

LYNwave Technology

Antenna & Thermal solution provider

Antenna Field Test Report

Company:

Project Name:

Model Name:

Feature:

Application:

Alarm

V730

WiFi Dual band *2, LoRa*1

Camera

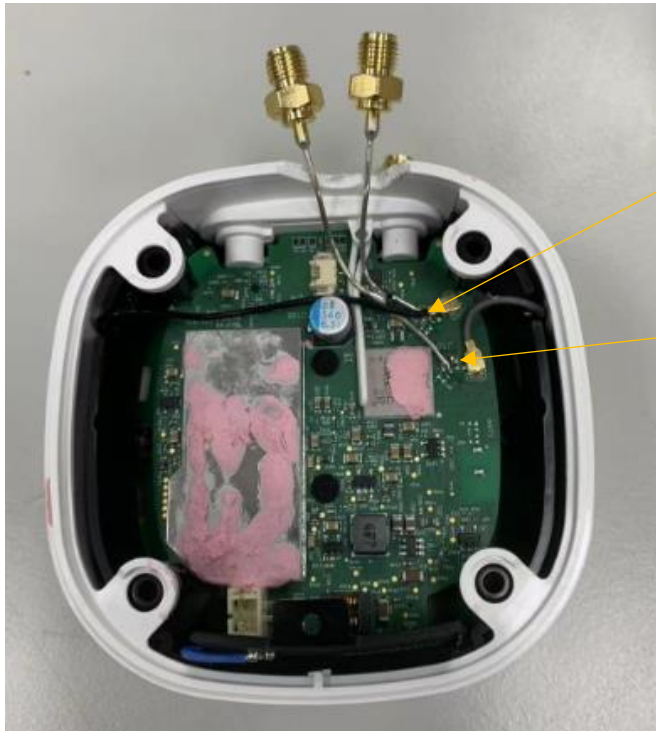
Date	Owner	Revision
2023/10/13	Zino	1. S2-1, Field test
2023/11/01	Zino	1. S2-2, Field test
2023/12/19	Zino	1. S2-3, Field test
2024/03/20	Zino	1. S3-1, Field test
2024/04/10	Zino	1. S3-2, Update Power Cable routing
2024/05/20	Zino	1. S3-3, Add Heat Sink
2024/06/06	Zino	1. S3-4, Field test
2024/06/19	Zino	1. S3-5, Rigid cable test from system level
2024/07/17	Zino	1. S3-6, Rigid cable test from system level
2024/09/30	Jason	1. S3-7, Rigid cable test from system level
2024/10/04	Jason	1. S3-8, Rigid cable test from system level
2024/10/09	Zino	1. S3-9, Rigid cable test from system level

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Measuring Point

Ant.1 & Ant.2 Measure Point (WiFi)



Ant.1 Measuring Point

Ant.2 Measuring Point

Ant.3 Measure Point (LoRa)

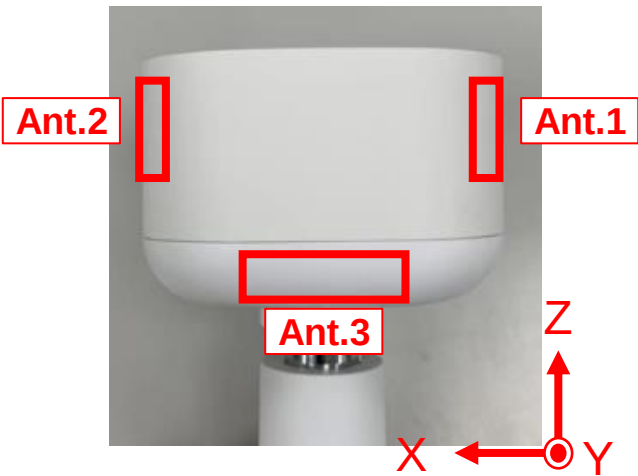


Ant.3 Measuring Point

Antenna Placement

Antenna	Description	Frequency(MHz)
Ant.1	Dual Band	2400~2500 5150~5850
Ant.2	Dual Band	2400~2500 5150~5850
Ant.3	LoRa	865~928

Front View



Rigid cable for system level tests

Ant.1



Ant.2



Ant.3



Equipment :
Satimo

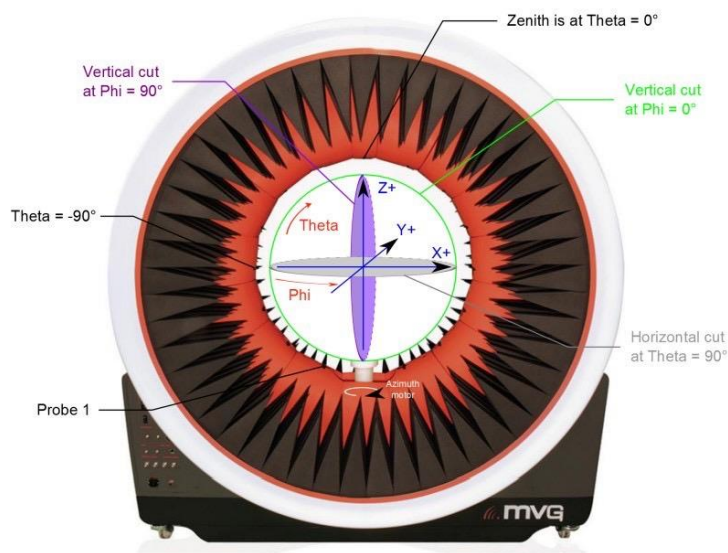
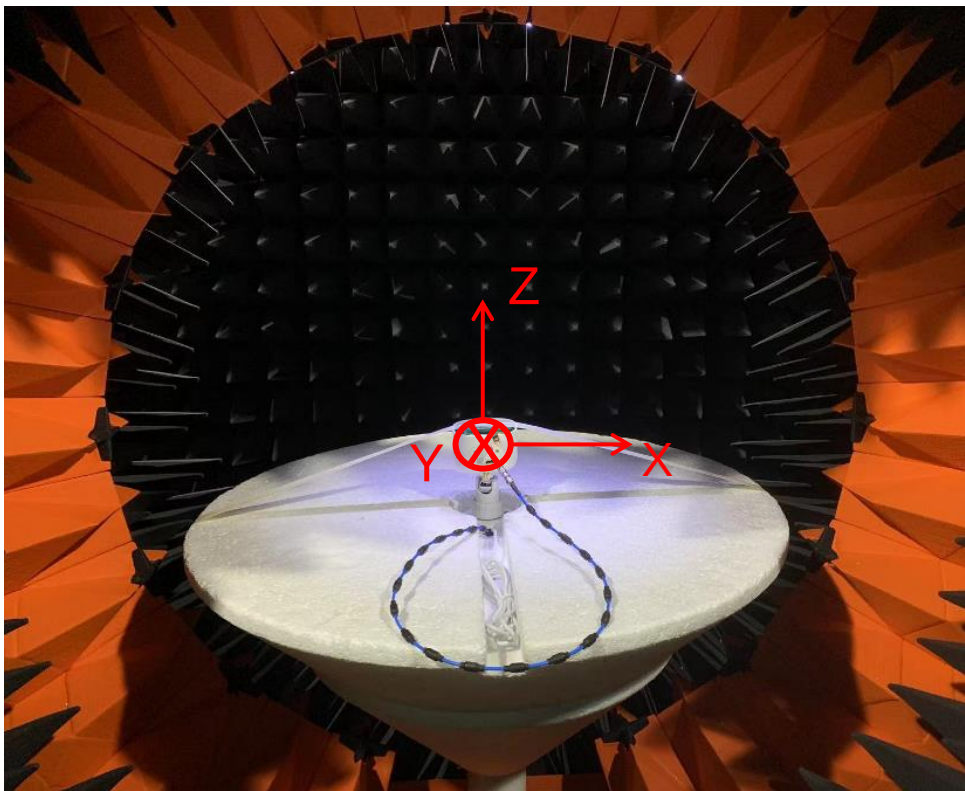


