages represent data taken with the antenna oriented in freespace without a ground plane, as shown in Figure 4.

Figure 4. ANT-DB1-WRT-ccc in Freespace, No Ground Plane

VSWR

Figure 5 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.

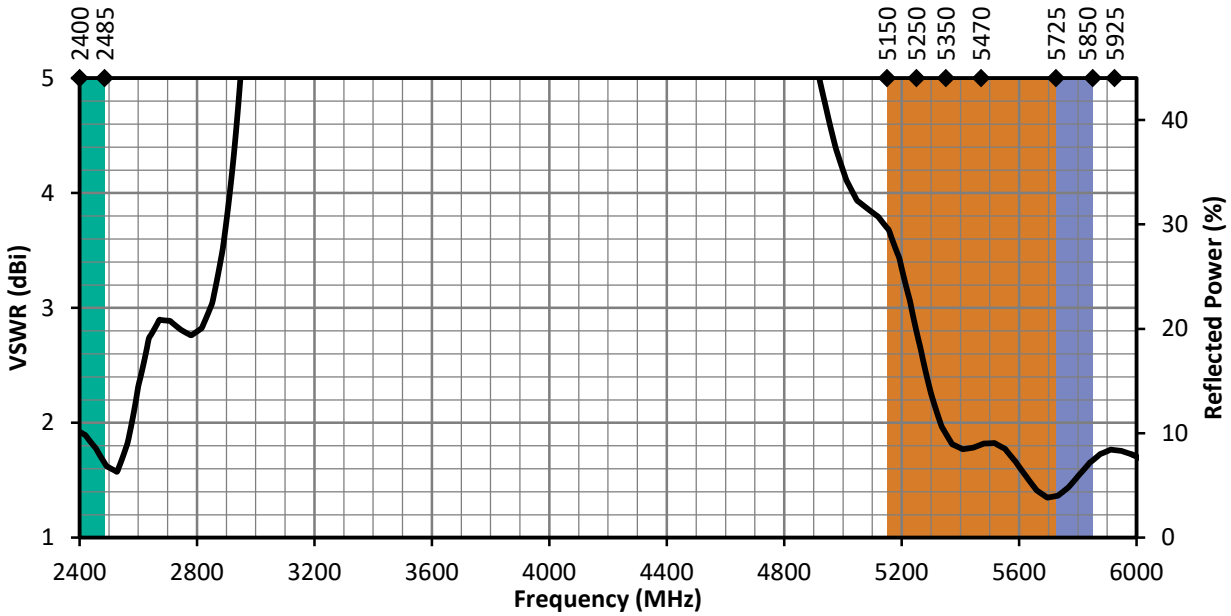


Figure 5. ANT-DB1-WRT-ccc VSWR, Freespace

Return Loss

Return loss (Figure 6), 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.

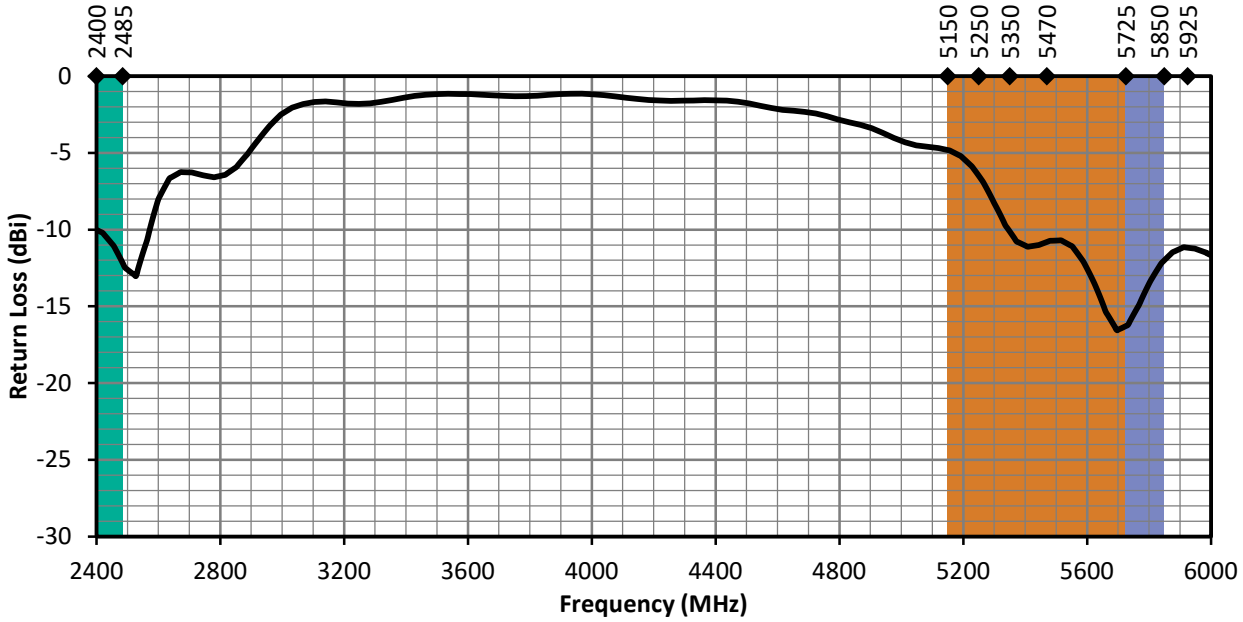


Figure 6. ANT-DB1-WRT-ccc Return Loss, Freespace

Peak Gain

The peak gain across the antenna bandwidth is shown in Figure 7. 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.

