

Cabin Radar Antenna Realized Gain simulations

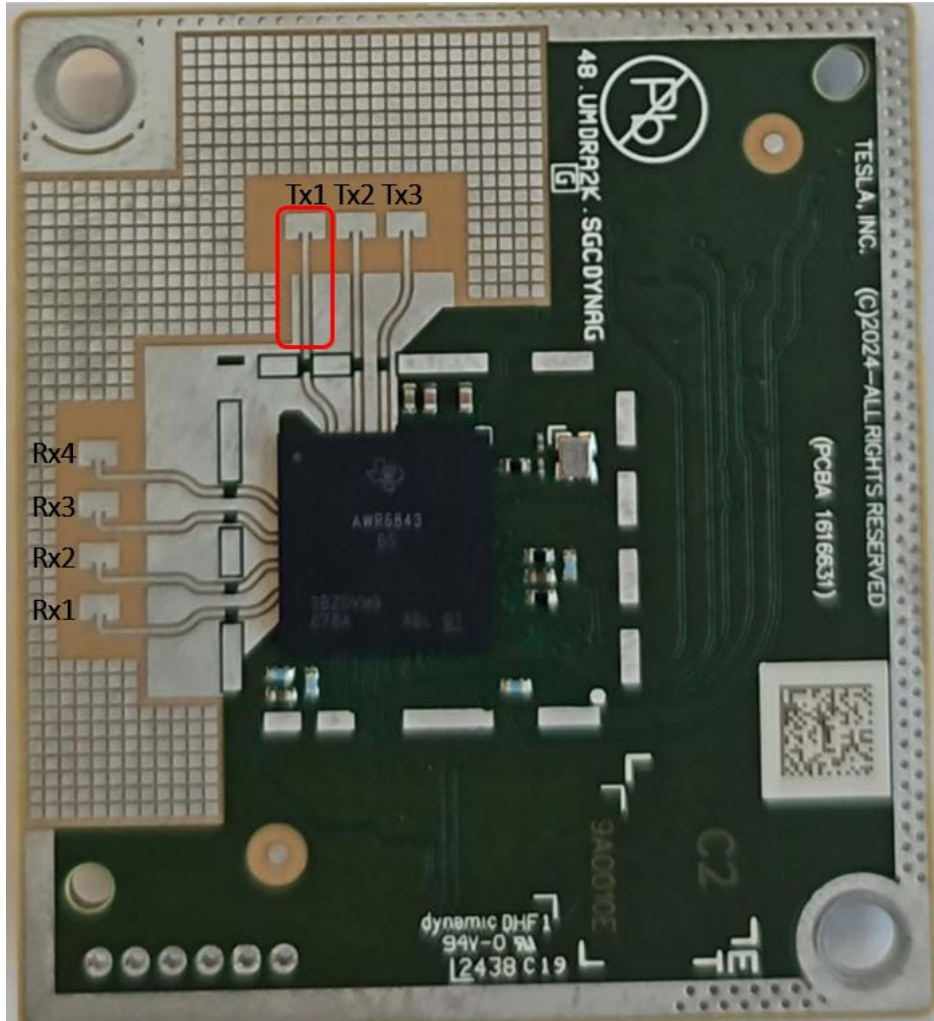
For Certification

Anand Konanur

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

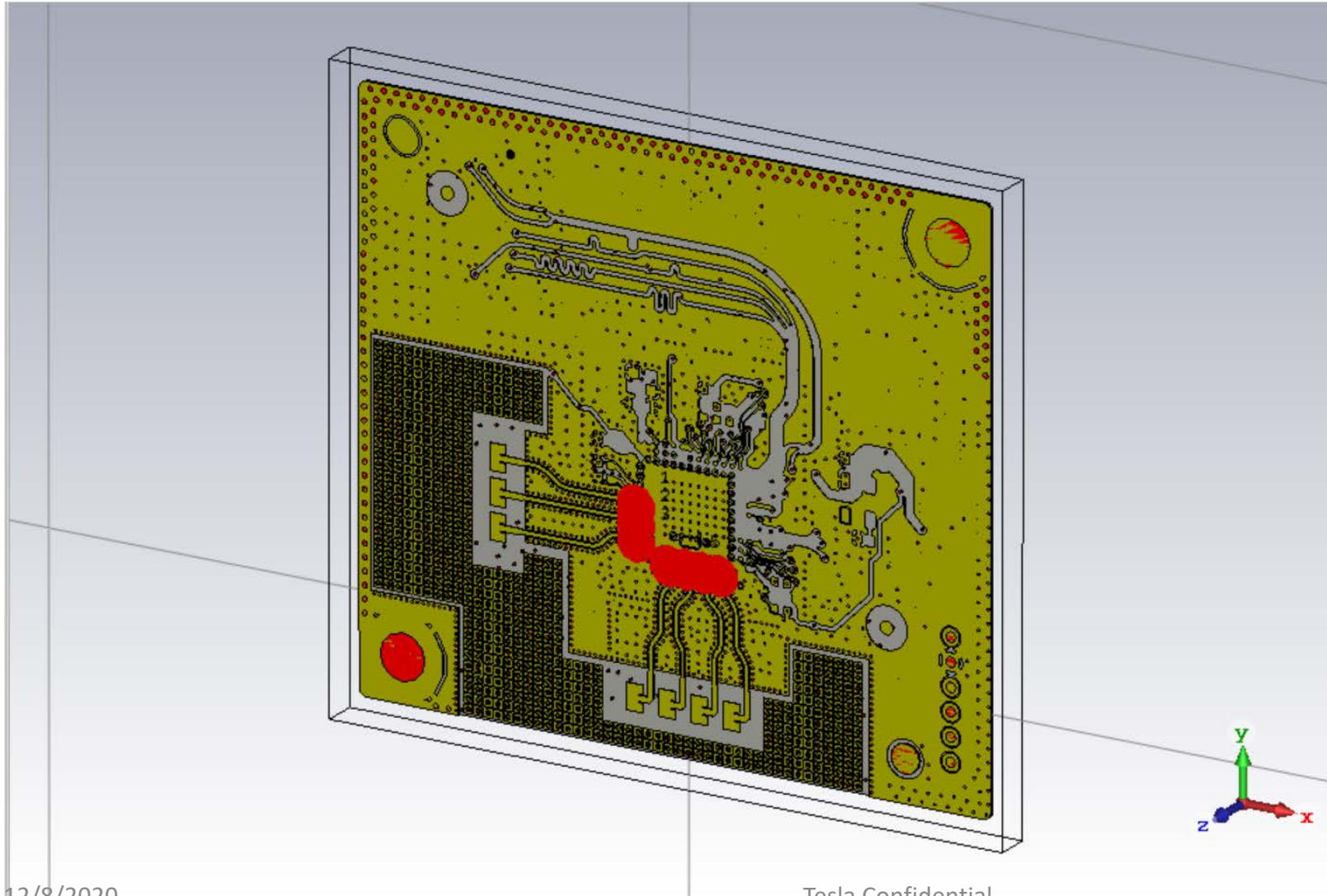


Antenna	Realized Gain(dBi)
Tx1	8.6
Tx2	9.2
Tx3	7.5
Rx1	6.8
Rx2	6.5
Rx3	7.5
Rx4	6.4

