



Bridgestone HP Antenna Test Report

May 27, 2024

Prepared by John Hsieh

Outline

- Test Information
- Test Configuration
- Test Setup & Procedure
- Test Equipment & Calibration
- Return Loss & Isolation
- Gain & Efficiency Table
- Radiation Pattern
- Directional Gain Calculations
- Raw Data

Test Information

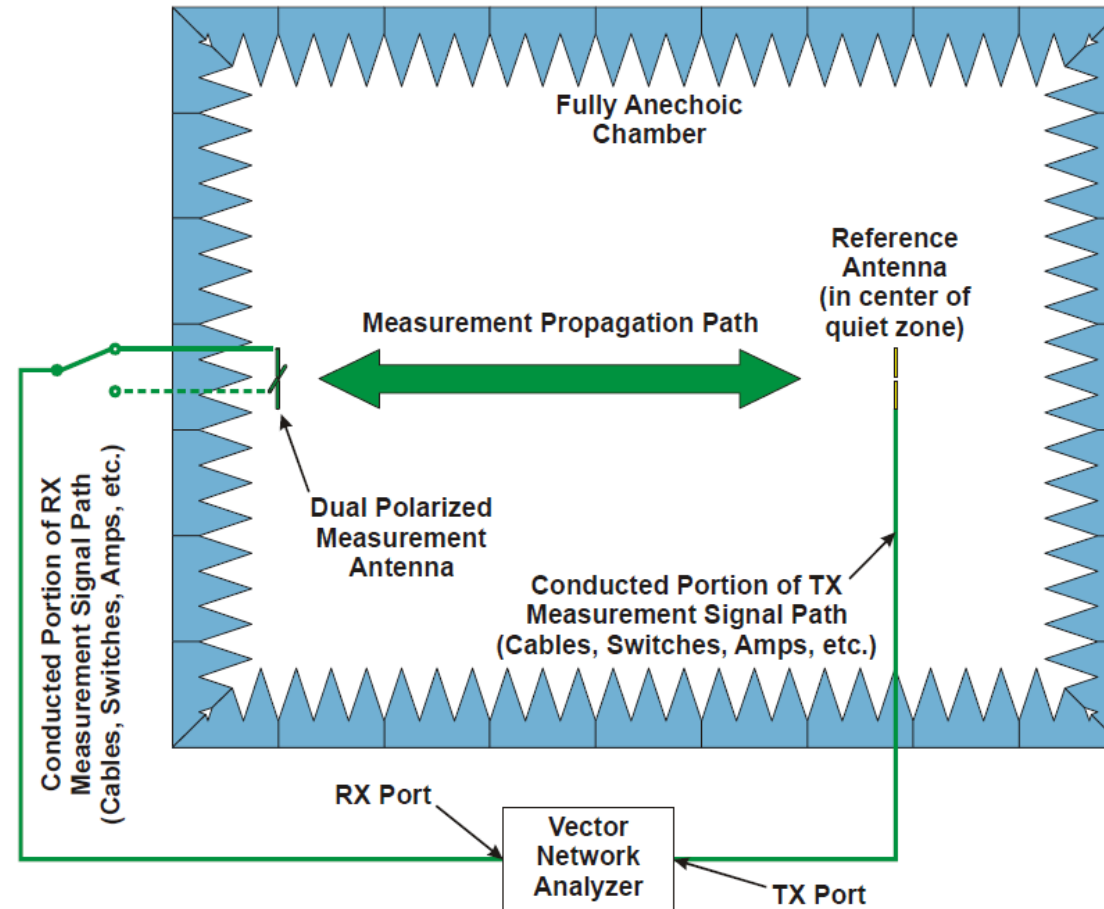
| Item | Description |
|------------------|---|
| Brand Name | Sercomm |
| Equipment | SCO5165P |
| Test Location | 2F, No. 3-1, YuanQu St. Taipei, Taiwan 115 R.O.C. |
| Test Condition | Radiation |
| Test Engineer | John Hsieh, Sercomm |
| Test Environment | ETS-Lindgren AMS-8500 Antenna Measurement Chamber |
| Test Date | May 2, 2024 ~ May 14, 2024 |

Test Setup & Procedure

1. Fix the DUT on the dielectric support structure and connect the feeding cable to the antenna used for test
2. Set measurement parameters such as frequency range and sampling angle
3. Perform test and then get far-field data (radiation pattern, gain, efficiency)
4. Repeat test procedure for other antennas

Test Equipment & Calibration

Network analyzer and reference antennas are used for calibration. Path loss and cable loss for different frequency bands can be checked and calculated.

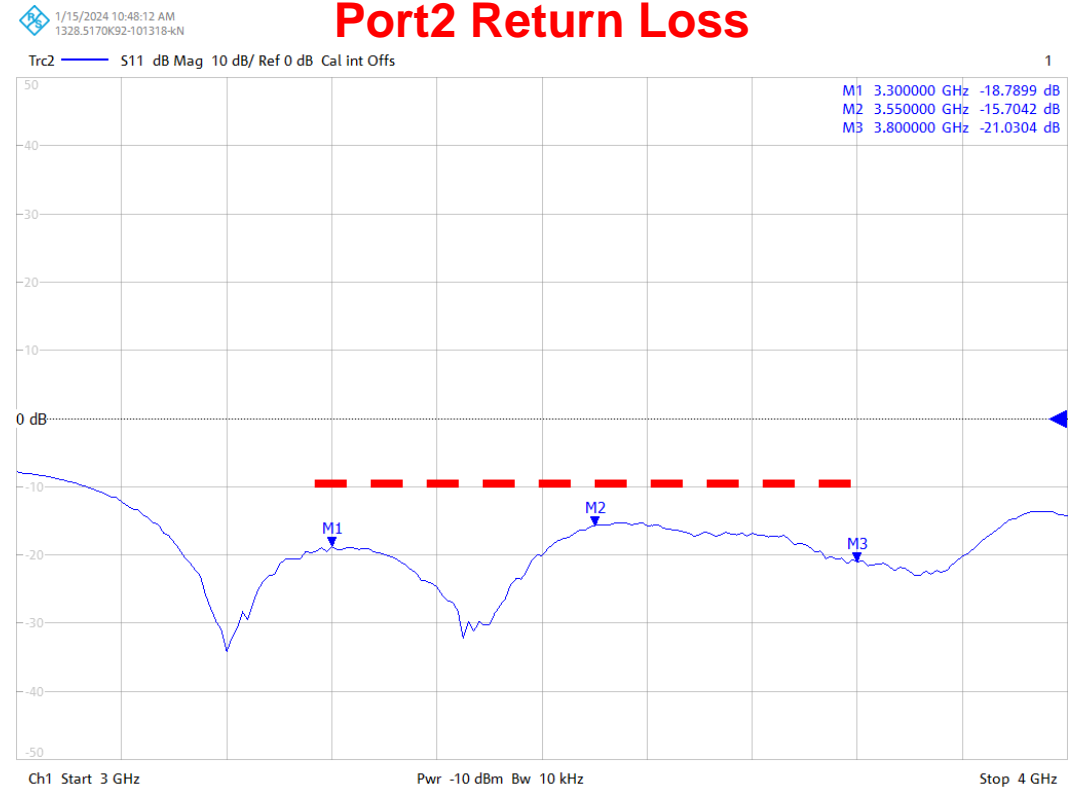
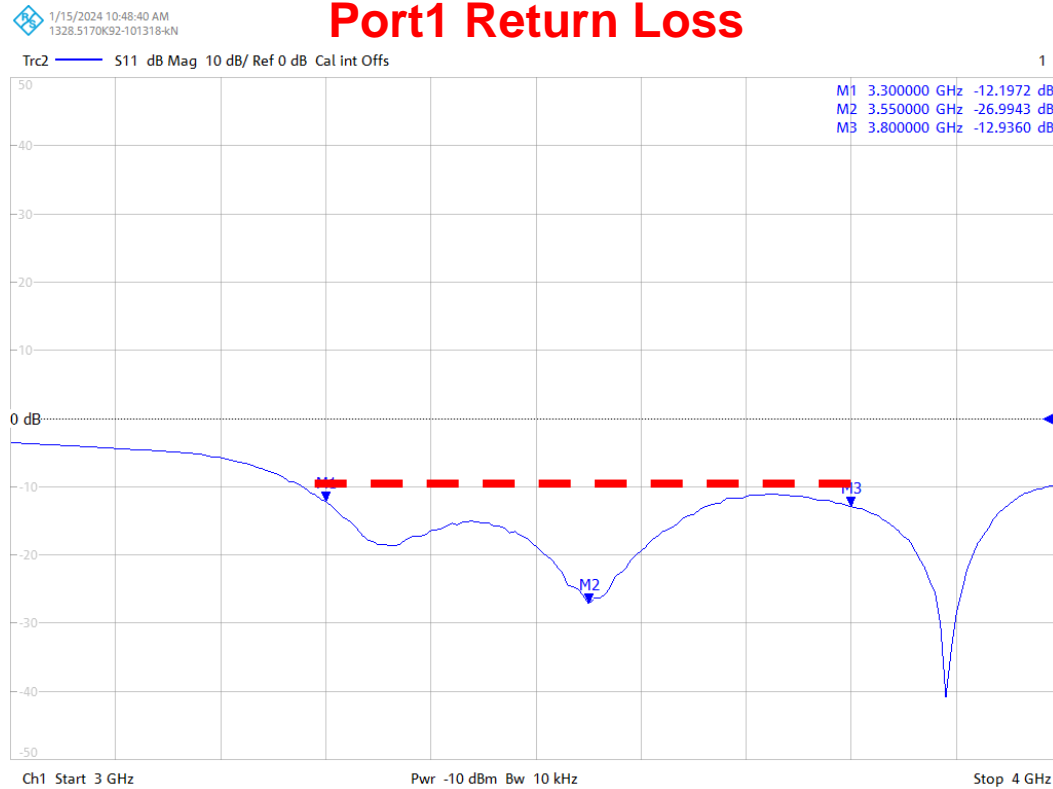


