
Logitech

Antenna Under Test (AUT)

Report

Model Name: MUSE

Equipment Type: Bluetooth speakers

Manufacturer: Logitech Far East LTD.

Test Location: Area B, West Side of Floor 1, Building 1, Tingwei Industrial Park, No. 6 Liufang Road, Bao'an District, Shenzhen City

Tested by: Junny Han_____

Test Date: 2024.09.05_____

Report Release History

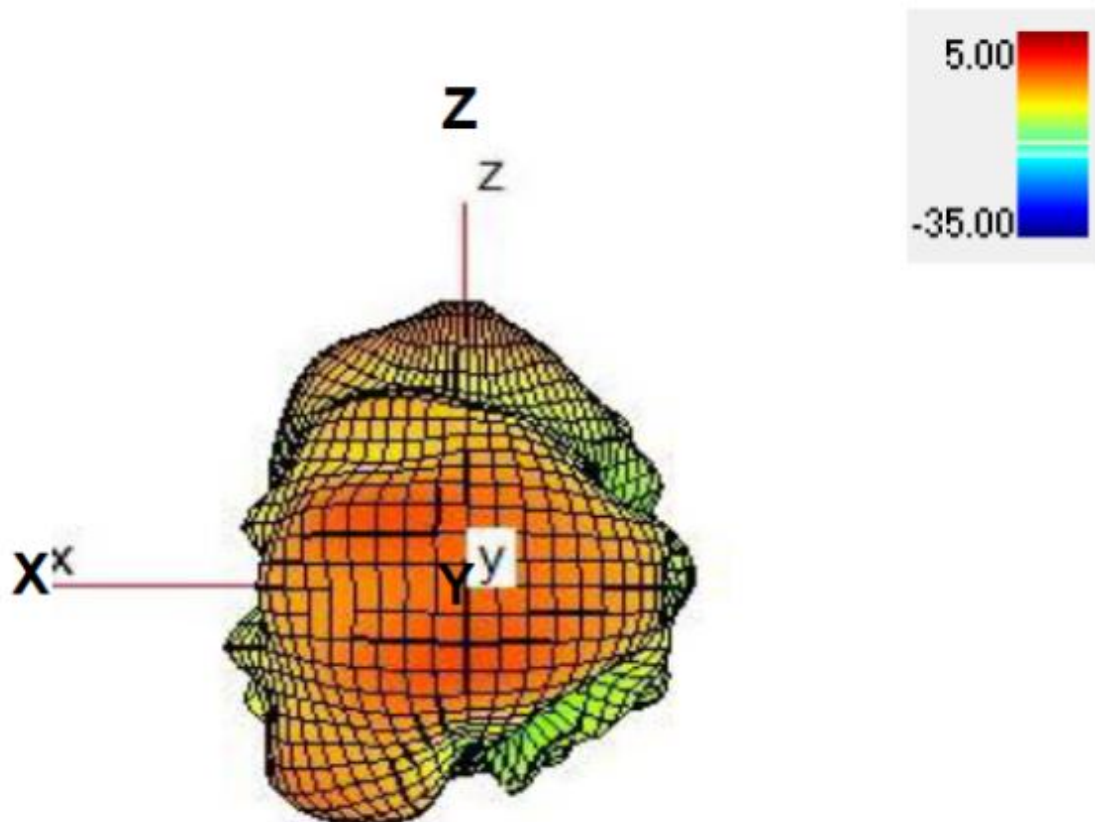
Report version	Description	Date Issued
MUSE report	Original release	2024/09/05

