

TECHNICAL SPECIFICATIONS

Ultra-Wideband (UWB) Vivaldi Antenna

Tapered Slot Broadband Antenna
6 GHz – 10 GHz

LITEPOINT

© 2024 LitePoint, A Teradyne Company.
All rights reserved.



Overview

LitePoint's 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. The antenna is designed to deliver relatively flat gain of about 8.5 dBi across the frequency range. The Vivaldi antenna is ideal for UWB ranging test as well as for parametric performance test.



Technical Specifications

Parameters	Value
Frequency Range	6 GHz – 10 GHz
Antenna Gain	8.4 dBi \pm 0.9 dB
Polarization	Linear single Polarization
3-dB Beamwidth 6 GHz, E-Plane 6 GHz, H-Plane 10 GHz, E-Plane 10 GHz, H-Plane	63° (Typical) 84° (Typical) 47° (Typical) 65° (Typical)
Return Loss 6 – 10 GHz	< -6 dB
Time Delay 6 – 10 GHz	370 – 460 ps at 0 degree angle

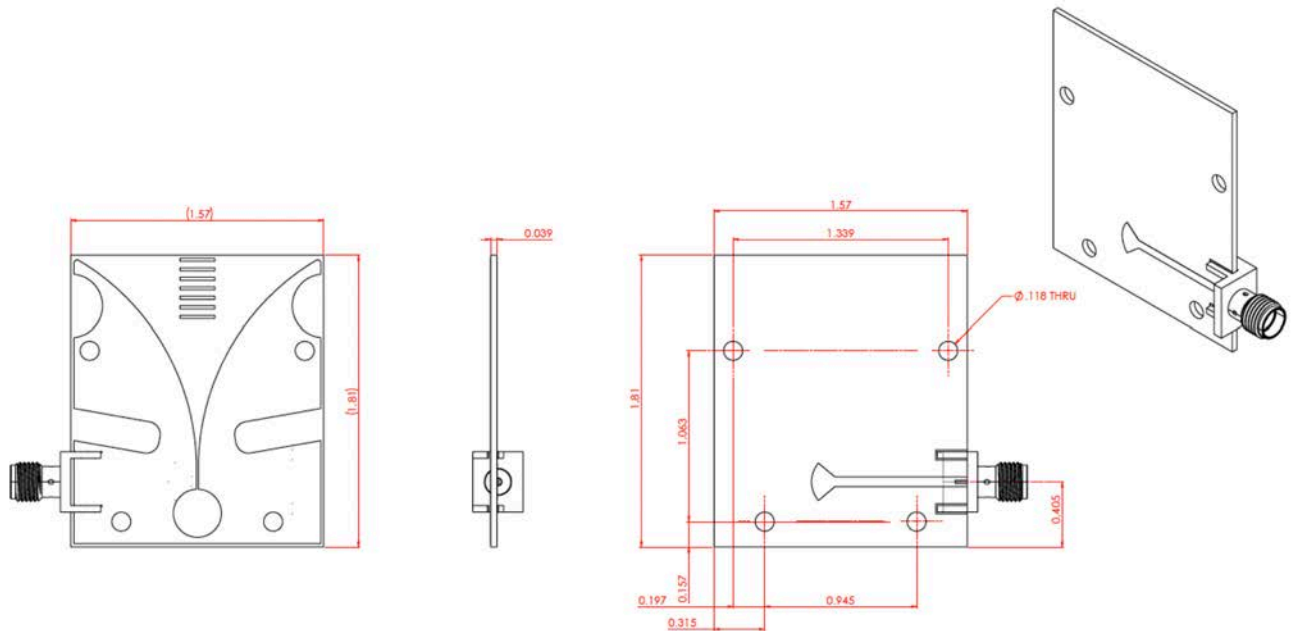
Electrical Specifications

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

Mechanical Specifications

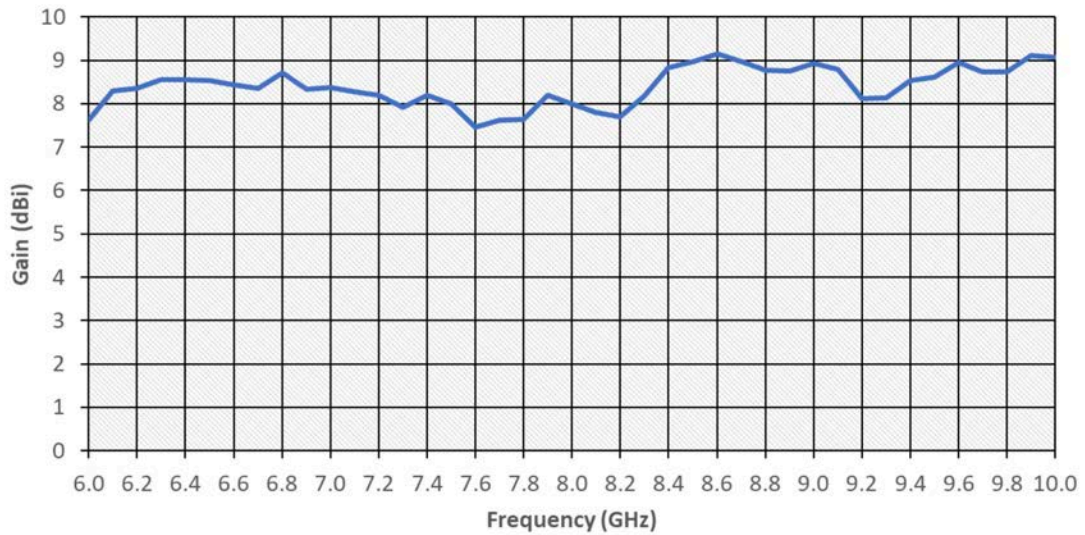
Parameters	Value
Antenna Port	3.5mm SMA Female
Material	Ceramic laminates
Finish	Copper
Size	46mm (L) x 40 mm (W) x 1 mm (H)