Test Equipment & Calibration

| Instrument | Brand | Characteristics | Model No. | Serial No. | Calibration Due Date |
|--------------------------------------|--------------|------------------------|------------|-----------------|--------------------------|
| Precision Sleeve Dipole | ETS-Lindgren | 700 MHz ~ 900 MHz | 3126-700 | 00169715 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 900 MHz ~ 1000 MHz | 3126-900 | 00169592 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 1400 MHz ~ 1700 MHz | 3126-1550 | 00164599 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 1700 MHz ~ 2000 MHz | 3126-1850 | 00169588 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 2000 MHz ~ 2300 MHz | 3126-2150 | 00169593 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 2300 MHz ~ 2700 MHz | 3126-2500 | 00169597 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 3000 MHz ~ 4000 MHz | 3126-3500 | 00239652 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 4000 MHz ~ 5000 MHz | 3126-4500 | 00239796 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 5000 MHz ~ 6000 MHz | 3126-5500 | 00169728 | Nov. 2, 2024 |
| Precision Sleeve Dipole | ETS-Lindgren | 6000 MHz ~ 7200 MHz | 3126-6500 | 00235488 | Nov. 2, 2024 |
| Horn Antenna | SCHWARZBECK | 1 GHz ~ 18 GHz | BBHA 9120D | BBHA 9120D-1294 | Oct. 7, 2024 |
| EMQuest Antenna Measurement Software | ETS-Lindgren | Control chamber system | EMQ-100 | 1437 | Non-Calibration Required |

