Altice Manhattan Antenna Test Report

May 22, 2025

Larry Jiang | Antenna Design Department

Sercomm Proprietary and Confidential

Introduction

- This report presents the passive antenna performance for Manhattan
- Sercomm integrated 8 antennas into the mockup

  3 WiFi DB antennas (2.4-2.5GHz and 5.15-5.85GHz band of operation)

  1 WiFi 5G antenna (5.15-5.85GHz band of operation)

  4 WiFi 6E antennas (5.925-7.125GHz Band of operation)

- Cable losses are included in the measurement data

Antenna Details

Item	Part number	Connector	Spec	Quantity	Polarization	Ant No.
1	617200AFIQ	U.FL	PCB 165mm BK	1	Linear	DB1
2	617200AEIQ	U.FL	PCB 60mm WH	1	Linear	DB2
3	617200ADIQ	U.FL	PCB 180mm GY	1	Linear	DB3
4	617200ACIQ	U.FL	PCB 250mm RD	1	Linear	5G1
5	617200ABIQ	U.FL	PCB 115mm BU	1	Linear	6G1
6	617200AAIQ	U.FL	PCB 125mm GN	1	Linear	6G2
7	617200A8IQ	U.FL	PCB 80mm YE	1	Linear	6G3
8	617200A9IQ	U.FL	PCB 60mm OG	1	Linear	6G4

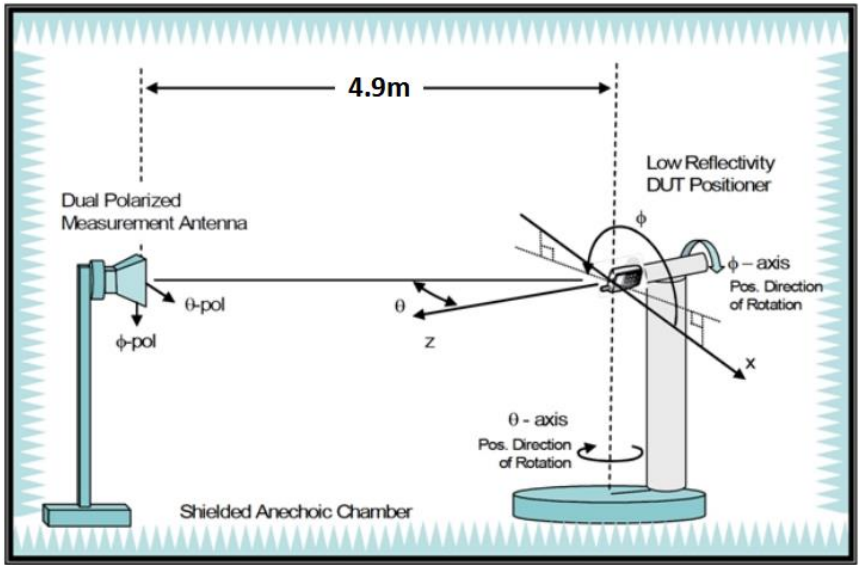
Ant No.	Operating Band	Type	Material	Feeding	Polarization
DB1~3	2400MHz ~ 2500MHz 5150MHz ~ 5850MHz	Dipole	PCB	Cable	Linear
6G1~4	5925MHz ~ 7125MHz	Dipole	PCB	Cable	Linear
5G1	5150MHz ~ 5850MHz	Dipole	PCB	Cable	Linear

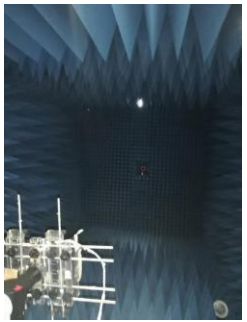
Test Information

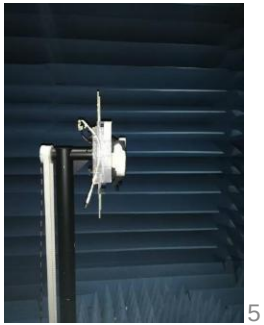
Item	Description
Brand Name	Altice
Equipment	Manhattan
Test Location	8F, No. 3-1, YuanQu St. Taipei, Taiwan 115 R.O.C.
Test Condition	Radiation
Test Engineer	Larry Jiang, Sercomm
Test Environment	ETS-Lindgren AMS-8500 Antenna Measurement Chamber
Test Date	May 20, 2025
Measurement control	EMQuest V1.09