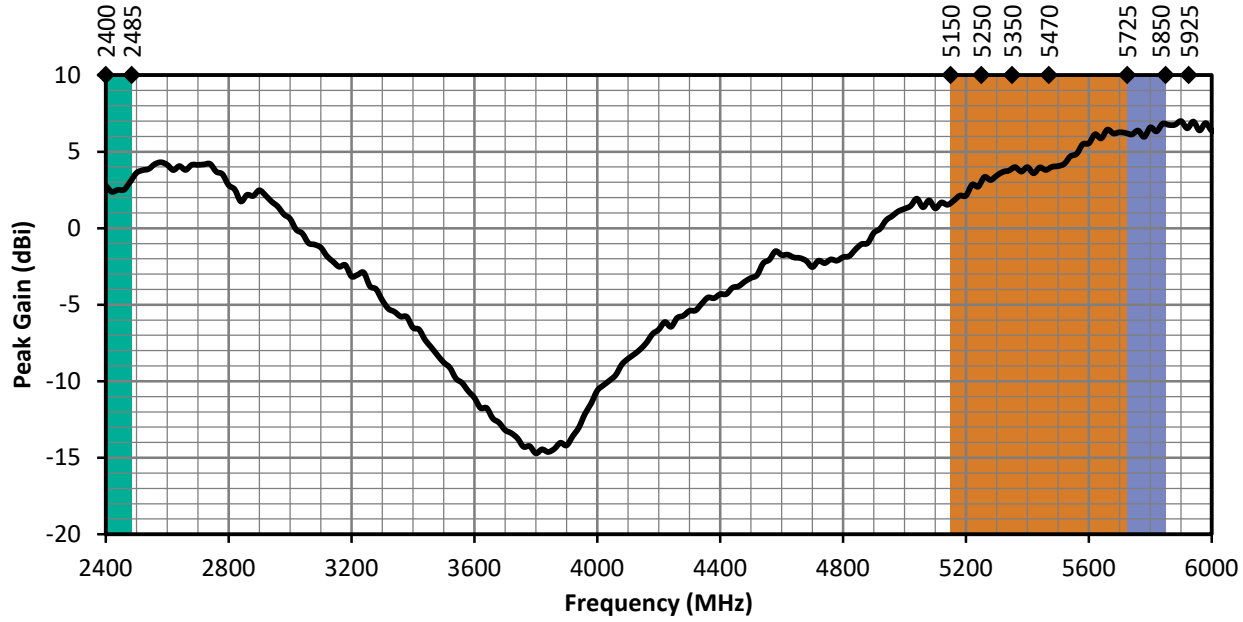


Figure 7. ANT-DB1-WRT-ccc Peak Gain, Freespace

Average Gain

Average gain (Figure 8), is the average of all antenna gain in 3-dimensional space at each frequency, providing an indication of overall performance without expressing antenna directionality.