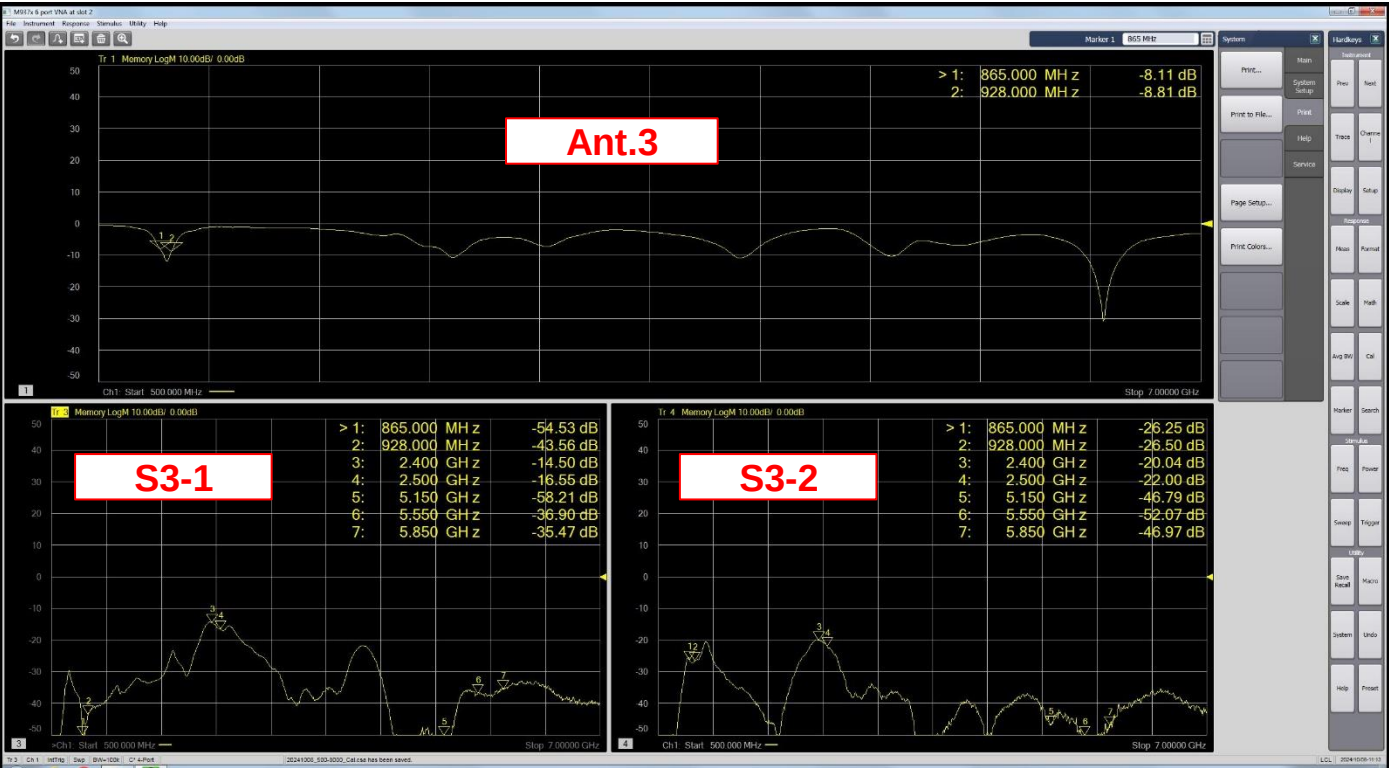
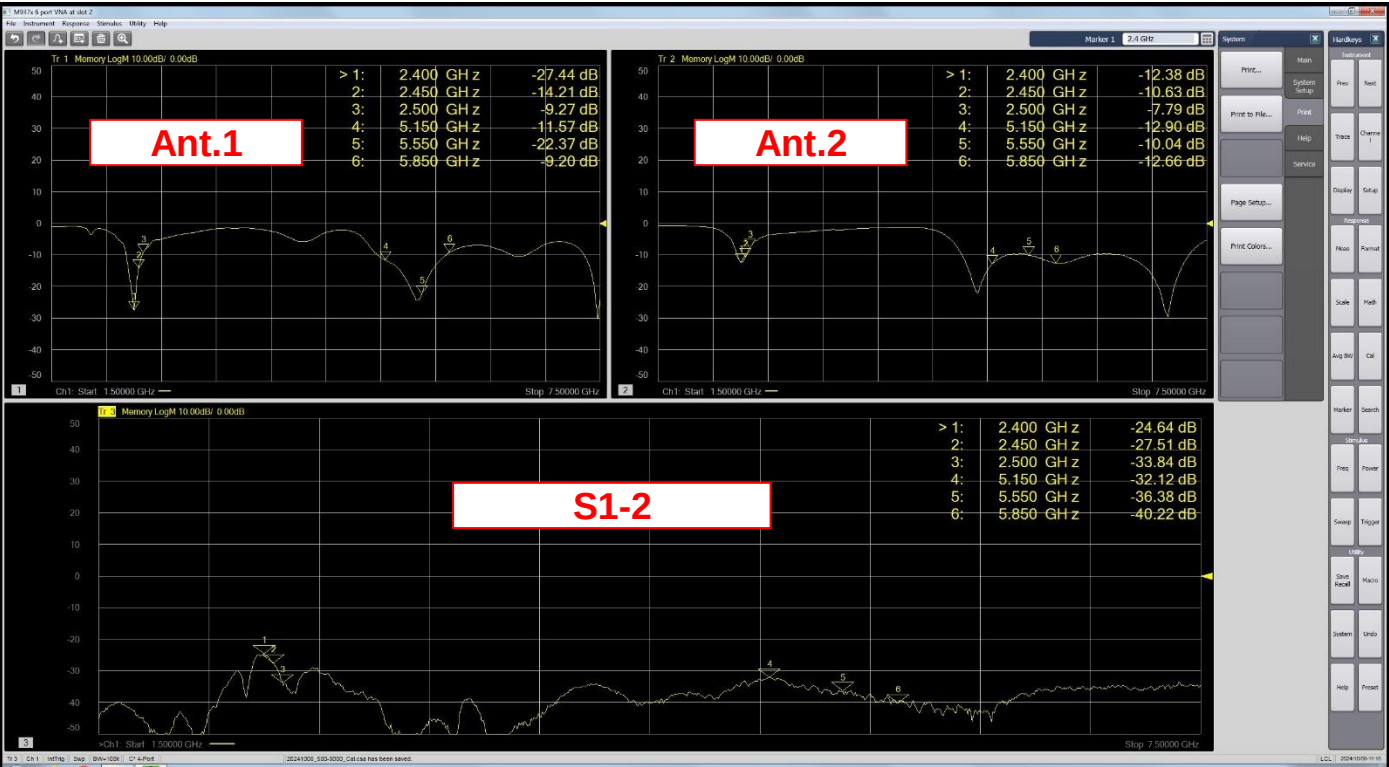
Figure 3.12: StarLab spherical coordinate system





The line goes to the left

S-parameters



Gain Table

	Frequency(MHz)	2400	2450	2500	5150	5350	5550	5750	5850
Ant.1	Peak Gain(dBi)	3.0	3.1	2.9	5.2	5.3	5.0	4.0	3.9
	Efficiency(%)	64	62	58	73	76	78	73	69
Ant.2	Peak Gain(dBi)	4.2	4.0	3.5	4.7	4.5	3.9	3.9	3.8
	Efficiency(%)	67	66	61	73	71	73	77	77

	Frequency(MHz)	865	902	928
Ant.3	Peak Gain(dBi)	-0.4	-0.4	-0.5
	Efficiency(%)	41	43	40

The antenna characteristics

	Ant.1	Ant.2
Return Loss – 2G	< -9dB	< -7dB
Return Loss – 5G	< -9dB	< -10dB
Isolation – 2G	< -20dB	< -20dB
Isolation – 5G	< -25dB	< -25dB
Efficiency – 2G	> 55%	> 60%
Efficiency – 5G	> 65%	> 70%
Peak Gain – 2G	3.0 – 3.4dBi	3.5 – 4.2dBi
Peak Gain – 5G	3.9 – 5.3dBi	3.8 – 4.7dBi

