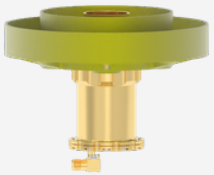
Standard Space Antennas

SPACE-READY ANTENNAS, WHEN TIME AND RELIABILITY MATTER

PN: SSA093B

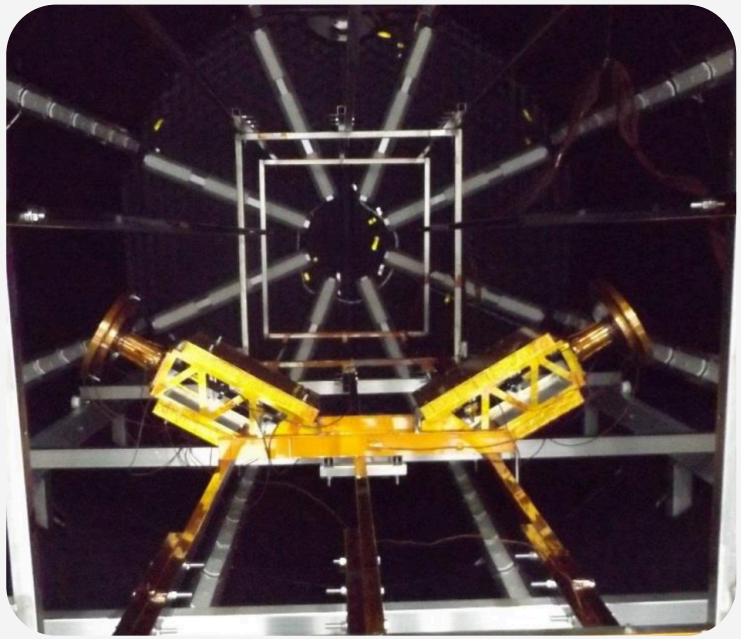


X Band Antenna

Sectoral Coverage

TRL 9

Mass: 154g



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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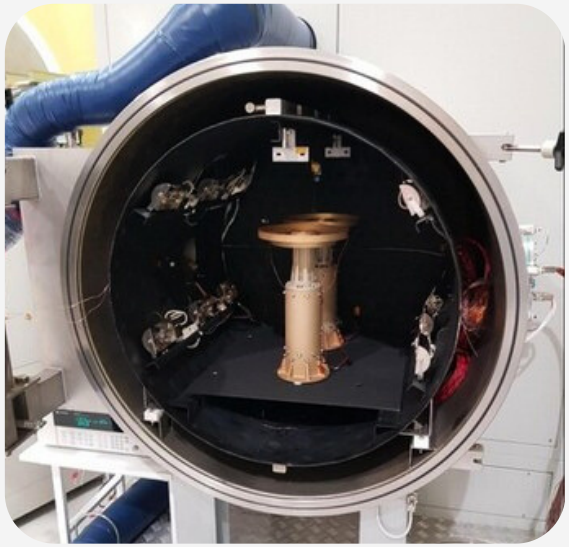
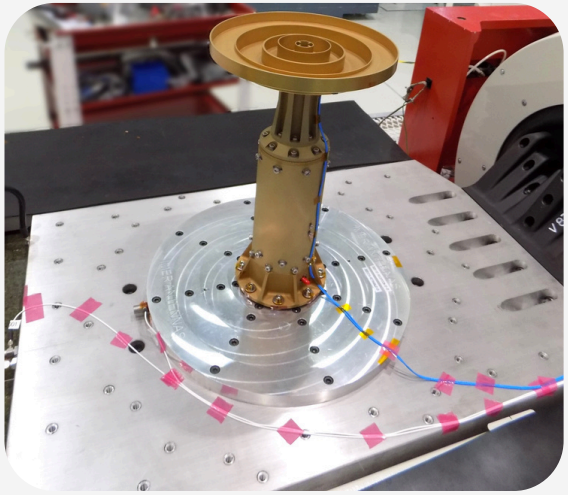




Benefits

- **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

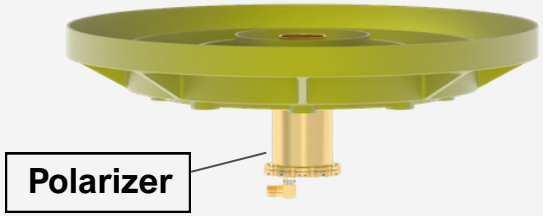
- **Lossless by design**

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

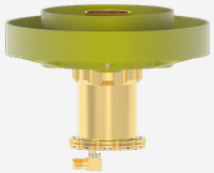
- **No performance degradation at end-of-life by design**

