



Standard Space Antennas

SPACE-READY ANTENNAS, WHEN TIME AND RELIABILITY MATTER

Datasheet

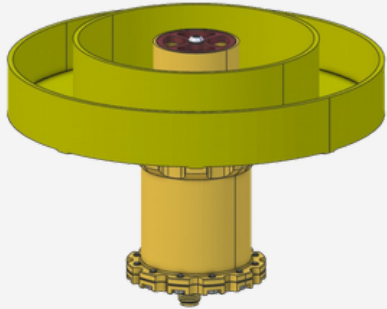
PN: SSA093B

Last Update: 03/20/26

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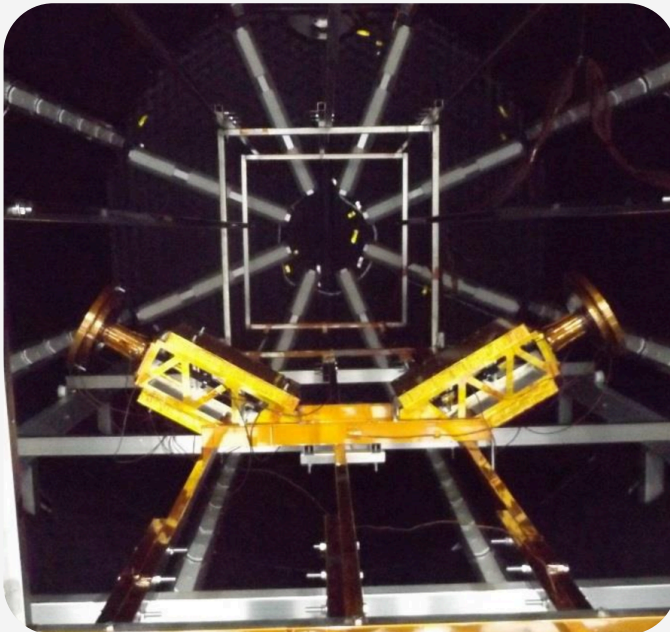
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X Band Antenna

Sectoral Coverage

TRL 9



Features

- **Choke-based beamformer that maximizes gain at the end of coverage**

3 dBi at Theta=60deg, Second approximation for an “isoflux” pattern, see page 3

- **Proprietary Ultra-Compact All-Metal Polarizer**

Approximately 50 mm

- **Low Insertion Loss**

No internal gaps or joints in the central waveguide

- **Minimal gain ripple or fading is expected under operational conditions with surrounding and back objects**

High multipath ratio at broad angles across the entire data downlink bandwidth 8.0-8.4 GHz





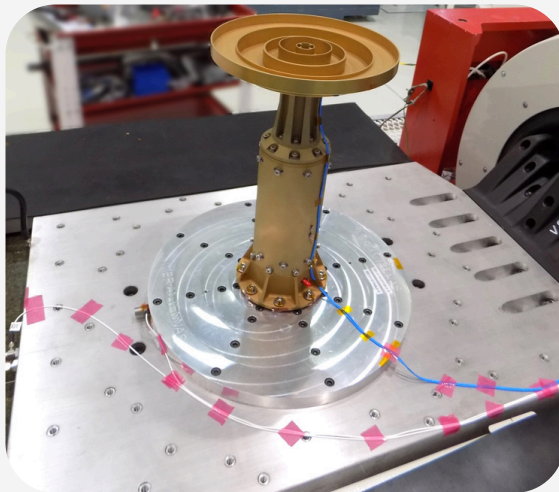
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Benefits

- **Designed for assembly, automation suitability, and optimal cost-effectiveness for high production batches**

Suitable for high-reliability data downlink service in satellite constellations, earth observation missions, or exploration probes

- **High power handling and compact solution for LGA Channel**

Ideal for high bit rate communications. Only 108mm in diameter

- **Compensate Gain at the end of coverage**

+3 dB compared to the patch version at Theta = 60 degrees

- **Lossless by design**

No hidden coupling power exists through the Cross Polarization Port, unlike the Septum Polarizer

- **No performance degradation at end-of-life by design**

Without a dielectric or ceramic-loaded waveguide, sensitivity to space ionizing radiation and temperature is not an issue





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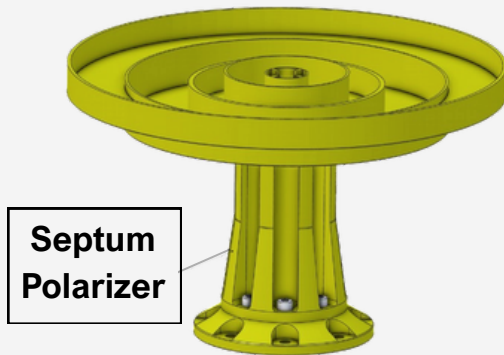
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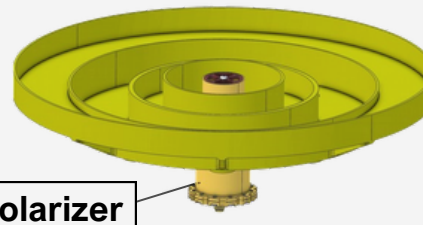
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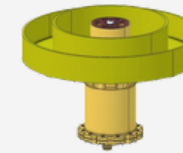
Models



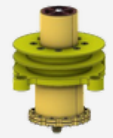
SSA071A



SSA093A



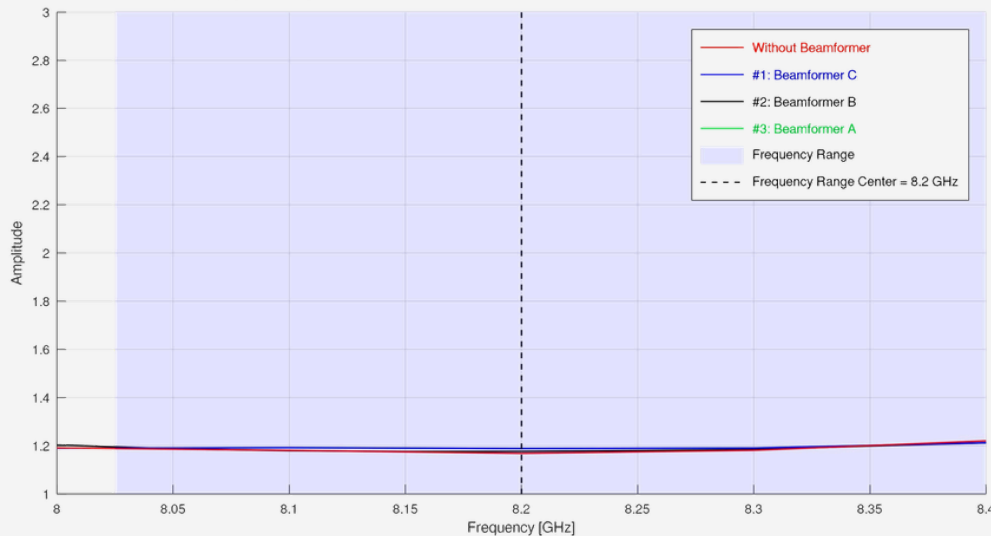
SSA093B



SSA093C

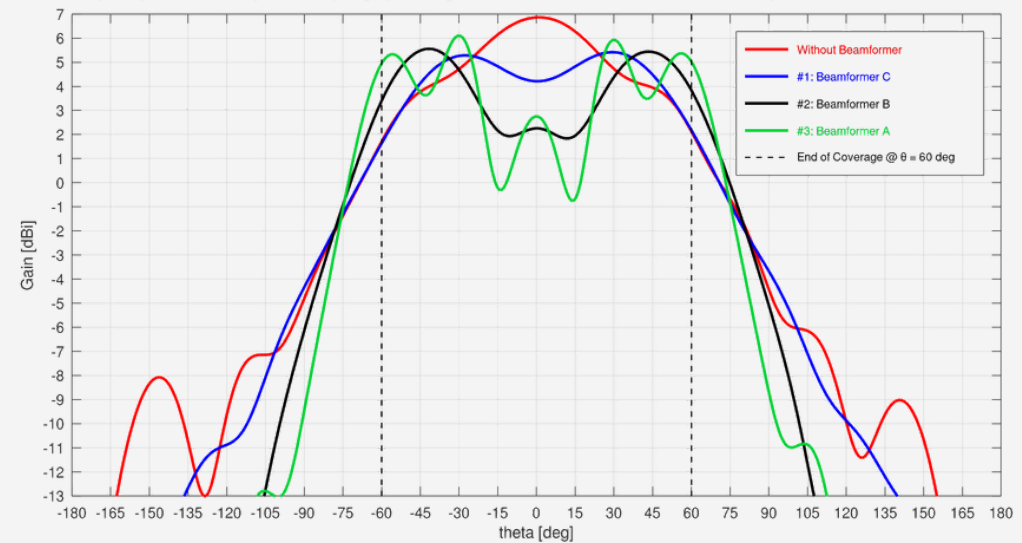
VSWR

Verification by Simulation of VSWR @ PN: SSA093 Models A, B & C
Frequency: [8.0:0.05:8.4] GHz, Method: Full Wave Simulation, Boundary Conditions: Isolated Antenna



Pattern Formation Process

Verification by Simulation of RHCP Gain Pattern @ Boresight - PN: SSA093 Models A, B & C
Frequency: 8.2 GHz, $\theta = [-180:1;180]$ deg, $\phi = 0$ deg, Method: Full Wave Simulation, Boundary Conditions: Isolated Antenna





