



Field Theory
1061 High St.
Mundelein, IL 60060

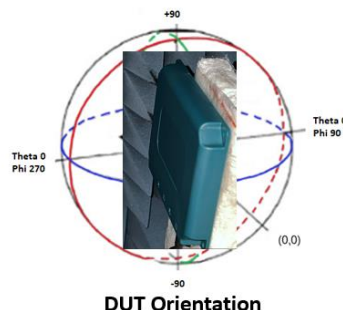
Antenna Unit Requirements and Results from PVT Build in Support of RightHand Technologies Cabin Link 6

FT-PR-EE-001

February 17, 2023

Testing Conditions

Test Conducted	10-31-22
DUT SN/PN	00109
SW Version	N/A
Equipment Used	Keysight Vector Network Analyzer; 3-meter anechoic antenna chamber equipped with a dual-pol quad-ridge horn receiver antenna and an EL-AZ positioner with laser positioner
Notes on DUT	Fully Assembled DVT Unit



1.1.1 Electrical/RF Requirements

1.1.1.1 Maximum Gain shall be ≤ 6.0 dBi through both the Low Band and High Band passbands.
Minimum Gain shall be 3.0 dBi through both the Low Band and High Band passbands.

Pass.

See Table 1.

Positive minimum gain does not reflect an omnidirectional antenna design.

1.1.1.2 Gain variation for each individual element in the array across the respective bandwidth shall be:

1.1.1.2.1 Low Band: <1.5 dB

Pass.

See Table 1.

1.1.1.2.2 High Band: <3.0 dB

Pass.

See Table 1.

1.1.1.3 Nominal Impedance, each element at connector shall be:

1.1.1.3.1 50Ω across respective band

Pass.

See Figure 1-4.

1.1.1.4 Maximum VSWR across respective bandwidth shall be:

1.1.1.4.1 Low Band: 2.5:1;

Pass.

See Figure 1-4.

1.1.1.4.2 High Band: 2.5:1;

Pass.

See Figure 1-4.

1.1.1.5 Power Handling:

1.1.1.5.1 Each element of the A/U shall be capable of meeting specified performance parameters with forward power levels up to and including +30 dBm.

Pass.

Per mechanical standards

1.1.1.6 Radiation Pattern:

1.1.1.6.1 The radiation pattern of the A/U shall be omnidirectional with respect to the z-axis of the mounting plane.

Pass.

See Figure 9-17 and Figure 18-27.

1.1.1.7 Polarization:

1.1.1.7.1 The polarization of the A/U shall be linear.

Pass.

1.1.1.8 RF Interface Connector:

1.1.1.8.1 The RF connectors shall be type SMA – female. Polarization of the connector shall be standard.

Pass.

Verified on Mechanical Drawing Revision 6 “FTASMR001” dated 11-17-23 and through inspection.

1.1.1.9 Swept RF Performance

1.1.1.9.1 A/U swept gain flatness, passband ripple, phase stability, and group delay shall be - commensurate with anticipated channel bandwidths and modulation envelopes.

Pass.

1.1.1.10 Ground (Reference) Plane

1.1.1.10.1 The A/U shall employ an integrated ground plane at its base to minimize the effects of mounting surfaces on its RF performance characteristics

Pass.

Verified on Mechanical Drawing Revision 6 “FTASMR001” dated 11-17-23 and through inspection.

3.1.2.12 Element-to-Element Isolation

3.1.2.12.1: Coupling from any element to any other element shall be -20 dB nominal;

Pass.

See Figure 27-34.

3.1.2.13: Element Efficiency:

3.1.2.13.1: Efficiency of each antenna element shall exceed 70%.

Pass.

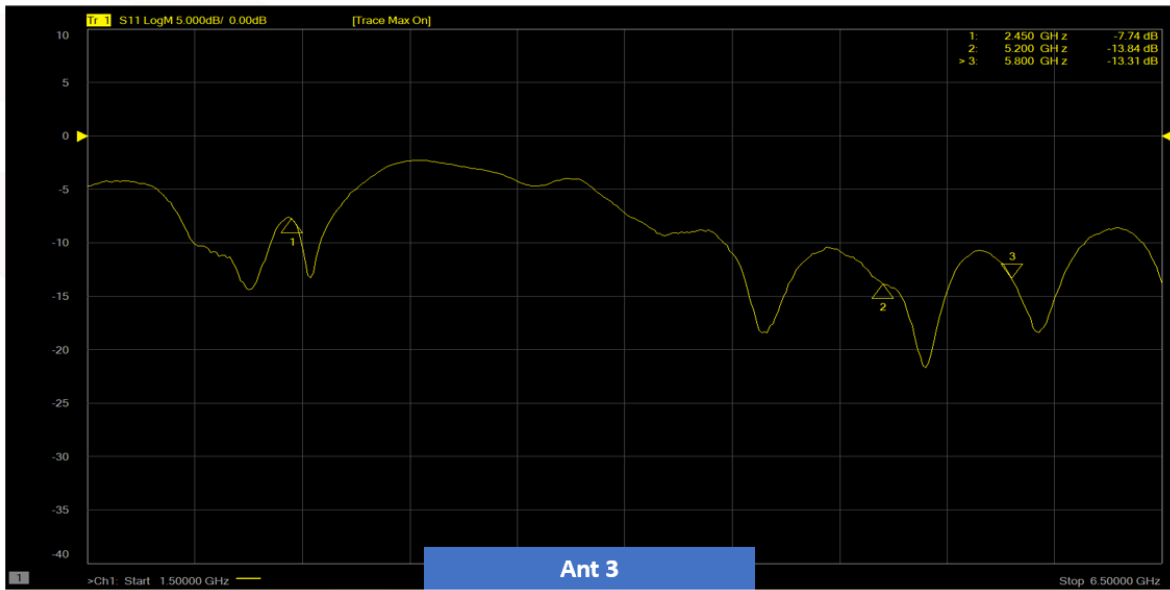
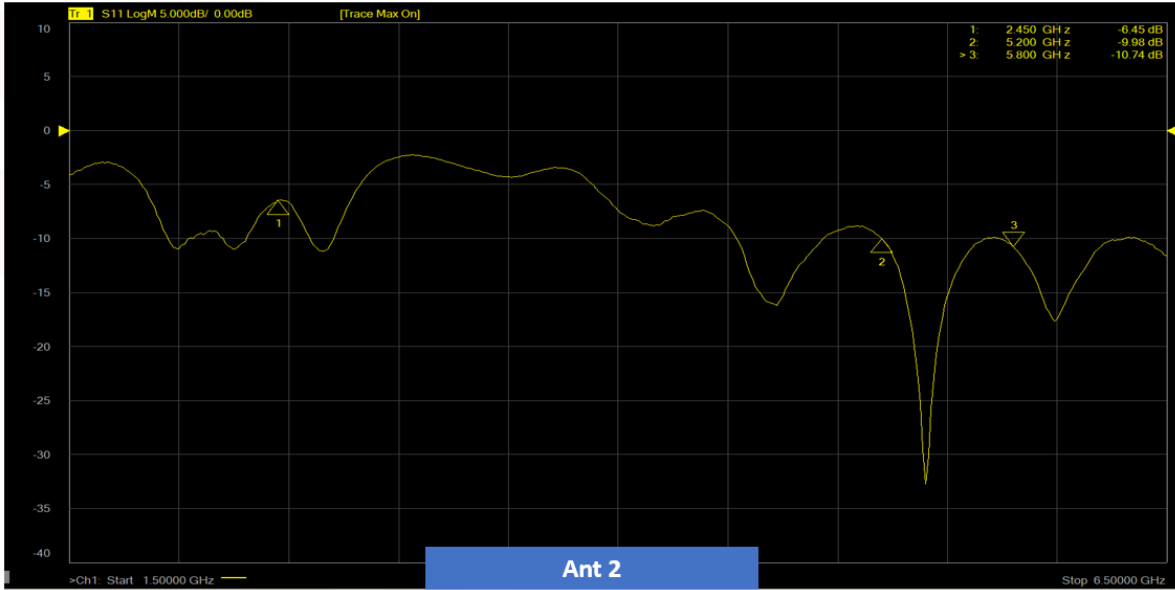
See Figure 5-8.