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

Models



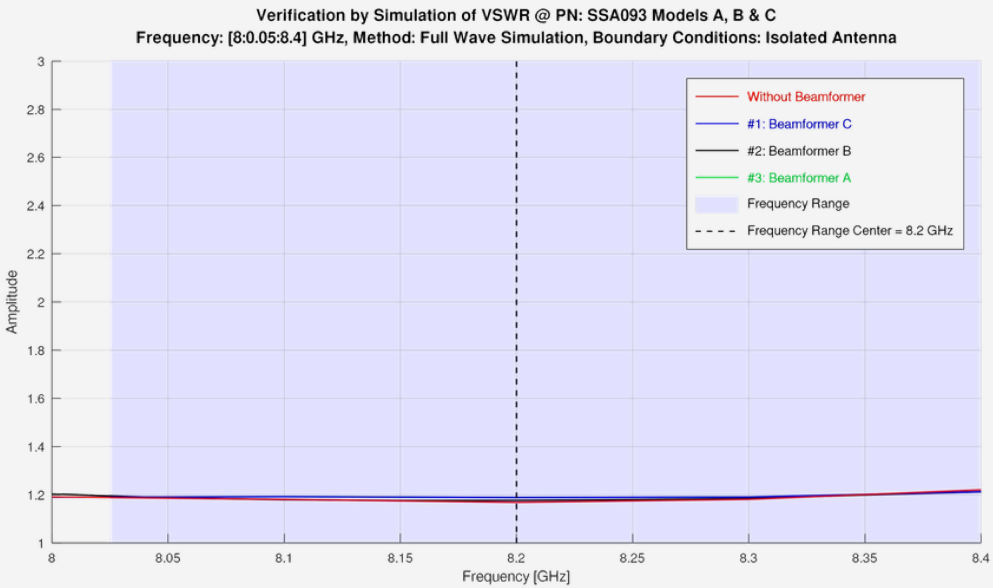
SSA093A



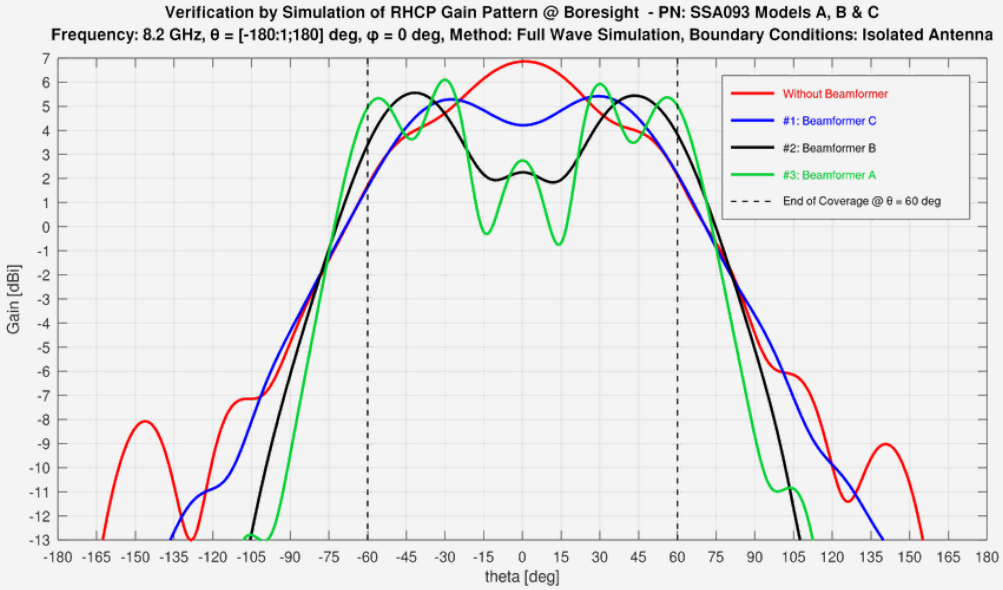
SSA093B

SSA093C

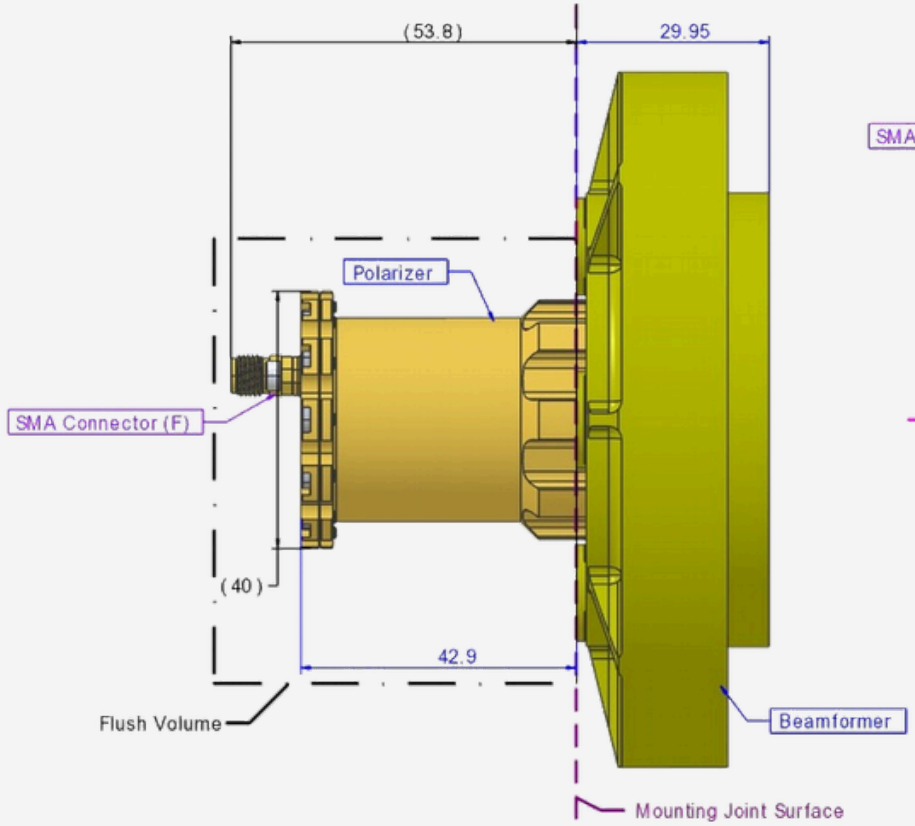
VSWR

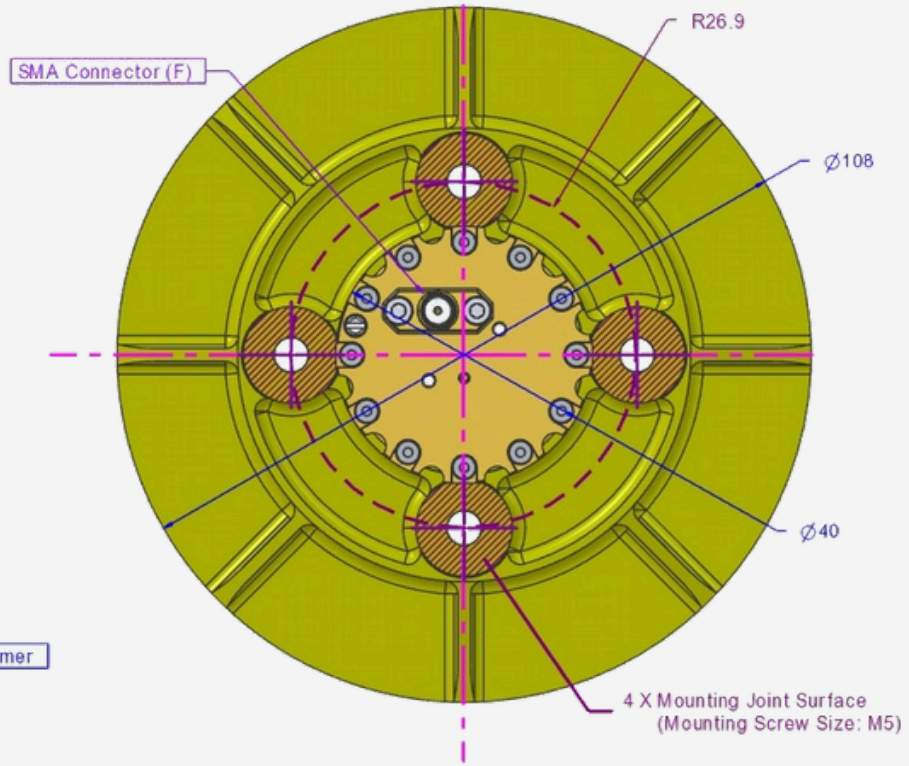


Pattern Formation Process



Mechanical Envelope





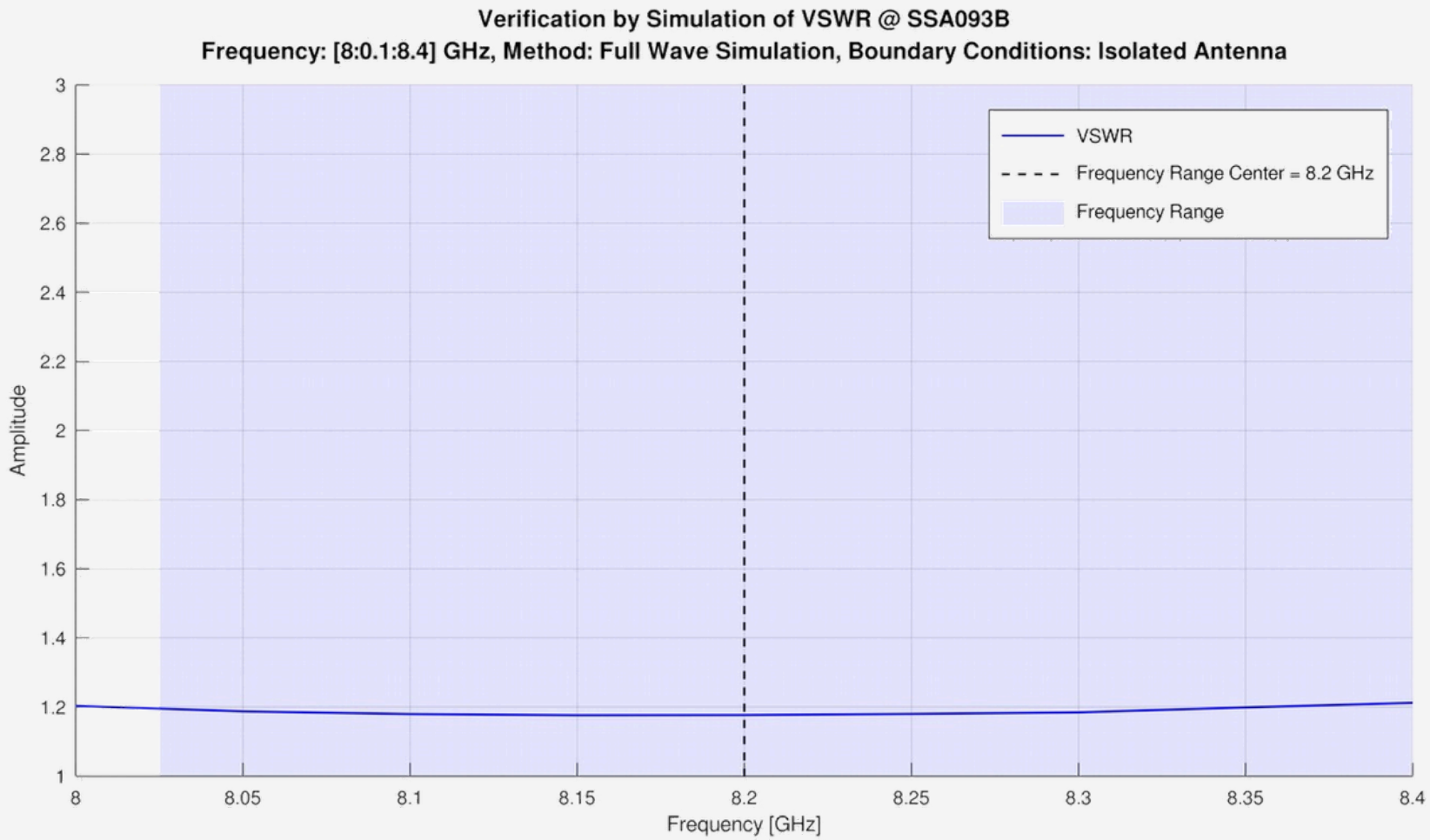
Typical Specifications @ Isolated condition

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 ≡ 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

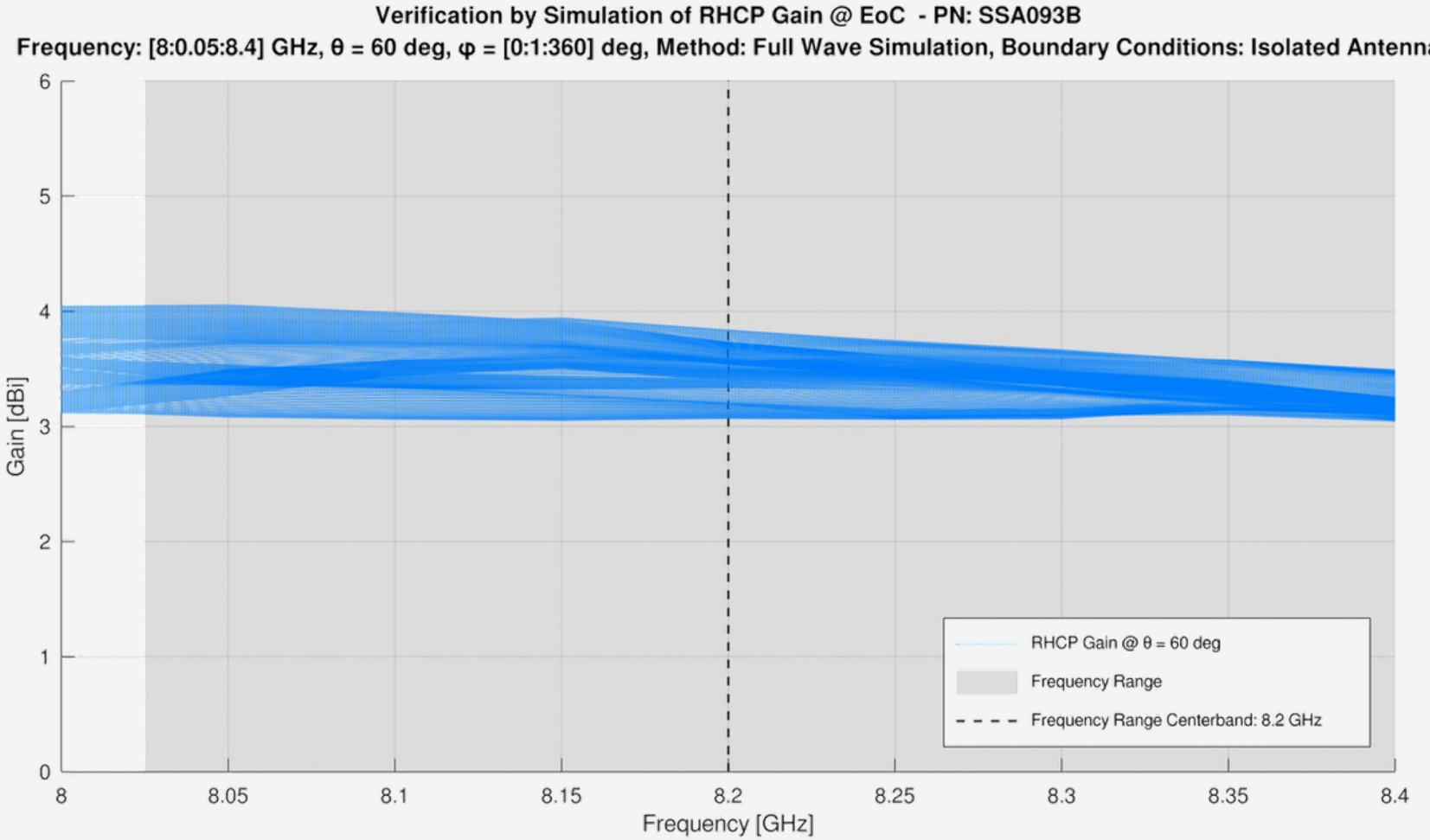
Enviromental Test & Mechanical Interface

