TECHNICAL SPECIFICATIONS

Dual-Band Ultra-Wideband (UWB) and Bluetooth® Dual-Polarized Vivaldi Antenna

2.4 GHz and 6 GHz – 10 GHz

LITEPOINT

Overview

LitePoint's Dual-Polarized Vivaldi antenna is designed to perform over-the-air (OTA) test at UWB frequencies from 6 GHz to 10 GHz, covering band group 2 including UWB channels 5 to 15, and allows measurements for both horizontal and vertical polarizations for linearly polarized electromagnetic waves. The antenna is designed to deliver typical gain of 7-9 dBi across the frequency range, ideal for UWB ranging test as well as for parametric performance test. Furthermore, this antenna can also be used in the 2.4 GHz band, enabling co-existence testing between Bluetooth® and UWB.

Technical Specifications

Parameters	Value
Frequency Range	2.4 GHz – 2.5 GHz 6 GHz – 10 GHz
Antenna Gain (typical)	5 dBi @ 2.45 GHz 7 – 9.2 dBi @ 6 – 10 GHz
Polarization	Linear Dual Orthogonal Polarization
3-dB Beamwidth (for both polarizations) 6 GHz, E-Plane 6 GHz, H-Plane 10 GHz, E-Plane 10 GHz, H-Plane	 82° (Typical) 110° (Typical) 39° (Typical) 59° (Typical)
Return Loss 2.4 – 2.5 GHz, 6 – 10 GHz	< -6dB
Time Delay 6 – 10 GHz	375 – 450 ps at 0 degree angle

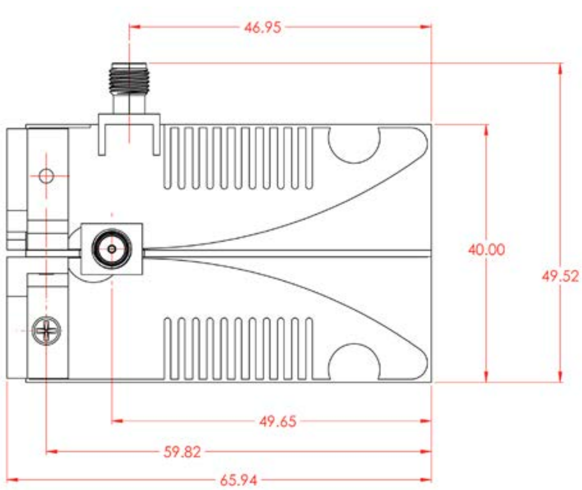
Electrical Specifications

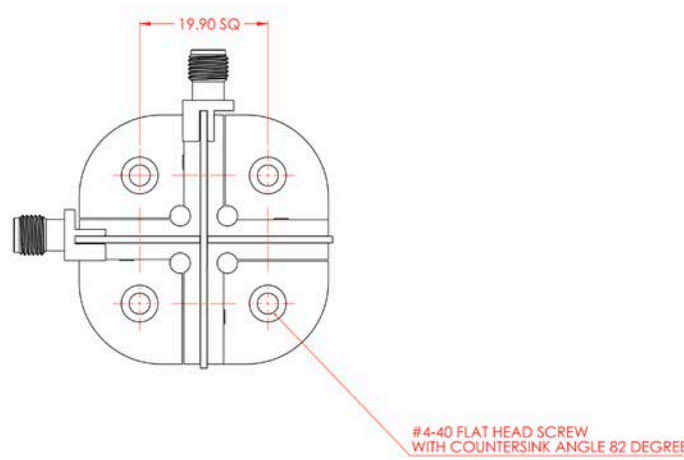
Parameters	Value
Power Handling	10 W
Specification Temperature	25°C
Operation Temperature Range	+5°C to +60°C

