



Customer Name & Project: GRG-4366U

Prepared By: Tony

Date: 14th Nov 2025

Airgain Project Code:

Introduction



- Airgain proposes an embedded antenna solution for GRG-4366U
 - **The antenna solution is updated based upon the latest device provided by Nov 10th, 2025**
 - **New heatsink**
 - **New mainboard**

DUT Description



- The solution for this device is as follows:
 - **Cable-fed Antennas:**
 - 5 pcs 2G band Antennas(2.4GHz-2.5GHz)**
 - 5 pcs 5G band Antennas(5.15GHz-5.85GHz)**
- The antenna is mounted on the plastic holder and connect to the radio through coaxial I-PEX EQ connector..

Summary of Requirements

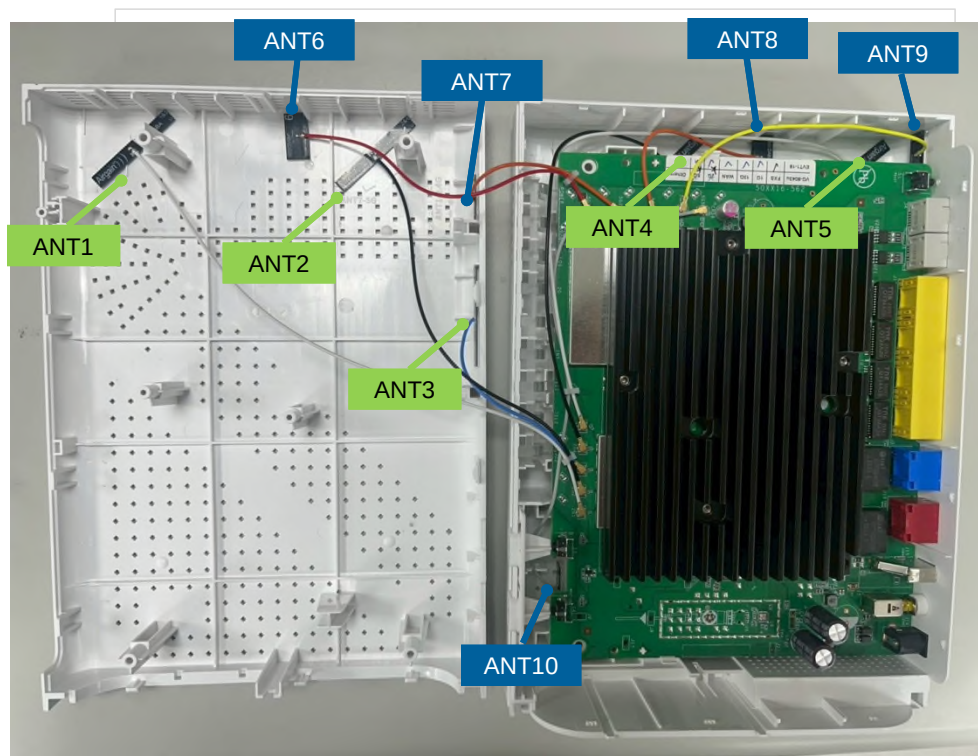


- Return Loss :
All band <-10dB
- Isolation:
2.4 GHz : -24 dB
5GHz : -26 dB
- Average Efficiency :
> 65%
- ExpectedPeak Gain:
2G: 3dB--5dB
5G: 2dB--3dB

Antenna Type: Dipole antenna

Airgain Antenna System Proposal

Antenna System Proposal



Antenna #	Part Number	Type
A1_2G	N01CDABA -T6-PK1-LW1X245BU	FR4, Cable fed
A2_2G	N01CDABB -T6-PK1-LB1X180BU	FR4, Cable fed
A3_2G	N01CDABC -T6-PK1-LA1X105BU	FR4, Cable fed
A4_2G	N01CDABB -T6-PK1-LB1X180BU	FR4, Cable fed
A5_2G (RX)	N01CDABA -T6-PK1-LW1X245BU	FR4, Cable fed
A6_5G	N02CDABF -T10-PK1-LR1X155BU	FR4, Cable fed
A7_5G	N02CDABG -T10-PK1-LK1X90BU	FR4, Cable fed
A8_5G	N02CDABG -T10-PK1-LK1X90BU	FR4, Cable fed
A9_5G	N02CDABJ -T10-PK1-LY1X130BU	FR4, Cable fed
A10_5G (RX)	N02CDABK -T10-PK1-LG1X220BU	FR4, Cable fed

Radiated Measurements

Antenna Realized Efficiency (%) – 2.4 GHz Wi-Fi Antennas



Frequency (MHz)	Ant1_2G4 (%)	Ant2_2G4 (%)	Ant3_2G4 (%)	Ant4_2G4 (%)	Ant5_2G4 (%)
2400	74.7	70.4	79.9	75.1	72.4
2410	75.7	70.6	79.0	75.4	72.6
2420	75.7	70.8	77.2	75.3	72.3
2430	75.9	71.7	77.1	75.5	72.4
2440	76.7	73.8	78.6	76.4	73.0
2450	77.2	75.2	78.9	77.1	73.4
2460	76.9	75.6	78.2	76.9	73.2
2470	77.5	76.8	78.3	77.5	73.4
2480	78.7	78.3	79.0	79.2	74.3
2490	79.1	79.0	78.5	79.5	74.5
Average	76.8	74.2	78.5	76.8	73.1

Antenna Realized Efficiency (%) – 5 GHz Wi-Fi Antennas



Frequency (MHz)	Ant6_5G (%)	Ant7_5G (%)	Ant8_5G (%)	Ant9_5G (%)	Ant10_5G (%)
5150	77.0	78.8	76.4	75.2	69.0
5200	77.6	79.8	79.0	78.1	69.6
5300	76.2	78.4	78.1	77.2	68.9
5400	75.4	78.3	78.8	76.1	68.5
5500	73.8	77.3	78.1	73.7	65.5
5600	74.5	78.7	79.6	76.3	65.5
5700	73.9	78.3	79.1	75.6	63.1
5800	74.5	79.7	79.7	74.7	62.1
5850	74.9	77.1	77.4	72.0	61.3
Average	75.3	78.5	78.5	75.4	65.9

Antenna Uncorrelated Gain(Calculation) – 2.4 & 5 GHz Wi-Fi Antennas

Frequency (MHz)	A1-A2-A3-A4
2400	3.4
2440	3.7
2480	3.9

Frequency (MHz)	A6-A7-A8-A9
5150	2.4
5300	2.4
5500	1.6
5800	2.2

Antenna Correlated Gain(Calculation) – 2.4 & 5 GHz Wi-Fi Antennas



Frequency (MHz)	A1-A2-A3-A4	
2400	9.0	
2440	9.3	
2480	9.5	

Frequency (MHz)	A6-A7-A8-A9	
5150	8.5	
5300	8.8	
5500	8.6	
5850	8.1	

Antenna Peak Realized Gain – 2.4 GHz Wi-Fi Antennas



Frequency (MHz)	Ant1_2G4 (dBi)	Ant2_2G4 (dBi)	Ant3_2G4 (dBi)	Ant4_2G4 (dBi)	Ant5_2G4 (dBi)
2400	4.5	6.0	6.4	3.8	5.0
2440	5.0	6.0	6.5	3.5	5.0
2480	5.2	6.0	6.4	3.2	5.1

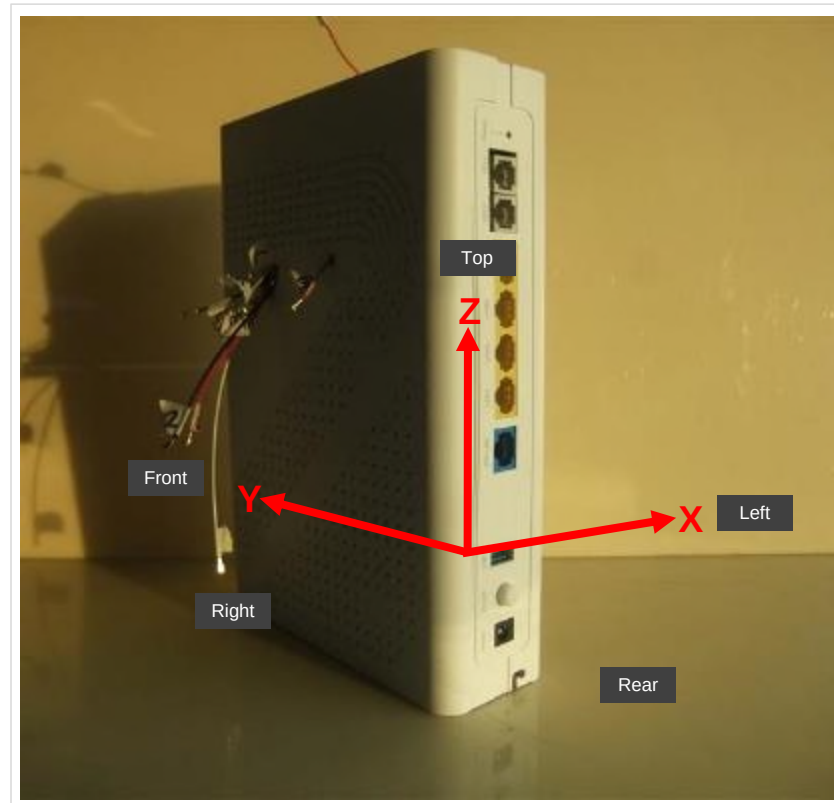
Antenna Peak Realized Gain – 5 GHz Wi-Fi Antennas



