



# Antenna Composite Gain Test Report

|                 |                                                                         |
|-----------------|-------------------------------------------------------------------------|
| Equipment       | 802.11ax WiFi6E 2+2+2 Access Point                                      |
| Brand Name      | Juniper                                                                 |
| Model Name      | AP64                                                                    |
| Applicant       | Juniper Networks, Inc.<br>1133 Innovation Way, Sunnyvale, CA 94089, USA |
| Manufacturer    | Juniper Networks, Inc.<br>1133 Innovation Way, Sunnyvale, CA 94089, USA |
| Sample Received | Sep. 13, 2023                                                           |
| Start Test Date | Oct. 04, 2023                                                           |
| Final Test Date | Oct. 04, 2023                                                           |

  
Approved by: Jackson Tsai

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## History of this test report

[illegible]

**1. Operation Mode and Antenna Information**

| Antenna Position | Brand Name | Model Name   | Ant. Type | Connector | Modes of Operation                     |
|------------------|------------|--------------|-----------|-----------|----------------------------------------|
| Ant1 2G6G        | Juniper    | 0990279010_1 | PIFA      | I-PEX     | Radio 2_2.4G / Radio 1_6G              |
| Ant2 2G5G        | Juniper    | 0990279010_2 | PIFA      | I-PEX     | Radio 0_5G / BT+Zigbee +Thread         |
| Ant3 2G5G        | Juniper    | 0990279010_3 | PIFA      | I-PEX     | Radio 1_2.4G / Radio 0_5G              |
| Ant4 2G6G        | Juniper    | 0990279010_4 | PIFA      | I-PEX     | Radio 1_2.4G / Radio 1_6G              |
| Ant5 2G5G6G      | Juniper    | 0990279010_5 | PIFA      | I-PEX     | Radio 2_2.4G / Radio 2_5G / Radio 2_6G |

Note:

**For 2.4GHz function:**

For IEEE 802.11 b/g/n/VHT/ax mode (2TX/2RX) (Radio 1)

Ant3 2G5G and Ant4 2G6G could transmit/receive simultaneously.

For IEEE 802.11 b/g/n/VHT/ax mode (1TX/1RX) (Radio 2)

Ant1 2G6G or Ant5 2G5G6G could transmit/receive.

For IEEE 802.11 b/g/n/VHT/ax mode (2TX/2RX) (Radio 2)

Ant1 2G6G and Ant5 2G5G6G could transmit/receive simultaneously.

**For 5GHz function:**

For IEEE 802.11 a/n/ac/ax mode (1TX/1RX) (Radio 2)

Ant5 2G5G6G could transmit/receive.

For IEEE 802.11 a/n/ac/ax mode (2TX/2RX) (Radio 0)

Ant2 2G5G and Ant3 2G5G could transmit/receive simultaneously.

**For 6GHz function:**

For IEEE 802.11 a/ax mode (2TX/2RX) (Radio 1)

Ant1 2G6G and Ant4 2G6G could transmit/receive simultaneously.

For IEEE 802.11 a/ax mode (1TX/1RX) (Radio 2)

Ant5 2G5G6G could transmit/receive.

**For BT function:**

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Ant2 2G5G could transmit/receive.

**For Thread function:**

For Thread mode (1TX/1RX)

Ant2 2G5G could transmit/receive.

**For Zigbee function:**

For Zigbee mode (1TX/1RX)

Ant2 2G5G could transmit/receive.



## 2. Test Frequency

The listed frequency of each bands are selected to represent each frequency bands

| Band [MHz]  | Test Frequency [MHz] |
|-------------|----------------------|
| 2400-2483.5 | 2450                 |
| 5150-5250   | 5200                 |
| 5250-5350   | 5300                 |
| 5470-5725   | 5600                 |
| 5725-5850   | 5785                 |
| 5925-6425   | 6175                 |
| 6425-6525   | 6475                 |
| 6525-6875   | 6695                 |
| 6875-7125   | 6995                 |

## 3. Testing Location

| Test Lab. : Sporton International Inc. Hsinhua Laboratory |               |                                                                                    |                           |                |
|-----------------------------------------------------------|---------------|------------------------------------------------------------------------------------|---------------------------|----------------|
| <input checked="" type="checkbox"/> Wen 33rd.St.          | ADD:          | No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) |                           |                |
|                                                           | TEL:          | 886-3-318-0787                                                                     | FAX:                      | 886-3-318-0287 |
| Test Condition                                            | Test Site No. | Test Engineer                                                                      | Test Environment (°C / %) | Test Date      |
| Radiated                                                  | 05CH03-HY     | Rex Liao                                                                           | 24.0~24.5°C / 50~55%      | 04/Oct/2023    |

Note:

Testing Site Information

Brand Name: TDK

Dimension: 11m\*6m\*6m

Characteristic: Fully Anechoic Chamber

## 4. Test Facility and Configuration

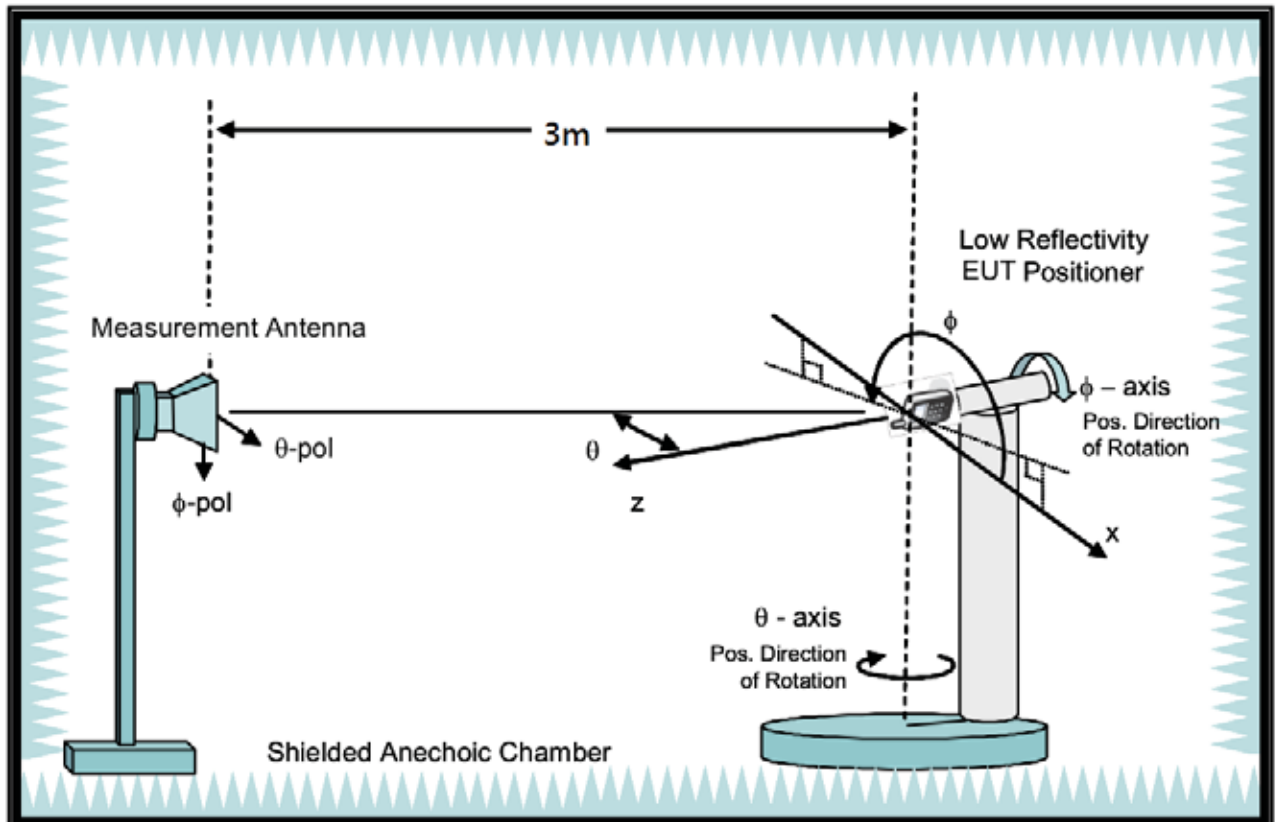
Test configuration: Reference to CITA OTA distributed-axes system configuration.

Chamber: Fully Anechoic Chamber.

Measurement antenna: Dual Polarization Horn antenna

Turntable: Multi-axis positioner (Theta and Phi angle).

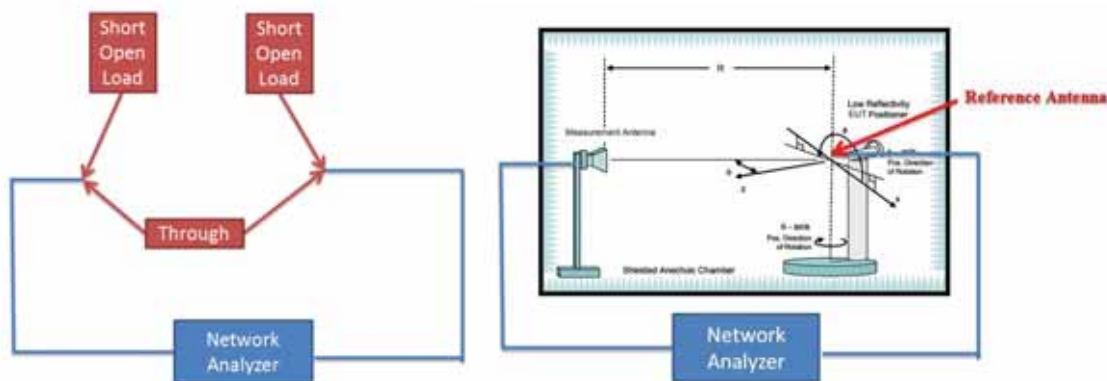
#Reference to CTIA "ctia-test-plan-for-wireless-device-over-the-air-performance-ver-3-7-1"



## 5. Reference Calibration

Connected cables to VNA calibration kit and use network analyzer internal function to do calibration. Do short, open and load to each side. Then connect through to both side and calibrate G values. The cable loss is calibrated and set inside the network analyzer.

Measurement Antenna is connected to port1 of Network analyzer and reference antenna connected to port 2 of Network Analyzer. Record G values and used with reference antenna gain to calculate gain factor.



| Frequency (MHz)       | 2400   | 2450   | 2500   | 5150   | 5200   | 5300   | 5600   | 5750   | 5800   | 5900   | 6000   | 6500   | 7000   | 7200   |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| G(theta) reading (dB) | -33.75 | -33.64 | -32.91 | -32.21 | -32.45 | -32.33 | -32.57 | -32.94 | -32.78 | -33.35 | -32.91 | -33.81 | -34.54 | -35.64 |
| G(phi) reading (dB)   | -33.19 | -32.12 | -32.48 | -32.51 | -32.64 | -31.68 | -32.24 | -32.45 | -32.45 | -32.85 | -32.45 | -33.62 | -34.48 | -35.24 |
| Reference gain (dBi)  | 10     | 10.4   | 10.6   | 12.3   | 12.5   | 13.3   | 13.3   | 13.2   | 13.1   | 13     | 13.2   | 12.4   | 11.8   | 11.1   |
| Factor(theta) (dB)    | 43.75  | 44.04  | 43.51  | 44.51  | 44.95  | 45.63  | 45.87  | 46.14  | 45.88  | 46.35  | 46.11  | 46.21  | 46.34  | 46.74  |
| Factor(phi) (dB)      | 43.19  | 42.52  | 43.08  | 44.81  | 45.14  | 44.98  | 45.54  | 45.65  | 45.55  | 45.85  | 45.65  | 46.02  | 46.28  | 46.34  |

Note:

$$G \text{ reading (dB)} = 20 \cdot \log(V_2/V_1) = 10 \cdot \log(P_2/P_1)$$

V2 is the voltage of VNA port2 is measured, V1 is the voltage of VNA port1 is the reference source.

P2 is the power of VNA port2 is measured, P1 is the power of VNA port1 is the reference source.

$$\text{Factor} = \text{gain factor} + \text{power gain conversion} = (\text{Reference antenna gain}) - (G \text{ reading})$$



## 6. Test Method

EUT set on multi-axis positioner and adjust EUT's physical center to measurement reference center. Measurement antenna set at phi polarization and 1.5 meter height. Port 1 of Network analyzer connect to antenna 1 of EUT. Record G value every 7.5 degree from 0 to 352.5 degree on Phi angle and 0 to 180 on theta angle of multi-axis positioner. Then set measurement antenna to theta polarization and repeat process. Repeat process to each antenna of EUT.

DG steps:

1. Each Phi and Theta polarization antenna gain are measured for all test angles.
2. Composite Phi and Theta antenna gain are computed, using formula in KDB662911 D01 d) (i) and e) (ii), for all angles.
3. Composite antenna gain are examined for all angles to determine max gain and Phi/Theta position. Max gain and phi/theta position are listed in section 7 tables.

Note: Antenna gain = G reading + factor, The factor of chapter five includes reference antenna gain factor and power gain conversion.





## 7. Measured Values and Calculation of Maximum Gain Positions

Dual-band mode 2.4G 2Tx Ant.1 & Ant.5

### DG\_1SS Max Value Position

| Frequency (Hz)     | 2.45G |
|--------------------|-------|
| Ant. 1 (dBi)       | 1.05  |
| Ant. 5 (dBi)       | 1.62  |
| DG [1SS] (dBi)     | 4.35  |
| Polarization       | Theta |
| $\Theta(^{\circ})$ | 52.5  |
| $\Phi(^{\circ})$   | 285   |

Note: The DG 1SS max value position is the maximum value of section 11 table DG 1SS Result.

### DG\_1SS Max Value Position Calculation

| Frequency (Hz)                                    | 2.45G            |
|---------------------------------------------------|------------------|
| Ant. 1 [ $10^{(G/20)}$ ]                          | $10^{(1.05/20)}$ |
| Ant. 5 [ $10^{(G/20)}$ ]                          | $10^{(1.62/20)}$ |
| Ant. 1 [ $10^{(G/20)}$ ] value                    | 1.128            |
| Ant. 2 [ $10^{(G/20)}$ ] value                    | 1.205            |
| Sum All Antenna [Amax]                            | 2.334            |
| DG [ $10 \cdot \log(A_{\max}^2/N_{\text{ant}})$ ] | 4.35             |

Note:

Directional Gain (1SS) is the max value of every look angle. Each position value is calculated by KDB662911 D01 d) (i).

Directional gain (1SS) =  $10 \cdot \log(10^{(G_{\text{ant1}}/20)} + 10^{(G_{\text{ant2}}/20)} + 10^{(G_{\text{ant3}}/20)} + 10^{(G_{\text{ant4}}/20)} + \dots)^2 / N_{\text{ant}}$

**Tri-band mode 2.4G 2Tx Ant.3 & Ant.4****DG\_1SS Max Value Position**

| Frequency (Hz)     | 2.45G |
|--------------------|-------|
| Ant. 3 (dBi)       | -1.14 |
| Ant. 4 (dBi)       | 4.41  |
| DG [1SS] (dBi)     | 5.08  |
| Polarization       | Theta |
| $\Theta(^{\circ})$ | 45    |
| $\Phi(^{\circ})$   | 352.5 |

Note: The DG 1SS max value position is the maximum value of section 11 table DG 1SS Result.

**DG\_1SS Max Value Position Calculation**

| Frequency (Hz)                                    | 2.45G             |
|---------------------------------------------------|-------------------|
| Ant. 3 [ $10^{(G/20)}$ ]                          | $10^{(-1.14/20)}$ |
| Ant. 4 [ $10^{(G/20)}$ ]                          | $10^{(4.41/20)}$  |
| Ant. 3 [ $10^{(G/20)}$ ] value                    | 0.877             |
| Ant. 4 [ $10^{(G/20)}$ ] value                    | 1.661             |
| Sum All Antenna [Amax]                            | 2.538             |
| DG [ $10 \cdot \log(A_{\max}^2/N_{\text{ant}})$ ] | 5.08              |

Note:

Directional Gain (1SS) is the max value of every look angle. Each position value is calculated by KDB662911 D01 d) (i).

Directional gain (1SS) =  $10 \cdot \log(10^{(G_{\text{ant1}}/20)} + 10^{(G_{\text{ant2}}/20)} + 10^{(G_{\text{ant3}}/20)} + 10^{(G_{\text{ant4}}/20)} + \dots)^2 / N_{\text{ant}}$



## Tri-band & Dual-band mode 5G 2Tx Ant.2 & Ant.3

### DG\_1SS Max Value Position

| Frequency (Hz)     | 5.2G  | 5.3G  | 5.6G  | 5.785G |
|--------------------|-------|-------|-------|--------|
| Ant. 2 (dBi)       | 4.14  | 3.93  | 4.24  | 0.57   |
| Ant. 3 (dBi)       | 0.36  | 0.56  | 0.34  | 1.38   |
| DG [1SS] (dBi)     | 5.46  | 5.42  | 5.52  | 3.99   |
| Polarization       | Phi   | Phi   | Phi   | Phi    |
| $\Theta(^{\circ})$ | 37.5  | 37.5  | 45    | 37.5   |
| $\Phi(^{\circ})$   | 217.5 | 217.5 | 217.5 | 232.5  |

Note: The DG 1SS max value position is the maximum value of section 11 table DG 1SS Result.

### DG\_1SS Max Value Position Calculation

| Frequency (Hz)                            | 5.2G             | 5.3G             | 5.6G             | 5.785G           |
|-------------------------------------------|------------------|------------------|------------------|------------------|
| Ant. 2 [ $10^{(G/20)}$ ]                  | $10^{(4.14/20)}$ | $10^{(3.93/20)}$ | $10^{(4.24/20)}$ | $10^{(0.57/20)}$ |
| Ant. 3 [ $10^{(G/20)}$ ]                  | $10^{(0.36/20)}$ | $10^{(0.56/20)}$ | $10^{(0.34/20)}$ | $10^{(1.38/20)}$ |
| Ant. 2 [ $10^{(G/20)}$ ] value            | 1.611            | 1.572            | 1.629            | 1.068            |
| Ant. 3 [ $10^{(G/20)}$ ] value            | 1.042            | 1.067            | 1.04             | 1.172            |
| Sum All Antenna [Amax]                    | 2.653            | 2.639            | 2.669            | 2.24             |
| DG [ $10 \cdot \log(A_{max}^2/N_{ant})$ ] | 5.46             | 5.42             | 5.52             | 3.99             |

Note:

Directional Gain (1SS) is the max value of every look angle. Each position value is calculated by KDB662911 D01 d) (i).

Directional gain (1SS) =  $10 \cdot \log(10^{(G_{ant1}/20)} + 10^{(G_{ant2}/20)} + 10^{(G_{ant3}/20)} + 10^{(G_{ant4}/20)} + \dots)^{2/N_{ant}}$



## Tri-band mode 6G 2Tx Ant.1 & Ant.4

### DG\_1SS Max Value Position

| Frequency (Hz)     | 6.175G | 6.475G | 6.695G | 6.995G |
|--------------------|--------|--------|--------|--------|
| Ant. 1 (dBi)       | 4.45   | 2.94   | 1.98   | 4.32   |
| Ant. 4 (dBi)       | -0.39  | 0.27   | 0.67   | -2.33  |
| DG [1SS] (dBi)     | 5.37   | 4.72   | 4.36   | 4.63   |
| Polarization       | Theta  | Theta  | Theta  | Theta  |
| $\Theta(^{\circ})$ | 67.5   | 60     | 52.5   | 52.5   |
| $\Phi(^{\circ})$   | 337.5  | 337.5  | 337.5  | 0      |

Note: The DG 1SS max value position is the maximum value of section 11 table DG 1SS Result.

### DG\_1SS Max Value Position Calculation

| Frequency (Hz)                            | 6.175G            | 6.475G           | 6.695G           | 6.995G            |
|-------------------------------------------|-------------------|------------------|------------------|-------------------|
| Ant. 1 [ $10^{(G/20)}$ ]                  | $10^{(4.45/20)}$  | $10^{(2.94/20)}$ | $10^{(1.98/20)}$ | $10^{(4.32/20)}$  |
| Ant. 4 [ $10^{(G/20)}$ ]                  | $10^{(-0.39/20)}$ | $10^{(0.27/20)}$ | $10^{(0.67/20)}$ | $10^{(-2.33/20)}$ |
| Ant. 1 [ $10^{(G/20)}$ ] value            | 1.669             | 1.403            | 1.256            | 1.644             |
| Ant. 4 [ $10^{(G/20)}$ ] value            | 0.956             | 1.032            | 1.08             | 0.765             |
| Sum All Antenna [Amax]                    | 2.625             | 2.434            | 2.336            | 2.409             |
| DG [ $10 \cdot \log(A_{max}^2/N_{ant})$ ] | 5.37              | 4.72             | 4.36             | 4.63              |

Note:

Directional Gain (1SS) is the max value of every look angle. Each position value is calculated by KDB662911 D01 d) (i).

Directional gain (1SS) =  $10 \cdot \log(10^{(G_{ant1}/20)} + 10^{(G_{ant2}/20)} + 10^{(G_{ant3}/20)} + 10^{(G_{ant4}/20)} + \dots)^{2/N_{ant}}$

**8. Summary of Test Result**

| <b>Freq(Hz)</b>                                         | <b>2.45G</b>     |
|---------------------------------------------------------|------------------|
| Ant. 1 Max Gain (dBi)                                   | 1.58             |
| Ant. 2 Max Gain (dBi)                                   | 1.22             |
| Ant. 3 Max Gain (dBi)                                   | 1.38             |
| Ant. 4 Max Gain (dBi)                                   | 4.41             |
| Ant. 5 Max Gain (dBi)                                   | 2.3              |
| Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$  | Theta/52.5/180   |
| Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$  | Theta/52.5/172.5 |
| Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$  | Theta/52.5/90    |
| Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$  | Theta/45/352.5   |
| Ant. 5 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$  | Theta/52.5/307.5 |
| Max Gain (dBi)                                          | 4.41             |
| Dual-band mode 2.4G 2Tx<br>DG [1SS] (dBi) Ant.1 & Ant.5 | 4.35             |
| Tri-band mode 2.4G 2Tx<br>DG [1SS] (dBi) Ant.3 & Ant.4  | 5.08             |

Note:

1. Antenna max gain is the max value of each individual antenna through all measurement angles.
2. The max gain is the max value of all antennas.

| <b>Freq(Hz)</b>                                                  | <b>5.2G</b>      | <b>5.3G</b>     | <b>5.6G</b>      | <b>5.785G</b>    |
|------------------------------------------------------------------|------------------|-----------------|------------------|------------------|
| Ant. 2 Max Gain (dBi)                                            | 4.71             | 4.7             | 5.46             | 3.57             |
| Ant. 3 Max Gain (dBi)                                            | 5.41             | 5.38            | 4.54             | 2.8              |
| Ant. 5 Max Gain (dBi)                                            | 3.96             | 4.26            | 3.43             | 2.52             |
| Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$           | Theta/37.5/307.5 | Theta/37.5/300  | Theta/30/292.5   | Theta/30/285     |
| Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$           | Theta/37.5/135   | Theta/30/142.5  | Theta/22.5/142.5 | Theta/37.5/135   |
| Ant. 5 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$           | Phi/7.5/135      | Theta/52.5/82.5 | Theta/22.5/22.5  | Theta/52.5/352.5 |
| Max Gain (dBi)                                                   | 5.41             | 5.38            | 5.46             | 3.57             |
| Tri-band & Dual-band mode 5G 2Tx<br>DG [1SS] (dBi) Ant.2 & Ant.3 | 5.46             | 5.42            | 5.52             | 3.99             |

Note:

1. Antenna max gain is the max value of each individual antenna through all measurement angles.
2. The max gain is the max value of all antennas.

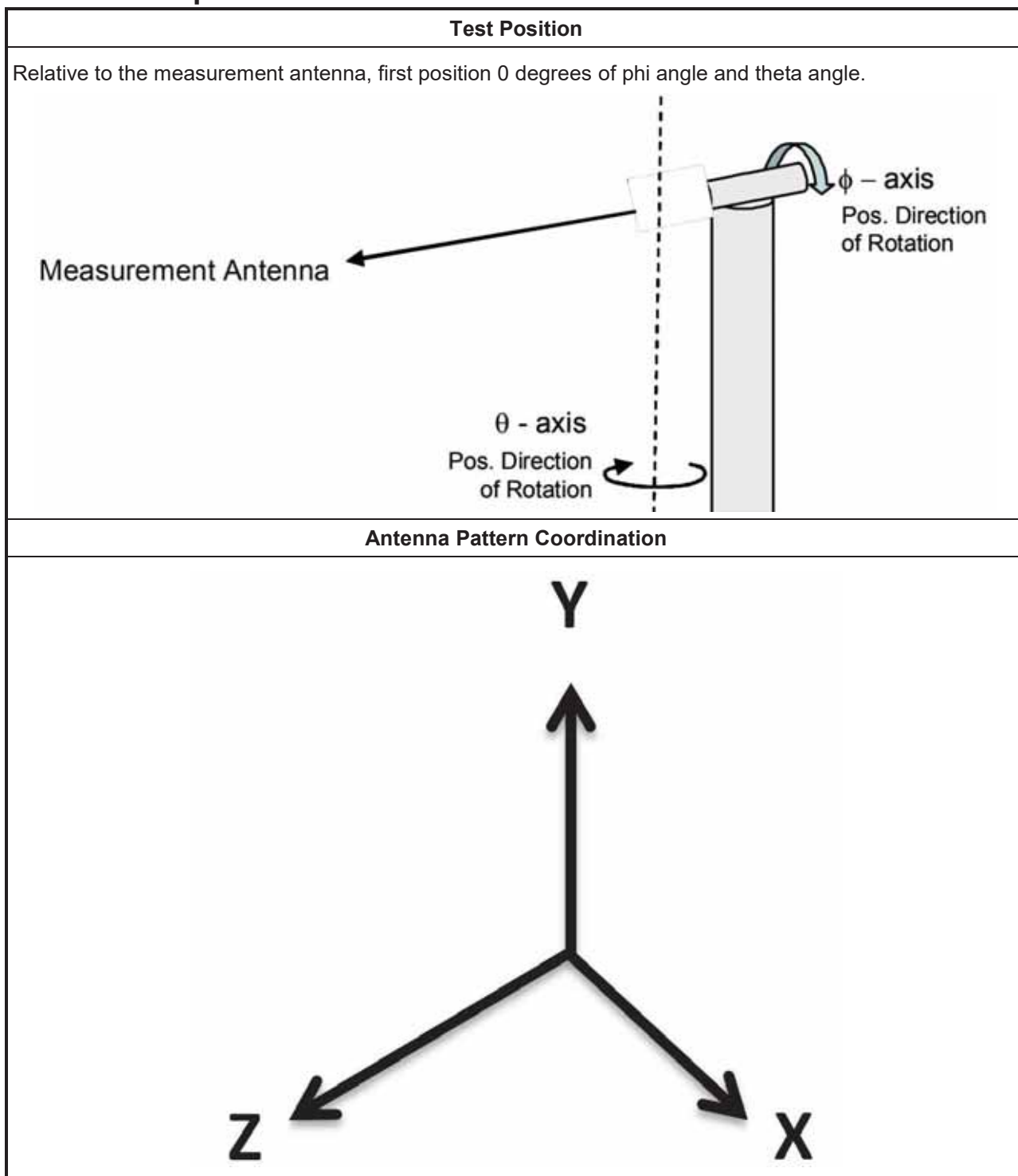


| <b>Freq(Hz)</b>                                        | <b>6.175G</b>    | <b>6.475G</b>    | <b>6.695G</b>    | <b>6.995G</b>  |
|--------------------------------------------------------|------------------|------------------|------------------|----------------|
| Ant. 1 Max Gain (dBi)                                  | 4.45             | 3.93             | 3.66             | 4.32           |
| Ant. 4 Max Gain (dBi)                                  | 3.05             | 2.9              | 4.25             | 3.33           |
| Ant. 5 Max Gain (dBi)                                  | 2.77             | 3.9              | 3.25             | 3.56           |
| Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$ | Theta/67.5/337.5 | Theta/52.5/112.5 | Theta/52.5/352.5 | Theta/52.5/0   |
| Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$ | Theta/67.5/172.5 | Theta/52.5/210   | Theta/60/217.5   | Theta/60/210   |
| Ant. 5 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$ | Theta/52.5/112.5 | Theta/67.5/307.5 | Theta/75/300     | Theta/37.5/135 |
| Max Gain (dBi)                                         | 4.45             | 3.93             | 4.25             | 4.32           |
| Tri-band mode 6G 2Tx<br>DG [1SS] (dBi) Ant.1 & Ant.4   | 5.37             | 4.72             | 4.36             | 4.63           |

Note:

1. Antenna max gain is the max value of each individual antenna through all measurement angles.
2. The max gain is the max value of all antennas.

## 9. Test Setup



Note:

Photos of Test Position: Please refer to the test photos in the appendix.



## 10. Test Equipment and Calibration Data

| Instrument                     | Brand       | Model No.  | Serial No.      | Characteristics  | Calibration Date | Calibration Due Date |
|--------------------------------|-------------|------------|-----------------|------------------|------------------|----------------------|
| Horn Antenna                   | SCHWARZBECK | BBHA9120D  | BBHA 9120D-1543 | 1GHz~18GHz       | May 11, 2023     | May 10, 2024         |
| Dual Polarization Horn Antenna | Sporton     | S0209DP    | S0209DP-001     | 2GHz~9GHz        | N.C.R.           | N.C.R.               |
| ENA Series Network Analyzer    | AGILENT     | E5071C     | MY46419477      | 100kHz~8.5GHz    | Jul. 28, 2023    | Jul. 27, 2024        |
| VNA Calibration Kit            | TS RF       | TS85033E-F | -               | DC~9GHz          | N.C.R.           | N.C.R.               |
| Multi-axis positioner          | Sporton     | MAPS01     | MAPS01-001      | Theta / Phi axis | N.C.R.           | N.C.R.               |
| Test Software                  | SPORTON     | SENSE-RDG  | V1.0.8          | -                | N.C.R.           | N.C.R.               |

Note: Calibration Interval of instruments listed above is one year.

NCR means Non-Calibration required.





## **11. Test Results**

Please refer to the appendix.

|                                           |         |
|-------------------------------------------|---------|
| Appendix A – Radiated Composite Gain..... | Page 18 |
| Appendix B – Antenna Pattern.....         | Page 38 |
| Appendix C – Test Photos.....             | Page 48 |

————THE END————



## Radiated Composite Gain Data

## Appendix A

| Freq(Hz)                                                         | 2.45G            | 5.2G             | 5.3G            | 5.6G             | 5.785G           | 6.175G           | 6.475G           | 6.695G           | 6.995G         |
|------------------------------------------------------------------|------------------|------------------|-----------------|------------------|------------------|------------------|------------------|------------------|----------------|
| Ant. 1 Max Gain (dBi)                                            | 1.58             |                  |                 |                  |                  | 4.45             | 3.93             | 3.66             | 4.32           |
| Ant. 2 Max Gain (dBi)                                            | 1.22             | 4.71             | 4.7             | 5.46             | 3.57             |                  |                  |                  |                |
| Ant. 3 Max Gain (dBi)                                            | 1.38             | 5.41             | 5.38            | 4.54             | 2.8              |                  |                  |                  |                |
| Ant. 4 Max Gain (dBi)                                            | 4.41             |                  |                 |                  |                  | 3.05             | 2.9              | 4.25             | 3.33           |
| Ant. 5 Max Gain (dBi)                                            | 2.3              | 3.96             | 4.26            | 3.43             | 2.52             | 2.77             | 3.9              | 3.25             | 3.56           |
| Ant. 1 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$           | Theta/52.5/180   |                  |                 |                  |                  | Theta/67.5/337.5 | Theta/52.5/112.5 | Theta/52.5/352.5 | Theta/52.5/0   |
| Ant. 2 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$           | Theta/52.5/172.5 | Theta/37.5/307.5 | Theta/37.5/300  | Theta/30/292.5   | Theta/30/285     |                  |                  |                  |                |
| Ant. 3 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$           | Theta/52.5/90    | Theta/37.5/135   | Theta/30/142.5  | Theta/22.5/142.5 | Theta/37.5/135   |                  |                  |                  |                |
| Ant. 4 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$           | Theta/45/352.5   |                  |                 |                  |                  | Theta/67.5/172.5 | Theta/52.5/210   | Theta/60/217.5   | Theta/60/210   |
| Ant. 5 Polarization/ $\Theta(^{\circ})/\Phi(^{\circ})$           | Theta/52.5/307.5 | Phi/7.5/135      | Theta/52.5/82.5 | Theta/22.5/22.5  | Theta/52.5/352.5 | Theta/52.5/112.5 | Theta/67.5/307.5 | Theta/75/300     | Theta/37.5/135 |
| Max Gain (dBi)                                                   | 4.41             | 5.41             | 5.38            | 5.46             | 3.57             | 4.45             | 3.93             | 4.25             | 4.32           |
| Dual-band mode 2.4G 2Tx<br>DG [1SS] (dBi) Ant.1 & Ant.5          | 4.35             |                  |                 |                  |                  |                  |                  |                  |                |
| Tri-band mode 2.4G 2Tx<br>DG [1SS] (dBi) Ant.3 & Ant.4           | 5.08             |                  |                 |                  |                  |                  |                  |                  |                |
| Tri-band & Dual-band mode 5G 2Tx<br>DG [1SS] (dBi) Ant.2 & Ant.3 |                  | 5.46             | 5.42            | 5.52             | 3.99             |                  |                  |                  |                |
| Tri-band mode 6G 2Tx<br>DG [1SS] (dBi) Ant.1 & Ant.4             |                  |                  |                 |                  |                  | 5.37             | 4.72             | 4.36             | 4.63           |



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# Radiated Composite Gain Data

