

DATASHEET

UWB STANDALONE ANTENNA PART NUMBER 2389095-1

UWB STANDALONE ANTENNA

FEATURES

- UWB (Ultra Wide Band) Antenna
- High Performance
- Omnidirectional Radiation Pattern
- 6.0–8.5 (9.5*) GHz
- Channels: 5, 6, 8, 9, (10*, 12*)
- Application: UWB Ranging, UWB AoA (Angle of Arrival)
- SMT Compatible

* see technical data for details

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TECHNICAL DATA

Dimensions	6.55 x 7.15 x 7.55 mm ³
Pad Configuration	Pad 1 = Feed UWB; Pad 2 = GND; Pad 3 = GND
Material	Brass (metal), LCP (resin)
Temperature range	-40 to + 105 °C
Manufacturing Process	SMT Placeable (Tape & Reel)

ELECTRICAL	CHANNEL 5	CHANNEL 9
Frequency range	6.24 to 6.74 GHz	7.73 to 8.24 GHz
Return Loss S11	< -7 dB	< -10 dB
Efficiency	> -1.3 dB	> -1.3 dB
Peak Gain	3 dBi	5 dBi
Radiation Properties	Omnidirectional	
Polarization	Linear Vertical	
Impedance	50 Ohm	
Max. Input Power	10 W	

Notes:

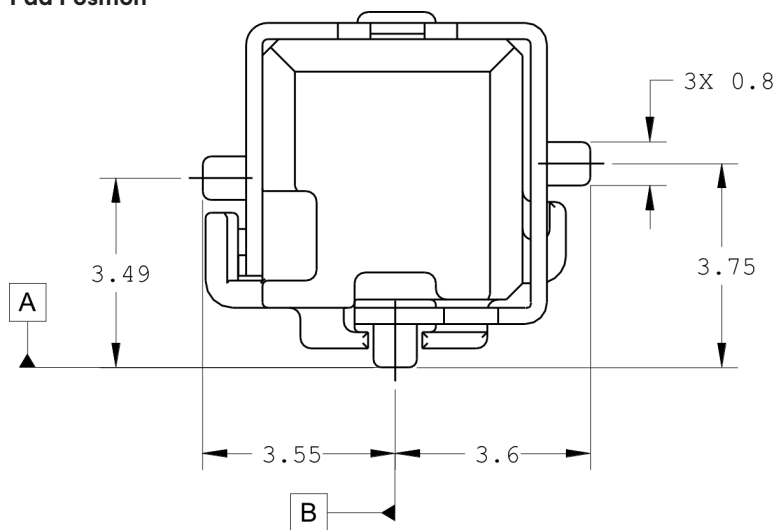
1. Performance data on 30x45 mm² eval ground plane.
2. Reference plane for measurement is the connector.

Comment to* on title page: The radiation pattern is omnidirectional for the UWB channels 5, 6, 8, and 9. In addition, the impedance bandwidth spans the channels 10 and 12. The antenna is suitable for the channels 10 and 12 with its radiation pattern being more directional.

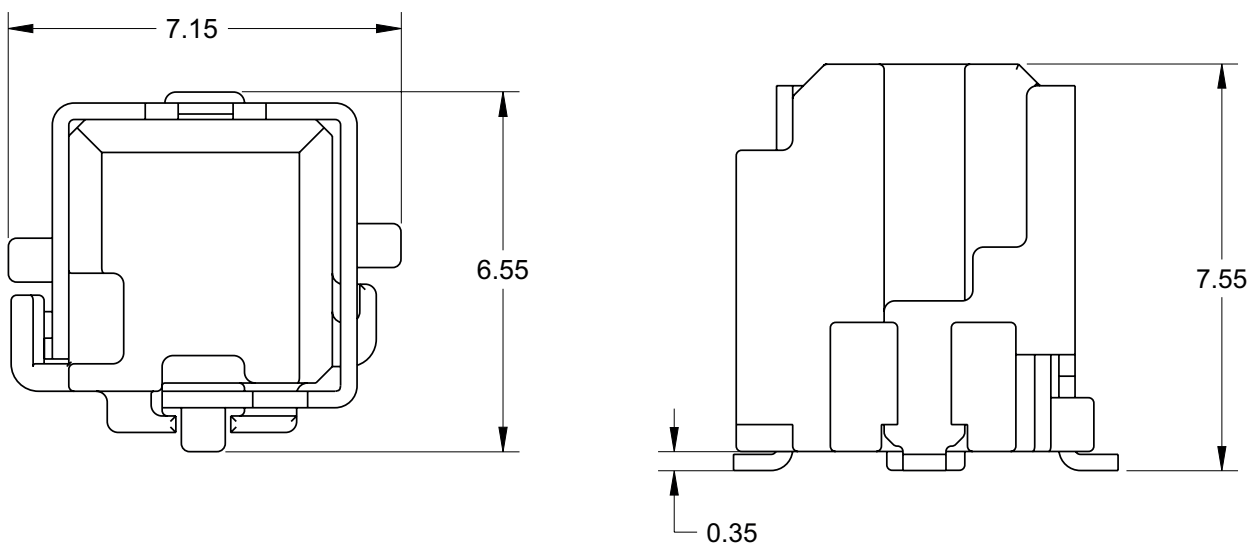
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ANTENNA DIMENSIONS

