

Base Version EVT Antenna Report

Date:2026/06/13

Antenna Information

1. Frequency range of operation:

Antenna1: On-board Antenna

- **Wi-Fi 2.4G&BT:** 2.4 to 2.482 GHz

Antenna 2: On-board Antenna

- **Wi-Fi 5G:** 5.15 to 5.85 GHz

2. Antenna Types:

Wi-Fi 2.4G&BT: PCB IFA antenna,

Wi-Fi 5G: PCB monopole antenna

3. Antenna Structure:

【Refer to Antenne report appendix】

4. Antenna Layout:

【Refer to Antenne report appendix】

Antenna/OTA Specification of Base Version

1. S11 / VSWR / Peak Gain / Directivity in Free Space

The following table summarizes the antenna specification requirements for Antenna Passive Performance.

- S11 < -10dB at 2.4G/900MHz; S11<-8dB at 5G
- Pi placeholder between the conducted port and Antenna port recommended in earlier builds (Proto/HVT/EVT)

Below antenna efficiency is based on the free space. If the product is defined as metal chassis, please contact Amazon antenna DRI for specific antenna eff specification.

Antenna	S11 (dB)	VSWR	Efficiency (dB)	Peak Gain (dBi)	Directivity (dB)
Wi-Fi (2.4GHz)	< -10	2:1		< 4dBi	< 7 dB
Wi-Fi (5 GHz)	< -8	2.3:1		< 4dBi	< 7 dB
Bluetooth	< -10	2:1		< 4dBi	< 7 dB

TABLE 3-1 –PASSIVE ANTENNA PERFORMANCE SPECIFICATION

2. Efficiency / TRP / TIS / Body SAR in Free Space

■ Antenna Performance Requirement in Free Space

Main Antenna (1st Antenna)

2.4 GHz Specifications			
Item	Specification	Rate	Condition
Passive Antenna Efficiency	> -4 dB	N/A	Minimum efficiency across 2.4 GHz band
Active Antenna Efficiency	> -4 dB	N/A	
Total Radiated Power (TRP)	> 11 dBm	11g @ 6 Mbps, Cond. PWR: 15 dBm	Free Space, Channels 1, 6, 11, 13
Total Isotropic Sensitivity (TIS)	< -87 dBm	11g @ 6 Mbps, Cond. Sen: -91 dBm	Free Space, Channels 1, 6, 11, 13
Body SAR	<1.27 W/kg	11b @ 1 Mbps	FCC at 5mm test distance, all sides of devices. (Mini Tablet PC)
5 GHz Basic Channel (36-48, 149-165) Specifications			
Item	Specification	Rate	Condition
Passive Antenna Efficiency	> -3.5 dB	N/A	Minimum efficiency across 5 GHz band
Active Antenna Efficiency	> -3.5 dB	N/A	
Total Radiated Power (TRP)	> 11 dBm	11g @ 6 Mbps, Cond. PWR: 15 dBm	Free Space, Channels 36, 48, 149, 165
Total Isotropic Sensitivity (TIS)	< -87.5 dBm	11a @ 6 Mbps, Cond. Sen: -91 dBm	Free Space, Channels 36, 48, 149, 165
Body SAR	<1.27 W/kg	11a @ 6 Mbps	FCC at 5mm test distance, all sides of devices. (Mini Tablet PC)
5 GHz DFS Channel (52-64, 100-144) Specifications			
Item	Specification	Rate	Condition
Passive Antenna Efficiency	> -3.5 dB	N/A	Minimum efficiency across 5 GHz band
Active Antenna Efficiency	> -3.5 dB	N/A	
Total Radiated Power (TRP)	> 11 dBm	11a @ 6 Mbps, Cond. PWR: 15 dBm	Free Space, Channels 64, 100, 144
Total Isotropic Sensitivity (TIS)	< -87.5 dBm	11a @ 6 Mbps, Cond. Sen: -91 dBm	Free Space, Channels 64, 100, 144
Body SAR	<1.27 W/kg	11a @ 6 Mbps	FCC at 5mm test distance, all sides of devices. (Mini Tablet PC)

Antenna Performance

Antenna average Efficiency & Gain:

