NANOBLADE

Internal Wireless Device Antenna
2400-2500 MHz/4900-6000 MHz

The evolution of technology has brought the need to communicate everywhere and at all times without being confined to one space. Our internal wireless device antennas feature wide bandwidth to enhance the performance and application of portable wireless devices based on standards such as 802.11 and Bluetooth®. The antennas are specifically designed to be embedded inside devices for aesthetically-pleasing integration with high durability.

FEATURES AND BENEFITS

- Covers 2.4 to 2.5 GHz and 4.9 to 6 GHz for all WLAN applications
- Coaxial cable pigtail with various connector choices
- Omnidirectional patterns and all frequencies with increased gain in upper bands for optimal coverage
- Conformance to European RoHS Directive

SPECIFICATIONS						
Part Numbers	CAF94505, MAF95090, MAF94158			ENB2449A1-10MHL4, ENB2449A1-20UFL		
Operating Frequency (MHz)	2400-2500	5150-5350	5600-6000	2400-2500	5150-5350	5600-6000
Gain (dBi)	2	3.9	4	3.19	4.1	4.35
VSWR – Max	2:1					
Nominal Impedance (Ohms)	50					
Polarization	Vertical, Omnidirectional					
Dimensions – cm (in.)	5.08 x 1.65 (2.0 x 0.65)					
Material Substance Compliance	RoHS					
Operating Temperature – ˚C (˚F)	-30 to +70 (-22 to +158)					
Storage Temperature – ˚C (˚F)	-40 to +85 (-40 to +185)					

CONFIGURATION

PART NUMBER	CABLE LENGTH	CONNECTOR
CAF94505	100 mm, Ø 1.13 mm	IPEX MHF
MAF95090	175 mm, Ø 1.13 mm	IPEX MHF
MAF94158	279.4 mm, Ø 1.13 mm	IPEX MHF
ENB2449A1-10MH4L	100 mm, Ø 1.13 mm	IPEX MHF4L
ENB2449A1-20UFL	200 mm, Ø 1.13 mm	IPEX MHF

Note: Specifications are based on the 100mm cable length, standard antenna version with MHF1 / U.FL connector. Varying the cable length or type or connector will cause variations in these antenna specifications.

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Flat Surface Antenna measurements

Flat surface measurements were performed with the antenna in free space.