Pad Position






Outline

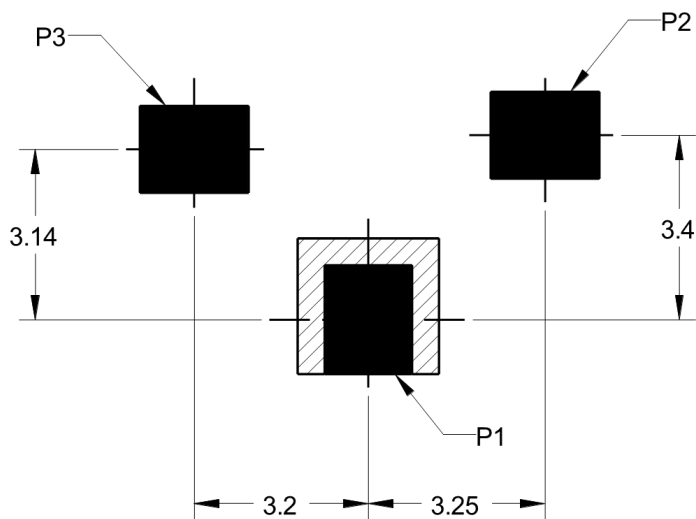


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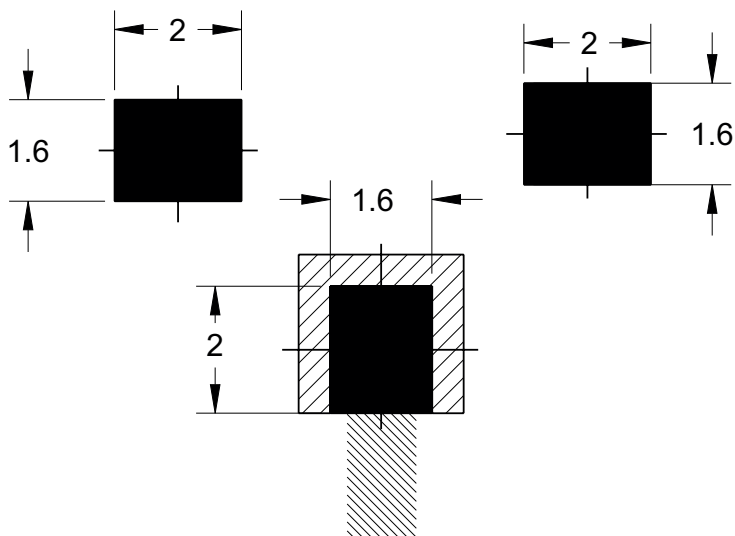
ANTENNA LAND PATTERN

PAD	DESCRIPTION
P1	UWB Feed Pad
P2	Ground Pad
P3	Ground Pad

	Copper Keep-out Area
	Antenna Copper Area
	50 Ohm Transmission Line All other areas to be GND



Dimensions referenced to P1 center.



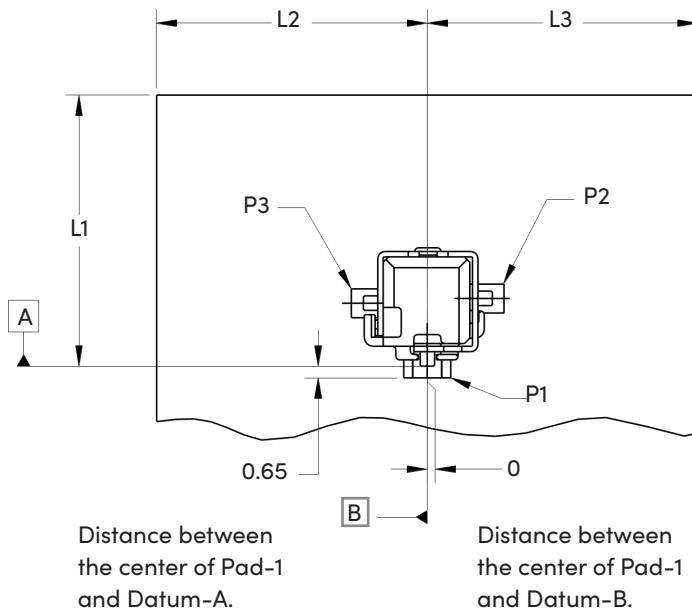
Copper keep-out area width around P1 is 0.5mm.