Passive Test For Antennas				
ANT1 2.4G	Without Cable Loss	Freq(MHz)	eff(dB)	Gain(dBi)
		2400	-3.2	1.5
		2410	-3.2	1.2
		2420	-3.5	1.0
		2430	-3.5	0.9
		2440	-3.6	0.8
		2450	-3.8	0.3
		2460	-3.9	0.3
		2470	-4.0	0.4
		2480	-4.1	0.6
		2490	-4.2	0.9
		2500	-4.0	1.0
		AVG	-3.7	0.8
ANT2 5G	Without Cable Loss	5150	-3.0	2.2
		5200	-3.1	2.4
		5250	-3.0	2.4
		5300	-2.8	2.6
		5350	-2.7	2.5
		5400	-2.6	2.6
		5450	-2.5	2.7
		5500	-2.4	2.6
		5550	-2.5	2.8
		5600	-2.3	2.6
		5650	-2.2	2.9
		5700	-2.2	2.8
		5750	-2.2	2.9
		5800	-2.0	3.0
		5850	-2.1	3.2
		AVG	-2.5	2.7
		4850	-	-6.8

Antenna Peak Gain:

Frequency	Peak Gain (dBi)	
	Ant1	Ant2
	IFA	Monopole
BT/BLE Band 2400-2480MHz	1.5	-
2.4GHz Band 2400-2500MHz	1.5	-
5GHz Band I (5150-5250MHz)	-	2.4
5GHz Band II-A (5250-5350MHz)	-	2.6
5GHz Band II-C (5470-5725MHz)	-	2.9
5GHz Band III (5725-5850MHz)	-	3.2

Measurement Method

Test Standard

Name	Parameter	Method	Standard no.
Ant Procedures	Radiation Efficiency, Antenna Gain, Radiation Pattern	IEEE standard test procedures for antennas	ANSI/IEEE std 149-2021

Equipment list and calibration date

Equipment	Manufacturer	Model No.	Last Cal.	Due Date
Network Analyzer	Agilent	E5071C	2025.11.18	2026.11.17
Anechoic chamber	General Test Systems Inc.	GTS RayZone 1800	2025.06.29	2027.06.29

Test software Version Number Used

Test software being used	Software Version
GTS MaxSign Libra	1.5.0-rc.4

Test Information

Test lab	HT-SH
Test equipment	Agilent E5071C
Test date	2026/06/04
Test engineer	Tang, Yandong 唐艳东
Reviewer	Chen, Haoyu 陈昊宇
Chamber info	ETS_CMW500
Gain measurement Lab info	ETS_CMW500
Calibration info	Agilent E5071C_2026/03/15

Testing Procedures

Test Step Flow

- 1.Maintain the test ambient temperature at 23 ± 2 °C. Power on all test instruments and allow a preheating period of no less than 30 minutes prior to measurement.
- 2.Turn on the anechoic chamber power supply, connect the test cables, and mount the Device Under

Test (DUT) in accordance with the applicable test standards.

3. Define test parameters and objectives per the approved test plan, then perform calibration procedures as required.

4. Launch the GTS Maxsign test software. Upon completion of the test, export the corresponding test plots and raw data, and save them to the designated directory.

Test Principle

1. The antenna performance measurements are conducted in accordance with the test methods defined in ANSI/IEEE Std 149-2021.