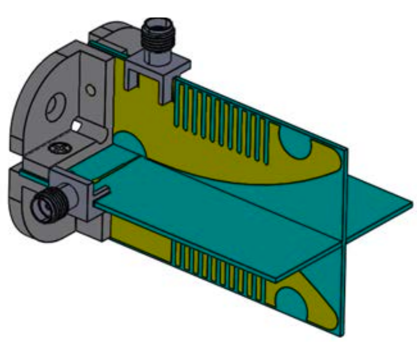
Mechanical Specifications

Parameters	Value
Antenna Port	2 SMA Female (3.5mm)
Material	Ceramic laminates
Finish	Copper
Size	66 mm (L) x 40 mm (W) x 40 mm (H)

Mechanical Drawings



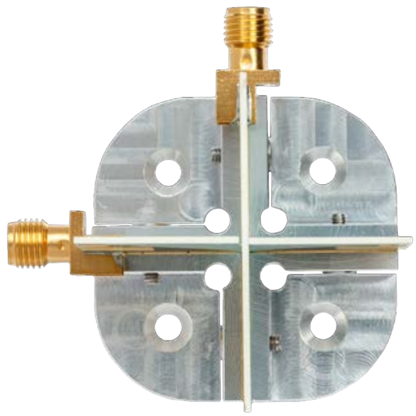




Performance Characteristics

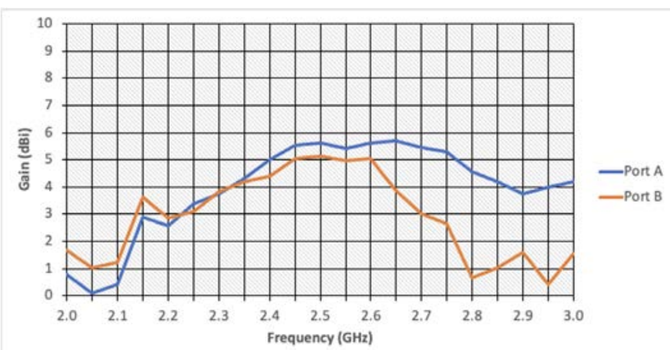
Port B/V-Pol (V)

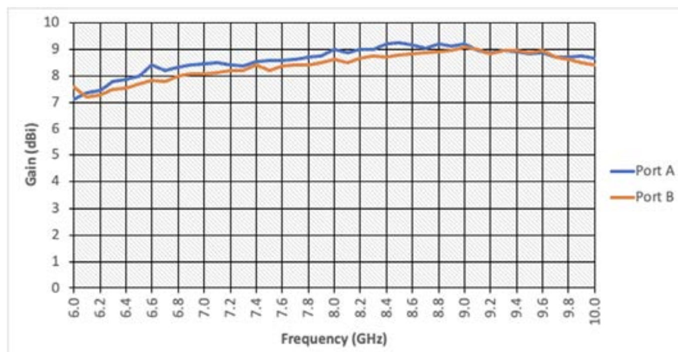
Port A/H-Pol (H)



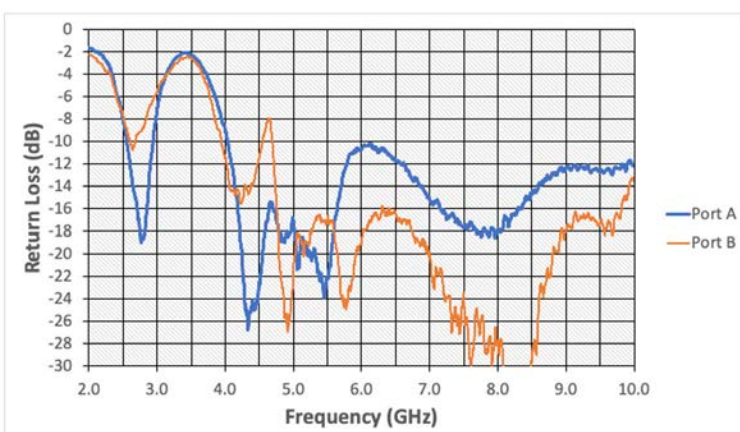
Note: The antenna ports are referred to as "Port A" and "Port B" in this data-sheet and as "H-Pol (H)" and "V-Pol (V)", respectively.

