



EW-7822DUX (DWA-X1850)

Passive Report

Date: November 18, 2024

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Introduction

- **This presentation summarizes the antennas system that Airgain plans to develop for EW-7822DUX (DWA-X1850) project**
- **Airgain proposes an embedded antenna solution for EW-7822DUX (DWA-X1850)**
 - The shell of this model is the latest version provided by the customer
 - The antenna is installed on the latest motherboard(ES4) provided by the customer
- **There are two dual band antennas**
 - SMT antenna: N03EDAAD
 - DIP antenna: M03EDAAE

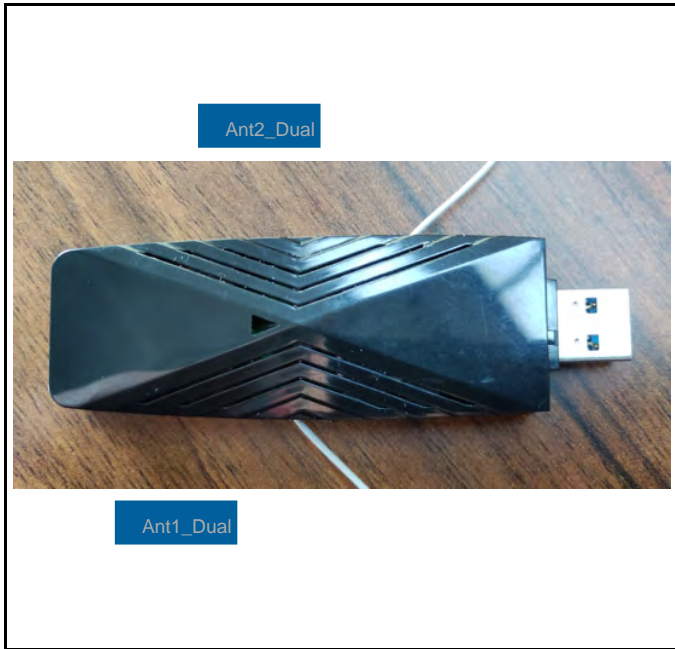




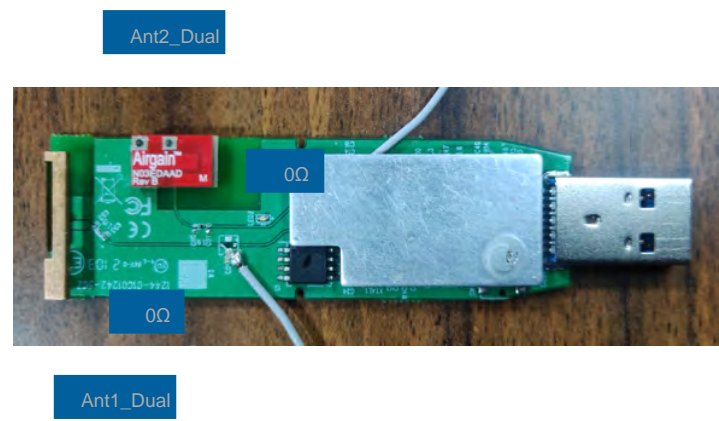
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Airgain Solution

Airgain Solution



Antenna #	Part Number
Ant1_Dual	M03EDAAE
Ant2_Dual	N03EDAAD

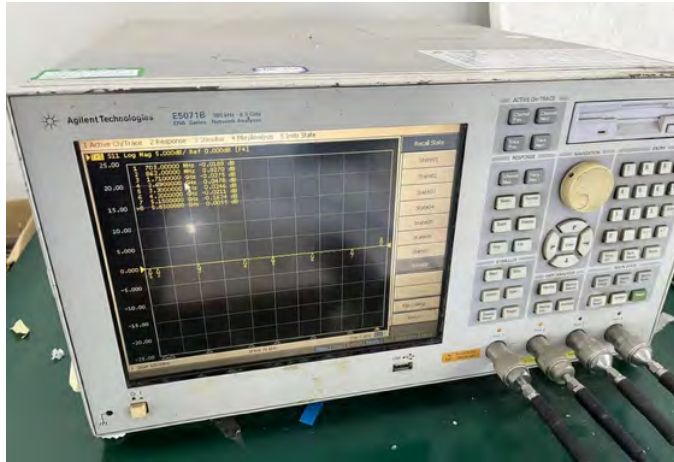


Antenna placement for EW-7822DUX (DWA-X1850)

