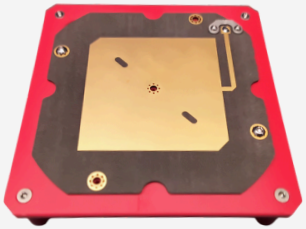
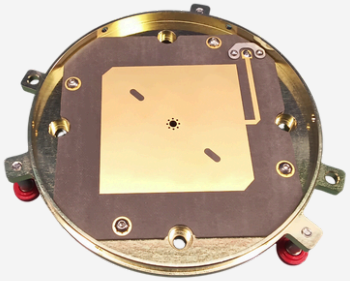
Standard Space Antennas

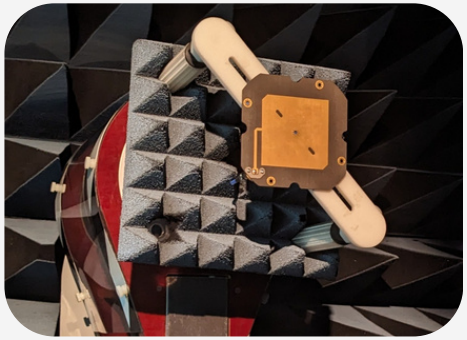
SPACE-READY ANTENNAS, WHEN TIME AND RELIABILITY MATTER

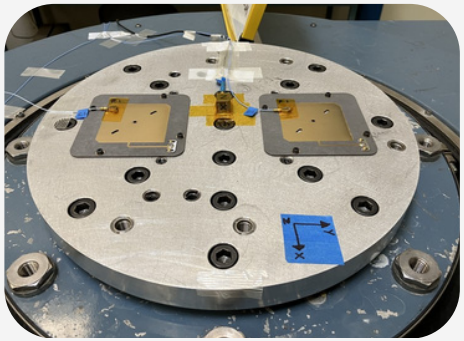
PN: SSA052D





- **L1 Band Antenna**
- **ET.patch™**
- **Hemispherical Coverage**
- **TRL 9**
- **Mass: 43g**





Features

- **Enhanced bandwidth through a slotted patch (~50MHz) to withstand manufacturing deviations, thermal cycling, and degradation over its lifespan**
  Classic design @er=2.20 covers the L1 range of 24MHz only marginally
- **A high Multipath Ratio reduces interference from the backplane and nearby objects**
  Surface currents in ceramic-based small patches significantly distort performance under operating conditions
- **Reinforced microstrip-to-connector transition construction to prevent cracking or detachment during the launching**
  A sandwich structure is used to reduce joint and solder area stress

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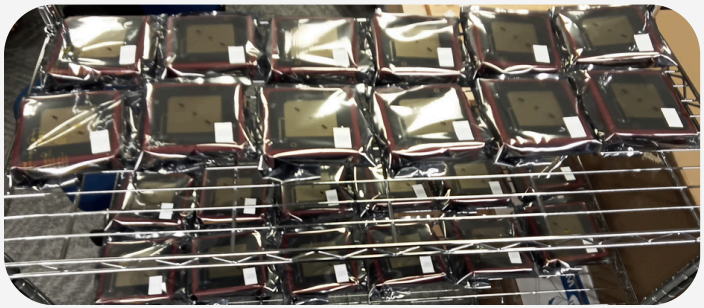


Benefits

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

  Low profile suitable for high-reliability GPS-L1 service in satellite constellations or critical missions

- **Low-loss by Teflon-based substrate**

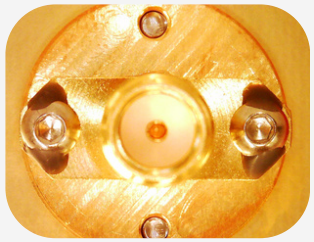
  RT/DUROID 5880 has extensive testing and proven flight heritage by NASA

- **There is no floating potential and consistent thermal conductivity to the joint**

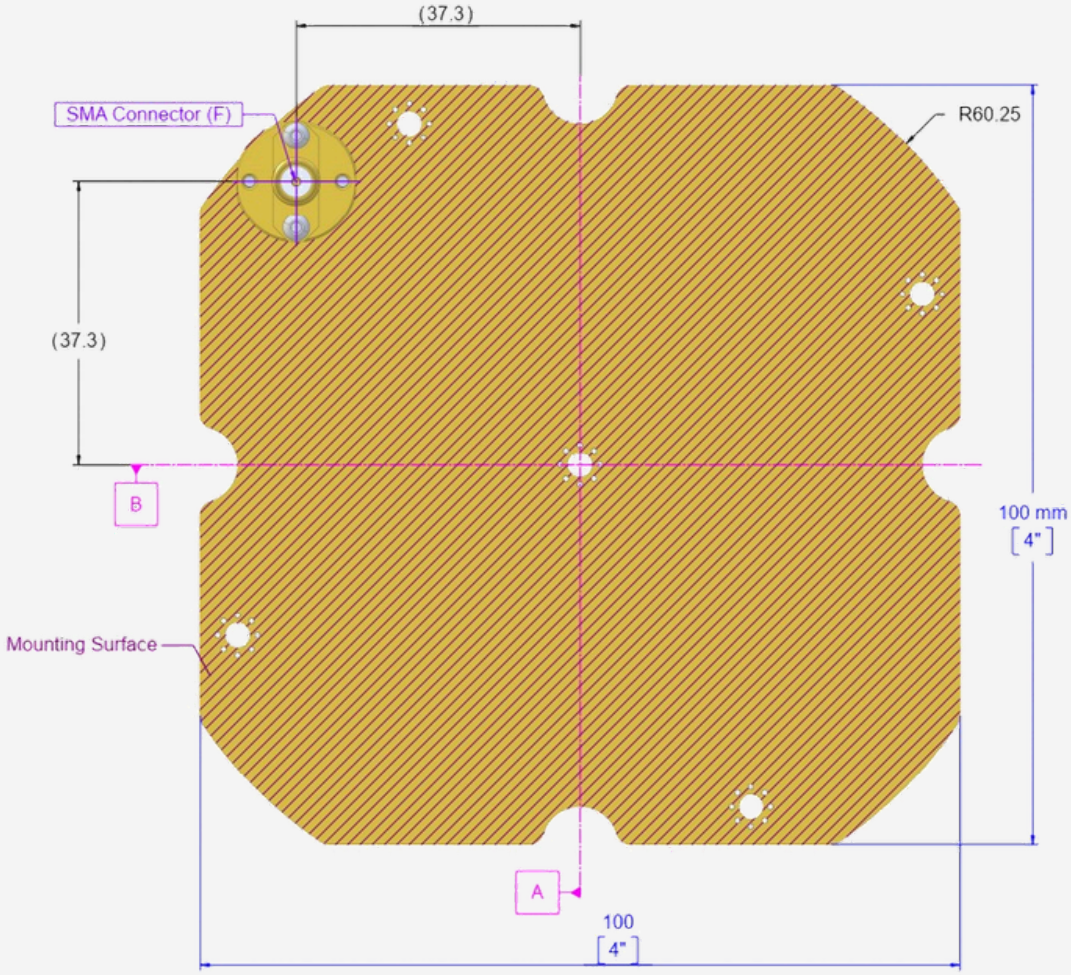
  Direct thermal and electrostatic discharge path from the exposed patch to the interface joint surface through internal metallic vias

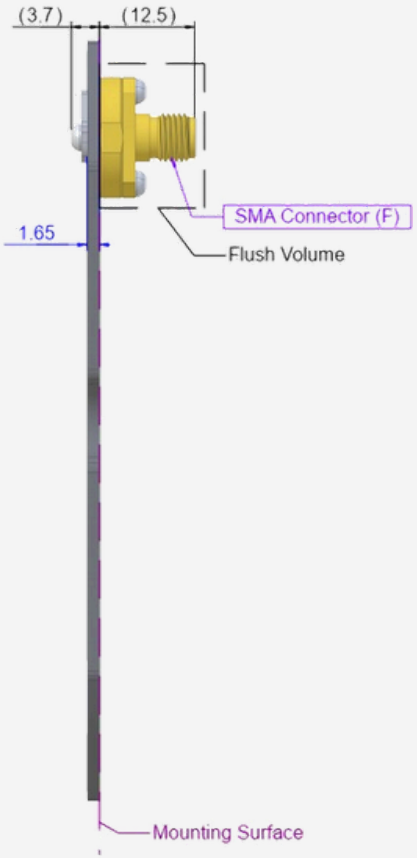
- **Optional: Flange adapter for Hat**

  Test Cap

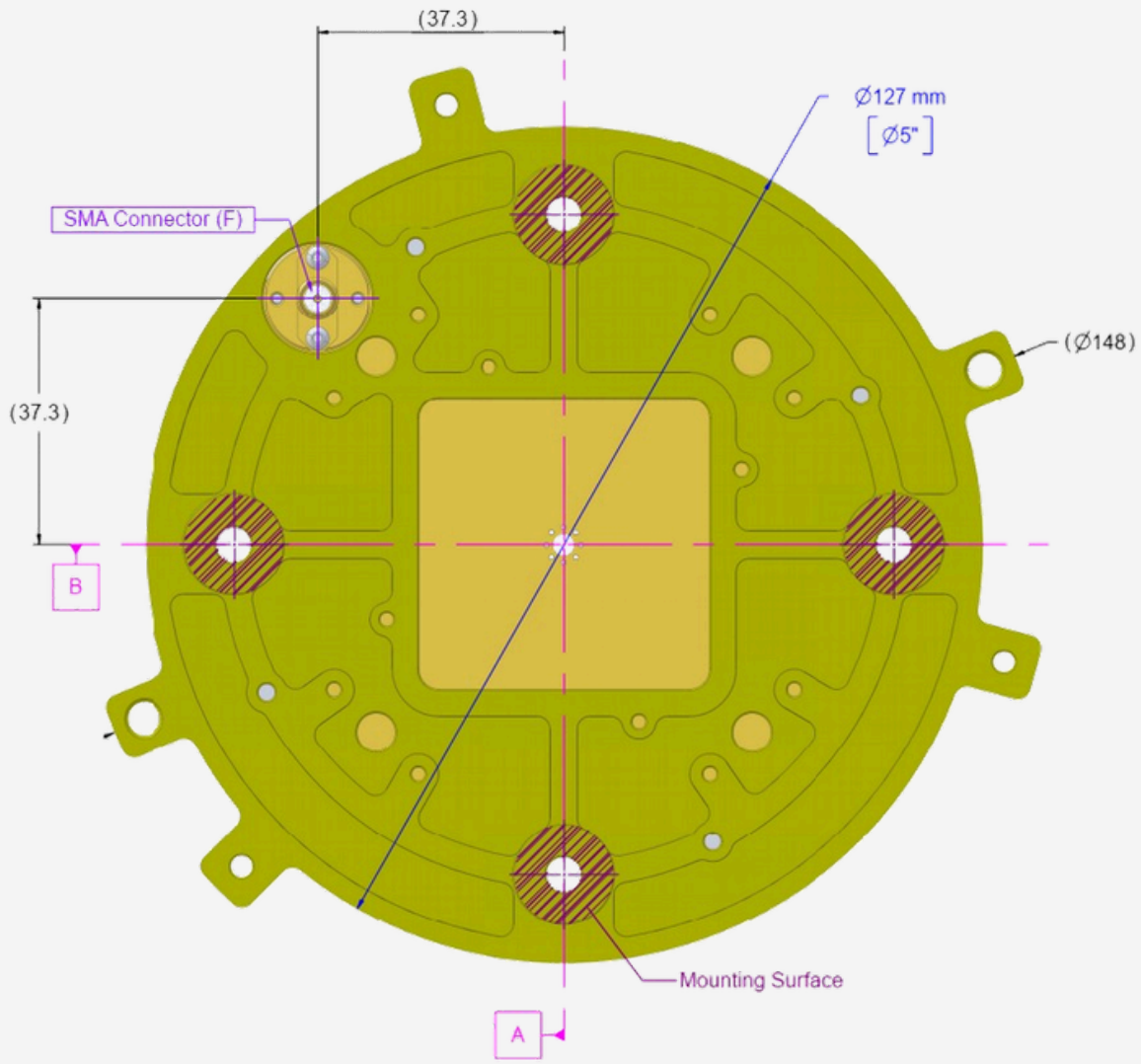


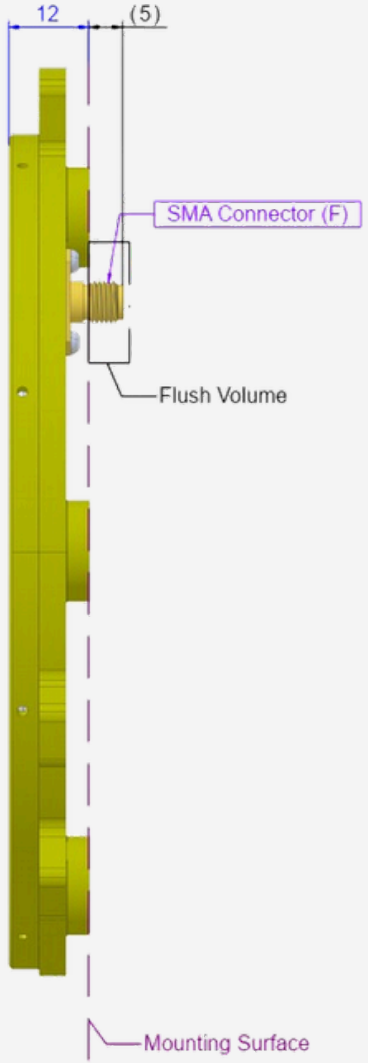
Mechanical Envelope - Isolated Antenna (Option 1)





