

VHC25 Antenna Testing Report

- Latest Heatsink

Provided by Patrick Tsai

2020/08/11



Contents VHC25

- Summary
- Antenna Placement
- Isolation



■ The measurement results are shown below

- Antenna Type
 - Pi-fa type antenna
- Reflection Coefficient
 - Under -10dB for all antennas
- Isolation
 - Under 19.2dB for all antennas
 - 25.9dB @ 2.4GHz for 5.2GHz WiFi and IoT Radios; 24.9dB @ 5.2GHz for 5.2GHz WiFi and IoT Radios
 - 26.1dBi @ 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi; 27.8dBi @ 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi
- Efficiency
 - ~ 60.6% @ 2.4GHz for 5.2GHz WiFi and IoT Radios; ~ 72.0% @ 5.7GHz for 5.2GHz WiFi and IoT Radios
 - ~ 62.3% @ 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi; ~ 70.4% @ 5.2GHz for 5.7GHz WiFi and 2.4GHz WiFi
- Peak Gain
 - 2.3dBi @ 2.4GHz for 5.2GHz WiFi and IoT Radios; 3.6dBi @ 5.2GHz for 5.2GHz WiFi and IoT Radios
 - 2.2dBi @ 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi; 4.1dBi @ 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi

p.s. The measurement is considered the 1.13 coaxial cable and sponges with side cover.



2.4GHz for 5.2GHz WiFi and IoT Radios

- **Minimum Isolation**

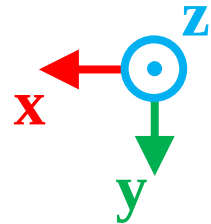
- 25.9dB on 2.4GHz

- **Efficiency**

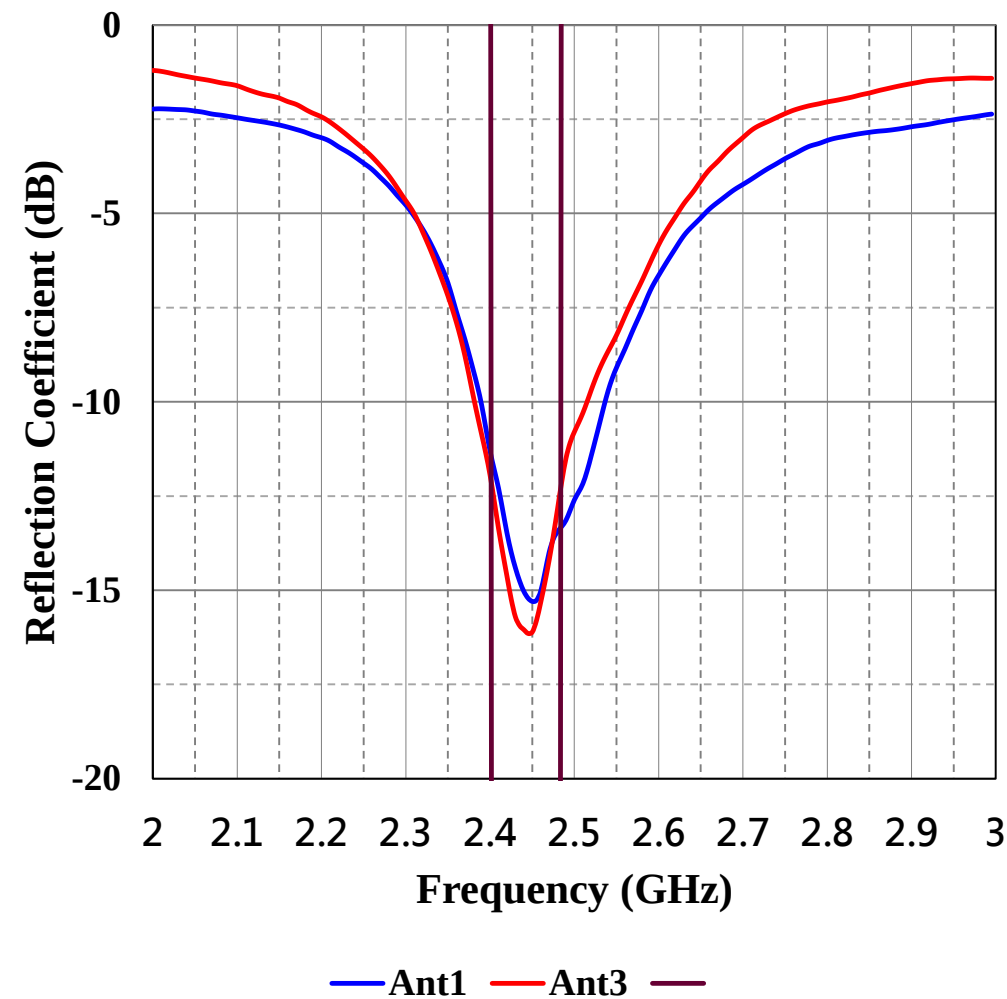
- ~60.6% on 2.4GHz

- **Peak Gain**

- 2.3dBi on 2.4GHz



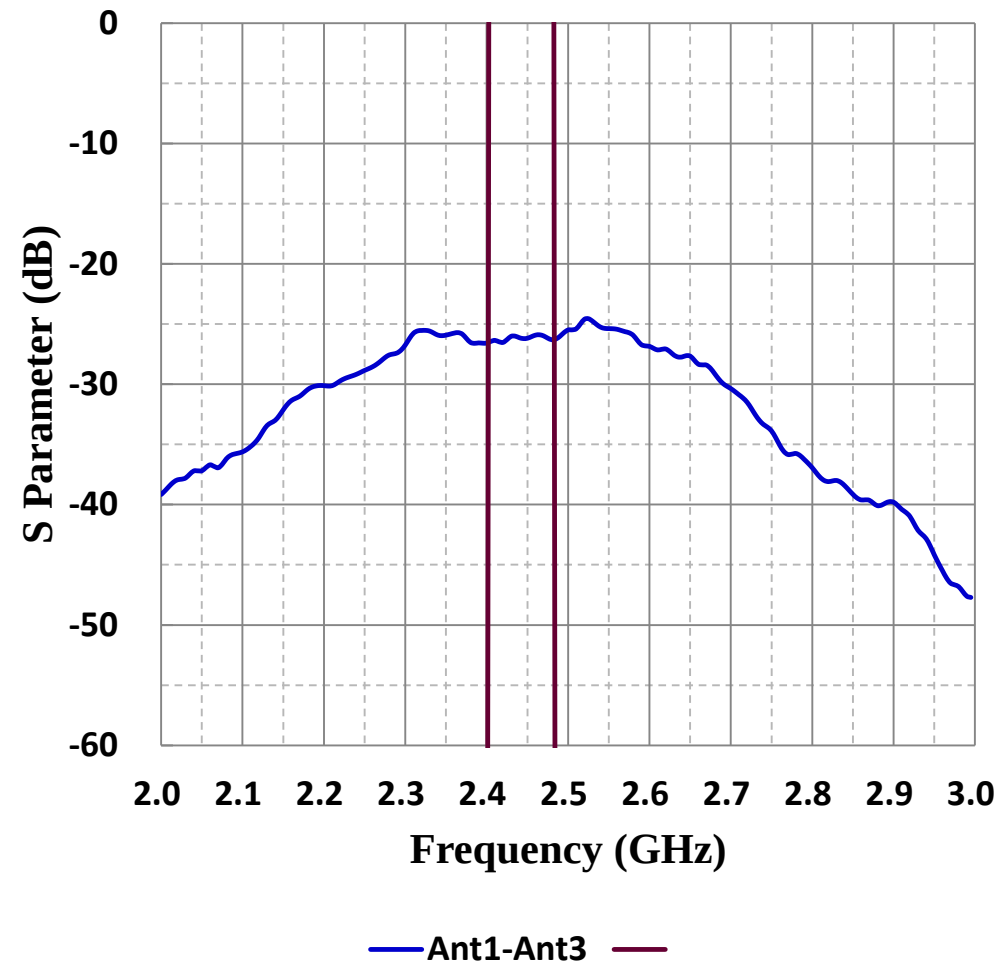
S Parameter 2.4GHz for 5.2GHz WiFi and IoT Radios



2.4GHz	Max	Mean	Min
Ant1	-11.3 dB	-13.9 dB	-15.3 dB
Ant3	-12.0 dB	-14.6 dB	-16.1 dB



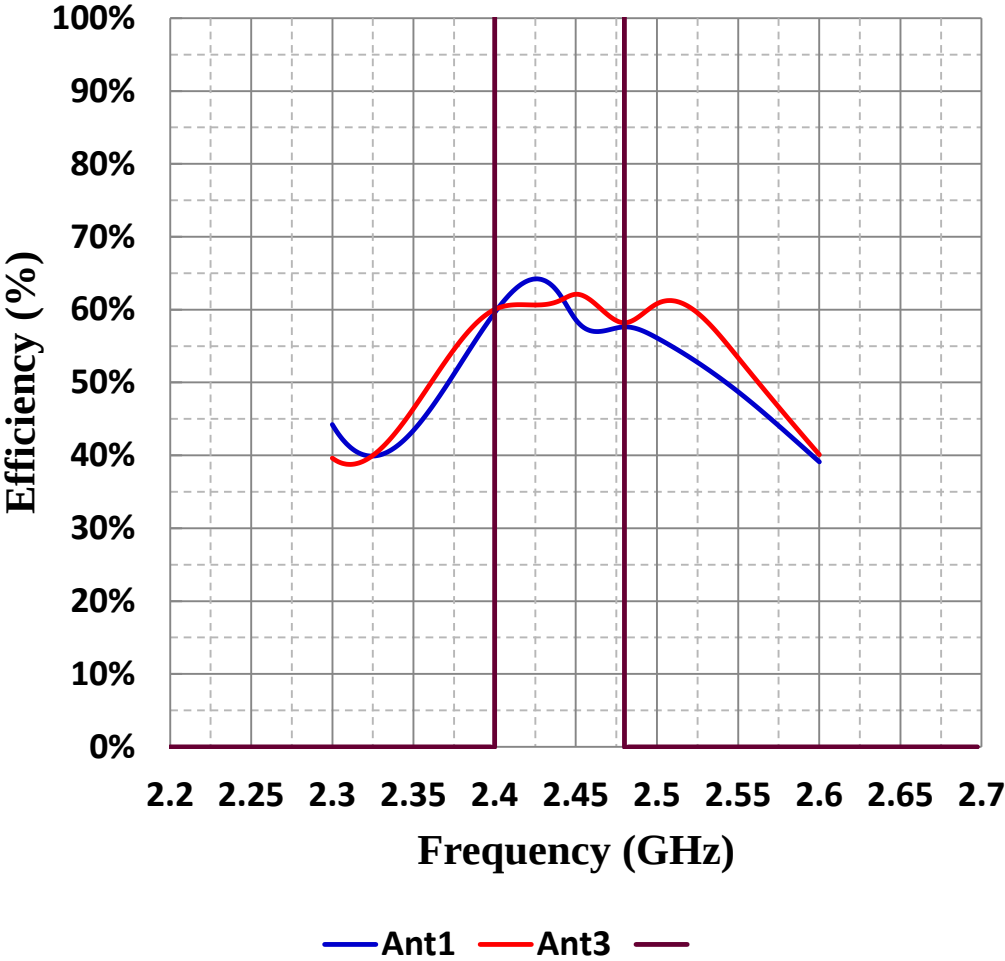
Isolation 2.4GHz for 5.2GHz WiFi and IoT Radios



2.4GHz	Max	Mean	Min
Ant1-Ant3	-25.9 dB	-26.2 dB	-26.6 dB



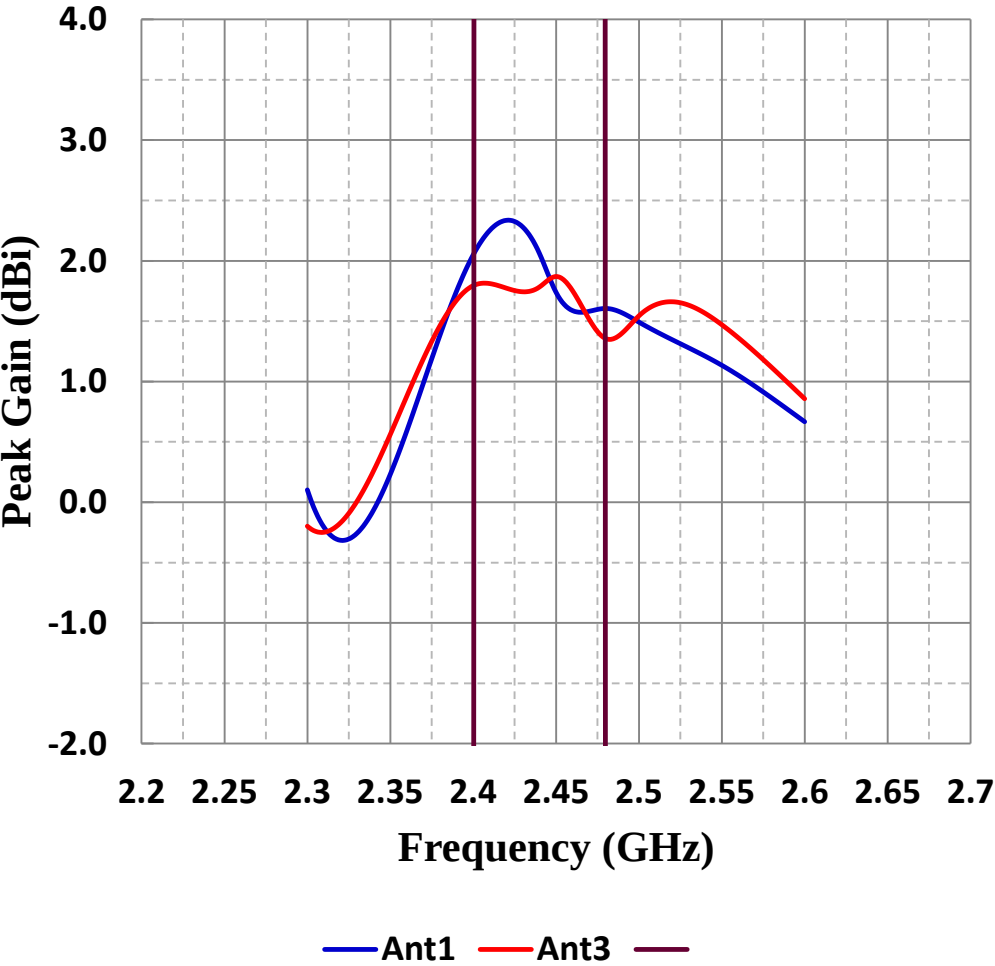
Efficiency 2.4GHz for 5.2GHz WiFi and IoT Radios



2.4GHz	Max	Mean	Min
Ant1	64.2%	60.5%	57.0%
Ant3	62.1%	60.6%	58.3%



Peak Gain 2.4GHz for 5.2GHz WiFi and IoT Radios

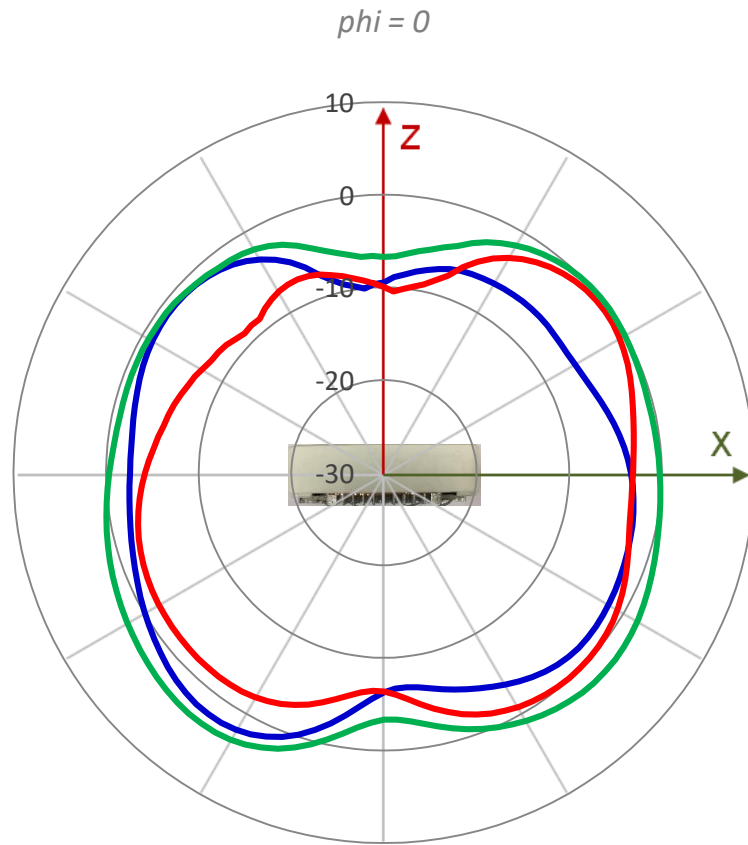


2.4GHz	Max	Mean	Min
Ant1	2.3 dBi	2.0 dBi	1.6 dBi
Ant3	1.9 dBi	1.7 dBi	1.4 dBi

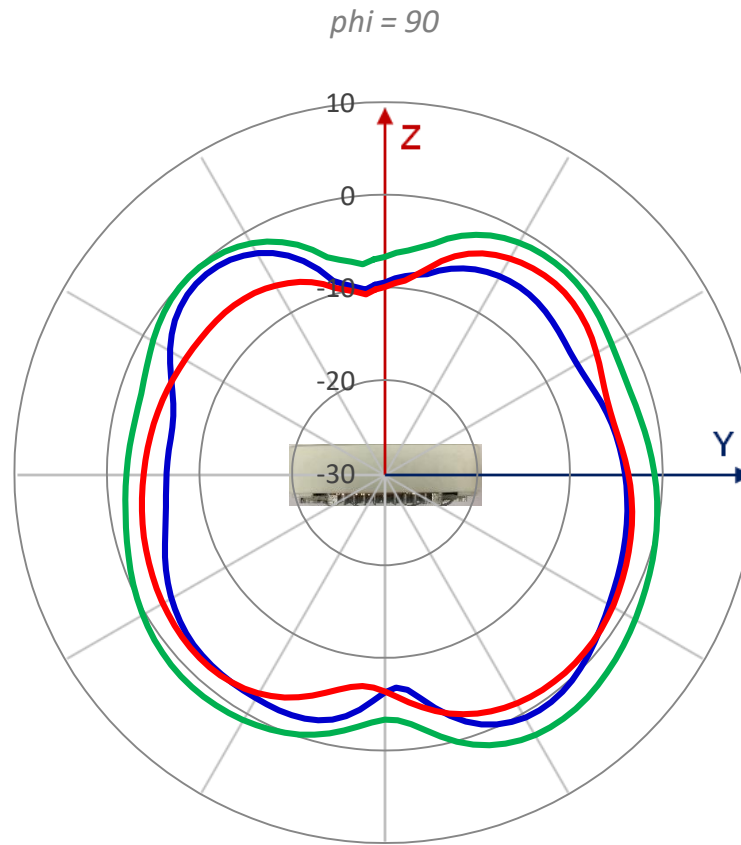


Realized Gain Pattern 2.4GHz for 5.2GHz WiFi and IoT Radios @2400MHz for G_{total}