Antenna Gain

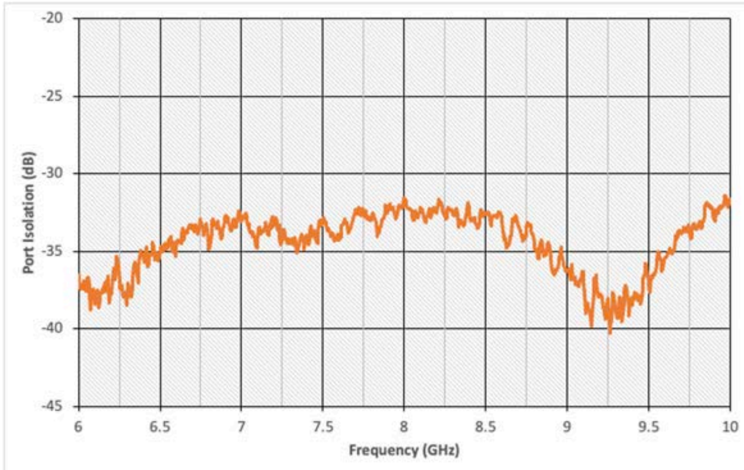




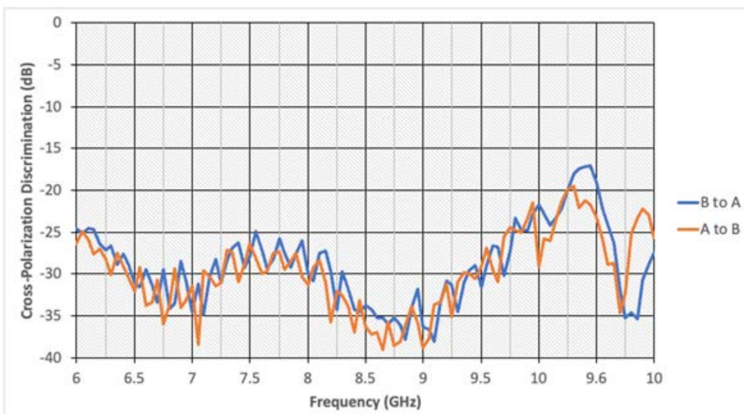
Return Loss



Port Isolation



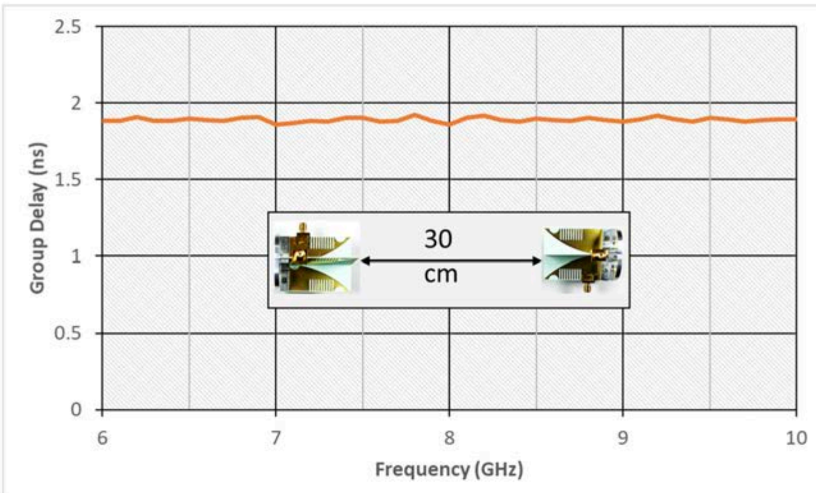
Cross-Polarization Discrimination



Group Delay

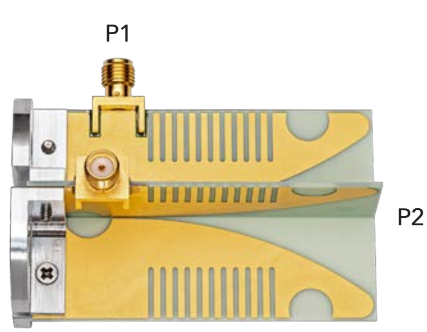
For applications that require sending very wide bandwidth signals, it is important that the phase of the signals is not distorted within the signal bandwidth when they are transmitted through antennas over-the-air. The parameter that quantifies such phase distortion is Group delay (or GD). Group delay is defined as the total time delay or transmit time of the amplitude envelopes of the various sinusoidal components of UWB signals. It can also be computed as the negative slope of the signal phase as a function of frequency. If the phase of the signal is linear over the operating frequencies, the group delay will be a constant.

