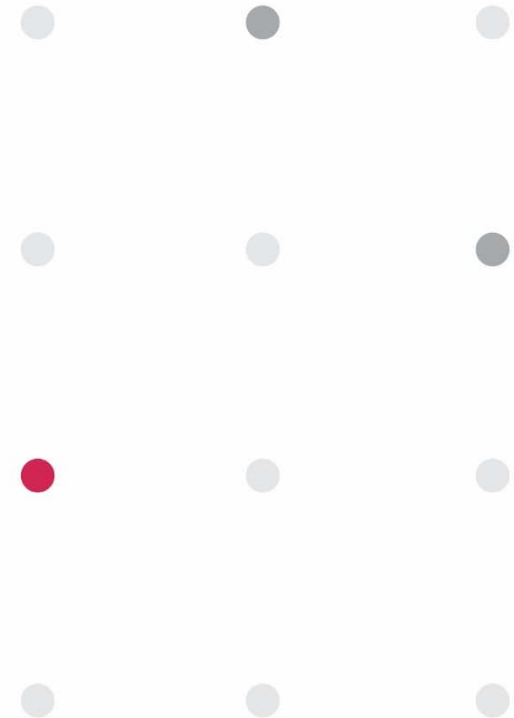


PSA

PASSIVE SYSTEM ALLIANCE
INPAQ TECHNOLOGY CO., LTD.



PASSIVE SYSTEM ALLIANCE
INPAQ TECHNOLOGY CO., LTD.

WE CONNECT WE PROTECT

Version 0.0

HAPUKA

Test personnel :Ian Chen
Checked by :Andy Chen
Approved by :Leeting Hsieh
INPAQ Technology Co., Ltd.
Last updated in Aug, 27, 2025

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Brand name: INPAQ

Model name:

BLE : WAG-M-LA-00-098

WiFi :WAG-M-LB-00-052

LoRa : WAG-M-LORA-00-008

Antenna Type: Wi-Fi/BLE/LoRa PIFA

Connector Type: N/A

Test Lab, site: INPAQ Technology Co., Ltd.

Test date: 08/27/2025

Contents

- Revised History
- Requirement of Antenna Design and Measurement
- Product / Antenna Overview
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 - 2D radiation pattern
- Conclusions

Revised History

Released Date	Version	Record
Aug. 27 th , 2025	0.0	Antenna test report



Requirement of Antenna Design and Measurement

Requirements of Antenna Design

RF Function	Number of ANT	Frequency Band	Remark
LORA	1	863~928MHz	Metal Antenna
BT	1	2400~2500MHz	Metal Antenna
WIFI 2/5G	1	2400~2500MHz & 5150~5850MHz	Metal Antenna