Parameter	Values	Remark
Mass (g)	154	Center of Mass: [0, 0, 13] mm from Mounting Joint Surface (≡ Z=0 of Antenna Coordinate System). [AD 1]
Size (mm)	108	Cavity Diameter (Max Envelope) [AD 1]
Height (mm)	29.95	Overall Height measured from Mounting Joint Surface. [AD 7] (Flush: 49.7 mm)
RF Interface	SMA Female	Optional Straight or Right Angle Connector [AD1]
Electrostatic Discharge	ESD Free	Verified by Review of Design
Outgassing	TML < 1.00 % CVCM < 0.05%	According to Declared Material, Component and Processes List [AD 7
Temperature Range [°C]	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)
Vacuum [Hpa]	≤ 1.33×10^-5 ±80%	In Thermal Vacuum Test [AD 8]
1st Natural Frequency [Hz]	1400	Analysis in [AD 11] Success with several Mast and Bracket Configuration [AD 2]. Numerical versus Test Deviation < 4%
Dynamic Acceleracion Loads [Grms]	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 Overall: 14.55	Shaker Test @ Random Vibration, Three Axis, 2 min / axis. [AD 2] According to NASA GEVS (General Environmental Verification Standard). Baseline≃ 6.8 Grms (Maximum Expected Environment according to Review of Typical Launch Vehicles) Acceptance≃10 Grms, 1.41* Baseline (ASD + 3 dB) Qualification≃ 14.1 Grms, 1.41* Acceptance (ASD + 6 dB) (Heritage by Similarity with SSA071A) Verified by Analysis in [AD 5]
Static Acceleration Loads [G]	Peak: 65	Shaker Test @ Sine Burst, Three Axis [AD 2], Qualification Level

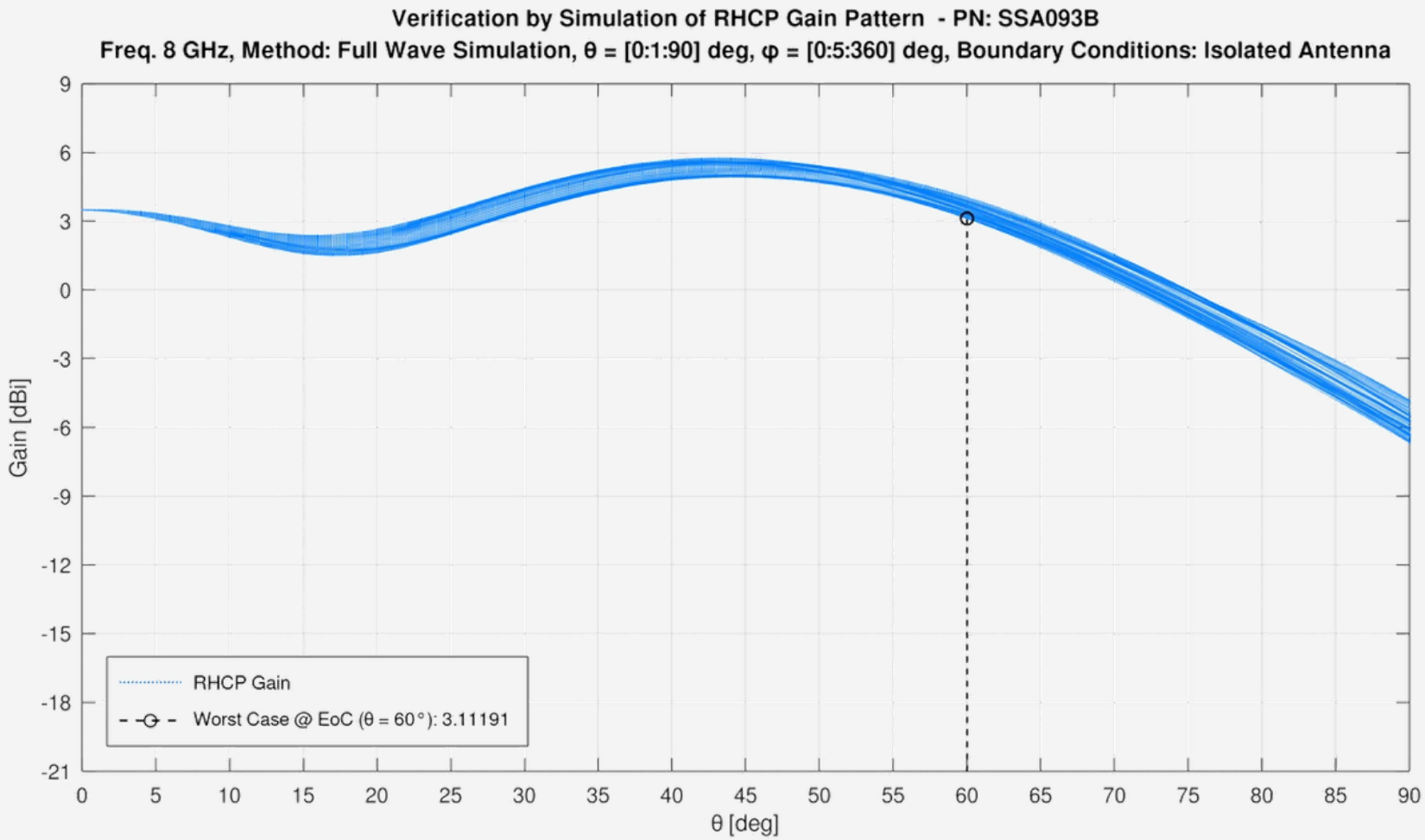
VSWR



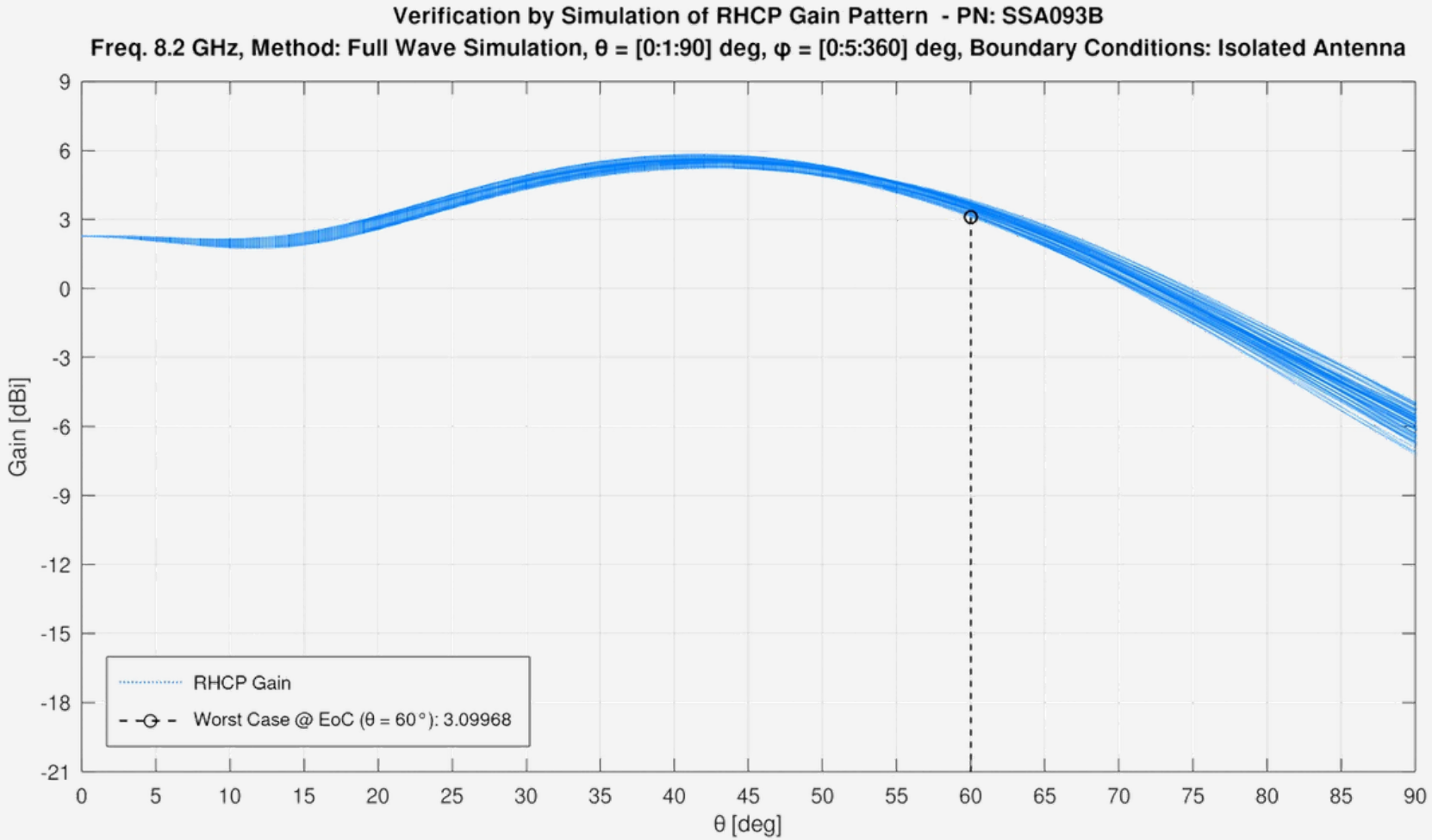
Gain vs Frequency @ EoC (θ = 60°)



