

# Logitech

## Antenna Under Test (AUT)

### Report

**Model Name:** RR0022

**Equipment Type:** Preset Button

**Manufacturer:** Logitech Far East LTD.

**Test Location:** #2, Creation Rd. 4, Science-based Ind. Park Hsinchu  
Taiwan, R.O.C

**Tested by:** \_\_\_\_\_ **BV Leo Chen** \_\_\_\_\_

**Report Date:** \_\_\_\_\_ **2025/02/06** \_\_\_\_\_

## Report Release History

Report version	Description	Date Issued
POE AUT Report	Original release	2025/2/06

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## 1. EUT Antenna Information

- 1) Antenna Material : PCB on board
- 2) Antenna Type : PIFA
- 3) Antenna Dimension: 19.81 x 6.42 mm
- 4) Operating Frequency : 2.4 GHz - 2.4835 GHz
- 5) Input Impedance : 50  $\Omega$
- 6) Standing-Wave Ratio : 2:1

## 2. Measured Values and Calculation of Antenna Gains

Measure peak horizontal/vertical EIRP on 3D plane. The highest measured values will be used to calculate the antenna peak gain.

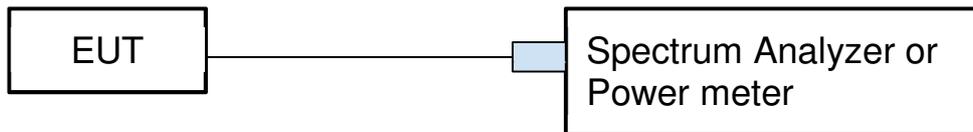
$$\text{Antenna Peak Gain (dBi)} = \text{Max EIRP(dBm)} - \text{Conducted Power (dBm)}$$

Frequency	3D Plane		Max Peak EIRP (dBm)	Conducted Power (dBm)	Antenna Peak Gain (dBi)
	Theta Peak EIRP (dBm)	Phi Peak EIRP (dBm)			
2402	2.7	-1.64	2.53	-0.5	2.83
2440	2.46	-1.65	2.41	-0.24	2.65
2480	2.37	-1.99	2.32	-0.19	2.51

**Test Date: 20240901**

### 3. Conducted Power Measurement

#### 3.1 Test Setup



#### 3.2 Test Instruments

Description	Model No.	Calibration Date	Calibration Until
Spectrum Analyzer Keysight	N9030B	2024/05/29	2025/05/28
RF signal cable Woken	00100A101Axxx	2024/05/29	2025/05/28

#### 3.3 Test Procedure

A spectrum analyzer or Power meter was used to perform output power measurement, setting the detector to average and configuring EUT continuously transmitting power(100% duty cycle).

#### 3.4 Test Result of RF conducted Power

Frequency	Conducted Power (dBm)
2402	-0.5
2440	-0.24
2480	-0.19

## 4. 3D Radiation Pattern Measurement

### 4.1 Test Location

3D radiation pattern measurement in the anechoic chamber

### 4.2 Description of the anechoic chamber

Length: 7.32m(24 ft)

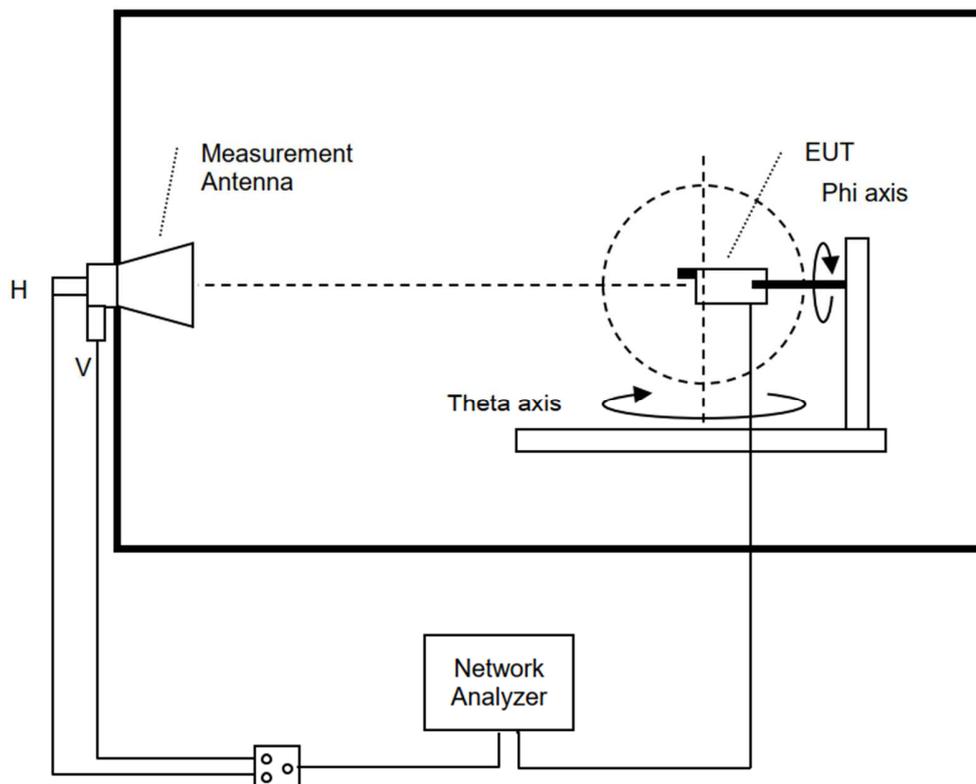
Width: 3.66m(12 ft)