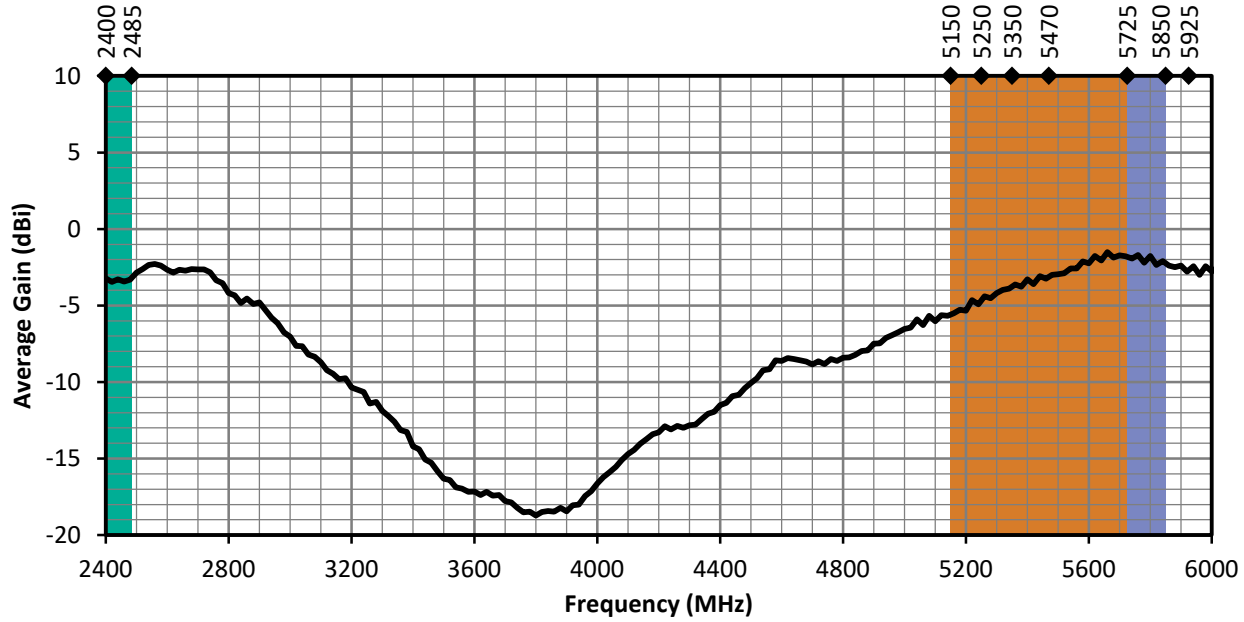


Figure 8. ANT-DB1-WRT-ccc Average Gain, Freespace

Radiation Efficiency

Radiation efficiency (Figure 9), 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.

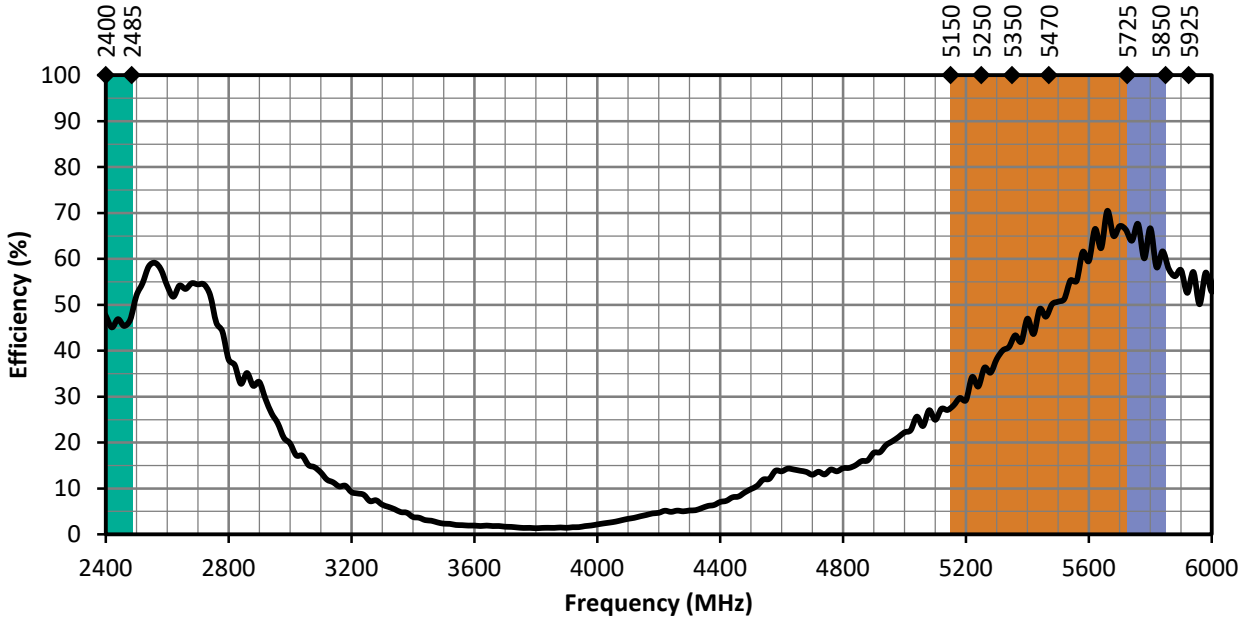


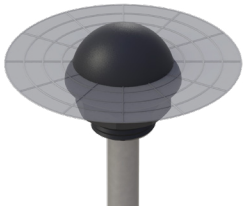
Figure 9. ANT-DB1-WRT-ccc Radiation Efficiency, Freespace

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 are shown in Figure 10 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.

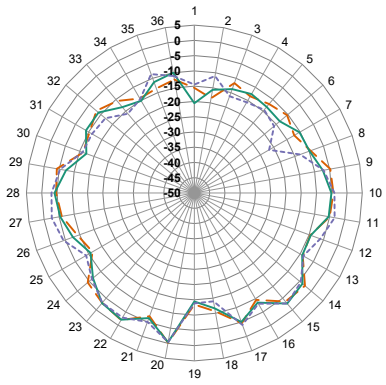
XZ-Plane Gain

YZ-Plane Gain

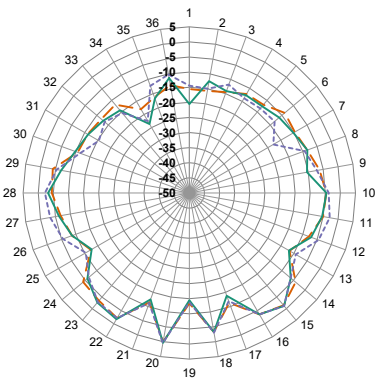


XY-Plane Gain

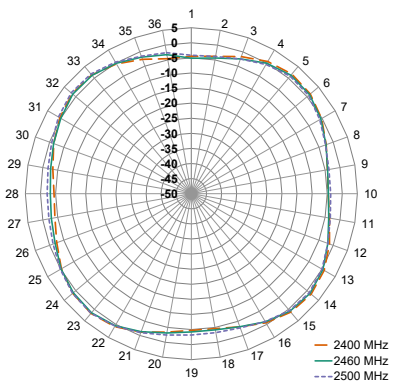
2400 MHz to 2485 MHz (2450 MHz)