Cabin Radar Simulations

Antenna Pattern simulations

Setup



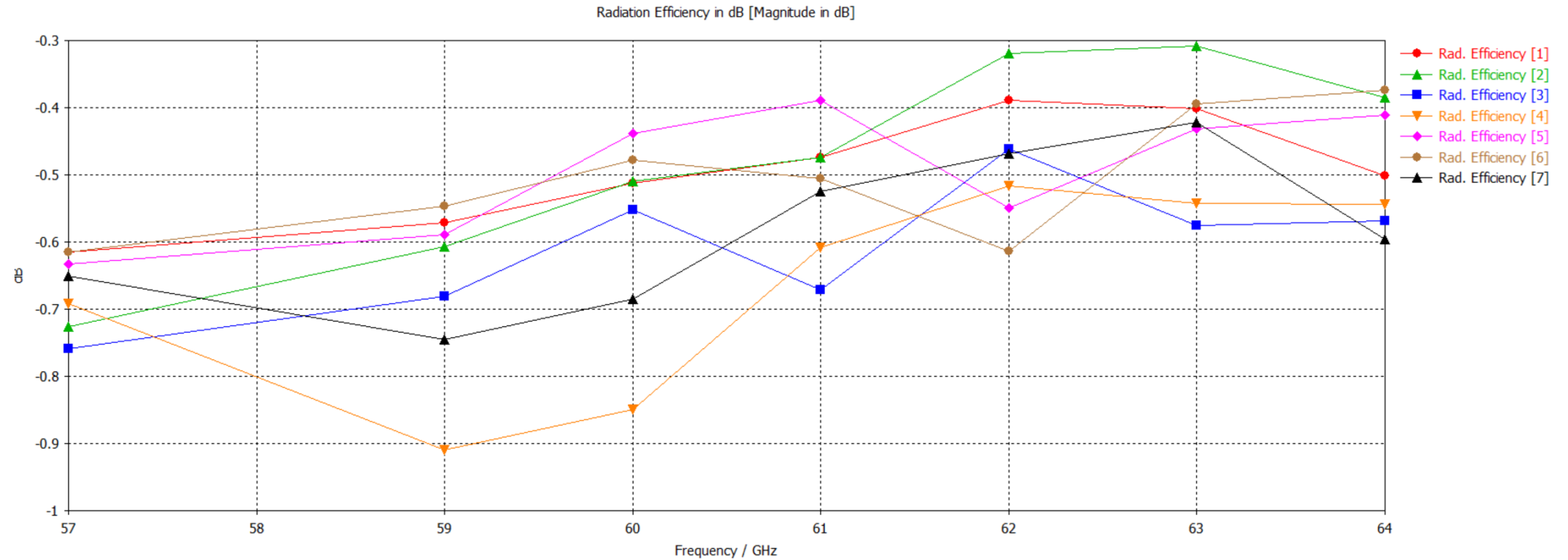
IPC 2581 import from
Altium

Using only L1 and
dielectric1

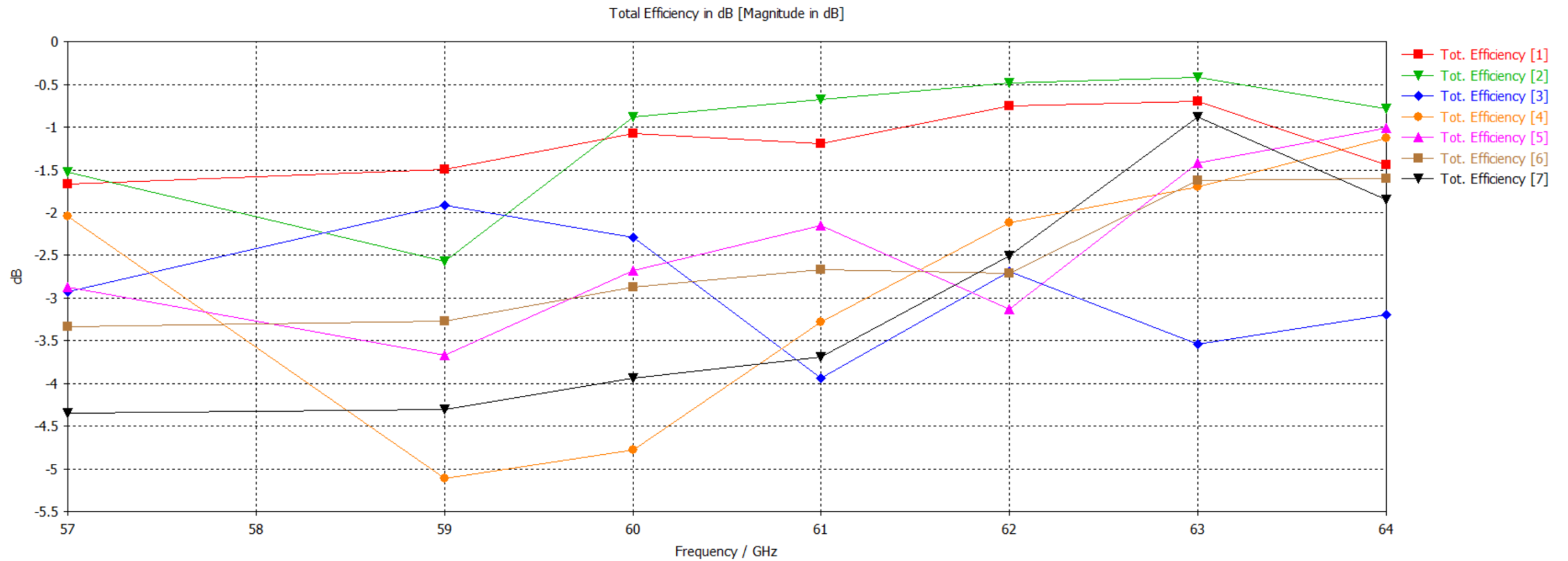
Created solid L2 layer (
0.1905 mm thickness)