Return Loss & Isolation

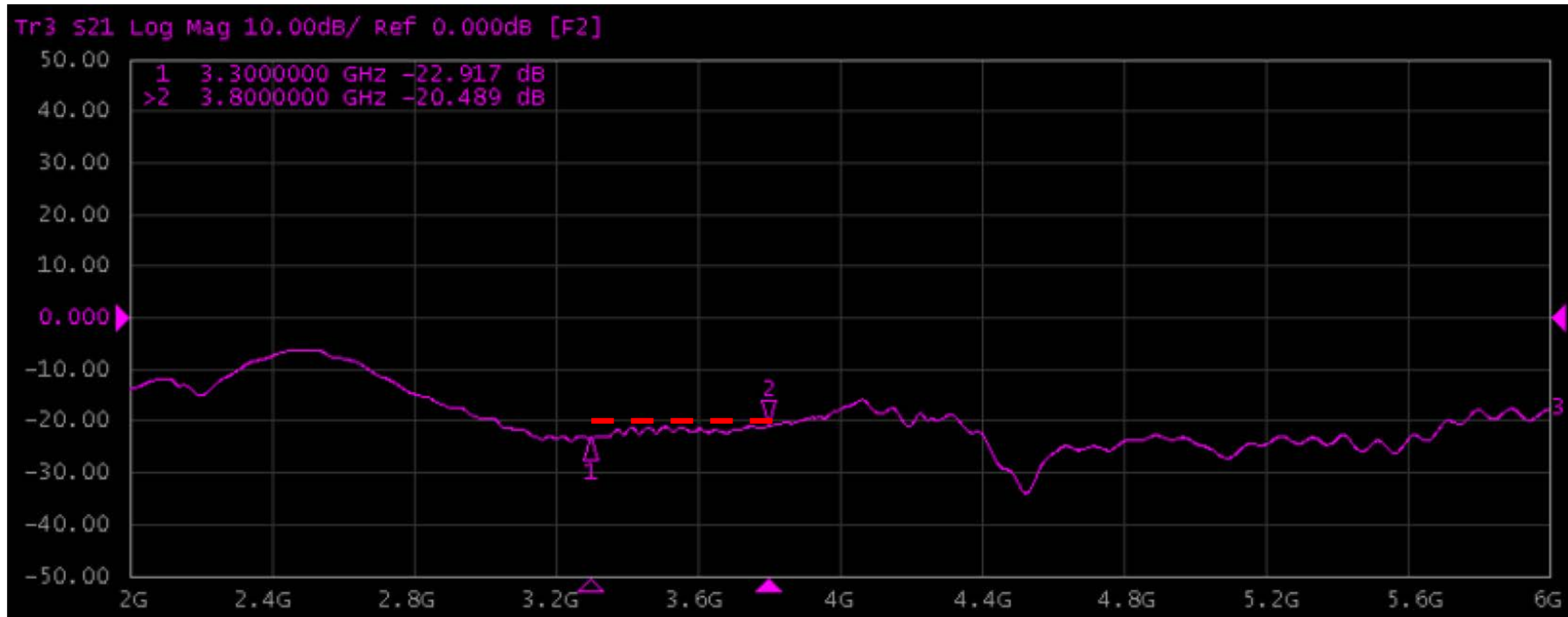
- Return Loss



Return Loss Spec < -10 dB

Return Loss & Isolation

- Isolation



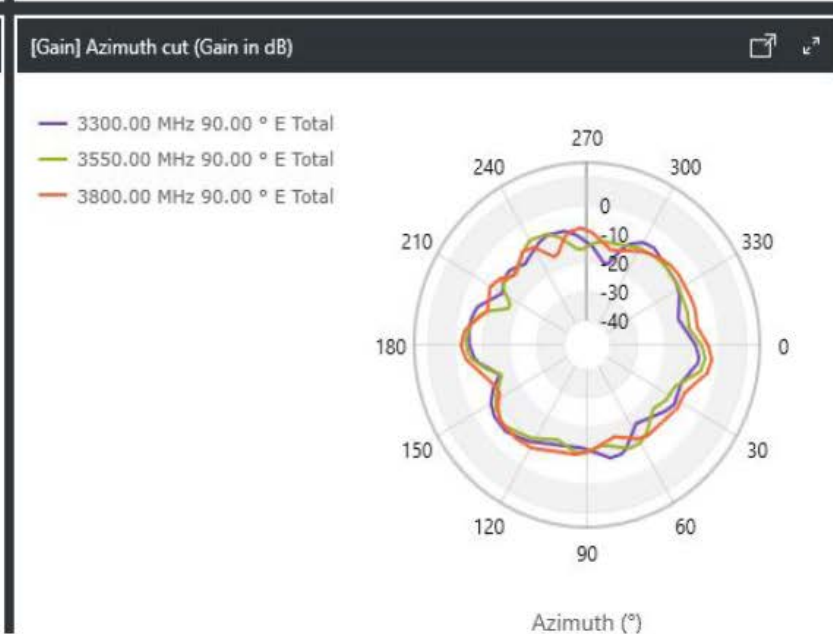
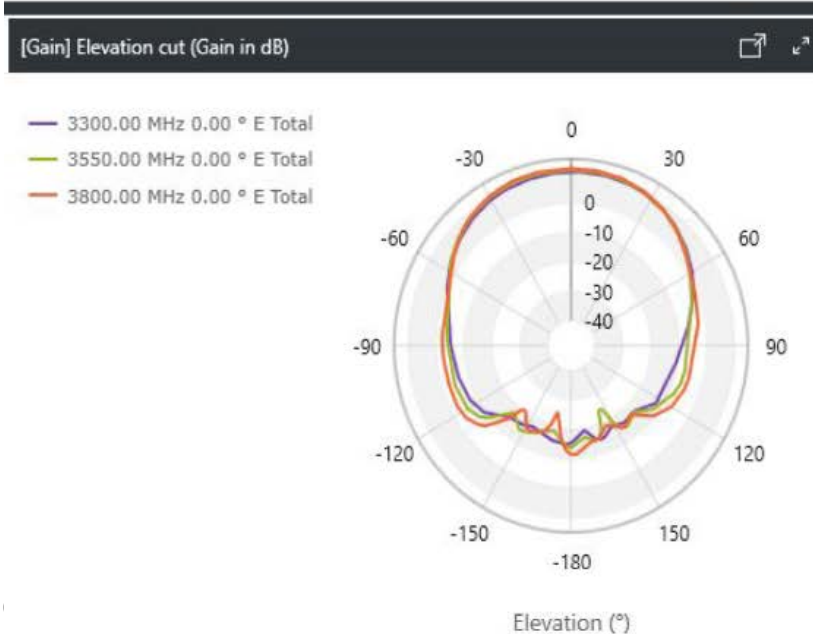
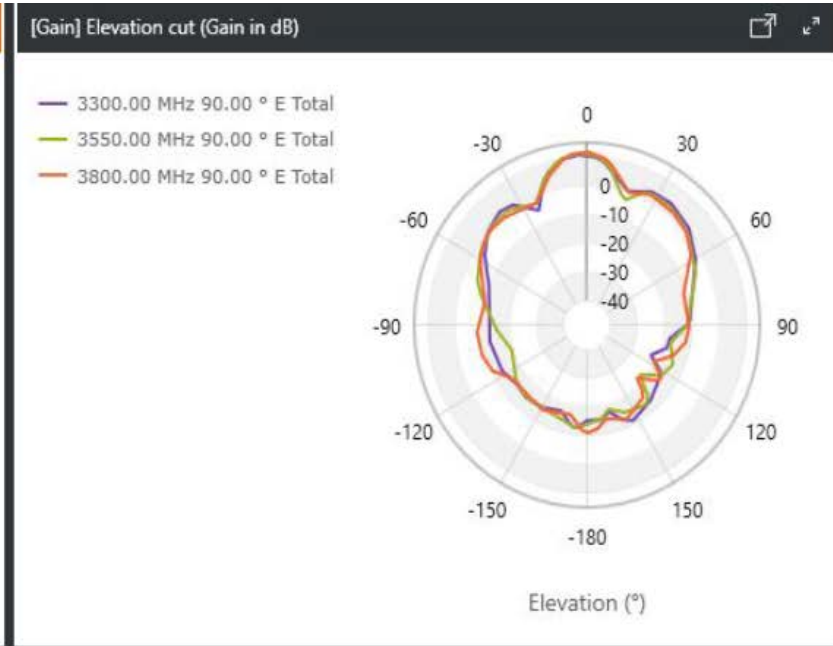
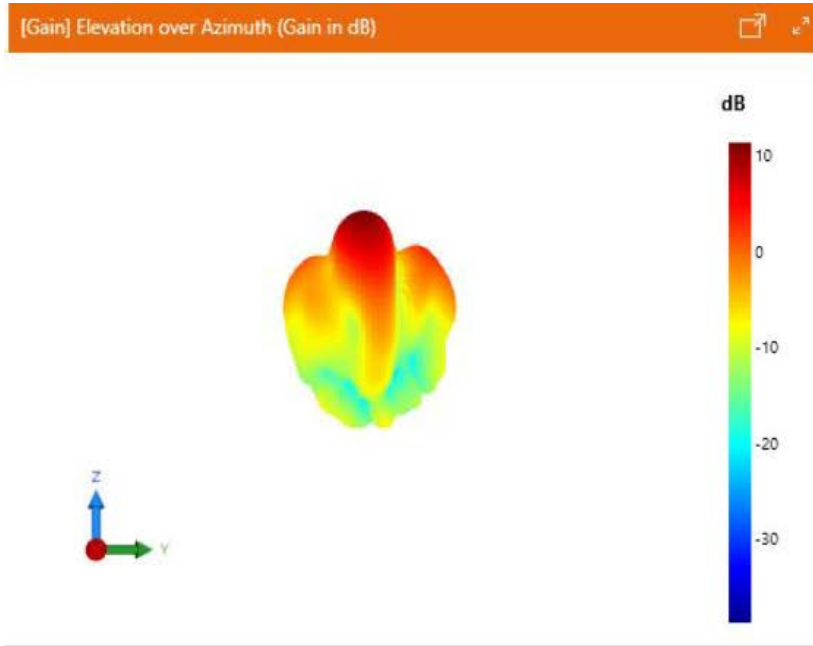
Isolation Spec < -20 dB

Gain & Efficiency Table

| Freq. (MHz) | Ant.1 | | Ant.2 | |
|----------------|--------------------|--------------------|--------------------|--------------------|
| | Efficiency (dB) | Peak gain (dBi) | Efficiency (dB) | Peak gain (dBi) |
| 3300 | -1.56 | 10.9 | -2.23 | 11.0 |
| 3350 | -1.53 | 11.0 | -1.88 | 11.2 |
| 3400 | -1.5 | 11.2 | -1.74 | 11.3 |
| 3450 | -1.44 | 11.4 | -1.68 | 11.4 |
| 3500 | -1.52 | 11.4 | -1.67 | 11.5 |
| 3550 | -1.54 | 11.5 | -1.74 | 11.4 |
| 3600 | -1.49 | 11.6 | -1.83 | 11.0 |
| 3650 | -1.4 | 11.8 | -1.9 | 10.9 |
| 3700 | -1.47 | 11.8 | -2.13 | 10.8 |
| 3750 | -1.54 | 11.8 | -2.05 | 11.1 |
| 3800 | -1.54 | 11.8 | -1.92 | 11.3 |