Mechanical Envelope - With Hat Adapter (Option 2)





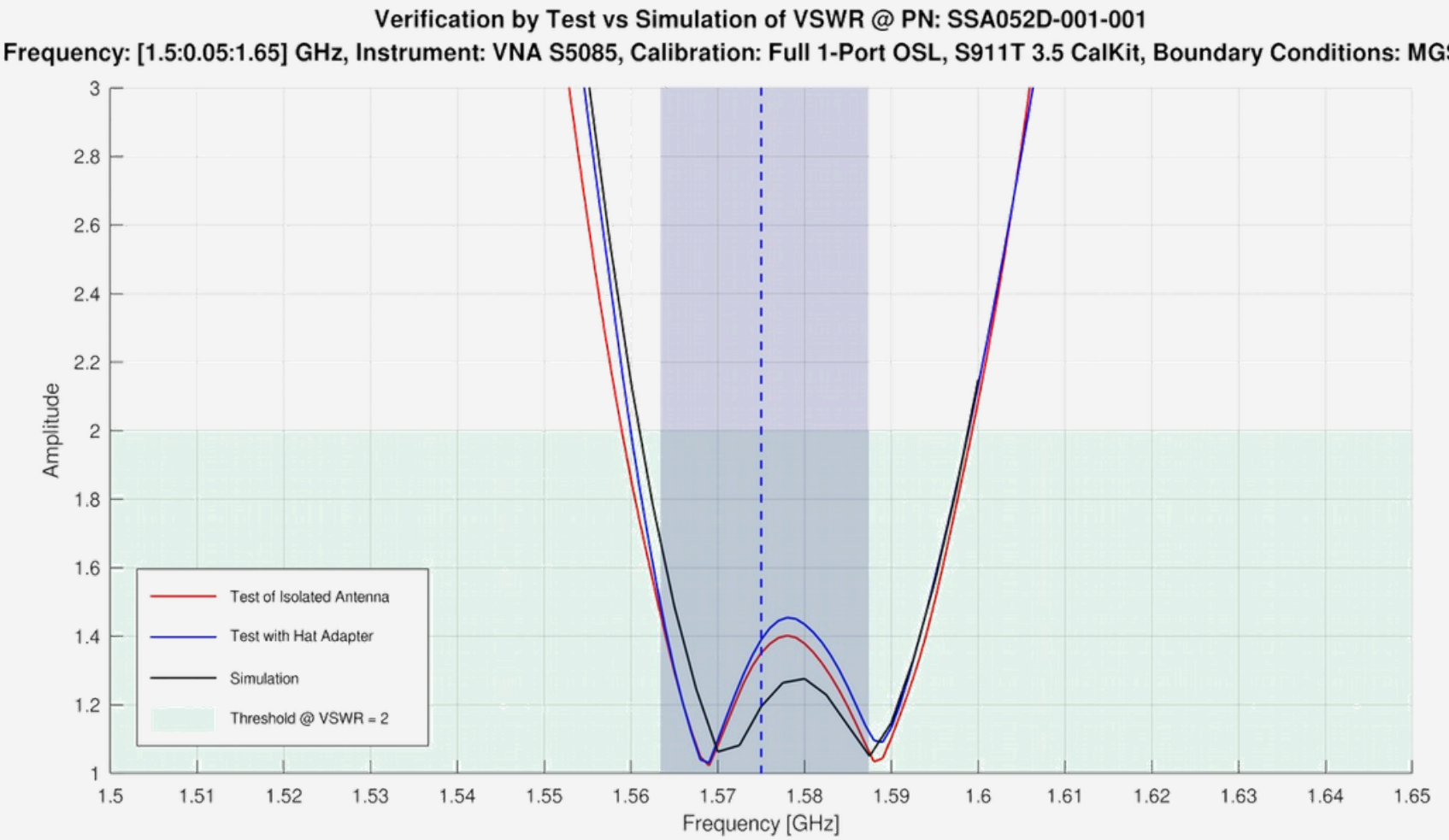
Typical Functional Specifications @ Isolated condition

Parameter	Values	Remark
Frequency Range [GHz]	1.563 – 1.587	Designed for GPS L1 Band
Reflection Coefficient [dB] (VSWR) Isolated Antenna	-17.8 (1.3), -16.51 (1.35), -21.09 (1.19)	@ GPS L1: 1565 MHz, 1575 MHz, 1585 MHz [AD 1]
Reflection Coefficient [dB] (VSWR) With Hat Adapter	-17.62 (1.3) -15.75 (1.39) -19.07(1.25)	@ GPS L1: 1565 MHz, 1575 MHz, 1585 MHz [AD 1]
Port to Port Isolation [dB]	NA	Single Port
Radiation Efficiency [%] Worst Case -3%	85.28, 85.88, 86.73	@ GPS L1: 1565 MHz, 1575 MHz, 1585 MHz [AD 15]
Radiation Pattern Envelope	Hemispherical	Cardioid [AD 2]
Phase Center [mm]	10	Relative to Antenna Coordinated System. Z=0 ≡ Mounting Joint Surfac
Realized Gain [dBi] RHCP @ Boresight	5.36, 5.94, 5.82	@ GPS L1: 1565 MHz, 1575 MHz, 1585 MHz [AD 3]
HPBW [°] @ Phi = 0° (@ Phi = 90°)	86 (84), 84 (82), 82 (84)	@ GPS L1: 1565 MHz, 1575 MHz, 1585 MHz [AD 2]
Polarization Sense	Circular	RHCP Confirmed by Measurements [AD 3]
Polarization Ratio [dB] (Axial Ratio [dB]) @ Boresight	7.26 (8.06) 18.44 (2.09) 10.23 (5.53)	@ GPS L1: 1565 MHz, 1575 MHz, 1585 MHz [AD 3]
Multipath Ratio [dB] Worst Case @ theta < 60° Ref: G_RHCP(theta)/G_LHCP(180-theta)	14.11, 17.21, 15.23	@ GPS L1: 1565 MHz, 1575 MHz, 1585 MHz [AD 16]
Multipactor Margin [dB]	NA	Receiver Antenna
Corona Discharge Margin [dB]	NA	Receiver Antenna

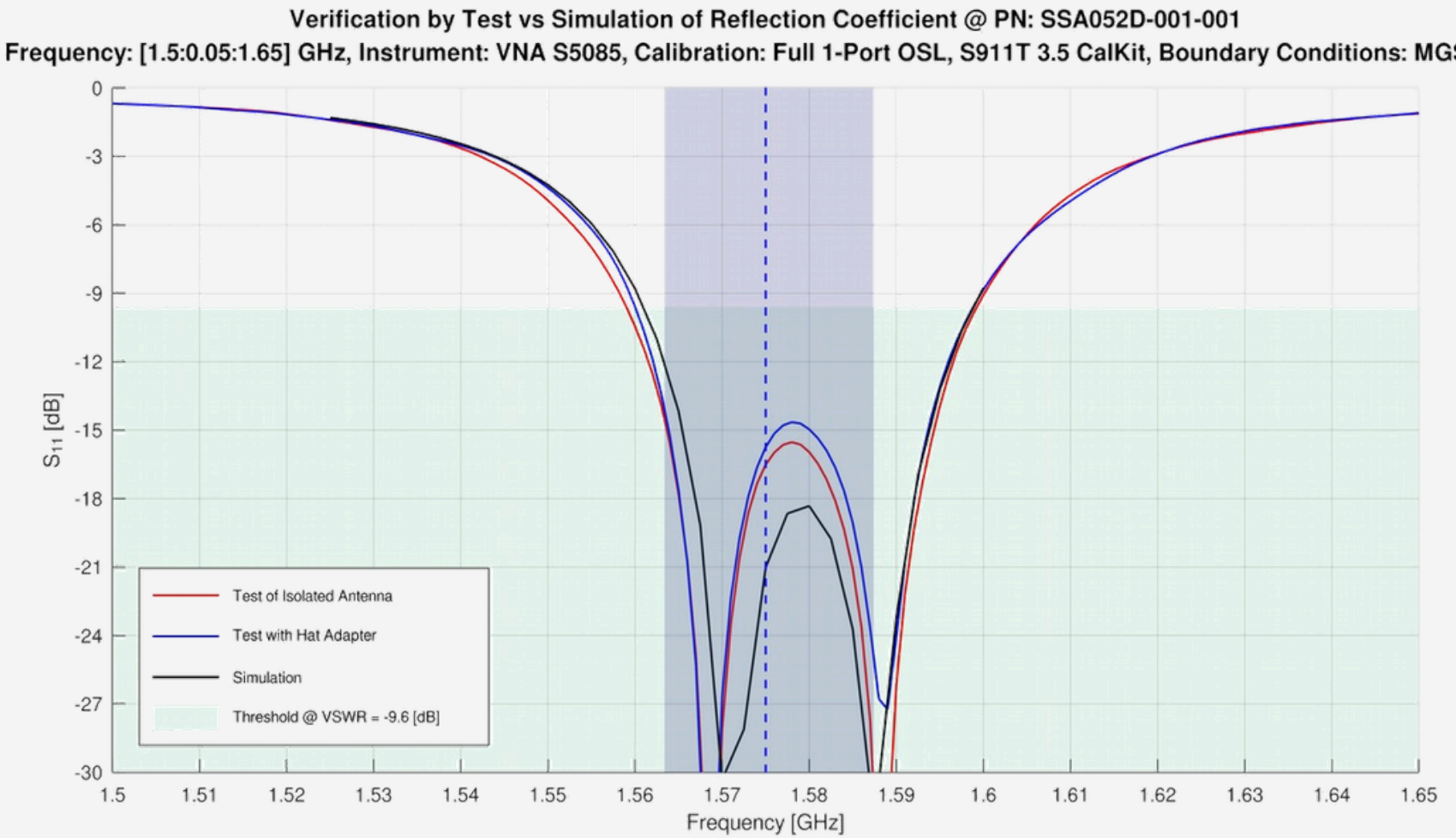
Typical Environmental & Interface Specification