Added lumped element
ports

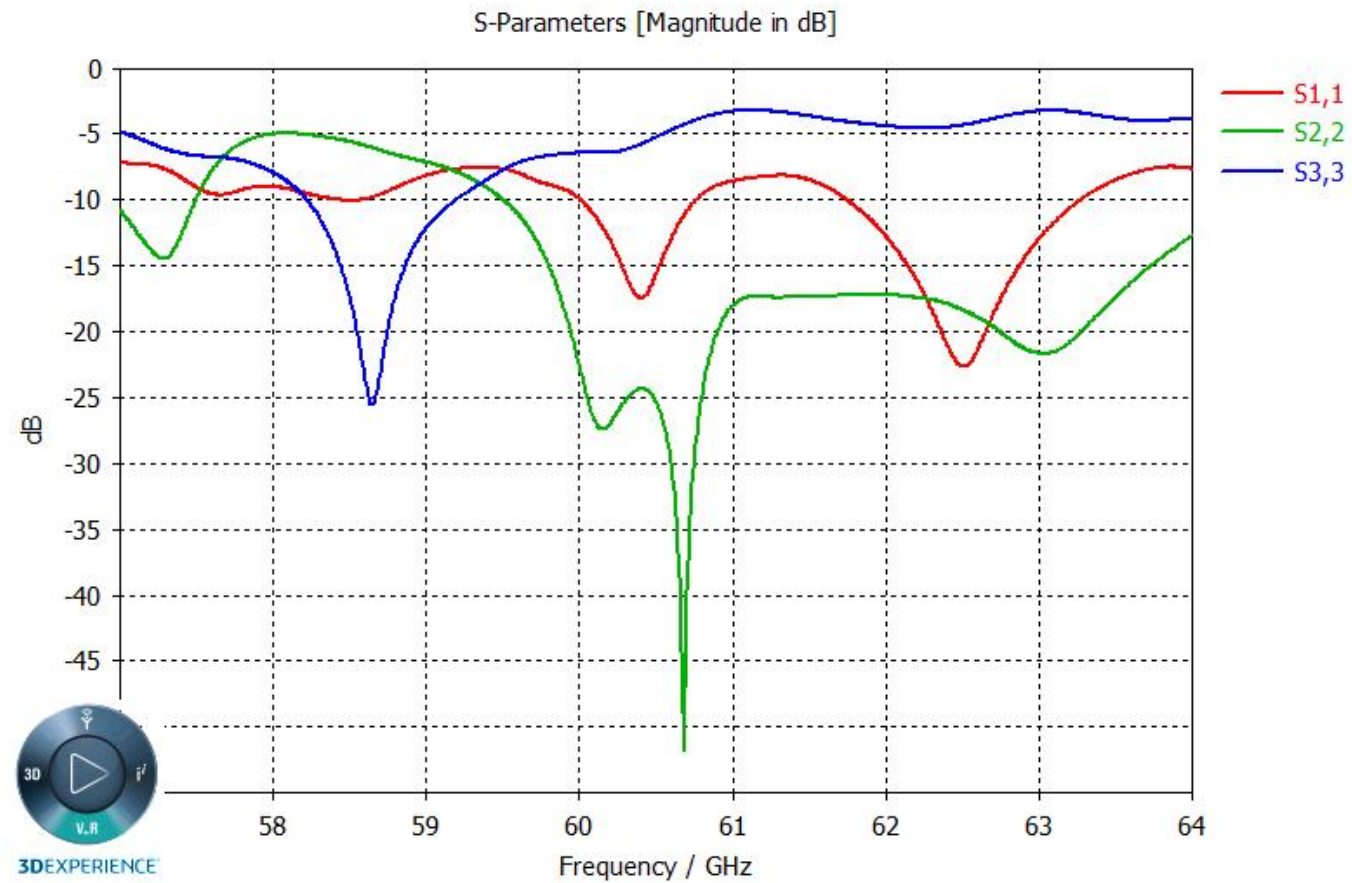
Radiation Efficiency



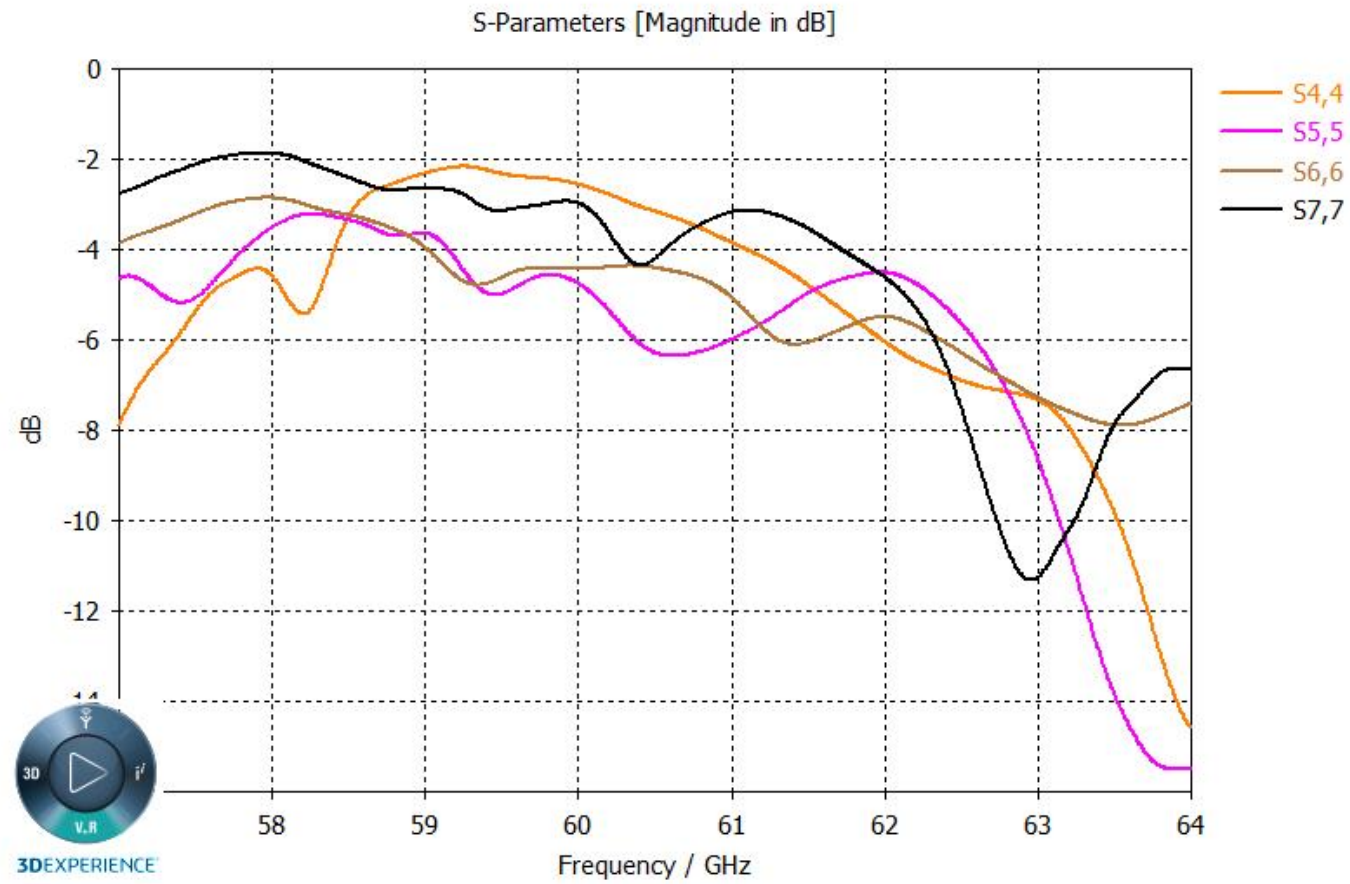
Total Efficiency



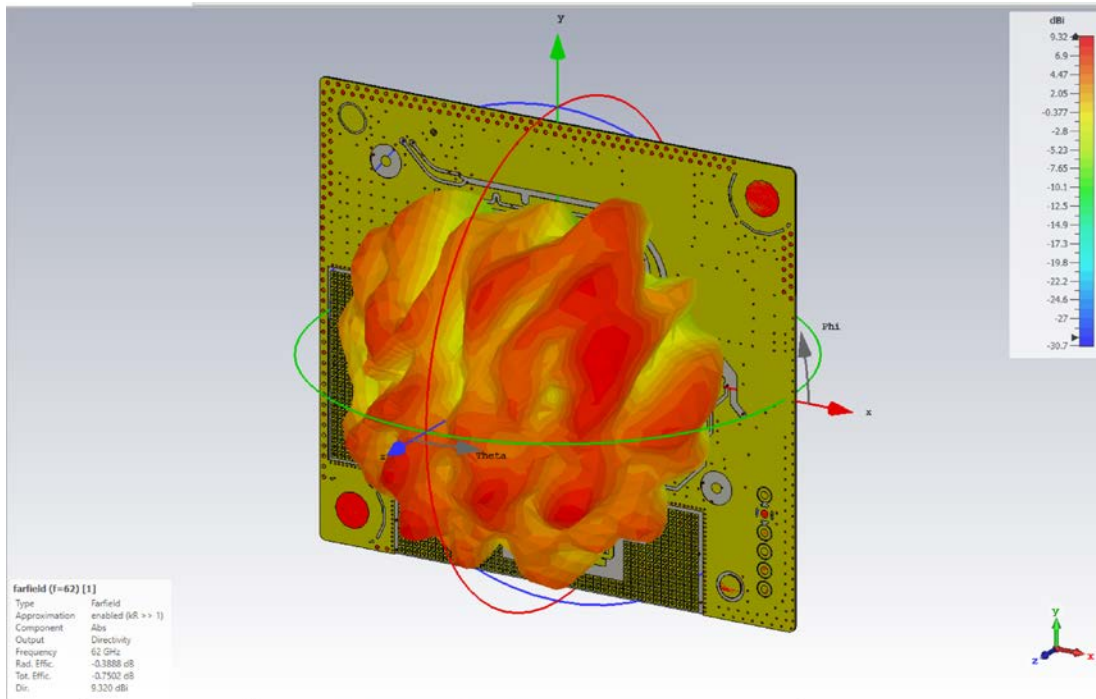
Tx matching



Rx Matching