Standard Space Antennas

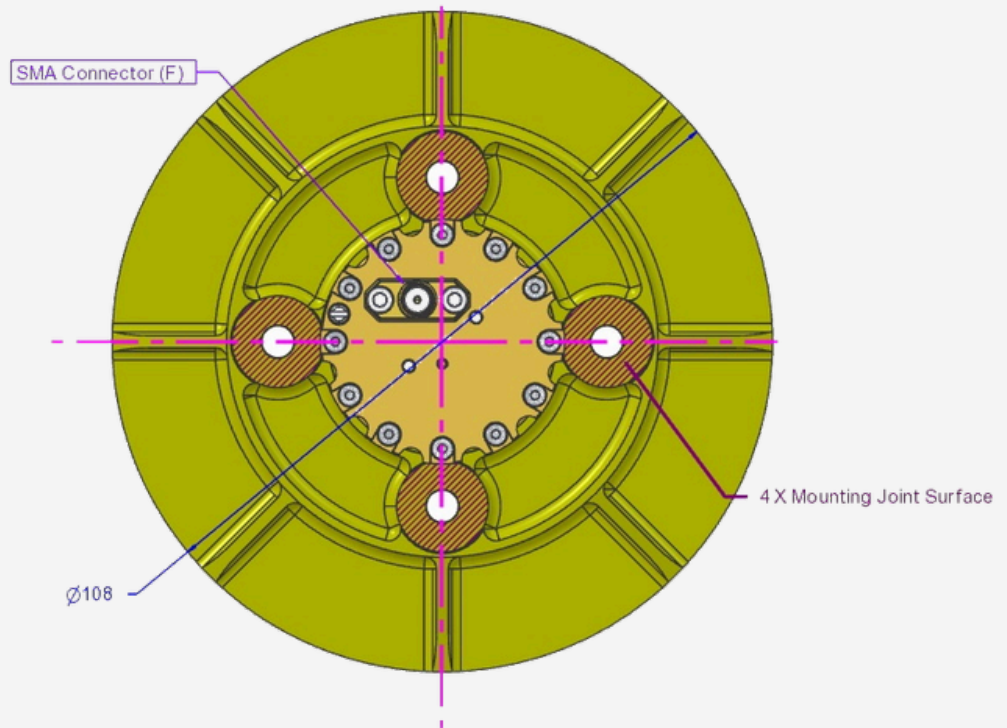
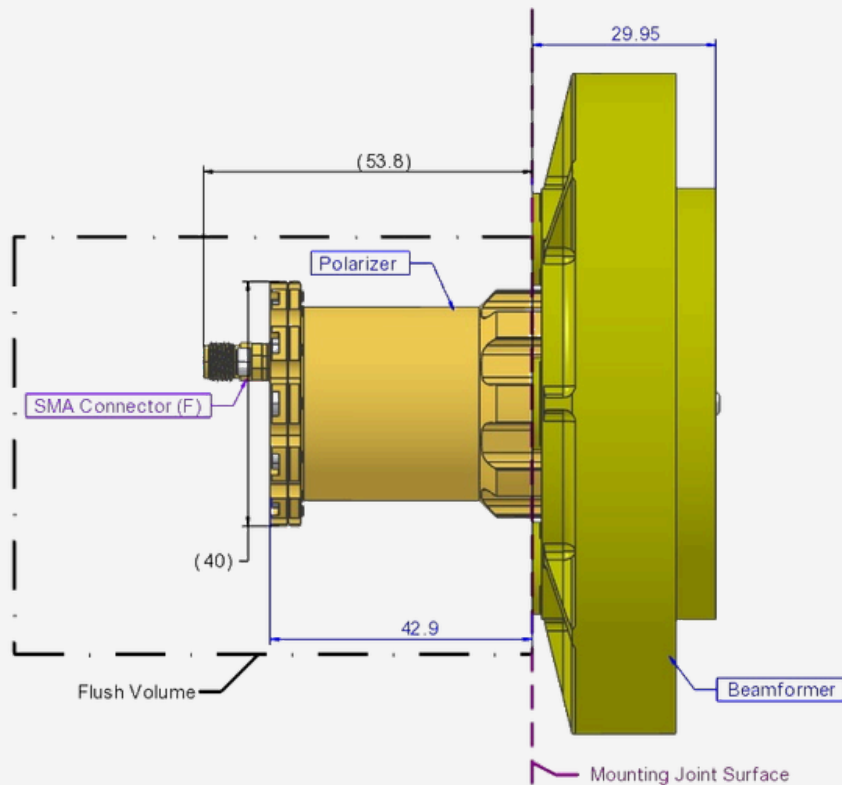
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Mechanical Envelope





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Typical Specifications @ Isolated condition

Parameter	Values	Remark
Frequency Range [GHz]	8.025 – 8.4	
VSWR	1.2	Worst Case @ Frequency Range [AD 12]
Bandwidth @ VSWR = 1.2 [GHz]	8 – 8.4 GHz	Antenna Bandwidth [AD 12]
Port to Port Isolation [dB]	NA	Single Port
Radiation Efficiency [%]	96.4	@ Frequency Range, Assuming a 3% degradation from expected [AD 10]
Total Efficiency [%]	95.7	@ Frequency Range, Assuming a 3% degradation from expected [AD 10]
Radiation Pattern Envelope	Sectoral	Quasi Isoflux Form Factor (Second Approximation) “Saddle Shape”
Phase Center [mm]	X= 0 ; Y= 0 ; Z= 31.6	Relative to Antenna Coordinated System. Z=0 $\equiv$ Joint Surface
Gain @ End of Coverage [dBi]	> 3	RHCP @ theta= 60° Worst Case @ Across Entire Frequency Range. [AD 4]
HPBW [°]	~125	@ Frequency Range. [AD 2]
Polarization Sense	Circular	RHCP
Polarization Ratio [dB] Worst Case	11.5 @theta < 60°	@ Frequency Range. [AD 4]
Multipath Ratio [dB] Worst Case Ref: $G_{RHCP}(\theta)/G_{LHCP}(180-\theta)$	20.4 @theta < 60°	@ Frequency Range. [AD 4]
Multipactor Margin [dB]	> 9	@ 70 W. Obtained via Aerospace Corporation Model Analysis, by Similarity with SSA071A
Corona Discharge Margin [dB]	NA	Non Operative during Launch





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Enviromental Test & Mechanical Interface

Parameter	Values	Remark
Mass (g)	154	Center of Mass: [0.1, 0.1, 1.4] from Mounting Joint Surface ($\equiv Z=0$ of Antenna Coordinate System). [AD 1]
Size (mm)	108	Diameter [AD 1]
Height (mm)	29.95	Protruding. Height measured from Mounting Joint Surface. [AD 1] (Flush: 42.9 mm)
RF Interface	SMA (F)	Optional Straight or Right Angle Connector. Optional WR-90 / WR-112. [AD 1]
Dynamic Acceleracion Loads	20 - 50 Hz: +6 dB/oct 50 - 70 Hz: 0.16 g ² /Hz 70 - 80 Hz: +6 dB/oct 80 - 350 Hz: 0.2 g ² /Hz 350 - 400 Hz: -6 dB/oct 400 - 800 Hz: 0.16 g ² /Hz 800 - 2000 Hz: -6 dB/oct <u>Overall: 14.55 Grms</u>	Shaker Test @ Random Vibration, Three Axis, 2 min / axis [AD 2]. Success with several Mast and Bracket Configuration (Heritage by Similarity with SSA071A) Verified by Analysis in [AD 5]
Static Acceleration Loads	Peak: 65 G	Shaker Test @ Sine Burst, Three Axis [AD 2]. Success with several Mast and Bracket Configuration (Heritage by Similarity with SSA071A) Verified by Analysis in [AD 5]
Temperature Range	Ref 1: (-105; 125) °C Ref 2: (-70, 100) °C	Ref 1: Thermal Vacuum Test, Four Cycles, 2 hours Dwell. [AD 8] Ref 2: Thermal Vacuum Test, Eight Cycles, 4 hours Dwell. [AD 2] (Heritage by Similarity with SSA071A)
1st Natural Frequency	1400	Analysis in [AD 11] Success with several Mast and Bracket Configuration [AD 2]. Numerical versus Test Deviation < 4% (Heritage by Similarity with SSA071A)





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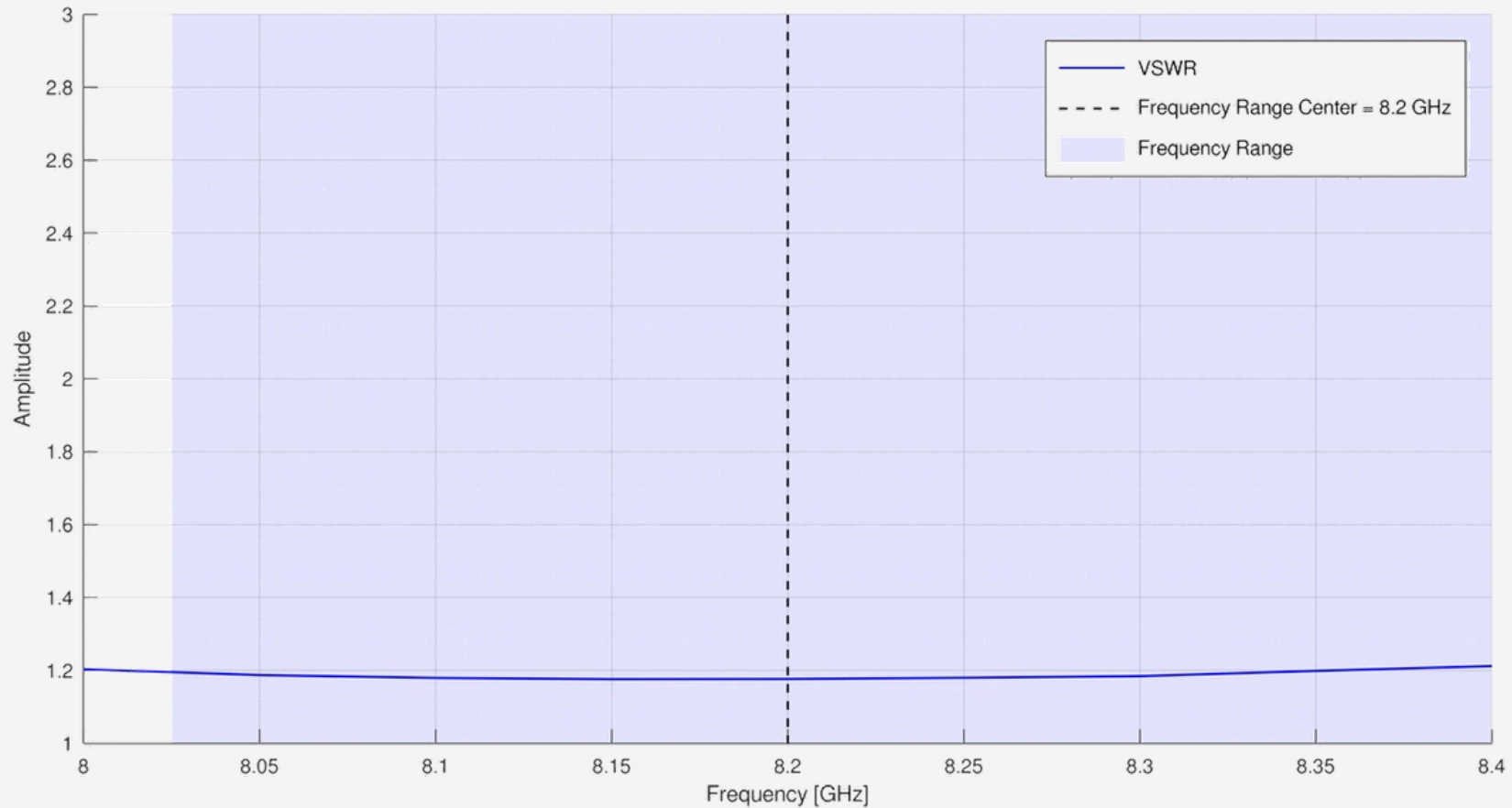
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VSWR

