



FCC Part 15 Antenna Gain Test Report

Model 2077

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1. Antenna Gains Summary

This report presents the peak gain data across the frequency band of operation. The measurement setup is also provided. Each antenna was measured separately for SISO evaluations.

2. Test Method and Test Setup

- Measurement Facility: Microsoft Antenna Lab
- Dates of Testing: 09/01/2023 – 09/30/2023
- Equipment: MVG Starlab (formerly known as Satimo)
- Calibration Verification: A reference calibration dipole was measured before the device was tested and compared to the reported values of the manufacturer to verify that the chamber calibration is within measurement uncertainty and in good standing.

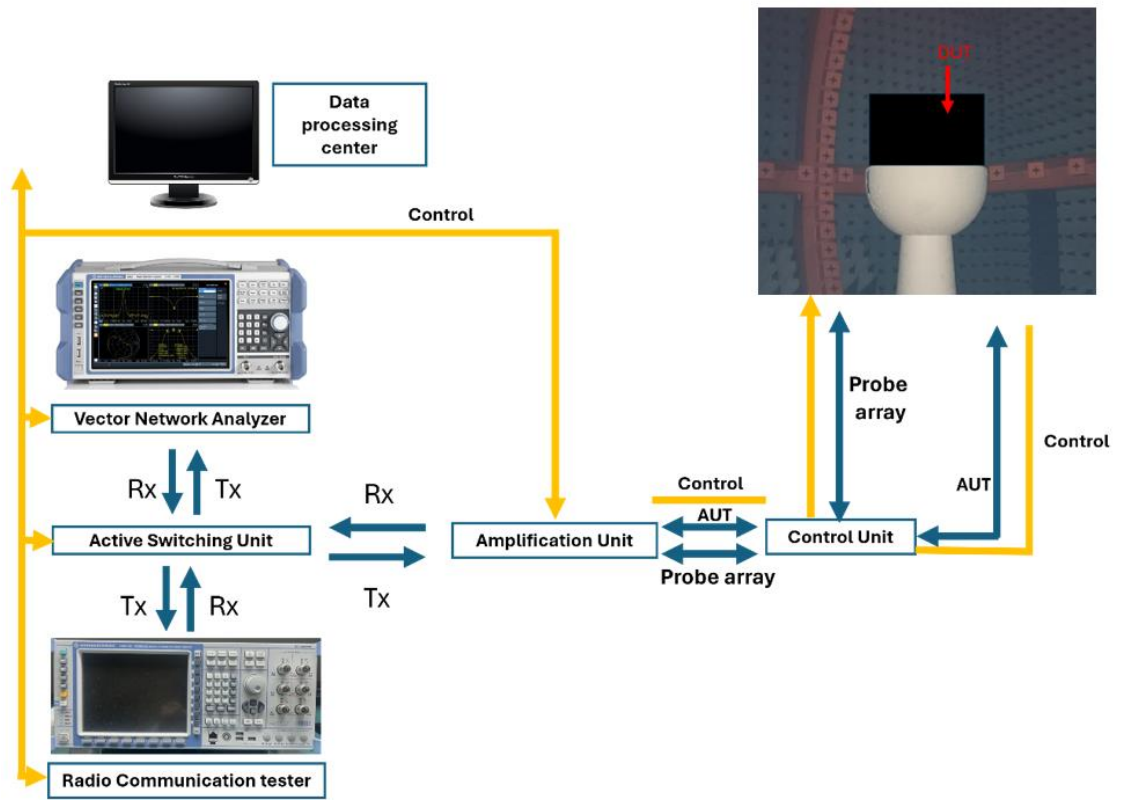
Item	Equipment	Manufacturer	Model	Cal Date	Cal. Due Date
1	SATIMO chamber	MVG	Satimo star gate	7/10/2023	7/10/2024
2	Network Analyzer	NPAC	1504 (serial number)	6/5/2023	7/5/2023

i. Passive Gain Calibration and Test Method

The calibration of the chamber is performed using gain by substitution method. A reference calibration dipole with known antenna gain and efficiency connected in the middle of the chamber in the quiet zone is measured and a calibration file that includes offset values for each frequency to adjust the losses of the system is generated. The device under test was tested the same way as the calibration dipoles and the calibration file described above is used to calculate the gain of each embedded antenna.