VSWR

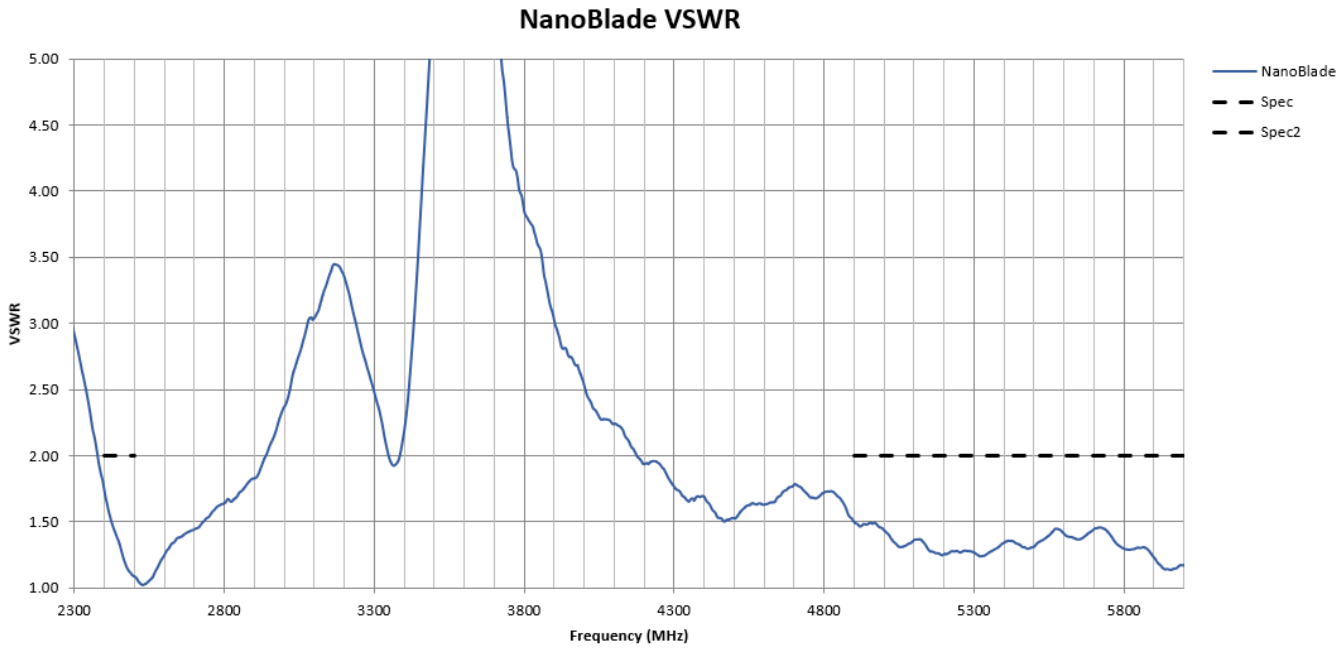

Figure 1: Antenna VSWR measured in free space

RETURN LOSS

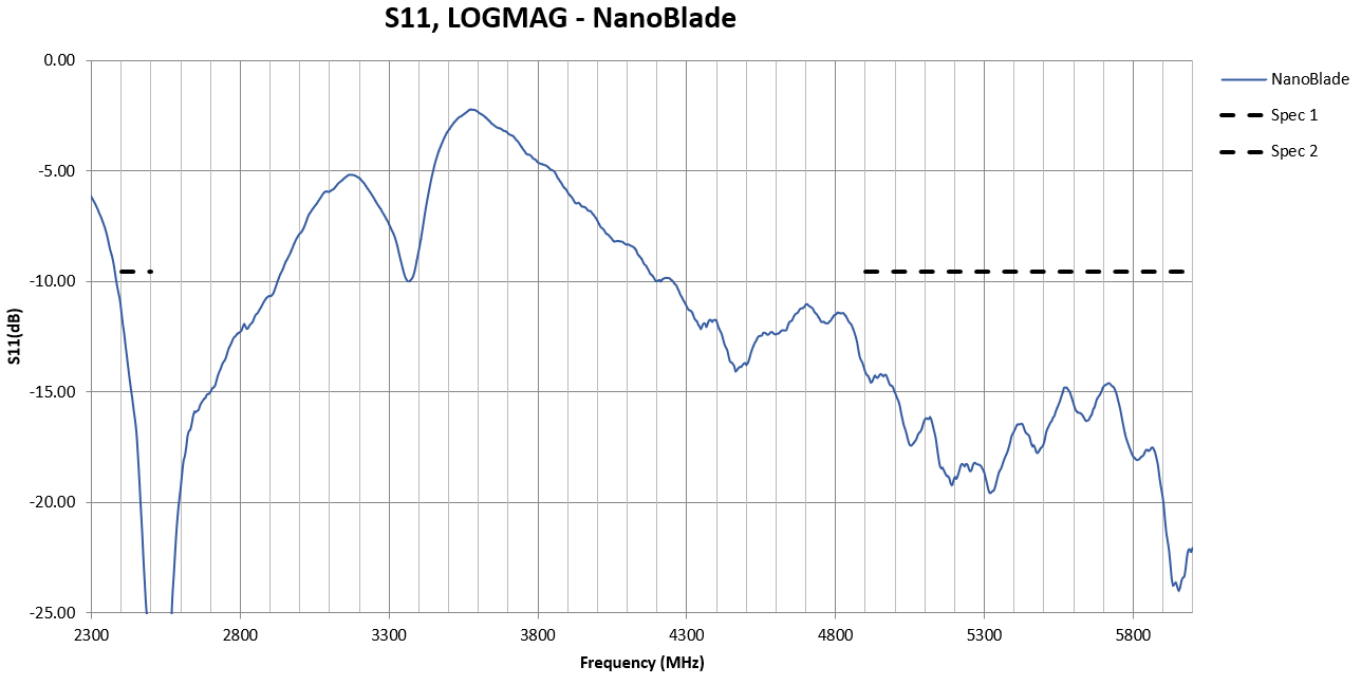

Figure 2: Antenna Return Loss measured in free space

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Antenna Chamber Test Setup

Antenna measurements such as VSWR and S11 were measured with an Agilent E5071C vector network analyzer. Radiation patterns were measured with a Rohde & Schwarz ZNB8-4PORT vector network analyzer in a Howland Company 3100 chamber equivalent. Phase center is nine inches above the Phi positioner.