XZ-Plane Gain

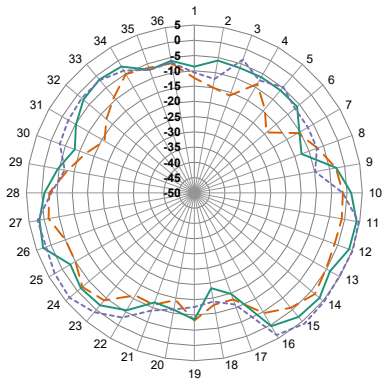


YZ-Plane Gain

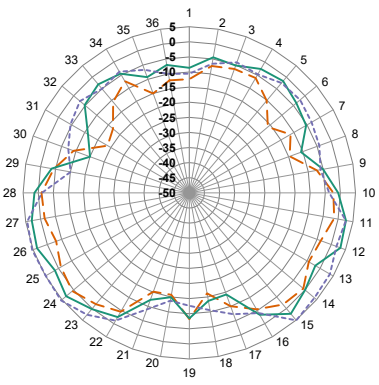


XY-Plane Gain

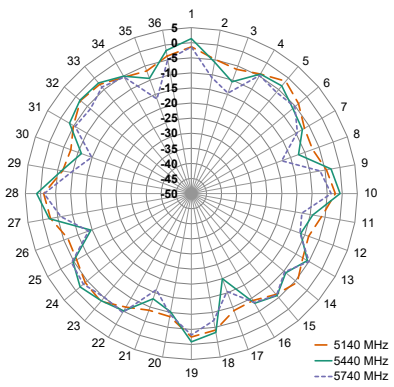
5150 MHz to 5725 MHz (5440 MHz)



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

Radiation Patterns

5725 MHz to 5850 MHz (5800 MHz)

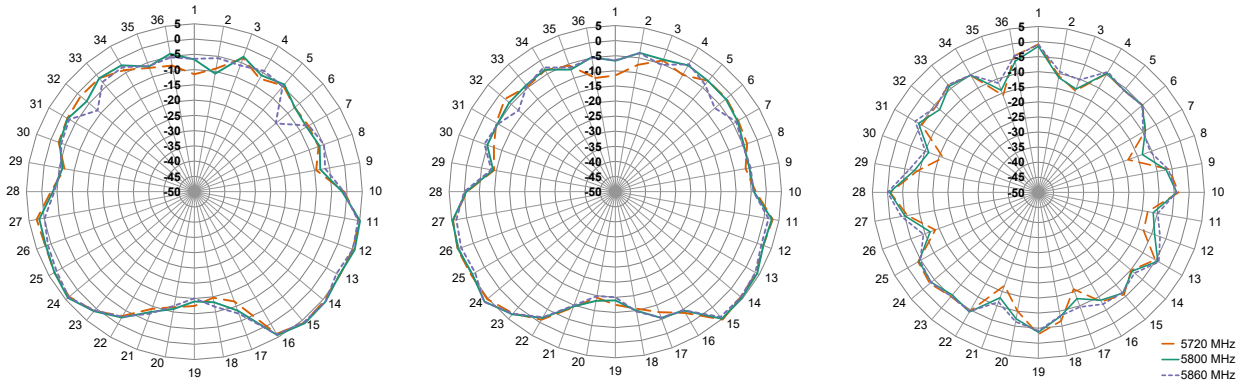


Figure 10. ANT-DB1-WRT-ccc Radiation Patterns, Freespace

Center of Ground Plane

The charts on the following pages represent data taken with the antenna oriented at the center of the ground plane, as shown in Figure 11.