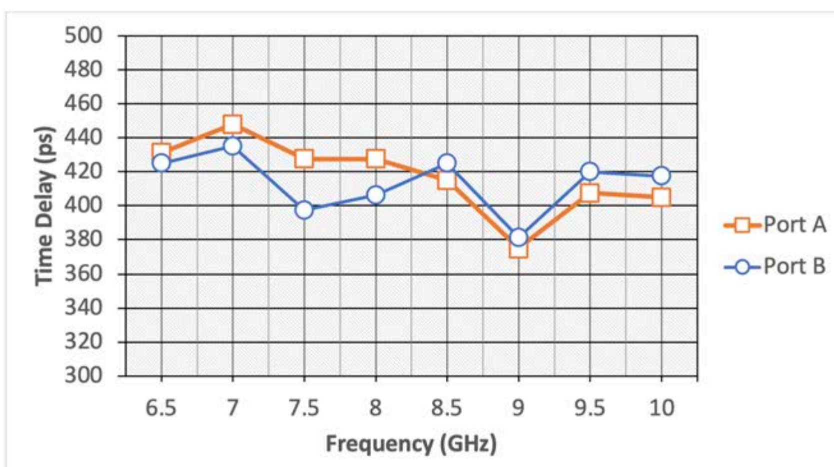
Two LitePoint UWB Vivaldi dual-polarized antennas are placed face-to-face in the maximum radiation direction at a distance of 30 cm, which meets the far-field region condition of r>D2/λ, where D is the aperture of the antenna, 4 cm, and λ is the signal wavelength at the lowest operating frequency, 6GHz. One antenna is used to transmit the signal and the other receives the signal. Both transmit and receive antennas have the same polarization. The total GD of the current setup is shown in the figure below with average of 1.8 ns in the operating frequency band from 6 to 10 GHz More importantly, the plot shows that LitePoint UWB antenna has a relatively flat group delay over the frequency band from 6 to 10 GHz as the total group delay only has a small variation of ± 0.03 ns.



Time Delay vs. Frequency at 0 degree angle

For applications requiring time-of-flight or distance measurements, the time that a signal travels through the antenna is needed to make accurate measurements. Such a parameter is described by the antenna time delay (TD) and is defined by the travel from point P1 to point P2, and vice versa, as illustrated in the figure below.