Test Configuration

ETS-Lindgren AMS-8500 antenna measurement system with a size of 7.32(L) × 3.66(W) × 3.66(H) m^3 is used for antenna performance test, which is based on the great-circle test method defined by CTIA. The multi-axis positioning system (MAPS) rotates the DUT around two orthogonal axes for full spherical coverage.







ETS-Lindgren AMS-8500

ETS-LINDGREN
An ESCO Technologies Company

Final Proposal For:

Customer:	Sercomm Corporation
Product:	AMS-8500 Antenna Measurement System
Application:	Radiated Wireless Antenna Measurements over the frequency range from 700 MHz to 10 GHz
Proposal Number:	009-14-0078183R3
Submission Date:	11,June, 2014

CTIA Authorized Test Lab
Lab Code: 20021212-00

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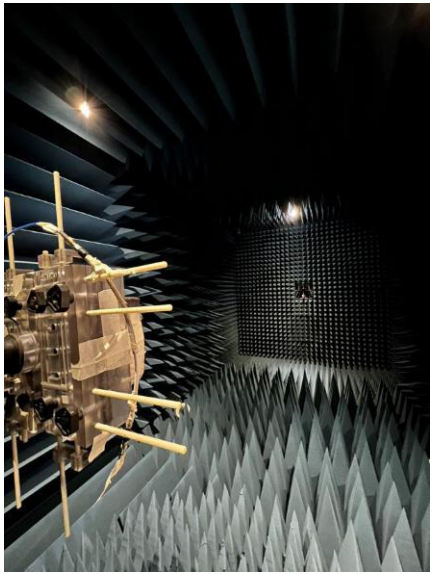
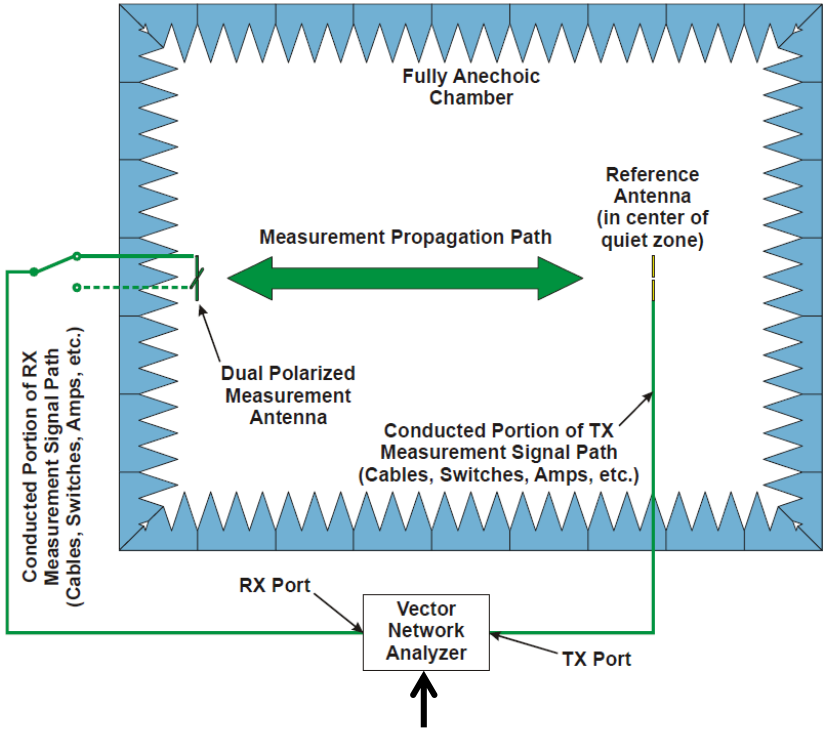
Test Setup & Procedure