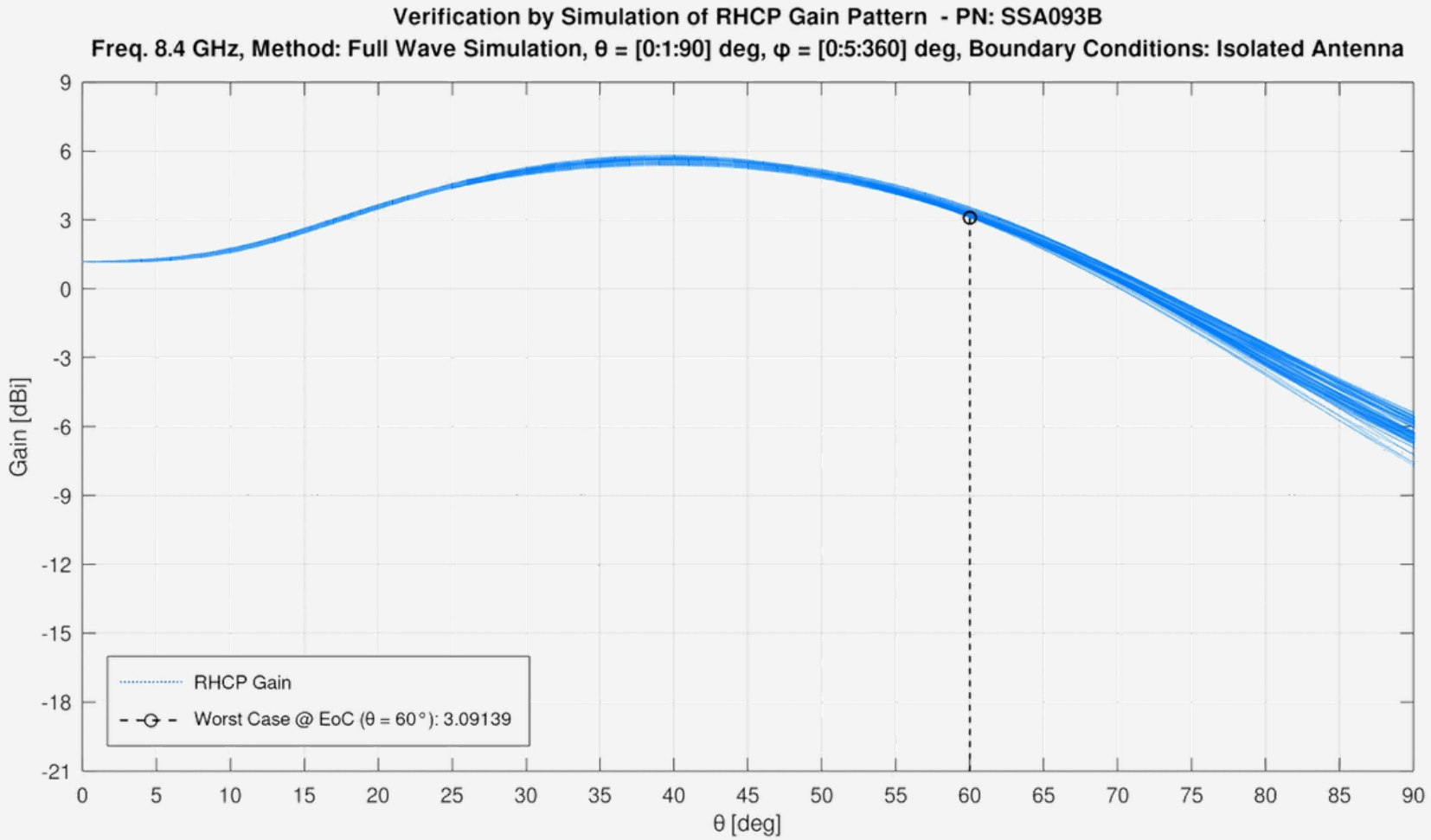
Gain Pattern @ 8 GHz



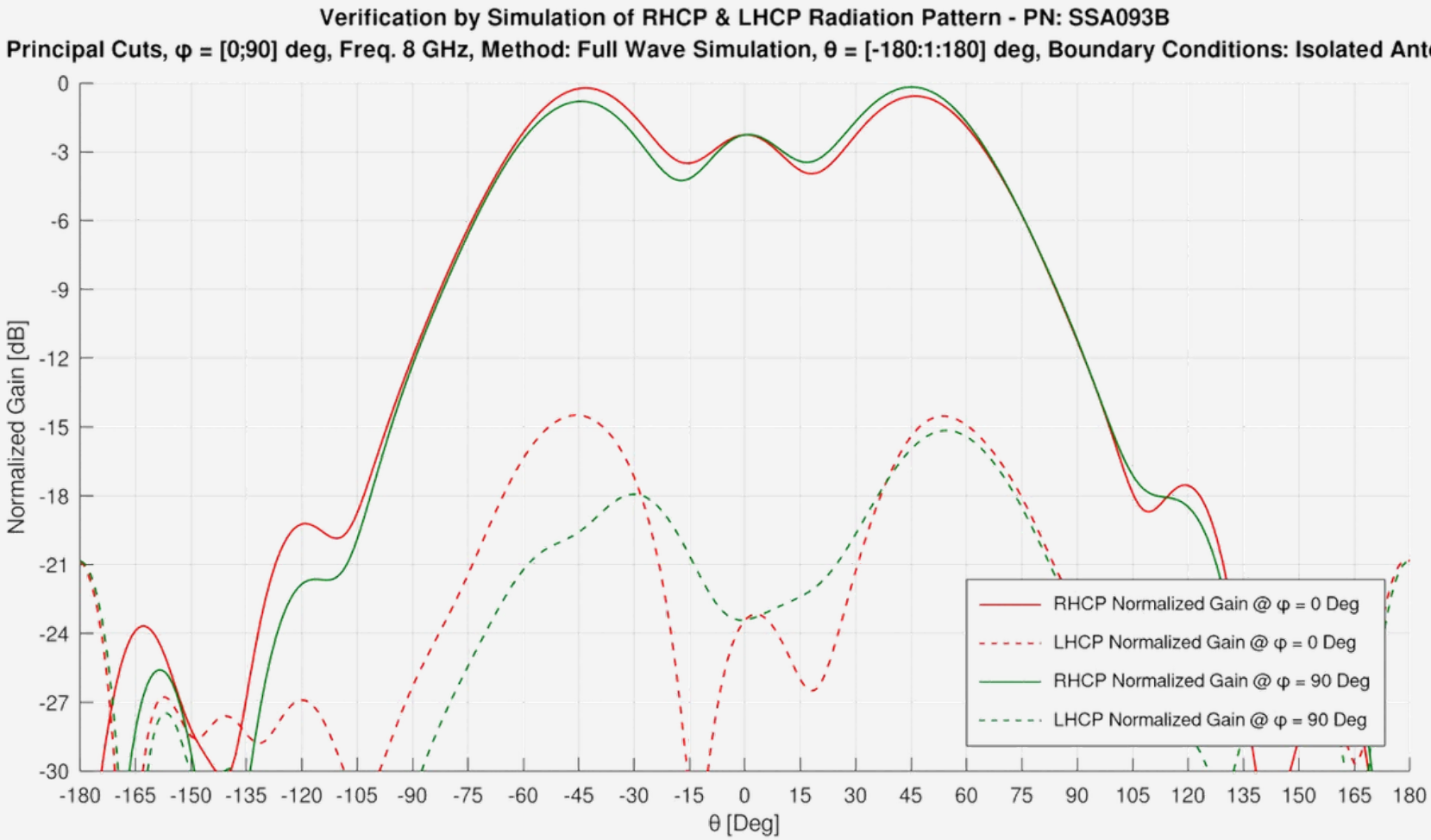
Gain Pattern @ 8.2 GHz



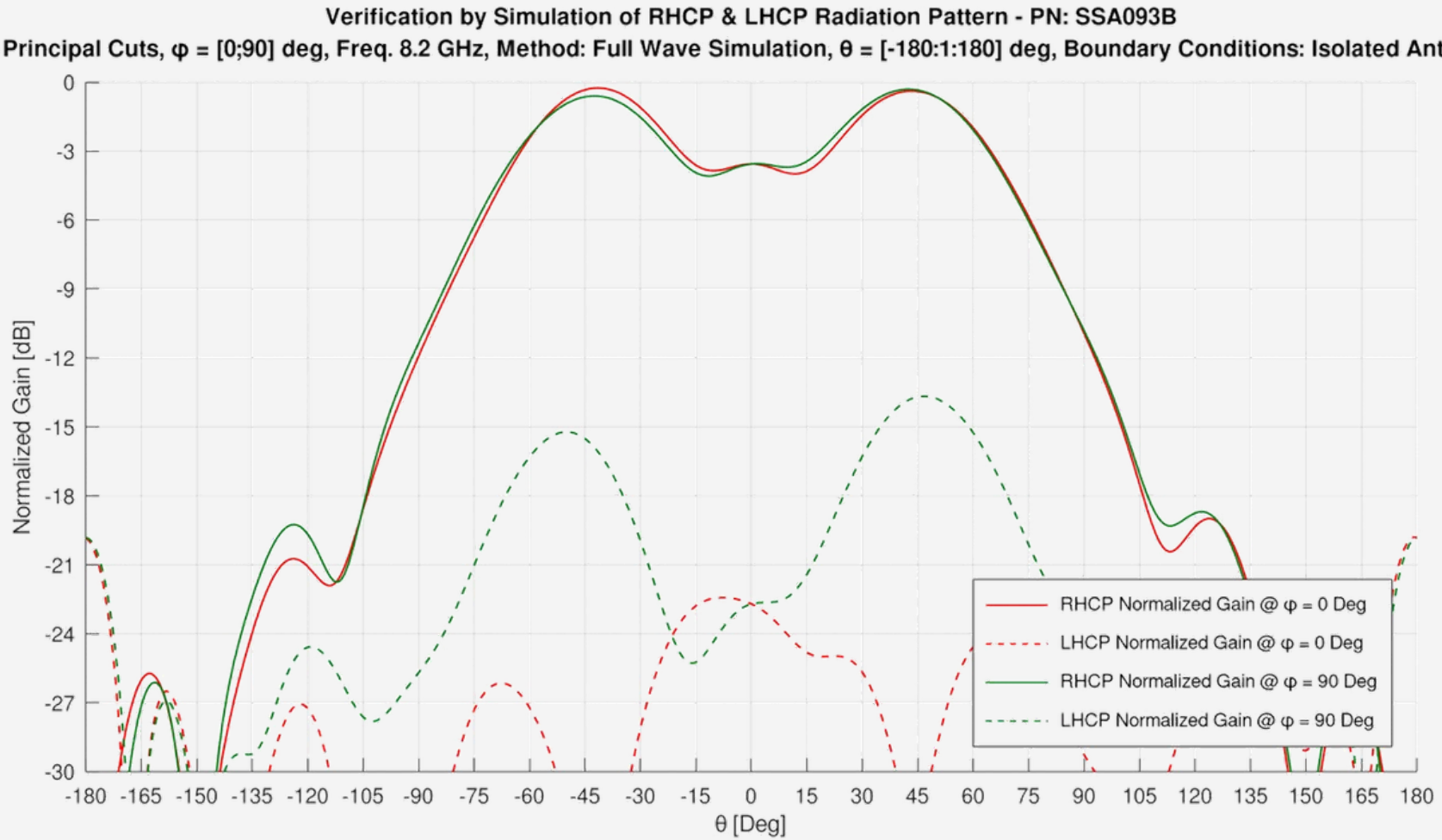