Height: 3.51m(11.52 f)

Turntable height: 1.45m

Measurement antenna height: 1.75m

Measurement distance: 4.86m



### 4.3 Test Instruments

Description	Model No.	SERIAL NUMBER	CALIBRATION DUE DATE
(OTA3-HY) ETS Anechoic Chamber	ETS-Lindgren AMS-8500	CT0000411-1132	N/A
Measurement Software	EMQu ETS-Lindgren est V1.14 build 31654	1281	N/A
Multi-Axis Positioning System	ETS-Lindgren 2090-OPTI	00086248	N/A
Switch Control	Agilent 3499A	MY42005285	N/A
Network Analyzer	Agilent E5071C	MY46104190	2025/5/29

### 4.4 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 0-180 degrees along the vertical plane in 15-degree increments.
- 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:

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

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

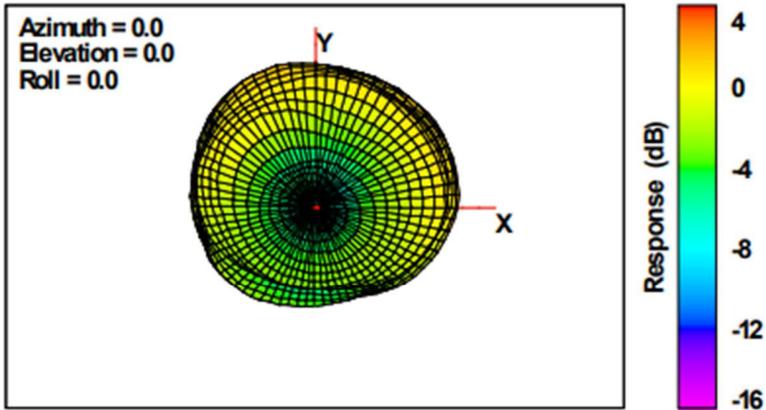
$L_{\text{C}}$  = signal loss in the cable connecting the signal generator to the substitute antenna, in dB