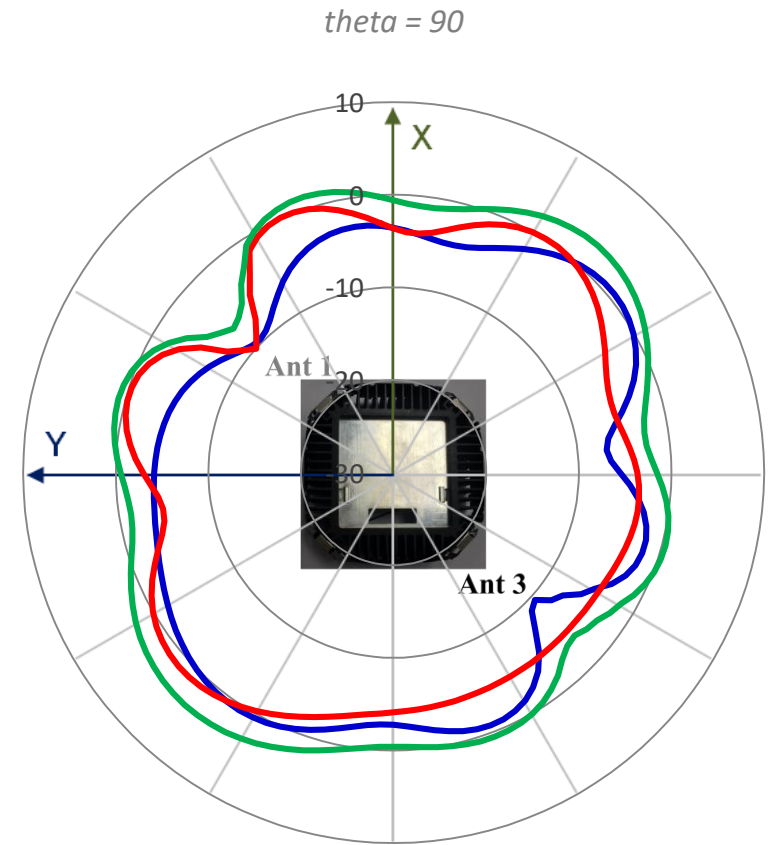
Unit: dBi



— Ant1 — Ant3 — Composite



— Ant1 — Ant3 — Composite

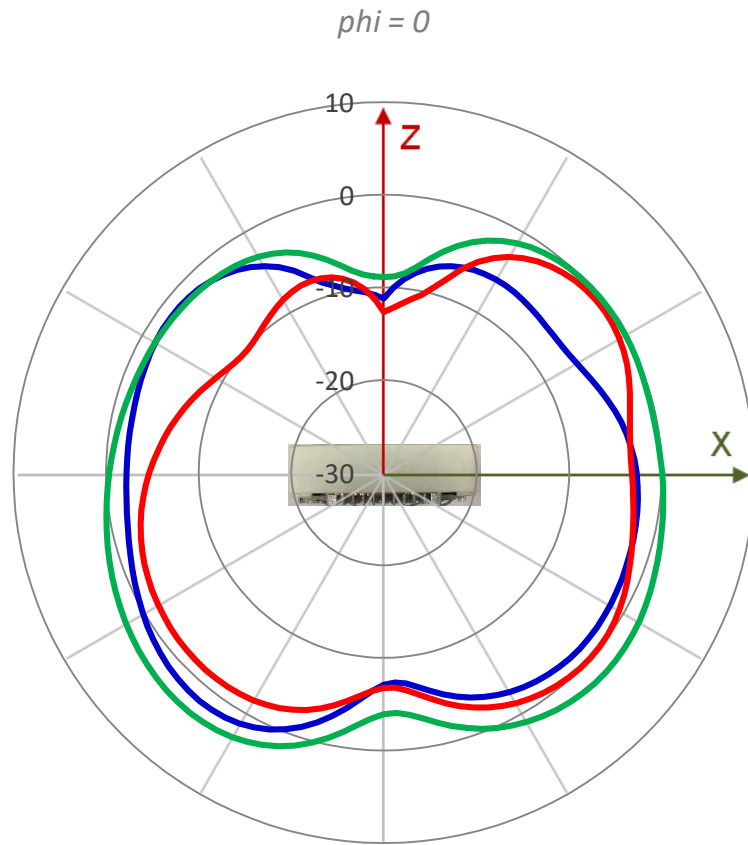


— Ant1 — Ant3 — Composite

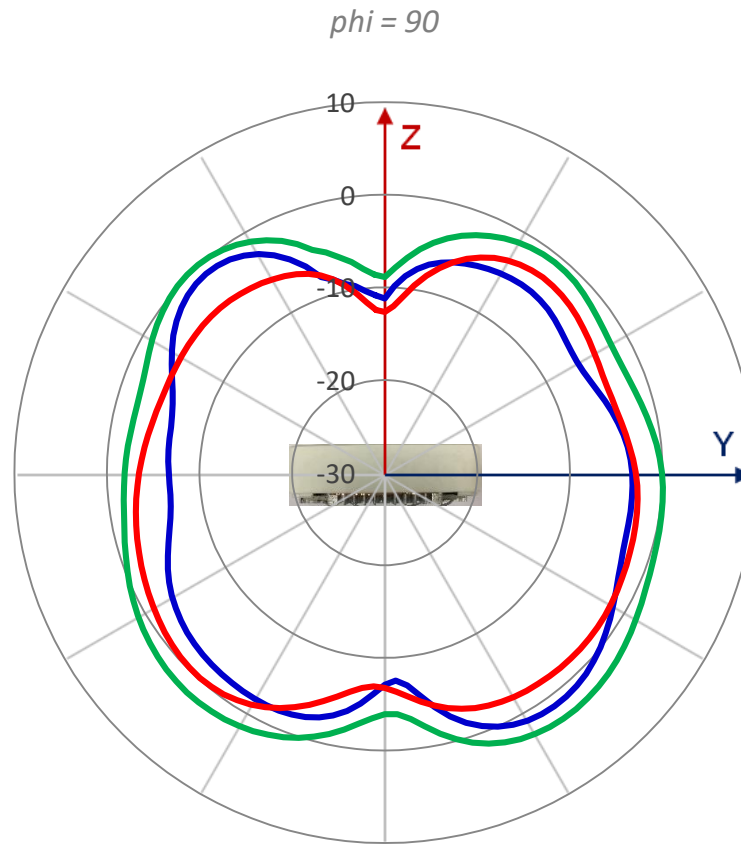


Realized Gain Pattern 2.4GHz for 5.2GHz WiFi and IoT Radios @2440MHz for G_{total}

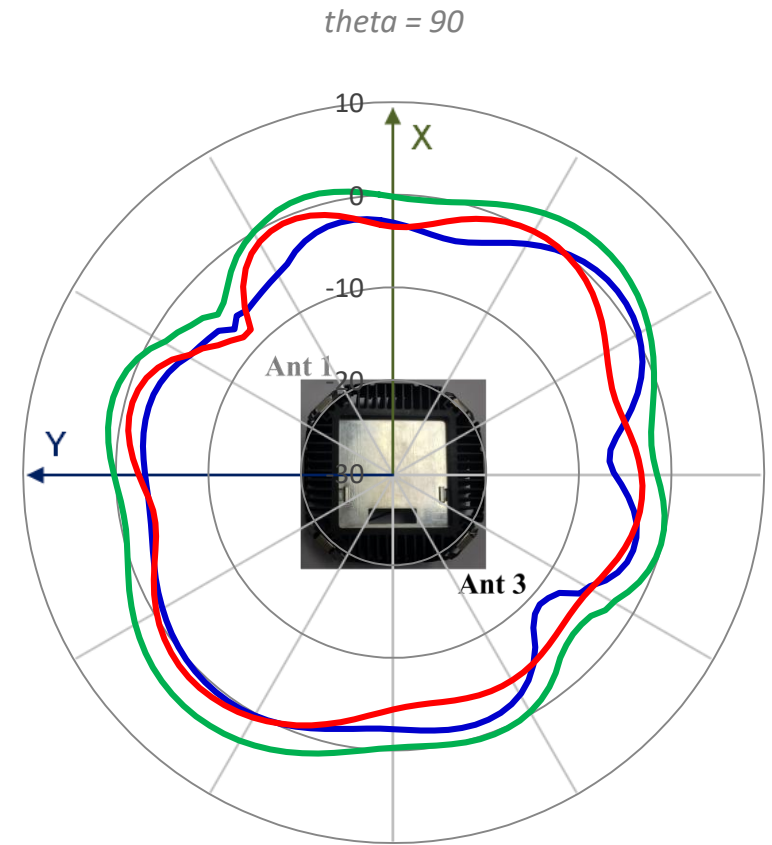
Unit: dBi



— Ant1 — Ant3 — Composite



— Ant1 — Ant3 — Composite

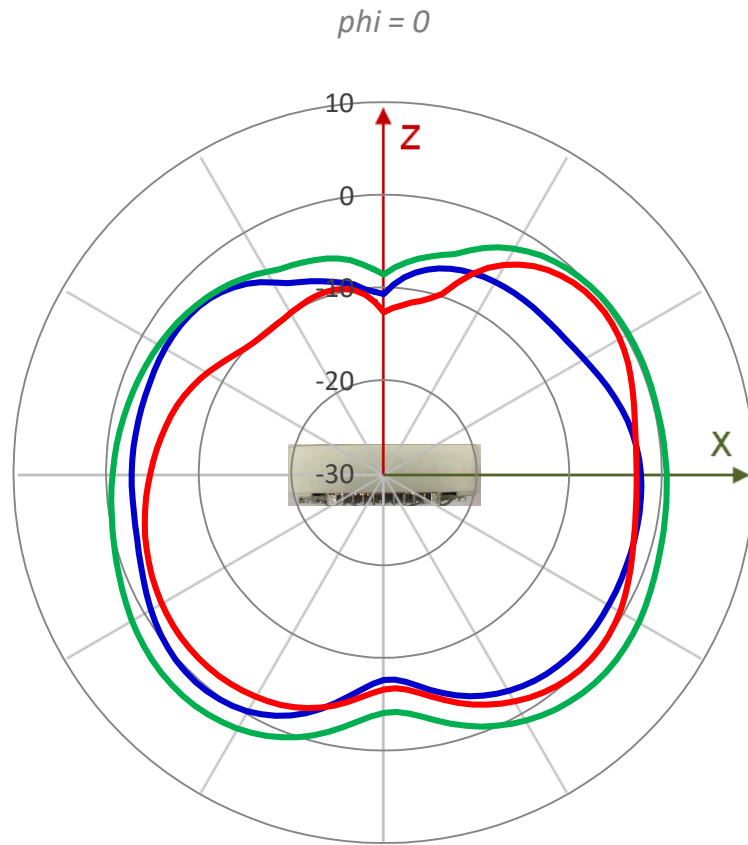


— Ant1 — Ant3 — Composite

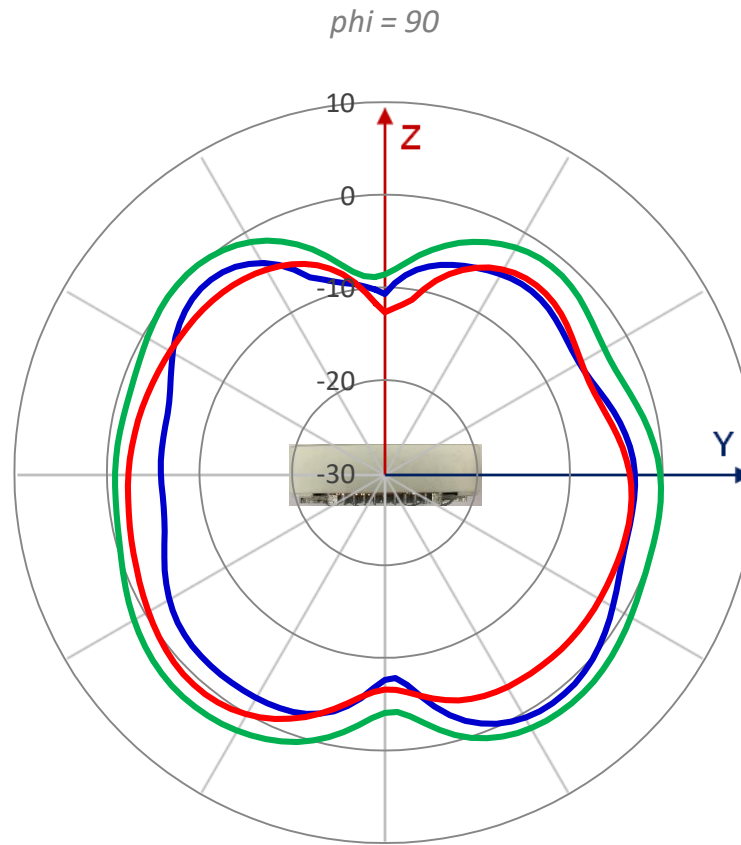


Realized Gain Pattern 2.4GHz for 5.2GHz WiFi and IoT Radios @2480MHz for G_{total}

