ANT-DB1-WRT-ccc

External Panel-Mount WiFi/WLAN Antenna

The ANT-DB1-WRT is a low-profile, panel-mount dipole antenna designed for superior performance in the 2.4 GHz, 5 GHz and 6 GHz bands supporting both WiFi 6 and WiFi 6E.

The ANT-DB1-WRT antenna's compact size allows it to be mounted in applications requiring a low profile and external antenna performance, such as WiFi/WLAN applications indoors and outdoors.

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.

Connector options for the ANT-DB1-WRT antenna are: SMA plug (male pin), RP-SMA plug (female socket), MHF1/U.FL-type plug (female socket), MHF3-type plug (female socket) or MHF4-type plug (female socket).

FEATURES

- Performance at 2.4 GHz to 2.485 GHz
  - VSWR: ≤ 1.9
  - Peak Gain: 3.2 dBi
  - Efficiency: 48%
- Performance at 5.150 GHz to 5.850 GHz
  - VSWR: ≤ 3.7
  - Peak Gain: 6.8 dBi
  - Efficiency: 57%
- Low-profile
  - Height: 10.0 mm (0.40 in)
- Mounts permanently with pressure sensitive adhesive ring and provided nut

APPLICATIONS

- WiFi/WLAN coverage
  - 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
- Smart Home networking
  - Sensing and remote monitoring
  - WiFi 6 (802.11ax)

ORDERING INFORMATION

Part Number	Description
ANT-DB1-WRT-UFL-100	Antenna, 100 mm (3.94 in) of 1.32 mm coaxial cable, MHF1/U.FL-type plug (female socket)
ANT-DB1-WRT-UFL-150	Antenna, 150 mm (5.91 in) of 1.32 mm coaxial cable, MHF1/U.FL-type plug (female socket)
ANT-DB1-WRT-UFL	Antenna, 216 mm (8.50 in) of 1.32 mm coaxial cable, MHF1/U.FL-type plug (female socket)
ANT-DB1-WRT-MHF3	Antenna, 216 mm (8.50 in) of 0.81 mm coaxial cable, MHF3-type plug (female socket)
ANT-DB1-WRT-MHF4-100	Antenna, 100 mm (3.94 in) of 1.13 mm coaxial cable, MHF4-type plug (female socket)
ANT-DB1-WRT-MHF4	Antenna, 216 mm (8.50 in) of 1.13 mm coaxial cable, MHF4-type plug (female socket)
ANT-DB1-WRT-RPS	Antenna, 216 mm (8.50 in) of RG-174 coaxial cable, RP-SMA plug (female socket)
ANT-DB1-WRT-SMA-150	Antenna, 150 mm (5.91 in) of RG-174 coaxial cable, SMA plug (male pin)
ANT-DB1-WRT-SMA	Antenna, 216 mm (8.50 in) of RG-174 coaxial cable, SMA plug (male pin)

Available from Linx Technologies and select distributors and representatives.

ELECTRICAL SPECIFICATIONS

ANT-DB1-WRT	ISM/WiFi	WiFi/U-NII 1-3	WiFi 6E/U-NII 5-8
Frequency Range	2.4 GHz to 2.485 GHz	5.15 GHz to 5.85 GHz	5925 MHz to 7125 MHz
VSWR (max)	1.9	3.7	4.0
Peak Gain (dBi)	3.2	5.1G:3.0 5.8G:6.8	7.0
Average Gain (dBi)	-3.3	-3.2	-3.4
Efficiency (%)	48	57	50
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.

MECHANICAL SPECIFICATIONS

Part Number	Connection	Coaxial Cable, minimum inside bend radius	Weight
ANT-DB1-WRT-UFL	MHF1/U.FL-type plug	1.32 mm: 6.0 mm (0.24 in)	100 mm = 5.1 g (0.18 oz) 150 mm = 5.4 g (0.19 oz) 216 mm = 5.7 g (0.20 oz)
ANT-DB1-WRT-MHF3	MHF3-type plug	0.81 mm: 4.0 mm (0.16 in)	216 mm = 5.4 g (0.19 oz)
ANT-DB1-WRT-MHF4	MHF4-type plug	1.13 mm: 5.0 mm (0.20 in)	100 mm = 4.2 g (0.15 oz) 216 mm = 5.0 g (0.18 oz)
ANT-DB1-WRT-RPS	RP-SMA plug	RG-174: 10.2 mm (0.40 in)	216 mm = 10.1 g (0.36 oz)
ANT-DB1-WRT-SMA	SMA plug	RG-174: 10.2 mm (0.40 in)	150 mm = 9.2 g (0.32 oz) 216 mm = 10.1 g (0.36 oz)
Operating Temp. Range	-40 °C to +90 °C		
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.

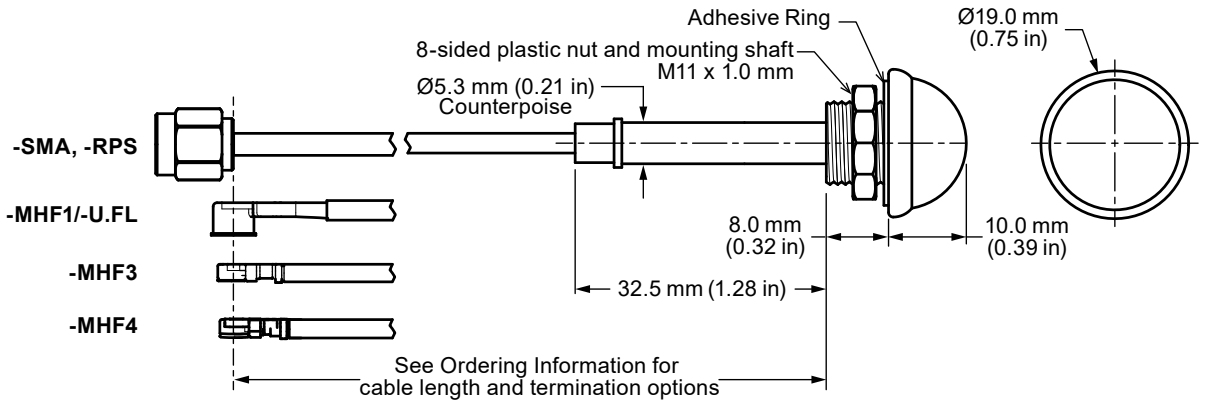


Figure 1: ANT-DB1-WRT Antenna Dimensions

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 nut which should be tightened to 4.0 kgf/cm (5 in/lbs) max. The recommended maximum enclosure wall thickness is 4.70 mm (0.188 in).