ii. Radiation Pattern and Gain Measurement

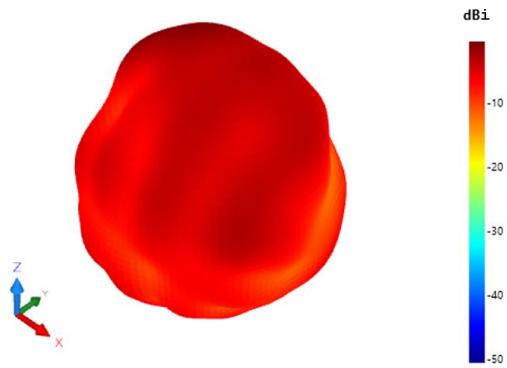
The radiation pattern and gain measurements were done in the MVG Starlab fully anechoic chamber. The antenna gain reported is the maximum measured in both horizontal and vertical polarizations. The measurement step size in both the Phi (ϕ) and Theta (θ) measurement axes was 3 degrees, meeting the requirements to use Directional MIMO Gains evaluation method.



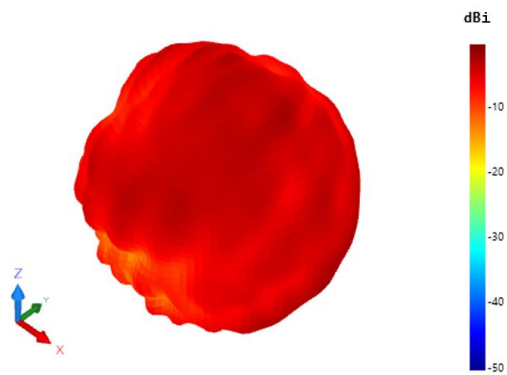
3. Antenna Gains

Model 2077 WLAN Gains	Frequency (MHz)	Left Antenna Peak Gain (dBi)	Right Antenna Peak Gain (dBi)
Bands			
2.4GHz	2400-2483.5	0.55	0.14
UNII-1	5150-5250	1.38	2.15
UNII-2A	5250-5350	1.39	2.43
UNII-2C	5470-5725	1.99	3.39
UNII-3	5725-5850	2.58	2.72
UNII-4	5850-5895	2.58	2.52
UNII-5	5925-6425	4.19	2.59
UNII-6	6425-6525	3.82	1.36
UNII-7	6525-6875	3.50	2.33
UNII-8	6875-7125	2.62	3.93