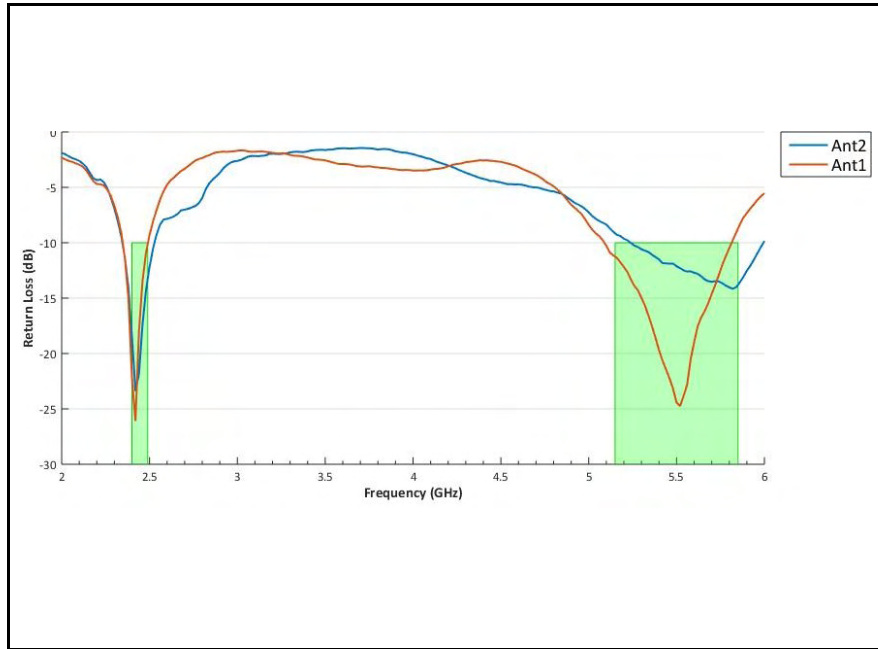
S-Parameters Return Loss

Actual Equipment List and Calibration Information

Vendor	Model	Calibrated Date	Calibrated Until
Agilent Technologies	E5071B	2020/8/31	2021/8/30



S-Parameter – Return Loss

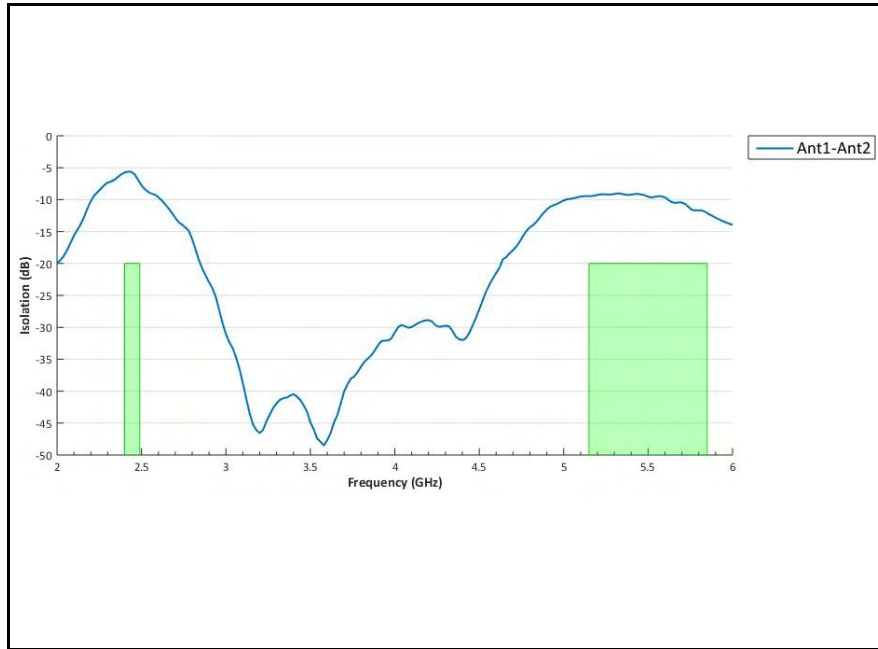


KEY OBSERVATIONS

Antenna	Return Loss (dB)			
	2.4 GHz	2.49 GHz	5.15 GHz	5.85 GHz
Ant1_Dual	-22.2	-10.1	-11.2	-9.1
Ant2_Dual	-18.5	-13.2	-9.2	-13.8



S-Parameter – Isolation Between 2.4GHz and 5GHz Antennas



Antenna	Minimum Isolation (dB)	
	2.4GHz- 2.49GHz	5.15GHz- 5.85GHz
Ant1_Dual- Ant2_Dual	-5.6	-9.1



Efficiency and Peak Gain

Actual Equipment List and Calibration Information

Vendor	Model	Calibrated Date	Calibrated Until
MVG industries	SLv2	2020/7/24	2021/6/23
ROHDE&SCHWARZ	ZVB.8	2020/8/31	2021/8/30

System overview



Test software:
 Satimo Passive Measurement Version: 1.8.0
 SatEnv Version: 3.0.3.0 build23

location of the testing:
 Airgain China office in Suzhou



Test Wiring Process and Other Information

- Connect DUT with Chamber

- Connect cable coming from DUT, designated as “Ant1_Dual” to the chamber’s cable.
- Run sequence of radiated tests .
- Disconnect the chamber’s cable from “Ant1_Dual”.
- Repeat this process for all 2 RF ports of DUT.