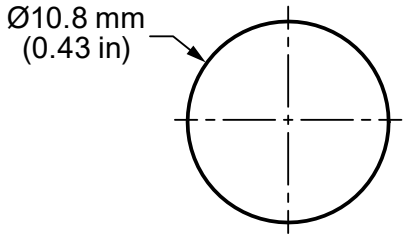


Figure 2: ANT-DB1-WRT Series Antenna Recommended Enclosure Mounting Dimensions

ANTENNA ORIENTATION

The ANT-DB1-WRT antenna is characterized in two antenna orientations as shown in Figure 3. The antenna in free space 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, characterization 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

FREE SPACE, 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 Free Space, 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.

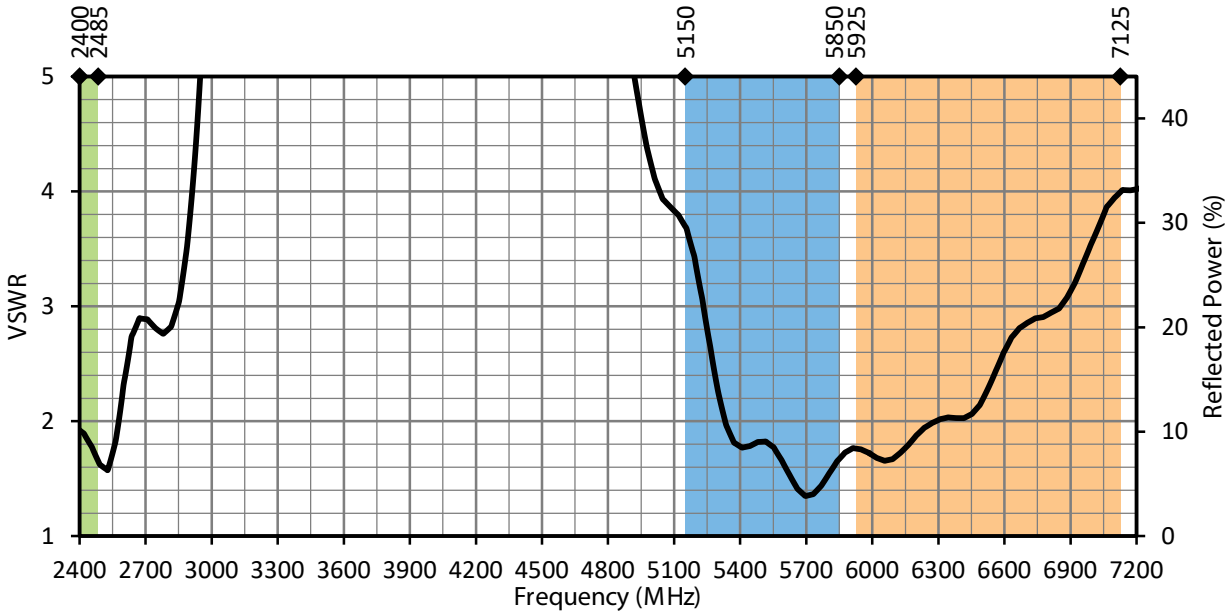


Figure 5: ANT-DB1-WRT-ccc VSWR, Free Space

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.

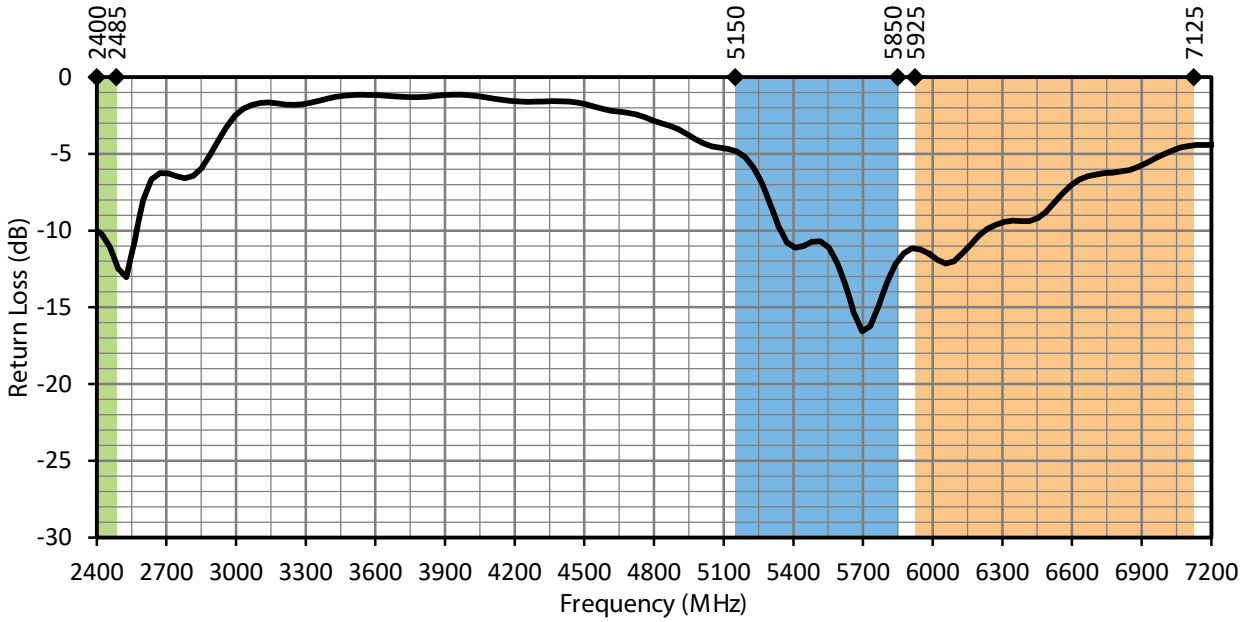


Figure 6: LPD Average Gain, Bent-90, with Frequency Band Highlights

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.

