

Antenna Under Test (AUT) Report

Report No.: EVT-700-006759

Model Name: VR0038(Lemmy)

Equipment Type: Video equipment

Manufacturer: FIH CO., LTD.

Test Location: No.19, Hwa Ya 2nd Rd., Kwei shan Dist., Taoyuan City,
Taiwan

Tested by: Leo Chen

Report Date: 2024/03/28

Report Release History

Report version	Description	Date Issued
VR0038 AUT Report	Original release	2024/03/28

Table of Contents

➤ BLE Antenna(F146D8713910001)	5
1. EUT Antenna Information	5
2. Measured Values and Calculation of Antenna Gains	5
3. RF Conducted Power Measurement	6
3.1 Test Setup	6
3.2 Test Instruments	6
3.3 Test Procedure	7
3.4 Test Result of RF conducted Power	7
4. 3D Radiation Pattern Measurement	1
4.1 Test Location	1
4.2 Description of the anechoic chamber	1
4.3 Test Instruments	2
4.4 Test Procedure	3
4.5 Test Setup photos	4
4.6 3D Pattern Test Plot	5
➤ WiFi-0 Antenna(VR0038-0)	8
1. EUT Antenna Information	8
2. Measured Values and Calculation of Antenna Gains	8
3. RF Conducted Power Measurement	9
3.1 Test Setup	9
3.2 Test Instruments	9
3.3 Test Procedure	10
3.4 Test Result of RF conducted Power	10
4. 3D Radiation Pattern Measurement	10
4.1 Test Location	10
4.2 Description of the anechoic chamber	10
4.4 Test Procedure	12
4.5 Test Setup photos	13
4.6 3D Pattern Test Plot	14
➤ WiFi-1 Antenna(VR0038-1)	20
1. EUT Antenna Information	20
2. Measured Values and Calculation of Antenna Gains	20
3. RF Conducted Power Measurement	21
3.1 Test Setup	21
3.2 Test Instruments	21
3.3 Test Procedure	22
3.4 Test Result of RF conducted Power	22
4. 3D Radiation Pattern Measurement	22
4.1 Test Location	22

4.2 Description of the anechoic chamber	22
4.4 Test Procedure	24
4.5 Test Setup photos	25
4.6 3D Pattern Test Plot	26

➤ BLE Antenna(F146D8713910001)

1. EUT Antenna Information

- 1) Antenna Material : Cable + FR4
- 2) Antenna Type : PIFA
- 3) Antenna Dimension : 30.00*13.90*0.60 mm
- 4) Operating Frequency : 2.4 GHz - 2.5 GHz
- 5) Input Impedance : 50 Ω
- 6) Standing-Wave Ratio : 1.85

2. Measured Values and Calculation of Antenna Gains

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

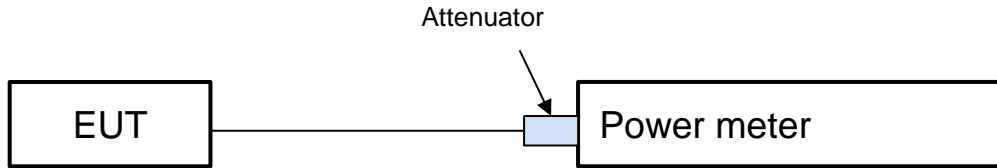
Antenna Peak Gain (dBi) = Max EIRP(dBm) - Conducted Power (dBm)

Frequency	Max Peak EIRP (dBm)	Conducted Power (dBm)	Antenna Peak Gain (dBi)
2402	3.76	1	2.76
2440	4.71	1.2	3.51
2480	4.51	1.1	3.41

Test Date: 2024/03/28

3. RF Conducted Power Measurement

3.1 Test Setup



3.2 Test Instruments

Description	Model No.	Serial No.	Last Calibration	Calibrated Until
MXA Signal Analyzer Keysight	N9020B	MY60112409	2024/2/20	2025/2/19
Pulse Power Sensor Anritsu	MA2411B	1726434	2023/6/19	2024/6/18
RF Power Meter Anritsu	ML2495A	1529002	2023/6/17	2024/6/16

Note: The calibration interval of the above test instruments is __12__ months

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 (MHz)	Measured Power (dBm)
2402	1
2440	1.2
2480	1.1

Test Date: 2024/03/28

4. 3D Radiation Pattern Measurement

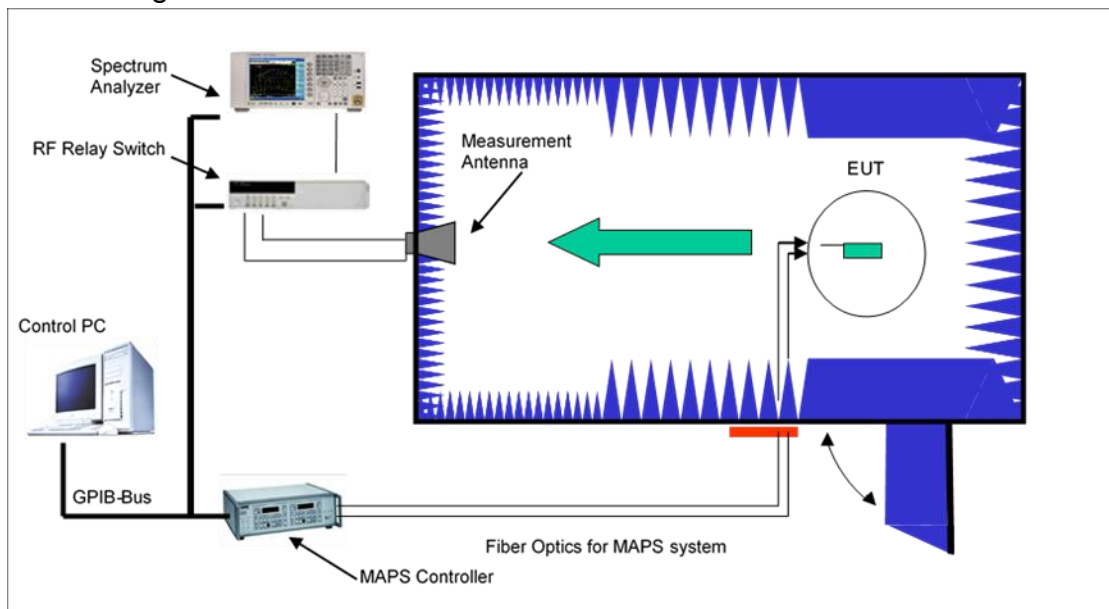
4.1 Test Location

3D radiation pattern measurement in the anechoic chamber

4.2 Description of the anechoic chamber

Anechoic Chamber

- Length: 7.32m
- Width: 3.66m
- Height: 3.51m



4.3 Test Instruments

Description	Model No.	Serial No.	Last Calibration
(OTA3-HY) ETS Anechoic Chamber	ETS-Lindgren AMS-8500	CT0000411-1132	N/A
Spectrum Analyzer R&S	FSV	102330	2023/5/9
Horn Antenna ETS	3164-08	00157567	N/A
Software	ETS-Lindgren EMQuest V1.14 build 31654	1281	N/A