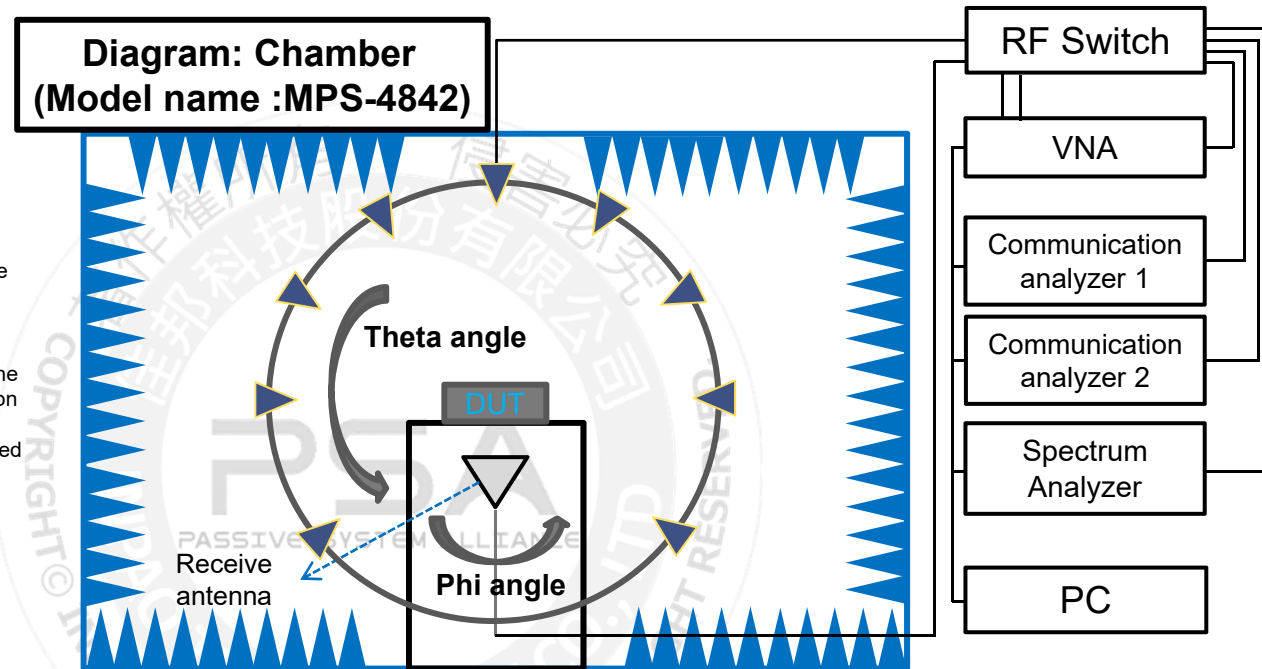
Requirements of Measurement

Test Item	Specification	Remark
S11	NA	
Peak Gain	NA	
Efficiency	NA	
Isolation	NA	

**Diagram: Chamber
(Model name :MPS-4842)**

Test Procedure (Passive Antenna Measurement):

1. Mount the Device Under Test (DUT) on the supporting pole at the center of the anechoic chamber.
2. Connect the DUT antenna port to the measurement system using a coaxial cable at the transmitter side of the chamber.
3. Close the chamber door to eliminate external signal interference during measurement.
4. Launch the antenna measurement system, configure the required test parameters (e.g., frequency points or rotation angles), and import the frequency list for testing.
5. After completing the measurement, process the recorded data and perform far-field data conversion as required.



Equipment	Spectrum Analyzer	Communication analyzer	VNA	RF Switch	Test Procedure & commercial test software
Brand	Keysight (N9020B)	R&S(CMW500) 、 ANRITSU(MT8000A) 、 (MT8862A)	Keysight (E5070C)	TEMRADIO	XH.PassiveTest

Test facility calibration

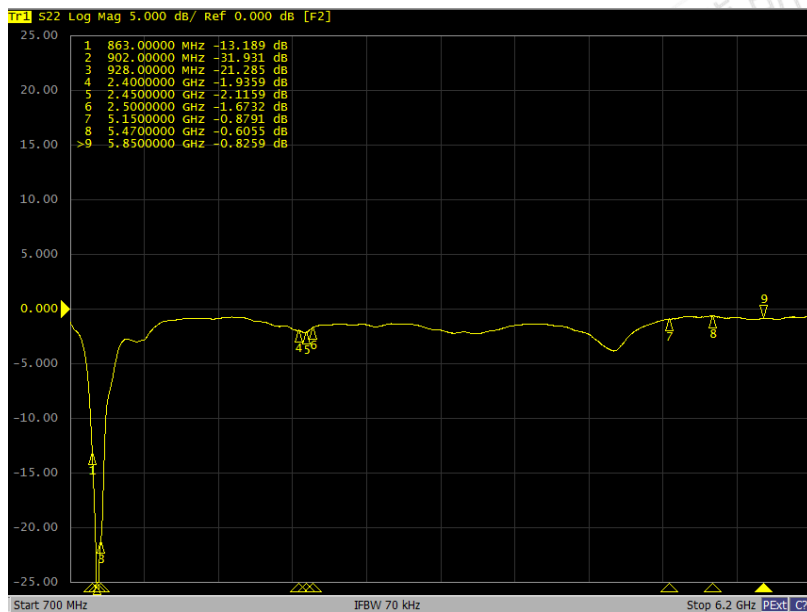
Equipment	Spectrum Analyzer	VNA	RF Switch
Brand	Keysight (N9020B)	Keysight (E5070C)	TEM RADIO
Calibration date	07/21/2025	07/21/2025	06/02/2025
Next time calibration date	07/21/2026	07/21/2026	06/02/2026