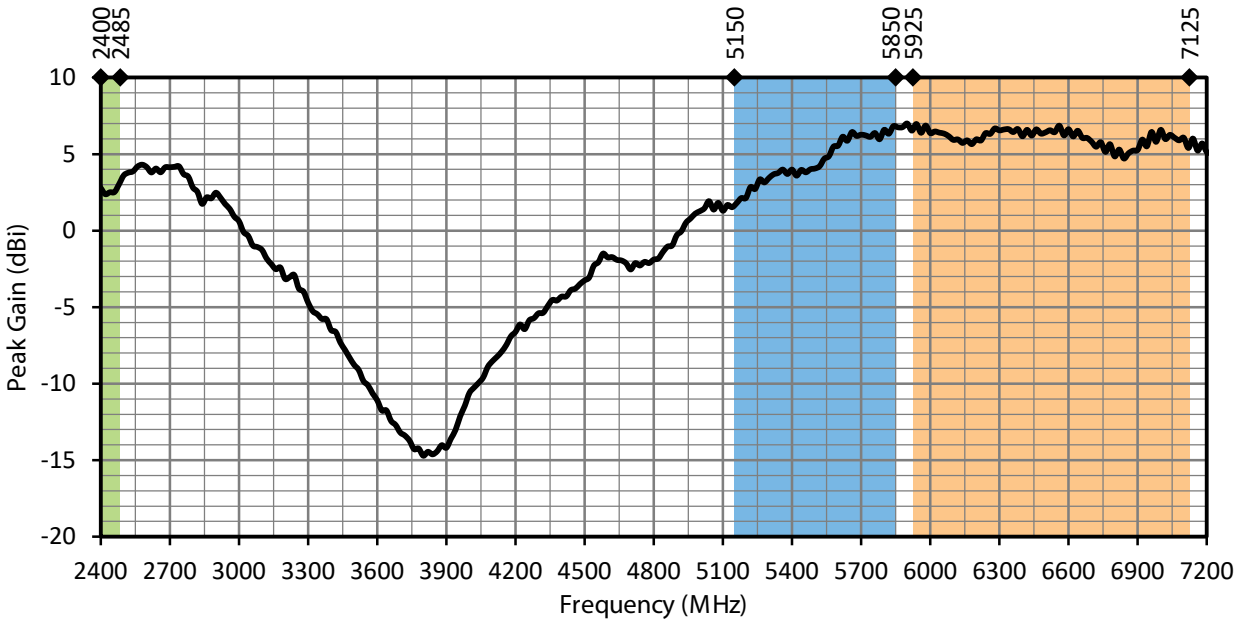


Figure 7: ANT-DB1-WRT-ccc Peak Gain, Free Space

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.

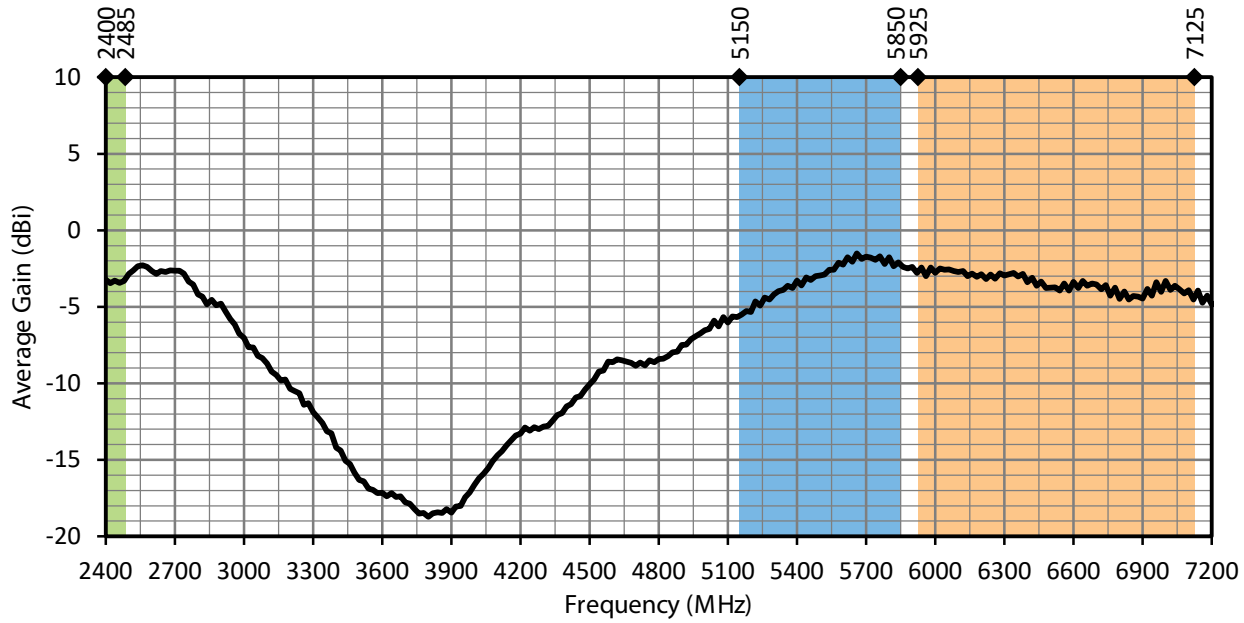


Figure 8: ANT-DB1-WRT-ccc Average Gain, Free Space

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.

