



HL Antenna Proposal for Zyxel project

--EX2210-T0 test Report

Date: 8th of April 2020

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Introduction

- Brief Project Description
 - Project Name: EX2210-T0
 - Category: WiFi AP
- The AP supports IEEE 802.11 a/b/g/n/ac /ax wireless standards
- HL Technologies developed a dedicated antenna system proposal for Zyxel EX2210-T0
- Antenna Configuration:
 - 2 x 2G4 WLAN antennas
 - 2 x 5G WLAN antennas
- WLAN antennas in HL proposal are
 - Off-board
 - PCB-type
 - Cable-fed
- This document shows test results for HL antenna solution test in the machine. model received from Zyxel



Requirements Review

- Antenna Configuration of zyxel project
 - 2 x 2G4 WLAN antennas
 - 2 x 5G WLAN antennas
- Basic Passive Requirements
 - RL for each antennas $> 10\text{dB}$
 - Isolation between all antennas
 - $> 20\text{dB}$ @ 2.4GHz band
 - $> 20\text{dB}$ @ 5GHz band.
 - Efficiency $> 60\%$

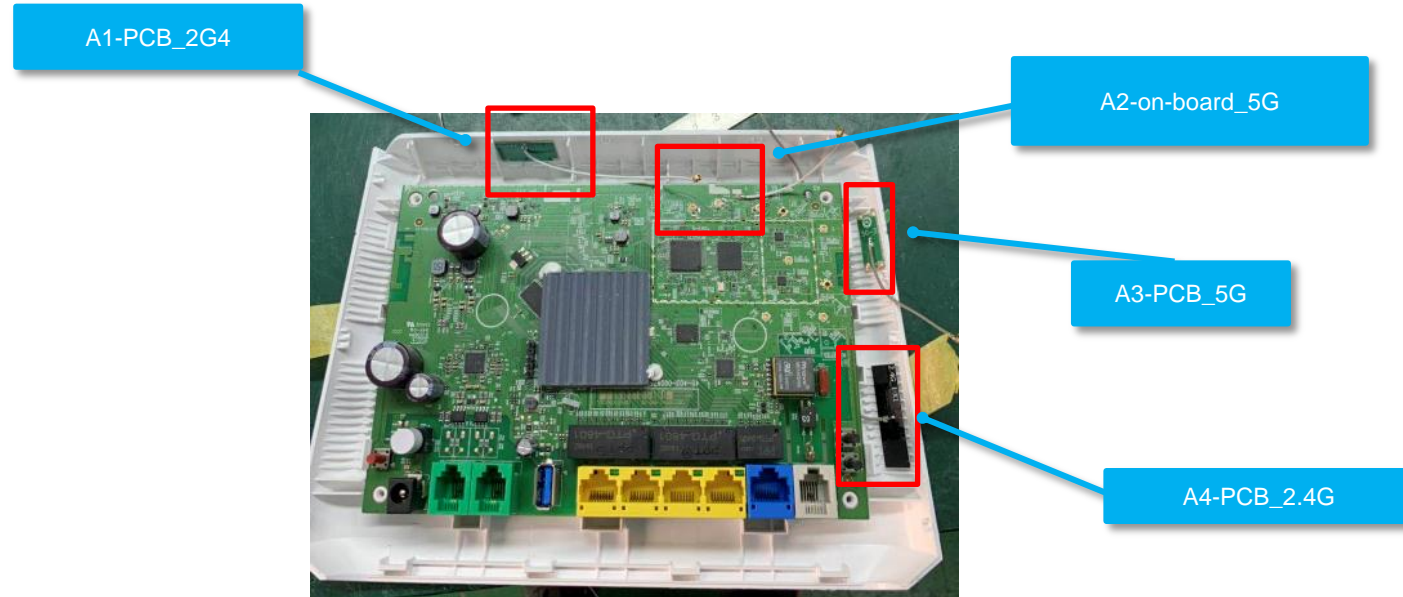
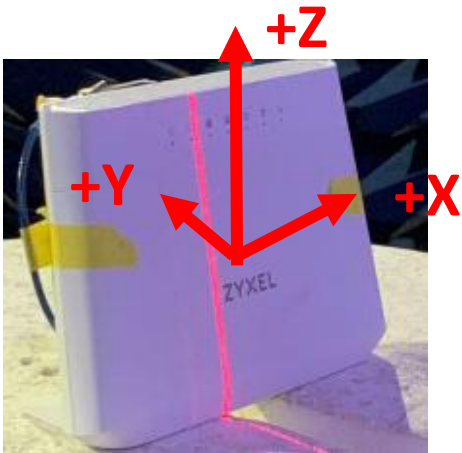


