Comcast Bugatti-IP Antenna Test Report

Apr 30, 2025

Larry Jiang | Antenna Design Department

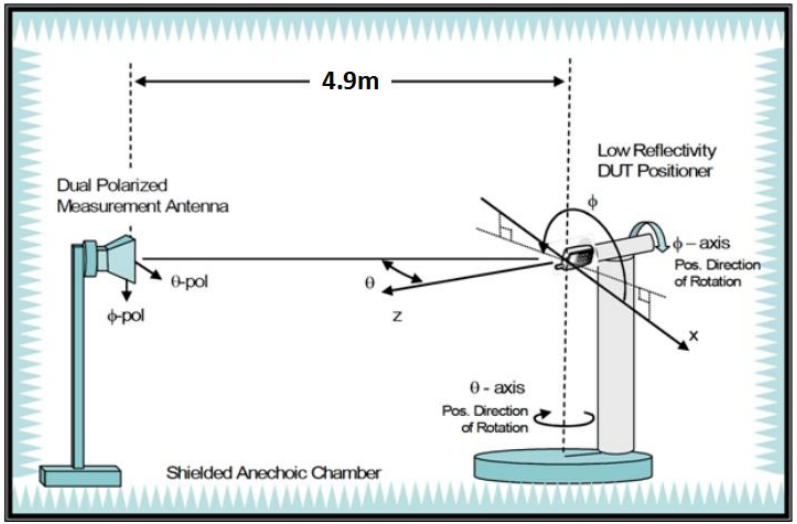
Test Infomation

Item	Description
Brand Name	Comcast
Equipment	Bugatti-IP
Test Location	8F, No. 3-1, YuanQu St. Taipei, Taiwan 115 R.O.C.
Test Condition	Radiation
Test Engineer	Larry Jing, Sercomm
Test Environment	ETS-Lindgren AMS-8500 Antenna Measurement Chamber
Test Date	Apr. 30, 2025
Measurement control	EMQuest V1.09

Antenna Details

Ant No.	Operating Band	Type	Material	Feeding	Connector	Quantity	Polarization
WIFI0	2400MHz ~ 2500MHz 5150MHz ~ 5850MHz	PIFA	FPC	Cable	U.FL	1	Liner
WIFI1	2400MHz ~ 2500MHz 5150MHz ~ 5850MHz	PIFA	FPC	Cable	U.FL	1	Liner