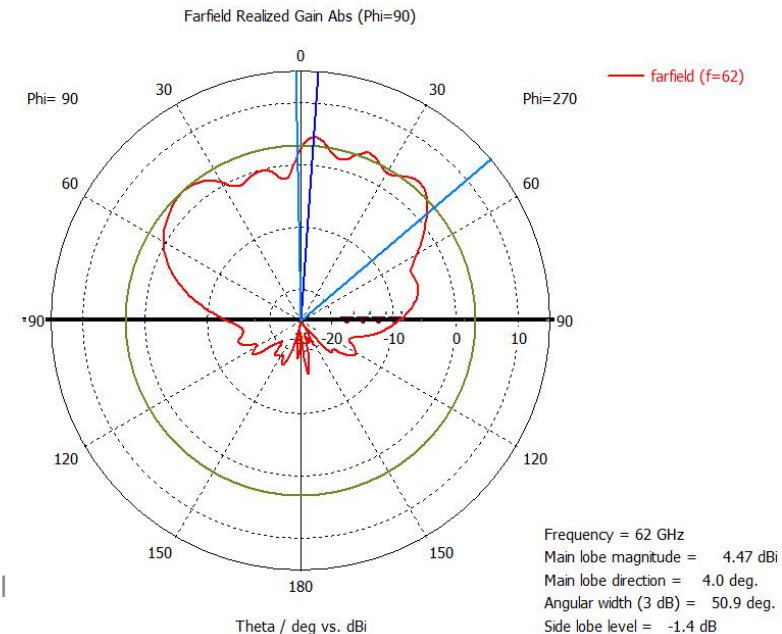
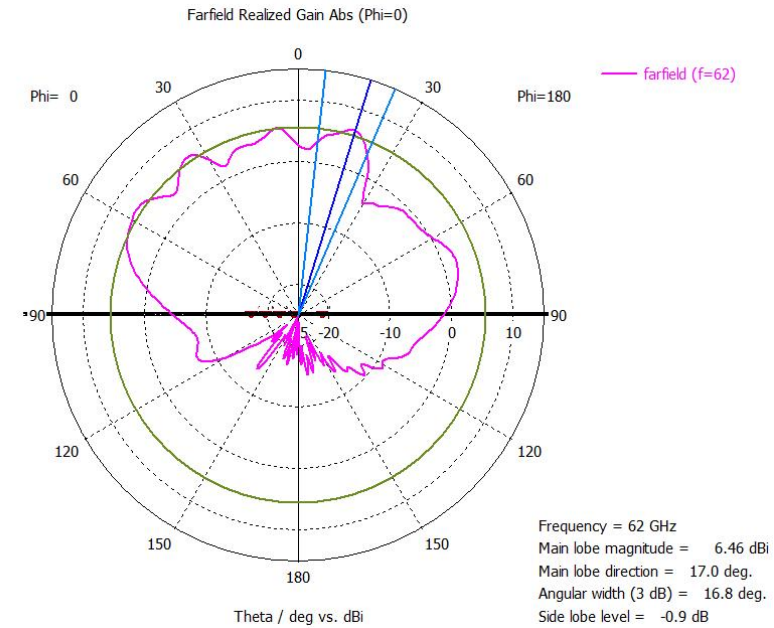


Antenna 1 (Tx1)

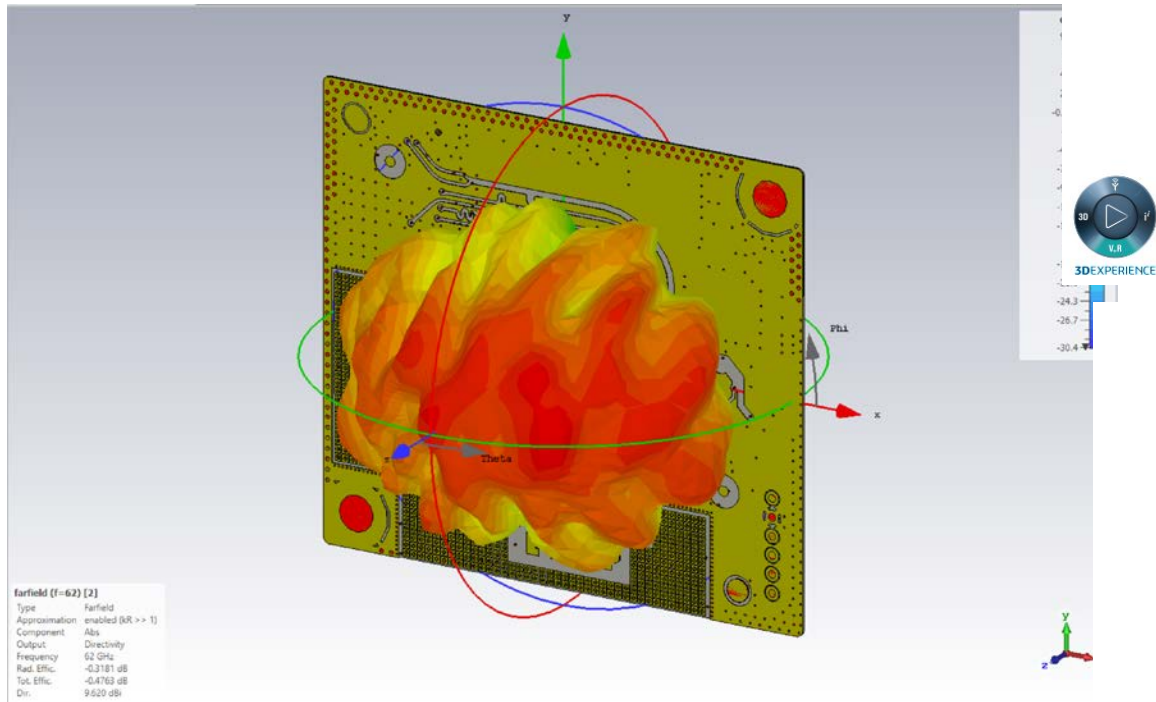


$$\text{Realized Gain} = \text{Directivity} - \text{Total Eff} = 8.6 \text{ dBi}$$