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

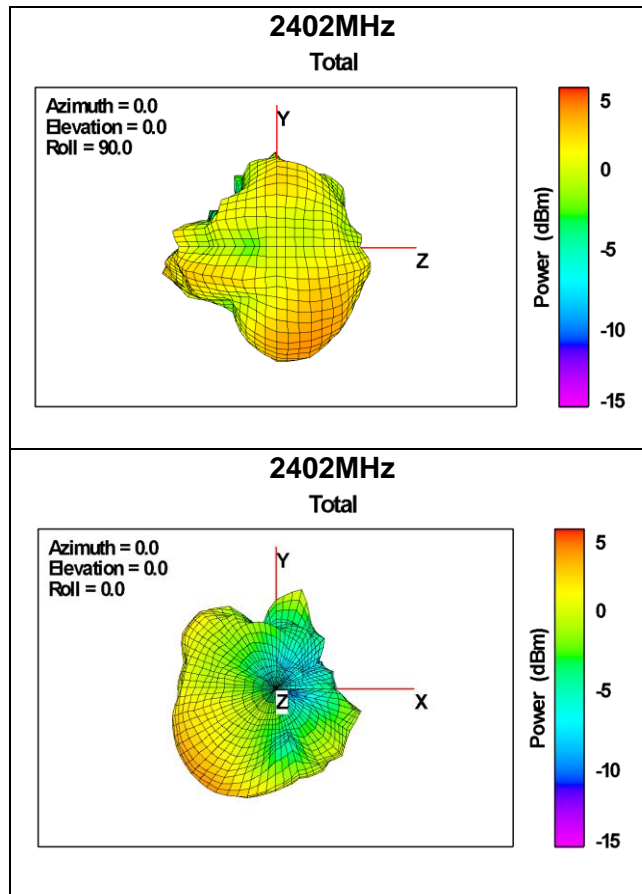
4.4 Test Procedure

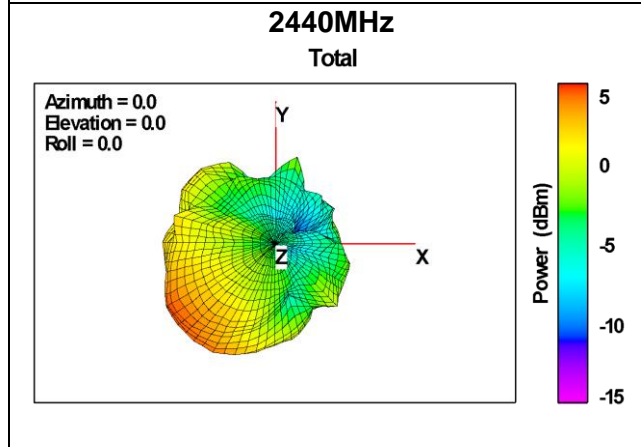
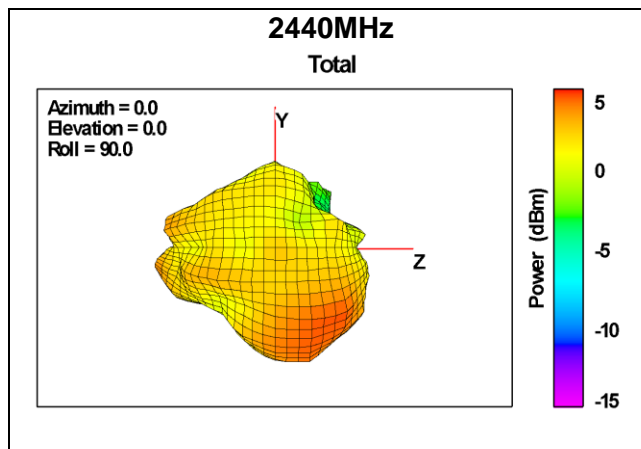
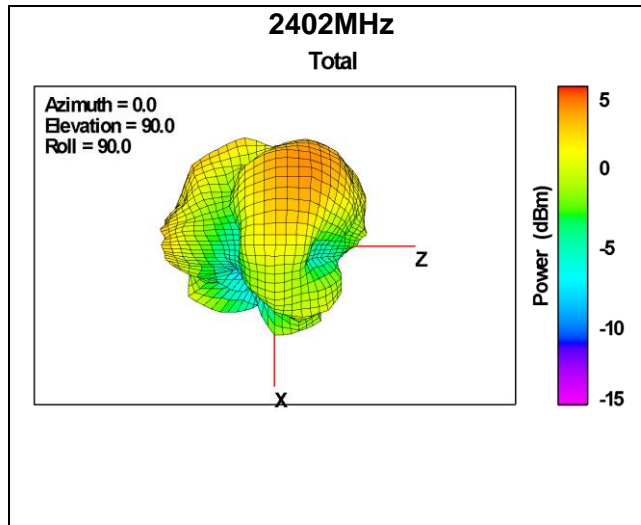
- i. Fasten the EUT in the center of the turntable, record the coordinates and take pictures.
- ii. Configuring EUT continuously transmitting (100% duty cycle).
- iii. Make sure the transmit signal is stable and at the maximum RF power level.
- iv. Setup the channel power function by spectrum analyzer.
- v. Read the 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.
- vi. $\text{Antenna Peak Gain (dBi)} = \text{Max EIRP(dBm)} - \text{Conducted Power (dBm)}$

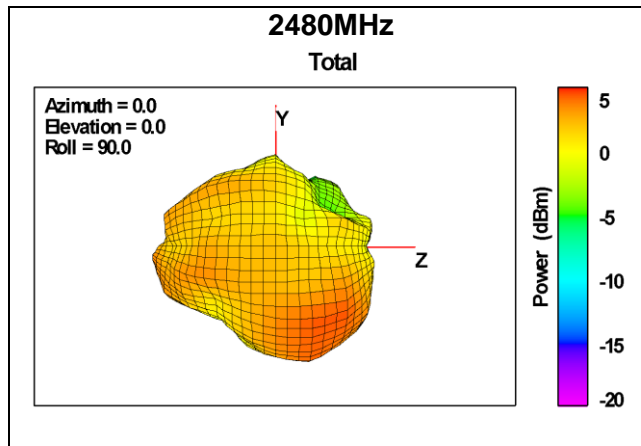
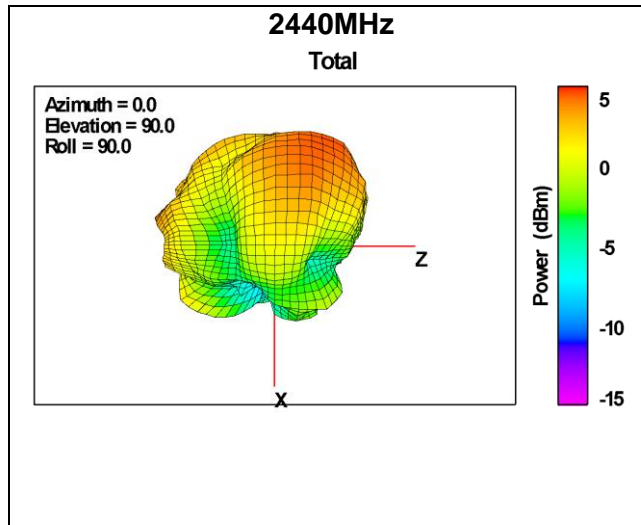
4.5 Test Setup photos