Results



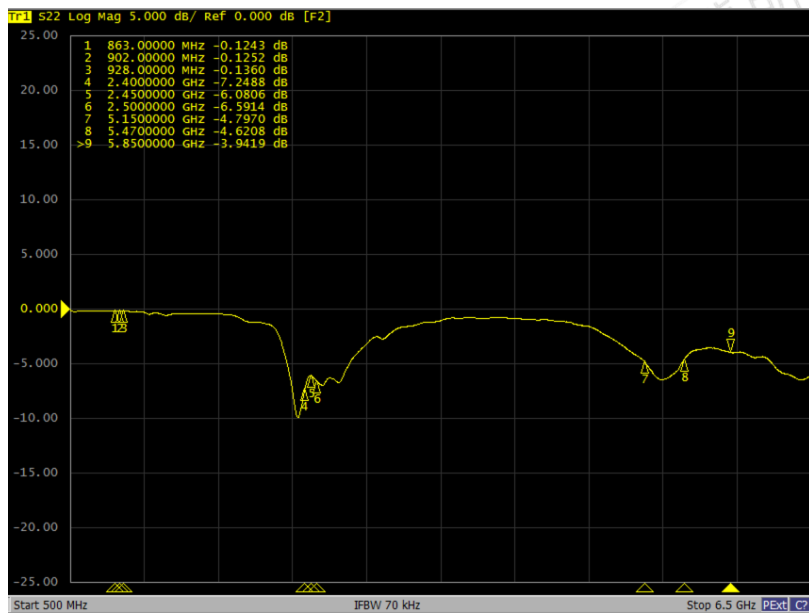
Return Loss

LORA

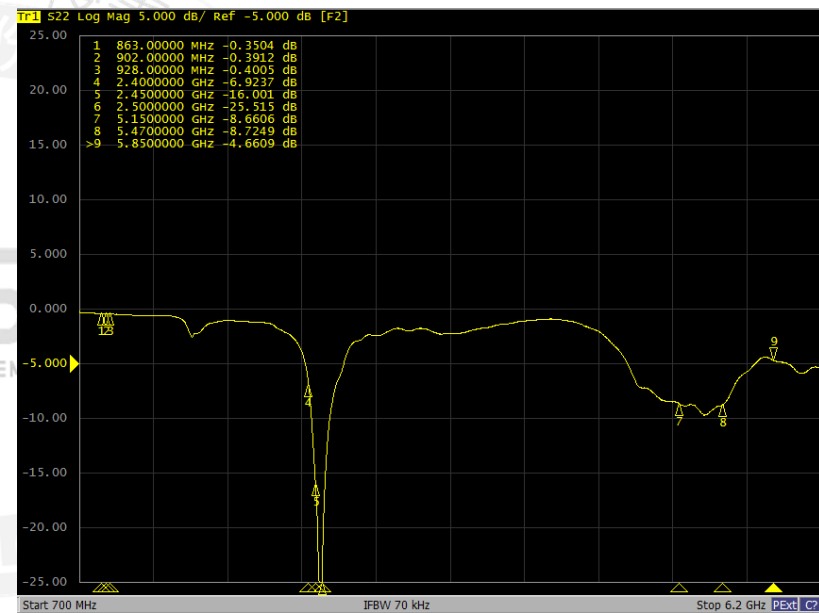


Return Loss

BT



WIFI



Efficiency and Peak Gain

LORA

Frequency (MHz)	Peak Gain (dBi)	Efficiency (dB)	Efficiency (%)
863	0	-5.05	31.26
880	-0.46	-4.83	32.89
902	1	-4.23	37.76
910	0.26	-3.68	42.85
928	1	-3.48	44.87