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ANTENNA PLACEMENT GUIDELINE

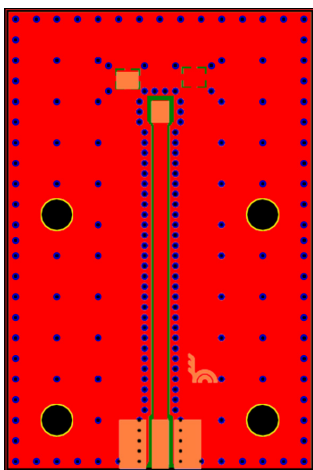
DIMENSION	DISTANCE FROM PCB OUTLINE
A	10 mm min.
B	10 mm min.
C	10 mm min.

Top view

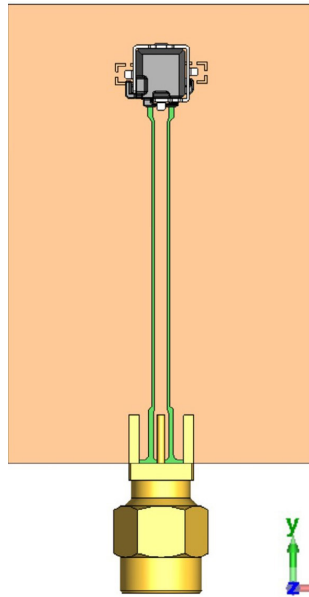


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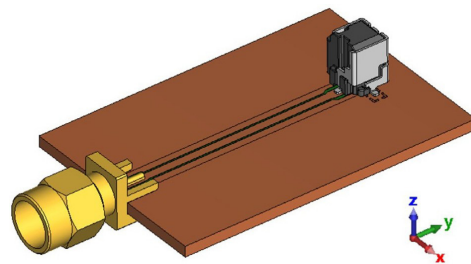
EVAL-BOARD



.dxf files available

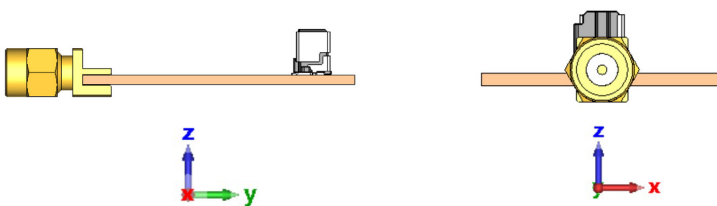


UWB Standalone
Eval-Board
30 x 45 mm²

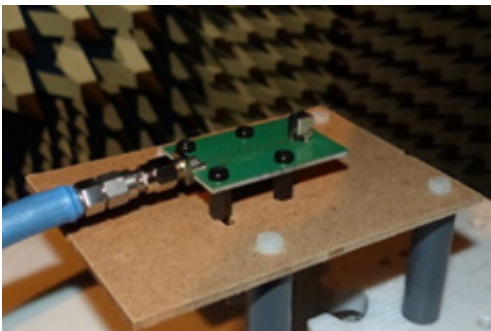


Recommended Connector: Linx CONSMA013.062

Simulation Model



Measurement Setup

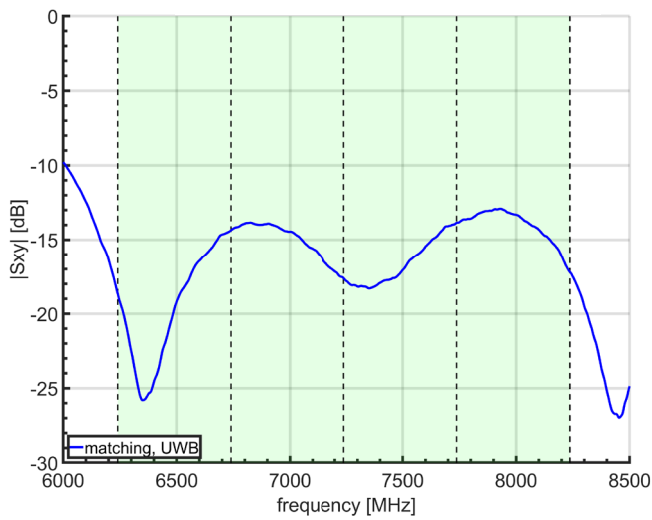


Reference Plane for Simulation and Measurement is the Connector.

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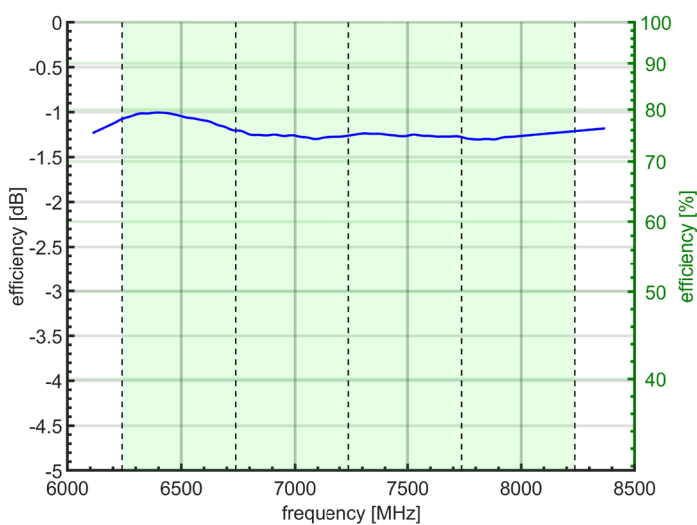
RETURN LOSS S11 (MEASURED)