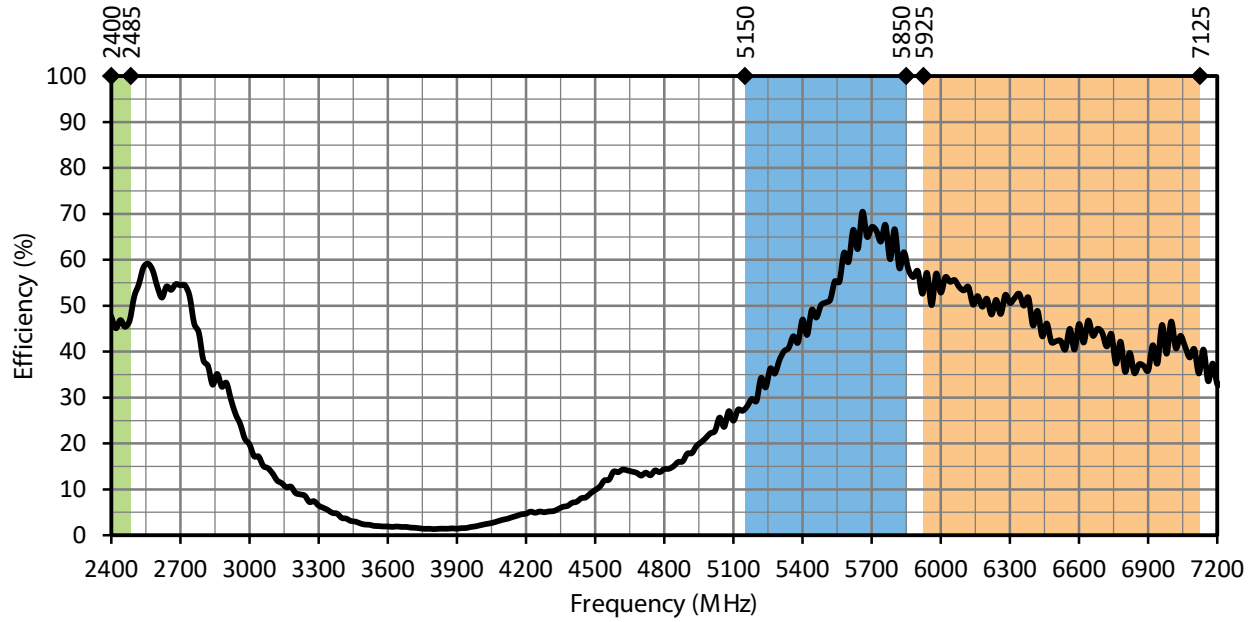


Figure 9: ANT-DB1-WRT-ccc Radiation Efficiency, Free Space

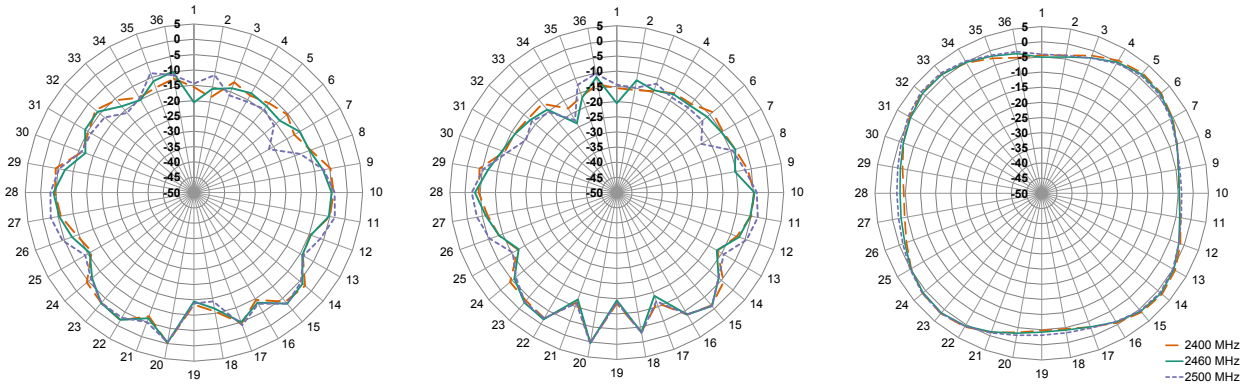
RADIATION PATTERNS

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.

RADIATION PATTERNS - FREE SPACE

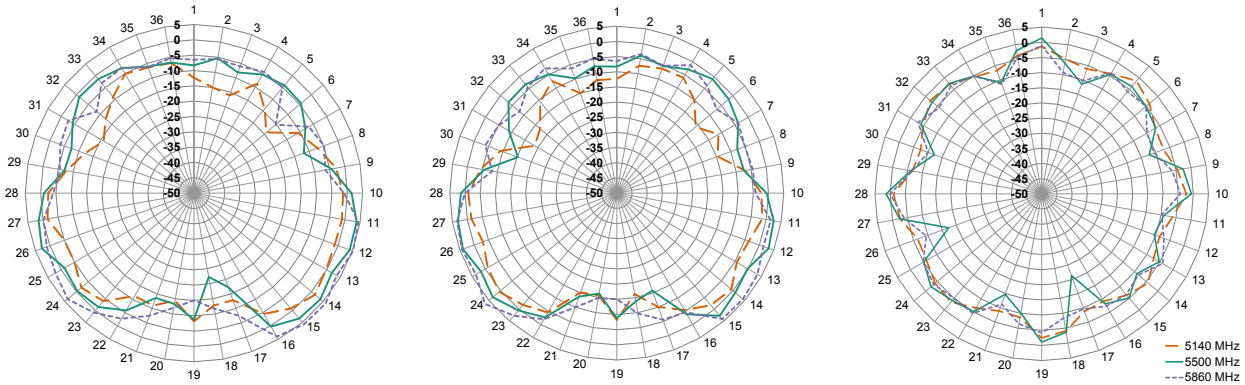
XZ-Plane Gain YZ-Plane Gain XY-Plane Gain

