Antenna Test Report

September 22nd, 2022

FCC ID:	SBVRM039
IC:	5373A-RM039
Model:	S39
Product Description:	802.11 a/b/g/n/ac/ax 2x2 Client Device with BT and BLE

Table of Context:

1. Measurement Method

Antenna Measurements in Anechoic Chambers

The influence of atmospheric conditions and surrounding objects are non-ideal for accurate antenna measurements. An anechoic chamber offers a non-reflective, no-echo room for performing the antenna measurements. The anechoic chamber can simulate outer space, which is the most ideal location for antenna measurements. All gain measurements were performed in accordance with IEEE Std. 149 (IEEE Standard Procedures for Antenna Measurements). Losses of any test test cables were calibrated out post-measurement. Please refer to Figure 1 as the measurement chamber diagram

1. Perform chamber calibration using reference antennas
2. Center the EUT in the chamber using the laser alignment system.
3. Connect the antenna micro-coax cable to the mast cable.
4. Capture antenna gain pattern using the automated measurement software.
5. Export the measurement data.
6. De-embed any additional cable losses in the setup (i.e., losses of any test cables that are not present in the actual product assembly).
7. Post-process the measured data to extract the peak gain.

Antenna peak gain values for S39 are shown below:

WiFi Antennas:

	CH0				CH1			
Frequency (MHz)	ANT1 (dBi)	Polarization	ANT2 (dBi)	Polarization	ANT3 (dBi)	Polarization	ANT4 (dBi)	Polarization
2400-2483.5	2.1	V	4.2	V	4.1	V	2.4	H
5180-5240	3.2	V	3.4	V	3.2	V	4.6	V
5260-5320	3.6	V	2.9	V	3.2	V	4.4	V
5500-5700	5	V	4.3	V	4.3	V	5.1	V
5725-5850	5.2	V	4.3	V	4.6	V	5.1	V
5925–6425	4.9	V	4.4	V	4.7	V	5.5	V
6425-6525	4.5	V	2.7	V	3.3	V	5.2	V
6525-6875	4.4	V	3	V	3.5	V	4.6	V
6875–7125	4.1	V	3.9	V	3.5	V	3.7	V

BT and BLE antenna :

Frequency (MHz)	ANT (dBi)	Polarization
2400-2483.5	1.2	V

Antenna Pattern Plots for S39 are shown below:

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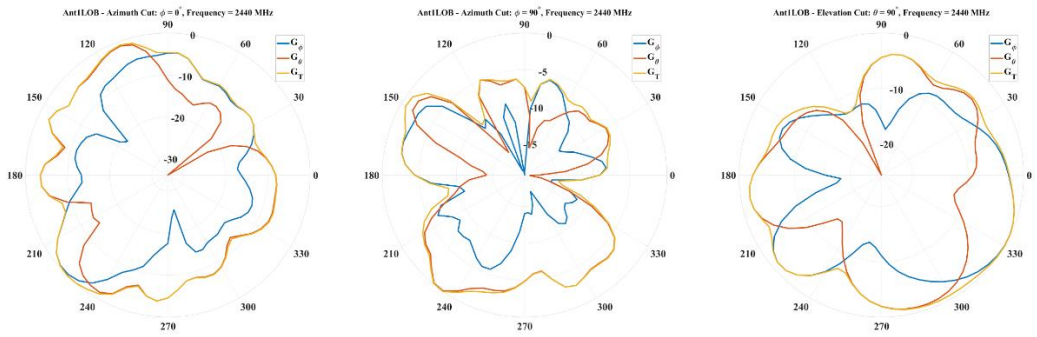
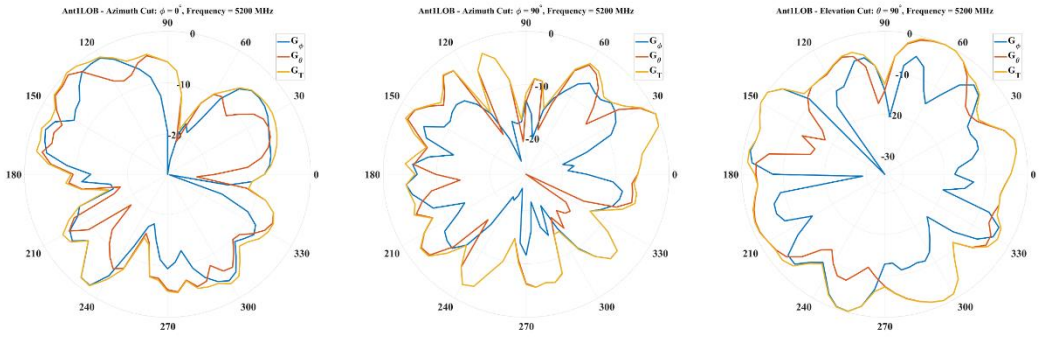
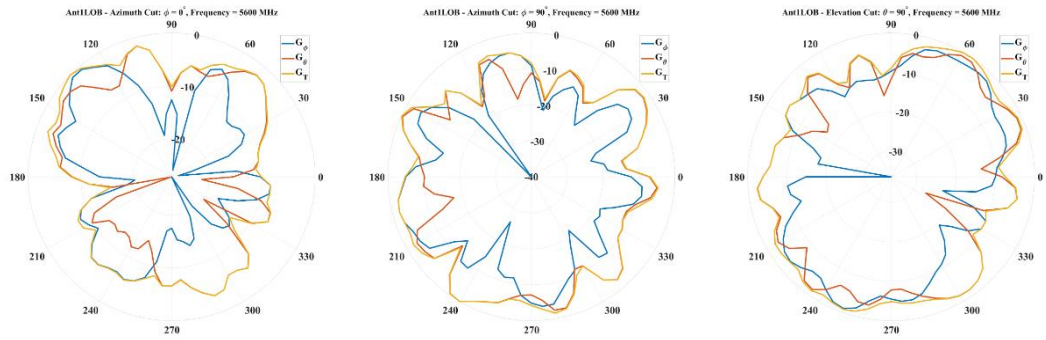
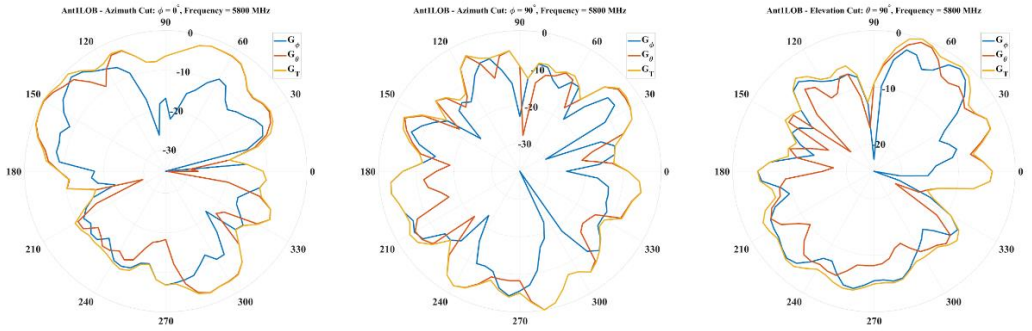
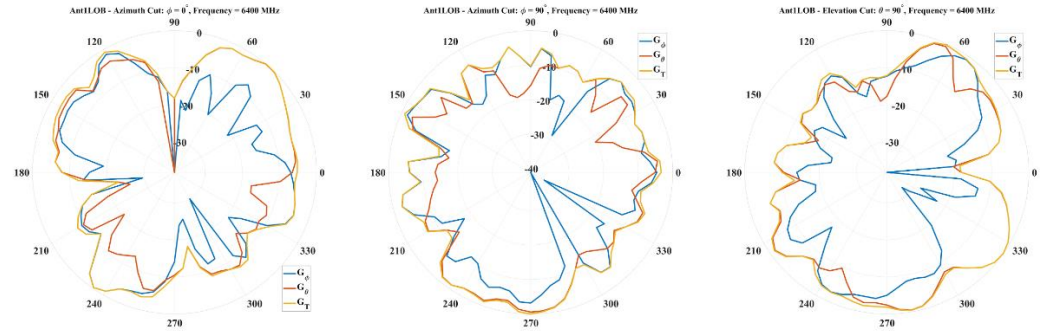
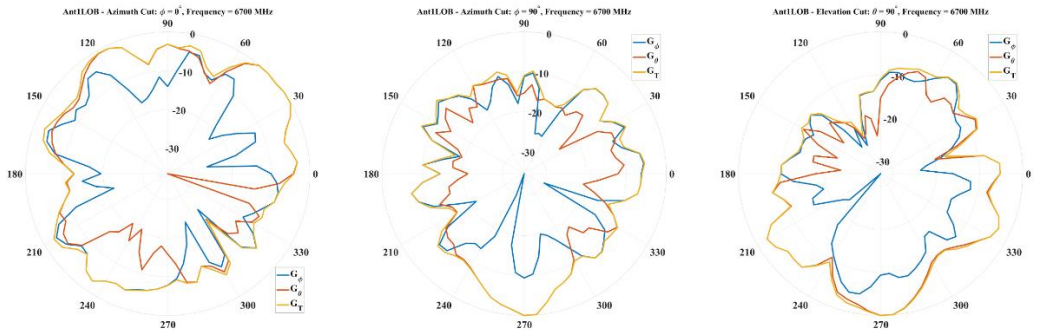
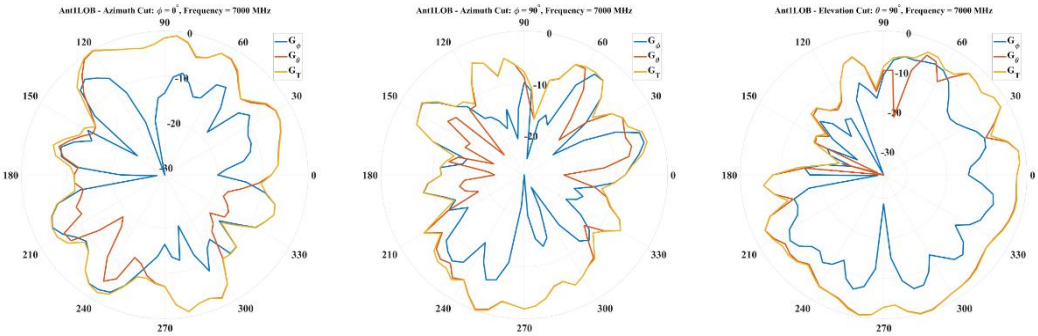
2440MHz	
5200MHz	
5600MHz	