- Other information related to testing

Test Condition	Test Engineer	Test Environment (°C/%)	Test Date
Radiated	Randy Gu	18-22/45-60	2021/3/11



Antenna Efficiency (%) – 2.4 GHz & 5 GHz Wi-Fi Antennas

Frequency (MHz)	Ant1_2G4 (%)	Ant2_2G4 (%)	Frequency (MHz)	Ant1_5G (%)	Ant2_5G (%)
2400	43.2	43.4	5150	44.6	44.4
2410	43.6	43.6	5200	45.5	41.8
2420	44.3	44.3	5300	46.9	44.2
2430	43.4	42.5	5400	48.1	42.4
2440	42.0	40.6	5500	48.5	42.6
2450	41.8	41.9	5600	54.1	42.6
2460	41.7	40.7	5700	56.7	41.9
2470	41.0	41.7	5800	57.9	41.9
2480	40.5	41.5	5850	57.5	40.0
2490	40.9	40.2	Average	51.1	42.4
Average	44.6	42.0			



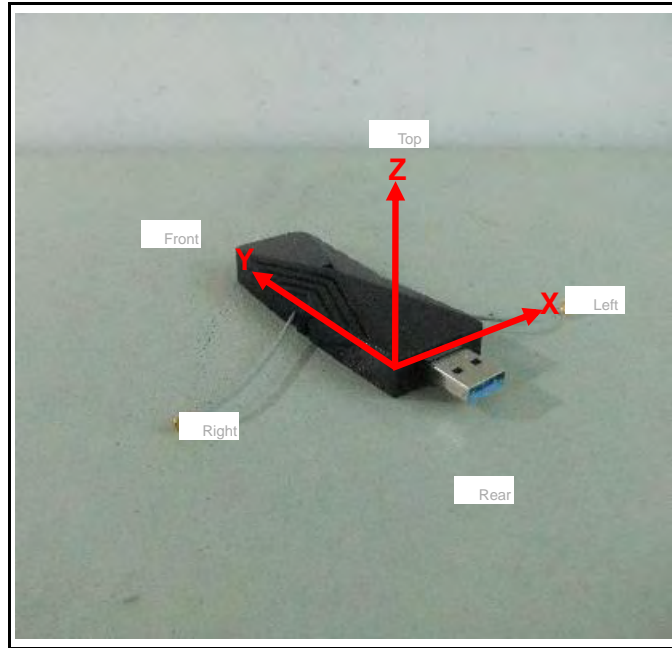
Antenna Peak Gain – 2.4 GHz & 5 GHz Wi-Fi Antennas

Frequency (MHz)	Ant1_2G4 (dBi)	Ant2_2G4 (dBi)	Frequency (MHz)	Ant1_5G (dBi)	Ant2_5G (dBi)
2400	1.0	0.4	5150	1.2	2.1
2410	1.0	0.5	5200	1.2	1.6
2420	1.2	0.6	5300	1.1	2.1
2430	1.2	0.5	5400	1.2	2.2
2440	1.0	0.3	5500	1.4	1.8
2450	1.0	0.3	5600	1.9	2.1
2460	1.1	0.3	5700	2.2	1.6
2470	1.2	0.2	5800	2.0	0.2
2480	1.2	0.1	5850	1.9	0.0
2490	1.1	0.2			



Radiation Patterns

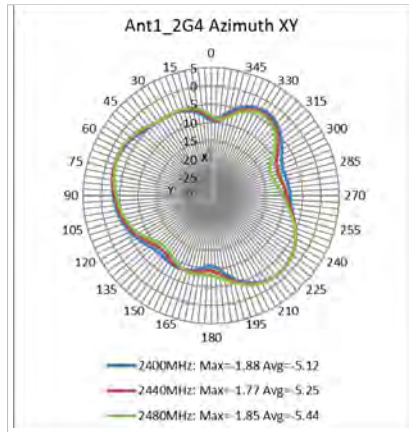
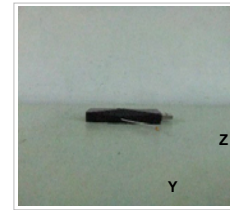
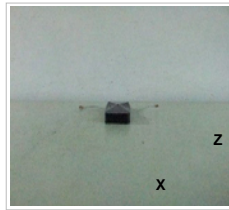
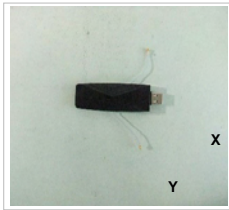
Coordinate System for Radiation Patterns



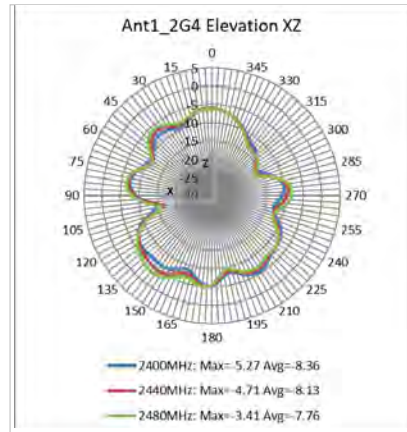
Orientation of EW-7822DUX (DWA-X1850)