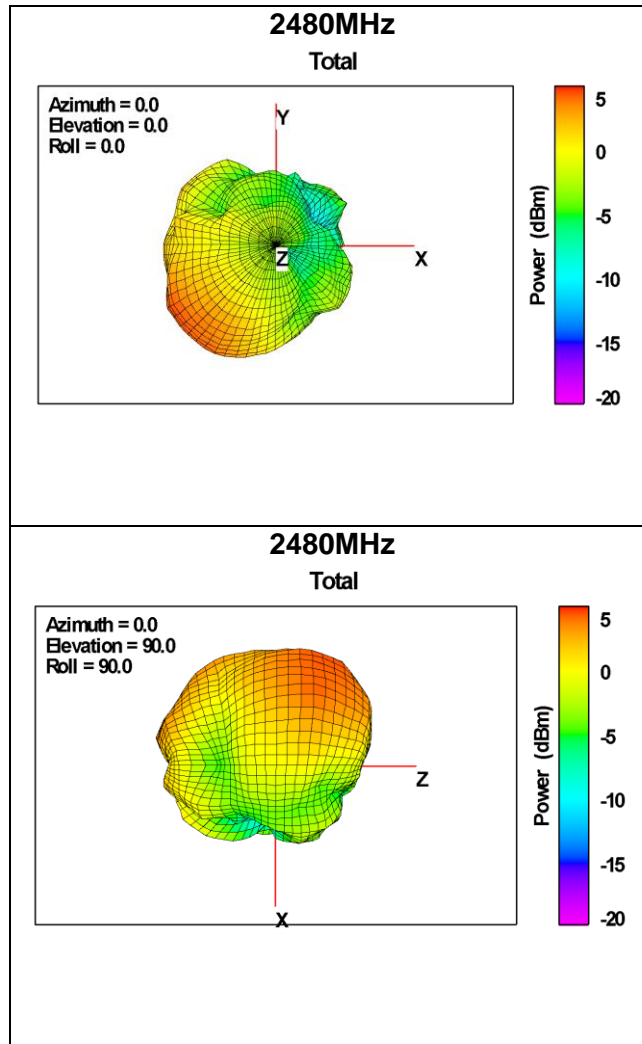
confidential

4.6 3D Pattern Test Plot









➤ WiFi-0 Antenna(VR0038-0)

1. EUT Antenna Information

- 1) Antenna Material : PCB
- 2) Antenna Type : PIFA
- 3) Antenna Dimension : 43.00*12.50*1.0 mm
- 4) Operating Frequency : 2.4 GHz - 2.5 GHz / 5GHz-6GHz
- 5) Input Impedance : 50 Ω
- 6) Standing-Wave Ratio : 1.85

2. Measured Values and Calculation of Antenna Gains

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

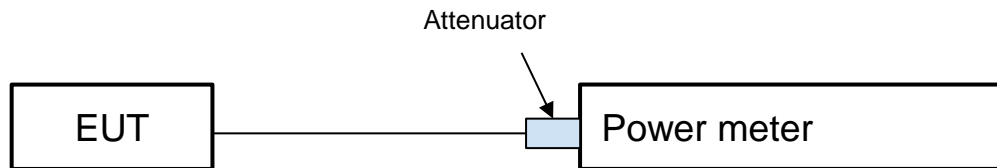
$$\text{Antenna Peak Gain (dBi)} = \text{Max EIRP(dBm)} - \text{Conducted Power (dBm)}$$

Frequency	Max Peak EIRP (dBm)	Conducted Power (dBm)	Antenna Peak Gain (dBi)
2412	18.11	14.8	3.31
2437	18.6	15	3.6
2462	18.07	14.8	3.27
5180	16.06	13.7	2.36
5500	17.03	13.8	3.23
5825	17.14	13.9	3.24

Test Date: 2024/3/28

3. RF Conducted Power Measurement

3.1 Test Setup



3.2 Test Instruments

Description	Model No.	Serial No.	Last Calibration
-------------	-----------	------------	------------------

MXA Signal Analyzer Keysight	N9020B	MY60112409	2024/2/20
Pulse Power Sensor Anritsu	MA2411B	1726434	2023/6/19
RF Power Meter Anritsu	ML2495A	1529002	2023/6/17

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

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 (MHz)	Measured Power (dBm)
2412	14.8
2437	15
2462	14.8
5180	13.7
5500	13.8
5825	13.9

4. 3D Radiation Pattern Measurement

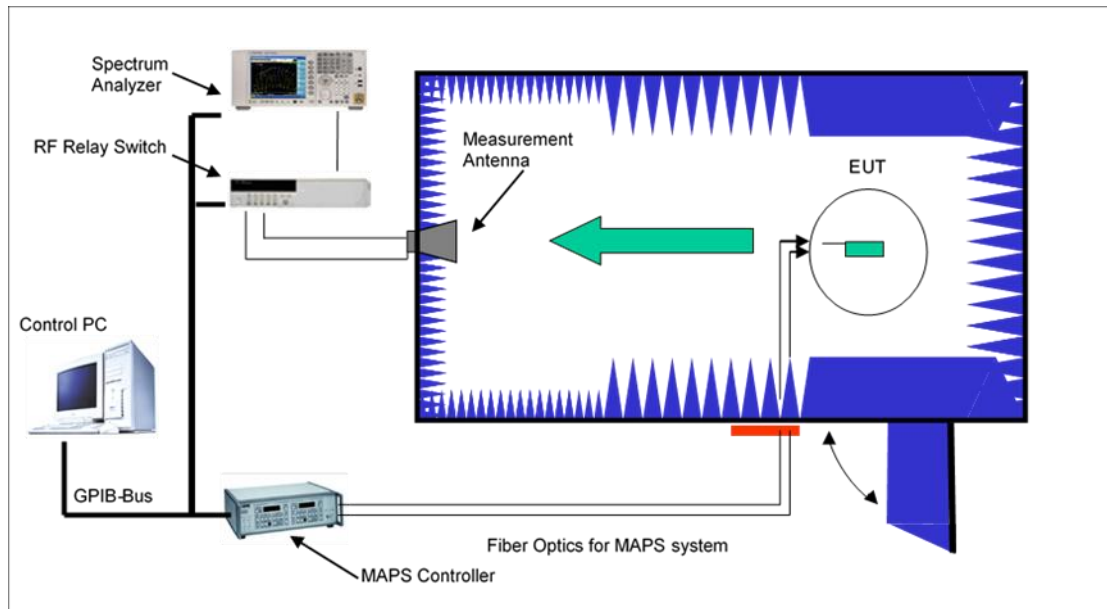
4.1 Test Location

3D radiation pattern measurement in the anechoic chamber

4.2 Description of the anechoic chamber

Anechoic Chamber

- Length: 7.32m
- Width: 3.66m
- Height: 3.51m



4.3 Test Instruments

Description	Model No.	Serial No.	Last Calibration
(OTA3-HY) ETS Anechoic Chamber	ETS-Lindgren AMS-8500	CT0000411-1132	N/A
Spectrum Analyzer R&S	FSV	102330	2023/5/9
Horn Antenna ETS	3164-08	00157567	N/A
Software	ETS-Lindgren EMQuest V1.14 build 31654	1281	N/A