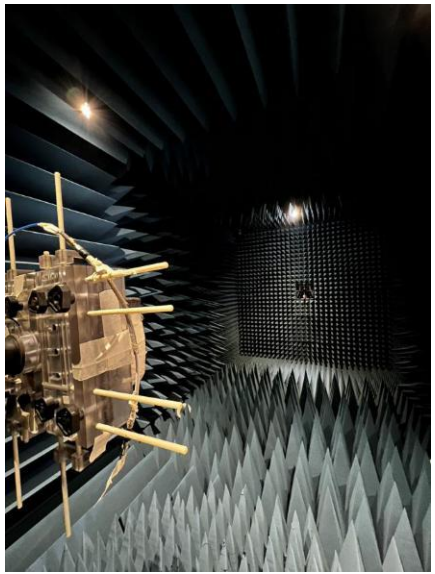
1. Fix the DUT on the dielectric support structure and connect the feeding cable to the antenna used for test
2. Set measurement parameters such as frequency range and sampling angle
3. Perform test and then get far-field data (radiation pattern, gain, efficiency)
4. Repeat test procedure for other antennas



Test Equipment & Calibration

Network analyzer and reference antennas are used for calibration. Path loss and cable loss for different frequency bands can be checked and calculated.

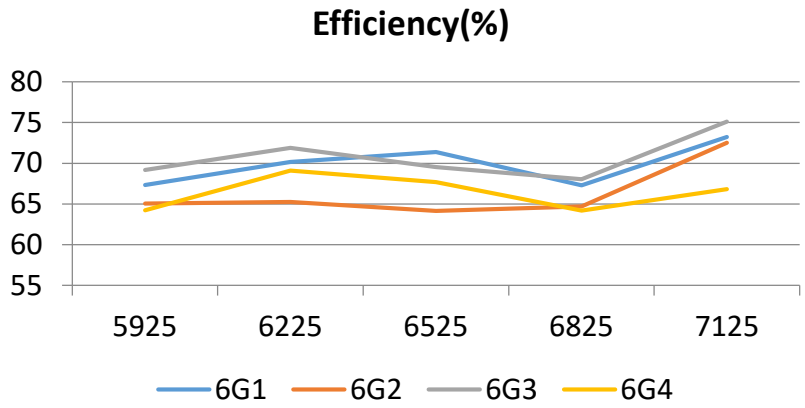




Test Equipment & Calibration

Instrument	Brand	Characteristics	Model No.	Serial No.	Calibration Date	Calibration Due Date
Precision Sleeve Dipole	ETS-Lindgren	700 MHz ~ 900 MHz	3126-700	00169715	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	900 MHz ~ 1000 MHz	3126-900	00169592	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	1400 MHz ~ 1700 MHz	3126-1550	00164599	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	1700 MHz ~ 2000 MHz	3126-1850	00169588	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	2000 MHz ~ 2300 MHz	3126-2150	00169593	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	2300 MHz ~ 2700 MHz	3126-2500	00169597	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	3000 MHz ~ 4000 MHz	3126-3500	00239652	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	4000 MHz ~ 5000 MHz	3126-4500	00239796	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	5000 MHz ~ 6000 MHz	3126-5500	00169728	Nov. 21, 2024	Nov. 21, 2025
Precision Sleeve Dipole	ETS-Lindgren	6000 MHz ~ 7200 MHz	3126-6500	00235488	Nov. 21, 2024	Nov. 21, 2025
Horn Antenna	SCHWARZBECK	1 GHz ~ 18 GHz	BBHA 9120D	BBHA 9120D-1294	Sep. 7, 2024	Sep. 7, 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