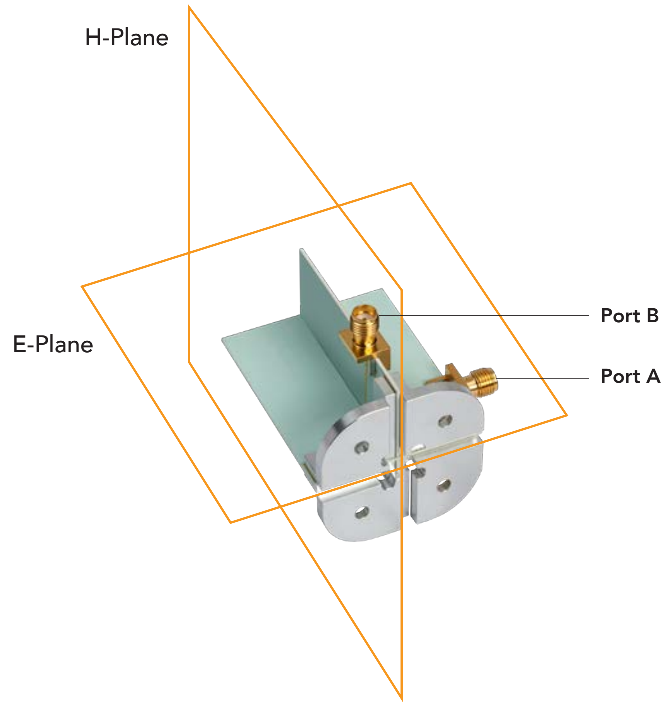




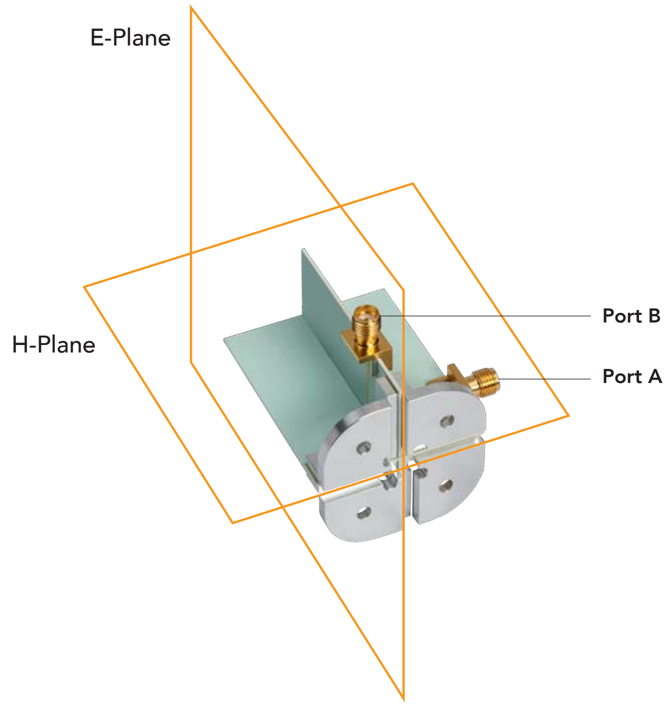
Antenna Patterns

Illustrations of E-plane and H-plane

Illustrated below are the plane of electric field (E-plane) and magnetic field (H-plane) vectors observed with respect to the direction of maximum radiation from Port A.

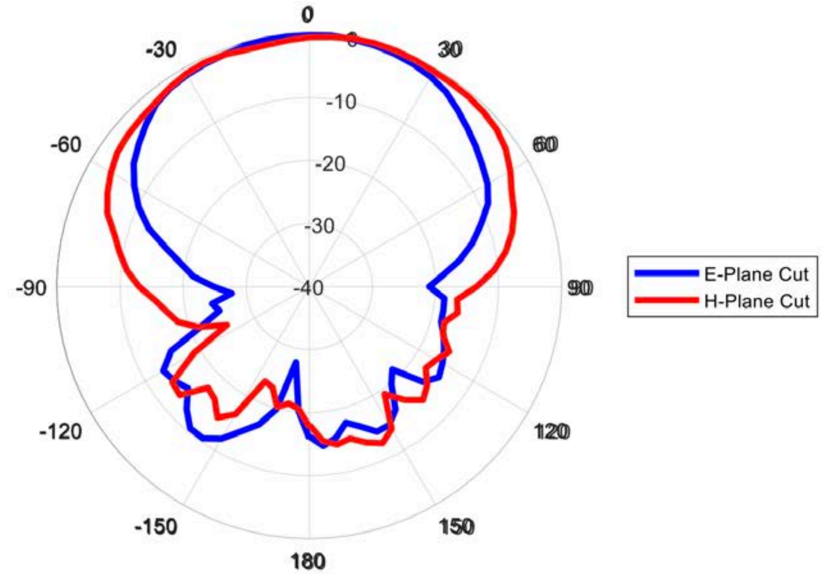


Illustrated below are the plane of electric field (E-plane) and magnetic field (H-plane) vectors observed with respect to the direction of maximum radiation from Port B.