Parameter	Values	Remark
Mass [g]	43	Center of Mass: [4.4, 4.4, 0.3] mm from Mounting Joint Surface [AD 9]
Size [mm]	100 X 100	Max Envelope. [AD 9]
Height [mm]	1.6 (3.7)	Overall Height measured from Mounting Joint Surface [AD 9]. (Max. Envelope, includes Screws Heads) (Flush: 12.5 mm)
RF Interface	SMA Female	[AD 9]
Electrostatic Discharge	ESD Free	Verified by Review of Design
Outgassing	TML < 1.00 % CVCM < 0.05%	According to Declared Material, Component and Processes List
Temperature Range [°C]	(-55; 140)	Thermal Vacuum Test, Four Cycles, 4 hours Dwell. Verified by Analysis in [AD 10]
Vacuum [Hpa]	≤ 1.33×10^-5 ±80 %	In Thermal Vacuum Test
1st Natural Frequency [Hz]	447	Verified by Analysis in [AD 12]
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 Hz: +6 dB/Oct 2000 Hz: 0.026 g^2/Hz Overall: 14.1	• Shaker Test @ Random Vibration, Three Axis, 2 min / axis. [AD 5] • 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) • *This Model was tested successfully @ 22.7 Grms*
Static Acceleration Loads [G]	Peak: 42.3	Shaker Test @ Sine Burst, Three Axis [AD 5]. Qualification Level, according to NASA GEVS
Shock [G]	42 @ 100 Hz 1400 @ 1000 Hz 1400 @ 10000 Hz	• Shock Test, 1 Shock/Axis. • 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

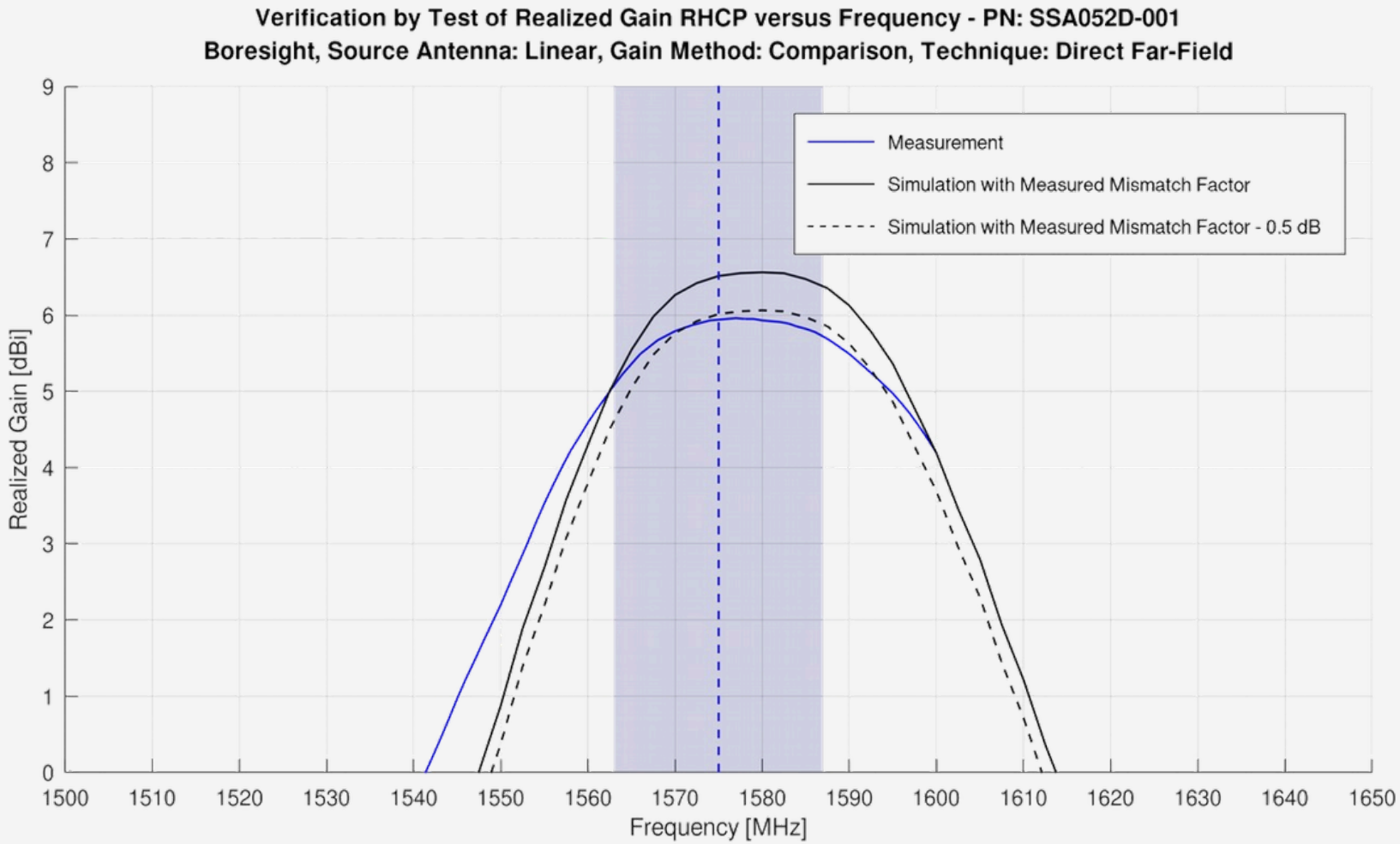
VSWR



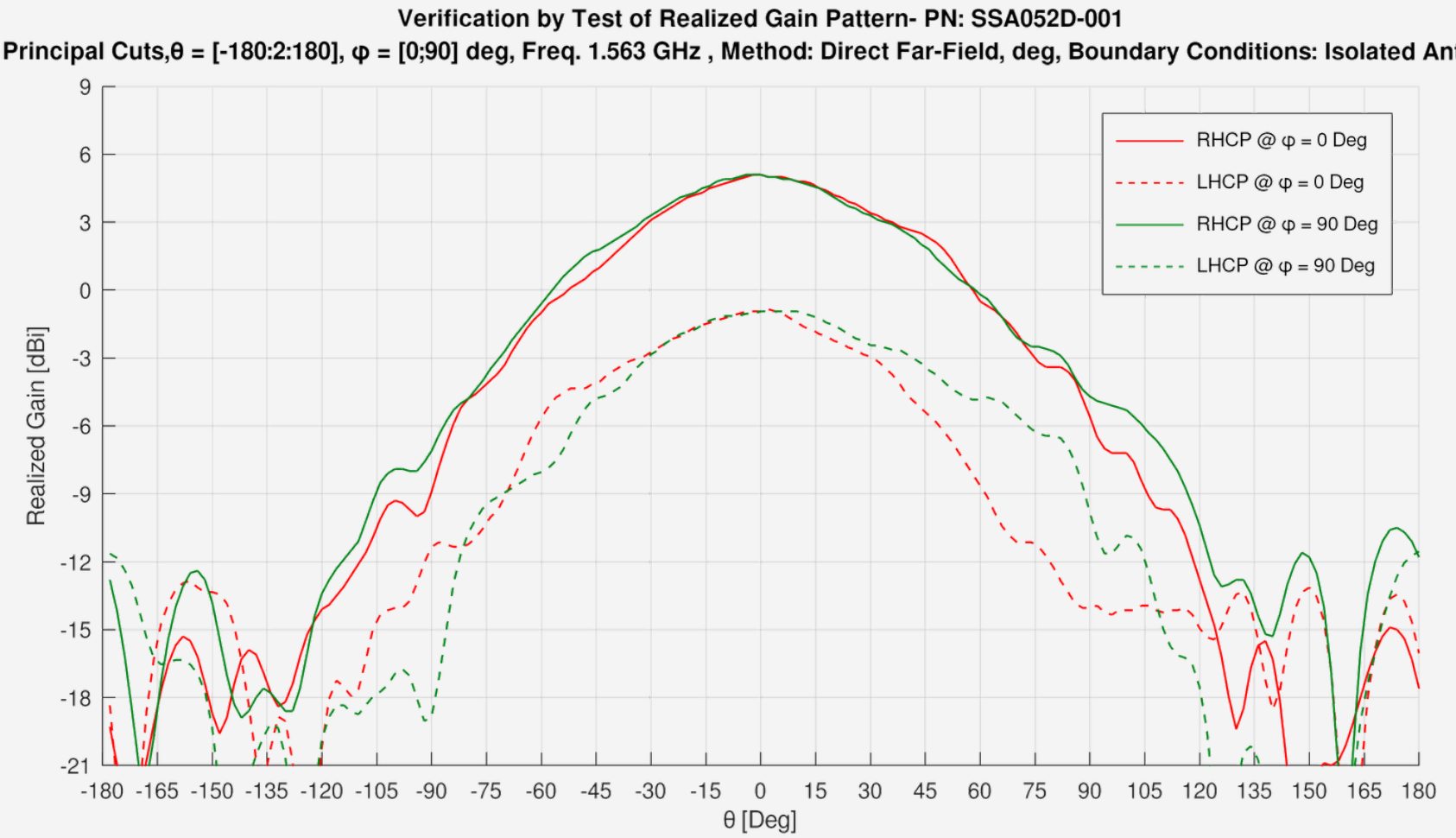
Reflection Coefficient



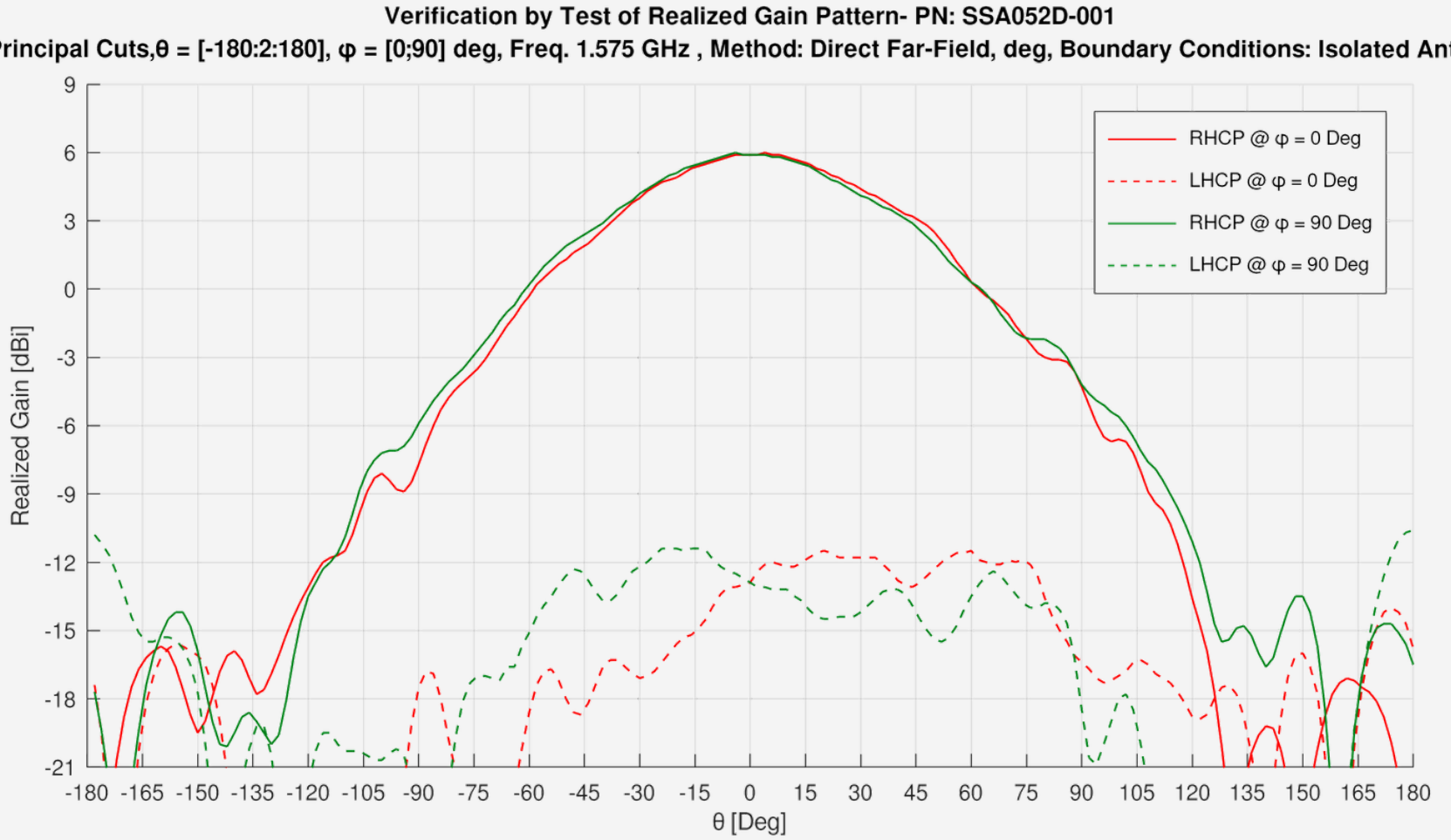
Realized Gain RHCP @ Boresight vs Frequency



