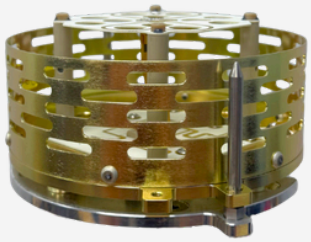
Standard Space Antennas

SPACE-READY ANTENNAS, WHEN TIME AND RELIABILITY MATTER

PN: SSA096B



L Band Antenna

FOHLDER ™

GNSS Multiband Antenna

TRL 9

Mass: 188g

Features

- **Multiband and Circular polarization through Modified Dipoles and Broadband BFN to withstand manufacturing deviations, thermal cycling, and degradation over its lifespan**
  No resonant or perturbation techniques are used

- **Cavity-backed configuration reduces interference from the backplane and nearby objects**
  Surface currents in high-permeability and certain stacked-based patch configurations significantly distort performance under operating conditions

- **No hidden lumped elements, and the synthesis was performed without an unused isolated port**

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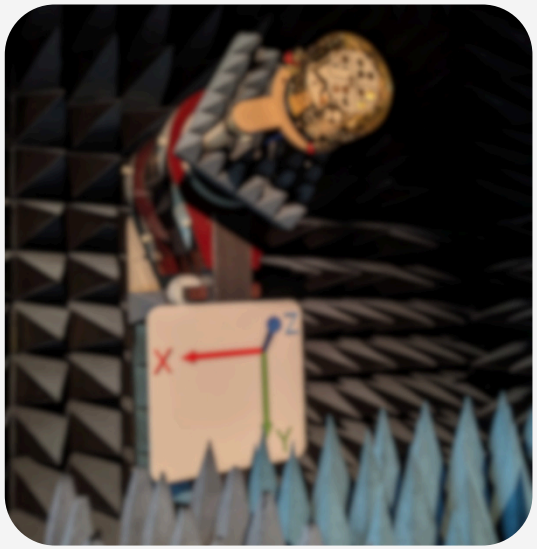
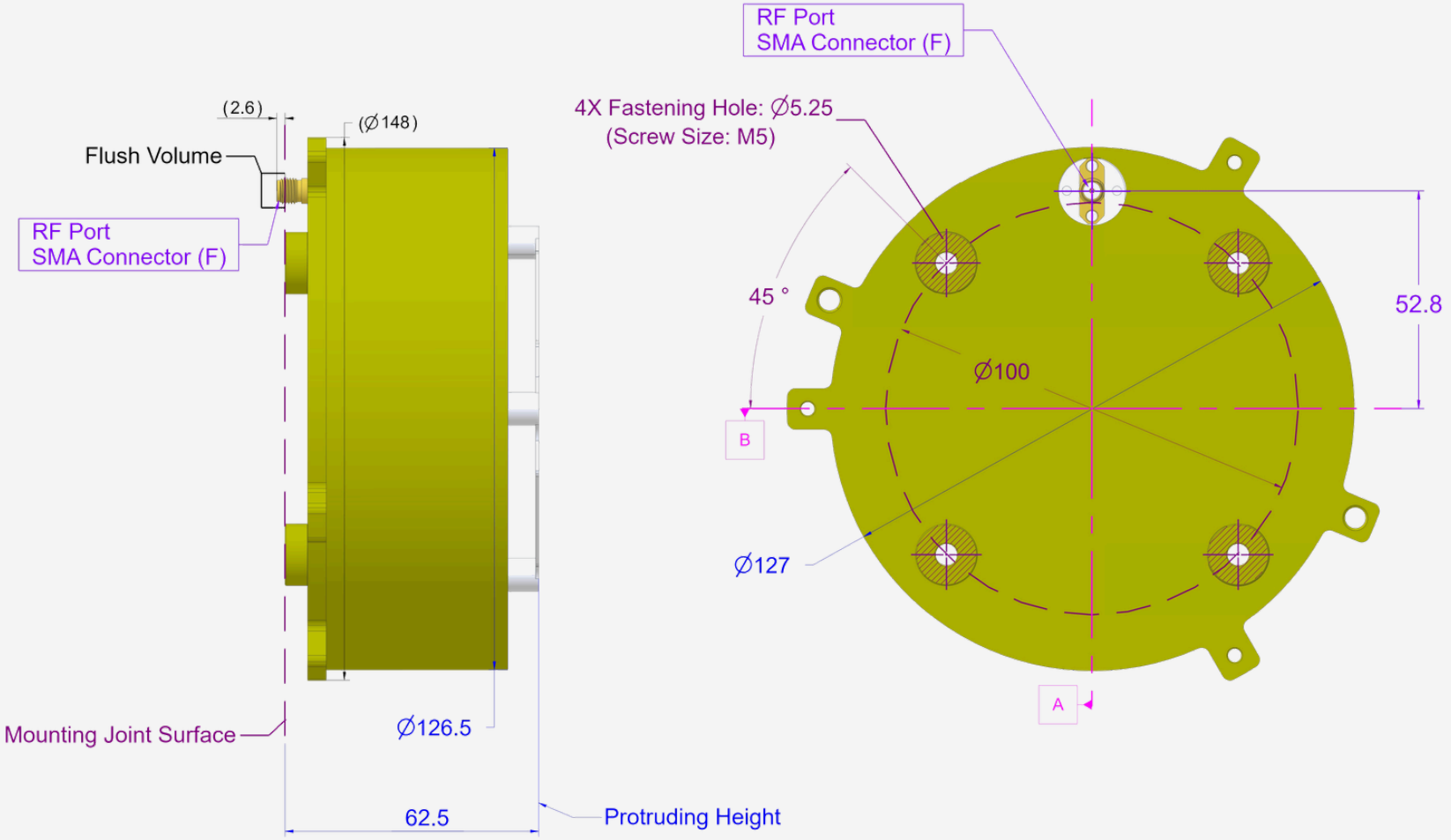
SPACE-READY ANTENNAS, WHEN TIME AND RELIABILITY MATTER



Benefits

- **Designed for assembly, automation suitability, and optimal cost-effectiveness for high-production batches**
  Multiband and high-reliability for GNSS service in satellite constellations or critical missions
- **Broadband Efficiency and Polarization Ratio**
  No material-dependent performance
- **Consistent operational performance**
  Due to the perfect match with the simulation results, the high symmetry in the azimuth of the radiation pattern, and lossless by design
- **Interface for a hat without needing an additional adapter**

Mechanical Envelope



Typical Functional Specifications @ Isolated condition

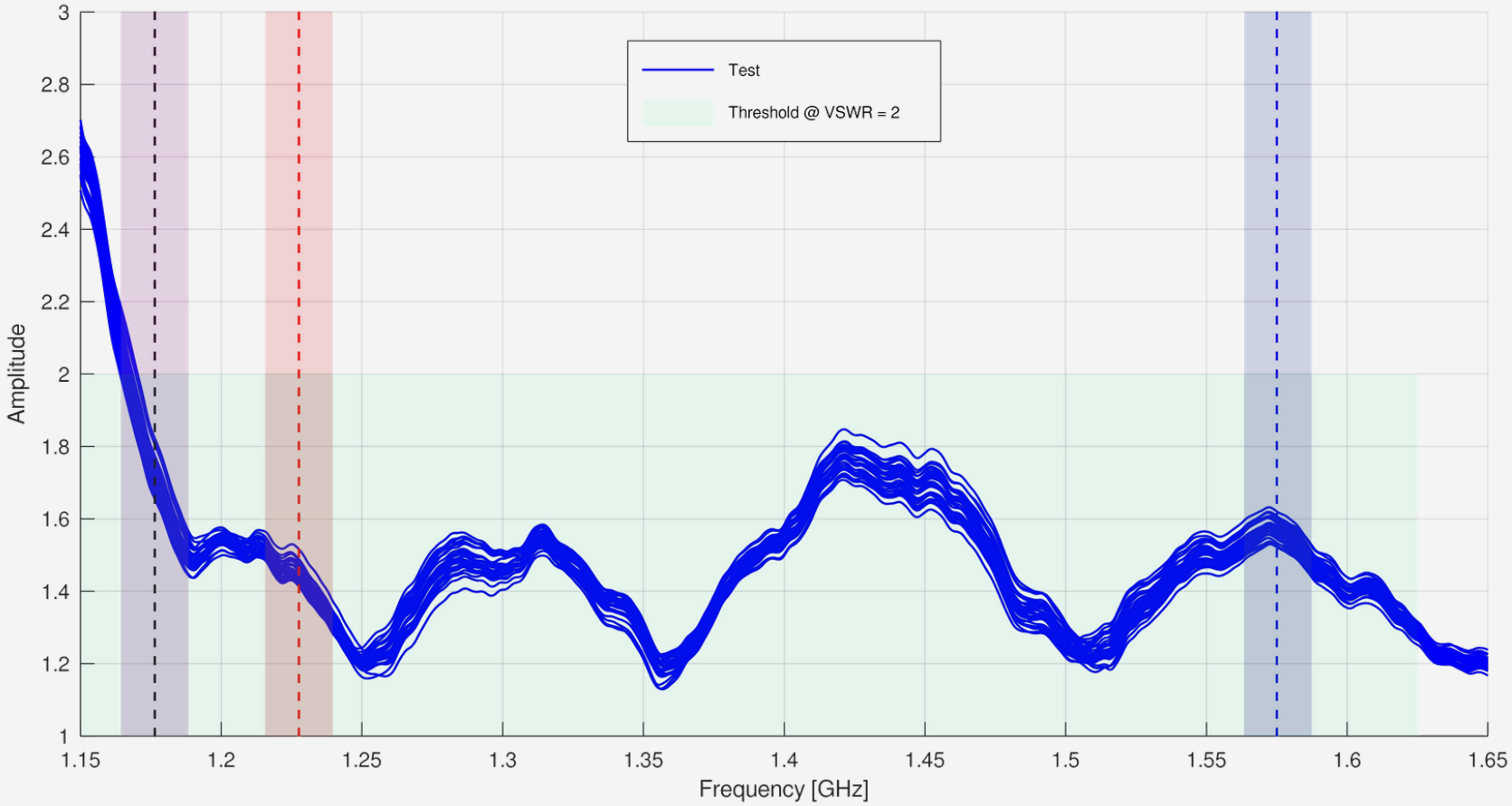
Parameter	Values	Remark
Frequency Range [GHz]	1.164 – 1.609	Frequency Range [AD 21]
Reflection Coefficient [dB]	-10.12 (-11.46) (-14.54 (-17.69)) (-13.19 (-14.86))	Worst Case (Best Case) @ L5 1176 MHz (L2 1227 MHz) (L1 1575 MHz) [AD1]
VSWR	1.90 (1.73) (1.46 (1.30)) (1.56 (1.44))	Worst Case (Best Case) @ L5 1176 MHz (L2 1227 MHz) (L1 1575 MHz) [AD 1]
Port to Port Isolation [dB]	NA	Single Port
Radiation Efficiency [%]	79.8 (85.7) (84.2)	Worst Case -3% @ L5 1176 MHz (L2 1227 MHz) (L1 1575 MHz) [AD 18]
Radiation Pattern Envelope	Hemispherical	Cardioid [AD 3]
Phase Center [mm]	[0;0;61]	Relative to Antenna Coordinated System [X;Y;Z] [AD 7]
Realized Gain RHCP [dBi]	4.27 (5.79) (5.66)	@ Boresight @ L5 1176 MHz (L2 1227 MHz) (L1 1575 MHz) [AD 2]
HPBW [Degree]	94 (90) (90 (88)) (80 (82))	@Phi = 0° (Phi = 90°) @ L5 1176 MHz (L2 1227 MHz) (L1 1575 MHz) [AD 3]
Polarization Sense	Circular	RHCP Confirmed by Measurements. [AD 3]
Polarization Ratio [dB]	11.47 (14.87) (17.15)	@ Boresight @ L5 1176 MHz (L2 1227 MHz) (L1 1575 MHz) [AD 2]
Axial Ratio [dB]	4.75 (3.17) (2.43)	@ Boresight @ L5 1176 MHz (L2 1227 MHz) (L1 1575 MHz) [AD 2]
Multipath Ratio [dB]	13.2 (14.1) (19.7)	Worst Case @ theta < 60° Ref: G_RHCP(theta)/G_LHCP(180-theta) @ L5 1176 MHz (L2 1227 MHz) (L1 1575 MHz) [AD 18]
Multipactor Margin [dB]	NA	Receiver Antenna
Corona Discharge Margin [dB]	NA	Receiver Antenna