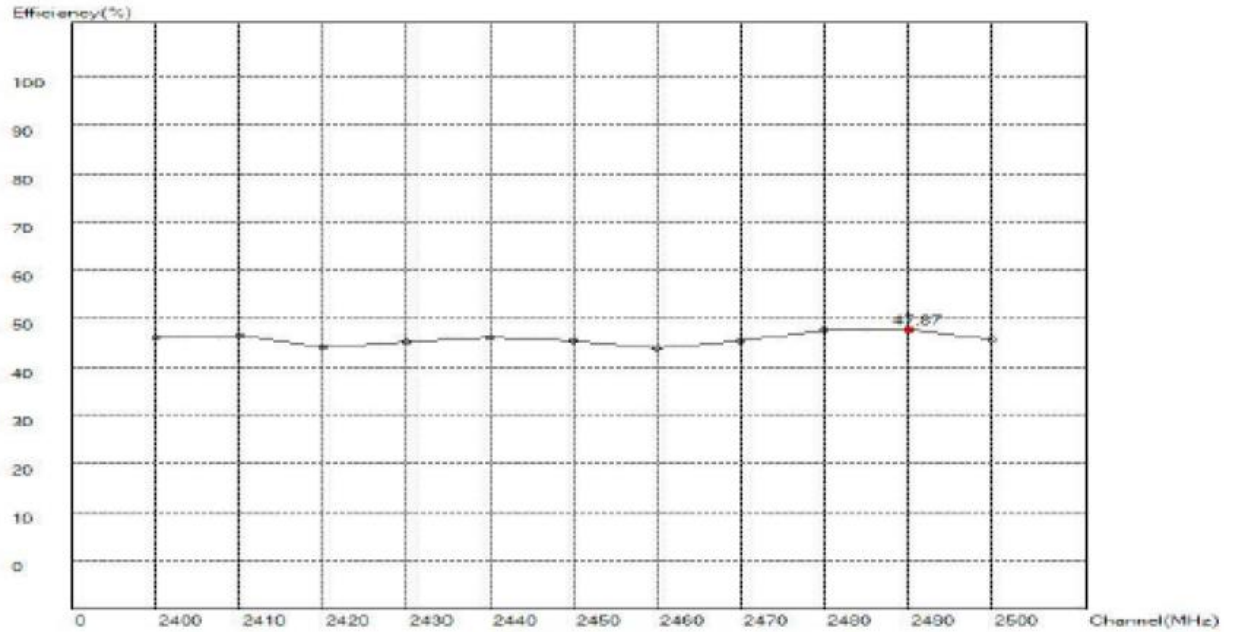
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1. EUT Antenna Information

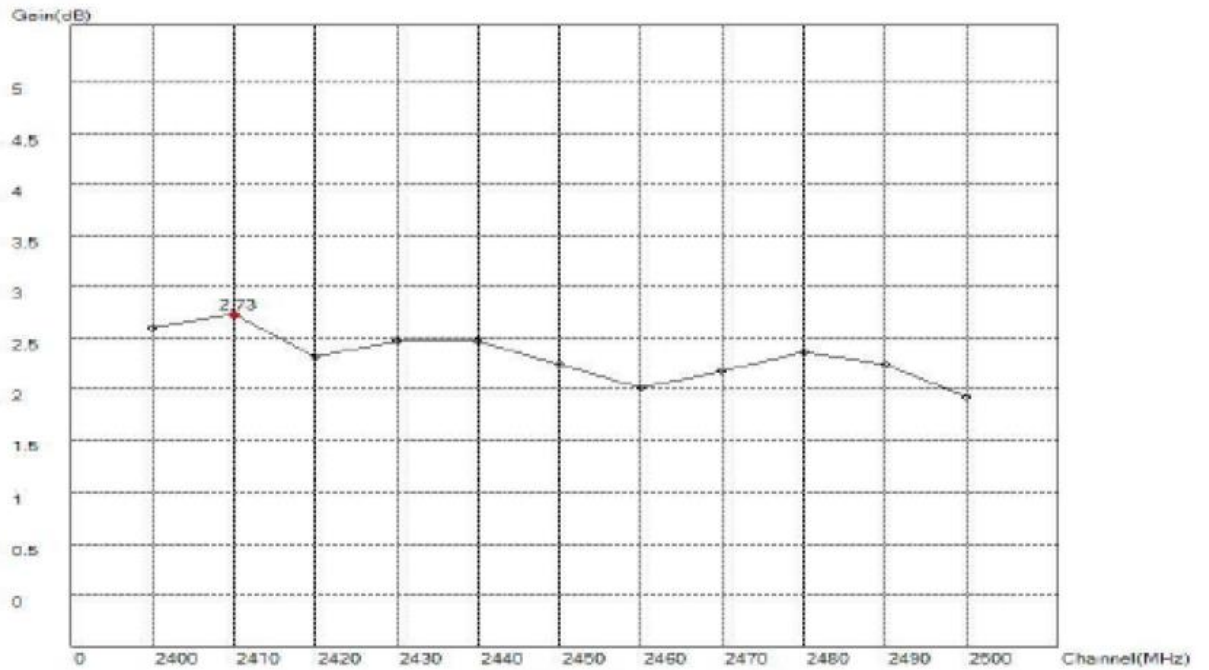
- 1) Antenna Material : FPC
- 2) Antenna Type : dipole
- 3) Antenna Dimension: 38 x 6.2 mm
- 4) Operating Frequency : 2.4 GHz - 2.4835 GHz
- 5) Input Impedance : 50 Ω
- 6) Standing-Wave Ratio : 2:1
- 7) Max Antenna Peak Gain: 2.73 @2410MHz dBi