Frequency (MHz)	Ant6_5G (dBi)	Ant7_5G (dBi)	Ant8_5G (dBi)	Ant9_5G (dBi)	Ant10_5G (dBi)
5150	4.5	3.7	5.6	3	3.6
5300	4.1	3.7	5.2	2.6	3.5
5500	4.4	3.4	4.0	2.8	3.4
5850	4.4	4.3	4.5	2.9	2.7

Radiation Patterns

Coordinate System for Radiation Pattern Visualization

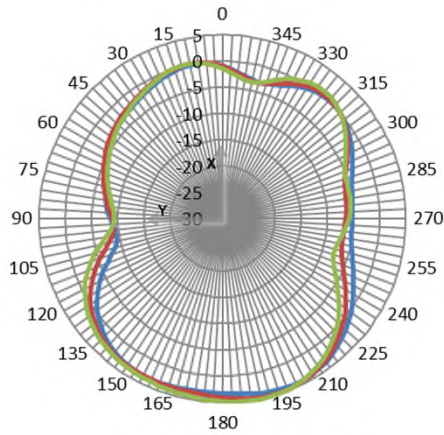


Orientation of Comtrend GRG-4366u PRF

Total Gain Patterns: Ant1_2G4



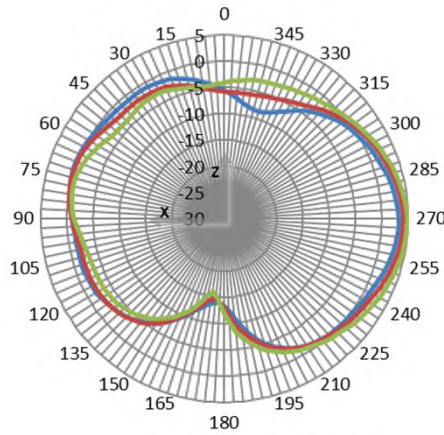
Ant1_2G4 Azimuth XY



— 2400MHz: Max=4.43 Avg=-0.70
— 2440MHz: Max=4.93 Avg=-0.57
— 2480MHz: Max=5.14 Avg=-0.49

Azimuth (XY)

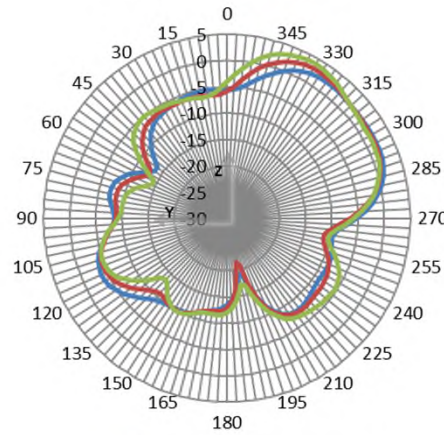
Ant1_2G4 Elevation XZ



— 2400MHz: Max=3.27 Avg=-1.91
— 2440MHz: Max=4.13 Avg=-1.63
— 2480MHz: Max=4.87 Avg=-1.37

Side to Side (XZ)

Ant1_2G4 Elevation YZ



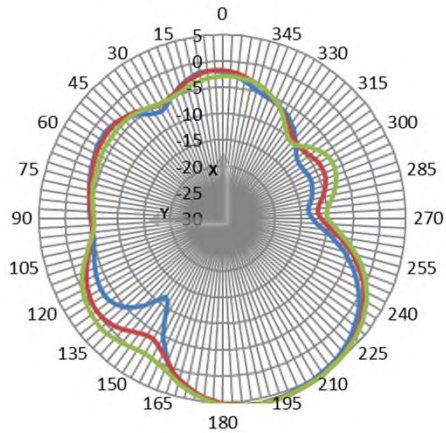
— 2400MHz: Max=2.19 Avg=-5.29
— 2440MHz: Max=2.97 Avg=-5.27
— 2480MHz: Max=3.89 Avg=-4.80

Front to Back (YZ)

Total Gain Patterns: Ant2_2G4



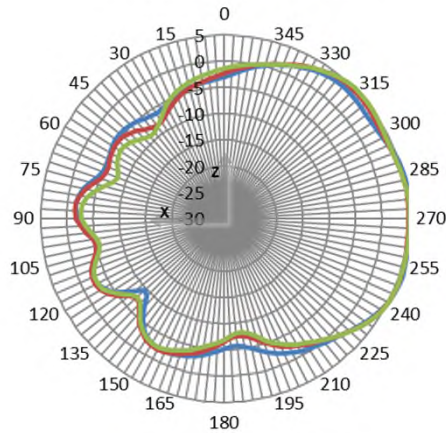
Ant2_2G4 Azimuth XY



— 2400MHz: Max=5.92 Avg=-2.10
— 2440MHz: Max=5.94 Avg=-1.35
— 2480MHz: Max=6.00 Avg=-1.00

Azimuth (XY)

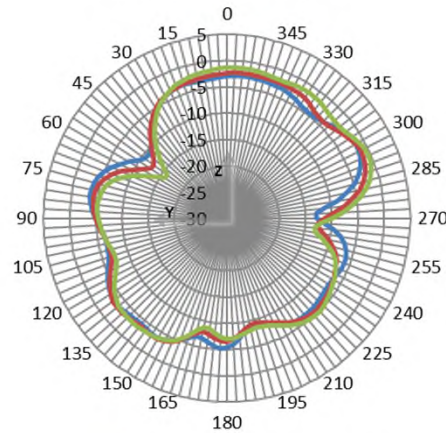
Ant2_2G4 Elevation XZ



— 2400MHz: Max=5.67 Avg=-0.17
— 2440MHz: Max=5.43 Avg=-0.22
— 2480MHz: Max=5.37 Avg=-0.33

Side to Side (XZ)

Ant2_2G4 Elevation YZ



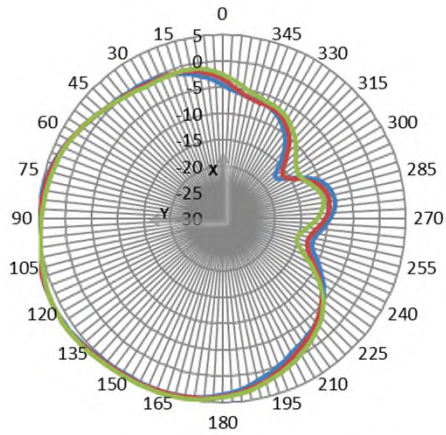
— 2400MHz: Max=-1.69 Avg=-5.22
— 2440MHz: Max=-1.44 Avg=-5.18
— 2480MHz: Max=-0.49 Avg=-4.94

Front to Back (YZ)

Total Gain Patterns: Ant3_2G4



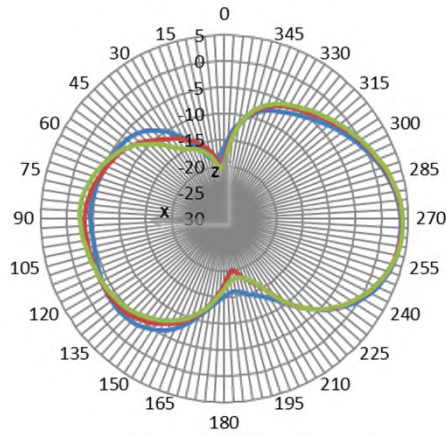
Ant3_2G4 Azimuth XY



— 2400MHz: Max=6.33 Avg=0.16
— 2440MHz: Max=6.41 Avg=0.24
— 2480MHz: Max=6.40 Avg=0.33

Azimuth (XY)