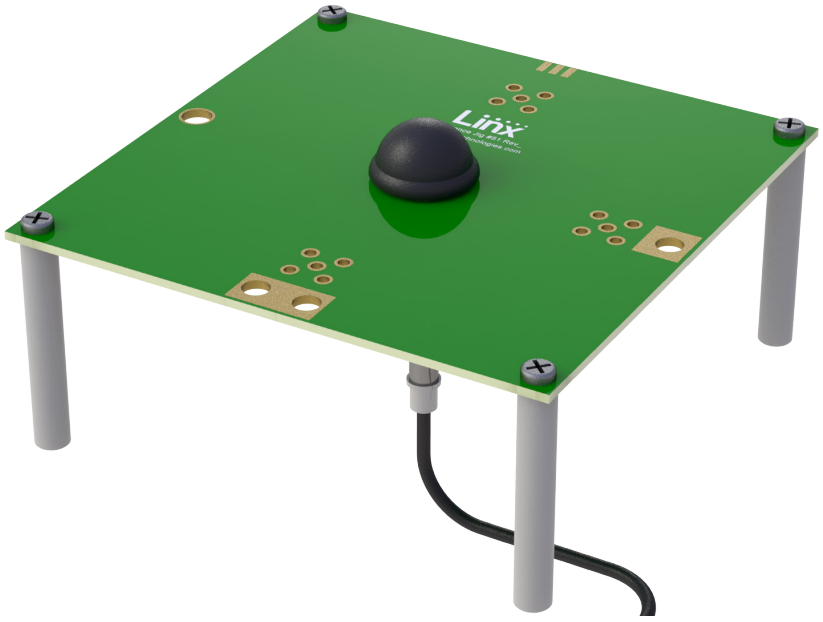


Figure 11. ANT-DB1-WRT-ccc at Center of Ground Plane

VSWR

Figure 12 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.

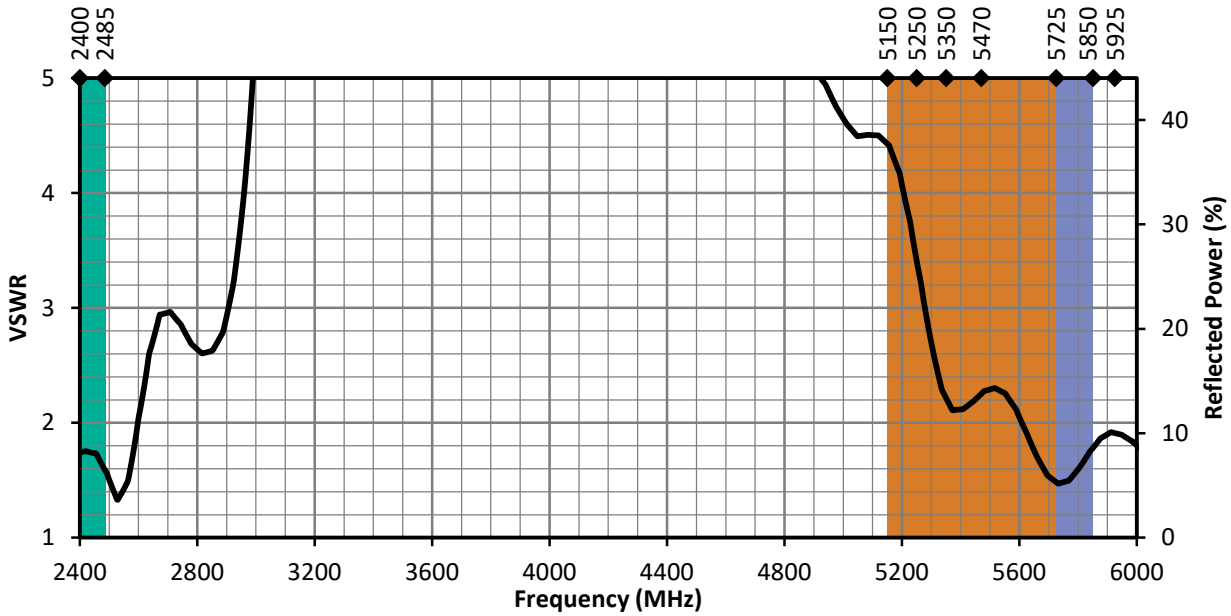


Figure 12. ANT-DB1-WRT-ccc VSWR, at Center of Ground Plane

Return Loss

Return loss (Figure 13), 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.

