Cabin Radar Antenna Realized Gain simulations

For Certification

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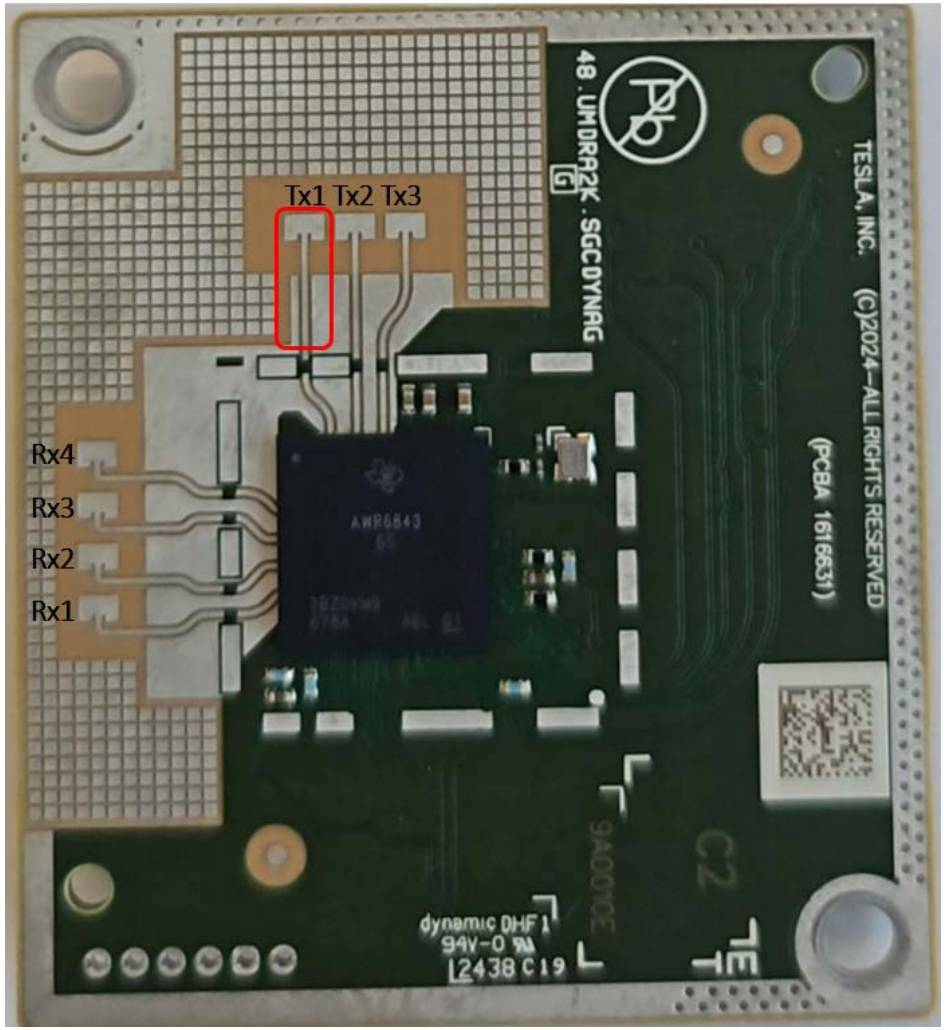
Methodology

- Simplified model for antennas are used and whole of L1 and L2 layers along with Top Layer Substrate is simulated.
- Signal path : Transceiver BGA-> Microstrip->Antenna
- Microstrip trace losses and antenna realized gain are simulated. BGA to microstrip transition loss is not modelled here.

Antenna gains

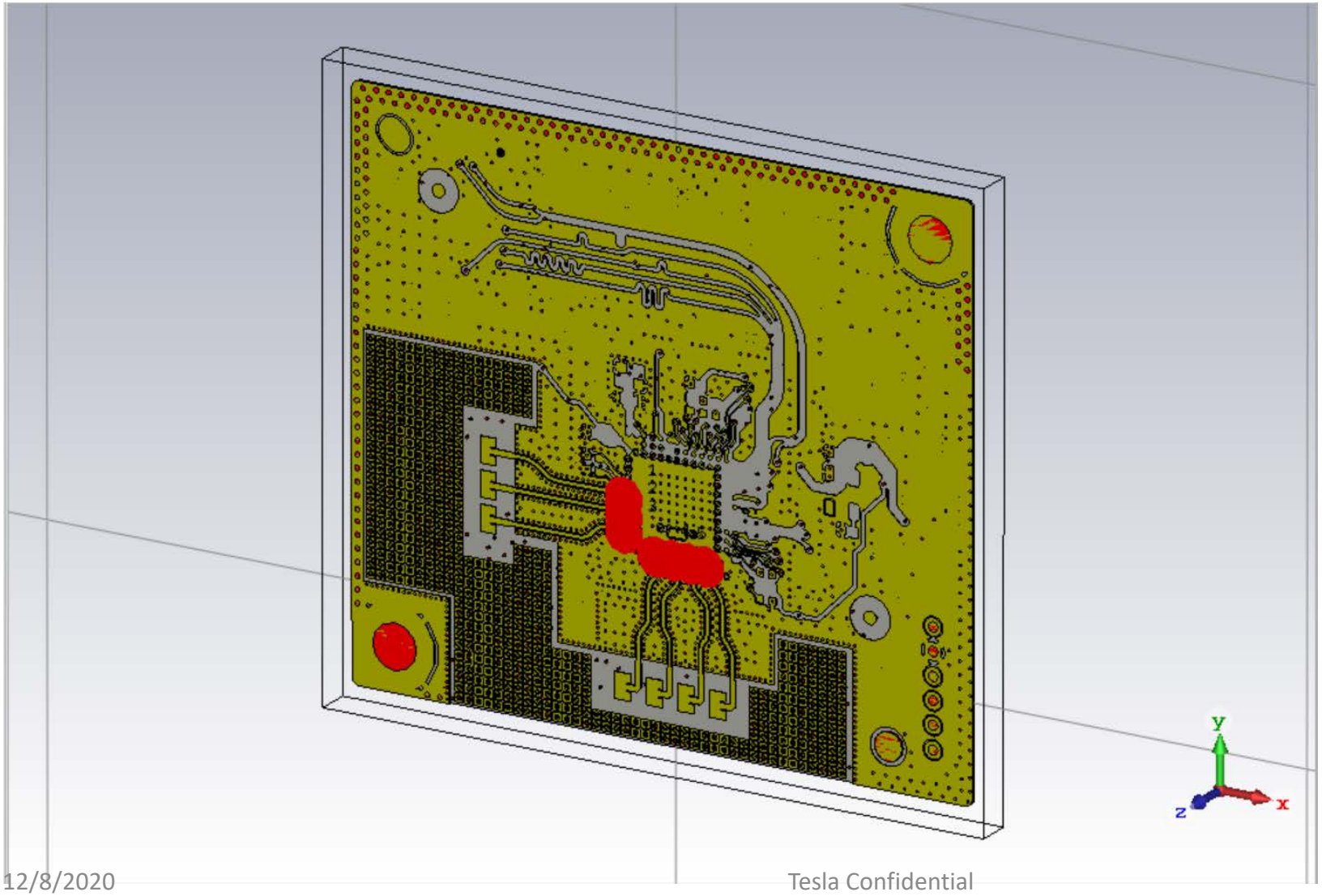


Antenna	Realized Gain(dBi)
Tx1	8.6
Tx2	9.2
Tx3	7.5
Rx1	6.8
Rx2	6.5
Rx3	7.5
Rx4	6.4

