

Product Name	Type	Rev.	HUTEC	1.2
JAS-U3-2024	FPCB+Cable, SMT		JASTEC	1.2

Antenna Under Test (AUT) Reprot

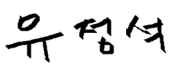
Customer Name : JASTEC

Company Name : HUTEC

Model Name : JAS-U3-2024

Description ITEM : WIFI , BT Antenna (FPCB+Cable, SMT)

Test Location : 5th FL, 46, Gunpocheomdansaneop 2-ro,
Gunpo-si, Gyeonggi-do, Korea

	Function	Mechanical Manager	Measurement Responsible	Technical Manager	Laboratory Director
HUTEC	Name	Yoo Jeong-seok	Bang Gu-Heyn	Kwon Soon-heung	Park Jun-han
	Signature				

PRODUCT PHOTO	WIFI	 WIFI Antenna Manufacturer : TAOGLAS(FXP70.07.0053A) Polarization: Linear (Vertical orientation) Feed Impedance: 50 Ohms Operating Frequency Bands:2400 MHz - 2483 MHz
	BT	 Bluetooth Antenna Manufacturer : AMOTECH ALA131C3 Polarization: Linear (Vertical orientation) Feed Impedance: 50 Ohms Operating Frequency Bands:2400 MHz - 2480 MHz

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1. Revision History of Product Specification

1.1 History List of Approval Sheet

[illegible]

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2. RF Specification

2.1 Test Condition

2.1.1 Test Environment (Condition/Method)

Measurement Standard: Radiated measurements per FCC Part 15 requirements.

① Voltage Standing Wave Ratio(VSWR)

Step 1. Set the frequency range after connect 50cm cable to Network analyzer.

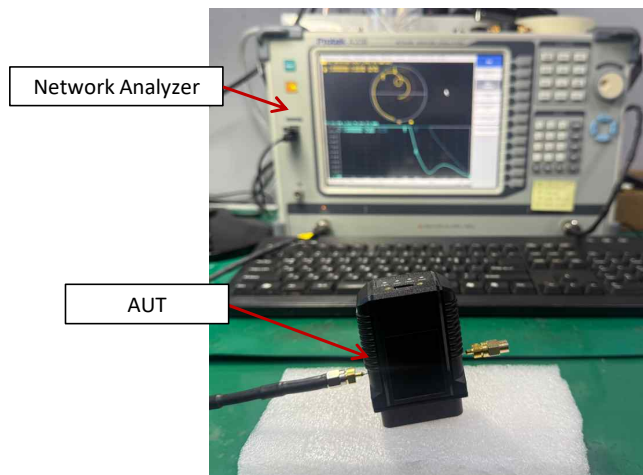
Step 2. Connect Calibration Kit to Network analyzer and calibrate.

Step 3. Fix the cable and keep separation distance over 30cm for reducing effect by Network analyzer.

Step 4. Fix insulator over 5cm on the bottom of measuring antenna.

Step 5. Measure VSWR with setting marker of desired frequency.

Set

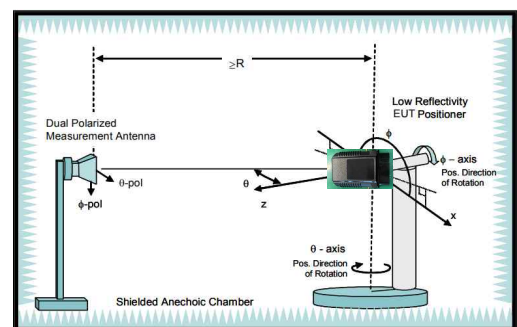
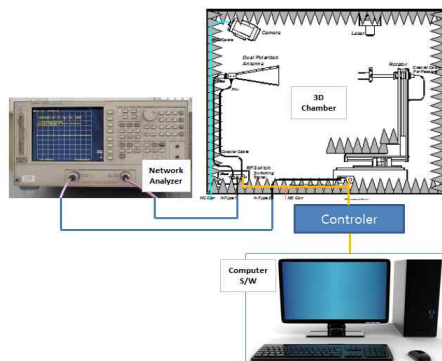


② Radiation Pattern & Gain

Step 1. Calibrate the Chamber system using Horn antenna, and set up the software to control the Chamber system at the same time.

Step 2. Keep the measuring antenna to holder.

Step 3. Measure Gain & efficiency.