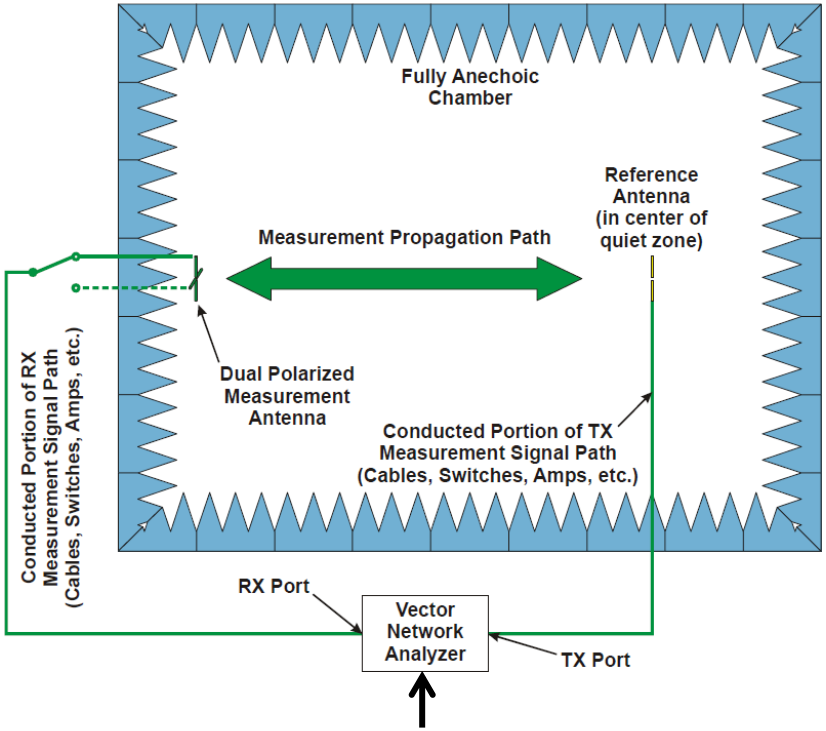
Test Configuration

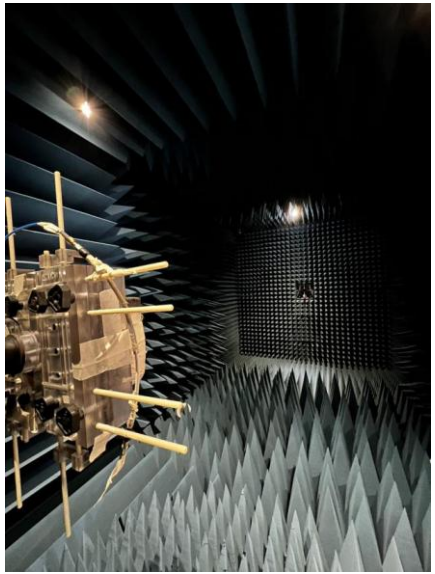


Test Setup & Procedure

1. Fix the DUT on the dielectric support structure and connect the feeding cable to the antenna used for test
2. Set measurement parameters such as frequency range and sampling angle
3. Perform test and then get far-field data (radiation pattern, gain, efficiency)
4. Repeat test procedure for other antennas

Test Equipment & Calibration





Test Equipment & Calibration

Instrument	Brand	Characteristics	Model No.	Serial No.	Calibration Date	Calibration Due Date
Precision Sleeve Dipole	ETS-Lindgren	700 MHz ~ 900 MHz	3126-700	00169715	May 21, 2024	May 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	900 MHz ~ 1000 MHz	3126-900	00169592	May 21, 2024	May 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	1400 MHz ~ 1700 MHz	3126-1550	00164599	May 21, 2024	May 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	1700 MHz ~ 2000 MHz	3126-1850	00169588	May 21, 2024	May 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	2000 MHz ~ 2300 MHz	3126-2150	00169593	May 21, 2024	May 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	2300 MHz ~ 2700 MHz	3126-2500	00169597	May 21, 2024	May 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	5000 MHz ~ 6000 MHz	3126-5500	00169728	May 21, 2024	May 21, 2025
Horn Antenna	SCHWARZBECK	1 GHz ~ 18 GHz	BBHA 9120D	BBHA 9120D-1294	Apr. 07, 2024	Apr. 07, 2025
EMQuest Antenna Measurement Software	ETS-Lindgren	Control chamber system	EMQ-100	1437	Non-Calibration Required	Non-Calibration Required
VNA	Keysight	9 KHz ~ 8.5 GHz	E5071C	MY46316900	July 15, 2024	July 15, 2025

Result Summary - Uncorrelated Gain & Correlated Gain

Frequency (MHz)	Uncorrelated Gain (dBi)	Correlated Gain (dBi)
2400	2.15	3.97
2450	2.31	3.94
2500	1.88	3.87

Frequency (MHz)	Uncorrelated Gain (dBi)	Correlated Gain (dBi)
5150	2.82	5.83
5450	2.44	5.43
5850	1.74	4.65

Calculations (1/2)

Because the antennas are fixed in location within the device the directional antenna gain for MIMO is calculated over a sphere using the raw spatial data taken at 5 degree steps of theta and phi for each antenna using the equations from KDB 662911 D01. The raw antenna data is located in the appendix of this report.

The uncorrelated antenna gain was calculated using KDB 662911 D01, F(2)(d)(ii)

The uncorrelated gain was calculated for each point in the spatial data, and the highest value reported.