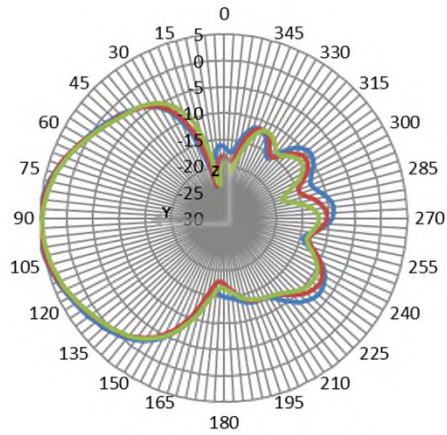
Ant3_2G4 Elevation XZ



— 2400MHz: Max=3.74 Avg=-4.55
— 2440MHz: Max=3.95 Avg=-4.59
— 2480MHz: Max=4.13 Avg=-4.50

Side to Side (XZ)

Ant3_2G4 Elevation YZ



— 2400MHz: Max=5.34 Avg=-4.50
— 2440MHz: Max=5.08 Avg=-4.95
— 2480MHz: Max=4.60 Avg=-5.19

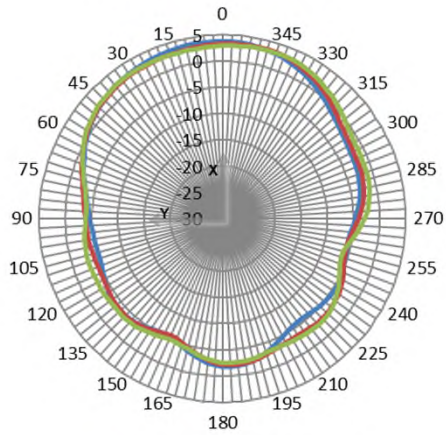
Front to Back (YZ)



Total Gain Patterns: Ant4_2G4



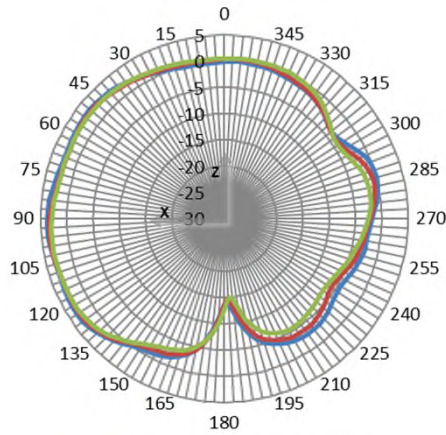
Ant4_2G4 Azimuth XY



— 2400MHz: Max=3.78 Avg=-1.44
— 2440MHz: Max=3.43 Avg=-1.20
— 2480MHz: Max=3.19 Avg=-0.96

Azimuth (XY)

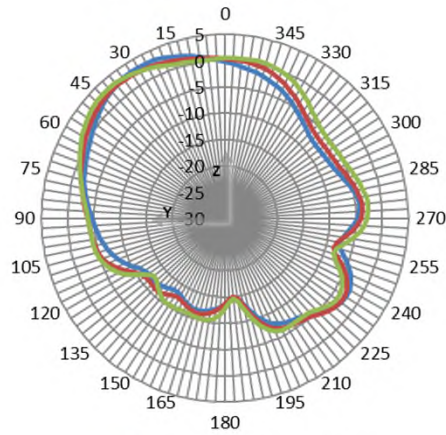
Ant4_2G4 Elevation XZ



— 2400MHz: Max=3.78 Avg=-0.28
— 2440MHz: Max=3.46 Avg=-0.62
— 2480MHz: Max=3.12 Avg=-0.87

Side to Side (XZ)

Ant4_2G4 Elevation YZ



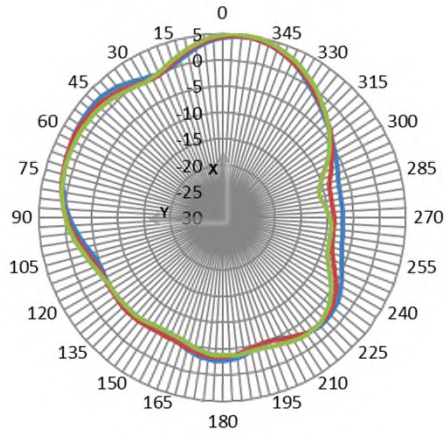
— 2400MHz: Max=3.14 Avg=-4.22
— 2440MHz: Max=2.59 Avg=-3.77
— 2480MHz: Max=3.16 Avg=-3.32

Front to Back (YZ)

Total Gain Patterns: Ant5_2G4



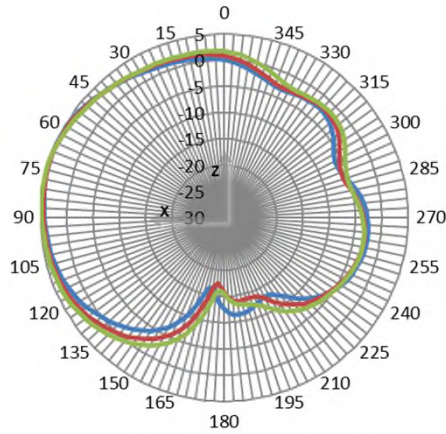
Ant5_2G4 Azimuth XY



— 2400MHz: Max=4.63 Avg=-1.43
— 2440MHz: Max=4.70 Avg=-1.60
— 2480MHz: Max=5.00 Avg=-1.69

Azimuth (XY)

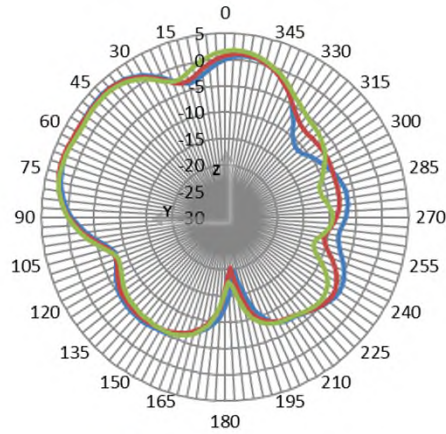
Ant5_2G4 Elevation XZ



— 2400MHz: Max=4.94 Avg=-1.28
— 2440MHz: Max=4.95 Avg=-0.93
— 2480MHz: Max=5.08 Avg=-0.46

Side to Side (XZ)

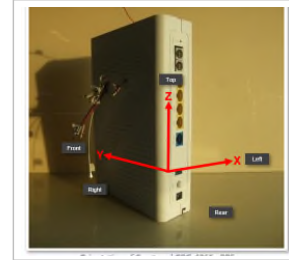
Ant5_2G4 Elevation YZ



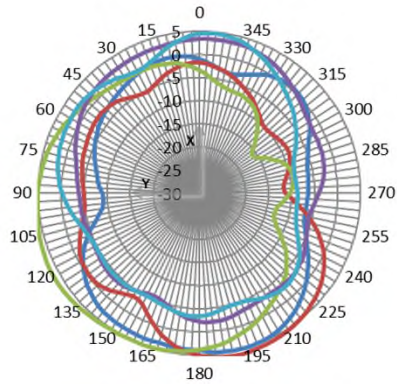
— 2400MHz: Max=3.07 Avg=-3.54
— 2440MHz: Max=2.94 Avg=-3.57
— 2480MHz: Max=2.67 Avg=-3.62

Front to Back (YZ)

Coverage Total Gain Patterns: Wi-Fi Antennas at 2440MHz



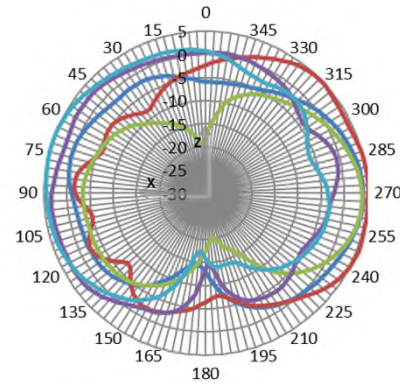
Azimuth XY 2440MHz



— Ant1_2G4: Max=4.93 Avg=-0.57
— Ant2_2G4: Max=5.94 Avg=-1.35
— Ant3_2G4: Max=6.41 Avg=0.24
— Ant4_2G4: Max=3.43 Avg=-1.20
— Ant5_2G4: Max=4.70 Avg=-1.60

Azimuth (XY)

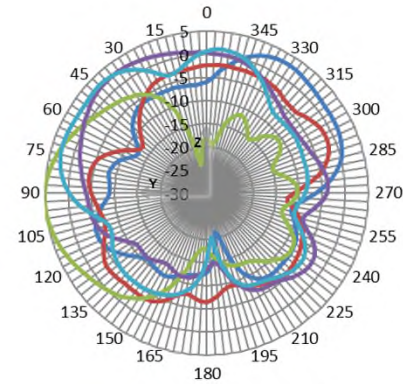
Elevation XZ 2440MHz



— Ant1_2G4: Max=4.13 Avg=-1.63
— Ant2_2G4: Max=5.43 Avg=-0.22
— Ant3_2G4: Max=3.95 Avg=-4.59
— Ant4_2G4: Max=3.46 Avg=-0.62
— Ant5_2G4: Max=4.95 Avg=-0.93