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

4.4 Test Procedure

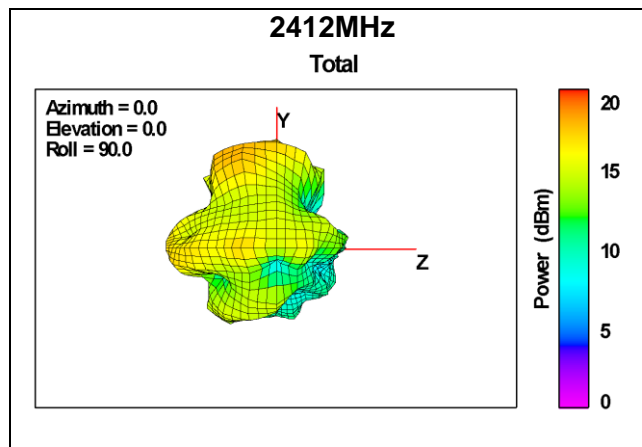
- i. Fasten the EUT in the center of the turntable, record the coordinates and take pictures.
- ii. Configuring EUT continuously transmitting (100% duty cycle).
- iii. Make sure the transmit signal is stable and at the maximum RF power level.
- iv. Setup the channel power function by spectrum analyzer.
- v. Read the 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.
- vi. Antenna Peak Gain (dBi) = Max EIRP(dBm) - Conducted Power (dBm)

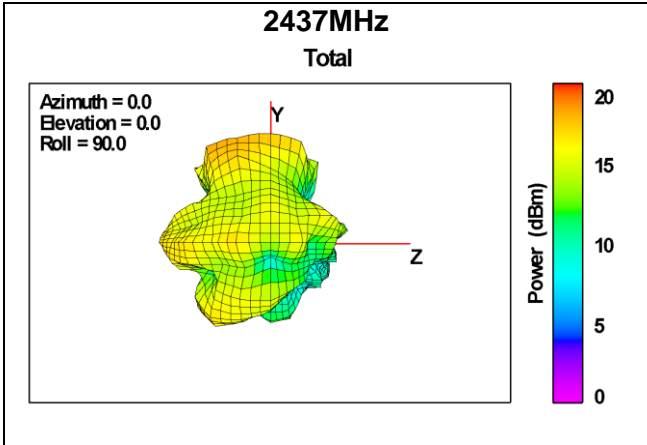
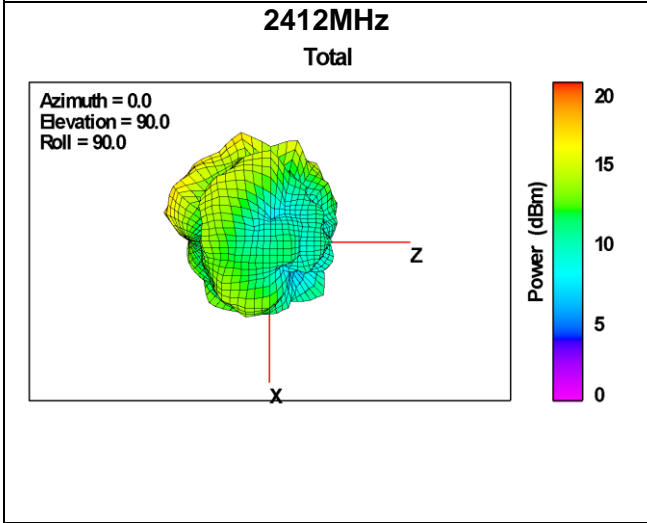
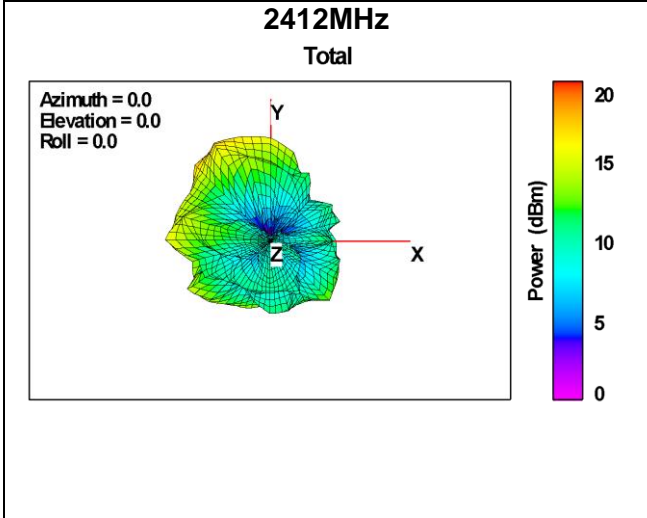
4.5 Test Setup photos

confidential

4.6 3D Pattern Test Plot

2.4GHz Band

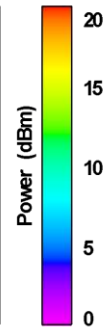
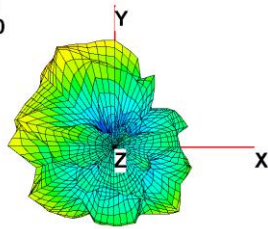




2437MHz

Total

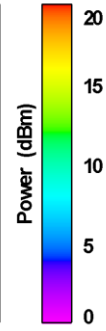
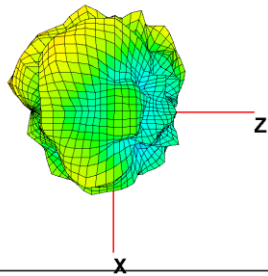
Azimuth = 0.0
Elevation = 0.0
Roll = 0.0