Typical Environmental & Interface Specification

Parameter	Values	Remark
Mass [g]	188	Center of Mass: [-0.1, 1.6, 16.2] mm from Mounting Joint Surface. [AD 7]
Size [mm]	127 (148)	Cavity Diameter (Max Envelope) [AD 7]
Height [mm]	62.8	Overall Height measured from Mounting Joint Surface. [AD 7] (Flush: 2.6 mm)
RF Interface	SMA Female	[AD 7]
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 8], [AD 9] and [AD 10]
Temperature Range [°C]	(-60; 100)	Thermal Vacuum Test, Four Cycles, 4 hours Dwell [AD 20]. Verified by Analysis in [AD 17]
Vacuum [Hpa]	≤ 1.33×10^-5 ±80%	In Thermal Vacuum Test [AD 20]
1st Natural Frequency [Hz]	543	Verified by Analysis in [AD 15]
Dynamic Acceleracion Loads [Grms]	20 Hz: 0.026 g^2/Hz 20 - 50 Hz: +6 dB/Oct 50 - 800 Hz: 0.16 g^2/Hz 800-2000: +6 dB/Oct 2000 Hz: 0.026 g^2/Hz Overall: 14.1	• Shaker Test @ Random Vibration, Three Axis, 2 min / axis. [AD 20] • 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)
Static Acceleration Loads [G]	Peak: 42.3	Shaker Test @ Sine Burst, Three Axis [AD 20], Qualification Level, according to NASA GEVS
Shock [G]	42 @ 100 Hz 1400 @ 1000 Hz 1400 @ 10000 Hz	• Shock Test, 1 Shock/Axis [AD 20]. • Shock Response Spectrum Baseline: 1000 G (Maximum Expected Environment according to Review of Typical Launch Vehicles) • Acceptance: 1000 G, Same as Baseline Level • Qualification: 1400 G, 1.4* Acceptance, according to NASA GEVS Criteria

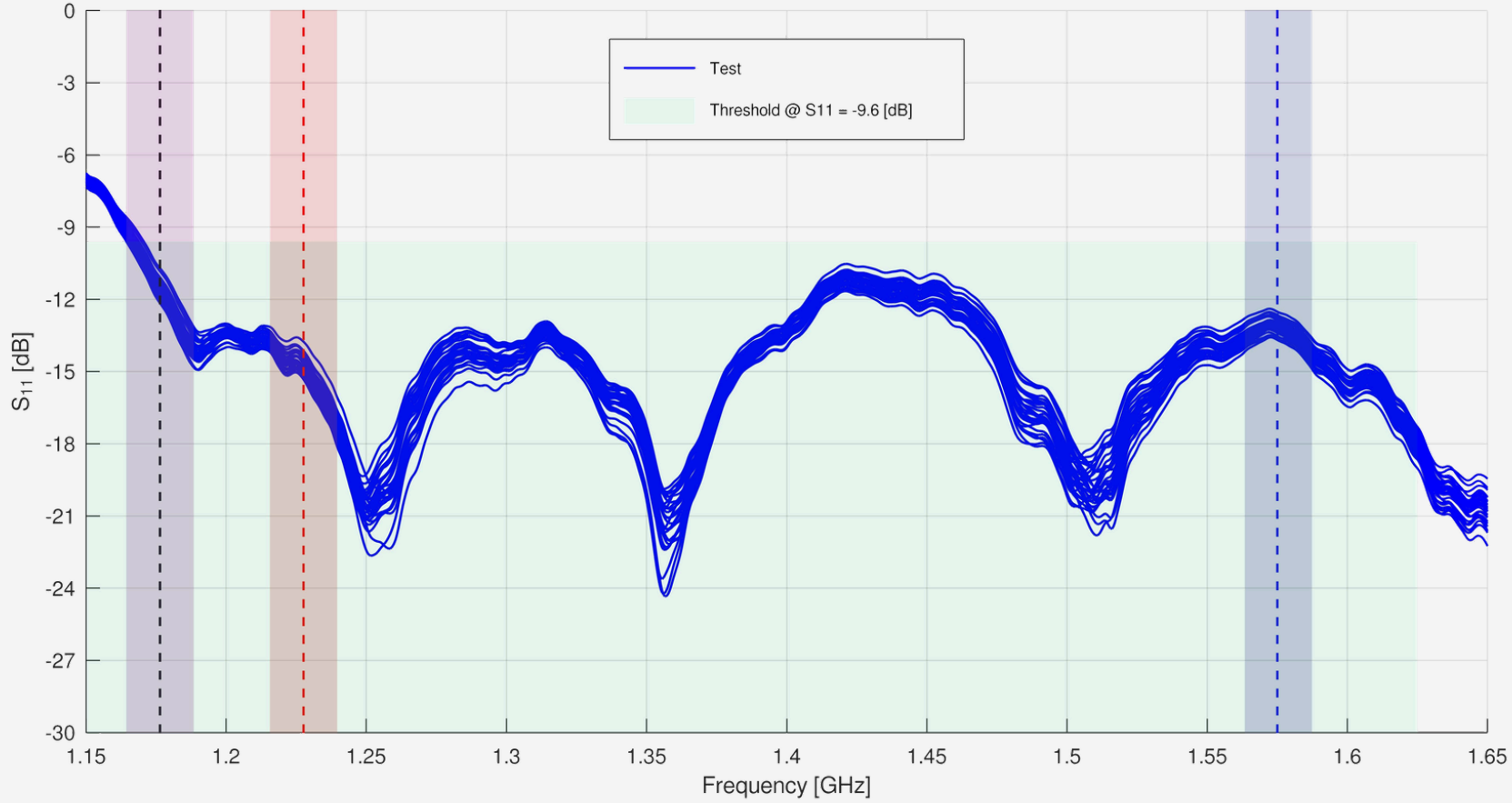
VSWR

Verification by Test of VSWR @ PN: SSA096B-001-033
Frequency: [1.15:0.05:1.65] GHz, Instrument: VNA S5085, Calibration: Full 1-Port OSL, S911T 3.5 CalKit, Boundary Conditions: MGSE-M2