Verification by Simulation of VSWR @ SSA093B

Frequency: [8:0.1:8.4] GHz, Method: Full Wave Simulation, Boundary Conditions: Isolated Antenna





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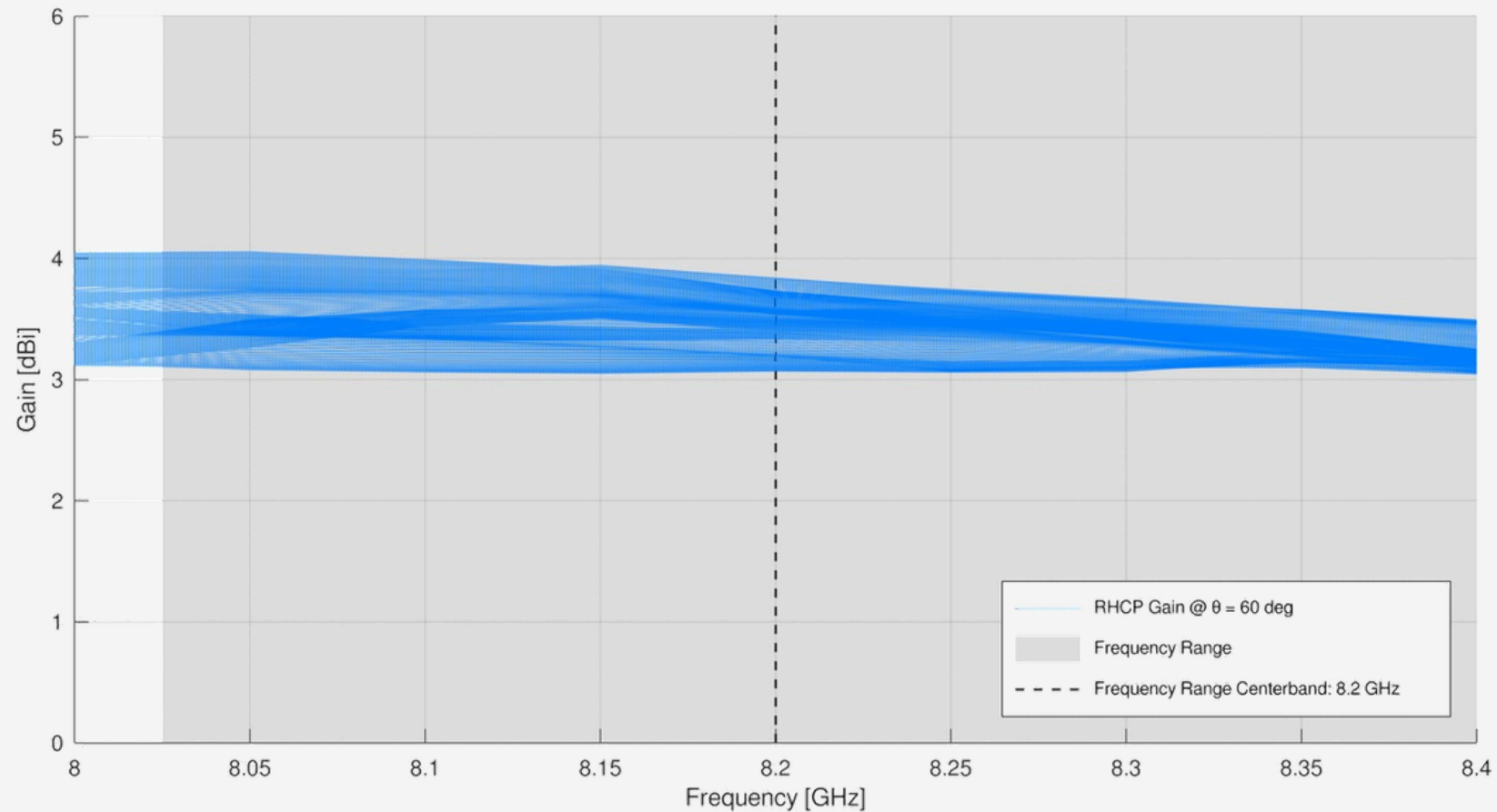
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Gain vs Frequency @ EoC ($\theta = 60^\circ$)

Verification by Simulation of RHCP Gain @ EoC - PN: SSA093B

Frequency: [8:0.05:8.4] GHz, $\theta = 60$ deg, $\phi = [0:1:360]$ deg, Method: Full Wave Simulation, Boundary Conditions: Isolated Antenna





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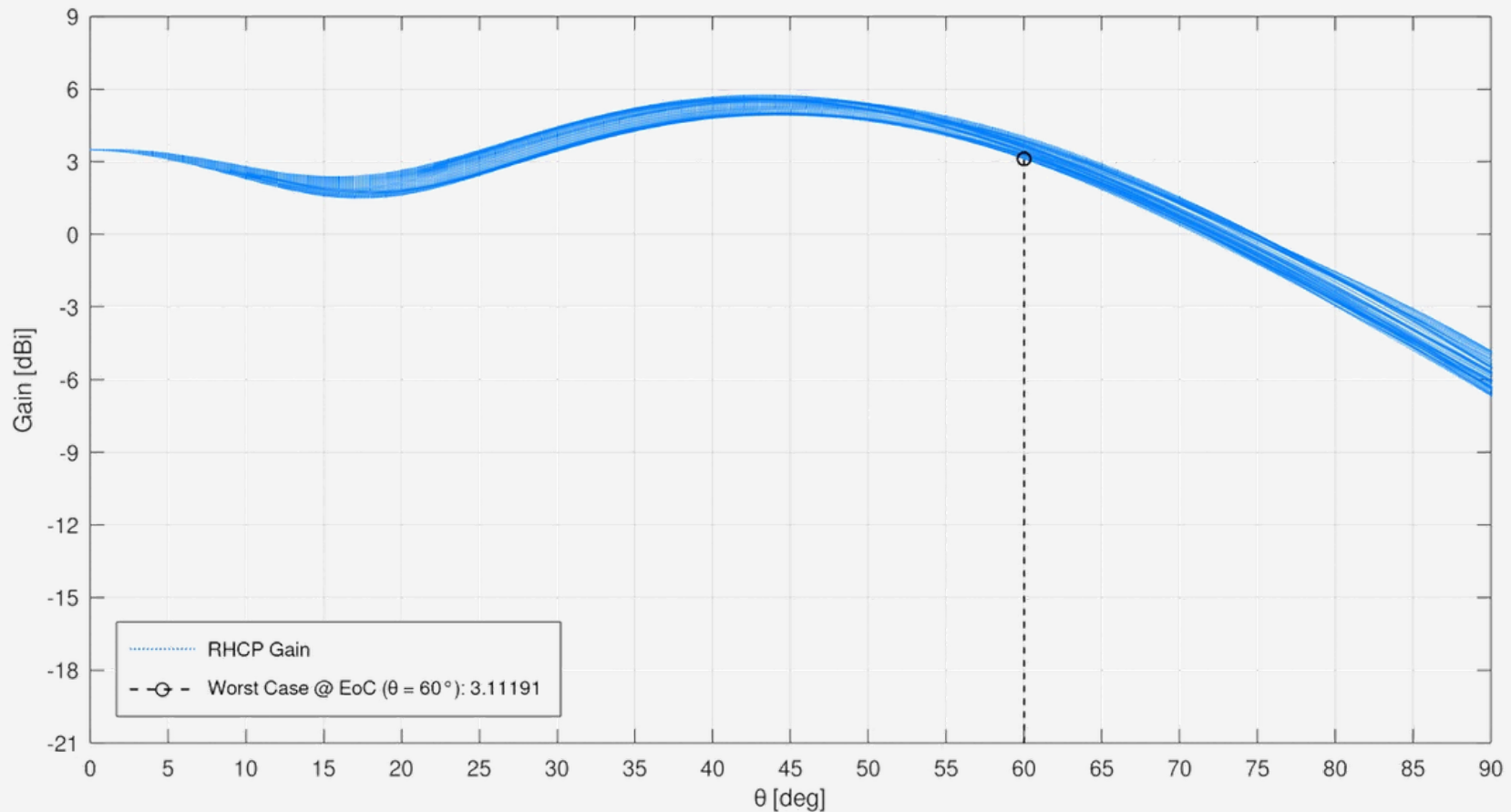
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Gain Pattern @ 8 GHz

Verification by Simulation of RHCP Gain Pattern - PN: SSA093B

Freq. 8 GHz, Method: Full Wave Simulation, $\theta = [0:1:90]$ deg, $\phi = [0:5:360]$ deg, Boundary Conditions: Isolated Antenna