# Appendix A

|          |                 |                  |                |                  |                |                  |                |                   |                   |                   |                 |                   |                 |                   |                   |                   |                 |                   |                   |                   |                 |                   |                 |                   |
|----------|-----------------|------------------|----------------|------------------|----------------|------------------|----------------|-------------------|-------------------|-------------------|-----------------|-------------------|-----------------|-------------------|-------------------|-------------------|-----------------|-------------------|-------------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| φ(157°)  | -10.91/-12.89   | -10.5/-14.73     | -13.3/-12.54   | -12.5/-12.43     | -12.3/-10.73   | -9.2/-9.83       | -11.0/-10.85   | -10.0/-9.88       | -8.6/-8.68        | -7.56/-7.11       | -8.8/-10.35     | -11.0/-11.41      | -10.5/-9.59     | -10.5/-13.5       | -12.3/-11.82      | -11.7/-9.73       | -10.3/-11.43    | -11.7/-10.01      | -10.5/-11.21      | -11.7/-10.43      | -8.7/-10.18     | -10.56/-10.57     | -10.19/-10.55   | -10.19/-10.55     |
| φ(152°)  | -14.3/-14.72    | -14.1/-12.41     | -9.3/-9.87     | -7.79/-8.07      | -11.06/-11.1   | -10.3/-12.59     | -11.59/-11.25  | -11.18/-11.24     | -10.7/-10.69      | -11.1/-10.61      | -10.4/-9.43     | -8.5/-9.3         | -13.3/-13.43    | -13.0/-11.13      | -11.0/-10.16      | -9.4/-9.47        | -7.87/-7.37     | -7.81/-8.24       | -6.67/-6.11       | -8.79/-8.97       | -8.66/-8.86     | -8.6/-8.52        | -8.47/-8.25     | -10.96/-12.21     |
| φ(147°)  | -8.52/-9.38     | -8.96/-9.98      | -6.14/-6.66    | -6.14/-6.66      | -11.01/-11.7   | -11.91/-14.7     | -11.33/-10.84  | -6.17/-6.04       | -7.83/-7.82       | -7.71/-8.02       | -8.79/-9.84     | -11.13/-12.03     | -11.11/-9.96    | -6.69/-6.72       | -6.03/-6.59       | -8.53/-8.94       | -8.66/-10.96    | -10.58/-8.68      | -8.69/-8.13       | -7.69/-7.33       | -6.8/-6.94      | -7.62/-8.54       | -7.47/-8.26     | -10.91/-10.55     |
| φ(140°)  | -13.34/-15.67   | -15.34/-15.08    | -15.18/-13.67  | -13.69/-13.77    | -14.15/-15.13  | -11.76/-10.7     | -10.69/-11.15  | -11.05/-9.83      | -8.71/-8.38       | -8.54/-8.4        | -7.8/-8.69      | -8.78/-10.5       | -11.49/-11.94   | -11.19/-11.8      | -12.5/-12.99      | -12.6/-12.34      | -11.44/-10.66   | -9.92/-9.36       | -9.33/-9.08       | -8.78/-8.92       | -8.13/-8        | -10.59/-10.9      | -10.77/-11.1    | -11.39/-11.69     |
| Freq(Hz) | 5.85/6.04       | Phi              |                |                  |                |                  |                |                   |                   |                   |                 |                   |                 |                   |                   |                   |                 |                   |                   |                   |                 |                   |                 |                   |
| G(dBm)   | φ(157°/φ(157°)) | φ(157°/φ(22.5°)) | φ(157°/φ(37°)) | φ(157°/φ(52.5°)) | φ(157°/φ(67°)) | φ(157°/φ(82.5°)) | φ(157°/φ(97°)) | φ(157°/φ(112.5°)) | φ(157°/φ(127.5°)) | φ(157°/φ(142.5°)) | φ(157°/φ(157°)) | φ(157°/φ(172.5°)) | φ(157°/φ(187°)) | φ(157°/φ(202.5°)) | φ(157°/φ(217.5°)) | φ(225°/φ(232.5°)) | φ(240°/φ(247°)) | φ(255°/φ(262.5°)) | φ(270°/φ(277.5°)) | φ(285°/φ(292.5°)) | φ(300°/φ(307°)) | φ(315°/φ(322.5°)) | φ(330°/φ(337°)) | φ(345°/φ(352.5°)) |
| φ(157°)  | 1.98/-1.3       | -1.12/-9.1       | 0.71/-0.84     | -1.22/-1.75      | -2.29/-3.01    | -3.53/-5.06      | -6.46/-7.86    | -8.41/-8.25       | -7.9/-8.55        | -5.86/-5.24       | -4.56/-3.36     | -2.27/-1.73       | -1.65/-1.28     | -0.9/-0.67        | -0.68/-0.66       | -1.58/-1.75       | -2.85/-4.18     | -5.76/-5.77       | -8.44/-8.68       | -8.53/-8.5        | -8.41/-7.72     | -6.58/-6.51       | -4.46/-5.38     | -3.24/-2.47       |
| φ(152°)  | 0.22/-0.32      | 0.54/-0.27       | 0.29/-0.3      | -0.29/-0.22      | -0.44/-0.29    | -0.44/-0.37      | -0.70/-0.29    | -1.17/-0.78       | -1.49/-1.27       | -1.42/-0.49       | -0.82/-0.28     | -0.68/-0.16       | -0.07/-0.09     | -0.47/-1.1        | -1.48/-1.3        | -2.29/-2.62       | -3.45/-4        | -4.72/-6.08       | -6.27/-6.68       | -6.22/-6.51       | -5.25/-5.19     | -4.48/-5.48       | -2.21/-0.33     |                   |
| φ(147°)  | 0.55/-0.98      | 1.18/-1.26       | 1.19/-0.7      | 0.32/-0.51       | -0.10/-1.22    | -1.08/-0.84      | -1.15/-2.24    | -3.99/-6.57       | -1.01/-14.26      | -12.13/-8.48      | -4.85/-2.46     | 0.76/-0.39        | 1.25/-0.9       | 2.42/-4           | 1.59/-12          | 0.33/-0.47        | 1.39/-1.24      | 2.39/-2.59        | 3.89/-4           | 4.78/-4.35        | 5.35/-5.25      | 5.48/-5.14        | 4.53/-4         | -2.88/-1.59       |
| φ(140°)  | 0.76/-0.95      | 1.34/-1.37       | 1.29/-1.5      | 1.71/-1.08       | 0.26/-0.28     | 0.98/-1          | 1.24/-1.5      | 4.71/-5.16        | 5.74/-6.73        | 6.94/-6.72        | 1.33/-0.4       | 1.23/-0.1         | 0.33/-0.3       | 0.65/-0.27        | 2.77/-1.73        | 0.76/-0.69        | 1.67/-0.91      | 3.47/-3.67        | 4.22/-4.04        | -10.14/-10.4      | 7.86/-6.65      | 4.52/-3.69        | 3.13/-3.3       | -1.52/-1.68       |
| φ(137°)  | 2.41/-2.33      | 3.24/-3.43       | 2.57/-2.83     | 2.97/-1.93       | 0.55/-0.72     | 0.91/-1          | 0.25/-0.27     | -1.42/-0.26       | -4.79/-2.6        | -5.74/-5.51       | -3.25/-3.66     | -2.59/-0.05       | 1.94/-2.28      | 2.93/-5           | 4.14/-4.29        | 3.95/-3.7         | 3.07/-3.36      | 1.54/-4.6         | -7.59/-8.85       | -4.17/-5.3        | -2.71/-0.1      | 1.29/-1.32        | 0.99/-1.4       |                   |
| φ(132°)  | 2.25/-3.26      | 3.36/-3.71       | 2.77/-2.1      | 1.89/-1.8        | 0.04/-0.52     | 1.28/-1.96       | 0.59/-0.86     | 0.52/-0.62        | -0.86/-1.37       | -2.27/-2.24       | -3.49/-4.84     | -4.10/-4.29       | 1.79/-2.95      | 3.82/-4           | 4.82/-4.1         | 3.49/-2           | 0.96/-1.4       | -3.52/-7.47       | -6.86/-5.72       | -7.13/-9.19       | -4.72/-4.07     | 1.94/-2.42        | 1.78/-2.1       |                   |
| φ(127°)  | 2.07/-2.5       | 2.98/-2.7        | 2.14/-3.1      | -0.22/-0.66      | 0.86/-0.43     | 1.67/-1.4        | 0.06/-0.56     | -0.59/-2.01       | -4.62/-6.54       | -7.88/-7.67       | -5.77/-2.25     | -0.23/-0.3        | 0.77/-2.2       | 3.42/-0.08        | <b>4.25/-3.2</b>  | 4.33/-36          | 3.44/-27        | 1.61/-0.63        | -3.65/-6.33       | -11.88/-14.65     | -13.72/-10.87   | -7.34/-3.67       | -1.55/-1.7      | 1.16/-1.4         |
| φ(122°)  | 2.16/-2.27      | 2.99/-2.79       | 0.86/-2.23     | -0.97/-1.19      | 0.29/-0.73     | 2.31/-2.7        | 0.51/-1.52     | -2.14/-2.78       | -8.99/-10.44      | -12.47/-10.3      | -1.27/-1.73     | 0.09/-1.16        | 1.23/-53        | 3.22/-8           | 3.16/-8           | 3.54/-46          | 3.02/-28        | 1.01/-0.43        | -1.11/-0.77       | -10.06/-14.05     | -11.53/-8.34    | -6.93/-6.23       | -4.25/-4.62     | -2.19/-0.85       |
| φ(117°)  | 2.302/-2.78     | 2.130/-1.81      | -1.05/-4.15    | -5.18/-2.63      | -0.55/-0.1     | 0.45/-0.4        | -0.9/-2.5      | -0.4/-3.5         | -6.54/-12.34      | -15.31/-9.49      | -5.62/-3.51     | -1.56/-2.1        | 1.45/-1.96      | 1.67/-1.6         | 0.41/-2           | 2.96/-2.49        | 1.72/-4.6       | 0.07/-2.15        | -2.21/-2.9        | -5.73/-3.4        | -11.22/-9.69    | -7.33/-6.89       | -4.55/-1.11     | 0.96/-1.6         |
| φ(112°)  | 1.745/-2.76     | 0.67/-0.74       | -3.52/-6.69    | -8.36/-6.97      | -3.07/-1.32    | -0.58/-0.97      | -2.19/-3.42    | -2.12/-2.63       | -6.91/-8.4        | -11.72/-9.35      | -4.62/-3.42     | -1.5/-1.56        | -1.16/-26       | 0.03/-1.79        | -3.88/-6.16       | -0.23/-0.47       | -2.31/-37       | 2.98/-3.58        | -4.82/-6.66       | -15.22/-10.94     | -8.17/-6.28     | -4.49/-2.08       | -0.01/-0.63     |                   |
| φ(107°)  | -0.11/-0.37     | -1.24/-2.55      | -5.96/-8.93    | -11.48/-11.04    | -8.93/-6.42    | -4.13/-37        | -3.89/-4.65    | -2.52/-4.8        | -6.74/-5.67       | -12.11/-12.7      | -7.95/-6.72     | -4.07/-3.87       | -3.31/-1.7      | -1.97/-3.06       | -4.79/-4.42       | -1.86/-1.55       | -1.83/-2.67     | -3.76/-4.7        | -4.35/-1.02       | -15.31/-11.39     | -10.62/-10.05   | -6.07/-4.34       | -4.01/-4.82     |                   |
| φ(102°)  | 0.26/-3.44      | -3.85/-4.74      | -8.66/-11.96   | -13.72/-13.14    | -9.23/-7.66    | -7.03/-6.39      | -6.31/-6.32    | -5.14/-6.14       | -2.66/-1.59       | -12.27/-12.68     | -9.56/-6.77     | -6.47/-6.66       | -5.47/-3.86     | -4.43/-7.04       | -7.02/-7.65       | -4.86/-5.55       | -4.58/-5.64     | -5.78/-7.85       | -2.27/-4.86       | -6.28/-12.37      | -14.52/-12.48   | -13.67/-11.63     | -8.62/-4.3      | 2.34/-4.8         |
| φ(97°)   | 0.26/-4.44      | -4.98/-6         | -8.56/-10.7    | -15.79/-15.03    | -13.05/-12.55  | -9.1/-7.4        | -7.62/-8.7     | -6.52/-10.5       | -6.39/-12.48      | -12.06/-8.69      | -8.36/-8.71     | -6.11/-6.62       | -5.34/-4.1      | -10.23/-12.35     | -10.68/-8.86      | -7.68/-7.36       | -7.91/-8.65     | -6.41/-6.35       | -8.12/-10.15      | -14.73/-11.82     | -13.34/-11.75   | -10.48/-10.14     | -4.91/-3.3      |                   |
| φ(92°)   | 0.36/-3.29      | -7.11/-6.6       | -9.58/-12.39   | -15.55/-15.48    | -13.14/-12.14  | -10.21/-11.5     | -8.93/-9.48    | -8.17/-11.58      | -10.39/-13.77     | -15.15/-14.81     | -12.32/-13.32   | -8.41/-10.72      | -6.88/-10.6     | -11.12/-4         | -15.34/-16        | -14.48/-11.65     | -11.57/-10.85   | -15.44/-10.62     | -12.56/-13.6      | -13.28/-12.06     | -12.21/-12.12   | -13.08/-14.54     | -10.54/-11.73   | 6.63/-4.09        |
| φ(87°)   | -0.13/-0.38     | -9.16/-10.46     | -9.04/-11.31   | -14.84/-13.62    | -12.28/-12.68  | -11.11/-10.6     | -8.96/-10.43   | -8.69/-13.69      | -13.54/-15.19     | -15.75/-15.31     | -13.21/-13.62   | -10.68/-10.61     | -10.73/-10.42   | -12.48/-13.7      | -15.17/-14.8      | -14.51/-14.84     | -14.67/-14.24   | -13.99/-15.63     | -15.26/-10.19     | -15.79/-11.89     | -11.71/-12.25   | -11.93/-12.76     | -15.82/-14.21   | -10.61/-10.41     |
| φ(82°)   | -0.19/-10.95    | -9.12/-10.25     | -8.56/-10.34   | -13.11/-10.45    | -12.39/-11.49  | -9.51/-12.51     | -11.19/-12.88  | -11.59/-12.75     | -11.89/-14.19     | -15.72/-15.1      | -15.72/-15.17   | -11.04/-13.41     | -11.27/-11.21   | -13.22/-15.2      | -14.42/-12.64     | -15.19/-12.99     | -12.46/-15.55   | -13.26/-15.53     | -12.78/-10.43     | -15.15/-13.91     | -13.32/-13.28   | -11.61/-14.6      | -14.45/-13.51   | -14.62/-14.35     |
| φ(77°)   | -0.24/-14.32    | -9.61/-12.01     | -9.34/-10.45   | -9.21/-8.7       | -8.95/-10.59   | -9.61/-10.7      | -8.89/-13.37   | -12.74/-12.57     | -14.15/-15.3      | -15.07/-15.3      | -15.15/-16.7    | -14.79/-13.48     | -11.97/-12.83   | -8.44/-8.96       | -12.22/-8.66      | -12.68/-9.78      | -11.96/-12.29   | -11.51/-12.94     | -13.52/-13.63     | -15.15/-13.91     | -13.32/-13.28   | -11.61/-14.6      | -14.45/-13.51   | -14.62/-14.35     |
| φ(72°)   | -1.15/-11.06    | -9.16/-10.42     | -8.44/-10.34   | -8.99/-8.67      | -7.57/-7.89    | -8.67/-12.21     | -10.42/-12.06  | -11.84/-13.56     | -15.41/-15.23     | -15.26/-15.35     | -14.84/-16.76   | -15.66/-12.99     | -12.13/-12.61   | -8.91/-11.7       | -12.19/-12.55     | -12.59/-12.46     | -8.13/-8.08     | -8.69/-8.7        | -15.15/-14.1      | -12.59/-14.1      | -12.32/-14.12   | -14.89/-12.84     | -15.82/-14.32   |                   |
| φ(67°)   | -1.63/-12.08    | -11.26/-12.04    | -10.59/-7.87   | -7.33/-10.85     | -10.87/-8.54   | -7.59/-8.62      | -10.85/-11.59  | -10.65/-13.75     | -12.42/-14.47     | -15.71/-15.66     | -16.89/-13.41   | -15.45/-14.06     | -11.78/-12.31   | -10.51/-15.23     | -13.52/-11.67     | -10.89/-13.45     | -11.95/-14.42   | -9.16/-7.29       | -11.05/-7.88      | -12.82/-13.31     | -14.59/-14.05   | -15.45/-15.83     | -15.75/-14.98   | -13.83/-10.38     |
| φ(62°)   | -1.466/-12.47   | -11.83/-14.21    | -12.31/-13.73  | -12.69/-9.88     | -8.49/-9.37    | -8.24/-9.19      | -11.32/-13.14  | -12.50/-10.84     | -12.54/-14.81     | -13.97/-15.97     | -13.66/-13.34   | -15.77/-15.92     | -13.59/-15.62   | -13.59/-15.62     | -12.91/-15.25     | -12.76/-14.06     | -10.89/-11.3    | -12.44/-4.4       | -11.55/-12.62     | -15.36/-15.57     | -15.23/-13.85   | -13.39/-12.53     | -12.86/-13.64   |                   |
| φ(57°)   | -0.32/-1.44     | -15.16/-14.5     | -12.32/-12.35  | -13.96/-11.38    | -14.07/-14.78  | -11.17/-12.74    | -15.69/-10.25  | -12.94/-13.7      | -13.79/-14.58     | -15.59/-15.4      | -15.23/-12.33   | -14.59/-15.14     | -12.71/-13.13   | -15.15/-13.2      | -14.84/-14.46     | -15.68/-16.26     | -15.68/-16.26   | -15.68/-16.26     | -15.68/-16.26     | -15.68/-16.26     | -15.68/-16.26   | -15.68/-16.26     | -15.68/-16.26   | -15.68/-16.26     |
| φ(52°)   | -1.68/-10.96    | -13.69/-15.64    | -14.54/-14.66  | -15.60/-14.57    | -13.81/-12.3   | -8.66/-4         | -14.32/-14.23  | -11.32/-10.62     | -11.22/-15.61     | -13.46/-13.13     | -13.46/-13.13   | -14.94/-16.13     | -14.94/-16.13   | -11.14/-11.8      | -11.26/-13.33     | -15.85/-15.12     | -14.71/-14.63   | -15.70/-15.44     | -13.76/-14.13     | -13.86/-14.17     | -13.20/-13.98   | -13.20/-13.76     | -13.20/-13.76   | -13.20/-13.76     |
| φ(47°)   | -1.745/-2.76    | -11.11/-11.3     | -14.98/-11.14  | -10.36/-10.47    | -10.70/-10.22  | -10.86/-11.37    | -10.49/-11.33  | -12.49/-12.35     | -11.22/-15.61     | -13.46/-13.13     | -13.46/-13.13   | -14.94/-16.13     | -14.94/-16.13   | -11.14/-11.8      | -11.26/-13.33     | -15.85/-15.12     | -14.71/-14.63   | -15.70/-15.44     | -13.76/-14.13     | -13.86/-14.17     | -13.20/-13.98</ |                   |                 |                   |









| Gen | 61750Pa |  | ThesAet1 |  | ThesAet2 |  | ThesAet3 |  | ThesAet4 |  | ThesAet5 |  | ThesAet6 |  | ThesAet7 |  | ThesAet8 |  | ThesAet9 |  | ThesAet10 |  | ThesAet11 |  | ThesAet12 |  | ThesAet13 |  | ThesAet14 |  | ThesAet15 |  | ThesAet16 |  | ThesAet17 |  | ThesAet18 |  | ThesAet19 |  | ThesAet20 |  | ThesAet21 |  | ThesAet22 |  | ThesAet23 |  | ThesAet24 |  | ThesAet25 |  | ThesAet26 |  | ThesAet27 |  | ThesAet28 |  | ThesAet29 |  | ThesAet30 |  | ThesAet31 |  | ThesAet32 |  | ThesAet33 |  | ThesAet34 |  | ThesAet35 |  | ThesAet36 |  | ThesAet37 |  | ThesAet38 |  | ThesAet39 |  | ThesAet40 |  | ThesAet41 |  | ThesAet42 |  | ThesAet43 |  | ThesAet44 |  | ThesAet45 |  | ThesAet46 |  | ThesAet47 |  | ThesAet48 |  | ThesAet49 |  | ThesAet50 |  | ThesAet51 |  | ThesAet52 |  | ThesAet53 |  | ThesAet54 |  | ThesAet55 |  | ThesAet56 |  | ThesAet57 |  | ThesAet58 |  | ThesAet59 |  | ThesAet60 |  | ThesAet61 |  | ThesAet62 |  | ThesAet63 |  | ThesAet64 |  | ThesAet65 |  | ThesAet66 |  | ThesAet67 |  | ThesAet68 |  | ThesAet69 |  | ThesAet70 |  | ThesAet71 |  | ThesAet72 |  | ThesAet73 |  | ThesAet74 |  | ThesAet75 |  | ThesAet76 |  | ThesAet77 |  | ThesAet78 |  | ThesAet79 |  | ThesAet80 |  | ThesAet81 |  | ThesAet82 |  | ThesAet83 |  | ThesAet84 |  | ThesAet85 |  | ThesAet86 |  | ThesAet87 |  | ThesAet88 |  | ThesAet89 |  | ThesAet90 |  | ThesAet91 |  | ThesAet92 |  | ThesAet93 |  | ThesAet94 |  | ThesAet95 |  | ThesAet96 |  | ThesAet97 |  | ThesAet98 |  | ThesAet99 |  | ThesAet100 |  | ThesAet101 |  | ThesAet102 |  | ThesAet103 |  | ThesAet104 |  | ThesAet105 |  | ThesAet106 |  | ThesAet107 |  | ThesAet108 |  | ThesAet109 |  | ThesAet110 |  | ThesAet111 |  | ThesAet112 |  | ThesAet113 |  | ThesAet114 |  | ThesAet115 |  | ThesAet116 |  | ThesAet117 |  | ThesAet118 |  | ThesAet119 |  | ThesAet120 |  | ThesAet121 |  | ThesAet122 |  | ThesAet123 |  | ThesAet124 |  | ThesAet125 |  | ThesAet126 |  | ThesAet127 |  | ThesAet128 |  | ThesAet129 |  | ThesAet130 |  | ThesAet131 |  | ThesAet132 |  | ThesAet133 |  | ThesAet134 |  | ThesAet135 |  | ThesAet136 |  | ThesAet137 |  | ThesAet138 |  | ThesAet1 |
|-----|---------|--|----------|--|----------|--|----------|--|----------|--|----------|--|----------|--|----------|--|----------|--|----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|----------|
|-----|---------|--|----------|--|----------|--|----------|--|----------|--|----------|--|----------|--|----------|--|----------|--|----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|-----------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|------------|--|----------|





# Radiated Composite Gain Data

# Appendix A

|          |                |                |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| h(25°)   | -5.8(-5.2)     | 4.17(+3.7)     | -3.37(-9.1)    | -8.65(-4.8)    | -13.68(-18.2)  | -18.50(-10.8)  | -10.49(-14.7)  | -12.55(-4.8)   | 5.24(+3.5)     | 6.33(+1.1)      | -11.86(-15.4)   | -8.33(-5.0)     | -7.9(-5.7)      | 7.8(-5.1)       | -3.73(-7.2)     | -8.4(-14.18)    | -10.47(-8.7)    | -10.35(+2.8)    | 6.19(+3.7)      | -3.27(+6.7)     | -11.9(-14.8)    | -11.38(-10.12)  | -11.09(-12.7)   | -10.72(-13.4)   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(30°)   | -10.47(+6.8)   | -7.84(+7.7)    | -7.81(+7.2)    | -8.2(-5.7)     | -14.94(-15.1)  | -10.42(-9.4)   | -9.06(+5.3)    | -2.86(-1.9)    | 0.55(+7.9)     | 3.2(+4.6)       | -11.48(-13.3)   | -8.8(+3.3)      | -12.64(+5.4)    | 3.31(+5.6)      | -0.57(-1.0)     | -3.83(+9.4)     | -1.88(+13.4)    | -11.41(-11.2)   | -10.52(+9.6)    | 6.44(+7.7)      | -11.18(-16.18)  | -15.96(-17.5)   | -17.25(-18.1)   | -15.12(-13)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(35°)   | -2.96(+1.04)   | -2.07(+2)      | -7.69(+4)      | -8.47(+13.2)   | -10.08(-10.7)  | -7.45(+5.5)    | -5.3(-2.1)     | -0.51(+5)      | 0.97(+1.9)     | -0.88(+4.7)     | -11.49(-13.45)  | -8.09(-14.8)    | -5.49(+2.55)    | -5.95(+6.7)     | -10.00(-10.8)   | -7.31(+17)      | -15.52(-16.09)  | -10.59(-12)     | -11.6(+4)       | 8.35(-10.3)     | -12.93(+15)     | -9.5(+22)       | -6.74(+6)       | -3.56(+24)      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(40°)   | 0.25(+1.9)     | 0.81(+3.4)     | -5.86(-12.4)   | -12.53(-16.6)  | -14.63(-17.9)  | -3.64(+3.2)    | -9(-7.1)       | -2.64(+5.7)    | 2.02(+5)       | 3.4(+2.6)       | -11.41(+7)      | -8.27(+10.3)    | -8.89(+2)       | -4.23(+3.2)     | -5.81(+14.7)    | -18.71(-15)     | -17.81(-15)     | -11.84(-12.4)   | -11.88(-10.7)   | -10.3(-9.8)     | -13.51(-10.6)   | -4.69(+4.7)     | -3.83(+2.9)     | -2.95(+1.7)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(45°)   | -3.31(+4.8)    | -1.03(+5.4)    | -3.65(-13.55)  | -14.27(-16.35) | -13.81(-7.8)   | -3.84(+2.5)    | -4.02(+6.2)    | -0.81(+4.8)    | 0.20(+1.4)     | 0.87(+6.4)      | -1.86(+14)      | -3.12(+6.79)    | -17.73(+14.03)  | -6.39(+1.5)     | -8.24(+3.7)     | -14.47(+17.2)   | -18.98(-17.8)   | -10.41(+8.7)    | -13.38(+17.8)   | -13.38(+17.8)   | -10.32(-14.3)   | -16.19(+9.6)    | -4.39(+4.7)     | -4.27(+5.3)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(50°)   | 6.39(+5.8)     | -3.43(-1.1)    | -2.14(-11.83)  | -17.26(-16.8)  | -16.27(+2.7)   | 6.66(+4.2)     | -1.85(+4.1)    | -3.03(+2.4)    | 0.47(+1.4)     | 1.42(+2)        | 1.84(+2.9)      | -2.52(+7.7)     | -4.13(-10)      | -1.81(+7.3)     | -11.37(+3.5)    | -7.14(-18.3)    | -18.07(-18.13)  | -13.28(+6.6)    | 8.8(-15.3)      | -13.91(-18.4)   | 6.25(+6.1)      | -3.99(+6.4)     | -4.79(+3.7)     | -6.57(+3.6)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(55°)   | 5.48(+17.5)    | 6.41(+13)      | -3.99(-10.6)   | -18.91(-14.58) | -19.01(-10.7)  | -7.85(+4.7)    | -2.72(+3.2)    | -2.52(+1.4)    | -1.85(+4)      | 0.15(+1.29)     | -3.75(+4.92)    | -3.23(+3.99)    | -2.01(+5.8)     | -11.25(-16.2)   | -16.28(+6.8)    | -7.4(-19.69)    | -12.69(-19.19)  | 8.91(+11.47)    | -8.75(-16.79)   | -17.37(-15.22)  | -6.68(+5.6)     | -3.97(+7.34)    | -4.28(+2.6)     | -2.98(+1.2)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(60°)   | 4.89(+6.84)    | -10.66(-10.38) | 6.71(-10.74)   | -13.1(-10.47)  | -11.51(+6.7)   | -18.31(+3.6)   | 6.88(+4.6)     | 4.06(+4.56)    | 5.31(+2.58)    | 3.91(+4.6)      | -3.78(+15.4)    | -8.65(+15.7)    | -7.83(+6.1)     | -2.8(-3.1)      | 6.14(+13.2)     | -18.71(+7.7)    | -15.37(-18.64)  | -17.13(-13.95)  | -15.01(-11.82)  | -18.91(-12.4)   | -7.38(+2.4)     | -3.36(+3)       | 5.22(+3.4)      | 3.01(+2.4)      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(65°)   | 3.89(+8.5)     | -15.42(-15.8)  | -10.48(-13.4)  | -11.43(+6.4)   | -18.5(-15.2)   | -7.5(+9)       | 8.2(+2.4)      | -7.66(+1.7)    | 0.88(+7.2)     | 7.73(+2.2)      | -1.66(+5.97)    | 6.42(+11.3)     | 5.2(+4.4)       | -4.77(+18.7)    | -18.25(-15.6)   | -8.2(+18.5)     | -17.06(-13.77)  | 7.85(+14.6)     | 3.51(+14.8)     | 8.54(+11.6)     | 5.22(+8.7)      | 5.86(+1.6)      | 4.38(+3.5)      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(70°)   | -7.26(-10.24)  | -13.11(-8.88)  | -10.46(-13.2)  | -10.89(-11.5)  | -10.95(-12.3)  | 8.95(+8.2)     | -8.11(+6.7)    | -7.26(-11.4)   | 4.73(+13.81)   | -11.52(-16.8)   | -15.59(+16.79)  | -15.93(-12.81)  | 8.33(+7.5)      | -7.23(-18)      | -18.92(+6.25)   | -12.97(+17.38)  | -16.03(-13.76)  | 6.13(+13.15)    | 8.61(+2.28)     | -14.48(-12.74)  | -14.12(-15.5)   | 6.49(+8.9)      | -10.84(+8.5)    | 6.53(+5.1)      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(75°)   | 6.07(+10.5)    | -15.4(-10.9)   | -16.43(-13.48) | -11.04(-12.22) | -16.36(-19.02) | -12.11(+9.66)  | -10.27(-16.8)  | 8.06(-11.45)   | -10.50(-14.32) | -7.72(+19.5)    | -13.39(-17.2)   | 3.02(+13.07)    | 8.95(+19.7)     | -11.72(-19.08)  | -18.56(+7.73)   | -18.93(+16.84)  | -17.59(-17.7)   | -12.97(+9.8)    | -12.35(-15.14)  | -18.88(-12.27)  | -17.71(+14.72)  | 8.91(+12)       | -14.91(+10.24)  | 8.71(+7.84)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(80°)   | -18.71(+5.5)   | -15.98(-13.2)  | -17.71(+13.36) | -9.98(-12.0)   | -18.08(-18.18) | -12.11(+9.67)  | -10.67(-16.4)  | -12.52(+14.25) | -12.32(+13.42) | -8.54(+18.43)   | -16.55(+8.9)    | -13.16(+15.97)  | 8.95(+14.6)     | -13.05(+17.7)   | -16.61(+5.34)   | -13.37(+13.85)  | -19.21(+12.38)  | 9.21(+14.4)     | -16.4(-15.18)   | -18.42(-14.79)  | 11.91(+13.64)   | -14.68(+14.4)   | -7.71(+9.1)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(85°)   | -11.71(+5.5)   | -17.52(+16)    | -18.89(-14.26) | -18.91(+14.29) | -19.14(+13.7)  | -17.52(+13.28) | -13.23(+17.74) | -14.12(+13.54) | -16.5(-13.08)  | -14.15(+19.07)  | -15.99(-13.2)   | -11.46(+17.17)  | -10.4(+10.17)   | -11.54(+16.39)  | -17.04(+12.3)   | -18.91(+7.77)   | -18.07(-12.36)  | 17.88(+15.5)    | -17.98(+17.3)   | -18.21(+16.69)  | -12.83(+14.14)  | -14.31(+16.7)   | -17.69(-12.48)  | -8.92(+12.4)    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(90°)   | -16.96(-18.7)  | -14.52(+14.35) | -14.32(-12.58) | -11.26(+13.3)  | -15.69(-15.7)  | -17.74(+9.3)   | -11.53(-12.83) | -19.16(-16.76) | -11.18(-19.7)  | -13.2(+15.4)    | -11.42(+19.2)   | -16.27(+16.32)  | -13.26(-10.4)   | -16.89(-17.39)  | -19.41(+17.7)   | -16.15(-15.88)  | -17.37(+17.74)  | -17.34(+13.28)  | -18.52(+18.76)  | -12.29(-11.86)  | -14.68(+17.96)  | -11.84(+11.14)  | -10.57(-15.12)  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(127°)  | -14.08(-16.37) | -12.21(+14.34) | -14.13(+14.26) | -11.63(+14.84) | -15.23(+19.24) | -16.46(+12.92) | -11.29(+13.98) | -10.16(+10.56) | -14.98(-18.74) | -12.02(+19.5)   | -10.98(-12.6)   | -15.29(-18.87)  | -18.77(+11.83)  | -13.16(-18.58)  | -12.93(+16.78)  | -12.93(+16.4)   | -12.96(+17.35)  | -14.24(+14.04)  | -10.36(+13.9)   | -15.99(+10.6)   | -15.26(+16.02)  | -15.89(+12.4)   | -14.46(+13.17)  | -11.86(+12.82)  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(142°)  | -15.04(-14.1)  | -14.81(+13.36) | -18.42(-16.36) | -15.34(-17.35) | -14.55(+17.35) | -15.27(-18.13) | -15.03(+13.5)  | -19.43(-12.69) | -12.24(+29.4)  | -8.31(+14.8)    | -10.75(+17.2)   | -12.82(+13.04)  | -13.63(+17.3)   | -14.57(+17.38)  | -16.14(+18.1)   | -18.86(-18.1)   | -14.94(+17.7)   | -18.25(-18.5)   | -17.55(-18.74)  | -14.32(+12.24)  | -13.15(-18)     | -18.89(-13.52)  | -15.12(-13.7)   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(157°)  | -18.12(+11)    | -18.86(-12.22) | -18.7(-17.8)   | -17.87(+17.7)  | -19.08(-17.87) | -17.87(+17.87) | -18.48(-19.33) | -17.91(-17.6)  | -17.30(-16.78) | -17.86(+13.2)   | -11.21(-14.83)  | -12.92(+10.79)  | -8.11(+10.36)   | -15.36(-16.88)  | -18.55(-15.53)  | -16.02(+17.7)   | -18.41(+17.13)  | -18.23(-16.88)  | -19.04(+10.74)  | -17.71(+15.65)  | -17.87(+18.41)  | -15.81(-16.28)  | -17.46(+14.29)  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(167°)  | -11.48(-14.84) | -18.75(-17.8)  | -16.31(-12.32) | -10.53(-13.68) | -18.69(-15.65) | -14.18(-16.37) | -18.5(-16.41)  | -13.03(-11.83) | -11.44(-13.55) | -11.07(+7.64)   | -7.23(+5)       | -12.47(+13.2)   | -11.66(+14.5)   | -19.15(-18.2)   | -16.56(-13.7)   | -14.23(+18.54)  | -17.18(-19.1)   | -17.07(-18.54)  | -16.64(+10.34)  | -12.91(+13.95)  | -14.49(+13.8)   | -13.83(+18.75)  | -15.84(-13.24)  | -14.26(+15.7)   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(177°)  | -17.74(-18.01) | -18.91(-18.08) | -18.84(-18.14) | -16.71(-16.77) | 8.79(+6.8)     | -8.77(+10.7)   | -13.12(-15.4)  | -14.79(-12.85) | -13.97(-17.01) | -14.84(+17.88)  | -14.24(+12.05)  | -14.92(+14.45)  | -18.15(-19.32)  | -14.77(-18.08)  | -14.71(+14.55)  | -18.68(+18.4)   | -16.68(+10.22)  | 9.04(+14.34)    | -11.58(+16)     | 8.93(+17.4)     | 7.74(+6.06)     | 8.80(+14.9)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(187°)  | -11.13(-15.84) | -18.65(+18.7)  | -17.55(-11.1)  | -12.86(-11.5)  | -10.27(+3.9)   | -16.02(+10.3)  | -10.32(-11.61) | -13.97(-17.02) | -13.84(-15.77) | -17.72(+16.7)   | -16.78(-18.3)   | -17.93(+17.44)  | -18.86(-17.38)  | -17.94(+17.7)   | -19.37(+10.73)  | -15.71(+16.15)  | -18.01(+17.85)  | -15.77(+15.5)   | -12.35(+12.3)   | -12.72(+15.15)  | -11.59(+18.9)   | 9.23(+4.2)      | 8.77(+14.1)     | -21.14(+2)      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(197°)  | -14.89(-16.09) | -17.31(+18.75) | -17.67(-17.92) | -17.86(-17.38) | -17.17(+17.8)  | -14.67(+12.36) | -13.15(+15.47) | -17.78(-15.1)  | -13.18(-13.38) | -16.35(-15.78)  | -13.29(-11.94)  | -11.62(-12.28)  | -13.13(-15.92)  | -18.94(-17.2)   | -13.19(-15.06)  | -17.96(+17.85)  | -16.41(-18.57)  | -13.81(-15.3)   | -16.61(+13.87)  | -15.10(-10.71)  | -10.71(+9.68)   | -8.15(+11.4)    | -11.47(+13.12)  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Freq(hz) | 6.4750GHz      | Thetake(1)     |                |                |                |                |                |                |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Gain     | 0°(h°)(90°5)   | 0°(h°)(90°25°) | 0°(h°)(90°35°) | 0°(h°)(90°45°) | 0°(h°)(90°55°) | 0°(h°)(90°65°) | 0°(h°)(90°75°) | 0°(h°)(90°85°) | 0°(h°)(90°95°) | 0°(h°)(90°105°) | 0°(h°)(90°115°) | 0°(h°)(90°125°) | 0°(h°)(90°135°) | 0°(h°)(90°145°) | 0°(h°)(90°155°) | 0°(h°)(90°165°) | 0°(h°)(90°175°) | 0°(h°)(90°185°) | 0°(h°)(90°195°) | 0°(h°)(90°205°) | 0°(h°)(90°215°) | 0°(h°)(90°225°) | 0°(h°)(90°235°) | 0°(h°)(90°245°) | 0°(h°)(90°255°) | 0°(h°)(90°265°) | 0°(h°)(90°275°) | 0°(h°)(90°285°) | 0°(h°)(90°295°) | 0°(h°)(90°305°) | 0°(h°)(90°315°) | 0°(h°)(90°325°) | 0°(h°)(90°335°) | 0°(h°)(90°345°) | 0°(h°)(90°355°) |
| h(25°)   | 5.84(+4.9)     | 4.75(+4.2)     | 4.71(+4.58)    | 4.84(+4.8)     | 5.08(+5.2)     | 5.05(+4.8)     | 8.32(+11.15)   | -14.42(-16.89) | -16.38(-17.72) | -15.32(+16.5)   | 9.92(+7.78)     | 8.21(+5.1)      | 4.31(+3.52)     | 3.91(+4.2)      | 4.09(+3.6)      | 3.98(+4.51)     | 5.33(+5.47)     | 7.5(+5.83)      | -11.21(-13.3)   | -14.86(-16.53)  | -17.19(-15.29)  | -13.08(-11.42)  | 4.46(+6.18)     | -17.32(+1.7)    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(30°)   | 7.77(+7.3)     | 7.07(+7.4)     | 7.52(+7.25)    | 7.78(+7.7)     | 8.18(+8.49)    | 10.35(+9.67)   | -10.80(-16.79) | -16.33(-16.25) | -16.71(-14.47) | -11.11(-14.47)  | -10.11(-16.52)  | -10.27(-16.92)  | -10.37(-16.27)  | 7.91(+5.4)      | 8.79(+5.6)      | 7.76(+6.45)     | 6.29(+7.76)     | 7.70(+5.4)      | -7.91(+10.91)   | -16.91(-17.54)  | -16.21(-16.97)  | -13.17(-15.89)  | 8.67(+6.28)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(35°)   | 15.15(+15.32)  | -16.95(+17.1)  | -17.67(+16.85) | -16.95(+17.01) | -14.21(+8.6)   | 9.01(+4.1)     | 7.95(+4.8)     | 8.51(+4.7)     | 8.92(+5.02)    | 7.78(+7.42)     | 6.81(+5.2)      | 4.8(+7.82)      | 9.44(+11.14)    | 14.15(+14.8)    | 8.23(+9.3)      | 8.39(+10.06)    | 10.38(+10.2)    | 3.84(+2)        | -5.85(+6.38)    | 8.33(+15.18)    | 11.29(+10.23)   | 3.99(+4.6)      | -15.14(+15.7)   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(40°)   | 7.87(+11.84)   | -16.51(+15.78) | -15.29(+15.43) | -16.80(+15.7)  | 9.13(+2.2)     | 3.75(+1.58)    | -1.39(+1.59)   | -3.02(+5.6)    | 6.73(+7.49)    | 8.11(+8.14)     | -1.71(+6.59)    | 3.48(+4.2)      | 8.94(+11.71)    | 7.76(+7.19)     | -2.42(+5.1)     | -1.71(+2.37)    | 3.76(+7.18)     | 6.25(+4.4)      | -0.03(+6.06)    | 9.91(+12.43)    | 9.57(+10.74)    | 4.61(+7.38)     | 5.15(+5.7)      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(45°)   | 4.50(+1.8)     | 5.12(+5.39)    | 4.93(+7.76)    | 8.41(+6.36)    | -12.25(+12.58) | -11.91(+12.33) | -14.79(+12.3)  | -14.74(+12.3)  | 3.94(+5.15)    | 5.99(+4.2)      | -3.76(+5.18)    | -3.44(+6.12)    | -7.17(+6.36)    | -2.07(+13.32)   | -1.14(+16.84)   | 5.43(+10.8)     | -3.19(+6.27)    | -10.55(+12.78)  | -12.77(+13.27)  | 8.2(+5.2)       | 6.31(+5.3)      | 3.57(+5.74)     | 5.32(+5.7)      | 1.54(+7.2)      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(50°)   | 1.51(+1.38)    | 2.68(+2.52)    | 2.62(+3.1)     | -4.83(+3.3)    | 5.59(+3.7)     | 3.95(+3.1)     | 1.86(+1.72)    | 1.89(+4.0)     | -1.5(-1.3)     | -1.96(+1.28)    | -4.84(+1.61)    | 8.91(+7.76)     | -7.69(+4.68)    | 6.87(+4.86)     | 1.91(+5.45)     | 8.31(+10.4)     | 6.29(+12.5)     | -13.23(+6.65)   | -14.22(+7.78)   | 8.41(+4.1)      | 7.79(+4.9)      | 3.93(+6.5)      | -11.96(+12.7)   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(55°)   | 0.28(+1.1)     | -1.74(+1.02)   | 0.31(+1.1)     | -2.34(+1.4)    | -3.08(+2.67)   | 3.66(+7.9)     | 3.80(+2.1)     | 2.41(+2.4)     | 2.77(+8.4)     | 2.34(+6.67)     | 0.73(+4.24)     | 2.84(+7.45)     | 3.41(+5.05)     | -1.13(+13.6)    | -0.45(+13.67)   | 7.93(+9.58)     | -6.81(+6.34)    | -4.93(+10.7)    | -17.71(+11.39)  | 8.16(+2.7)      | 1.86(+2.27)     | -3.80(+2.2)     | -1.97(+3.1)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(60°)   | 1.48(+1.1)     | 0.69(+0.3)     | 1.36(+0.5)     | 2.14(+0.85)    | 2.24(+2.02)    | 0.26(+2.58)    | 2.23(+5)       | 6.53(+5.8)     | 1.86(+1.75)    | 4.22(+5.4)      | -1.72(+5.15)    | -4.48(+2.18)    | -1.19(+3.41)    | -7.81(+4.7)     | -11.93(+14.8)   | 6.47(+3.58)     | -2.72(+2.02)    | 2.33(+3.9)      | -5.69(+6.06)    | 4.03(+1.12)     | 2.08(+1.9)      | 0.22(+1.8)      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(65°)   | 0.91(+7.5)     | 1.30(+1.23)    | 0.50(+1.29)    | -0.53(+3.6)    | -1.29(+1.62)   | 0.08(+2.3)     | 0.01(+4.7)     | -2.31(+1.9)    | 1.01(+1.82)    | -2.29(+2.97)    | 6.30(+1.7)      | 2.29(+3.7)      | 4.57(+2.4)      | -3.37(+10.3)    | -3.91(+10.22)   | 6.75(+12.7)     | 7.2(+10.38)     | 4.15(+2.2)      | -8.07(+3.71)    | -4.89(+1.7)     | -2.92(+3.6)     | 3.16(+2.94)     | -1.57(+3.1)     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(70°)   | 0.46(+1)       | -0.19(+1.7)    | -0.82(+0.6)    | -0.43(+1.85)   | 0.65(+1.26)    | 0.55(+2.62)    | -0.55(+2.47)   | -1.81(+2.3)    | 0.55(+1.1)     | 4.21(+1.66)     | 0.08(+1.09)     | -1.59(+0.62)    | -2.4(+1.4)      | -1.04(+1.7)     | -3.29(+14.4)    | -10.36(+4.6)    | 5.02(+5.46)     | 6.95(+4.8)      | 6.64(+1.81)     | -5.52(+2.27)    | -3.95(+2.25)    | 2.67(+1.84)     | 1.59(+1.78)     | -0.19(+1.74)    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(75°)   | 0.06(+2.6)     | -1.24(+2.6)    | -1.95(+2.4)    | 0.22(+1.46)    | 0.22(+1.46)    | 0.22(+1.46)    | 0.22(+1.46)    | 0.44(+2.7)     | 0.71(+4.5)     | 4.41(+1.05)     | -1.47(+1.34)    | -1.08(+1.5)     | -0.79(+1.77)    | -0.77(+1.77)    | -14.85(-10.24)  | -3.33(+10.3)    | 3.81(+2.73)     | 2.82(+1.7)      | -5.86(+4.83)    | 3.3(+2.53)      | -2.86(+2.62)    | 0.87(+2.67)     | -0.72(+0.81)    |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| h(80°)   | 0.06(+0.3)     | -2.61(+4.9)    | -3.44(+11.9)   | -1.04(+2.96)   | 2.58(+1.67)    | 5.86(+6.49)    | -2.53(+6.81)   | 0.33(+2.2)     | 0.08(+1.39)    | 3.42(+6.66)     | -0.59(+1.22)    | -2.19(+4.1)     | -1.7(+2.4       |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |



# Radiated Composite Gain Data

# Appendix A

|         |               |               |                |                |                |                 |                 |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|---------|---------------|---------------|----------------|----------------|----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| (H75)   | 2.89-3.43     | -4.39-5.88    | -8.39-9.87     | -12.59-15.71   | -10.72-12.47   | -18.67-6.61     | -5.09-3.24      | -4.14-5.56       | 6.53-4.1         | 2.79-0.15        | -5.49-3.87       | -5.14-3.49       | -3.68-5.75       | -11.77-14.84     | -7.75-6.17       | -9.14-58         | -18.39-14.04     | -15.29-10.84     | -5.21-6.76       | -3.07-6.77       | -8.36-4.86       | -6.74-7.18       | -6-4             | -2.99-2.33       |
| (H825)  | 4.64-6.18     | 6.26-8.99     | -13.62-13.57   | -13.29-10.62   | -12.22-16.45   | -17.35-7.71     | 6.2-4.7         | -7.69-6.88       | 8.61-4.88        | 4.68-7.59        | -11.03-7.48      | -8.59-6.69       | -7.59-7.66       | -14.27-13.25     | -6.55-6.83       | 6.59-19.38       | -12.69-11.59     | -13.36-13.94     | 3.14-21          | -4.69-8.83       | -10.84-7.18      | 8.61-16.99       | 8.91-52.92       | -5.54-6.11       |
| (H75)   | 7.75-9.26     | 9.16-10.17    | -18.21-17.42   | -12.51-16.46   | -12.16-16.14   | -18.02-14.34    | -11.77-6.69     | -7.52-9.4        | -11.47-7.31      | -7.92-6.87       | -16.38-13.77     | -11.83-8.83      | -10.85-12.44     | -16.34-17.06     | -12.53-10.76     | -11.67-17.72     | -11.51-11.34     | -14.62-13.85     | 6.21-74          | -6.54-15.1       | -11.52-13.76     | -11.39-15.54     | -14.86-10.03     | -7.66-9.41       |
| (H875)  | -12.16-12.35  | -11.79-8.7    | -18.27-18.17   | -13.39-13.52   | -17.37-18.52   | -16.49-12.98    | -16.16-8.24     | -12.54-10.43     | -18.17-9.08      | -8.99-13.83      | -14.56-18.11     | -16.84-12.77     | -15.79-15.47     | -14.96-17.37     | -15.84-16.14     | -18.71-14.02     | -11.84-13.46     | -15.81-13.34     | -16.80-13.95     | -13.67-16.71     | -12.93-17.47     | -15.99-17.72     | -14.13-10.27     | -16.44-8.64      |
| (H105)  | -11.41-15.88  | -11.79-11.26  | -17.15-14.8    | -14.59-13      | -15.24-17.3    | -16.46-15.77    | -16.37-14.21    | -13.11-10.12     | -18.27-15.79     | -13.89-13.48     | -10.78-10.11     | -19.1-18.19      | -13.35-16.12     | -16.82-18.1      | -14.56-16.94     | -17.48-18.76     | -14.26-18.63     | -13.83-13.17     | -18.07-14.72     | -16.89-16.65     | -17.11-18.66     | -19.21-18.52     | -11.54-14.81     | -13.19-14.57     |
| (H1225) | -18.71-15     | -10.18-15.03  | -18.02-18.98   | -15.56-14.18   | -16.53-18.34   | -17.51-16.38    | -16.76-14.21    | -11.81-13.15     | -15.16-18.93     | -15.55-18.83     | -12.23-13.73     | -16.32-19.31     | -18.83-15.56     | -15.77-18.98     | -18.41-15.14     | -18.83-17.89     | -15.55-19.51     | -17.82-13.05     | -18.39-18.87     | -18.29-13.69     | -13.38-18.45     | -18.45-17.28     | -17.54-14.38     | -16.48-17.12     |
| (H1375) | -16.98-16.74  | -11.78-18.98  | -14.76-17.17   | -15.29-10.74   | -12.2-18.07    | -16.41-15.21    | -15.81-17.65    | -15.51-15.36     | -16.42-18.38     | -16.18-19.36     | -15.83-10.26     | -11.00-14.82     | -19.04-15.69     | -15.73-18.55     | -17.76-18.46     | -16.49-17.86     | -15.14-12.2      | -19.11-17.8      | -13.26-11.27     | -16.82-17.89     | -13.69-18.34     | -19.39-18.6      | -11.85-15.88     | -12.46-17.12     |
| (H1275) | -16.98-13.99  | -18.43-18.49  | -12.58-19.17   | -14.80-11.65   | -18.91-17.63   | -19.01-17.12    | -18.71-18.55    | -17.39-19.37     | -18.21-17.39     | -17.91-18.08     | -18.22-16.07     | -13.86-12.51     | -13.05-14.19     | -18.41-17.73     | -17.15-18.18     | -18.11-15.21     | -17.79-17.87     | -18.9-18.99      | -18.21-18.52     | -14.89-17.58     | -13.53-18.67     | -12.62-16.62     | -18.84-12.19     | -13.33-18.72     |
| (H15)   | -17.28-15.53  | -15.02-13.49  | -11.66-14.11   | -18.39-12.37   | -8.26-12.17    | -17.71-13.41    | -12.07-13.63    | -17.93-18.2      | -16.44-16.09     | -18.16-11        | -15.24-16.56     | -17.18-16.16     | -18.9-18.54      | -16.86-14.73     | -17.68-15.1      | -18.76-19.3      | -18.26-14.72     | -14.68-18.78     | -17.89-19.35     | -18.53-18.94     | -14.50-12.25     | -15.88-18.91     | -14.76-17.93     |                  |
| (H1425) | -16.77-17.02  | -18.64-13.15  | -12.01-15.31   | -13.51-12.71   | -11.20-10.22   | -14.62-17.95    | -15.53-13.91    | -14.36-16.29     | -19.08-16.3      | -15.84-16.28     | -15.46-18.01     | -16.41-18.81     | -16.78-18.39     | -15.28-18.14     | -17.43-18.68     | -18.16-16.81     | -15.8-17.82      | -15.51-17.86     | -18.43-17.43     | -14.93-16.72     | -17.64-17.72     | -18.34-16.67     | -14.46-14.62     |                  |
| (H1575) | -17.24-19.92  | -18.49-11.99  | 8.63-11.16     | -17.16-19.98   | -13.04-10.56   | -12.73-15.54    | -11.74-16.48    | -11.79-19.17     | -12.11-16.57     | -11.36-15.15     | -15.84-17.24     | -18.51-16.25     | -14.83-18.16     | -17.72-17.55     | -16.29-18.5      | -18.31-19.87     | -18.13-18.77     | -16.13-18.73     | -17.89-18.75     | -19.25-17.67     | -16.2-18.61      | -18.29-19.16     | -13.34-12.48     |                  |
| (H1575) | 16.36-19.29   | -17.56-14.12  | -16.09-16.85   | -19.38-19.02   | 16.19-13.71    | -15.88-15.58    | -12.01-15.39    | 1.36-15.73       | -13.89-17.34     | -13.87-15.28     | -12.21-15.19     | 12.24-11.61      | 1.79-18.27       | -18.66-18.59     | -17.18-18.08     | -16.39-19.11     | 18.13-16.51      | -12.53-11.11     | -12.52-11.11     | -16.07-17.33     | -18.11-19.88     | -15.61-17.02     | -15.52-13.93     |                  |
| (H1725) | -17.27-14.07  | -16.74-16.15  | -14.61-11.17   | -13.27-14.71   | -18.51-18.98   | -17.59-18.09    | -18.95-18.91    | -18.39-19        | -16.02-17.49     | -7.89-19.3       | -16.42-19.15     | -13.83-15.57     | -16.39-17.51     | -14.89-17.02     | -16.29-19.14     | -17.18-17.42     | -14.89-17.54     | -14.14-18.69     | -14.69-12.91     | -13.89-13.43     | -14.03-15.16     | -12.12-13        | -11.61-12.92     | -17.23-15.27     |
| (H1725) | -18.47-18.97  | -14.36-18.97  | -14.36-18.97   | -15.10-14.28   | -13.42-12.45   | -12.12-13.45    | -13.51-15.75    | -17.32-18.13     | -15.19-13.37     | -16.25-18.32     | -18.24-18.51     | -16.39-18.58     | -16.39-18.58     | -14.39-14.38     | -14.39-14.38     | -13.75-13.29     | -14.11-11.69     | -12.85-12.17     | -11.89-12.12     | -12.01-11.74     | -11.89-13.17     | -17.33-16.77     | -17.86-17.93     |                  |
| (H1875) | -14.64-15.22  | -13.51-14.75  | -13.19-12.24   | -12.36-12.86   | -12.43-12.88   | -14.52-15.51    | -16.04-16.05    | -17.95-17.75     | -18.18-17.84     | -18.72-17.48     | -18.07-18.17     | -18.71-18.87     | -18.09-19.26     | -17.87-15.71     | -17.22-19.91     | -14.99-13.96     | -13.71-14.23     | -14.30-15.61     | -15.97-13.79     | -13.42-13.5      | -14.13-187       | -13.77-13.14     | -15.19-17.98     | -16.37-14.92     |
| FreeRx  | 6.965Rx       | Thetax1       | +              | -              | -              | -               | -               | -                | -                | -                | -                | -                | -                | -                | -                | -                | -                | -                | -                | -                | -                | -                | -                |                  |
| Gen     | 0(75)7(907.5) | 0(157)9(22.5) | 0(307)19(37.5) | 0(457)19(63.5) | 0(607)19(87.5) | 0(757)19(112.5) | 0(907)19(137.5) | 0(1057)19(162.5) | 0(1207)19(187.5) | 0(1357)19(212.5) | 0(1507)19(237.5) | 0(1657)19(262.5) | 0(1807)19(287.5) | 0(1957)19(312.5) | 0(2107)19(337.5) | 0(2257)19(362.5) | 0(2407)19(387.5) | 0(2557)19(412.5) | 0(2707)19(437.5) | 0(2857)19(462.5) | 0(3007)19(487.5) | 0(3157)19(512.5) | 0(3307)19(537.5) | 0(3457)19(562.5) |
| (H75)   | 5.03-4.01     | -3.23-4.22    | -2.1-1.82      | -5.56-15.56    | 1.41-15.12     | 2.3-3.29        | 4.29-5.66       | -7.69-6.66       | -11.95-15.51     | -17.41-18.87     | -13.43-10.23     | -7.84-5.69       | -4.75-4.28       | -3.69-2.39       | -3.02-3.5        | 2.3-2.38         | 2.6-3.51         | 4.04-4.59        | 5.61-6.74        | 8.72-10.36       | -14.51-15.95     | -18.85-14.99     | -14.71-17.2      | 4.48-6.4         |
| (H75)   | 6.99-6.54     | 6.4-6.17      | -5.46-5.42     | -5.8-6         | 6.47-6.24      | -5.74-6.2       | -7.79-9.35      | -10.34-10.52     | -12.22-15.52     | -16.58-16.26     | -17.79-19.41     | -14.2-10.79      | 8.02-6.13        | 4.1-3.55         | 2.73-1.79        | -1.1-1.28        | -4.16-1.82       | 2.55-3.76        | 4.99-6.09        | -7.84-10.11      | -6.4-6.49        | -6.22-5.11       | 6.63-6.38        | -8.17-7.73       |
| (H1575) | 5.07-4.38     | -3.39-3.83    | -4.63-4.8      | -5.86-7.38     | 8.68-7.59      | 6.24-7.1        | -8.04-8.72      | -7.13-8.05       | -8.36-8.67       | -8.45-7.84       | -7.28-6.41       | -5.41-5.48       | -3.29-5.24       | -7.42-8.4        | -8.16-8.67       | -4.84-4.24       | -1.49-1.02       | -1.07-1.58       | -2.34-3.99       | -6.4-6.49        | -6.65-6.82       | 5.61-5.38        | -5.72-5.83       |                  |
| (H225)  | 6.59-6.28     | -5.54-5.66    | -4.99-4.83     | -3.95-5.07     | 6.23-6.12      | 6.11-7.25       | -5.06-5.65      | -4.78-4.43       | 4.69-5.53        | 5.9-6.2          | -7.1-8.03        | -7.89-7.21       | 6.44-6.41        | -4.76-5.47       | -5.09-5.83       | -3.39-3.63       | 8.53-5.61        | 3.39-1.86        | -1.76-2.73       | -4.43-6.44       | -8.71-10.17      | -12.02-12.43     | -11.92-10.68     | -6.52-6.97       |
| (H375)  | -1.71-3.32    | -4.52-5.21    | -3.49-2.44     | -2.95-2.36     | 2.78-1.69      | 0.84-0.68       | -0.56-1.39      | -1.59-1.46       | 2.67-4.61        | -0.81-0.88       | -0.21-0.88       | -8.29-10.02      | -11.09-10.59     | -8.62-7.91       | 6.44-6.45        | 6.03-10.1        | -3.20-11.01      | -10.88-10.48     | -11.91-11.41     | -8.24-10.17      | -18.76-11.61     | -16.78-11.61     | -13.24-10.25     | -11.10-6         |
| (H375)  | 1.86-1.62     | 0.75-0.3      | -0.07-0.41     | -0.69-0.72     | 0.28-0.58      | 1.02-1.12       | 1.16-1.51       | -0.57-1.36       | 2.78-3.36        | 4.16-2.87        | -3.87-3.94       | 6.02-10.39       | -17.86-9.6       | 4.49-11.98       | -12.12-11.18     | -10.45-11.5      | -12.19-12.25     | 9.18-9.67        | 6.01-6.99        | 6.42-7.81        | 8.9-9.08         | -10.6-9.59       | 4.49-7.3         | 2.24-2.39        |
| (H375)  | 3.99-4.48     | 2.4-0.62      | 1.21-0.61      | 0.26-0.5       | 1.56-0.52      | 0.76-1.15       | 1.59-1.55       | -0.26-2.72       | 1.73-0.51        | 1.59-1.55        | -1.1-2.23        | -3.97-1.57       | -6.75-13.72      | 3.39-9.67        | 6.53-10.13       | -15.46-16.15     | -17.32-18.22     | -9.4-06          | -13.39-12.79     | -16.69-12.65     | -10.37-16.74     | 3.32-3.31        | 1.83-2.1         |                  |
| (H325)  | 1.3-1.5       | 1.92-1.47     | 1.52-2.34      | 1.64-1.99      | 1.82-2.53      | 2.67-3.06       | 6.03-7.67       | 1.29-2.45        | 1.42-2.54        | 0.88-1.22        | -6.93-10.14      | -3.51-10.64      | -4.21-10.63      | 8.97-9.21        | -10.74-16.24     | -7.61-8.68       | -13.89-17.44     | 8.57-7.21        | 8.95-9.33        | -17.54-17.93     | -15.84-16.19     | -19.14-15        | 2.36-1.94        | 0.77-0.45        |
| (H375)  | 3.77-6.89     | 2.79-1.79     | 0.77-1.12      | 1.4-0.57       | 0.7-0.91       | 2.1-0.71        | 0.3-0.91        | 1.3-0.87         | 0.2-0.97         | 0.29-1.23        | -0.23-0.49       | 3.34-9.61        | 7.99-14.02       | -14.61-12.44     | -15.81-16.42     | -7.74-8.42       | -9.35-10.93      | 9.99-9.48        | 9.21-9.48        | -11.29-8.12      | -13.98-13.51     | -17.73-6.39      | -12.27-12.07     | 4.03-3.3         |
| (H375)  | 1.3-0.7       | 2.55-1.39     | 0.27-0.68      | 0.71-0.98      | 0.17-0.94      | 0.17-0.94       | 0.51-1.35       | 1.3-0.63         | 0.48-0.29        | 0.23-0.51        | 0.2-0.44         | 2.01-0.49        | 4.08-1.82        | 1.69-1.87        | 4.58-1.49        | 8.31-11.97       | 7.88-9.33        | 8.48-8.35        | 8.81-8.36        | -10.59-10.51     | -16.91-9.7       | 3.601-2.29       | 1.2-1.74         |                  |
| (H375)  | 2.42-0.01     | 1.78-0.26     | -1.84-2.91     | -1.63-1.92     | 0.74-0.57      | 0.84-1.48       | -0.55-0.53      | 0.23-0.29        | -1.69-1.29       | -2.44-0.88       | 0.73-1.11        | -1.99-2.35       | -2.31-1.45       | -12.91-14.11     | 8.91-9.41        | 2.35-1.97        | -2.16-4.09       | 5.97-7.68        | 7.39-5.78        | 5.71-74          | 4.19-179         | -17.41-11.55     | -2.28-1.77       | 2.77-1.23        |
| (H825)  | 2.24-0.61     | 0.02-1.02     | 2.35-0.73      | 2.25-0.32      | 2.32-0.55      | 2.65-4.43       | -1.69-2.75      | -1.21-1.38       | -3.26-3.4        | 4.43-0.51        | 2.53-0.33        | 4.05-3.32        | 3.67-1.02        | -14.60-16.57     | 7.2-9.76         | 1.25-0.37        | 6.60-9.27        | 6.48-5.77        | 5.22-5.55        | 8.81-11.56       | -16.96-11.59     | -13.41-2.35      | -2.76-1.26       |                  |
| (H375)  | -3.3-2.23     | -1.49-2.41    | 2.98-0.45      | -3.74-0.45     | 3.81-2.17      | 4.4-7.8         | -3.26-3.82      | -5.02-6.22       | 6.27-7.15        | -5.98-6.39       | -5.84-6.86       | -7.4-5.1         | -4.61-7.05       | 9.94-15.35       | 8.96-6.35        | 3.76-3.51        | -1.07-0.43       | 7.11-6.01        | 6.45-4.78        | 6.93-11          | -11.41-14.91     | -11.67-10.19     | 5.13-10.86       |                  |
| (H375)  | 4.45-0.33     | 1.51-1.46     | 4.23-5.84      | -5.58-5.62     | 5.52-6.14      | -7.09-6.52      | -5.75-5.84      | -6.53-6.45       | 6.27-7.15        | -5.98-6.39       | -5.96-6.91       | 8.41-8.2         | -8.19-7.79       | 1.71-1.17        | -11.32-0.33      | 7.72-8.25        | 3.45-7.31        | -11.59-12.39     | 9.23-9.47        | -7.49-9.25       | -17.44-14.91     | -12.83-11.67     | -2.96-5.64       | -4.77-14.7       |
| (H375)  | 2.13-0.74     | 4.16-1.02     | -7.46-1.44     | -5.58-0.93     | -8.97-6        | 9.31-10.74      | -8.59-9.73      | 8.68-7.1         | 8.34-6.48        | -11.1-9.2        | -14.94-14.44     | -12.19-10.79     | 9.07-9.68        | -14.13-19.91     | -11.86-7.09      | -12.54-8.49      | -10.93-10.52     | -14.58-13.97     | -17.93-8.26      | -12.93-15.74     | -15.09-15.76     | -12.43-12.86     | -6.61-8.74       |                  |
| (H1025) | 4.73-0.76     | -8.04-0.29    | -10.2-0.75     | -5.66-5.82     | 9.66-6.88      | -7.96-10.24     | -10.05-10.15    | -11.39-9.56      | -16.58-16.78     | -15.02-10.75     | -11.88-10.21     | -10.56-10.16     | -15.25-13.43     | -15.58-18.84     | -18.24-10.33     | -14.68-11.85     | -16.66-11.72     | -17.57-9.04      | -12.94-15.37     | -14.52-16.65     | -15.56-12.75     | 9.27-11.44       | -11.24-10.68     |                  |
| (H1025) | -11.37-10.58  | -10.71-14.7   | -11.04-8.62    | 8.23-9.79      | -13.09-14.74   | -11.03-14.72    | -12.35-12.72    | -13.38-11.71     | -12.11-17.01     | -18.37-19.12     | -12.59-10.32     | -16.72-12.59     | -16.29-15.67     | -14.19-18.26     | -17.99-6.8       | 5.54-15.36       | -16.15-18.27     | -15.52-10.57     | -16.59-15.95     | -                |                  |                  |                  |                  |