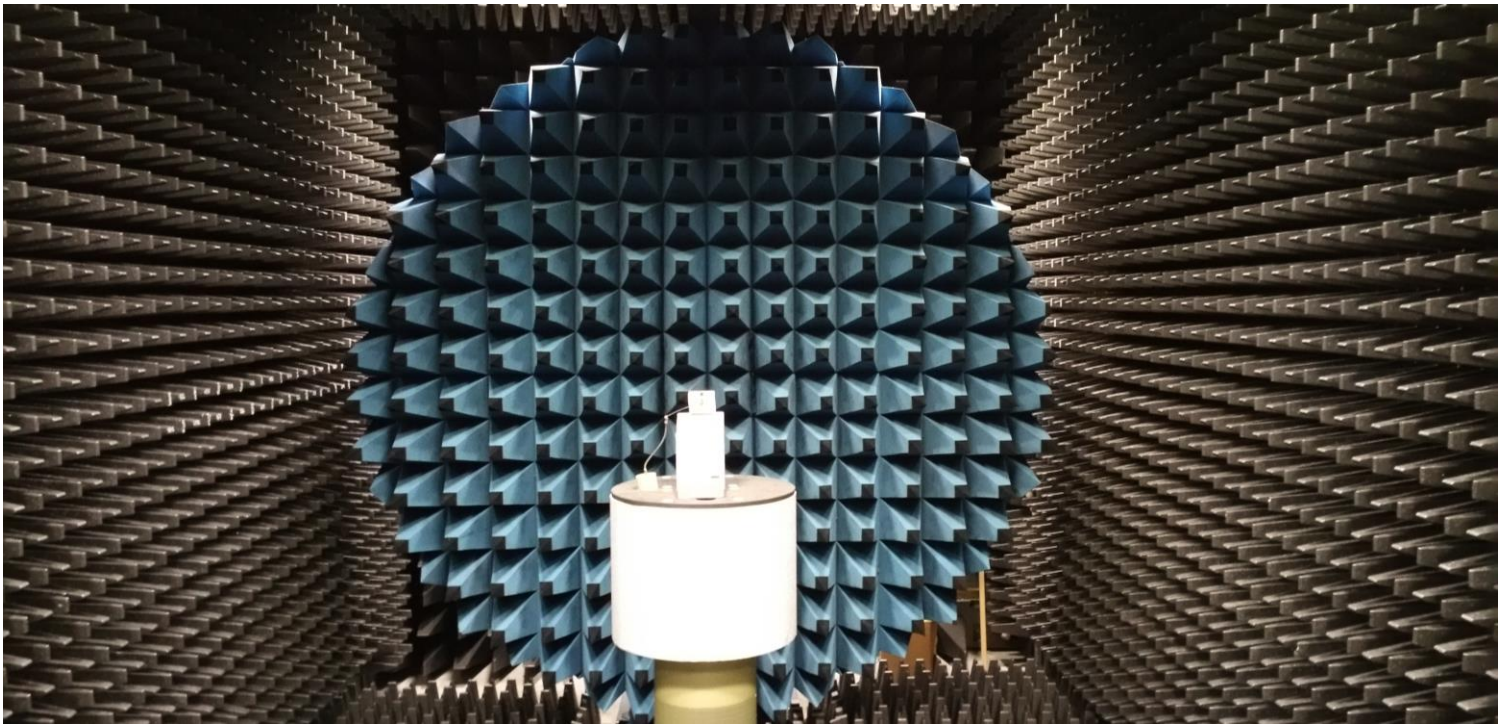

Figure 3: Howland Company 3100 Antenna chamber

Antenna Radiation Performance

Nanoblade centered in free space

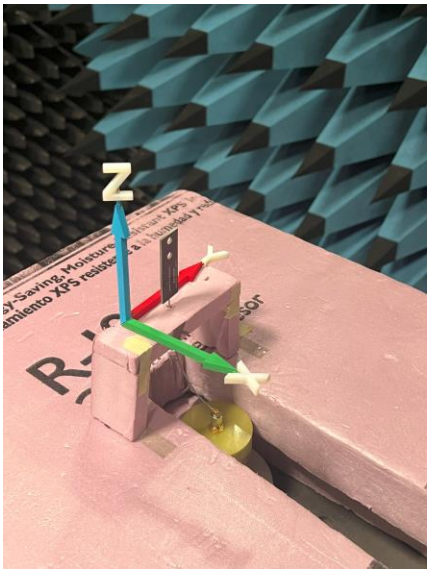

Figure 4: Flat surface setup

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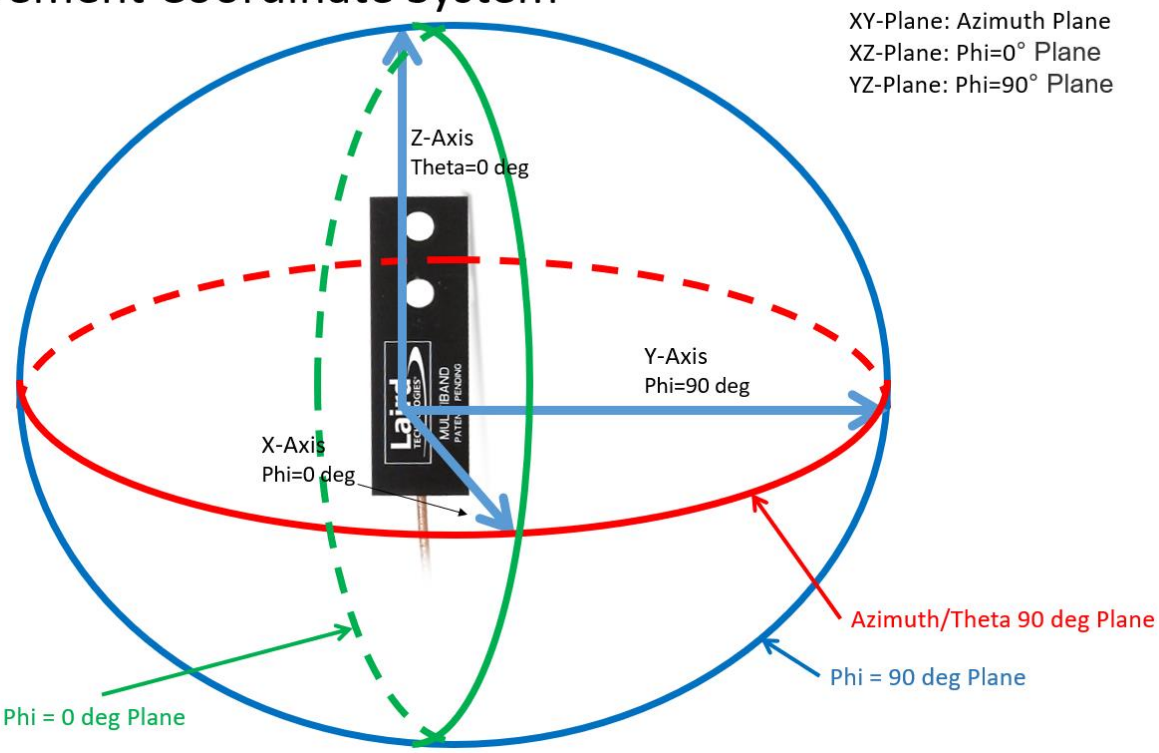
3D Measurement Coordinate System



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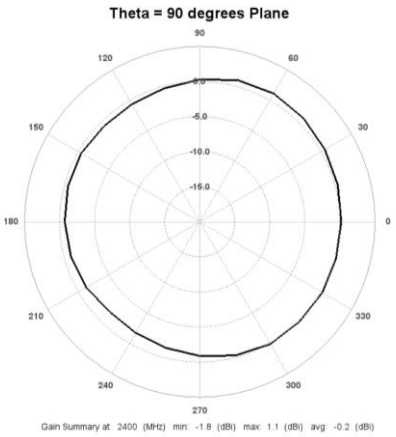
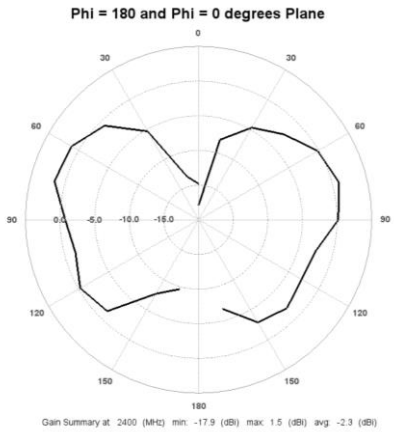
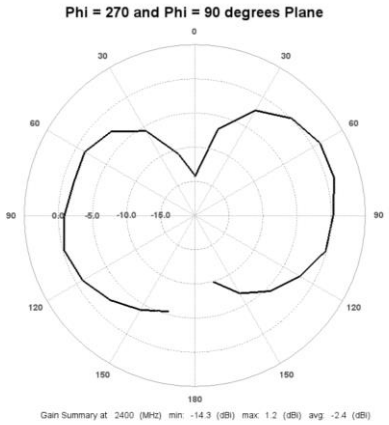
RADIATION PATTERNS – 2D Plots