COORDINATE SYSTEM

Description of the Anechoic chamber :

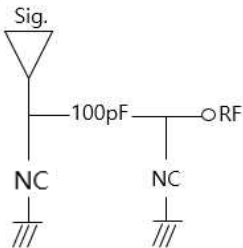
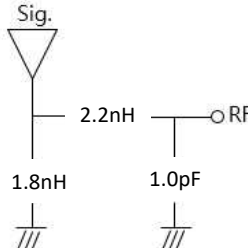
Length : 5.0m
Width : 2.8m
Height : 2.8m
Receiving antenna height : 1.4m
Turntable Height : 1.4m

Test Location :

4th FL, 46, Gunpocheomdansaneop 2-ro,
Gunpo-si, Gyeonggi-do, Korea

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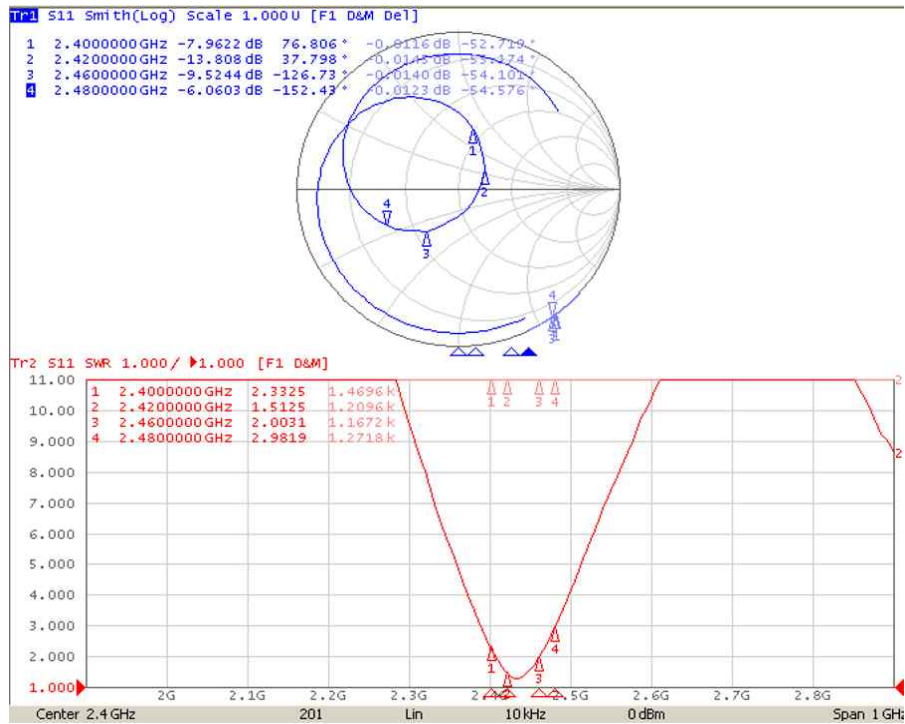
2.2 Electrical Specification

WIFI Antenna					
VSWR	Frequency	2400MHz	2420MHz	2460MHz	2480MHz
	SPEC	Less than 3.3 : 1	Less than 2.5 : 1	Less than 3.0 : 1	Less than 3.9 : 1
3D Avg. Gain	SPEC	More than -3.5dBi	More than -3.1dBi	More than -3.5dBi	More than -4.6dBi
BT Antenna					
VSWR	Frequency	1559MHz	1609MHz	2400MHz	2483MHz
	SPEC	Less than 3.9 : 1	Less than 3.8 : 1	Less than 4.2 : 1	Less than 4.5 : 1
3D Avg. Gain	SPEC	More than -4.0dBi	More than -4.3dBi	More than -4.7dBi	More than -4.8dBi
Matching Value		WIFI Antenna		BT Antenna	
					
Directivity		Omni-directional			
Polarization		Linear			
Feed Impedance		50 Ohms			
Power Handling		2Watt			

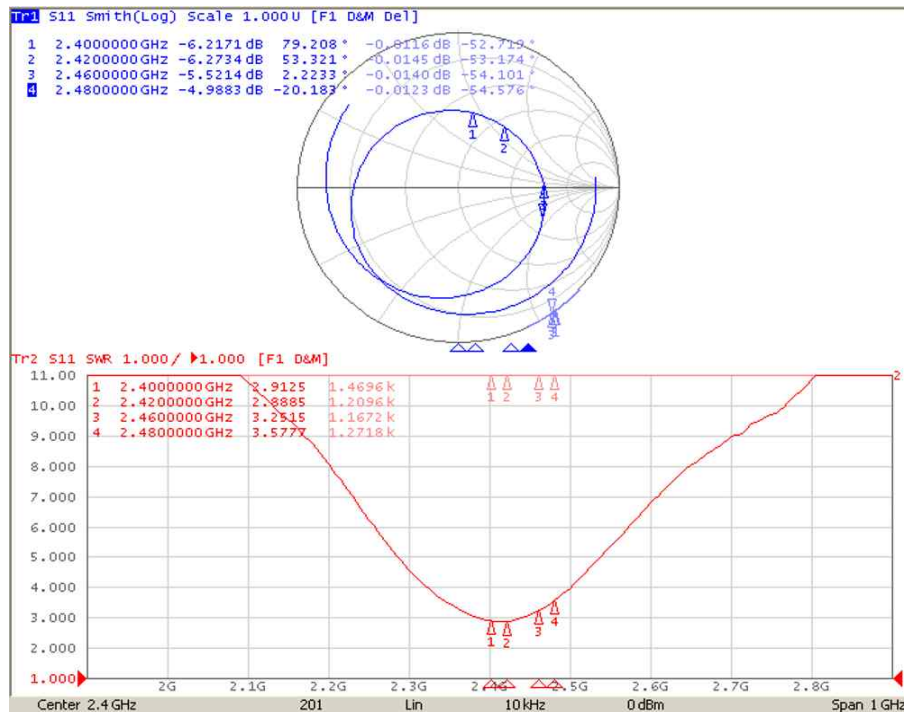
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2.2.1 V.S.W.R