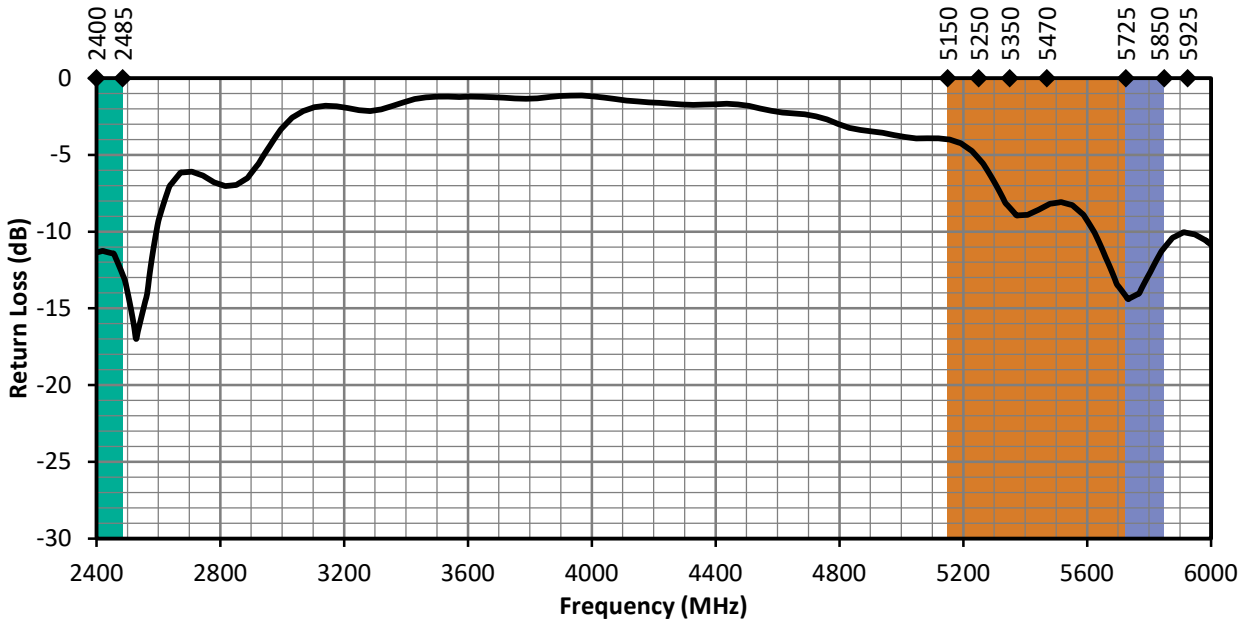


Figure 13. ANT-DB1-WRT-ccc Return Loss, at Center of Ground Plane

Peak Gain

The peak gain across the antenna bandwidth is shown in Figure 14. 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.

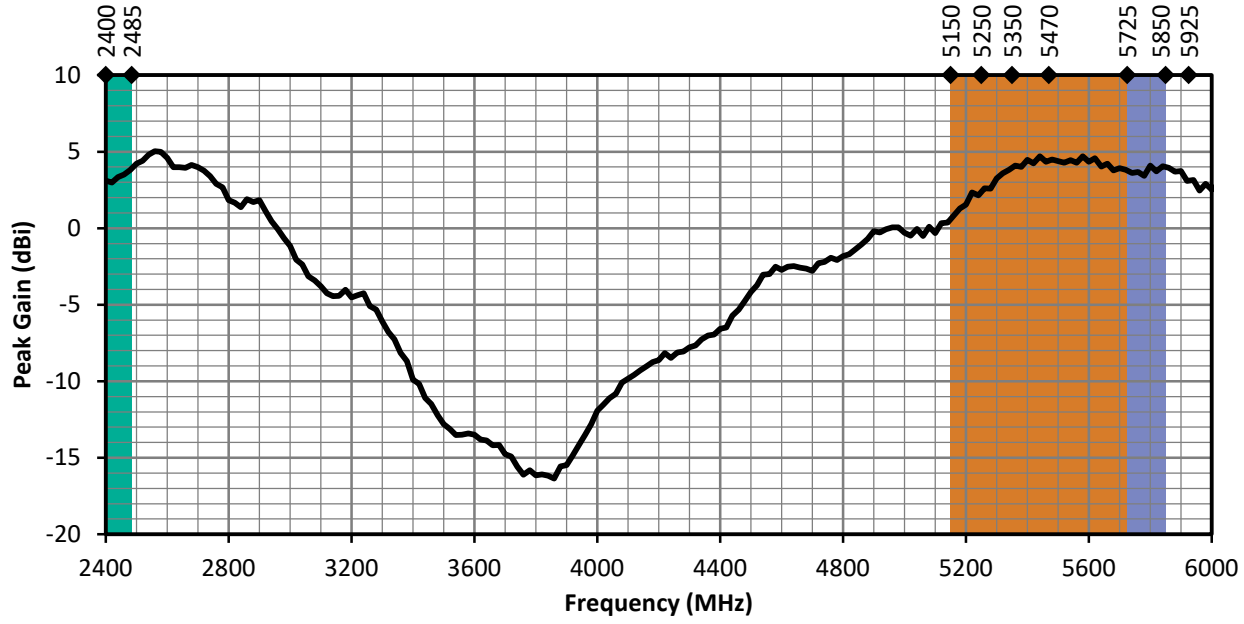


Figure 14. ANT-DB1-WRT-ccc Peak Gain, at Center of Ground Plane

Average Gain

Average gain (Figure 15), is the average of all antenna gain in 3-dimensional space at each frequency, providing an indication of overall performance without expressing antenna directionality.