5800MHz	
6400MHz	
6700MHz	
7000MHz	

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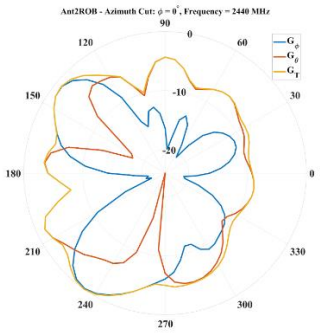
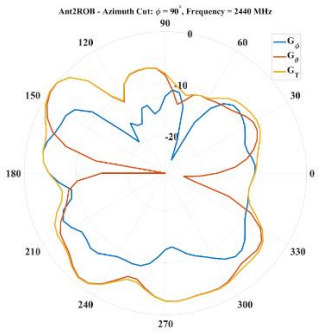
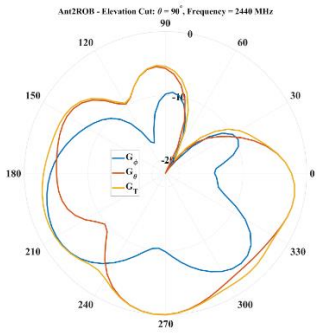
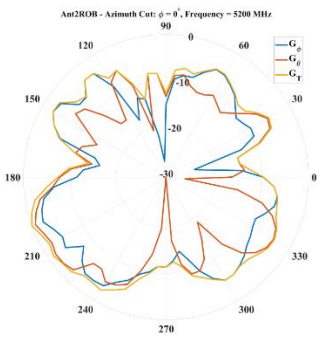
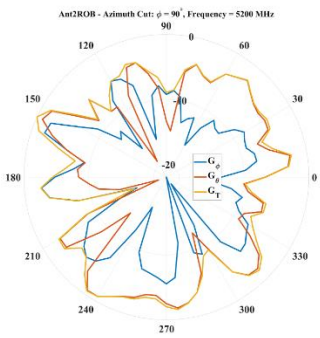
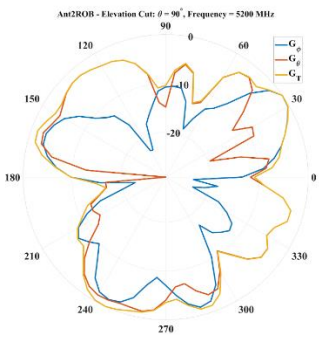