Table 1. Gain Data

Frequency (MHz)	Gain (dBi)			
	Ant 1	Ant 2	Ant 3	Ant 4
2412	2.52	2.00	2.90	3.41
2440	3.00	1.57	2.75	3.56
2480	3.00	1.42	3.05	3.66
5200	4.10	3.62	4.48	5.75
5300	3.75	3.80	5.00	5.60
5500	3.12	5.10	4.65	5.45
5800	3.10	3.90	4.75	5.30

Figure 1-4. S-Parameters





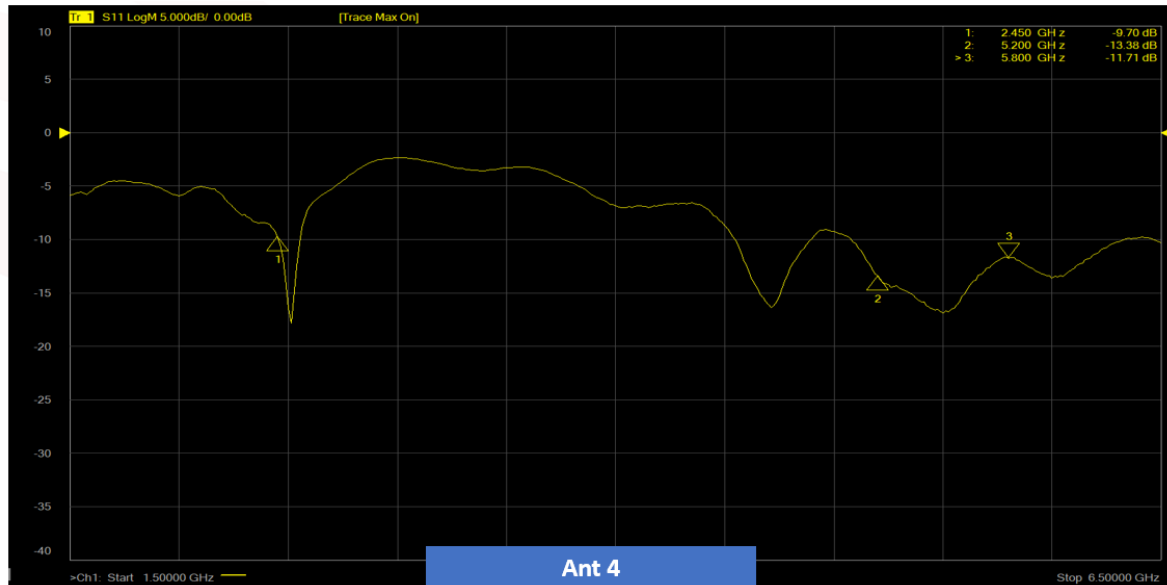
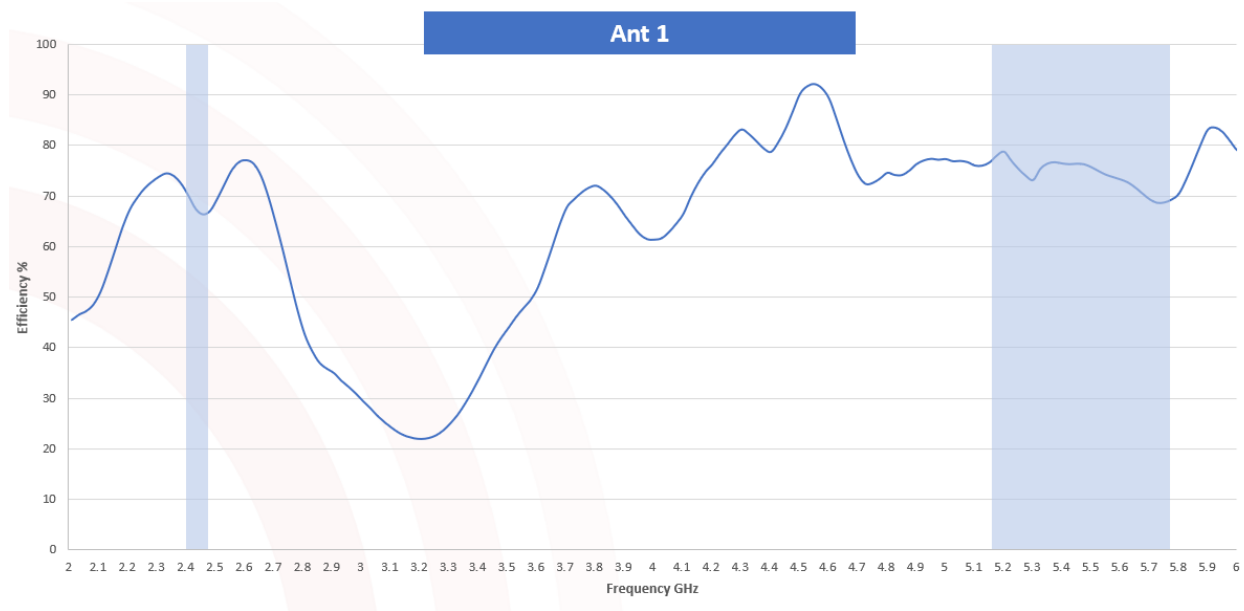
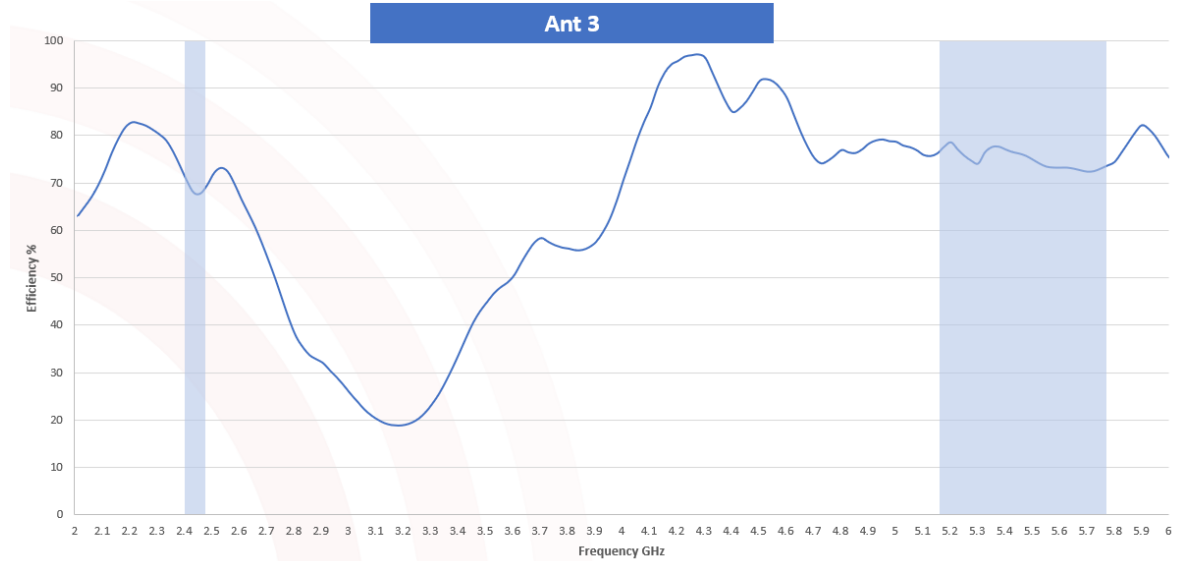
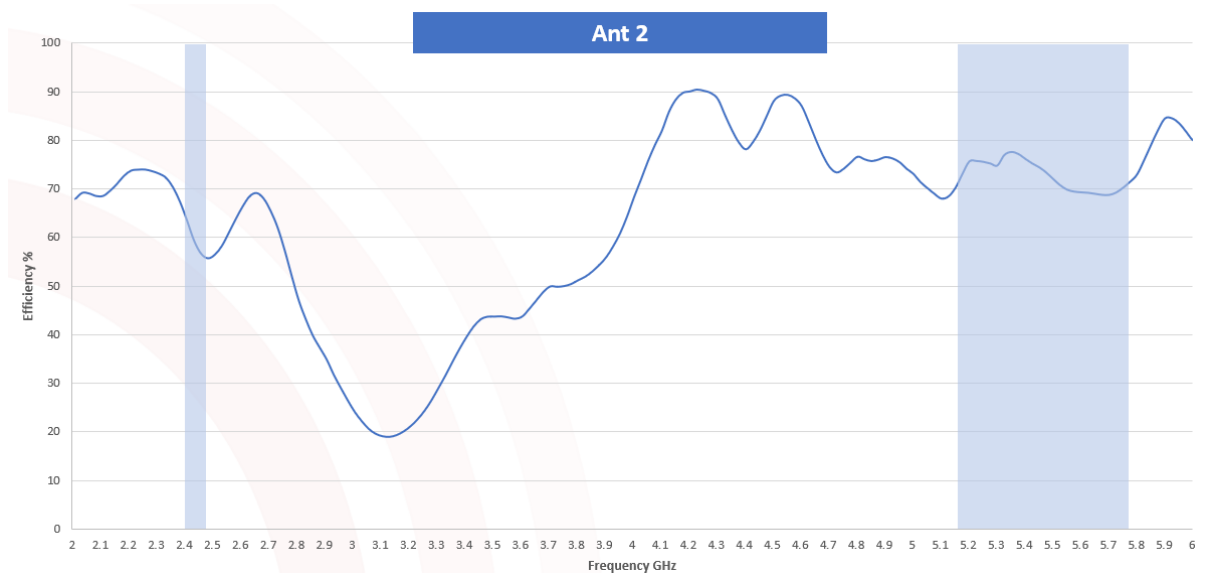