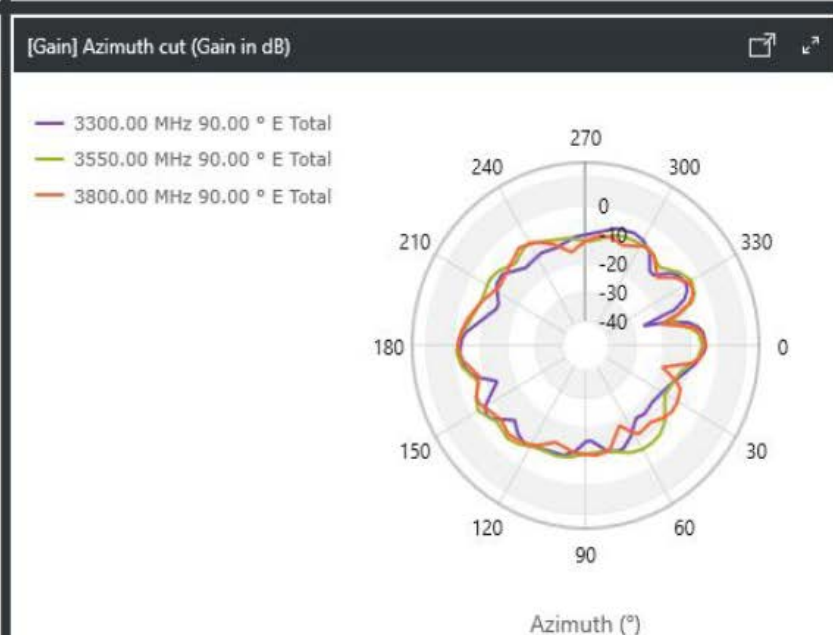
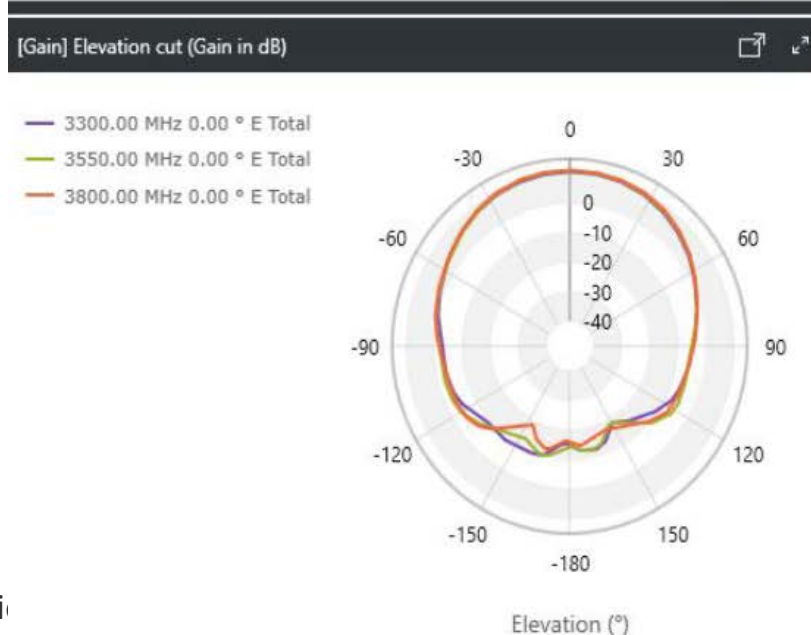
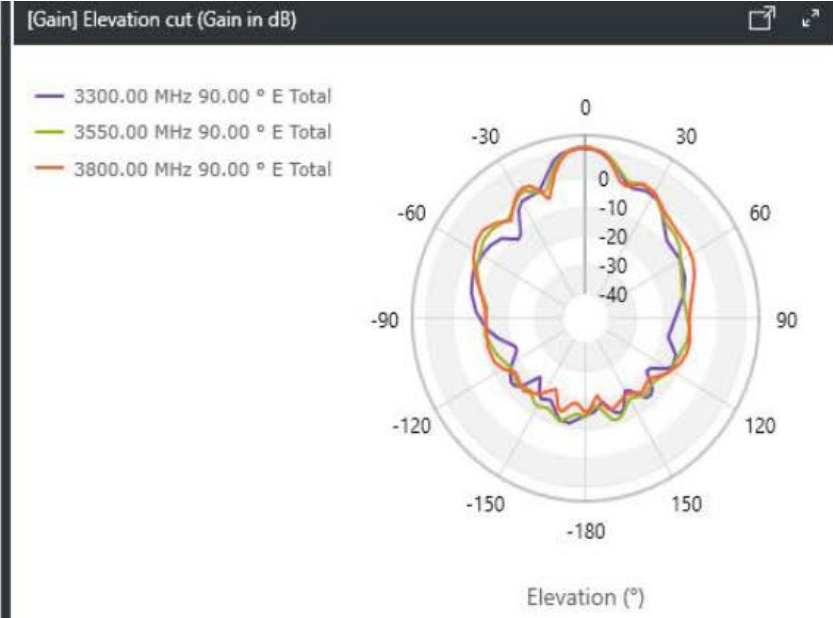
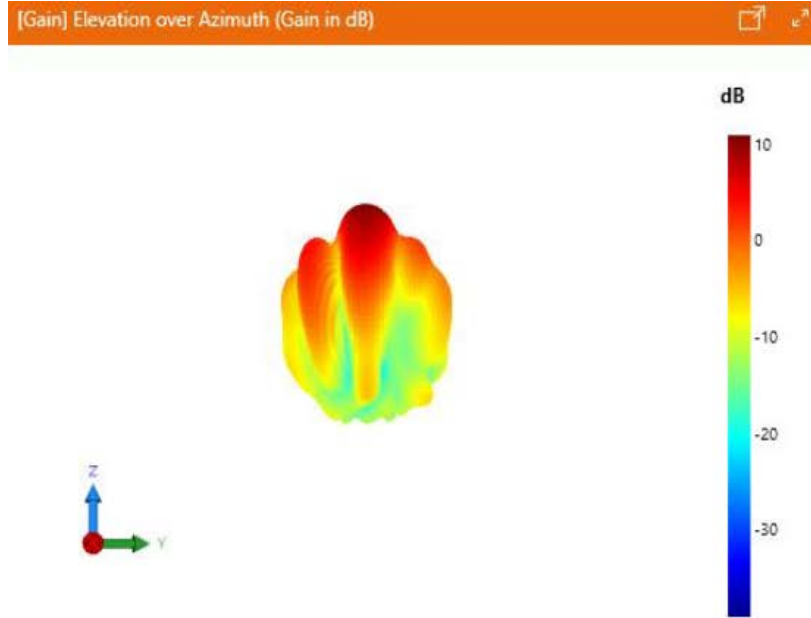
Radiation Pattern

- Port1



Radiation Pattern

- Port2



Directional Gain Calculations

The system has two ports, each port cross polarized to the other port. For 3.8GHz, Port1 is +45 degree, Port2 is -45 degree. Antennas have fixed orientations relative to one another that ensure that the antennas are cross-polarized regardless of any user actions.

The directional gain is therefore the maximum gain of an individual antenna between Port 1 and 2 per KDB 662911 D01 Multiple Transmitter Output v02r01.