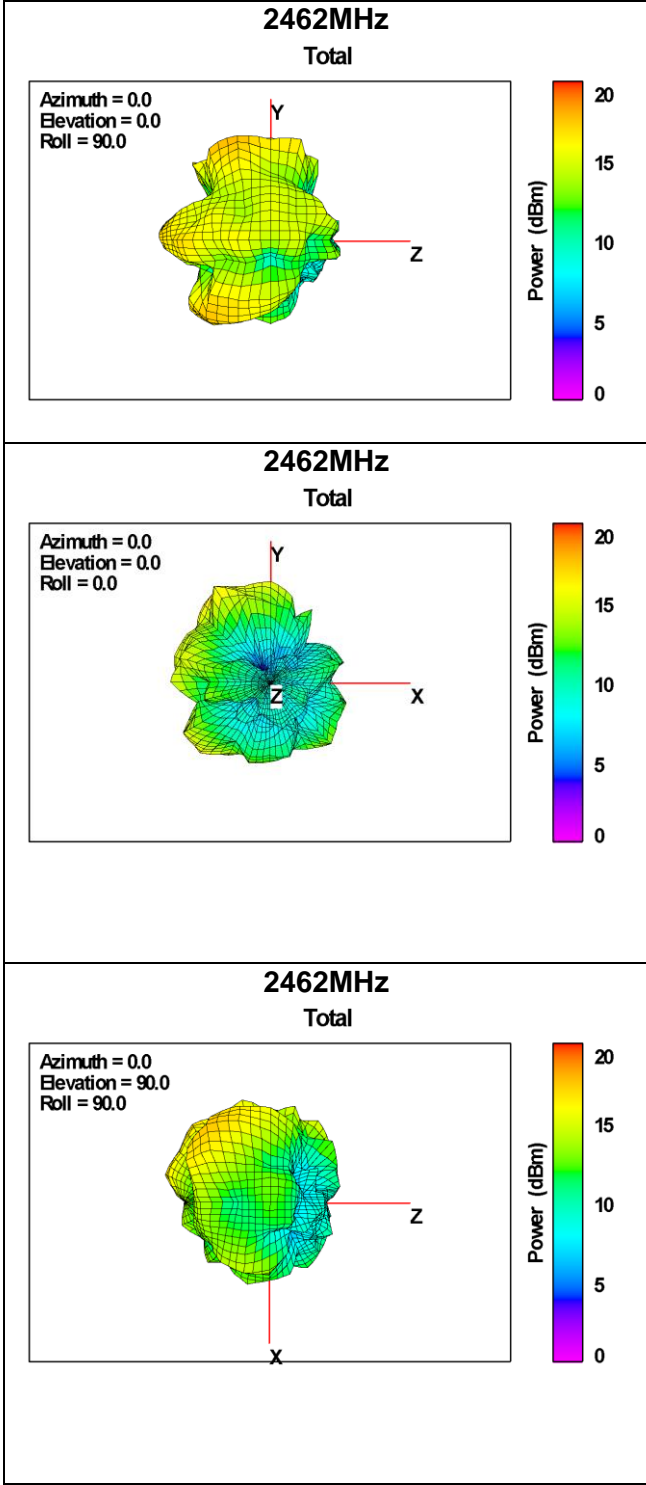


2437MHz

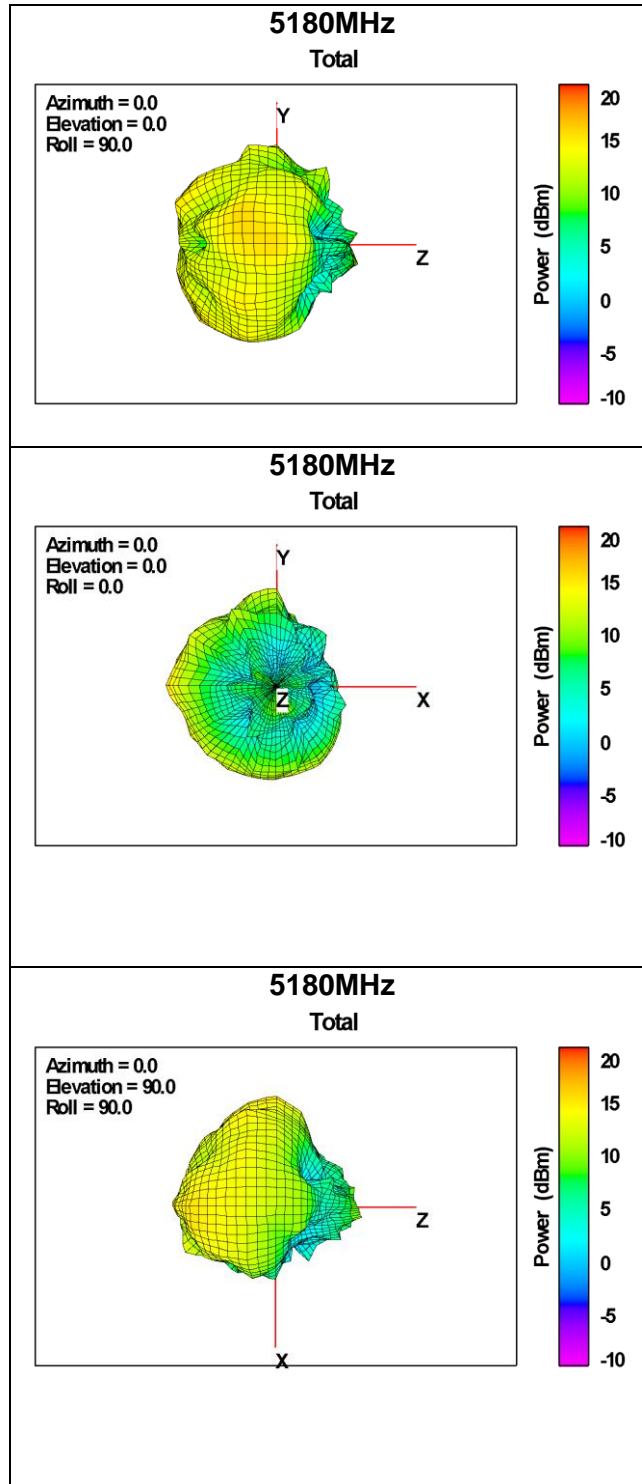
Total

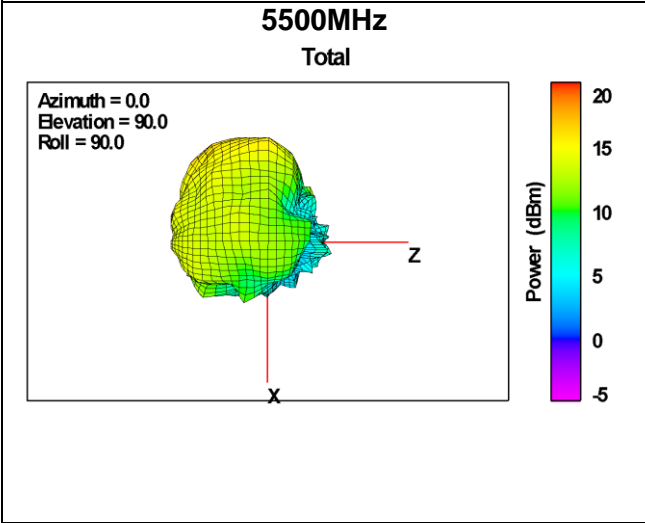
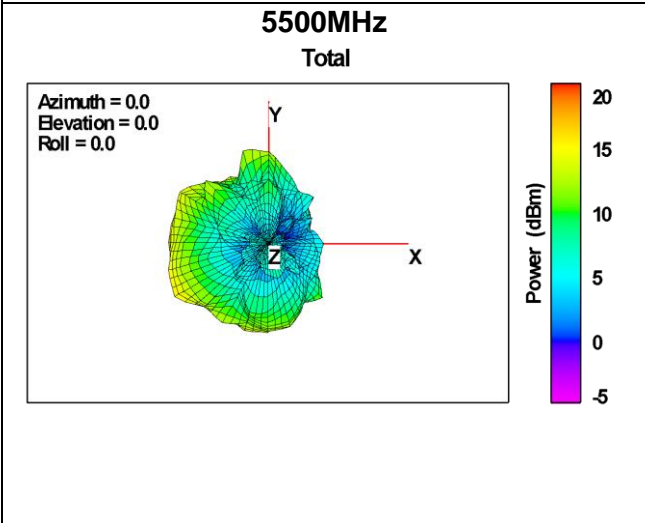
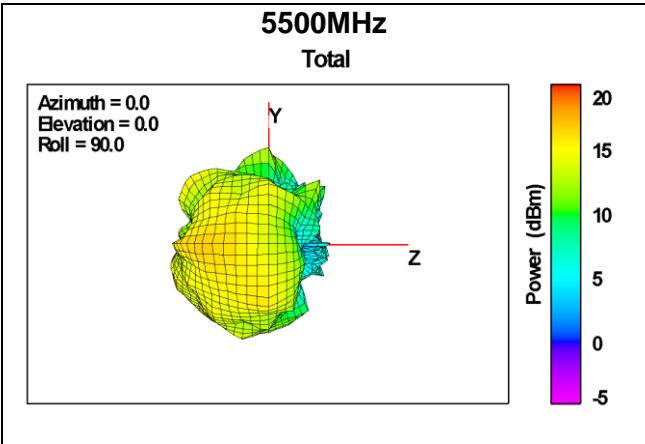
Azimuth = 0.0
Elevation = 90.0
Roll = 90.0

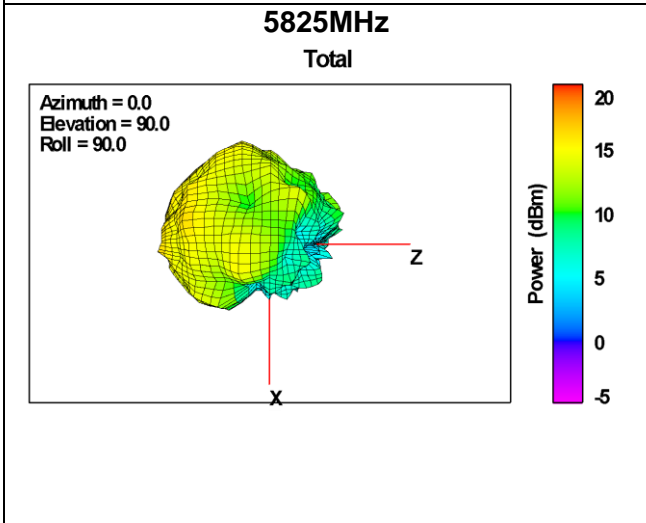
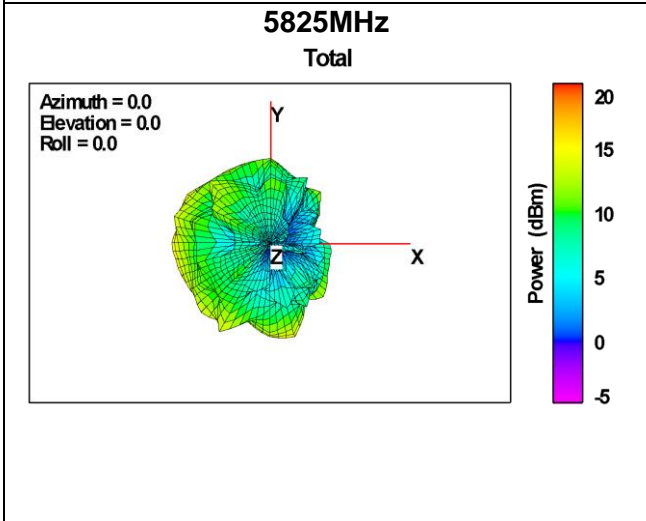
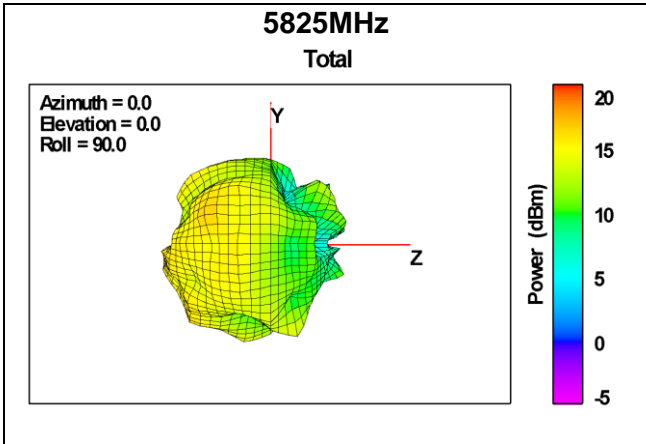




5GHz Band







➤ WiFi-1 Antenna(VR0038-1)

1. EUT Antenna Information

- 1) Antenna Material : PCB
- 2) Antenna Type : PIFA
- 3) Antenna Dimension : 41.00*13.0*1.0 mm
- 4) Operating Frequency : 2.4 GHz - 2.5 GHz / 5GHz-6GHz
- 5) Input Impedance : 50 Ω
- 6) Standing-Wave Ratio : 1.85

2. Measured Values and Calculation of Antenna Gains

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

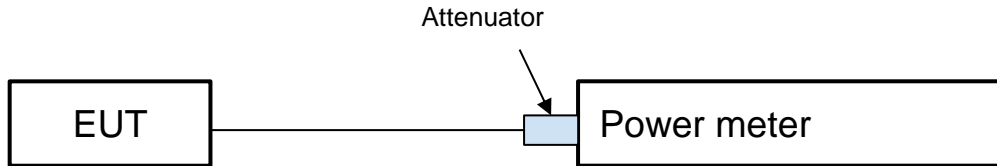
Antenna Peak Gain (dBi) = Max EIRP(dBm) - Conducted Power (dBm)

