Antenna Report

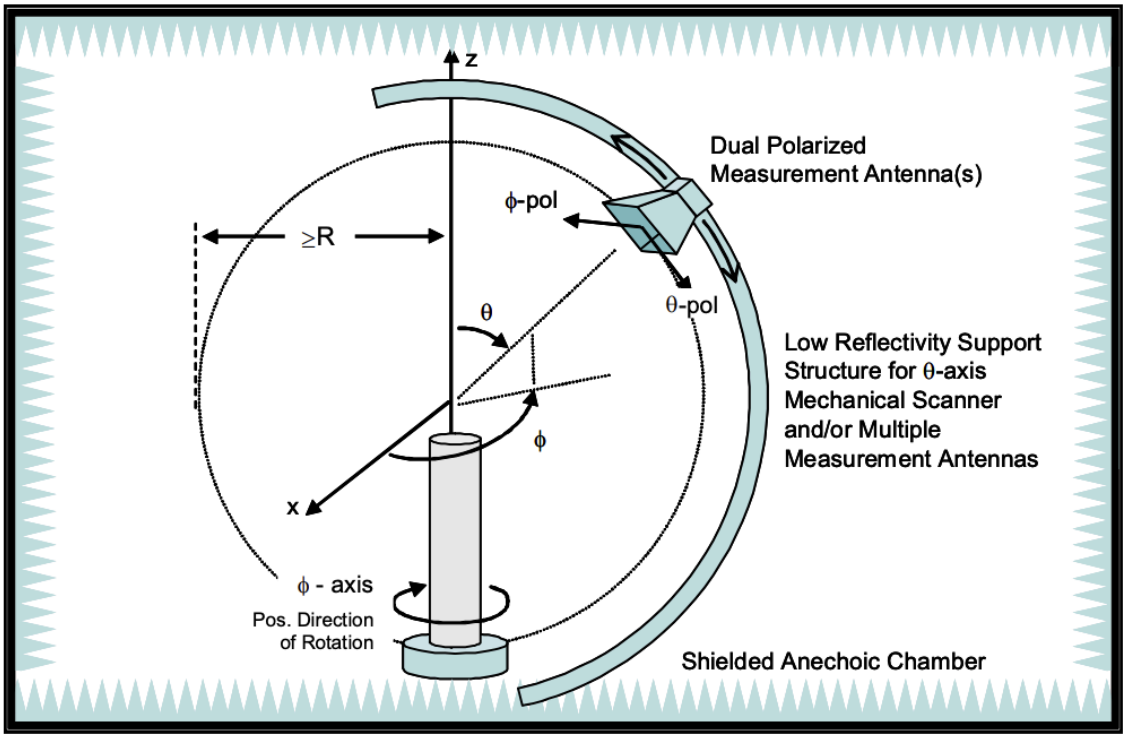
FCC ID: A4RGRY0E
4/2/2024

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 being recorded using the spectrum analyzer (active) or network analyzer (passive) for both theta and phi polarizations at each position resulting in a 3D gain pattern. Step size is <30 deg along both axes.

Gain is either derived directly through spatial averaging of VNA S21 measurements (passive measurement) or by the ratio of spatial averaging of 3D EIRP/TRP measurements vs the conducted power (active measurement).



Measurements were obtained through an active non-signalling measurement (test mode) plus measured conductive RF power.

2. Test Setup

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

3. Test Equipment

Site Description	Chamber Manufacturer	Type
8923 Multi Probe Anechoic Chamber	ETS-Lindgren	Fully Anechoic
Site location:	US-MTV-STLN-2011-1M4	

Description	Manufacturer	Model
Network Analyzer	Rohde and Schwarz	ZNB8
Spectrum Analyzer	Rohde and Schwarz	FSW8
Signaling Equipment	Rohde and Schwarz	CMW500

4. Other information

Equipment calibration status	- Calibration date : Sep 6, 2023 - Due of next calibration : Sep 6, 2024
Test dates	- April 9th, 2024
Names of test personnel	- Justin Deng : justindeng@google.com