Appendix

Raw Data (Port1 3300MHz)

| Theta Angle (°) | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Phi Angle (°) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) |
| 0 | 10.79 | 10.41 | 9.14 | 6.73 | 3.25 | -0.87 | -3.19 | -5.95 | -8.24 | -12.05 | -17.93 | -18.51 | -14.54 |
| 15 | 10.79 | 10.35 | 8.31 | 6.57 | 2.07 | -0.59 | -6.59 | -9.12 | -16.55 | -16.53 | -10.6 | -17.47 | -14.54 |
| 30 | 10.79 | 9.62 | 4.27 | 0.9 | -11.17 | -9.53 | -14.25 | -16.76 | -8.83 | -11.66 | -10.69 | -15.21 | -14.54 |
| 45 | 10.79 | 8.19 | -3.51 | -14.99 | -12.57 | -8.31 | -7.6 | -9.29 | -9.33 | -9.25 | -16.62 | -16.52 | -14.54 |
| 60 | 10.79 | 6.33 | -4.22 | -5.14 | -9.59 | -10.69 | -6.33 | -7.91 | -14.14 | -13.38 | -16.7 | -19.78 | -14.54 |
| 75 | 10.79 | 4.59 | -0.06 | -1 | -5.89 | -6.04 | -8.4 | -7.53 | -13.82 | -16.37 | -13.8 | -22.82 | -14.54 |
| 90 | 10.79 | 3.76 | 0.66 | 0.85 | -5.35 | -8.74 | -13.49 | -14.37 | -26.08 | -15.24 | -17.17 | -24.47 | -14.54 |
| 105 | 10.79 | 4.25 | -1.65 | 1.38 | -3.55 | -8.95 | -11.01 | -14.51 | -16.96 | -13.82 | -18.54 | -22.86 | -14.54 |
| 120 | 10.79 | 5.76 | -7.46 | -0.14 | -2.68 | -5.56 | -7.56 | -9.5 | -8.67 | -13.28 | -17.17 | -18.99 | -14.54 |
| 135 | 10.79 | 7.73 | -1.27 | -3.91 | -4.66 | -5.54 | -7.26 | -8.92 | -8.73 | -13.26 | -13.16 | -16.3 | -14.54 |
| 150 | 10.79 | 9.44 | 5.41 | -4.35 | -6.36 | -7.53 | -12.72 | -11.56 | -18.14 | -11.02 | -15.2 | -14.71 | -14.54 |
| 165 | 10.79 | 10.41 | 8.62 | 2.28 | -1.92 | -10.15 | -14.06 | -16.44 | -10.2 | -13.42 | -35.61 | -14.07 | -14.54 |
| 180 | 10.79 | 10.48 | 9.11 | 6.25 | 2.66 | -2.87 | -6.91 | -8.51 | -12.19 | -10.4 | -14.65 | -12.02 | -14.54 |
| 195 | 10.79 | 9.65 | 6.67 | 4.99 | -1.99 | -3.17 | -10.52 | -10.96 | -25.97 | -10.21 | -11.08 | -11.76 | -14.54 |
| 210 | 10.79 | 8.09 | 0.65 | -5.24 | -6.75 | -9.34 | -11.62 | -13.18 | -15.6 | -15.67 | -12.2 | -13.79 | -14.54 |
| 225 | 10.79 | 5.89 | -4.99 | -5.44 | -7.24 | -10.2 | -13.31 | -17.8 | -10.07 | -13.66 | -13.91 | -18.31 | -14.54 |
| 240 | 10.79 | 3.47 | 0.72 | -0.73 | -4.75 | -13.91 | -16.32 | -12.71 | -14.5 | -13.32 | -16.18 | -26.24 | -14.54 |
| 255 | 10.79 | 1.65 | 2.96 | 1.38 | -2 | -5.36 | -7.86 | -14.35 | -14.6 | -12.36 | -14.13 | -20.04 | -14.54 |
| 270 | 10.79 | 0.83 | 2.89 | 2.46 | -3.85 | -8.29 | -12.71 | -12.46 | -18.21 | -11.87 | -11.39 | -16.64 | -14.54 |
| 285 | 10.79 | 1.28 | 1.11 | 1.75 | -4.81 | -10.38 | -10.54 | -15.58 | -11.28 | -12.4 | -12.17 | -16.87 | -14.54 |
| 300 | 10.79 | 3.07 | -2.34 | -0.77 | -4.73 | -6.46 | -8.12 | -7.32 | -12.64 | -14.31 | -12.74 | -16.48 | -14.54 |
| 315 | 10.79 | 5.55 | -3.14 | -4.79 | -7.86 | -4.38 | -6.15 | -8.2 | -11.76 | -9.93 | -10.87 | -15.8 | -14.54 |
| 330 | 10.79 | 7.83 | 3.15 | -5.92 | -6.86 | -7.63 | -9.17 | -12.5 | -9.04 | -7.99 | -10.47 | -15.49 | -14.54 |
| 345 | 10.79 | 9.46 | 6 | 0.86 | -4.26 | -11.18 | -12.77 | -20.38 | -14.31 | -16.32 | -11.23 | -18.11 | -14.54 |
| 360 | 10.79 | 10.41 | 9.14 | 6.73 | 3.25 | -0.87 | -3.19 | -5.95 | -8.24 | -12.05 | -17.93 | -18.51 | -14.54 |

Raw Data (Port1 3500MHz)

| Theta Angle (°) | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Phi Angle (°) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) |
| 0 | 11.26 | 11.09 | 9.5 | 6.05 | 1.34 | -2.27 | -4.09 | -3.95 | -6.08 | -11.87 | -13.8 | -19.28 | -11.04 |
| 15 | 11.26 | 11.04 | 8.77 | 5.86 | -0.72 | -2.38 | -9.38 | -8.38 | -21.84 | -14.63 | -7.02 | -19.55 | -11.04 |
| 30 | 11.26 | 10.2 | 4.11 | -1.96 | -9.06 | -9.7 | -13.21 | -19.11 | -12.77 | -13.62 | -8.4 | -16.22 | -11.04 |
| 45 | 11.26 | 8.67 | -5.53 | -11.87 | -16.31 | -12.39 | -11.82 | -12.27 | -12.71 | -11.22 | -13.97 | -16.71 | -11.04 |
| 60 | 11.26 | 6.81 | -4.9 | -7.34 | -7.69 | -8.2 | -6.45 | -9.29 | -13.62 | -15.79 | -25.45 | -20.2 | -11.04 |
| 75 | 11.26 | 4.95 | -1.28 | -1.66 | -4.81 | -5.76 | -10.32 | -10.67 | -16.53 | -17.56 | -15.72 | -19.21 | -11.04 |
| 90 | 11.26 | 4.09 | -0.38 | 0.13 | -3.5 | -8.99 | -13.58 | -19.95 | -20.46 | -13.59 | -17.47 | -18.33 | -11.04 |
| 105 | 11.26 | 4.29 | -1.9 | -1.08 | -4.99 | -7.47 | -13.54 | -17.66 | -16.13 | -15.3 | -21.85 | -20.22 | -11.04 |
| 120 | 11.26 | 5.74 | -5.24 | -2.22 | -6.76 | -9.16 | -8.83 | -12.4 | -15.47 | -14.48 | -18.01 | -17.54 | -11.04 |
| 135 | 11.26 | 7.76 | -3.25 | -2.37 | -3.24 | -6.68 | -8.23 | -9.07 | -11.41 | -12.26 | -9.59 | -13.76 | -11.04 |
| 150 | 11.26 | 9.61 | 4.88 | -5.58 | -5.61 | -5.04 | -9.37 | -12.7 | -14.22 | -12.97 | -12.11 | -13.46 | -11.04 |
| 165 | 11.26 | 10.78 | 8.51 | 0.9 | -5.31 | -11.19 | -12.03 | -13.46 | -7.73 | -15.36 | -14.4 | -11.85 | -11.04 |
| 180 | 11.26 | 10.97 | 9.1 | 5.71 | 1.5 | -6.07 | -4.95 | -9.6 | -8.37 | -8.79 | -13.04 | -10.8 | -11.04 |
| 195 | 11.26 | 10.14 | 6.12 | 3.72 | -6.18 | -4.42 | -13.35 | -9.98 | -16.13 | -9.46 | -8.79 | -12.69 | -11.04 |
| 210 | 11.26 | 8.33 | -3.83 | -8.78 | -3.59 | -9.69 | -12.14 | -14.83 | -20.69 | -11.66 | -13.24 | -14.1 | -11.04 |
| 225 | 11.26 | 5.51 | -5.75 | -1.57 | -4.52 | -11.07 | -14.71 | -17.15 | -15.63 | -15.7 | -14.92 | -15.75 | -11.04 |
| 240 | 11.26 | 1.97 | 0.13 | -0.09 | -2.54 | -8.19 | -11.29 | -11.33 | -11.93 | -15.26 | -12.88 | -18.07 | -11.04 |
| 255 | 11.26 | -1.13 | 1.59 | 1.09 | -2.05 | -6.63 | -9.72 | -12.25 | -12.4 | -17.56 | -10.31 | -15.99 | -11.04 |
| 270 | 11.26 | -2.29 | 1.54 | 1.36 | -5.03 | -8.08 | -12.29 | -11.91 | -13.4 | -16.91 | -10.46 | -13.8 | -11.04 |
| 285 | 11.26 | -1.12 | -0.06 | 0.25 | -8.36 | -16.27 | -17.35 | -23.68 | -11.58 | -20.91 | -12.85 | -13.04 | -11.04 |
| 300 | 11.26 | 1.52 | -3.29 | -2.76 | -7.56 | -9.55 | -10.07 | -11.07 | -10.47 | -20.24 | -16.49 | -14.56 | -11.04 |
| 315 | 11.26 | 4.84 | -5.45 | -6.6 | -9.83 | -7.14 | -7.44 | -9.17 | -14.29 | -13.14 | -12.86 | -14.6 | -11.04 |
| 330 | 11.26 | 7.81 | 2.31 | -6.48 | -6.73 | -7.7 | -10.66 | -9.17 | -13.79 | -8.92 | -10.88 | -13.95 | -11.04 |
| 345 | 11.26 | 9.91 | 6.02 | -0.92 | -8.05 | -10.11 | -11.96 | -17.4 | -14.99 | -10.75 | -10.31 | -14.65 | -11.04 |
| 360 | 11.26 | 11.09 | 9.5 | 6.05 | 1.34 | -2.27 | -4.09 | -3.95 | -6.08 | -11.87 | -13.8 | -19.28 | -11.04 |