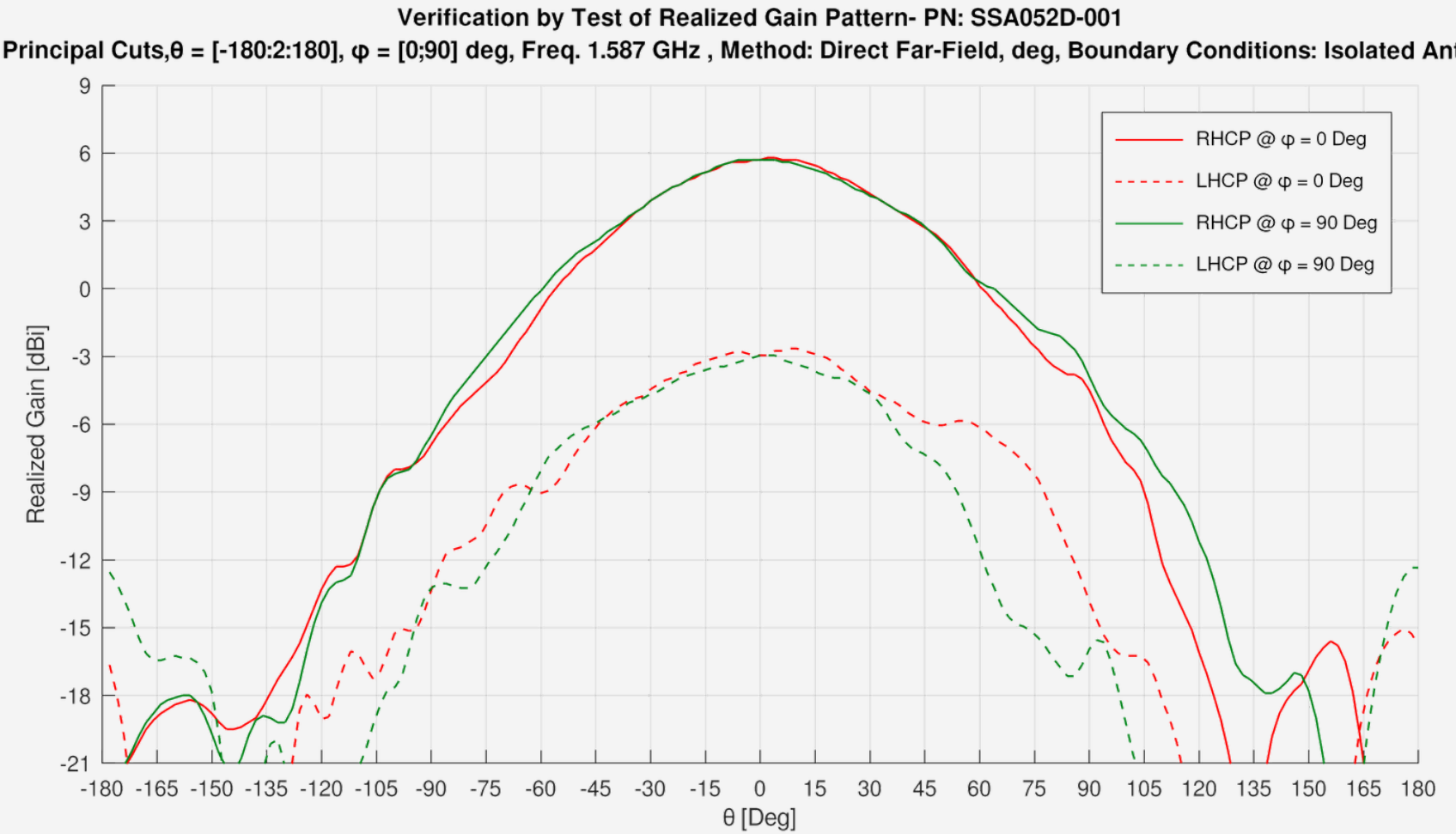
Realized Gain Pattern @ Frequency: 1.563 GHz



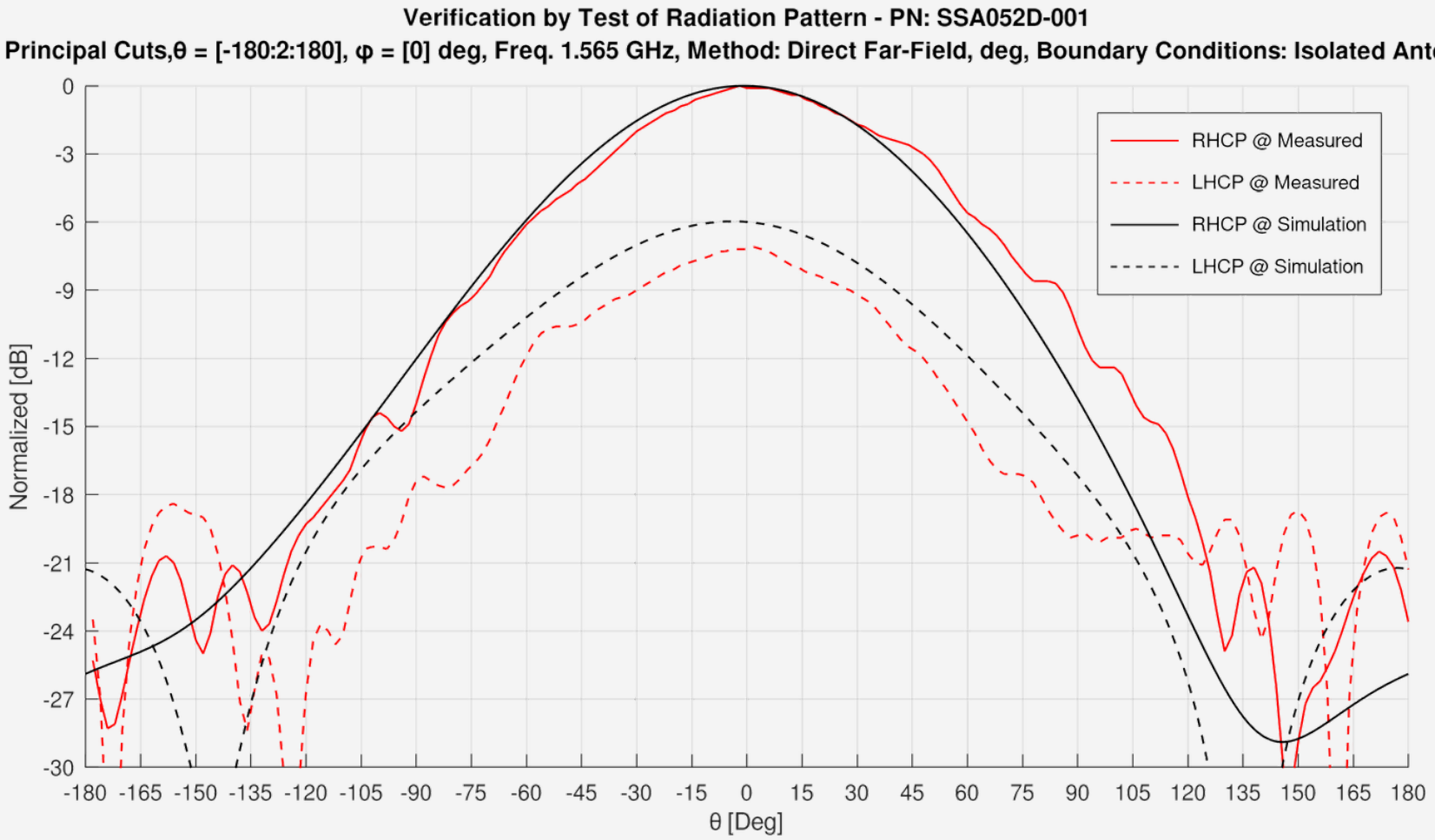
Realized Gain Pattern @ Frequency: 1.575 GHz



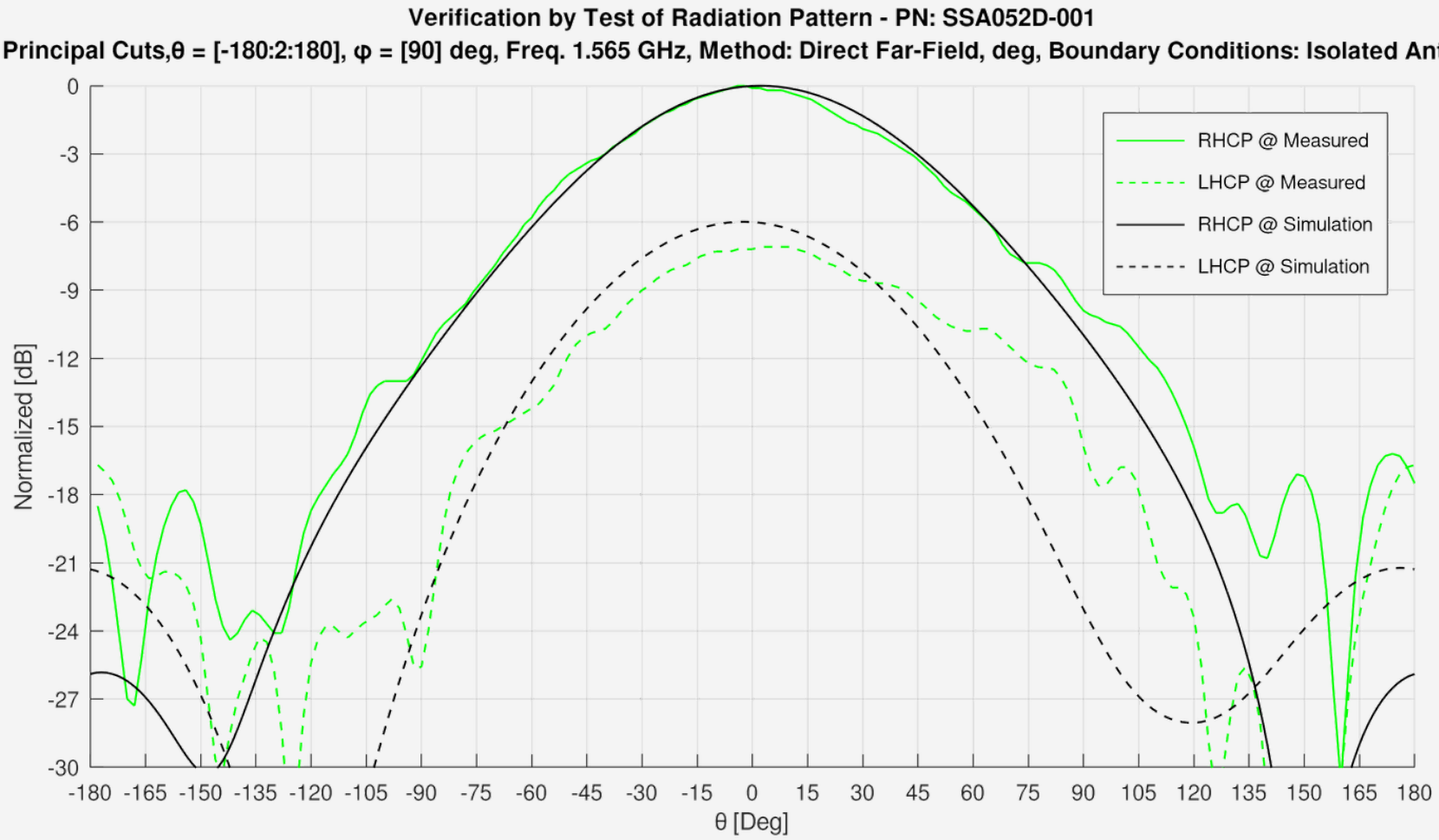
Realized Gain Pattern @ Frequency: 1.587 GHz