HL Antenna System Proposal



HL Antenna System

Zyxel project

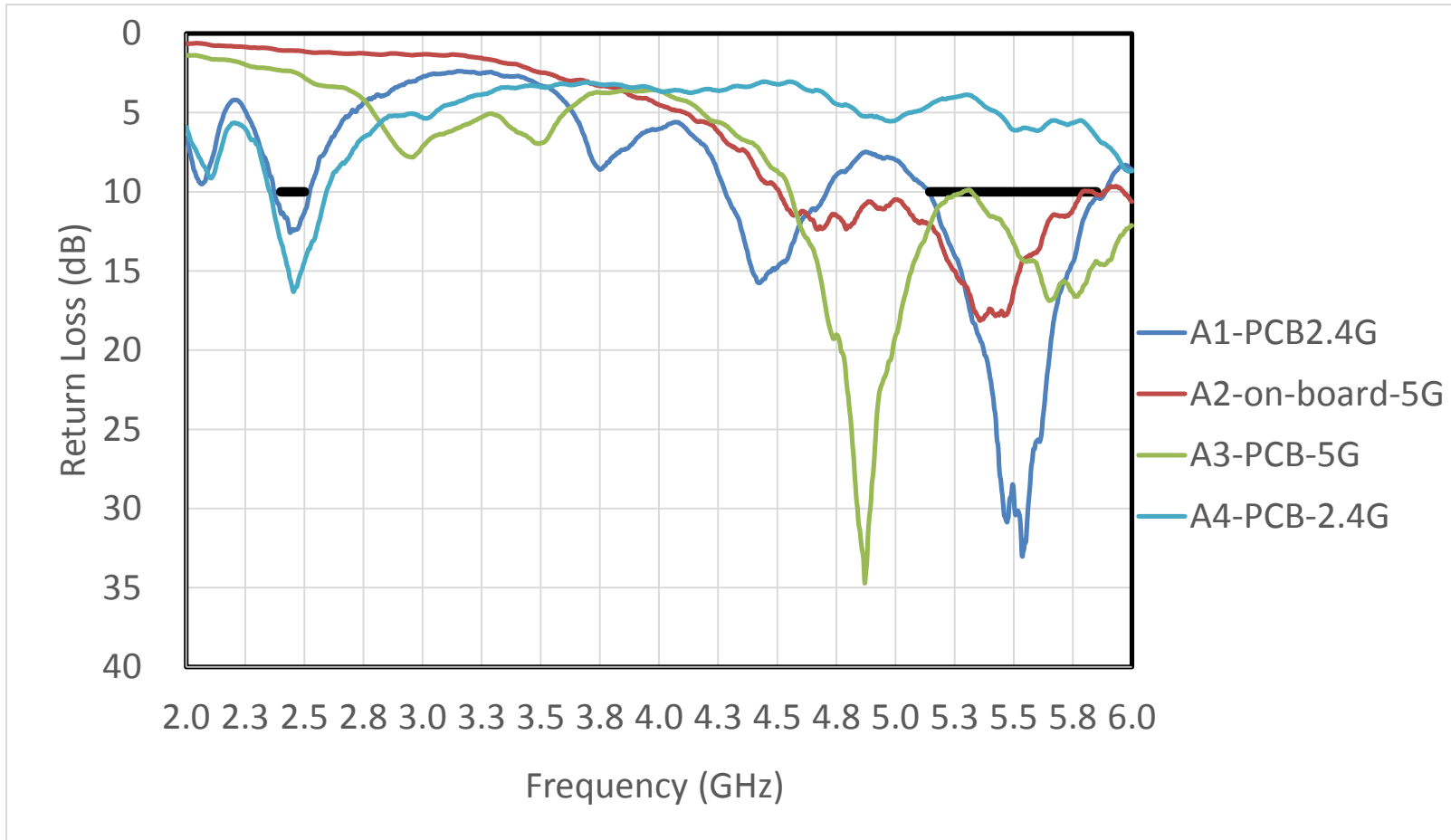


S-parameters

- Calibration plane is at the locations of Feeding Port



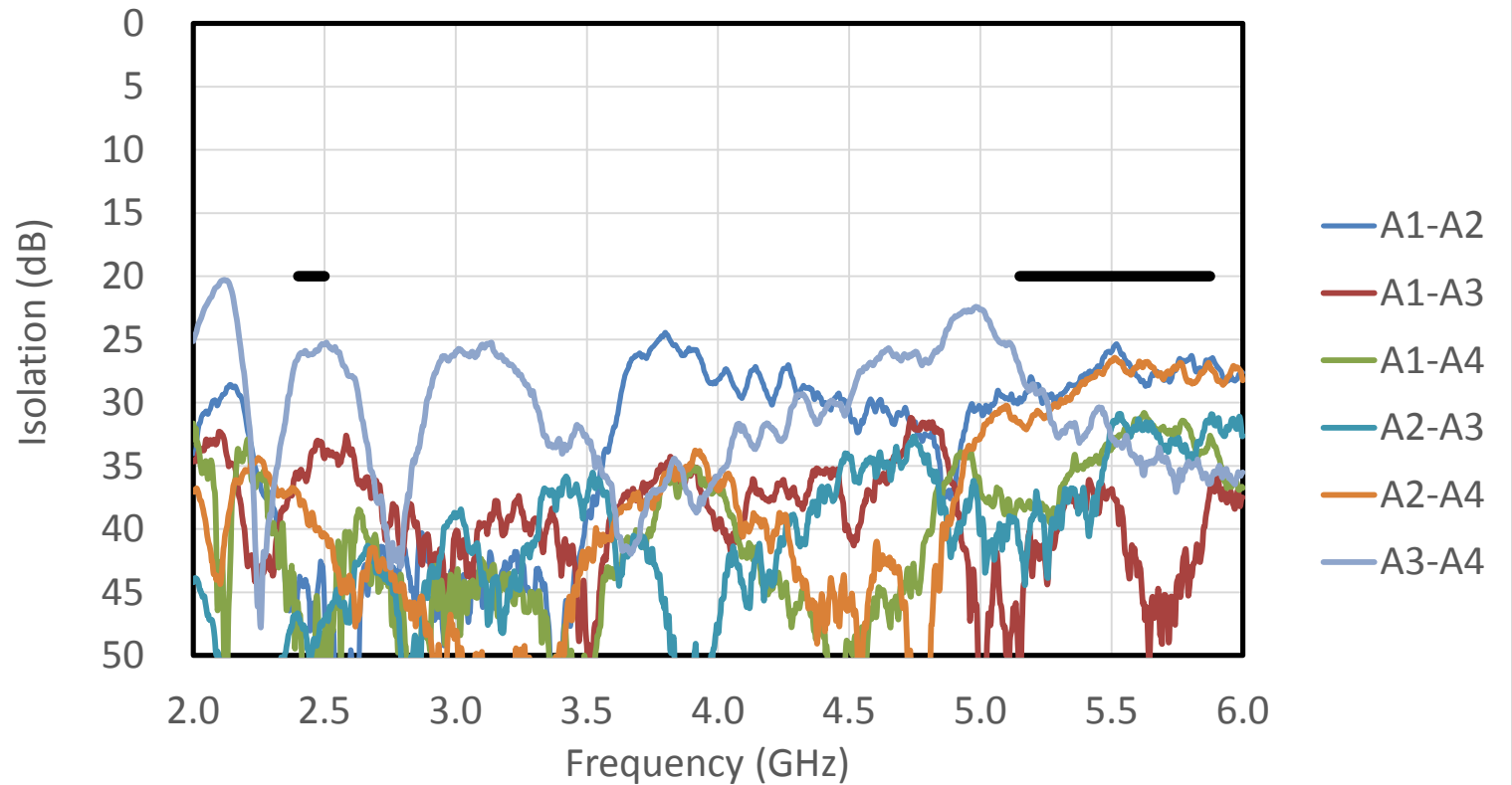
Return Loss of WLAN Antennas



Return loss (dB)	A1_2G4	A2_5G	A3_5G	A4_2.4G
2400MHz	11.5	/	/	14.1
2500MHz	11.3	/	/	15.4
5150MHz	/	12.2	11.8	/
5850MHz	/	11.2	14.5	/