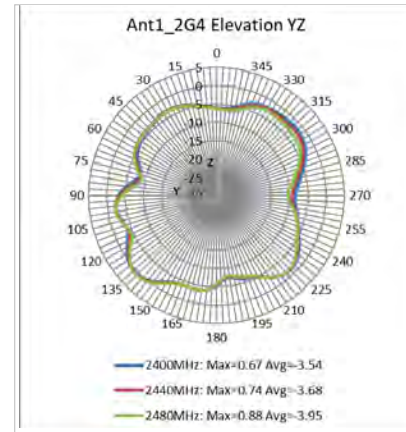
2D Patterns: Ant1_2G4 at 2.44 GHz



Azimuth



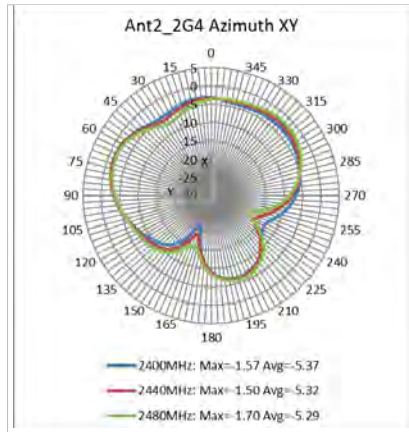
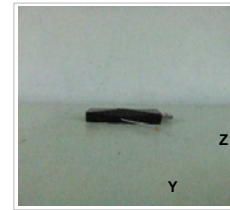
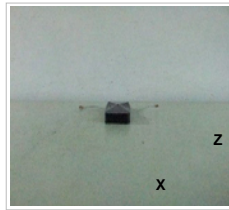
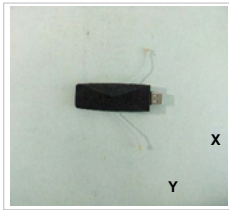
Side to Side Elevation



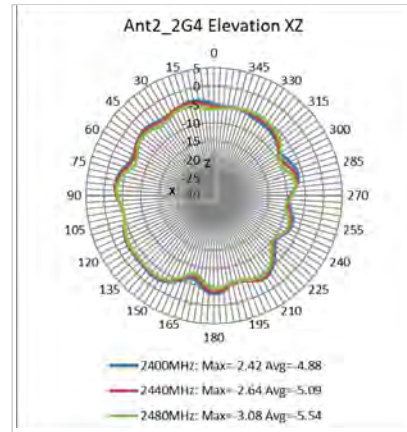
Front to Back Elevation



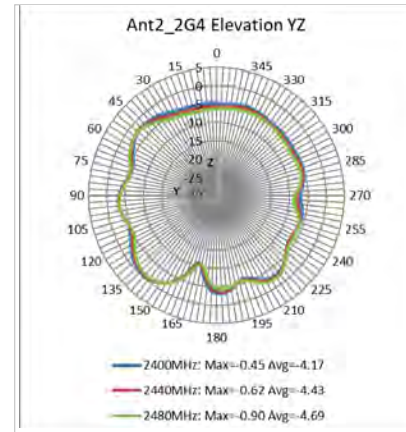
2D Patterns: Ant2_2G4 at 2.44 GHz



Azimuth



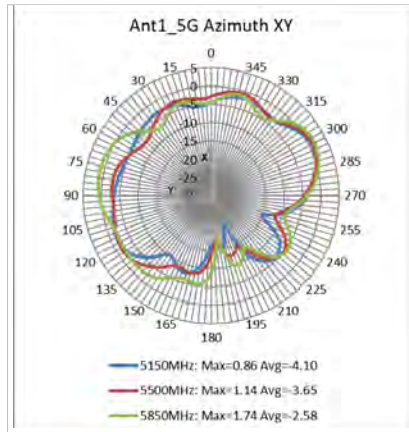
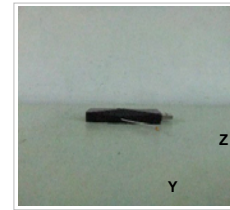
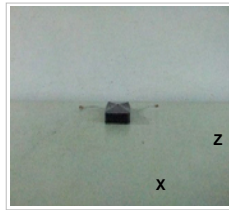
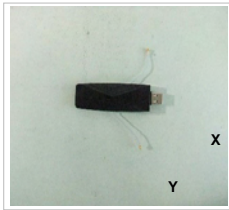
Side to Side Elevation