Peak Gain & Efficiency



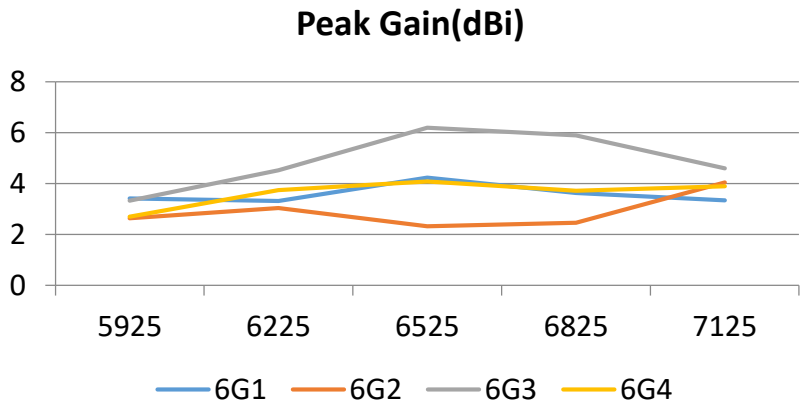
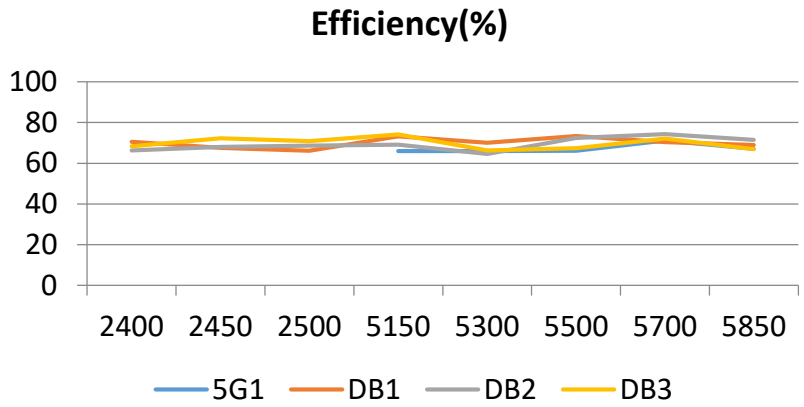


Table 1								
Frequency (MHz)	6G1		6G2		6G3		6G4	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
5925	67.32	3.42	65.06	2.64	69.16	3.33	64.23	2.7
6225	70.15	3.32	65.24	3.04	71.89	4.52	69.08	3.74
6525	71.39	4.23	64.13	2.32	69.51	6.19	67.7	4.08
6825	67.3	3.63	64.69	2.46	68.04	5.89	64.2	3.72
7125	73.24	3.34	72.53	4.04	75.12	4.6	66.83	3.89

Peak Gain & Efficiency



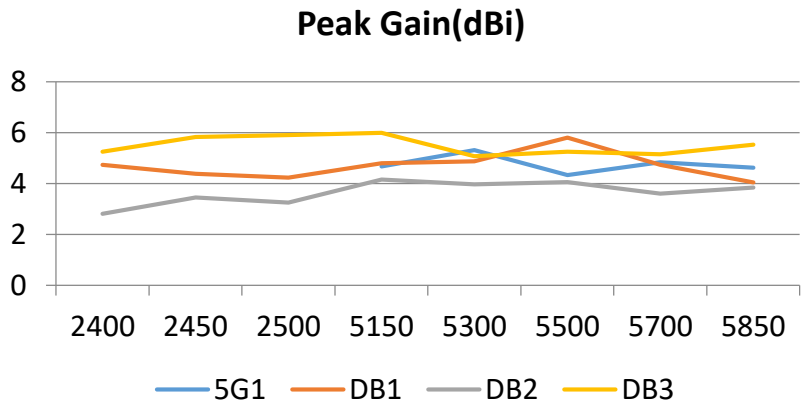


Table 2

Frequency (MHz)	5G1		DB1		DB2		DB3	
	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)	Efficiency (%)	Peak Gain (dBi)
2400			70.5	4.74	66.29	2.81	68.32	5.25
2450			67.61	4.38	67.97	3.46	72.28	5.83
2500			66.12	4.24	68.7	3.25	70.87	5.91
5150	65.93	4.67	73.16	4.8	69.12	4.16	74.08	5.98
5300	66.03	5.32	70.04	4.87	64.56	3.97	66.32	5.08
5500	66.2	4.34	73.43	5.81	72.43	4.06	67.41	5.25
5700	71.14	4.84	70.43	4.74	74.22	3.61	72.15	5.15
5850	67.07	4.63	68.88	4.05	71.5	3.84	66.93	5.53