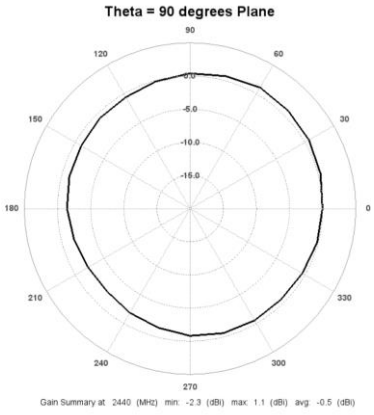
2D Plots at 2400 MHz

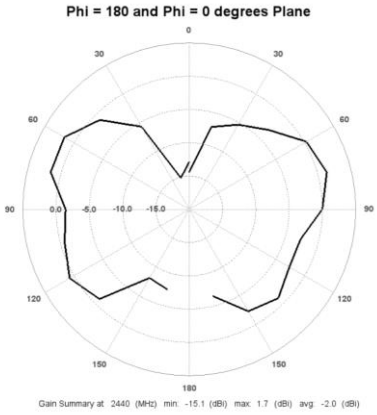


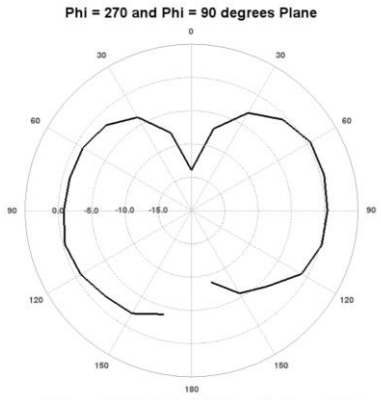




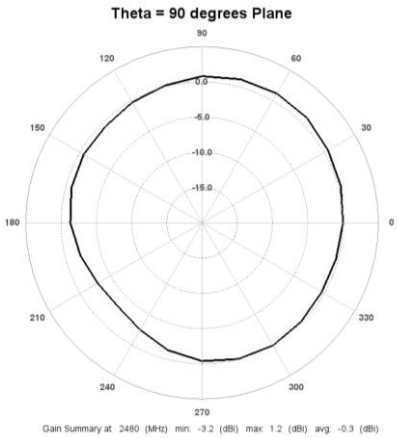
2D Plots at 2440 MHz

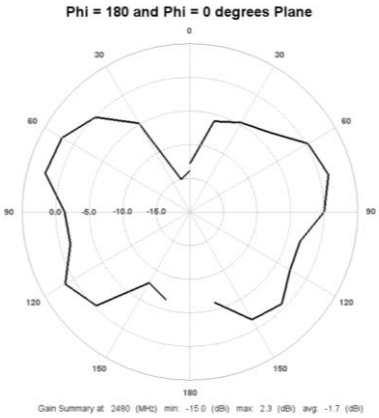


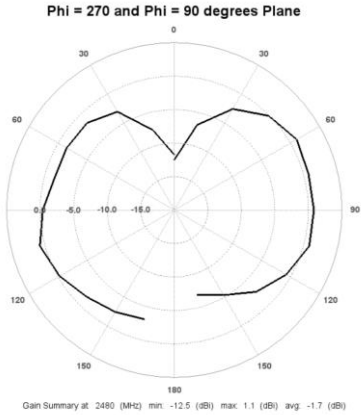




2D Plots at 2480 MHz







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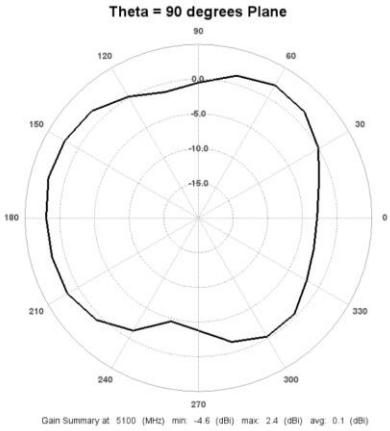
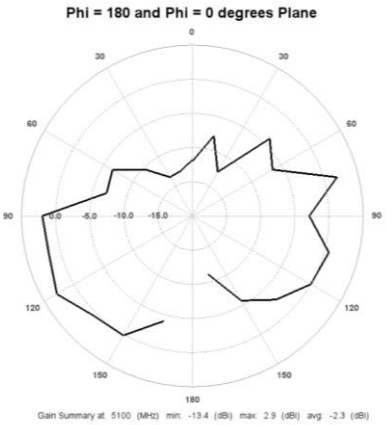
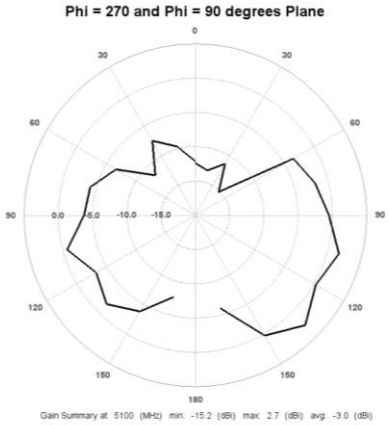
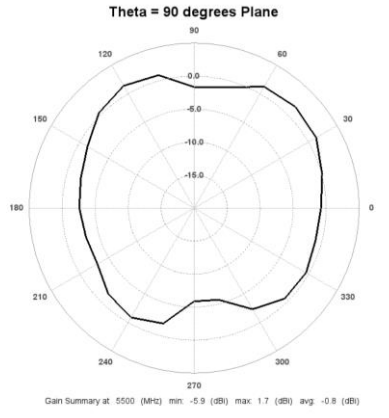
2D Plots at 5100 MHz

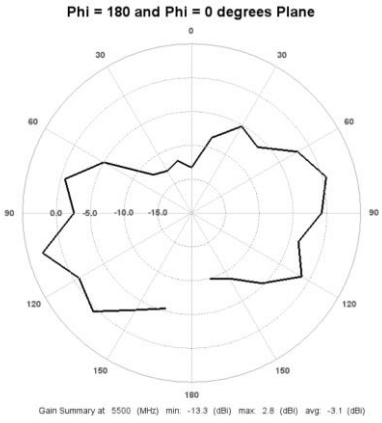


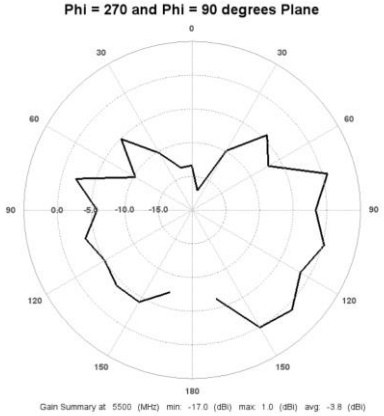




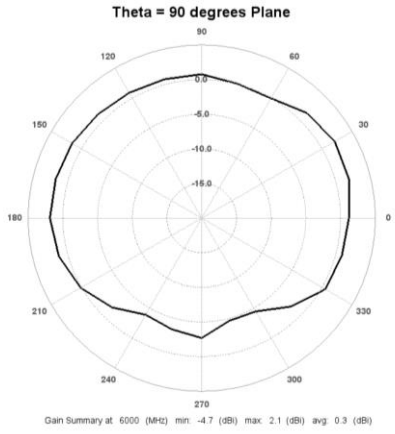
2D Plots at 5500 MHz

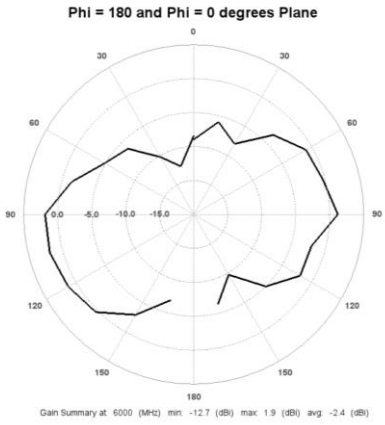


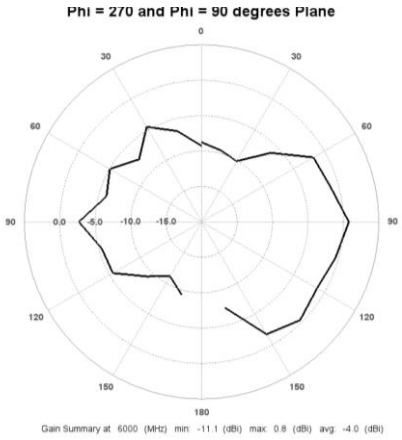




2D Plots at 6000 MHz







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RADIATION PATTERNS – 3D Plots