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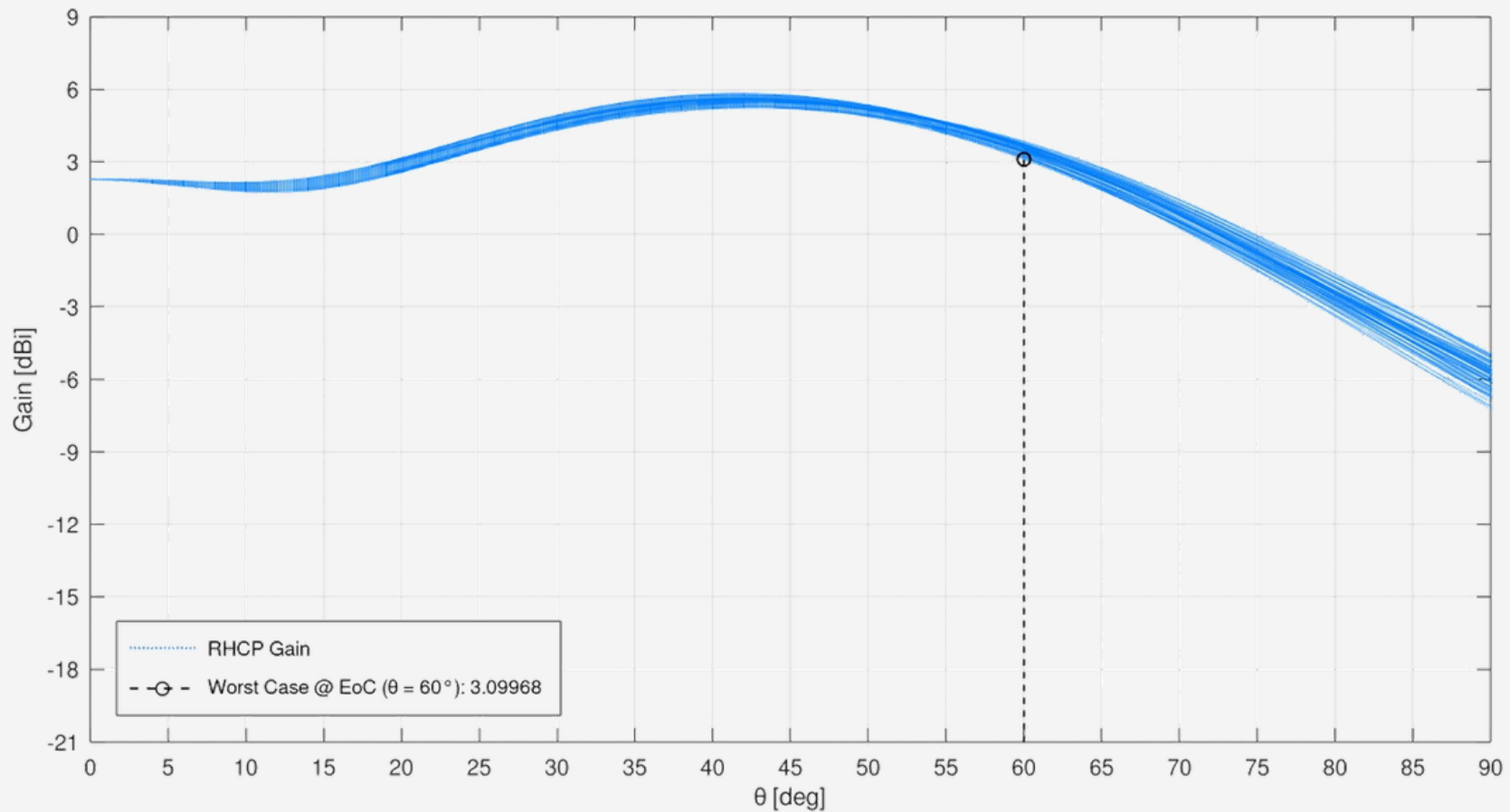
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Gain Pattern @ 8.2 GHz

Verification by Simulation of RHCP Gain Pattern - PN: SSA093B

Freq. 8.2 GHz, Method: Full Wave Simulation, $\theta = [0:1:90]$ deg, $\phi = [0:5:360]$ deg, Boundary Conditions: Isolated Antenna





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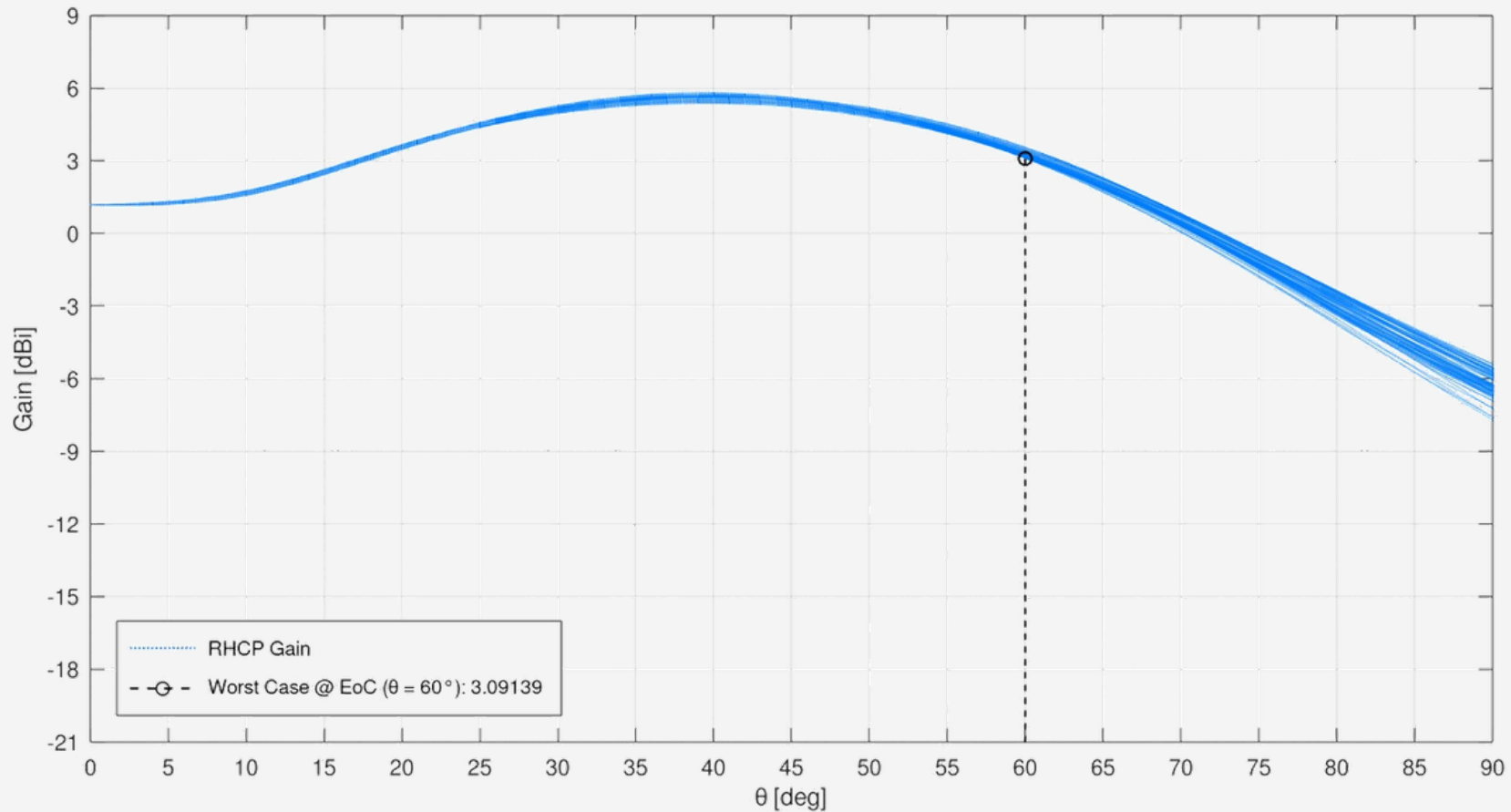
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Gain Pattern @ 8.4 GHz

Verification by Simulation of RHCP Gain Pattern - PN: SSA093B

Freq. 8.4 GHz, Method: Full Wave Simulation, $\theta = [0:1:90]$ deg, $\phi = [0:5:360]$ deg, Boundary Conditions: Isolated Antenna





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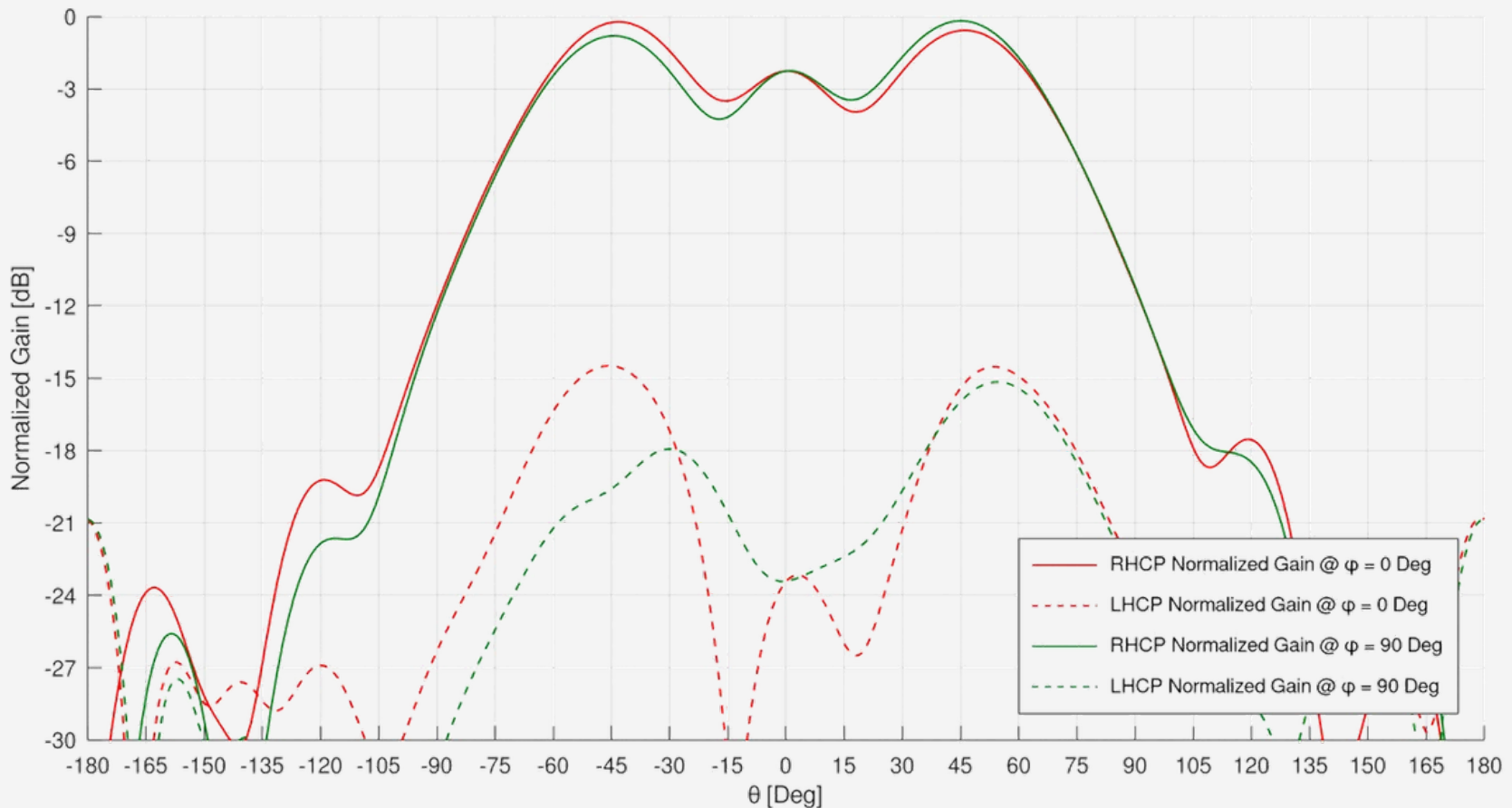
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Radiation Pattern Principal Cuts @ 8 GHz