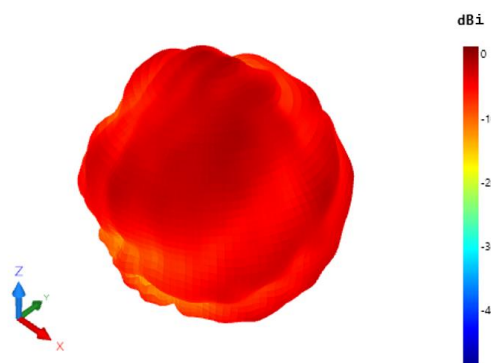
Antenna 6 3D radiation pattern 2400 MHz



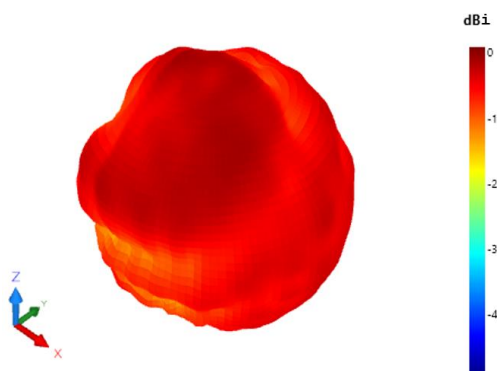
Antenna 6 3D radiation pattern 5200 MHz



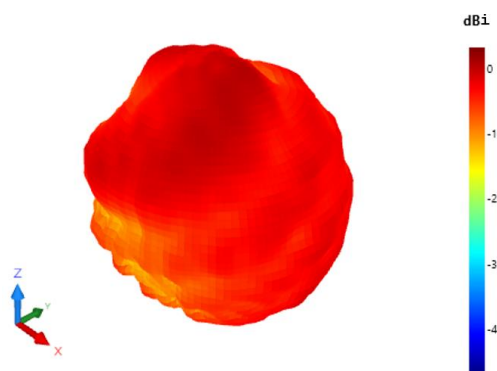
Antenna 6 3D radiation pattern 5550 MHz



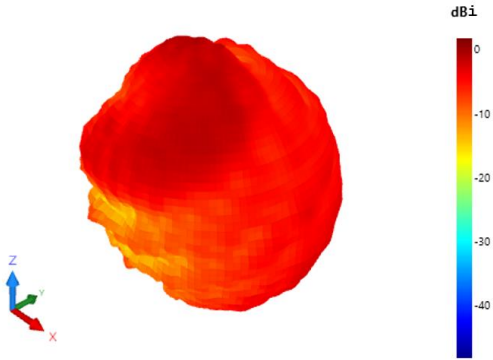
Antenna 6 3D radiation pattern 5800 MHz



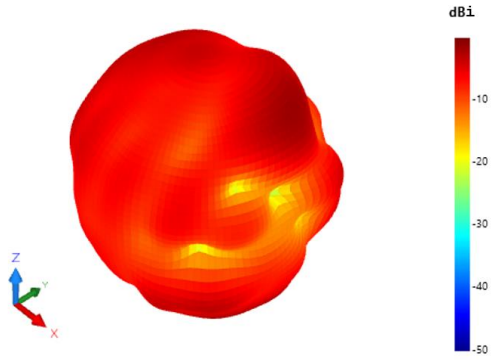
Antenna 6 3D radiation pattern 6400 MHz



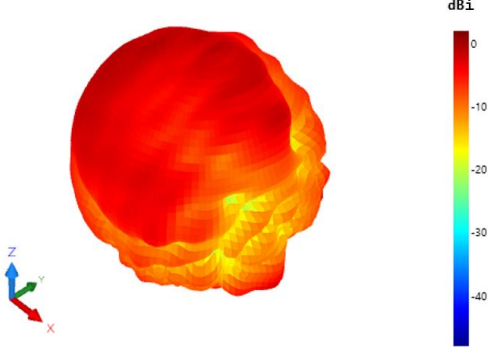
Antenna 6 3D radiation pattern 7100 MHz



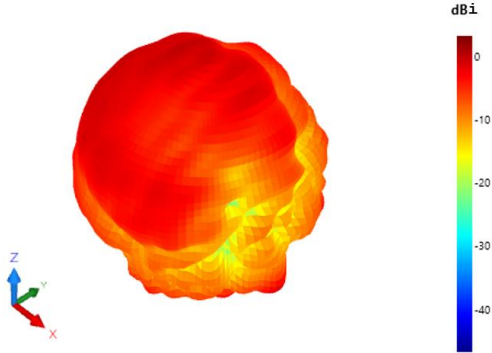
Antenna 7 3D radiation pattern 2400 MHz



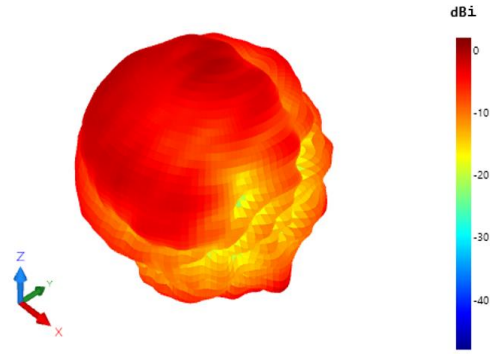
Antenna 7 3D radiation pattern 5200 MHz



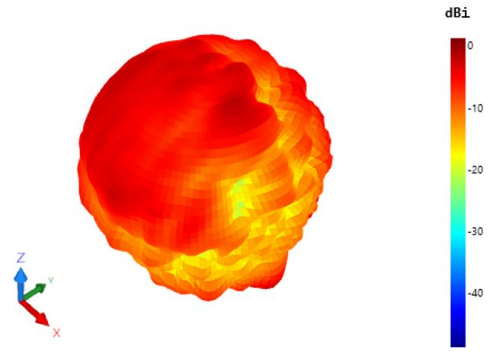
Antenna 7 3D radiation pattern 5550 MHz



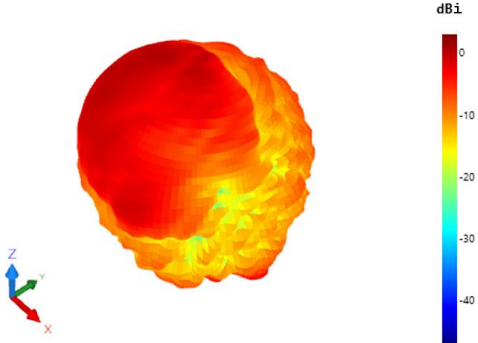
Antenna 7 3D radiation pattern 5800 MHz



Antenna 7 3D radiation pattern 6400 MHz



Antenna 7 3D radiation pattern 7100 MHz



Record of Revisions

Revision	Date	Section	Page(s)	Summary of Changes
1.0	04/01/2024	All	All	First Version