Result Summary - Correlated Gain

Frequency (MHz)	Correlated Gain (dBi)
2400	3.17
2450	3.23
2500	4.22

Frequency (MHz)	Correlated Gain (dBi)
5150	6.00
5300	5.83
5500	5.82
5700	5.97
5850	5.98

Frequency (MHz)	Correlated Gain (dBi)
5925	4.48
6225	5.16
6525	6.20
6825	5.45
7125	5.66

Directional Gain Calculation

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: 4.22dBi
= $10*\log(((10^{(G0/20)}+10^{(G1/20)}+10^{(G2/20)})^2)/3)$
= $10*\log(((10^{(-9.18/20)}+10^{(1.47/20)}+10^{(2.17/20)})^2)/3)$

This occurs at: 2500MHz, phi 195/theta 45

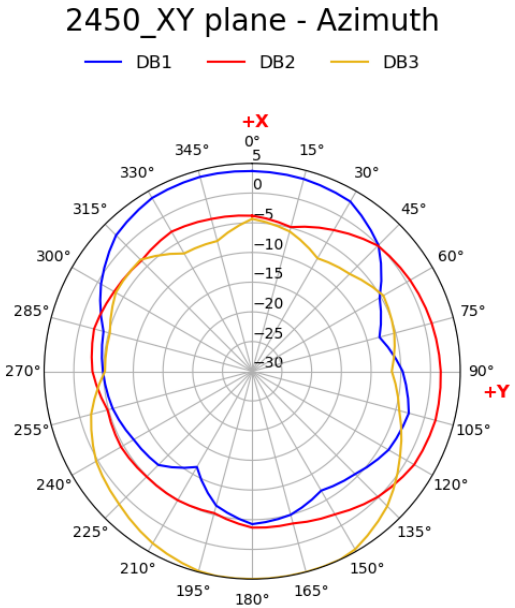
5GHz correlated calculation:
Maximum correlated gain: 6dBi
= $10*\log(((10^{(G0/20)}+10^{(G1/20)}+10^{(G2/20)}+10^{(G3/20)})^2)/4)$
= $10*\log(((10^{(-0.07/20)}+10^{(-2.47/20)}+10^{(3.48/20)}+10^{(-2.47/20)})^2)/4)$

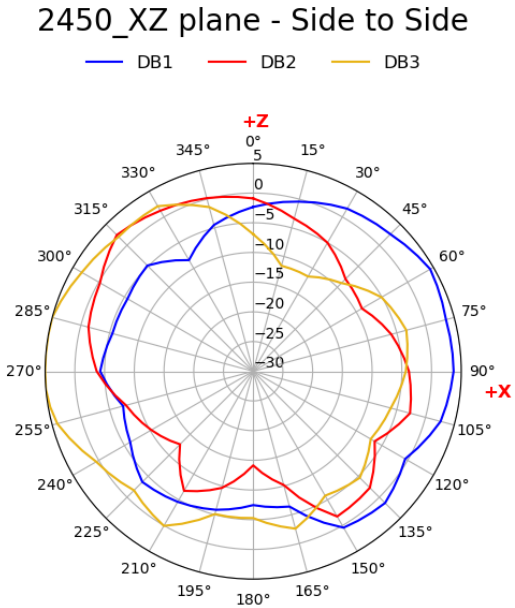
This occurs at: 5150MHz, phi 225/theta 10