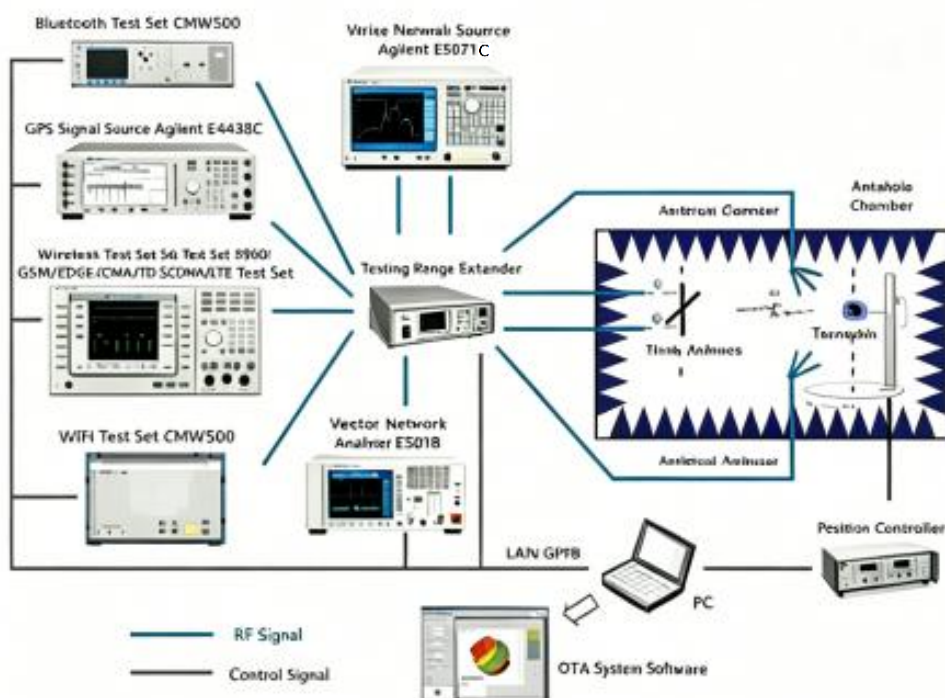
Test Conditions

1. The Device Under Test (DUT), Vector Network Analyzer (VNA), test instruments, and RF test cables/connectors shall exhibit adequate reliability, stability, dynamic range, and measurement accuracy to ensure valid and precise test results.

2. All test instruments must hold valid calibration certificates and remain within their respective calibration validity periods at the time of testing.

3. The DUT shall be complete and undamaged prior to testing, and the test environment shall be kept clean and free of interference sources.