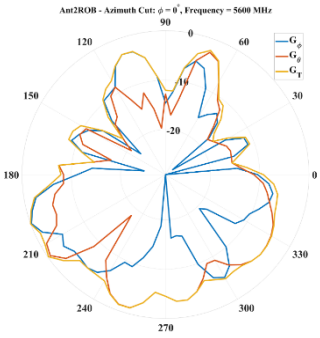
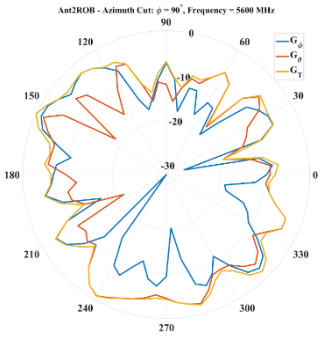
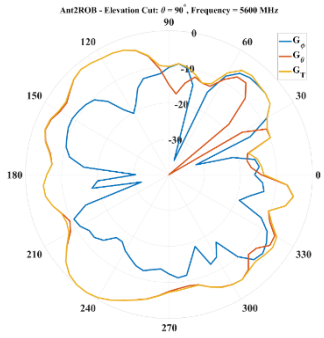
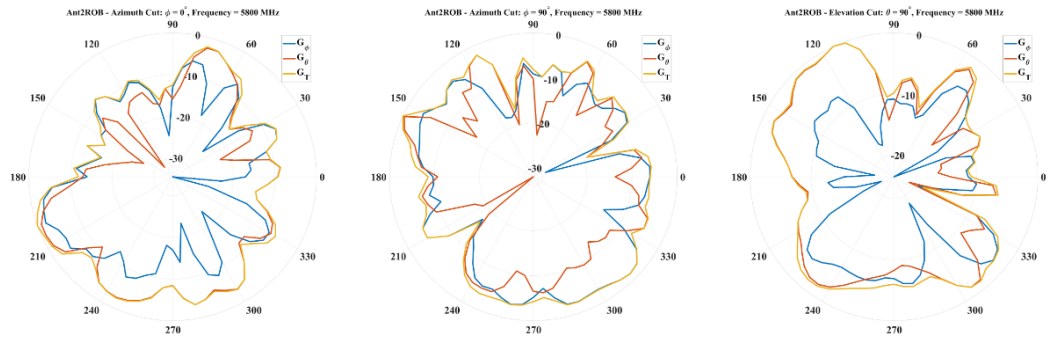
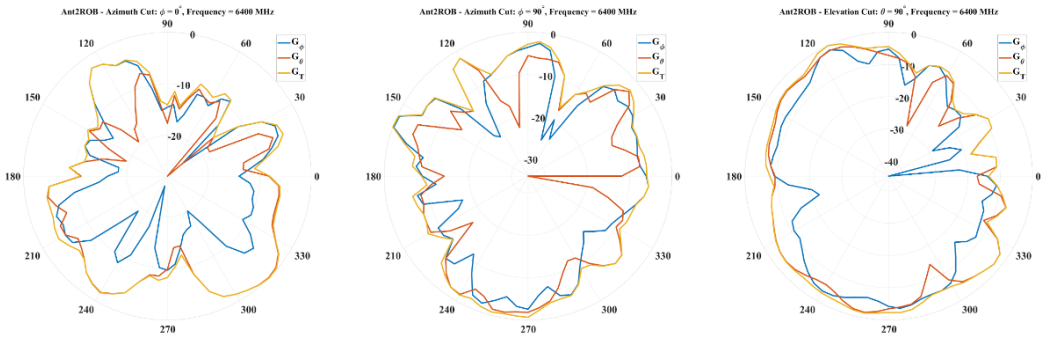
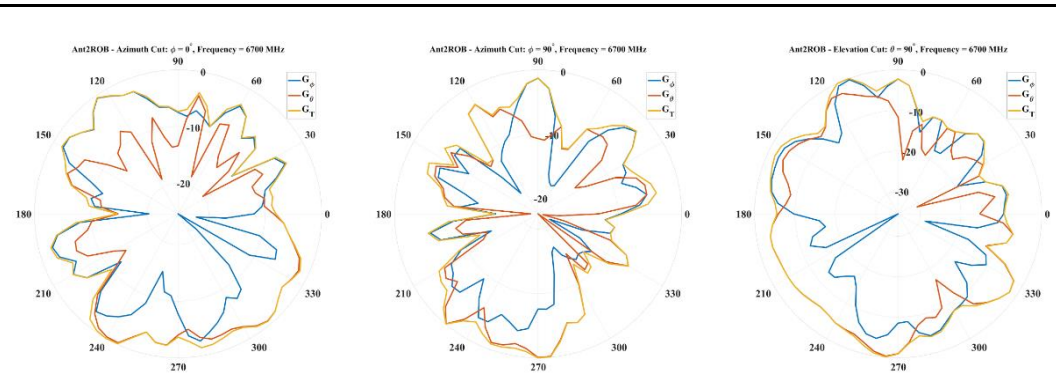
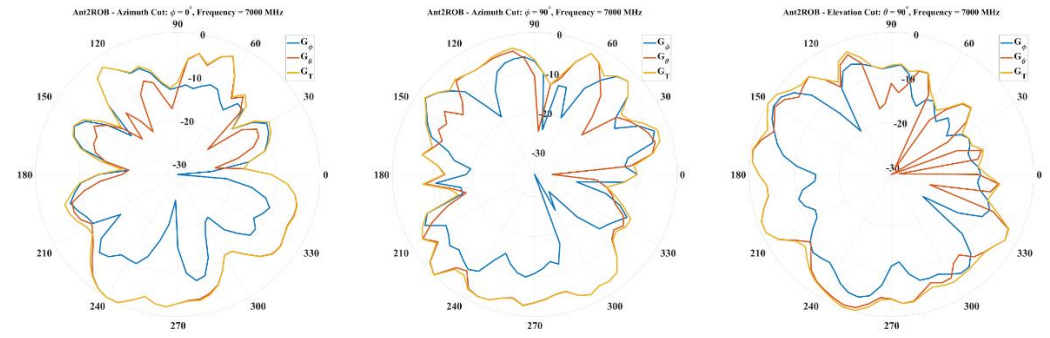
2440MHz	  
5200MHz	  
5600MHz	  