# Radiated Composite Gain Data

# Appendix A

|         |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
|---------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| (H127)  | -18.15-11.58 | -13.95-10.08 | -14.53-16.88 | -11.73-9.4   | 6.57-8.3     | -12.82-10.93 | -15.13-9.41  | -13.79-13.94 | -18.44-18.38 | -18.69-15.52 | -17.16-18.9  | -18.07-17.54 | -19.37-17.39 | -18.76-17.32 | -11.89-13.7  | -8.46-15.04  | -15.19-15.81 | -17.35-11.35 | -15.81-13.73 | -14.34-17.79 | -19.09-17.5  | -18.99-18.04 | -12.86-11.19 | -17.11-18.28 |
| (H128)  | -11.12-15.19 | -18.49-18.86 | -17.88-17.31 | -15.50-11.12 | -11.65-11.2  | -10.46-13.93 | -12.44-18.57 | -17.88-13.94 | -17.65-17.82 | -17.73-14.39 | -9.75-13.81  | -18.71-18.1  | -17.75-18.39 | -12.46-18.56 | -13.87-10.71 | -13.04-17.49 | -17.85-17.37 | -18.26-18.67 | -16.82-13.91 | -13.45-17.61 | -17.86-17.34 | -17.11-17.57 | -18.54-18.36 | -11.17-11.03 |
| (H129)  | -18.62-13.47 | -14.19-19.07 | -15.19-19.03 | -14.47-11.05 | -12.69-9.31  | -10.16-18.07 | -14.79-13.41 | -19.41-17.32 | -15.54-12.79 | -13.17-14.02 | -17.08-17.74 | -15.17-14.02 | -17.08-17.74 | -15.17-14.02 | -17.08-17.74 | -15.17-14.02 | -17.08-17.74 | -15.17-14.02 | -17.08-17.74 | -15.17-14.02 | -17.08-17.74 | -15.17-14.02 | -17.08-17.74 | -15.17-14.02 |
| (H130)  | -18.36-17.37 | -17.55-18.11 | -17.61-18.57 | -15.21-14.22 | -18.16-14.72 | -18.16-14.72 | -17.44-13.87 | -13.99-18.04 | -18.12-13.28 | -11.04-12.65 | -18.22-18.42 | -13.37-15.65 | -18.33-14.62 | -13.37-15.65 | -17.07-17.37 | -17.98-18.33 | -18.24-18.12 | -16.37-18.11 | -18.54-17.85 | -18.91-17.58 | -18.94-18.33 | -18.72-18.19 | -18.96-17.88 | -16.46-15.83 |
| (H131)  | -11.58-12.87 | -14.61-15.68 | -12.95-12.44 | -12.85-13.68 | -15.01-16.48 | -18.38-18.42 | -18.25-12.17 | -9.89-10.76  | -14.75-17.16 | -18.14-16.99 | -18.53-16.52 | -13.57-15.11 | -18.06-19.22 | -14.83-18.88 | -18.06-18.8  | -18.85-18.57 | -17.86-17.77 | -18.18-17.71 | -18.01-18.34 | -18.51-18.78 | -18.06-18.86 | -18.62-18.46 | -18.03-18.97 | -14.63-13.25 |
| (H132)  | -12.22-11.99 | -14.34-13.65 | -12.94-13.49 | -15.11-16.06 | -18.13-18.4  | -19.22-18.09 | -17.82-18.67 | -17.13-16.5  | -17.27-18.75 | -14.93-12.22 | -12.14-11    | -16.22-16.54 | -12.27-18.86 | 8.34-85      | -10.81-16.82 | -18.42-18.13 | -18.42-17.41 | -14.8-14.86  | -17.26-17.77 | -18.89-17.82 | -19.14-19.11 | -18.89-18.05 | -18.32-18.17 | -16.11-17.8  |
| (H133)  | -14.94-17.26 | -15.22-16.08 | -18.19-19.19 | -11.86-18.41 | -17.91-18.67 | -18.19-19.19 | -18.25-18.38 | -18.33-18.38 | -18.89-18.55 | -14.12-12.98 | -17.34-14.28 | -12.22-10.18 | -10.1-10.23  | -12.22-10.18 | -17.34-14.28 | -18.69-17.65 | -17.61-14.3  | -12.79-11.89 | -17.19-17.42 | -14.12-15.95 | -15.19-15.99 | -14.87-13.25 | -14.12-15.95 | -14.44-14.63 |
| (H134)  | -18.23-16.81 | -14.38-13.62 | -13.43-13.54 | -14.79-15.55 | -15.92-15.95 | -16.17-17.17 | -18.16-16.95 | -17.42-17.35 | -17.95-18.38 | -17.94-17.84 | -18.11-14.92 | -14.41-13.79 | -13.31-12.74 | -12.51-12.12 | -12.51-12.12 | -12.11-14.13 | -11.63-11.65 | -11.89-12.23 | -12.87-13.08 | -13.98-14.35 | -15.14-14.82 | -14.57-15.61 | -18.88-18.88 | -17.31-18.54 |
| Free/ea | 5.25/ea      | Thetalest. 2 | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            |
| Gen     | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  | 0°/90°/180°  |
| (H135)  | -16.61-14.38 | -18.26-19.01 | -18.03-18.69 | -8.89-6.91   | 5.74-4.8     | -3.75-3.07   | -2.51-1.97   | -1.91-1.85   | -2.06-2.27   | -2.47-2.88   | 3.54-4       | 4.74-6.15    | 8.37-11.05   | -13.93-18.53 | -17.71-15.35 | -11.94-9.47  | -7.43-6.35   | -5.61-4.76   | -3.74-3.83   | -2.14-2.07   | -2.49-3.29   | -4.06-4.8    | -5.59-6.45   | -7.26-8.43   |
| (H136)  | 5.61-6.43    | -11.61-10.1  | -17.35-18.4  | -18.06-17.61 | -15.69-12.61 | -10.95-9.16  | -7.4-6.29    | -5.6-5.25    | -5.36-5.46   | -5.74-6.3    | -7.35-8.67   | -10.36-13.41 | -19.03-19.01 | -19.05-19.39 | -6.93-7.16   | -5.99-4.36   | -3.27-2.59   | -2.22-1.72   | -1.05-0.17   | 4.67-6.22    | 6.30-6.25    | -1.09-1.21   | -10.34-14.6  | -4.97-8.67   |
| (H137)  | 5.25-4.74    | -11.34-17.93 | -18.43-18.67 | -19.21-18.32 | -18.11-14.14 | -10.51-16.46 | -7.38-7.88   | -6.88-10.48  | -5.26-5.14   | -12.64-16.83 | -16.48-18.67 | -17.39-19.28 | -18.62-16.57 | -11.3-7.2    | -6.99-0.33   | -3.47-2.24   | -1.2-0.32    | 0.34-1.01    | 1.64-2.34    | 2.77-2.73    | 2.52-2.4     | 1.35-0.55    | 3.36-1.72    | -3.08-4.38   |
| (H225)  | -1.89-3.25   | -3.57-5.22   | -6.82-8.28   | -11.78-19.18 | -19.22-16.02 | -12.81-10.82 | -10.13-16.6  | -12.16-16.36 | -18.19-18.13 | -18.98-17.48 | -19.37-18.13 | -18.91-17.19 | -18.89-18.12 | -18.43-18.49 | -8.37-6.09   | -2.66-0.85   | 0.30-1.2     | 1.87-0.26    | 2.98-0.05    | 3.31-0.43    | 3.45-0.32    | 3.02-0.32    | 1.44-0.21    | -0.97-1.22   |
| (H226)  | -2.14-2.02   | -2.05-2.4    | -2.68-3.82   | -7.31-17.87  | -17.89-12.47 | -13.34-19.09 | -18.86-17.17 | -18.12-17.9  | -18.83-18.24 | -18.69-19.32 | -17.45-19.21 | -14.89-14.05 | -18.45-19.12 | -17.44-13.31 | -7.97-4.22   | -2.33-1.19   | -0.01-0.84   | 1.31-0.3     | 1.95-2.21    | 2.81-0.31    | 4.00-4.46    | 4.53-4.15    | 3.25-0.97    | 0.28-1.23    |
| (H227)  | -3.78-3.85   | -3.83-3.5    | -3.75-3.98   | -11.11-11.6  | -10.47-17.01 | -7.55-10.17  | -17.73-12.11 | -10.59-9.28  | -7.25-8.24   | -10.97-15.06 | -18.79-17.46 | -15.13-12.5  | -11.36-15.61 | -18.99-15.55 | -5.75-2.75   | -2.3-2.21    | -0.86-0.1    | 0.94-1.86    | 2.81-0.22    | 3.56-0.47    | 4.42-4.71    | 4.68-4.12    | 3.42-0.52    | 0.73-1.23    |
| (H228)  | 2.82-3.35    | -3.3-4.33    | 4.4-4.19     | -5.61-7.9    | -7.06-7.24   | -8.88-15.65  | -19.51-14.6  | -9.83-5.53   | -3.89-4.46   | -7.84-11.49  | -15.44-13.14 | -10.69-9.19  | 8.41-11.96   | -14.83-13.4  | 4.12-3.33    | -5.75-3.61   | -4.65-2.07   | 0.87-1.04    | 1.74-2.11    | 2.32-0.3     | 2.84-0.35    | 3.68-0.22    | 2.52-2.4     | 0.28-1.23    |
| (H229)  | 3.23-3.83    | -1.74-1.5    | -4.07-4.89   | -5.67-5.44   | 4.55-7.83    | -12.27-17.88 | -18.27-13.23 | -10.4-6.2    | -3.41-3.99   | -7.93-13.96  | -12.42-14.97 | -8.82-6.09   | 9.39-17.38   | -14.69-17.14 | -8.93-8.28   | -8.93-8.28   | 0.33-0.86    | -1.49-0.56   | 0.12-0.8     | 1.36-1.92    | 2.95-2.55    | 2.65-2.72    | 2.94-0.91    | 0.07-0.99    |
| (H230)  | 3.26-3.46    | -1.89-0.96   | -2.96-4.44   | 5.71-5.54    | 4.88-5.93    | -11.26-18.39 | -13.53-10.47 | 8.18-6.44    | 2.83-2.19    | -4.66-7.42   | 10.14-12.47  | -8.87-6.21   | -13.33-11.57 | -10.59-10.49 | -11.47-9.7   | -4.99-5.22   | -4.21-5.89   | -1.61-0.67   | -0.01-0.94   | 0.03-1.71    | 1.88-2.14    | 2.54-0.67    | 3.22-0.99    | -1.02-0.27   |
| (H231)  | 4.41-0.67    | 4.41-0.67    | 4.41-0.67    | 4.41-0.67    | 4.41-0.67    | -10.1-10.73  | -10.1-10.73  | 7.96-4.47    | -5.21-5.21   | 2.36-0.55    | -5.21-5.21   | 7.73-10.31   | -10.59-10.49 | -11.50-10.32 | -10.59-10.49 | -11.50-10.32 | -10.59-10.49 | -11.50-10.32 | -10.59-10.49 | -11.50-10.32 | -10.59-10.49 | -11.50-10.32 | -10.59-10.49 | -11.50-10.32 |
| (H232)  | 4.99-6.75    | -2.38-3.52   | -3.25-3.54   | -7.53-5.34   | 8.37-11.41   | 8.47-10.19   | -10.23-10.32 | 8.32-10.43   | 2.30-2.72    | 4.2-4.24     | 5.61-6.15    | 6.08-6.22    | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     | 8.46-9.1     |
| (H233)  | 4.78-5.84    | -4.89-5.65   | -4.89-5.61   | 8.47-6.72    | -11.38-15.85 | -10.93-9.51  | 9.62-7.41    | 4.14-4.13    | 2.30-2.72    | 3.92-4.02    | -2.54-1.74   | -3.71-4.71   | -12.59-10.36 | -10.47-13.95 | -13.51-19.19 | 5.27-12.13   | -1.38-0.45   | 0.17-1.08    | 1.82-0.92    | 7.73-7.19    | 1.6-0.48     | -1.51-1.01   | -0.22-1.5    | -5.64-0.67   |
| (H234)  | 7.59-10.58   | -10.68-8.77  | -7.34-7.87   | -10.21-7.66  | -11.59-16.57 | -12.14-10.62 | -11.06-10.35 | -8.67-6.45   | -4.03-6.52   | -4.76-7.17   | -5.56-9.79   | -5.79-9.05   | -12.72-10.84 | -11.16-13.22 | -14.86-7.55  | -7.06-3.41   | -3.26-4.71   | -0.71-1.7    | -3.74-1.93   | -0.47-0.75   | 0.11-0.21    | -3.9-1.07    | -2.96-1.34   | -6.89-8.48   |
| (H235)  | -8.66-12.82  | -13.36-8.91  | -7.6-9.07    | -13.13-10.9  | -13.67-13.24 | -12.66-13.06 | -16.08-18.22 | -18.37-12.42 | -7.9-10.51   | -4.78-7.67   | -8.31-13.35  | -7.98-9.47   | -10.77-13.3  | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 | -14.69-13.75 |
| (H236)  | -13.25-14.18 | -18.49-9.82  | -8.27-9.73   | -10.37-13.22 | -18.86-11.87 | -11.51-12.28 | -15.44-17.83 | -16.70-14.52 | -14.86-12.45 | -11.48-10.57 | -13.40-14.02 | -8.53-13.15  | -14.97-14.87 | -11.15-14.78 | -12.15-15.17 | -11.28-0.35  | -11.92-12.28 | -5.02-0.91   | -11.24-0.48  | 6.53-4.46    | 6.43-0.99    | 9.78-6.51    | 4.74-3.34    | -8.54-13.43  |
| (H237)  | -19.77-15.54 | -13.52-10.41 | -10.14-10.47 | -11.42-11.44 | -10.56-11.03 | -10.71-10.13 | -10.73-10.6  | -11.70-10.59 | -11.33-10.32 | -14.16-10.62 | -11.26-10.63 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 | -16.23-16.46 |
| (H238)  | -17.83-17.88 | -16.66-17.12 | -7.91-6.47   | -11.39-13.03 | -18.22-17.13 | -18.21-17.13 | -10.50-10.76 | -13.29-16.63 | -16.39-12.37 | -12.28-14.48 | -14.68-19.39 | -6.53-18.69  | -12.96-12.69 | -16.29-17.39 | -14.86-11.37 | 9.24-9.67    | -17.74-10.49 | -7.33-8.42   | -12.27-17    | -8.37-4.46   | -5.56-4.15   | 8.19-7.65    | 7.08-11.09   | -15.23-17.7  |
| (H239)  | -17.98-18.62 | -18.44-18.31 | -10.58-11.03 | -14.64-14.52 | -18.74-19.28 | -18.21-18.41 | -18.97-18.18 | -16.78-17.86 | -15.05-17.92 | -18.11-14.51 | -18.14-17.91 | -13.22-14.5  | -18.97-18.53 | -17.91-14.13 | -13.56-11.12 | -6.95-10.57  | -18.13-13.85 | -7.92-9.37   | -9.71-9.81   | -8.67-7.87   | 6.61-6.88    | -19.28-17.79 | -18.96-17.88 | -18.96-17.88 |
| (H240)  | -18.64-15.24 | -18.19-19.31 | -18.34-18.61 | -14.44-16.52 | -18.67-17.81 | -18.67-17.81 | -14.51-13.42 | -13.94-13.37 | -11.51-10.29 | -11.66-18.84 | -16.67-17.93 | -17.32-19.02 | -18.66-17.2  | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 | -16.39-16.65 |
| (H241)  | -18.64-15.24 | -18.66-18.31 | -18.37-18.43 | -18.18-17.64 | -18.18-18.22 | -17.65-14.41 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 | -18.18-17.64 |
| (H242)  | -13.22-13.24 | -17.14-16.78 | -14.91-16.38 | -18.68-14.16 | -12.92-13.73 | -17.23-17.59 | -18.61-19.34 | -18.11-16.48 | -16.65-18.14 | -18.79-18.98 | -17.59-19.01 | -18.71-17.59 | -18.21-15.95 | -15.72-16.33 | -15.98-16.36 | -8.47-17.32  | -8.67-12.3   | -15.93-12.78 | -11.14-12.14 | -8.89-14.48  | -10.45-15.14 | 9.34-8.32    | -9.61-12.63  | -13.71-13.94 |
| (H243)  | -14.41-16.45 | -17.04-17.11 | -17.96-18.09 | -18.82-17.96 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 | -18.18-17.97 |
| (H244)  | -10.01-17.87 | -17.06-14.97 | -11.86-10.71 | -13.36-11.19 | -12.28-11.76 | -17.91-13.1  | -18.58-18.12 | -17.73-18.49 | -17.88-18.67 | -16.82-18.45 | -17.54-18.46 | -13.86-15.62 | -18.33-17.9  | -17.79-18.34 | -15.13-13.4  | -10.74-10.35 | 8.94-9.28    | -9.19-10.34  | -6.25-8.53   | -8.57-8.72   | -7.76-7.41   | -13.21-19.1  | -9.75-11.9   | -9.7         |









# Radiated Composite Gain Data

# Appendix A

|         |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
|---------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| θ(°)    | -10.69+9.91  | -11.64+11.47 | -7.78+7.43   | -3.55(2)     | 2.04+7.6     | 3.74+3.41    | -4.33+2.25   | -1.15(5)     | 1.9(1)+9     | 0.94(7)+5    | 2.59(1)+6    | 0.02+1.2     | -1.55+3.2    | 2.48+1.3     | -0.79+3.7    | -3.85+2.81   | -7.35+9.9    | -13.16+19.13 | -14.97+11.17 | -10.39+6.38  | -4.32+2.94   | -1.08(0)     | 1.26+3.42    | -7.85+11.43  |
| φ(°)    | 8.31+12.1    | -10.54+8.2   | -6.89+6.8    | 5.21(0)+4    | 4.23+6.1     | 4.11(5)+1    | 4.89+9.2     | -1.83(3)+1   | 0.38(1)+4    | 0.11(3)+9    | 1.23(1)+8    | 0.09+1.2     | 2.23+2.04    | 3+2.84       | -1.81+6.3    | -7.06+3.71   | -7.58+6.01   | -12.01+18.57 | -12.21+8.69  | 6+8.56       | 3+7.52       | -1.85+1.03   | 2.1+5.52     | -7.47+11.09  |
| θ(82°)  | -10.36+10.39 | -11.83+9.24  | -9.16+9.94   | 4.58+2.36    | -7.07+9.27   | -4.74+3.97   | -2.71+1.57   | -1.38+0.67   | 4.3+0.96     | 0.59(0)+6    | -1.42+2.6    | -2.57+2.9    | -3.85+4.1    | -3.28+1.5    | -6.29+5.63   | -6.42+7.75   | -10.9+14.5   | -7.54(7)+5   | -6.69+3.29   | -2.24+3.14   | -3.22+2.47   | -3.67+3.43   | -7.46+11.01  |              |
| θ(87°)  | -12.24+11.71 | -11.74+12.02 | -11+12.3     | 4.67+3.35    | 8.36+3.98    | 6.32(4)+4    | -4.87+4.95   | -3.91+2.88   | 2.89+2.07    | 1.38+2.4     | -3.01+4.3    | -2.8+4.2     | -4.08+3.46   | 4.74+1.5     | -4.45+7.89   | -12.36+7.4   | 8.7+8.95     | 8.76+13.93   | 8.51(4)+4    | -8.61+1.5    | -2.43+3.06   | -4.97+4.26   | -4.33+6.86   | -8.31+13.33  |
| θ(89°)  | -12.32+13.85 | -12.37+11.96 | -11.83+10.72 | -12.72+5.94  | -12.21+8.91  | -7.05+7.54   | 4.58+1.7     | 6.1+5.01     | 5.04+4.24    | -4.01+5.09   | -5.6+3.82    | -4.41+6.2    | -5.97+6.02   | 6.16+5.26    | 6.75+10.46   | -11.77+10.01 | -10.89+11.89 | -13.59+16.44 | -10.29+9.95  | -10.11+10.3  | -4.36+3.79   | -6.67+6.35   | -8.81+13.01  | -10.22+16.27 |
| θ(105°) | -12.52+13.85 | -12.55+11.96 | -11.73+10.96 | -15.85+6.58  | -12.9+10.5   | -8.33+10.4   | 8.1+8.96     | 9.96+7.73    | 8.89+5.91    | 4.59+6.17    | 9.37+6.56    | 7.51+7.34    | 6.37+8.42    | 4.68+7.53    | 8.36+11.84   | -12.55+14.45 | -13.74+13.66 | -18.08+17.94 | -10.87+17.99 | -15.05+17.55 | 8.3+18       | -6.94+8.82   | 8.61+16.38   | -10.82+18.26 |
| θ(112°) | -12.56+13.35 | -11.84+13.38 | -12.72+8.27  | -11.92+11.8  | -9.28+14.65  | -11.14+12.22 | -11.89+7.07  | 8.62+8.3     | 9.71+9.16    | 9.38+7.16    | 6.38+7.06    | -7.42+11.5   | 8.71+9.6     | 8.56+10.5    | -11.77+10.12 | -13.09+13.68 | -16.6+13.69  | -12.44+15.29 | -10.89+14.95 | -13.72+13.81 | -17.84+14.51 | -13.15+16.04 | -13.13+18.02 | -10.82+18.26 |
| θ(114°) | -14.11+14.54 | -15.12+10.74 | -17.43+10.87 | -13.38+10.14 | -10.91+13.38 | -10.69+17.57 | -13.45+11.73 | -12+8.84     | 7.92+8.78    | 9.05+8.45    | -7.72+12.4   | -7.73+10.93  | -12.2+11.5   | 6.55+12.04   | -14.24+11.79 | -13.96+18.1  | -18.84+18.96 | -15.52+18.26 | -11.97+18.4  | -16+15.32    | -13.37+11.01 | -12+11.45    | -14.35+17.44 | -12.23+18.5  |
| θ(127°) | -17.51+17.89 | -18.24+18.98 | -18+18+12.4  | -18.43+15.5  | -12.91+18.7  | -16.82+12.03 | -11.85+19.29 | 8.19+8.21    | 6.68+10.4    | 9.76+10.54   | -12.54+12.02 | -13.59+12.26 | -10.9+12.76  | -14.2+12.2   | -14.72+15.84 | -14.62+16.38 | -14.21+14.73 | -17.17+18.14 | -17.59+11.9  | -15+18.11    | -11.22+19.19 | -17.17+18.51 | -16.82+17.38 | -16.82+17.38 |
| θ(142°) | -17.62+17.21 | -18.36+17.98 | -18.24+18.22 | -18.95+18.22 | -17.19+17.25 | -17.22+17.38 | -14.69+14.54 | -8.61+8.64   | 4.54+8.64    | 8.84+8.69    | 8.8+10.38    | -11.52+10.79 | 8.04+14.38   | -11.64+8.69  | -12.84+14.74 | -15.13+16.43 | -15.51+16.82 | -12.21+13.3  | -18.77+18.68 | -16.86+15.37 | -18.83+18.19 | -16.24+18.98 | -17.98+18.94 | -17.98+18.94 |
| θ(145°) | -18.38+18.65 | -17.56+17.91 | -18.07+14.49 | -18.24+15.14 | -12.52+17.02 | -16.91+15.52 | -10.91+11.39 | -11.91+11.76 | 4.91+11.76   | 8.94+10.9    | 9.69+9.59    | -11.63+13.01 | -10.69+16.75 | -11.29+13.33 | -10.81+16.2  | -16.99+18.97 | -18.42+19.18 | -16.42+19.18 | -17.71+17.24 | -15.59+18.3  | -18.32+18.28 | -17.47+18.62 | -17.89+18.4  | -17.89+18.4  |
| θ(149°) | -18.76+17.27 | -14.21+17.37 | -13.15+15.99 | -16.36+15.14 | -12.32+16.19 | -12.66+15.3  | -12.89+11.84 | -13.33+16.71 | 4.43+11.5    | 9.47+9.98    | 9.16+9.54    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    | 9.16+9.45    |
| θ(157°) | -15.4+12.8   | -11.66+17.18 | -19.03+17.58 | -14.29+13.62 | -13.44+17.32 | -13.78+13.18 | -12+11.51    | -11+10.8     | 10.79+9.69   | 9.22+10.02   | 8.26+9.16    | -11.15+10.43 | -10.87+12.31 | -13.81+13.57 | -13.78+16.78 | -15+14.32    | -17.45+15.93 | -17.37+17.93 | -15.68+15.15 | -16.91+18.03 | -18.24+18.31 | -18.21+18.96 | -18.33+18.5  | -18.33+18.5  |
| θ(161°) | -16.79+19.02 | -14.82+19.43 | -15.96+13.28 | -13.25+11.87 | -11.02+12.65 | -13.76+12.19 | -12.32+10.29 | -11.77+11.42 | -10.35+10.21 | -11.03+10.69 | -10.79+10.86 | -14.52+17.08 | -14.67+17.33 | -14.15+16.77 | -17.40+15.89 | -17.40+15.89 | -17.40+15.89 | -17.40+15.89 | -17.40+15.89 | -17.40+15.89 | -17.40+15.89 | -17.40+15.89 | -17.40+15.89 | -17.40+15.89 |
| θ(172°) | -14.93+15.52 | -16.04+16.28 | -16.02+16.49 | -16.4+18.92  | -15.26+16.02 | -15+13.75    | -13.89+12.84 | -10.91+14.34 | 8.11+10.88   | 8.63+8.68    | 9.38+10.28   | -11.24+12.2  | -11.46+11.13 | -13.16+14.45 | -17.27+16.64 | -17.07+17.67 | -17.27+17.68 | -16.41+13.14 | -13.81+13.98 | -12.99+11.73 | -11.77+11.37 | -12.75+14.95 | -15.62+15.5  | -15.62+15.5  |
| θ(184°) | -16.74+18.15 | -17.84+18.11 | -17.92+17.82 | -17.73+17.87 | -19.02+16.72 | -14.78+12.89 | -12.47+12.58 | -13.34+12.2  | -11.15+11.24 | -11.54+10.98 | 8.97+10.44   | -11.84+17.87 | -10.89+18.98 | -11.74+18.82 | -19.25+16.25 | -18.99+18.73 | -17.91+17.42 | -17.49+17.13 | -15.26+15.17 | -13.57+12.61 | -12.84+13.87 | -13.89+13.27 | -14.25+15.95 | -14.25+15.95 |
| Free(θ) | 5.65(θ)      | Phuket 3     |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
| Gen     | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         | θ(°)         | φ(°)         |
| θ(°)    | 5.51+5       | 5.05+4.94    | -4.52+4.41   | 4.47+4.76    | 4.87+4.87    | 5.15+5.77    | -6.48+7.12   | -7.8+8.7     | 8.74+10.08   | -10.64+11.95 | -12.38+10.14 | -7.86+7.08   | 7.01+7.57    | 8.84+1.5     | -4.68+4.04   | 4.73+5.51    | 4.36+7.23    | 7.65+4.49    | -10.05+10.16 | -13.39+13.57 | -12.72+11.5  | 8.7+11       | 7.18+4.25    |              |
| φ(°)    | 3.64+5.55    | -5.14+5.4    | -3.84+3.21   | 2.91+2.78    | 2.49+2.72    | 3.56+4.53    | -5.07+6.04   | 8.19+12.07   | -17.66+13.54 | -8.25+7.17   | -4.79+3.85   | -3.17+2.95   | 3.42+3.77    | -4.58+4.65   | -5.05+5.1    | -4.86+4.96   | 5.04+4.89    | -4.46+4.55   | -7.89+9.46   | -11.71+13.42 | -13.81+11.74 | 8.81+12      |              |              |
| θ(°)    | 7.94+7.17    | 6.09+4.81    | -3.60+3.06   | 2.43+1.91    | -1.51+1.34   | -1.4+1.53    | -2.06+3.44   | -5.16+7.79   | -11.21+7.39  | -8.13+13.5   | -9.06+3.1    | -3.21+1.97   | -1.25+0.68   | 0.37+0.7     | -1.6+2.58    | -3.51+4.42   | 4.71+4.44    | 4.03+3.36    | -3.08+3.91   | -5.44+6.19   | -7.98+11.19  | -15.69+18.38 | -19.03+18.35 | -11.45+9.31  |
| φ(°)    | 6.03+4.54    | -4.37+4.63   | -3.57+2.69   | -1.46+0.63   | -0.34+0.32   | 0.64+0.34    | -0.66+0.71   | 3.39+5.66    | 9.1+10.3     | -10.02+12.59 | 9.28+12.49   | -3.74+3.15   | -0.95+2.53   | 0.37+0.65    | -0.27+1.21   | -0.12+0.65   | 1.74+3.12    | 1.49+4.41    | -4.98+6.89   | -11.79+13.89 | -18.98+18.81 | -19.81+17.82 | -17.17+18.06 | -18.82+18.49 |
| θ(°)    | 4.29+1.4     | 0.54+0.9     | -1.86+1.64   | 0.89+0.73    | 0.95+1.39    | -1.11+1.07   | 0.08+0.45    | -1.4+2.31    | 4.29+3.61    | -12.87+15.35 | -11.16+17.78 | 4.84+2.48    | -1.06+0.41   | 8.4+0.29     | -0.19+0.59   | 1.52+1.97    | 0.06+1.26    | 2.42+2.30    | 2.64+4.22    | -13.82+10.22 | -13.92+18.87 | -15.57+9.31  | -7.29+8.35   | -10.58+9.86  |
| φ(°)    | 5.56+1.51    | 0.30+0.5     | -3.41+2.18   | -1.79+1.59   | 1.19+1.25    | -1.51+0.08   | 0.64+0.47    | 0.1+1.73     | 3.34+0.36    | -12.46+17.57 | -11.93+17.46 | 6.26+2.96    | -1.1+1.37    | 0.05+0.62    | 0.48+0.91    | 1.91+1.74    | 0.02+1.65    | -1.71+1.79   | 3.95+4.7     | -7.05+7.09   | -11.71+17.84 | -15.58+9.13  | -5.43+7.47   | -7.77+8.68   |
| θ(°)    | 5.93+2.38    | 0.41+0       | 0.91+1.63    | -3.2+3.12    | 2.58+2.39    | -1.32+0.47   | 0.67+0.52    | -0.48+1.73   | 5.06+10.77   | -16.19+15.61 | -9.52+4.94   | -3.81+2.75   | -1.27+1.57   | 0.31+0.55    | 0.62+0.34    | 0.62+0.34    | 0.86+1       | 1.51+1.92    | -4.23+2.84   | -12.71+16.49 | -15.71+16.94 | -17.13+14.43 | -11.55+9.49  | -6.65+7.41   |
| φ(°)    | 3.91+1.23    | 0.69+0.68    | -0.99+1.5    | 5.08+4.13    | 3.1+2.85     | -1.16+0.08   | 0.21+1.93    | 3.23+6.19    | -10.97+12.52 | -14.41+15.92 | -2.06+1.98   | 2.19+1.03    | 0.99+1.08    | 2.44+2.22    | 3.4+4.42     | -11.08+16.1  | 1.03+10.19   | -1.87+16.12  | -18.59+12.62 | -17.91+16.12 | -18.59+12.62 | -17.91+16.12 | -18.59+12.62 | -17.91+16.12 |
| θ(°)    | 2.91+1.57    | -1.47+1.52   | 2.25+2.3     | 4.93+1.77    | 4.884        | 3.37+1.71    | -1.75+2.35   | 4.25+0.91    | 8.33+12.79   | 8.28+19      | -11.58+14.4  | 4.76+3.1     | 1.96+2.1     | 3.94+3       | -2.53+1.98   | 2.71+3.1     | 0.38+0.3     | 1.47+1.38    | 1.32+0.96    | 6.89+9.59    | 16.79+18.8   | 18.29+14.65  | 13.56+10.9   | 3.58+10.3    |
| θ(°)    | 3.35+2.57    | 3.16+1.9     | 0.71+1.3     | 4.19+3.35    | 7.23+5.32    | 3.9+3.5      | -3.39+4.52   | -4.41+5.59   | 7.97+12.14   | -17.52+16.15 | -10.91+17.3  | -4.03+5.85   | 5.2+3.93     | 4.02+3.17    | -7.14+5.83   | -4.91+4.5    | -3.33+3.02   | 4.76+5.45    | 4.25+2.67    | 6.42+10.68   | -17.57+19.98 | -18.71+16.42 | -15.41+10.43 | -7.94+18.16  |
| φ(°)    | 5.12+5.28    | 5.69+5.12    | -10.36+16.07 | 11.86+11.22  | -10.91+7.38  | 6.19+5.37    | 4.26+5.36    | 4.52+6.17    | 8.48+12.25   | -10.01+15.73 | -10.84+12.91 | 8.98+9.21    | -7.01+7.63   | 5.99+7.26    | -7.82+10.15  | 8.97+8.8     | 5.63+5.23    | 5.6+6.62     | 5.06+6.22    | -14.92+17.81 | -18.43+18.2  | -15.05+13.53 | 4.53+7.24    |              |
| θ(82°)  | 7.53+6.48    | 9+12.33      | -17.01+18.14 | 15.36+14.26  | -12.96+10.38 | 8.26+7.77    | 5.65+6.72    | -6.89+7.26   | 8.31+12.98   | -15.96+15.96 | -10.94+9.88  | 7.96+8.41    | 8.07+7.14    | 8.45+11.35   | -12+12.78    | -13.27+13.83 | 8.84+7.87    | 8.63+8.92    | 8.16+8.02    | 2.76+8.25    | -18.72+16.69 | -17.86+18.93 | -15.48+13.95 | -9.76+11.1   |
| φ(°)    | 11.05+11.05  | -15.1+11.12  | -18.17+18.57 | -16.47+16.54 | -13.38+12.91 | 4.65+6.03    | -7.71+10.18  | -8.36+12.58  | -15.89+16.35 | -12.76+10.19 | 8.84+16.15   | -12.65+19.38 | -12.65+19.38 | -17.71+17.17 | -16.71+17.16 | -17.59+16.26 | -12.08+11.35 | -10.79+9.43  | 8.26+6.68    | -10.37+16.3  | -19.38+18.81 | -17.88+17.49 | -15.14+18.87 | -10.36+13.92 |
| θ(87°)  | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 | -15.48+16.88 |
| θ(89°)  | -13.38+18.25 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 | -17.23+19.92 |
| θ(105°) | -17.59+18.58 | -18.34+16.76 | -16.36+19.19 | -17.63+17.36 | -16.61+16.62 | -11.11+10.35 | -11.19+11.33 | -11.91+14.57 | -14.11+16.33 | -18.49+16.75 | -15.15+19.38 | -11.59+14.57 | -11.63+11.17 | -15.32+16.41 | -17.41+14.35 | -17.59+13.77 | -13.01+16.78 | -14.61+18.17 | -15.02+19.78 | -16+18.52    | -18.96+16.35 | -18.4+17.91  | -17.67+14.58 | -17.67+14.58 |
| θ(142°) | -17.78+18.97 | -13.34+16.16 | -12.71+13.82 | -15.34+13.96 | -13.17+13.77 | -10.53+13.77 | -12.44+14.2  | -14.06+13.1  | -17.34+12.27 | -14.56+19.21 | -17.34+14.22 | -17.34+14.22 |              |              |              |              |              |              |              |              |              |              |              |              |