Raw Data (Port1 3800MHz)

| Theta Angle (°) | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Phi Angle (°) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) |
| 0 | 11.78 | 11.51 | 9.9 | 5.98 | 1.68 | -1.13 | -3.07 | -4.49 | -4.44 | -8.39 | -11.25 | -15.49 | -8.29 |
| 15 | 11.78 | 11.1 | 7.4 | 4.27 | -8.68 | -5.43 | -10.9 | -10.35 | -12.56 | -14.07 | -7.59 | -17.01 | -8.29 |
| 30 | 11.78 | 9.58 | -1.26 | -15.71 | -4.33 | -6.3 | -9.91 | -10.87 | -19.97 | -15.29 | -10.52 | -17.23 | -8.29 |
| 45 | 11.78 | 7.17 | -10.64 | -3.77 | -9.15 | -12.57 | -12.67 | -16.99 | -16.68 | -11.41 | -12.46 | -18.16 | -8.29 |
| 60 | 11.78 | 4.45 | -5.86 | -7.01 | -2.93 | -4.35 | -11.06 | -13.87 | -12.72 | -20.39 | -17.21 | -16.35 | -8.29 |
| 75 | 11.78 | 2.13 | -2.9 | -1.1 | -4.21 | -8.61 | -7.27 | -10.5 | -12.5 | -23.43 | -14.49 | -15.63 | -8.29 |
| 90 | 11.78 | 1.13 | -1.71 | 0.07 | -4.36 | -10.14 | -9.19 | -7.88 | -12.59 | -22.37 | -14.09 | -17 | -8.29 |
| 105 | 11.78 | 1.49 | -1.9 | -0.4 | -1.93 | -10.95 | -19.01 | -13.21 | -17.51 | -19.68 | -19.01 | -18.73 | -8.29 |
| 120 | 11.78 | 3.44 | -2.95 | -1.93 | -2.9 | -6.41 | -10.46 | -14.19 | -13.87 | -22.34 | -12.87 | -21.01 | -8.29 |
| 135 | 11.78 | 6.13 | -6.44 | -1.95 | -2.2 | -4.78 | -6.81 | -10.08 | -12.43 | -14 | -10.21 | -15.42 | -8.29 |
| 150 | 11.78 | 8.59 | 1.96 | -4.05 | -3.04 | -2.24 | -6.29 | -7.05 | -12.97 | -9.73 | -7.6 | -12.77 | -8.29 |
| 165 | 11.78 | 10.32 | 7.89 | -2.35 | -7.18 | -5.06 | -6.48 | -9.86 | -8.47 | -12.08 | -10.55 | -12.54 | -8.29 |
| 180 | 11.78 | 11.12 | 9.88 | 5.67 | 2.19 | -1.71 | -2.27 | -6.35 | -5.53 | -8.7 | -13.05 | -13.07 | -8.29 |
| 195 | 11.78 | 10.8 | 7.3 | 3.93 | -6.41 | -2.25 | -7.65 | -5.22 | -11.33 | -9.03 | -8.68 | -13.97 | -8.29 |
| 210 | 11.78 | 9.32 | -3.62 | -9.28 | -2.83 | -4.81 | -9.8 | -9.55 | -13.6 | -9.83 | -12.56 | -15.72 | -8.29 |
| 225 | 11.78 | 6.68 | -2.64 | 0.16 | -3.27 | -5.18 | -10.98 | -12.56 | -13.37 | -15 | -17.96 | -17.11 | -8.29 |
| 240 | 11.78 | 3.65 | 1.06 | 0.2 | -1.01 | -5.77 | -11.11 | -12.12 | -12.03 | -15.56 | -15.9 | -19.91 | -8.29 |
| 255 | 11.78 | 1.29 | 1.62 | 1.38 | -2.13 | -6.07 | -13.02 | -13.59 | -13.1 | -21.74 | -12.58 | -21.43 | -8.29 |
| 270 | 11.78 | 0.25 | 0.77 | -0.18 | -7.05 | -10.84 | -10.64 | -17.36 | -16.22 | -20.01 | -12.7 | -19.68 | -8.29 |
| 285 | 11.78 | 0.92 | -0.78 | -2.67 | -9.15 | -9.84 | -10.98 | -17.19 | -14.09 | -16.93 | -16.48 | -19.52 | -8.29 |
| 300 | 11.78 | 3.17 | -2.11 | -5.45 | -5.78 | -6.95 | -8.41 | -11.56 | -13.88 | -15.19 | -19.61 | -18.24 | -8.29 |
| 315 | 11.78 | 6.18 | -3.91 | -6.59 | -9.55 | -5.42 | -9.29 | -7.84 | -12.52 | -12.8 | -10.06 | -14.85 | -8.29 |
| 330 | 11.78 | 8.85 | 2.89 | -7.33 | -9.2 | -8.35 | -12.4 | -10.59 | -12.84 | -10.72 | -8.03 | -14.15 | -8.29 |
| 345 | 11.78 | 10.71 | 6.91 | -1.34 | -7.57 | -8.1 | -7.84 | -11.32 | -14.67 | -10.34 | -9.84 | -12.89 | -8.29 |
| 360 | 11.78 | 11.51 | 9.9 | 5.98 | 1.68 | -1.13 | -3.07 | -4.49 | -4.44 | -8.39 | -11.25 | -15.49 | -8.29 |