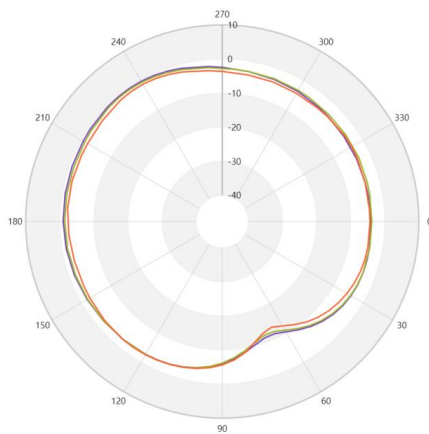
	Ant.3
Return Loss	< -7dB
Isolation – LoRa	< -20dB
Isolation – 2G	< -14dB
Isolation – 5G	< -25dB
Efficiency	> 40%
Peak Gain	-0.4 – -0.5dBi

Ant.1_2GHz 2D Radiation Pattern

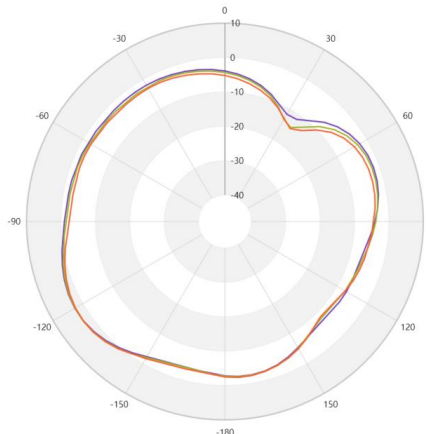
Frequency(MHz) : 2400~2500

Radiation Pattern :

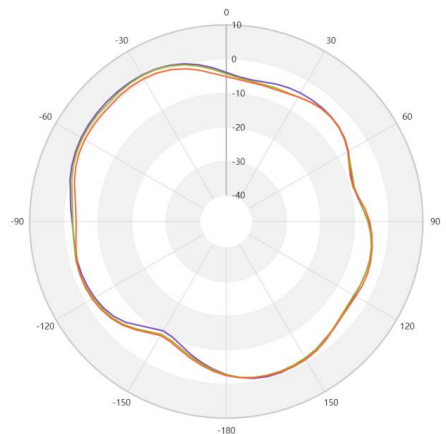
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0

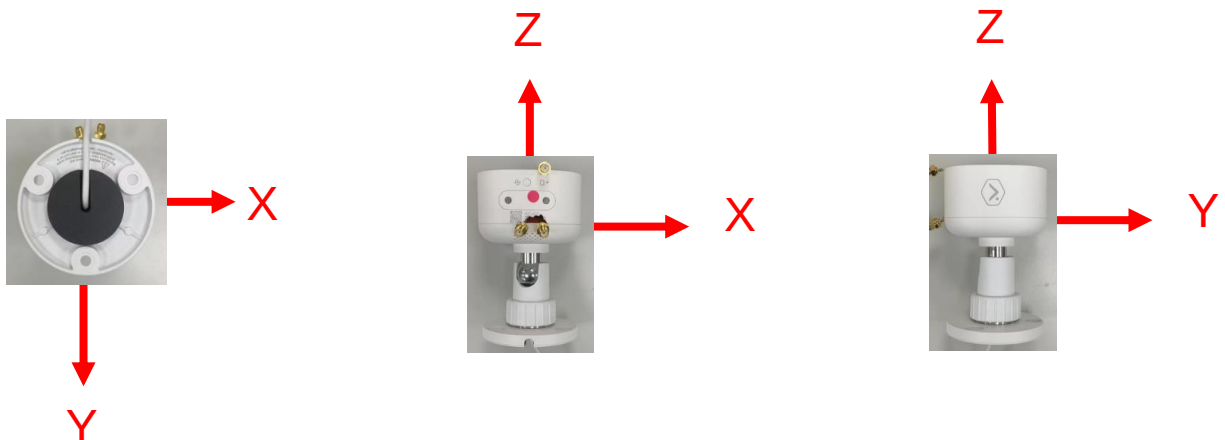


Elevation Plane
phi = 90



— 2400.00 MHz
— 2450.00 MHz
— 2500.00 MHz

Setup :

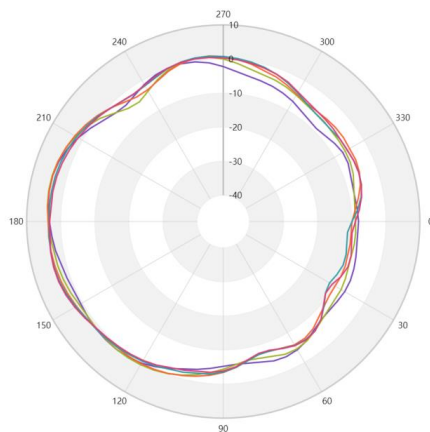


Ant.1_5GHz 2D Radiation Pattern

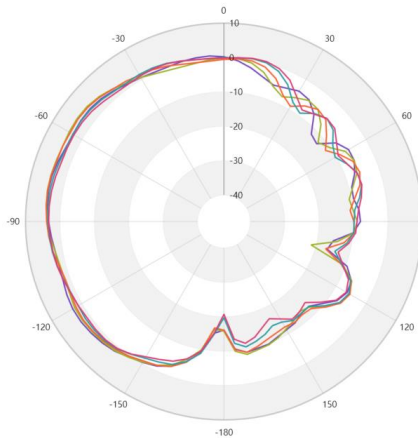
Frequency(MHz) : 5150~5850

Radiation Pattern :

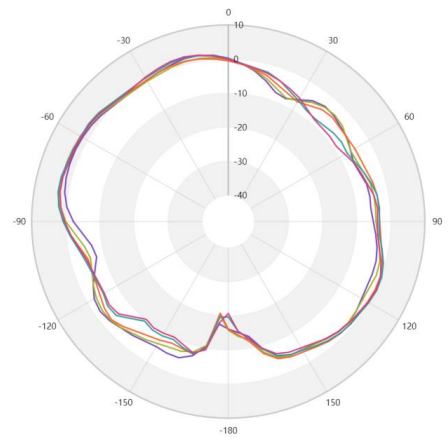
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0



Elevation Plane
phi = 90



— 5150.00 MHz
— 5350.00 MHz
— 5550.00 MHz
— 5750.00 MHz
— 5850.00 MHz

Setup :



Y

X



Z

X



Z

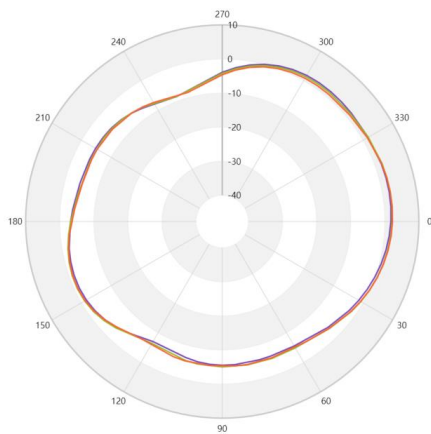
Y

Ant.2_2GHz 2D Radiation Pattern

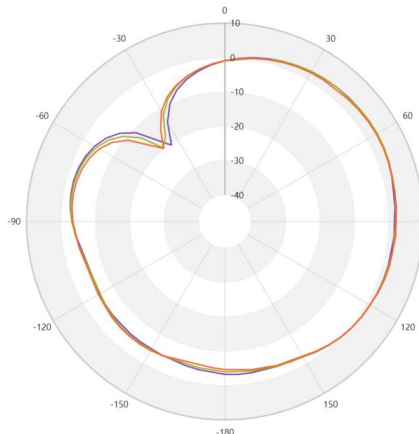
Frequency(MHz) : 2400~2500

Radiation Pattern :