2. Measured Values of Antenna Gains and Efficiency



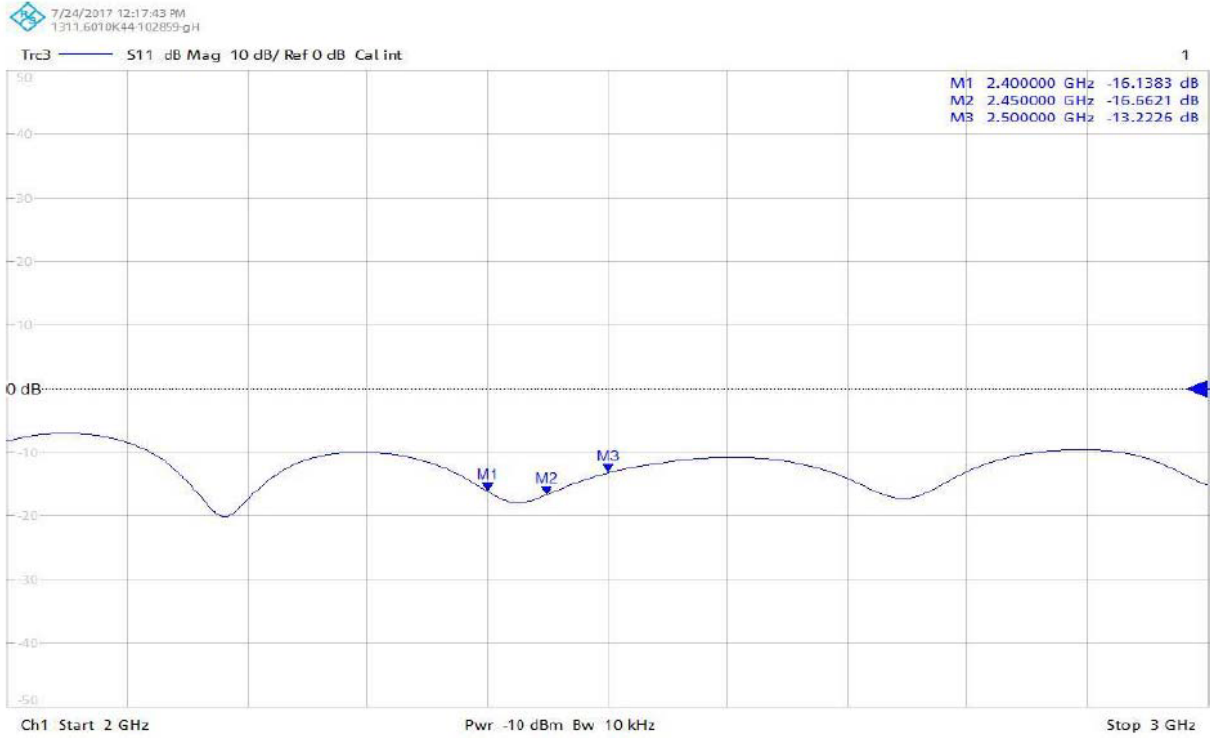


Maximum Efficiency at 2490 MHz 47.87%



Maximum Peak Gain at 2410 MHz: 2.73dBi

3. S-parameter Measured



4. 2D Radiation Pattern Measurement

5.1 Test Location

2D radiation pattern measurement in the anechoic chamber

5.2 Description of the anechoic chamber

Length: 5m

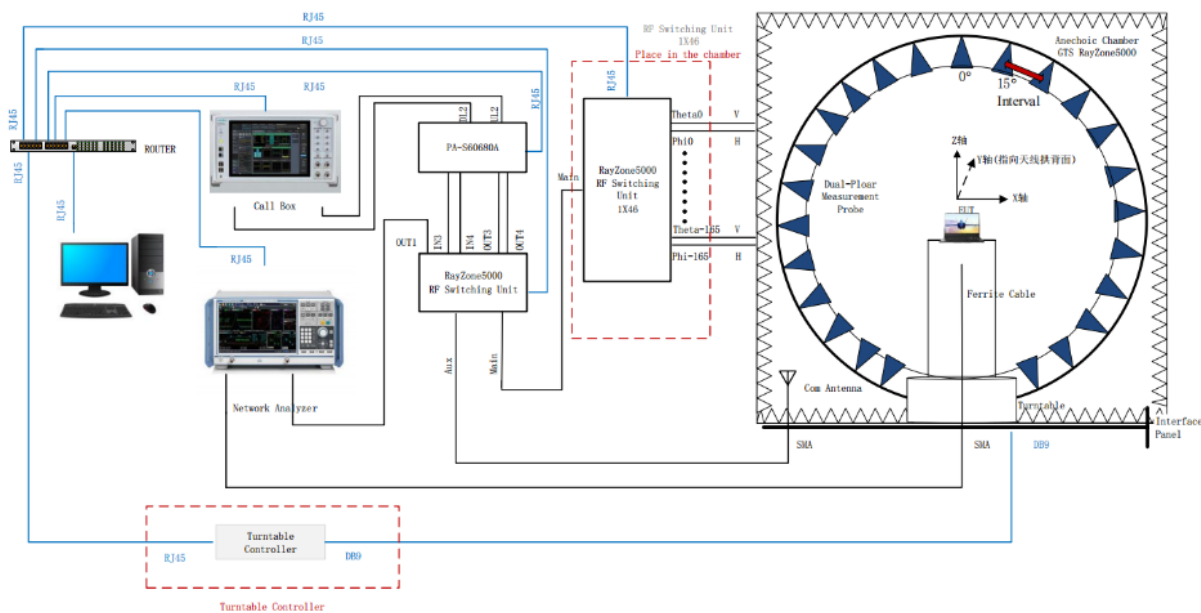
Width: 5m

Height: 5m

Turntable height:2.3m

Measurement antenna height:2.3m

 RayZone5000 SIS0 Test Setup

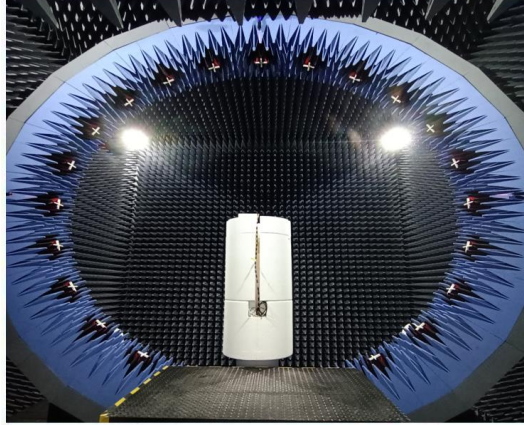


Microwave anechoic chamber model:RayZone5000

TD-SCDMA test equipment: SP6010/Agilent 8960

WCDMA/GSM/CDMA test equipment: Agilent 8960

Antenna passive testing equipment: Agilent Technologies E5071C



5.3 Test Instruments

Description	Model No.	Serial No.	Last Calibration
Wireless connection test device	CMW500	NDX-WJ295	2024-6-12
Horn Antenna ETS	RayZone5000	NDX-03	2024-6-13
RF signal cable Woken	RayZone5000	NDX-03	2024-6-13
Software	SAM	SAM2.9.10190809	NA
Antenna Tower	RayZone5000	NDX-03	2024-6-13
Turntable	RayZone5000	NDX-03	2024-6-13
Controller	RayZone5000	NDX-03	2024-6-13
Chamber	RayZone5000	NDX-03	2024-6-13

Note: The calibration interval of the above test instruments is 12 months

Test Procedure

- i. Connect the EUT to Spectrum Analyzer and record the power setting of EUT and the measured conducted power.
- ii. Fasten the EUT in the center of the turntable, record the coordinates and take pictures.
- iii. Configuring EUT continuously transmitting power(100% duty cycle).
- iv. Make sure the transmit signal is stable and at the maximum RF power level.
- v. Setup the channel power function by spectrum analyzer.
- vi. Read the channel power level on the spectrum analyzer and record in the following positions.
 1. The turntable is then stepped between 0 to 360 degrees along the horizontal plane in 15-degree increments.
 2. Data is recorded using the spectrum analyzer for both theta and phi polarizations at each position.
- vii. Rotate the EUT with 90 degrees and repeat step f.1 and step f.2 until all 3 planes(X-Y,X-Z,Y-Z) were measured.
- viii. According to substitution techniques, a substitution horn antenna is substituted for EUT at the same position and the signal generator exports the CW signal to the substitution antenna via a TX cable. Rotated the turntable and moved the receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a value of spectrum reading equal to "Raw Value" gotten from step vii. Record the power level of S.G.