Isolation Between all WLAN Antennas



Isolation (dB)	A1-A2	A1-A3	A1-A4	A2-A3	A2-A4	A3-A4
2400M Hz	44.7	36.2	46.1	46.8	37.2	26.4
2500M Hz	44.5	34.3	48.4	47.2	40.3	25.3
5150M Hz	29.7	53.3	37.8	41.5	31.6	27.5
5850M Hz	26.7	37.0	32.6	31.5	27.1	36.2



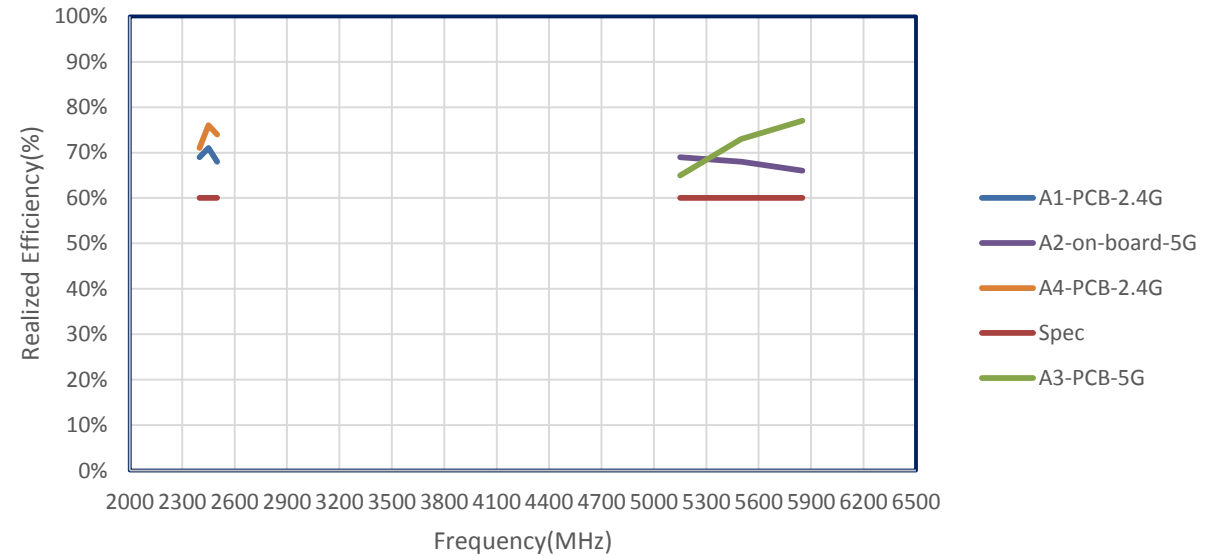
Radiated Performance

- Calibration plane is at the locations of Feeding Port
 - Realized Efficiency
 - Peak Realized Gain



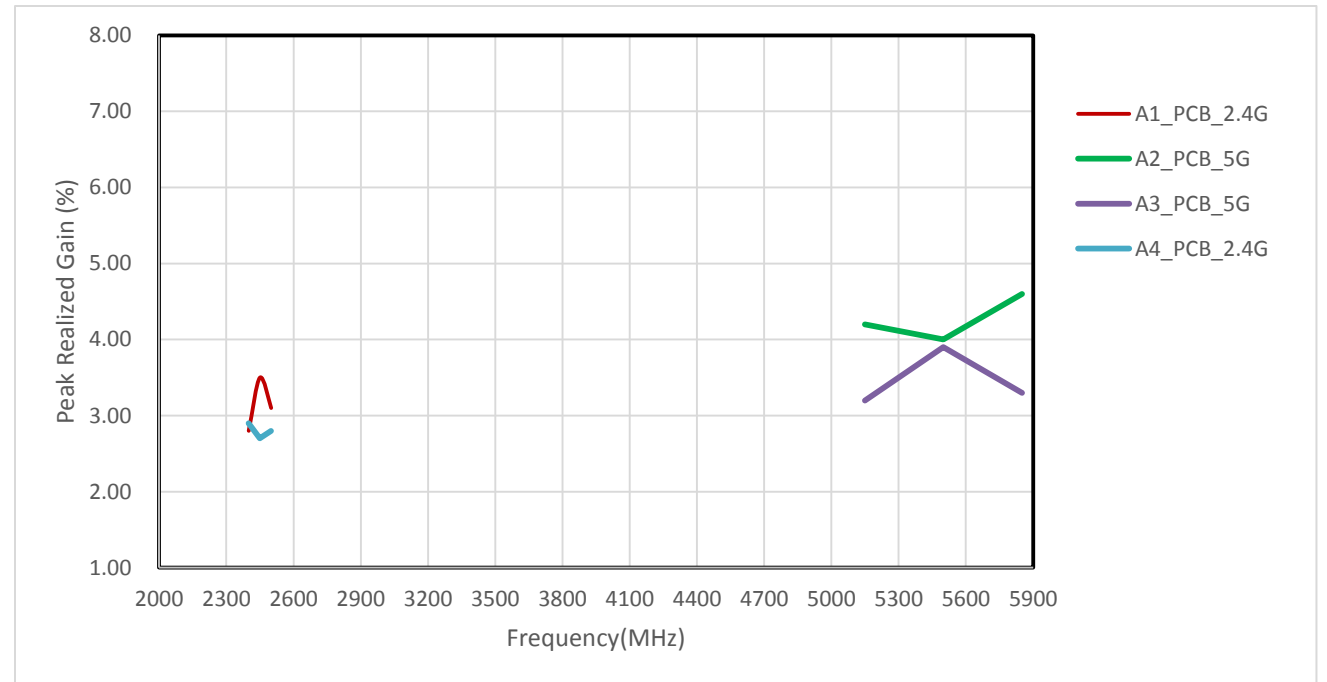
Realized Efficiency – WLAN Antennas

Frequency/MHz	A1_PCB_2G4	A2_onboard_5G	A3_PCB_5G	A4_PCB_2.4G
2400	69%	/	/	71%
2450	71%	/	/	76%
2500	68%	/	/	74%
5150	/	69%	66%	/
5500	/	68%	80%	/
5850	/	66%	79%	/
Average	69%	68%	72%	74%



