# Antenna Report

FCC ID: A4RGLBW0, A4RGK2MP

Date: April 16, 2025

Google LLC

1. Test Method

The antenna gains are obtained through measurements in a fully anechoic OTA chamber with a 3D positioner. Measurements are taken in discrete steps in theta and phi direction. Data is recorded for both theta and phi polarizations at each position using Signal Analyzer(active). Step size is 15 deg along both axes.
Gain is derived from peak EIRP and conducted power measurements
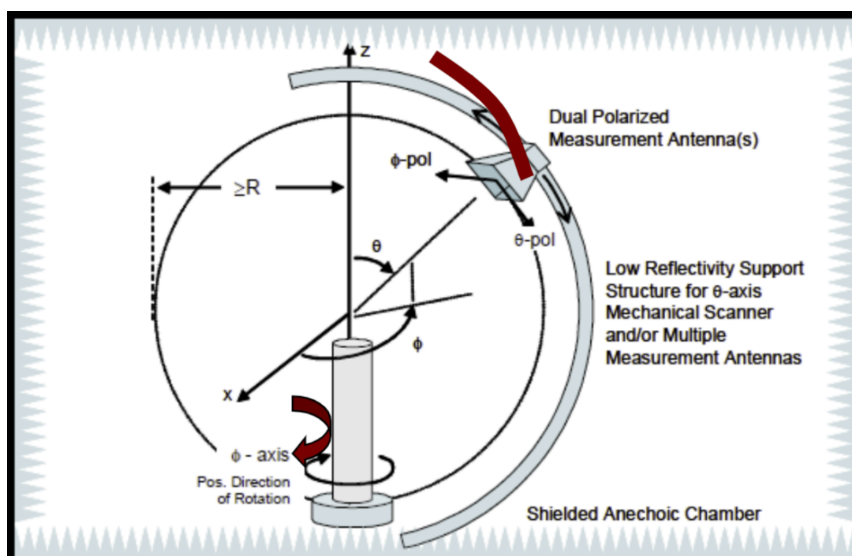
R=1.02m for WPTC-S

2. Test Location, Equipment, and Calibration

Test Chamber Information			
Chamber Manufacturer	**Type**	**Software Version**	**Chamber Location**
R&S	Conical-Cut Anechoic	11.30.00	1383 Shorebird Way, Mountain View, CA 94043

Test Equipment Information				
Instrument	**Manufacturer**	**Model**	**Calibration Date**	**Due Date**
Signal Analyzer	R&S	FSV	Sep.18, 2022	Sep.18, 2025

Reviewed by: Zhisen Qian
Review Completion Date: 04/01/2025

Test Engineer: Patrick Choi
Test Completion Date: 01/14/2025

3. Site Path Loss

To provide accurate antenna gain values, the chamber is calibrated with the measured path loss. The block diagram below represents the setup of the site path loss. Path loss is provided for both polarities for all WLAN frequency ranges.
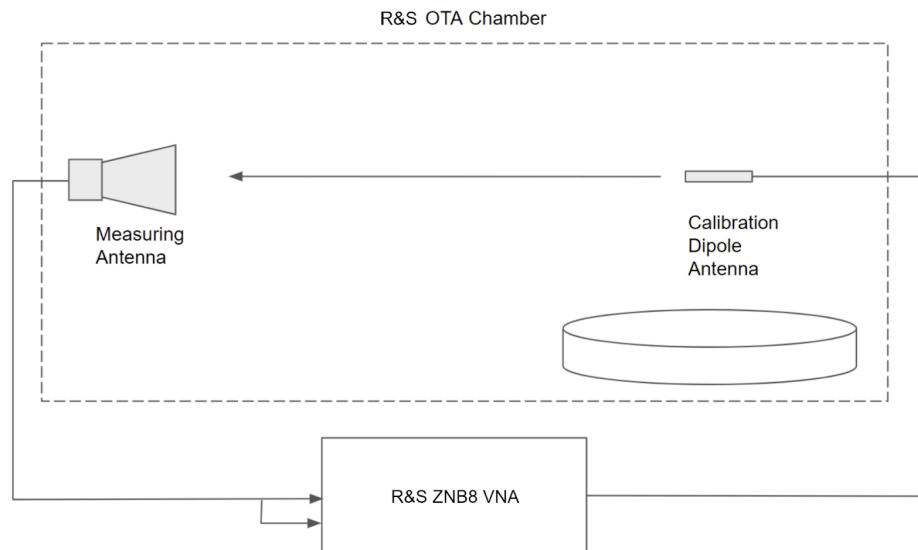