Figure 5-8. Passive Efficiencies





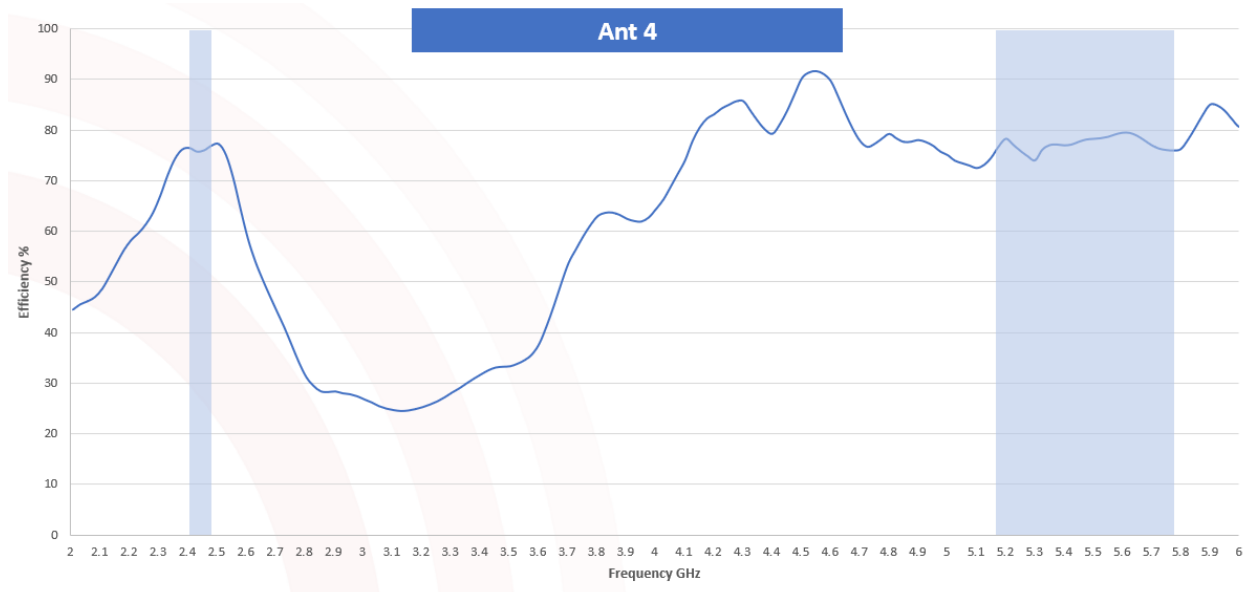
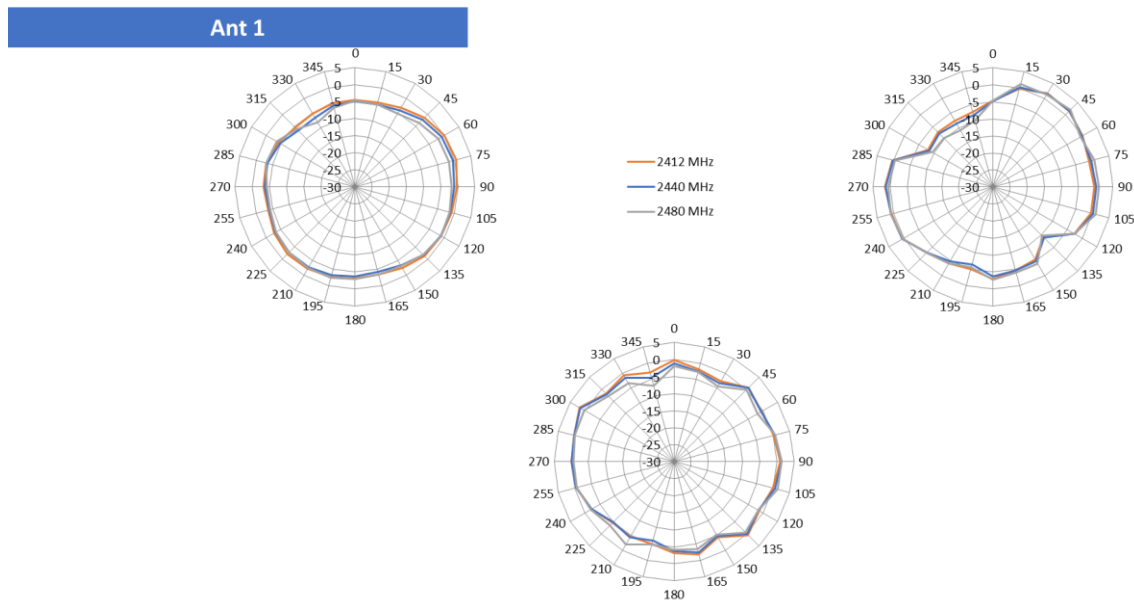
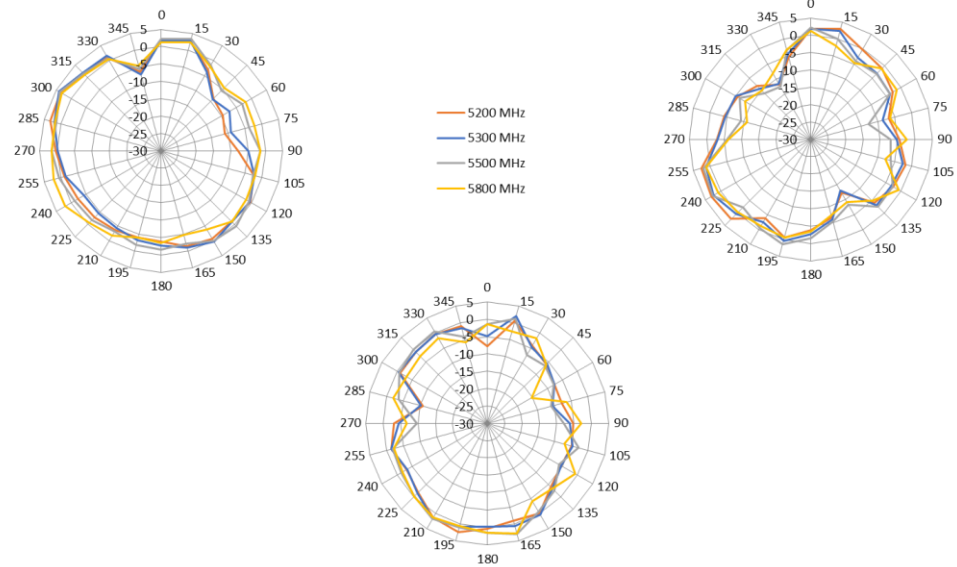