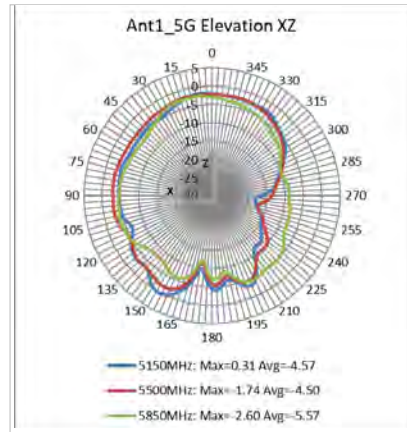
Front to Back Elevation



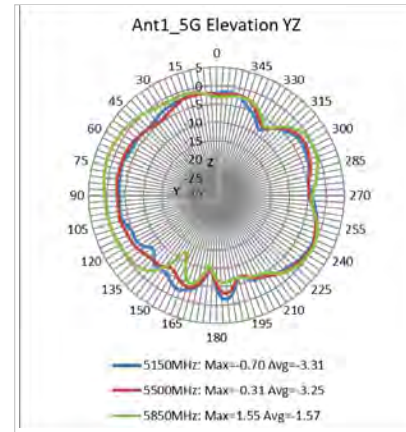
2D Patterns: Ant1_5G at 5.5 GHz



Azimuth



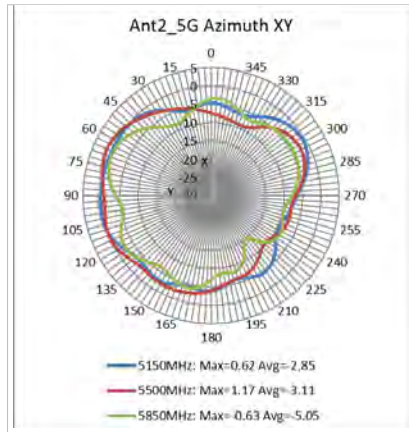
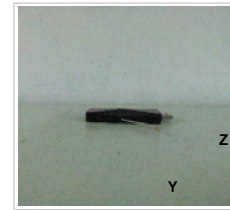
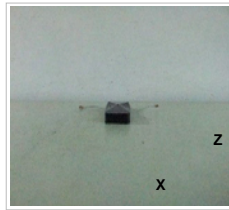
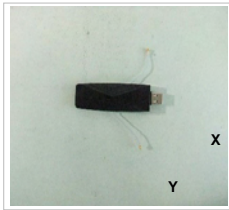
Side to Side Elevation



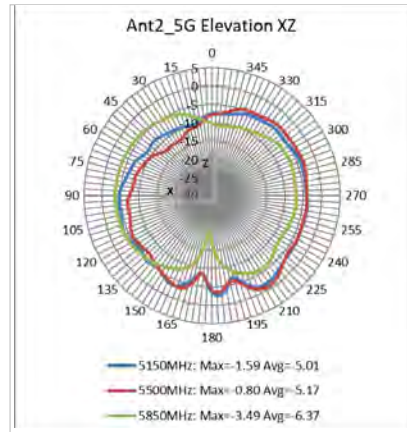
Front to Back Elevation



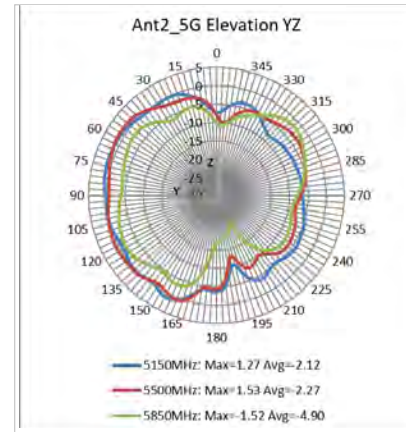
2D Patterns: Ant2_5G at 5.5 GHz



Azimuth



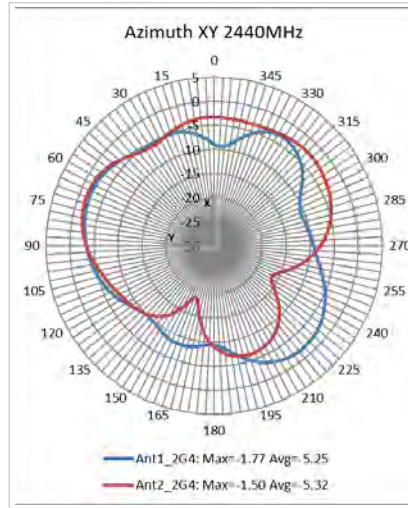
Side to Side Elevation



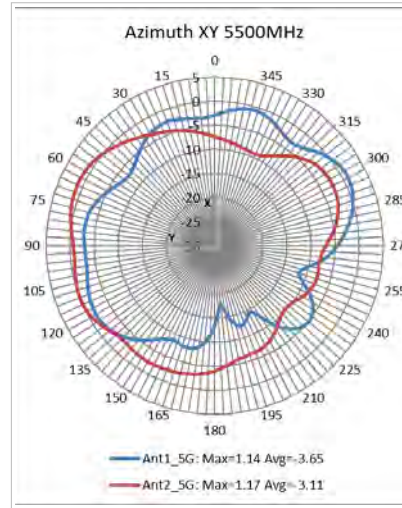
Front to Back Elevation



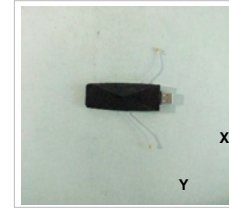
System Coverage: Azimuth at 2.44 GHz & 5.5 GHz