# Radiated Composite Gain Data

# Appendix A

|          |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| (H112.1) | -14.48-17.73 | -19.24-19.17 | -14.89-18.52 | -12.89-12.94 | -14.07-18.26 | -15.42-12.37 | -13.02-12.73 | -16.89-19.54 | 8.44-10.88   | -10.23-8.7   | -11.02-11.64 | -11.28-11.08 | 8.93-9.49    | -13.97-10.75 | -8.24-13.58  | -17.87-14.82 | -12.38-18.23 | -15.16-16.58 | -18.71-17.88 | -19.22-17.7  | -18.75-17.98 | -18.74-14.55 | -14.79-16.88 | -17.98-17.15 |
| (H120.1) | -17.43-17.12 | -18.87-17.81 | -16.44-17.76 | -13.13-14.74 | -15.71-14.73 | -18.92-18.18 | -16.89-15.63 | -13.31-13.14 | -10.32-9.87  | -11.16-11.78 | -13.43-14.03 | -15.4-15.26  | -12.08-11.51 | -18.01-13.92 | -12.03-9.82  | -17.52-17.11 | -17.15-15.65 | -15.39-14.17 | -15.87-12.12 | -13.73-13.63 | -13.32-14.92 | -17.74-17.07 | -17.13-15.17 | -13.47-14.71 |
| (H127.1) | -17.94-16.73 | -18.06-17.79 | -14.83-18.81 | -15.41-17.05 | -15.44-12.58 | -18.89-16.99 | -16.79-12.84 | 9.93-10.28   | 9.80-10.66   | -10.1-16.08  | -16.94-13.08 | -17.96-15.45 | -18.6-18.85  | -14.66-13.54 | -15.89-17.54 | -17.72-17.88 | -17.92-18.69 | -17.92-18.69 | -17.92-18.69 | -18.12-18.27 | -16.53-16.75 | -14.57-16.19 | -19.22-19.08 | -16.25-18.95 |
| (H130.1) | -16.34-18.82 | -16.18-18.2  | -17.35-17.37 | -15.26-14.81 | -18.47-15.12 | -15.86-17.22 | -16.97-13.34 | -13.17-12.38 | -10.1-16.42  | 8.27-8.24    | -10.55-12.63 | -11.51-15.61 | -14.98-14.34 | -15.97-17.03 | -14.73-13.73 | -17.81-17.96 | -17.48-18.04 | -17.31-17.75 | -14.14-14.56 | -18.26-19.01 | -15.61-18.79 | -19.84-17.47 | -11.18-18.4  | -14.31-16.85 |
| (H142.1) | -18.83-18.81 | -17.44-15.1  | -14.62-18.58 | -13.01-11.11 | -14.51-16.7  | -17.12-18.62 | -18.1-16.28  | -14.26-10.83 | 8.55-11.41   | 9.27-8.24    | -14.04-18.5  | -17.55-16.64 | -13.07-12.13 | -11.41-12.92 | -14.51-15.88 | -14.14-18.4  | -18.15-18.32 | -18.38-19.59 | -17.76-19.04 | -18.9-17.88  | -17.69-17.94 | -17.69-17.94 | -17.69-17.94 | -14.23-16.47 |
| (H150.1) | -16.26-16.34 | -16.33-17.21 | -16.26-15.09 | -13.79-13.24 | -15.71-14.78 | -13.81-17.61 | -13.08-10.76 | -10.52-12.38 | -13.64-10.84 | 8.49-13.53   | -11.75-15.05 | -14.67-11.07 | -10.48-12.17 | -12.99-17.87 | -18.3-14.77  | -15.43-17.53 | -18.27-18.53 | -17.90-17.84 | -14.83-13.35 | -17.76-18.74 | -18.41-18.6  | -19.24-17.5  | -18.11-18.3  | -17.98-11.51 |
| (H157.1) | -18.83-18.84 | -17.44-15.1  | -16.36-16.21 | -17.88-16.17 | -17.84-15.45 | -13.32-14.27 | -13.14-12.03 | -11.1-11.23  | -13.09-12.66 | -11.03-11.26 | -12.20-14.9  | -14.76-14.58 | -14.56-13.32 | -14.56-13.32 | -18.11-17.76 | -17.04-17.24 | -17.38-18.05 | -16.46-19.15 | -18.41-17.55 | -18.79-18.72 | -18.85-18.58 | -17.47-19.06 | -19.09-18.71 |              |
| (H160.1) | -19.91-17.89 | -17.86-18.72 | -18.48-17.55 | -16.10-17.82 | -17.73-17.58 | -17.71-15.49 | -14.32-14.15 | -14.48-14.84 | -14.15-12.83 | -11.63-11.02 | -11.27-11.51 | -12.28-13.69 | -13.70-12.84 | -13.76-17.4  | -18.69-19.13 | -14.8-13.88  | -14.44-16.14 | -18.76-18.88 | -18.88-17.64 | -18.49-14.44 | -15.22-15.73 | -15.16-15.06 | -15.84-18.17 | -18.45-18.25 |
| (H172.1) | -15.96-17.73 | -16.16-17.73 | -18.85-19.6  | -17.89-18.52 | -17.88-17.85 | -17.88-15.35 | -13.9-12.91  | -12.28-11.06 | -10.67-11.64 | -13.38-13.71 | -12.85-12.45 | -12.62-12.02 | -11.75-12.4  | -13.13       | -13.25-12.75 | -12.19-13.11 | -15.52-18.29 | -19.28-18    | -19.35-18.88 | -18.18-18.16 | -17.53-18.36 | -18.39-17.44 | -17.31-17.12 | -15.95-15.14 |
| (H180.1) | -16.89-17.58 | -18.13-18.11 | -17.83-19.44 | -17.74-18.59 | -17.65-18.35 | -15.67-14.98 | -13.7-12.89  | -11.8-11.78  | -12.28-12.16 | -11.4-10.88  | -12.53-14.01 | -15.34-15    | -15.11-16.62 | -18.63-18.47 | -19.03-18.69 | -19.27-19.37 | -17.85-19.7  | -15.98-13.48 | -12.52-13.23 | -13.33-15.38 | -12.93-12.82 | -13.09-12.85 | -13.09-12.85 | -14.98-17.12 |
| FreeHd   | 2.65294      | PhdA.4       | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            | ↓            |
| Gain     | (H07Y067.1)  | (H15Y022.1)  | (H30Y037.1)  | (H45Y062.1)  | (H60Y087.1)  | (H75Y082.1)  | (H90Y097.1)  | (H105Y112.1) | (H120Y127.1) | (H135Y142.1) | (H150Y157.1) | (H165Y172.1) | (H180Y187.1) | (H195Y202.1) | (H210Y217.1) | (H225Y232.1) | (H240Y247.1) | (H255Y262.1) | (H270Y277.1) | (H285Y292.1) | (H300Y307.1) | (H315Y322.1) | (H330Y337.1) | (H345Y352.1) |
| (H7)     | -19.96-10.13 | 8.515-15     | 8.171-48     | 6.93-106     | -11.37-12.34 | -13.14-13.88 | -13.59-13.69 | -13.58-13.99 | -14.37-14.65 | -14.84-14.45 | -13.64-12.74 | -12.27-12.03 | -12.11-12.38 | -12.63-12.84 | -12.88-12.79 | -12.71-12.46 | -12.25-12.19 | -12.38-12.69 | -13.04-13.35 | -13.34-13.22 | -12.39-12.7  | -12.48-12.27 | -12.13-12.38 | -12.45-12.74 |
| (H15)    | -10.91-10.28 | 8.98-9       | 8.98-10.26   | -10.55-10.98 | -11.54-12.06 | -12.38-12.58 | -12.40-11.98 | -11.67-11.65 | -11.88-12.42 | -12.95-13.71 | -13.96-13.56 | -13.04-12.87 | -11.13-13.54 | -14.16-14.27 | -13.91-13.24 | -13.02-12.77 | -12.67-12.94 | -13.81-14.81 | -10.63-16.59 | -16.11-14.91 | -13.84-13.03 | -12.36-11.64 | -11.28-11.38 | -11.58-11.31 |
| (H17)    | -11.38-11.38 | -11.24-10.96 | -10.89-11.1  | -11.27-11.32 | -11.36-11.23 | -10.94-10.78 | -10.65-10.54 | -10.43-10.18 | 8.92-9.79    | -10.10-10.65 | -11.15-11.4  | -11.71-12.35 | -13.41-14.32 | -14.92-15.12 | -15.17-15.24 | -15.31-15.18 | -15.17-15.72 | -17.06-18.2  | -18.76-19.03 | -15.31-12.68 | -11.12-10.23 | 8.61-9.14    | 8.13-8.63    | -10.49-10.75 |
| (H22.1)  | -11.25-10.67 | 8.84-9.35    | 8.44-10.23   | -11.26-11.62 | -11.54-10.63 | 9.72-9.27    | 8.5-10.18    | -10.5-9.86   | 8.7-1.5      | 4.95-9.46    | -7.38-8.27   | -8.41-11.27  | -13.23-13.51 | -13.75-14.19 | -15.34-17.69 | -18.84-17.25 | -18.79-18.81 | -18.99-17.89 | -18.16-94    | -13.88-11.16 | 8.89-8.66    | 7.87-17.41   | 7.53-8.4     | -10.92-10.71 |
| (H27.1)  | 8.44-8.31    | 7.22-9.34    | 7.38-8.64    | -10.88-13.61 | -14.18-11.74 | 8.86-8.74    | 9-10.38      | -11.58-10.53 | 7.95-8.55    | 4.7-4.51     | 5.01-6.09    | -7.66-9.91   | -12.29-12.88 | -11.97-15.85 | -18.81-19.35 | -18.48-19.3  | -19.14-18.77 | -15.11-12.82 | -15.19-16.25 | -7.4-7.84    | 7.53-8.4     | 7.53-8.4     | 7.53-8.4     | 7.53-8.4     |
| (H37.1)  | 7.88-8.34    | 5.71-5.77    | 6.49-7.54    | 8.88-12.49   | -8.99-14.47  | -10.52-8.65  | 9.21-11.4    | -12.96-18.7  | 7.17-4.8     | 7.14-3.76    | 4.85-9.91    | -7.88-10.85  | -12.77-12.15 | -16.22-18.4  | 9.68-10.66   | -18.51-17.04 | -18.6-18.55  | -18.05-19.03 | -18.07-18.14 | -17.43-18.49 | -12.26-12.37 | 8.36-7.68    | 8.46-8.79    | -7.68-8.16   |
| (H47.1)  | 7.53-8.36    | 6.4-6        | 7.26-8.45    | -10.55-15.14 | -17.37-17.39 | -11.75-9.89  | -11.94-11.54 | -12.52-12.67 | 8.42-8.03    | 5.66-6.57    | -5.86-7.18   | 8.88-11.32   | -8.99-11.29  | 8.82-9.62    | 8.25-10.32   | -13.18-14.86 | -15.07-17.45 | -19.05-16.71 | -17.96-18.43 | -13.98-13.33 | -12.51-10.57 | 8.41-8.68    | 8.49-8.28    | 7.62-8.36    |
| (H52.1)  | 8.36-8.7     | 8.27-8.7     | 8.28-9.21    | -11.96-15.25 | -16.46-19.27 | -13.56-11.16 | -11.93-10.84 | -16.81-17.41 | -16.88-8.7   | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     | 4.9-8.87     |
| (H57.1)  | 8.4-8.46     | 8.237-8.86   | 8.711-11.21  | -12.75-12.53 | -17.81-18.55 | -15.94-13.97 | -13.22-12.75 | -18.73-19.28 | -18.48-14.02 | -12.59-13.44 | -16.23-17.72 | -17.68-19.35 | -18.7-19.3   | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    | 8.25-9.75    |
| (H67.1)  | 7.36-8.51    | 6.5-9.51     | 11.43-12.77  | -15.39-19.38 | -18.41-18.69 | -15.92-12.04 | -13.78-16.15 | -17.88-19.05 | -13.71-17.45 | -14.32-14.42 | -19.36-19.65 | -18.63-19.03 | -16.59-16.49 | 9.96-10.38   | -12.96-12.29 | -10.75-12.4  | -17.79-18.41 | -17.79-18.41 | -17.79-18.41 | -17.79-18.41 | -17.79-18.41 | -17.79-18.41 | -17.79-18.41 | -17.79-18.41 |
| (H72.1)  | 7.48-8.56    | 7.38-8.55    | -13.69-13.43 | -17.12-15.84 | -18.07-18.38 | -11.63-8.65  | -11.04-11.77 | -15.91-14.38 | -18.02-18.84 | -18.91-17.08 | -18.91-15.15 | -19.05-18.41 | -18.49-18.16 | -12.96-12.2  | -13.06-12.52 | -17.63-14.18 | -13.66-16.15 | -18.4-19.38  | -17.68-18.64 | -15.29-15.13 | 8.96-7.7     | 7.43-8.52    | 7.54-8.77    | -11.51-10.7  |
| (H82.1)  | 7.87-8.26    | 8.32-12.9    | -12.37-12.08 | -18.05-18.24 | -17.84-17.98 | -11.63-8.65  | -10.62-11.57 | -15.91-11.34 | -13.59-18.1  | -18.87-17.5  | -17.31-18.63 | -17.82-18.54 | -18.68-14.5  | -13.65-13.28 | -13.45-13.44 | -17.59-15.95 | -15.96-19.03 | -19.18-18.56 | -18.31-17.26 | -14.26-16.15 | 8.96-7.7     | 7.22-8.59    | 6.08-7.14    | -10.88-11.78 |
| (H87.1)  | 8.54-8.68    | 8.51-12.92   | -11.02-10.87 | -18.59-18.45 | -16.35-18.47 | -12.27-12.32 | 8.84-17.33   | -16.41-10.49 | -11.11-14.32 | -14.02-12.32 | -13.42-14.78 | -17.37-18.12 | -17.89-17.73 | -17.71-18.1  | -14.56-16.97 | -16.96-14.59 | -14.33-17.6  | -18.16-17.48 | -18.49-19.17 | -15.48-16.87 | 7.93-17.23   | 7.33-6.47    | 6.05-6.69    | -11.05-12.84 |
| (H97.1)  | 8.45-8.65    | 8.29-13.38   | -10.53-9.88  | -11.51-10.93 | -17.71-12.12 | -10.28-12.37 | 8.47-17.15   | -17.16-10.37 | -10.47-14.31 | -12.41-12.38 | -13.13-13.17 | -17.57-17.59 | -18.65-18.64 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 | -15.88-14.84 |
| (H102.1) | 8.47-8.75    | 8.12-12.32   | 6.5-9.71     | -15.04-16.27 | -16.45-16.81 | -17.47-15.35 | -16.47-15.35 | -10.89-12.63 | -16.27-12.33 | -12.29-14.23 | -14.17-14.51 | -17.12-17.52 | -16.14-18.69 | -17.19-17.81 | -18.65-18.07 | -18.16-19.01 | -14.14-15.41 | -17.61-18.07 | -16.26-14.12 | -12.02-12.04 | 8.2-9.31     | 8.48-8.25    | 7.32-8.54    | -11.59-8.86  |
| (H112.1) | 8.47-8.75    | 8.12-12.32   | 6.5-9.71     | -15.04-16.27 | -16.45-16.81 | -17.47-15.35 | -16.47-15.35 | -10.89-12.63 | -16.27-12.33 | -12.29-14.23 | -14.17-14.51 | -17.12-17.52 | -16.14-18.69 | -17.19-17.81 | -18.65-18.07 | -18.16-19.01 | -14.14-15.41 | -17.61-18.07 | -16.26-14.12 | -12.02-12.04 | 8.2-9.31     | 8.48-8.25    | 7.32-8.54    | -11.59-8.86  |
| (H117.1) | 8.47-8.75    | 8.12-12.32   | 6.5-9.71     | -15.04-16.27 | -16.45-16.81 | -17.47-15.35 | -16.47-15.35 | -10.89-12.63 | -16.27-12.33 | -12.29-14.23 | -14.17-14.51 | -17.12-17.52 | -16.14-18.69 | -17.19-17.81 | -18.65-18.07 | -18.16-19.01 | -14.14-15.41 | -17.61-18.07 | -16.26-14.12 | -12.02-12.04 | 8.2-9.31     | 8.48-8.25    | 7.32-8.54    | -11.59-8.86  |
| (H122.1) | 8.47-8.75    | 8.12-12.32   | 6.5-9.71     | -15.04-16.27 | -16.45-16.81 | -17.47-15.35 | -16.47-15.35 | -10.89-12.63 | -16.27-12.33 | -12.29-14.23 | -14.17-14.51 | -17.12-17.52 | -16.14-18.69 | -17.19-17.81 | -18.65-18.07 | -18.16-19.01 | -14.14-15.41 | -17.61-18.07 | -16.26-14.12 | -12.02-12.04 | 8.2-9.31     | 8.48-8.25    | 7.32-8.54    | -11.59-8.86  |
| (H127.1) | 8.47-8.75    | 8.12-12.32   | 6.5-9.71     | -15.04-16.27 | -16.45-16.81 | -17.47-15.35 | -16.47-15.35 | -10.89-12.63 | -16.27-12.33 | -12.29-14.23 | -14.17-14.51 | -17.12-17.52 | -16.14-18.69 | -17.19-17.81 | -18.65-18.07 | -18.16-19.01 | -14.14-15.41 | -17.61-18.07 | -16.26-14.12 | -12.02-12.04 | 8.2-9.31     | 8.48-8.25    | 7.32-8.54    | -11.59-8.86  |
| (H132.1) | 8.47-8.75    | 8.12-12.32   | 6.5-9.71     | -15.04-16.27 | -16.45-16.81 | -17.47-15.35 | -16.47-15.35 | -10.89-12.63 | -16.27-12.33 | -12.29-14.23 | -14.17-14.51 | -17.12-17.52 | -16.14-18.69 | -17.19-17.81 | -18.65-18.07 | -18.16-19.01 | -14.14-15.41 | -17.61-18.07 | -16.26-14.12 | -12.02-12.04 | 8.2-9.31     | 8.48-8.25    | 7.32-8.54    | -11.59-8.86  |
| (H137.1) | 8.47-8.75    | 8.12-12.32   | 6.5-9.71     | -15.04-16.27 | -16.45-16.81 | -17.47-15.35 | -16.47-15.35 | -10.89-12.63 | -16.27-12.33 | -12.29-14.23 | -14.17-14.51 | -17.12-17.52 | -1           |              |              |              |              |              |              |              |              |              |              |              |



# Radiated Composite Gain Data

# Appendix A

|          |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| E(157.5) | -18.72-18.41 | -16.14-15.21 | -16.73-14.11 | -13.33-16.44 | -18.01-18.36 | -16.71-17.27 | -17.1-15.19  | -14.14-17.2  | -18.09-13.81 | -12.57-15.08 | -19.33-17.98 | -16.49-18.27 | -15.6-12.73  | -10.71-10.3  | -8.17-17.57  | -10.2-16.98  | -16.57-17.06 | -18.39-18.08 | -18.26-17.84 | -17.88-12.39 | -10.9-11.33  | -13.17-17.4  | -18.48-18.83 | -17.83-18.11 |
|          |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
| E(162.5) | -12.02-15.42 | -17.22-18.8  | -14.41-15.03 | -16.26-16.43 | -17.68-18.36 | -17.48-18.56 | -17.05-18.34 | -18.04-17.14 | -12.66-10.31 | 6.1-9.57     | -12.4-16.15  | -15.12-14.34 | -12.45-11.47 | -10.86-10.97 | -11.57-11.59 | -12.03-17.48 | -18.05-18.31 | -19.27-17.77 | -18.41-15.56 | -12.92-15.05 | 8.99-11.48   | -18.31-18.36 | -14.19-12.02 |              |
|          |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
| E(175.5) | -16.01-19.1  | -18.36-17.27 | -18.3-17.9   | -19.17-19.4  | -18.84-18.54 | -17.63-17.35 | -18.89-18.93 | -18.89-19.16 | -17.48-18.03 | -17.14-18.91 | -16.42-16    | -16.24-16.72 | -16.41-15.15 | -14.52-13.73 | -13.05-14.41 | -17.16-18.2  | -18.91-18.7  | -18.94-18.43 | -18.97-17.92 | -18.4-18.1   | -17.98-18.13 | -16.97-17.46 | -17.55-18.36 | -17.73-17.72 |
|          |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
| Gain     | 6.47592Prd   | Phutk 4      | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            |              |
| Gain     | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) | 0(°)W(°)S(°) |              |
| E(°)     | 6.767-1.42   | 8.22-19.8    | -13.86-14.2  | -13.83-14.57 | -17.38-18.46 | -17.8-18.6   | -17.82-18.6  | -18.36-17.87 | -15.01-13.52 | -13.05-11.99 | -10.24-8.3   | -8.18-8.65   | -8.25-8.38   | -8.55-8.68   | -8.54-18.9   | -11.47-13.7  | -15.47-17.86 | -16.92-16.83 | -18.52-14.12 | -10.25-16.34 | -8.68-7.81   | -6.64-8.85   | -5.51-5.62   | -6.29-6.48   |
| E(15)    | 7.887-1.46   | 8.916-6.45   | 4.957-7.4    | -7.74-7.9    | -16.22-17.95 | -16.58-19.1  | 8.15-9.78    | 3.291-4.96   | -4.0-8.6     | -3.054-4.99  | 4.72-5.9     | -7.18-6.15   | -11.58-10.56 | -10.52-10.82 | -16.22-20.83 | -17.98-16.18 | -14.48-14.06 | -12.99-14.14 | -10.89-13.55 | -14.52-15.37 | -11.70-13.27 | -11.70-13.27 | -11.70-13.27 | -11.70-13.27 |
| E(22.5)  | 6.93-0.52    | 4.19-0.68    | 7.62-0.47    | 8.19-0.76    | 7.33-0.83    | 9.72-16.54   | -18.13-15.3  | 6.92-4.48    | 4.78-4.46    | 4.54-4.45    | 4.24-4.61    | 6.10-4.26    | 8.95-10.35   | -11.98-12.64 | -13.94-13.92 | -14.18-17.9  | -13.78-11.07 | -12.36-15.07 | -15.47-11.93 | -8.88-4.28   | 6.94-7.13    | 7.96-8.65    | 8.98-9.85    | 4.39-4.65    |
| E(37.5)  | 6.96-10.03   | 10.72-7.77   | 6.715-6.65   | 8.02-8.45    | 7.24-4.58    | -17.28-15.1  | -17.78-15.9  | 3.291-4.96   | 4.519-2.54   | 7.55-12.06   | -17.93-13.91 | 8.71-7.31    | 7.31-7.92    | 7.84-9.06    | -10.57-13.96 | -18.78-17.38 | -14.92-12.77 | -11.72-18.1  | -13.71-14.9  | -15.71-14.3  | 9.95-10.12   | 10.92-10.12  | 24.61-2.64   | -11.70-12.6  |
| E(52.5)  | 7.30-14.10   | -7.27-7.9    | 4.71-14.5    | -3.84-4.91   | 9.79-18.36   | -7.74-7.7    | -18.95-17.6  | -17.01-12.3  | 4.775-5.84   | 6.31-5.93    | -11.15-12.74 | -16.38-14.46 | -14.25-14.19 | 5.5-4.1      | -3.97-4.27   | 5.99-4.86    | -11.73-12.68 | -11.77-18.47 | -5.77-12.7   | -1.86-17.37  | -2.38-13.52  | 4.1-13.56    | -8.67-17.5   | -15.59-13.58 |
| E(67.5)  | 7.28-14.71   | 4.48-14.9    | -7.52-9.87   | -7.77-10.36  | 3.32-8.31    | -15.63-13.01 | -8.93-7.77   | -2.11-4.23   | 8.95-6.34    | 7.83-7.32    | 4.73-4.43    | -2.32-1.01   | 2.28-4.46    | 4.33-4.47    | 6.94-10.36   | -13.73-12.21 | -11.71-12.38 | -9.62-14.32  | -1.4-10.82   | -1.29-9.54   | 3.37-18.2    | 5.38-14.91   | -17.99-10.27 | -14.86-12.62 |
| E(82.5)  | -14.22-18.56 | 8.73-13.77   | -2.05-13.3   | -7.69-13.5   | -7.63        | -8.21-18.58  | -8.14-10.9   | -1.15-15.26  | 8.67-7.82    | 8.11-10.32   | -8.95-6.7    | 3.39-1.58    | -1.09-15.15  | 1.45-15.1    | -1.04-15.35  | 8.99-12.36   | -14.17-17.8  | -14.25-16.71 | -1.28-12.06  | -3.57-14.26  | 1.18-11.27   | 0.07-15.5    | -12.78-13.8  | -12.61-13.6  |
| E(97.5)  | 4.2-8.82     | -14.81-17.4  | -5.54-8.84   | -8.07-9.24   | -8.71-10.88  | -9.27-10.28  | 8.01-10.32   | -7.48-14.74  | -12.75-11.96 | -12.04-11.13 | -8.62-12.8   | -4.81-16.35  | 8.89-11.77   | 7.67-16.1    | -1.14-10.7   | 3.98-17.5    | -18.14-18.04 | -19.25-10.61 | 4.26-16.73   | -3.42-15.3   | 5.74-12.48   | -2.58-10.63  | 8.33-11.77   | -2.63-11.3   |
| E(112.5) | 2.31-15.45   | 8.77-16.06   | -11.84-14.47 | -7.15-16.55  | 4.41-10.77   | -17.13-19.98 | -8.02-15.1   | -7.48-14.74  | -12.75-11.96 | -12.04-11.13 | -8.62-12.8   | -4.81-16.35  | 8.89-11.77   | 7.67-16.1    | -1.14-10.7   | 3.98-17.5    | -18.14-18.04 | -19.25-10.61 | 4.26-16.73   | -3.42-15.3   | 5.74-12.48   | -2.58-10.63  | 8.33-11.77   | -2.63-11.3   |
| E(127.5) | 2.84-15.45   | 8.61-12.4    | -10.7-16.9   | -6.28-12.62  | 4.41-10.57   | -19.23-15.35 | -10.41-10.7  | -10.12-10.23 | 8.69-5.34    | 8.91-10.08   | -10.31-18.2  | -4.75-12.11  | -4.05-11.21  | -2.96-12.51  | -3.14-10.7   | -4.83-17.86  | -18.14-18.04 | -19.25-10.61 | 4.26-16.73   | -3.42-15.3   | 5.74-12.48   | -2.58-10.63  | 8.33-11.77   | -2.63-11.3   |
| E(142.5) | -13.04-16.97 | -18.09-14.97 | -17.51-19.9  | -15.19-19.8  | -18.39-18.4  | -15.42-19.9  | -16.42-18.6  | -14.73-16.9  | -17.1-17.6   | -16.84-18.7  | -18.03-18.2  | -14.21-17.7  | -12.12-15.8  | -13.24-17.1  | -12.01-17.25 | -16.18-17.39 | -17.42-15.6  | -16.18-17.39 | -17.42-15.6  | -16.18-17.39 | -17.42-15.6  | -16.18-17.39 | -17.42-15.6  | -16.18-17.39 |
| E(157.5) | -18.98-18.68 | -17.85-18.2  | -17.71-18.9  | -17.71-18.4  | -18.43-13.26 | -21.17-18.67 | -18.01-18.27 | -18.14-13.2  | -17.18-17.3  | -15.98-17.81 | -15.17-18.6  | -15.98-17.81 | -16.17-17.3  | -18.85-18.36 | -16.17-17.3  | -18.85-18.36 | -16.17-17.3  | -18.85-18.36 | -16.17-17.3  | -18.85-18.36 | -16.17-17.3  | -18.85-18.36 | -16.17-17.3  | -18.85-18.36 |
| E(172.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(187.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(202.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(217.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(232.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(247.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(262.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(277.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(292.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(307.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(322.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(337.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(352.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 |
| E(367.5) | -18.27-19.4  | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.34-18.44 | -18.         |              |              |              |              |              |              |              |              |





- : A16 of A20
- : AP391129



## Radiated Composite Gain Data

## Appendix A

|        | (H25°)        | -4.88°/3      | -7.42/4.84    | -7.23/9.37    | -6.18/4.3     | 0.28/6.69     | -10.48/9.55   | -7.43/3       | -5.18/2.88    | 0.69/1.45     | 1.14/0.55     | 0.25/-0.09    | -1.15/-2.29   | -3.19/-4.22   | 4.37/-4.58    | 0.39/-0.11    | -16.75/-18.49 | -6.37/-3.88   | -1.67/-1.67   | -1.89/-1.61   | -0.01/0.99    | 2.72/3.48     | 2.96/1.74     | 1.09/0.58     | -0.43/-4.28 |
|--------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| (H8°)  | 4.14/5.97     | 4.35/5.97     | 5.97/7.35     | 6.91/10.8     | 8.41/4.28     | 9.07/-10.1    | -7.27/5.5     | 5.49/-0.57    | 2.63/-4.69    | 0.33/2.23     | -0.12/0.57    | -1.52/57      | -3.46/7.3     | 3.93/-4.08    | -6.92/-4.7    | -11.47/-11.1  | -11.49/-4.11  | 2.23/-2.97    | 3.33/2.5      | -1.31/0.47    | 1.92/59       | 2.31/1.25     | 0.63/0.33     | -0.53/-0.21   |             |
| (H0°)  | 5.12/4.12     | 7.22/-3.2     | 4.72/4.71     | 11.94/-14.6   | -11.46/-7.85  | -10.00/-13.9  | -6.61/4.65    | -7.64/-7.98   | 5.3/-3.15     | 2.37/-1.72    | -1.37/-3.24   | -3.49/-4.22   | -5.65/-4.94   | 5.14/-5.98    | -8.91/-10.7   | -16.81/-16.7  | -10.92/-3.83  | -3.83/-4.04   | 6.59/-6.86    | -1.70         | 1.13/1.34     | 0.06/-0.57    | -1.15/-1.02   | -1.42/-2.89   |             |
| (H1°)  | 5.69/-6.68    | -8.14/-15.7   | 8.50/-10.58   | -14.26/-19.5  | -14.48/-17.2  | -13.83/-14.7  | -13.83/-14.7  | -10.85/-15.5  | 9.39/-10.1    | 9.21/-6.23    | -4.79/-4.1    | 3.9/-4.54     | -5.36/-5.23   | -4.48/-7.8    | 7.33/-7.9     | -11.78/-13.24 | -14.02/-19.29 | -17.02/-4.46  | 4.74/-1.67    | 6.13/7.8      | 2.41/-4.48    | 0.00/-0.58    | 2.54/-3.83    | -3.84/-4.27   | -4.13/-4.35 |
| (H2°)  | -0.83/-11.36  | -10.42/-12.8  | -11.63/-16.84 | -16.79/-17.96 | -16.26/-11.18 | -17.11/-18.1  | -13.82/-11.82 | -16.04/-17.2  | -13.82/-12.35 | -10.34/-13.7  | -8.49/-11.8   | -11.63/-8.07  | -10.07/-11.56 | -12.82/-12.77 | -15.55/-16.68 | -17.61/-18.48 | -17.89/-8.68  | 8.96/-5.96    | -10.91/-8.69  | 4.26/-6.68    | 4.15/-5.55    | 6.89/-11.27   | -10.89/-11.38 | -12.81/-10.12 |             |
| (H3°)  | -14.04/-12.32 | -14.49/-12.53 | -14.22/-18.15 | -19.25/-17.54 | -17.12/-12.07 | -17.51/-15.1  | -16.59/-14.66 | -18.14/-16.15 | -13.30/-15.38 | -10.38/-11.54 | -14.94/-11.91 | -15.61/-10.97 | -12.78/-11.67 | -14.89/-16.35 | -18.14/-14.31 | -17.89/-13.09 | -17.91/-13.58 | -19.12/-3.76  | 4.59/-6.43    | 8.21/-9.43    | -12.91/-16.1  | -11.44/-15.36 | -15.94/-14.15 | -17.53/-17.22 |             |
| (H4°)  | -16.73/-14    | -16.18/-13    | -17.66/-19.17 | -18.06/-19.54 | -19.59/-15.23 | -18.09/-17.84 | -18.36/-16.1  | -18.53/-17.27 | -14.11/-15.7  | -16.75/-13.23 | -14.67/-16.28 | -18.13/-15.58 | -15.99/-12.69 | -18.11/-17.81 | -18.91/-16.76 | -18.71/-14.04 | -17.91/-18.21 | -18.67/-19.58 | -17.07/-18.35 | -12.12/-10.12 | -12.01/-18.03 | -17.66/-17.57 | -15.33/-17.57 | -17.57/-17.22 |             |
| (H5°)  | -18.66/-14.3  | -18.50/-18.7  | -18.61/-19.16 | -17.29/-19.58 | -17.49/-17.28 | -17.18/-16.8  | -18.10/-16.8  | -18.56/-16.88 | -18.60/-17.5  | -16.77/-14.32 | -14.97/-17.08 | -18.12/-17.83 | -15.87/-14.64 | -18.74/-16.57 | -18.87/-16    | -18.92/-16.35 | -17.98/-17.9  | -17.43/-11.92 | -17.57/-18.15 | -18.16/-15.4  | -18.42/-16.86 | -18.91/-19.13 | -17.18/-17.42 | -18.38/-18.17 |             |
| (H6°)  | -18.74/-16.38 | -19.06/-19.2  | -18.27/-19.37 | -18.07/-18.44 | -18.58/-18.67 | -18.49/-17.85 | -17.87/-18.34 | -18.46/-17.41 | -17.17/-16.83 | -17.34/-16.44 | -17.66/-16.54 | -17.28/-19.15 | -18.67/-17.41 | -18.59/-17.81 | -18.13/-16.3  | -18.53/-19.35 | -19.52/-19.66 | -18.83/-17.97 | -17.73/-17.87 | -18.43/-17.23 | -18.44/-17.83 | -18.53/-19.78 | -18.46/-18.2  |               |             |
| (H7°)  | -19.53/-17.42 | -18.51/-18.89 | -18.46/-17.97 | -18.79/-18.56 | -18.77/-17.52 | -18.76/-17.87 | -18.59/-18.62 | -17.82/-19.12 | -18.95/-19.75 | -18.91/-18.43 | -18.59/-18.18 | -18.95/-17.76 | -19.69/-19.07 | -18.77/-17.82 | -18.82/-19.61 | -18.97/-17.89 | -18.79/-17.87 | -18.49/-17.21 | -17.24/-16.15 | -18.49/-17.21 | -18.31/-17.43 | -17.71/-18.9  | -17.86/-17.93 | -17.86/-17.93 |             |
| (H8°)  | -19.57/-19.24 | -18.54/-18.16 | -18.27/-17.98 | -18.98/-15.97 | -14.98/-15.45 | -15.91/-17.13 | -18.59/-18.39 | -18.01/-18.34 | -18.23/-17.4  | -17.89/-19.81 | -18.94/-18.42 | -18.08/-19.37 | -18.73/-19.14 | -18.15/-18.47 | -18.15/-18.47 | -18.98/-19.13 | -18.98/-19.13 | -18.74/-19.18 | -18.23/-17.92 | -18.31/-14.03 | -18.66/-17.5  | -17.91/-18.17 | -18.98/-19.14 | -18.98/-19.14 |             |
| (H9°)  | -17.69/-19.28 | -18.94/-19.84 | -18.46/-19.56 | -18.40/-14.13 | -17.07/-16.48 | -14.83/-16.32 | -14.76/-16.13 | -17.77/-14.76 | -11.91/-14.3  | -17.33/-17.72 | -18.75/-19.18 | -18.42/-19.76 | -18.03/-19.86 | -18.52/-17.87 | -19.25/-17.94 | -19.31/-19.86 | -19.16/-19.76 | -18.79/-19.78 | -18.56/-16.25 | -17.11/-19.3  | -19.51/-19.15 | -16.07/-17.14 | -16.88/-19.76 | -17.73/-17.94 |             |
| (H10°) | -16.49/-19.38 | -19.01/-19.84 | -18.68/-18.83 | -19.25/-15.03 | -11.93/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 | -17.38/-17.18 |             |
| (H11°) | -12.36/-14.61 | -18.07/-18    | -15.91/-15.29 | -16.55/-17.28 | -16.61/-19.1  | -17.68/-16.61 | -13.27/-18.08 | -18.66/-18.22 | -18.32/-17.67 | -18.36/-18.75 | -17.75/-18.33 | -18.12/-19.01 | -17.4/-12.12  | -12.11/-18.7  | -17.21/-16.3  | -13.95/-14.61 | -19.32/-19.18 | -18.26/-15.94 | -17.21/-16.88 | -17.61/-17.62 | -17.71/-18.95 | -19.01/-17.27 | -17.19/-18.03 | -18.37/-15.36 |             |
| (H12°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| (H13°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| (H14°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| (H15°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| (H16°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| (H17°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| (H18°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| (H19°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| (H20°) | -17.27/-17.81 | -18.96/-17.82 | -17.74/-18.19 | -17.76/-17.95 | -18.85/-18.88 | -18.46/-18.84 | -17.31/-18.83 | -17.52/-18.93 | -18.29/-18.36 | -18.26/-18.77 | -17.69/-18.81 | -18.02/-14.82 | -12.89/-13.83 | -16.68/-17.91 | -18.97/-17.28 | -17.19/-18.58 | -18.66/-17.82 | -17.71/-19.38 | -18.67/-18.91 | -18.33/-18.53 | -17.35/-18.16 | -17.53/-18.52 | -19.16/-18.46 | -18.46/-18.46 |             |
| FreeHq | 5.20/Phd.5    | ThdAval.5     | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓           |
| Gen    | (H0°/H9°)     | 5°/30°        | 15°/45°       | 30°/60°       | 45°/75°       | 60°/90°       | 75°/105°      | 90°/120°      | 105°/135°     | 120°/150°     | 135°/165°     | 150°/180°     | 165°/195°     | 180°/210°     | 195°/225°     | 210°/235°     | 225°/240°     | 235°/240°     | 240°/235°     | 235°/225°     | 225°/210°     | 210°/195°     | 195°/180°     | 180°/165°     | 165°/150°   |
| (H0°)  | 0.880/28      | 1.11/79       | 2.43/96       | 3.32/132      | 3.29/15       | 2.82/23       | 1.46/56       | 0.83/-2.23    | 4.31/-91      | -11.03/-18.27 | -18.56/-17.23 | -8.07/-4.93   | 2.69/-1.07    | 0.04/0.9      | 1.99/28       | 0.43/24       | 2.82/44       | 2.11/76       | 0.98/0.1      | -1.19/-12.7   | -4.97/-4.62   | -11.87/-18.76 | -12.99/-74.1  | -4.46/-2.53   |             |
| (H1°)  | 3.31/-1.58    | 4.89/-5.58    | 1.51/22       | 2.64/23       | 3.18/18       | 2.92/29       | 1.86/29       | 0.73/-2.67    | 4.54/-9.88    | -10.33/-14.65 | -8.42/-9.29   | 0.85/2.27     | 0.85/2.27     | 0.90/1.29     | 2.12/21       | 1.75/15       | 1.93/16       | 1.21/76       | 0.44/1.6      | -4.65/-1.79   | -1.58/6.16    | -1.58/6.16    | -11.93/-11.93 | -8.45/-8.45   |             |
| (H2°)  | 2.79/-1.73    | 4.86/5.14     | 1.04/7.4      | 2.13/24       | 2.83/29       | 2.43/-1.94    | 1.23/0.13     | -1.47/-3.11   | 6.57/-47.1    | -6.12/-1.74   | 4.64/-4.86    | 3.90/-2.65    | -1.64/-0.99   | 0.53/-2.36    | 0.21/1.37     | -0.61/0.87    | -1.26/-1.56   | 1.82/-1.24    | 2.64/-1.38    | 4.08/-4.1     | -7.27/-6.69   | -13.33/-17.29 | -10.74/-74.9  | 6.54/-5.39    |             |
| (H3°)  | 1.35/-1.25    | 1.80/-1.61    | 1.20/1.41     | 1.54/1.87     | 2.02/2.4      | 2.301/76      | 0.91/-3.04    | 2.52/-4.34    | 5.37/-47.1    | -4.37/-1.44   | 3.28/-4.26    | 5.16/-5.13    | -2.22/-2.67   | 2.69/-1.2     | 0.21/1.37     | -0.61/0.87    | -1.26/-1.56   | 1.82/-1.24    | 2.64/-1.38    | 4.08/-4.1     | -7.27/-6.69   | -13.33/-17.29 | -10.74/-74.9  | 6.54/-5.39    |             |
| (H4°)  | 0.84/-0.83    | 4.89/-5.45    | 4.61/-5.55    | 0.03/-15      | 1.98/2.4      | 1.76/1.94     | 0.53/0.15     | 0.68/-2.15    | 4.09/-4.23    | 2.77/-19      | -2.41/-4.94   | 5.58/-6.29    | 3.82/-3.25    | -1.64/-0.94   | 4.48/-4.24    | 0.61/2.3      | 0.81/2.3      | 3.36/-3.1     | 6.73/-4.69    | 4.47/-3.78    | 4.49/-4.23    | 6.25/-3.68    | -2.58/-2.35   | -1.98/-1.77   |             |
| (H5°)  | 1.97/0.61     | -1.29/-1.57   | -3.81/3.14    | 2.05/0.27     | 0.69/-25      | 1.99/-1.7     | 1.22/1.08     | 3.94/-1.33    | 4.04/-4.68    | 3.76/-3.76    | 5.37/-3.7     | 2.76/-4.77    | 2.41/-2.69    | 4.49/-5.1     | 4.49/-5.1     | 4.22/-2.7     | 0.81/2.3      | 1.47/1.64     | 4.41/4.1      | 6.73/-4.69    | 4.47/-3.78    | 4.49/-4.23    | 6.25/-3.68    | -2.58/-2.35   |             |
| (H6°)  | 0.89/-0.84    | 2.19/-1.37    | 6.75/4.7      | 2.95/-1.36    | 0.83/0.24     | 2.40/-1.75    | 4.41/4.9      | 7.33/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     | 4.73/9.97     |             |
| (H7°)  | 1.28/0.38     | -1.86/-1.79   | 5.96/-3.35    | 2.55/0.69     | 9.77/-2.4     | 0.96/2.77     | 2.94/0.22     | 2.96/-4.47    | 3.97/-3.73    | 2.77/0.83     | 5.79/-4.69    | 8.99/-4.02    | 4.16/-2.38    | 2.13/-3.55    | -4.99/-4.64   | 2.31/0.02     | 0.89/-2.71    | 6.62/-9.94    | -1.93/-11.77  | -7.82/-7.41   | -10.71/-16.58 | -11.21/-17.9  | 5.63/-2.2     | 0.04/-0.4     |             |
| (H8°)  | 1.10/0.3      | 2.14/-0.1     | 5.98/-4.75    | 3.35/-1.80    | 3.10/-3.03    | 0.37/2.29     | 2.85/0.34     | 3.68/-4.51    | 2.71          |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |             |