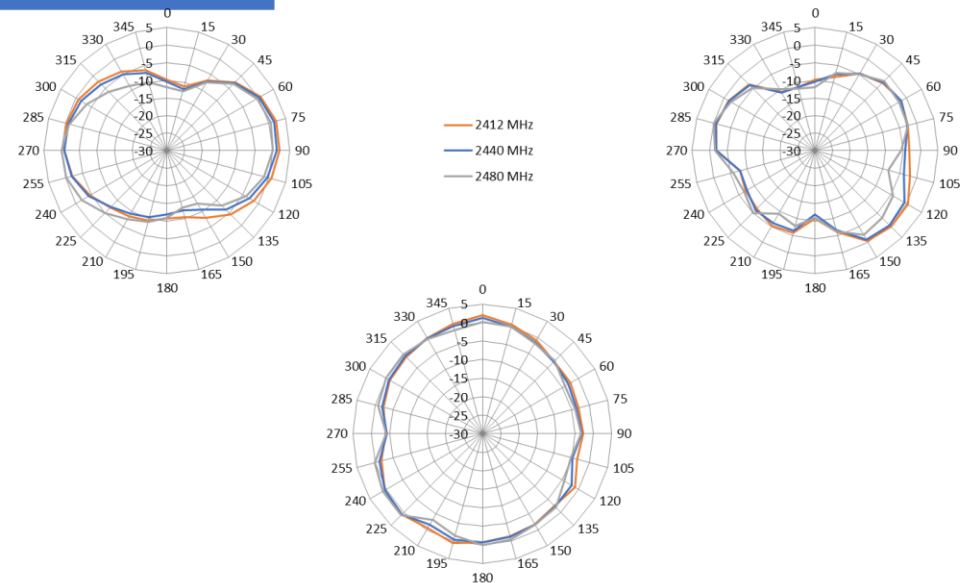
Figure 9-17. 1D Radiation Patterns



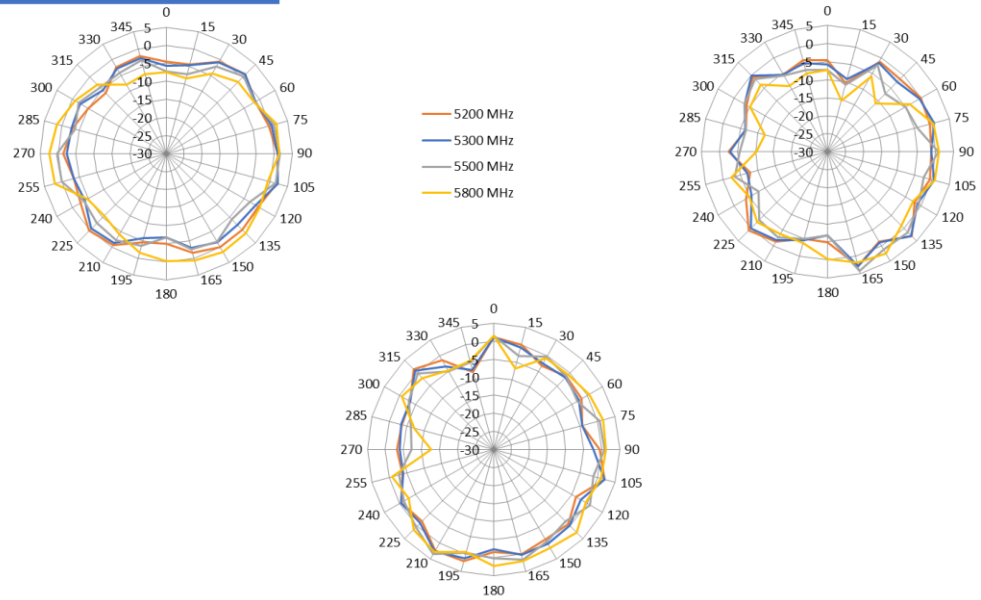
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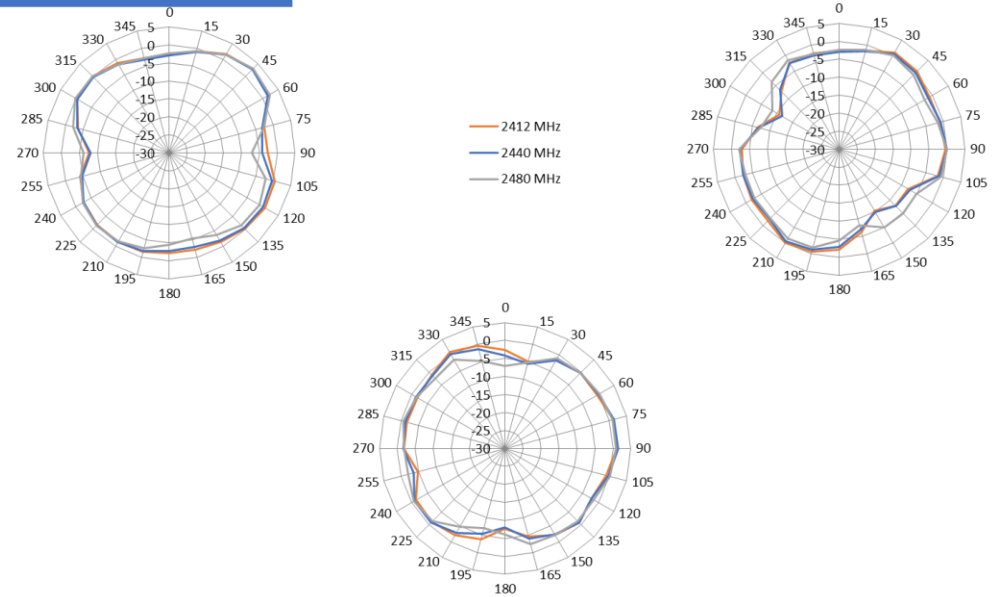