Frequency	Max Peak EIRP (dBm)	Conducted Power (dBm)	Antenna Peak Gain (dBi)
2412	16.47	14.6	1.87
2437	18.07	15	3.07
2462	18.07	14.8	3.27
5180	16.69	13.6	3.09
5500	16.56	13.7	2.86
5825	15.22	13.5	1.72

Test Date: 2024/3/28

3. RF Conducted Power Measurement

3.1 Test Setup



3.2 Test Instruments

Description	Model No.	Serial No.	Last Calibration
MXA Signal Analyzer Keysight	N9020B	MY60112409	2024/2/20
Pulse Power Sensor Anritsu	MA2411B	1726434	2023/6/19
RF Power Meter Anritsu	ML2495A	1529002	2023/6/17

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

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 (MHz)	Measured Power (dBm)
2412	14.6
2437	15
2462	14.8
5180	13.6
5500	13.7
5825	13.5

4. 3D Radiation Pattern Measurement

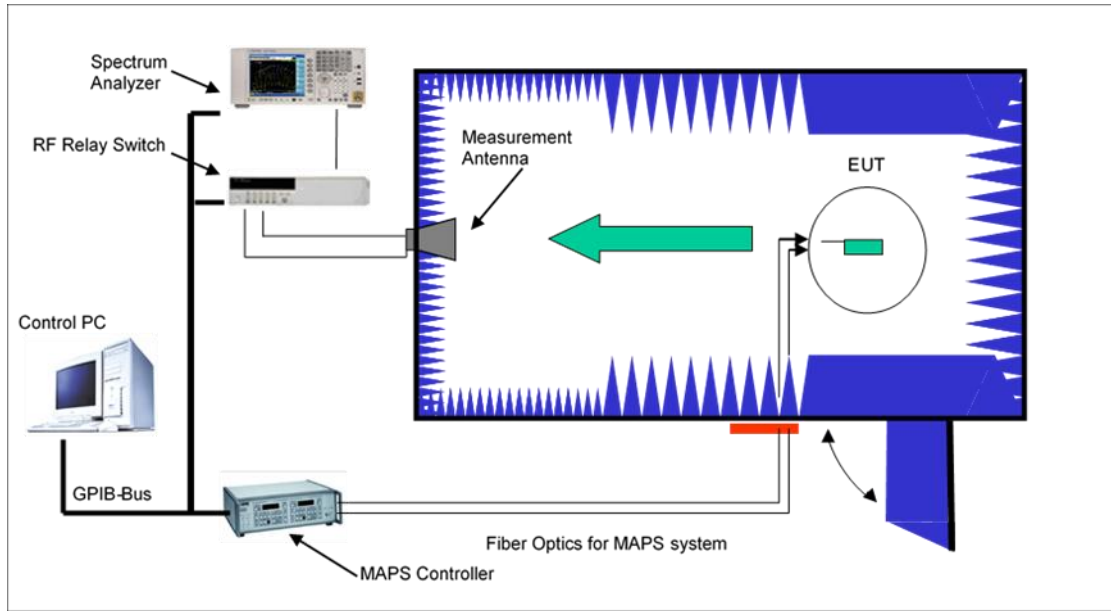
4.1 Test Location

3D radiation pattern measurement in the anechoic chamber

4.2 Description of the anechoic chamber

Anechoic Chamber

- Length: 7.32m
- Width: 3.66m
- Height: 3.51m



4.3 Test Instruments

Description	Model No.	Serial No.	Last Calibration
(OTA3-HY) ETS Anechoic Chamber	ETS-Lindgren AMS-8500	CT0000411-1132	N/A
Spectrum Analyzer R&S	FSV	102330	2023/5/9
Horn Antenna ETS	3164-08	00157567	N/A
Software	ETS-Lindgren EMQuest V1.14 build 31654	1281	N/A

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

4.4 Test Procedure

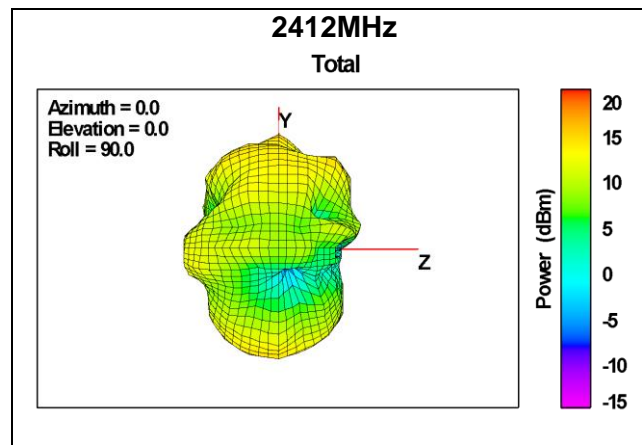
- i. Fasten the EUT in the center of the turntable, record the coordinates and take pictures.
- ii. Configuring EUT continuously transmitting (100% duty cycle).
- iii. Make sure the transmit signal is stable and at the maximum RF power level.
- iv. Setup the channel power function by spectrum analyzer.
- v. Read the 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.
- vi. $\text{Antenna Peak Gain (dBi)} = \text{Max EIRP(dBm)} - \text{Conducted Power (dBm)}$

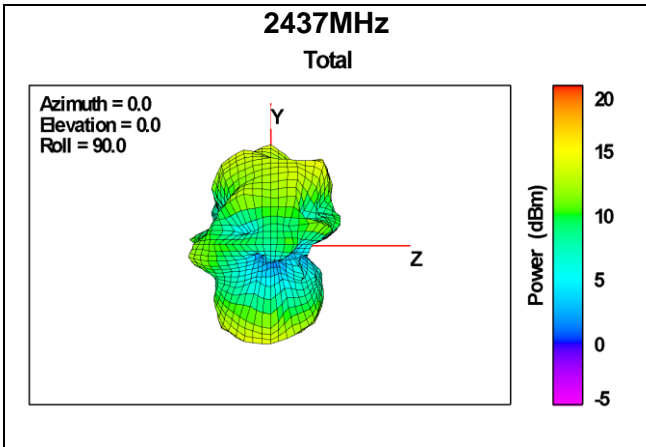
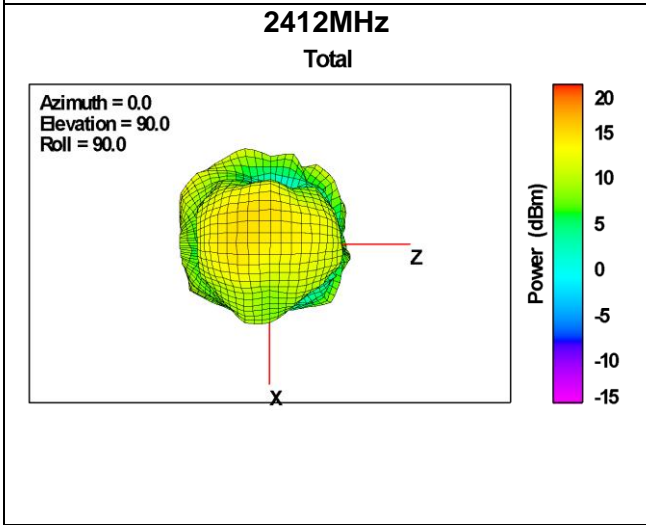
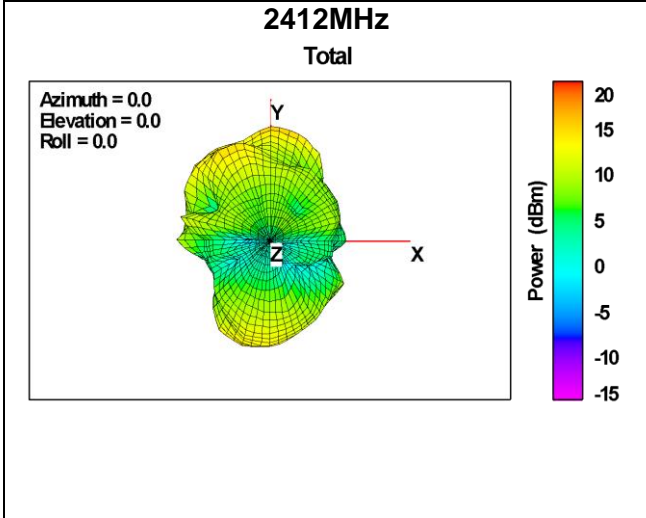
4.5 Test Setup photos