Test Configuration diagram

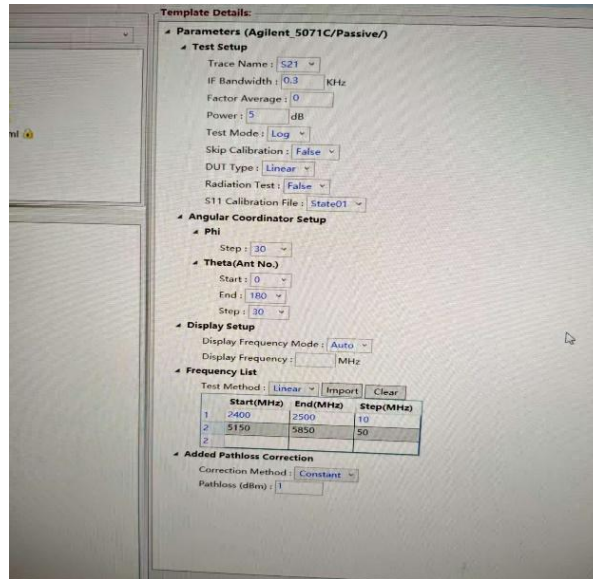


Test set up and block diagram of test setup

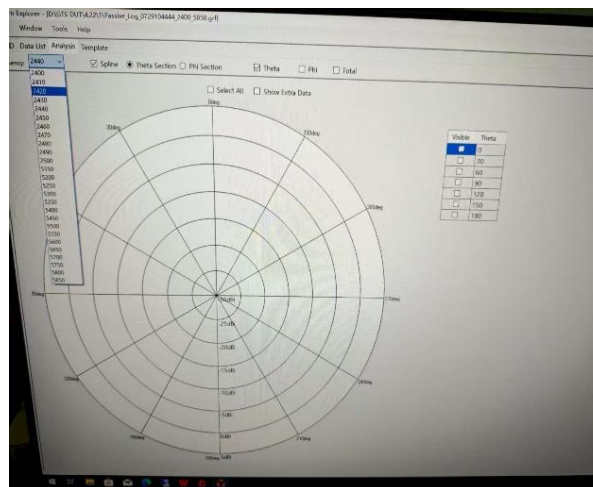
Chamber Set up - Conical Cut

【Refer to Antenne report appendix】

Set frequency point



Set test angle

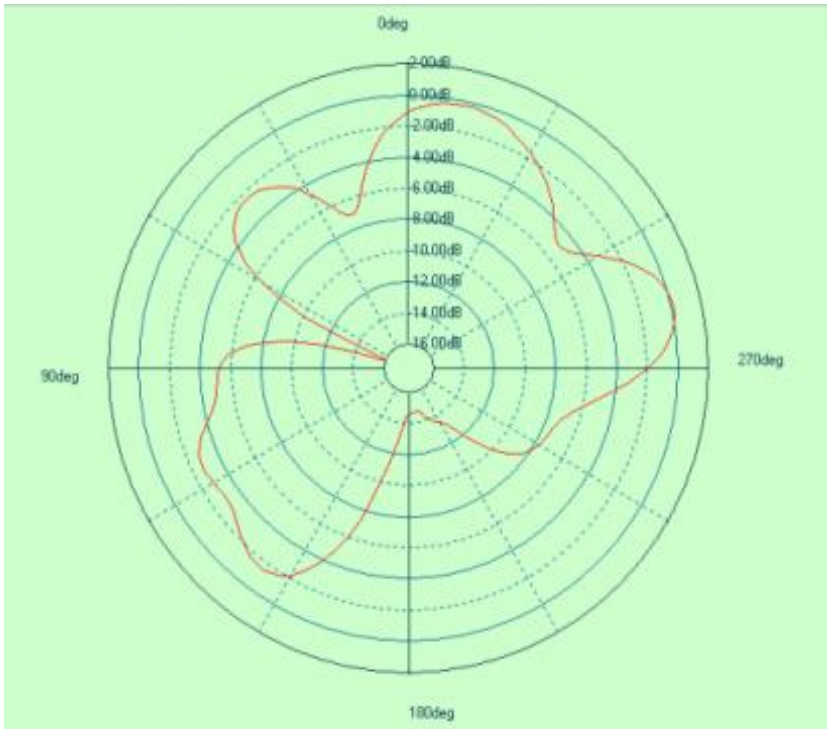