$$\text{EIRP} = P_{\text{SigGen}} + G_{\text{T}} - L_{\text{C}}$$

where:

P_{SigGen} = power setting of the signal generator that produces the same received power reading as the DUT, in dBm;

G_{T} = gain of the substitute antenna, in dBd (ERP) or dBi (EIRP);

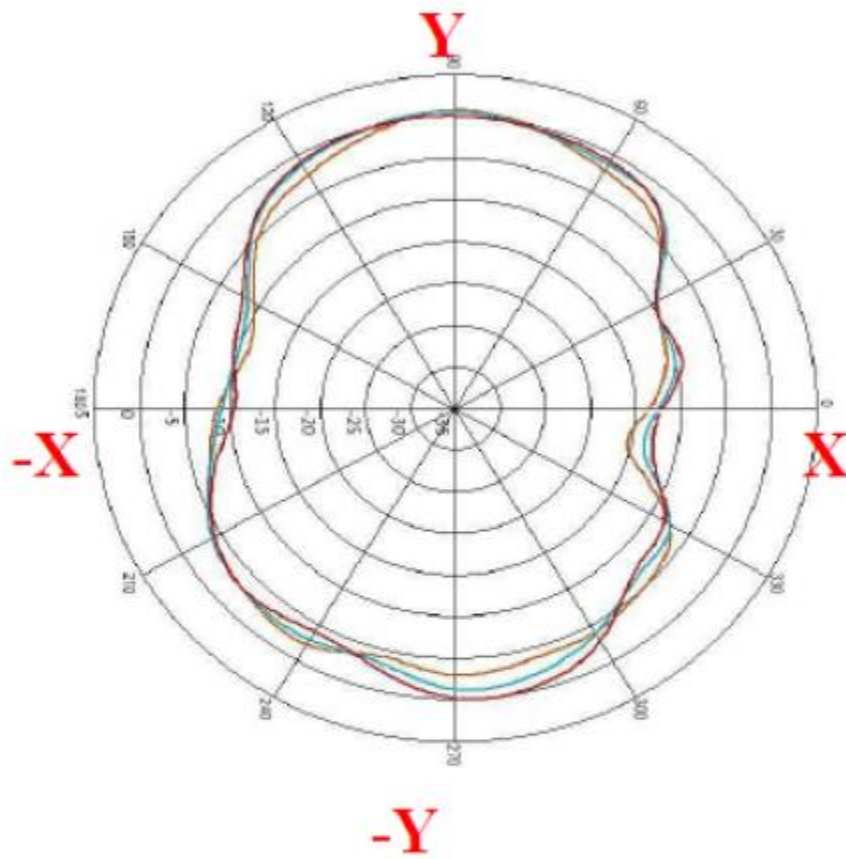
L_{C} = signal loss in the cable connecting the signal generator to the substitute antenna, in dB

- ix. Antenna Peak Gain (dBi) = Max EIRP(dBm) - Conducted Power (dBm)