Side to Side (XZ)

Elevation YZ 2440MHz



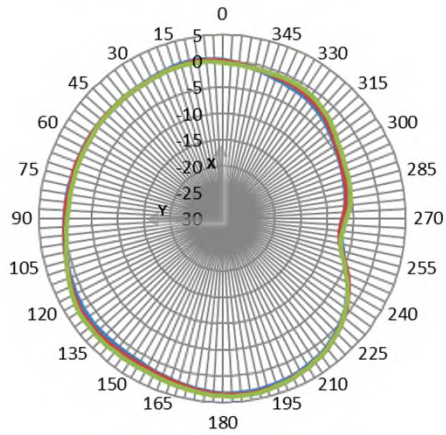
— Ant1_2G4: Max=2.97 Avg=-5.27
— Ant2_2G4: Max=-1.44 Avg=-5.18
— Ant3_2G4: Max=5.08 Avg=4.95
— Ant4_2G4: Max=2.59 Avg=-3.77
— Ant5_2G4: Max=2.94 Avg=-3.57

Front to Back (YZ)

Uncorrelated Gain Patterns: Wi-Fi Antennas at 2G4



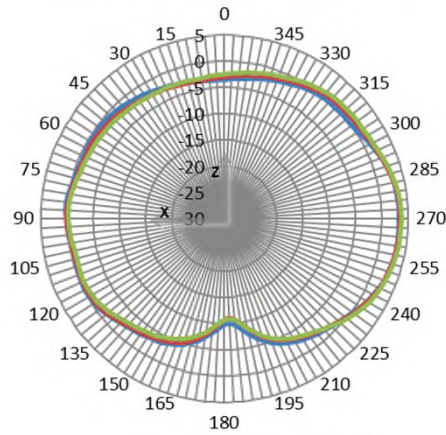
Uncorrelated_2G4 Azimuth XY



— 2400MHz: Max=3.35 Avg=-0.19
— 2440MHz: Max=3.69 Avg=-0.01
— 2480MHz: Max=3.90 Avg=0.14

Azimuth (XY)

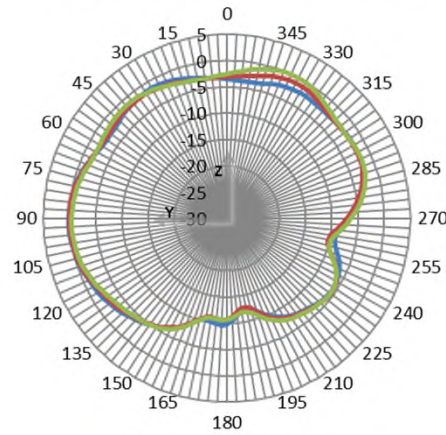
Uncorrelated_2G4 Elevation XZ



— 2400MHz: Max=3.27 Avg=-0.97
— 2440MHz: Max=3.48 Avg=-1.02
— 2480MHz: Max=3.80 Avg=-1.00

Side to Side (XZ)

Uncorrelated_2G4 Elevation YZ



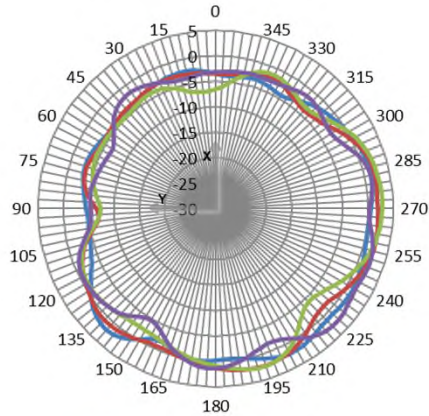
— 2400MHz: Max=0.19 Avg=-3.80
— 2440MHz: Max=0.05 Avg=-3.80
— 2480MHz: Max=0.03 Avg=-3.55

Front to Back (YZ)

Total Gain Patterns: Ant6_5G



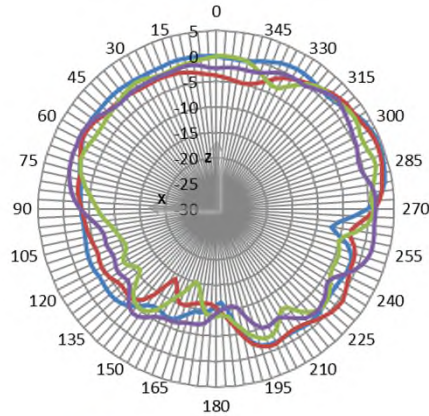
Ant6_5G Azimuth XY



— 5150MHz: Max=2.13 Avg=-1.06
— 5300MHz: Max=2.40 Avg=-0.93
— 5500MHz: Max=2.89 Avg=-1.56
— 5850MHz: Max=2.67 Avg=-1.33

Azimuth (XY)

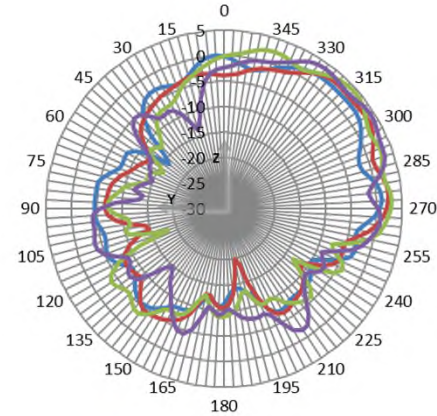
Ant6_5G Elevation XZ



— 5150MHz: Max=4.41 Avg=-1.21
— 5300MHz: Max=4.08 Avg=-1.95
— 5500MHz: Max=2.54 Avg=-2.81
— 5850MHz: Max=1.95 Avg=-2.20

Side to Side (XZ)

Ant6_5G Elevation YZ



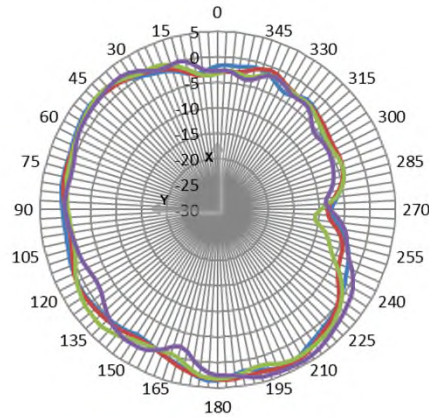
— 5150MHz: Max=2.13 Avg=-4.07
— 5300MHz: Max=3.30 Avg=-4.17
— 5500MHz: Max=4.36 Avg=-3.45
— 5850MHz: Max=4.33 Avg=-3.59

Front to Back (YZ)

Total Gain Patterns: Ant7_5G



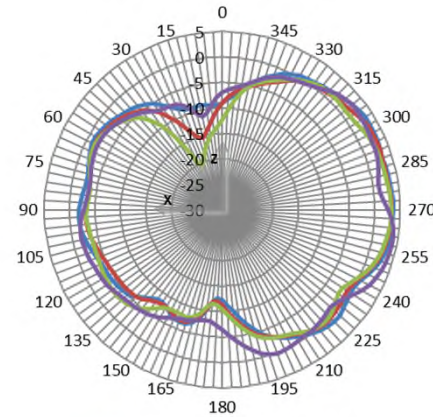
Ant7_5G Azimuth XY



— 5150MHz: Max=3.63 Avg=-0.18
— 5300MHz: Max=3.66 Avg=-0.23
— 5500MHz: Max=3.33 Avg=-0.35
— 5850MHz: Max=4.30 Avg=-0.35

Azimuth (XY)

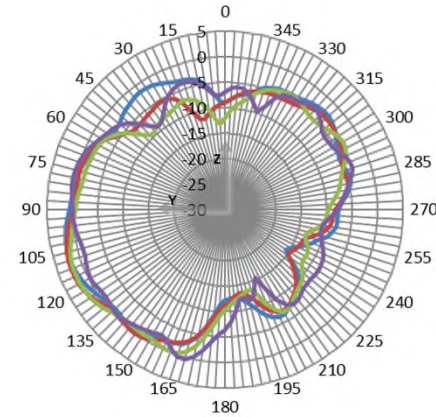
Ant7_5G Elevation XZ



— 5150MHz: Max=3.62 Avg=-1.76
— 5300MHz: Max=3.38 Avg=-2.42
— 5500MHz: Max=3.33 Avg=-2.67
— 5850MHz: Max=4.12 Avg=-1.64

Side to Side (XZ)