UWB Standalone Antenna @ Eval-Board



EFFICIENCY (MEASURED)

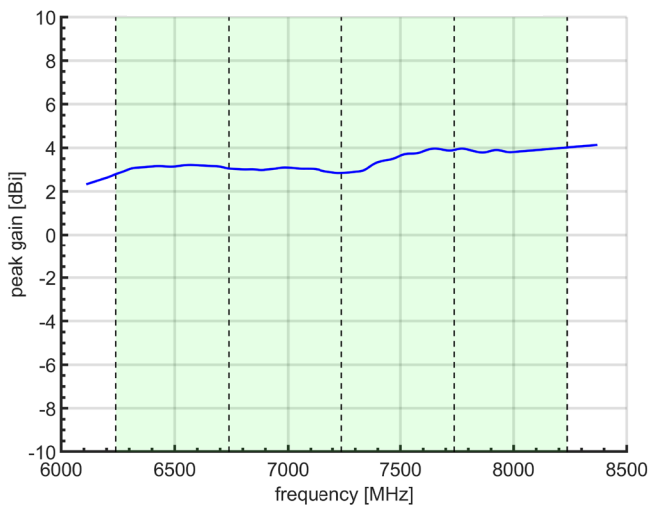
UWB Standalone Antenna @ Eval-Board



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PEAK GAIN (MEASURED)

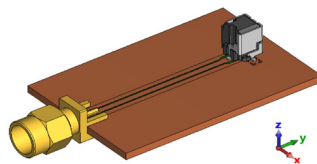
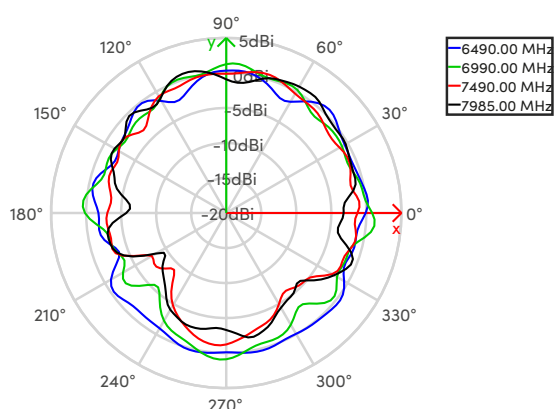
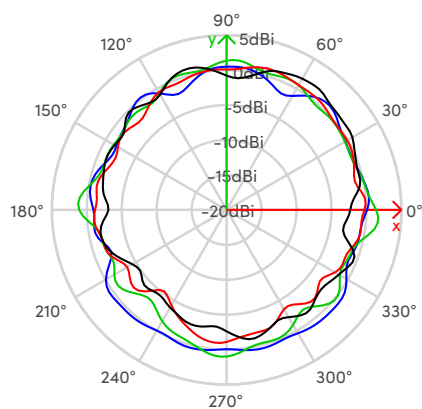
UWB Standalone Antenna @ Eval-Board
E_Total ; Theta=[0 - 180]° ; Phi= [0 - 360]°



RADIATION PATTERN XY-PLANE - TOTAL & THETA POLARIZATION (MEASURED)