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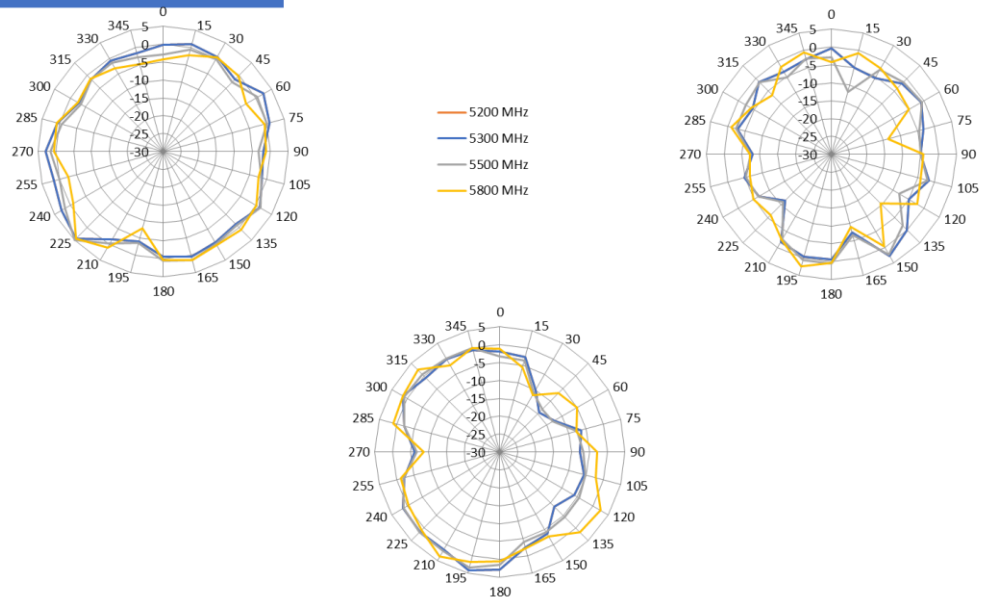
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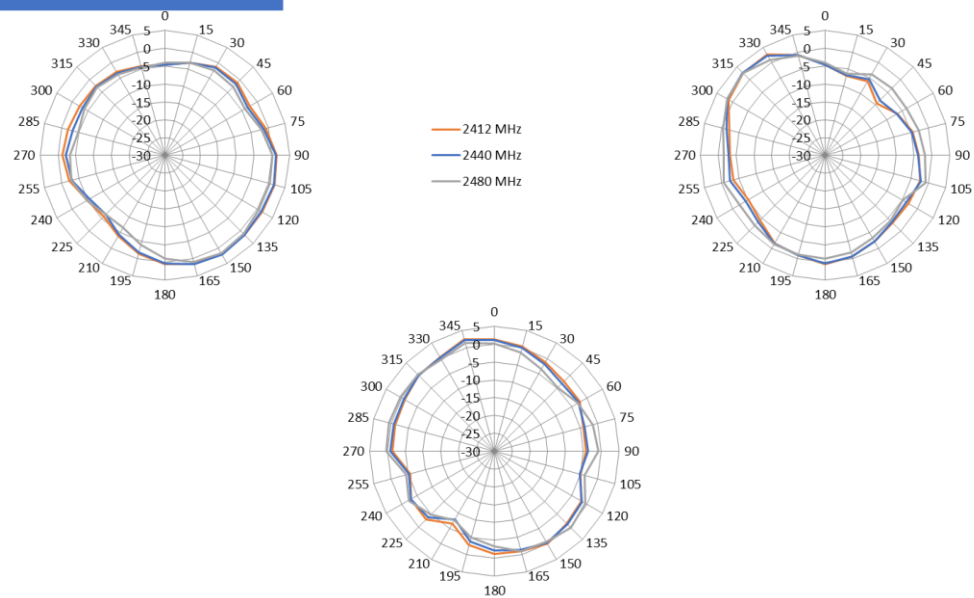
Ant 3