Ant7_5G Elevation YZ



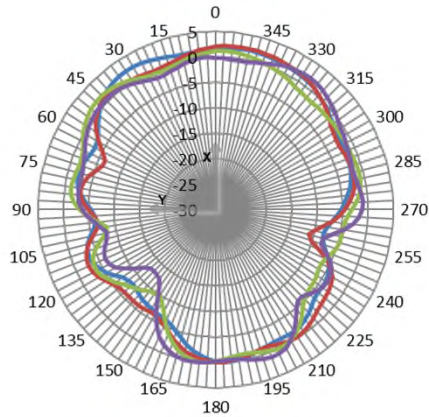
— 5150MHz: Max=2.09 Avg=-3.79
— 5300MHz: Max=2.46 Avg=-4.45
— 5500MHz: Max=2.01 Avg=-4.68
— 5850MHz: Max=0.54 Avg=-4.26

Front to Back (YZ)

Total Gain Patterns: Ant8_5G



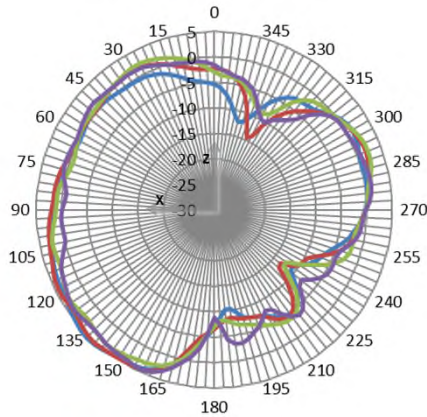
Ant8_5G Azimuth XY



— 5150MHz: Max=2.47 Avg=-1.80
— 5300MHz: Max=2.31 Avg=-1.76
— 5500MHz: Max=1.68 Avg=-1.93
— 5850MHz: Max=1.92 Avg=-1.95

Azimuth (XY)

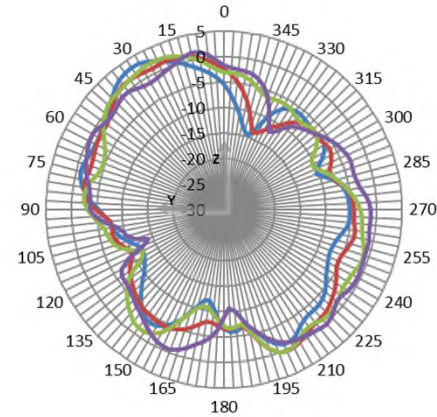
Ant8_5G Elevation XZ



— 5150MHz: Max=5.51 Avg=-0.83
— 5300MHz: Max=5.19 Avg=-0.47
— 5500MHz: Max=3.91 Avg=-0.51
— 5850MHz: Max=4.44 Avg=-0.58

Side to Side (XZ)

Ant8_5G Elevation YZ



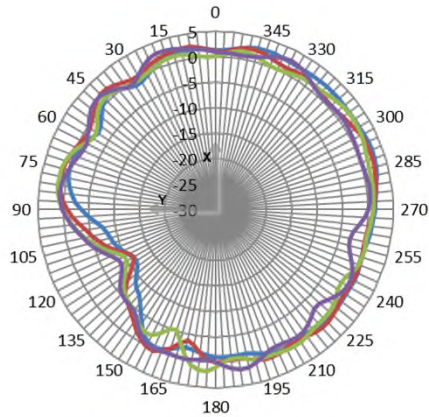
— 5150MHz: Max=3.24 Avg=-4.56
— 5300MHz: Max=1.50 Avg=-3.91
— 5500MHz: Max=2.16 Avg=-3.32
— 5850MHz: Max=1.39 Avg=-2.91

Front to Back (YZ)

Total Gain Patterns: Ant9_5G



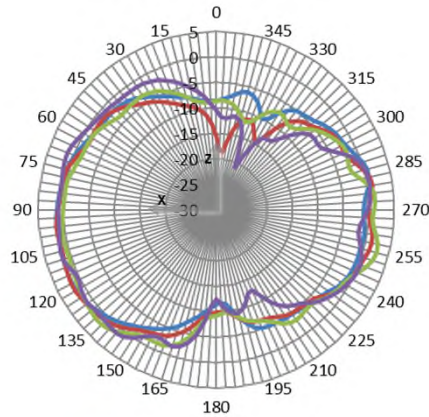
Ant9_5G Azimuth XY



— 5150MHz: Max=2.99 Avg=-0.18
— 5300MHz: Max=2.52 Avg=0.10
— 5500MHz: Max=2.49 Avg=-0.21
— 5850MHz: Max=2.83 Avg=-0.23

Azimuth (XY)

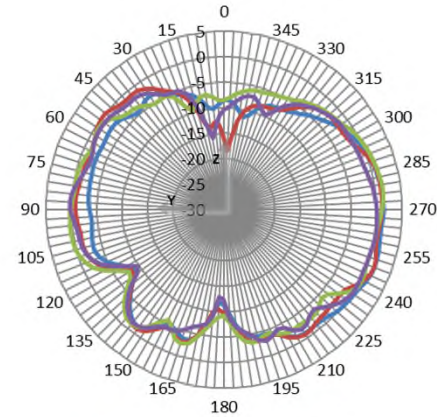
Ant9_5G Elevation XZ



— 5150MHz: Max=1.89 Avg=-2.60
— 5300MHz: Max=1.97 Avg=-2.83
— 5500MHz: Max=2.72 Avg=-2.51
— 5850MHz: Max=1.72 Avg=-2.66

Side to Side (XZ)

Ant9_5G Elevation YZ



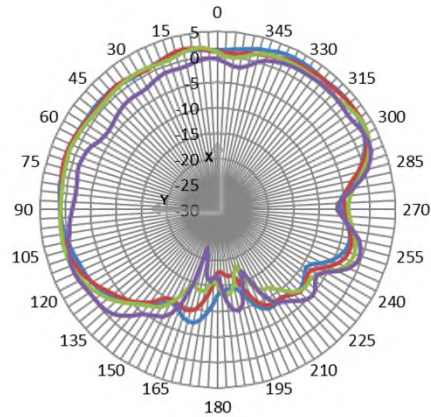
— 5150MHz: Max=1.72 Avg=-3.17
— 5300MHz: Max=1.63 Avg=-2.72
— 5500MHz: Max=1.51 Avg=-2.49
— 5850MHz: Max=0.27 Avg=-3.09

Front to Back (YZ)

Total Gain Patterns: Ant10_5G



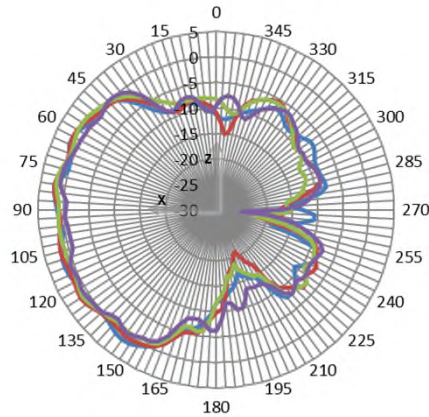
Ant10_5G Azimuth XY



5150MHz: Max=3.51 Avg=-1.23
5300MHz: Max=3.49 Avg=-1.37
5500MHz: Max=3.32 Avg=-1.43
5850MHz: Max=2.65 Avg=-2.30

Azimuth (XY)

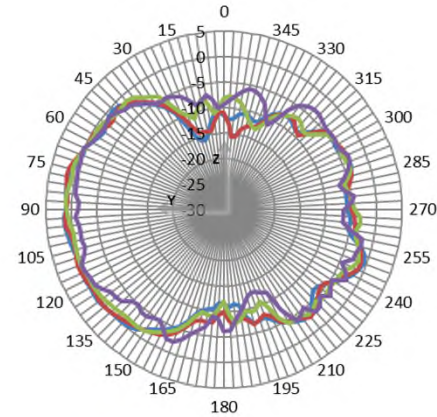
Ant10_5G Elevation XZ



5150MHz: Max=1.96 Avg=-4.54
5300MHz: Max=2.22 Avg=-4.54
5500MHz: Max=1.91 Avg=-4.67
5850MHz: Max=1.10 Avg=-4.90

Side to Side (XZ)

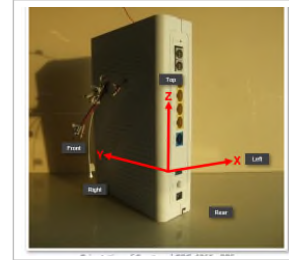
Ant10_5G Elevation YZ



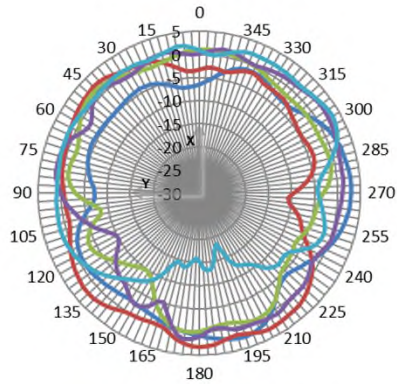
5150MHz: Max=1.47 Avg=-3.98
5300MHz: Max=1.62 Avg=-3.83
5500MHz: Max=1.10 Avg=-3.90
5850MHz: Max=0.01 Avg=-4.18