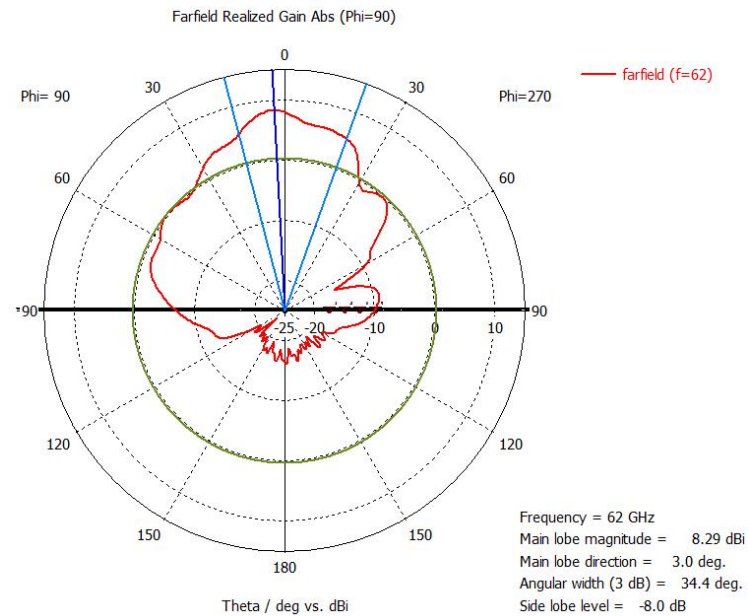
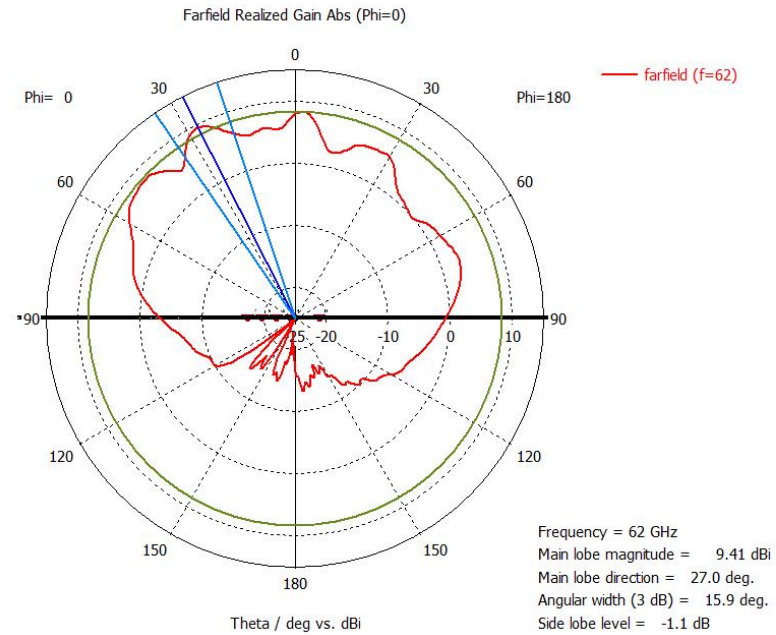
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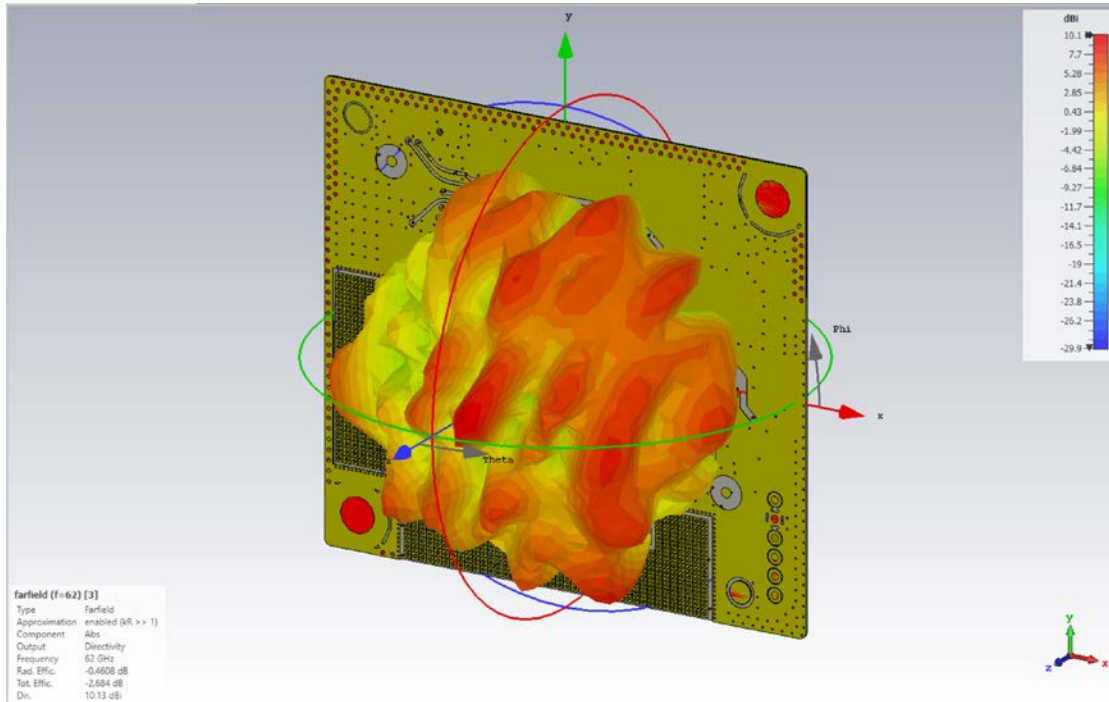
Antenna 2 (Tx2)



Realized Gain = Directivity – Total Eff = 9.2 dBi

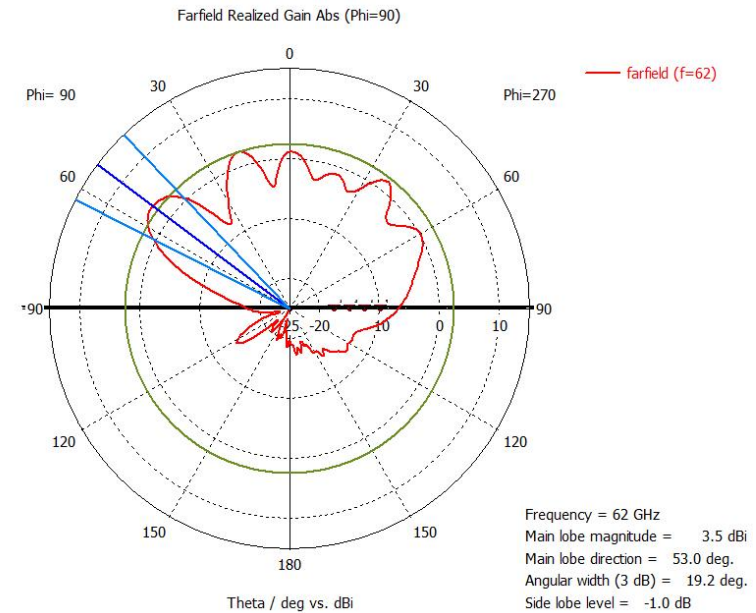
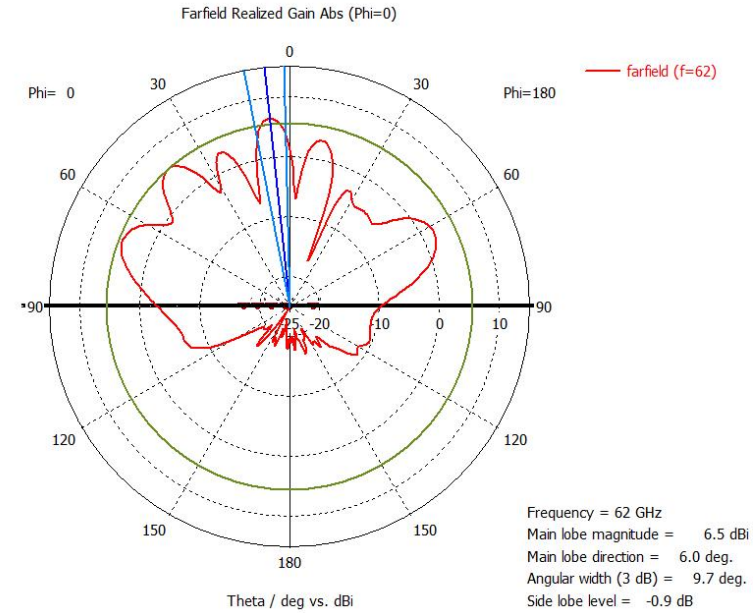