2.4GHz uncorrelated calculation:
Maximum uncorrelated gain: 2.31 dBi
$= 10*\log(((10^{\wedge(G0/10)})+(10^{\wedge(G1/10)}))/2)$
$= 10*\log(((10^{\wedge(5.08/10)})+(10^{\wedge(-7.3/10)}))/2)$

This occurs at: 2450MHz, phi 180/theta 135

5GHz uncorrelated calculation:
Maximum uncorrelated gain: 2.82dBi
$= 10*\log(((10^{\wedge(G0/10)})+(10^{\wedge(G1/10)}))/2)$
$= 10*\log(((10^{\wedge(2.96/10)})+(10^{\wedge(2.68/10)}))/2)$

This occurs at: 5150MHz, phi 60/theta 0

Calculations (2/2)

Because the antennas are fixed in location within the device the directional antenna gain for MIMO is calculated over a sphere using the raw spatial data taken at 5 degree steps of theta and phi for each antenna using the equations from KDB 662911 D01. The raw antenna data is located in the appendix of this report.

The correlated antenna gain was calculated using KDB 662911 D01, F(2)(d)(i)

The correlated gain was calculated for each point in the spatial data, and the highest value reported.

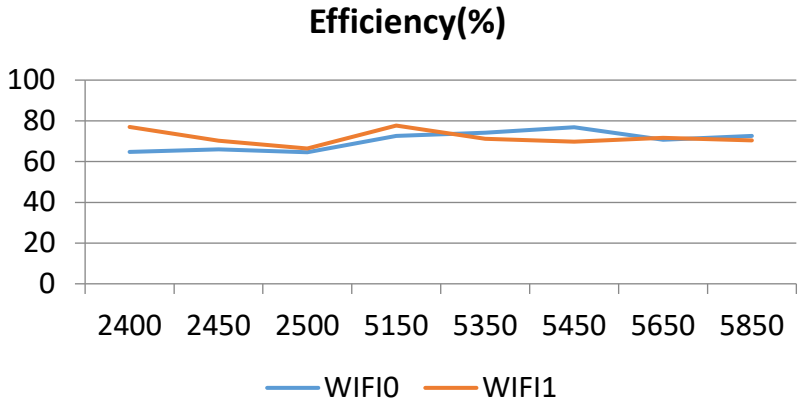
2.4GHz correlated calculation:
Maximum correlated gain: 3.97dBi
= $10*\log(((10^{\wedge(G0/20)}+10^{\wedge(G1/20)})^{\wedge}2)/2)$
= $10*\log(((10^{\wedge(4.83/20)}+10^{\wedge(-6.2/20)})^{\wedge}2)/2)$

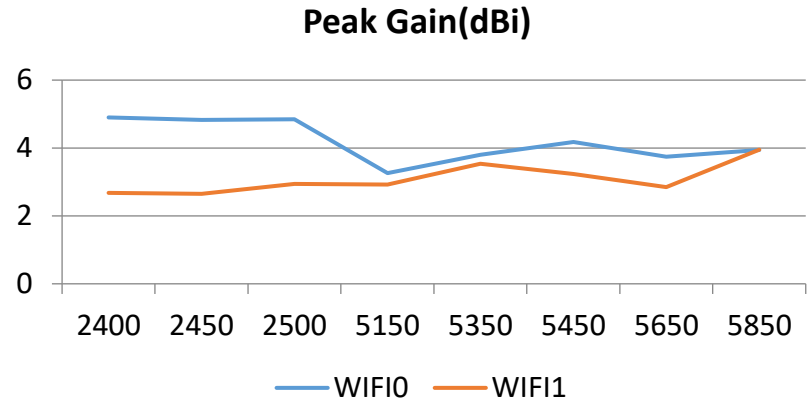
This occurs at: 2400MHz, phi 180/theta 135

5GHz correlated calculation:
Maximum correlated gain: 5.83dBi
= $10*\log(((10^{\wedge(G0/20)}+10^{\wedge(G1/20)})^{\wedge}2)/2)$
= $10*\log(((10^{\wedge(2.96/20)}+10^{\wedge(2.68/20)})^{\wedge}2)/2)$