Mechanical Drawings

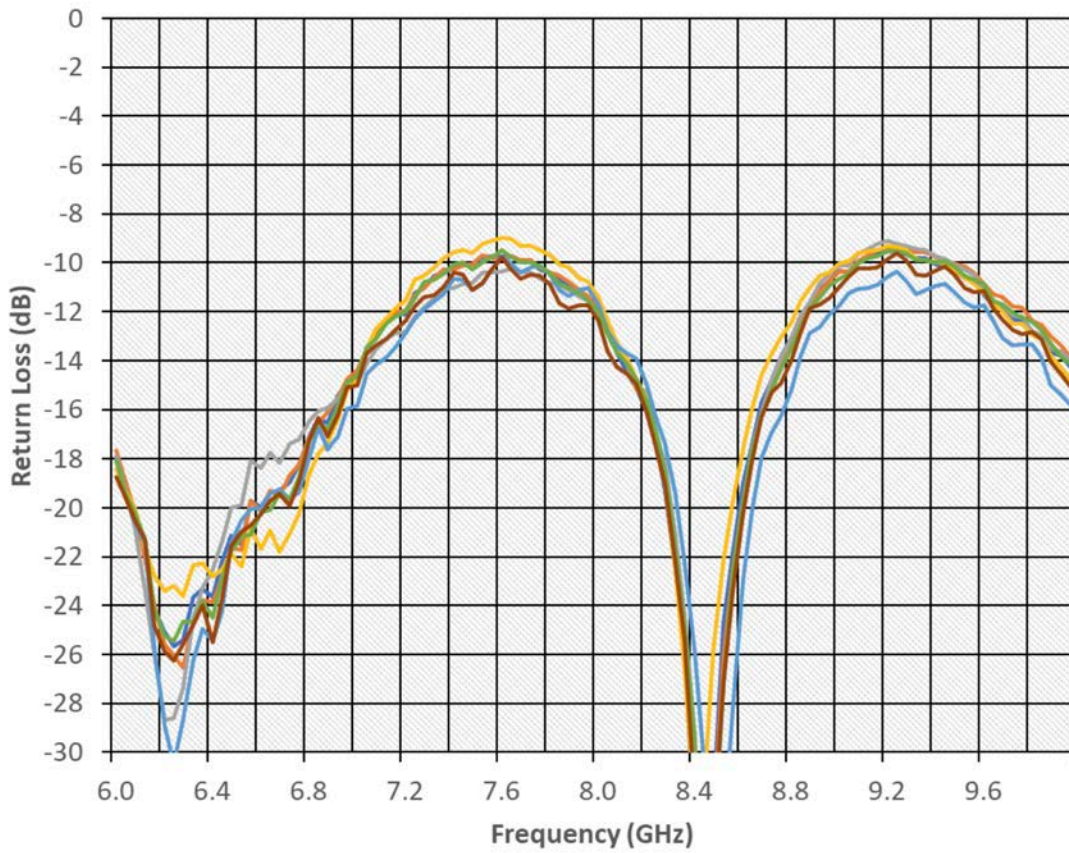


Performance Characteristics

Antenna Gain



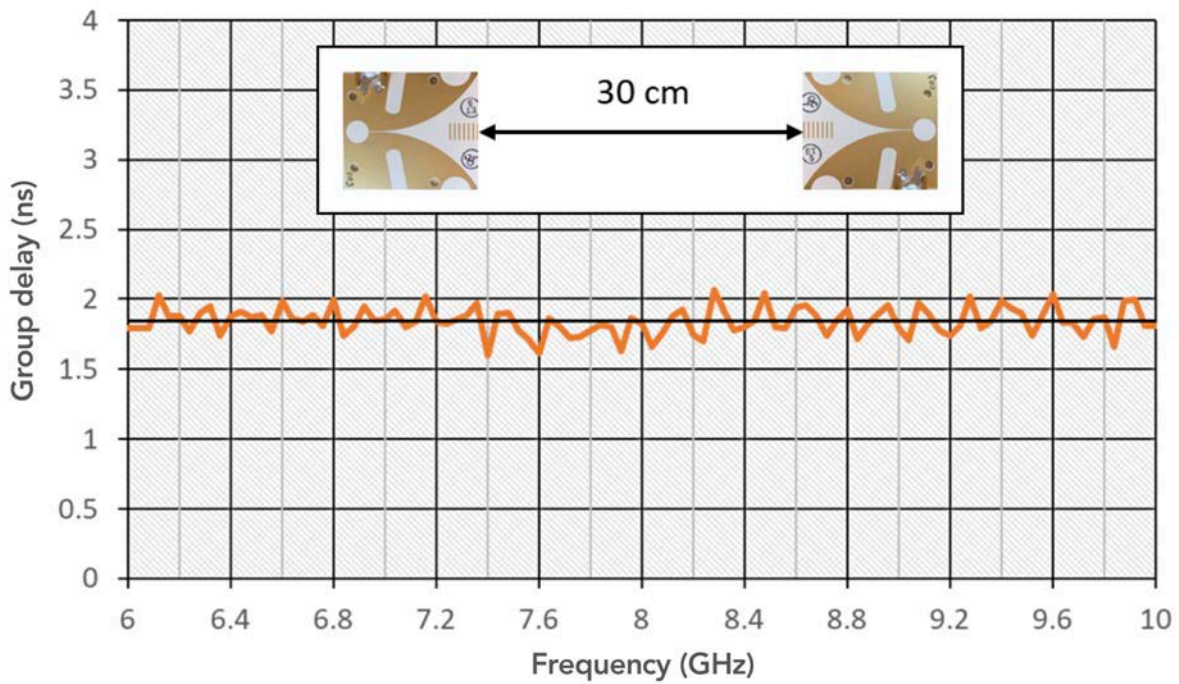
Return Loss



Group Delay

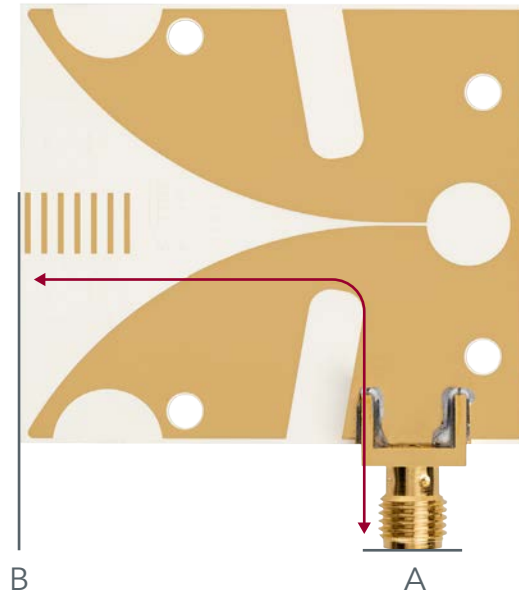
For applications that require sending very wide bandwidth signals, it is important that the phase of the signals is not distorted within the signal bandwidth when they are transmitted through antennas over-the-air. The parameter that quantifies such phase distortion is the Group Delay (or GD). Group 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 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 $r > D^2/\lambda$, where D is the aperture of the antenna, 4 cm, and λ is the signal wavelength at the lowest operating frequency, 6 GHz. One antenna is used to transmit the signal and the other receives the signal. The total GD of the current setup is shown in the figure below with average of 1.84 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 ± 0.25 ns.