Antenna 3 (Tx3)

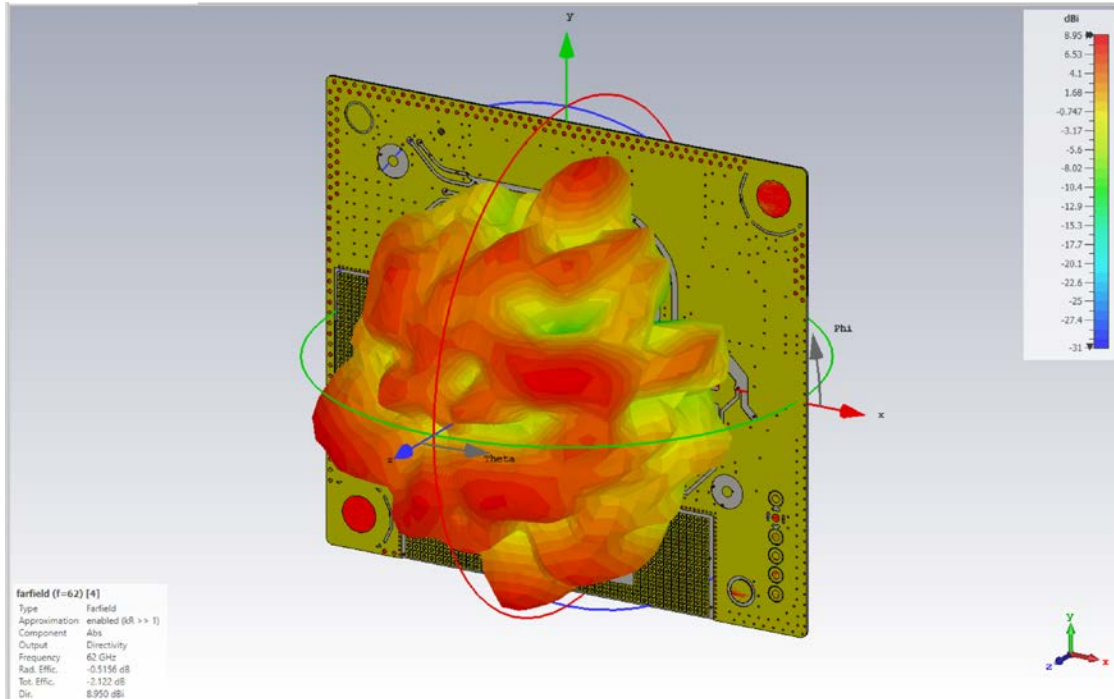


Realized Gain = Directivity – Total Eff = 7.5 dBi

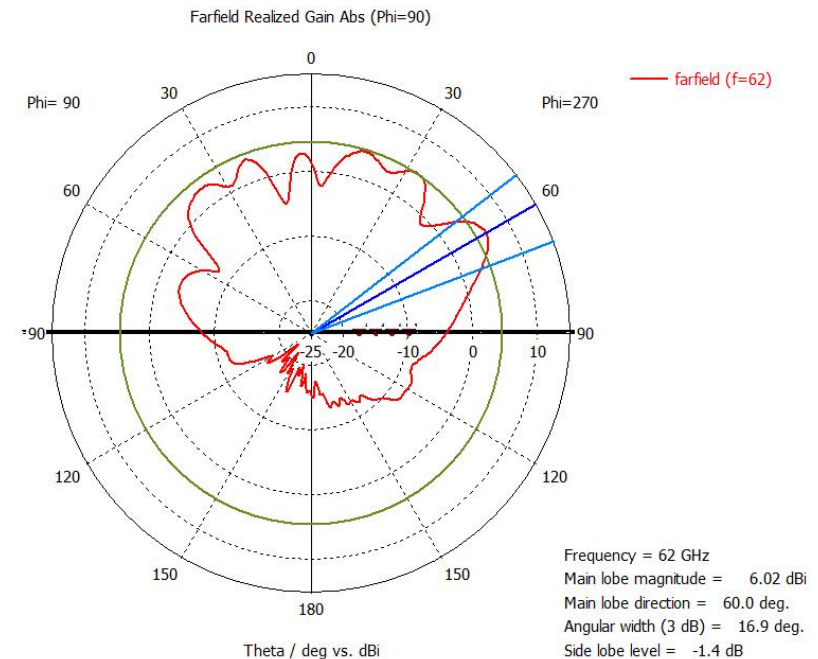
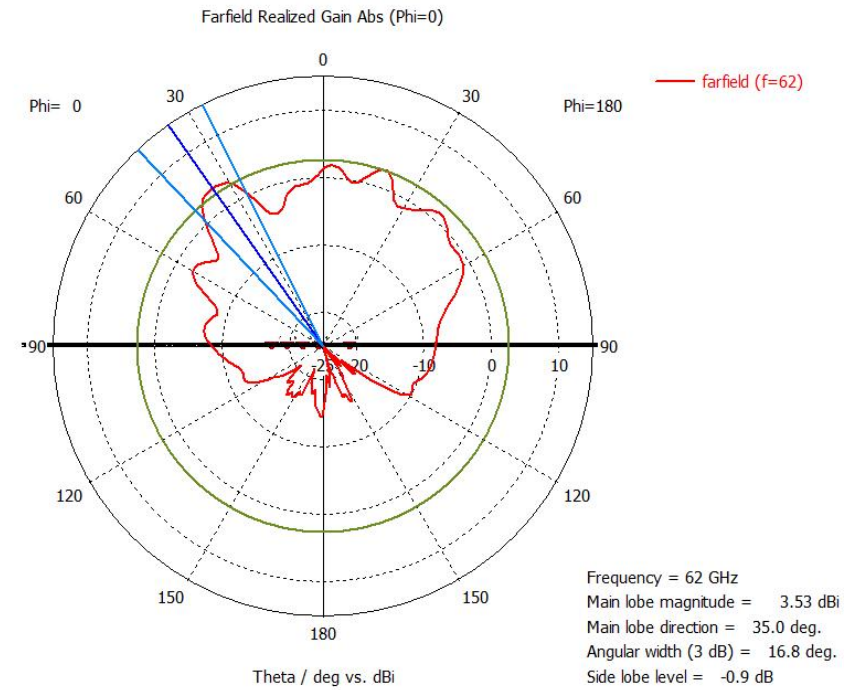
12/8/2020