Gain Pattern @ 8.4 GHz



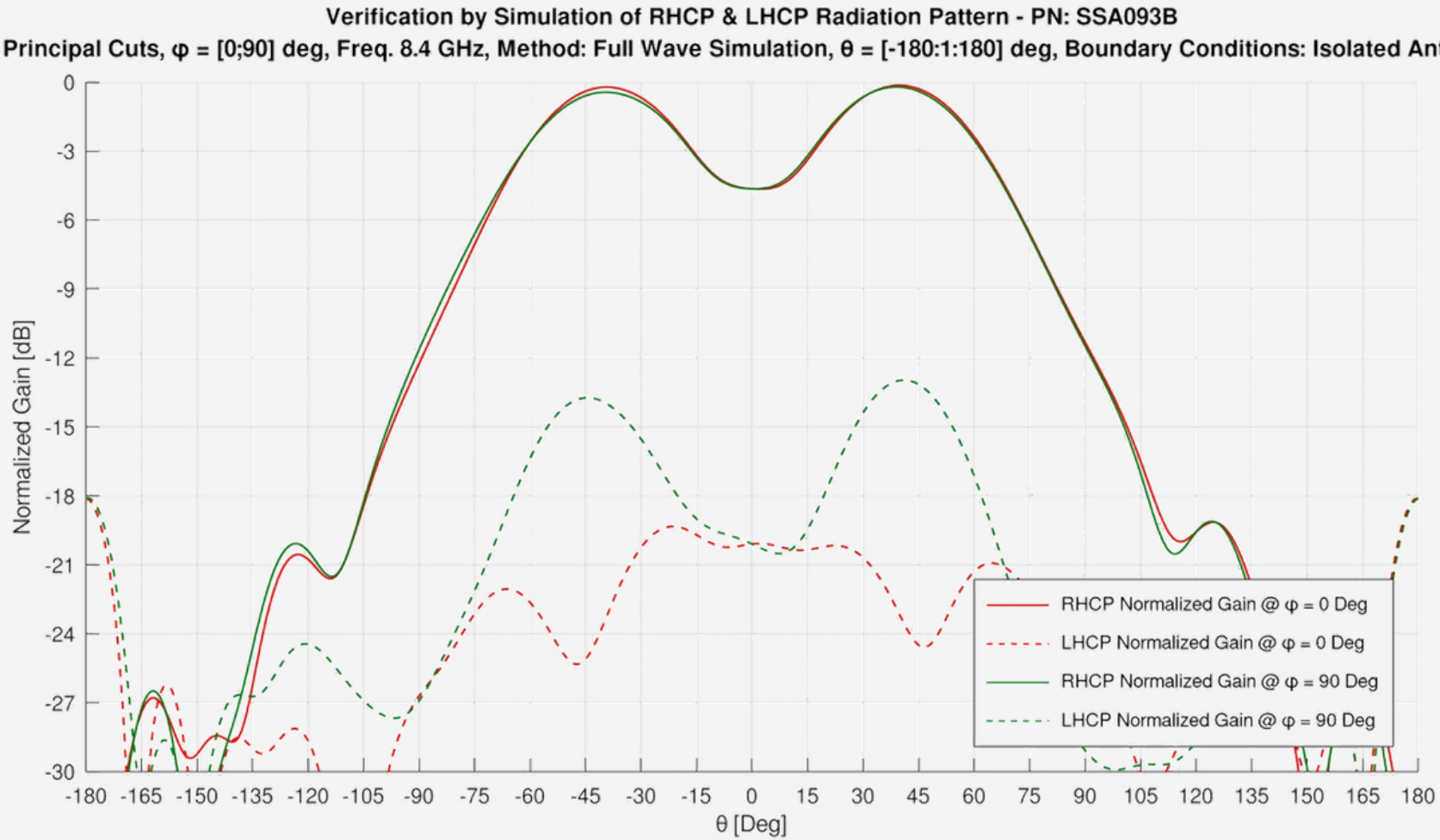
Radiation Pattern Principal Cuts @ 8 GHz



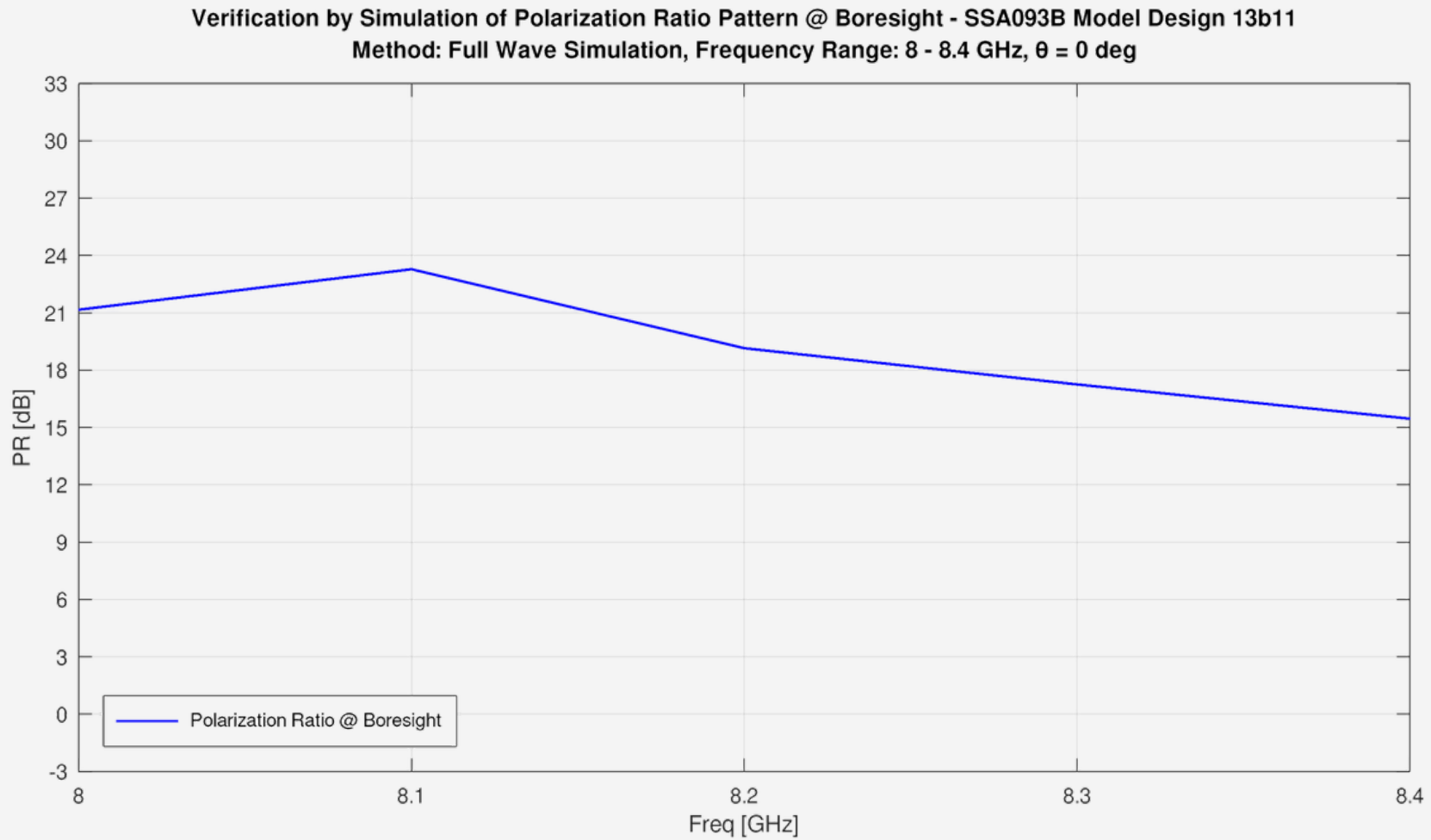
Radiation Pattern Principal Cuts @ 8.2 GHz