Cabin Radar Simulations

Antenna Pattern simulations

Setup



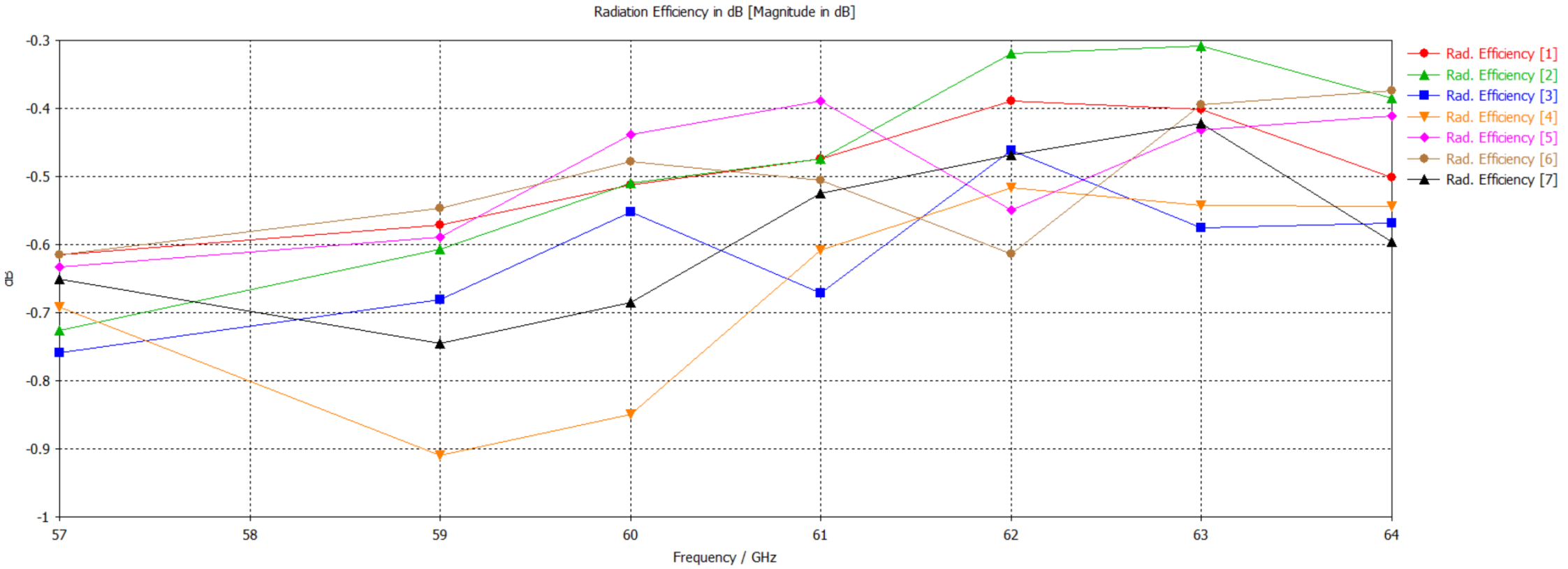
IPC 2581 import from Altium

Using only L1 and dielectric1

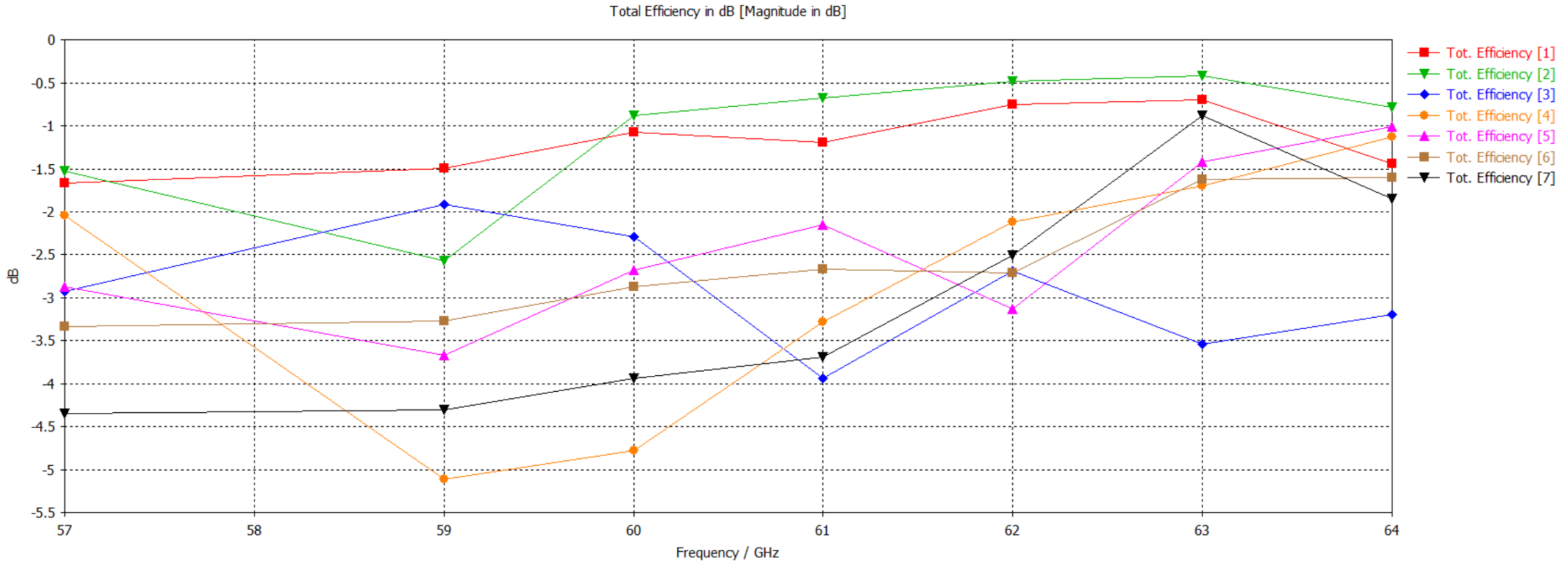
Created solid L2 layer (0.1905 mm thickness)