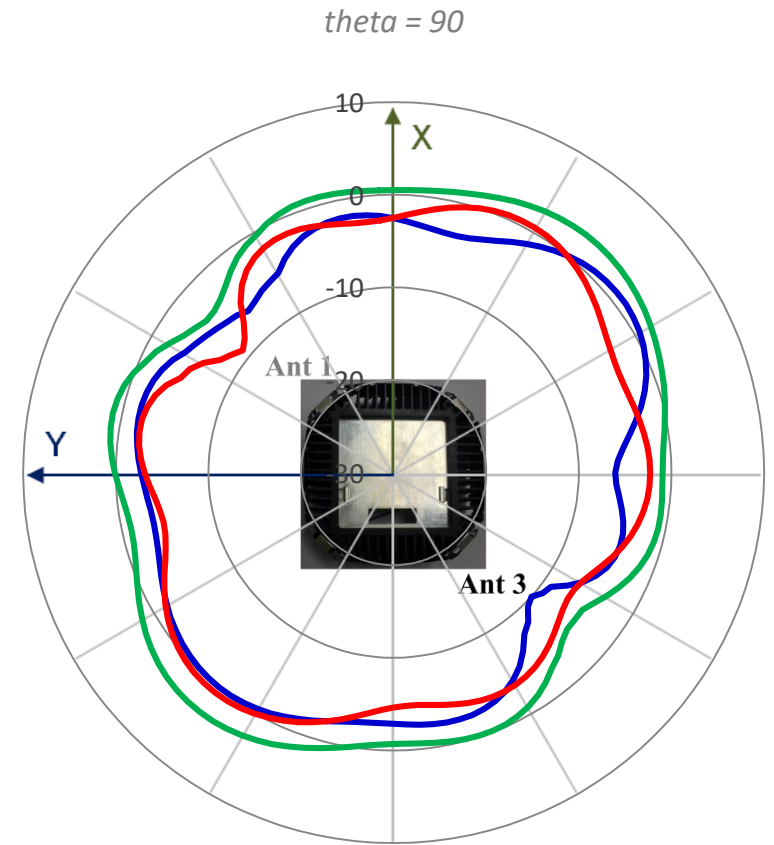
Unit: dBi



— Ant1 — Ant3 — Composite



— Ant1 — Ant3 — Composite



— Ant1 — Ant3 — Composite



5.2GHz for 5.2GHz WiFi and IoT Radios

- **Minimum Isolation**

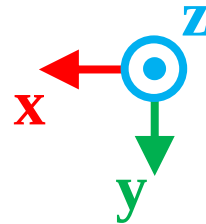
- 24.9dB on 5.2GHz

- **Efficiency**

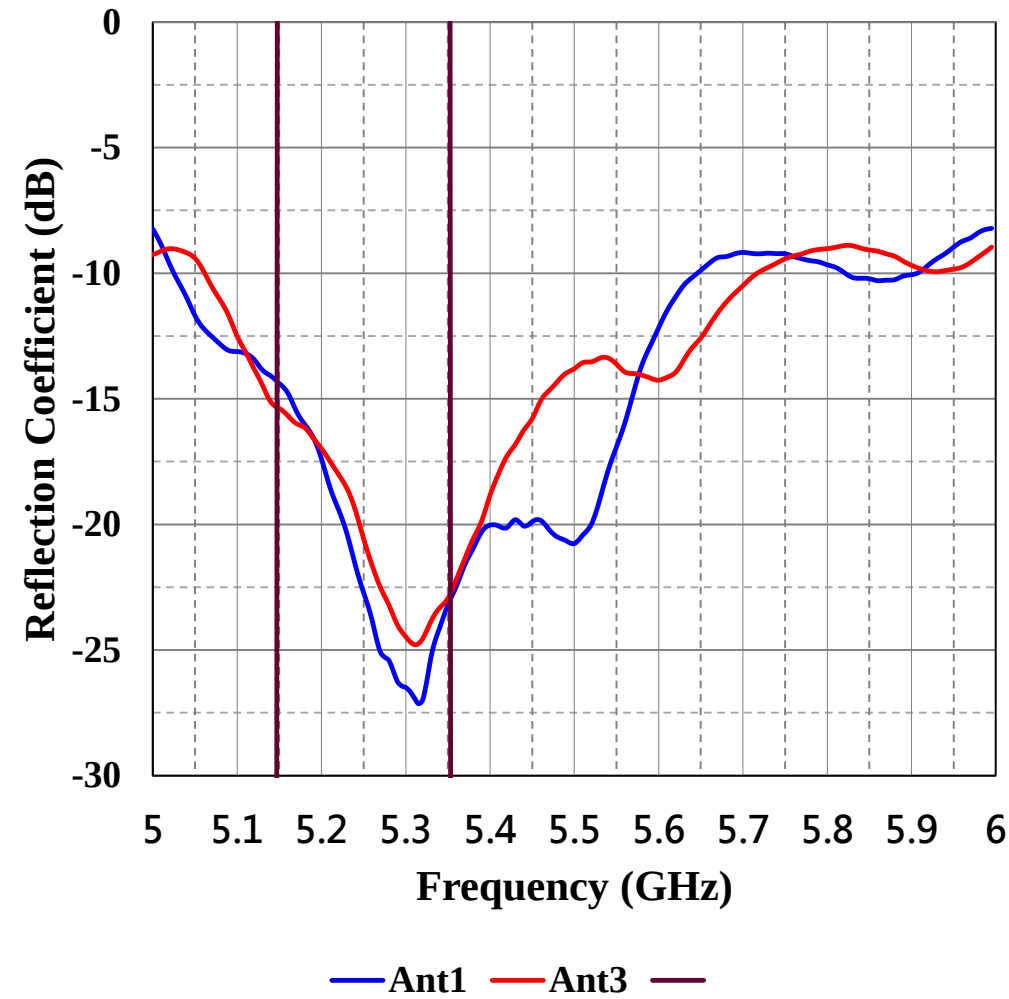
- ~72.0% on 5.2GHz

- **Peak Gain**

- 3.6dBi on 5.2GHz



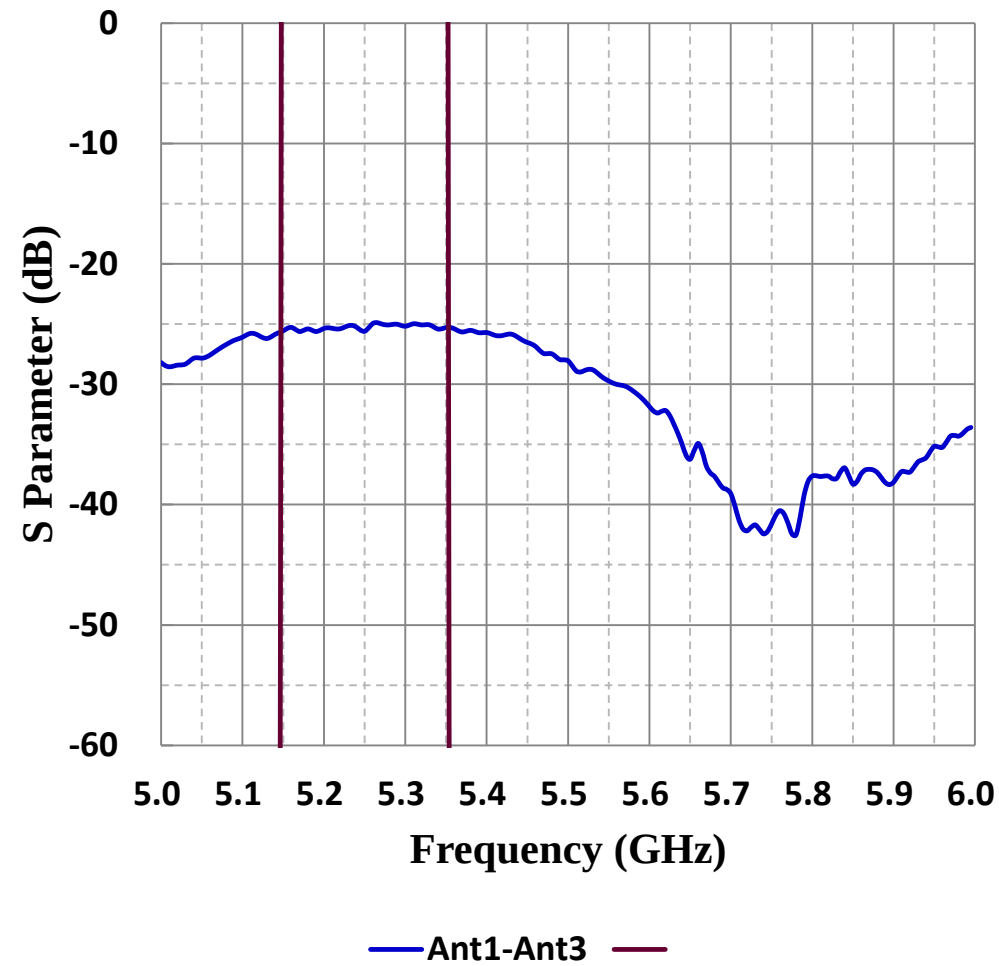
S Parameter 5.2GHz for 5.2GHz WiFi and IoT Radios



5.2GHz	Max	Mean	Min
Ant1	-14.4 dB	-21.5 dB	-27.1 dB
Ant3	-15.4 dB	-20.3 dB	-24.8 dB



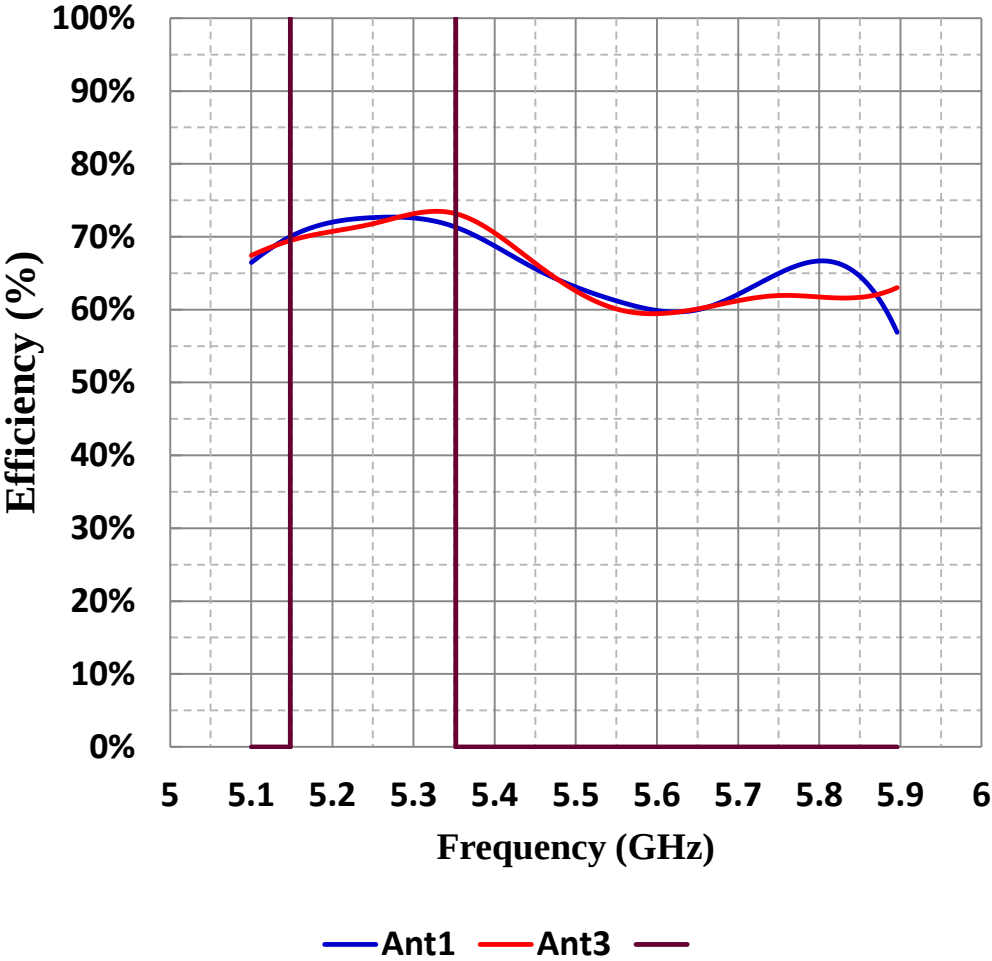
Isolation 5.2GHz for 5.2GHz WiFi and IoT Radios



5.2GHz	Max	Mean	Min
Ant1-Ant3	-24.9 dB	-25.3 dB	-25.6 dB



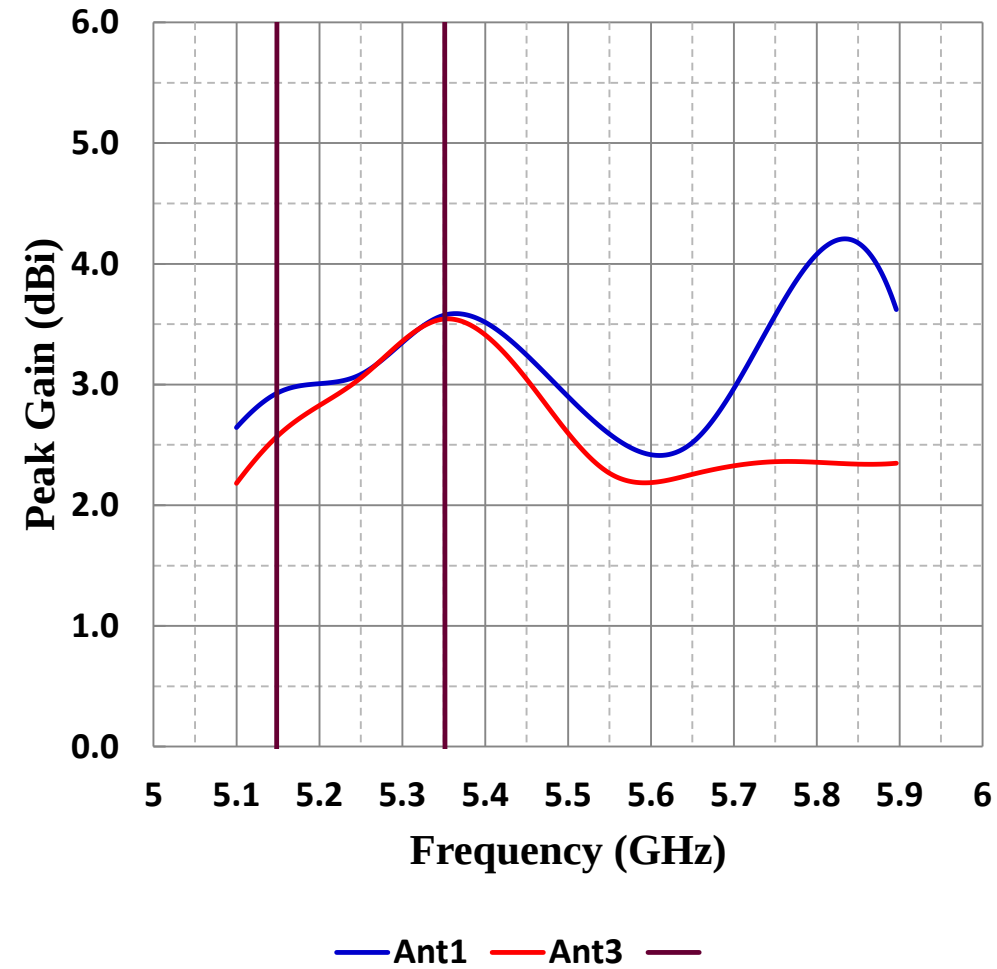
Efficiency 5.2GHz for 5.2GHz WiFi and IoT Radios



5.2GHz	Max	Mean	Min
Ant1	72.7%	72.1%	70.2%
Ant3	73.5%	71.8%	69.6%



Peak Gain 5.2GHz for 5.2GHz WiFi and IoT Radios

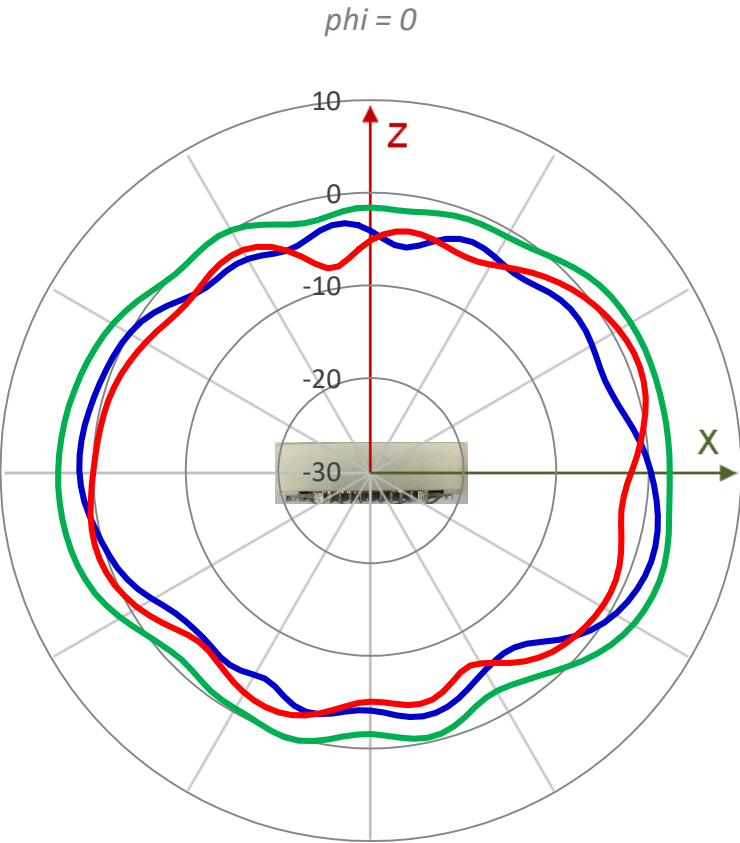


5.2GHz	Max	Mean	Min
Ant1	3.6 dBi	3.2 dBi	2.9 dBi
Ant3	3.5 dBi	3.1 dBi	2.6 dBi

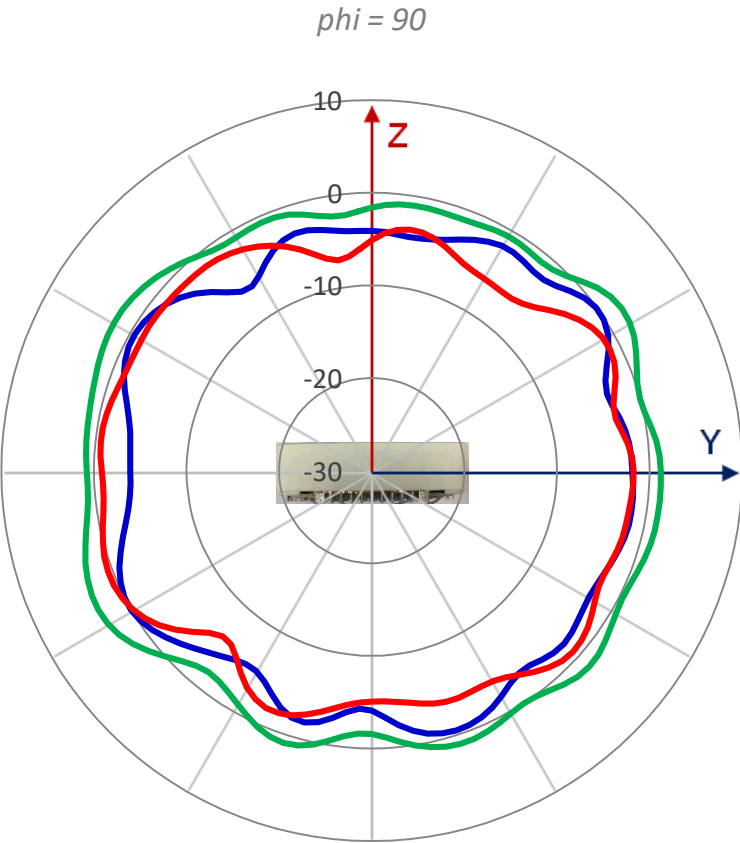


Realized Gain Pattern 5.2GHz for 5.2GHz WiFi and IoT Radios @5150MHz for G_{total}