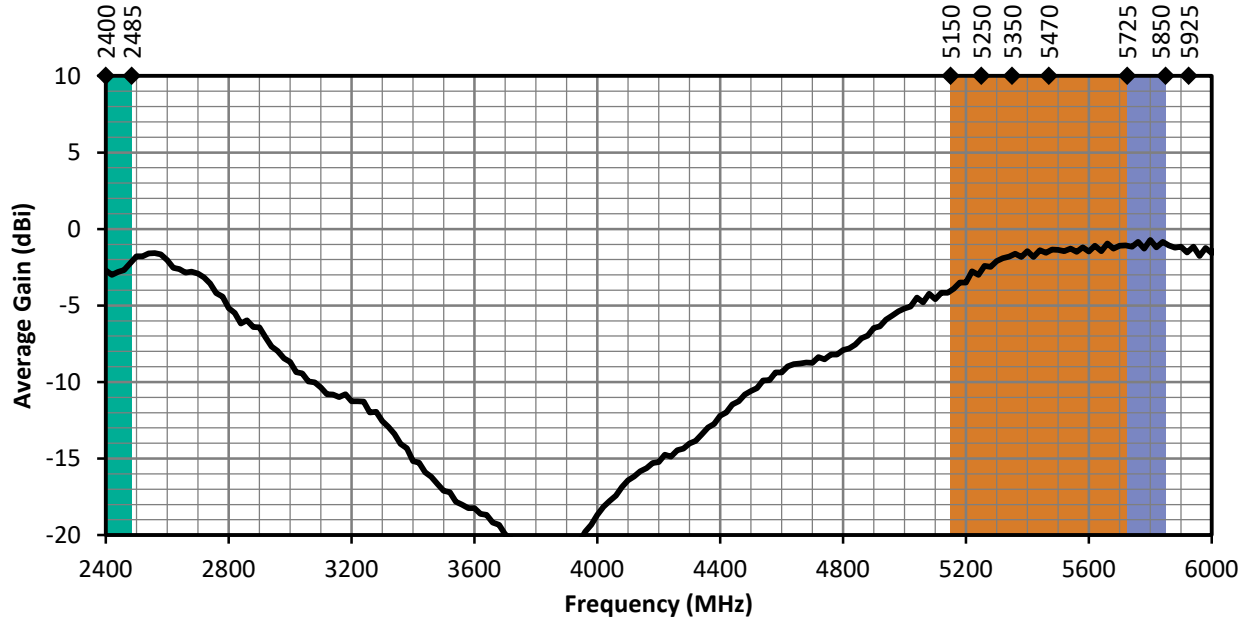


Figure 15. ANT-DB1-WRT-ccc Average Gain, at Center of Ground Plane

Radiation Efficiency

Radiation efficiency (Figure 16), 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.

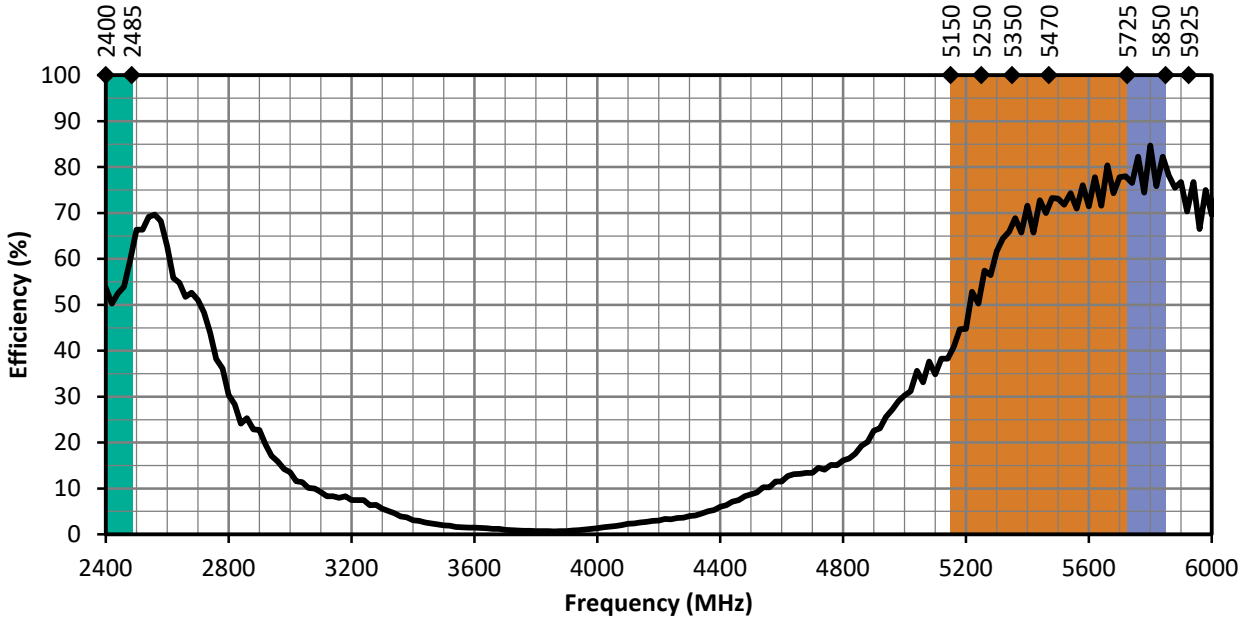


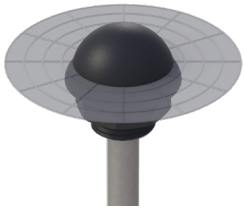
Figure 16. ANT-DB1-WRT-ccc Radiation Efficiency, at Center of Ground Plane

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 are shown in Figure 10 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.