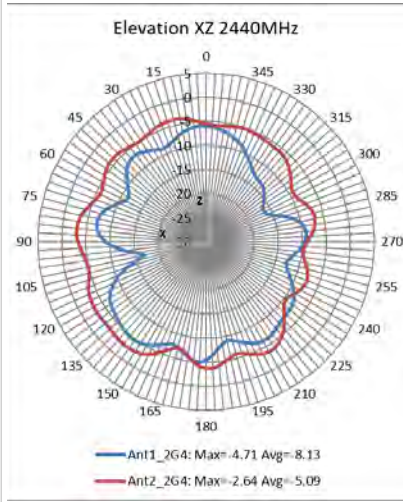
WiFi Antennas @ 2.44 GHz



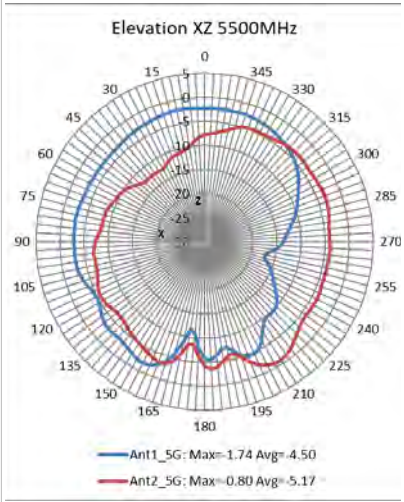
WiFi Antennas @ 5.5 GHz



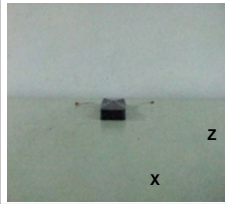
System Coverage: Side to Side Elevation at 2.44 GHz & 5.5 GHz



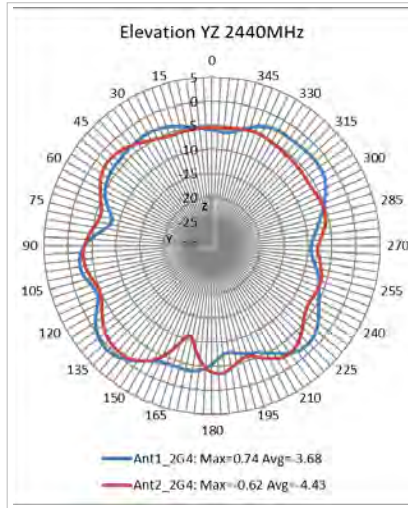
WiFi Antennas @ 2.44 GHz



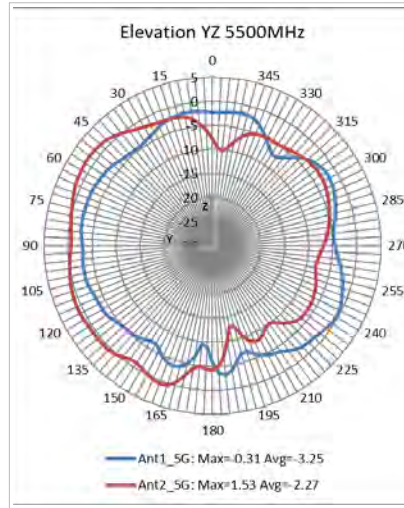
WiFi Antennas @ 5.5 GHz



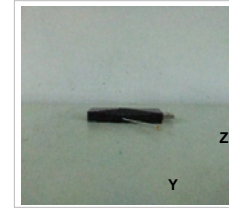
System Coverage: Front to Back Elevation at 2.44 GHz & 5.5 GHz