This occurs at: 5150MHz, phi 60/theta 0

Peak Gain & Efficiency

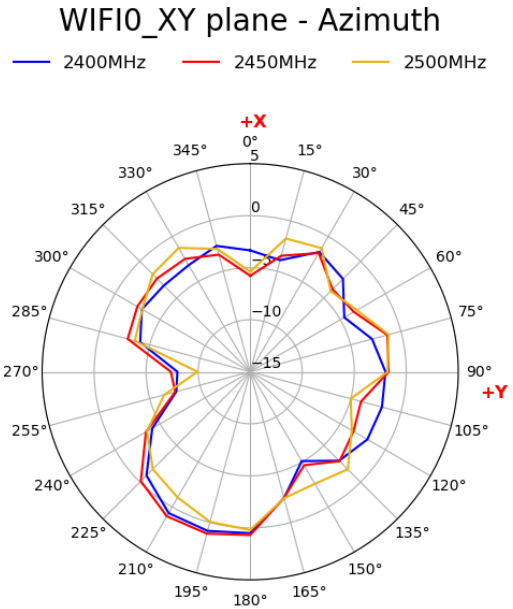


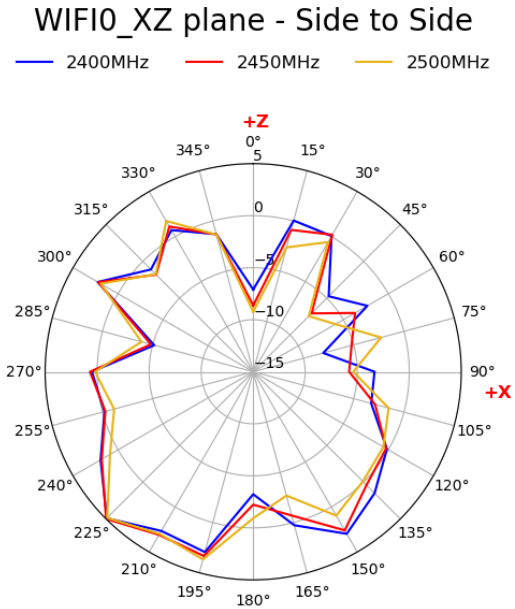


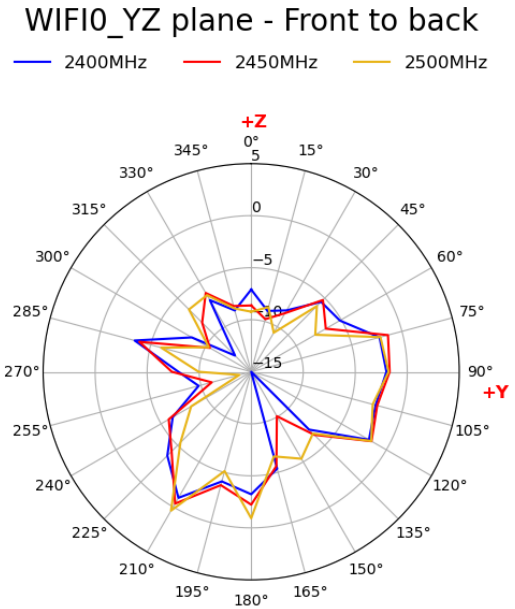
Peak Gain & Efficiency				
Frequency (MHz)	WIFI0		WIFI1	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
2400	64.76	4.9	76.95	2.68
2450	66.02	4.83	70.29	2.65
2500	64.57	4.85	66.42	2.94
5150	72.6	3.26	77.67	2.92
5350	74.11	3.8	71.2	3.54
5450	76.85	4.18	69.83	3.23
5650	70.73	3.74	71.72	2.85
5850	72.64	3.94	70.39	3.95