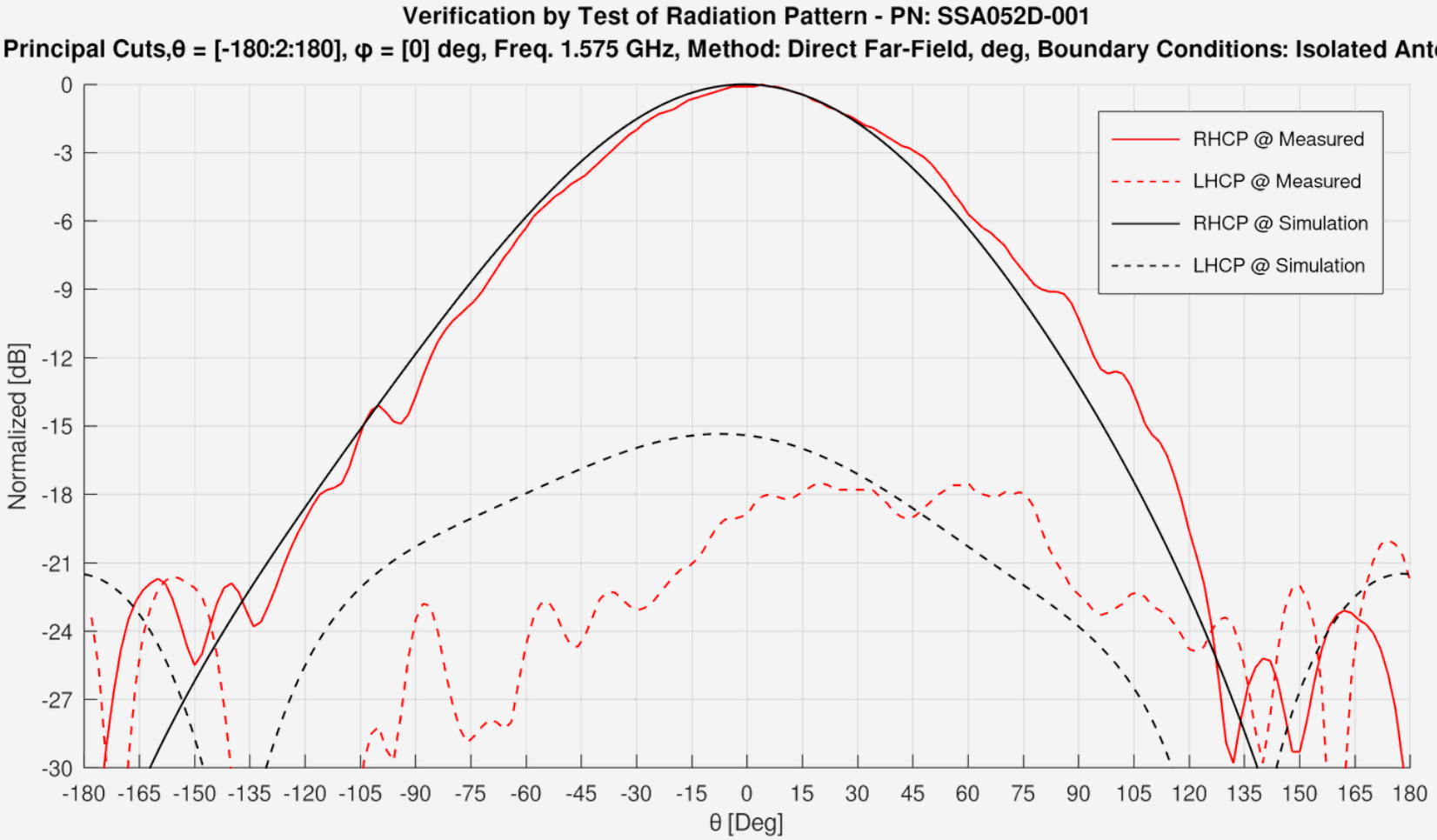
Radiation Pattern Principal Cuts @ Phi = 0 Degrees, Frequency: 1.565 GHz



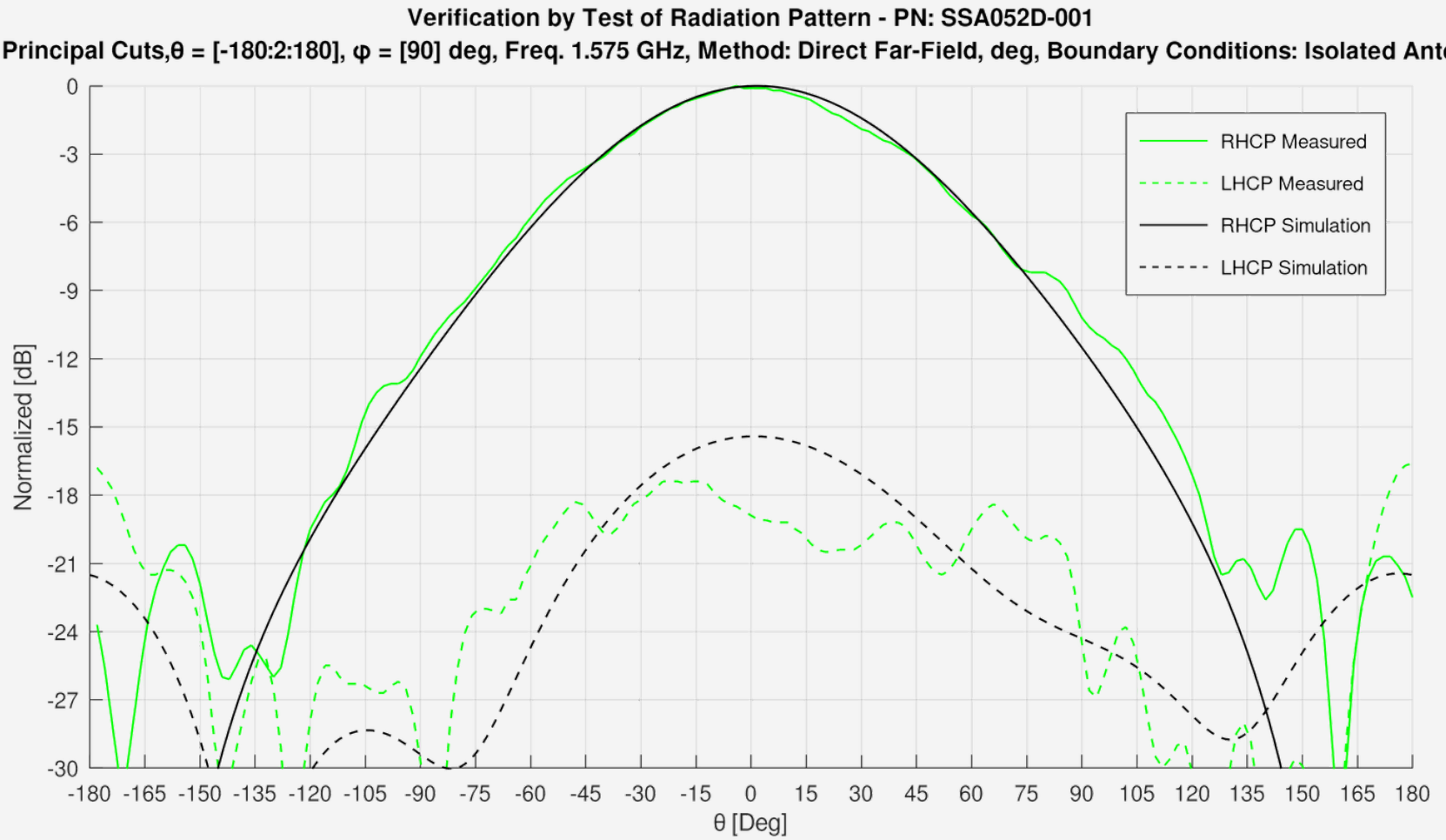
Radiation Pattern Principal Cuts @ Phi = 90 Degrees, Frequency: 1.565 GHz



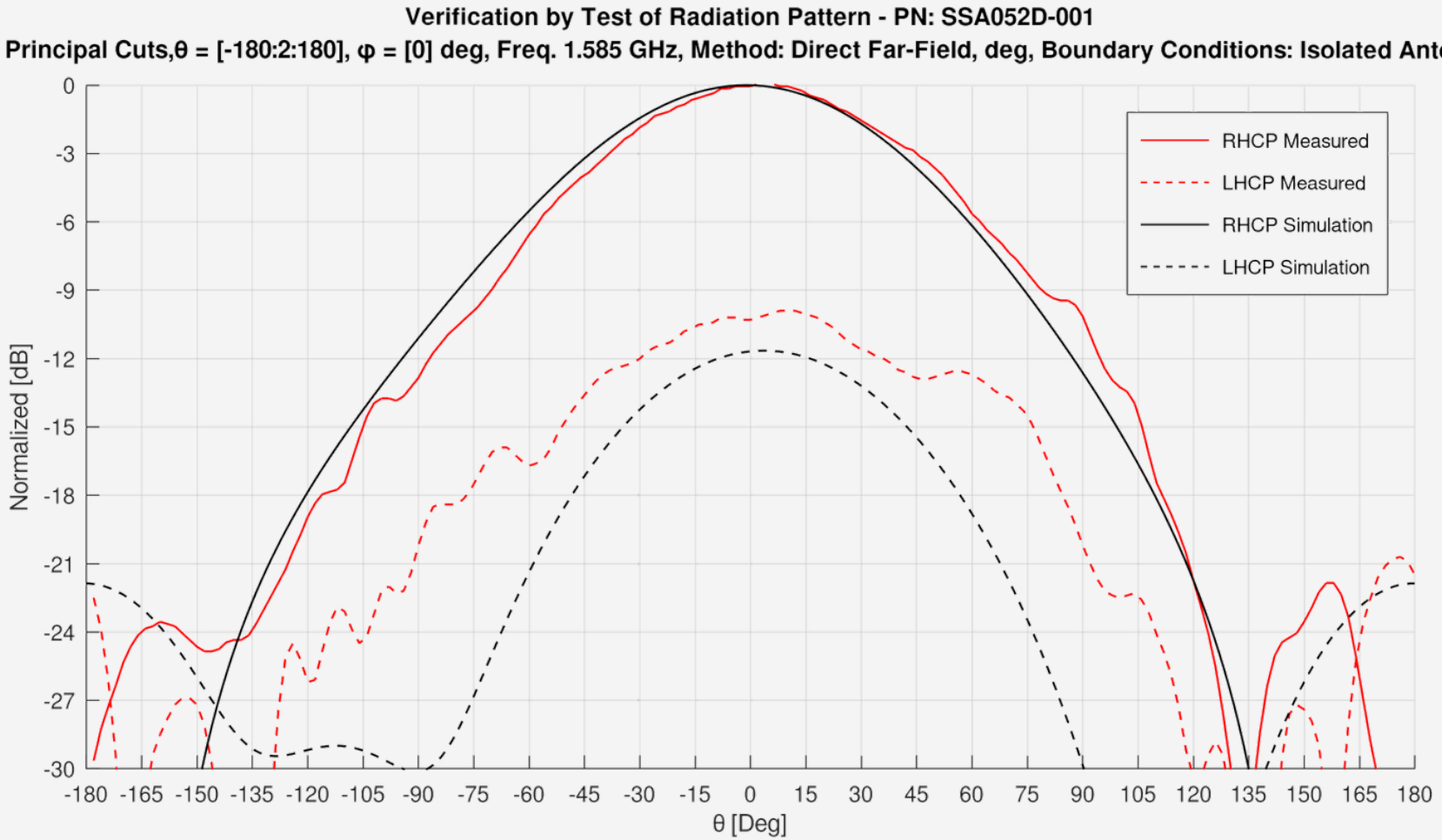
Radiation Pattern Principal Cuts @ Phi = 0 Degrees, Frequency: 1.575 GHz