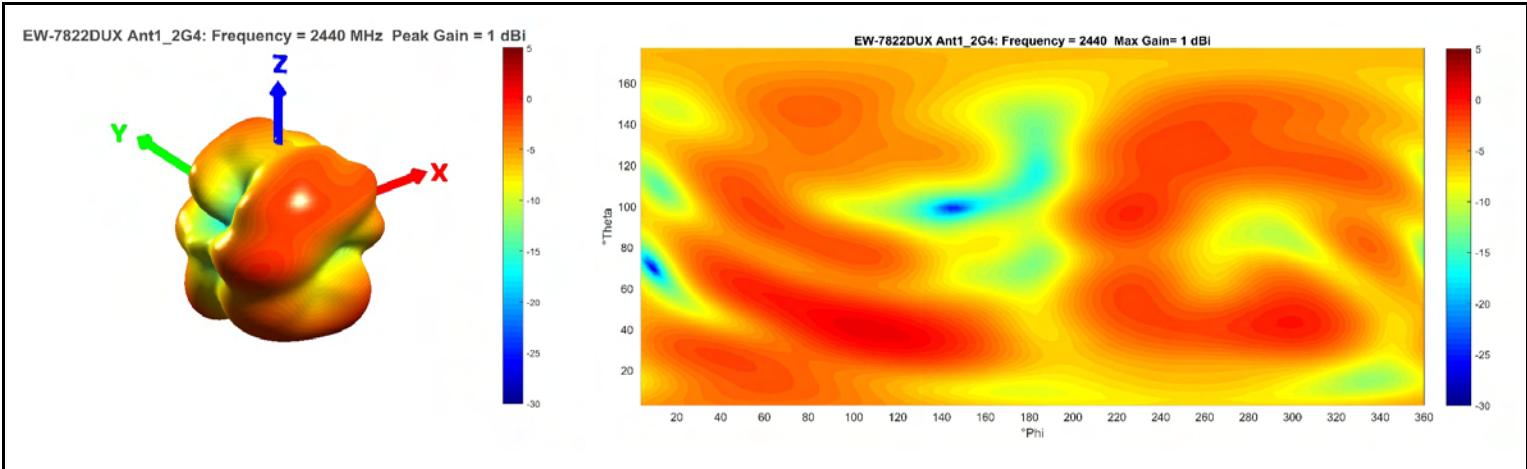
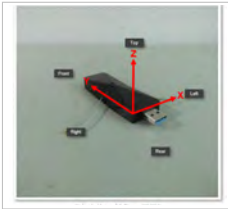
WiFi Antennas @ 2.44 GHz



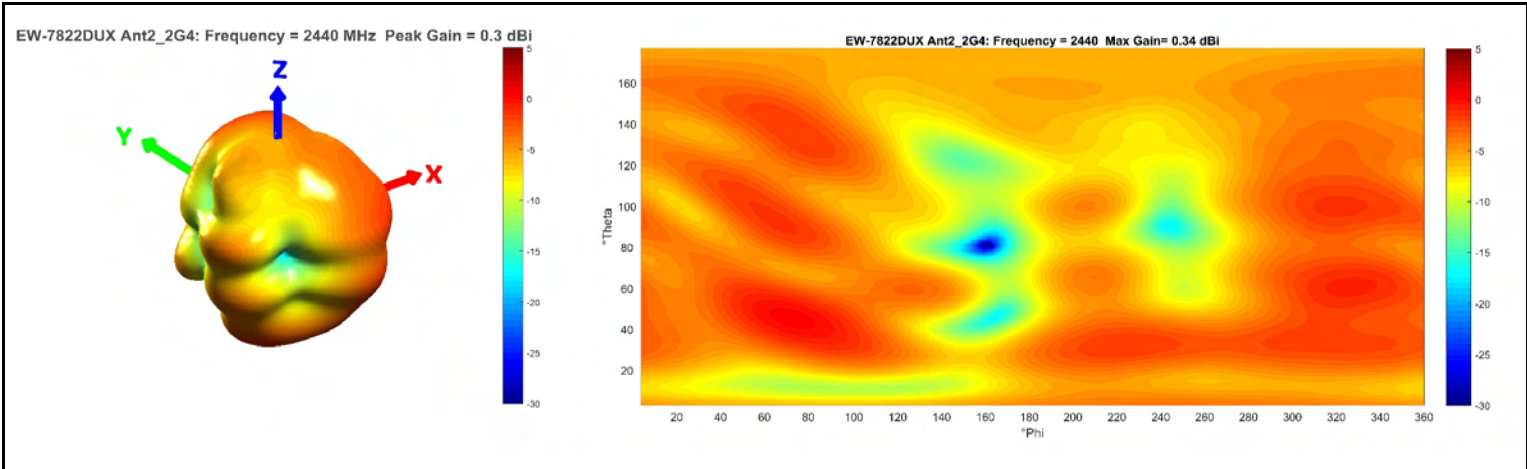
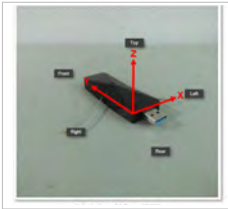
WiFi Antennas @ 5.5 GHz