Appendix

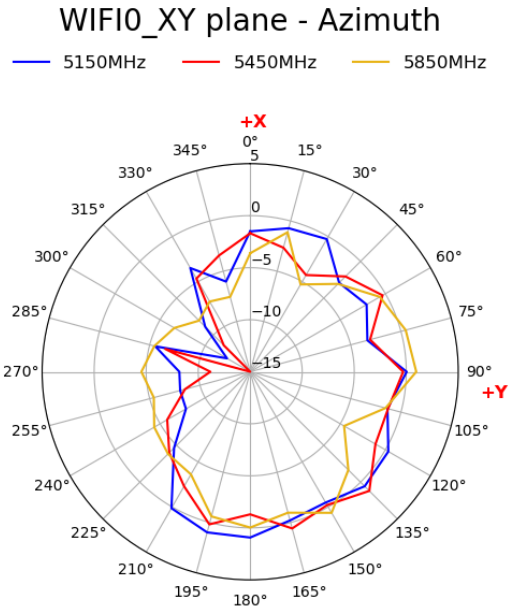
2D Radiation Pattern - WIFI0@2G

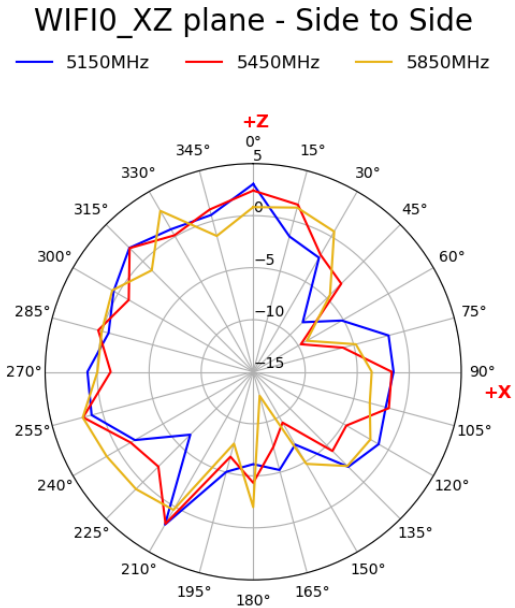


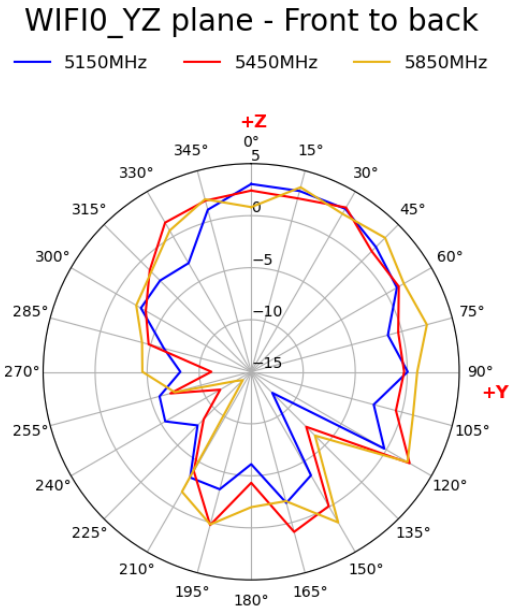




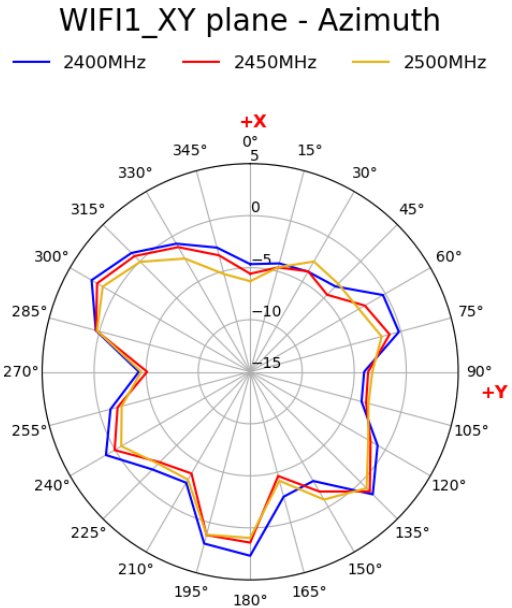