Added lumped element ports

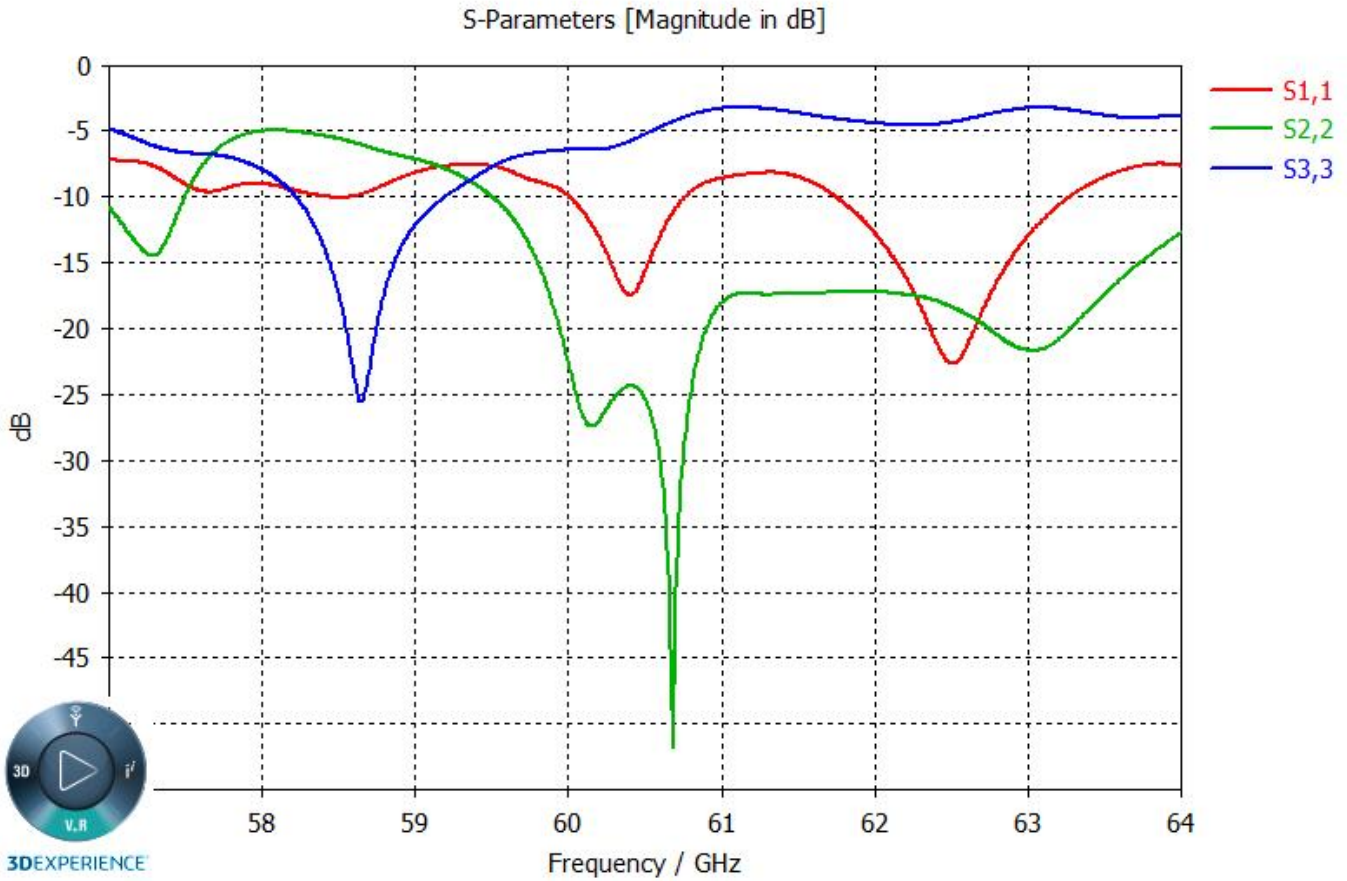
Radiation Efficiency



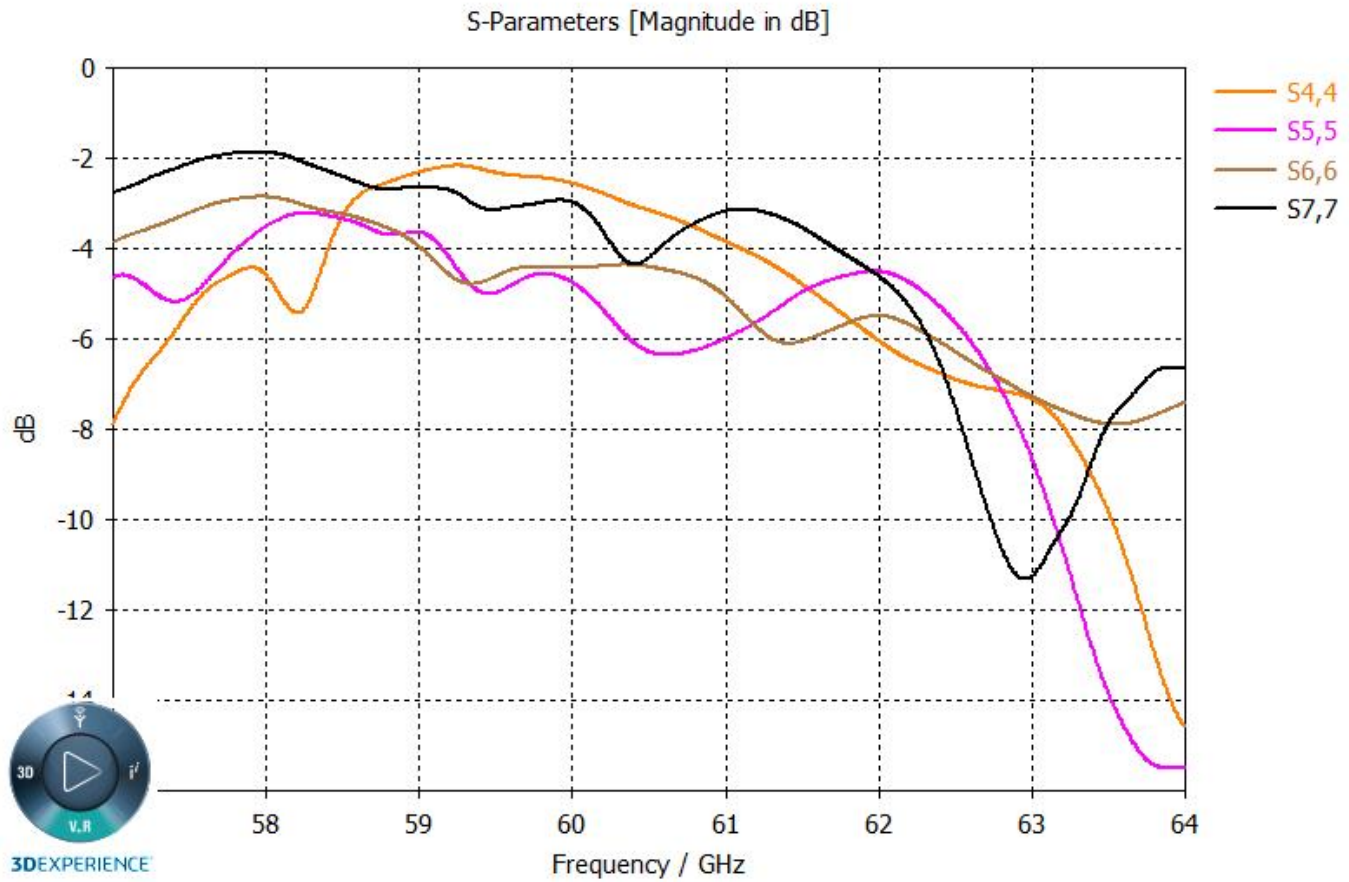
Total Efficiency



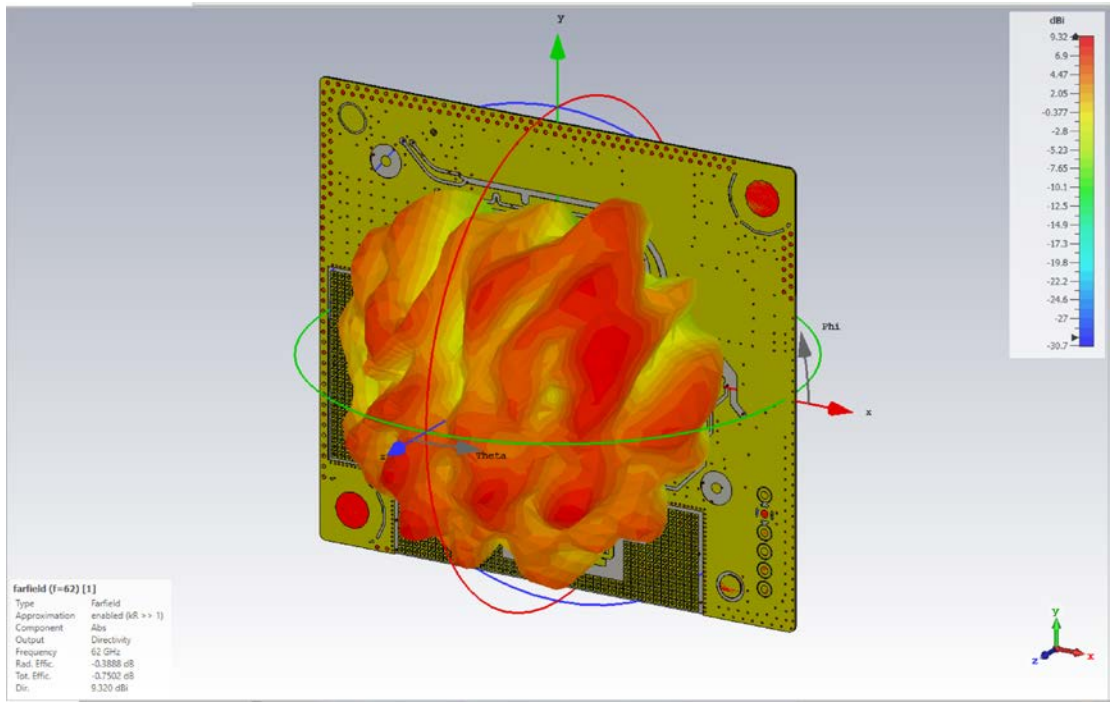
Tx matching

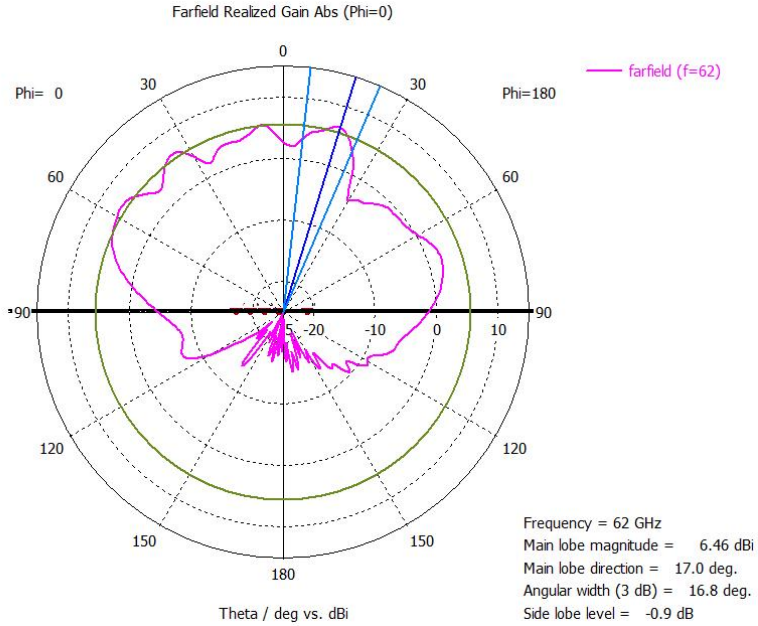