Antenna Radiation Pattern

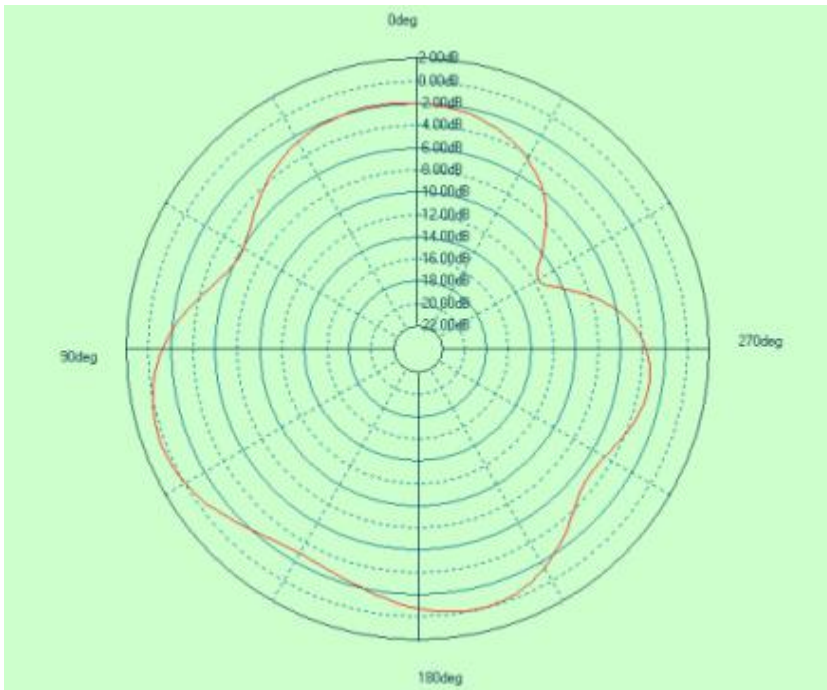
Antenna 1: Wi-Fi 2.4G/BT/BLE

2440MHz

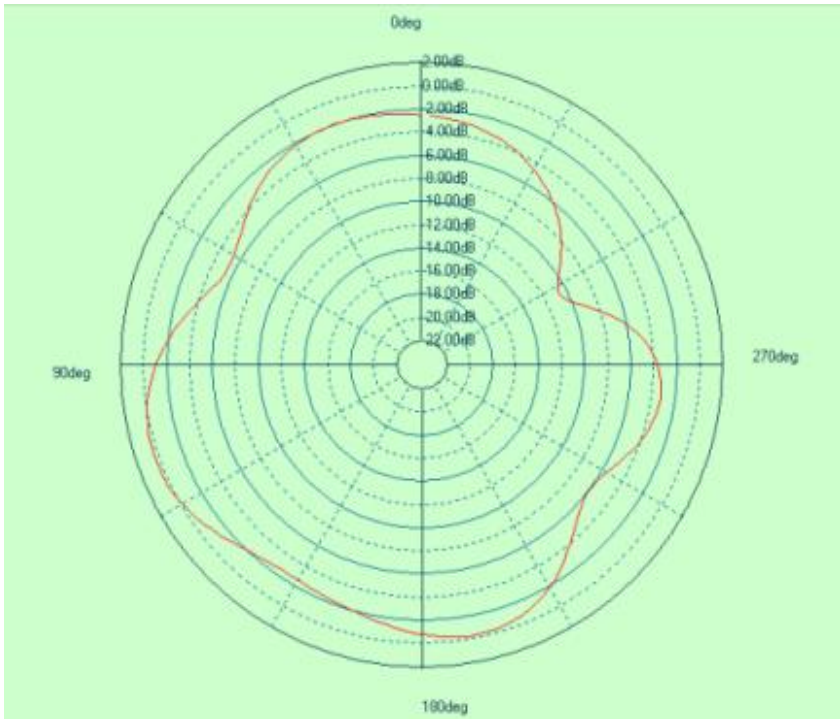
1. 2440MHz 2D-H



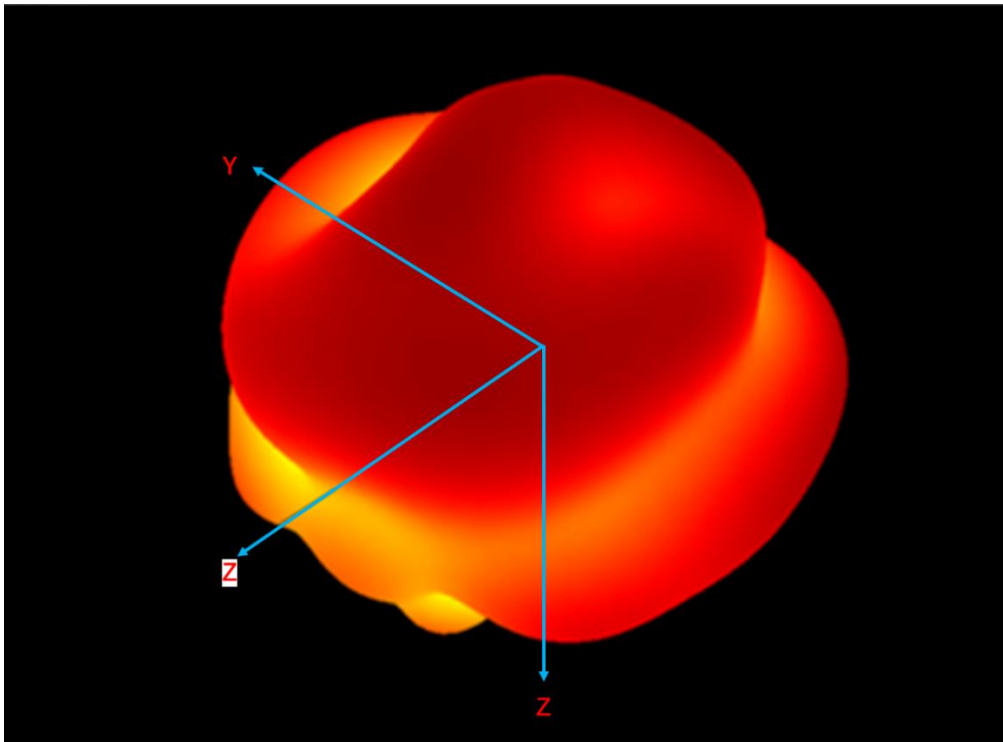
2. 2440MHz **2D-E1**



3. 2440MHz **2D-E2**



4. 2440MHz 3D Pattern