Ant 3



Ant 4



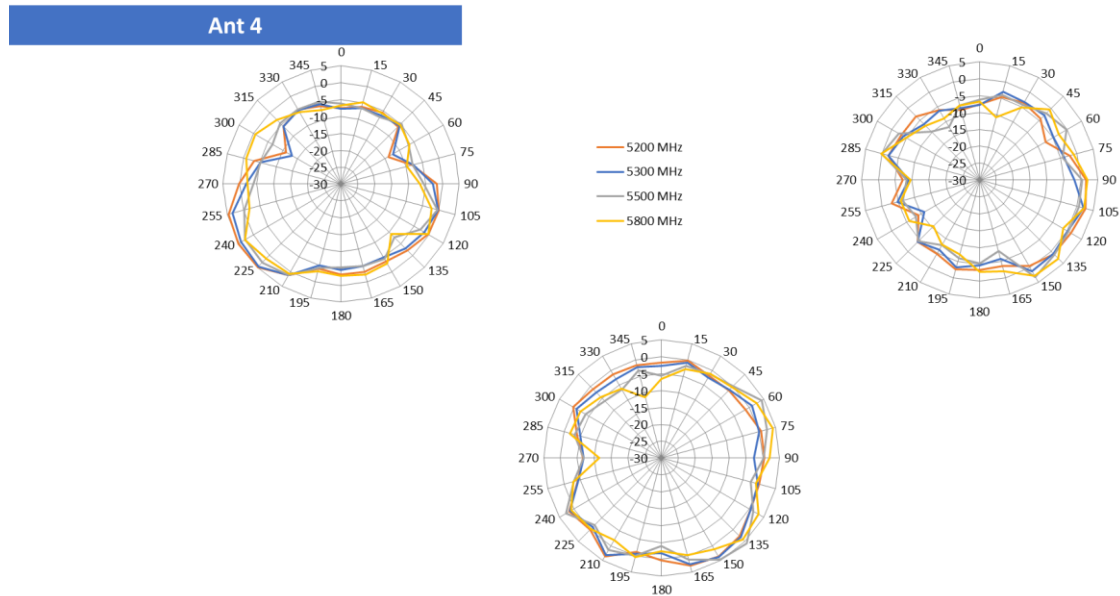
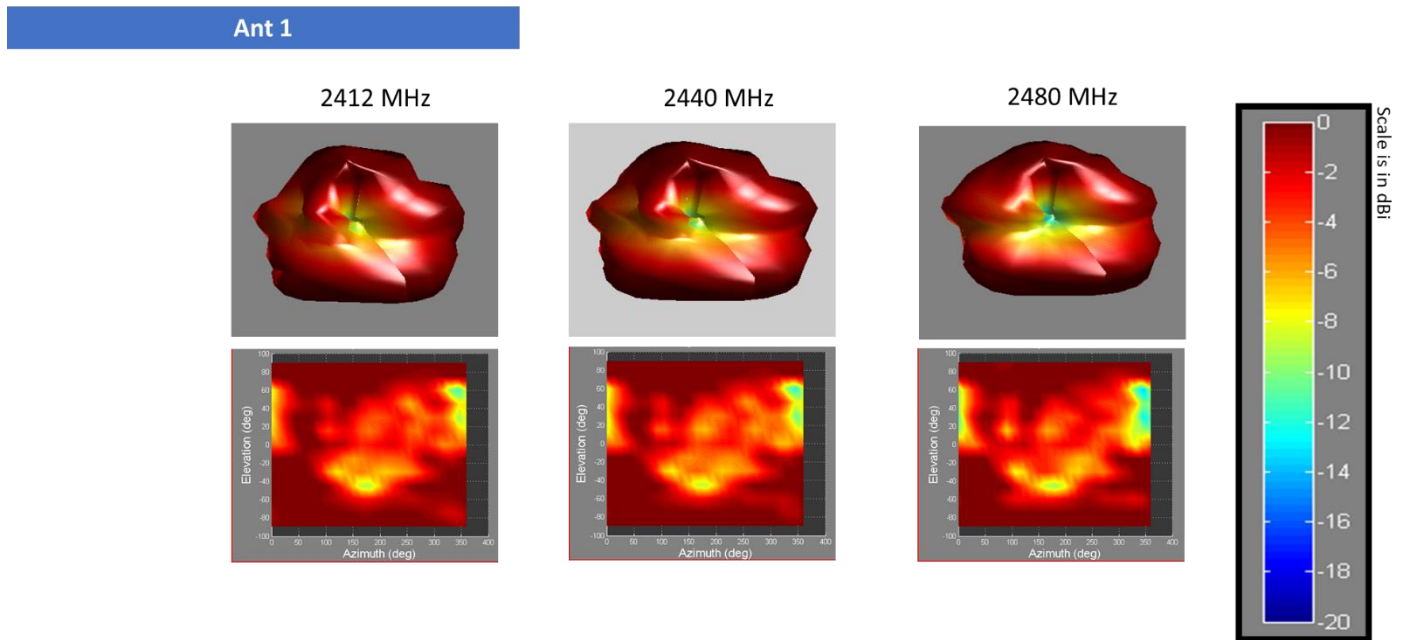
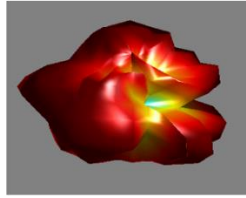