2D Radiation Pattern - WIFI0@5G

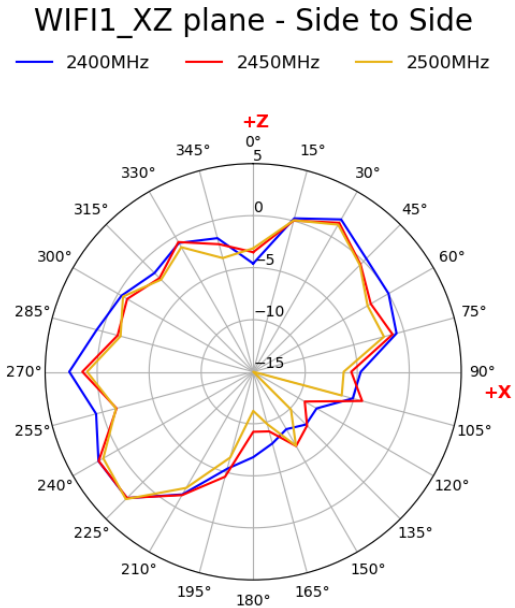


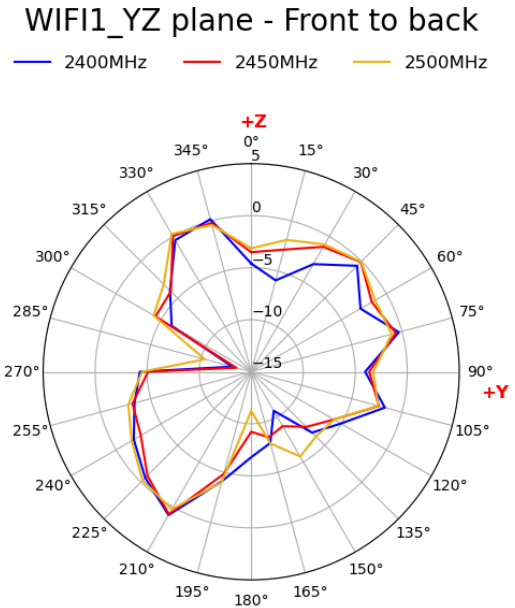




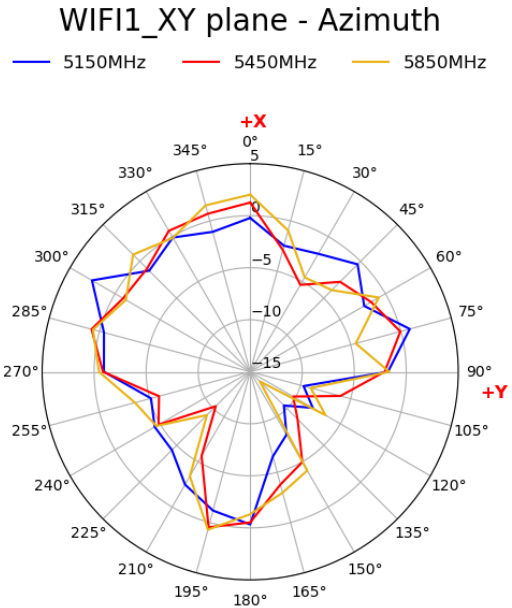
2D Radiation Pattern - WIFI1@2G

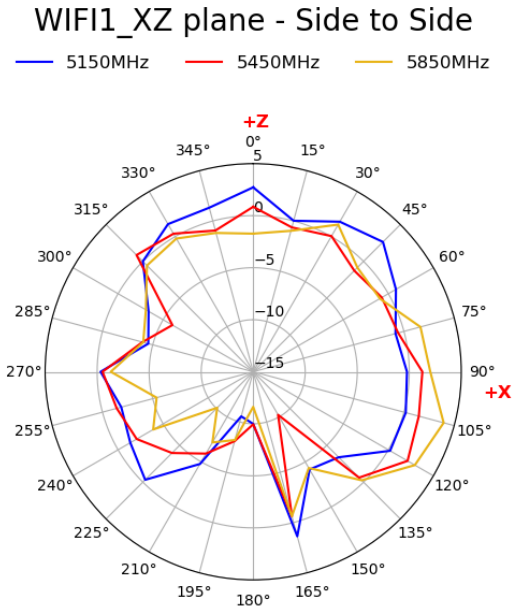