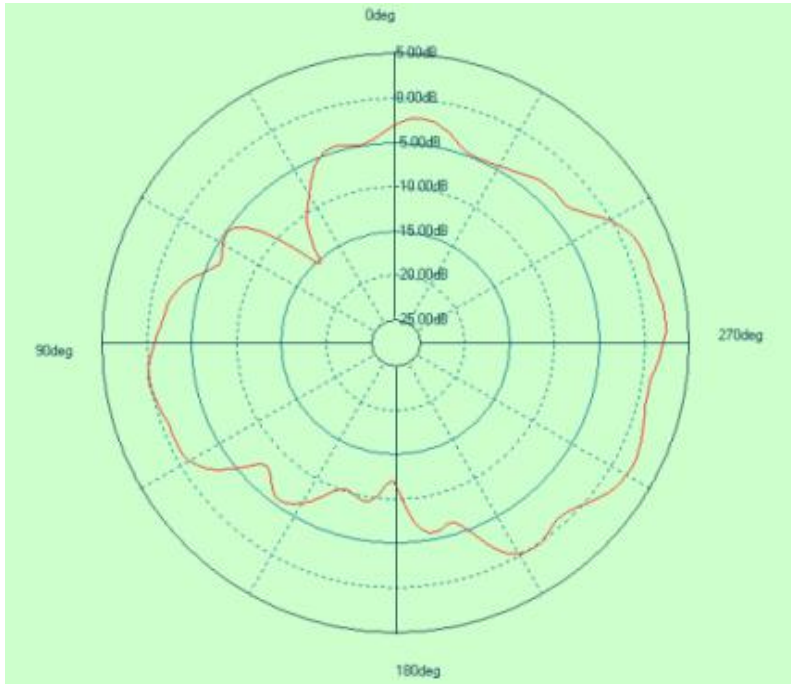


Antenna Radiation Pattern

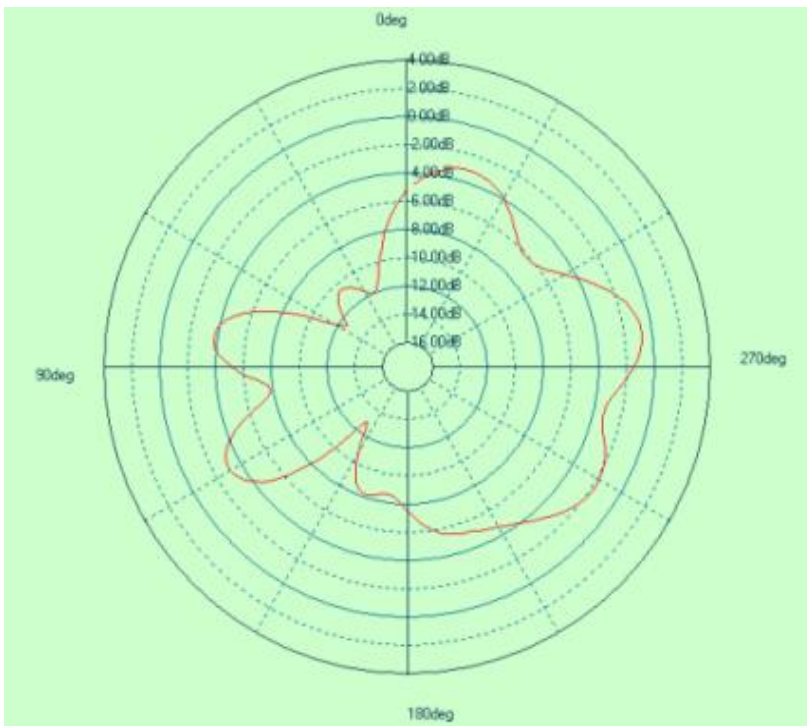
Antenna 2: Wi-Fi 5GHz

5500MHz

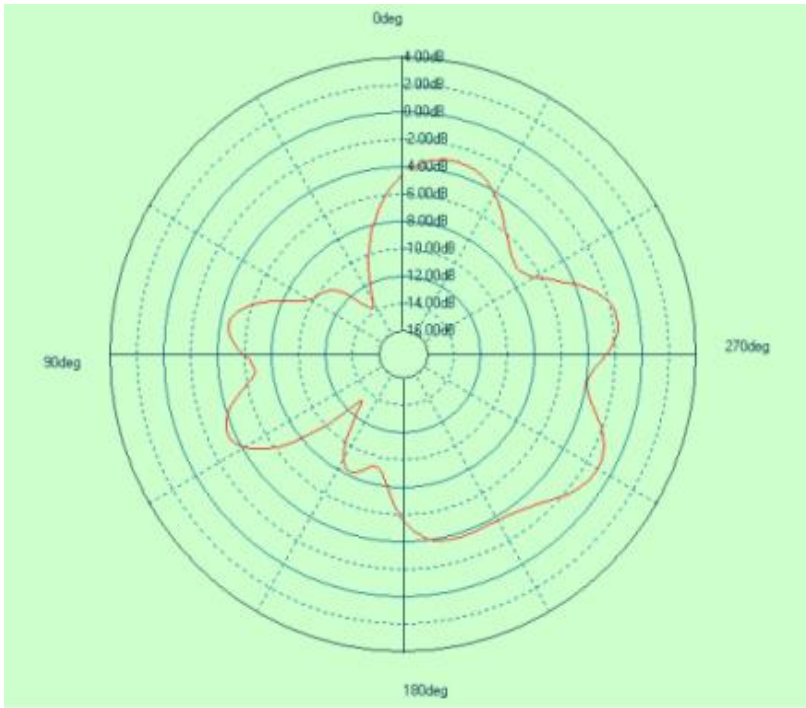
1. 5500MHz **2D-H**



2. 5500MHz **2D-E1**



3. 5500MHz **2D-E2**



4. 5500MHz 3D Pattern