Peak Realized Gain – WLAN Antennas

Frequency/MHz	A1_PCB_2.4 G (dBi)	A2_PCB_5G (dBi)	A3_PCB_5G (dBi)	A4_PCB_2.4G (dBi)
2400	2.8	/	/	2.9
2450	3.5	/	/	2.7
2500	3.1	/	/	2.8
5150	/	4.2	3.2	/
5500	/	4.0	3.9	/
5850	/	4.6	3.3	/

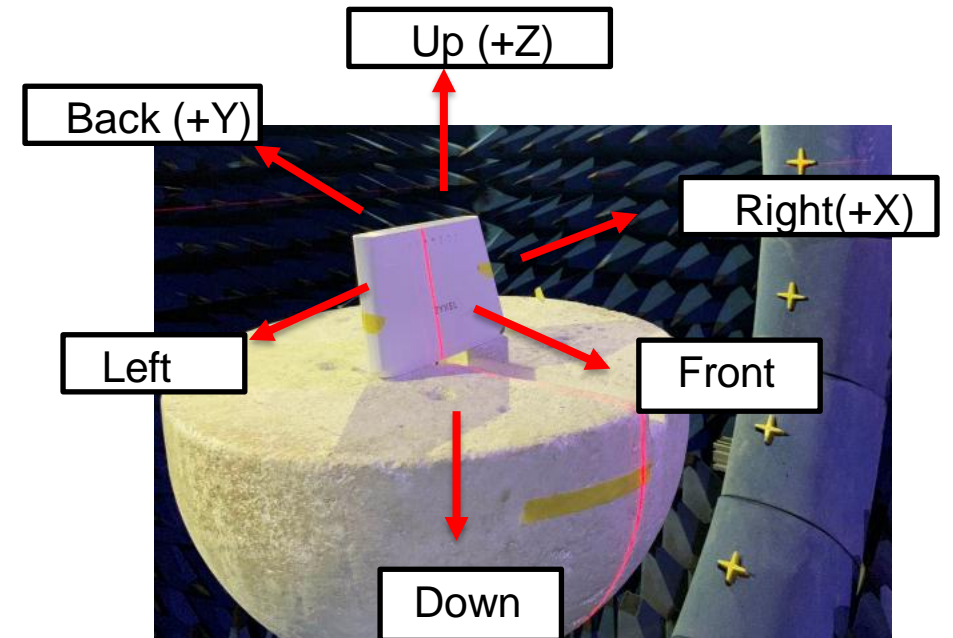
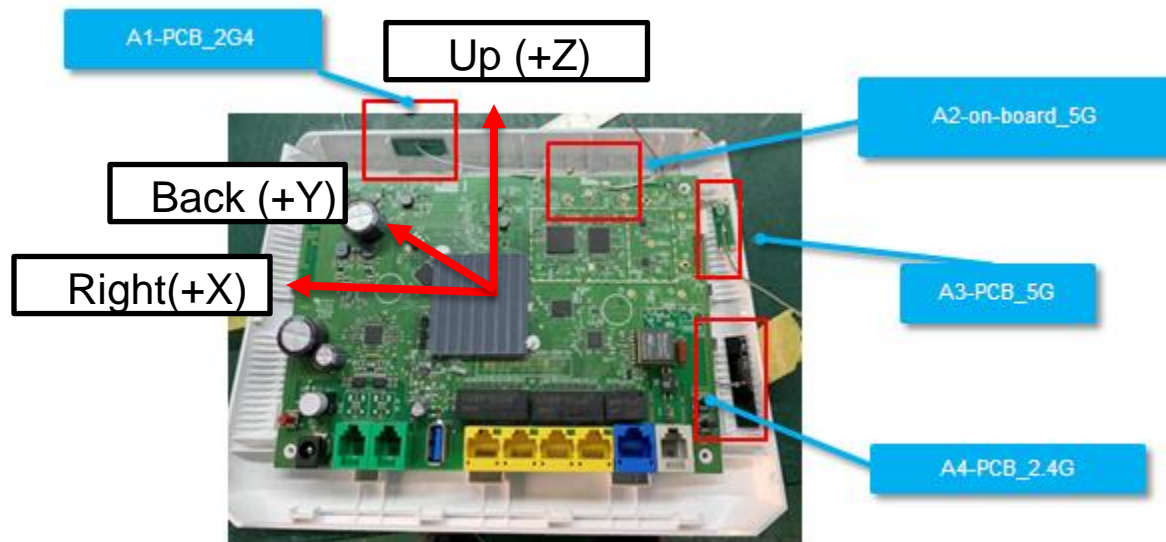


Radiation Patterns

- Calibration plane is at the locations of Feeding Port
 - Total Gain Patterns in Principal Planes