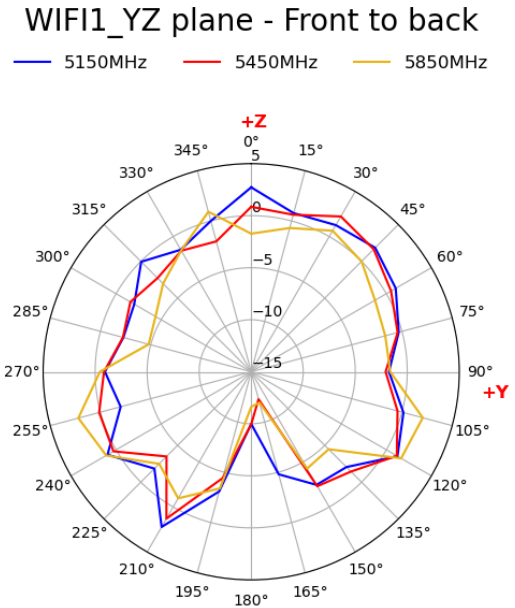




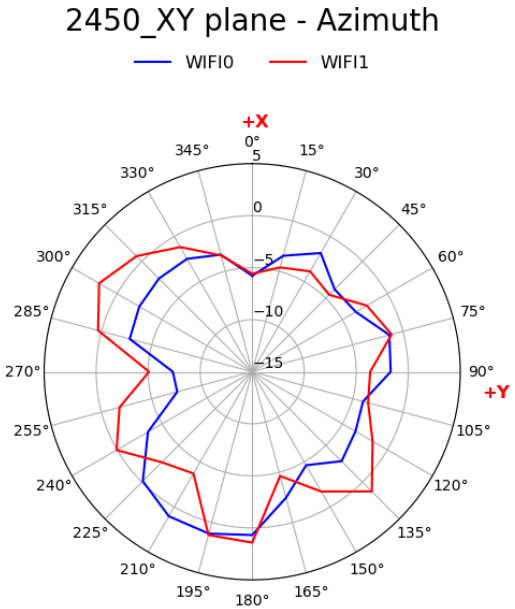
2D Radiation Pattern - WIFI1@5G

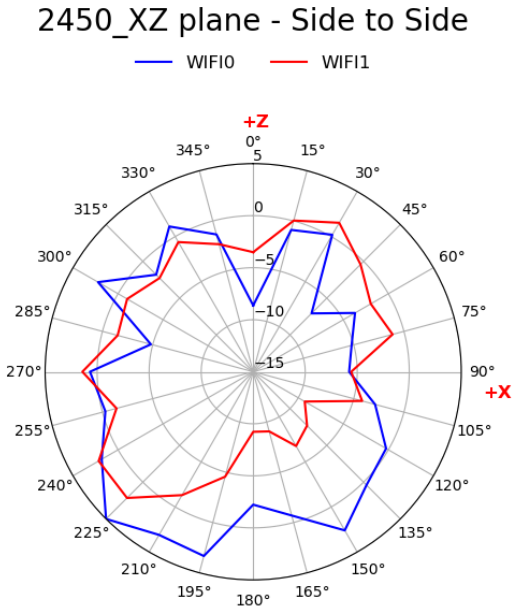


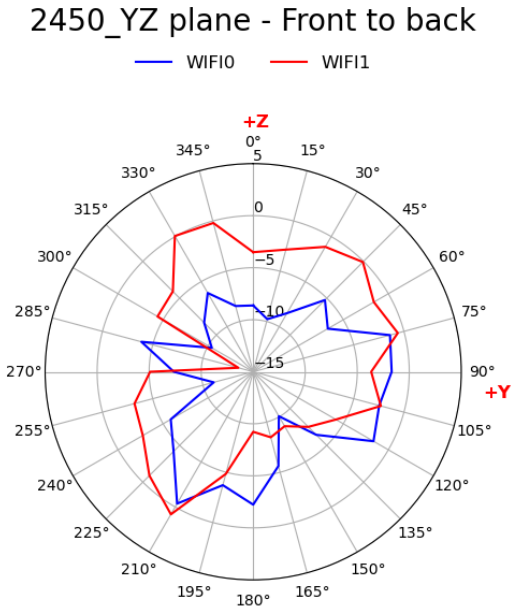