Raw Data (Port2 3300MHz)

| Theta Angle (°) | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Phi Angle (°) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) |
| 0 | 11.02 | 10.38 | 8.22 | 4.71 | 1.23 | -2.01 | -4.36 | -7.35 | -8.1 | -13.81 | -10.23 | -8.56 | -10 |
| 15 | 11.02 | 10.31 | 6.08 | 1.85 | -9.5 | -8.94 | -15.95 | -11.15 | -22.04 | -15.94 | -8.27 | -9.45 | -10 |
| 30 | 11.02 | 9.35 | 0.16 | -5.03 | -4.88 | -7.61 | -9.94 | -10.64 | -10.83 | -8.32 | -11.99 | -12.34 | -10 |
| 45 | 11.02 | 7.51 | -1.29 | -2.11 | -7.09 | -9.64 | -14.38 | -10.44 | -12.26 | -14.68 | -19.59 | -15.92 | -10 |
| 60 | 11.02 | 5.39 | -0.04 | -3.77 | -7.93 | -10.06 | -10.26 | -13.03 | -16.3 | -14.72 | -13.78 | -15.17 | -10 |
| 75 | 11.02 | 4.02 | -0.57 | -10.23 | -5.38 | -8.22 | -9.85 | -11.21 | -25.81 | -19.92 | -15.33 | -13.98 | -10 |
| 90 | 11.02 | 3.39 | -0.5 | -16.15 | -4.04 | -5.64 | -8.98 | -11.75 | -16.42 | -14.74 | -16.94 | -13.86 | -10 |
| 105 | 11.02 | 3.87 | -0.31 | -10.99 | -6.25 | -5.3 | -7.39 | -10.08 | -12.09 | -13.37 | -16.23 | -14.53 | -10 |
| 120 | 11.02 | 5.51 | -3.13 | -3.28 | -8.72 | -7.85 | -9.02 | -7.43 | -11.56 | -11.74 | -14.1 | -15.57 | -10 |
| 135 | 11.02 | 7.62 | -2.98 | -0.25 | -1.19 | -9.73 | -9.93 | -11.68 | -16.62 | -19.69 | -13.24 | -15.59 | -10 |
| 150 | 11.02 | 9.39 | 6.02 | -10.02 | -10.94 | -3.46 | -6.17 | -7.02 | -13.37 | -13.2 | -12.64 | -13.67 | -10 |
| 165 | 11.02 | 10.34 | 9.26 | 4.5 | 2.12 | -7.05 | -6.24 | -21.88 | -13.75 | -17.63 | -14.24 | -12.45 | -10 |
| 180 | 11.02 | 10.29 | 8.16 | 6.41 | 0.67 | -1.57 | -6.73 | -5.46 | -6.86 | -12.86 | -26.79 | -12 | -10 |
| 195 | 11.02 | 9.39 | 3.86 | 0.52 | -6.24 | -7.43 | -11.97 | -14.16 | -16.71 | -11.17 | -14.37 | -11.06 | -10 |
| 210 | 11.02 | 7.68 | -2.43 | -5.65 | -6.4 | -9.45 | -16.11 | -13.87 | -17.11 | -10.54 | -12.08 | -10.57 | -10 |
| 225 | 11.02 | 5.4 | -1.95 | -1.68 | -6.82 | -11.74 | -12.81 | -12.74 | -9.03 | -17.4 | -14.48 | -11.03 | -10 |
| 240 | 11.02 | 2.9 | 0.56 | -2.49 | -7.99 | -10.13 | -9.25 | -17.55 | -11.41 | -11.26 | -17.17 | -11.43 | -10 |
| 255 | 11.02 | 1.17 | 0.9 | -6.29 | -10.58 | -9.79 | -14.11 | -12.09 | -13.76 | -10.42 | -16.85 | -12.43 | -10 |
| 270 | 11.02 | 0.66 | 1.05 | -8.27 | -8.27 | -22.01 | -13.66 | -13.41 | -13.96 | -14.59 | -15.93 | -12.86 | -10 |
| 285 | 11.02 | 0.94 | 1.93 | -10.12 | -6.07 | -5.91 | -7.86 | -9.34 | -12.59 | -10.59 | -19.28 | -14.86 | -10 |
| 300 | 11.02 | 2.23 | 1.64 | -3.17 | -14.19 | -6.1 | -9.73 | -11.25 | -11.12 | -11.56 | -12.05 | -17.58 | -10 |
| 315 | 11.02 | 4.62 | -1.28 | 1.28 | -0.95 | -6.02 | -8.06 | -8.39 | -11.41 | -13.9 | -10.73 | -17.6 | -10 |
| 330 | 11.02 | 7.17 | 2.46 | -1.73 | -4.81 | -4.99 | -12.07 | -8.59 | -12.13 | -9.26 | -12.99 | -13.02 | -10 |
| 345 | 11.02 | 9.1 | 5.64 | 1.8 | -0.74 | -4.56 | -6.07 | -9.34 | -18.81 | -9.07 | -11.69 | -9.89 | -10 |
| 360 | 11.02 | 10.38 | 8.22 | 4.71 | 1.23 | -2.01 | -4.36 | -7.35 | -8.1 | -13.81 | -10.23 | -8.56 | -10 |

Raw Data (Port2 3500MHz)

| Theta Angle (°) | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Phi Angle (°) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) |
| 0 | 10.73 | 10.47 | 8.33 | 4.91 | 1.2 | -0.46 | -3.13 | -4.73 | -6.04 | -11.76 | -12.44 | -8.49 | -11.83 |
| 15 | 10.73 | 10.31 | 5.87 | 1.97 | -3.55 | -3.84 | -7.04 | -7.4 | -20.06 | -19.98 | -8.61 | -8.65 | -11.83 |
| 30 | 10.73 | 9.09 | -0.3 | -2.14 | -0.85 | -4.19 | -8.55 | -9.95 | -9.57 | -8.11 | -9.21 | -10.91 | -11.83 |
| 45 | 10.73 | 6.78 | -0.49 | 0.9 | -4.76 | -8.15 | -8.42 | -9.78 | -11.42 | -10.83 | -16.31 | -14.04 | -11.83 |
| 60 | 10.73 | 4.01 | 0.5 | -3.57 | -9.45 | -8.42 | -7.46 | -9.42 | -14.55 | -17.54 | -12.76 | -14.13 | -11.83 |
| 75 | 10.73 | 1.5 | -0.49 | -9.05 | -3.76 | -6.24 | -8.19 | -8.75 | -16.12 | -17.9 | -15.16 | -12.79 | -11.83 |
| 90 | 10.73 | 0.48 | -0.15 | -4.08 | -2.27 | -7.34 | -11 | -13.28 | -15 | -16.18 | -16.77 | -12.98 | -11.83 |
| 105 | 10.73 | 0.64 | 1.3 | -5.94 | -4.17 | -7.43 | -8.28 | -10.61 | -11.42 | -13.3 | -14.96 | -15.72 | -11.83 |
| 120 | 10.73 | 2.52 | 0.97 | -2.05 | -7.77 | -7.11 | -7.58 | -7.52 | -9.69 | -10.84 | -11.7 | -23.42 | -11.83 |
| 135 | 10.73 | 5.38 | -7.97 | 2.68 | 1.27 | -6.41 | -8.61 | -11.72 | -10.66 | -11.18 | -13.21 | -20.56 | -11.83 |
| 150 | 10.73 | 7.98 | 2.75 | -2.12 | -2.07 | -0.24 | -3.58 | -5.59 | -10.93 | -15.39 | -12.96 | -15.01 | -11.83 |
| 165 | 10.73 | 9.57 | 8.24 | 2.38 | 0.71 | -10.4 | -7.76 | -18.51 | -11.95 | -19.49 | -14.58 | -14.34 | -11.83 |
| 180 | 10.73 | 10.02 | 7.97 | 6.12 | 1.54 | -2.39 | -6.04 | -7.71 | -6.78 | -8.94 | -16.09 | -12.73 | -11.83 |
| 195 | 10.73 | 9.34 | 3.99 | 0.96 | -8.01 | -7.33 | -11.14 | -14.17 | -19.73 | -13.25 | -19.2 | -10.74 | -11.83 |
| 210 | 10.73 | 7.59 | -3.5 | -6.23 | -6.4 | -12.27 | -15.21 | -16.74 | -15.27 | -13.6 | -14.22 | -9.98 | -11.83 |
| 225 | 10.73 | 5.08 | -1.55 | -1.33 | -5.13 | -8.21 | -10.33 | -10.77 | -8.79 | -15.87 | -10.71 | -11.67 | -11.83 |
| 240 | 10.73 | 2.66 | 0.11 | -2.86 | -3.42 | -4.68 | -8.77 | -11.1 | -11.53 | -8.61 | -10.28 | -14.04 | -11.83 |
| 255 | 10.73 | 1.23 | -0.39 | -4.31 | -8.24 | -7.99 | -10.95 | -11.34 | -11.77 | -11.13 | -13.1 | -13.47 | -11.83 |
| 270 | 10.73 | 1.01 | -0.74 | -12.08 | -10.05 | -11.45 | -9.84 | -10.77 | -11.63 | -17.98 | -15.05 | -11.41 | -11.83 |
| 285 | 10.73 | 1.59 | 0.5 | -17.28 | -4.9 | -8.43 | -9.72 | -8.35 | -13.83 | -13.36 | -15.88 | -10.63 | -11.83 |
| 300 | 10.73 | 2.68 | 2.23 | -9.67 | -6.37 | -2.98 | -5.78 | -11.64 | -15.93 | -10.67 | -16.11 | -11.86 | -11.83 |
| 315 | 10.73 | 4.71 | 0.64 | 1.59 | -1.23 | -7 | -7.78 | -9.59 | -9.7 | -19.89 | -11.82 | -15.5 | -11.83 |
| 330 | 10.73 | 7.27 | 1.75 | 0.89 | -1.69 | -1.64 | -5.5 | -5.95 | -7.9 | -10.23 | -10.78 | -14.76 | -11.83 |
| 345 | 10.73 | 9.36 | 5.41 | 0.11 | -2.9 | -4.63 | -6.26 | -8.39 | -12.45 | -8.48 | -9.32 | -11.06 | -11.83 |
| 360 | 10.73 | 10.47 | 8.33 | 4.91 | 1.2 | -0.46 | -3.13 | -4.73 | -6.04 | -11.76 | -12.44 | -8.49 | -11.83 |