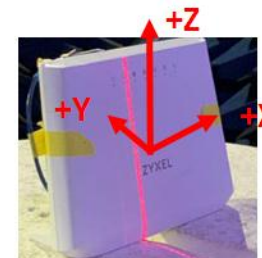
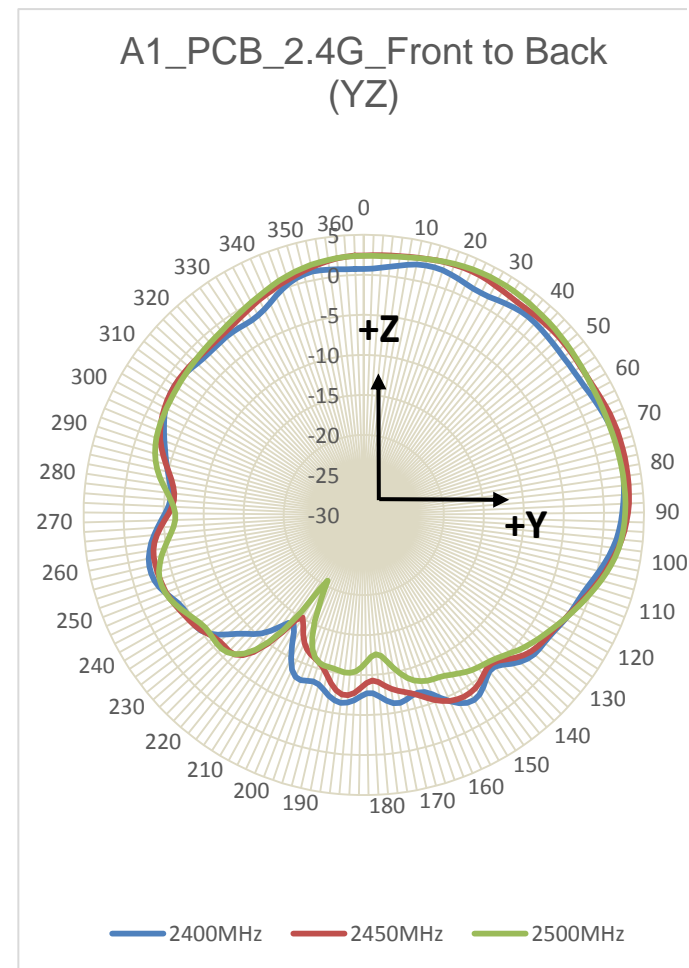
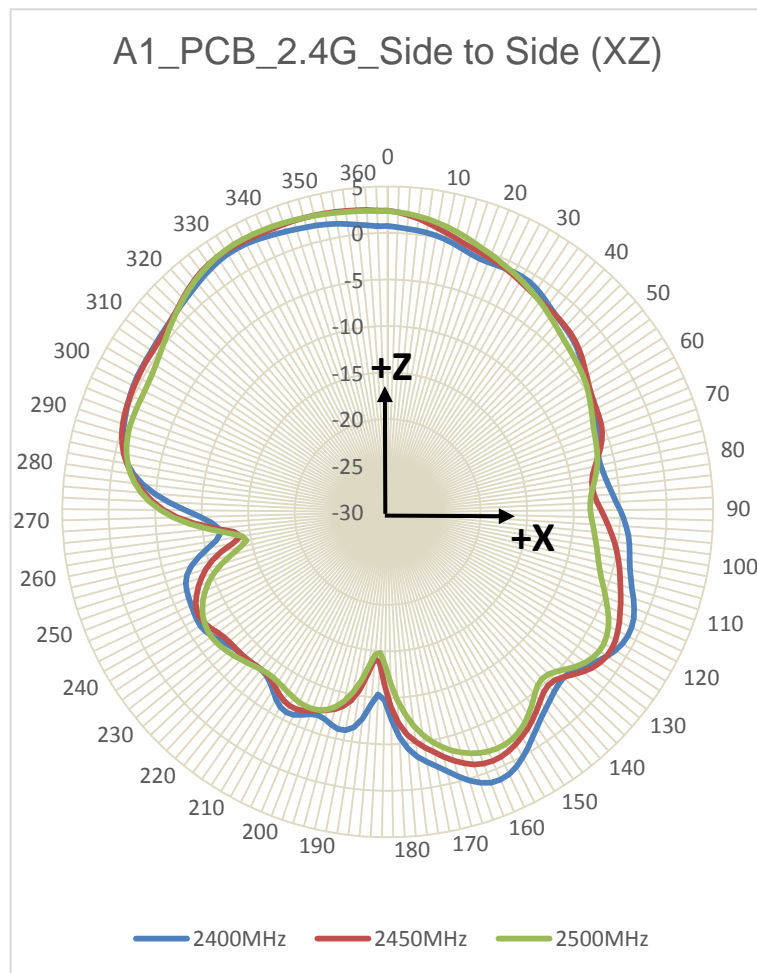
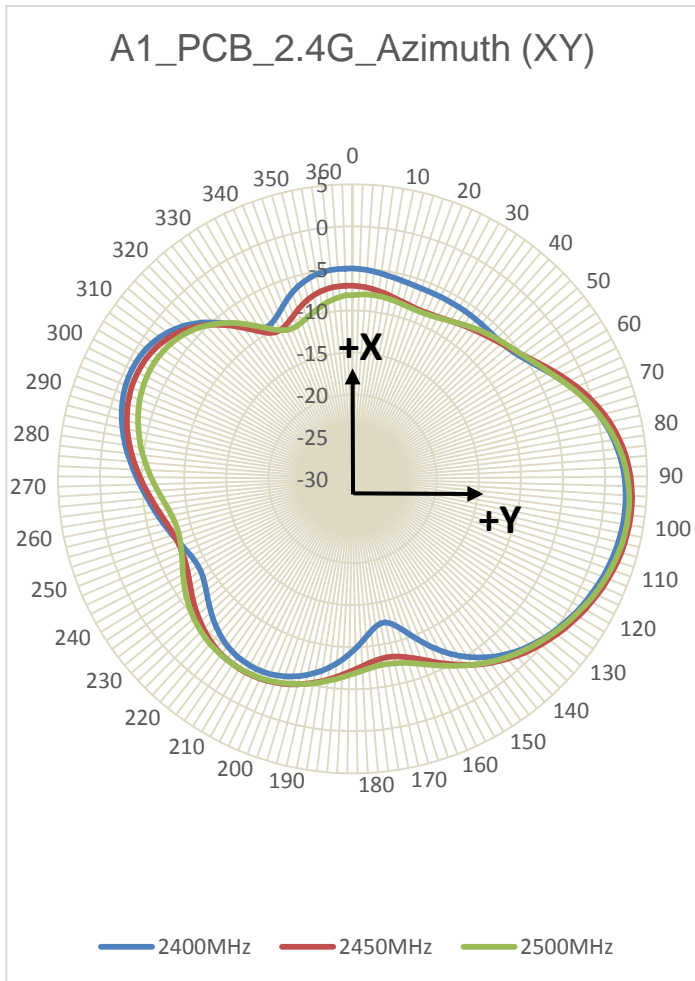