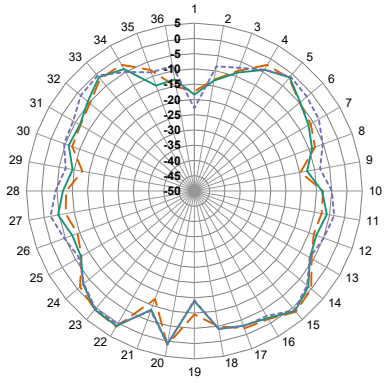
XZ-Plane Gain

YZ-Plane Gain

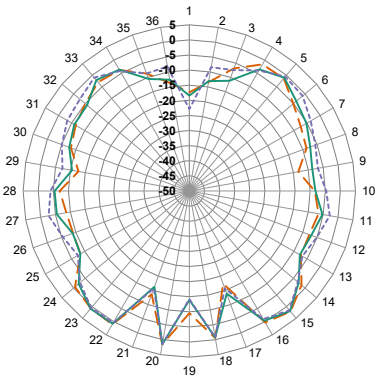


XY-Plane Gain

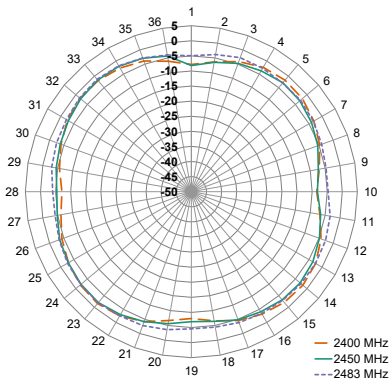
2400 MHz to 2485 MHz (2450 MHz)



XZ-Plane Gain

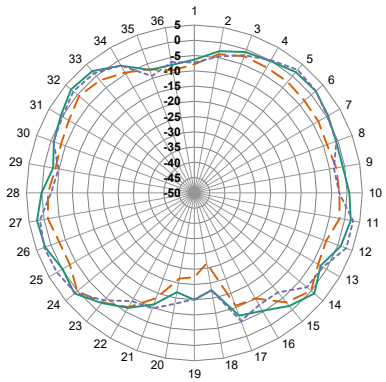


YZ-Plane Gain

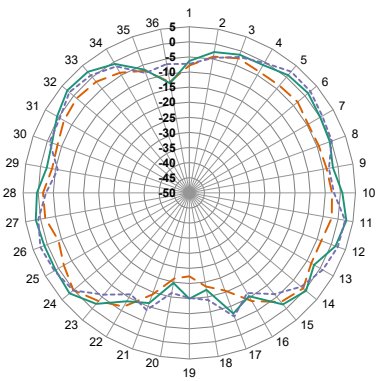


XY-Plane Gain

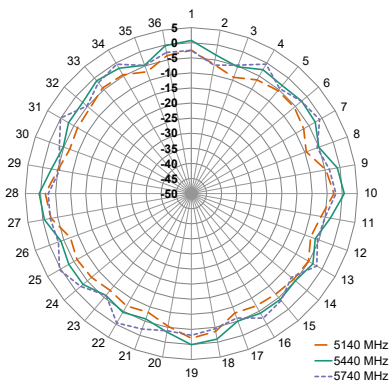
5150 MHz to 5725 MHz (5440 MHz)



XZ-Plane Gain



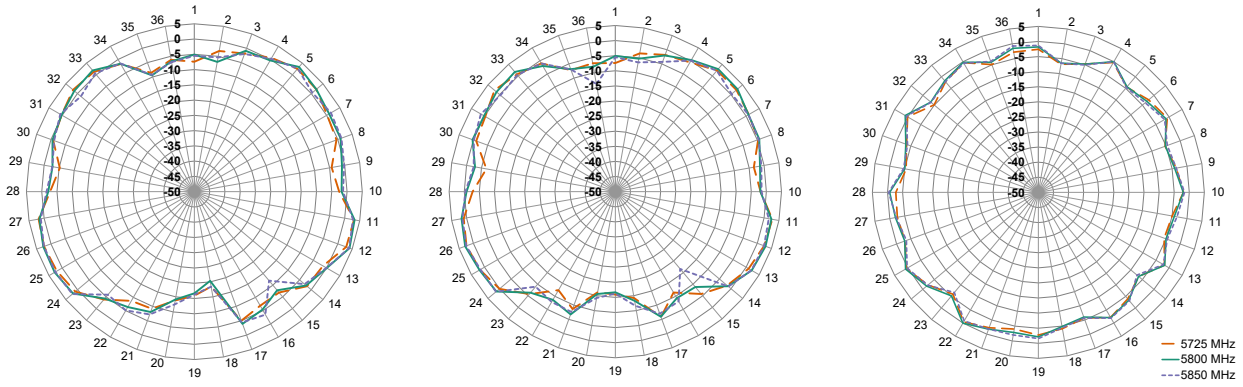
YZ-Plane Gain



XY-Plane Gain

Radiation Patterns

5725 MHz to 5850 MHz (5800 MHz)



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

Figure 17. ANT-DB1-WRT-ccc Radiation Patterns, at Center of Ground Plane

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Doc# DS21153-157ANT Replaces (Dated release, 12/4/17)