Figure 18-27. Heat Map & 3D Spherical Plots

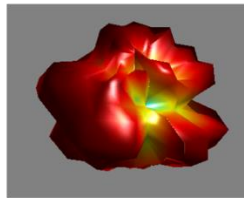


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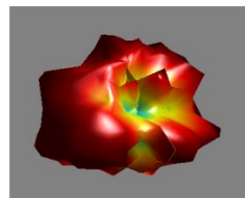
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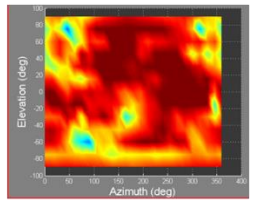
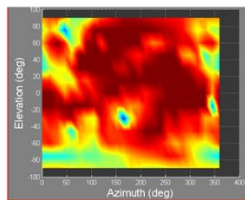
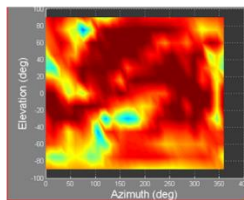
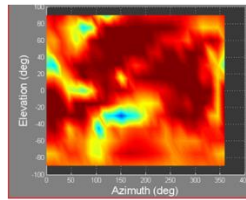
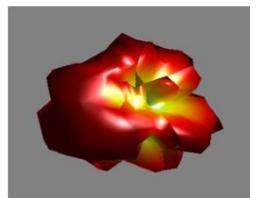
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5550 MHz

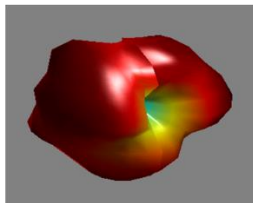


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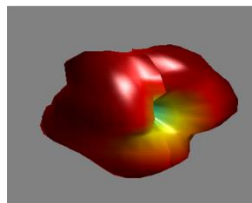


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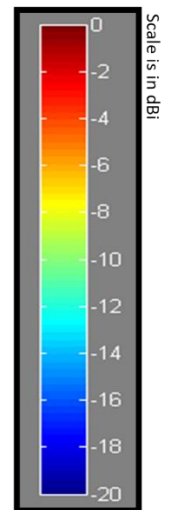
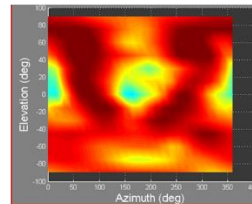
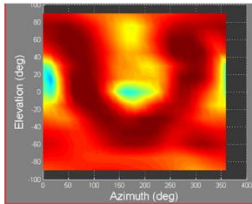
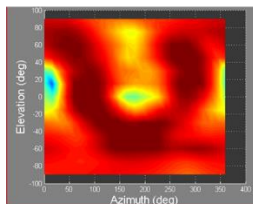
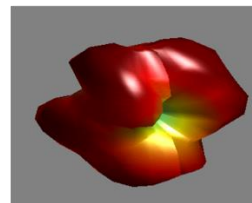
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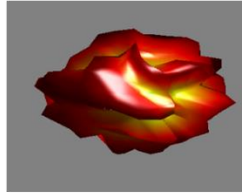


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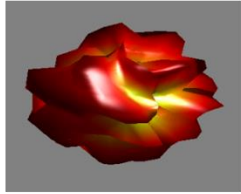


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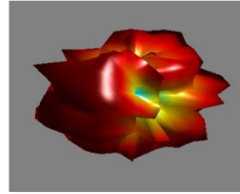
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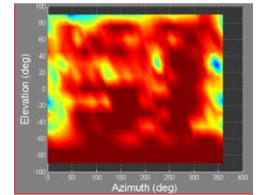
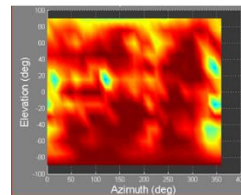
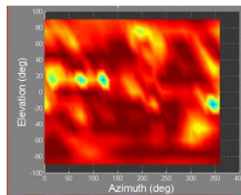
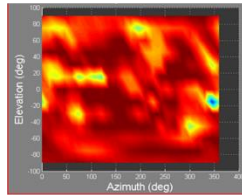
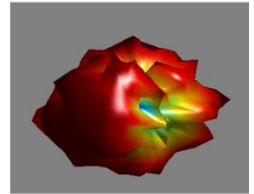
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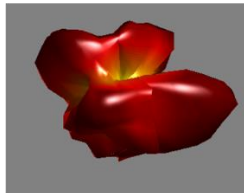