Verification by Simulation of RHCP & LHCP Radiation Pattern - PN: SSA093B

Principal Cuts, $\phi = [0; 90]$ deg, Freq. 8 GHz, Method: Full Wave Simulation, $\theta = [-180; 180]$ deg, Boundary Conditions: Isolated Antenna





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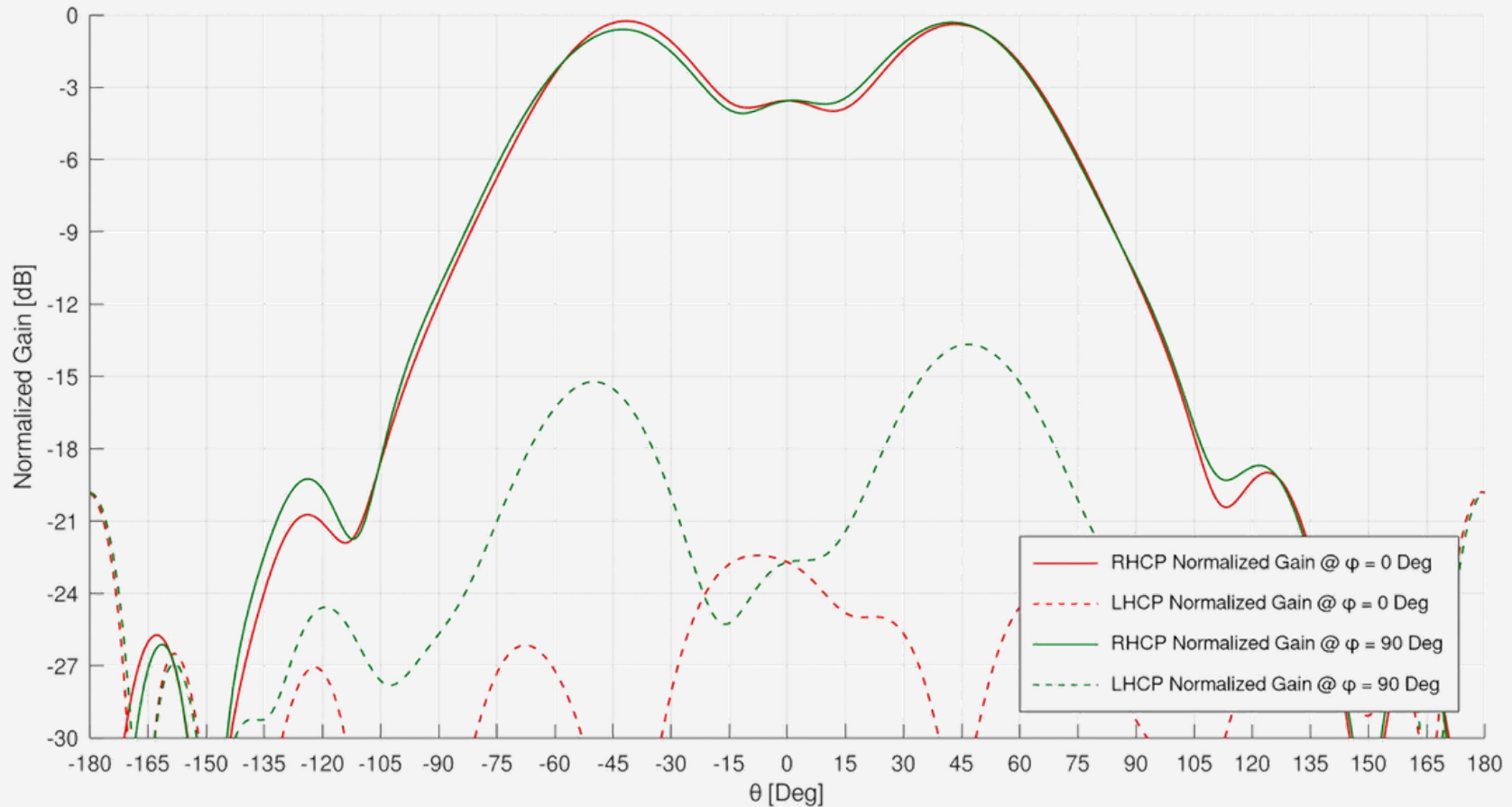
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Radiation Pattern Principal Cuts @ 8.2 GHz

Verification by Simulation of RHCP & LHCP Radiation Pattern - PN: SSA093B

Principal Cuts, $\phi = [0; 90]$ deg, Freq. 8.2 GHz, Method: Full Wave Simulation, $\theta = [-180:1:180]$ deg, Boundary Conditions: Isolated Antenna





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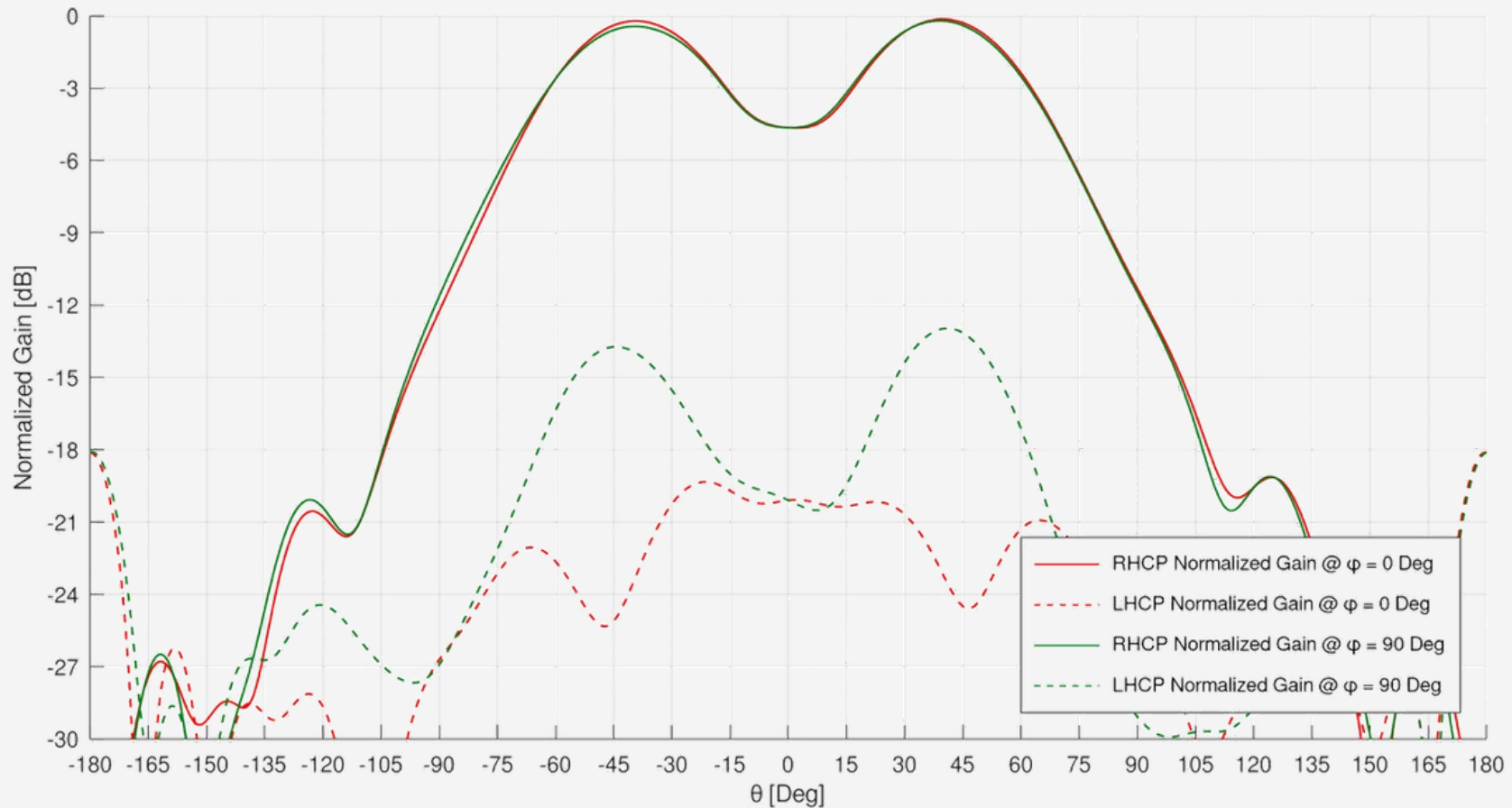
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Radiation Pattern Principal Cuts @ 8.4 GHz

Verification by Simulation of RHCP & LHCP Radiation Pattern - PN: SSA093B

Principal Cuts, $\phi = [0; 90]$ deg, Freq. 8.4 GHz, Method: Full Wave Simulation, $\theta = [-180:1:180]$ deg, Boundary Conditions: Isolated Antenna