5. Antenna Type

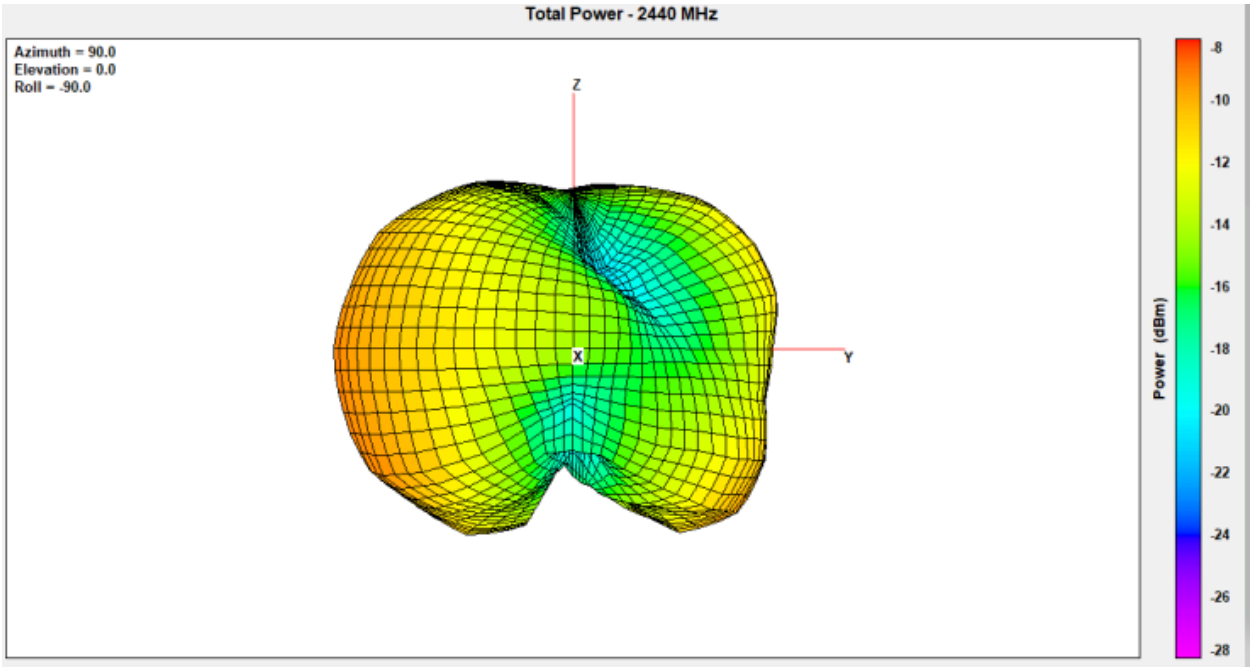
Antenna	Supported band	Type
Bottom ANT	LTE/UMTS LB	PIFA
Top ANT	LTE/UMTS LB/MB/HB WLAN 2.4GHz/BT WLAN 5GHz UWB CH5, CH9	PIFA