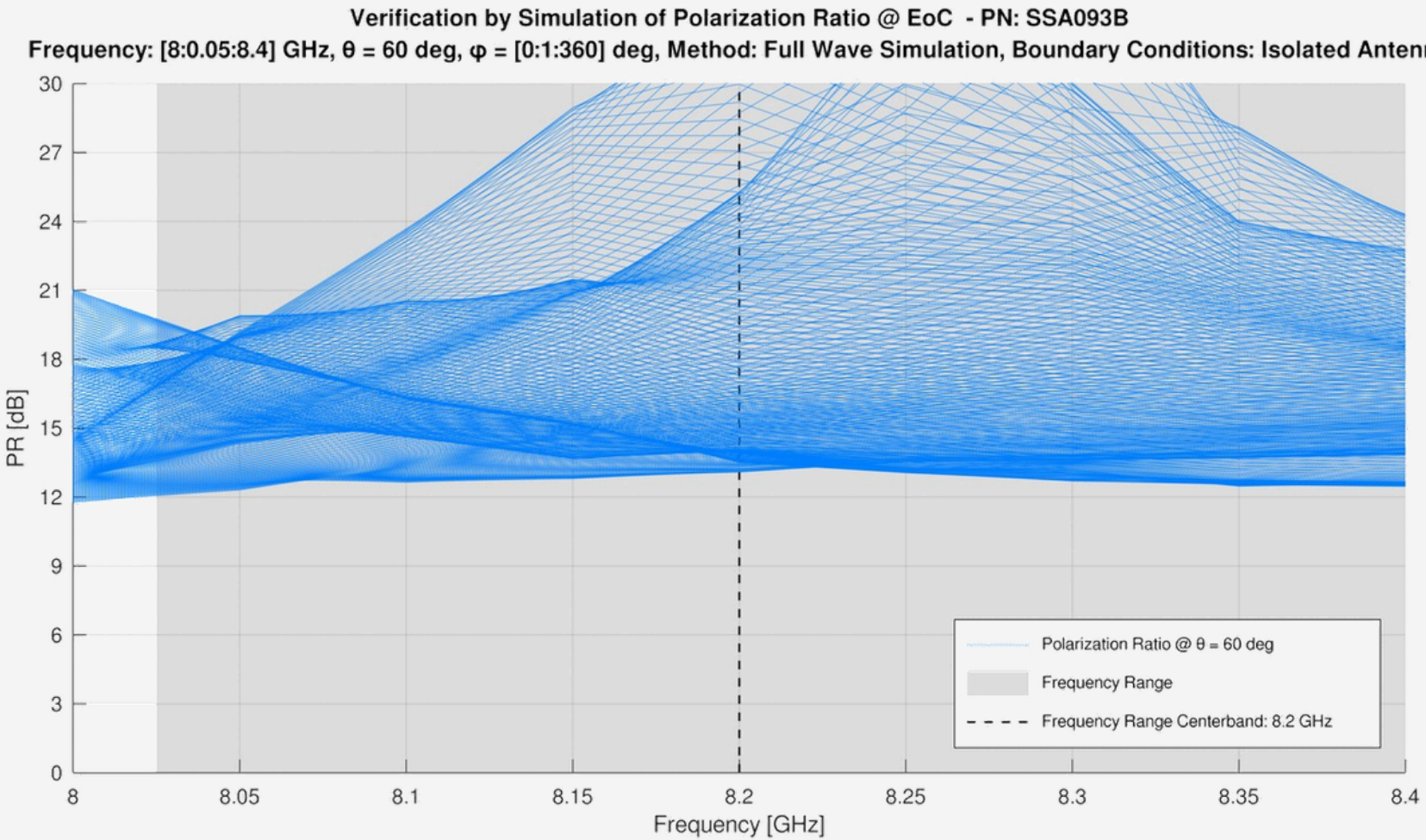
Radiation Pattern Principal Cuts @ 8.4 GHz



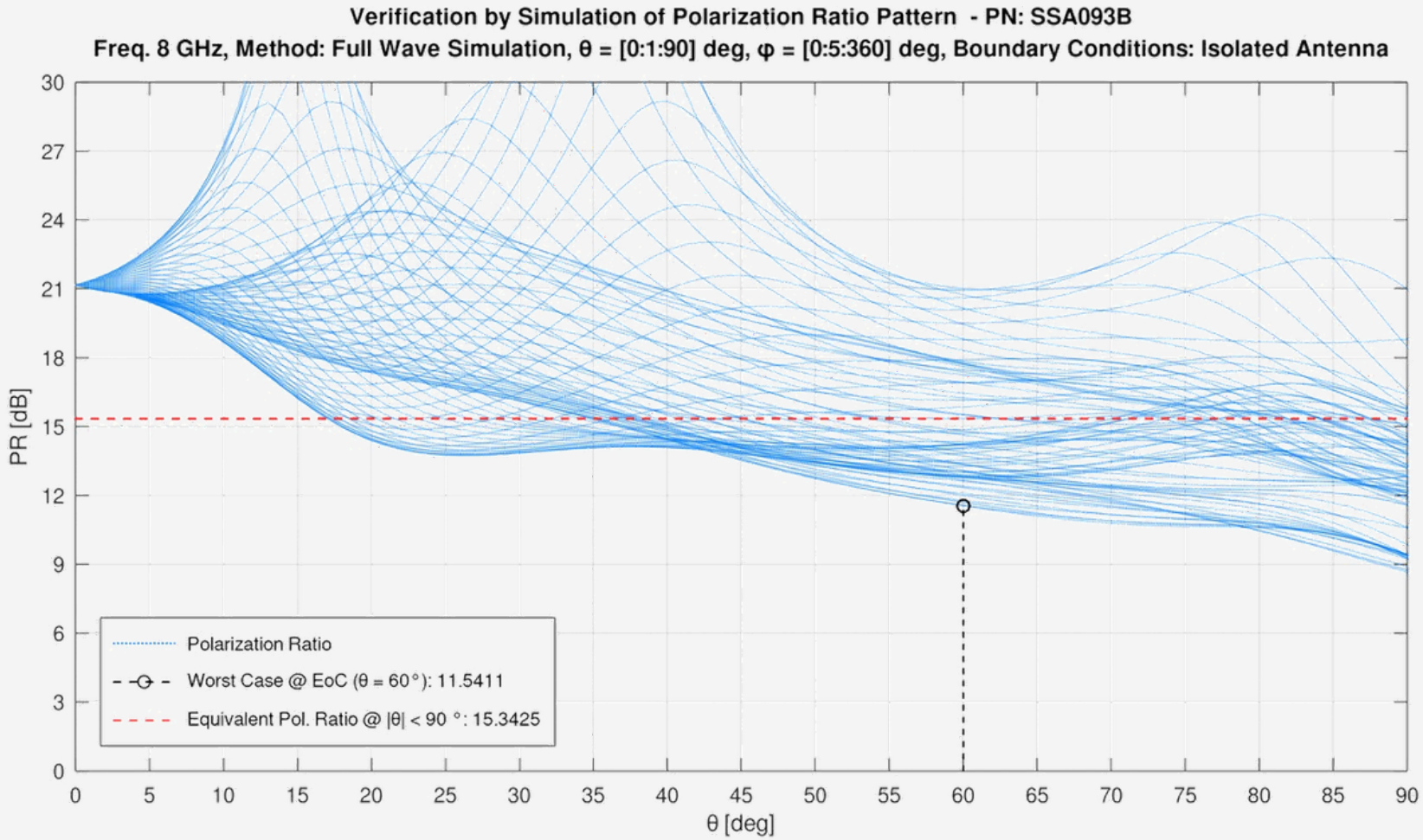
Polarization Ratio @ Boresight vs Frequency