3D Plots at 2400 MHz

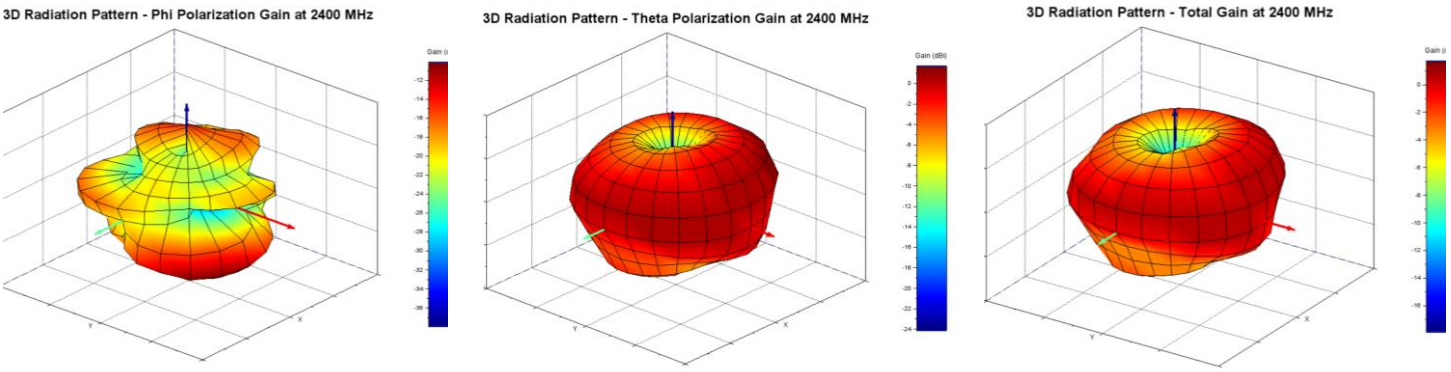

Figure 5: Phi polarization, Theta polarization and, and total gain plots – 2400 MHz

3D Plots at 2440 MHz

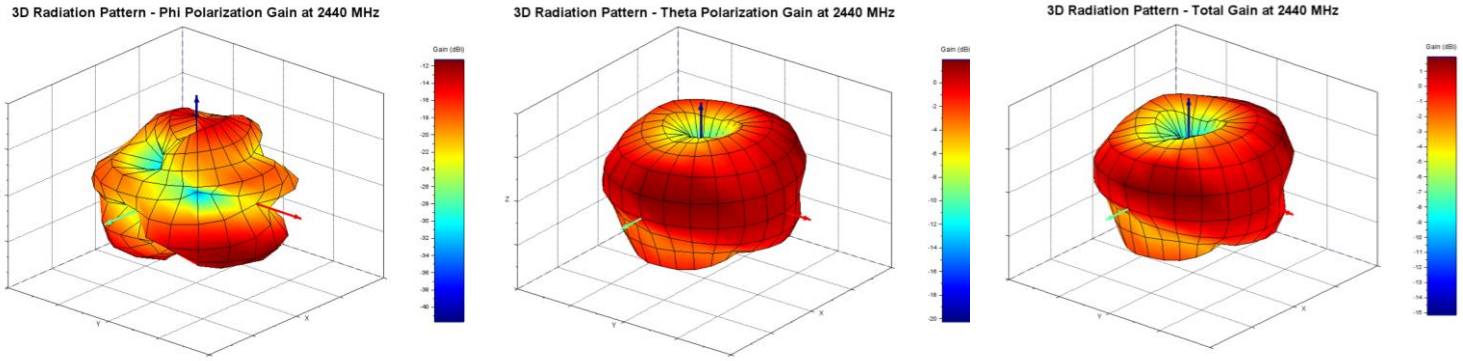

Figure 6: Phi polarization, Theta polarization and, and total gain plots – 2440 MHz

3D Plots at 2480 MHz

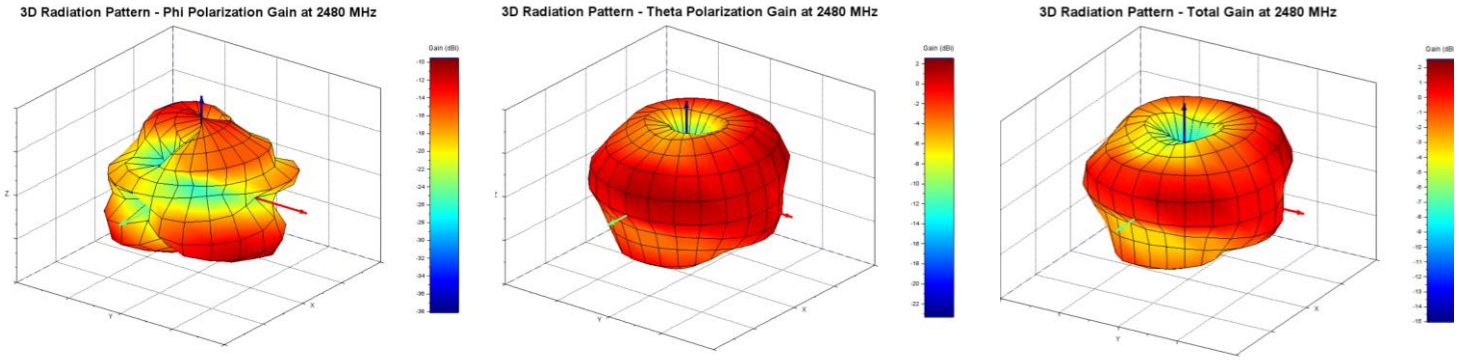

Figure 7: Phi polarization, Theta polarization and, and total gain plots – 2480 MHz

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3D Plots at 5100 MHz

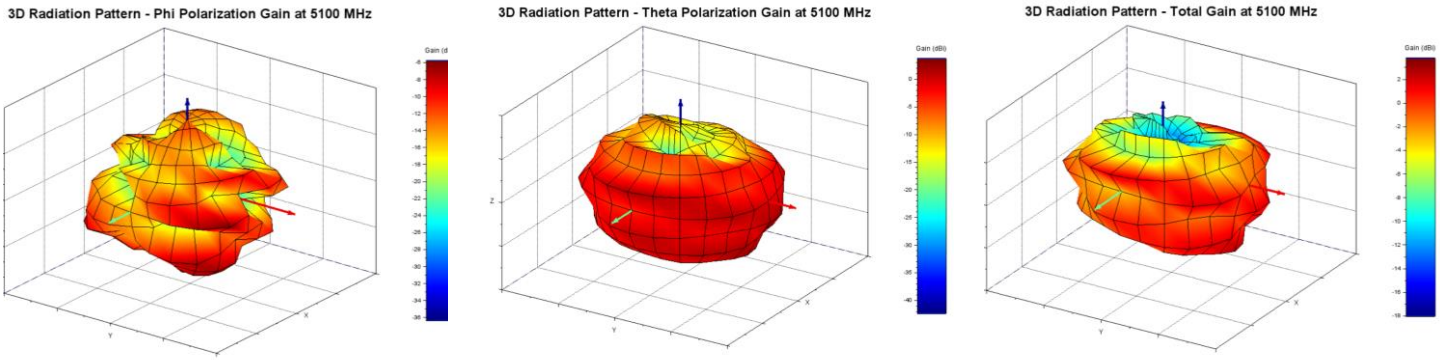

Figure 8: Phi polarization, Theta polarization and, and total gain plots – 5100 MHz