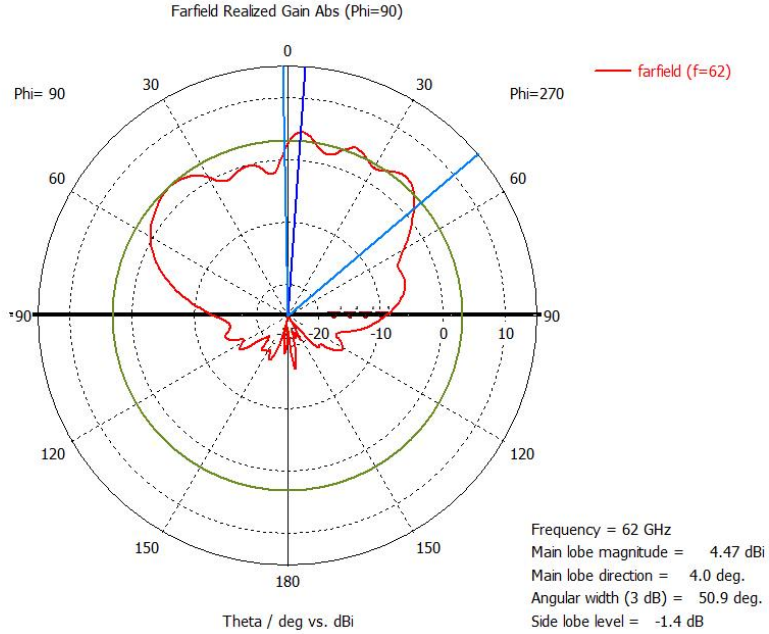
Rx Matching



Antenna 1 (Tx1)

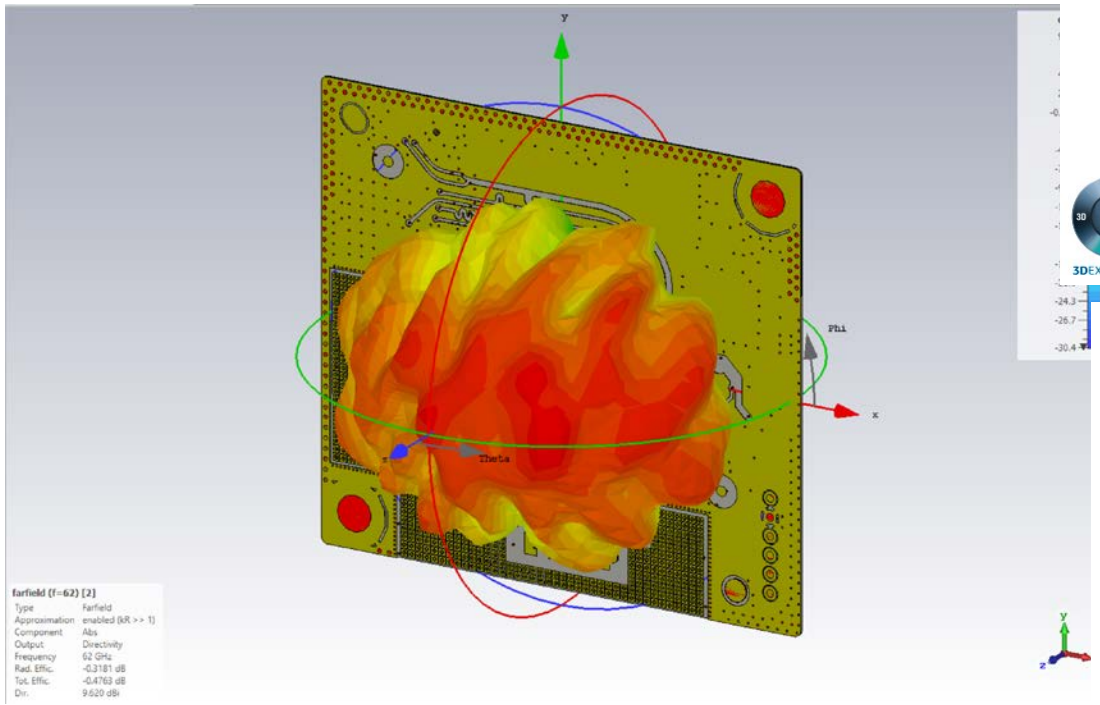


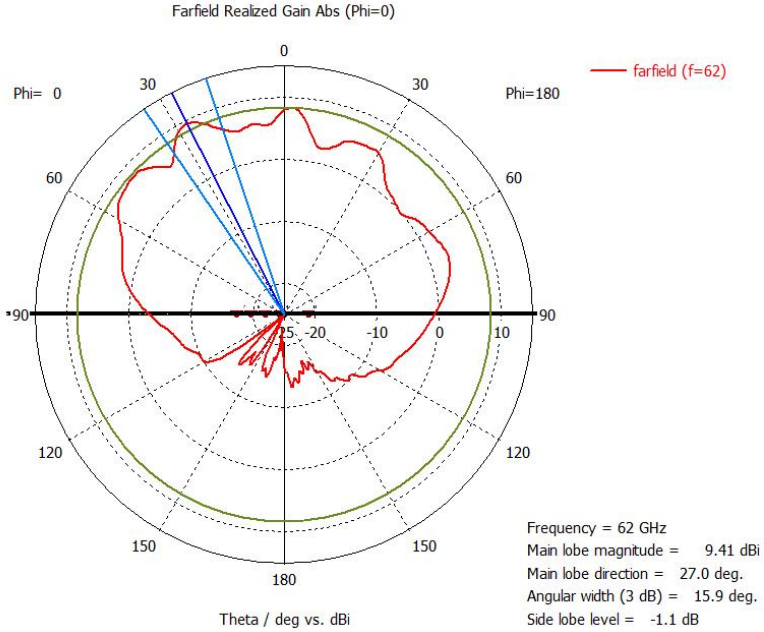


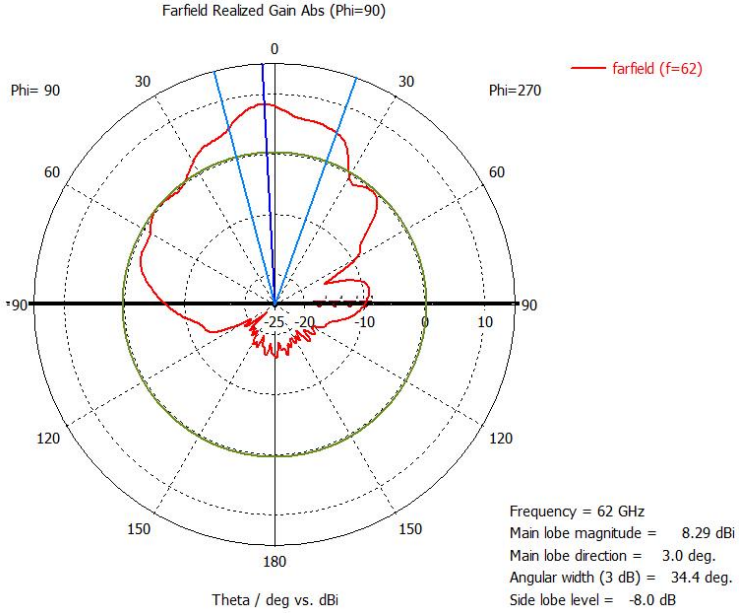


Realized Gain = Directivity – Total Eff = 8.6 dBi

Antenna 2 (Tx2)