5800MHz	
6400MHz	
6700MHz	
7000MHz	

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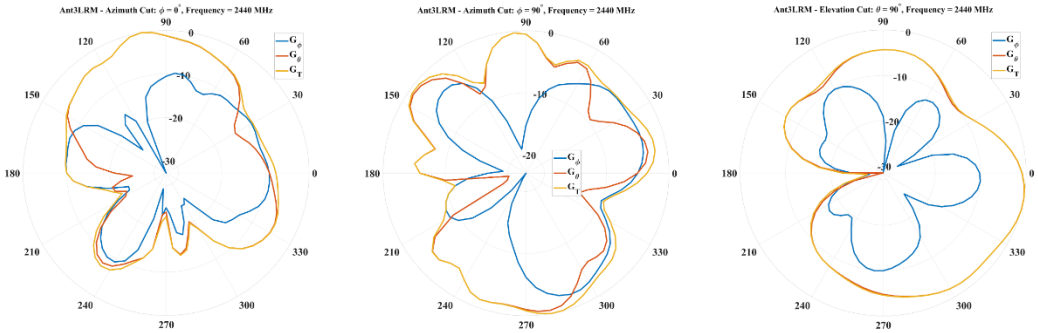
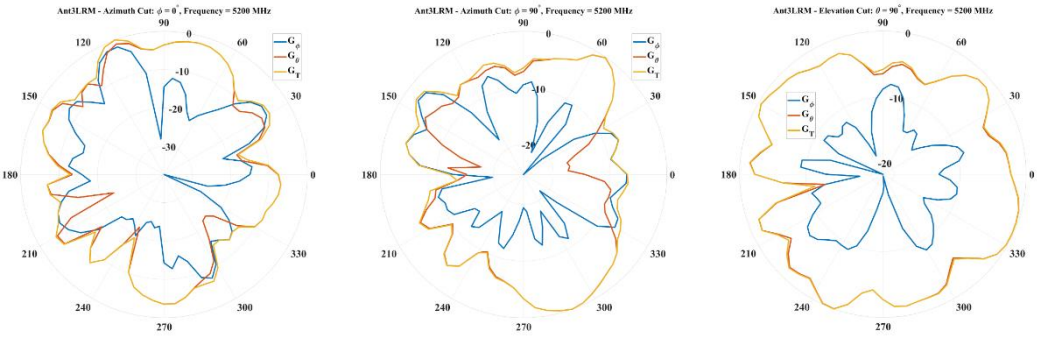
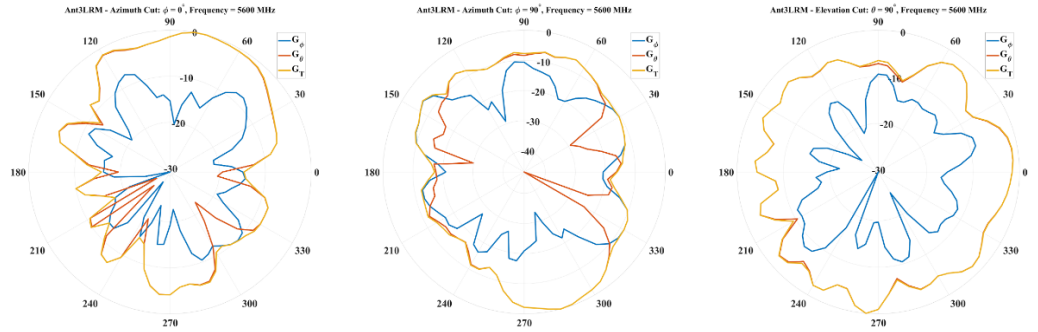
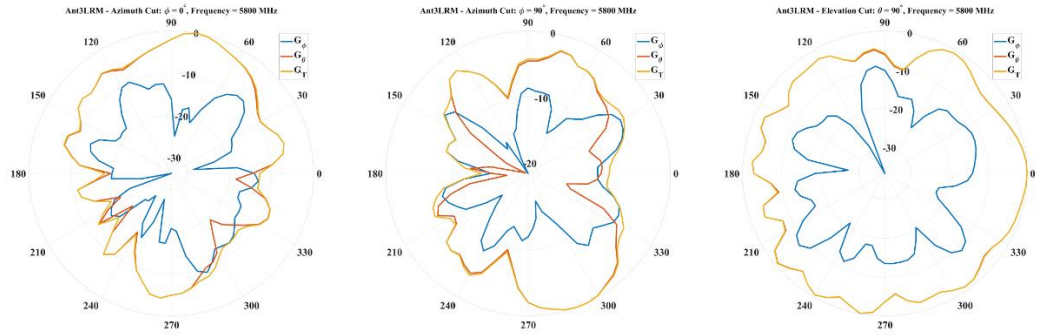
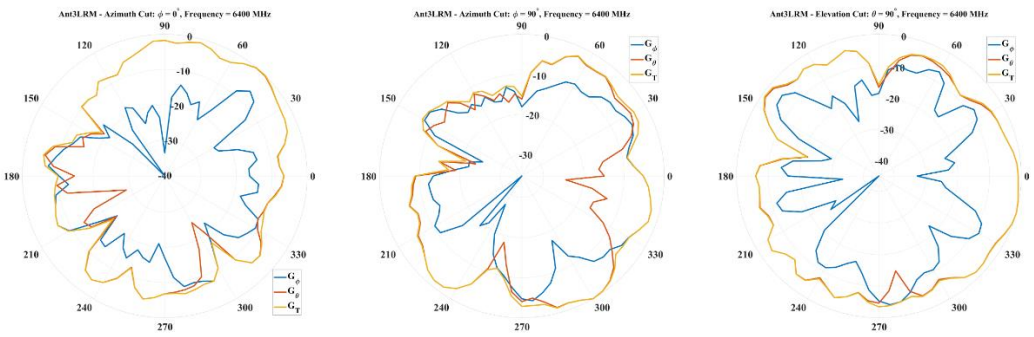
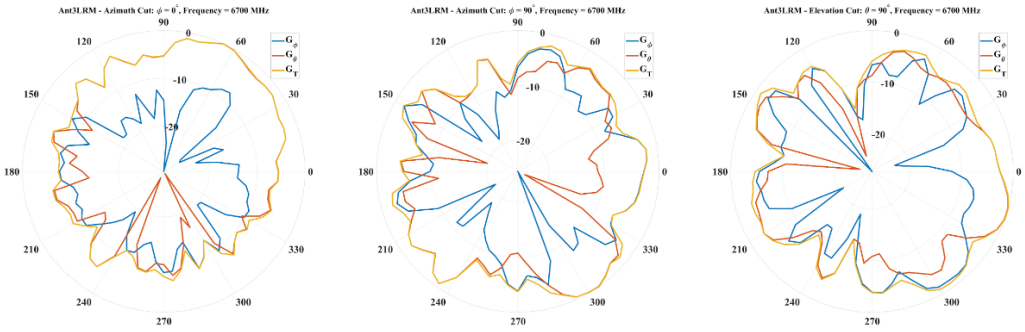
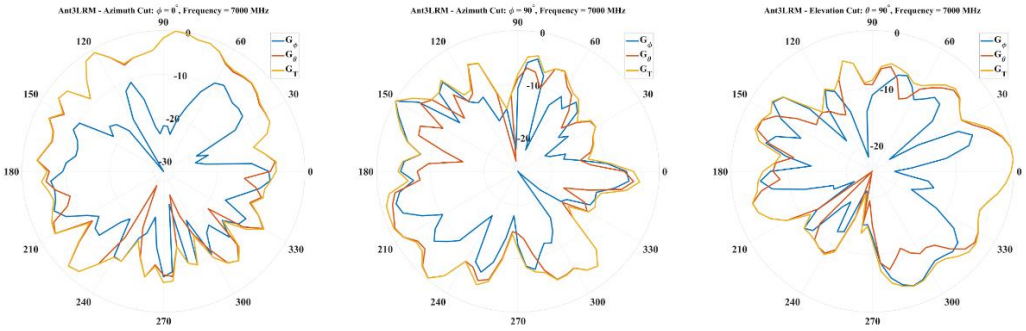
2440MHz	
5200MHz	
5600MHz	
5800MHz	