2400 MHZ TO 2485 MHZ (2450 MHZ)



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

5150 MHZ TO 5850 MHZ (5500 MHZ)

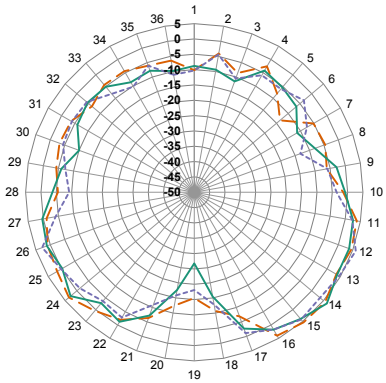


XZ-Plane Gain YZ-Plane Gain XY-Plane Gain

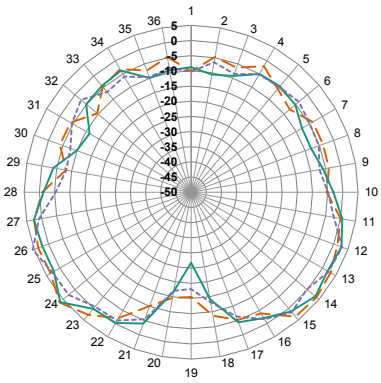
Figure 10: ANT-DB1-WRT-ccc Radiation Patterns, Free Space

RADIATION PATTERNS - FREE SPACE

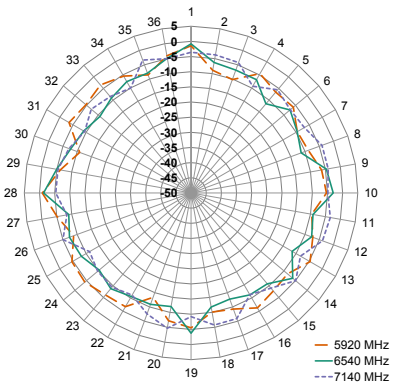
5925 MHZ TO 7125 MHZ (6530 MHZ)



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

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.

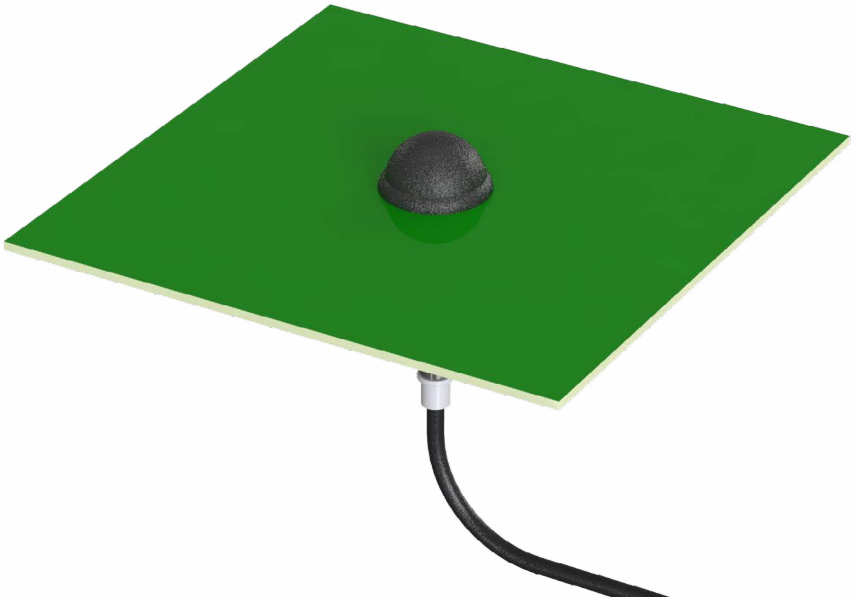


Figure 11: ANT-DB1-WRT-ccc at Center of Ground Plane

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.

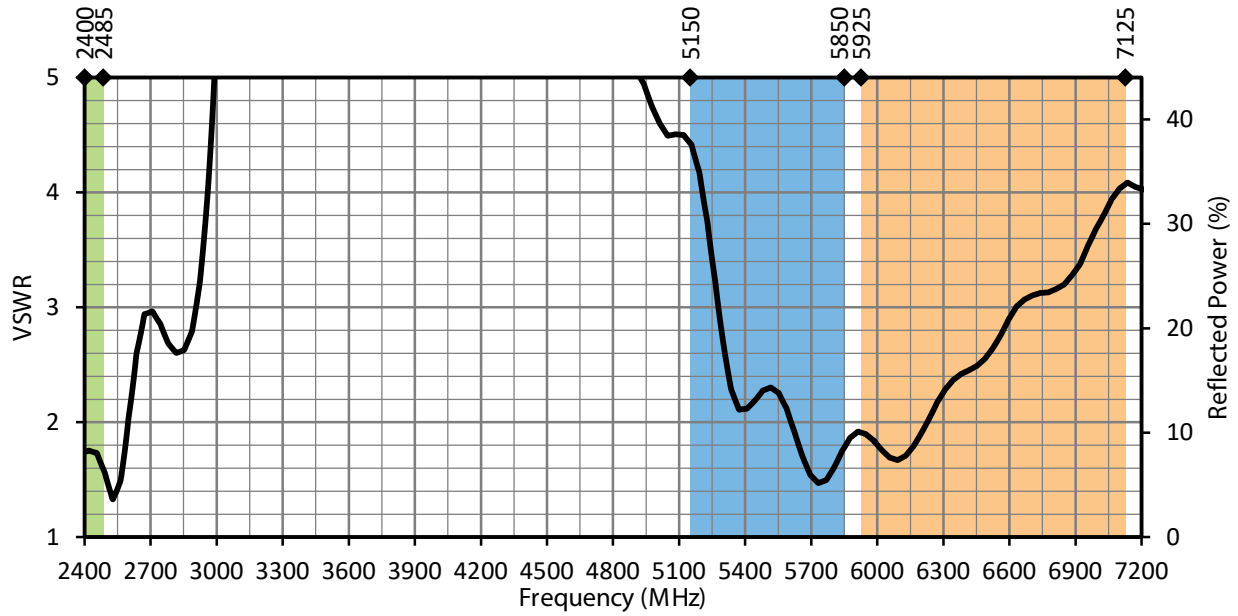


Figure 12: ANT-DB1-WRT-ccc VSWR, at Center of Ground Plane

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.