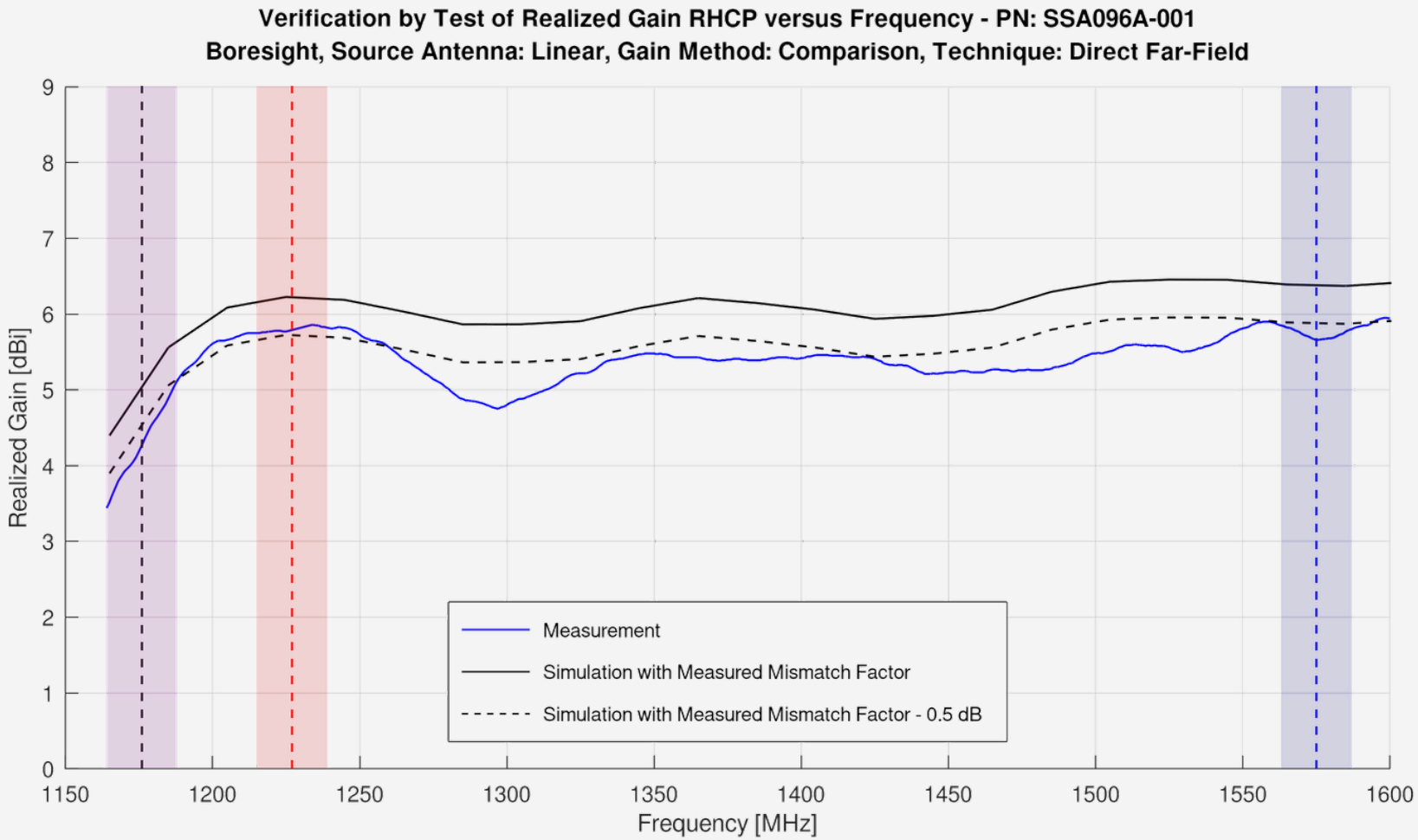


Reflection Coefficient

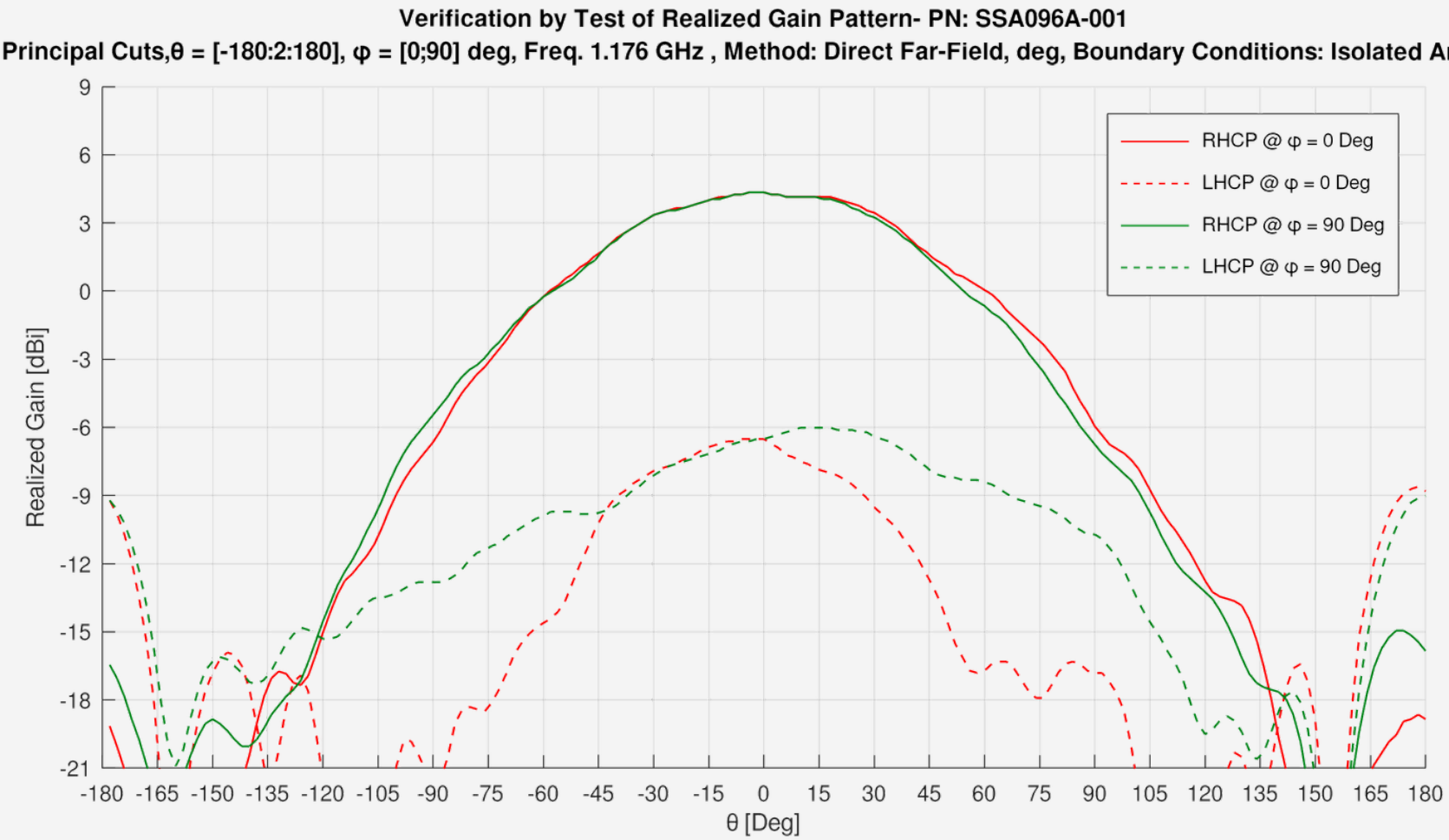
Verification by Test of Reflection Coefficient @ PN: SSA096B-001-033
Frequency: [1.15:0.05:1.65] GHz, Instrument: VNA S5085, Calibration: Full 1-Port OSL, S911T 3.5 CalKit, Boundary Conditions: MGSE-M2



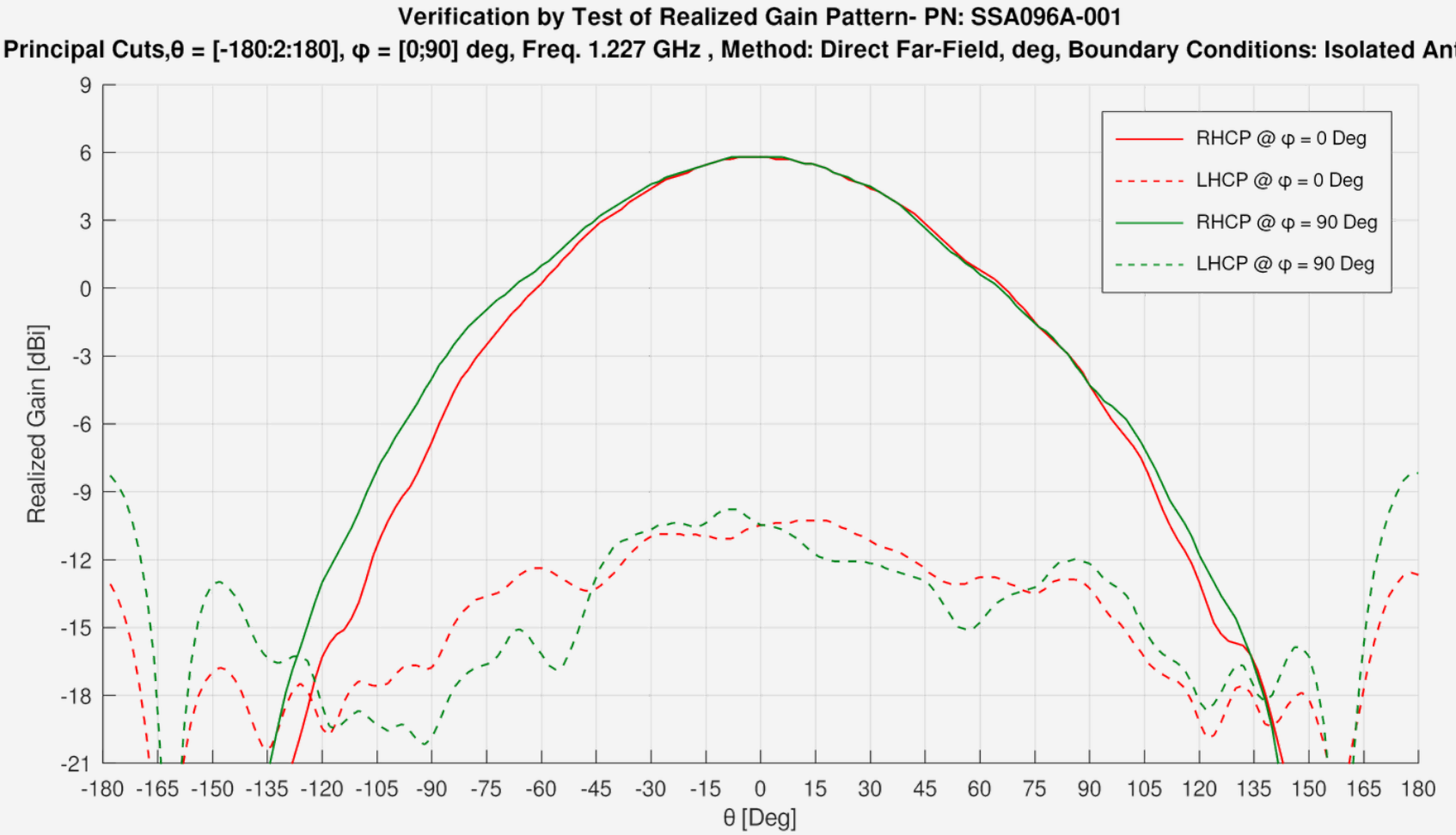
Realized Gain RHCP vs Frequency @ Boresight