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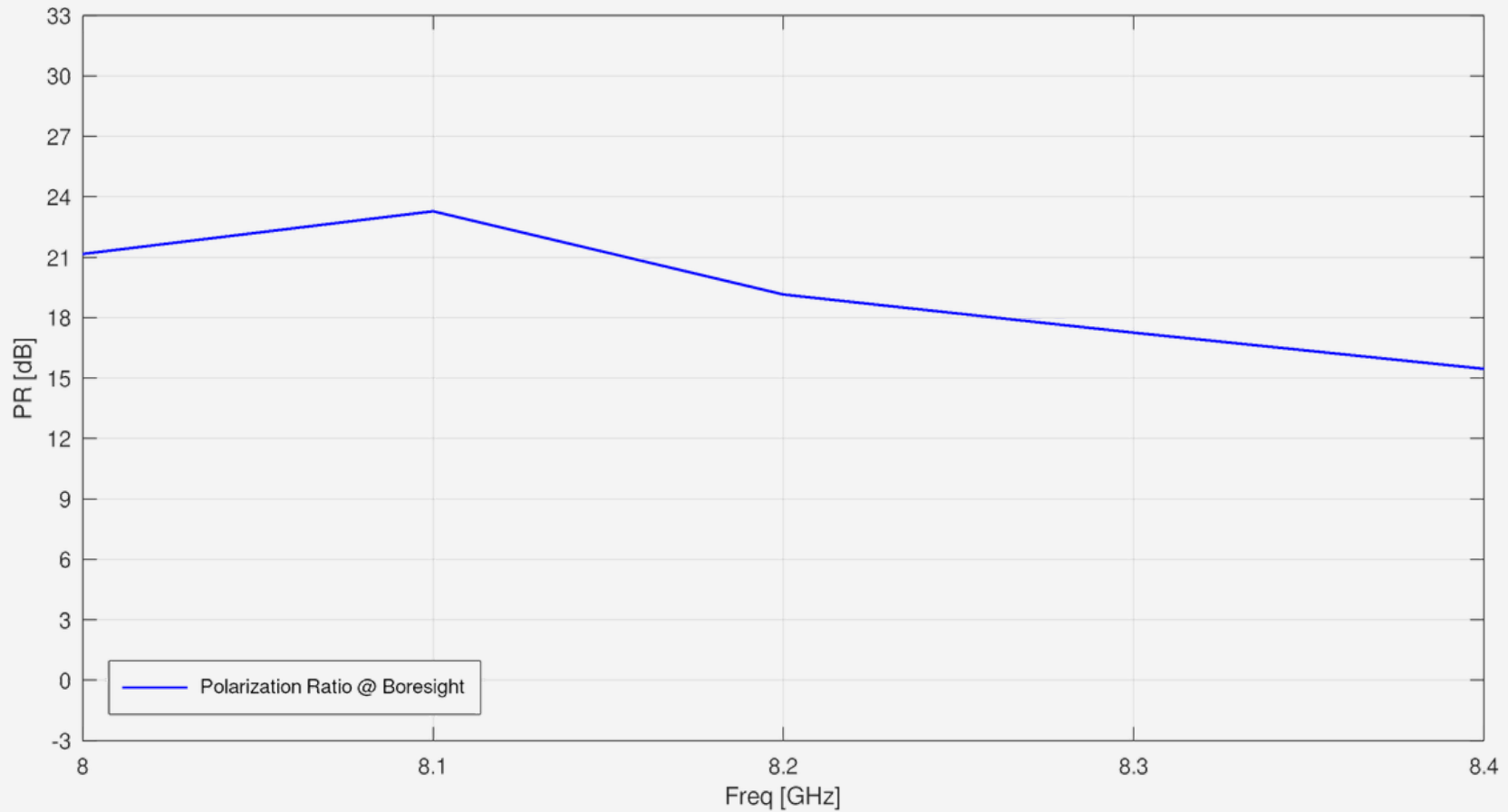
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Polarization Ratio @ Boresight vs Frequency

Verification by Simulation of Polarization Ratio Pattern @ Boresight - SSA093B Model Design 13b11

Method: Full Wave Simulation, Frequency Range: 8 - 8.4 GHz, $\theta = 0$ deg





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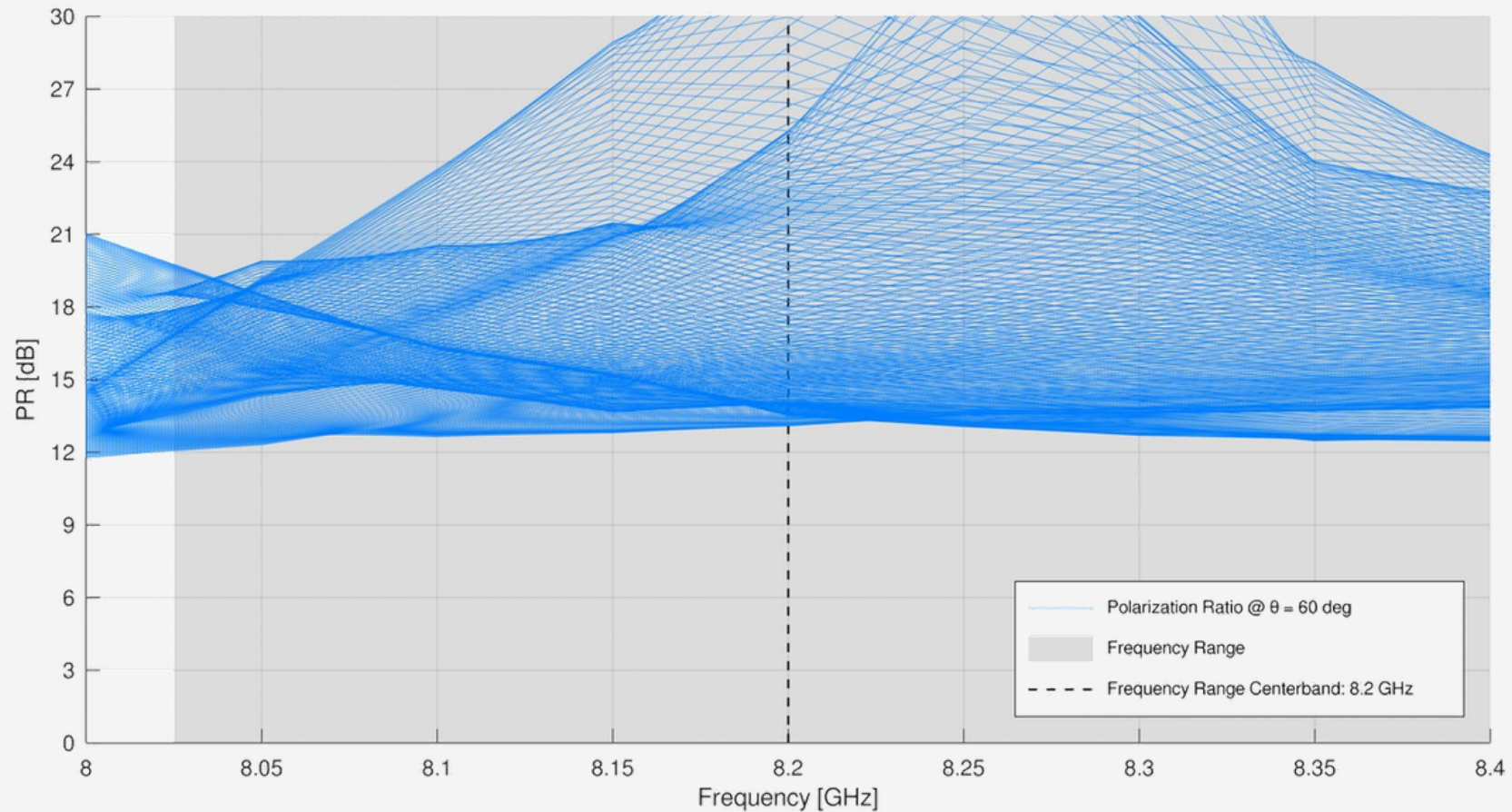
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Polarization Ratio @ EoC ($\theta = 60^\circ$) vs Frequency

Verification by Simulation of Polarization Ratio @ EoC - PN: SSA093B

Frequency: [8:0.05:8.4] GHz, $\theta = 60$ deg, $\phi = [0:1:360]$ deg, Method: Full Wave Simulation, Boundary Conditions: Isolated Antenna





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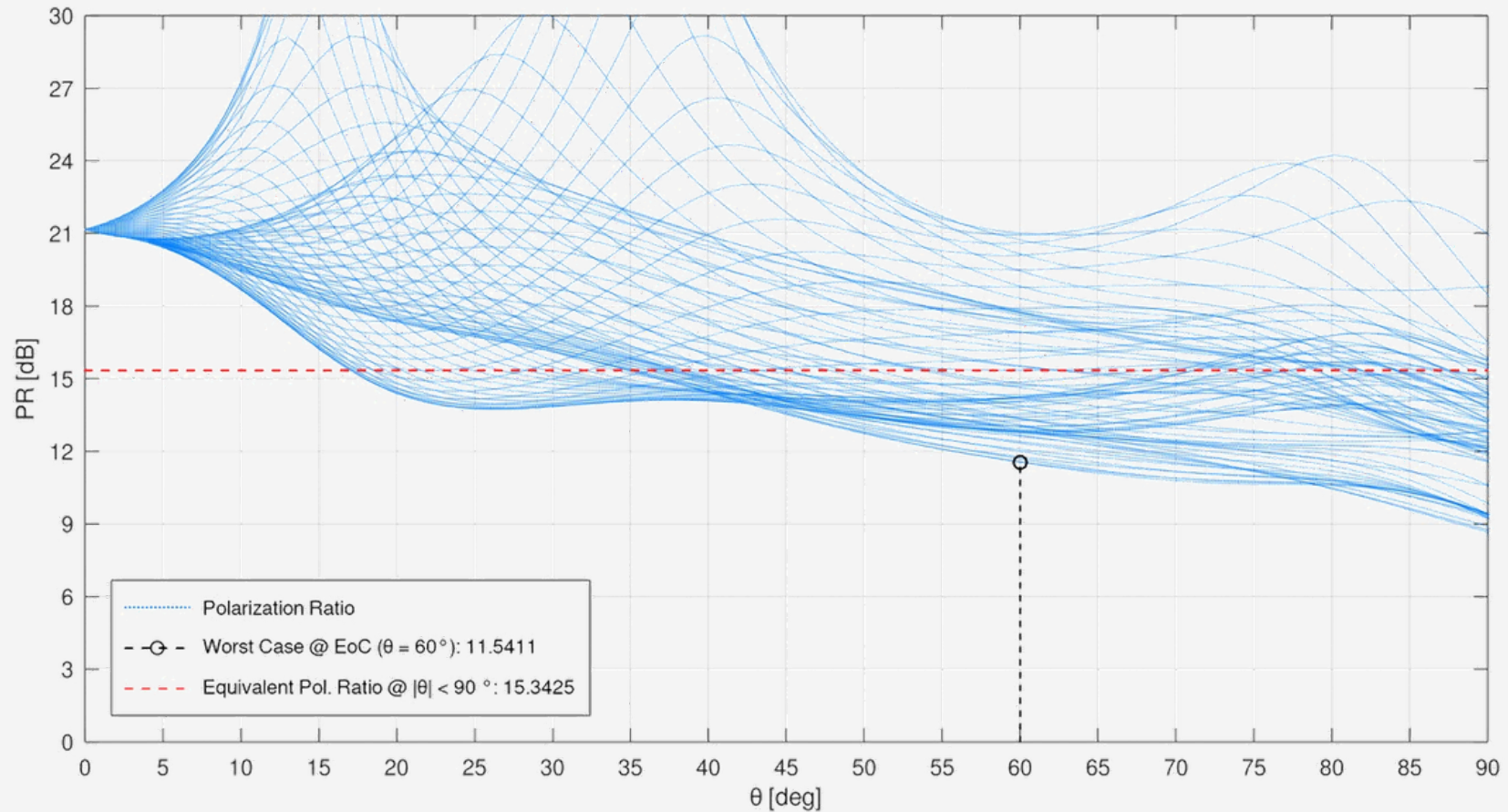
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Polarization Ratio Pattern @ 8 GHz