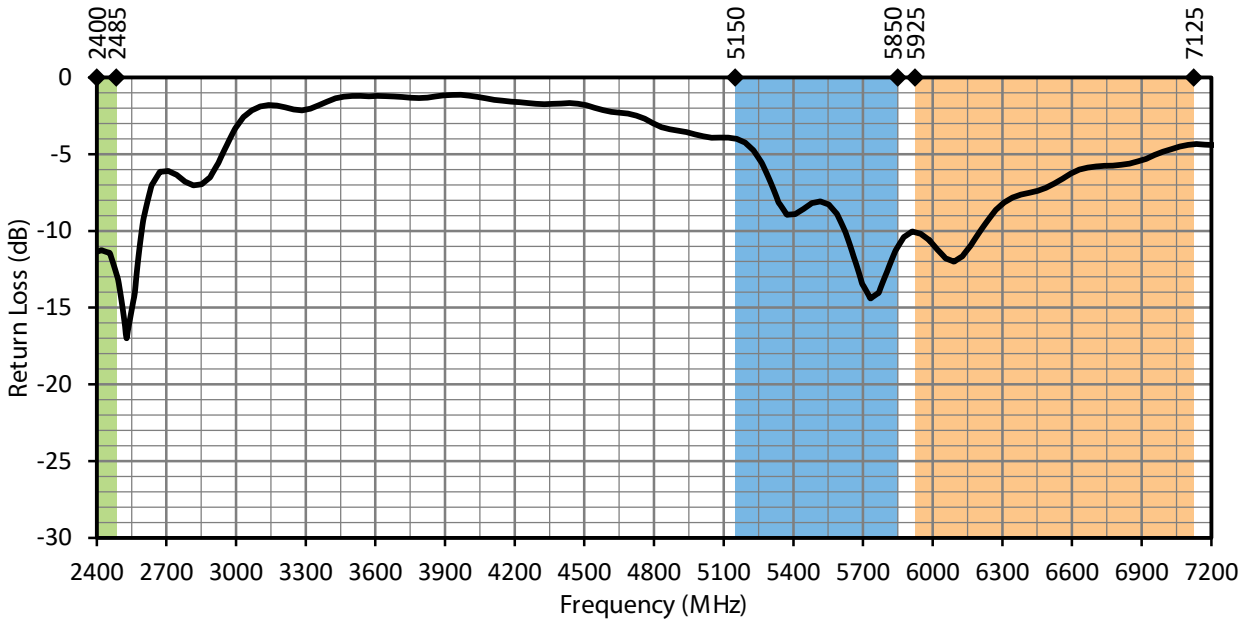


Figure 13: ANT-DB1-WRT-ccc Return Loss, at Center of Ground Plane

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.

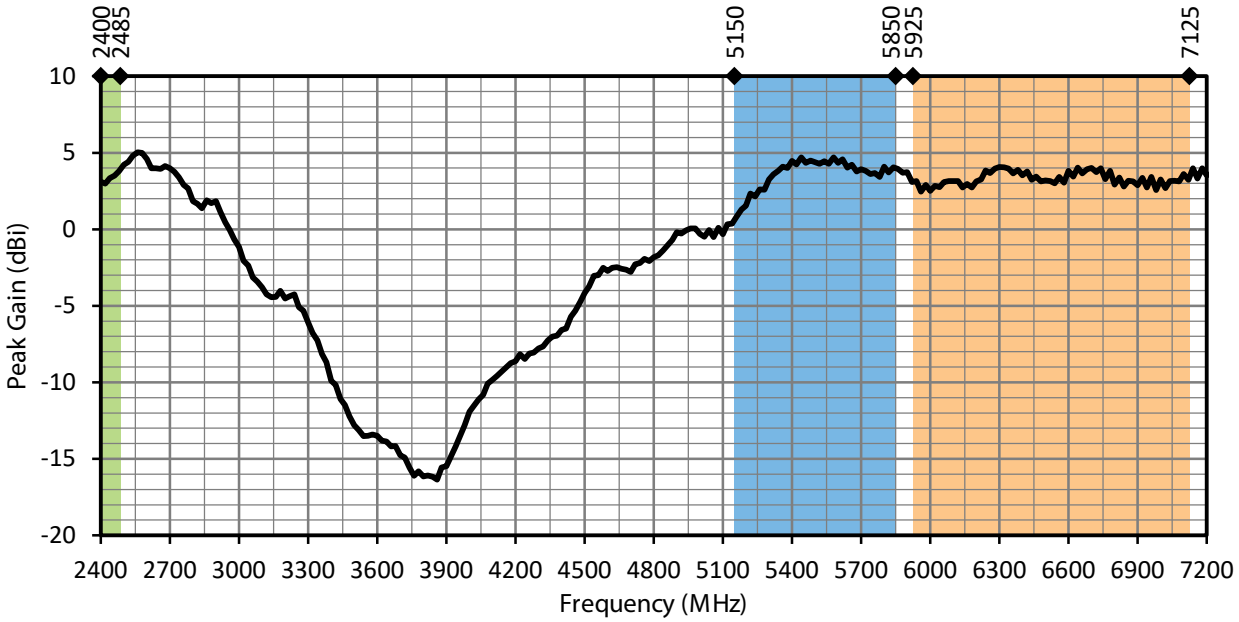


Figure 14: ANT-DB1-WRT-ccc Peak Gain, at Center of Ground Plane

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.