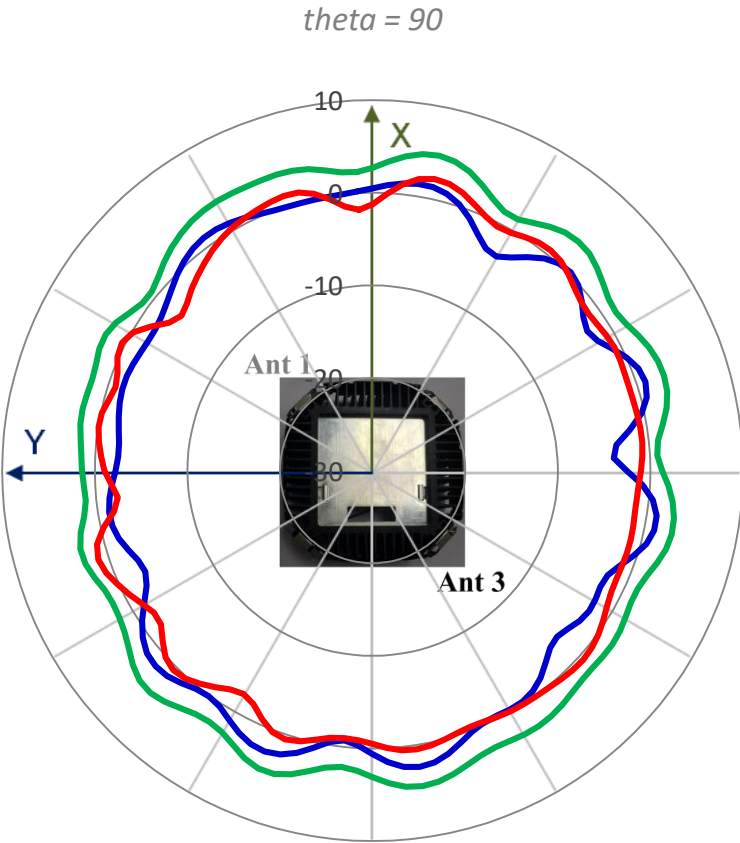
Unit: dBi



Ant1 Ant3 Composite



Ant1 Ant3 Composite

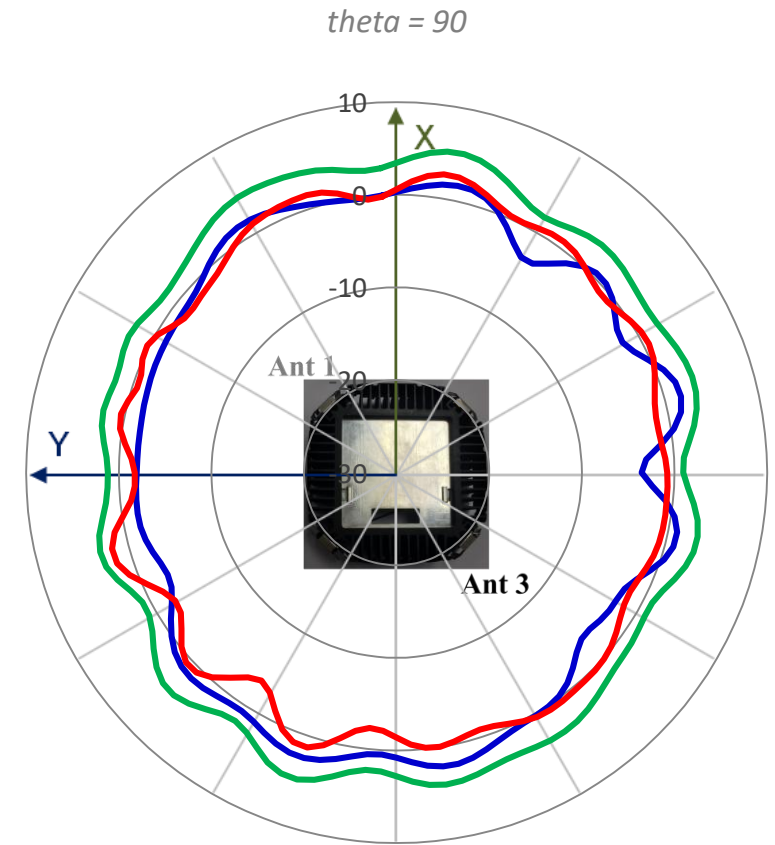
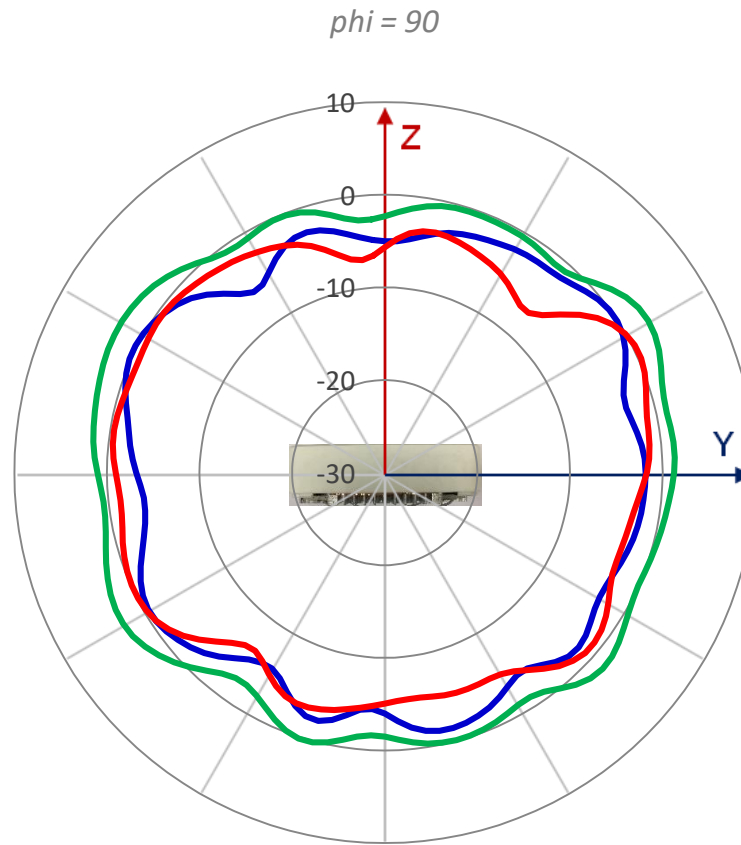
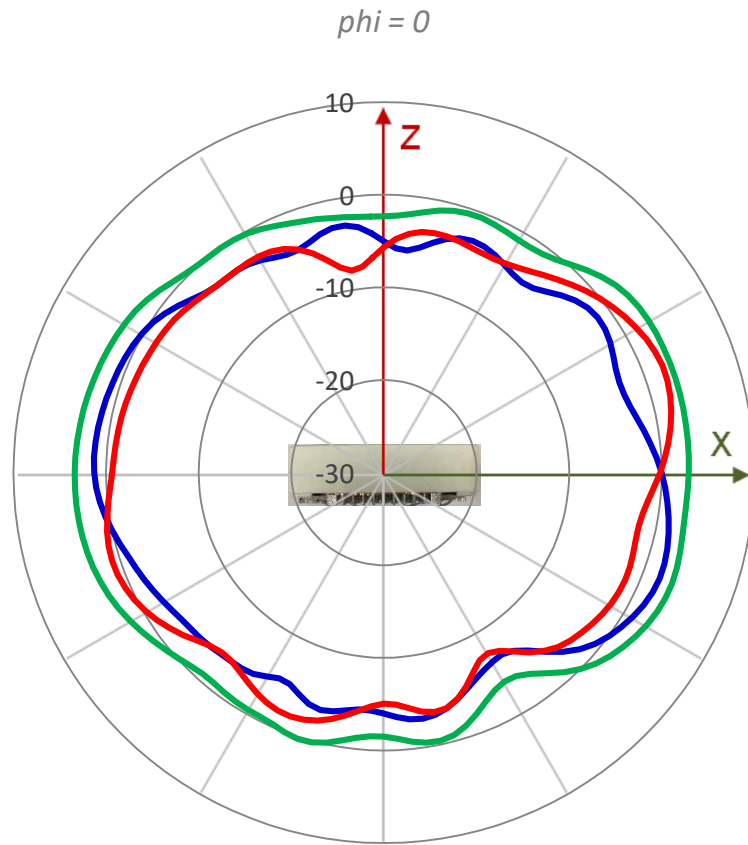


Ant1 Ant3 Composite



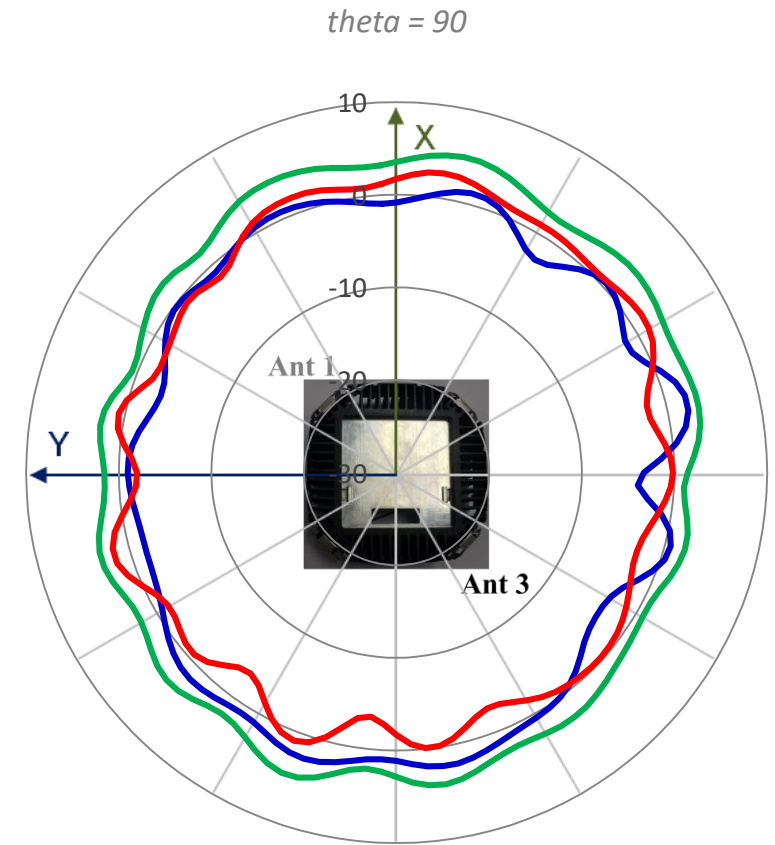
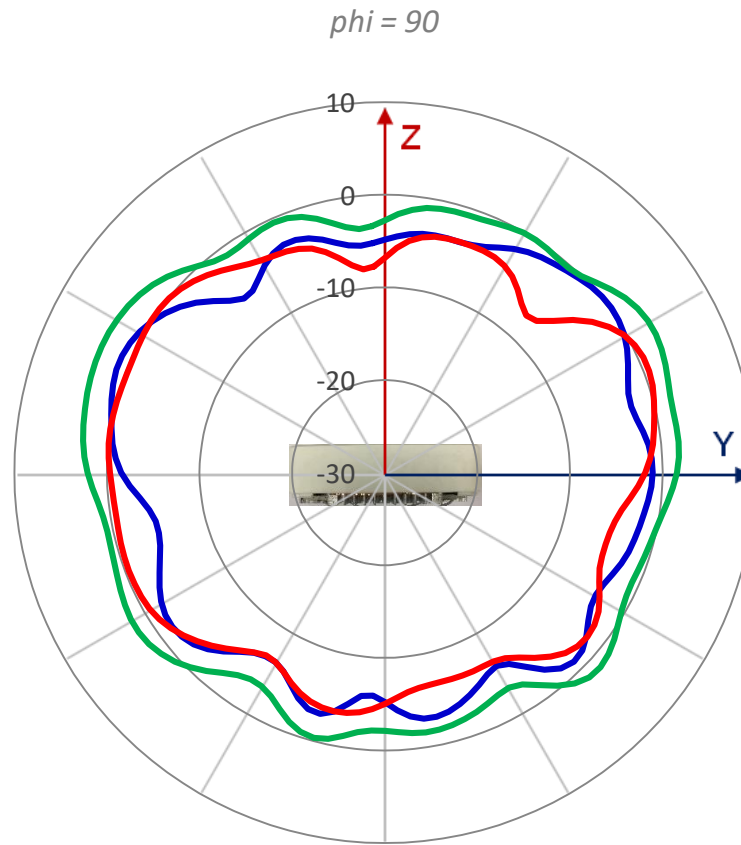
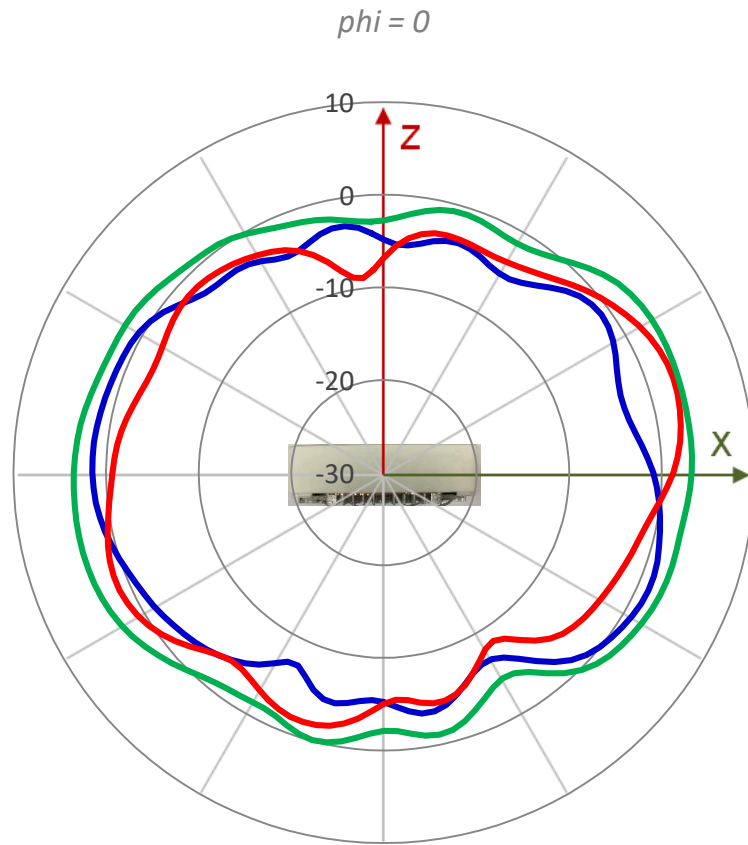
Realized Gain Pattern 5.2GHz for 5.2GHz WiFi and IoT Radios @5250MHz for G_{total}

Unit: dBi



Realized Gain Pattern 5.2GHz for 5.2GHz WiFi and IoT Radios @5350MHz for G_{total}