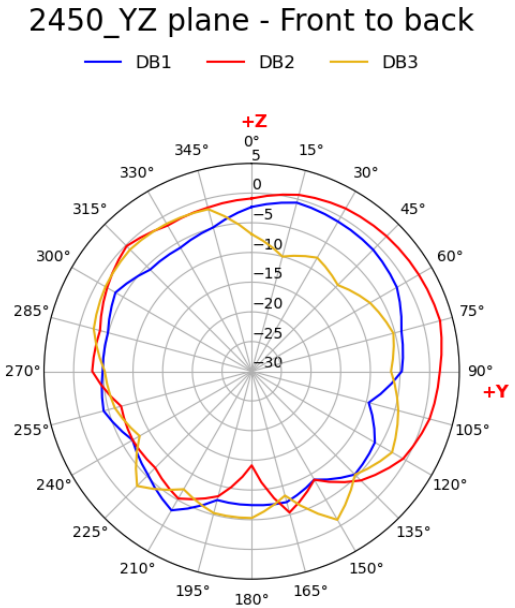
6GHz correlated calculation:
Maximum correlated gain: 6.2dBi
= $10*LOG(((10^{(G0/20)}+10^{(G1/20)}+10^{(G2/20)}+10^{(G3/20)})^2)/4)$
= $10*LOG(((10^{(-0.76/20)}+10^{(-2.5/20)}+10^{(5.77/20)}+10^{(-6.52/20)})^2)/4)$