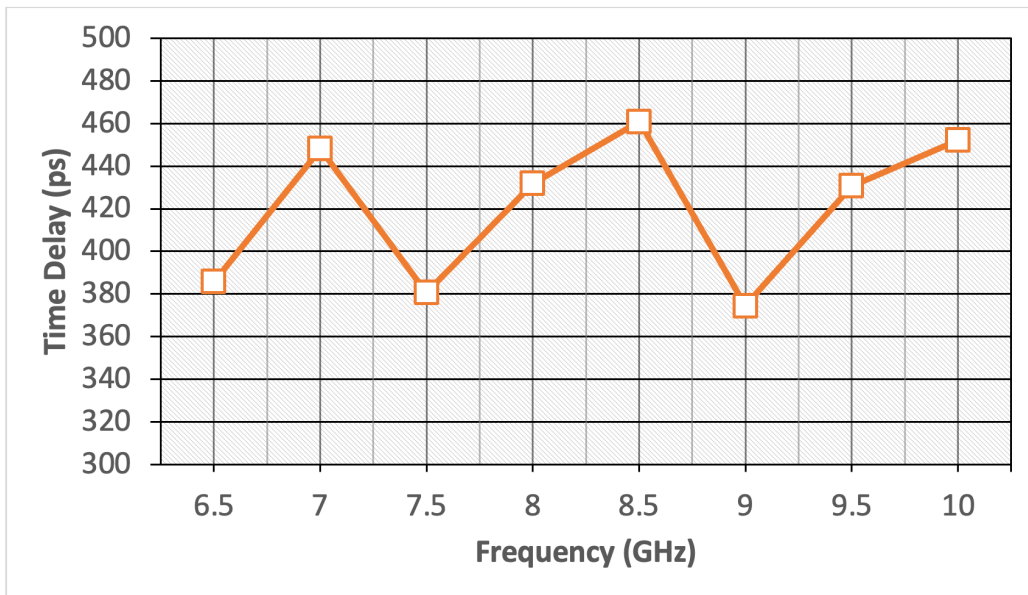


Time Delay

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 A to point B, and vice versa, as illustrated in the figure below.