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

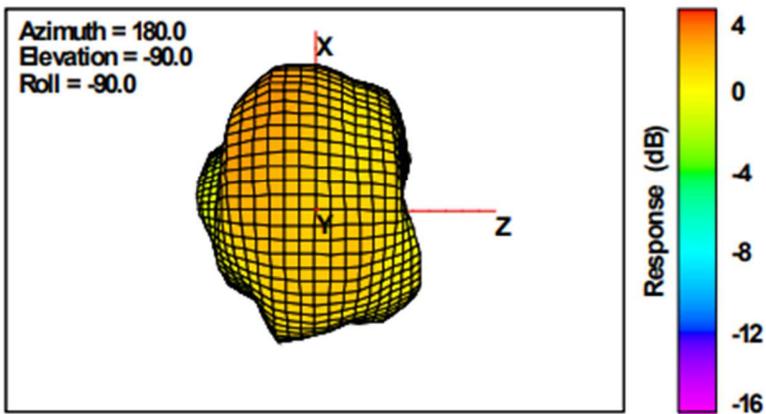
## **4.5 Test Setup photos**

## **4.6 3D Pattern Test Plot**

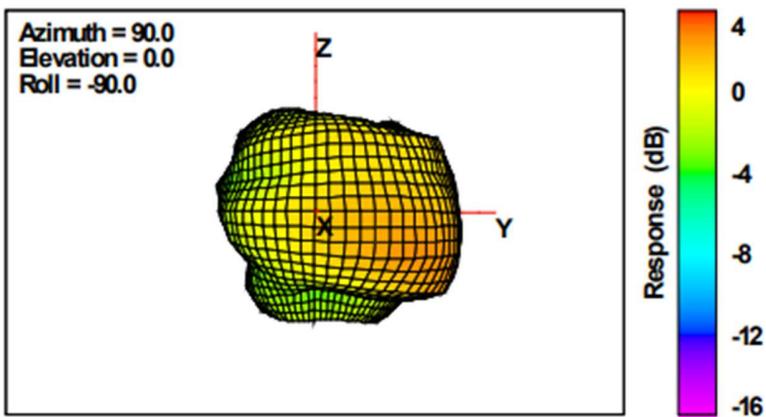
2402MHz  
Total



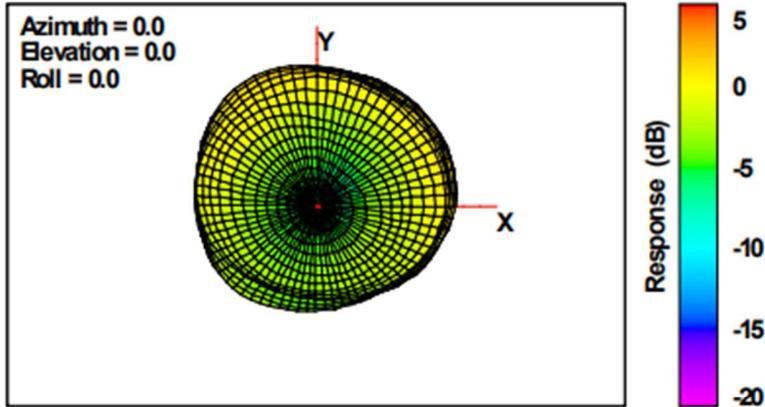
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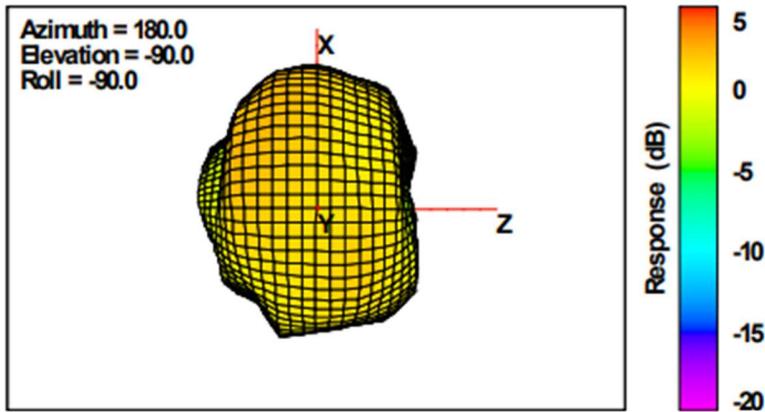
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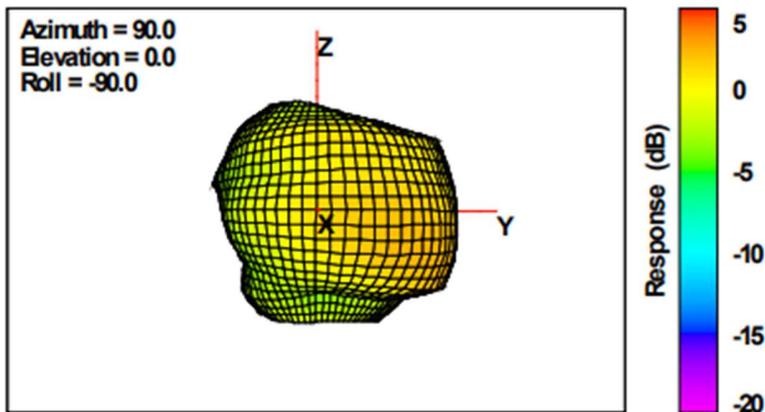
2440MHz  
Total



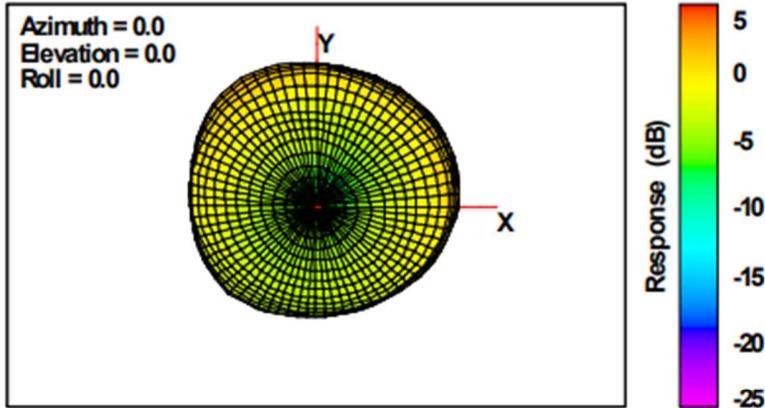
Total



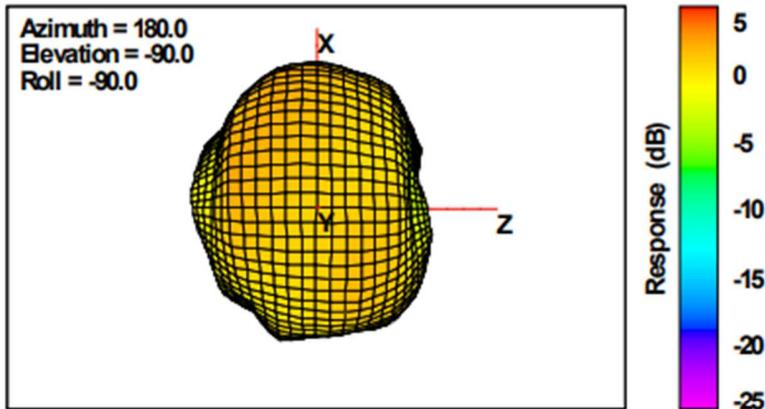
Total



2480MHz  
Total



Total



Total