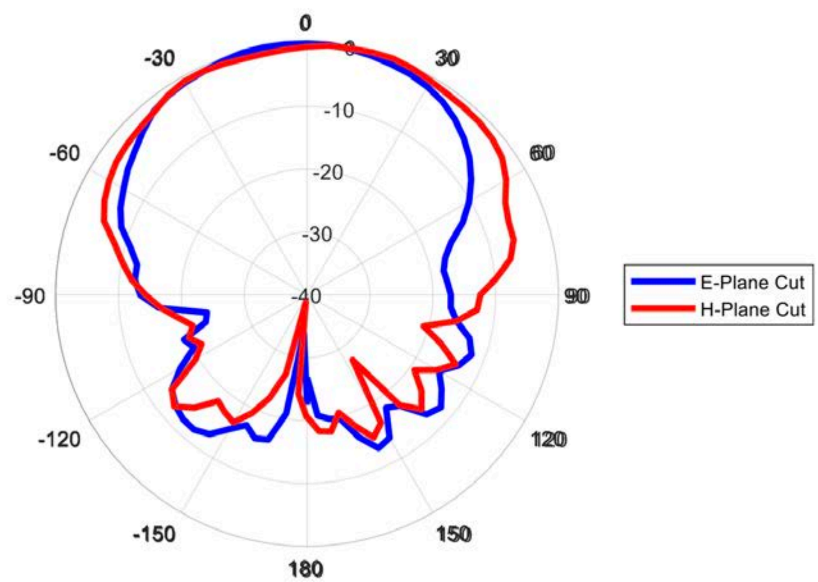


Patterns 6 GHz

Port A

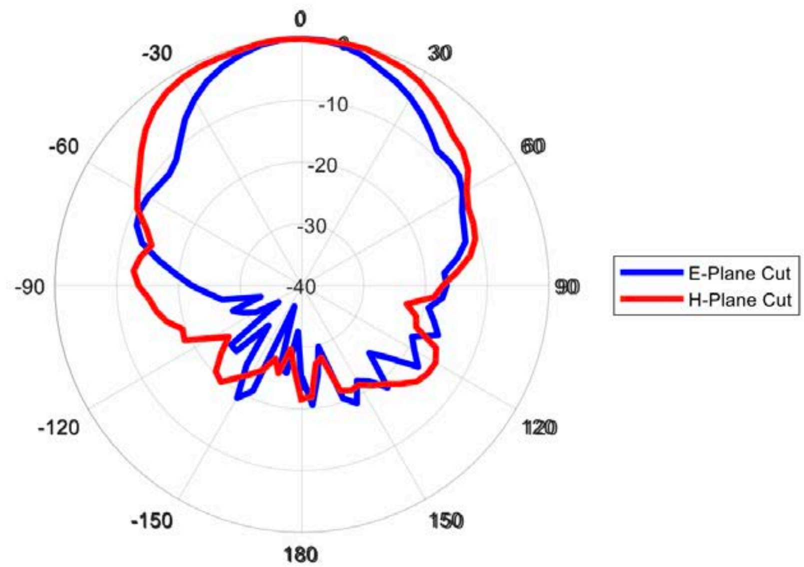


Port B

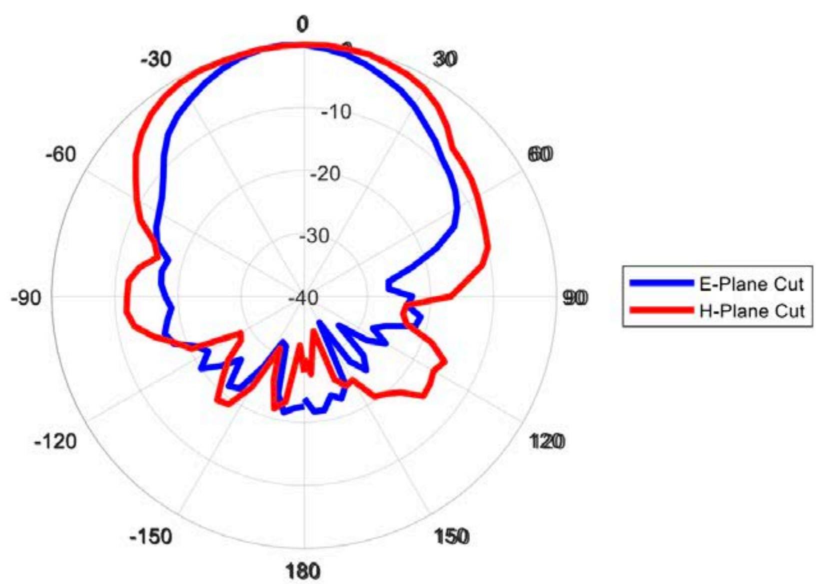


Patterns 8 GHz

Port A

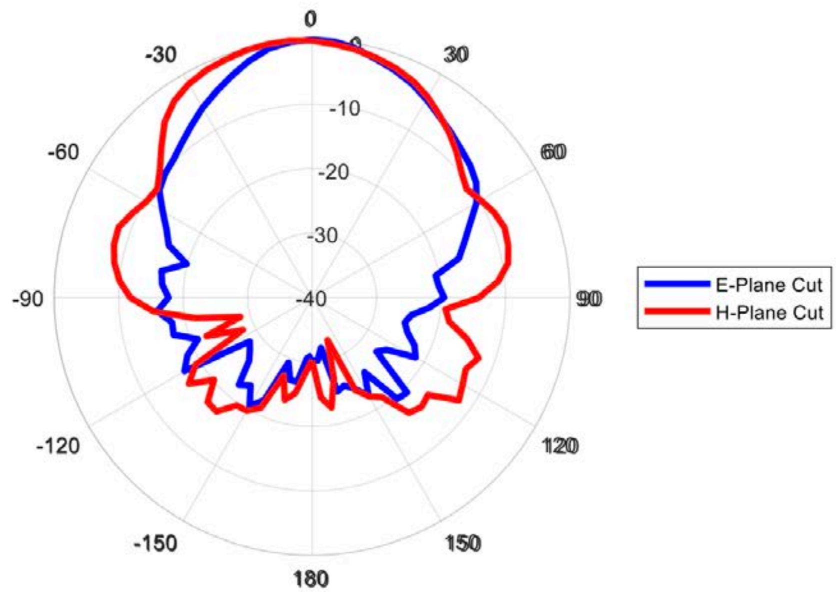


Port B

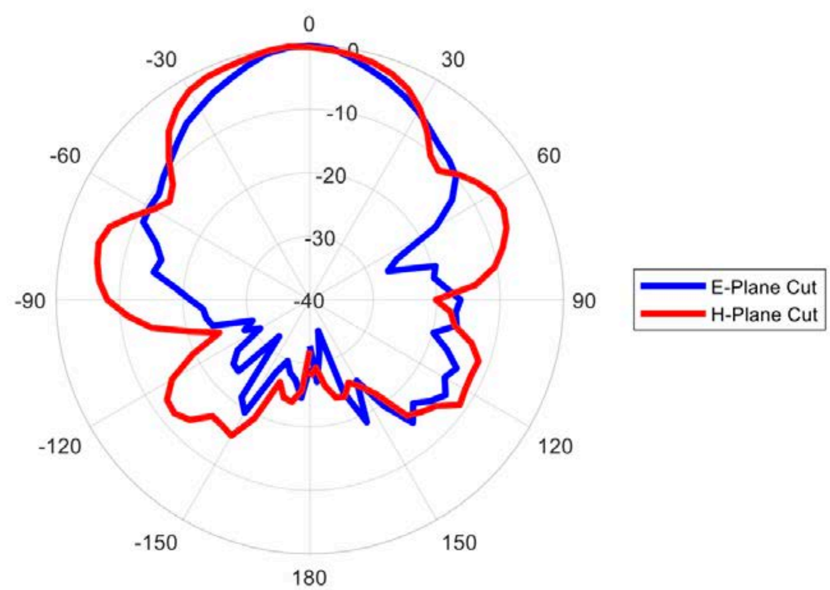


Patterns 10 GHz

Port A



Port B



Order Codes

Code	Product
0150-IUWB-022	Dual-Band UWB and Bluetooth Dual Polarization Vivaldi Antenna 2.4 GHz & 6-10 GHz

LITEPOINT

CONTACT INFORMATION
180 Rose Orchard Way
San Jose, CA 95134
United States of America

+1.866.363.1911
+1.408.456.5000

LITEPOINT TECHNICAL SUPPORT
www.litepoint.com/support

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