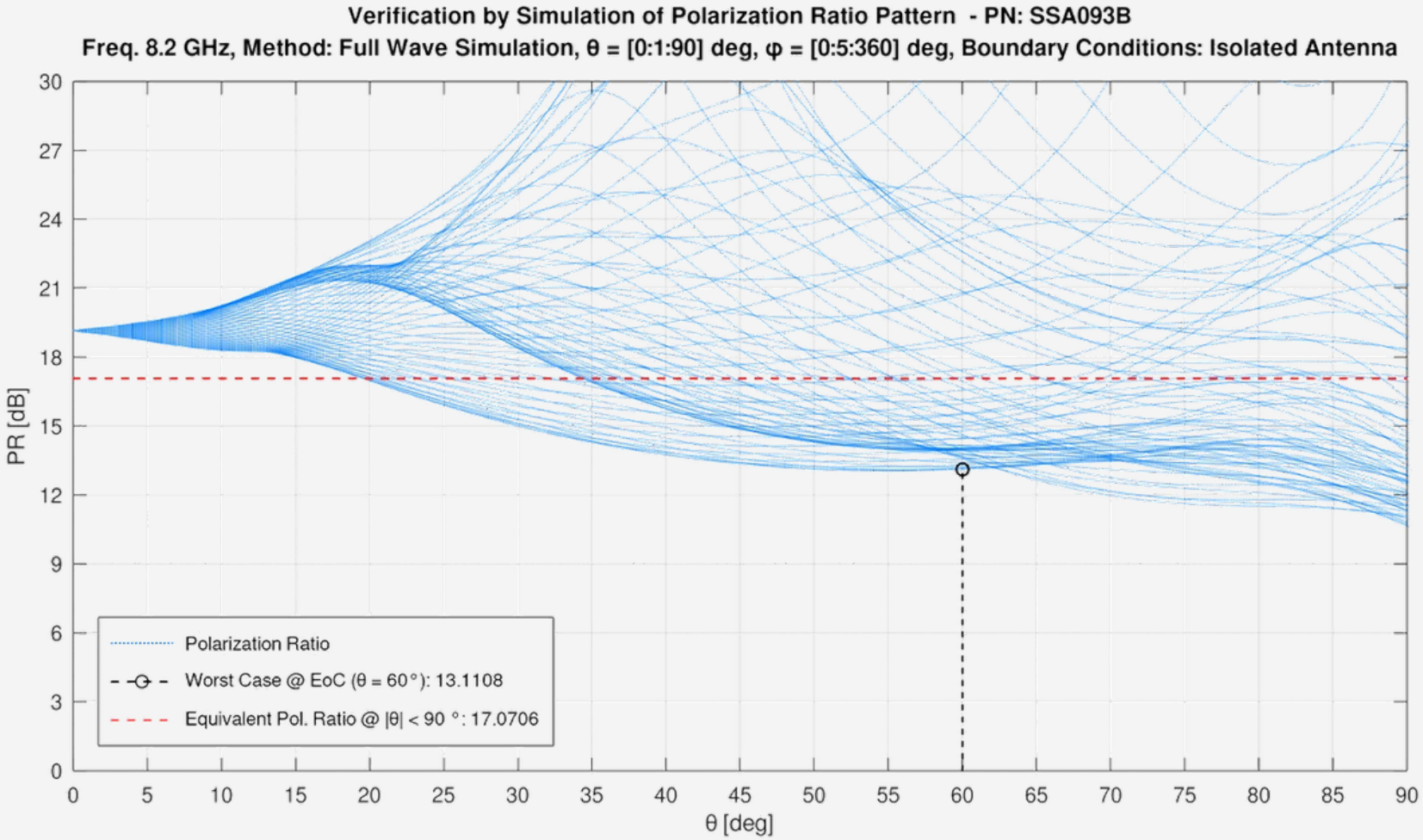
Polarization Ratio @ EoC (θ = 60°) vs Frequency