Verification by Simulation of Polarization Ratio Pattern - PN: SSA093B

Freq. 8 GHz, Method: Full Wave Simulation, $\theta = [0:1:90]$ deg, $\phi = [0:5:360]$ deg, Boundary Conditions: Isolated Antenna





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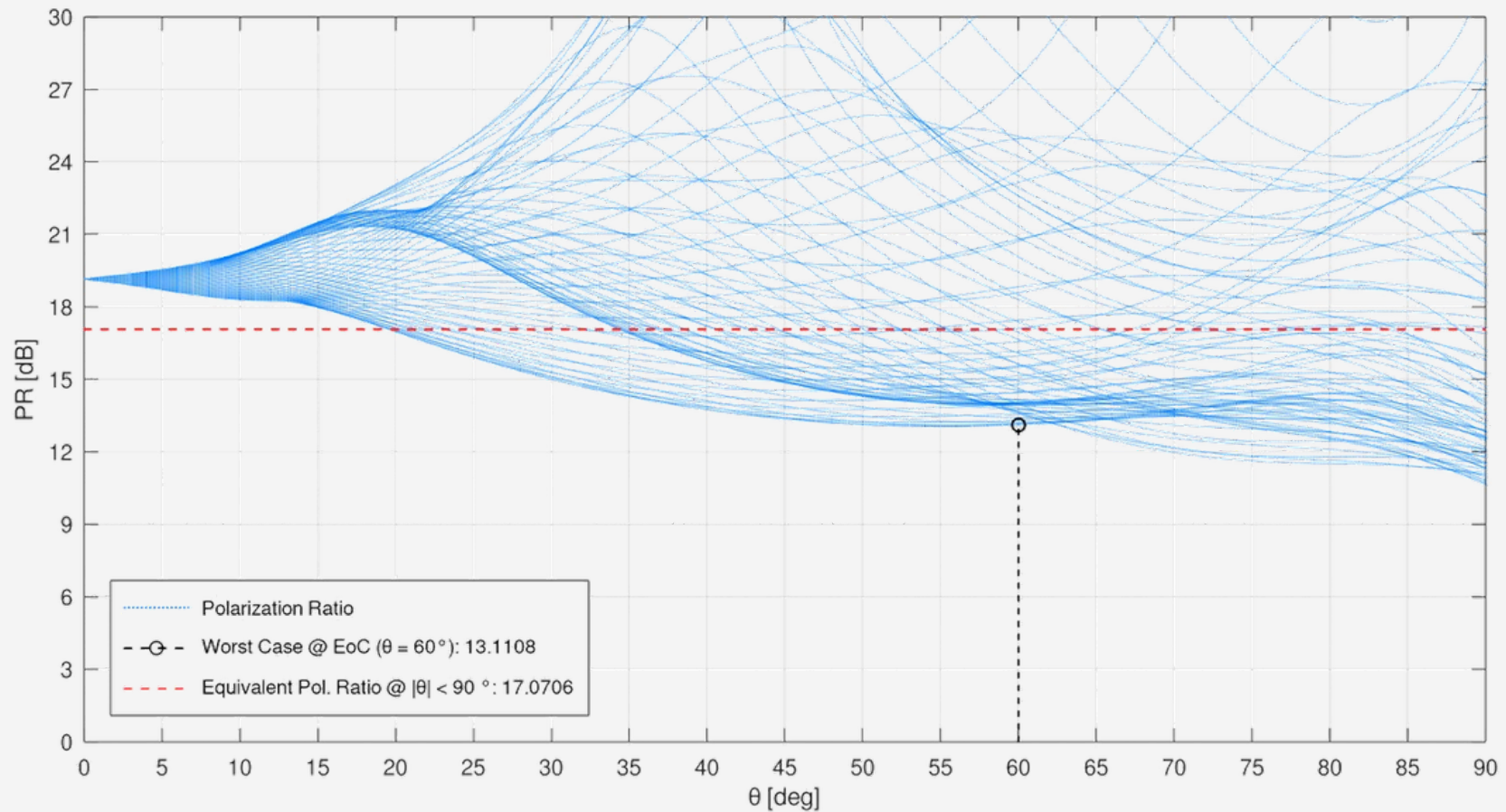
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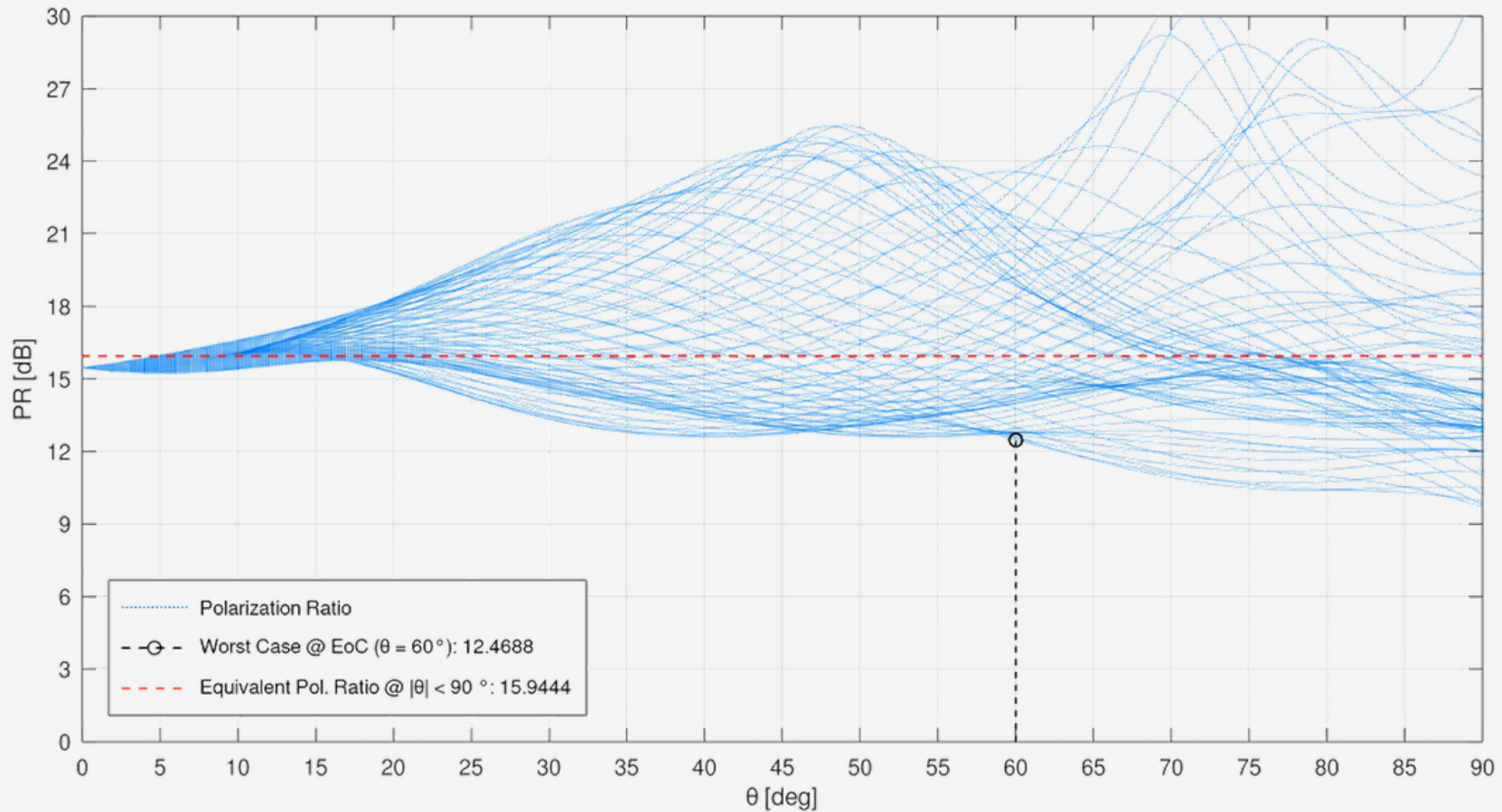
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Polarization Ratio Pattern @ 8.4 GHz

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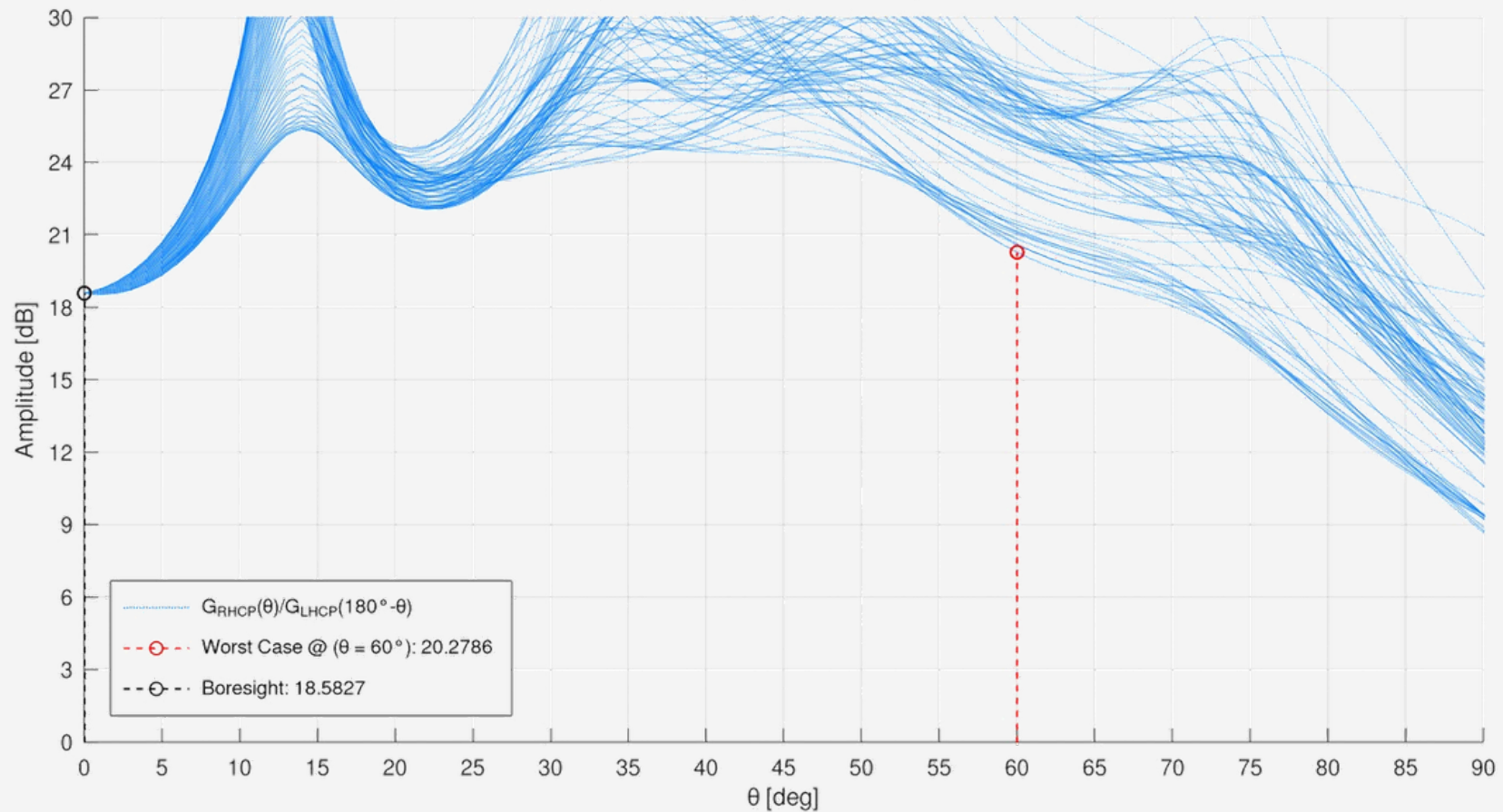
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Multipath Ratio Pattern @ Frequency: 8 GHz