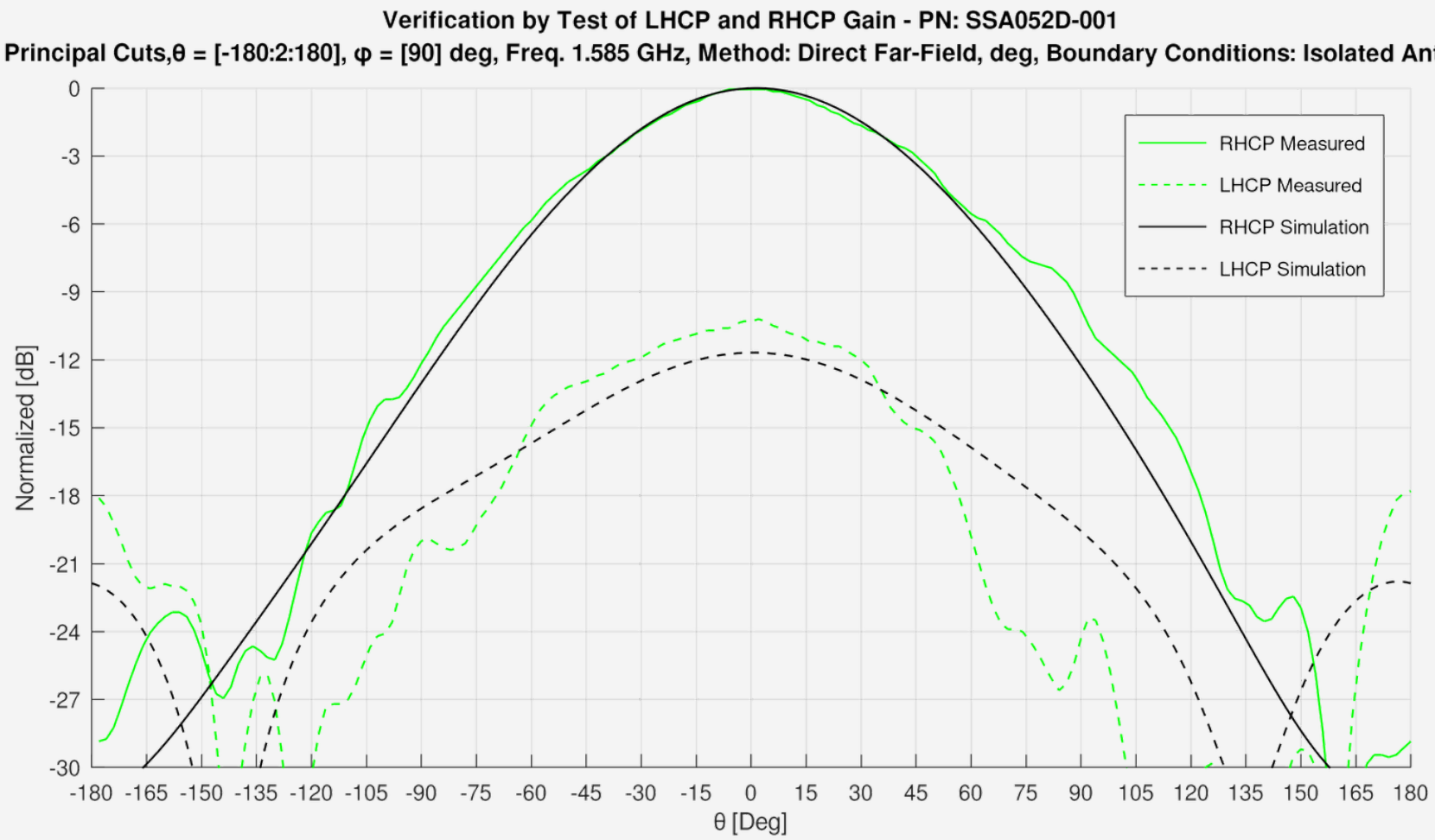
Radiation Pattern Principal Cuts @ Phi = 0 Degrees, Frequency: 1.575 GHz



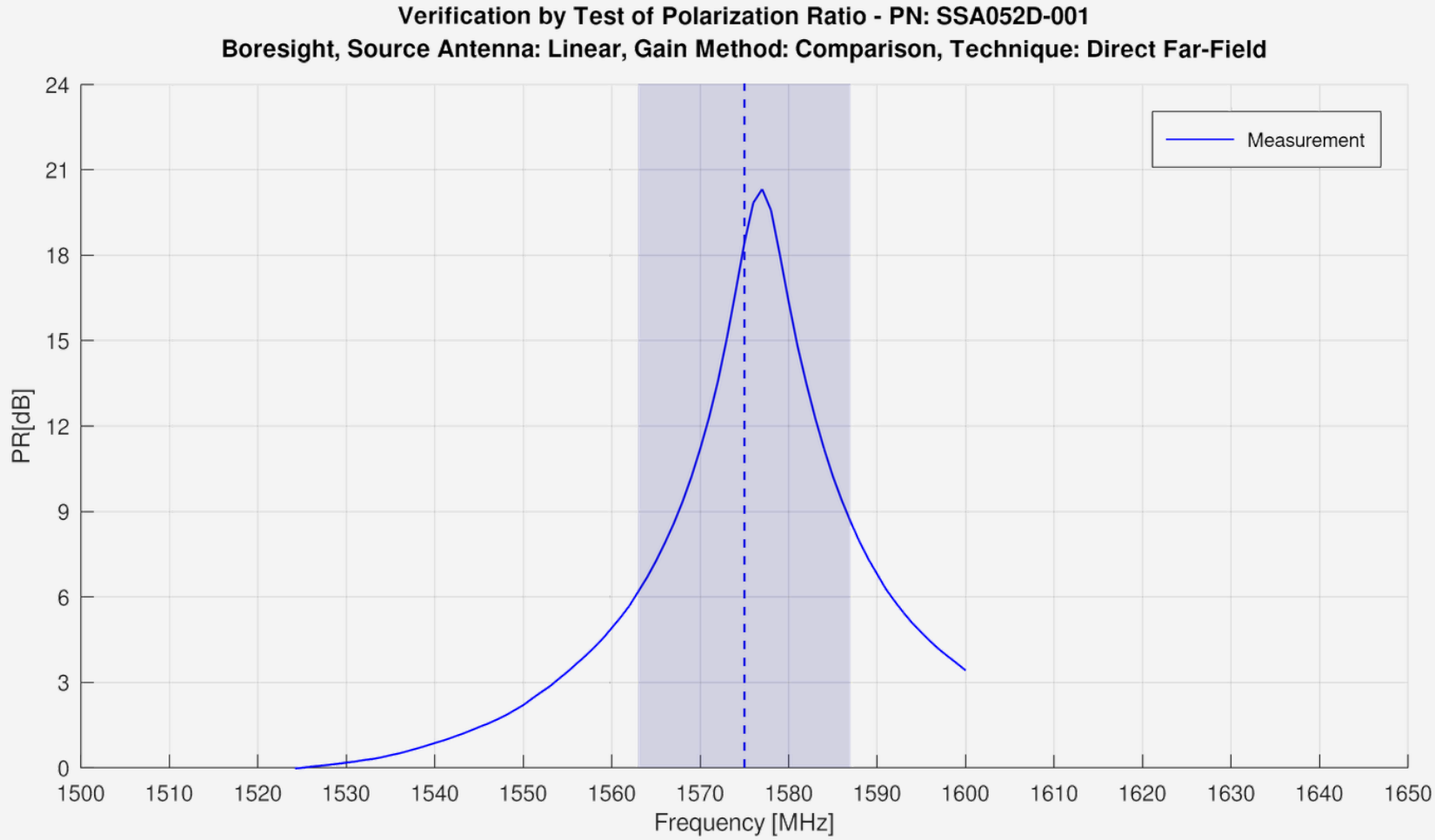
Radiation Pattern Principal Cuts @ Phi = 90 Degrees, Frequency: 1.585 GHz



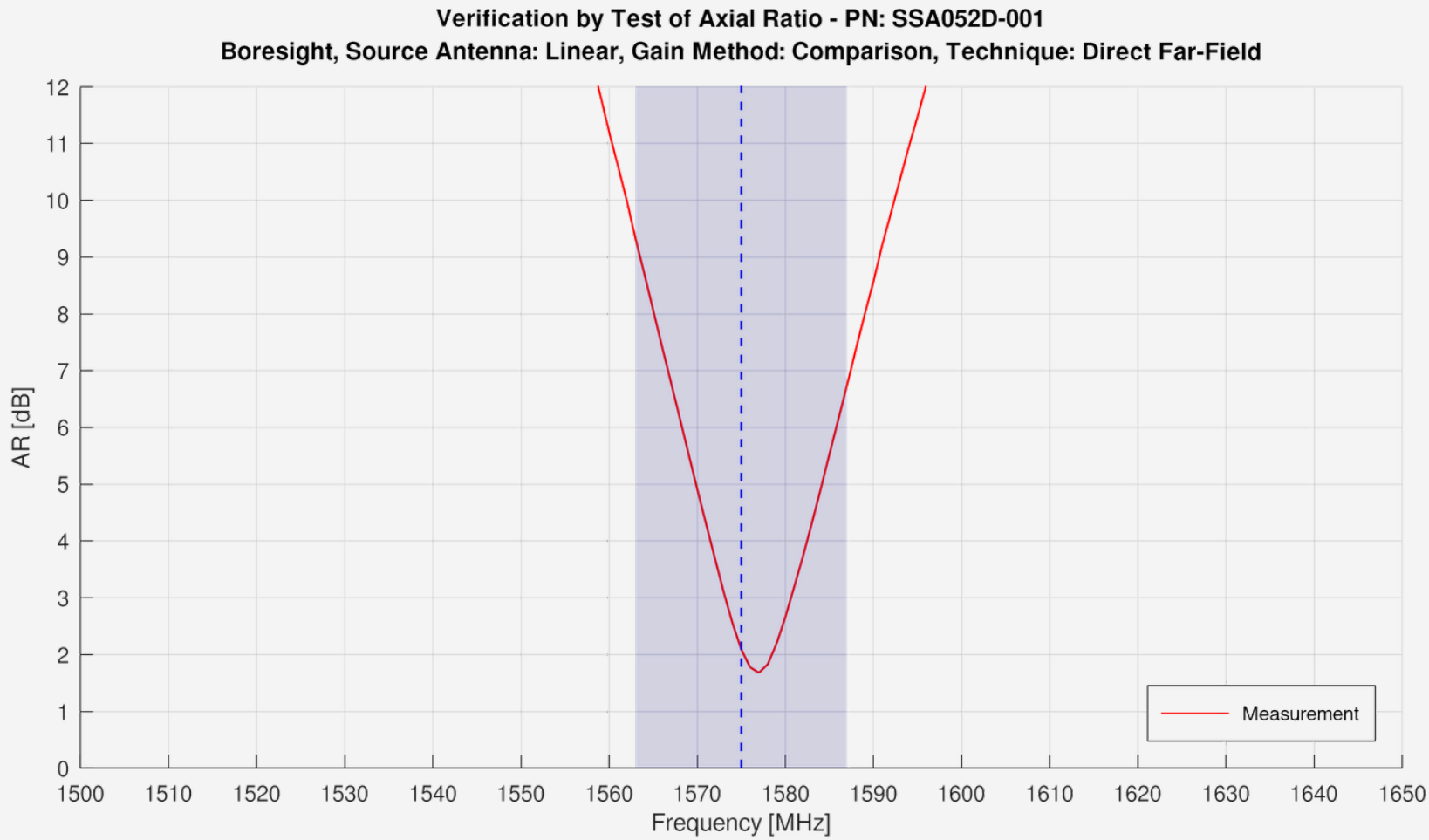
Radiation Pattern Principal Cuts @ Phi = 90 Degrees, Frequency: 1.585 GHz