## Radiated Composite Gain Data

## Appendix A

|           |               |                  |                  |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
|-----------|---------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| φ(162°)   | -10.71-8.88   | -18.45-17.14     | -18.46-17.58     | -18.78-18.09     | -14.85-16.01      | -19.37-14.95      | -16.45-18.75      | -13.13-9.72       | -15.67-12.24      | -12.67-18.13      | -15.86-16.15      | -16.01-11.82      | 7.94-18.71        | -18.27-13.55      | -14.09-17.11      | -18.33-14.2       | -18.4-18.08       | -18.33-17.46      | -17.41-15.18      | -17.96-18.54      | -11.95-9.44       | -14.04-14.74      | -12.63-19.07      | -18.33-17.75      |
| φ(112.5°) | -11.87-10.39  | -19.14-18.82     | -18.15-18.62     | -18.79-17.46     | -19.13-15.45      | -18.12-18.15      | -15.59-14.88      | -16.06-10.11      | -12.67-17.59      | -15.18-15.15      | -15.09-15.35      | -18.48-11.01      | -10.64-18.94      | -18.86-17.59      | -18.95-15.88      | -14.01-15.89      | -18.03-18.82      | -17.06-17.13      | -18.67-15.78      | -17.34-18.82      | -14.19-3          | -17.26-19.05      | -15.22-18.39      | -19.35-18.62      |
| φ(105°)   | -16.71-15.17  | -18.66-18.16     | -19.54-17.45     | -16.02-14.55     | -14.23-15.71      | -17.98-18.93      | -19.16-18.16      | -18.47-17.87      | -15.62-14.89      | -17.59-18.93      | -18.79-12.08      | -12.83-15.52      | -18.49-17.36      | -12.22-18.52      | -19.43-17.42      | -16.39-17.08      | -18.43-18.43      | -18.83-18.9       | -18.50-17.42      | -18.46-18.25      | -18.25-15.77      | -17.55-17.42      | -18.83-14.48      | -15.13-19.05      |
| φ(142.5°) | -17.97-18.37  | -17.38-18.16     | -18.86-18.14     | -18.87-14.66     | -11.85-12.93      | -17.47-18.75      | -18.13-18.33      | -18.14-12.78      | -12.78-16.96      | -12.82-18.89      | -17.38-18.37      | -17.38-18.17      | -14.37-17.36      | -19.16-18.92      | -18.38-18.86      | -18.61-18.65      | -18.65-18         | -15.10-13.31      | -18.41-18.5       | -17.81-12.51      | -17.75-17.82      | -17.75-17.82      | -15.38-15.24      | -19.16-17.14      |
| φ(135°)   | -10.03-18.65  | -17.14-15.45     | -15.94-14.99     | -18.88-14.75     | -11.26-13.55      | -18.04-14.31      | -17.38-14.15      | -18.05-14.45      | -10.71-11.65      | -17.11-16.77      | -12.77-18.37      | -15.29-13.41      | -18.77-11.67      | -13.77-17.63      | -16.84-17.63      | -16.81-13.48      | -18.90-12.35      | -17.52-18.49      | -15.24-17.82      | -18.84-18.61      | -18.26-17.78      | -12.99-18.76      | -15.78-17.15      | -18.94-15         |
| φ(157.5°) | -18.37-17.05  | -18.28-13.63     | -11.11-57        | -15.07-18.97     | -14.69-15.16      | -15.84-13.84      | -10.14-10.38      | -14.56-18.43      | -17.13-19.08      | -18.58-19.13      | -13.79-14.83      | -14.72-13.28      | -12.66-14.23      | -16.71-13.03      | -18.24-18.87      | -15.33-15.52      | -18.19-18.2       | -15.33-17.23      | -18.24-18.87      | -15.33-15.52      | -18.19-18.2       | -15.33-17.23      | -18.24-18.87      | -15.33-15.52      |
| φ(172.5°) | -17.36-16.39  | -18.11-17.83     | -18.03-18.25     | -17.28-18.12     | -17.26-17.44      | -17.88-18.68      | -16.71-18.08      | -18.51-17.84      | -18.25-19.33      | -15.48-18.88      | -17.23-18.48      | -18.12-19.13      | -18.65-17.48      | -17.78-18.48      | -18.12-17.28      | -17.81-18.54      | -17.73-18.42      | -18.88-17.85      | -15.89-15.29      | -15.11-15.35      | -14.79-14.51      | -14.58-16.31      | -18.19-17.82      | -18.44-18.95      |
| FreeGain  | 16.74-17.17   | 17.13-16.66      | 16.58-16.05      | 18.31-18.61      | 17.62-17.97       | 17.24-16.06       | 15.98-15.95       | 15.72-16.15       | -16.83-16.21      | 15.44-15.44       | 16.71-17.09       | 19.09-17.83       | 16.14-18.05       | 18.12-17.98       | 17.86-17.97       | 18.12-17.98       | 17.86-17.98       | 17.86-17.98       | 17.86-17.98       | 15.86-14.35       | 14.56-14.62       | 15.28-15.7        | 16.18-17.91       | 17.42-16.68       |
| FreeGain  | 5.629754      | Thetad=5         |                  |                  |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |
| Gain      | φ(162°/φ(5°)) | φ(162°/φ(37.5°)) | φ(162°/φ(62.5°)) | φ(162°/φ(87.5°)) | φ(162°/φ(112.5°)) | φ(162°/φ(137.5°)) | φ(162°/φ(162.5°)) | φ(162°/φ(187.5°)) | φ(162°/φ(212.5°)) | φ(162°/φ(237.5°)) | φ(162°/φ(262.5°)) | φ(162°/φ(287.5°)) | φ(162°/φ(312.5°)) | φ(162°/φ(337.5°)) | φ(162°/φ(362.5°)) | φ(162°/φ(387.5°)) | φ(162°/φ(412.5°)) | φ(162°/φ(437.5°)) | φ(162°/φ(462.5°)) | φ(162°/φ(487.5°)) | φ(162°/φ(512.5°)) | φ(162°/φ(537.5°)) | φ(162°/φ(562.5°)) | φ(162°/φ(587.5°)) |
| φ(5°)     | -3.35-2.5     | -1.63-1.5        | -1.27-1.27       | -1.37-1.69       | 2.26-2.38         | -3.86-1.4         | 4.73-1.75         | -10.73-13.84      | -16.88-17.32      | -22.71-6.43       | -7.13-6.43        | 4.07-3.47         | 2.7-3.28          | 2.03-1.94         | 3.12-3.2          | 2.31-2.4          | -3.03-3.86        | 6.56-5.97         | -7.05-9.34        | -12.34-16         | -18.01-17.38      | -14.08-11.54      | -14.44-8.62       | 5.24-2.28         |
| φ(17.5°)  | -1.877-1.59   | -1.17-1.28       | -2.09-2.22       | -3.24-3.42       | 5.21-6.44         | -6.02-10          | -11.10-13.65      | -16.57-17.27      | -15.88-18.49      | -17.51-12.85      | -10.54-12.67      | -6.86-5.62        | -3.82-2.6         | -1.74-2.89        | -6.06-10.94       | -4.20-5.9         | -2.18-3.4         | -5.04-9.38        | -14.33-17.1       | -15.35-10.74      | -7.61-6.02        | -4.82-3.57        | -2.66-2.31        |                   |
| φ(37.5°)  | -2.5202       | 0.83-0.94        | 0.59-0.63        | 1.59-3.28        | 5.33-7.98         | -11.27-14.4       | -14.81-12         | -20.71-7.7        | 5.05-4.21         | 4.31-4.7          | 5.87-4.97         | -3.94-2.88        | -1.83-0.81        | 0.01-0.74         | 1.29-1.53         | 1.39-0.71         | -5.99-2.51        | -6.06-10.94       | -17.45-12.87      | -8.47-5.83        | -4.42-3.69        | -3.51-2.87        | -2.24-1.52        |                   |
| φ(52.5°)  | 1.180231      | <b>3.223-43</b>  | 3.00-2.5         | 1.41-32          | -1.28-3.7         | 6.52-7.59         | -8.7-58           | -15.0-3.09        | -1.55-0.88        | -1.01-1.88        | -3.72-5.49        | -4.7-7.8          | -1.36-0.4         | 0.00-0.06         | 0.00-0.1          | 1.27-1.88         | 2.03-1.35         | -7.04-14.58       | -16.37-8.75       | -4.9-3.17         | -2.18-2.09        | -2.19-1.6         | 6.50-27           |                   |
| φ(67.5°)  | 1.892-18      | 2.95-0.4         | 2.41-2.39        | 2.41-83          | 1.04-33           | 3.2-11.2          | -1.86-2.98        | -4.23-5.32        | -4.78-3.02        | -5.03-7.52        | -6.53-6.37        | -1.03-0.69        | -1.99-0.66        | 0.02-0.1          | 0.96-2.1          | 2.47-75           | -4.8-1.32         | -16.96-8.68       | -5.44-2.17        | -1.33-1.17        | -1.47-1.12        | 0.31-1.54         |                   |                   |
| φ(82.5°)  | 0.63-0.28     | -0.07-0.05       | 0.01-0.63        | 0.01-0.54        | 0.76-0.82         | 1.15-1.39         | 0.61-1.52         | -3.91-5.74        | 5.18-4.01         | -4.45-4.68        | -6.86-7.45        | -7.1-14.6         | -1.98-0.14        | 0.77-0.02         | -1.33-1.7         | 0.28-1.88         | 1.89-2.26         | -7.59-4.94        | -14.18-14.05      | -12.04-9.79       | -7.2-3.46         | -1.97-0.74        | -0.16-0.81        |                   |
| φ(97.5°)  | 0.35-1.32     | -2.14-1.97       | -1.68-2.11       | -2.36-1.33       | -1.43-0.51        | 1.55-0.77         | 0.71-1.62         | -4.16-3.74        | 2.7-2.77          | -3.64-8.66        | -6.86-7.45        | -7.1-14.6         | -1.98-0.14        | 0.77-0.02         | -1.33-1.7         | 0.28-1.88         | 1.89-2.26         | -7.59-4.94        | -14.18-14.05      | -12.04-9.79       | -7.2-3.46         | -1.97-0.74        | -0.16-0.81        |                   |
| φ(112.5°) | 1.11-0.7      | -1.61-1.66       | -2.5-3.73        | 3.91-4.92        | -4.58-1.04        | 1.86-1.72         | 0.25-0.52         | 0.32-1.58         | 1.27-1.77         | -2.64-4.66        | -4.3-3.51         | -3.76-3.89        | -1.97-1.67        | -1.79-4.26        | -7.38-7.2         | -2.34-5.45        | -3.26-3.24        | -7.38-17.37       | -15.33-13.1       | -7.12-18          | -5.05-5.61        | -10.47-58         | 0.88-1.98         |                   |
| φ(127.5°) | 1.02-0.11     | -0.51-0.09       | -0.43-0.43       | -3.82-0.83       | -3.82-0.83        | 1.72-0.5          | -1.04-1.75        | 1.68-2.39         | 2.76-0.48         | -2.62-2.68        | -3.57-3.98        | -1.45-1.88        | -4.86-5.64        | -10.37-10.79      | -4.4-4.2          | -5.07-6.98        | -7.28-10.79       | -15.07-10.95      | -9.06-4.33        | -3.2-3.67         | -4.83-5.8         | -0.22-1.86        | 2.24-1.98         |                   |
| φ(137.5°) | 0.09-1.21     | -4.73-0.04       | -0.22-1.83       | -4.83-5.85       | 2.12-0.54         | 0.64-1.33         | -0.33-1.8         | 1.12-2.73         | 1.93-1.57         | -2.29-2.36        | -1.28-2.52        | -5.02-3.75        | -1.55-1.8         | -3.54-7.38        | 0.91-0.101        | -5.56-5.23        | -8.54-7.33        | 5.34-6.94         | -13.34-15.59      | -6.73-3.1         | -1.93-3.62        | -5.46-2.59        | 0.83-1.16         |                   |
| φ(147.5°) | 1.371-2.58    | -2.06-1.17       | -0.56-2.03       | -4.83-5.87       | 2.89-0.6          | -1.37-0.16        | -4.14-2.98        | -0.01-1.56        | 1.89-1.50         | -2.22-2.07        | -7.74-2.68        | -3.59-3.15        | -1.55-1.8         | -3.54-7.38        | 0.91-0.101        | -5.56-5.23        | -8.54-7.33        | 5.34-6.94         | -13.34-15.59      | -6.73-3.1         | -1.93-3.62        | -5.46-2.59        | 0.83-1.16         |                   |
| φ(157.5°) | 3.32-4.71     | -3.62-3.21       | -1.62-2.93       | -6.96-2.7        | -4.59-2.36        | -3.43-4.63        | -5.07-4.34        | -1.33-0.96        | -6.4-1.93         | -3.58-4.33        | -3.02-3.92        | 8.1-2.64          | 5.35-3.5          | -6.87-7.27        | -9.2-8.07         | -8.22-4.65        | -13.96-8.51       | -4.33-4.16        | -7.84-4.77        | -1.08-4.44        | -7.18-4.41        | -1.66-3.14        | -3.81-3.35        |                   |
| φ(167.5°) | 5.15-6.54     | -5.24-4.32       | -4.13-5.21       | -7.27-6.48       | -6.89-4.59        | -4.81-6.85        | -5.86-5.42        | -3.38-1.79        | -1.97-1.24        | -7.48-5.53        | -14.14-5.42       | -6.07-5.33        | -7.77-6.83        | -14.13-5.9        | -9.38-12.41       | -11.43-6.3        | -6.04-5.08        | -8.24-11.88       | -8.99-1.91        | -1.39-1.67        | -6.88-1.62        | -3.05-4.87        | 6.55-55           |                   |
| φ(177.5°) | 7.14-6.8      | -6.01-6.98       | -6.98-7.99       | -7.99-8.97       | -6.98-6.91        | -6.13-7.99        | -6.98-6.91        | -5.42-6.91        | -4.06-5.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         |                   |
| φ(187.5°) | 8.54-8.19     | -8.78-8.44       | -8.98-8.62       | -9.18-8.82       | -8.19-10.11       | -8.20-10.11       | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         | -5.91-7.3         | -7.26-7.2         |                   |
| φ(197.5°) | 9.94-10.59    | -11.71-10.2      | -12.71-10.35     | -13.71-10.06     | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      | -10.98-14.72      |                   |
| φ(207.5°) | -10.92-12.36  | -15.41-12.72     | -11.98-16.56     | -13.10-16.98     | -11.82-16.38      | -12.29-11.07      | -19.41-17.93      | -11.49-19.86      | 9.24-11.83        | -10.97-19.44      | -16.51-17.47      | -12.28-18.11      | -16.88-19.32      | -17.11-18.24      | -15.01-17.77      | -18.84-15.98      | -17.81-15.02      | -15.93-13.7       | -15.49-12.18      | -16.59-11.9       | -10.74-14.96      | -18.25-15         | -10.77-12.87      |                   |
| φ(217.5°) | -12.52-12.02  | -16.09-12.84     | -14.94-12.3      | -18.07-12.5      | -11.15-16.14      | -19.41-17.93      | -14.20-18.31      | -16.59-18.46      | 8.19-13.31        | -17.82-16         | -16.47-19.38      | -16.77-18.82      | -14.90-12.49      | -15.33-15.64      | -16.45-19.32      | -16.88-12.7       | -18.42-13.51      | -16.40-17.48      | -16.09-16.57      | -15.08-16.46      | -16.36-14.87      | -15.11-12.48      | -16.41-16.04      |                   |
| φ(227.5°) | -16.86-15.31  | -16.72-15.27     | -13.04-12.42     | -15.03-15.81     | -15.31-16.88      | -14.91-15.46      | -13.98-17.23      | -16.58-12.52      | -11.38-17.13      | -14.07-14.52      | -14.28-16.85      | -17.77-18.42      | -14.37-17.91      | -16.24-19.34      | -17.52-12.92      | -18.83-15.84      | -16.44-15.11      | -17.85-11.96      | -14.81-14.94      | -18.08-16.18      | -16.75-15.72      | -15.11-12.49      | -16.83-13.54      |                   |
| φ(237.5°) | -14.31-10.3   | -9.78-9.64       | -6.78-11.66      | -12.51-17.41     | -16.87-19.22      | -14.16-17.34      | -15.88-17.12      | -18.48-18.43      | -14.18-11.54      | -12.04-21.41      | -18.21-18.56      | -17.17-11.28      | -15.84-18.96      | -16.92-18.96      | -14.05-12.61      | -15.77-18.15      | -18.44-15.17      | -14.01-16.78      | -18.23-19         | -18.25-15.1       | -11.62-10.48      | -11.04-10.51      | -16.81-10.71      |                   |
| φ(247.5°) | -12.73-9.7    | -4.19-9.64       | -13.83-13.68     | -18.48-18.67     | -16.12-17.54      | -16.21-17.68      | -14.09-18.86      | -10.77-19.81      | -8.34-10.01       | -11.07-17.47      | -12.51-16.76      | -18.52-19.71      | -15.86-18.83      | -17.32-15.41      | -16.02-18.2       | -19.06-16.61      | -12.78-16.31      | -18.85-17.83      | -16.14-15.79      | -16.10-18.78      | -13.99-12.72      | -11.72-11.11      | -12.73-14.4       |                   |
| φ(257.5°) | -10.98-13.57  | -13.83-14.34     | -17.58-17.53     | -16.78-18.89     | -10.98-17.2       | -17.85-17.61      | -17.08-17.12      | -15.74-17.33      | -12.77-17.11      | -11.85-14.56      | -18.56-18.08      | -15.94-14.16      | -17.77-17.87      | -14.67-16.51      | -16.02-18.21      | -19.09-15.69      | -16.71-18.37      | -18.65-18.12      | -16.65-18.16      | -17.22-18.19      | -14.48-11.93      | -10.49-14.9       | 8.35-10.68        |                   |
| φ(267.5°) | -16.65-13.19  | -13.51-13.43     | -18.63-17.49     | -17.85-17.78     | -18.33-17.31      | -16.65-17.37      | -17.03-17.19      | -17.51-17.88      | -17.14-13.68      | -12.69-13.64      | -16.46-17.74      | -18.59-17.02      | -15.18-13.19      | -14.17-17.58      | -17.66-18.83      | -16.51-14.86      | -14.87-15.14      | -13.99-13.14      | -11.04-10.14      | -11.13-155        | -16.51-13.91      | -17.19-18.45      | -17.84-18.57      |                   |
| φ(277.5°) | -13.34-13.33  | -14.91-13.18     | -14.74-14.89     | -14.75-15.94     | -15.94-15.59      | -15.93-15.73      | -14.77-14.53      | -14.81-15.61      | -18.23-18.95      | -16.14-19.33      | -18.16-15.16      | -16.95-18.86      | -16.14-19.33      | -16.24-15.36      | -14.91-15.68      | -18.84-18.29      | -16.77-17.91      | -16.77-18.03      | -13.94-15.1       | -14.73-12.86      | -12.22-11.6       |                   |                   |                   |



# Radiated Composite Gain Data

# Appendix A

|          |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Freq(Hz) | θ = 0°       |              | θ = 30°      |              | θ = 60°      |              | θ = 90°      |              | θ = 120°     |              | θ = 150°     |              | θ = 180°     |              | θ = 210°     |              | θ = 240°     |              | θ = 270°     |              | θ = 300°     |              | θ = 330°     |              | θ = 360°     |              |
|          | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            |
| (H100)   | -18.31-18.38 | -15.13-18.44 | -16.49-17.33 | -17.58-11.25 | -11.18-16.77 | -18.19-17.88 | -17.03-14.78 | -12.90-14.16 | -17.91-18.46 | -16.74-13.82 | -15.80-15.13 | -13.82-15.86 | -16.28-19.37 | -16.88-18.8  | -15.88-16.67 | -19.14-17.38 | -18.88-13.44 | -19.37-18.44 | -14.05-18.24 | -17.88-16.15 | -16.29-18.1  | -14.04-17.35 | -14.99-17.44 | -18.89-18.85 | -18.89-18.85 | -18.89-18.85 |
| (H150)   | 8.32-13.31   | -18.19-17.78 | -19.35-17.17 | -17.59-9.1   | -10.88-17.82 | -17.15-11.16 | -11.16-15.1  | -14.03-10.34 | -10.87-13.88 | -18.50-18.72 | -18.55-18.71 | -18.98-15.86 | -14.64-18.11 | -18.36-19.58 | -14.77-18.92 | -18.46-16.02 | -15.88-16.72 | -18.18-14.05 | -11.89-13.21 | -17.21-19.37 | -19.15-18.85 | -16.72-17.38 | -18.26-18.98 | -12.47-19.1  | -18.89-18.85 | -18.89-18.85 |
| (H160)   | -18.59-19.08 | -16.85-14.16 | -10.01-11.81 | -17.39-18.71 | -17.33-18.42 | -14.11-11.28 | -12.10-15.72 | -18.29-17.06 | -17.91-15.79 | -17.91-15.79 | -17.91-15.79 | -18.07-18.93 | -15.19-13.11 | -13.34-16.11 | -14.99-14.02 | -15.01-12.94 | -12.93-11.62 | -12.93-11.62 | -15.01-12.94 | -12.93-11.62 | -15.01-12.94 | -12.93-11.62 | -15.01-12.94 | -12.93-11.62 | -15.01-12.94 | -12.93-11.62 |
| (H172.5) | -15.45-13.88 | -12.32-11.35 | -11.29-11.1  | -13.41-14.23 | -14.45-13.82 | -12.92-11.34 | -11.55-12.17 | -13.17-15.87 | -17.96-18.98 | -18.51-18.97 | -19.30-18.76 | -18.97-18.04 | -17.74-19.19 | -18.77-14.2  | -18.41-18.34 | -19.41-18.21 | -17.38-18.11 | -18.32-18.44 | -18.19-17.86 | -18.22-18.16 | -17.95-17.71 | -18.22-18.16 | -17.73-18.83 | -17.95-17.71 | -18.22-18.16 | -17.73-18.83 |
| (H180)   | -11.91-11.44 | -10.08-9.38  | -8.63-8.66   | -8.51-9.59   | -10.73-11.51 | -12.02-12.63 | -13.51-14.84 | -17.64-17.35 | -18.31-18.17 | -17.91-19.5  | -19.30-18.76 | -13.41-11.08 | -9.23-8.04   | -7.54-7.25   | -7.08-7.22   | -7.55-7.96   | -8.51-9.38   | -10.39-11.93 | -13.39-15.36 | -18.41-18.04 | -18.89-18.06 | -17.78-18.85 | -18.37-18.37 | -13.52-12.73 | -18.89-18.85 | -18.89-18.85 |
| Freq(Hz) |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |
| Gain     | θ = 0°       |              | θ = 30°      |              | θ = 60°      |              | θ = 90°      |              | θ = 120°     |              | θ = 150°     |              | θ = 180°     |              | θ = 210°     |              | θ = 240°     |              | θ = 270°     |              | θ = 300°     |              | θ = 330°     |              | θ = 360°     |              |
|          | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            | Gain         | θ            |
| (H1)     | 2.74-2.51    | 2.54-2.59    | 2.88-3.48    | 4.35-4.78    | 5.48-6.38    | 8.08-10.48   | -13.59-18.8  | -18.89-16.82 | -11.75-9.59  | 4.264-8.7    | 3.9-3.7      | 2.88-2.3     | -1.9-1.34    | -1.3-1.46    | -1.88-2.65   | 3.98-4.57    | 5.97-7.48    | 8.52-12.27   | -16.31-17.33 | -18.69-14.98 | -11.21-9.84  | -7.57-6.1    | -4.64-3.87   | -3.26-3.08   | -1.89-1.89   | -1.89-1.89   |
| (H2)     | 0.48-0.53    | 0.98-1.63    | 2.31-3.38    | 4.16-4.73    | 5.23-5.28    | 5.24-5.48    | 6.53-6       | 4.71-4.7     | 8.41-92      | 4.64-9.4     | 8.98-9.14    | 7.18-6.09    | -4.72-3.78   | 2.23-2.14    | 3.23-3.4     | 4.71-4.58    | 5.47-6.98    | 8.23-13.32   | -18.41-18.53 | -12.14-8.82  | 5.9-3.88     | 2.15-1.43    | 0.88-0.64    | 0.18-0.18    | 0.18-0.18    | 0.18-0.18    |
| (H3)     | 0.10-0.36    | -1.05-2.31   | -3.58-4.24   | -3.82-2.9    | -1.51-0.29   | 0.48-0.4     | 0.94-0.81    | 0.27-0.34    | -1.11-1.88   | 2.76-3.48    | 4.6-5.32     | -5.6-5.4     | 4.4-3.18     | 2.38-1.57    | 0.85-0.54    | 0.23-0.24    | 0.40-0.2     | 0.28-1.32    | -3.07-6.18   | -7.45-8.99   | -8.84-4.92   | -3.23-2.02   | -1.34-0.84   | 0.18-0.2     | 0.18-0.2     | 0.18-0.2     |
| (H22.5)  | 0.56-0.04    | 0.18-1.23    | -1.74-2.26   | -2.88-2.7    | -1.42-0.1    | 0.55-0.4     | 0.57-0.91    | -1.13-1.15   | -1.0-0.6     | -0.83-0.81   | 0.54-0.76    | 0.94-0.94    | 0.76-0.21    | 1.59-1.41    | 1.41-1.63    | 1.43-0.76    | 3.98-1.75    | -3.56-5.57   | -6.43-4.96   | -3.21-2.31   | -1.9-1.8     | -1.75-1.87   | -1.85-0.77   | -1.85-0.77   | -1.85-0.77   | -1.85-0.77   |
| (H4)     | 1.03-0.61    | 2.19-1       | 0.27-2.87    | 5.86-6.51    | 4.81-2.98    | 2.18-2.47    | -3.67-4.09   | -2.95-1.82   | -1.23-1.44   | -1.88-1.34   | 0.22-0.88    | 0.96-0.24    | 0.77-1.19    | -1.71-1.85   | -1.04-0.28   | -0.13-0.11   | -0.12-0.14   | -2.69-3.82   | -14.6-16.57  | -10.37-15.05 | -6.22-2.21   | 0.69-0.67    | -1.8-1.71    | 0.81-0.25    | 0.81-0.25    | 0.81-0.25    |
| (H37.5)  | 0.63-0.51    | 1.34-0.98    | 0.04-3.88    | 9.87-13.24   | 7.74-12.84   | -1.94-05     | -6.09-3.15   | -0.77-0.22   | -1.08-2.98   | -3.98-1.77   | 0.06-0.88    | 0.70-0.07    | 0.66-1.67    | 3.81-4.63    | -1.9-3.13    | -4.26-3.13   | -2.33-4.11   | 4.6-4.71     | -4.08-4.02   | -6.94-14.17  | -18.34-8.65  | -3.97-4.22   | -1.76-2.15   | -1.76-2.15   | -1.76-2.15   | -1.76-2.15   |
| (H45)    | 0.9-0.4      | 0.39-0.17    | 0.09-0.62    | 8.85-18.87   | 8.82-2.85    | 2.22-4.09    | -6.05-1.28   | 8.83-1.45    | 0.05-2.46    | -3.77-2.54   | -1.12-1.44   | -1.87-2.4    | -2.55-2.71   | -3.41-4.81   | -3.31-4.98   | -9.53-6.51   | -3.08-5.54   | -10.13-12.52 | -10.18-6.91  | -7.98-12.6   | -10.71-8.3   | -4.58-4.95   | -3.21-3.73   | 0.72-0.96    | 0.72-0.96    | 0.72-0.96    |
| (H52.5)  | 0.18-0.63    | 0.07-0.08    | -0.09-2.15   | -11.48-8.63  | 4.28-3.13    | -3.92-4.95   | -4.55-2.3    | 1.88-2.77    | 2.13-0.53    | 4.47-0.57    | 0.85-2.42    | -3.92-4.82   | -4.72-1.7    | 0.63-1.4     | -3.73-3.25   | -3.47-1.76   | -17.11-18.49 | -15.88-12.11 | -19.08-6.2   | 4.25-1.9     | -1.63-3.23   | -2.07-1.5    | 1.66-0.9     | 1.66-0.9     | 1.66-0.9     | 1.66-0.9     |
| (H60)    | 0.180-0.09   | 0.09-0.22    | -1.49-2.05   | 9.74-7.35    | 5.67-7.47    | 4.63-4.48    | -3.2-0.81    | 1.32-2.39    | 2.57-1.57    | 4.28-0.12    | 0.22-1.57    | -1.69-2.59   | -4.19-1.79   | 0.09-0.42    | -0.83-1.44   | -6.88-6.05   | 5.86-10.34   | -18.35-10.11 | -12.34-13.16 | -11.02-6.2   | -1.58-0.85   | 1.35-0.27    | -0.55-0.3    | 1.79-0.32    | 1.79-0.32    | 1.79-0.32    |
| (H67.5)  | 1.05-0.08    | 0.08-1.08    | -3.77-5      | -10.74-5.88  | -17.11-12.65 | -4.62-2.64   | -1.70-1.82   | 0.72-0.73    | 8.98-0.08    | 2.87-2.77    | -1.53-1.37   | 0.48-0.44    | 2.53-3.8     | -1.58-0.7    | 0.43-1       | -3.52-4.29   | -5.89-9.98   | -12.4-5.94   | -4.73-5.3    | 5.1-1.28     | 1.58-0.32    | 2.7-0.8      | 0.6-0.2      | 0.6-0.2      | 0.6-0.2      | 0.6-0.2      |
| (H75)    | 0.91-0.53    | 0.71-2.52    | 4.53-4.39    | 8.89-5.59    | 8.82-16.84   | 6.99-14.5    | 4.6-7.48     | -1.23-1.84   | -2.53-3.1    | 4.71-5.74    | -3.71-2.6    | 0.18-0.5     | -0.46-4.71   | -3.27-2.31   | -3.42-1.2    | -3.9-4.88    | -6.27-6.98   | -18.19-7.55  | 0.75-0.56    | 2.2-0.67     | 2.18-0.28    | 1.95-0.45    | 0.44-0.63    | 0.44-0.63    | 0.44-0.63    | 0.44-0.63    |
| (H82.5)  | 1.35-1.57    | 2.83-5.83    | 8.93-11.84   | 4.93-7.73    | 4.72-10.94   | 4.65-1.4     | -1.73-2.87   | -3.48-5.05   | 4.63-6.8     | 4.67-5.3     | -3.88-1.74   | -1.29-2.31   | -1.15-0.81   | 4.44-4.73    | -5.89-5.32   | -3.96-10.38  | -8.89-6.28   | -8.71-9.31   | 0.65-0.59    | -1.19-1.91   | 2.49-1.93    | 0.77-1.14    | 0.21-2.3     | 0.21-2.3     | 0.21-2.3     | 0.21-2.3     |
| (H90)    | 1.68-0.82    | 2.3-4.88     | 12.18-16.82  | 9.88-10.49   | 9.52-10.69   | 7.85-13.66   | 6.14-16.35   | 2.51-0.97    | 4.32-0.91    | 4.32-0.91    | 4.31-0.83    | 4.16-1.88    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    | 0.52-0.64    |
| (H97.5)  | 0.58-0.58    | 6.88-10.45   | 17.02-17.18  | 12.18-16.82  | 17.21-18.54  | 8.89-6.39    | 7.07-9.13    | 7.59-10.71   | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    | 9.37-9.42    |
| (H105)   | 7.88-6.88    | 7.41-4.13    | -18.76-16.78 | -14.49-14.52 | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  | 19.32-19.95  |
| (H112.5) | -11.02-9.87  | 0.71-17.3    | -15.52-12.47 | -16.46-17.96 | -18.87-14.48 | -14.14-13.98 | 6.37-15.21   | -16.32-13.2  | -11.41-11.8  | -12.41-10.9  | -13.9-18.8   | -10-10.18    | 6.10-11.18   | -11.27-17.7  | -16.68-14.49 | -14.36-18.98 | -18.42-18.14 | -14.50-19.28 | -18.48-13.14 | -10.91-17.35 | 7.76-9.19    | 4.3-6.12     | 0.48-0.22    | 0.48-0.22    | 0.48-0.22    | 0.48-0.22    |
| (H120)   | -10.89-11.24 | -10.89-11.24 | -18.34-11.77 | -10.89-14.49 | -14.91-12.82 | -12.88-15.81 | 10.91-13.38  | -18.86-14.77 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 | -18.86-15.81 |
| (H127.5) | -18.84-18.84 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 | -18.81-18.49 |
| (H135)   | -14.78-13.2  | -13.54-10.22 | -19.25-15.53 | 9.12-11.91   | -19.18-18.68 | 8.96-9.27    | -17.99-18.47 | -16.15-14.14 | -17.77-17.28 | -19.67-18.81 | -16.75-15.82 | -17.28-18.13 | -15.26-15.72 | -18.45-17.98 | -17.91-17.91 | -17.28-18.81 | -13.86-13.25 | -18.13-18.41 | -13.79-17.14 | -17.91-18.12 | -12.01-13.22 | -17.78-18.68 | -17.28-18.68 | -17.28-18.68 | -17.28-18.68 | -17.28-18.68 |
| (H142.5) | -18.29-18.29 | -17.63-19.03 | -18.19-18.09 | -12.29-11.14 | -19.18-17.67 | -18.74-18.07 | -18.21-18.93 | 17.91-17.15  | -17.65-16.18 | -14.67       |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |



# Radiated Composite Gain Data

# Appendix A

| Gen      | 0°(7°)0°(7°) | 0°(15°)0°(22.5°) | 0°(30°)0°(37.5°) | 0°(45°)0°(52.5°) | 0°(60°)0°(67.5°) | 0°(75°)0°(82.5°) | 0°(90°)0°(97.5°) | 0°(105°)0°(112.5°) | 0°(120°)0°(127.5°) | 0°(135°)0°(142.5°) | 0°(150°)0°(157.5°) | 0°(165°)0°(172.5°) | 0°(180°)0°(187.5°) | 0°(195°)0°(202.5°) | 0°(210°)0°(217.5°) | 0°(225°)0°(232.5°) | 0°(240°)0°(247.5°) | 0°(255°)0°(262.5°) | 0°(270°)0°(277.5°) | 0°(285°)0°(292.5°) | 0°(300°)0°(307.5°) | 0°(315°)0°(322.5°) | 0°(330°)0°(337.5°) | 0°(345°)0°(352.5°) |
|----------|--------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| 0°(0°)   | -1.16(-0.98) | -0.6(-0.5)       | -1.26(-1.33)     | -1.87(-1.87)     | -2.51(-2.02)     | -3.37(-3.45)     | -3.5(-3.62)      | -3.96(-3.07)       | -2.68(-2.3)        | -1.62(-1.35)       | -0.79(-0.49)       | -0.37(-0.29)       | -0.36(-0.25)       | -0.5(-0.72)        | -0.91(-0.97)       | -1.1(-1.35)        | -1.68(-2.04)       | -2.62(-3.16)       | -3.29(-3.41)       | -3.41(-3.61)       | -3.63(-3.47)       | -3.25(-2.93)       | -2.53(-2.02)       | -1.78(-1.52)       |
| 0°(15°)  | 0.09(-0.29)  | -0.57(-0.79)     | -0.72(-0.21)     | -0.03(-0.09)     | 0.07(-0.1)       | 0.29(-0.79)      | -1.65(-2.69)     | -4.17(-5.68)       | -7.36(-6.42)       | -8.52(-7.25)       | -5.69(-4.5)        | -3.15(-2.12)       | -1.39(-0.84)       | -0.57(-0.37)       | -0.59(-0.98)       | -1.01(-1.27)       | -3.5(-3.75)        | -6.87(-6.98)       | -7.55(-6.65)       | -6.99(-4.57)       | -3.33(-2.2)        | -1.25(-0.38)       | 0.19(0.55)         | 0.86(-0.42)        |
| 0°(30°)  | 0.07(-0.08)  | -0.36(-1.07)     | -1.59(-1.17)     | -2.22(-1.2)      | 1.31(-1.26)      | -1.41(-2.34)     | -3.14(-4.2)      | -6.79(-9.5)        | -12.42(-10.76)     | -17.59(-17.79)     | -19.15(-12)        | -7.69(-5.04)       | -2.99(-1.45)       | -0.99(-0.2)        | -0.42(-0.24)       | -0.21(-0.48)       | -1.62(-1.42)       | -3.01(-3.95)       | -4.65(-5.1)        | -4.93(-4.97)       | -4.59(-4.7)        | -3.42(-3.6)        | -2.01(-2.4)        | 0.31(-0.23)        |
| 0°(45°)  | 1.43(-0.3)   | -1.34(-1.56)     | -3.99(-7.07)     | -6.69(-5.69)     | 3.39(-5.68)      | 6.28(-6.65)      | 8.91(-6.47)      | 7.19(-6.25)        | 5.63(-6.69)        | 4.41(-7.5)         | 7.92(-9.69)        | 7.01(-6.86)        | 4.22(-3.01)        | 1.7(-1.19)         | 0.91(-0.38)        | 1.09(-0.62)        | 2.99(-3.7)         | 2.77(-3.62)        | 2.99(-3.7)         | 2.97(-3.7)         | 4.26(-4.6)         | 5.61(-5.29)        | 6.47(-5.39)        | 6.47(-5.39)        |
| 0°(60°)  | 1.38(-1.03)  | -2.24(-1.4)      | -1.41(-3.75)     | -4.5(-6.4)       | 6.97(-9.85)      | -14.29(-15.61)   | -11.35(-7.45)    | -3.09(-0.49)       | 0.95(-1.18)        | 0.47(-0.12)        | -0.27(-0.63)       | -1.31(-1.79)       | -2.98(-4.5)        | -3.74(-6.09)       | 0.92(-1.1)         | -0.3(-3.63)        | -7.65(-7.39)       | -6.37(-5.95)       | -6.52(-7.88)       | -8.25(-7.25)       | -6.91(-4.2)        | -9.65(-12.4)       | -6.86(-3.92)       | -3.72(-3.55)       |
| 0°(75°)  | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(90°)  | -0.27(-0.64) | -2.45(-0.74)     | -3.4(-1.1)       | -4.17(-3.4)      | -10.1(-11.03)    | -10.37(-10.63)   | -3.13(-3.74)     | -0.17(-1.17)       | -1.75(-0.5)        | 1.74(-2.6)         | 0.93(-2.35)        | 0.89(-2.4)         | -3.01(-4.16)       | -16.56(-10.98)     | -2.45(-7.29)       | -2.93(-4.12)       | -7.96(-5.65)       | -4.16(-5.05)       | -9.46(-8.5)        | -12.74(-12.17)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(105°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(120°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(135°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(150°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(165°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(180°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(195°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(210°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(225°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(240°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(255°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(270°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(285°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(300°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(315°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(330°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(345°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| 0°(360°) | -0.13(-0.7)  | -1.57(-0.57)     | -1.37(-2.76)     | -4.12(-4.24)     | -7.82(-7.23)     | -10.37(-10.63)   | -8.26(-4.1)      | -1.35(-0.37)       | 1.1(-1.06)         | 2.92(-8.8)         | 2.35(-1.19)        | 1.69(-3.5)         | -1.76(-5.3)        | -0.36(-3.2)        | 0.16(0.83)         | -0.48(-4.38)       | -7.7(-7.27)        | -5.67(-5.38)       | -6.94(-6.2)        | -12.19(-18.51)     | -8.52(-3.15)       | -1.57(-1.93)       | -3.94(-7.37)       | -0.69(-3.12)       |
| FreePort | 0.9959Grd    | Phuket 5         | 0                | 0                | 0                | 0                | 0                | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  | 0                  |
| Gen      | 0°(7°)0°(7°) | 0°(15°)0°(22.5°) | 0°(30°)0°(37.5°) | 0°(45°)0°(52.5°) | 0°(60°)0°(67.5°) | 0°(75°)0°(82.5°) | 0°(90°)0°(97.5°) | 0°(105°)0°(112.5°) | 0°(120°)0°(127.5°) | 0°(135°)0°(142.5°) | 0°(150°)0°(157.5°) | 0°(165°)0°(172.5°) | 0°(180°)0°(187.5°) | 0°(195°)0°(202.5°) | 0°(210°)0°(217.5°) | 0°(225°)0°(232.5°) | 0°(240°)0°(247.5°) | 0°(255°)0°(262.5°) | 0°(270°)0°(277.5°) | 0°(285°)0°(292.5°) | 0°(300°)0°(307.5°) | 0°(315°)0°(322.5°) | 0°(330°)0°(337.5°) | 0°(345°)0°(352.5°) |
| 0°(0°)   | -1.16(-0.98) | -0.57(-0.02)     | 0.33(0.8)        | 1.21(-1.2)       | 1.21(-1.3)       | 1.28(-2.6)       | 1.06(0.78)       | 0.67(0.26)         | 0.21(-0.32)        | -0.44(-0.53)       | -0.49(-0.02)       | 0.14(0.2)          | 0.43(0.54)         | 0.48(0.44)         | 0.29(0.28)         | 0.42(0.42)         | 0.67(0.55)         | 0.93(0.19)         | 0.22(0.45)         | 0.52(0.35)         | 0.33(0.14)         | 0.06(-0.43)        | 0.7(-1.14)         | -1.1(-0.6)         |
| 0°(15°)  | 0.29(0.54)   | 0.57(-0.02)      | -0.4(-0.76)      | 0.91(-1.06)      | 0.74(-0.25)      | 0.37(-0.7)       | 0.94(-1.26)      | 1.47(-1.18)        | 0.98(0.61)         | 0.14(-0.64)        | 1.73(-2.64)        | 2.5(-2.1)          | 1.34(-0.52)        | 0.48(0.44)         | 0.19(0.94)         | 1.55(2.15)         | 2.47(2.55)         | 2.14(2.14)         | 1.94(1.65)         | 1.29(0.73)         | 0.30(0.06)         | -0.32(-0.55)       | -0.44(-0.44)       | -0.98(-0.35)       |
| 0°(30°)  | 2.41(-3.9)   | 2.76(-3.3)       | 3.66(-4.5)       | 5.61(-5.6)       | 4.53(-3.64)      | 2.73(-1.8)       | -1.09(-0.56)     | -0.39(-0.55)       | 0.95(-1.4)         | 1.2(-3.2)          | 4.02(-4.58)        | 4.82(-6.06)        | 5.9(-7.2)          | 7.7(-7.57)         | 6.65(-6.85)        | 2.54(-1.02)        | -0.04(0.38)        | 1.02(1.39)         | 1.67(1.76)         | 1.66(1.55)         | 1.55(1.52)         | 1.47(-1.16)        | 0.15(-1.2)         | 2.33(-2.4)         |
| 0°(45°)  | 8.35(-7.88)  | 6.79(-10.04)     | -10.51(-11.36)   | -11.16(-7.74)    | 6.39(-4.24)      | -3.94(-3.04)     | -3.06(-3.07)     | 3.16(-3.28)        | -3.95(-3.7)        | -8.4(-6.4)         | 3.94(-4.21)        | -4.64(-5.32)       | -6.05(-6.71)       | -6.79(-6.16)       | -7.31(-6.38)       | -6.23(-3.19)       | -0.67(0.4)         | 0.97(1.06)         | 1.01(1.06)         | 1.21(-1.39)        | 1.54(-1.13)        | 0.19(-0.53)        | -2.1(-2.05)        | -4.03(-4.18)       |
| 0°(60°)  | 5.15(-5.55)  | 5.13(-5.48)      | 4.99(-4.69)      | 4.60(-4.66)      | 4.42(-3.26)      | 3.3(-1.1)        | 2.63(-2.51)      | 2.36(-2.21)        | 1.89(-0.89)        | -1.1(-1.28)        | -1.21(-1.28)       | -1.74(-2.53)       | 2.31(-1.4)         | 0.54(-0.41)        | 2.98(-3.66)        | 4.54(-5.02)        | -4.49(-3.4)        | 1.33(-1.2)         | 2.21(-2.36)        | 3.04(-2.23)        | 3.12(0.7)          | 0.87(-0.45)        | 0.92(-0.61)        | 2.54(-2.76)        |
| 0°(75°)  | 4.95(-5.27)  | 4.69(-5.39)      | 3.19(-3.15)      | 4.60(-4.76)      | 6.32(-4.79)      | 4.67(-4.19)      | 4.06(-1.47)      | 0.66(-0.79)        | 0.09(-0.02)        | -0.32(-0.78)       | 0.26(-0.94)        | -0.25(-0.4)        | -1.47(-0.75)       | -0.89(-0.26)       | 4.59(-4.46)        | 0.01(-1.75)        | 4.34(-4.46)        | 5.14(-1.07)        | 3.99(0.8)          | 1.68(2.24)         | 2.96(2.53)         | 1.08(-1.36)        | 3.24(-2.78)        | 4.25(-4.72)        |
| 0°(90°)  | 4.79(-5.08)  | 6.55(-5.15)      | 4.07(-1.77)      | -1.27(-1.34)     | -1.45(-1.87)     | -0.17(-0.67)     | -0.61(-1.23)     | -1.15(-3.8)        | 3.48(-3.2)         | 5.2(-5.68)         | -2.68(-2.14)       | 0.06(-0.49)        | -0.62(-1.99)       | 4.47(-4.76)        | 4.06(-4.52)        | 3.19(-5.65)        | -7.46(-6.18)       | -10.16(-105)       | 5.5(-1.28)         | 1.38(0.86)         | -0.15(-0.          |                    |                    |                    |





## Appendix B

[illegible]



## Antenna Pattern

## Appendix B

| (H25°)   | 5.671-5.73   | 5.104-8.0    | 3.50-2.31    | 2.76-2.27    | 5.68-5.70    | 4.52-4.92    | 4.76-5.39     | 3.94-3.58     | 3.74-3.86     | 3.88-3.16     | 3.12-3.48     | 2.54-1.29     | 1.23-2.02     | 3.48-5.15     | 4.89-3.68     | 3.78-4.81     | 4.79-5.07     | 2.79-0.85     | 0.17-0.30     | 0.05-0.07     | 0.24-0.02     | 0.79-1.43     | 2.21-3.22     | 3.48-1.21     |
|----------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| (H30°)   | 5.761-3.16   | 1.85-2.47    | 1.48-1.10    | 1.39-2.33    | 3.21-0.85    | 0.88-0.96    | 0.05-1.17     | 1.20-0.56     | 1.00-2.17     | 2.59-2.81     | 3.80-4.83     | 3.98-4.38     | 5.64-4.31     | 2.23-1.02     | 0.73-1.58     | 2.99-3.80     | 5.76-7.42     | 4.19-5.26     | 3.79-1.88     | 0.97-0.96     | 1.26-0.11     | 1.39-5.24     | 3.89-1.76     | 0.71-1.19     |
| (H35°)   | 2.90-2.2     | 2.98-2.36    | 1.87-0.96    | 2.40-0.63    | 0.19-0.88    | 0.19-0.88    | 2.26-1.72     | 0.83-0.65     | 0.96-0.21     | 0.27-0.10     | 2.42-0.92     | 4.17-0.21     | 5.87-0.24     | 1.40-0.78     | 3.01-0.81     | 4.19-0.73     | 1.13-0.103    | 0.82-1.41     | 3.70-0.79     | 2.12-0.52     | 4.26-0.69     | 1.73-0.11     | 2.99-1.25     | 2.66-0.89     |
| (H40°)   | 4.66-1.87    | 4.26-3.73    | 3.04-1.76    | 0.60-0.67    | 1.56-2.25    | 2.24-1.88    | 2.73-0.18     | 1.61-1.11     | 2.99-0.54     | 2.81-0.89     | 0.47-0.65     | 1.26-0.62     | 5.31-0.73     | 4.65-1.35     | 4.50-2.48     | 8.16-13.91    | 1.37-0.154    | 8.82-1.41     | 4.43-0.08     | 4.69-0.69     | 5.26-0.67     | 5.10-3.41     | 1.34-0.17     | 2.73-0.75     |
| (H45°)   | 5.59-0.61    | 3.76-2.36    | 3.10-2.38    | 2.05-1.64    | 1.96-2.26    | 3.20-2.81    | 2.04-0.68     | 3.13-0.61     | 3.43-0.96     | 1.77-0.34     | 1.98-0.80     | 0.02-0.46     | 1.90-0.1345   | 4.10-1.13     | 2.28-0.58     | 7.01-6.70     | 1.61-0.153    | 7.16-5.70     | 6.73-0.79     | 8.39-0.76     | 5.21-0.64     | 1.61-0.153    | 1.34-0.17     | 3.04-0.75     |
| (H50°)   | 5.36-0.63    | 3.96-0.14    | 2.27-0.35    | 1.87-0.64    | 0.20-1.14    | 2.68-2.56    | 1.87-0.15     | 2.78-0.32     | 3.17-0.79     | 2.01-0.69     | 2.96-1.77     | 1.14-1.67     | 3.04-0.32     | 1.06-0.34     | 6.76-10.34    | 6.49-4.47     | 8.21-13.91    | 8.24-0.63     | 8.28-0.52     | 4.97-0.50     | 6.09-0.16     | 6.23-0.27     | 1.05-0.88     | 3.22-0.95     |
| (H55°)   | 3.80-0.65    | 3.61-0.21    | 0.20-0.54    | 0.63-0.42    | 0.54-1.00    | 0.64-0.61    | 2.01-2.71     | 1.89-2.40     | 1.33-0.15     | 1.30-0.56     | 1.67-0.10     | 1.23-0.09     | 0.06-0.67     | 1.55-0.94     | 7.34-13.75    | 3.63-4.26     | 7.50-11.19    | 7.15-0.75     | 4.15-0.46     | 3.22-0.37     | 5.10-3.00     | 5.19-3.04     | 0.24-0.50     | 2.00-1.75     |
| (H57°)   | 1.53-0.24    | 2.70-1.21    | 0.96-2.11    | 1.30-1.74    | 0.32-0.48    | 0.77-0.32    | 0.78-1.33     | 1.56-1.29     | 0.46-0.07     | 0.44-0.23     | 0.52-0.37     | 0.27-0.20     | 0.27-0.20     | 6.29-11.45    | 5.65-11.74    | 4.65-1.74     | 2.06-0.43     | 5.49-5.97     | 3.14-0.23     | 1.68-0.63     | 5.22-0.36     | 6.36-0.72     | 0.74-0.91     | 0.81-0.92     |
| (H62°)   | 5.65-0.65    | 6.95-0.38    | 2.54-0.32    | 2.17-0.38    | 1.10-0.48    | 2.51-2.76    | 0.37-0.61     | 0.53-0.30     | 2.37-0.07     | 0.46-0.27     | 0.46-0.27     | 2.71-1.46     | 2.14-0.42     | 1.88-1.24     | 5.20-1.05     | 6.86-0.27     | 4.97-1.77     | 1.41-0.24     | 1.54-0.42     | 6.80-0.27     | 7.86-0.63     | 2.12-0.77     | 1.88-0.24     | 1.88-0.24     |
| (H67°)   | 1.97-1.44    | 6.80-1.74    | 2.74-0.28    | 3.24-0.81    | 3.22-0.26    | 3.83-4.71    | 2.70-0.21     | 3.22-1.75     | 3.10-0.32     | 5.26-2.54     | 5.26-2.56     | 4.08-3.68     | 3.88-5.55     | 8.21-10.09    | 8.07-0.51     | 4.75-1.20     | 4.68-0.39     | 4.99-8.92     | 3.32-0.89     | 3.59-0.24     | 4.47-1.10     | 6.50-1.12     | 4.49-0.24     | 2.36-1.32     |
| (H67°)   | 3.77-0.33    | 2.59-0.14    | 4.80-0.57    | 4.91-0.14    | 5.19-0.40    | 6.81-0.56    | 5.71-0.37     | 5.92-0.42     | 6.00-0.50     | 7.20-0.60     | 6.80-0.51     | 8.91-0.66     | 7.49-1.71     | 6.62-1.42     | 10.91-0.57    | 7.52-0.23     | 6.46-0.37     | 4.86-0.99     | 4.85-0.98     | 10.94-10.32   | 11.10-10.97   | 4.70-0.48     | 3.73-0.44     | 3.73-0.44     |
| (H69°)   | 4.80-0.24    | 5.88-0.76    | 7.20-0.18    | 5.07-1.57    | 3.85-1.73    | 8.54-0.74    | 4.80-0.71     | 7.34-0.54     | 7.60-1.72     | 6.24-0.71     | 7.20-0.58     | 10.10-0.38    | 8.16-0.76     | 12.50-0.16    | 11.33-0.16    | 8.07-0.90     | 10.50-10.54   | 14.88-1.78    | 11.90-11.98   | 14.88-1.78    | 16.01-11.05   | 7.91-0.44     | 5.88-0.08     | 5.88-0.08     |
| (H71°)   | 7.83-0.64    | 5.99-0.03    | 0.94-0.73    | 0.51-0.24    | 0.68-0.22    | 7.59-0.17    | 0.91-0.41     | 4.89-0.78     | 13.74-14.70   | 12.43-10.12   | 11.85-0.51    | 9.22-10.02    | 11.63-10.16   | 12.68-14.24   | 15.31-10.96   | 17.29-0.42    | 13.80-10.48   | 13.69-0.32    | 14.96-0.61    | 15.09-11.47   | 13.71-11.44   | 8.67-0.52     | 10.19-0.88    | 10.19-0.88    |
| (H73°)   | 10.80-0.82   | 0.20-0.32    | 0.50-0.89    | 7.45-0.32    | 0.61-1.18    | 11.98-10.42  | 11.34-12.24   | 11.42-10.15   | 11.96-10.42   | 10.22-10.15   | 11.96-10.42   | 10.22-10.15   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   | 11.96-10.42   |
| (H77°)   | 11.50-10.84  | 10.66-10.37  | 11.04-10.98  | 8.47-10.98   | 7.58-11.81   | 13.00-12.35  | 13.79-11.68   | 14.19-10.37   | 15.47-10.15   | 16.45-10.35   | 16.50-10.14   | 12.73-10.30   | 10.73-11.41   | 14.80-10.15   | 15.00-10.52   | 15.23-10.50   | 10.63-10.97   | 16.00-10.13   | 10.91-10.29   | 13.06-10.52   | 13.39-10.84   | 11.57-10.21   | 13.50-10.97   | 11.58-10.72   |
| (H78°)   | 11.23-9.70   | 11.05-10.86  | 8.88-11.42   | 13.04-9.72   | 7.80-9.87    | 14.80-11.99  | 10.53-10.20   | 11.74-9.73    | 15.54-10.80   | 11.45-12.42   | 16.52-10.10   | 15.46-15.22   | 13.00-11.00   | 15.15-15.46   | 13.31-12.96   | 10.58-0.92    | 13.88-10.50   | 15.10-10.91   | 13.03-15.36   | 13.92-15.99   | 13.12-13.03   | 13.42-10.31   | 12.87-15.97   | 13.00-15.17   |
| (H82°)   | 11.73-9.10   | 8.49-9.96    | 8.22-10.74   | 13.09-10.72  | 3.98-0.60    | 11.43-15.27  | 14.00-12.75   | 12.69-14.00   | 10.67-14.47   | 13.82-10.13   | 13.34-15.29   | 15.47-15.56   | 13.37-10.52   | 13.30-10.15   | 11.64-13.48   | 14.80-11.12   | 13.90-10.42   | 13.19-13.08   | 13.44-15.11   | 15.02-12.36   | 13.31-12.75   | 12.90-13.56   | 14.47-15.33   | 12.87-11.14   |
| (H83°)   | 10.03-9.74   | 4.98-9.58    | 7.71-9.34    | 12.33-10.33  | 1.61-0.89    | 11.43-15.23  | 10.70-12.41   | 10.97-0.68    | 10.68-14.66   | 10.57-10.26   | 13.88-14.58   | 15.90-14.01   | 13.13-15.29   | 13.07-10.74   | 13.40-15.48   | 14.50-15.87   | 15.32-15.80   | 15.49-15.60   | 15.46-15.14   | 12.56-12.87   | 15.28-15.18   | 15.61-15.18   | 12.26-10.34   | 12.26-10.34   |
| (H87°)   | 11.97-9.87   | 6.21-0.89    | 6.07-0.81    | 11.64-10.39  | 12.91-12.22  | 11.14-13.20  | 10.71-11.82   | 11.85-14.66   | 12.84-11.01   | 10.54-12.83   | 12.62-11.57   | 11.11-11.52   | 11.03-10.96   | 15.11-14.99   | 15.44-15.21   | 14.36-14.19   | 15.28-15.68   | 11.46-10.33   | 11.52-13.32   | 14.06-15.02   | 15.08-15.50   | 15.83-15.20   | 13.93-10.21   | 13.93-10.21   |
| (H87°)   | 11.31-10.68  | 6.60-0.58    | 6.95-0.88    | 11.80-15.25  | 13.53-15.64  | 14.04-14.72  | 15.00-15.78   | 14.98-14.98   | 13.93-13.05   | 13.25-15.95   | 14.54-15.05   | 12.37-13.81   | 14.96-15.17   | 15.15-14.93   | 15.85-15.35   | 13.97-14.29   | 15.28-15.61   | 10.60-10.10   | 11.67-12.06   | 12.46-12.06   | 11.04-11.17   | 10.16-11.76   | 14.76-10.34   | 14.76-10.34   |
| (H87°)   | 11.26-10.17  | 11.42-11.69  | 11.50-11.88  | 13.17-12.94  | 12.11-11.47  | 12.11-11.47  | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   | 12.11-11.47   |
| (H87°)   | 11.75-12.63  | 11.41-12.25  | 11.65-10.73  | 11.41-10.23  | 11.10-10.06  | 11.26-10.25  | 12.07-13.50   | 12.50-14.43   | 12.44-13.29   | 13.38-12.96   | 13.50-14.33   | 14.74-14.82   | 14.88-14.60   | 13.93-13.21   | 13.71-11.97   | 12.71-11.97   | 11.17-11.88   | 11.85-12.58   | 11.82-11.24   | 11.07-11.12   | 11.10-10.37   | 10.46-11.60   | 11.23-10.96   | 11.23-10.96   |
| Freq(Hz) | 2.450-Ps1    | TableA.2     | ↓            | ↓            | ↓            | ↓            | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             | ↓             |
| Gain     | 0°(H90°/57°) | 0°(H92°/57°) | 0°(H93°/57°) | 0°(H95°/57°) | 0°(H97°/57°) | 0°(H98°/57°) | 0°(H100°/57°) | 0°(H102°/57°) | 0°(H104°/57°) | 0°(H106°/57°) | 0°(H108°/57°) | 0°(H110°/57°) | 0°(H112°/57°) | 0°(H114°/57°) | 0°(H116°/57°) | 0°(H118°/57°) | 0°(H120°/57°) | 0°(H122°/57°) | 0°(H124°/57°) | 0°(H126°/57°) | 0°(H128°/57°) | 0°(H130°/57°) | 0°(H132°/57°) | 0°(H134°/57°) |
| (H5°)    | 5.29-0.38    | 5.18-0.14    | 4.44-0.37    | 4.39-0.47    | 4.53-0.49    | 5.02-0.22    | 5.40-0.52     | 5.63-0.58     | 5.84-0.58     | 5.63-0.69     | 5.76-0.39     | 6.01-0.58     | 5.52-0.14     | 4.98-0.41     | 4.78-0.49     | 4.51-0.76     | 4.78-0.74     | 4.92-0.14     | 5.18-0.20     | 5.12-0.43     | 4.79-0.48     | 4.65-0.46     | 4.79-0.48     | 4.91-0.41     |
| (H7°)    | 4.99-0.38    | 5.36-0.36    | 3.20-0.33    | 2.90-0.29    | 3.10-0.35    | 3.28-0.69    | 3.73-0.36     | 3.90-0.39     | 3.91-0.44     | 4.38-0.15     | 4.21-0.21     | 4.34-0.35     | 4.41-0.47     | 4.79-0.49     | 4.51-0.72     | 5.01-0.51     | 5.65-0.68     | 5.50-0.71     | 5.89-0.97     | 4.95-0.47     | 4.69-0.22     | 4.96-0.44     | 4.70-0.48     | 4.70-0.48     |
| (H9°)    | 2.75-0.27    | 2.32-0.22    | 1.73-1.18    | 1.40-1.54    | 1.75-1.92    | 1.98-0.10    | 2.08-0.10     | 1.98-0.10     | 1.69-1.65     | 1.69-1.65     | 1.76-1.81     | 1.80-1.99     | 2.27-0.71     | 3.30-0.74     | 4.57-0.98     | 4.91-0.77     | 4.52-0.23     | 3.90-0.67     | 3.61-0.92     | 3.78-0.98     | 4.25-0.44     | 4.91-0.27     | 4.36-0.16     | 4.48-0.07     |
| (H12°)   | 2.14-0.10    | 1.51-0.19    | 0.85-0.71    | 0.80-1.01    | 1.30-1.17    | 1.80-1.91    | 1.91-1.57     | 1.29-1.00     | 0.97-0.92     | 0.97-0.92     | 0.97-0.92     | 1.39-0.27     | 2.85-0.65     | 3.31-0.41     | 4.58-0.23     | 3.73-0.29     | 2.80-0.24     | 2.57-0.27     | 2.94-0.31     | 3.36-0.31     | 3.73-0.48     | 4.48-0.41     | 4.41-0.33     | 3.15-0.53     |
| (H13°)   | 2.28-0.20    | 1.57-0.18    | 0.89-0.82    | 0.97-1.32    | 1.18-1.27    | 2.26-0.15    | 1.89-1.51     | 1.30-1.34     | 1.04-1.58     | 1.68-1.67     | 1.74-1.72     | 1.94-0.26     | 3.24-0.34     | 3.59-0.41     | 4.58-0.27     | 3.96-0.27     | 2.94-0.21     | 2.96-0.27     | 3.91-0.08     | 3.28-0.23     | 3.19-0.16     | 3.76-0.24     | 3.28-0.14     | 3.28-0.14     |
| (H17°)   | 3.28-0.20    | 2.03-1.61    | 1.28-1.12    | 1.25-0.71    | 2.15-0.28    | 1.95-1.48    | 1.18-1.17     | 1.47-1.95     | 2.43-0.64     | 3.70-0.48     | 3.12-0.72     | 1.71-1.22     | 1.41-0.25     | 3.08-0.48     | 3.54-0.75     | 5.50-0.48     | 4.05-0.38     | 2.96-0.72     | 2.98-0.45     | 2.11-0.88     | 1.90-2.30     | 3.09-0.40     | 4.76-0.15     | 4.62-0.11     |
| (H18°)   | 3.48-0.24    | 2.54-2.35    | 1.88-1.41    | 1.47-1.53    | 2.31-0.61    | 1.95-0.26    | 0.97-0.44     | 1.29-0.21     | 0.29-0.24     | 0.29-0.24     | 0.17-0.67     | 0.63-0.00     | 1.16-0.47     | 3.85-0.65     | 4.03-0.38     | 5.72-0.44     | 3.27-0.23     | 1.92-0.43     | 3.94-0.08     | 0.95-1.02     | 2.20-0.49     | 5.11-0.29     | 4.81-0.44     | 4.81-0.44     |
| (H22°)   | 3.93-0.75    | 3.30-0.33    | 2.80-0.27    | 2.17-0.77    | 2.91-0.80    | 3.95-0.44    | 0.40-0.32     | 1.52-0.26     | 3.22-0.15     | 2.71-0.24     | 1.22-0.18     | 0.80-1.41     | 1.26-0.53     | 0.69-0.69     | 2.50-0.32     | 4.43-0.38     | 3.25-0.38     | 2.55-1.62     | 1.04-0.03     | 0.19-0.00     | 0.03-0.44     | 1.39-0.28     | 4.47-0.68     | 5.50-0.48     |
| (H30°)   | 3.37-0.33    | 3.93-0.49    | 4.52-0.73    | 3.30-0.54    | 3.60-0.66    | 6.10-0.65    | 0.84-0.20     | 1.34-0.21     | 3.29-0.76     | 2.54-0.29     | 0.00-0.72     | 0.40-0.71     | 1.48-0.13     | 1.84-0.94     | 2.16-0.97     | 3.56-0.87     | 2.34-0.21     | 0.42-0.10     | 0.38-0.09     | 0.20-0.12     | 0.07-0.17     | 3.37-0.48     | 5.64-0.04     | 5.64-0.04     |
| (H37°)   | 4.25-0.41    | 4.80-0.59    | 4.00-0.54    | 3.86-0.30    | 6.61-0.15    | 5.60-0.27    | 0.20-0.49     | 1.50-0.20     | 2.45-0.29     | 2.50-0.50     | 2.55-1.11     | 0.07-0.68     | 0.00-1.35     | 3.60-0.21     | 1.58-1.38     | 2.98-0.46     | 5.82-0.44     | 2.53-1.17     | 3.80-0.11     | 0.43-0.47     | 0.20-0.27     | 0.89-1.86     | 4.40-0.58     | 4.77-0.76     |
| (H40°)   | 5.50-0.45    | 4.60-0.62    | 6.96-0.51    | 4.5          |              |              |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |





## Antenna Pattern

## Appendix B

|         |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |               |              |              |              |              |              |
|---------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|
| (H0°)   | 0.030-0.16   | 0.710-0.42   | -5.24-5.22   | -12.02-7.22  | 4.37-0.58    | -7.52-0.48   | -4.35-9.78   | -4.75-0.54   | -2.52-1.94   | -2.33-0.84   | -3.03-0.40   | -0.13-1.82   | -0.91-0.31   | -1.48-0.41   | -4.89-0.14   | -0.88-0.75   | -0.25-1.36   | 0.78-0.28    | 0.24-1.88     | 1.16-1.74    | 1.77-0.15    | 1.95-0.56    |              |              |
| (H2°)   | 2.17-12.12   | -0.53-0.79   | 4.84-1.79    | -12.87-6.52  | 5.29-8.22    | -0.50-17.13  | 7.86-10.31   | 5.64-5.60    | 3.17-3.61    | 4.18-0.96    | -0.03-1.31   | -1.41-1.30   | -3.43-1.82   | -3.77-1.82   | -5.84-0.66   | -2.76-1.50   | -1.38-1.58   | -0.78-1.08   | -1.02-1.41    | 0.28-0.98    | -0.33-0.38   | -1.21-0.63   | 0.26-0.51    | 0.50-0.23    |
| (H4°)   | 3.39-3.42    | -1.69-0.99   | 6.62-0.68    | -13.10-10.03 | -0.46-0.79   | -11.86-6.71  | -8.65-13.28  | 4.29-0.74    | 5.47-5.55    | -7.06-0.24   | -3.03-5.61   | -7.16-4.33   | -4.41-8.96   | -6.51-8.89   | -7.72-4.02   | -3.27-3.50   | -2.70-2.06   | -2.91-0.70   | -2.91-0.70    | -1.02-1.49   | -2.19-1.87   | -3.07-2.64   | -1.23-1.70   | -2.48-0.58   |
| (H6°)   | 5.54-6.98    | -3.24-3.38   | -8.81-10.35  | -13.31-11.72 | -12.22-8.80  | -10.00-13.65 | -10.43-10.11 | 7.73-6.22    | 8.45-0.87    | -6.89-6.81   | -4.38-0.87   | -12.20-6.88  | 8.95-13.12   | 8.88-0.87    | -10.72-6.40  | -8.88-1.78   | 8.26-5.18    | 6.51-0.24    | -4.20-0.48    | -3.71-0.41   | 6.22-0.37    | -3.88-1.41   | -4.97-0.84   |              |
| (H8°)   | 6.57-9.81    | -5.64-7.86   | -7.45-9.84   | -13.56-11.93 | -8.61-11.99  | -12.26-11.59 | -15.42-14.64 | -15.83-14.87 | -11.75-5.58  | -8.71-9.08   | -8.02-10.42  | -12.48-11.44 | -12.30-15.63 | -13.87-9.95  | -14.22-10.75 | -11.30-12.06 | -7.47-10.77  | -11.70-12.27 | -7.88-5.19    | -5.06-6.45   | -6.87-1.74   | -6.77-0.52   | -4.88-0.78   |              |
| (H10°)  | -8.54-10.24  | -6.88-8.80   | -7.90-9.36   | -10.84-8.86  | -8.26-10.47  | -10.75-9.82  | -15.11-13.43 | -10.28-6.71  | -8.82-15.09  | -13.41-10.34 | -8.82-11.22  | -10.04-14.27 | -15.28-9.44  | -13.31-12.18 | -14.74-8.72  | -12.07-12.54 | -7.22-10.44  | -12.18-10.19 | -8.87-8.85    | -8.45-13.39  | -9.88-1.78   | -6.40-5.14   | -8.19-0.47   |              |
| (H12°)  | -10.22-13.54 | -10.20-10.26 | -10.79-10.93 | -6.83-6.67   | -7.75-9.97   | -11.11-9.62  | 8.14-11.41   | -10.00-12.04 | -12.33-10.15 | -10.54-9.75  | -11.01-14.24 | -11.42-15.47 | -14.94-10.32 | -6.57-6.61   | -13.60-15.30 | -8.61-11.03  | -11.51-5.62  | -10.33-6.89  | -9.94-9.08    | -8.99-7.84   | -8.83-0.70   | -6.84-10.54  | -8.70-0.47   |              |
| (H14°)  | -14.82-15.31 | -10.21-0.43  | -8.89-10.76  | -12.19-10.17 | -4.48-7.81   | 9.01-14.13   | -11.79-14.38 | -13.83-15.49 | -15.88-12.02 | -12.65-13.75 | -15.11-13.53 | -10.01-15.41 | -10.90-7.99  | -15.78-13.50 | -14.34-12.15 | -8.19-10.38  | -12.21-12.28 | 6.33-7.99    | -10.89-6.45   | -8.63-13.26  | -10.74-13.77 | -7.71-6.53   | -4.83-7.43   | -11.75-13.01 |
| (H16°)  | -19.34-15.09 | -14.50-13.38 | -14.60-7.70  | -8.24-10.27  | -12.13-10.85 | 7.51-9.11    | -10.50-10.18 | -12.87-14.71 | -15.14-13.54 | -12.54-12.06 | -10.28-13.43 | -14.28-14.81 | -13.12-12.84 | -12.96-14.96 | -14.53-12.43 | 8.51-13.88   | -12.41-11.93 | 7.89-8.87    | -10.11-8.77   | -7.52-11.51  | -10.51-11.26 | -8.95-6.58   | -5.88-7.52   | -12.86-14.15 |
| (H18°)  | -24.38-13.59 | -12.07-11.98 | -11.71-12.26 | -12.45-6.89  | -8.17-11.16  | -7.72-13.10  | -12.41-9.85  | -11.85-15.28 | -11.80-15.86 | -11.37-15.01 | -10.86-10.70 | -9.95-10.80  | -15.84-15.84 | -14.41-15.27 | -10.95-8.44  | -11.30-10.34 | -8.34-10.85  | 4.83-10.43   | -11.87-11.77  | -8.84-7.88   | -10.95-10.05 | -12.22-8.81  | -8.88-8.03   | -13.58-15.88 |
| (H20°)  | -31.36-14.06 | -15.51-14.13 | -11.51-10.54 | -10.71-10.09 | -12.88-14.42 | -11.59-12.45 | -15.43-13.85 | -11.56-12.12 | -11.42-9.15  | 8.56-14.07   | -15.44-12.20 | -15.03-12.97 | -10.91-12.97 | -12.39-12.73 | -10.32-9.88  | -13.85-10.98 | 8.62-9.83    | 8.62-9.79    | -12.32-14.12  | -11.42-9.21  | -10.78-13.03 | -11.10-9.82  | -11.40-10.99 | -13.40-13.27 |
| (H22°)  | -11.80-11.00 | -14.13-15.01 | -15.03-15.34 | -14.90-14.05 | -12.91-10.89 | -14.64-12.41 | -10.03-9.18  | -10.76-15.30 | -14.86-12.11 | -13.01-12.41 | -14.76-15.06 | -14.50-12.95 | -12.81-13.58 | -15.47-15.06 | -14.76-15.06 | -12.53-11.10 | -14.56-15.35 | -14.29-9.14  | -14.56-15.35  | -14.29-9.14  | 7.10-6.15    | 7.10-6.15    | 8.11-10.98   | -14.67-15.35 |
| (H24°)  | -7.89-0.55   | -11.98-11.62 | -10.24-9.88  | -8.89-9.03   | -8.97-10.04  | -10.39-13.05 | -14.03-13.74 | -11.80-11.85 | -13.87-11.81 | -14.19-14.23 | -12.70-13.12 | -11.10-11.10 | -11.04-10.45 | -11.19-12.18 | -10.69-15.86 | -12.38-12.98 | -12.84-12.03 | -12.51-10.55 | -10.82-9.19   | -10.76-10.99 | -8.48-9.57   | -6.78-7.88   | -9.98-8.60   | -7.78-7.20   |
| (H26°)  | -3.71-11.07  | -12.19-11.87 | -10.78-11.11 | -8.69-9.73   | 5.98-9.54    | 9.93-10.42   | -10.80-10.79 | -10.87-11.10 | -11.31-11.86 | -12.54-14.17 | -14.79-11.41 | -13.88-11.56 | -10.98-15.86 | 6.26-8.75    | -4.77-10.77  | -7.51-7.43   | -7.02-9.22   | 8.94-9.45    | -10.20-12.12  | -11.73-10.44 | -8.35-9.45   | -6.25-8.45   | -5.88-6.45   | -5.88-6.45   |
| (H28°)  | -14.10-12.85 | -12.62-12.03 | -13.19-14.44 | -15.67-13.88 | -14.93-15.02 | -15.37-15.06 | -15.46-15.69 | -15.40-13.99 | -13.06-13.09 | -12.88-12.33 | -12.20-11.95 | -11.89-11.85 | -11.72-11.45 | -11.26-11.03 | -10.52-9.82  | -9.78-9.80   | -10.84-11.44 | -12.08-12.38 | -12.28-12.08  | -11.96-11.65 | -11.59-11.71 | -12.40-13.00 | -13.40-13.14 | -14.57-14.91 |
| FeedNo1 | 5.7655-0.84  | TableNo1     | 2            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +            | +             | +            | +            | +            | +            | +            |
| Gain    | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)   | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  | 0°(H0°/H2°)  |
| (H0°)   | 5.40-4.91    | 5.15-5.09    | 4.88-4.47    | 4.35-4.29    | 4.35-4.28    | 4.23-3.91    | 3.86-4.03    | 3.78-3.32    | 3.00-2.83    | 2.84-2.86    | 2.93-3.09    | 3.18-3.34    | 3.53-3.75    | 3.74-3.87    | 3.89-4.05    | 4.07-4.13    | 4.42-4.88    | 4.84-4.90    | 5.06-5.02     | 5.04-5.03    | 5.10-5.39    | 5.65-6.26    | 6.25-6.80    |              |
| (H2°)   | 2.17-2.60    | 3.37-3.82    | 4.15-0.17    | 4.60-0.46    | 5.22-5.48    | 6.01-0.24    | 6.07-2.38    | 7.84-8.88    | 7.62-7.55    | 7.52-7.46    | 7.38-7.48    | 7.25-6.41    | 5.86-5.47    | 4.91-5.44    | 4.05-3.47    | -2.80-2.28   | -1.88-1.86   | -1.24-0.85   | -0.58-0.36    | -1.61-0.04   | 0.90-1.45    | 0.86-1.34    | -1.78-2.24   |              |
| (H4°)   | 0.59-1.75    | -2.06-2.53   | -2.94-3.29   | -4.01-4.83   | -4.71-5.37   | -5.83-6.34   | -8.33-9.18   | -1.14-8.48   | -8.74-8.87   | -10.69-9.02  | -12.72-11.14 | -5.08-4.17   | -3.08-2.20   | -1.15-1.14   | -0.83-0.78   | -0.24-0.36   | -0.24-0.08   | 0.17-0.48    | 0.78-1.12     | 1.53-0.84    | 2.10-2.32    | 2.21-0.91    | 1.43-0.87    | 0.21-0.48    |
| (H6°)   | 0.16-1.16    | -1.78-2.47   | -2.71-2.87   | -3.48-4.72   | -7.94-10.14  | -6.93-8.45   | -8.51-11.32  | -12.58-10.65 | -8.69-9.03   | -7.57-6.41   | -5.20-4.42   | -3.76-3.19   | -2.31-0.96   | -0.03-0.41   | 0.06-0.31    | 0.22-0.49    | 1.15-1.15    | 0.88-0.67    | 1.29-1.98     | 2.54-0.32    | 3.30-3.55    | 3.62-0.49    | 3.60-2.44    | 1.60-0.67    |
| (H8°)   | 2.31-1.53    | 0.21-1.45    | 2.18-2.17    | 1.95-2.92    | 3.80-5.41    | -4.81-14.31  | -4.81-11.06  | -8.90-5.51   | 4.95-5.72    | 0.07-0.80    | 0.58-2.54    | 3.35-3.14    | 2.01-2.46    | 0.03-0.41    | 0.22-0.49    | 1.15-1.15    | 0.88-0.67    | 1.29-1.98    | 2.54-0.32     | 3.30-3.55    | 3.62-0.49    | 3.60-2.44    | 1.60-0.67    |              |
| (H10°)  | 2.88-2.40    | 0.78-1.35    | 2.21-1.49    | -1.79-2.69   | -2.56-5.58   | -3.24-3.62   | -7.28-10.31  | -5.93-3.94   | 3.87-4.33    | 4.14-1.54    | -7.06-7.72   | -6.19-9.32   | -1.88-1.65   | -1.00-0.62   | 1.25-0.68    | 1.62-3.34    | 3.60-3.99    | 2.54-2.35    | 2.14-2.52     | 2.70-3.07    | 3.40-3.37    | 3.10-3.29    | 2.91-3.06    |              |
| (H12°)  | 0.88-1.40    | 0.98-0.99    | -1.02-1.08   | -2.29-1.39   | -3.39-3.30   | 2.53-3.61    | -7.99-10.31  | -6.47-5.47   | 4.39-4.95    | 4.89-1.94    | 1.51-8.85    | 3.14-1.22    | 0.02-0.51    | 0.36-0.51    | 1.20-0.24    | 1.98-1.79    | 1.44-1.66    | 1.03-1.24    | 1.16-1.07     | 1.17-1.07    | 1.30-1.24    | 2.02-2.38    | 2.93-2.94    |              |
| (H14°)  | 1.24-0.64    | 1.18-0.19    | -1.61-0.83   | 3.21-3.43    | 2.20-2.34    | 2.42-2.53    | -4.82-9.38   | 4.36-5.73    | 5.17-7.88    | -11.49-15.25 | -4.70-12.37  | -1.88-0.15   | 0.13-0.10    | -0.08-0.96   | 1.29-1.93    | 1.12-0.45    | -0.07-0.53   | 0.04-1.42    | -0.47-0.29    | 1.40-1.79    | 1.46-2.27    | 3.14-3.33    | 2.86-2.35    |              |
| (H16°)  | 0.69-0.23    | 1.17-0.74    | 1.96-1.54    | 5.10-5.60    | 5.22-5.42    | -2.95-2.79   | 5.67-11.58   | -6.69-5.72   | 4.48-4.91    | -7.86-9.82   | -4.61-12.04  | -1.50-0.60   | 0.40-0.27    | 1.11-0.90    | -0.60-0.73   | 0.20-0.27    | 0.71-1.45    | -0.60-0.73   | 0.20-0.27     | 0.71-1.45    | -0.60-0.73   | 0.20-0.27    | 0.71-1.45    |              |
| (H18°)  | 1.02-1.81    | 0.02-0.80    | 1.95-2.02    | 5.98-7.15    | 3.57-3.59    | 4.31-3.29    | 6.95-10.38   | 6.19-7.74    | 4.49-4.28    | -2.38-1.48   | -1.48-0.73   | 2.91-2.88    | 1.12-1.86    | 0.94-0.96    | 0.54-1.39    | 0.05-0.17    | 1.80-0.62    | 1.11-1.29    | 1.80-0.62     | 1.11-1.29    | 1.80-0.62    | 1.11-1.29    | 1.80-0.62    |              |
| (H20°)  | 5.82-5.29    | -1.71-1.12   | -1.71-1.14   | 7.23-6.30    | 3.67-5.55    | 3.82-7.86    | 7.58-11.62   | 7.11-6.43    | 4.17-4.32    | -5.64-0.35   | -2.08-1.15   | -3.86-6.71   | 3.35-3.59    | 5.02-4.49    | -7.96-4.36   | 2.79-2.42    | 3.89-2.30    | 0.68-2.52    | -3.28-0.61    | -0.87-1.88   | -1.94-0.74   | -0.83-0.84   | -0.61-0.51   |              |
| (H22°)  | 2.92-3.40    | 3.78-3.18    | 3.02-3.40    | 6.81-6.40    | 4.85-5.24    | -10.47-10.78 | 8.48-11.97   | 8.69-5.67    | 4.85-5.43    | 5.78-6.02    | 3.82-5.53    | 5.93-5.65    | 2.70-0.63    | 0.68-0.39    | 3.78-5.61    | 1.57-0.25    | -2.29-1.25   | 2.22-0.37    | 2.22-0.37     | 2.22-0.37    | 2.22-0.37    | 2.22-0.37    | 2.22-0.37    |              |
| (H24°)  | 0.70-1.16    | 5.60-4.94    | 4.50-4.60    | 7.43-10.99   | 7.78-7.34    | -10.86-10.70 | 8.48-12.59   | 7.02-7.71    | 8.84-6.45    | 5.31-6.13    | 8.64-13.37   | 4.42-6.66    | 4.84-7.51    | 7.51-9.13    | 7.84-6.45    | -7.19-7.13   | 2.92-5.18    | 5.97-0.30    | -1.98-2.71    | -3.13-3.04   | 4.10-4.22    | 3.67-4.81    | 7.16-6.64    |              |
| (H26°)  | 8.88-6.35    | -7.90-7.78   | -6.89-7.68   | -8.78-9.88   | -8.58-7.83   | -11.81-13.02 | -10.93-12.78 | -13.28-13.32 | 0.82-7.60    | -11.43-8.66  | -17.13-15.55 | -10.48-12.57 | -11.12-10.19 | -12.18-10.36 | -13.81-11.91 | -9.84-6.08   | -10.57-11.85 | -6.38-6.23   | -0.86-0.36    | -3.72-3.87   | -4.95-6.39   | -5.57-6.12   | -4.12-4.57   | -8.15-6.68   |
| (H28°)  | -11.07-9.83  | -10.59-9.09  | -7.84-7.72   | -11.28-11.30 | -10.68-8.88  | -10.57-12.71 | -13.71-14.71 | -15.89-10.94 | -10.80-13.25 | -8.86-12.86  | -15.05-13.56 | -11.69-15.88 | -11.81-13.08 | -15.45-15.86 | -12.86-6.83  | -14.99-14.90 | -12.90-10.97 | -11.46-11.72 | -7.25-6.08    | -6.39-7.75   | -8.20-7.37   | -6.44-7.90   | -10.80-10.16 |              |
| (H30°)  | -12.44-10.34 | -9.24-10.11  | -8.42-9.10   | -10.27-10.24 | 8.07-8.38    | -10.73-10.88 | -14.56-13.00 | -15.50-14.33 | -12.42-12.91 | -13.56-15.45 | -13.56-15.45 | -11.57-9.88  | -10.80-13.75 | -15.50-15.86 | -12.34-10.50 | -13.48-12.89 | -8.22-11.16  | -12.44-11.07 | -8.82-8.07    | -10.46-10.72 | -10.86-10.32 | -7.13-10.16  | -10.54-10.12 |              |
| (H32°)  | -14.87-14.26 | -11.73-10.51 | -8.58-9.73   | -10.10-9.83  | -7.04-0.04   | 8.99-10.88   | -6.41-11.35  | -14.41-14.53 | -13.05-12.12 | -12.15-15.24 | -12.15-15.86 | -12.78-15.76 | -15.05-11.79 | -11.78-12.82 | -13.49-9.12  | -11.86-9.87  | -15.09-15.82 | -12.04-15.52 | -11.11-11.27  | -10.52-8.26  | -11.83-14.25 | -11.42-10.35 | -7.47-8.71   | -11.57-9.27  |
| (H34°)  | -11.78-14.38 | -14.76-16.23 | -12.26-10.54 | -11.03-11.10 | -10.45-12.98 | 8.99-12.46   | -11.34-12.26 | -16.04-13.92 | -15.42-14.84 | -14.52-14.02 | -10.71-14.86 | -15.86-15.61 | -10.84-13.68 | -14.95-12.71 | -14.14-14.96 | -11.09-12.38 | -15.00-11.94 | -12.63-16.04 | -9.22-11.93</ |              |              |              |              |              |

### Antenna Pattern

## Appendix B



## Appendix B

Sporton International Inc.



## Antenna Pattern

## Appendix B

|         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |                |               |               |          |
|---------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|
| (H25.1) | 2.512-15      | 1.771-62      | 1.641-87      | 1.641-92      | 2.272-61      | 2.702-53      | 2.342-15      | 2.152-38      | 2.893-37      | 3.583-52      | 3.192-87      | 2.332-09      | 1.731-33      | 0.780-30      | -0.08-41      | -0.771-18     | -1.42-148     | -1.271-20     | -0.650-29     | 1.292-03      | 2.592-88      | 2.782-51       | 2.242-26      | 2.372-56      |          |
| (H26.1) | 1.801-22      | 0.840-25      | -0.15-0-35    | 0.15-1-22     | 2.082-34      | 2.131-65      | 1.391-38      | 1.391-87      | 1.391-87      | 2.610-16      | 3.343-07      | 2.491-88      | 1.561-50      | 1.190-53      | 0.09-0-31     | -0.41-18      | 0.130-45      | 0.370-3-40    | -1.35-1-92    | -1.58-0-70    | 0.121-07      | 1.691-92       | 1.971-97      | 1.671-35      | 1.411-85 |
| (H27.1) | 1.330-35      | -0.96-2-24    | -3.70-3-55    | -1.82-0-09    | 0.911-33      | 1.501-61      | 1.781-76      | 1.791-97      | 2.770-40      | 3.132-08      | 0.860-11      | 0.040-44      | 0.610-43      | 0.520-26      | -0.13-0-01    | 0.831-45      | 1.500-69      | -0.34-0-68    | -0.80-0-56    | -0.11-0-43    | 0.971-20      | 0.810-67       | 1.13-01-42    | 1.21-01-35    |          |
| (H28.1) | 1.790-48      | -1.59-2-91    | -5.02-4-36    | -2.09-0-74    | 0.010-12      | 1.062-44      | 2.932-38      | 1.501-45      | 2.563-46      | 3.341-98      | 0.740-06      | -0.04-0-29    | 0.370-62      | 0.46-0-24     | -1.14-1-71    | -0.391-09     | 1.790-95      | 0.330-18      | -0.43-0-59    | 0.401-81      | 2.632-84      | 2.411-26       | 0.831-73      | 2.372-05      |          |
| (H29.1) | 2.201-15      | -0.781-57     | -3.36-2-84    | -1.79-0-34    | -0.201-66     | 0.893-52      | 3.251-76      | 3.04-67       | 1.860-48      | 2.771-58      | 1.600-36      | -0.46-0-76    | -0.61-0-13    | -0.10-0-11    | -0.34-0-68    | 0.550-1-06    | -0.461-0-55   | -0.13-0-15    | -0.15-0-57    | 2.91-53       | 3.132-08      | 1.892-42       | 0.892-64      | 2.822-64      |          |
| (H30.1) | 2.251-24      | -0.711-87     | -2.76-2-85    | -2.741-36     | 2.111-1-90    | 0.842-53      | 2.621-11      | -1.45-1-77    | 0.391-86      | 1.831-43      | 0.890-46      | -0.51-0-94    | -1.07-0-37    | 0.05-0-71     | -2.36-3-75    | -1.43-2-44    | -1.42-1-89    | -1.25-1-26    | -3.21-0-21    | -0.081-38     | 2.132-82      | 2.431-69       | 1.932-54      | 2.732-73      |          |
| (H31.1) | 1.010-21      | -1.81-2-95    | -2.75-3-40    | -3.24-2-69    | -1.331-1-99   | -0.240-67     | 0.431-85      | 2.611-152     | 0.540-48      | 0.280-36      | 0.33-0-41     | 2.07-2-28     | -3.151-58     | -0.701-143    | -3.24-1-10    | -5.61-4-20    | -2.771-2-26   | -2.21-4-63    | -0.59-2-06    | 0.211-41      | 1.491-38      | 0.160-1-84     | 0.841-58      | 1.731-66      |          |
| (H32.1) | 0.491-10      | 1.32-0-85     | -3.39-3-93    | 0.411-149     | -0.83-2-61    | -1.571-77     | -3.211-75     | 3.641-126     | -1.771-184    | -1.751-31     | -0.621-37     | -3.131-391    | -4.441-386    | -4.231-266    | -4.311-89     | -8.19-7-85    | -4.83-2-38    | -2.23-4-30    | -0.621-256    | 0.441-33      | 0.52-0-32     | -2.45-0-21     | -0.75-0-59    | -0.99-0-02    |          |
| (H33.1) | 2.781-25      | 5.75-0-19     | 4.571-497     | 5.36-0-75     | 4.64-3-36     | 3.29-4-44     | 4.98-0-55     | 5.13-0-28     | 3.071-382     | -1.552-89     | -1.552-89     | 5.521-557     | 8.41-0-26     | 4.74-4-95     | 6.29-0-92     | -11.24-0-30   | 5.44-2-71     | 3.114-36      | 8.281-238     | 0.401-77      | 0.761-237     | -5.25-0-81     | -2.741-26     | -3.311-20     |          |
| (H34.1) | 4.930-488     | 8.718-577     | 16.791-70     | 7.18-0-85     | 6.93-0-58     | 5.27-0-84     | 8.071-632     | 7.08-0-55     | 4.94-0-68     | 6.03-0-86     | -3.71-0-25    | -7.05-1-74    | 8.45-0-81     | 8.411-179     | -7.78-1-232   | -12.461-232   | -7.861-222    | 5.08-0-45     | -0.29-0-57    | -1.44-0-55    | 0.91-0-629    | 8.15-0-84      | 5.58-0-52     | -7.02-0-48    |          |
| (H35.1) | 7.610-637     | 8.98-0-111    | 8.691-001     | 8.770-526     | 8.871-274     | 8.541-037     | 11.021-003    | 9.80-7-25     | 6.54-0-85     | 6.56-1-57     | 11.31-0-19    | 11.741-0-20   | 10.501-87     | 8.71-0-192    | -13.691-149   | 8.70-0-48     | 7.34-0-77     | -15.81-0-43   | -3.513-3-38   | 4.89-0-192    | 11.770-10-10  | 7.591-59       | 5.33-0-63     | 7.591-59      |          |
| (H36.1) | 5.24-0-82     | -0.53-0-19    | -0.17-0-15    | 0.19-0-12     | 1.19-0-10     | 1.08-0-10     | 1.02-0-10     | 1.02-0-10     | 1.161-0-07    | 8.161-0-31    | 14.71-0-35    | 14.621-36     | 14.621-36     | 14.621-36     | 14.621-36     | 14.621-36     | 14.621-36     | 14.621-36     | 14.621-36     | 14.621-36     | 14.621-36     | 14.621-36      | 14.621-36     | 14.621-36     |          |
| (H37.1) | 1.271-10-25   | -1.68-11-05   | -12.89-11-24  | -10.711-0-44  | -11.621-12-30 | -10.401-19-57 | -12.391-12-37 | -13.411-10-08 | 8.431-10-19   | -11.05-0-98   | -10.591-12-71 | -16.231-14-06 | -13.991-12-94 | -13.991-14-07 | -11.86-12-74  | -15.41-15-03  | -15.271-15-15 | -14.621-10-07 | -15.191-15-04 | -13.691-15-02 | -13.191-14-34 | -15.421-14-16  | -10.991-12-08 | -13.591-11-63 |          |
| (H38.1) | -0.34-11-20   | -13.69-11-12  | -11.29-10-20  | -11.36-11-06  | -11.761-13-38 | -13.30-14-06  | -15.04-14-67  | -16.49-12-82  | -11.171-12-13 | -12.731-14-08 | -12.521-15-00 | -15.621-15-51 | -16.231-14-29 | -12.421-15-43 | -14.671-15-15 | -15.521-15-28 | -14.091-15-55 | -15.391-13-89 | -15.171-14-92 | -15.191-14-11 | -11.851-14-62 | -15.091-14-06  | -12.591-13-70 | -15.171-15-26 |          |
| (H39.1) | -15.031-13-10 | -13.891-14-30 | -12.891-11-24 | -10.821-11-15 | -12.411-15-38 | -14.33-151-70 | -15.05-15-66  | -14.46-12-80  | -11.861-11-22 | -11.191-12-27 | -12.821-12-65 | -15.991-15-37 | -15.58-15-90  | -13.361-15-29 | -15.64-15-06  | -15.00-14-60  | -15.80-13-37  | -14.211-13-84 | -14.49-15-17  | -13.191-14-24 | -11.291-14-19 | -15.36-15-96   | -14.711-15-15 | -15.071-15-28 |          |
| (H40.1) | -15.331-15-87 | -14.561-15-44 | -15.05-12-36  | -10.60-14-80  | -11.761-13-38 | -15.071-13-80 | -14.891-15-00 | -15.29-12-89  | -11.351-11-88 | -14.46-11-88  | -11.111-10-58 | -15.621-15-50 | -15.741-14-62 | -14.581-15-51 | -15.141-15-61 | -13.891-15-01 | -14.80-15-55  | -14.121-13-35 | -15.671-15-50 | -15.201-15-09 | -15.991-11-16 | -15.331-15-09  | -14.731-14-57 | -15.441-15-46 |          |
| (H41.1) | -13.95-14-88  | -12.841-13-00 | -14.421-12-21 | -10.491-8-82  | -11.401-10-81 | -13.171-15-82 | -13.261-13-83 | -14.571-12-40 | -6.891-10-63  | -11.071-11-09 | -13.561-15-66 | -14.911-15-58 | -15.711-14-82 | -15.871-15-21 | -13.811-14-06 | -13.271-15-82 | -12.291-15-91 | -13.551-15-70 | -11.151-15-70 | -14.731-11-03 | -13.361-13-72 | -13.731-14-77  | -14.211-14-15 | -15.501-15-24 |          |
| (H42.1) | -12.55-15-32  | -13.011-12-25 | -12.821-13-13 | -14.89-13-58  | -11.081-10-83 | -14.501-15-17 | -11.221-10-88 | -13.691-13-40 | -4.801-11-88  | -13.721-15-32 | -13.461-12-51 | -14.69-15-27  | -13.74-14-80  | -15.40-15-52  | -14.80-15-38  | -14.731-12-78 | -13.121-15-70 | -12.351-15-54 | -15.051-14-11 | -15.05-14-15  | -13.201-14-34 | -15.151-14-55  | -15.501-15-12 | -15.501-15-12 |          |
| (H43.1) | -11.381-13-14 | -15.161-15-25 | -14.381-13-88 | -14.36-14-85  | -15.551-15-40 | -15.311-14-60 | -15.311-14-60 | -14.831-13-75 | -12.9611-97   | -12.111-10-34 | -13.781-15-28 | -15.581-15-60 | -14.861-11-24 | -11.021-14-48 | -14.741-13-75 | -12.821-13-02 | -16.101-15-63 | -15.361-13-85 | -14.451-15-66 | -14.971-15-00 | -14.621-15-99 | -16.021-14-38  | -14.411-15-01 | -15.901-13-35 |          |
| (H44.1) | -14.961-15-08 | -15.161-15-15 | -15.161-15-31 | -14.64-15-40  | -15.331-15-33 | -14.641-14-70 | -14.611-14-70 | -15.721-16-05 | -15.721-16-05 | -14.361-15-46 | -15.231-13-12 | -12.771-12-55 | -14.961-15-54 | -15.231-13-12 | -14.941-14-96 | -15.301-14-15 | -15.781-14-81 | -14.961-14-16 | -15.591-15-54 | -15.091-15-02 | -14.98-151-51 | -14.401-12-39  | -13.021-13-37 | -14.401-12-39 |          |
| (H45.1) | -11.69-15-11  | -14.661-15-59 | -16.171-15-29 | -14.931-16-11 | -11.66-14-28  | -15.161-14-28 | -15.161-14-28 | -14.391-13-86 | -14.501-14-97 | -15.521-14-16 | -14.581-15-17 | -15.441-16-15 | -15.291-16-17 | -15.351-15-09 | -15.351-14-32 | -15.601-14-50 | -13.961-14-53 | -16.051-14-55 | -14.941-14-79 | -14.841-15-02 | -15.291-15-53 | -15.871-141-08 | -14.461-12-39 | -13.021-13-37 |          |
| (H46.1) | -11.501-16-24 | -14.551-14-98 | -15.431-14-90 | -15.151-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55 | -15.101-14-55  | -15.101-14-55 | -15.101-14-55 |          |
| FreeHd  | 5.350Pd       | TableHd.5     | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -              | -             | -             |          |
| Gain    | (H47.1)       | (H48.1)       | (H49.1)       | (H50.1)       | (H51.1)       | (H52.1)       | (H53.1)       | (H54.1)       | (H55.1)       | (H56.1)       | (H57.1)       | (H58.1)       | (H59.1)       | (H60.1)       | (H61.1)       | (H62.1)       | (H63.1)       | (H64.1)       | (H65.1)       | (H66.1)       | (H67.1)       | (H68.1)        | (H69.1)       | (H70.1)       |          |
| (H71.1) | 1.631-53      | 1.4111-28     | 1.2711-27     | 1.2211-34     | 1.5311-67     | 1.6511-91     | 2.0821-28     | 2.0821-28     | 2.1421-03     | 1.9211-81     | 1.7711-73     | 1.6611-70     | 1.7011-56     | 1.4111-47     | 1.5411-54     | 1.6811-81     | 1.8621-21     | 2.1421-21     | 2.3821-44     | 2.3721-37     | 2.3221-23     | 2.0821-25      | 2.0621-06     | 1.9911-78     |          |
| (H72.1) | 1.871-09      | 0.9601-05     | 0.9301-03     | 0.9411-13     | 1.3911-59     | 1.7321-01     | 2.5621-35     | 2.4521-64     | 2.7321-20     | 1.2911-59     | 1.6711-68     | 1.6711-68     | 1.3211-11     | 1.1011-10     | 1.1111-24     | 1.5011-68     | 1.7011-86     | 1.9111-88     | 1.9111-88     | 1.9111-88     | 1.9111-88     | 1.9111-88      | 1.9111-88     | 1.9111-88     |          |
| (H73.1) | 1.6711-28     | 1.1011-03     | 1.0161-87     | 0.8201-70     | 0.5701-62     | 0.7301-97     | 1.1911-34     | 1.5811-87     | 2.4021-59     | 2.7721-87     | 2.8721-85     | 2.8321-78     | 2.6521-40     | 2.6211-41     | 1.6711-28     | 0.9701-24     | -0.331-0-87   | -1.251-0-12   | -0.3101-43    | 0.9911-60     | 2.1021-38     | 2.6421-84      | 2.9931-07     | 2.8221-31     |          |
| (H74.1) | 2.2121-14     | 2.2821-42     | 2.3611-90     | 1.4711-15     | 1.0701-83     | 0.6401-40     | 0.2701-38     | 0.8711-62     | 3.3501-40     | 2.9111-70     | 2.8021-70     | 2.2811-85     | 1.3181-86     | 0.8901-54     | -0.181-0-71   | -1.051-1-32   | -1.1711-01    | -0.4411-26    | 2.1021-31     | 2.3321-17     | 2.9931-07     | 2.8221-31      | 2.9931-07     | 2.8221-31     |          |
| (H75.1) | 2.7521-63     | 2.4621-44     | 1.9811-49     | 1.8311-65     | 1.5011-21     | 0.9201-71     | 0.6501-70     | 0.8011-71     | 2.6021-25     | 2.4621-41     | 3.2711-12     | 3.0711-29     | 2.4811-52     | 0.2411-50     | -0.3301-57    | 1.2911-59     | 1.4601-68     | -0.661-1-95   | -2.4811-06    | -1.0301-37    | 1.2111-98     | 2.3121-40      | 2.3021-20     | 2.3721-70     |          |
| (H76.1) | 2.6011-82     | 0.5311-44     | -1.831-145    | -0.951-0-50   | 0.401-0-04    | 1.2621-76     | 2.6911-28     | 1.9711-42     | 2.1611-82     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56     | 1.7801-56      | 1.7801-56     | 1.7801-56     |          |
| (H77.1) | 2.8111-28     | -1.10-3-39    | -0.331-5-96   | 4.5711-19     | 1.6611-18     | 2.5541-30     | 4.3921-96     | 0.6811-26     | 0.7521-21     | 0.9411-53     | 1.2101-94     | 0.8901-90     | 1.2511-43     | 0.5411-59     | -3.7211-36    | 0.1321-07     | 2.3511-24     | 0.1111-06     | -1.7811-20    | 0.4711-59     | 2.2821-85     | 2.3711-26      | 1.5101-99     | 3.4911-15     |          |
| (H78.1) | 2.8711-23     | -1.26-31-71   | 6.2711-62     | 6.1711-36     | 0.6711-80     | 3.1711-74     | 4.3211-39     | 0.4311-24     | 0.9311-24     | 2.7621-47     | 2.5621-47     | 0.2621-03     | 0.6511-12     | -1.5711-14    | -0.2911-43    | 1.2711-08     | 1.5111-73     | -1.5011-00    | 0.6711-24     | 2.9711-36     | 2.9911-89     | 2.7811-26      | 2.1311-42     | 3.8911-47     |          |
| (H79.1) | 2.8911-40     | -1.0611-32    | 4.2611-40     | 3.8911-30     | -4.5711-05    | 2.0031-57     | 2.7711-02     | -0.8611-64    | 0.7411-24     | 3.2711-32     | 2.0011-19     | -0.891-186    | -0.6611-99    | 2.0401-45     | -2.8811-94    | -3.1011-08    | -0.1911-103   | 2.0811-36     | 3.0611-14     | 0.6411-54     | 2.5321-90     | 2.5011-57      | 2.6511-19     | 3.5711-42     |          |
| (H80.1) | 1.2301-65     | 1.4711-28     | 2.8911-34     | 2.9611-75     | 4.8811-04     | 1.3311-23     | 2.7111-42     | 1.2601-34     | 0.6201-89     | 1.3601-26     | 2.7711-22     | 1.4611-11     | 1.4911-11     | 1.5211-16     | 1.4911-11     | 1.2611-58     | 3.0411-56     | -1.3811-14    | 1.6711-24     | 1.8411-42     | 3.4601-33     | 1.1711-15      | 2.1021-05     | 3.4601-33     |          |
| (H81.1) | 0.5311-45     | 2.4411-33     | 2.8911-29     | 3.            |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |                |               |               |          |



### Antenna Pattern

## Appendix B

|        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |                |            |            |            |            |
|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------|------------|------------|------------|------------|
| (#75)  | 4.89050    | 0.39076    | 2.10350    | 4.04024    | 1.54973    | 2.13079    | 0.44283    | 2.55229    | 2.57180    | 0.52004    | 1.28288    | 2.69125    | 1.38013    | 0.84618    | -0.29093   | 3.35959    | -3.05568   | -6.70047   | 0.01624    | 0.70378        | 4.77438    | 4.78040    | 2.86204    | 1.93187    |
| (#76)  | -0.66022   | 0.55020    | -4.44588   | 0.00284    | -7.84847   | 0.67177    | 0.49177    | 1.04010    | -0.26182   | -0.77149   | -0.70311   | 1.97184    | -0.38043   | -0.56020   | -3.27102   | -3.36016   | -3.76948   | -6.22010   | 0.88024    | <b>5.03262</b> | 3.37027    | 0.70017    | 0.69325    |            |
| (#82)  | -1.18147   | -2.68051   | 0.50179    | 0.02476    | -8.83137   | -0.77113   | 0.72029    | -1.34123   | -2.99434   | -0.46282   | -1.37037   | 0.38019    | -0.41447   | -1.85332   | -0.76337   | -3.61933   | -4.59735   | -5.94113   | 1.60024    | 2.93478        | 3.70034    | 1.80017    | 0.68144    | -1.33939   |
| (#87)  | -1.57326   | -4.11717   | 7.68847    | -0.27169   | -8.03519   | -6.70314   | -3.58127   | -1.54707   | -4.35646   | -5.76131   | -2.95124   | -3.26091   | -0.38448   | -0.38938   | -8.71563   | -7.71958   | -6.03831   | -4.73118   | 0.46054    | 1.80375        | 2.84193    | 0.73323    | -1.45338   | -3.65440   |
| (#97)  | -3.83308   | -6.54833   | -1.131026  | -10.26128  | -14.95848  | -7.32620   | 6.51442    | -0.80921   | -5.62450   | -8.22042   | -3.54426   | -5.77134   | -3.77680   | -6.71819   | -11.00571  | -15.48433  | -8.64483   | -6.72509   | -4.71238   | -6.00800       | 3.07184    | 2.68808    | -4.24167   | -6.44222   |
| (#107) | -7.98133   | -6.68126   | -1.146305  | -12.99183  | -15.15551  | -8.65146   | -7.41424   | -6.23177   | 9.98613    | -11.89738  | -3.67551   | -5.34241   | -3.77457   | -6.61111   | -12.27141  | -13.42143  | -8.02433   | -6.12549   | -1.12370   | -6.91436       | -5.59420   | -4.14167   | -5.31473   | -6.27189   |
| (#112) | -10.36817  | 8.30115    | -1.379141  | -15.04415  | -11.52124  | -10.87566  | 8.87105    | -9.49126   | -10.70973  | -12.74937  | -10.45910  | 7.17173    | -5.85814   | -10.12540  | -9.94104   | -12.63147  | -14.36517  | -11.30122  | 8.61116    | -5.73014       | -7.73042   | -7.18448   | -8.88165   | -6.231182  |
| (#127) | -12.12105  | -10.10575  | -4.831089  | -9.891279  | -12.880192 | -10.88634  | 8.301231   | -13.265128 | -13.266142 | -7.79173   | -8.38959   | -9.97161   | -11.82156  | -14.895126 | -10.12117  | -10.19329  | -12.36658  | -8.201122  | -12.23450  | -8.26050       | -8.88158   | -6.89125   | -12.331172 |            |
| (#137) | -15.588139 | -13.54146  | -1.3471279 | -9.952196  | -10.98151  | -10.324115 | 8.89934    | -14.91134  | -10.92429  | -11.98158  | -8.23944   | -10.73979  | -6.55101   | -13.870159 | -13.411453 | -12.16626  | -12.151430 | -14.688193 | -13.980101 | -14.911122     | -5.527185  | -11.211314 | -15.031535 | -14.911581 |
| (#147) | -18.02127  | -12.38183  | -1.8371089 | -8.959393  | -14.981419 | -8.498171  | -12.859134 | -12.859134 | -14.761431 | -14.291477 | -14.591136 | -14.681123 | -14.128126 | -15.341465 | -15.341465 | -10.701202 | -12.221407 | -15.471539 | -12.709185 | -12.938187     | -11.951033 | -11.741610 | -14.741402 | -15.751127 |
| (#142) | -15.151446 | -15.011594 | -1.3841982 | -9.811118  | -14.111053 | -12.461519 | -12.461519 | -15.451017 | -12.391030 | -14.951186 | -13.981038 | -5.088123  | -7.211277  | -7.688184  | -10.301516 | -11.421083 | -14.488103 | -9.611271  | -7.295125  | -14.001179     | -14.741402 | -11.951132 | -11.071191 | -13.981548 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
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| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
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| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.421149 | -15.421149 | -10.861149 | -10.861149 | -14.901196 | -14.901196 | -14.901196     | -14.901196 | -14.901196 | -14.901196 | -14.901196 |
| (#157) | -18.991739 | -18.991739 | -1.4331447 | -10.889170 | -17.711014 | -13.731033 | -13.731033 | -11.891179 | -11.891179 | -10.851179 | -10.851179 | -11.731140 | -11.731140 | -15.       |            |            |            |            |            |                |            |            |            |            |

E1(XY plane) –  $\Theta(90)\Phi(0-360)$   
E2(XZ plane) –  $\Theta(0-180)\Phi(0)$  and  $\Theta(0-180)\Phi(180)$   
E3(YZ plane) –  $\Theta(0-180)\Phi(90)$  and  $\Theta(0-180)\Phi(270)$