Orientation of DUT for Radiation Pattern Visualization

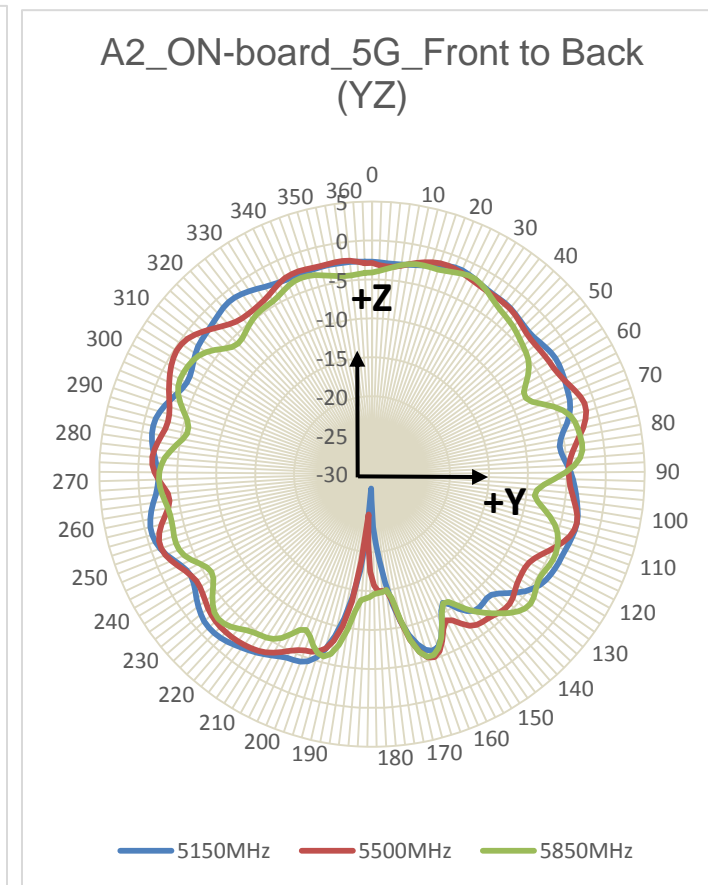
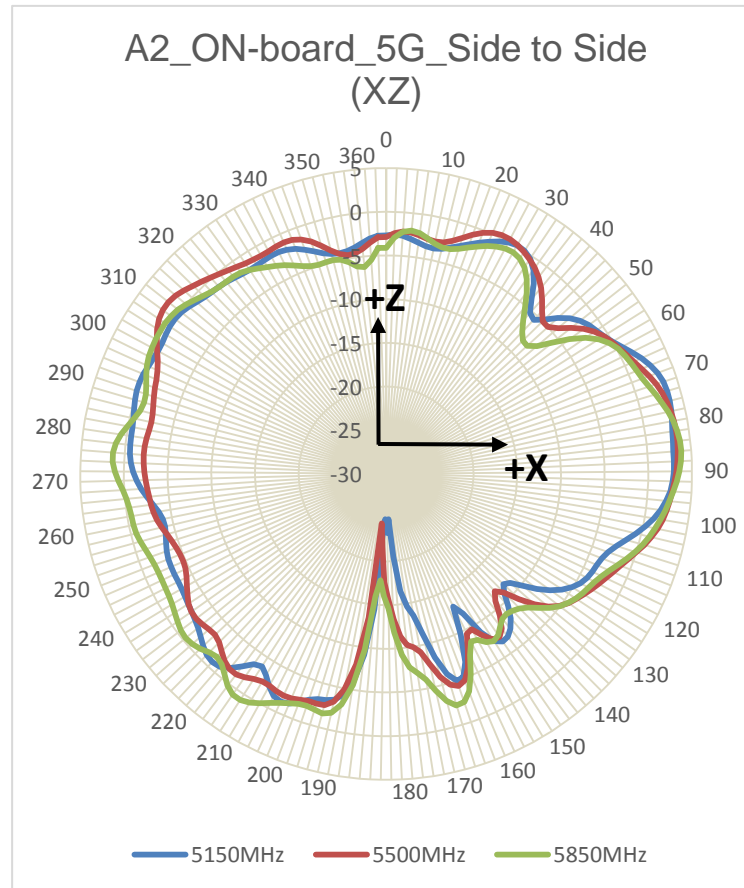
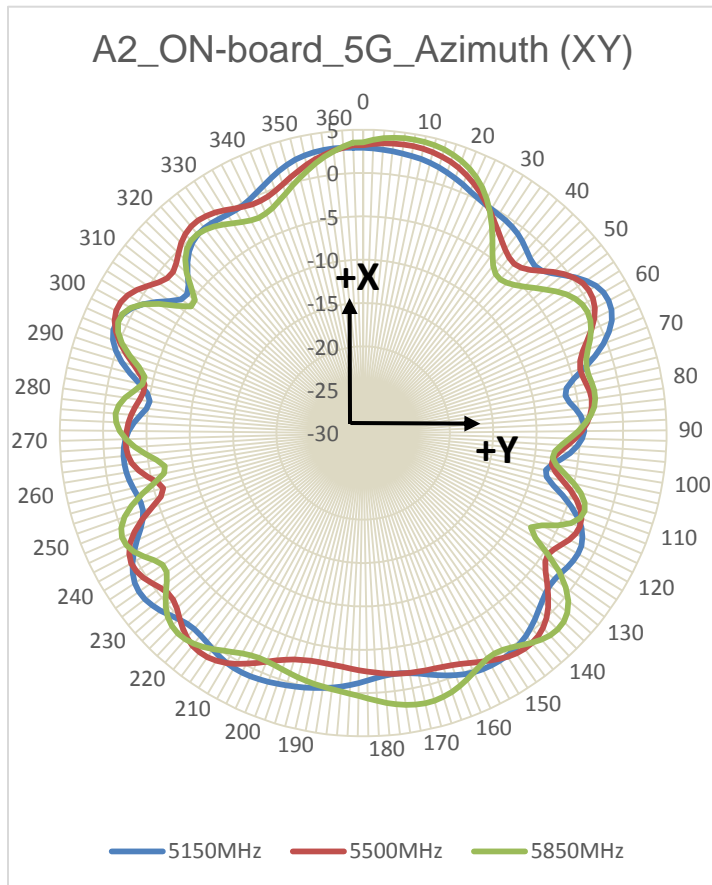
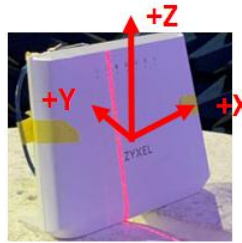


	XZ	YZ	XY
0	Up	UP	Right
90	Right	Back	Back
180	Down	Down	left
270	left	Front	Front