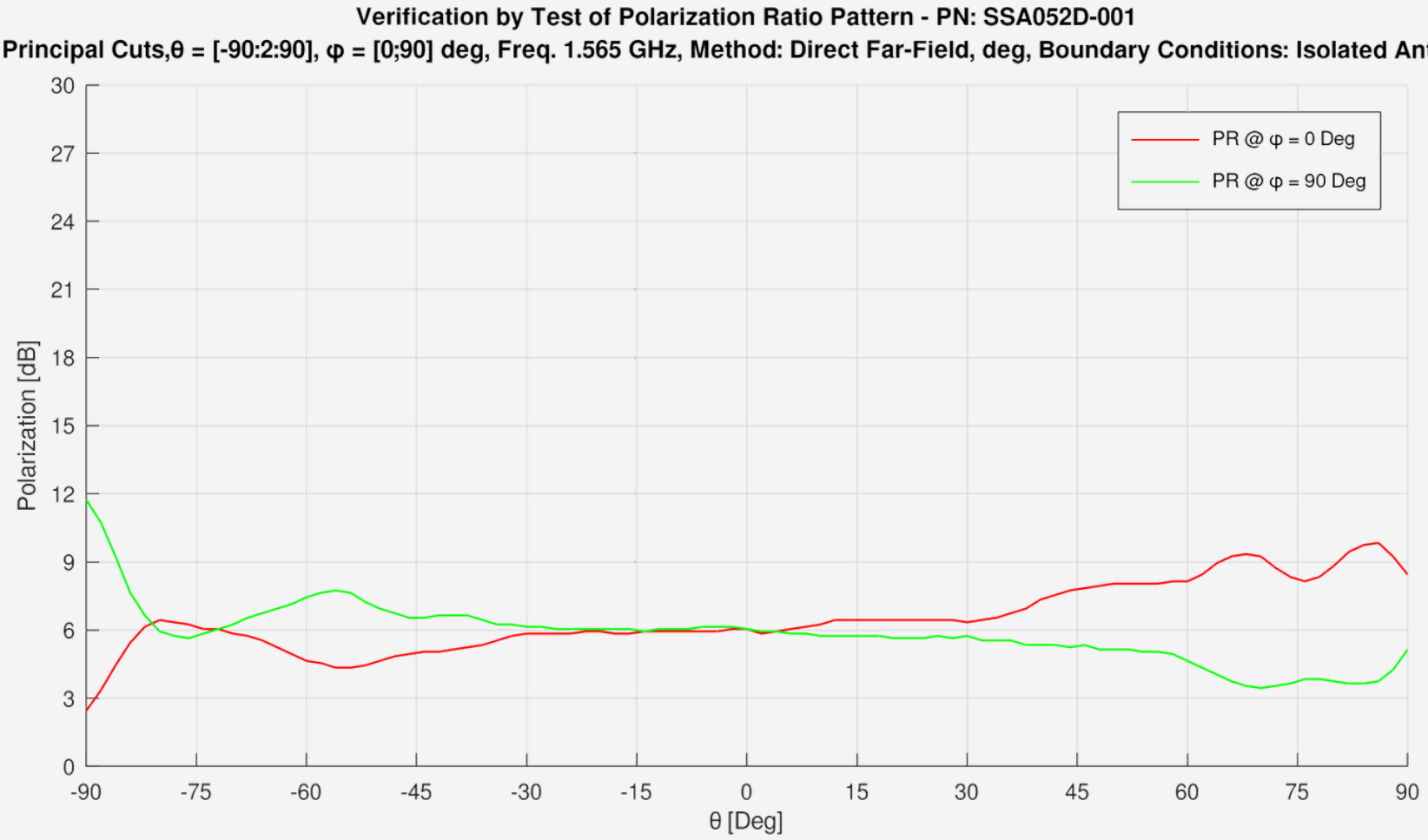
Polarization Ratio @ Boresight vs Frequency



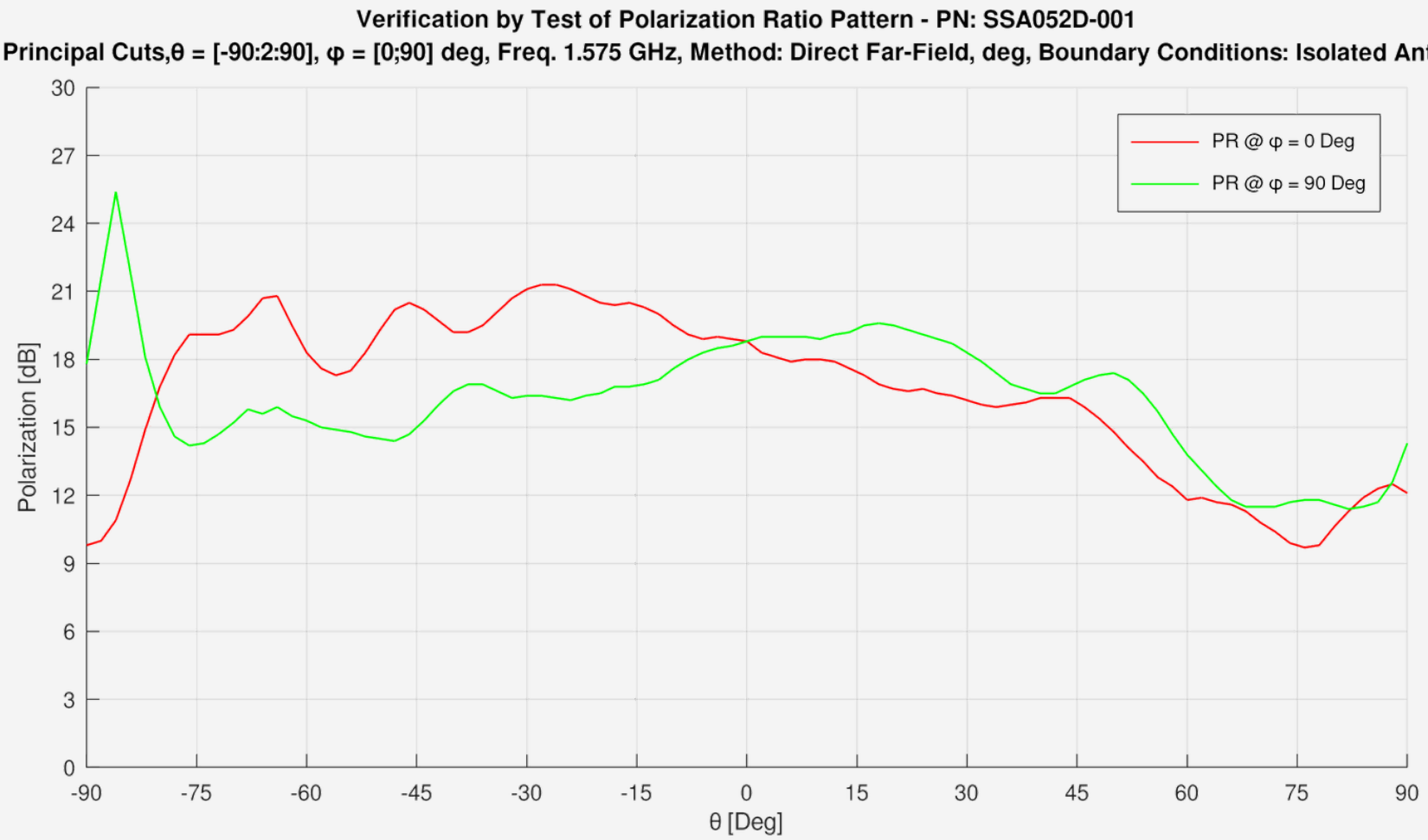
Axial Ratio @ Boresight vs Frequency



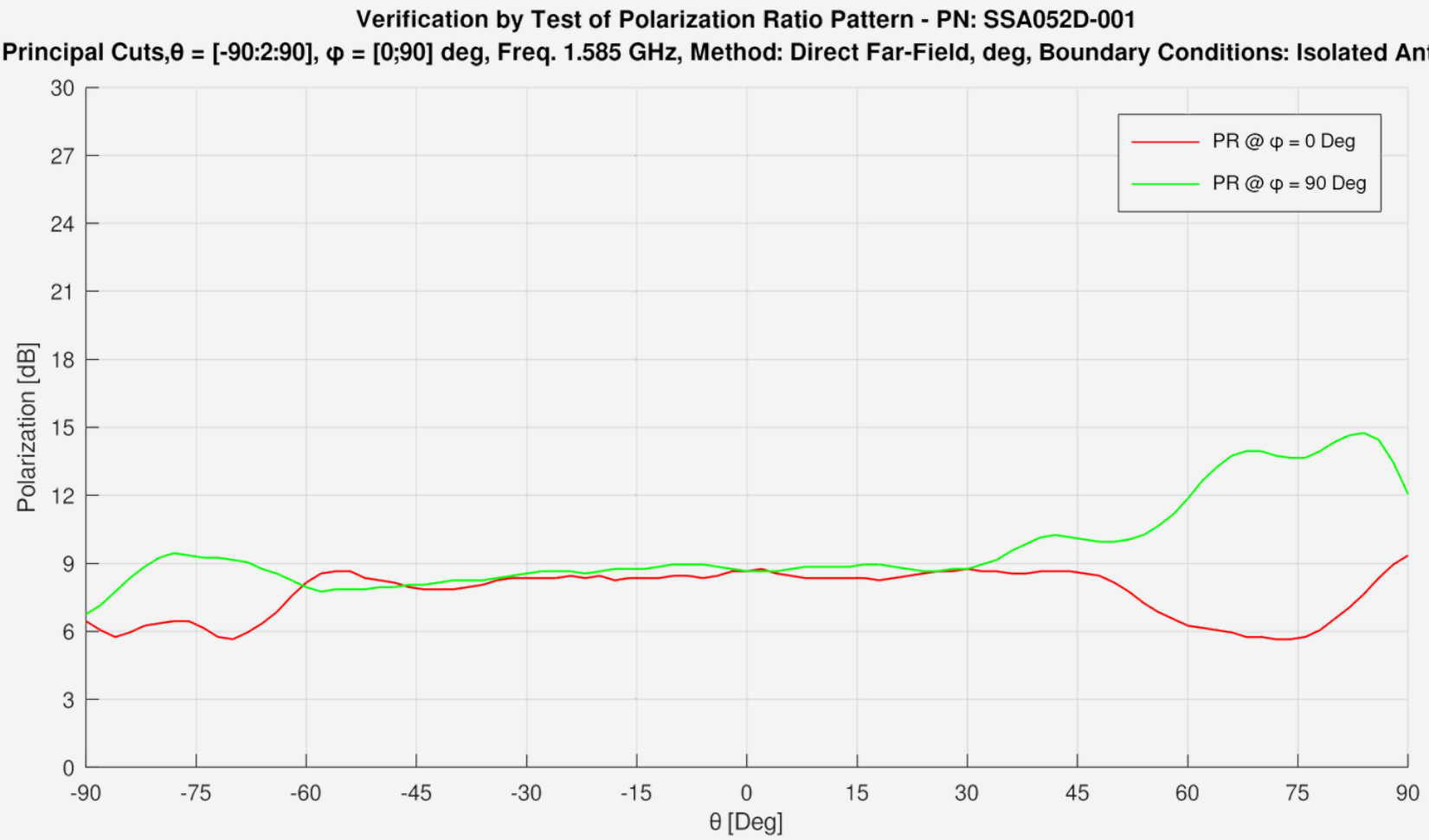
Polarization Ratio Pattern @ Frequency: 1.565 GHz