UWB Standalone Antenna @ Eval-Board
Realized Gain (E_Total) @ XY-Plane

UWB Standalone Antenna @ Eval-Board
Realized Gain (E_Theta) @ XY-Plane

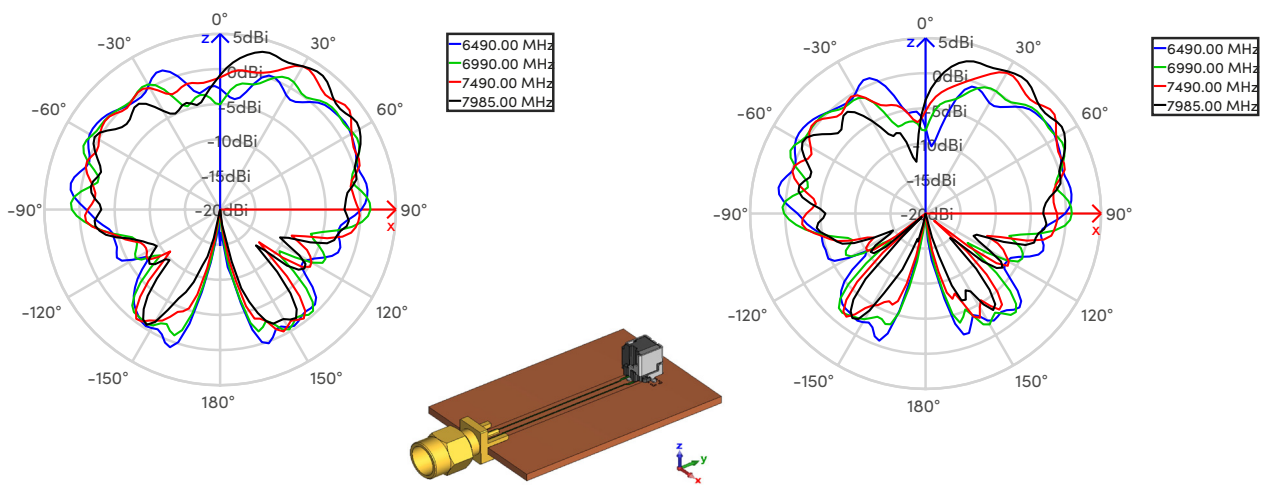


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RADIATION PATTERN XZ-PLANE - TOTAL & THETA POLARIZATION (MEASURED)

UWB Standalone Antenna @ Eval-Board
Realized Gain (E_Total) @ XZ-Plane

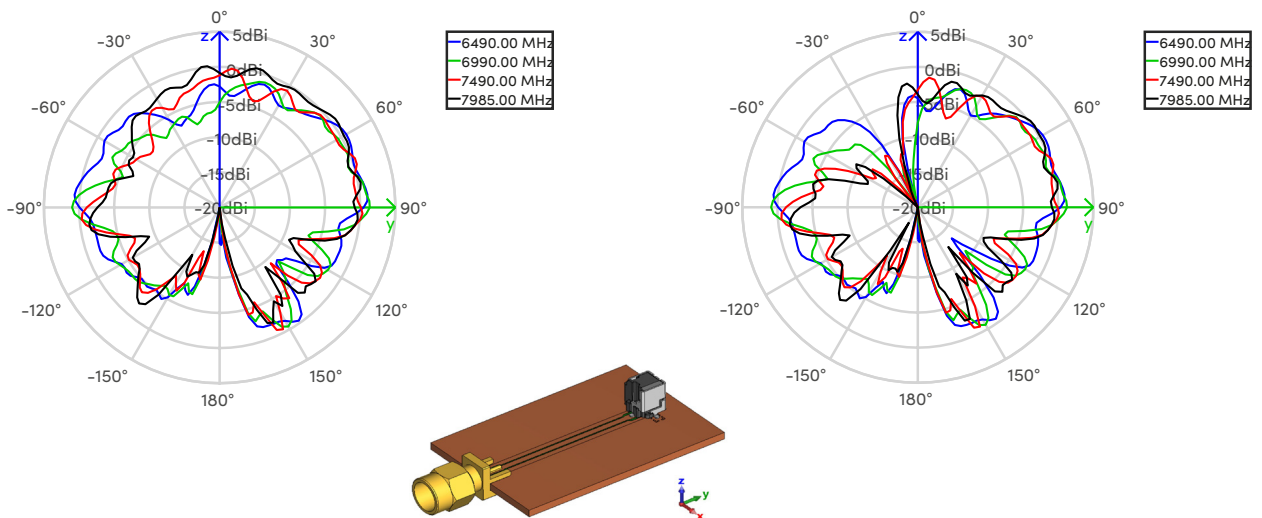
UWB Standalone Antenna @ Eval-Board
Realized Gain (E_Theta) @ XZ-Plane



RADIATION PATTERN XY-PLANE - TOTAL & THETA POLARIZATION (MEASURED)

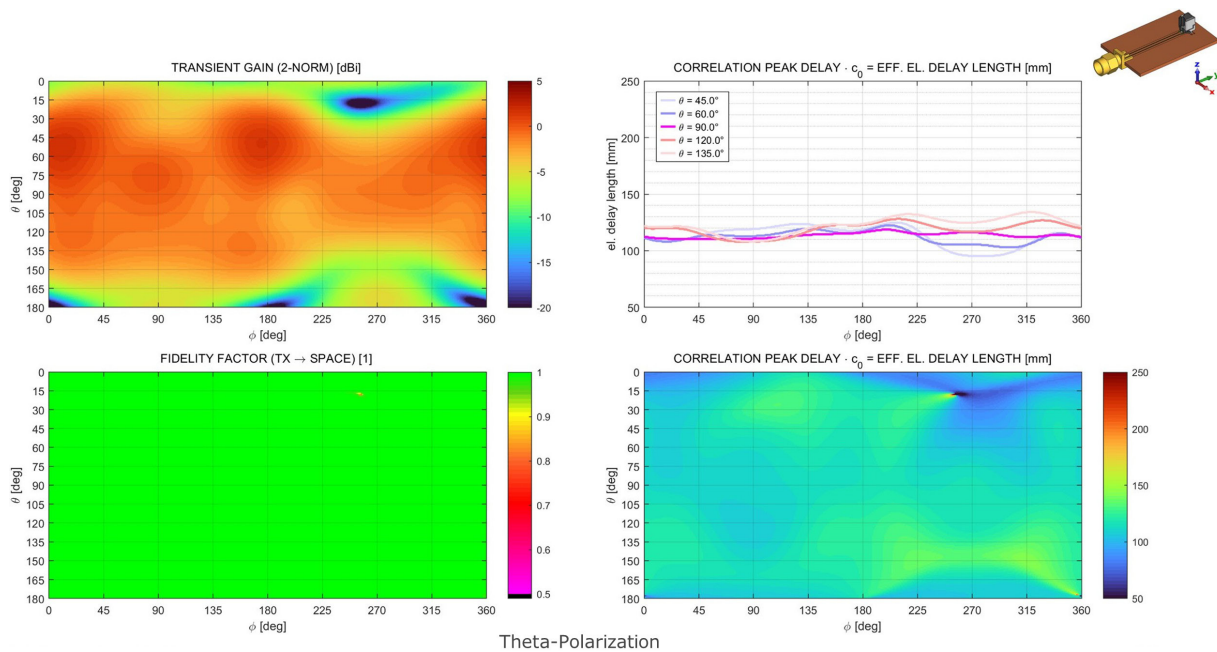
UWB Standalone Antenna @ Eval-Board
Realized Gain (E_Total) @ YZ-Plane