BT

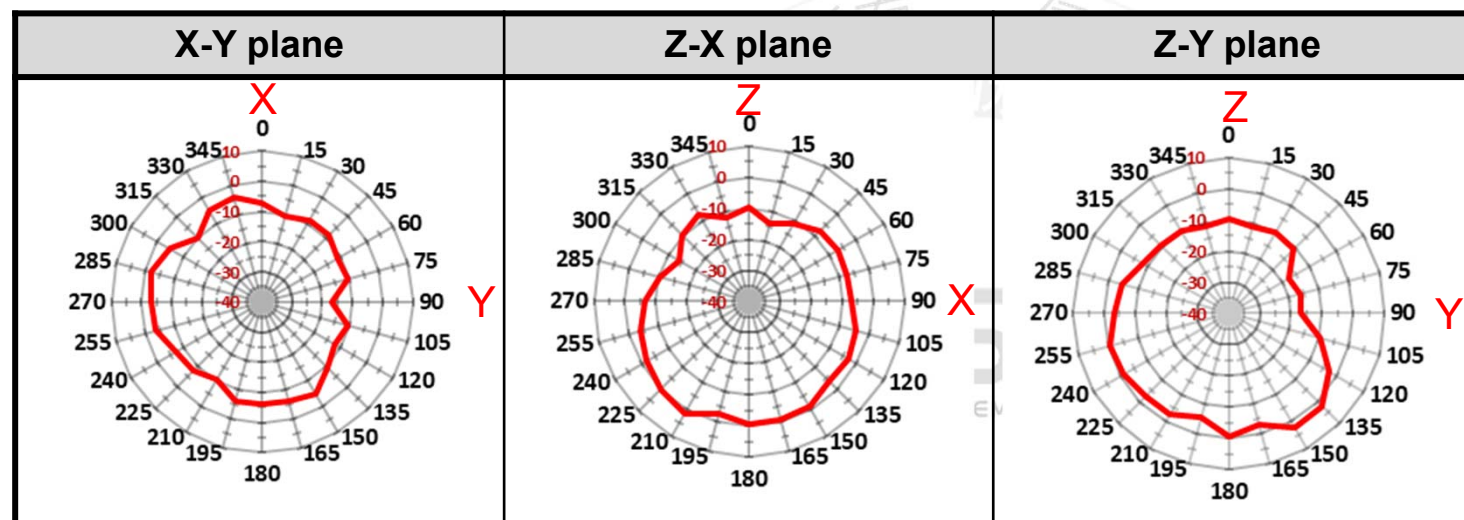
Frequency (MHz)	Peak Gain (dBi)	Efficiency (dB)	Efficiency (%)
2400	2.64	-5.55	27.86
2450	2.79	-5.26	29.79
2500	2.93	-5.19	30.27

Efficiency and Peak Gain

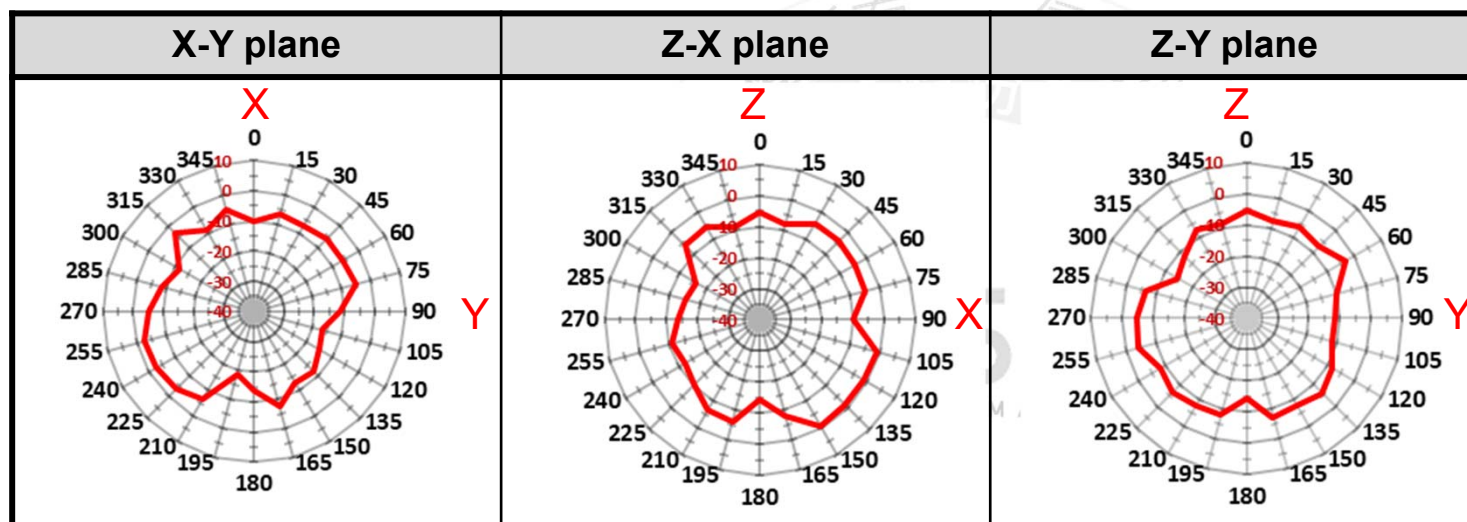
WIFI

Frequency (MHz)	Peak Gain (dBi)	Efficiency (dB)	Efficiency (%)
2400	2.42	-5.94	25.47
2450	2.73	-4.30	37.15
2500	2.8	-3.74	42.27
5150	1.86	-6.19	24.04
5350	2.5	-5.76	26.55
5470	1.65	-5.94	25.47
5600	2.5	-6.19	24.04
5725	1.92	-6.37	23.07
5850	1.40	-6.81	20.84