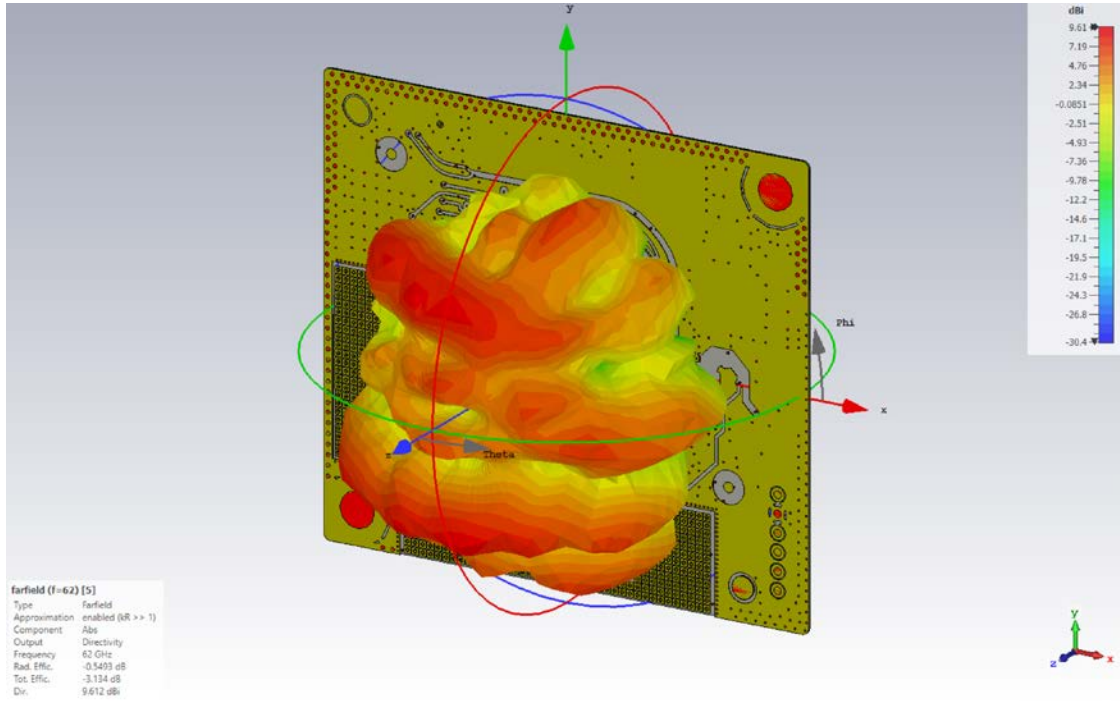
Antenna 4 (Rx1)



$$\text{Realized Gain} = \text{Directivity} - \text{Total Eff} = 6.8 \text{ dBi}$$

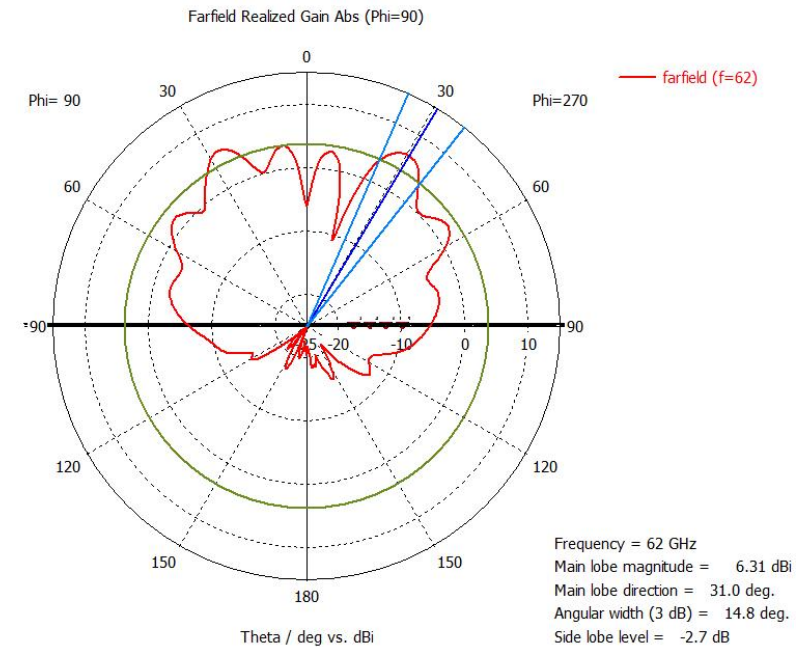
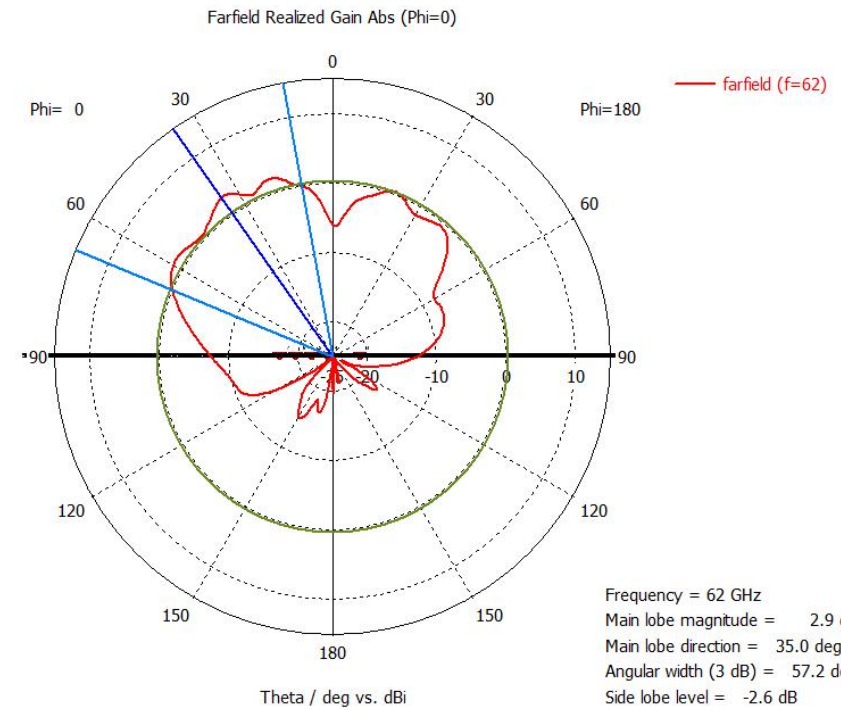


Antenna 5 (Rx2)

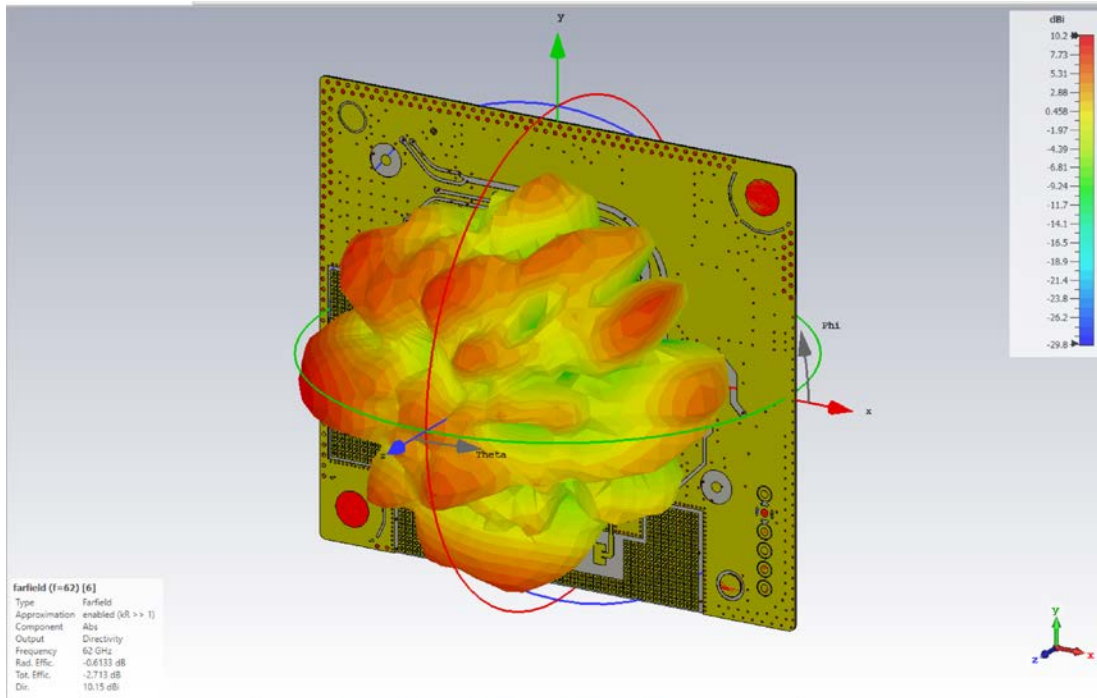


$$\text{Realized Gain} = \text{Directivity} - \text{Total Eff} = 6.5 \text{ dBi}$$