UWB Standalone Antenna @ Eval-Board
Realized Gain (E_Theta) @ YZ-Plane

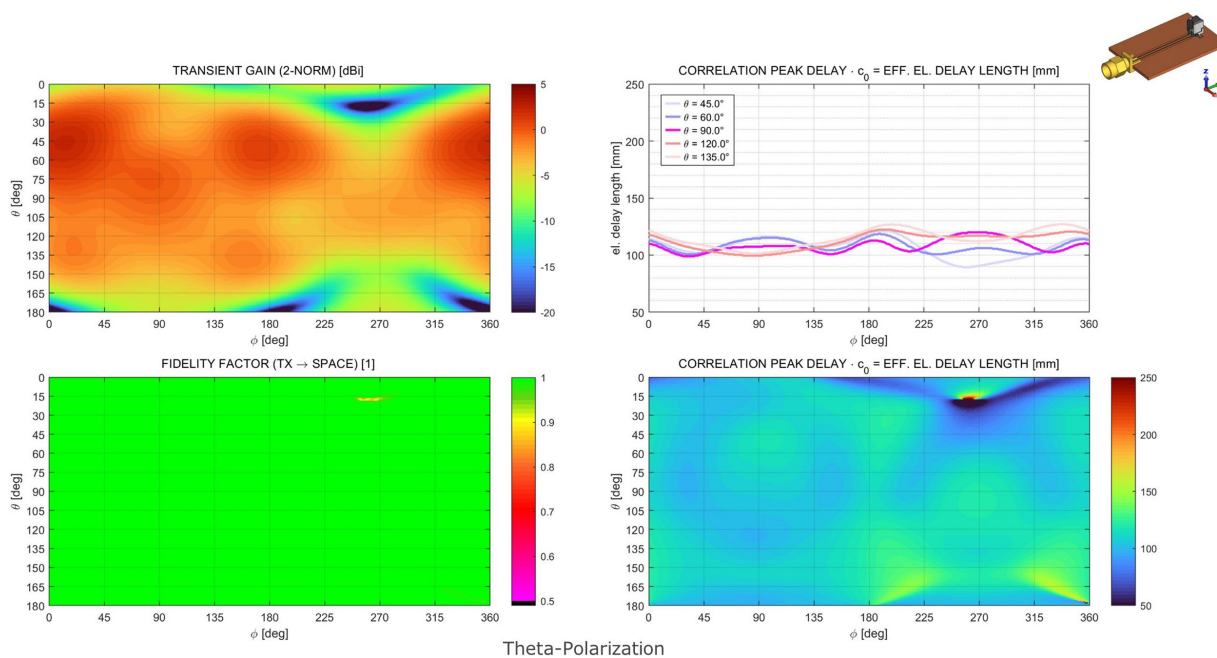


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TRANSIENT GAIN, FIDELITY FACTOR AND CORRELATION PEAK DELAY - CHANNEL 5 (SIMULATED)