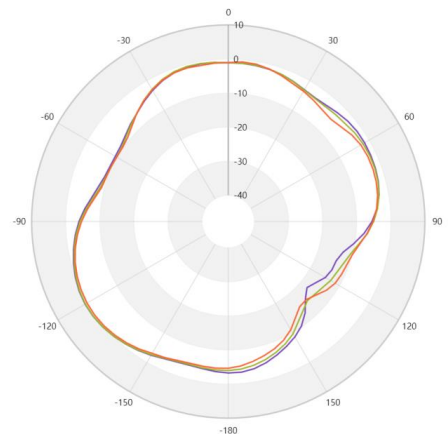
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0

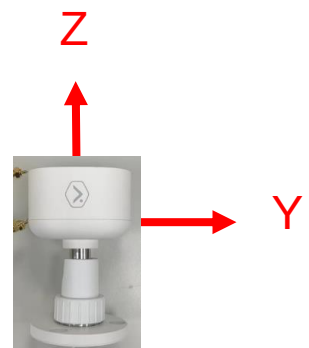
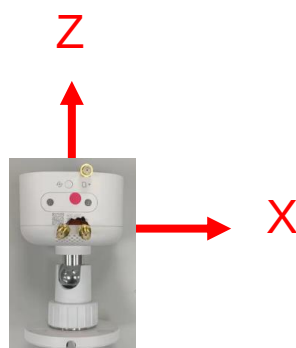
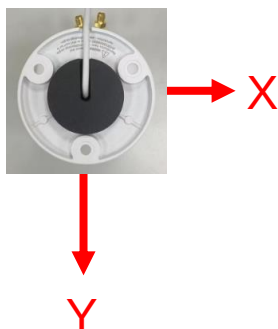


Elevation Plane
phi = 90



— 2400.00 MHz
— 2450.00 MHz
— 2500.00 MHz

Setup :

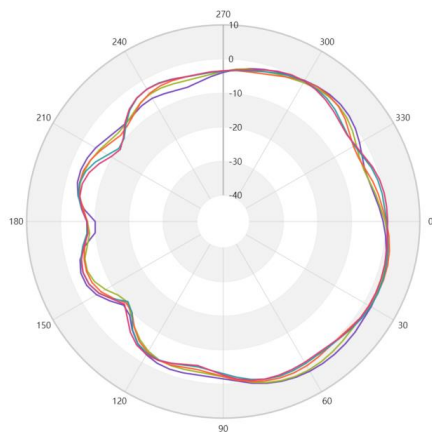


Ant.2_5GHz 2D Radiation Pattern

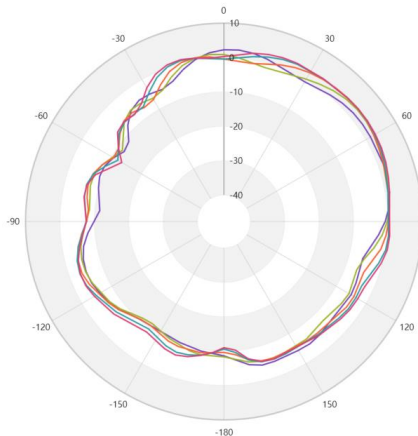
Frequency(MHz) : 5150~5850

Radiation Pattern :

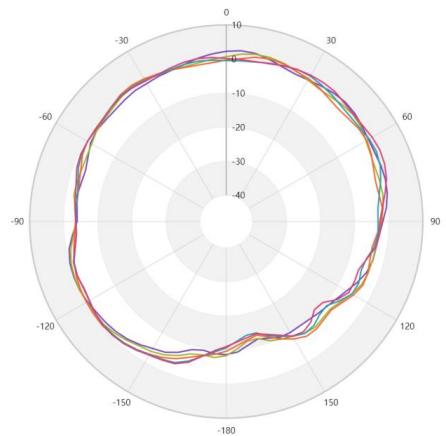
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0



Elevation Plane
phi = 90



— 5150.00 MHz
— 5350.00 MHz
— 5550.00 MHz
— 5750.00 MHz
— 5850.00 MHz

Setup :



Y

X



Z

X



Z

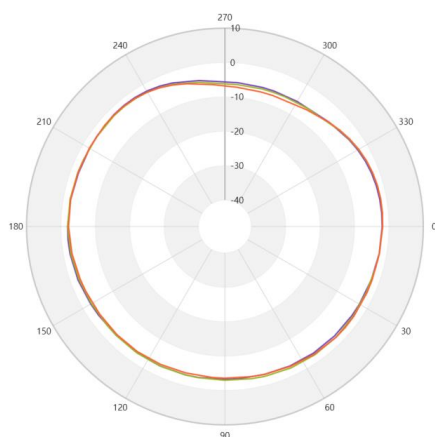
Y

Ant.3_2D Radiation Pattern

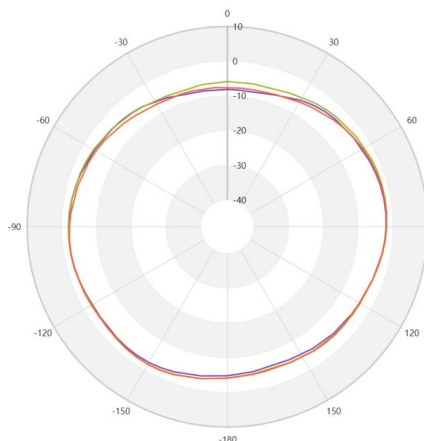
Frequency(MHz) : 865~928

Radiation Pattern :

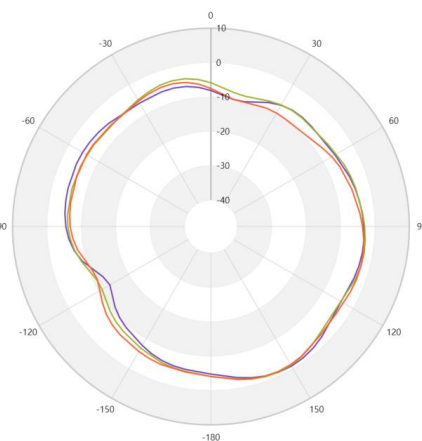
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0



Elevation Plane
phi = 90



— 865.00 MHz
— 902.00 MHz
— 928.00 MHz

Setup :



Y

X



Z

X



Z

Y

Combine 2D Radiation Pattern

Frequency(MHz) : 2450/5550

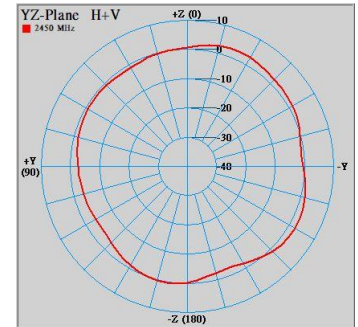
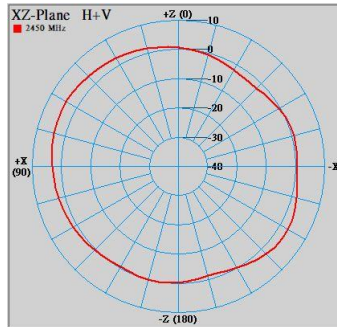
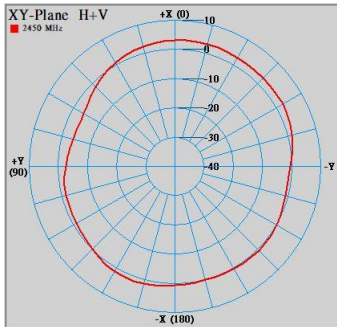
Radiation Pattern :