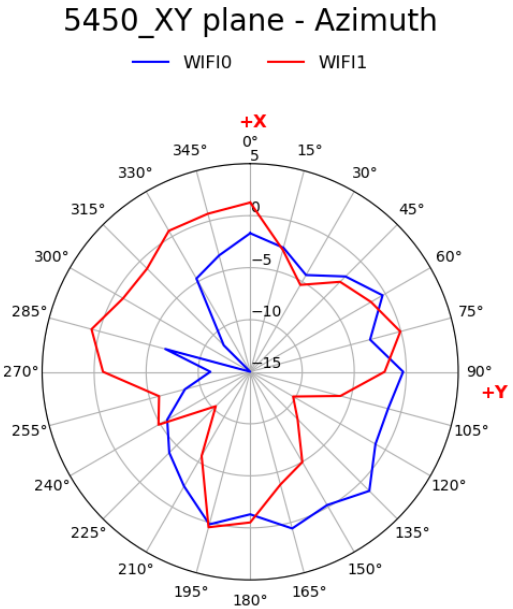
System Coverage - @2G

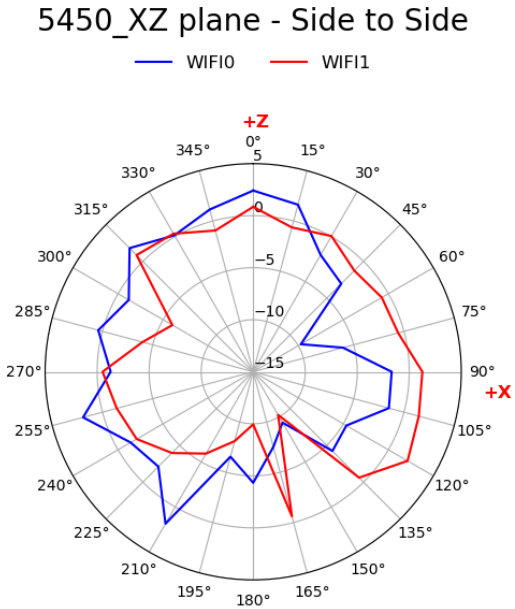


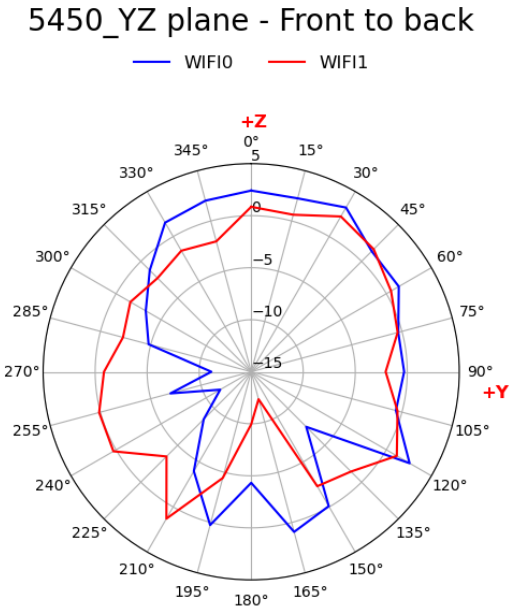




System Coverage - @5G







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