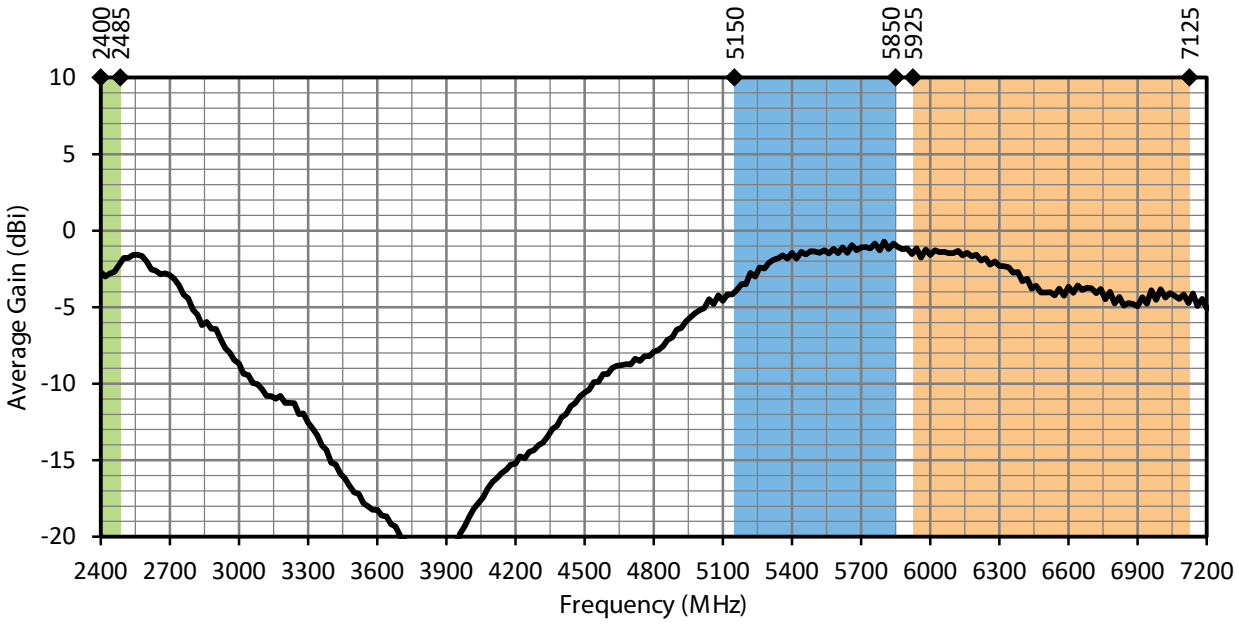


Figure 15: ANT-DB1-WRT-ccc Average Gain, at Center of Ground Plane

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.

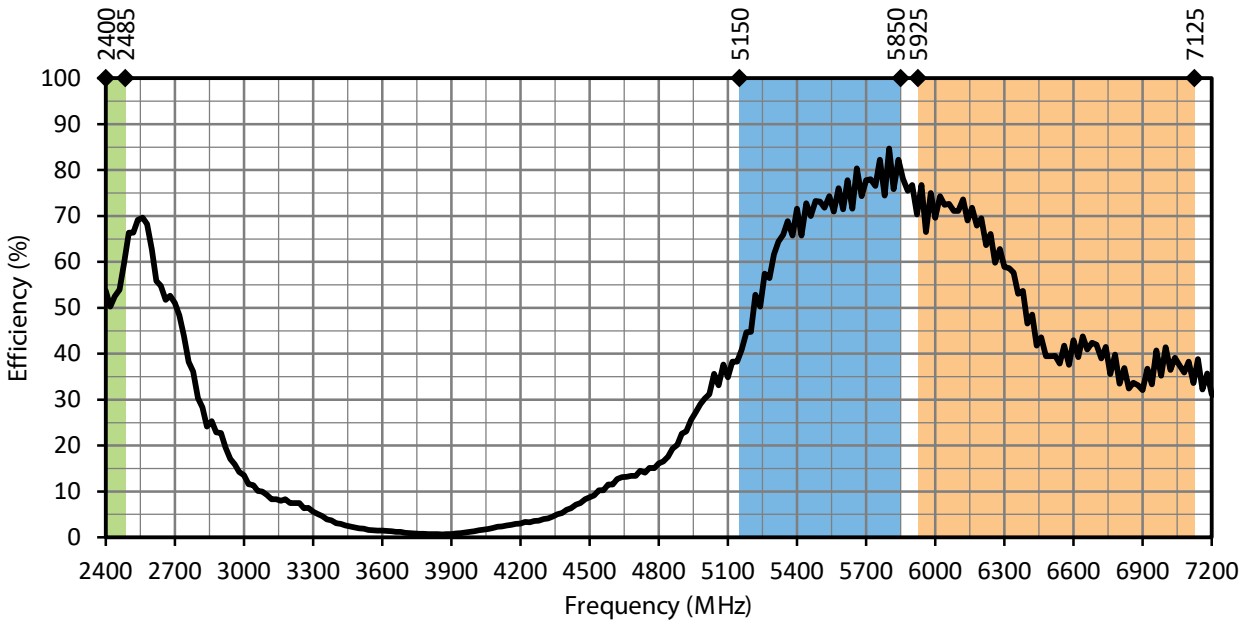
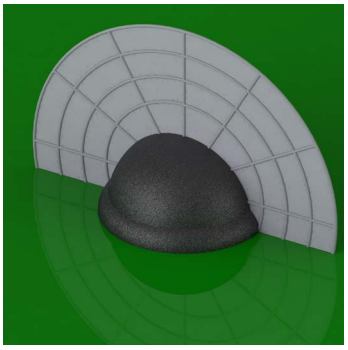


Figure 16: ANT-DB1-WRT-ccc Radiation Efficiency, at Center of Ground Plane

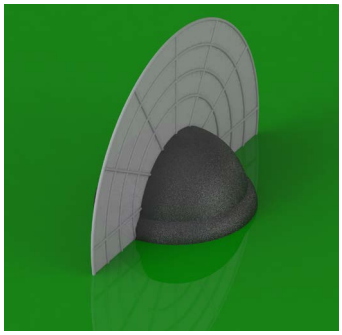
RADIATION PATTERNS

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 17 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.