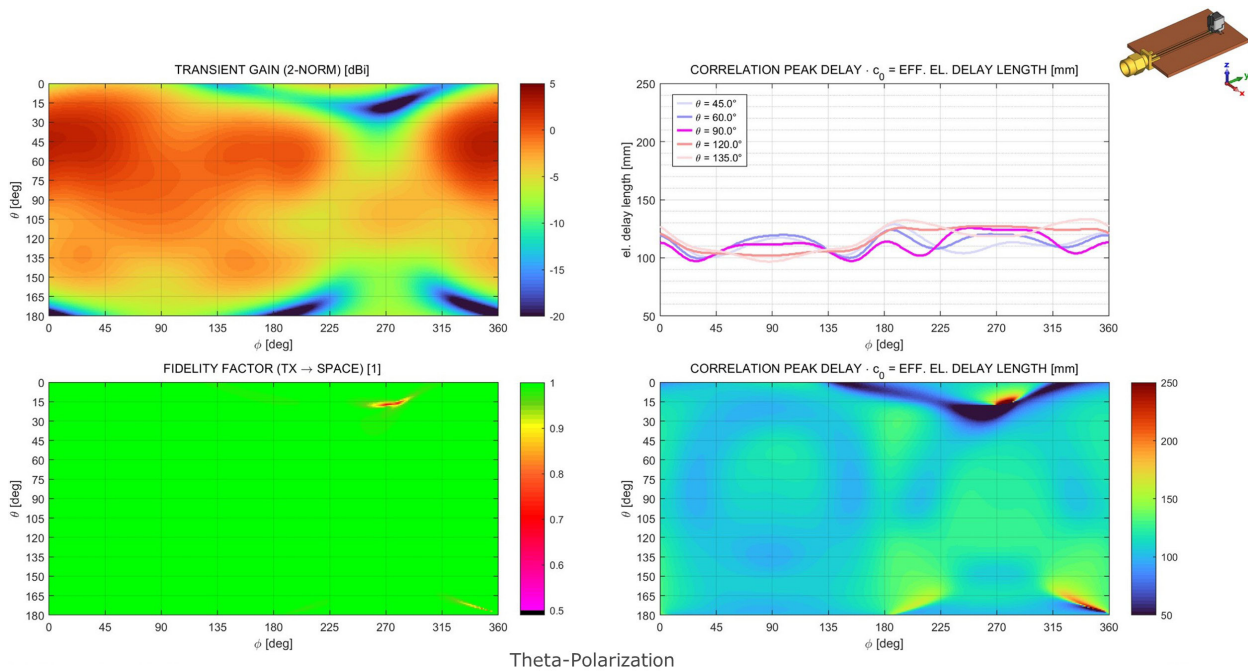


TRANSIENT GAIN, FIDELITY FACTOR AND CORRELATION PEAK DELAY - CHANNEL 6 (SIMULATED)

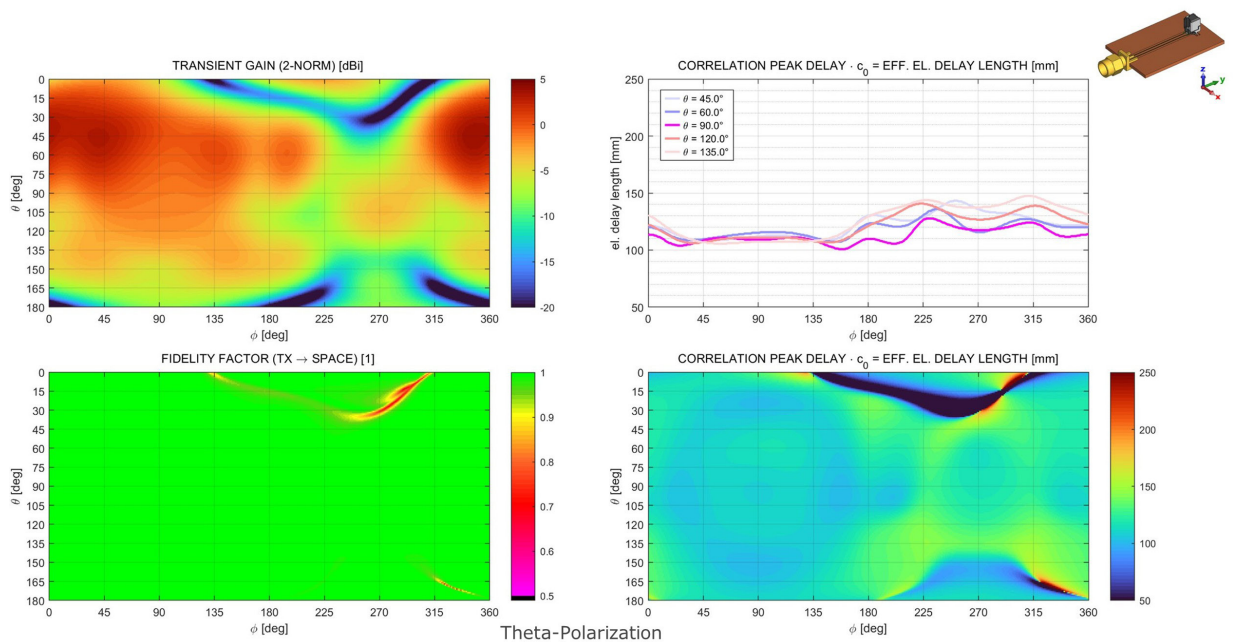


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TRANSIENT GAIN, FIDELITY FACTOR AND CORRELATION PEAK DELAY - CHANNEL 8 (SIMULATED)



TRANSIENT GAIN, FIDELITY FACTOR AND CORRELATION PEAK DELAY - CHANNEL 9 (SIMULATED)



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TRANSIENT GAIN

Definition

Broad-band and energy-based pendant to classical power-based antenna gain
 → Mean gain weighted with power spectral density of UWB reference pulse (acc. to IEEE standard 802.4.15).

$$g_{\theta}(\theta, \phi) = \frac{\int_{-\infty}^{+\infty} G_{\theta}(\omega, \theta, \phi) \cdot |S_{TX}(\omega)|^2 d\omega}{\int_{-\infty}^{+\infty} |S_{TX}(\omega)|^2 d\omega}$$

W. Wiesbeck, et. al.: Basic properties and design principles of UWB antennas. Proc. IEEE, Vol. 97, No. 2, Feb. 2009.

FIDELITY FACTOR

Definition

Normalized cross-correlation of radiated pulse (electr. far-field of antenna) with transmit pulse in TD when antenna is stimulated with a UWB reference pulse (acc. to IEEE standard 802.4.15).