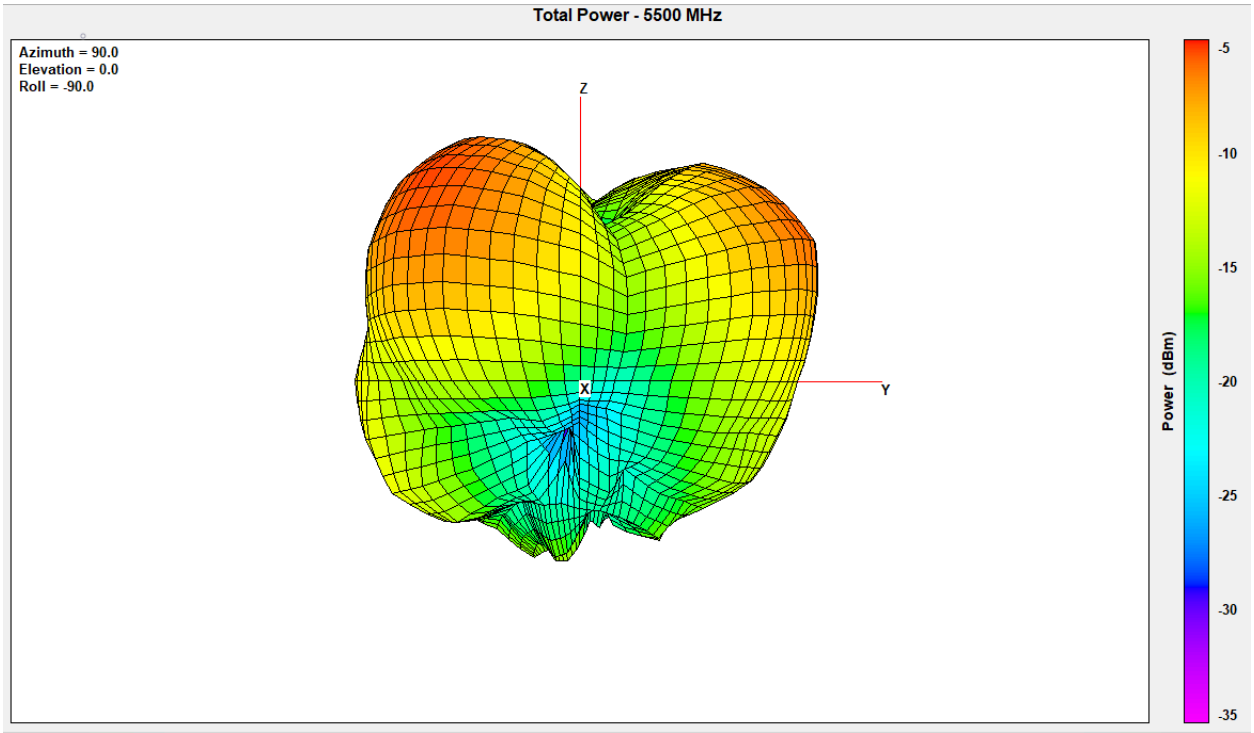
6. WLAN/BT/UWB Peak Antenna Gain

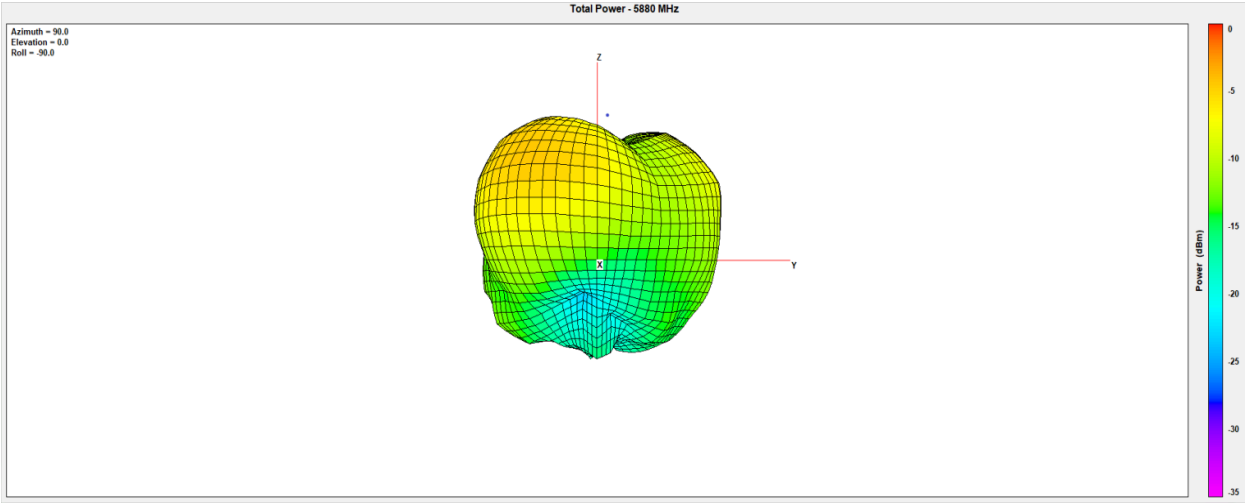
Wireless Technology	A4RGRY0E		TOP ANT
	Band	Frequency (MHz)	Peak ANT Gain (Passive)
Wi-Fi/BT/BLE	2G	2400-2483.5	-8.3
	5G	5150-5850	-4.2
	5G - UNII-4	5850-5895	-4.2
UWB	CH5	6250-6750	-1.0
	CH9	7750-8250	1.4