Front to Back (YZ)

Coverage Total Gain Patterns: Wi-Fi Antennas at 5500MHz



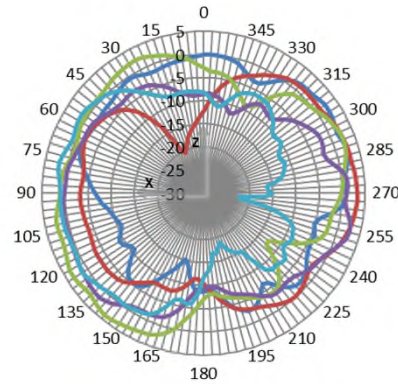
Azimuth XY 5500MHz



Ant6_5G: Max=2.89 Avg=-1.56
Ant7_5G: Max=3.33 Avg=-0.35
Ant8_5G: Max=1.68 Avg=-1.93
Ant9_5G: Max=2.49 Avg=-0.21
Ant10_5G: Max=3.32 Avg=-1.43

Azimuth (XY)

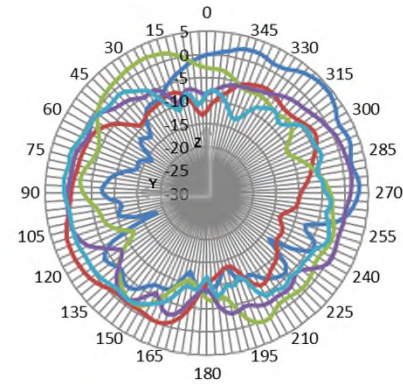
Elevation XZ 5500MHz



Ant6_5G: Max=2.54 Avg=-2.81
Ant7_5G: Max=3.33 Avg=-2.67
Ant8_5G: Max=3.91 Avg=-0.51
Ant9_5G: Max=2.72 Avg=-2.51
Ant10_5G: Max=1.91 Avg=-4.67

Side to Side (XZ)

Elevation YZ 5500MHz



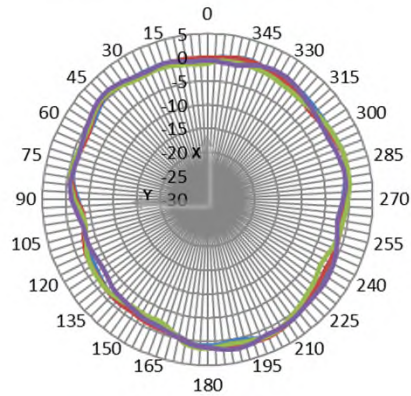
Ant6_5G: Max=4.36 Avg=-3.45
Ant7_5G: Max=2.01 Avg=-4.68
Ant8_5G: Max=2.16 Avg=-3.32
Ant9_5G: Max=1.51 Avg=-2.49
Ant10_5G: Max=1.10 Avg=-3.90

Front to Back (YZ)

Uncorrelated Gain Patterns: Wi-Fi Antennas at 5G



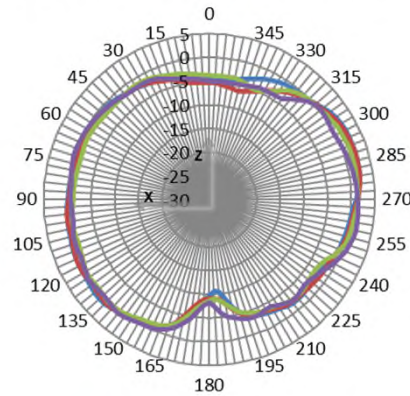
Uncorrelated_5G Azimuth XY



5150MHz: Max=1.48 Avg=-0.45
5300MHz: Max=1.75 Avg=-0.38
5500MHz: Max=1.53 Avg=-0.66
5800MHz: Max=2.15 Avg=-0.45

Azimuth (XY)

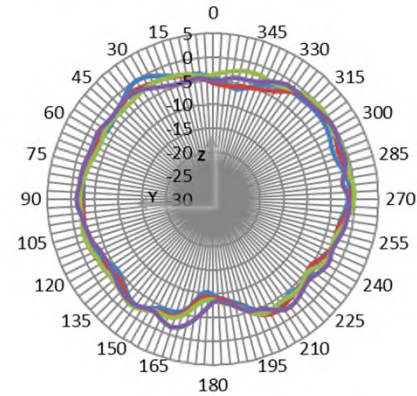
Uncorrelated_5G Elevation XZ



5150MHz: Max=2.39 Avg=-1.10
5300MHz: Max=2.35 Avg=-1.32
5500MHz: Max=1.60 Avg=-1.56
5800MHz: Max=1.71 Avg=-1.37

Side to Side (XZ)

Uncorrelated_5G Elevation YZ



5150MHz: Max=-0.26 Avg=-3.25
5300MHz: Max=-0.42 Avg=-3.07
5500MHz: Max=-0.03 Avg=-2.68
5800MHz: Max=-0.33 Avg=-2.69

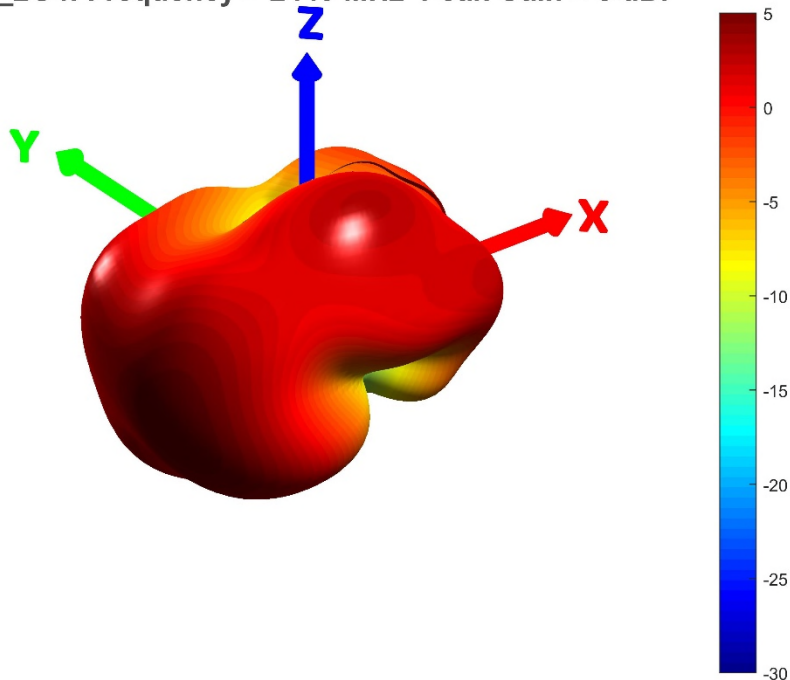
Front to Back (YZ)