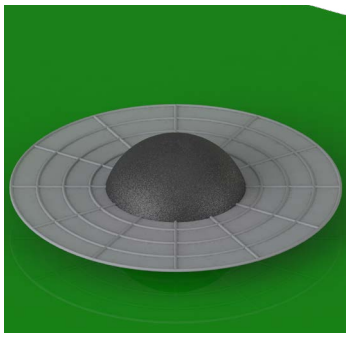
RADIATION PATTERNS - CENTER OF GROUND PLANE



XZ-Plane Gain

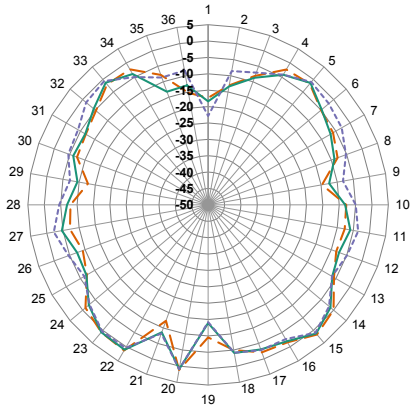


YZ-Plane Gain

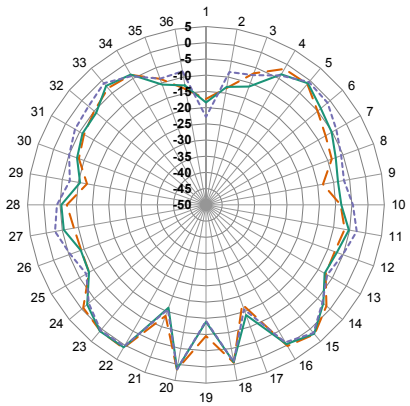


XY-Plane Gain

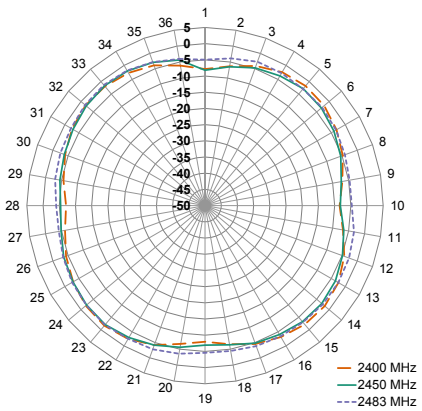
2400 MHZ TO 2485 MHZ (2450 MHZ)



XZ-Plane Gain

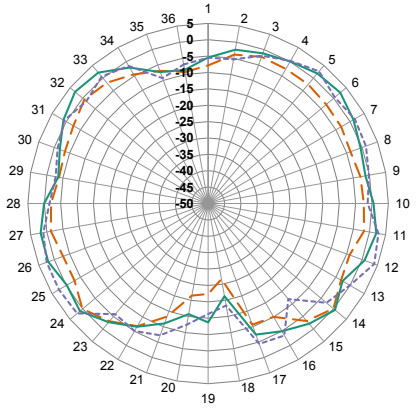


YZ-Plane Gain

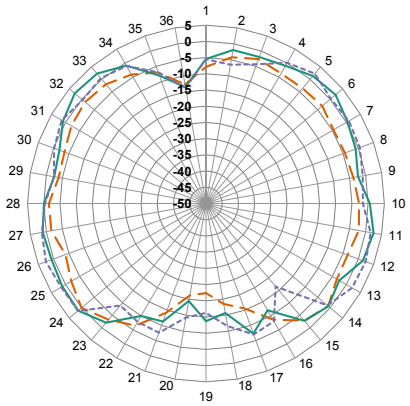


XY-Plane Gain

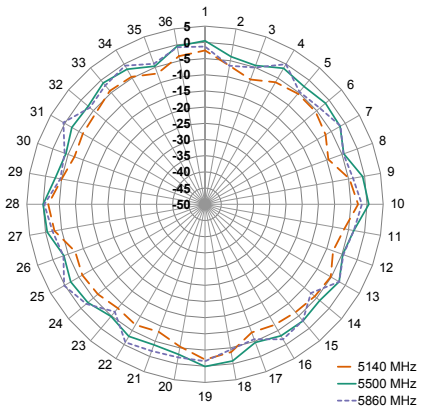
5150 MHZ TO 5850 MHZ (5500 MHZ)



XZ-Plane Gain

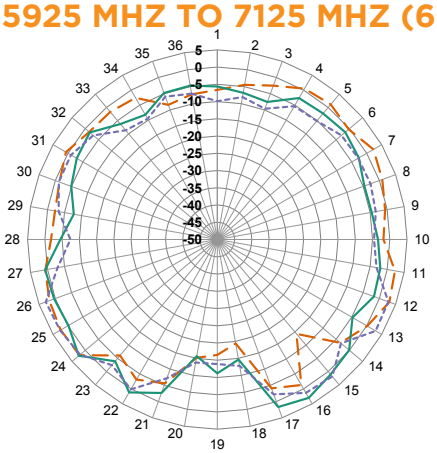


YZ-Plane Gain

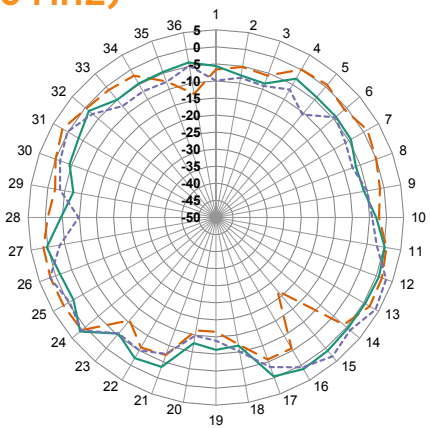


XY-Plane Gain

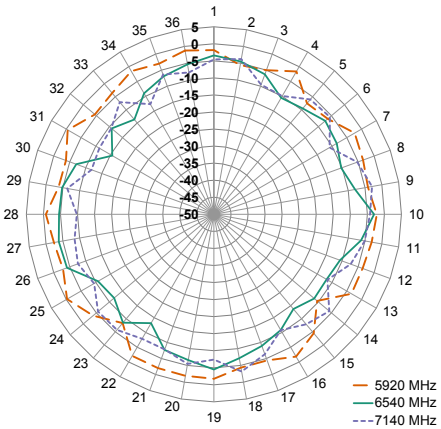
RADIATION PATTERNS - CENTER OF GROUND PLANE 5925 MHZ TO 7125 MHZ (6530 MHZ)



XZ-Plane Gain



YZ-Plane Gain



XY-Plane Gain

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

TE TECHNICAL SUPPORT CENTER

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UK:	+44 (0) 800-267666
France:	+33 (0) 1-3420-8686
Netherlands:	+31 (0) 73-6246-999
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