Azimuth Plane
Theta = 90

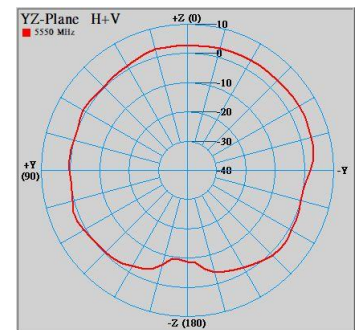
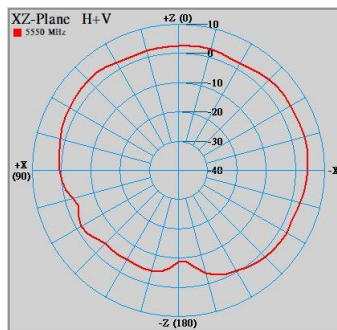
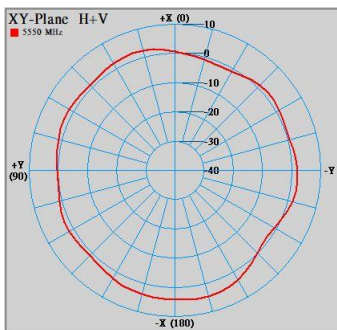
Elevation Plane
phi = 0

Elevation Plane
phi = 90

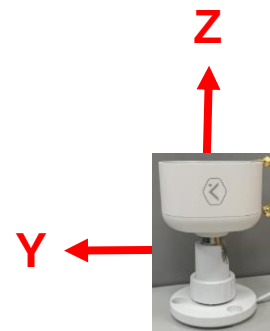
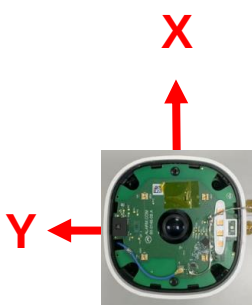
2G



5G



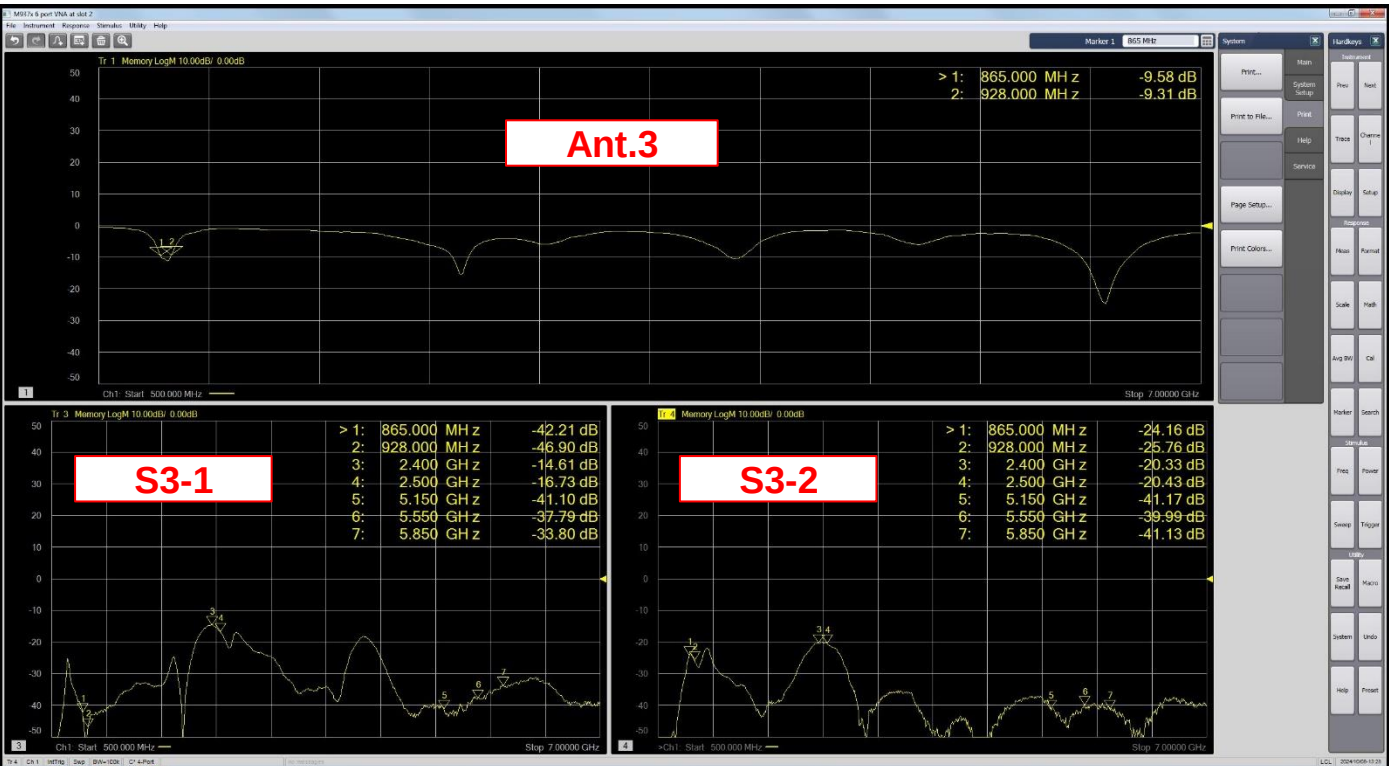
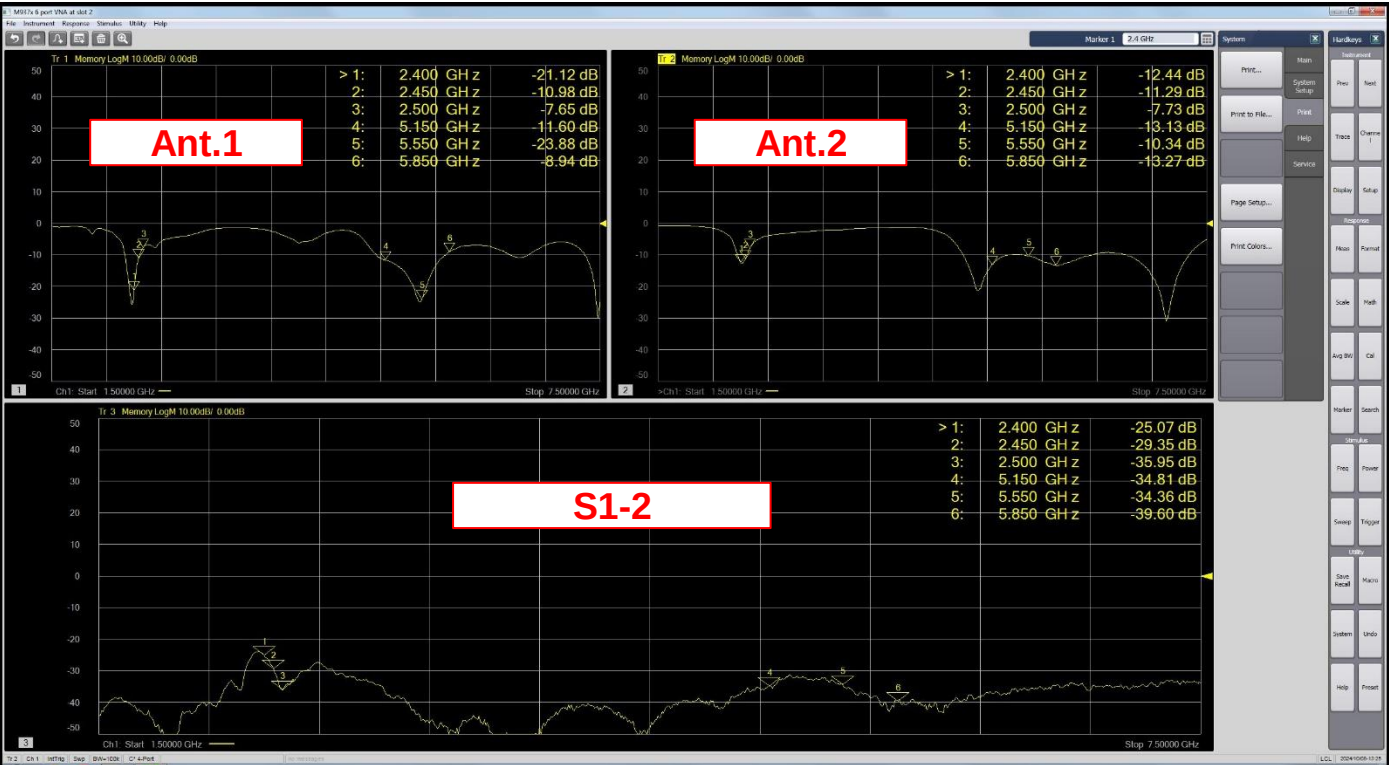
Setup :