3D Plots at 5500 MHz

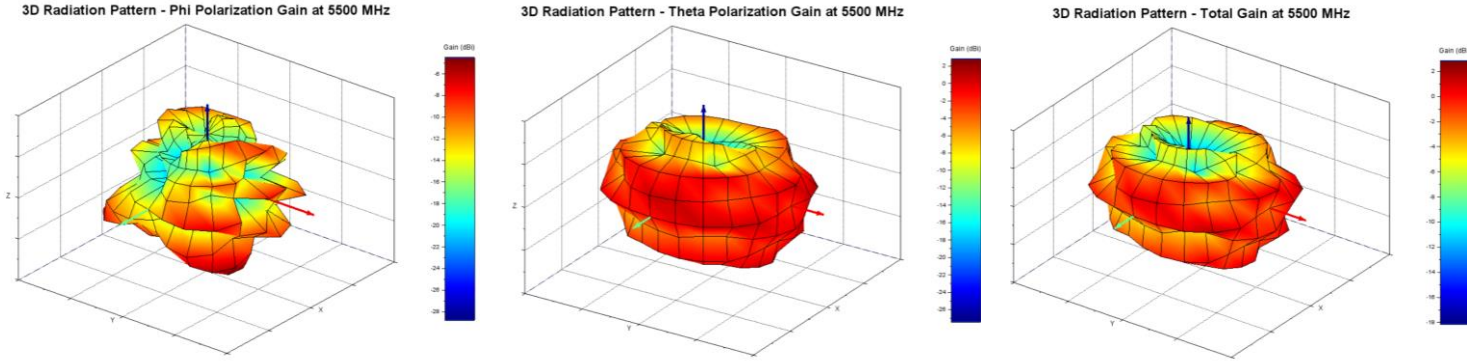

Figure 9: Phi polarization, Theta polarization and, and total gain plots – 5500 MHz

3D Plots at 6000 MHz

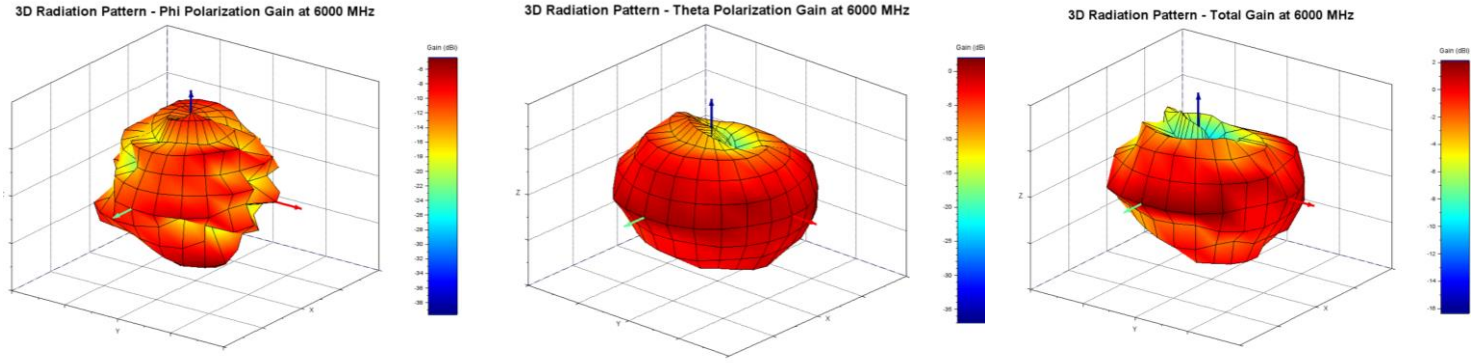

Figure 10: Phi polarization, Theta polarization and, and total gain plots – 6000 MHz

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EFFICIENCY

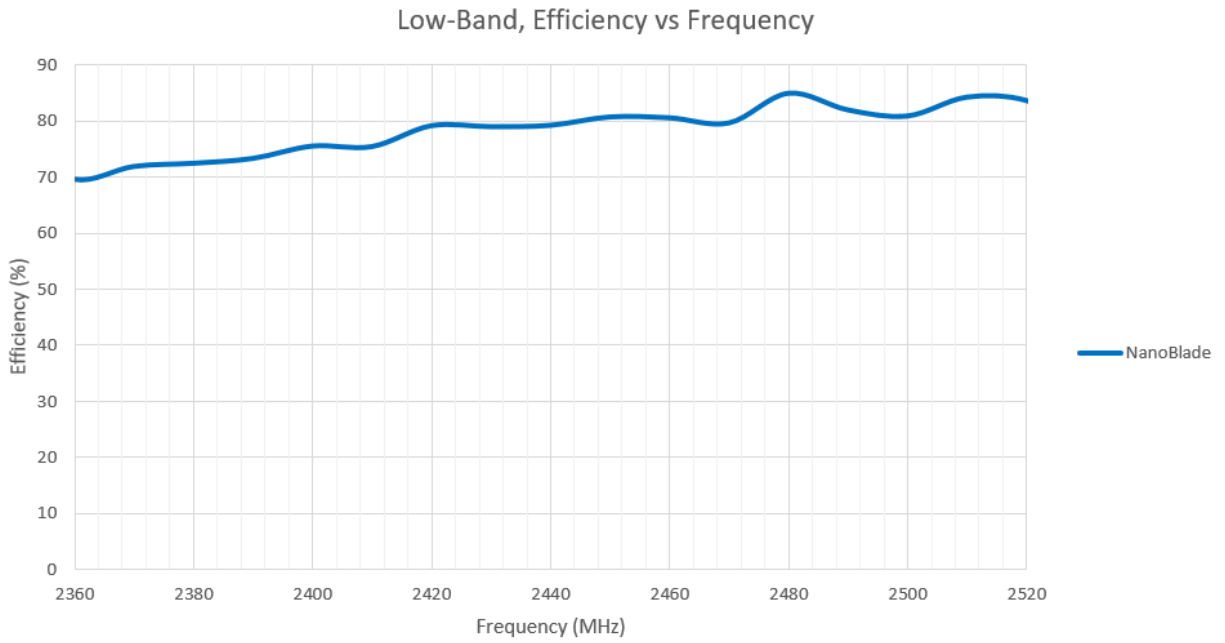

Figure 11: Low-Band antenna efficiency measured in free space with a nominal value of -1.1dB across the operating frequency