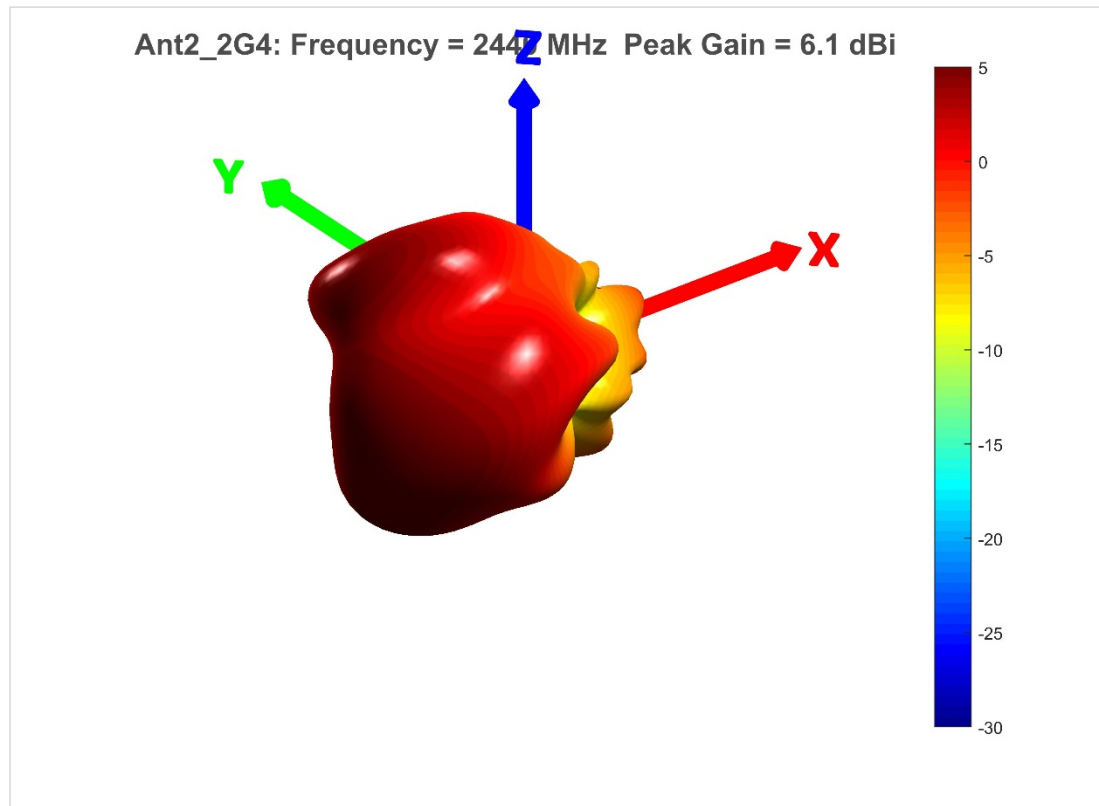
Total Gain 3D Pattern: Ant1_2G4 at 2440MHz



Ant1_2G4: Frequency = 2440 MHz Peak Gain = 5 dBi



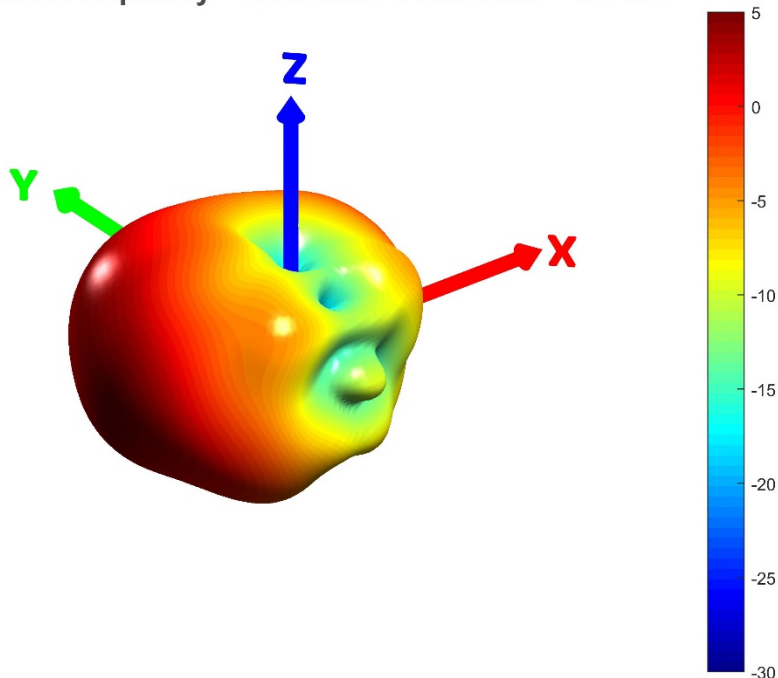
Total Gain 3D Pattern: Ant2_2G4 at 2440MHz



Total Gain 3D Pattern: Ant3_2G4 at 2440MHz



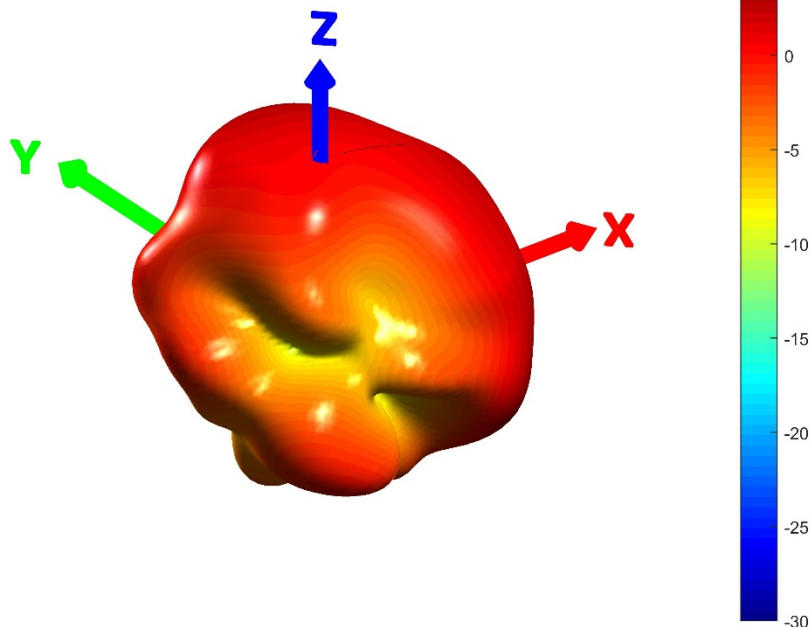
Ant3_2G4: Frequency = 2440 MHz Peak Gain = 6.4 dBi



Total Gain 3D Pattern: Ant4_2G4 at 2440MHz



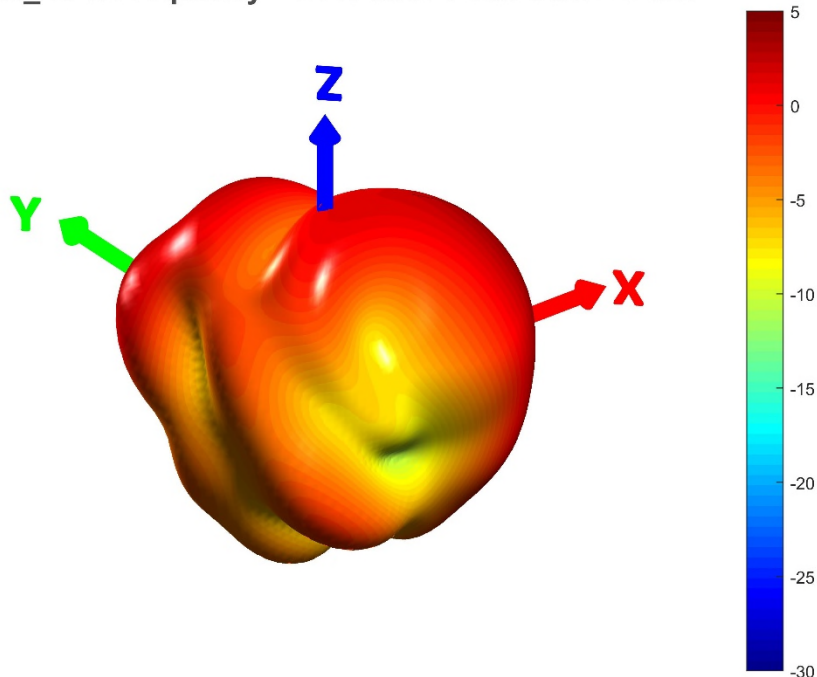
Ant4_2G4: Frequency = 2440 MHz Peak Gain = 3.9 dBi



Total Gain 3D Pattern: Ant5_2G4 at 2440MHz



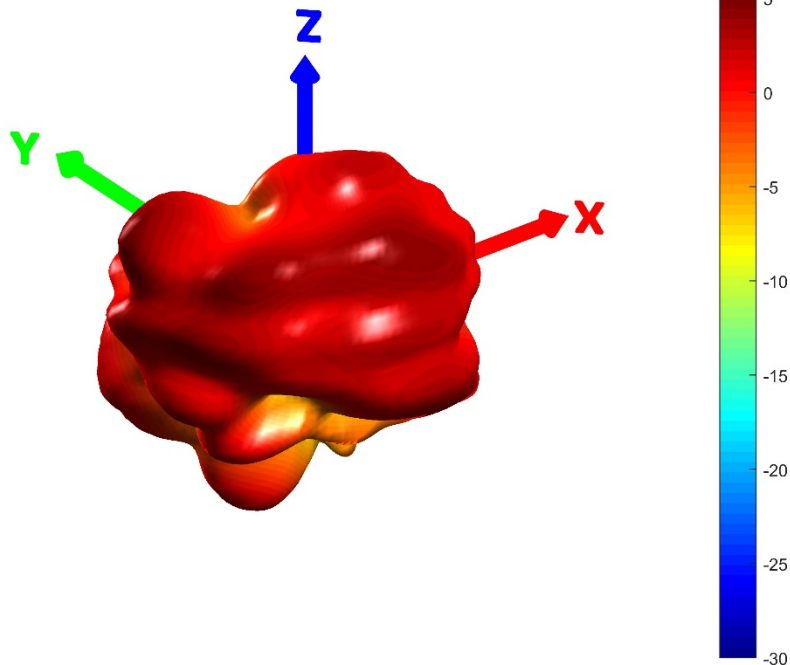
Ant5_2G4: Frequency = 2440 MHz Peak Gain = 5 dBi