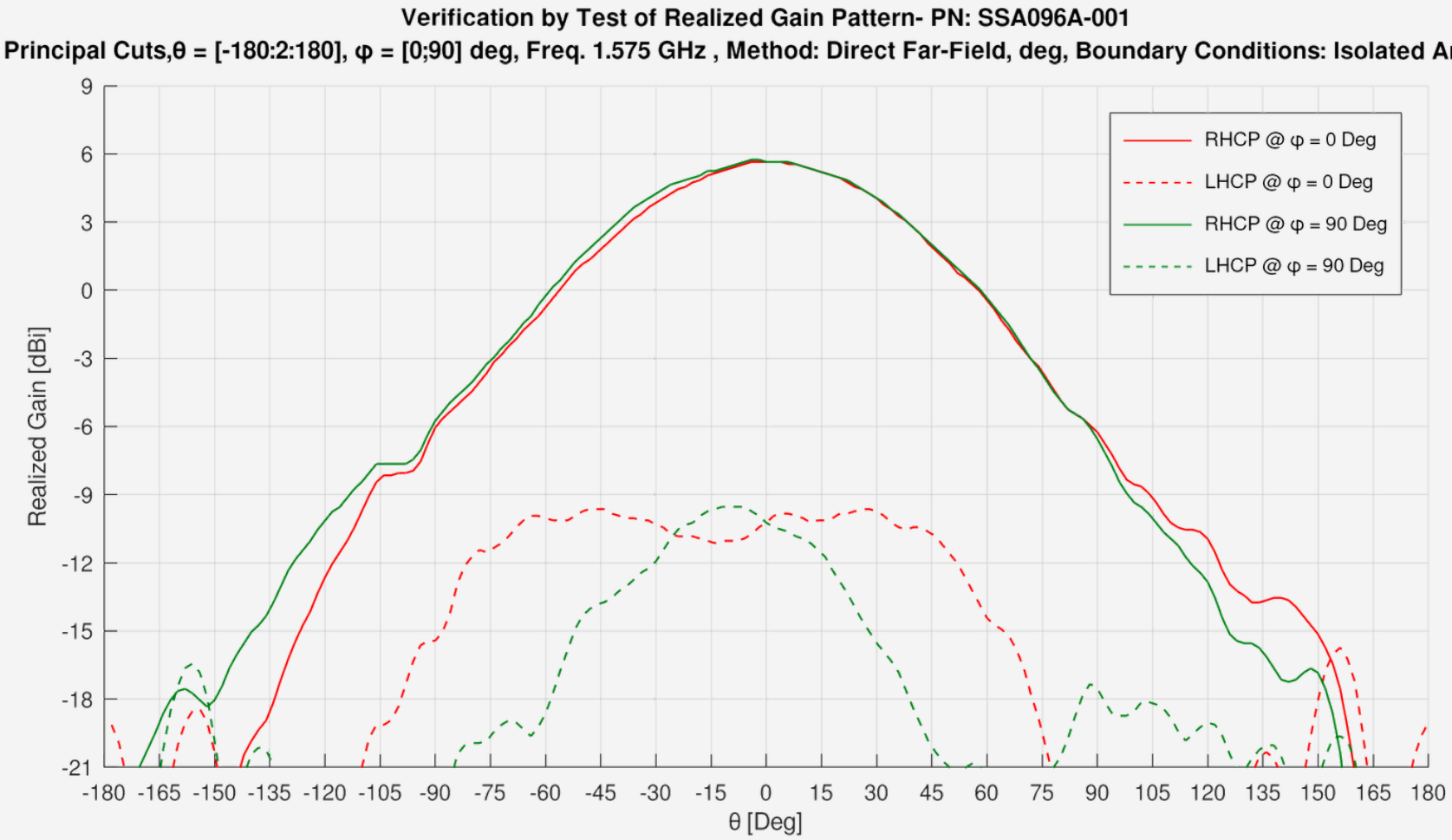
Realized Gain Pattern @ 1.176 GHz



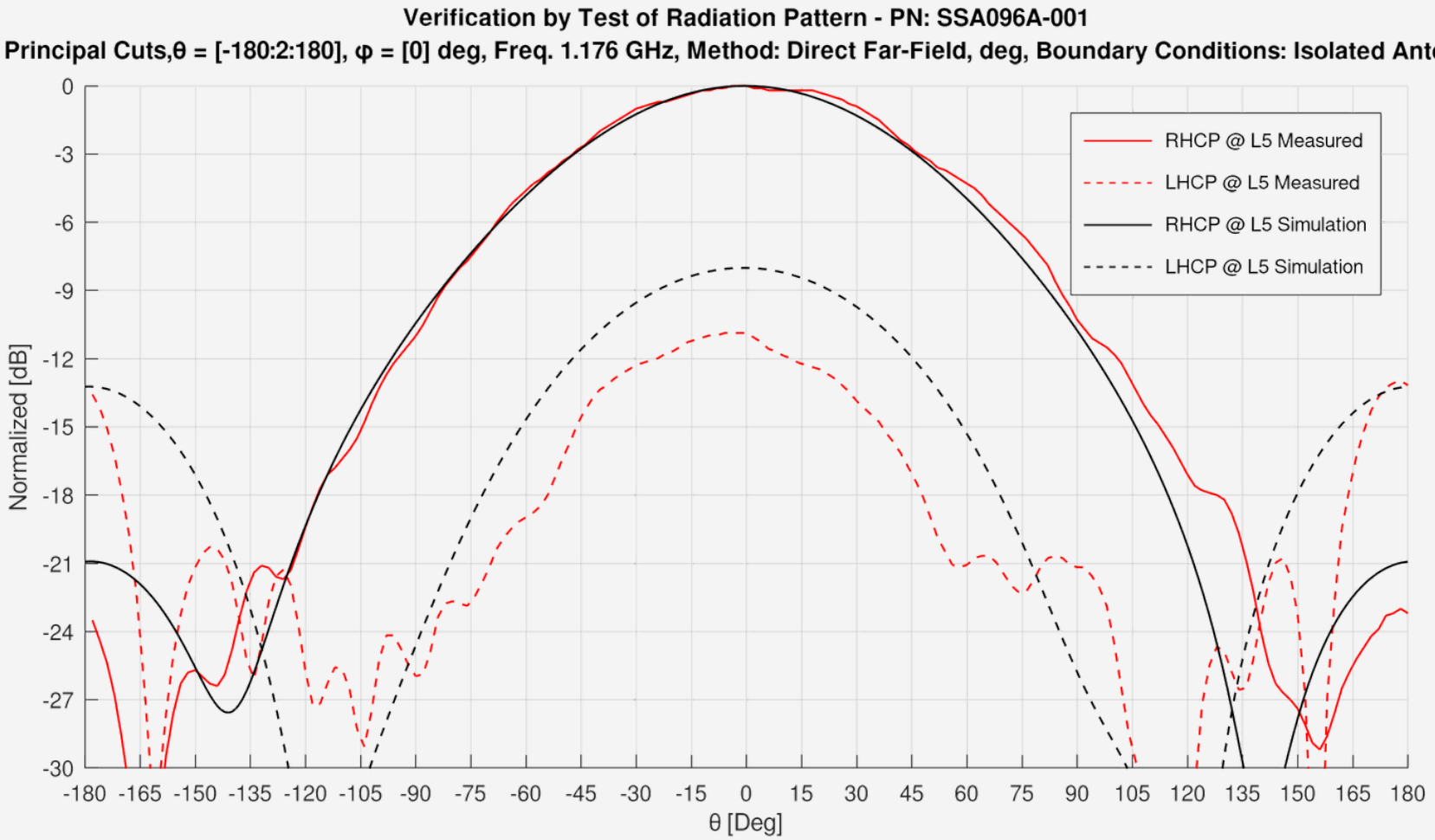
Realized Gain Pattern @ 1.227 GHz



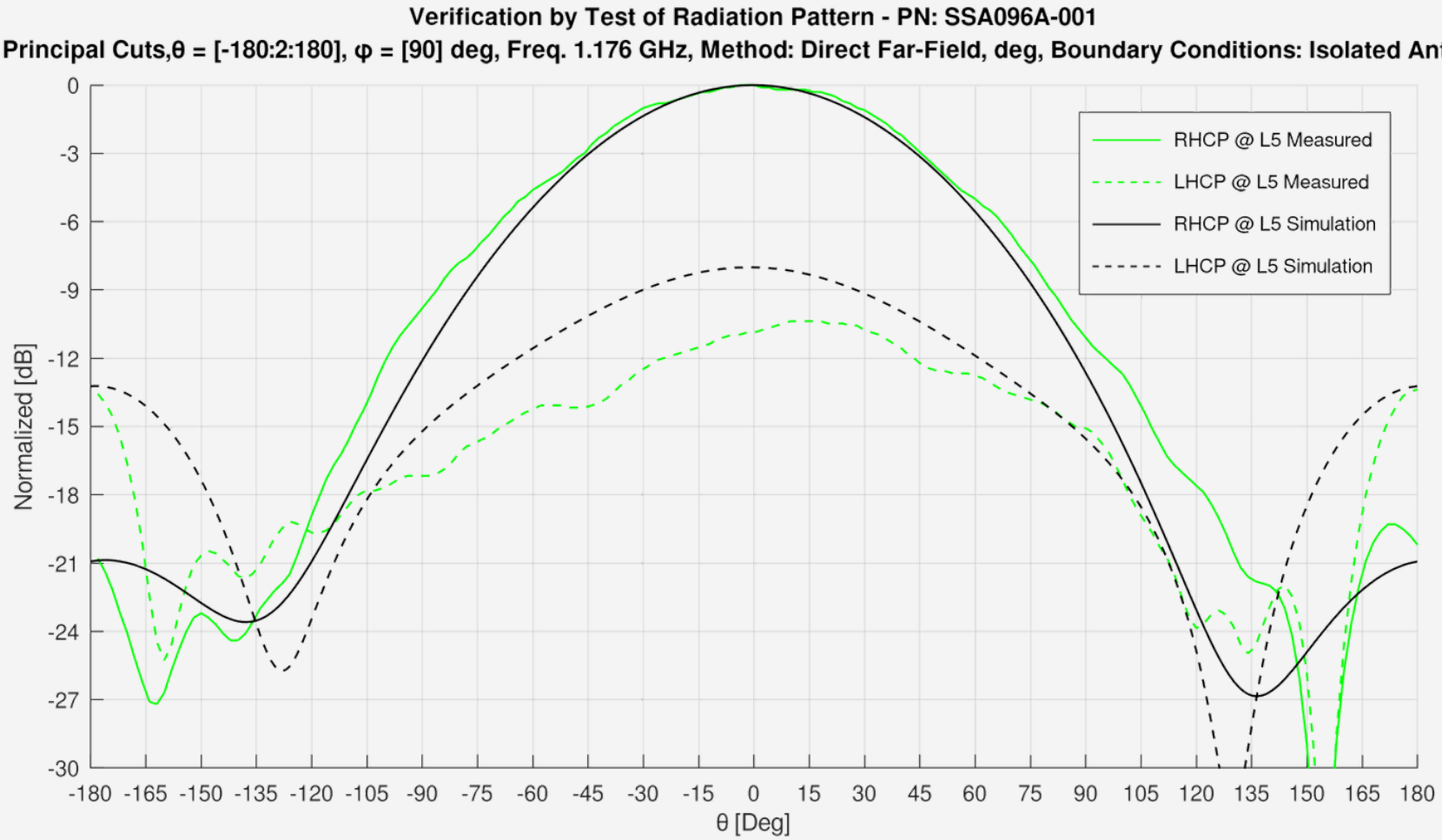
Realized Gain Pattern @ 1.575 GHz



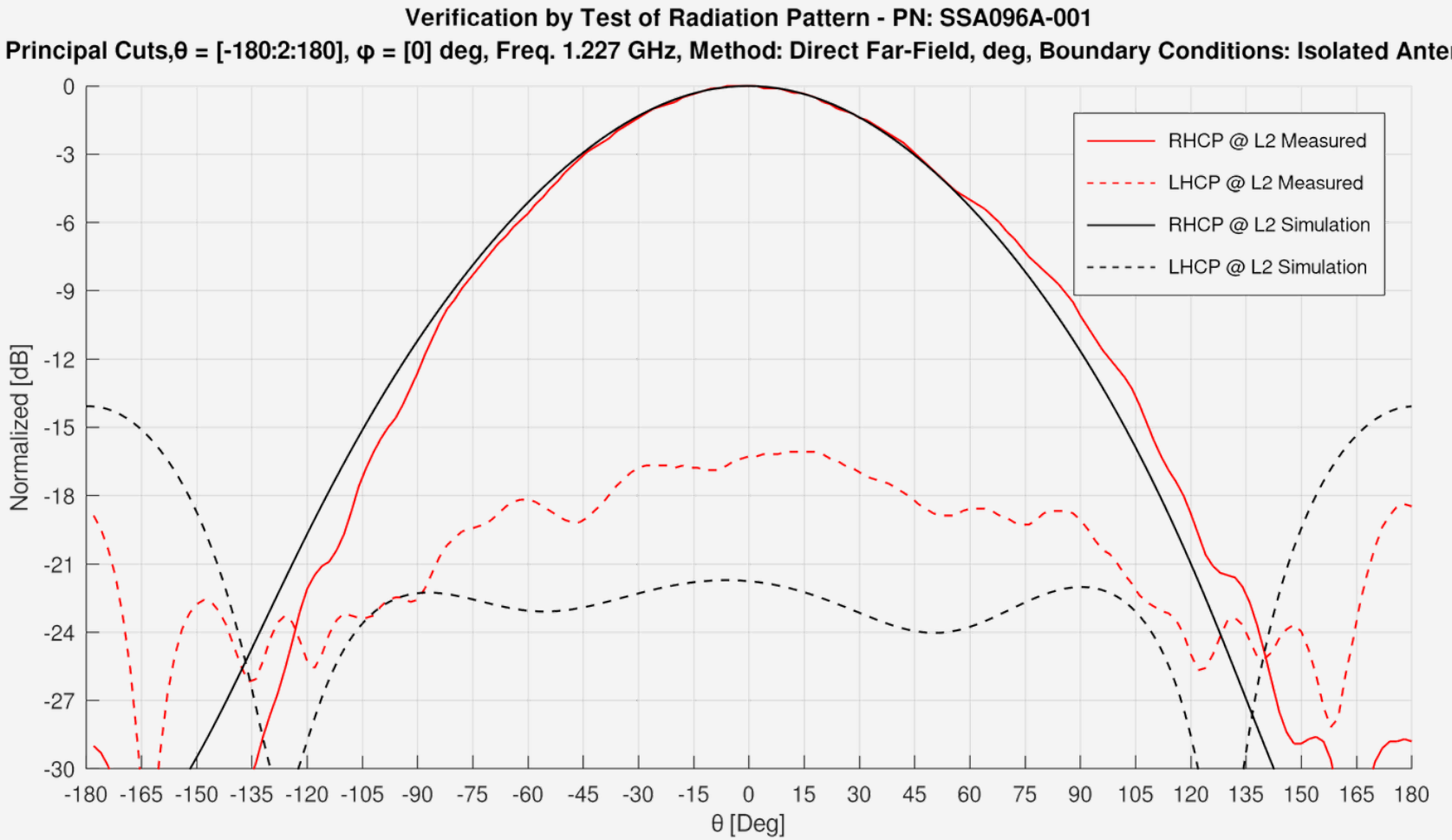
Radiation Pattern @ 1.176 GHz Phi = 0 Degrees