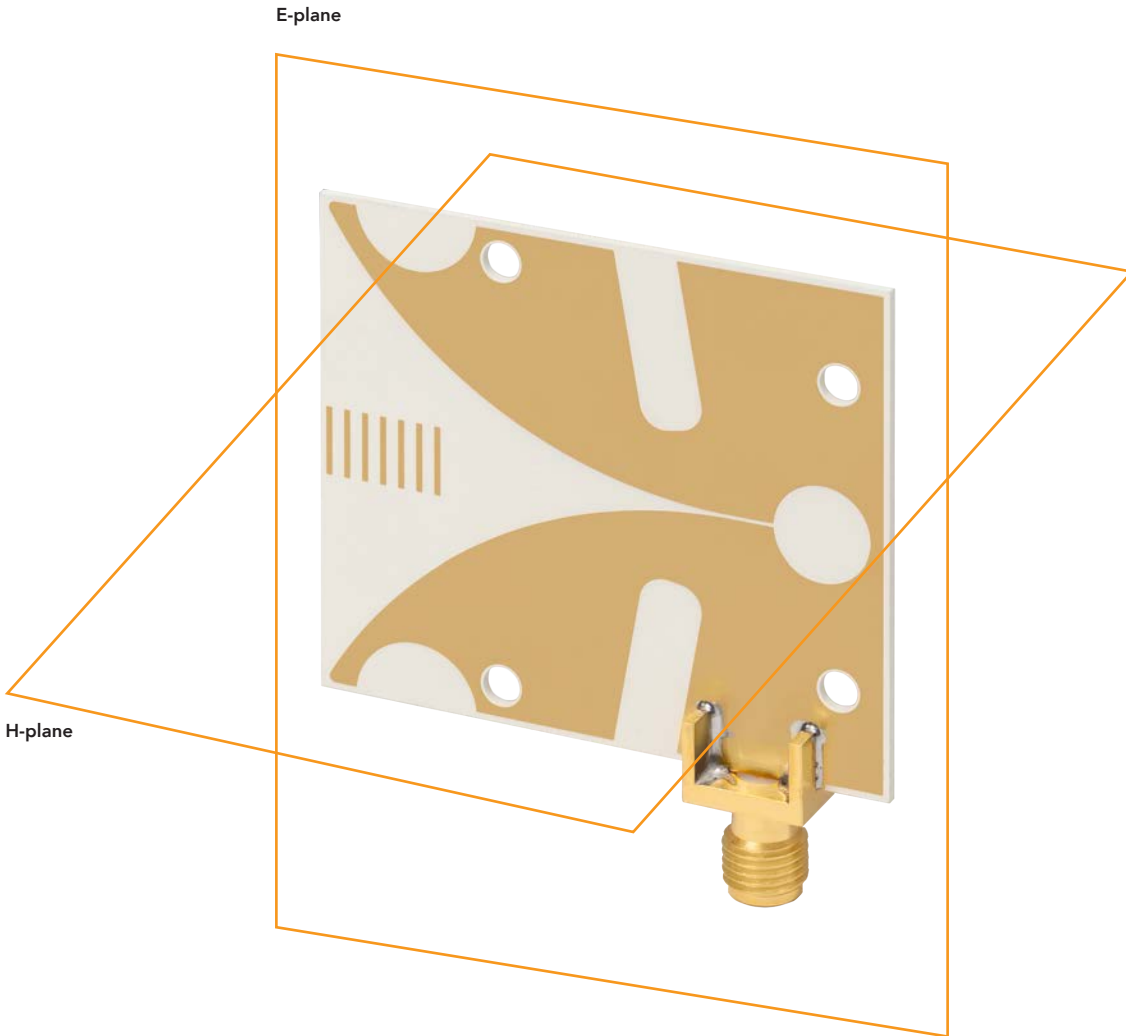


Time Delay vs. Frequency at 0 degree angle

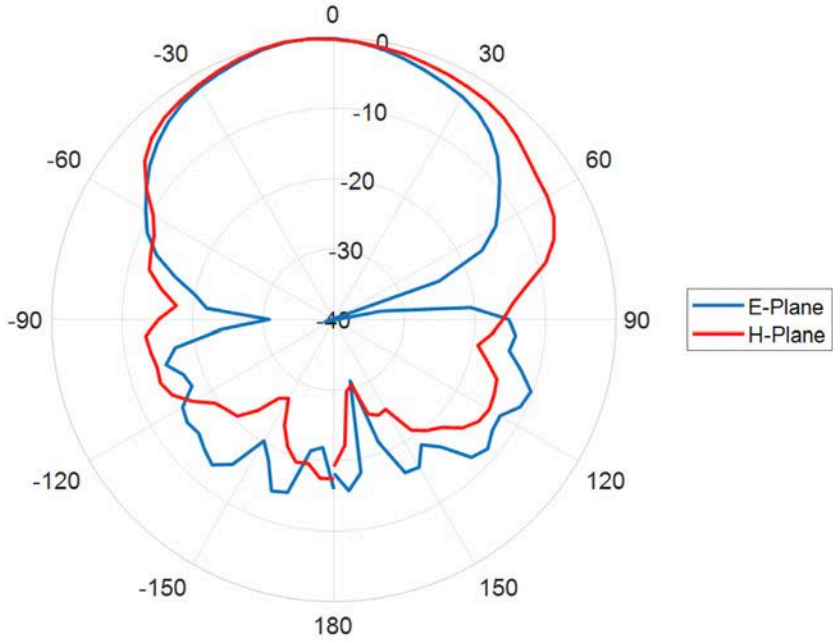


Antenna Patterns

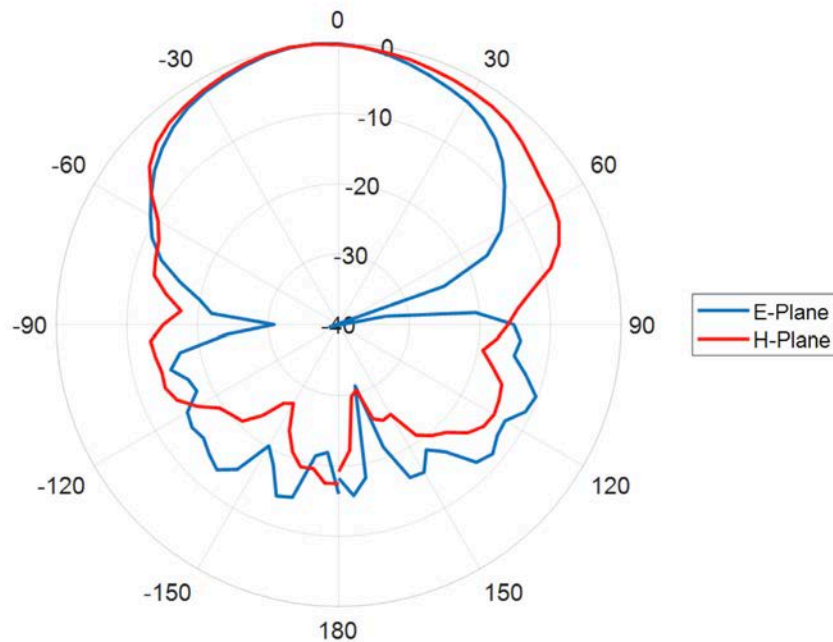
Illustrated below are the plane of electric field (E-plane) and magnetic field (H-plane) vectors observed with respect to the direction of maximum radiation.



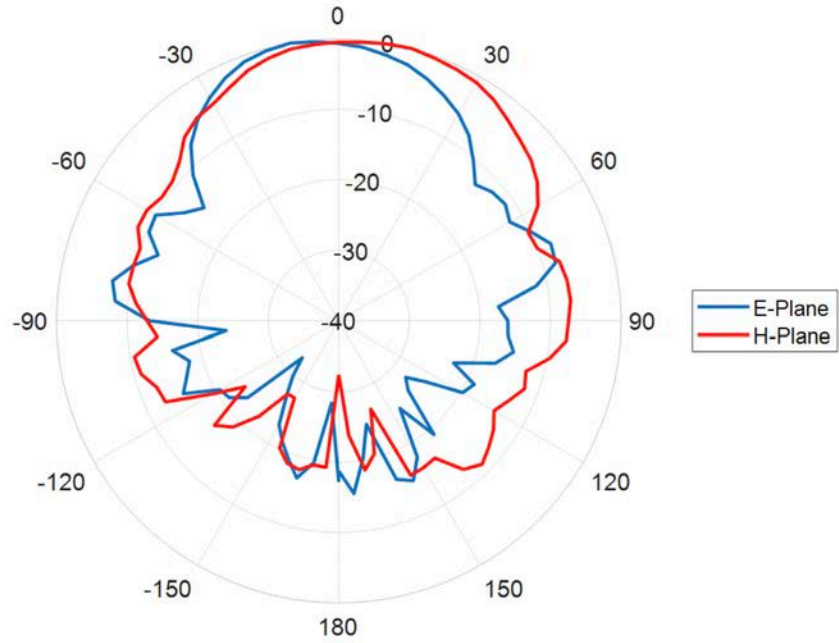
Patterns 6 GHz



Patterns 8 GHz



Patterns 10 GHz



Order Codes

Code	Product
0150-IUWB-020	UWB Vivaldi Antenna 6-10 GHz

LITEPOINT

© 2024 LitePoint, A Teradyne Company.
All rights reserved.

TRADEMARKS

LitePoint and the LitePoint logo are registered trademarks of LitePoint Corporation. All other trademarks or registered trademarks are owned by their respective owners.

RESTRICTED RIGHTS LEGEND

No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the prior written permission of LitePoint Corporation.

DISCLAIMER

LitePoint Corporation makes no representations or warranties with respect to the contents of this manual or of the associated LitePoint Corporation products, and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. LitePoint Corporation shall under no circumstances be liable for incidental or consequential damages or related expenses resulting from the use of this product, even if it has been notified of the possibility of such damages.

If you find errors or problems with this documentation, please notify LitePoint Corporation at the address listed below. LitePoint Corporation does not guarantee that this document is error-free. LitePoint Corporation reserves the right to make changes in specifications and other information contained in this document without prior notice.

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

Doc: 1075-0168-001
February 2024 Rev 5