Verification by Simulation of Multipath Ratio - PN: SSA093B

Full Spherical Cuts, Freq. 8 GHz, $\theta = [0:1:90]$ deg, $\phi = [0:5:180]$ deg, Boundary Conditions: Isolated Antenna





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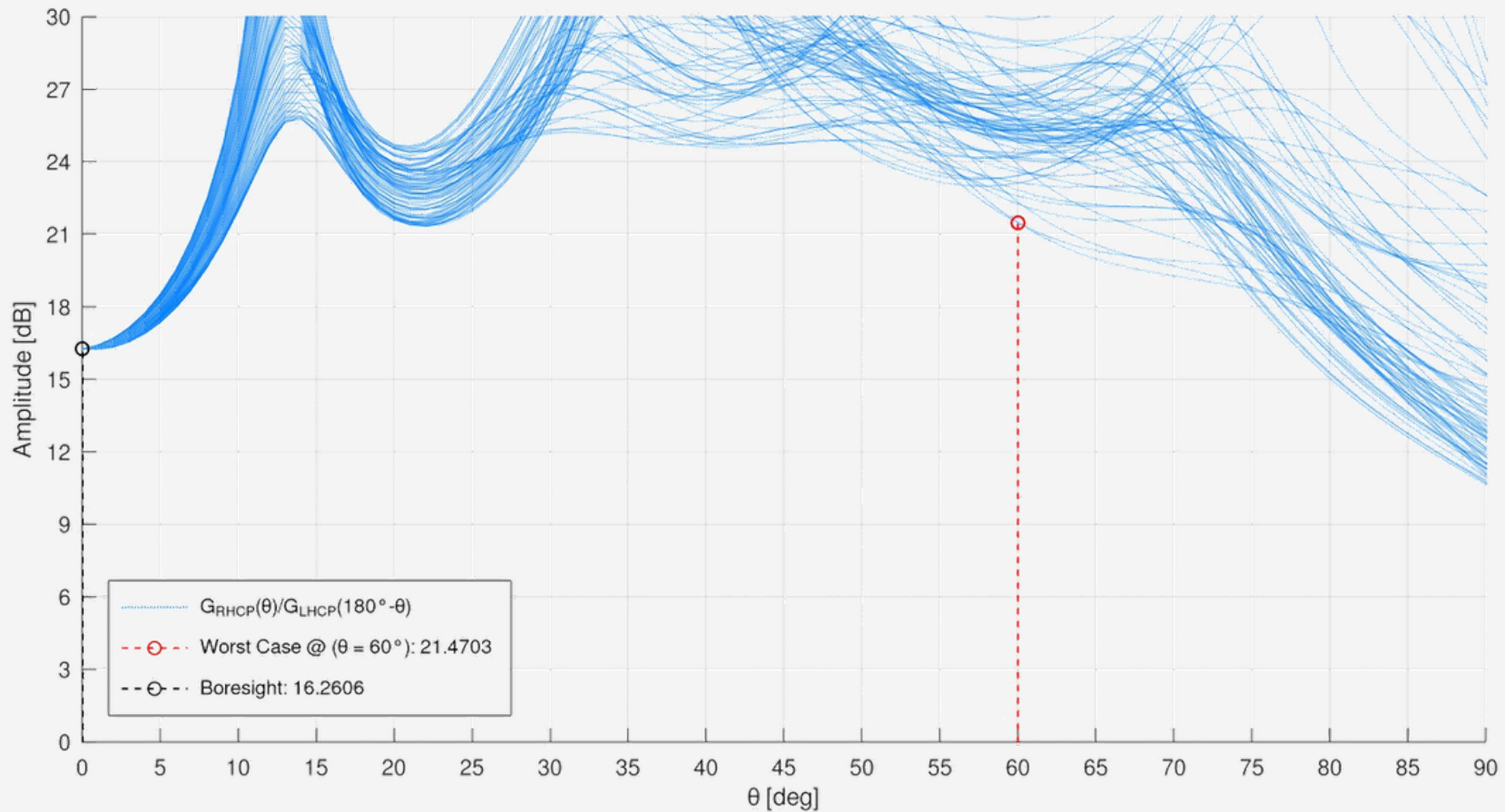
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Multipath Ratio Pattern @ Frequency: 8.2 GHz

Verification by Simulation of Multipath Ratio - PN: SSA093B

Full Spherical Cuts, Freq. 8.2 GHz, $\theta = [0:1:90]$ deg, $\phi = [0:5:180]$ deg, Boundary Conditions: Isolated Antenna





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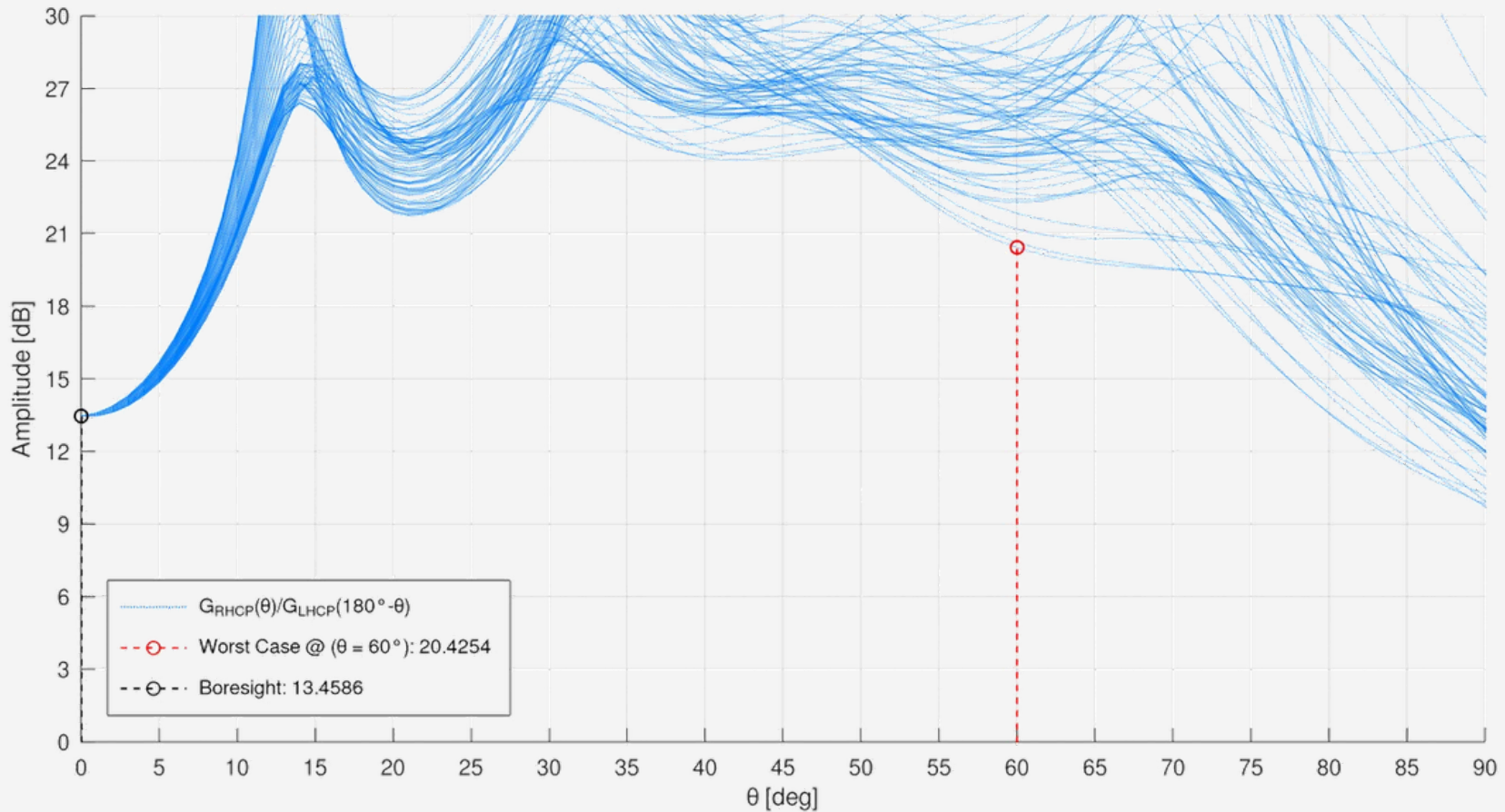
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Multipath Ratio Pattern @ Frequency: 8.4 GHz

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- **Installed Performance: Pattern Distortion, Coverage & Cosite Interference**
- **Full Functional Test**
- **Environmental Test: Shaker, Thermal vacuum**
- **Antenna Bracket Design & Supply**
- **Electrical Ground Support Equipment (Hat)**

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your mission is
successful.**



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