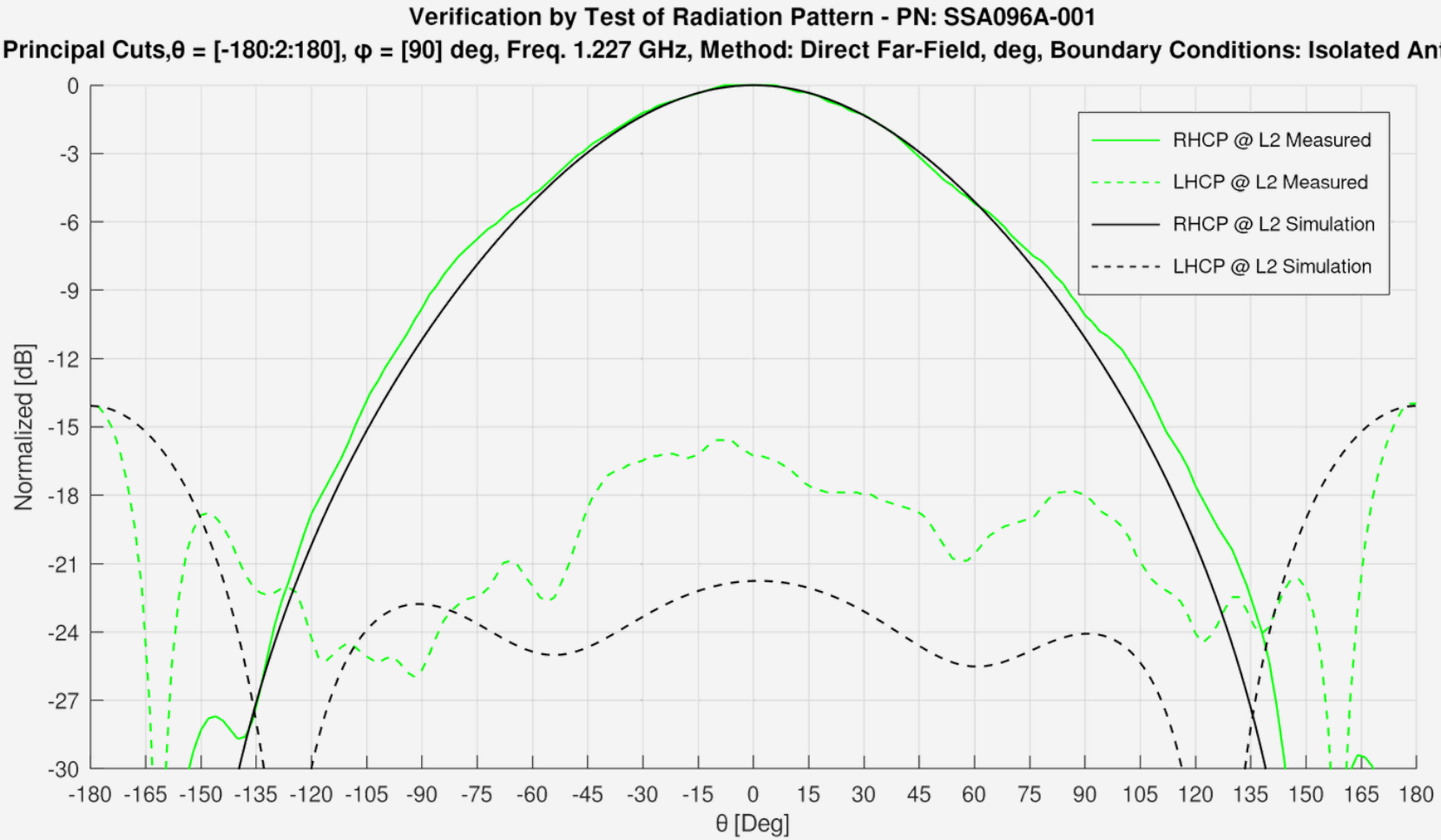
Radiation Pattern @ 1.176 GHz Phi = 90 Degrees



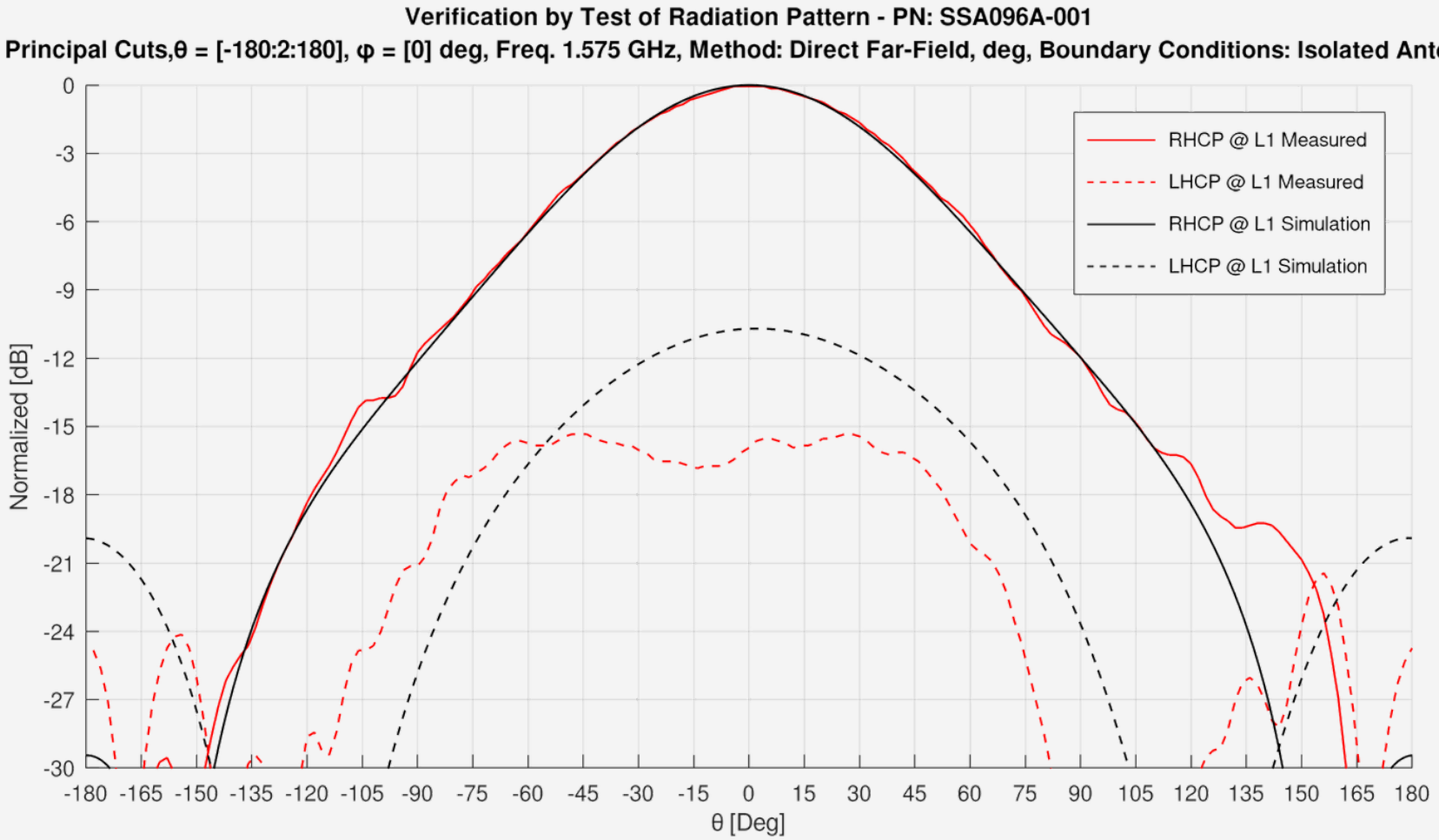
Radiation Pattern @ 1.227 GHz Phi = 0 Degrees



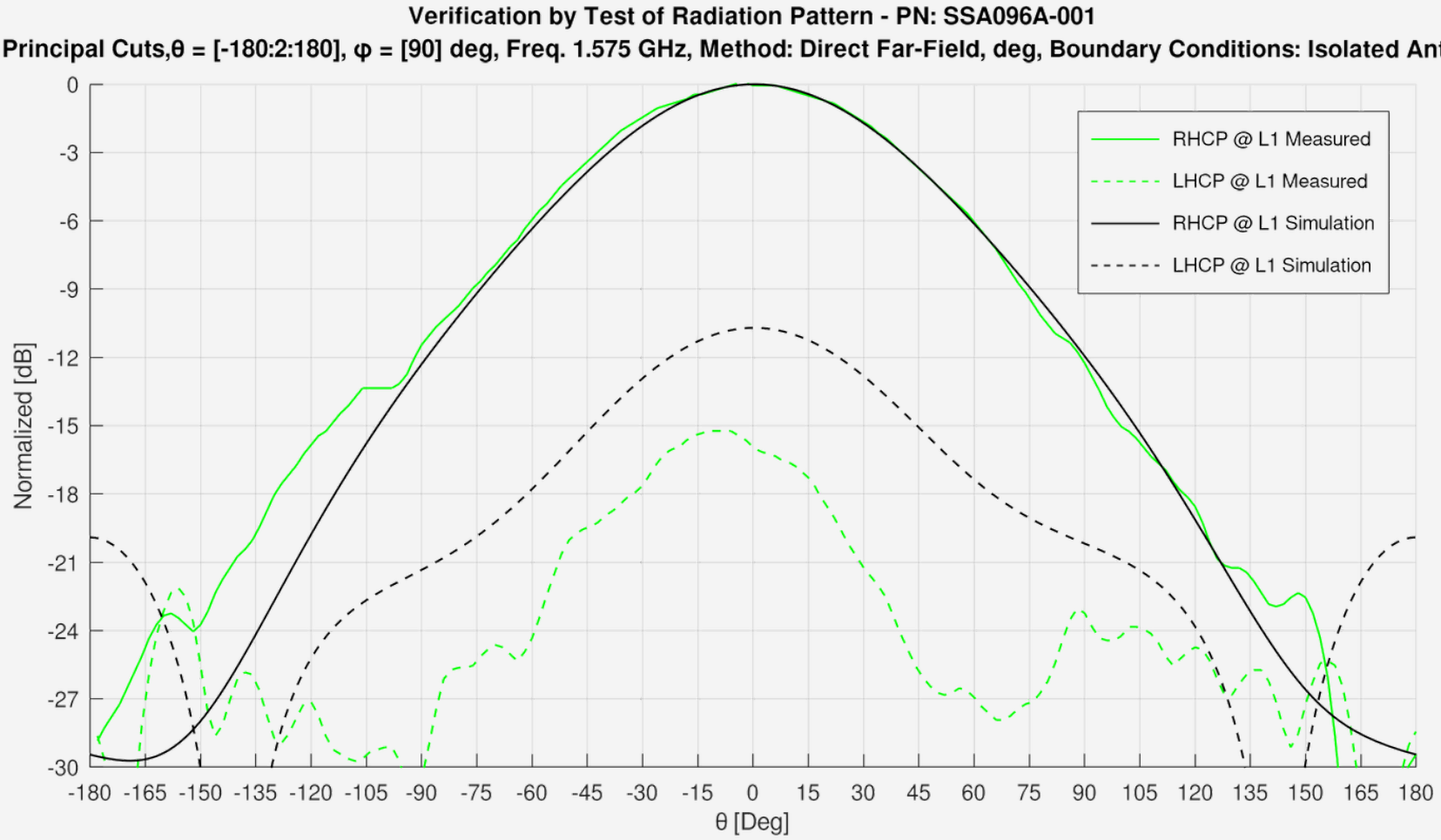
Radiation Pattern @ 1.227 GHz Phi = 90 Degrees