Raw Data (Port2 3800MHz)

| Theta Angle (°) | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Phi Angle (°) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) | Response (dB) |
| 0 | 11.13 | 10.9 | 9.39 | 5.81 | 2.65 | 0.27 | -3.29 | -5.86 | -6.19 | -8.91 | -14.06 | -9.81 | -14.25 |
| 15 | 11.13 | 10.55 | 6.19 | 2.98 | -3.07 | -2.01 | -8.49 | -8 | -18.51 | -14.09 | -8.38 | -9.64 | -14.25 |
| 30 | 11.13 | 8.87 | -3.87 | -4.06 | -2.86 | -6.86 | -11.58 | -14.41 | -9.57 | -12.63 | -8.89 | -11.59 | -14.25 |
| 45 | 11.13 | 5.63 | -0.71 | -0.92 | -5.57 | -5.91 | -9.01 | -13.7 | -12.27 | -9.62 | -10.26 | -16.82 | -14.25 |
| 60 | 11.13 | 1.25 | 0.7 | -11.11 | -4.52 | -8.37 | -8.34 | -10.43 | -14 | -20.68 | -14.71 | -20.63 | -14.25 |
| 75 | 11.13 | -3.19 | 0.65 | -5.07 | -2.45 | -8.87 | -11.8 | -12.22 | -15.45 | -13.37 | -14.18 | -18.13 | -14.25 |
| 90 | 11.13 | -5.09 | 2.15 | -1.4 | -1.93 | -7.78 | -10.62 | -11.11 | -12.76 | -12.96 | -15.6 | -18.84 | -14.25 |
| 105 | 11.13 | -4.28 | 4.4 | -6.95 | -3.05 | -7.36 | -9.23 | -10.71 | -15.91 | -19.28 | -22.03 | -17.53 | -14.25 |
| 120 | 11.13 | -0.73 | 5 | -3.35 | -8.56 | -5.95 | -6.71 | -11.09 | -13.15 | -15.53 | -12.76 | -16.73 | -14.25 |
| 135 | 11.13 | 3.92 | -0.63 | 4.12 | 0.39 | -12.15 | -12.78 | -13.51 | -14.79 | -10.47 | -13.21 | -17.92 | -14.25 |
| 150 | 11.13 | 7.51 | 1.41 | 1.1 | -0.86 | -0.46 | -3.95 | -7.41 | -13.95 | -14.49 | -12.98 | -19.8 | -14.25 |
| 165 | 11.13 | 9.79 | 8.89 | 2.25 | 0.66 | -15.04 | -10.32 | -16.33 | -23.06 | -10.6 | -10.43 | -18.17 | -14.25 |
| 180 | 11.13 | 10.55 | 9.08 | 6.94 | 0.86 | -0.6 | -6.64 | -5.99 | -6.94 | -11.38 | -14.72 | -15.56 | -14.25 |
| 195 | 11.13 | 9.67 | 4.39 | 1.18 | -24.67 | -16.9 | -14.44 | -16.05 | -13.01 | -12.64 | -14.8 | -15.58 | -14.25 |
| 210 | 11.13 | 7.5 | -9.53 | -9.45 | -9.29 | -8.4 | -8.62 | -10.04 | -10.72 | -8.83 | -28.48 | -15.89 | -14.25 |
| 225 | 11.13 | 4.17 | -1.78 | -4.05 | -4.61 | -8.45 | -12.13 | -15.48 | -17.49 | -13.51 | -14.44 | -17.59 | -14.25 |
| 240 | 11.13 | -0.05 | 0.76 | -1.48 | -2.99 | -10.74 | -15.58 | -10.47 | -13.79 | -11.6 | -8.71 | -18.48 | -14.25 |
| 255 | 11.13 | -4.03 | 0.67 | -0.94 | -2.56 | -8.74 | -9.84 | -15.5 | -14.44 | -16.91 | -9.46 | -23.83 | -14.25 |
| 270 | 11.13 | -4.79 | -0.34 | -3.78 | -5.19 | -8.61 | -10.81 | -9.74 | -11.59 | -14.91 | -14.92 | -30.63 | -14.25 |
| 285 | 11.13 | -3.04 | -0.61 | -9.33 | -7.1 | -9.13 | -11.53 | -9.77 | -8.5 | -13.2 | -18.45 | -20.5 | -14.25 |
| 300 | 11.13 | 0.23 | 0.47 | -13.11 | -5.26 | -7.45 | -6.84 | -10.88 | -11.47 | -12.57 | -19.79 | -16.95 | -14.25 |
| 315 | 11.13 | 4 | -0.89 | -2.55 | -4.56 | -5.42 | -7.87 | -8.58 | -15.83 | -16.05 | -16.53 | -17.89 | -14.25 |
| 330 | 11.13 | 7.38 | 0.57 | 0.34 | -1.44 | -3.8 | -4.32 | -7.73 | -8.56 | -18.81 | -13.31 | -18.34 | -14.25 |
| 345 | 11.13 | 9.72 | 5.66 | -1.17 | -3.11 | -6.5 | -7.94 | -13.35 | -11.14 | -8.33 | -13.21 | -14.49 | -14.25 |
| 360 | 11.13 | 10.9 | 9.39 | 5.81 | 2.65 | 0.27 | -3.29 | -5.86 | -6.19 | -8.91 | -14.06 | -9.81 | -14.25 |

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