Unit: dBi



2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi

- **Minimum Isolation**

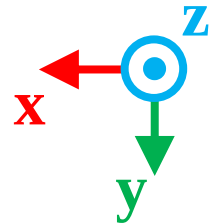
- 26.1dB on 2.4GHz

- **Efficiency**

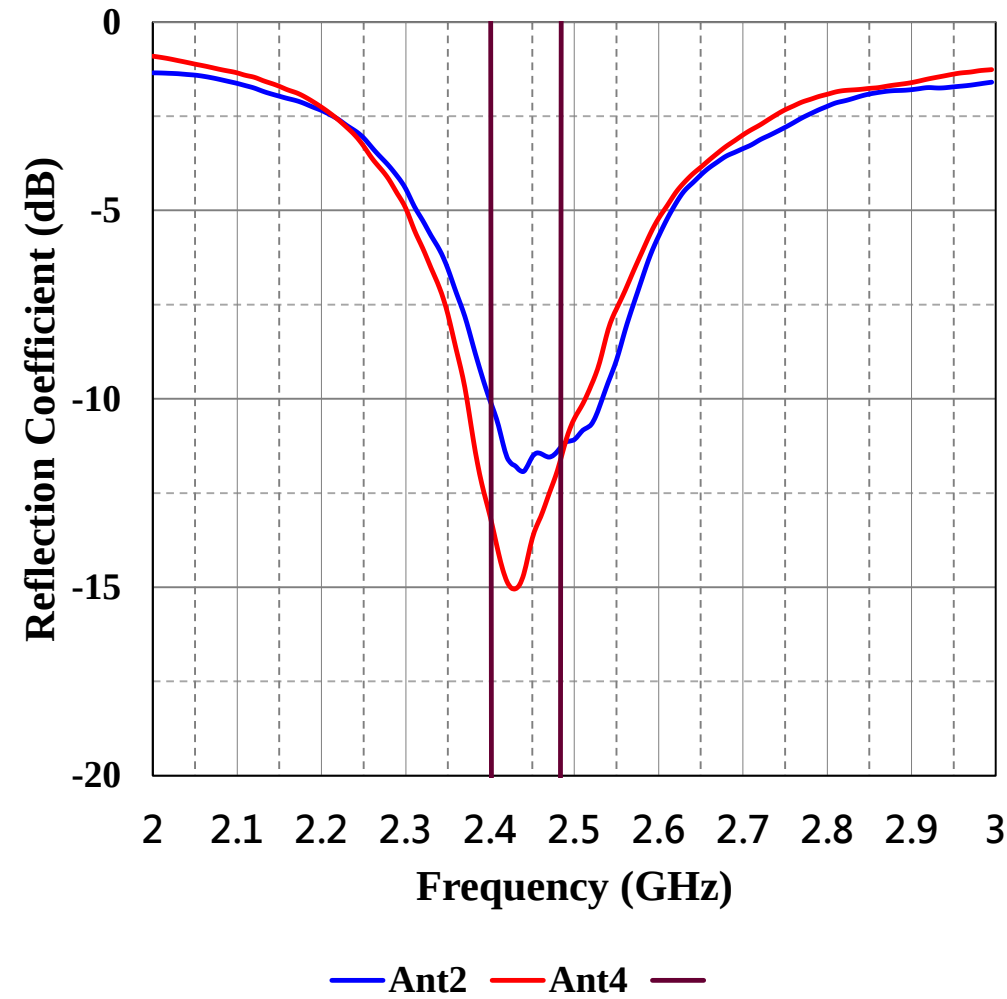
- ~62.3% on 2.4GHz

- **Peak Gain**

- 2.2dBi on 2.4GHz



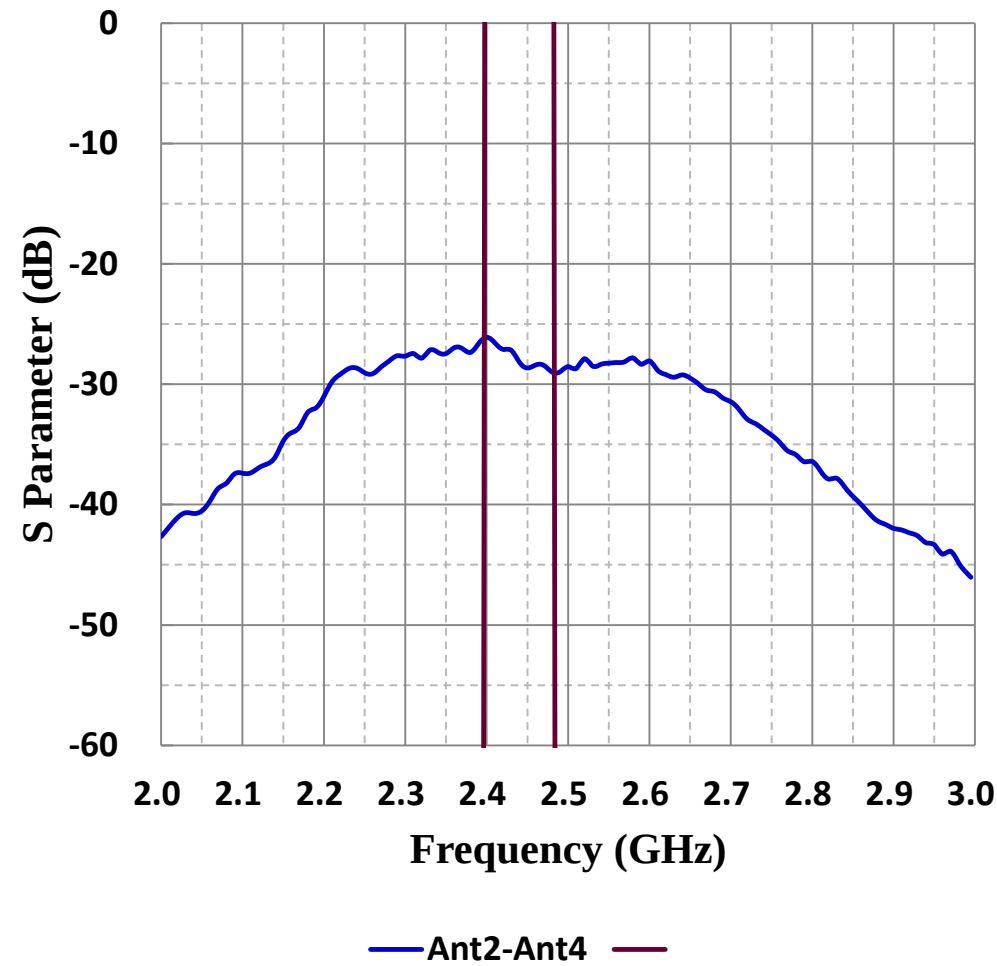
S Parameter 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi



2.4GHz	Max	Mean	Min
Ant2	-10.9 dB	-12.2 dB	-12.7 dB
Ant4	-11.9 dB	-13.8 dB	-15.0 dB



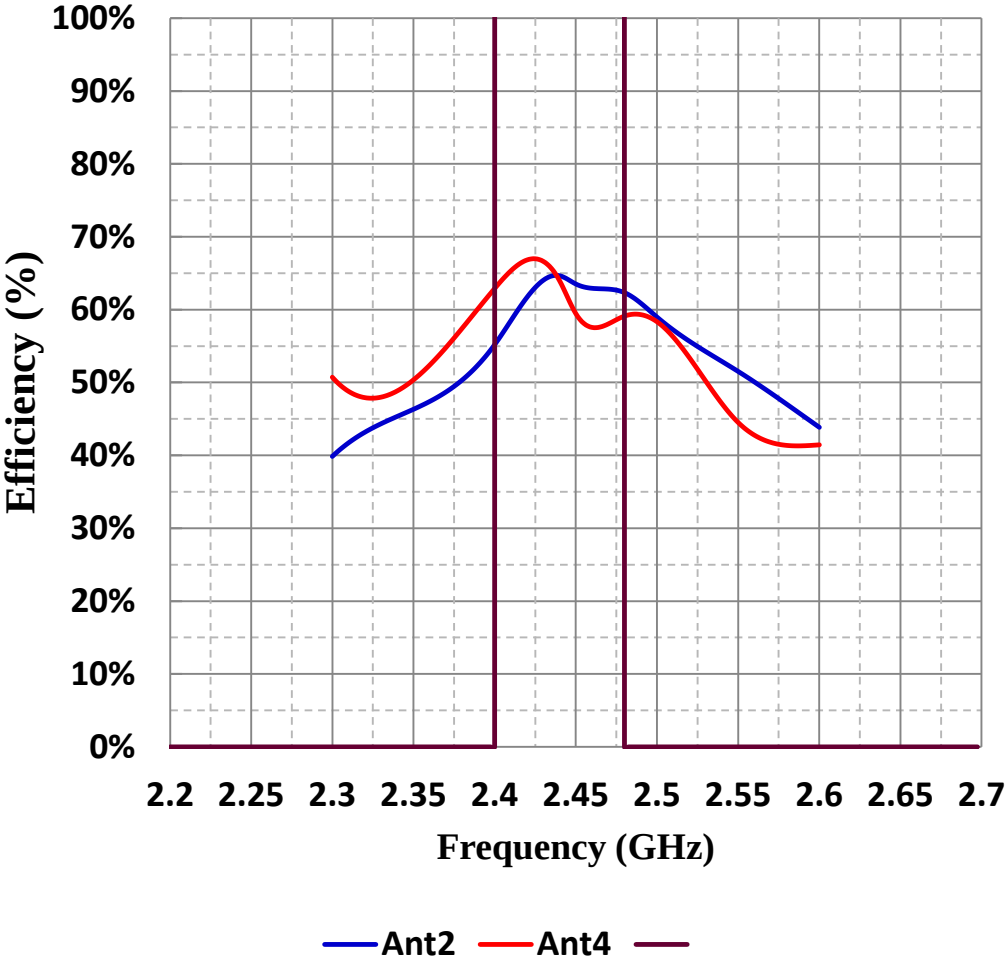
Isolation 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi



2.4GHz	Max	Mean	Min
Ant2-Ant4	-26.1 dB	-27.7 dB	-29.0 dB



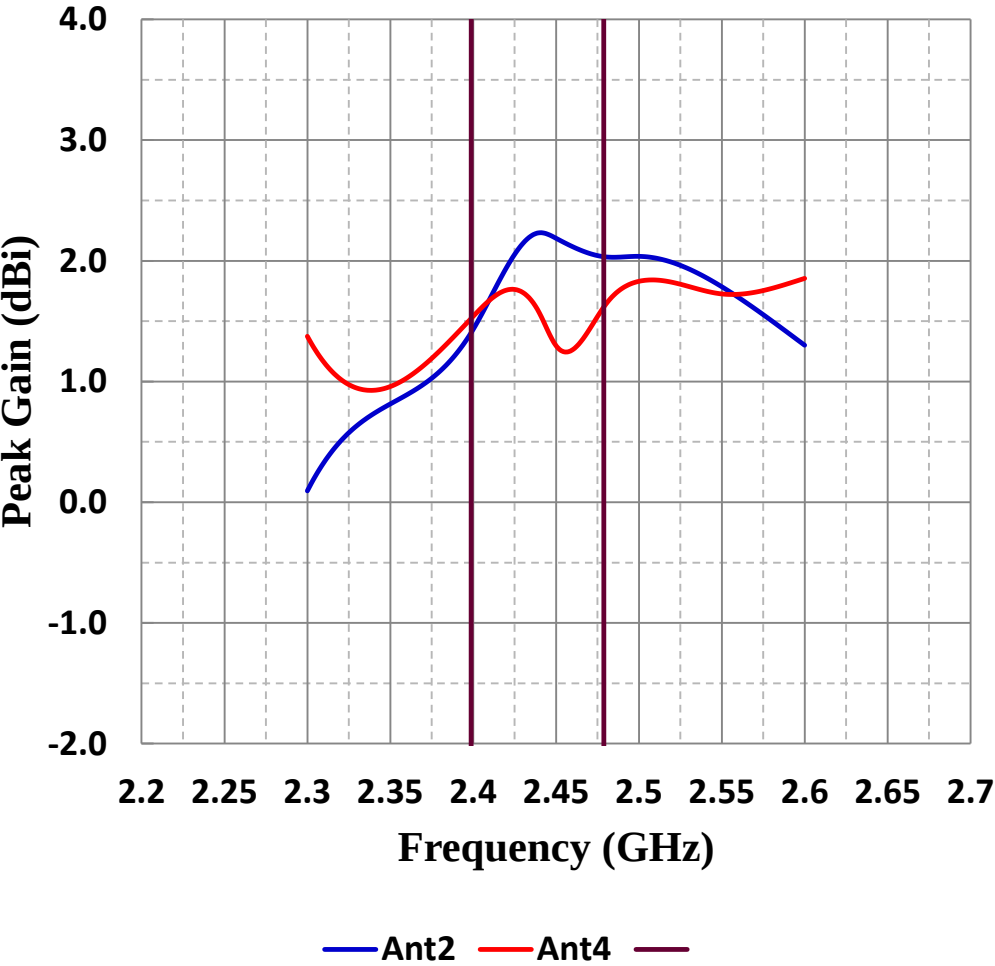
Efficiency 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi



2.4GHz	Max	Mean	Min
Ant2	64.7%	62.1%	55.2%
Ant4	67.0%	62.4%	57.5%



Peak Gain 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi

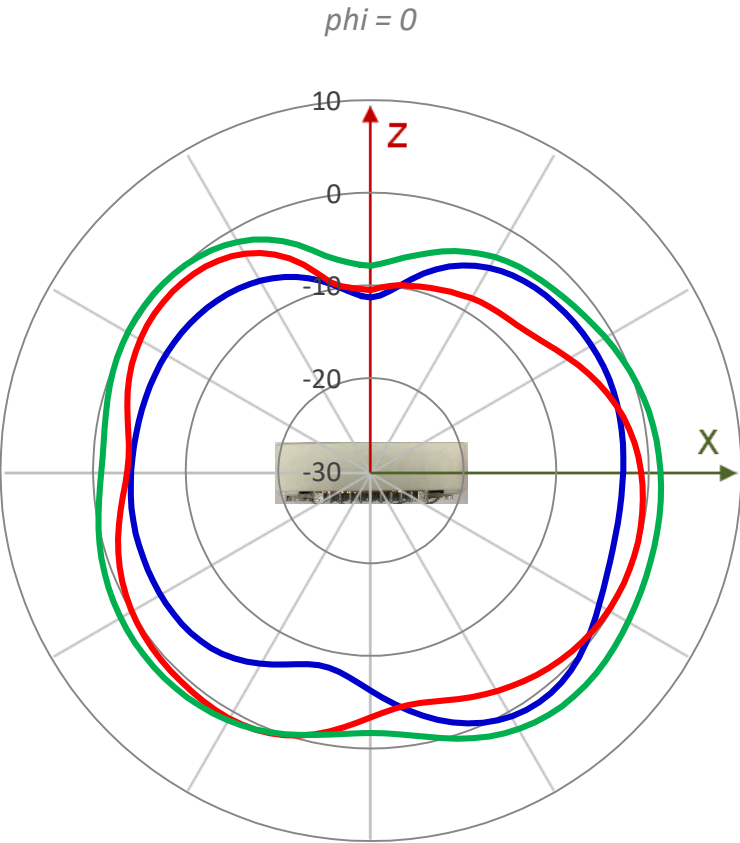


2.4GHz	Max	Mean	Min
Ant2	2.2 dBi	2.0 dBi	1.4 dBi
Ant4	1.8 dBi	1.5 dBi	1.2 dBi

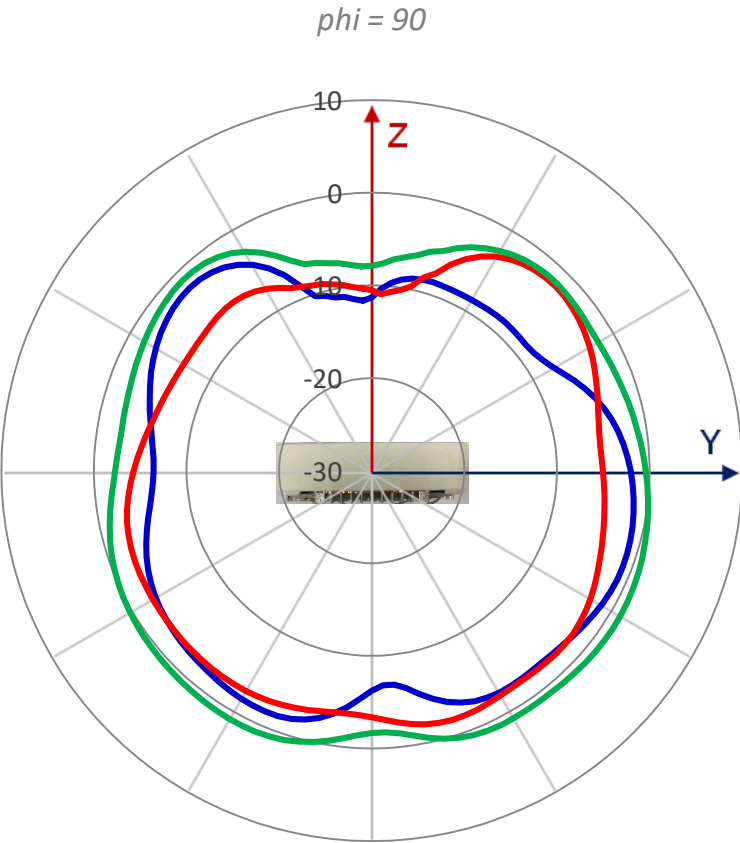


Realized Gain Pattern 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi @2400MHz for G_{total}