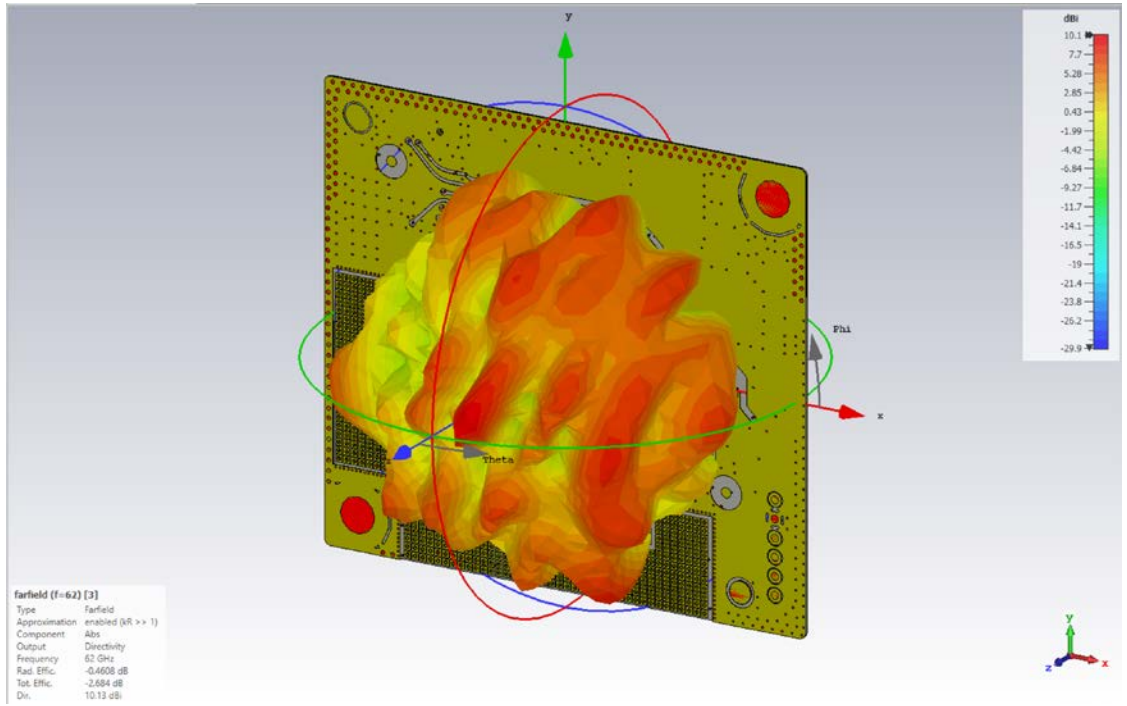


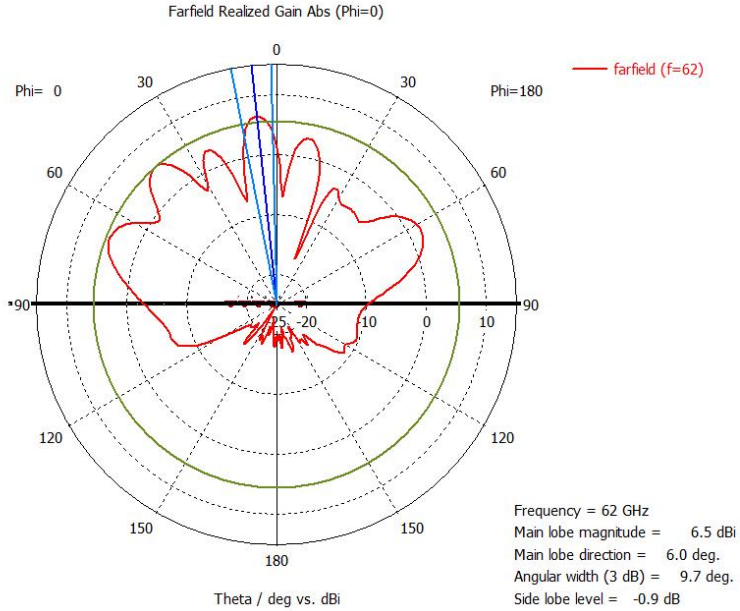


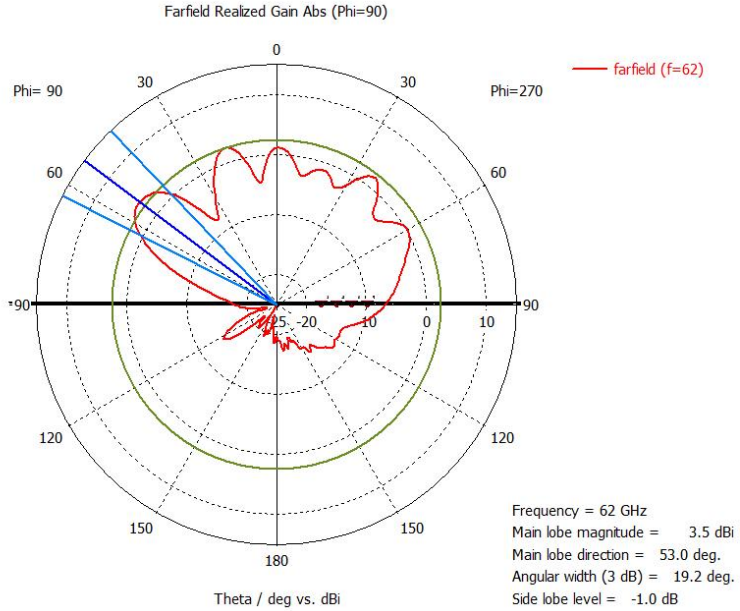


Realized Gain = Directivity – Total Eff = 9.2 dBi

Antenna 3 (Tx3)