The line goes to the right

S-parameters



Gain Table

	Frequency(MHz)	2400	2450	2500	5150	5350	5550	5750	5850
Ant.1	Peak Gain(dBi)	2.8	2.6	2.3	4.8	4.7	4.7	4.5	3.9
	Efficiency(%)	65	57	47	72	76	79	74	69
Ant.2	Peak Gain(dBi)	4.2	4.2	3.7	4.7	4.2	3.8	4.0	4.0
	Efficiency(%)	67	68	63	75	70	72	75	76

	Frequency(MHz)	865	902	928
Ant.3	Peak Gain(dBi)	-0.1	-0.4	-0.9
	Efficiency(%)	40	46	41

The antenna characteristics

	Ant.1	Ant.2
Return Loss – 2G	< -7dB	< -7dB
Return Loss – 5G	< -8dB	< -10dB
Isolation – 2G	< -20dB	< -20dB
Isolation – 5G	< -25dB	< -25dB
Efficiency – 2G	> 45%	> 60%
Efficiency – 5G	> 65%	> 70%
Peak Gain – 2G	2.3 – 2.8dBi	3.7 – 4.2dBi
Peak Gain – 5G	3.9 – 4.8dBi	3.8 – 4.7dBi

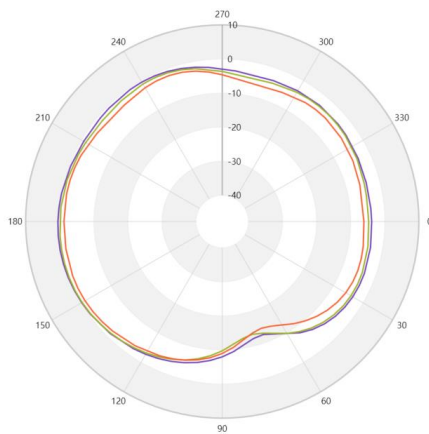
	Ant.3
Return Loss	< -7dB
Isolation – LoRa	< -20dB
Isolation – 2G	< -14dB
Isolation – 5G	< -25dB
Efficiency	> 40%
Peak Gain	-0.1 – -0.9dBi

Ant.1_2GHz 2D Radiation Pattern

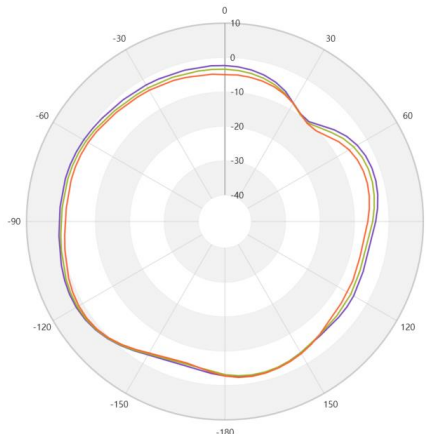
Frequency(MHz) : 2400~2500

Radiation Pattern :

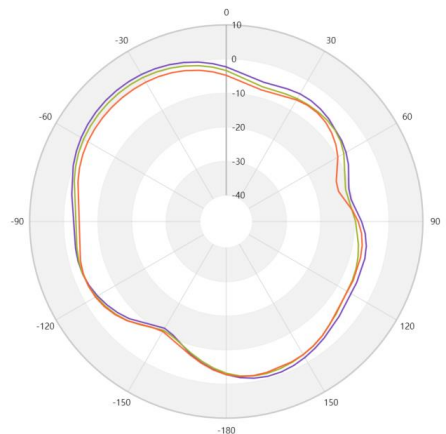
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0

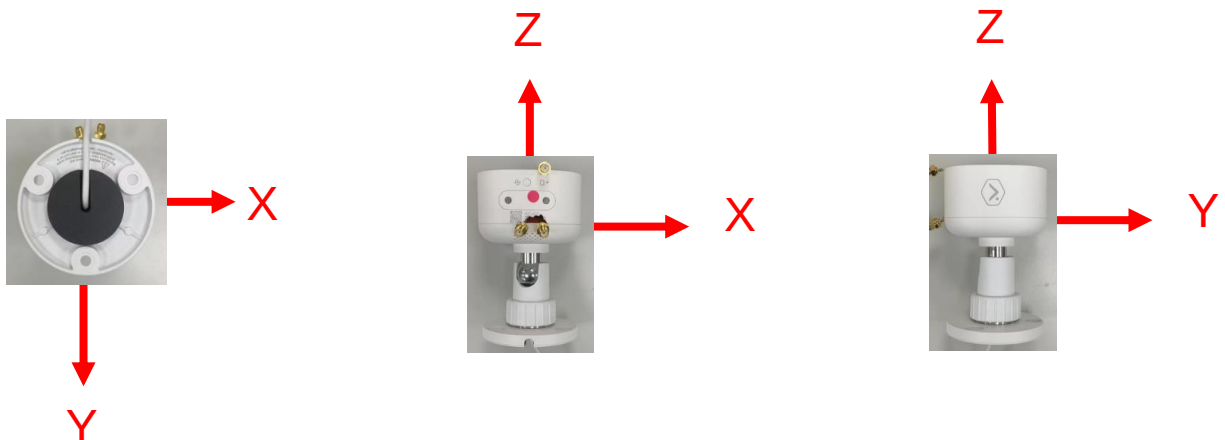


Elevation Plane
phi = 90



— 2400.00 MHz
— 2450.00 MHz
— 2500.00 MHz

Setup :

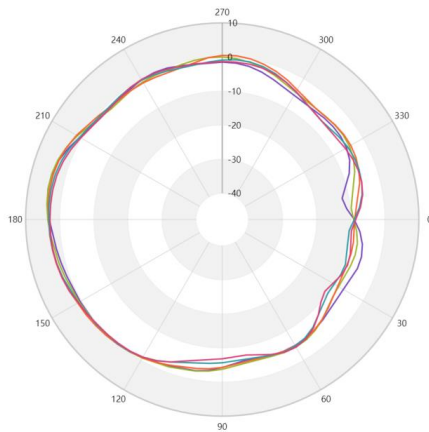


Ant.1_5GHz 2D Radiation Pattern

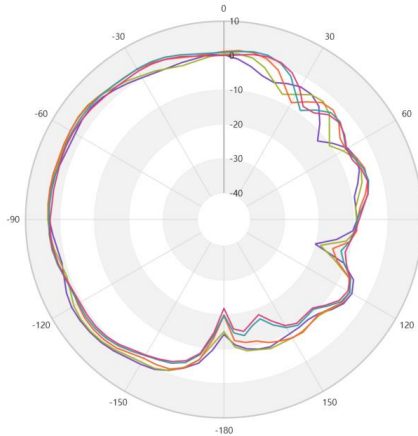
Frequency(MHz) : 5150~5850

Radiation Pattern :

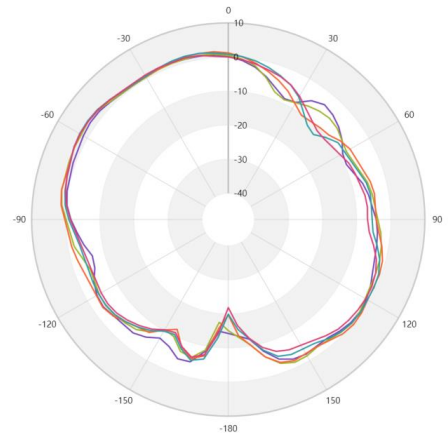
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0