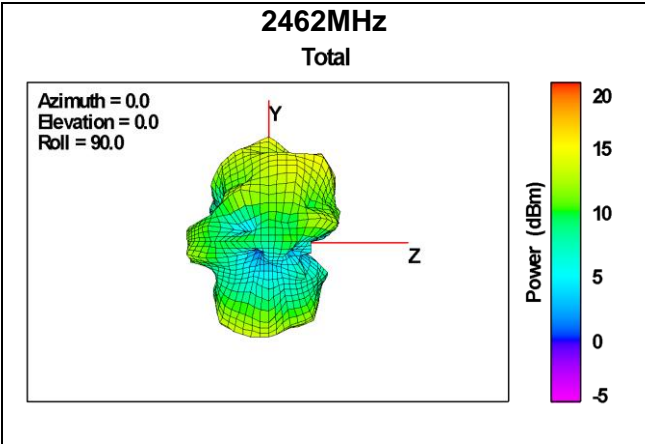
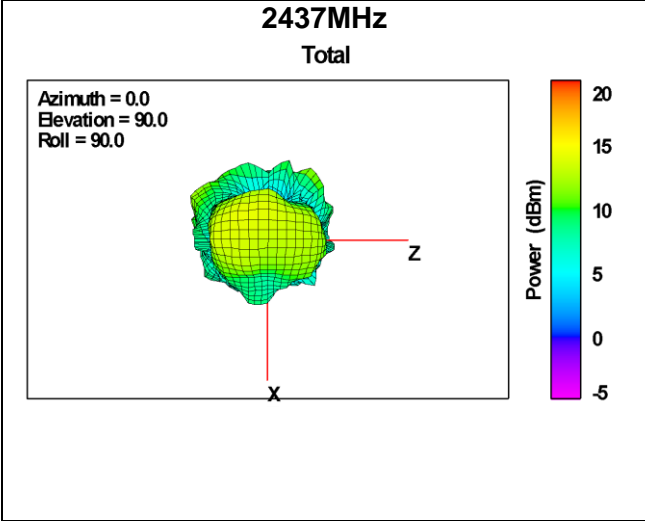
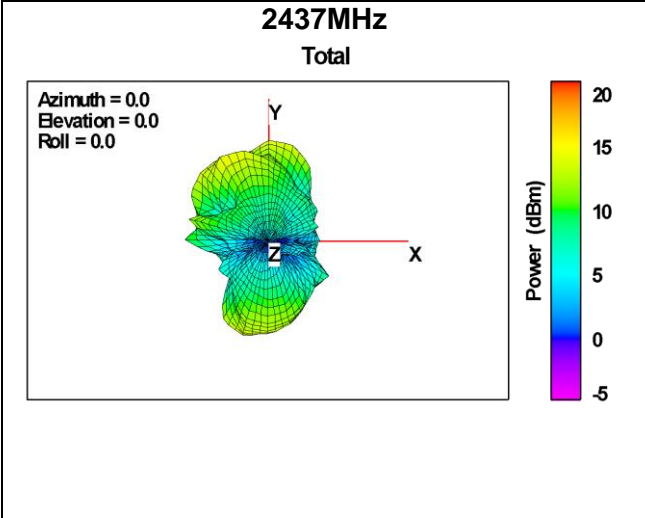
Confidential

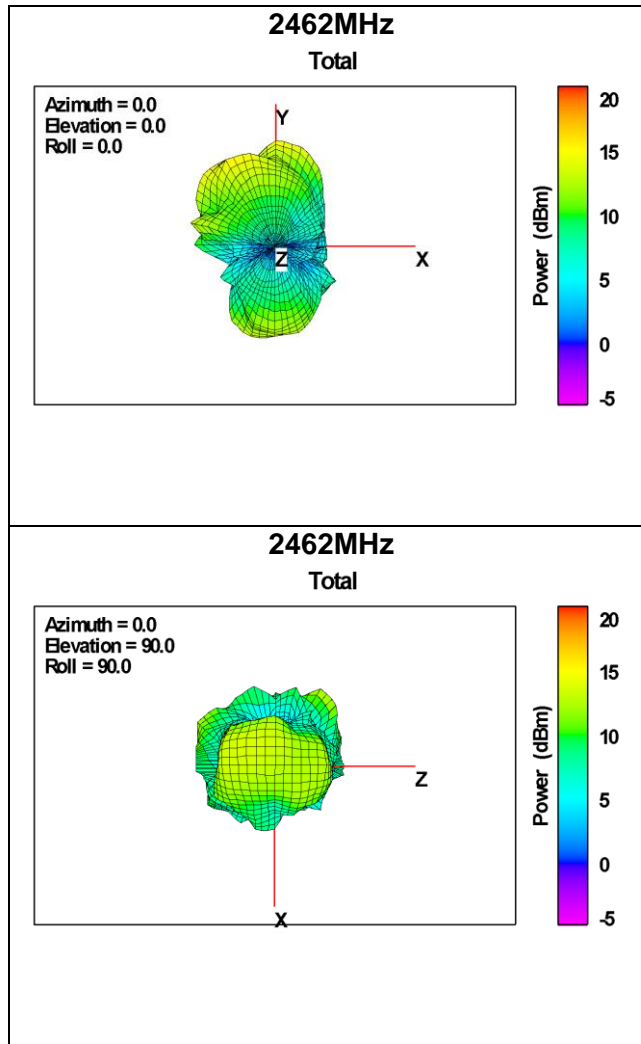
4.6 3D Pattern Test Plot

2.4GHz Band









5GHz Band