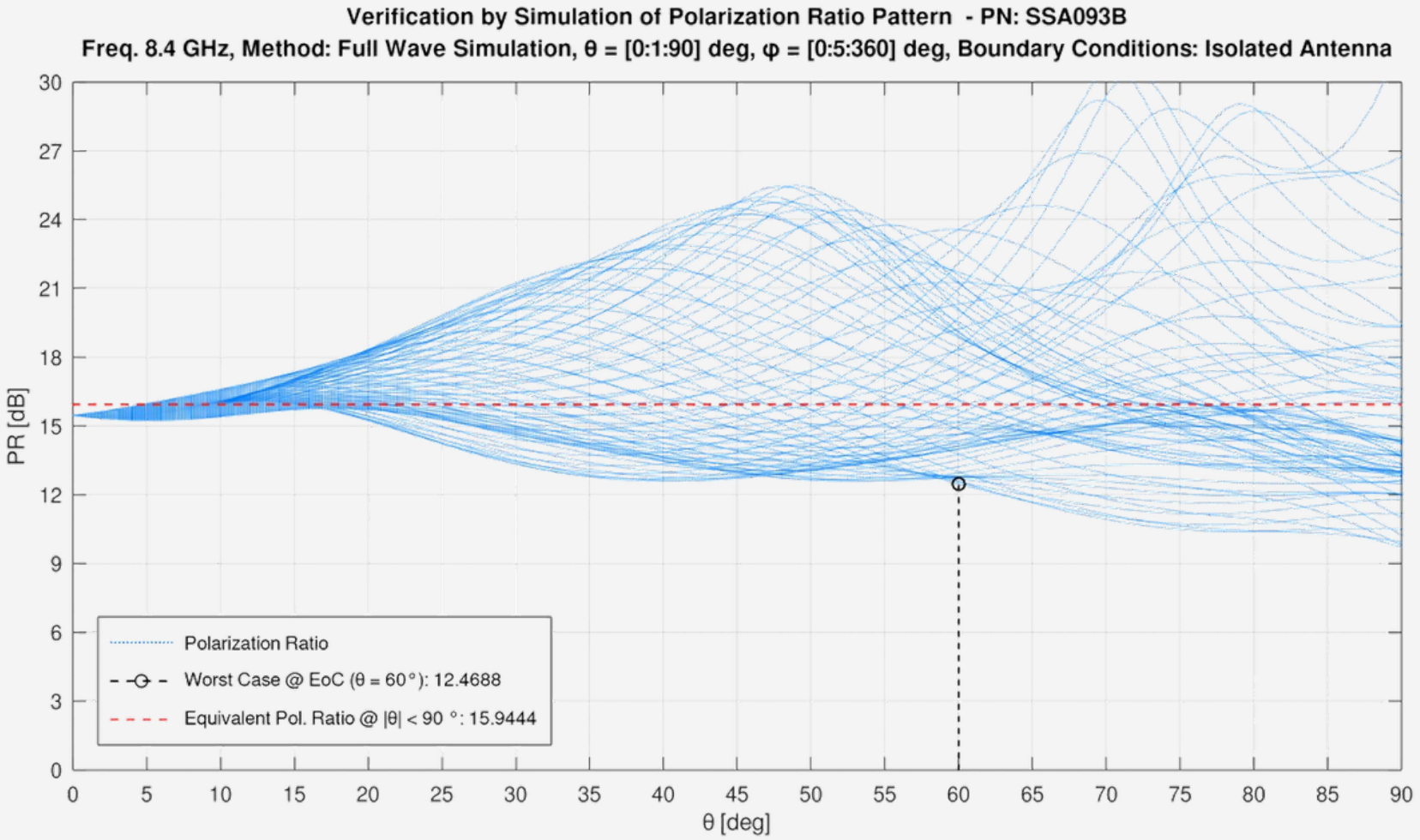
Polarization Ratio Pattern @ 8 GHz



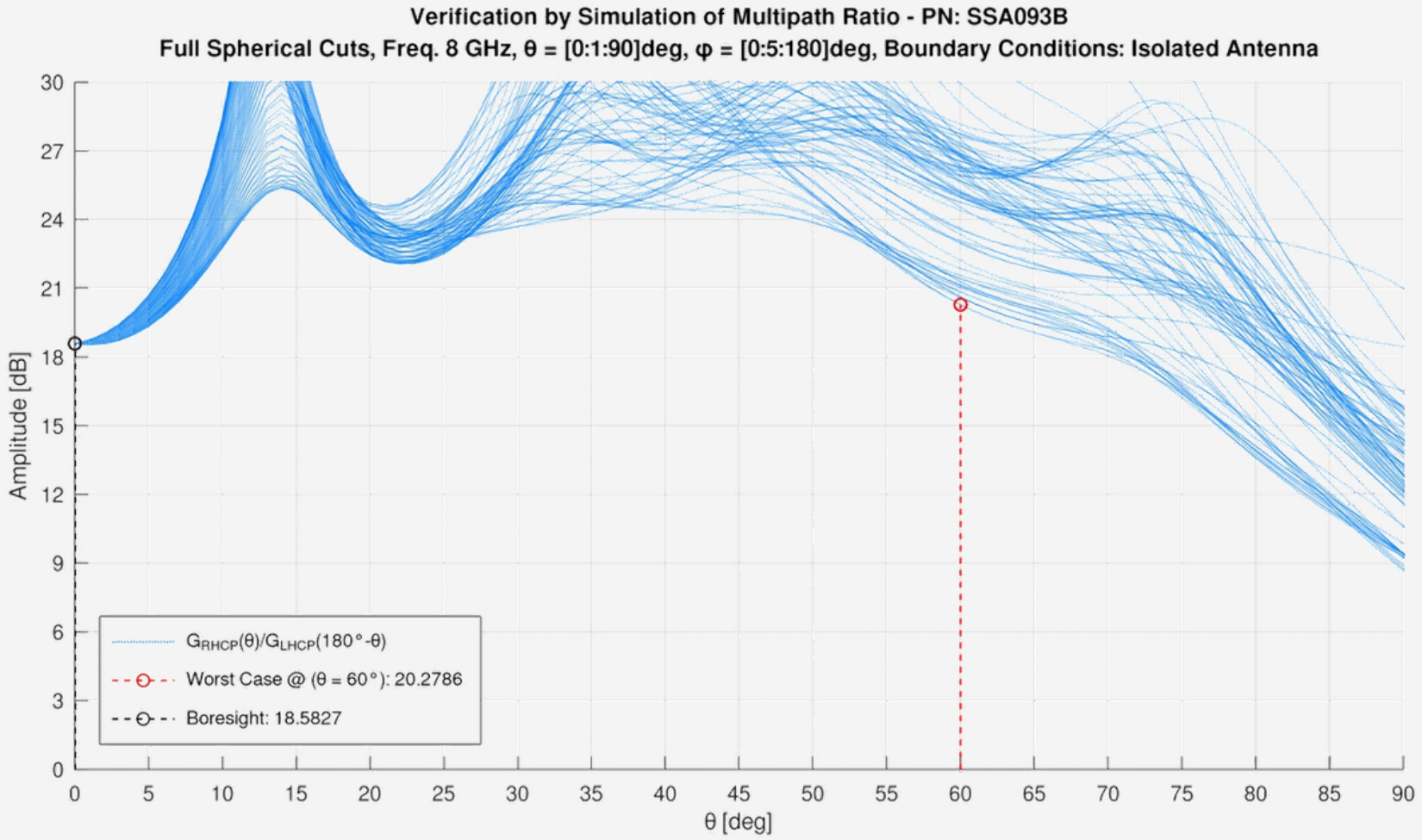
Polarization Ratio Pattern @ 8.2 GHz



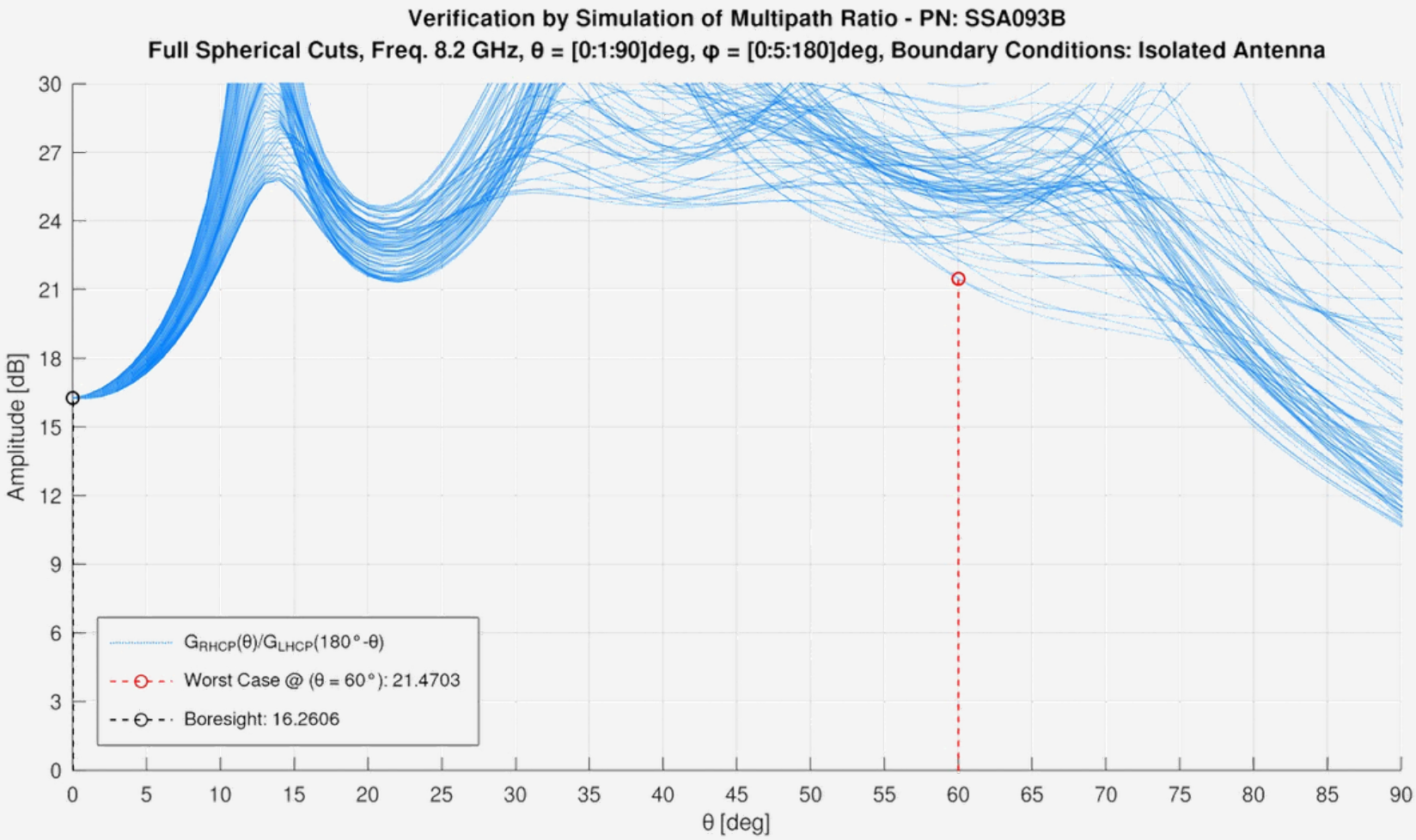
Polarization Ratio Pattern @ 8.4 GHz



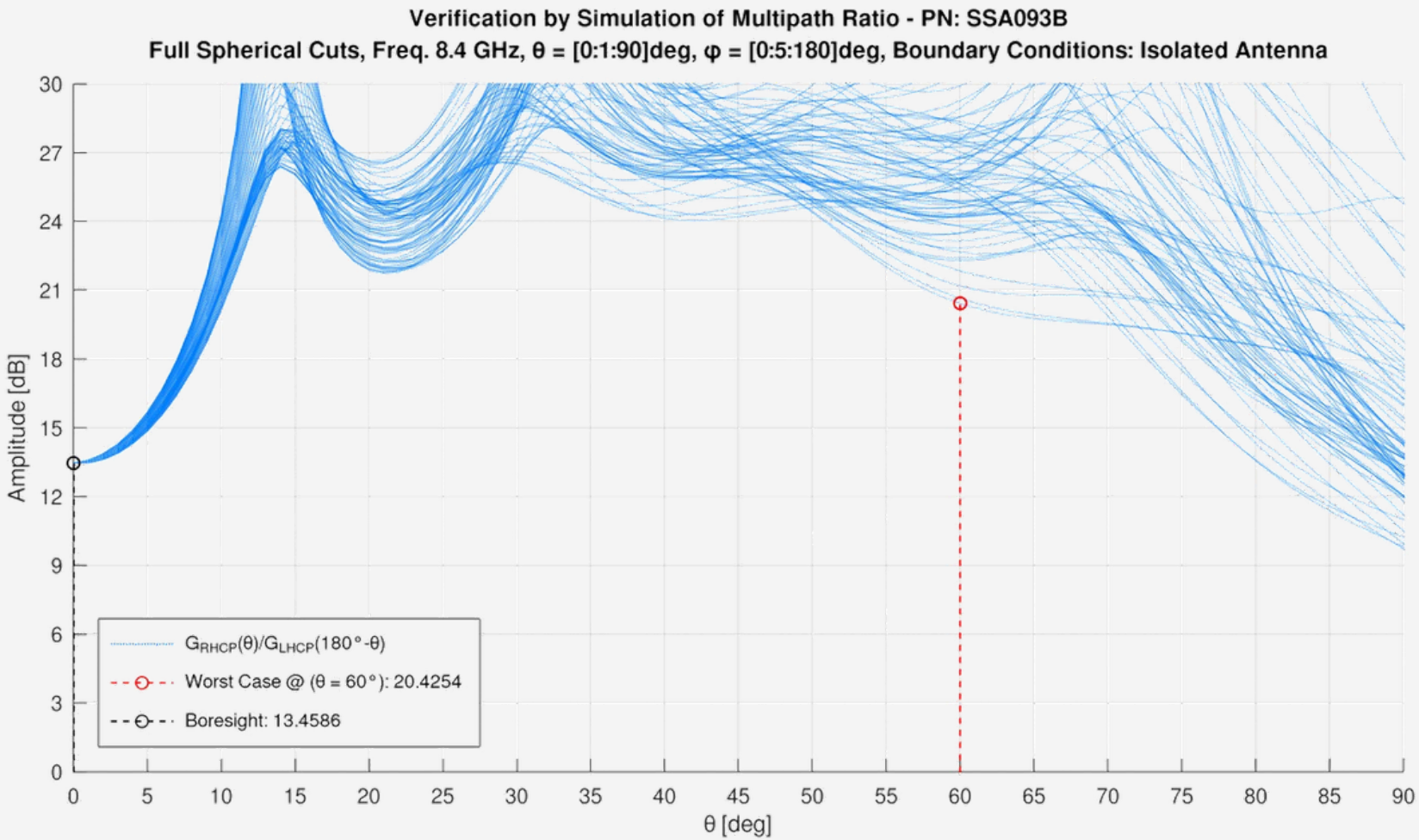
Multipath Ratio Pattern @ Frequency: 8 GHz



Multipath Ratio Pattern @ Frequency: 8.2 GHz



Multipath Ratio Pattern @ Frequency: 8.4 GHz



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Our Additional Services Include:

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

Keep the antenna from deciding if your mission is successful.

Contact Us for More Information

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