6400MHz	
6700MHz	
7000MHz	

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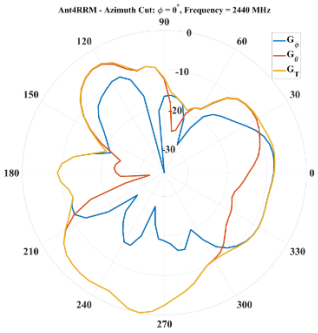
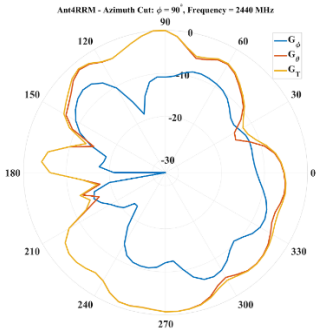
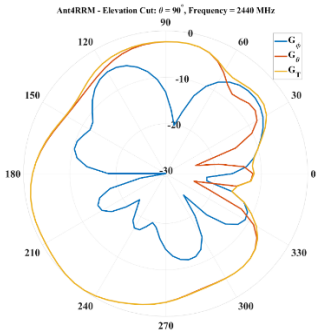
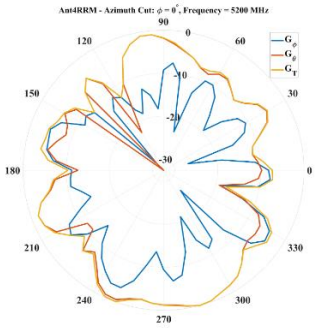
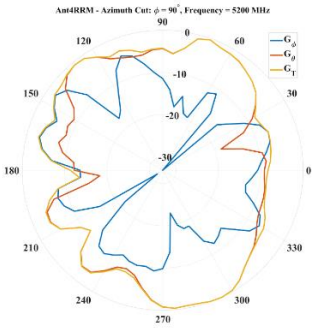
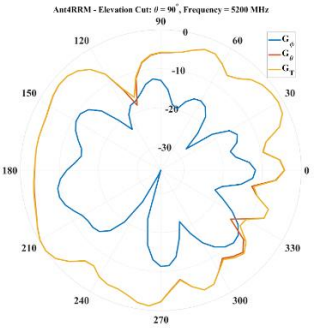
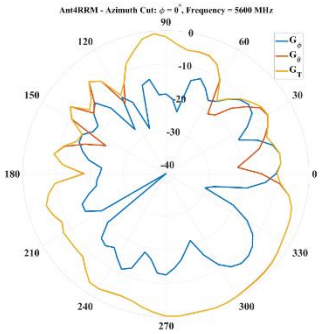
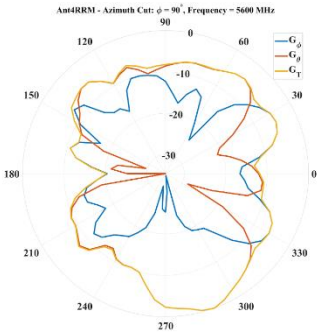