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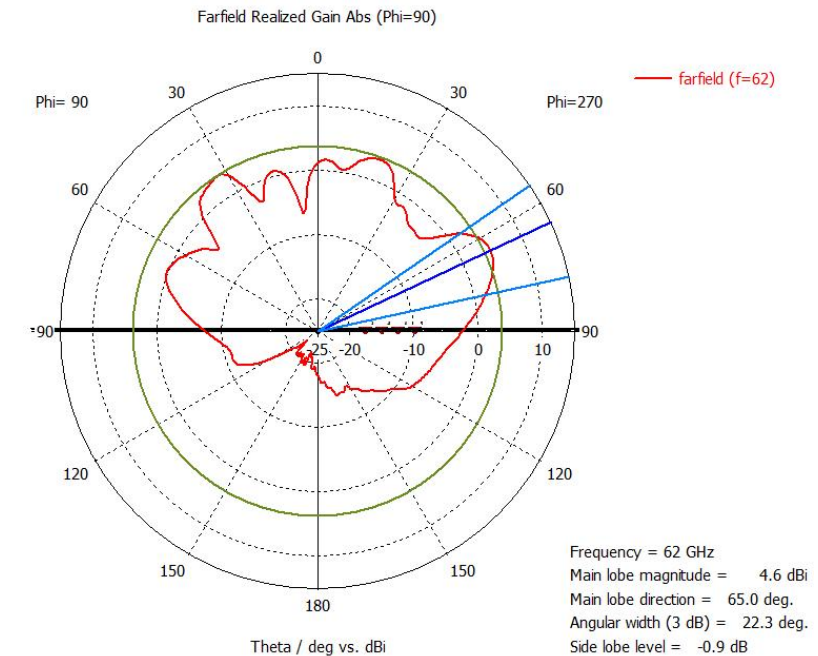
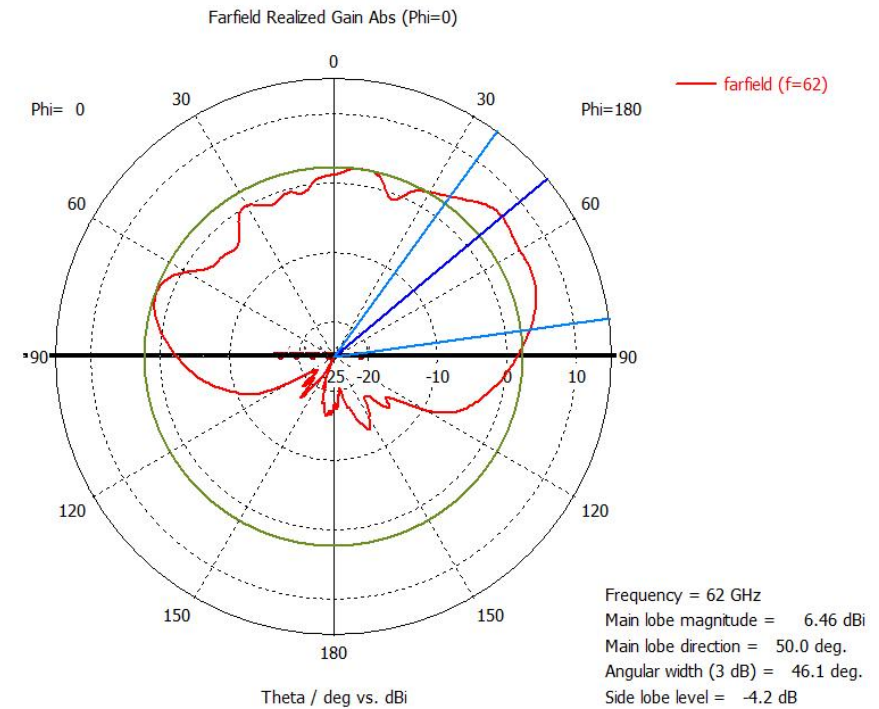


Antenna 6 (Rx3)



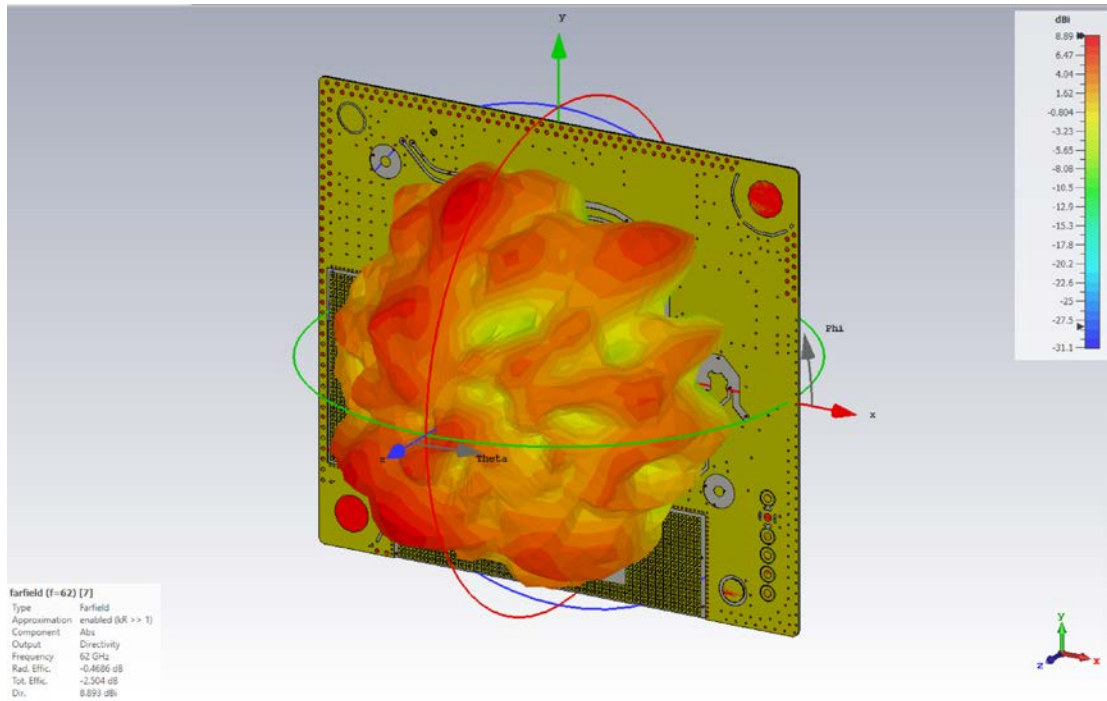
$$\text{Realized Gain} = \text{Directivity} - \text{Total Eff} = 7.5 \text{ dBi}$$

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Antenna 7 (Rx4)



Realized Gain = Directivity – Total Eff = 6.4 dBi

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