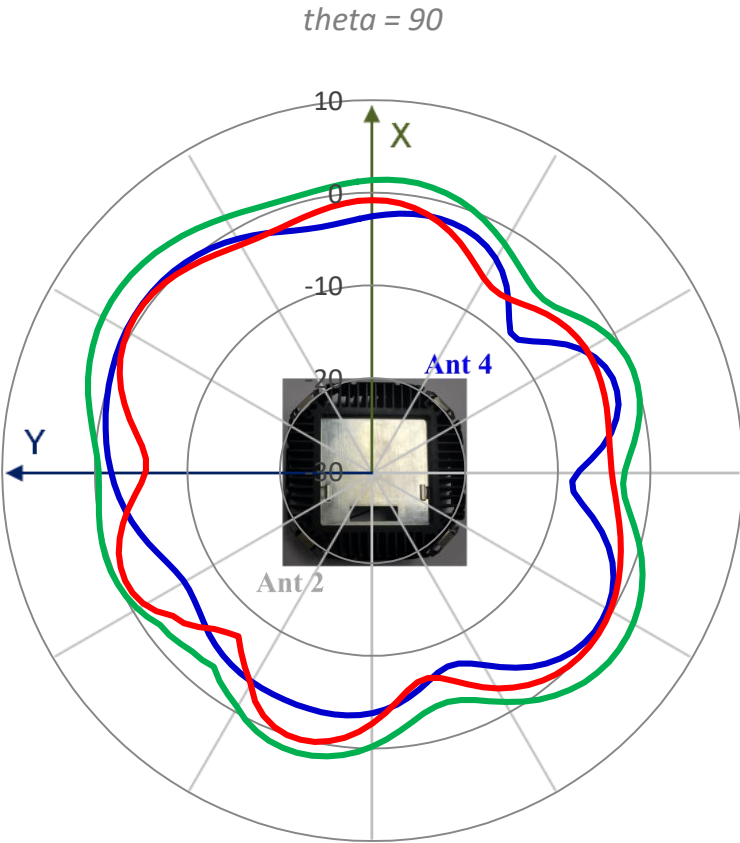
Unit: dBi



— Ant2 — Ant4 — Composite



— Ant2 — Ant4 — Composite

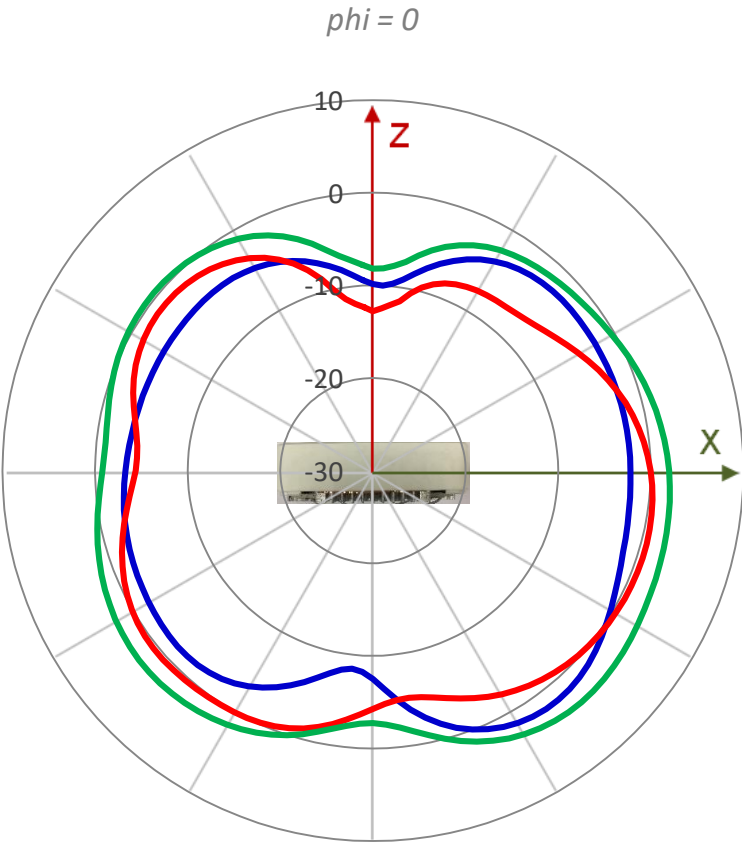


— Ant2 — Ant4 — Composite

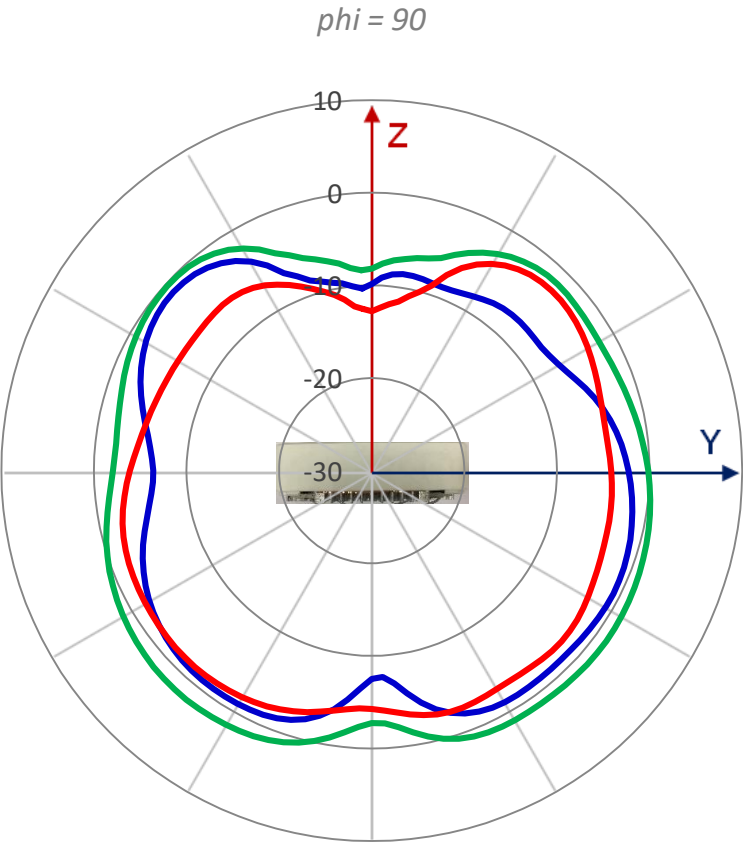


Realized Gain Pattern 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi @2440MHz for G_{total}

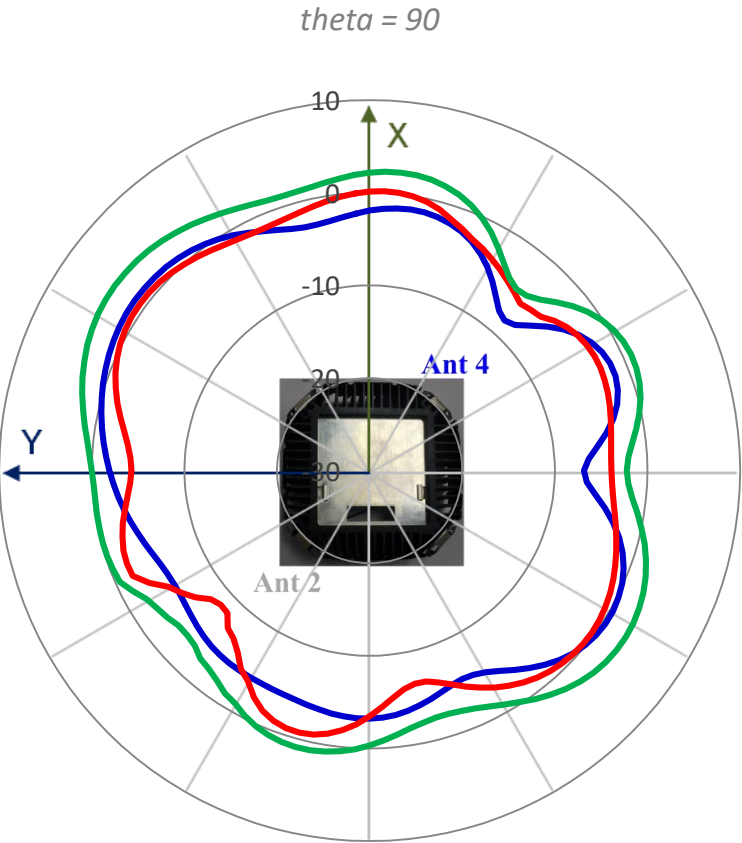
Unit: dBi



— Ant2 — Ant4 — Composite



— Ant2 — Ant4 — Composite

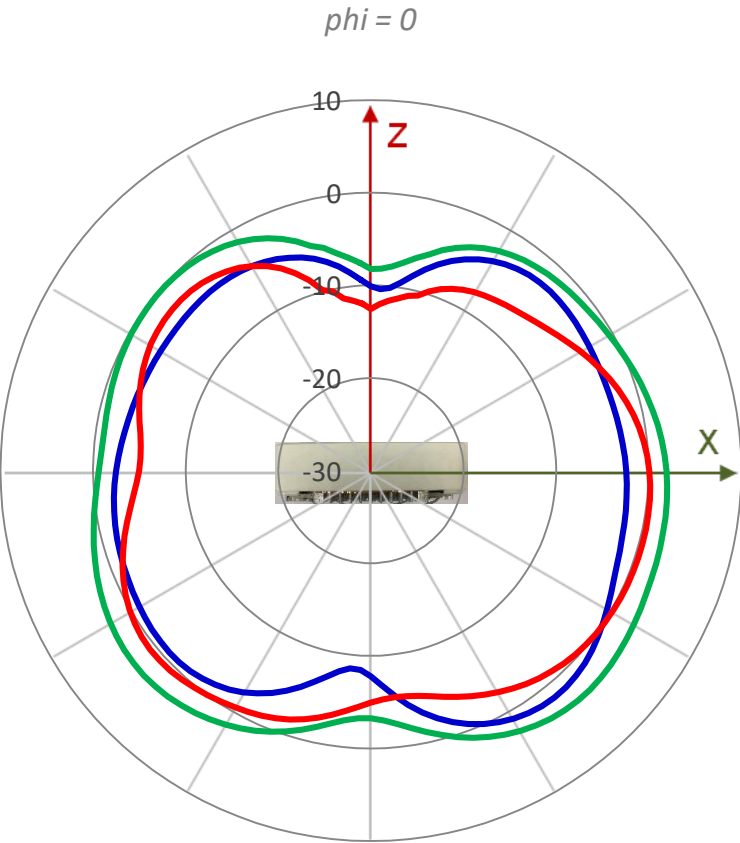


— Ant2 — Ant4 — Composite

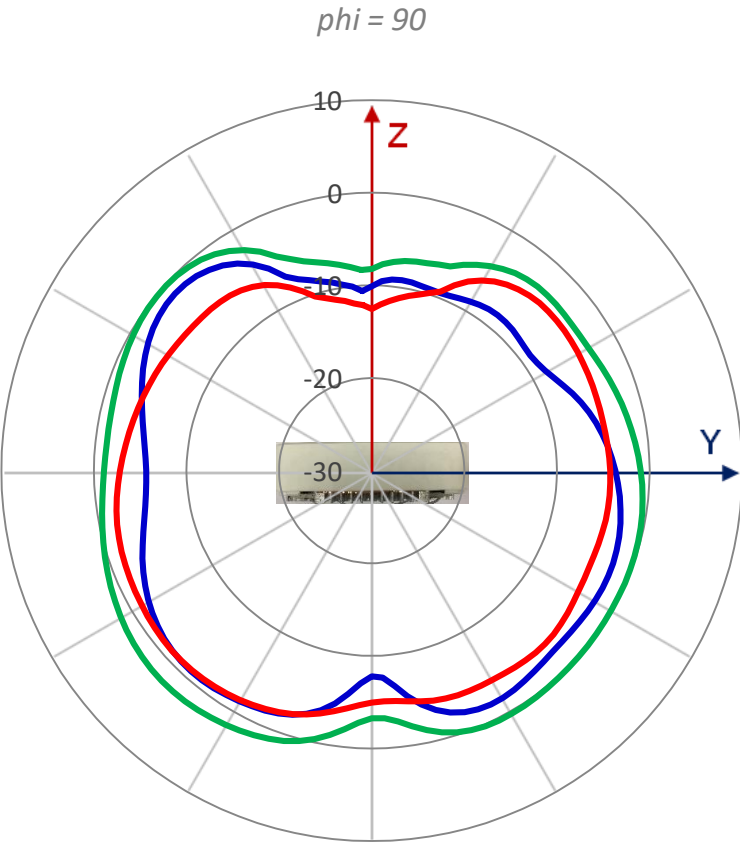


Realized Gain Pattern 2.4GHz for 5.7GHz WiFi and 2.4GHz WiFi @2480MHz for G_{total}