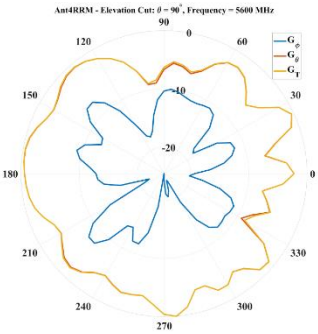
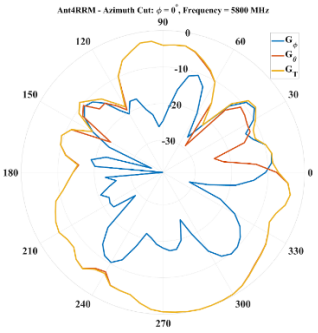
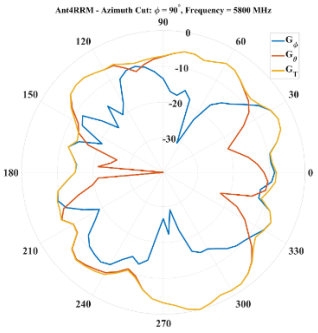
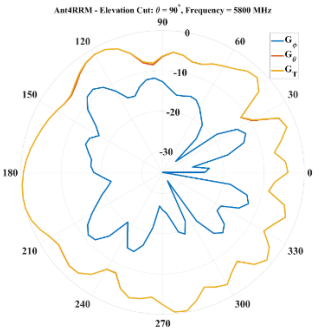
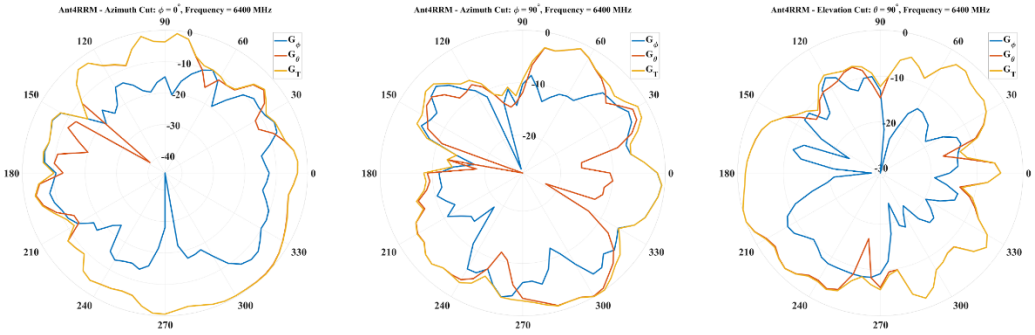
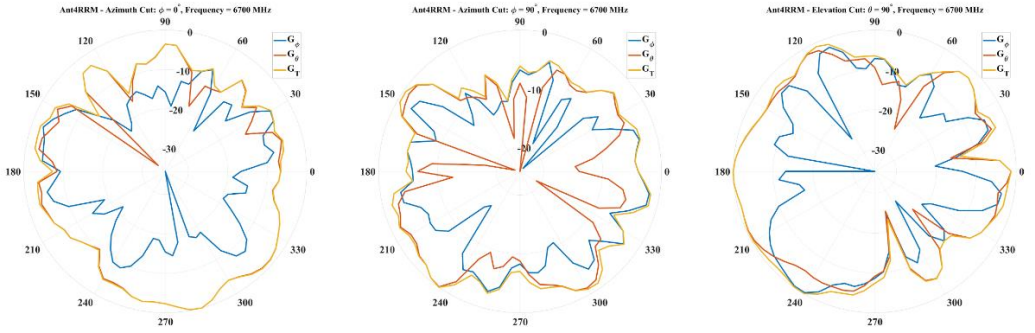
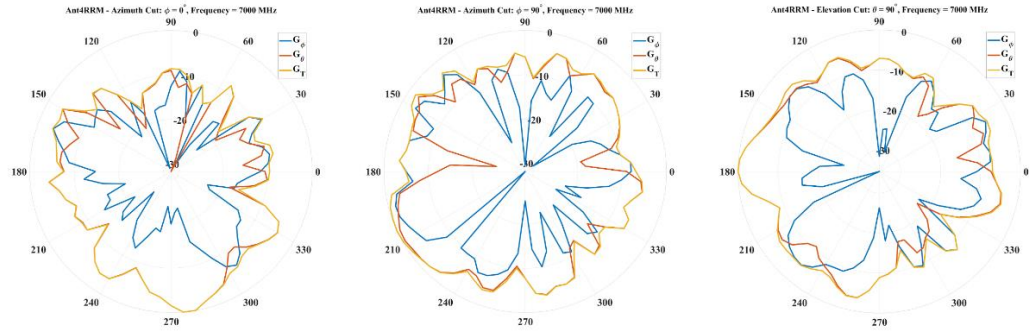
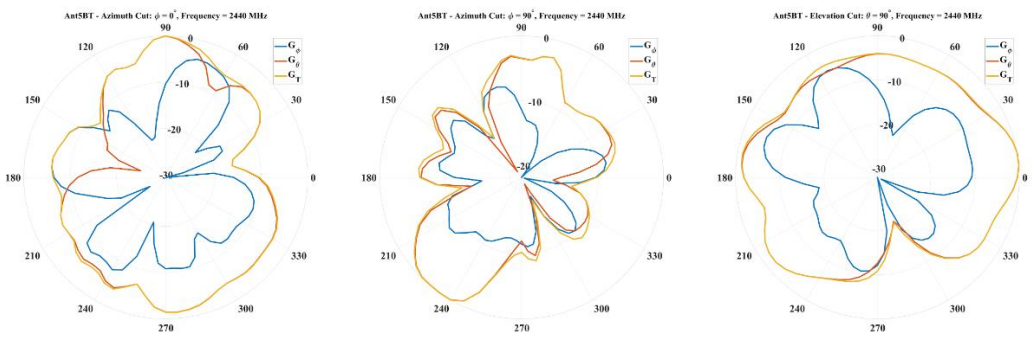
2440MHz	  
5200MHz	  
5600MHz	  
5800MHz	  