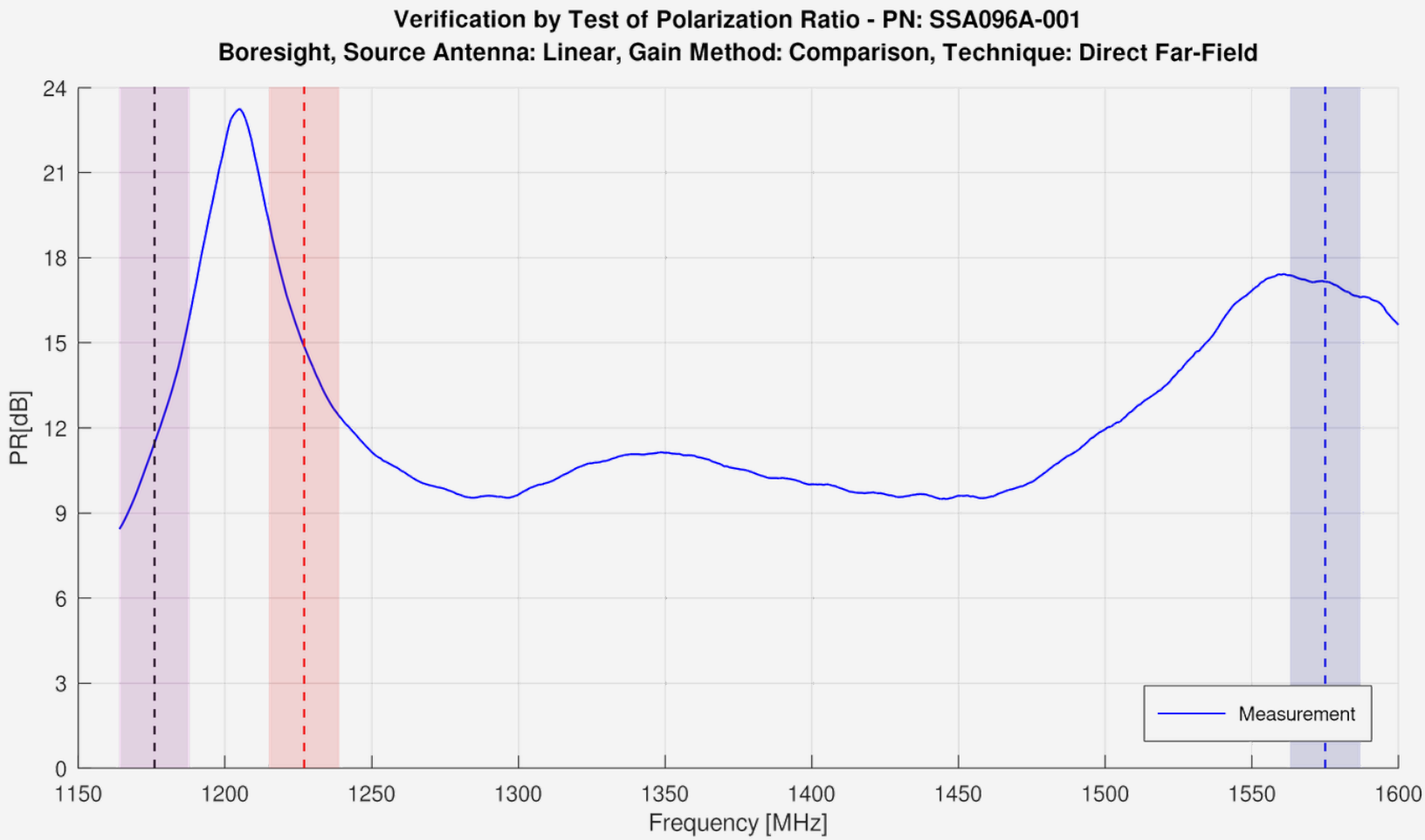
Radiation Pattern @ 1.575 GHz Phi = 0 Degrees



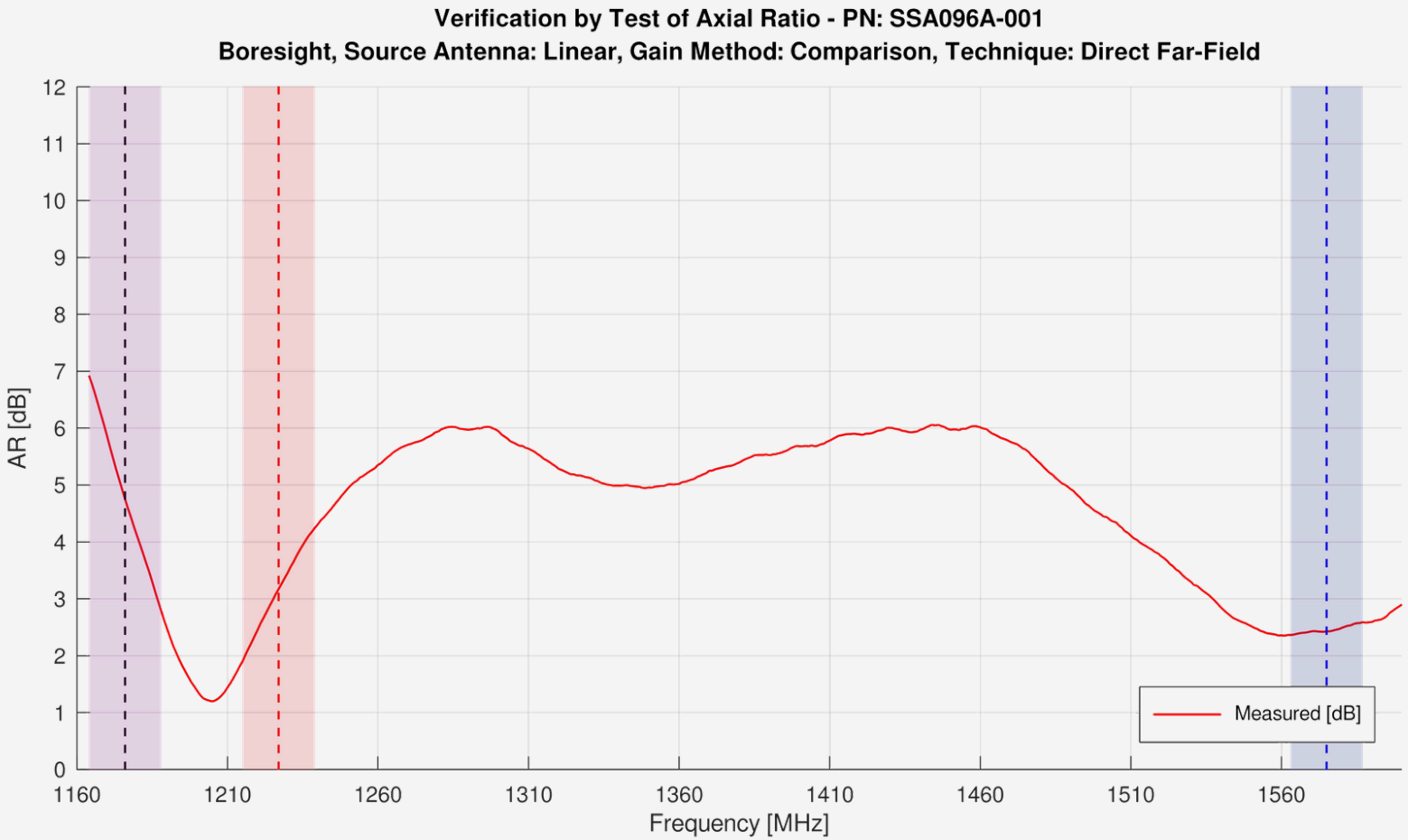
Radiation Pattern @ 1.575 GHz Phi = 90 Degrees



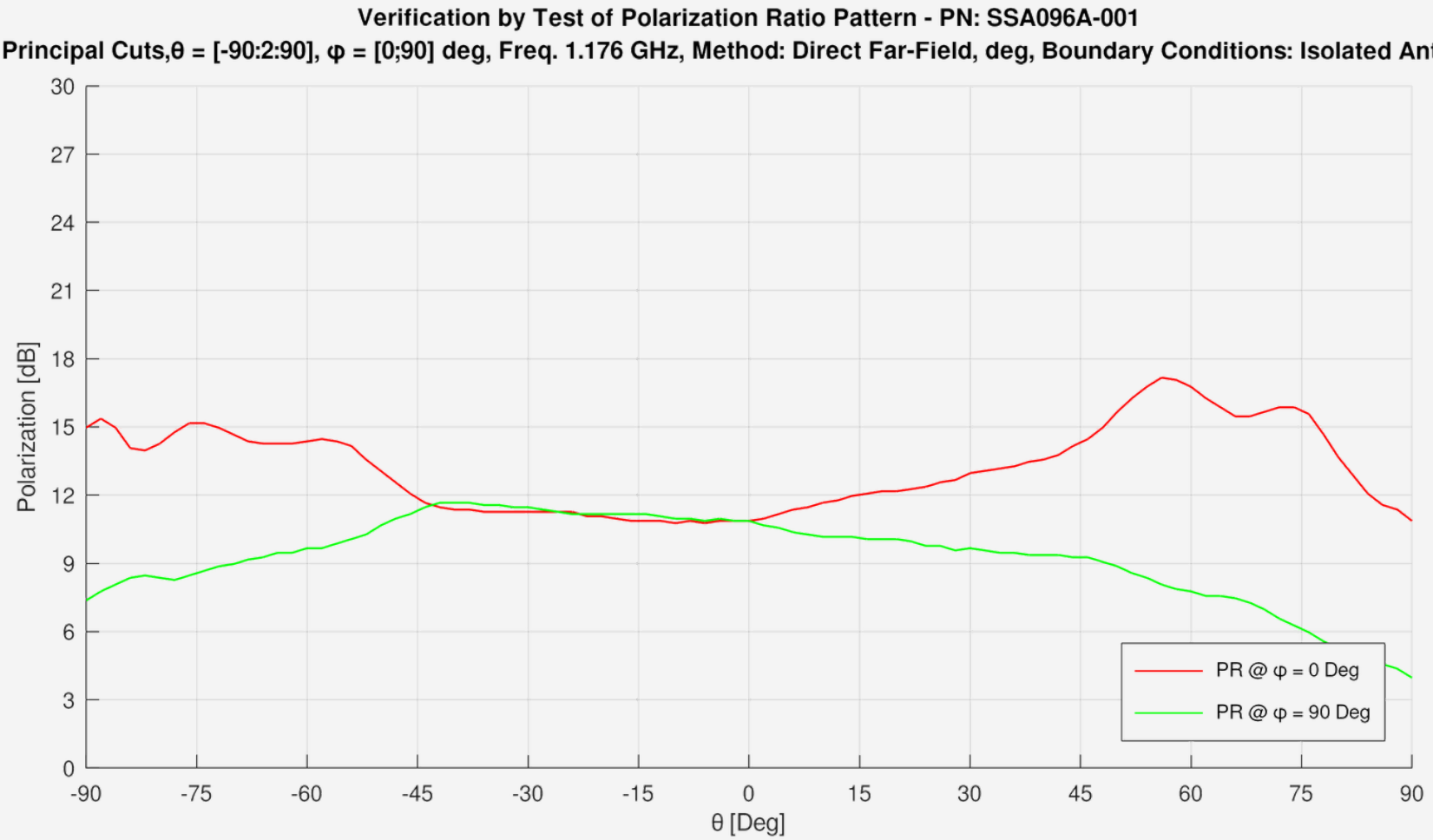
Polarization Ratio Versus Frequency at Boresight