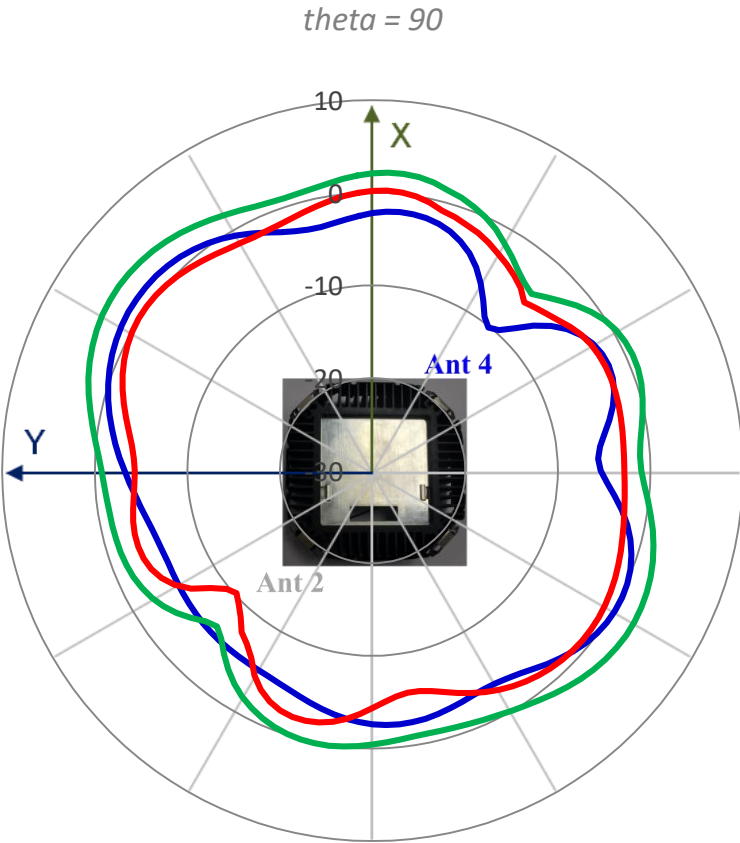
Unit: dBi



— Ant2 — Ant4 — Composite



— Ant2 — Ant4 — Composite



— Ant2 — Ant4 — Composite



5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi

- **Minimum Isolation**

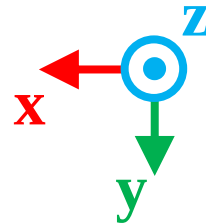
- 27.8dB on 5.7GHz

- **Efficiency**

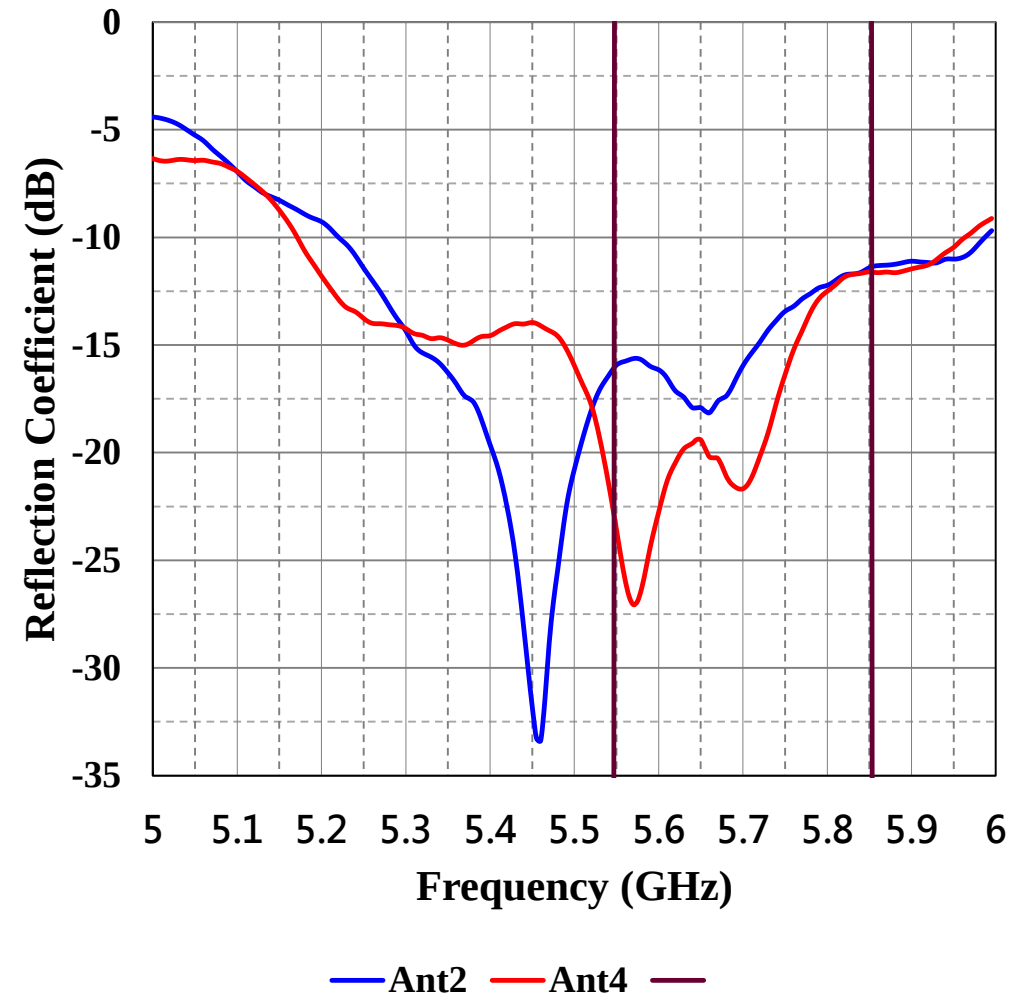
- ~70.4% on 5.7GHz

- **Peak Gain**

- 3.4dBi on 5.7GHz



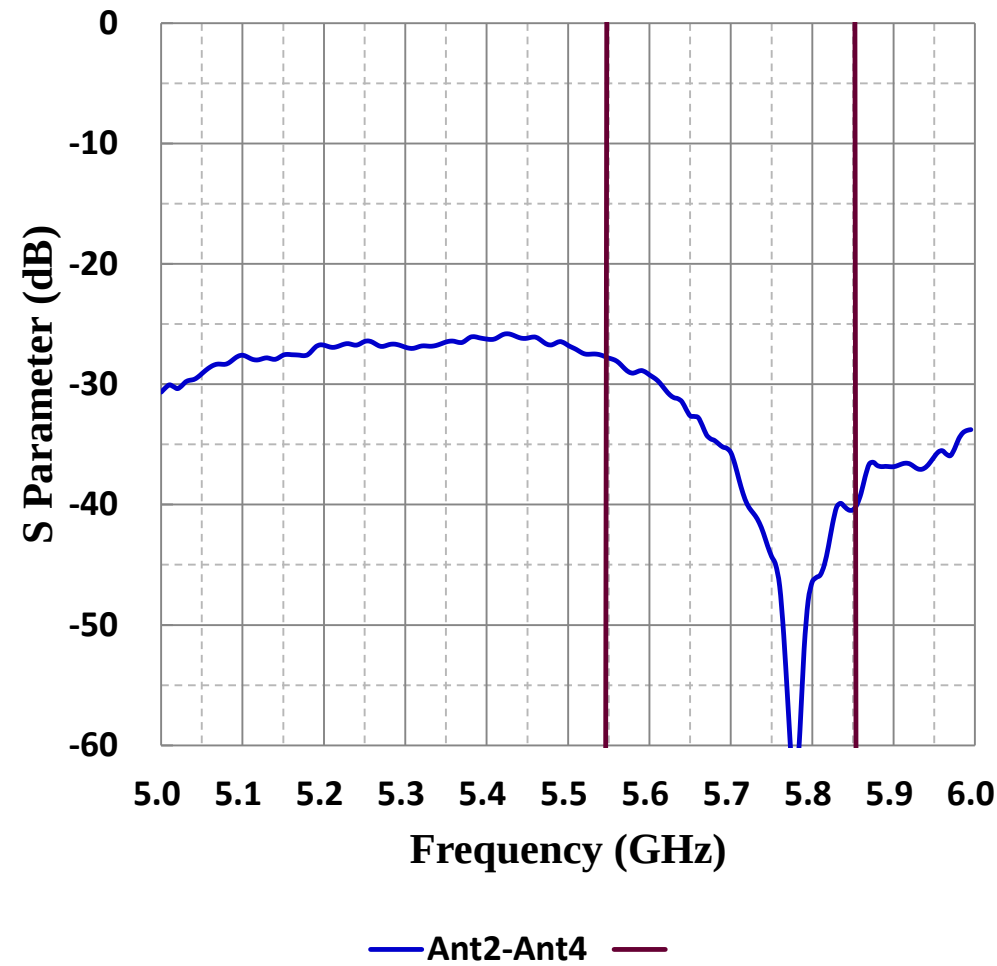
S Parameter 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi



5.7GHz	Max	Mean	Min
Ant2	-11.4 dB	-14.9 dB	-18.1 dB
Ant4	-11.6 dB	-18.6 dB	-27.1 dB



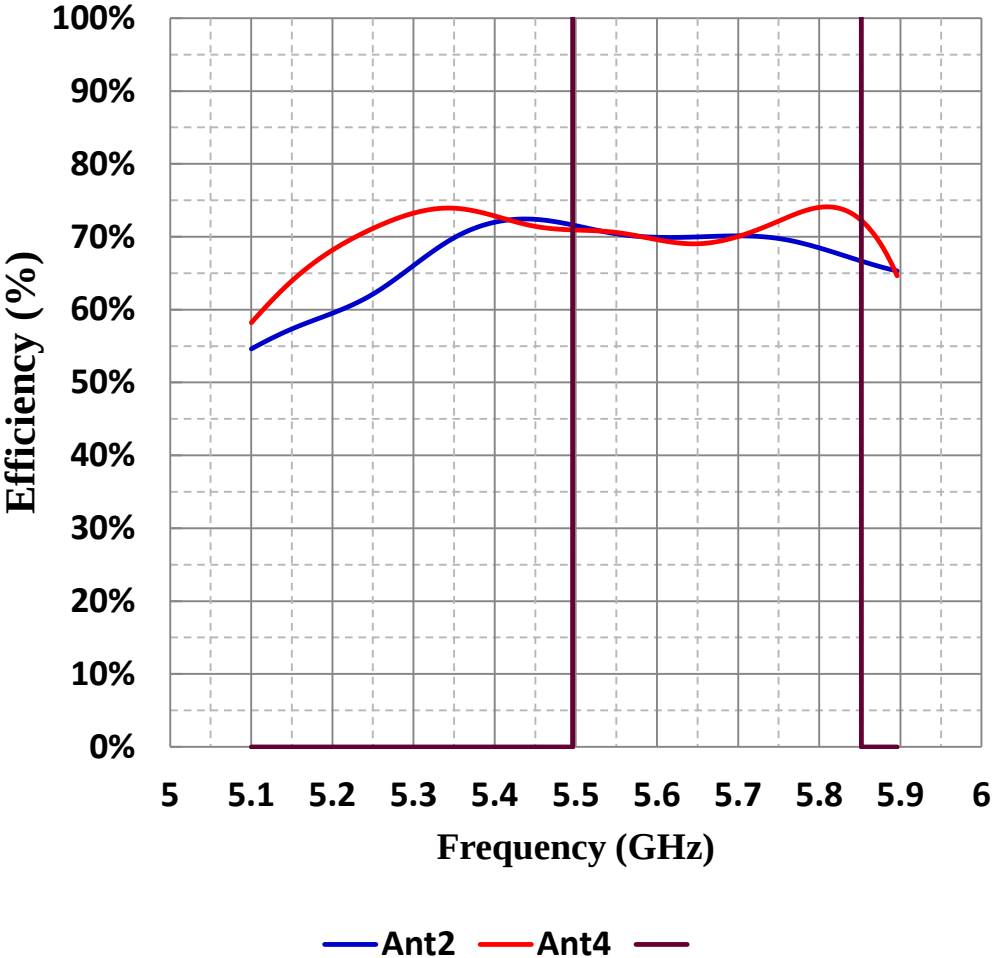
Isolation 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi



5.7GHz	Max	Mean	Min
Ant2-Ant4	-27.8 dB	-38.1 dB	-63.3 dB



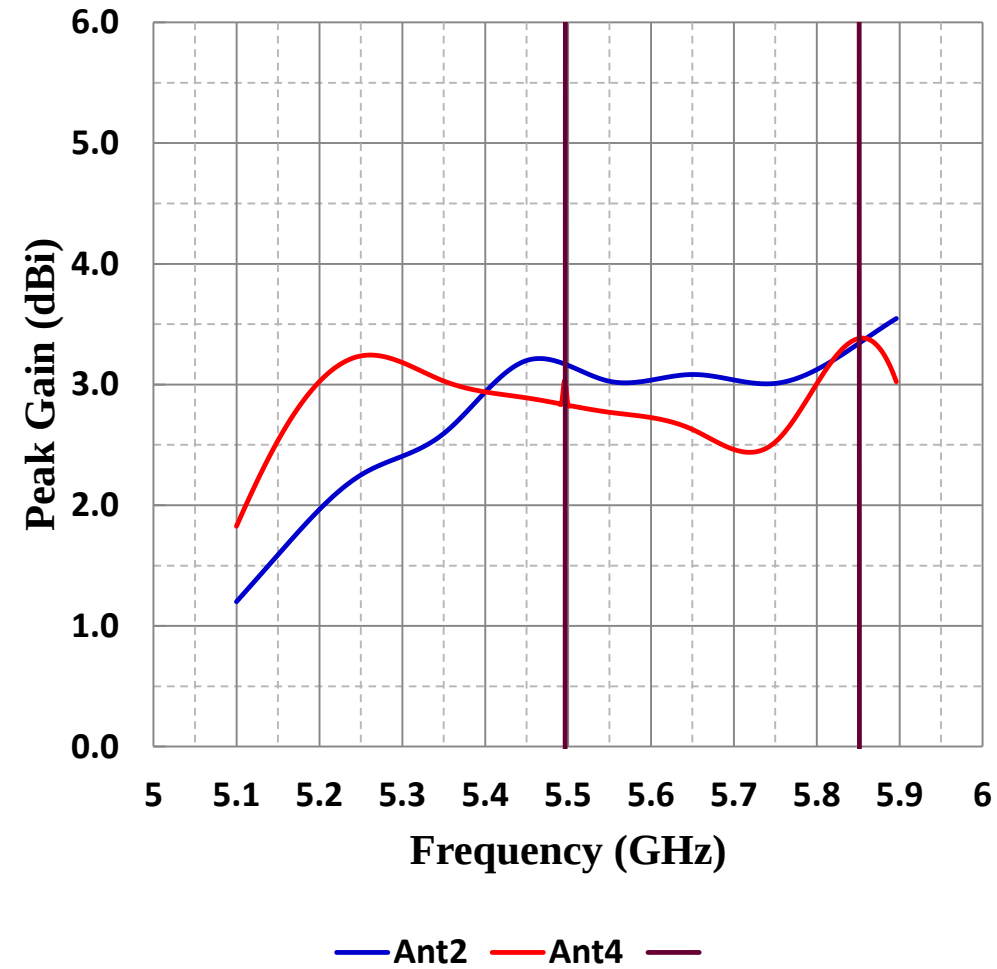
Efficiency 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi



5.7GHz	Max	Mean	Min
Ant2	71.5%	69.7%	66.9%
Ant4	74.1%	71.1%	69.2%



Peak Gain 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi

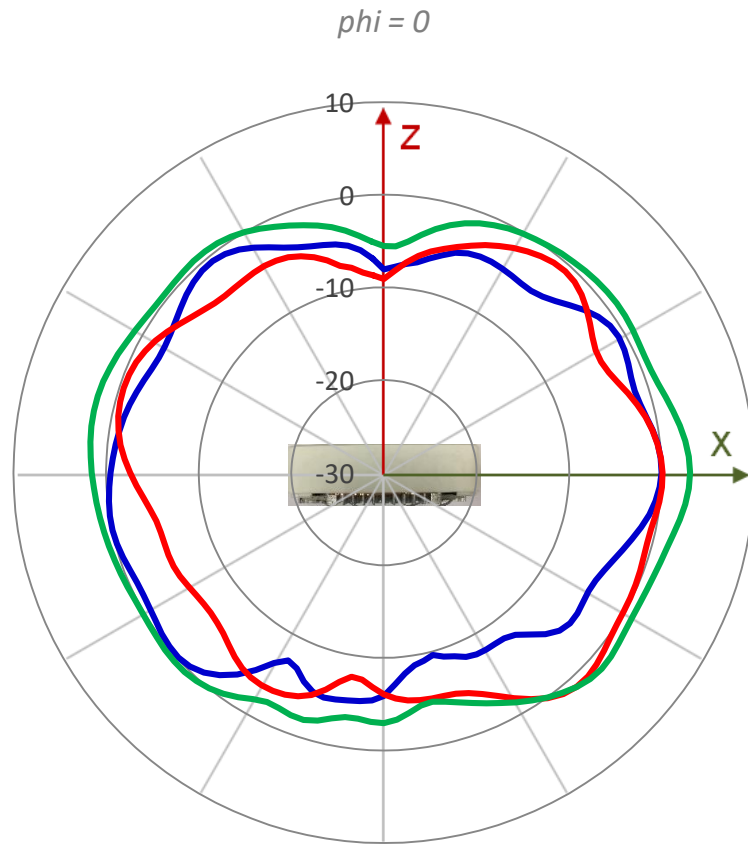


5.7GHz	Max	Mean	Min
Ant2	3.3 dBi	3.1 dBi	3.0 dBi
Ant4	3.4 dBi	2.7 dBi	2.4 dBi

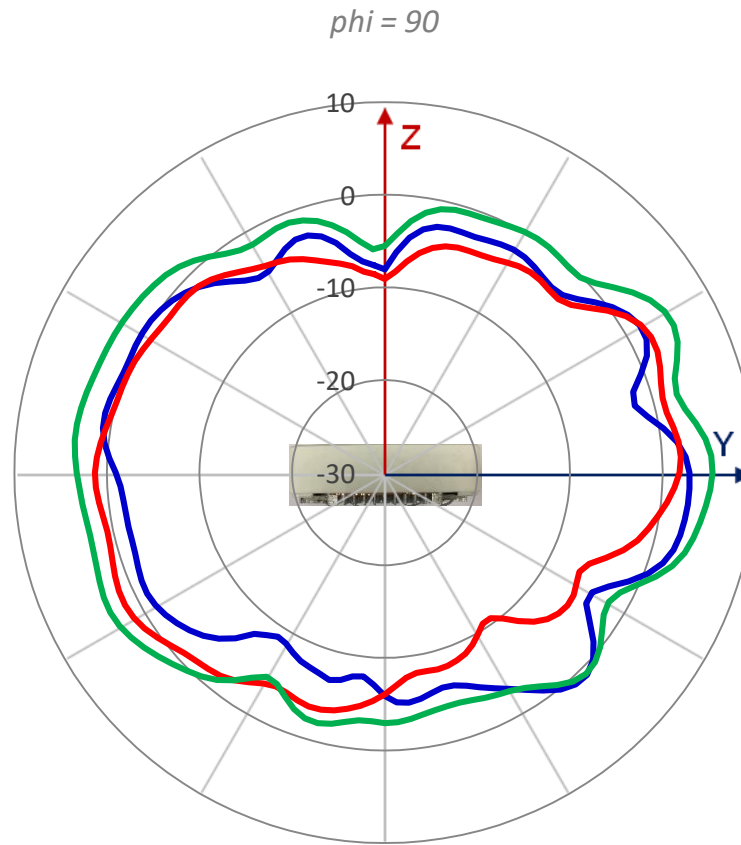


Realized Gain Pattern 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi @5550MHz for G_{total}