5.4 2D Pattern Test Plot

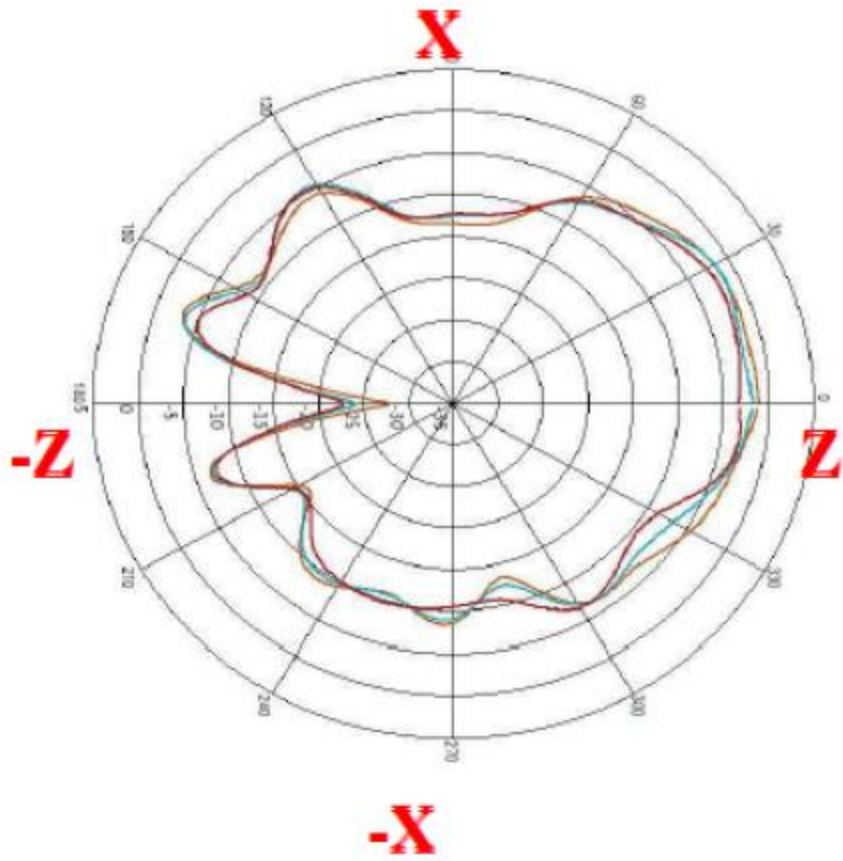
2D radiation pattern measurement in the anechoic chamber

X-Y Plane: Horizontal and Vertical



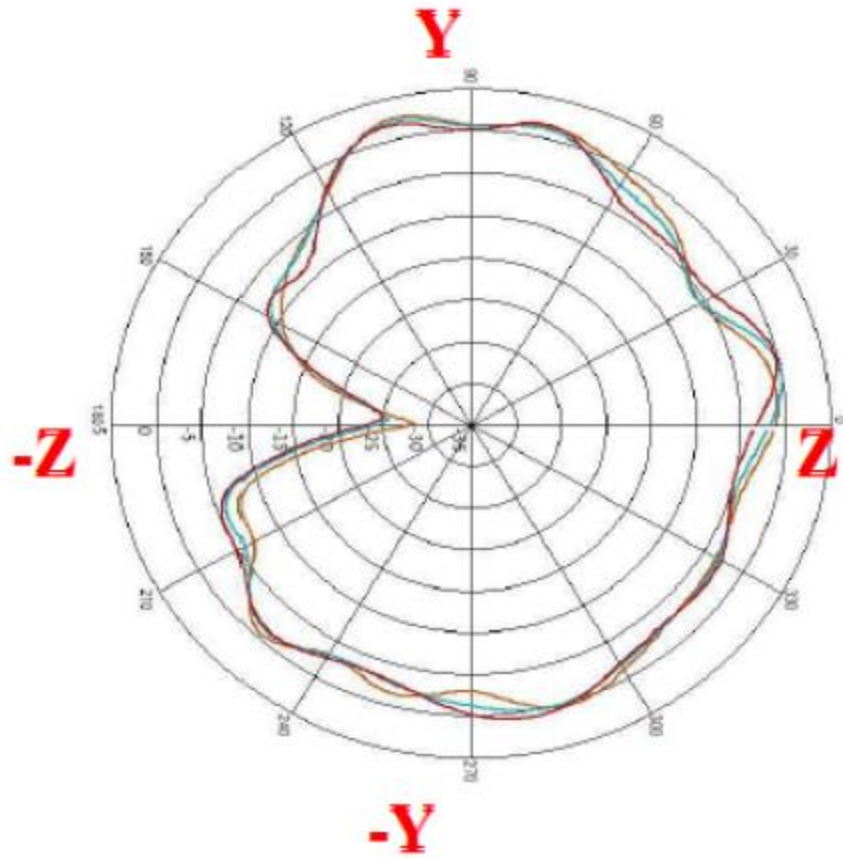
XY plane

X-Z Plane: Horizontal and Vertical



ZX plane

Y-Z Plane: Horizontal and Vertical



ZY plane

Test Date: 2024.09.05