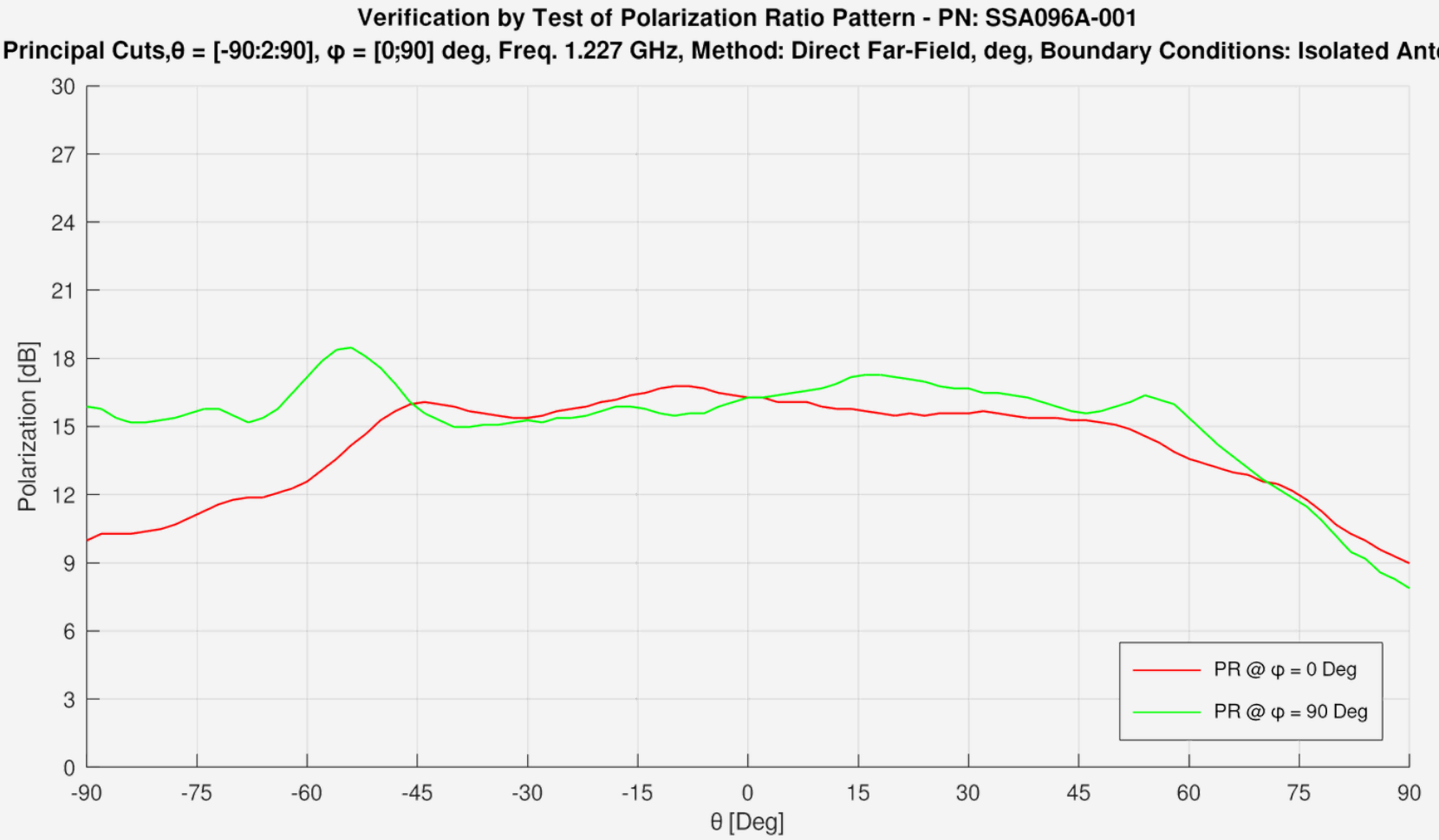
Axial Ratio



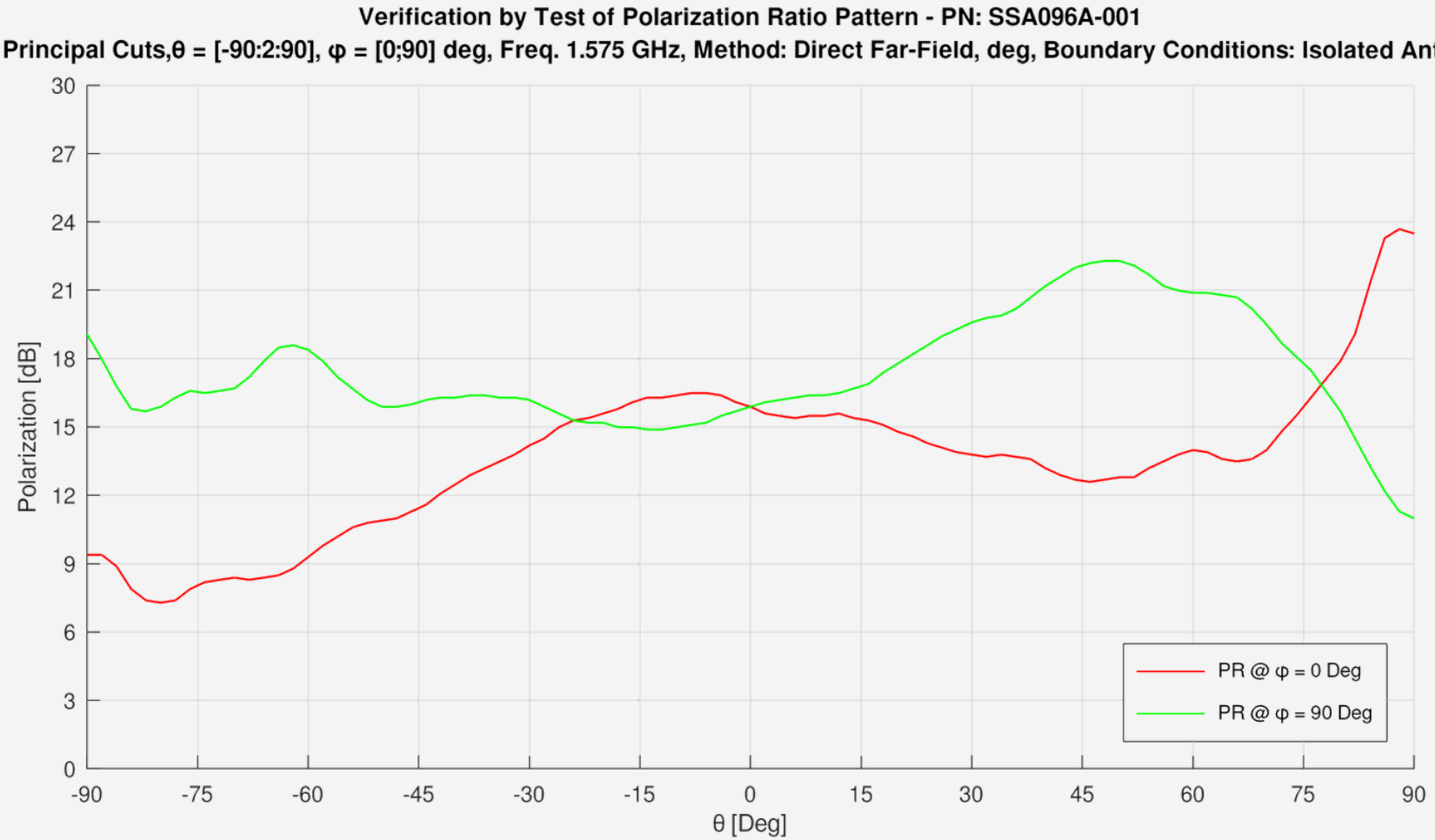
Polarization Ratio Pattern @ 1.176 GHz



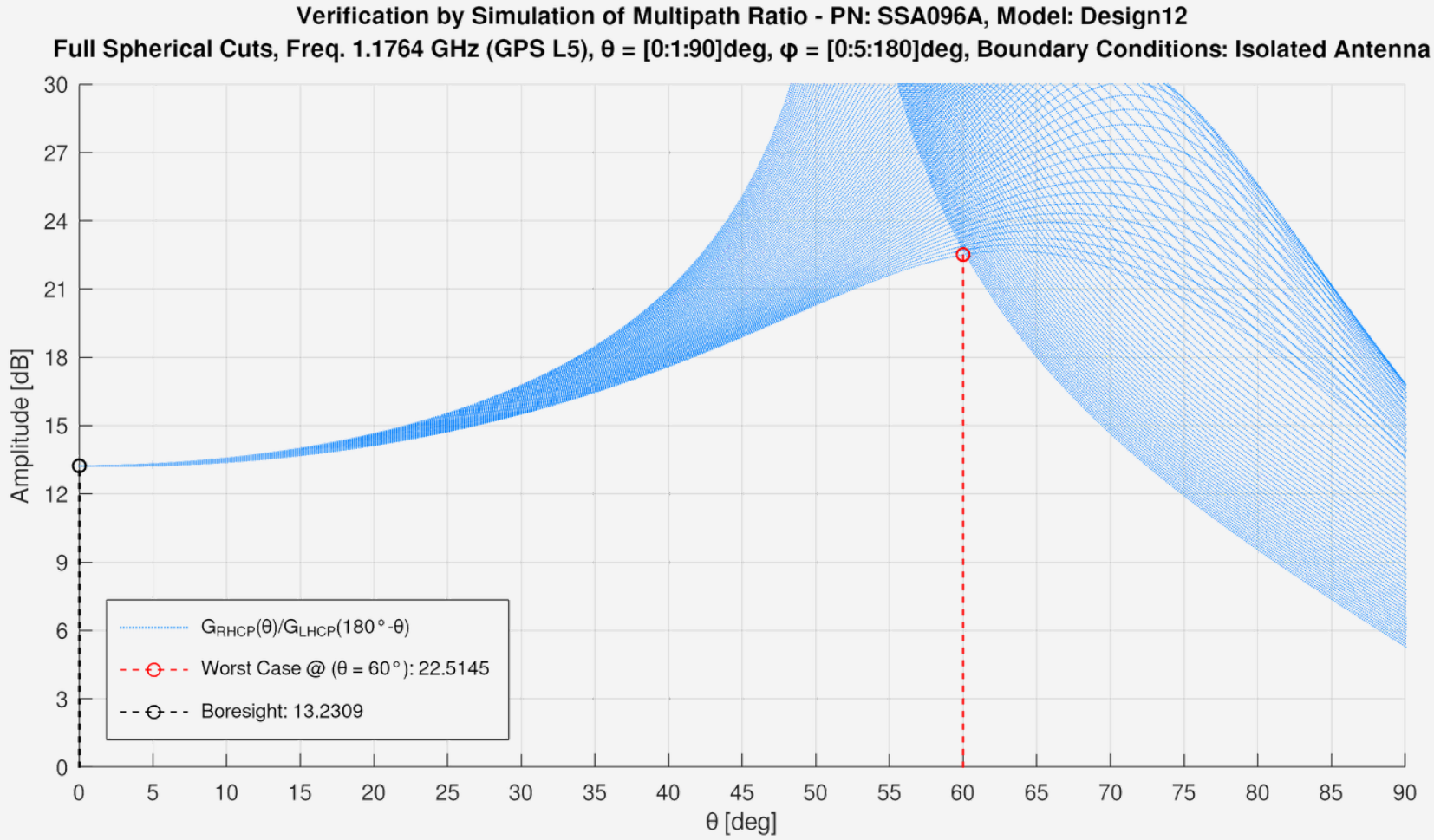
Polarization Ratio Pattern @ 1.227 GHz



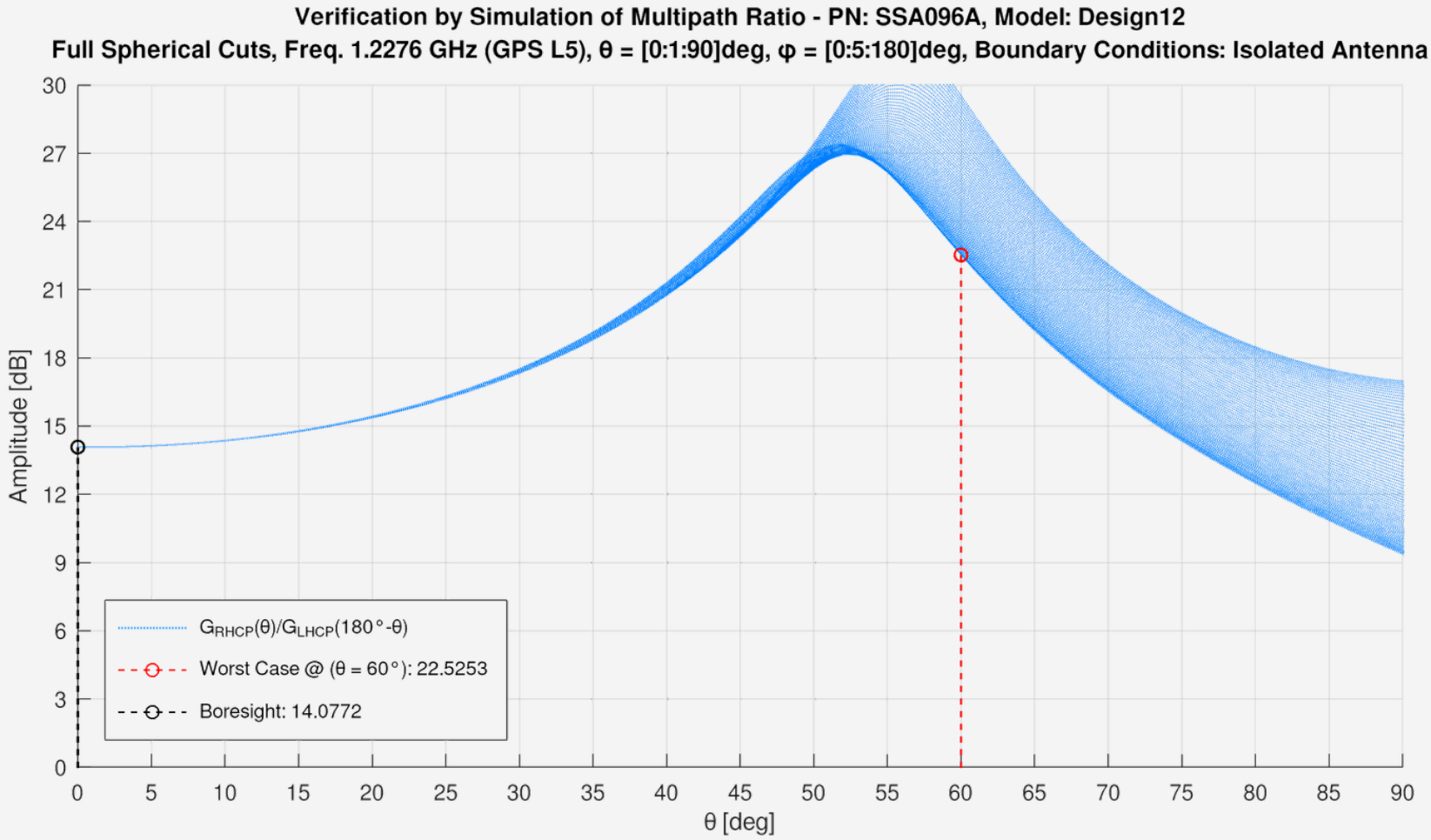
Polarization Ratio Pattern @ 1.575 GHz



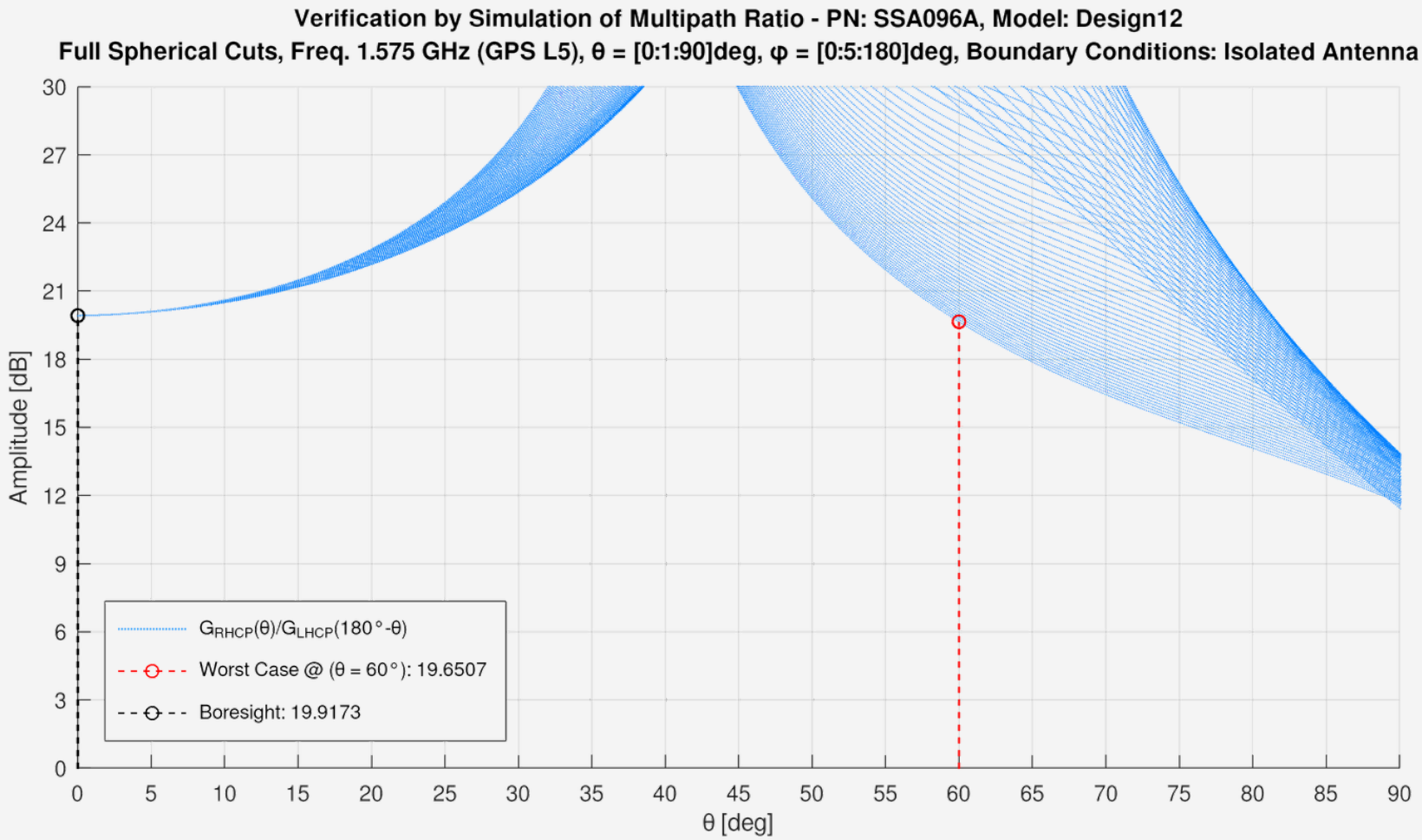
Multipath Ratio Pattern @ Frequency: 1.1764 GHz