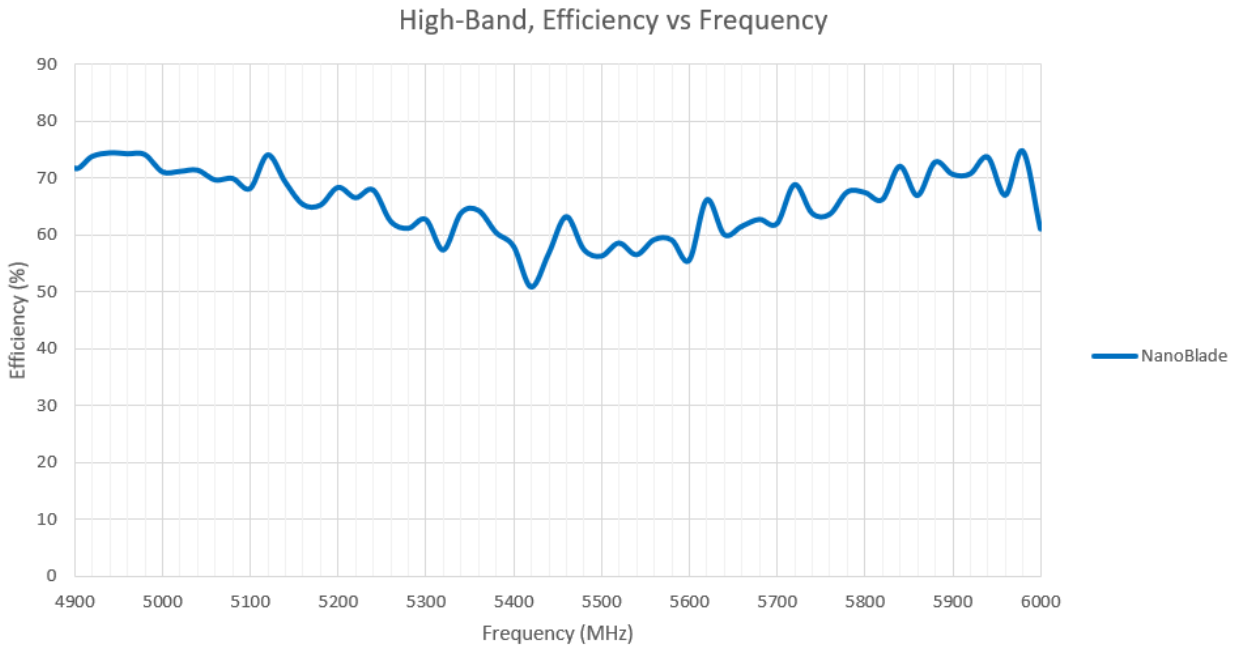

Figure 12: High-Band antenna efficiency measured in free space with a nominal value of -1.91dB across the operating frequency