Figure: Chamber Block Diagram of Path Loss

Frequency (MHz)	H-Pol Path Loss	V-Pol Path Loss
2402	-42.69	-45.21
2412	-42.79	-45.01
2437	-42.81	-44.45
2462	-43.04	-44.78
2480	-42.98	-44.44
5180	-53.62	-52.53
5280	-53.47	-52.79
5500	-53.58	-53.32
5820	-54.47	-54.74
5887	-54.1	-54.13
6175	-54.94	-55.28
6475	-55.23	-55.13
6700	-55.6	-55.47
7000	-55.24	-55.74

4. Test Setup

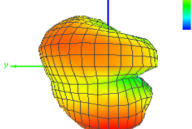See separate appendix document for pictures of the test setup in this filing.
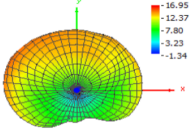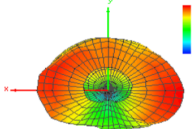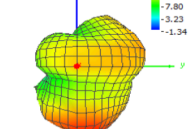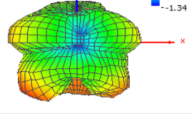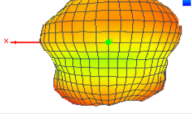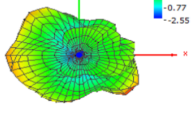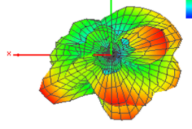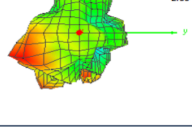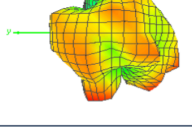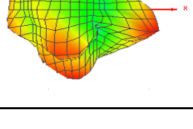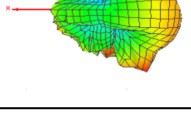
5. Antenna Type

Antenna	Type
Ant 3	IFA
Ant 4	ILA
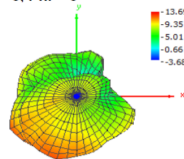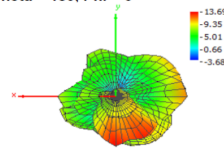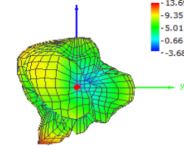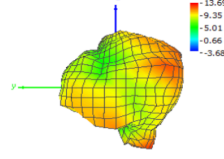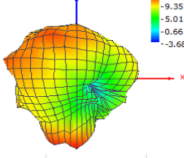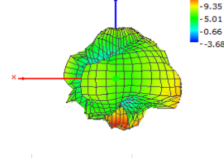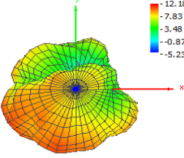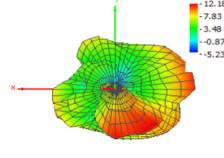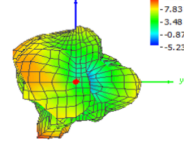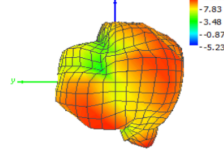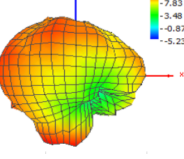
6. WLAN/BT Antenna Test Data

Ant	Band	Frequency	Peak Gain(dBi)
Ant 4	WiFi/BT 2.4 GHz	2402 - 2480 MHz	-1.0
Ant 3	WiFi/BT 2.4 GHz	2402 - 2480 MHz	0.7
Ant 4	UNII-1	5180 MHz	-2.4
	UNII-2A	5280 MHz	-4.1
	UNII-2C	5500 MHz	-3.5
	UNII-3	5820 MHz	-3.4
	UNII-4	5887 MHz	-4.7
	UNII-5	6175 MHz	-1.6
	UNII-6	6475 MHz	-6.2
	UNII-7	6700 MHz	-6.5
	UNII-8	7000 MHz	-5.2
Ant 3	UNII-1	5180 MHz	-2.6
	UNII-2A	5280 MHz	-2.2
	UNII-2C	5500 MHz	-4.3
	UNII-3	5820 MHz	-0.1
	UNII-4	5887 MHz	-0.1
	UNII-5	6175 MHz	1.8
	UNII-6	6475 MHz	-0.4
	UNII-7	6700 MHz	0.5
	UNII-8	7000 MHz	-2.6

7. Radiation Plots for Max Gain Plane

ANT	Frequency	Pattern
ANT 4	2402 - 2480 MHz	
ANT 4	5180 MHz	

ANT 4	5280 MHz	
ANT 4	5500 MHz	

ANT 4	5820 MHz	
		Theta = 0, Phi = 0 Theta = 180, Phi = 0
		Theta = 90, Phi = 0 Theta = 90, Phi = 180
		Theta = 90, Phi = 270 Theta = 90, Phi = 90
ANT 4	5887 MHz	
		Theta = 0, Phi = 0 Theta = 180, Phi = 0
		Theta = 90, Phi = 0 Theta = 90, Phi = 180
		Theta = 90, Phi = 270 Theta = 90, Phi = 90