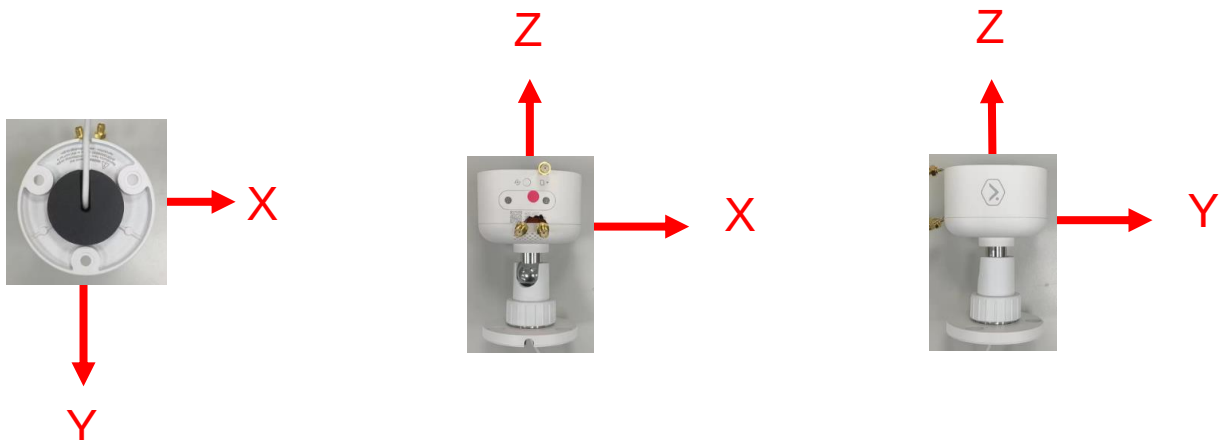


Elevation Plane
phi = 90



— 5150.00 MHz
— 5350.00 MHz
— 5550.00 MHz
— 5750.00 MHz
— 5850.00 MHz

Setup :

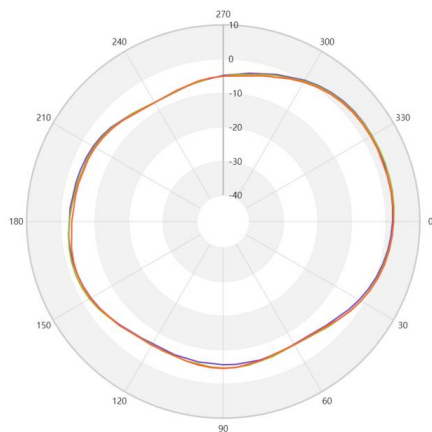


Ant.2_2GHz 2D Radiation Pattern

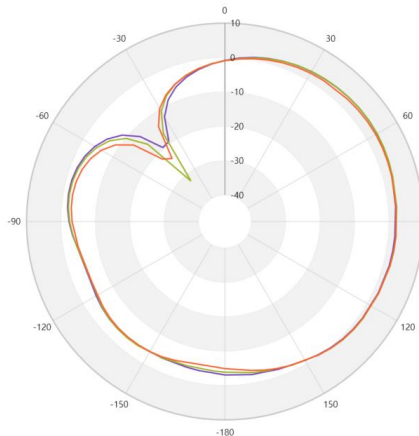
Frequency(MHz) : 2400~2500

Radiation Pattern :

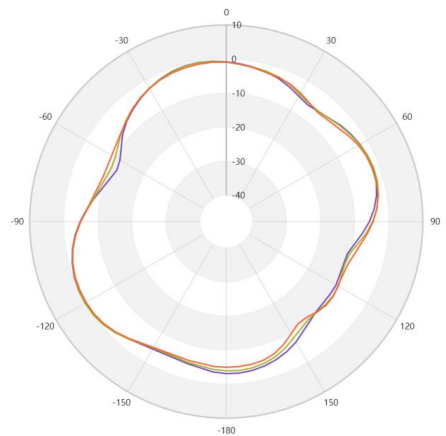
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0

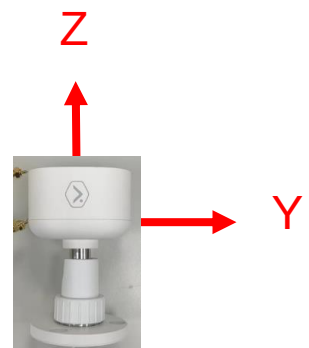
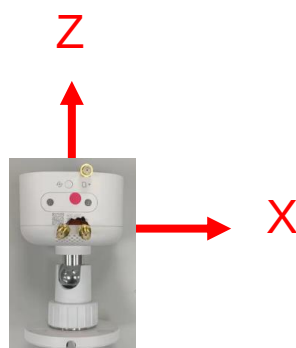
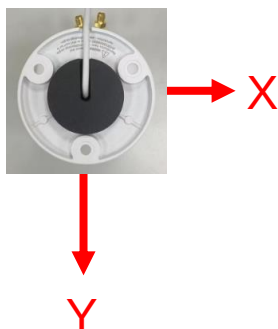


Elevation Plane
phi = 90



— 2400.00 MHz
— 2450.00 MHz
— 2500.00 MHz

Setup :

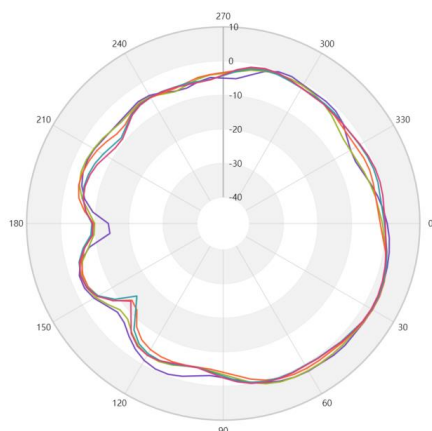


Ant.2_5GHz 2D Radiation Pattern

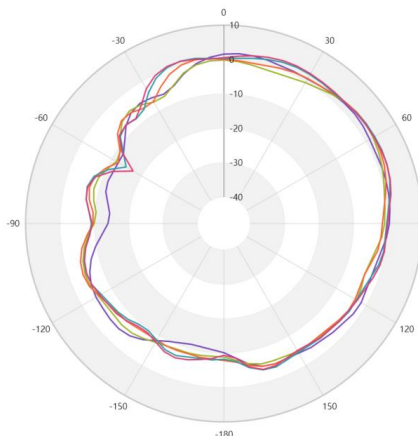
Frequency(MHz) : 5150~5850

Radiation Pattern :

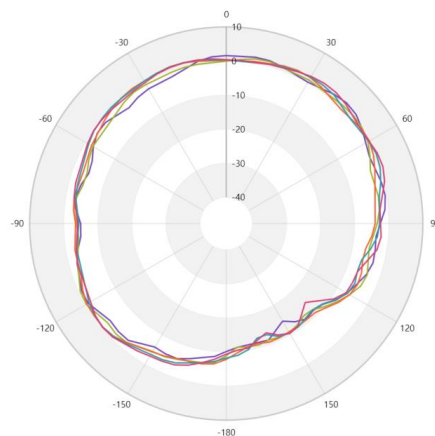
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0



Elevation Plane
phi = 90



— 5150.00 MHz
— 5350.00 MHz
— 5550.00 MHz
— 5750.00 MHz
— 5850.00 MHz

Setup :



Y

X



Z

X



Z

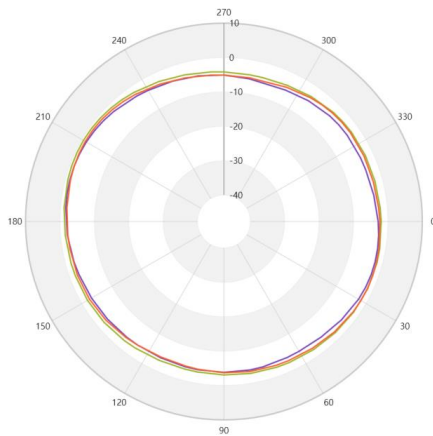
Y

Ant.3_2D Radiation Pattern

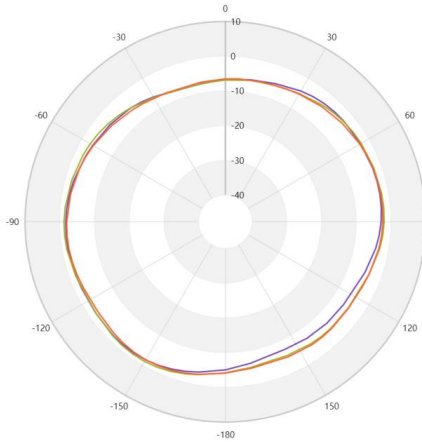
Frequency(MHz) : 865~928

Radiation Pattern :