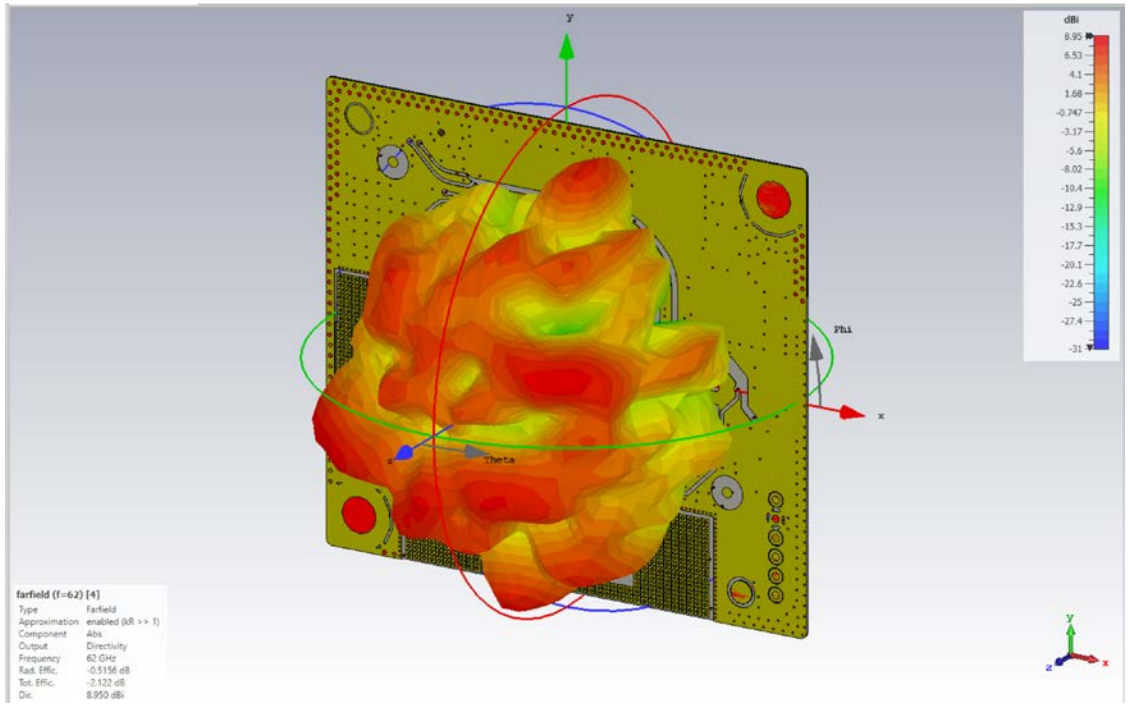


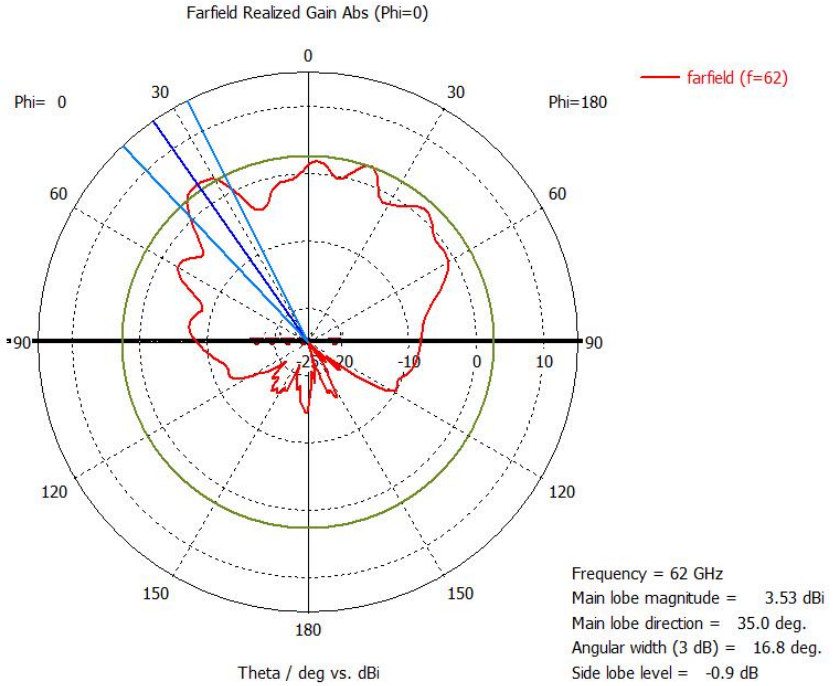


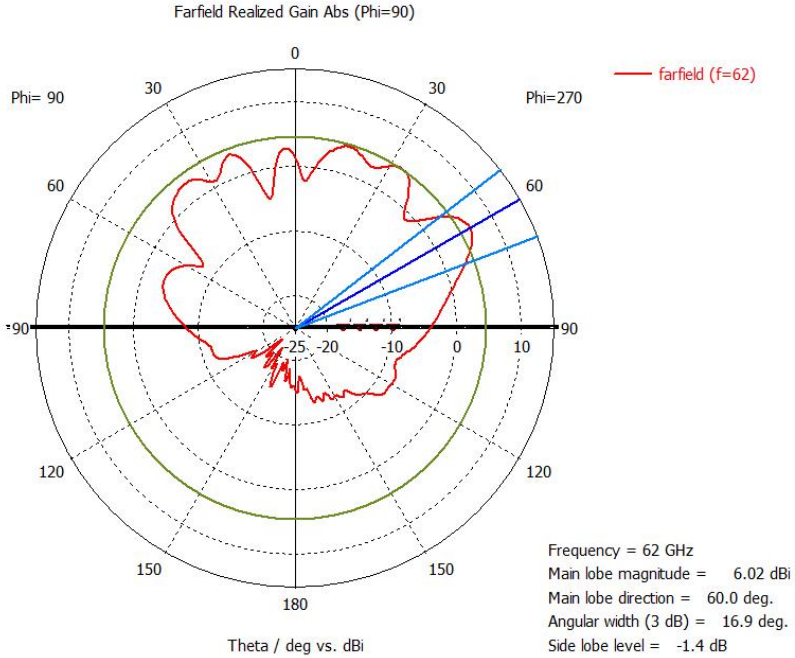


Realized Gain = Directivity – Total Eff = 7.5 dBi

Antenna 4 (Rx1)