This occurs at: 6525MHz, phi 210/theta 15

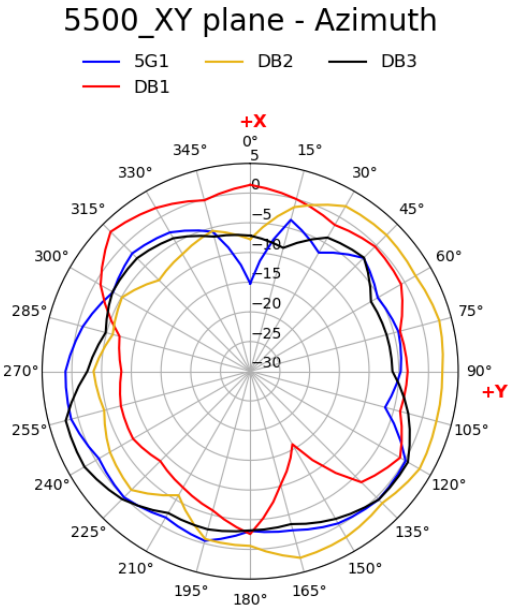
System Coverage - WiFi @2G

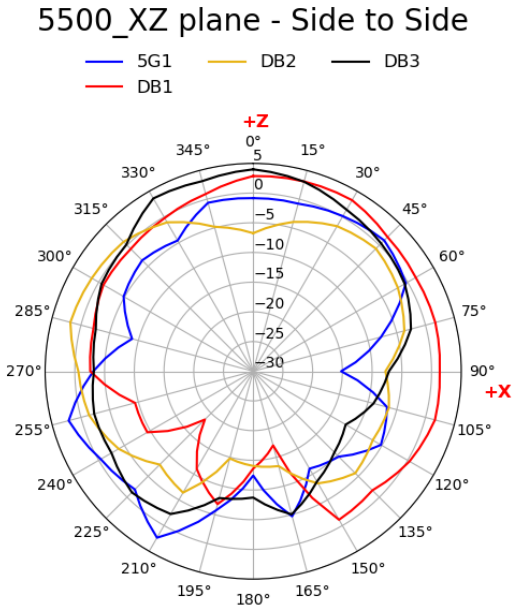


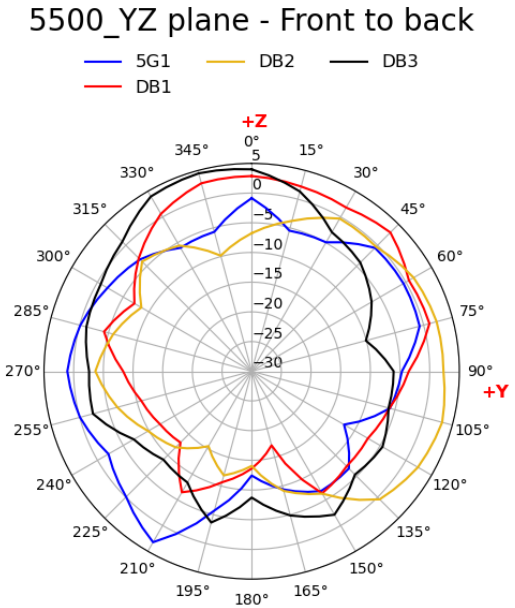




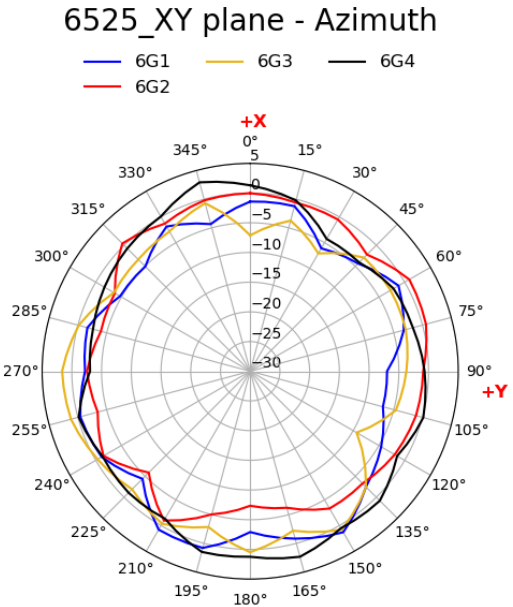
System Coverage - WiFi @5G

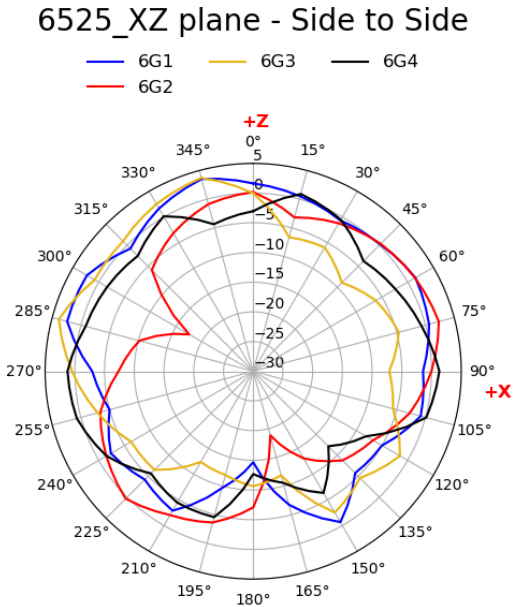


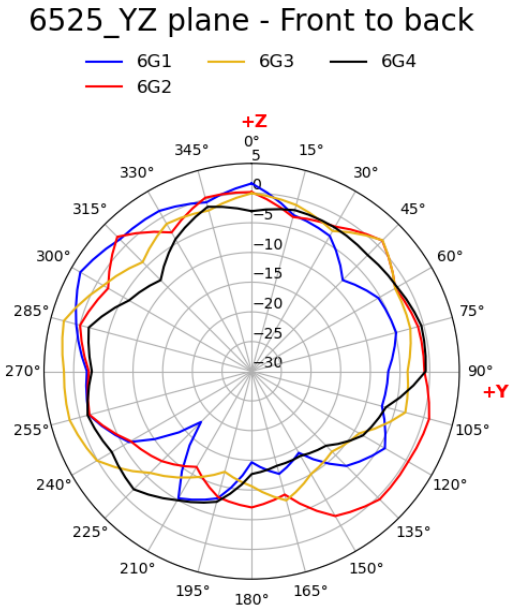




System Coverage - WiFi @6G







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