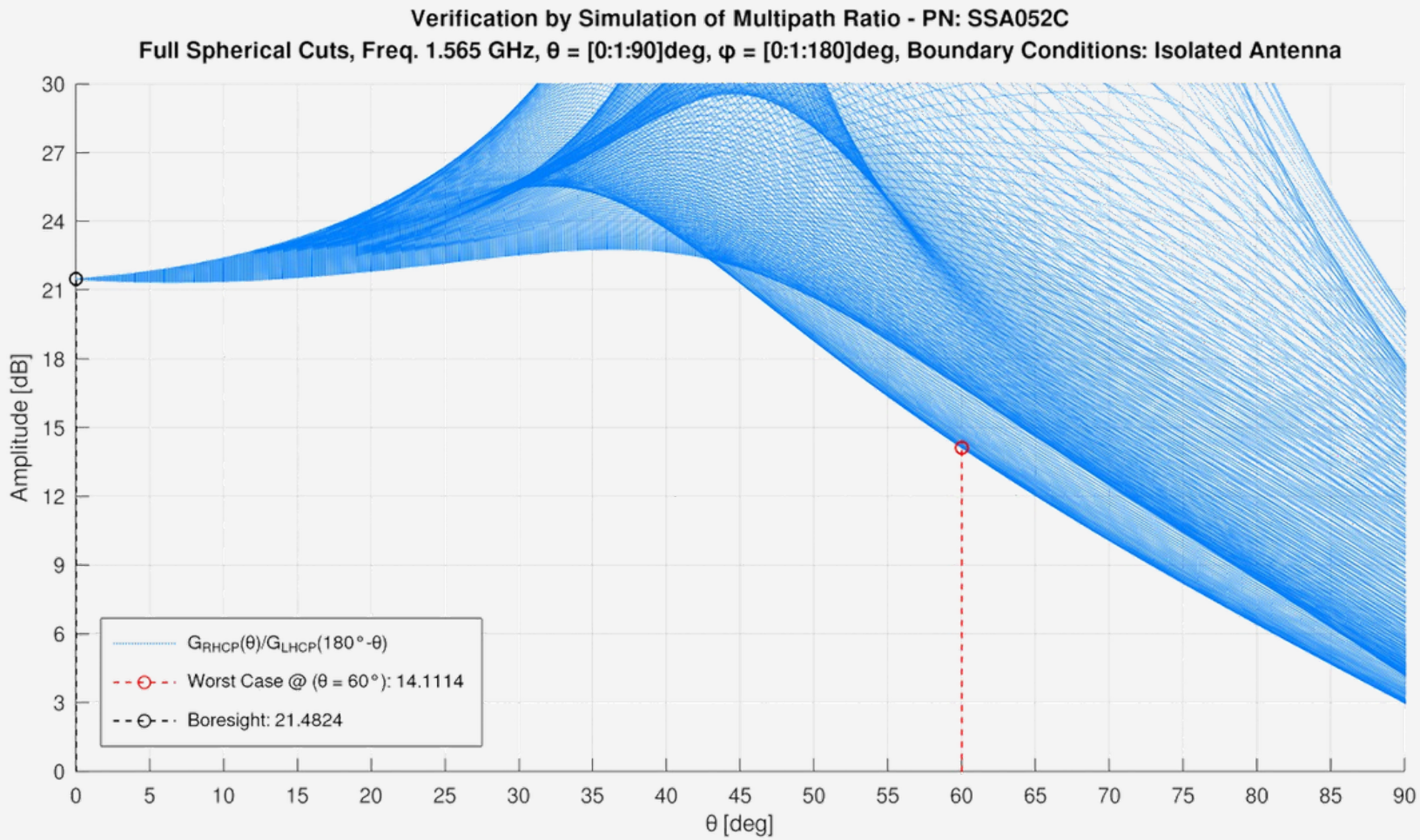
Polarization Ratio Pattern @ Frequency: 1.575 GHz



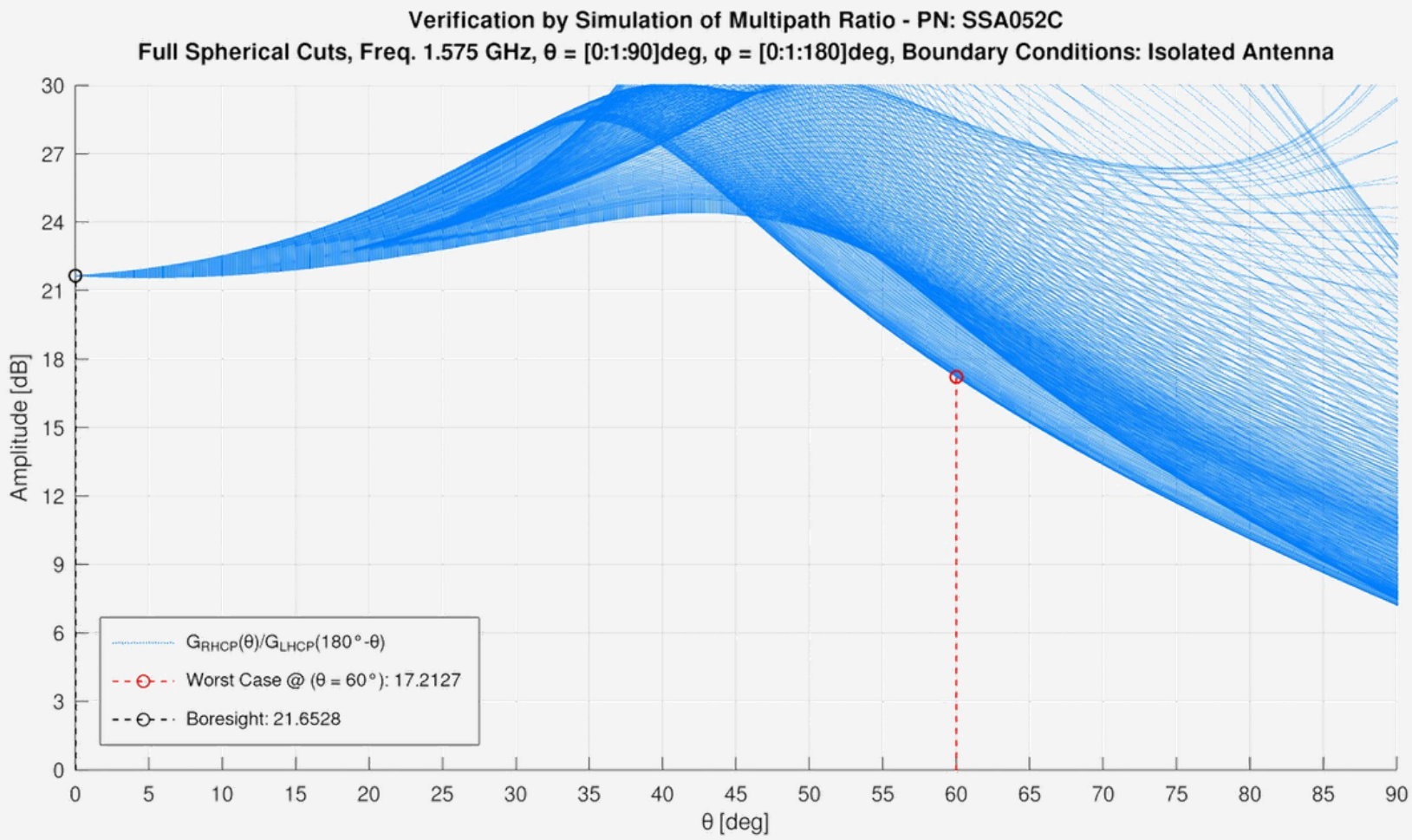
Polarization Ratio Pattern @ Frequency: 1.585 GHz



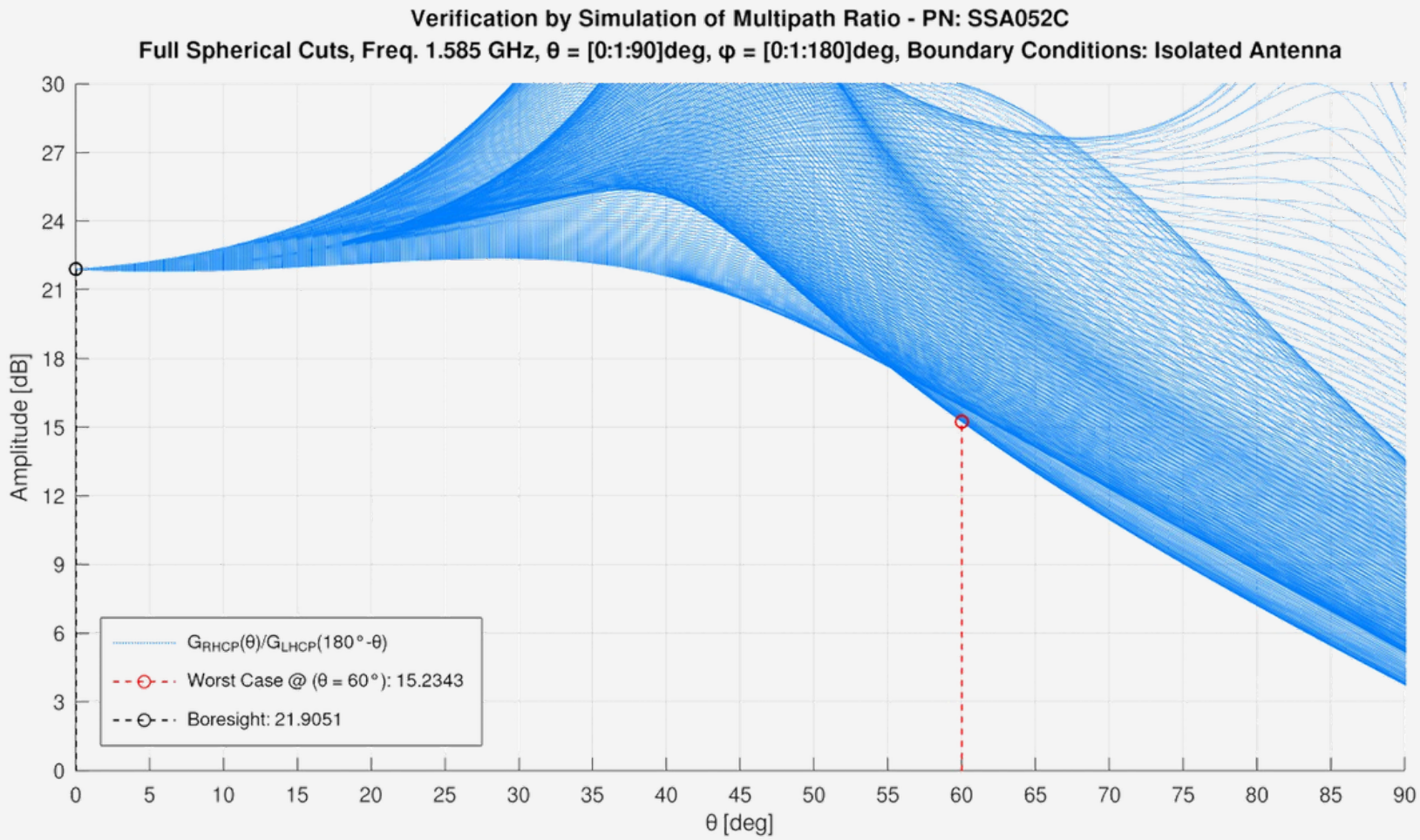
Multipath Ratio Pattern @ Frequency: 1.565 GHz



Multipath Ratio Pattern @ Frequency: 1.575 GHz



Multipath Ratio Pattern @ Frequency: 1.585 GHz



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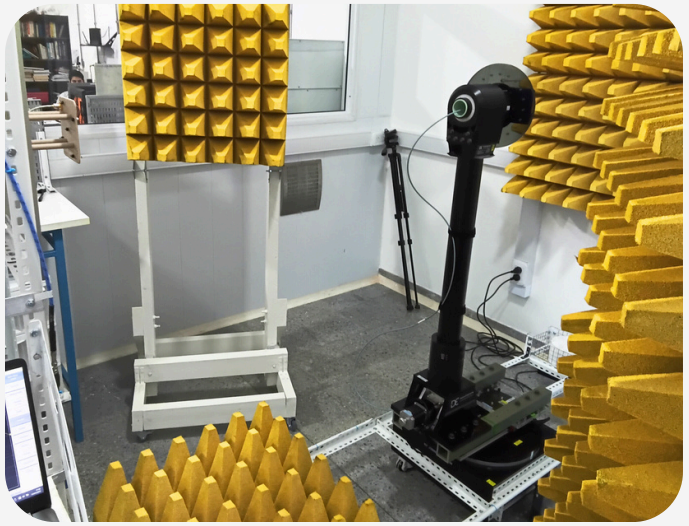
Our Additional Services Include:

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

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