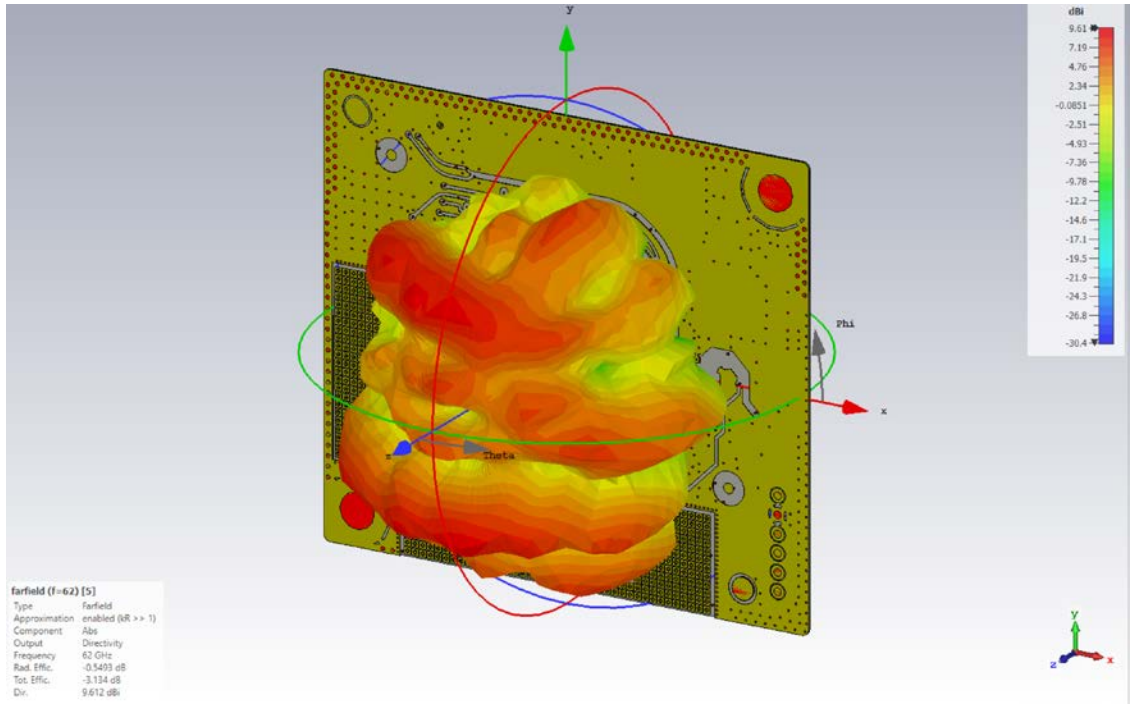


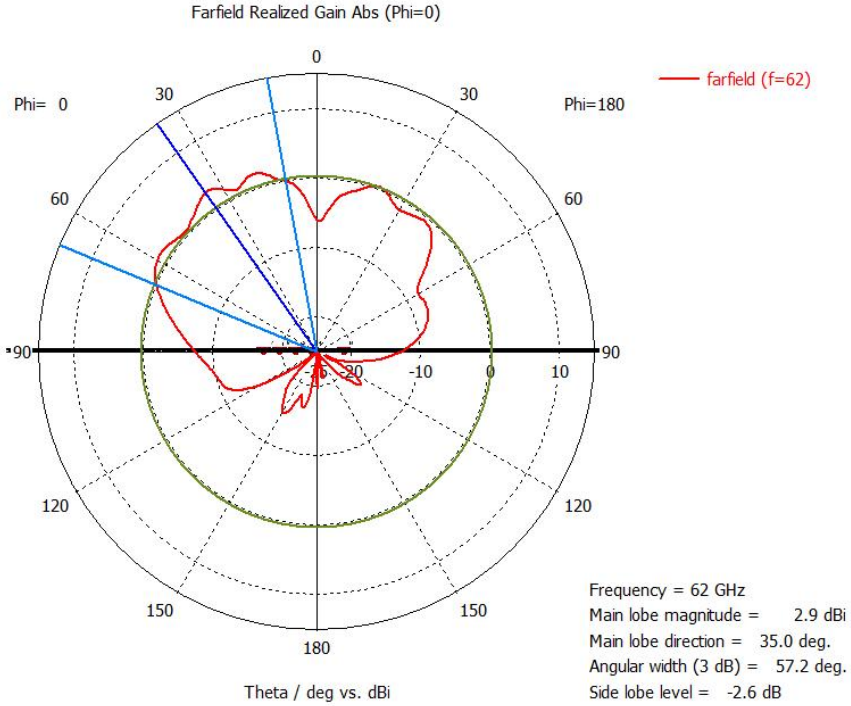


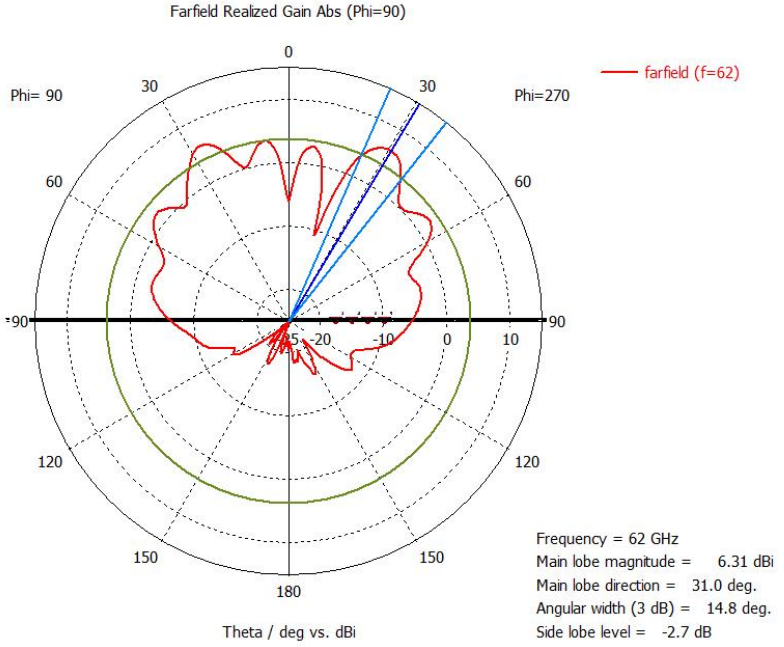


Realized Gain = Directivity – Total Eff = 6.8 dBi

Antenna 5 (Rx2)