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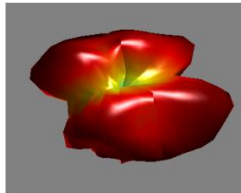


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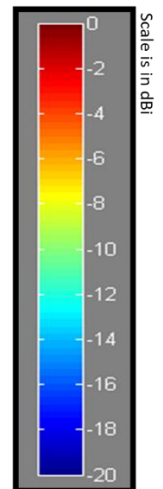
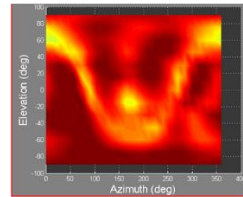
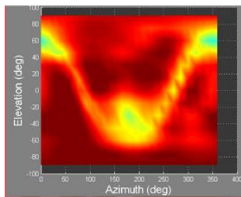
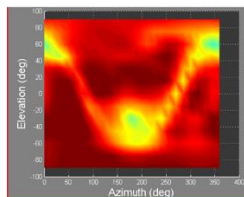
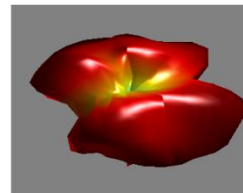
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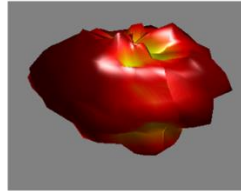


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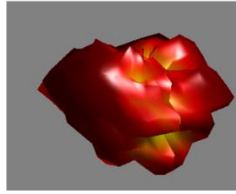


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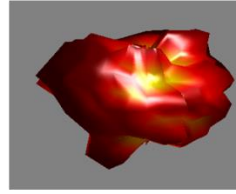
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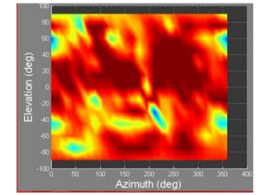
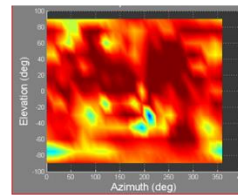
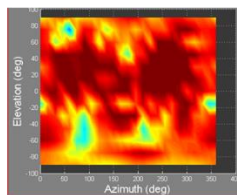
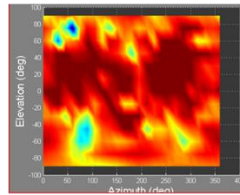
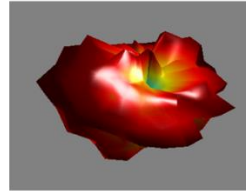
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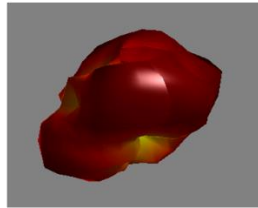


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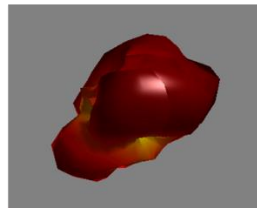


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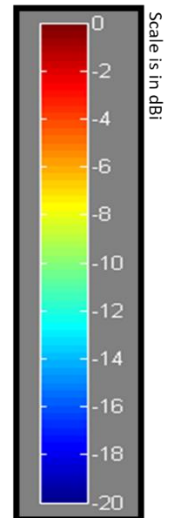
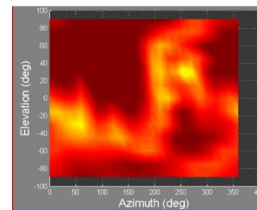
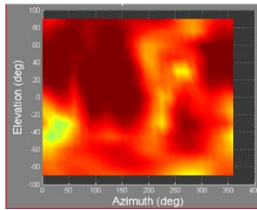
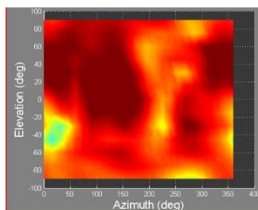
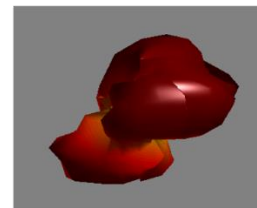
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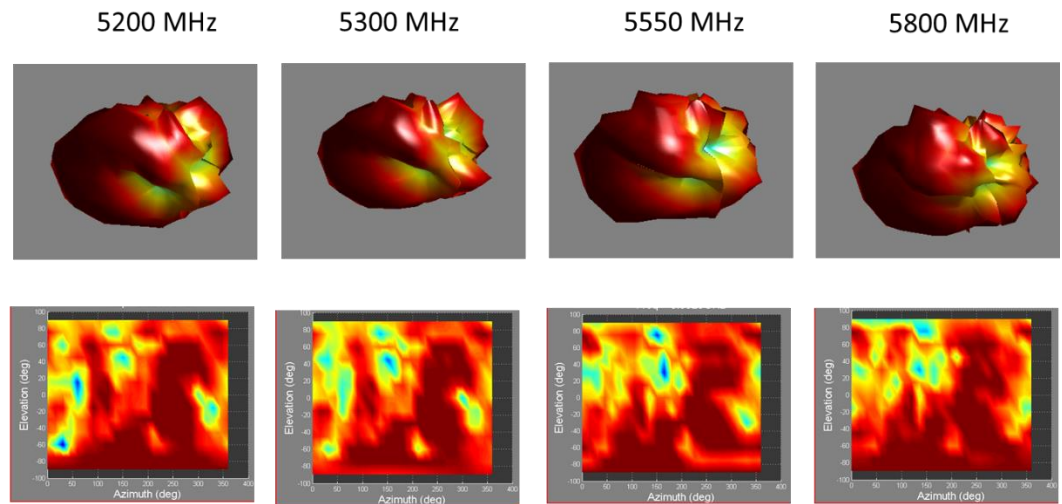


Figure 28-34. Isolation