6400MHz	
6700MHz	
7000MHz	

BT/BLE Antenna

2440MHz	

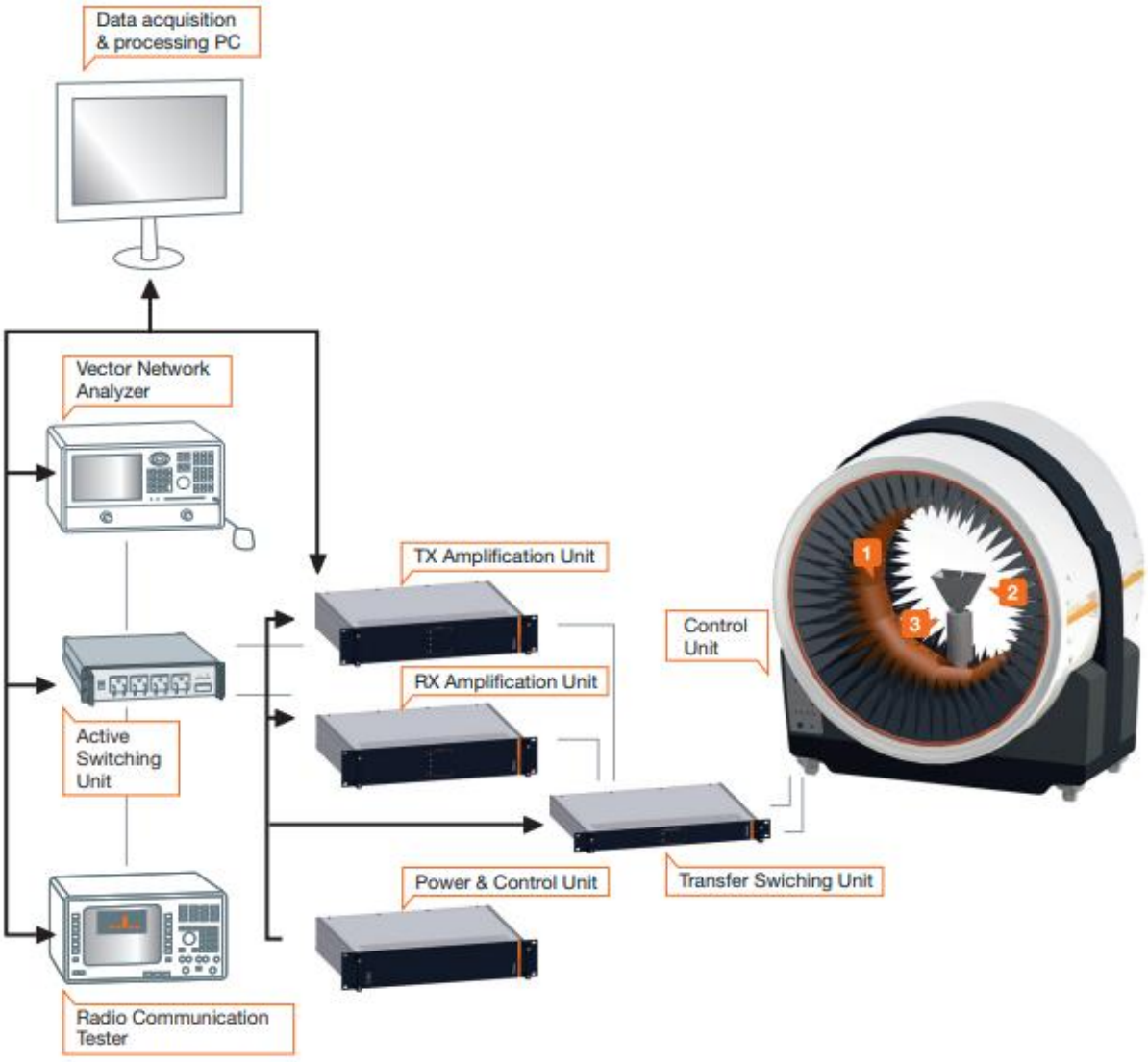

Data acquisition & processing PC
Vector Network Analyzer
Active Switching Unit
Radio Communication Tester
TX Amplification Unit
RX Amplification Unit
Power & Control Unit
Control Unit
Transfer Swiching Unit
1
2
3

Figure 1. Measurement Chamber Diagram

2. Test location

Sonos Antenna Chamber

Peak Gain was measured using the Chamber. The antenna was measured in the full product assembly. Please see Figure 2. as a demonstration of EUT in the test chamber.

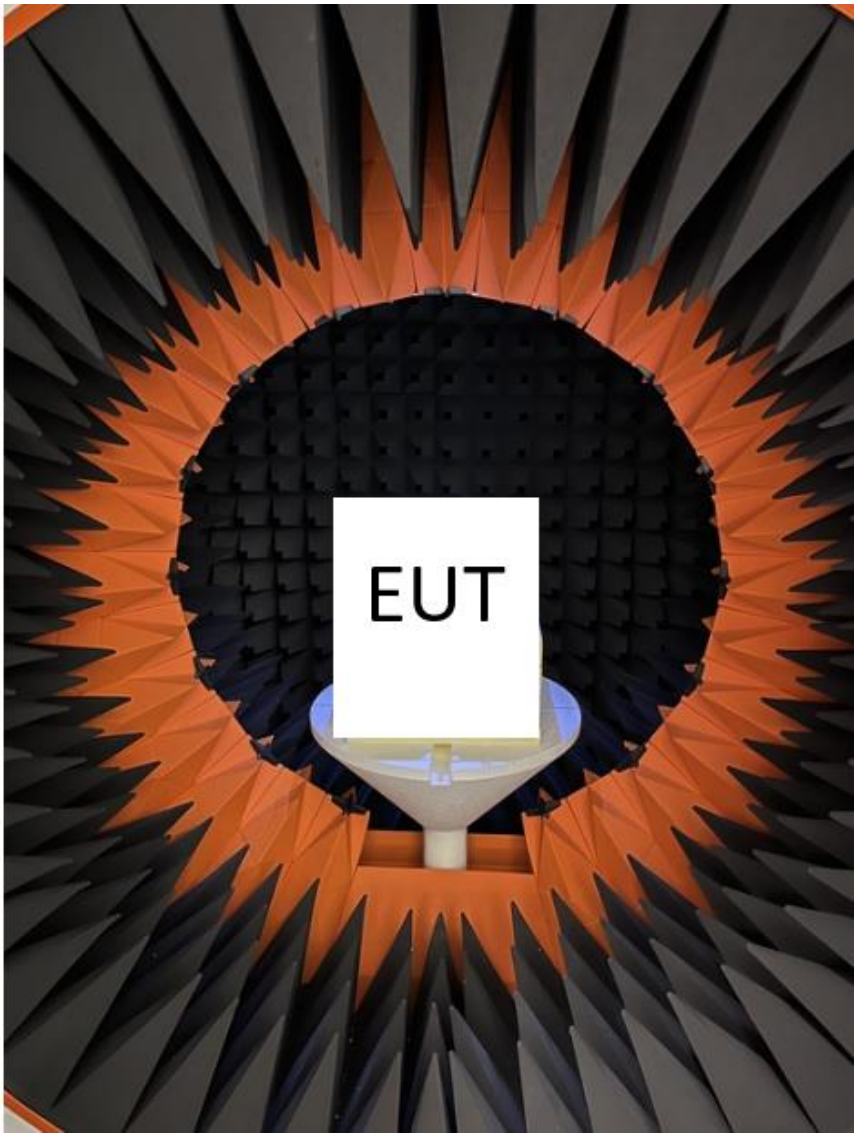


Figure 2. EUT in the test chamber.

3. Test Equipment list

Description	Manufacturer	ID number
Antenna measurement system	MVG	Sonos 02

The chamber is calibrated annually by the vendor.