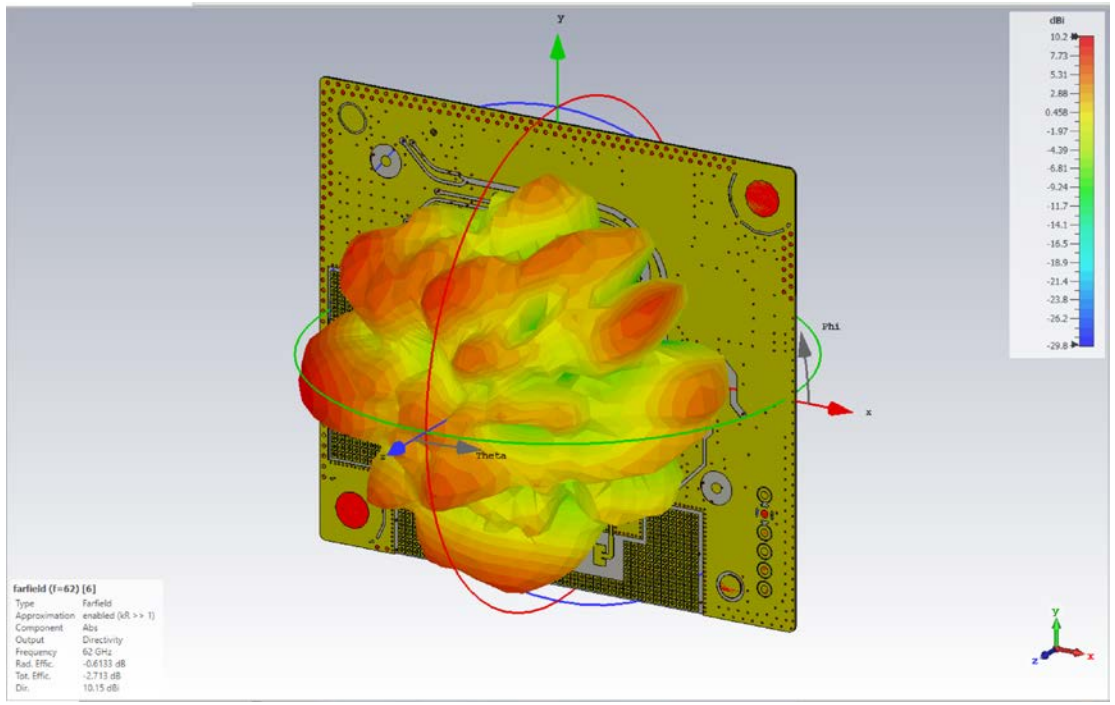


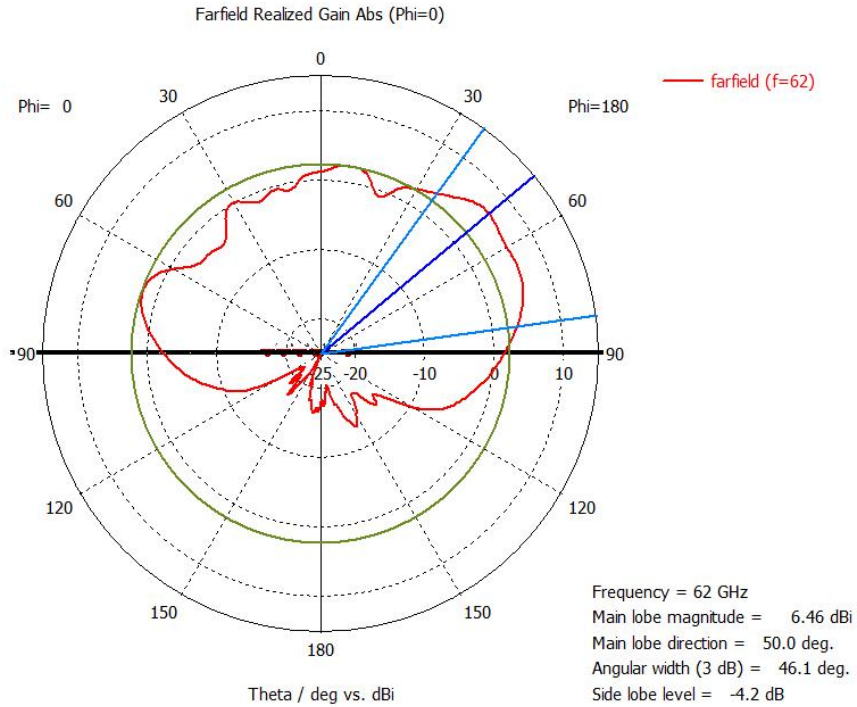


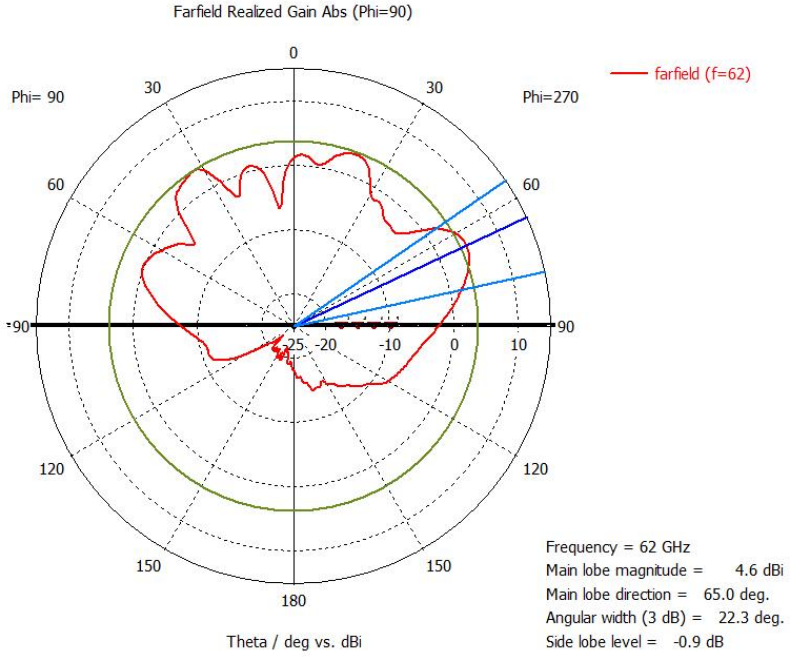


Realized Gain = Directivity – Total Eff = 6.5 dBi

Antenna 6 (Rx3)

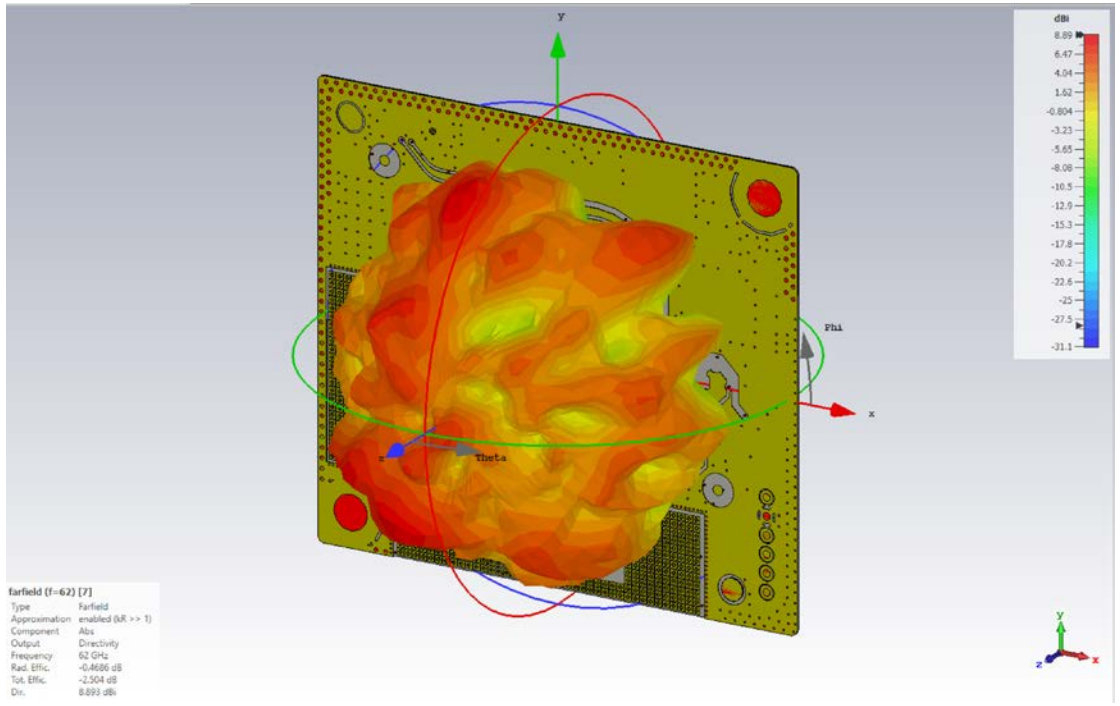


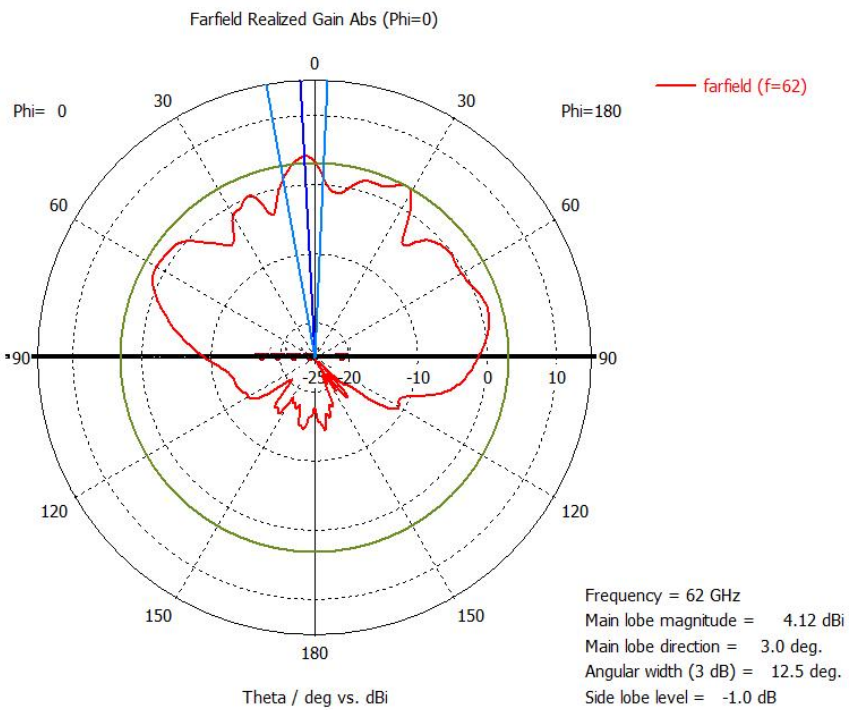


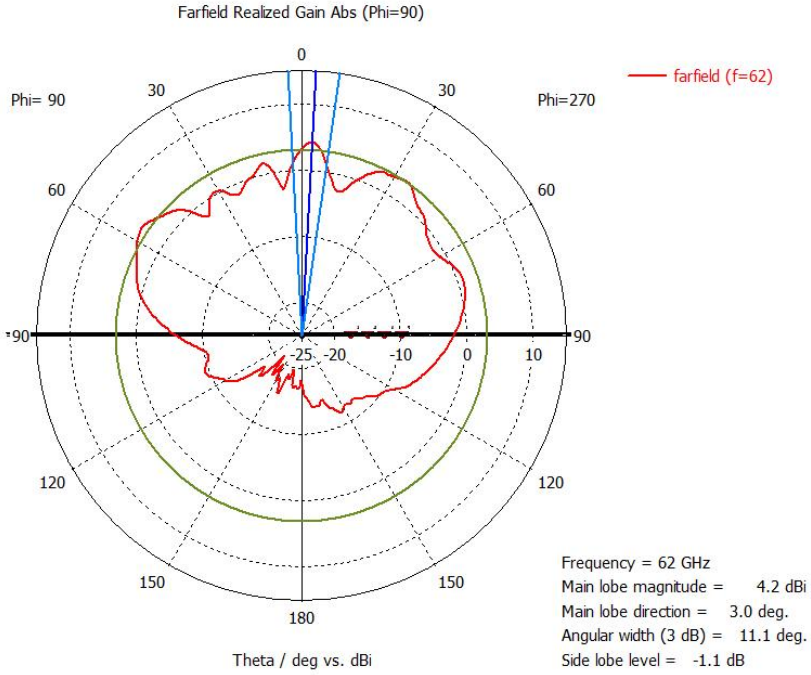


Realized Gain = Directivity – Total Eff = 7.5 dBi

Antenna 7 (Rx4)







Realized Gain = Directivity – Total Eff = 6.4 dBi