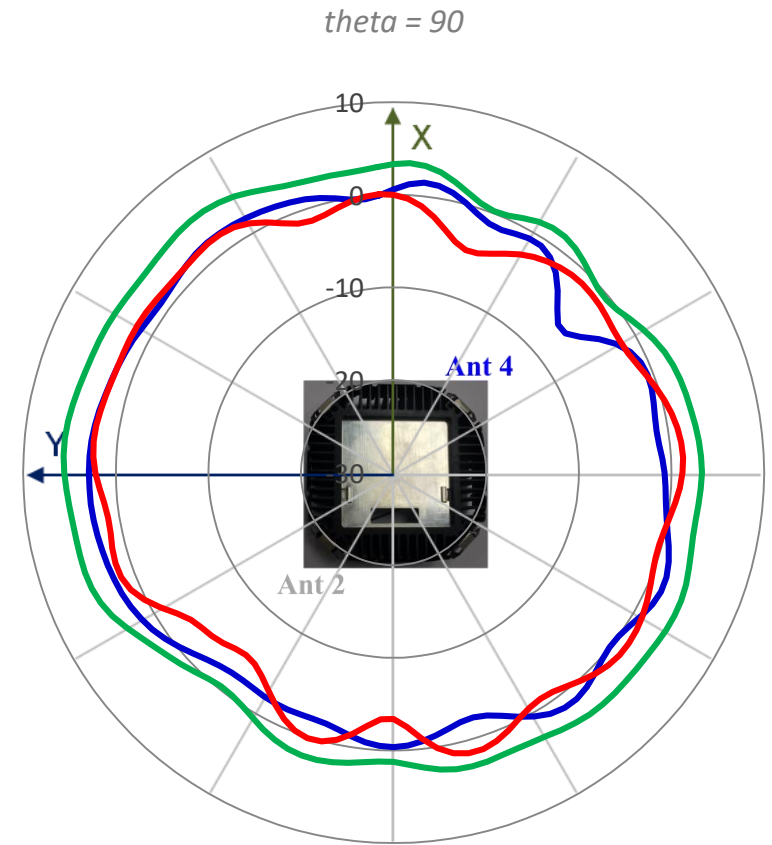
Unit: dBi



— Ant2 — Ant4 — Composite



— Ant2 — Ant4 — Composite

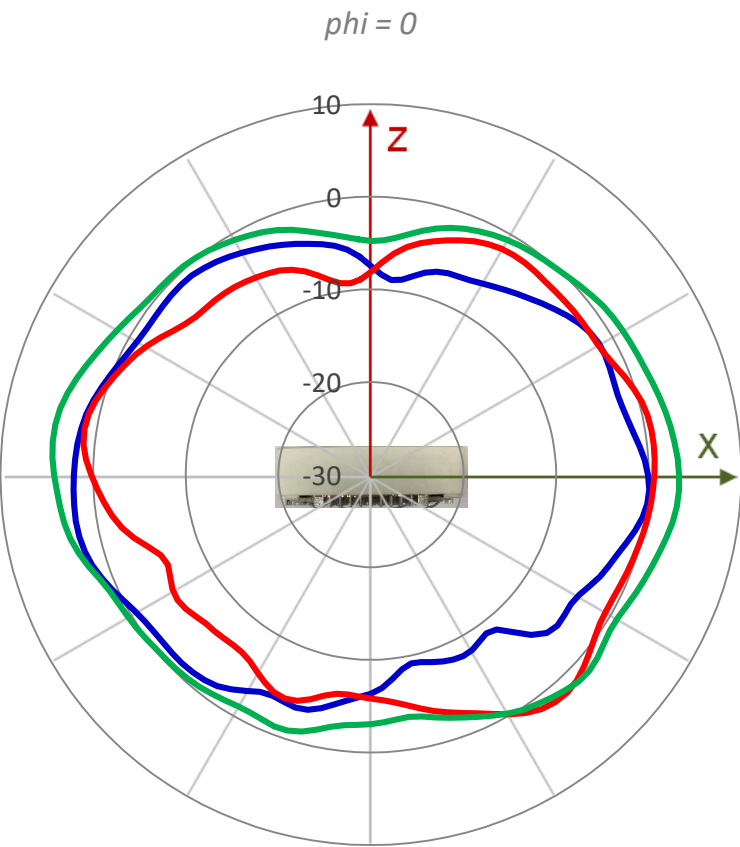


— Ant2 — Ant4 — Composite

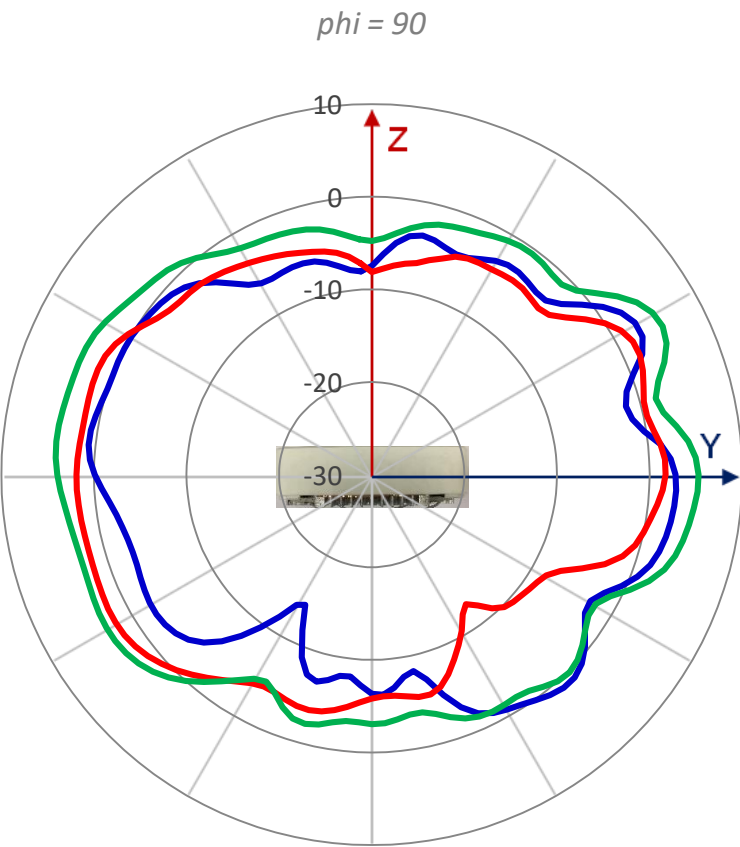


Realized Gain Pattern 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi @5750MHz for G_{total}

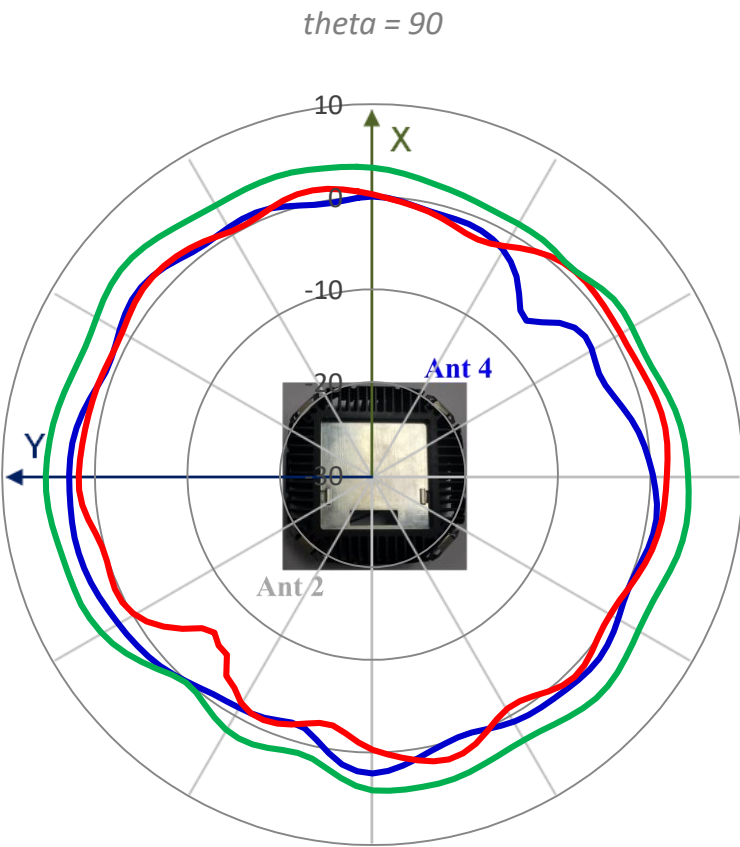
Unit: dBi



— Ant2 — Ant4 — Composite



— Ant2 — Ant4 — Composite

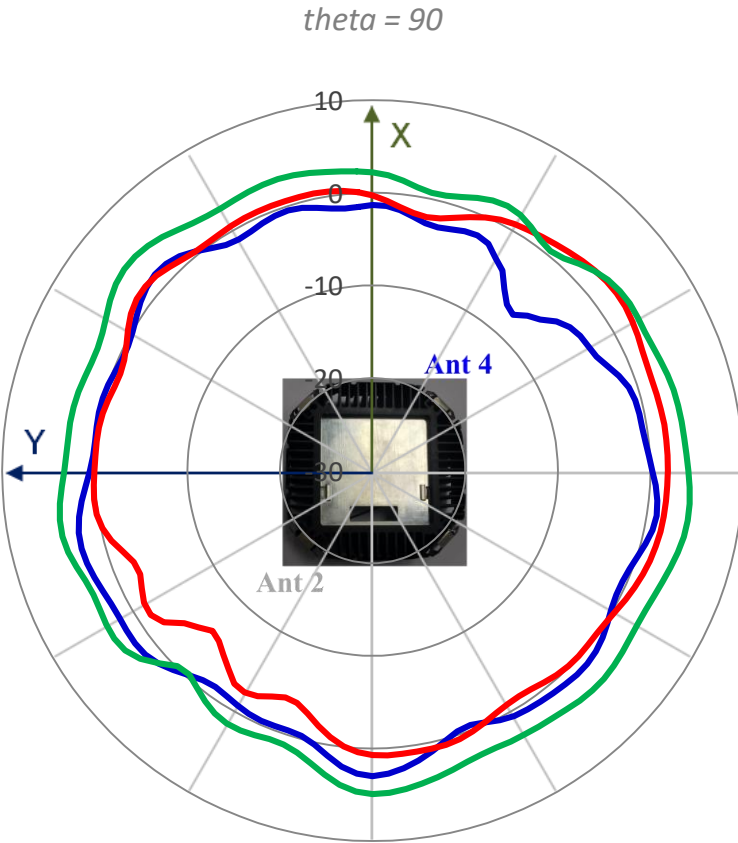
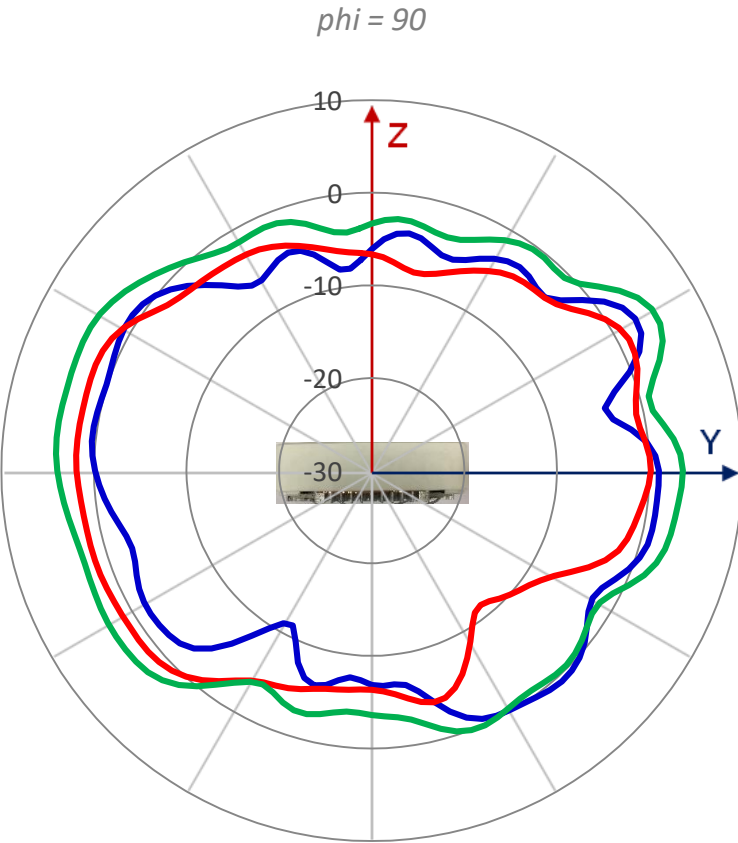
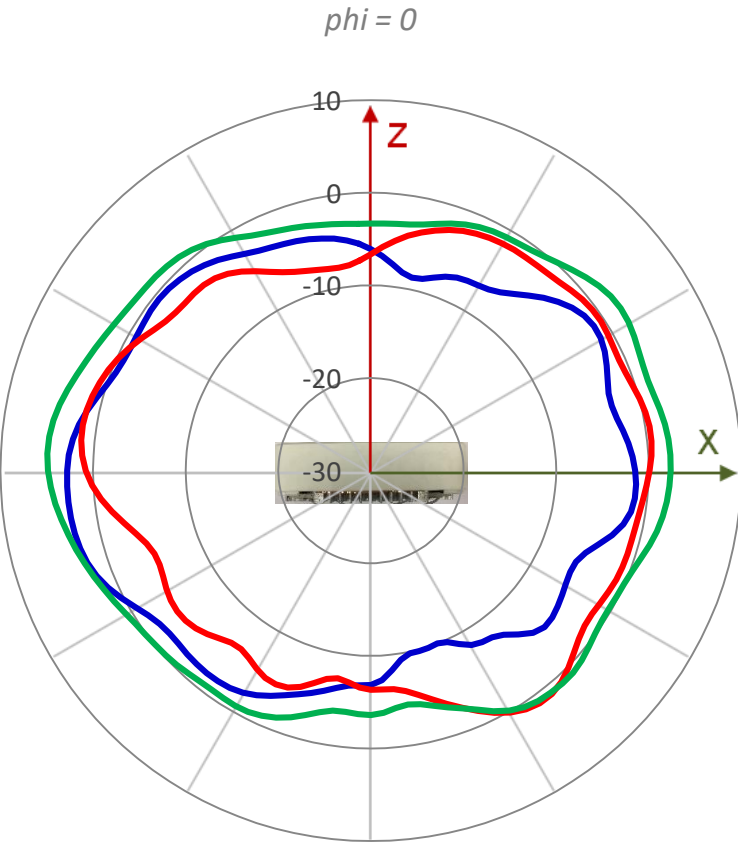


— Ant2 — Ant4 — Composite



Realized Gain Pattern 5.7GHz for 5.7GHz WiFi and 2.4GHz WiFi @5850MHz for G_{total}

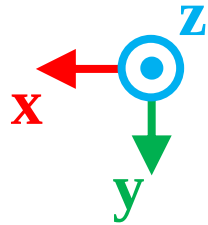
Unit: dBi



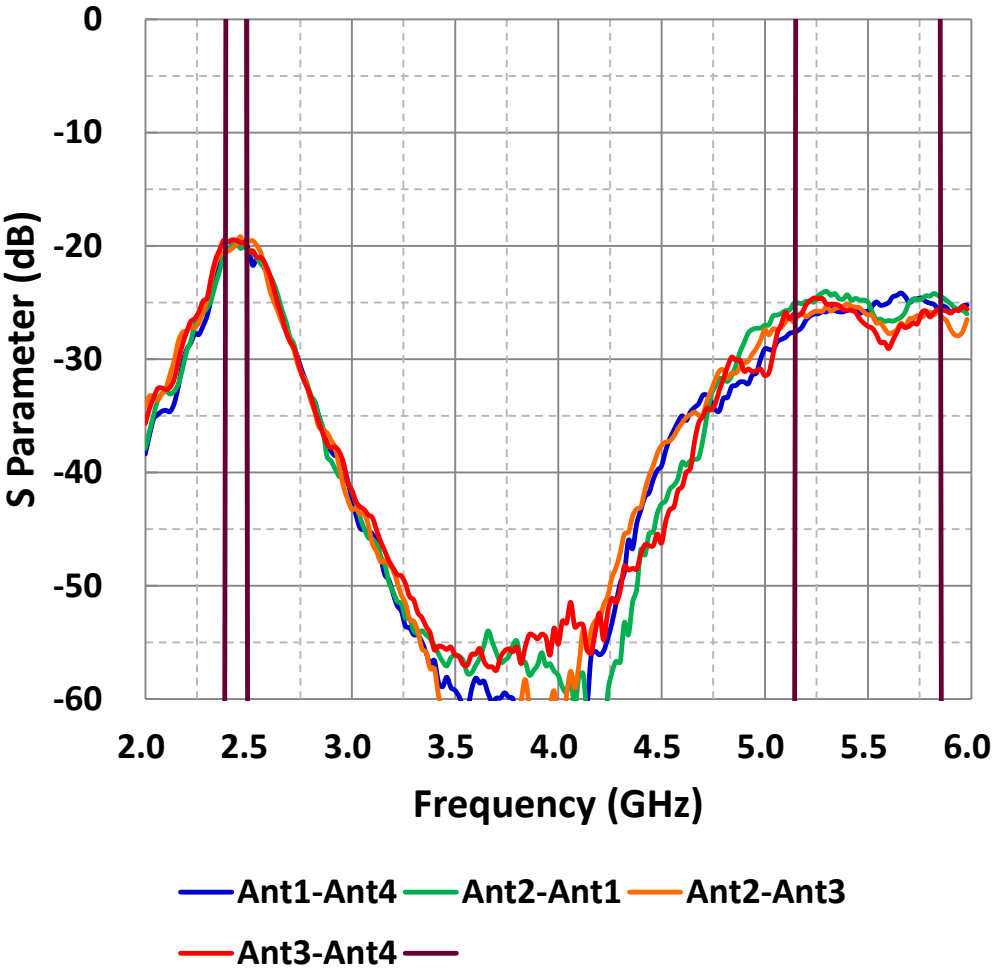
Isolation

- **Minimum Isolation**

- 24.0dB on 5GHz / 19.2dB on 2.4GHz



Isolation VHC25



2.4GHz	Max	Mean	Min
Ant 1-Ant 2	-19.6 dB	-19.9 dB	-20.4 dB
Ant 1-Ant 4	-19.6 dB	-20.0 dB	-20.3 dB
Ant 2-Ant 3	-19.2 dB	-19.9 dB	-20.5 dB
Ant 3-Ant 4	-19.4 dB	-19.6 dB	-19.7 dB

5GHz	Max	Mean	Min
Ant 1-Ant 2	-24.2 dB	-25.5 dB	-27.5 dB
Ant 1-Ant 4	-24.0 dB	-25.1 dB	-26.7 dB
Ant 2-Ant 3	-25.1 dB	-26.1 dB	-27.7 dB
Ant 3-Ant 4	-24.6 dB	-26.3 dB	-29.0 dB