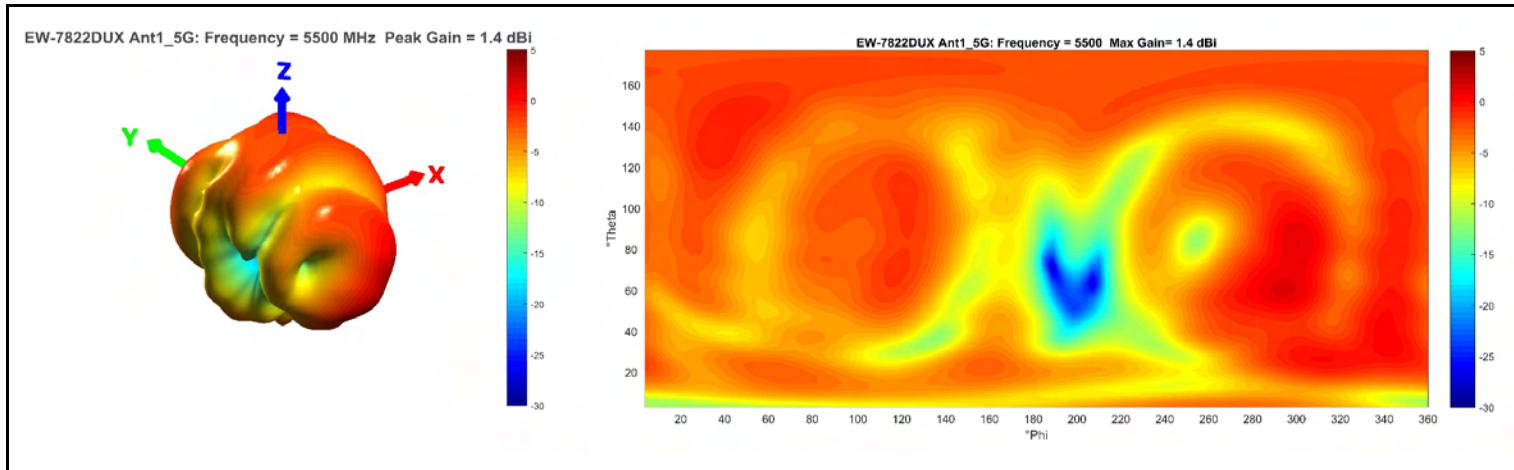
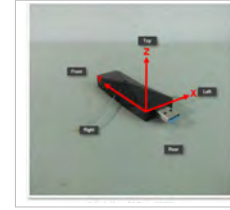
3D Pattern – Ant1 at 2.44 GHz



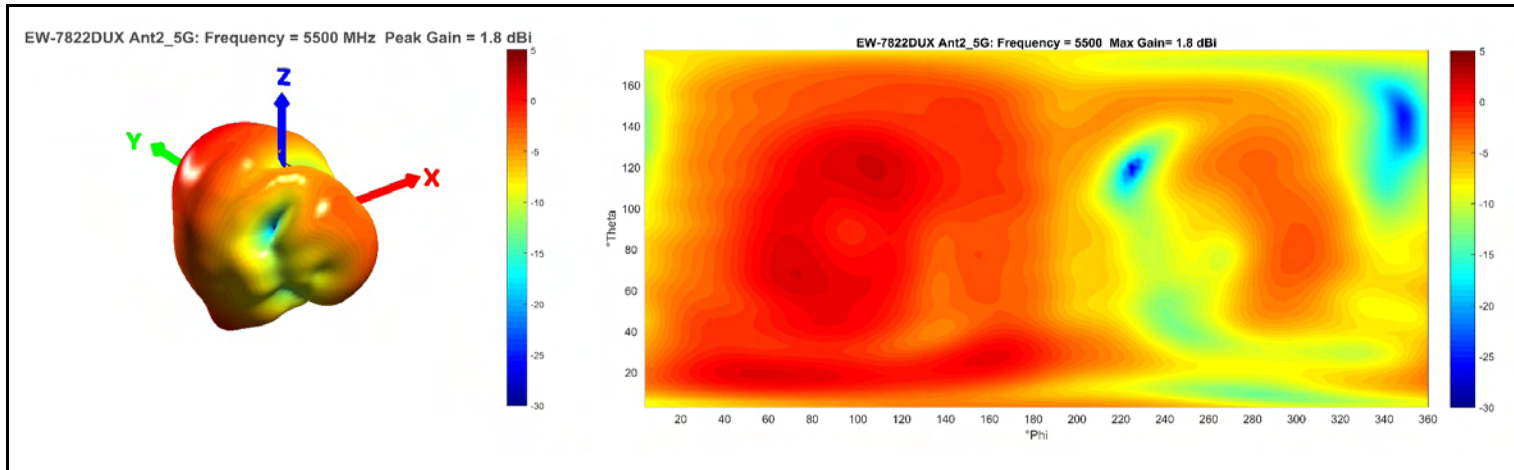
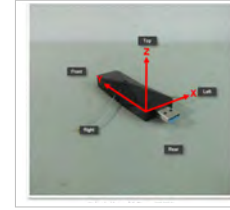
3D Pattern – Ant2 at 2.44 GHz



3D Pattern – Ant1 at 5.5 GHz



3D Pattern – Ant2 at 5.5 GHz



Summary

- Antenna return loss meet
 - Below -9.1dB for all antennas in Wi-Fi band
- Isolation meets
 - Below -5.6dB between all Wi-Fi antennas
- Efficiency:
 - More than 40%