Appendix: Radiation Plots

- Wi-Fi, BT/BLE




Total Power - 5500 MHz
Azimuth = 90.0
Elevation = 0.0
Roll = -90.0
Z
X
Y
Power (dBm)
-5
-10
-15
-20
-25
-30
-35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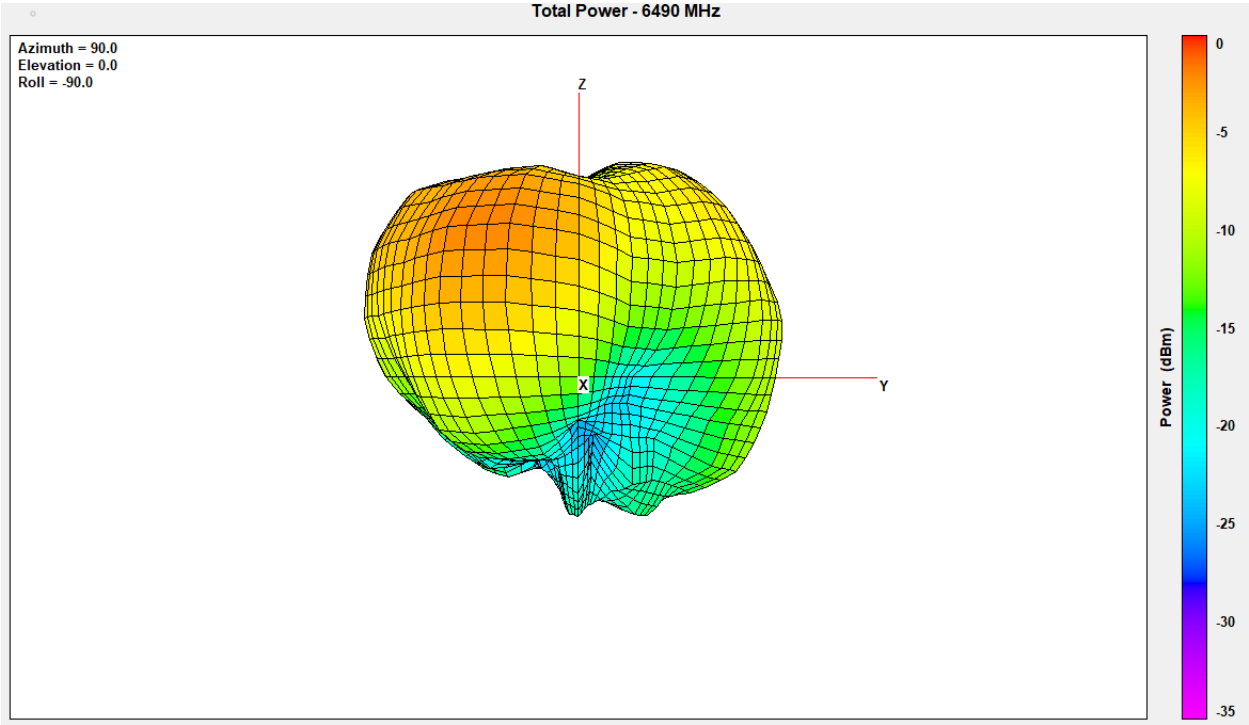
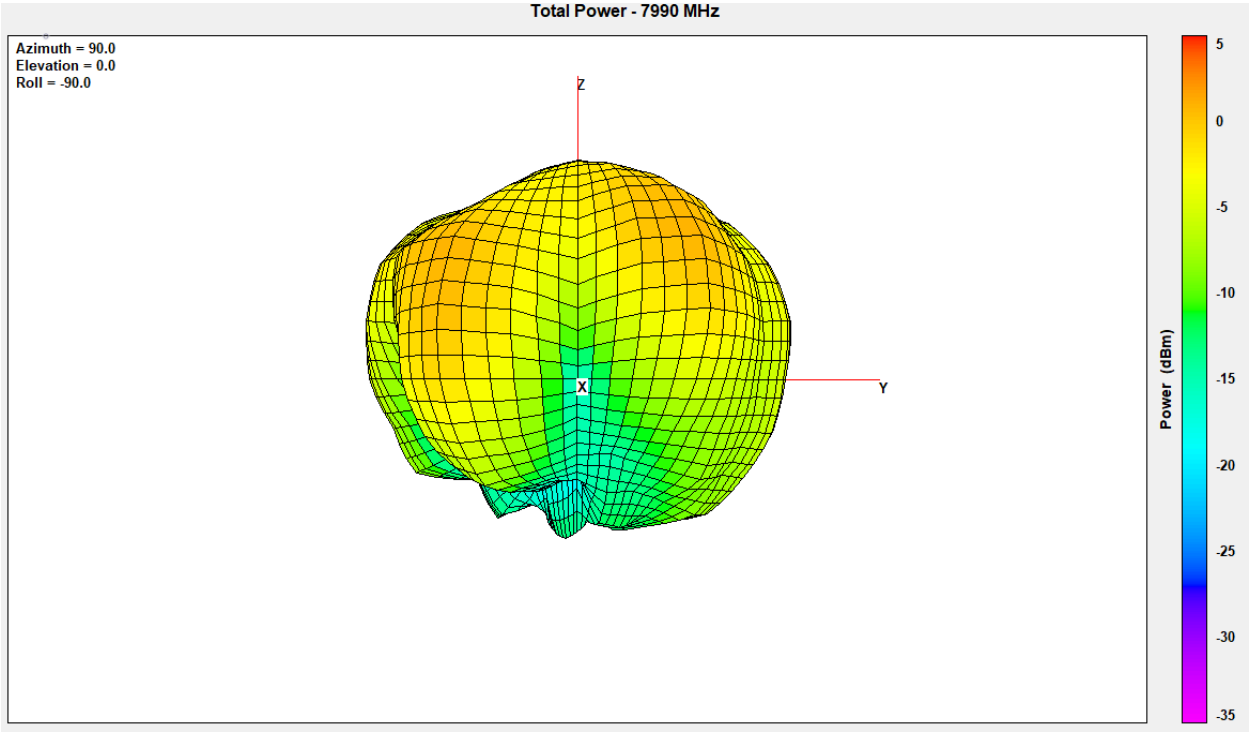
Azimuth = 90.0
Elevation = 0.0
Roll = -90.0
Z
X
Y
Power (dBm)
0
-5
-10
-15
-20
-25
-30
-35

- UWB
    - 6490 MHz (CH5) :



    - 7990 MHz (CH9):