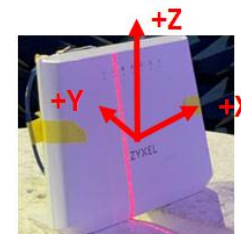
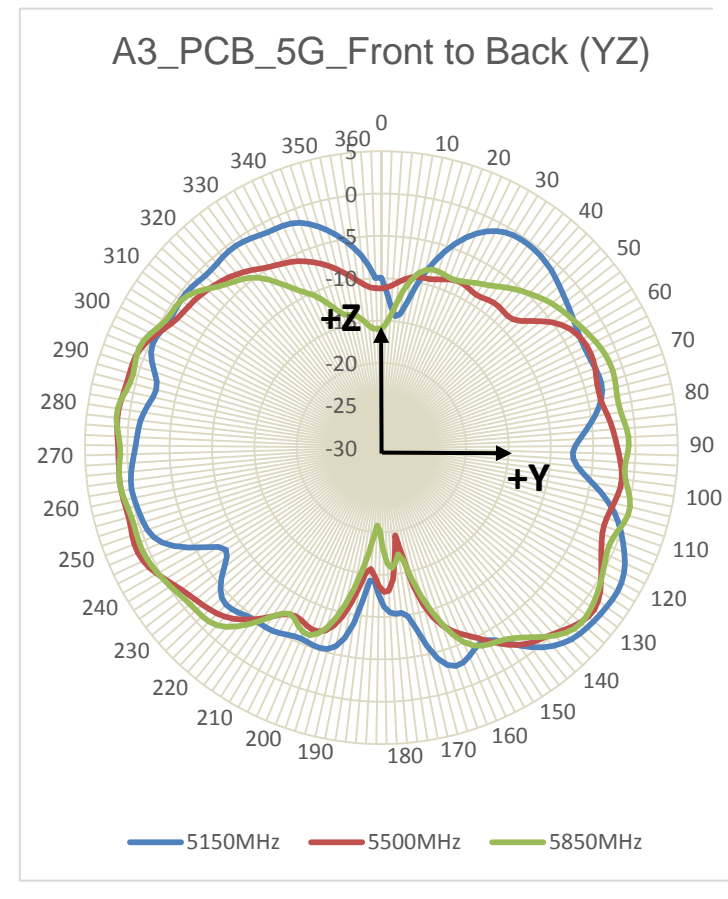
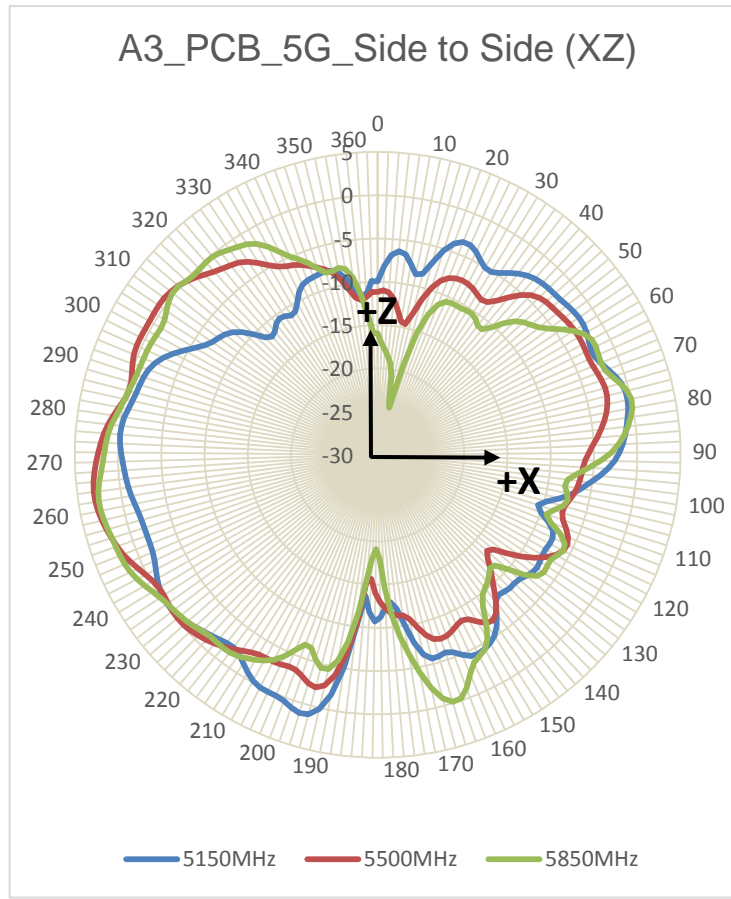
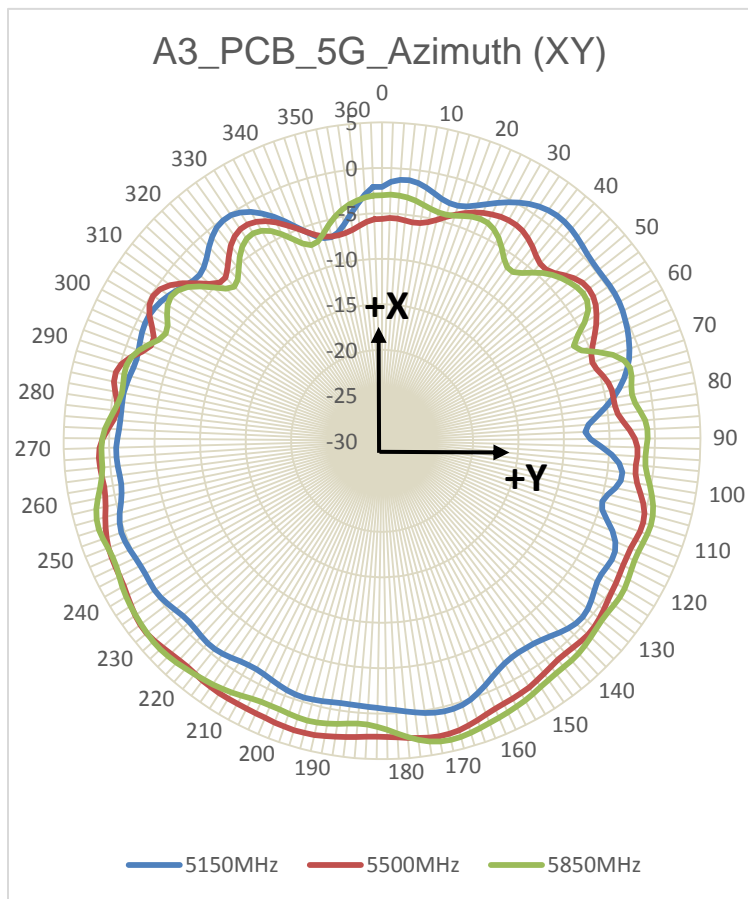
Total Gain Patterns in Principal Planes:



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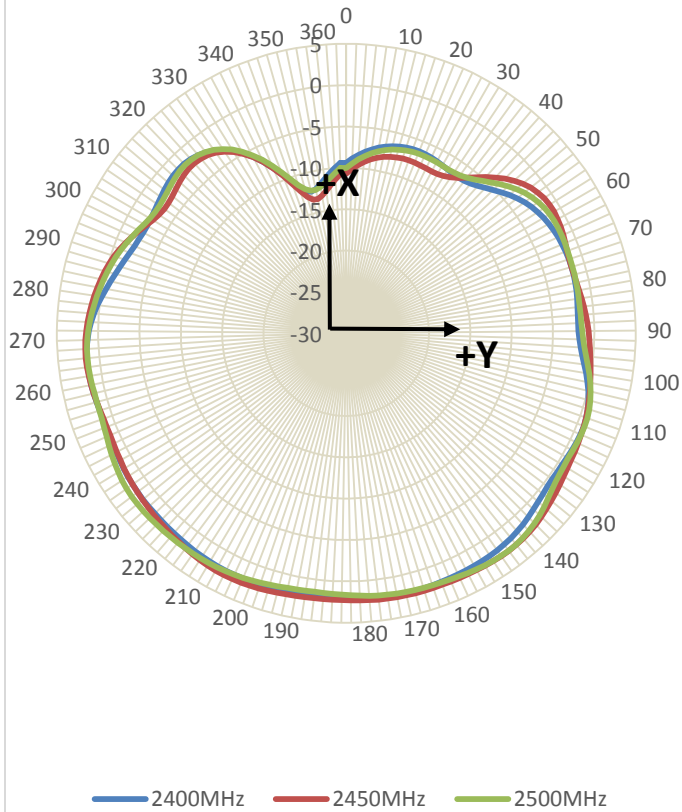


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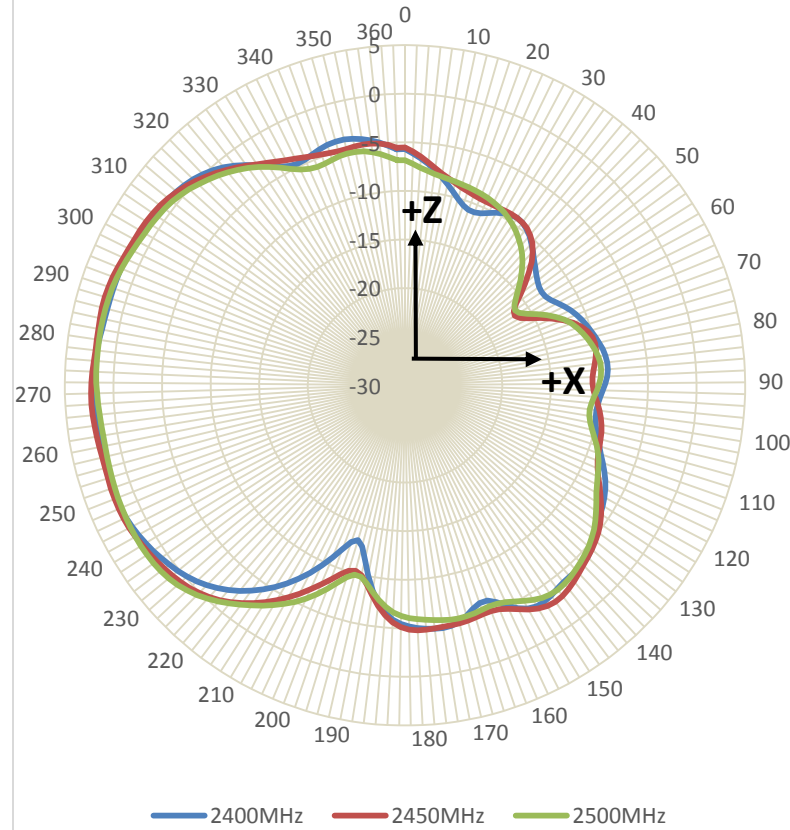


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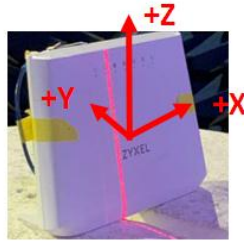
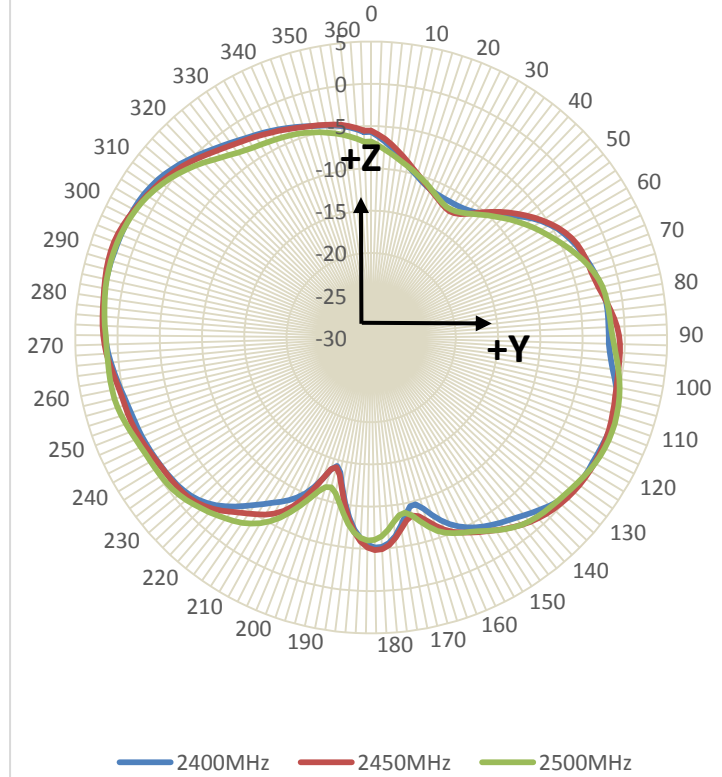
A4_PCB_2.4G_Azimuth (XY)



A4_PCB_2.4G_Side to Side (XZ)



A4_PCB_2.4G_Front to Back (YZ)



THANK YOU



HL TECHNOLOGIES