Multipath Ratio Pattern @ Frequency: 1.2276 GHz



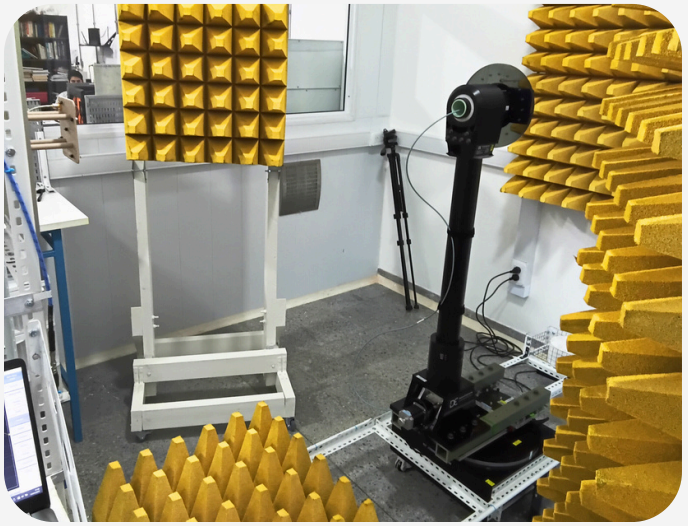
Multipath Ratio Pattern @ Frequency: 1.575 GHz



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)**

Contact Us for More Information



Keep the antenna from deciding if your mission is successful.

www.ssa-lab.com info@ssa-lab.com +1 (561) 806-4296 3651 FAU BLVD STE 400, Boca Raton, FL 33431