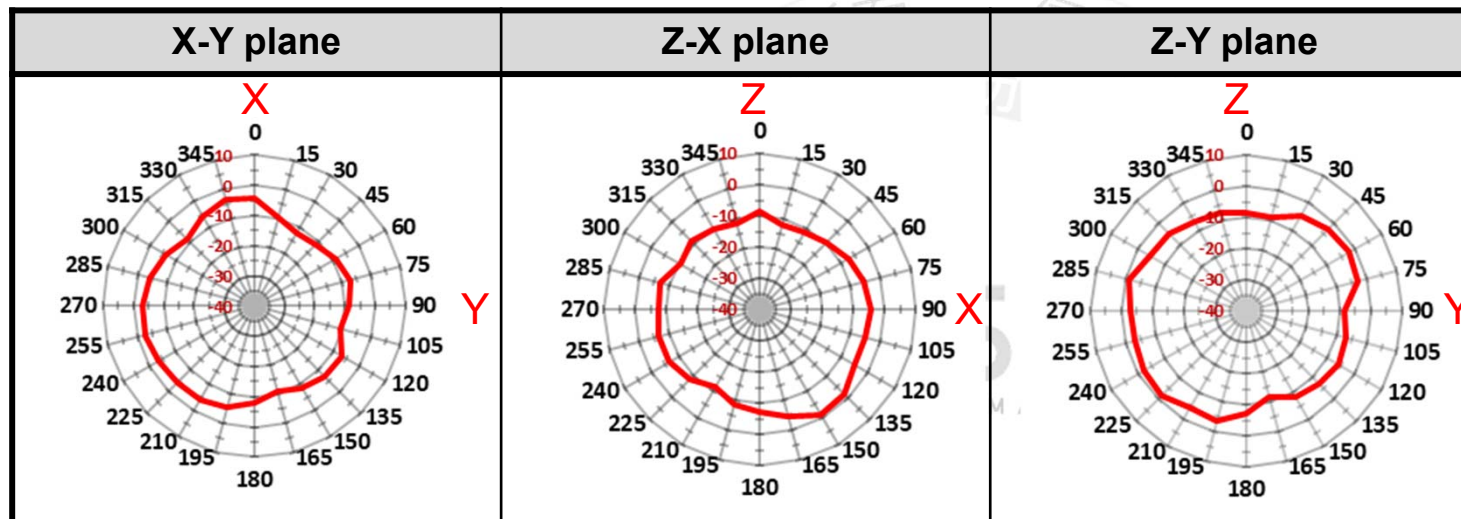
2D radiation pattern – WiFi 2.4G



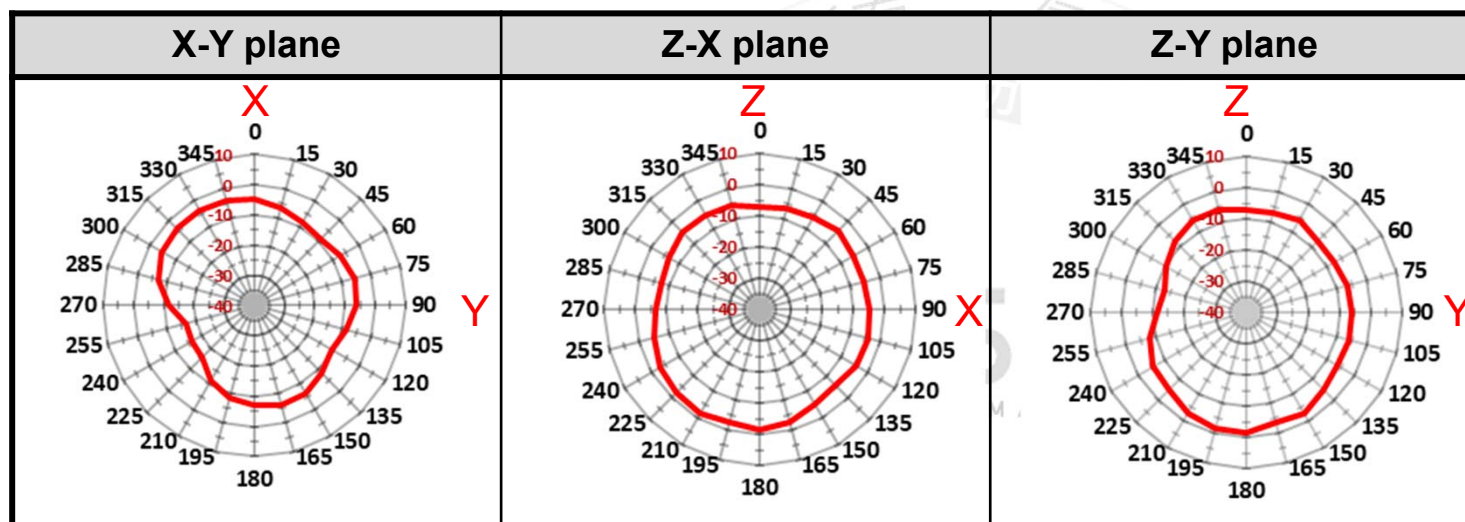
2D radiation pattern – WiFi 5G



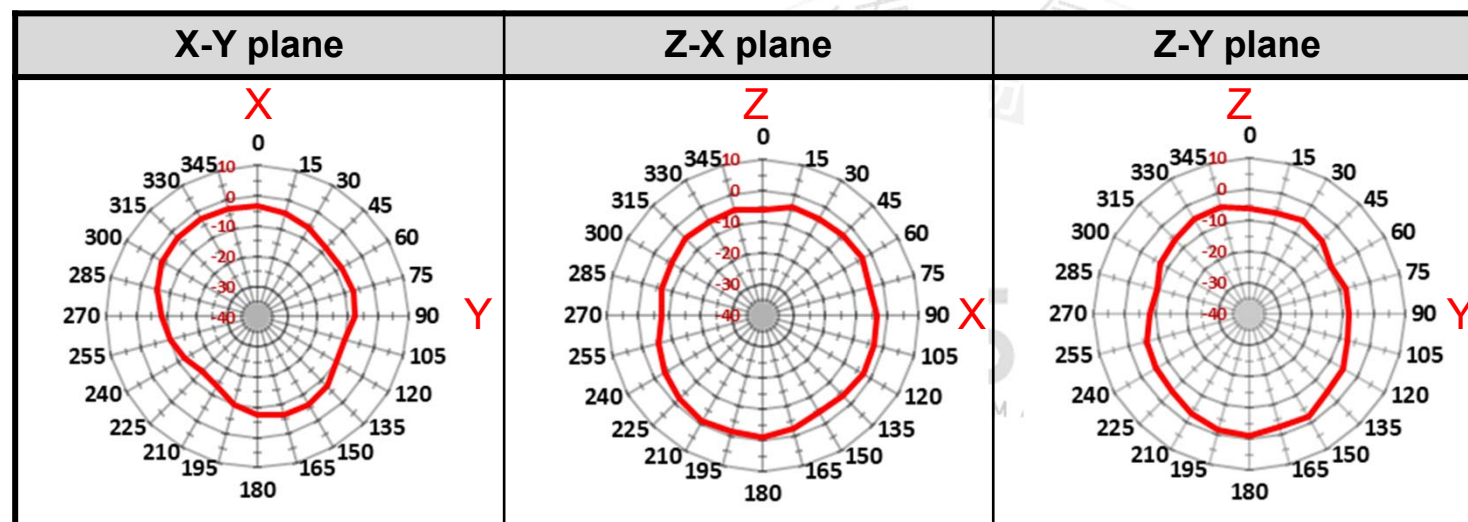
2D radiation pattern – BT



2D radiation pattern – LoRa 800MHz



2D radiation pattern – LoRa 900MHz



Conclusions

1. The efficiency of LORA antenna are between 31~44%.
2. The efficiency of BT antenna are between 27~30%
3. The efficiency of WIFI antenna are between 25~42% and 20~26% on 2.4GHz and 5GHz, respectively.