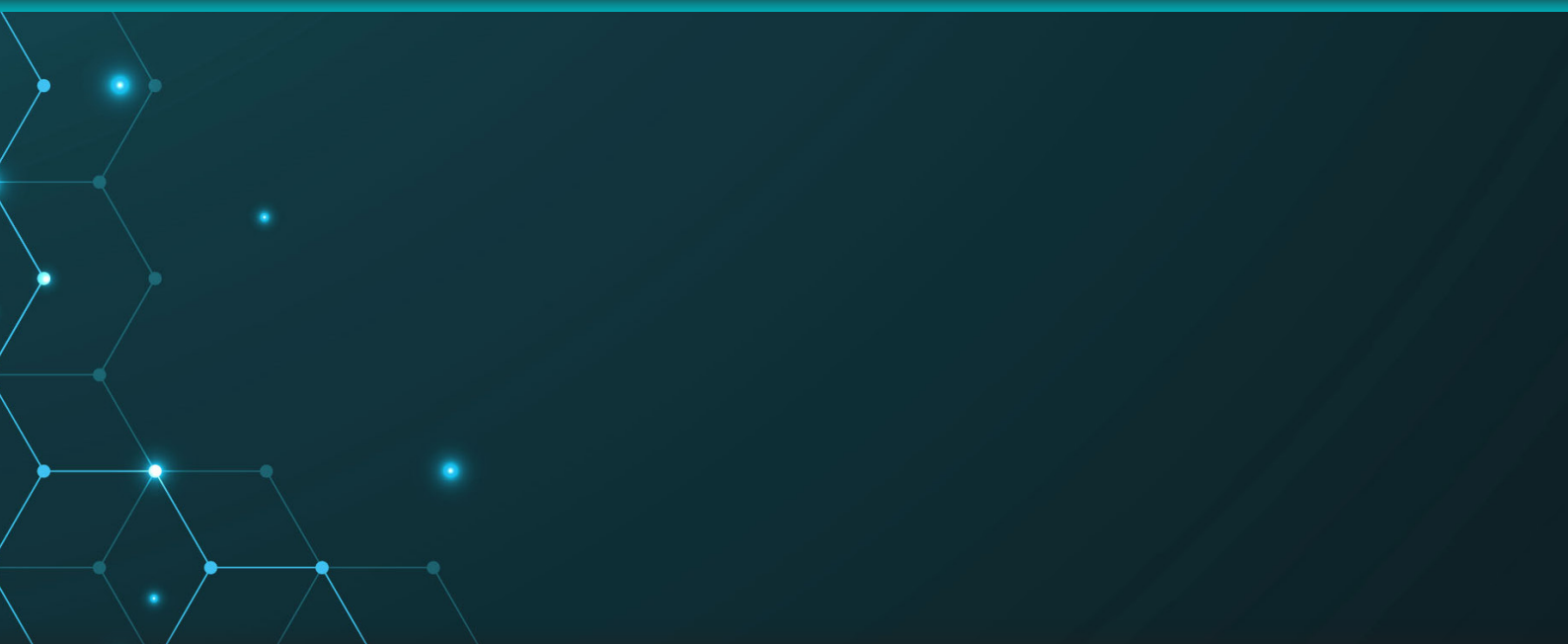
$$F_{\theta}(\theta, \phi) = \max_{\tau} \left\{ \frac{\left| \int_{-\infty}^{+\infty} e_{\theta}^{\text{FF}}(t + \tau, \theta, \phi) \cdot s_{TX}^*(t) dt \right|}{\sqrt{\int_{-\infty}^{+\infty} |e_{\theta}^{\text{FF}}(t, \theta, \phi)|^2 dt} \cdot \sqrt{\int_{-\infty}^{+\infty} |s_{TX}(t)|^2 dt}} \right\}$$

D.-H. Kwon: Effect of antenna gain and group delay variations on pulse-preserving capabilities of ultrawideband antennas. IEEE Trans. AP, Vol. 54., No. 8, Aug. 2006.

DELAY

Definition

Time-lag τ (available from above fidelity factor calculation) cross-correlation peak between radiated and stimulated pulse in TD. Electrical far-field of antenna can be referenced to any distance from phase-center. The delay is referenced to the antenna phase center (with zero radial distance).



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