Total Gain 3D Pattern: Ant6_5G at 5500MHz



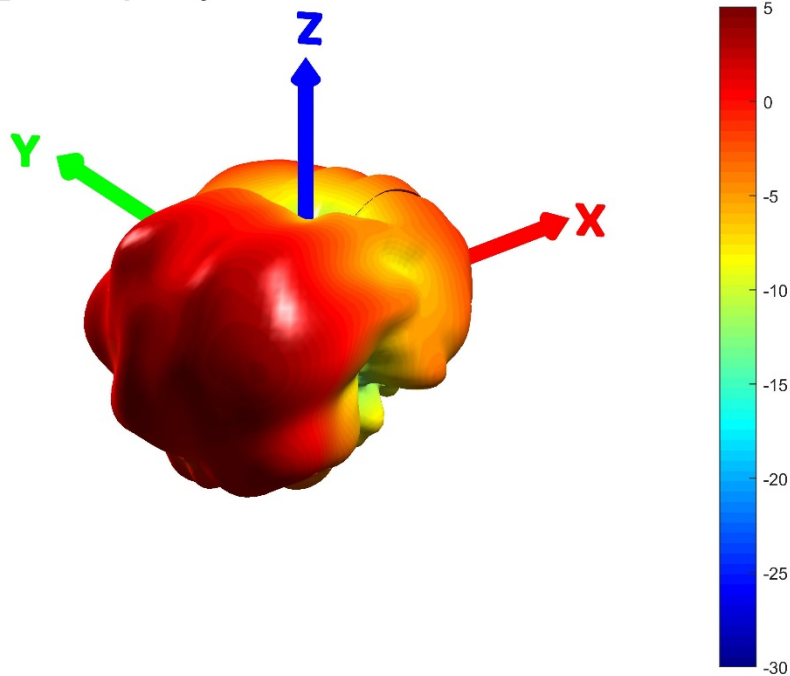
Ant6_5G: Frequency = 5500 MHz Peak Gain = 4.5 dBi



Total Gain 3D Pattern: Ant7_5G at 5500MHz



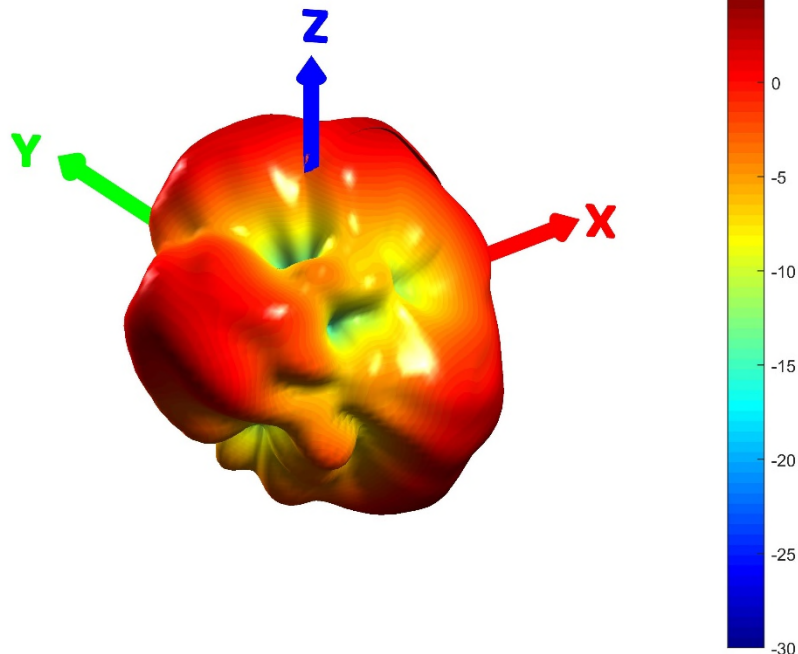
Ant7_5G: Frequency = 5500 MHz Peak Gain = 4.5 dBi



Total Gain 3D Pattern: Ant8_5G at 5500MHz



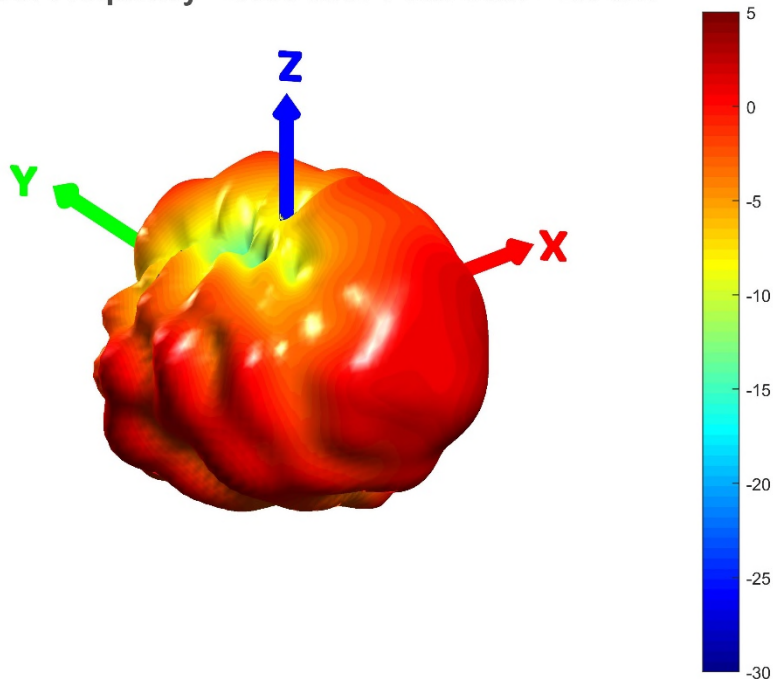
Ant8_5G: Frequency = 5500 MHz Peak Gain = 5 dBi



Total Gain 3D Pattern: Ant9_5G at 5500MHz



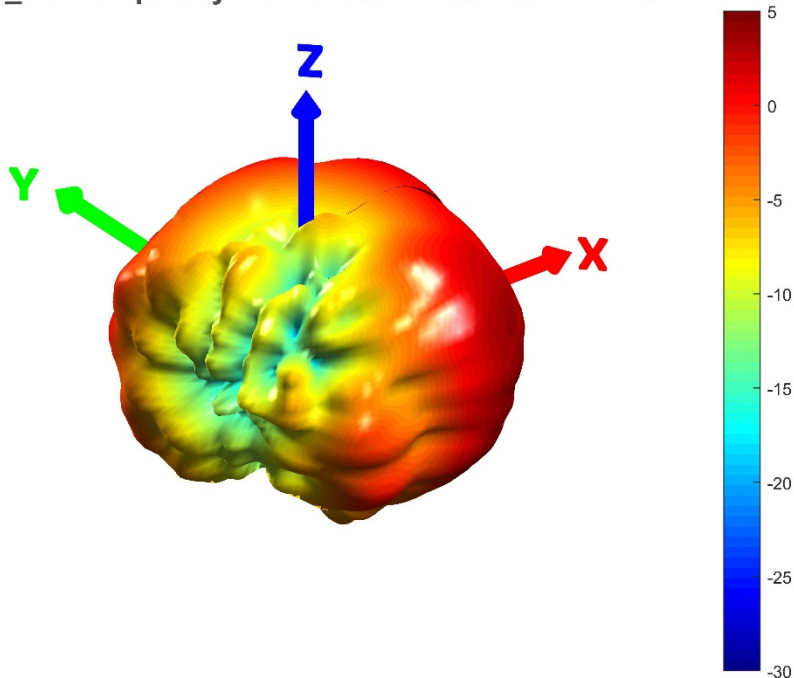
Ant9_5G: Frequency = 5500 MHz Peak Gain = 2.8 dBi



Total Gain 3D Pattern: Ant10_5G at 5500MHz



Ant10_5G: Frequency = 5500 MHz Peak Gain = 4.4 dBi



Conclusions



- Return Loss :
2G Antenna < -10 dB;
5G Antenna < -10dB;
- Isolation:
2G < -22dB;
5G < -27dB;
- Efficiency:
2G_Average > 65%
5G_Average > 65%
- Uncorrelated Gain :
3.4dB < 2G < 3.9dB
1.6dB < 5G < 2.4dB

The actual performance will be based on the final customer device