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ANTENNA GAIN

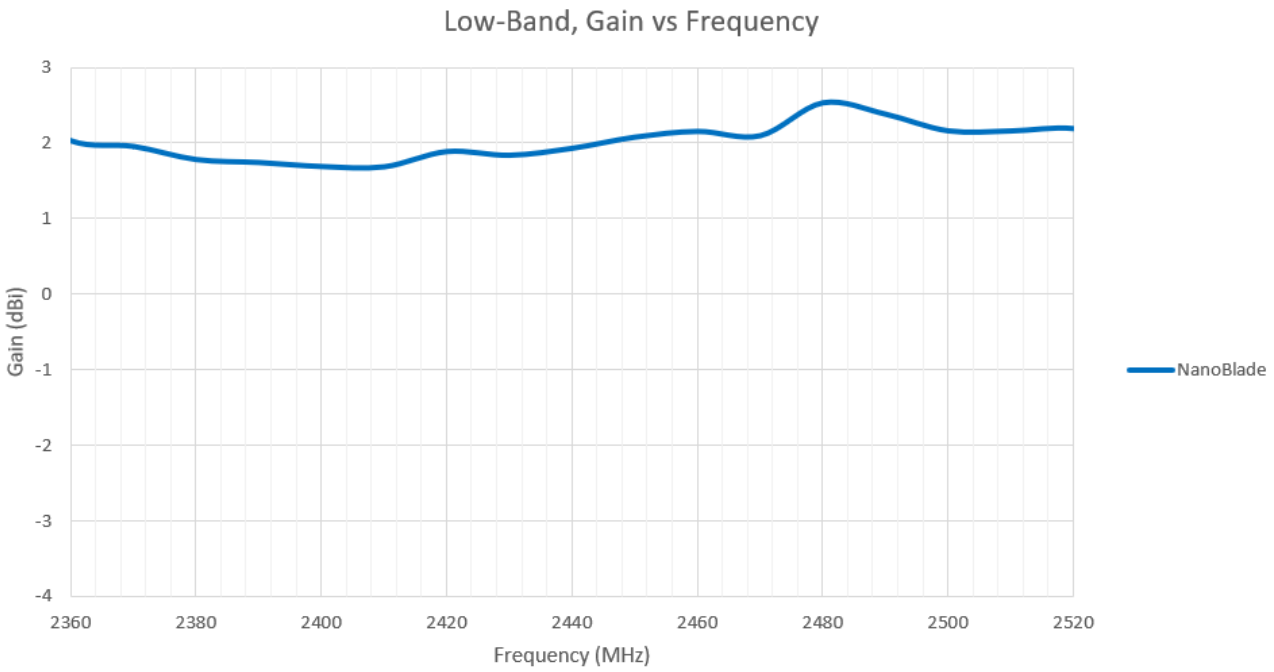

Figure 13: Low-Band Total Gain vs. Frequency, measured in free space

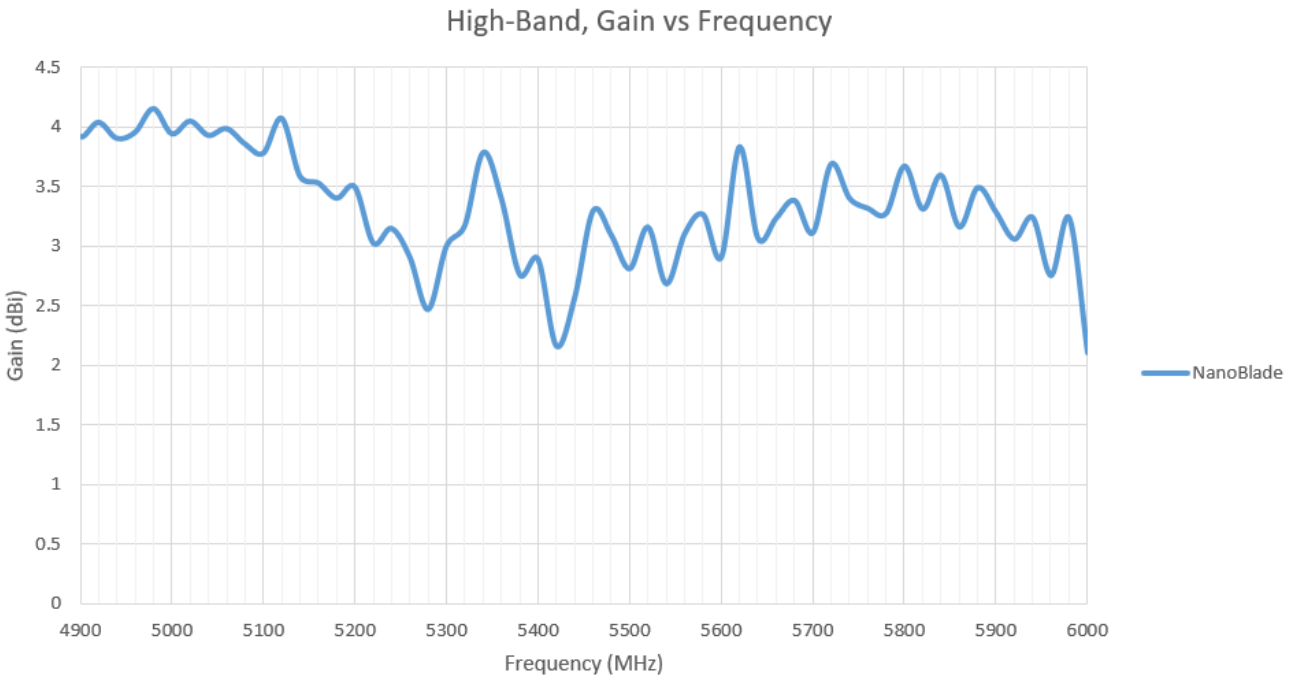

Figure 14: High-Band Total Gain vs. Frequency, measured in free space

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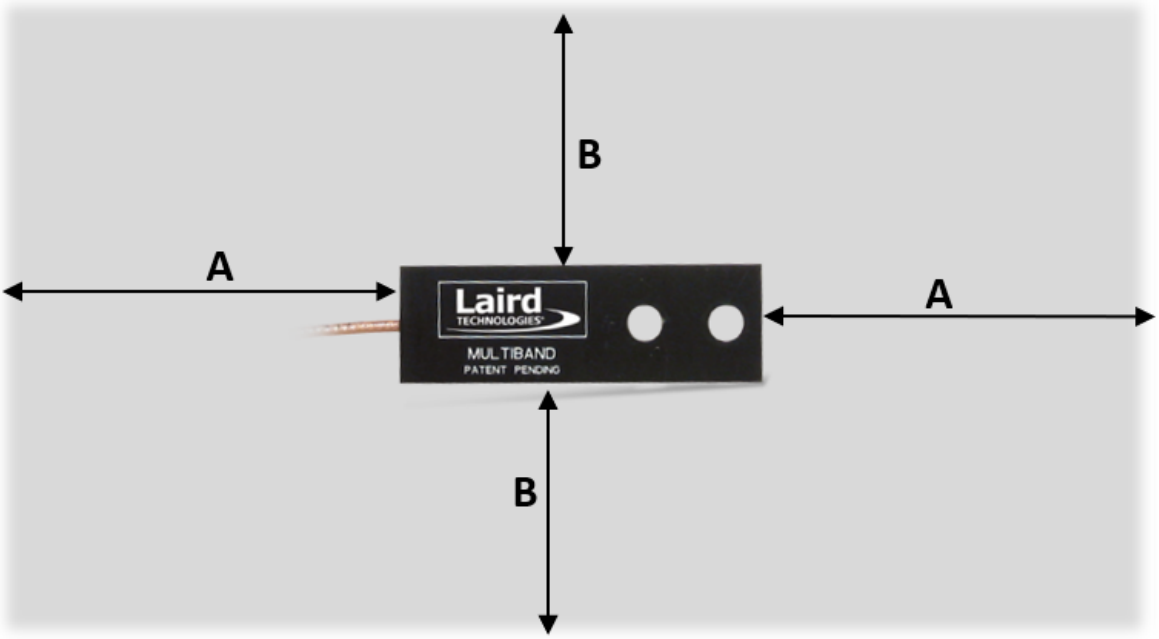
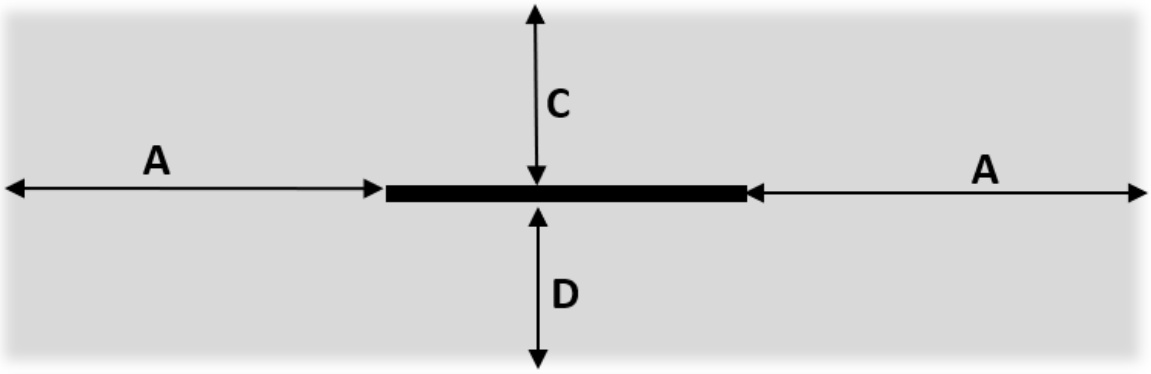
Recommended Antenna Conductive Material Keep Out Region





Keep Out Region Distance (mm)			
A	B	C	D
5	5	10	10

Notes:

- Antenna can be mounted on polycarbonate with a nominal thickness of 2.25mm (1.5mm - 3mm), or with plastic screws
- Diagram is not to scale

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Additional Information

Please contact your local sales representative or our support team for further assistance:

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Website	www.lairdconnect.com/
Technical Support	www.lairdconnect.com/resources/support
Sales Contact	www.lairdconnect.com/contact

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Laird Connectivity's products are subject to standard Terms & Conditions.

REVISION HISTORY

Version	Date	Notes	Approver
1.0	10 Mar 2022	Initial Release	Various
2.0	25 Oct 2023	Updated Antenna Patterns, Placement & Keep Out Region	Adam Engelbrecht

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