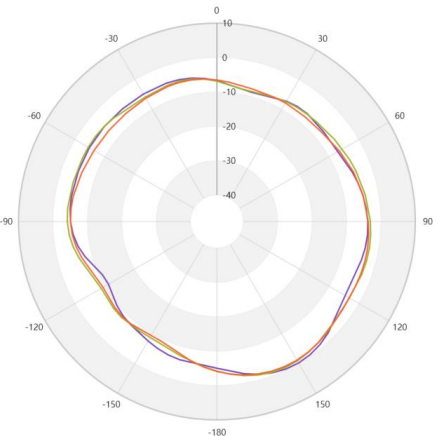
Azimuth Plane
Theta = 90



Elevation Plane
phi = 0

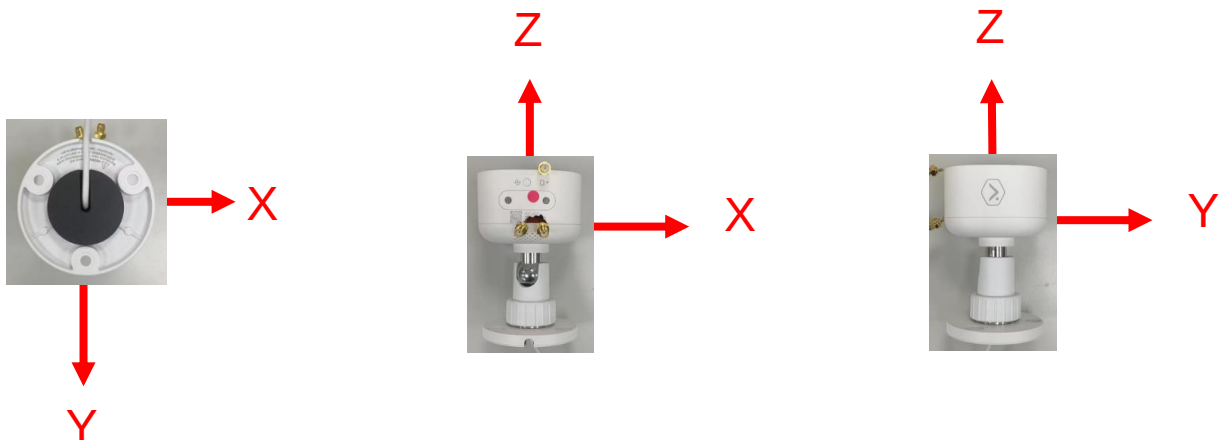


Elevation Plane
phi = 90



— 865.00 MHz
— 902.00 MHz
— 928.00 MHz

Setup :



Combine 2D Radiation Pattern

Frequency(MHz) : 2450/5550

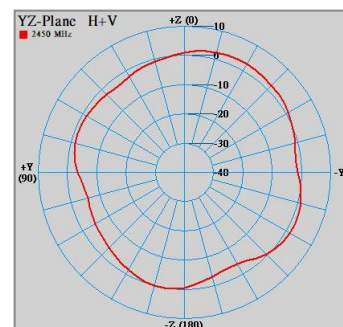
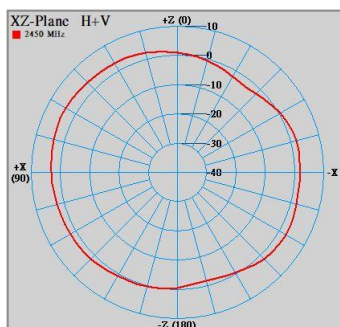
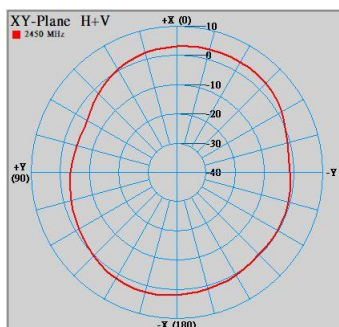
Radiation Pattern :

Azimuth Plane
Theta = 90

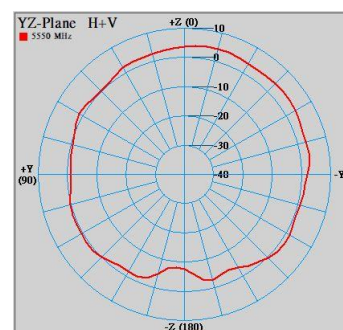
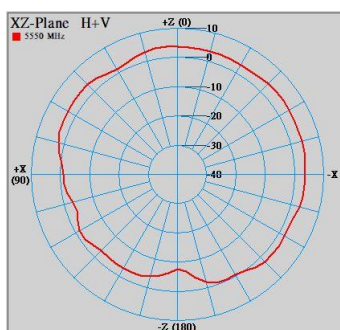
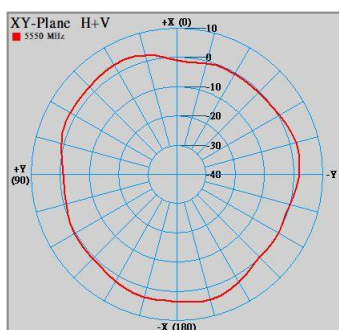
Elevation Plane
phi = 0

Elevation Plane
phi = 90

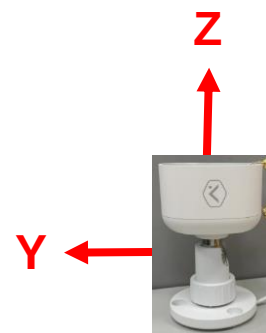
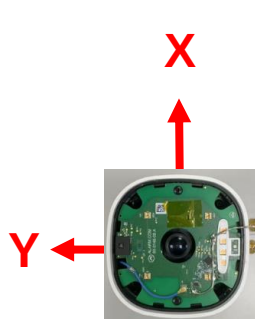
2G



5G

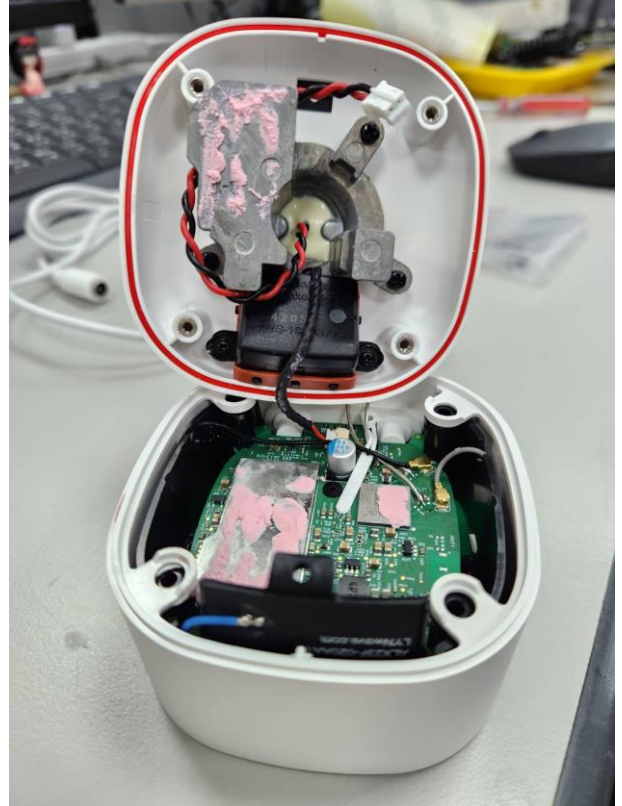


Setup :



Summary

- 1009
 - The tested DUT is registered at 504074C0052A.
 - Frequency deviation and worse efficiency were resulted at 2500 MHz in Ant.1 on the routing case of "The line goes to the right".
 - Suggest routing the power cable like "The line goes to the left" shown below.



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