WIFI Antenna



BT Antenna



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2.2.2 3D Gain & Radiation Pattern

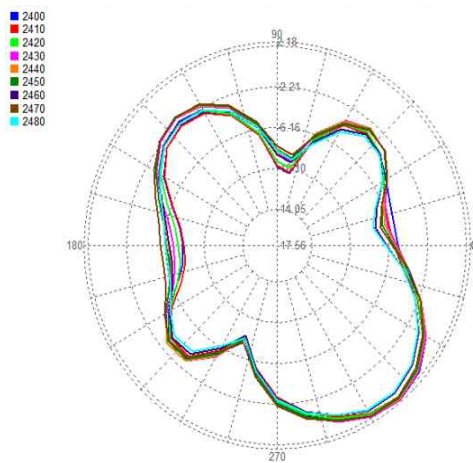
Test Location : 4th FL, 46, Gunpocheomdansaneop 2-ro, Gunpo-si, Gyeonggi-do, Korea

1. WIFI Antenna

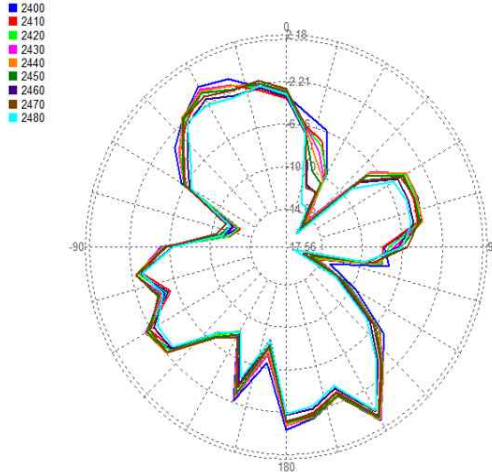
Frequency	Avg. Gain	Efficiency	Peak Value			Null Value		
[MHz]	[dBi]	[%]	θ [Deg]	Φ [Deg]	Value[dBi]	θ [Deg]	Φ [Deg]	Value[dBi]
2400	-2.593	55.047	110	260	2.824	170	30	-16.038
2410	-2.65	54.323	110	260	2.875	170	30	-16.278
2420	-2.158	60.836	110	260	3.285	170	30	-15.88
2430	-1.83	65.612	110	260	3.734	170	30	-15.62
2440	-1.862	65.126	110	260	3.645	170	30	-15.936
2450	-2.215	60.05	110	260	3.306	170	30	-16.416
2460	-2.532	55.821	110	260	2.997	170	30	-16.904
2470	-3.171	48.187	110	260	2.365	170	30	-17.558
2480	-3.643	43.218	110	260	1.934	170	30	-17.968

Test Antenna XY plane

Horizontal

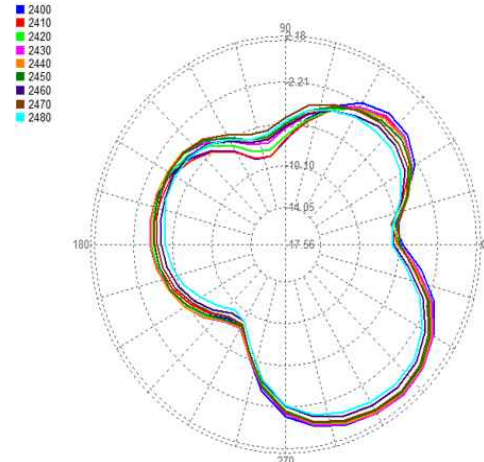


Vertical

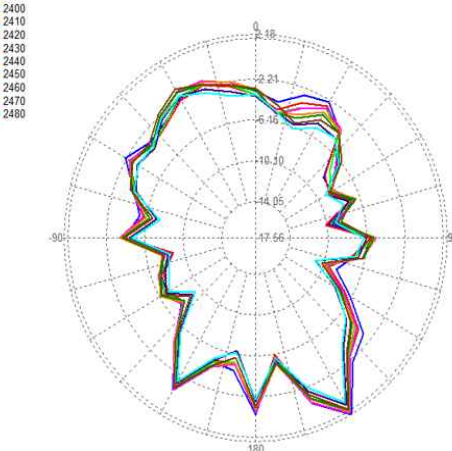


Test Antenna XZ plane

Horizontal



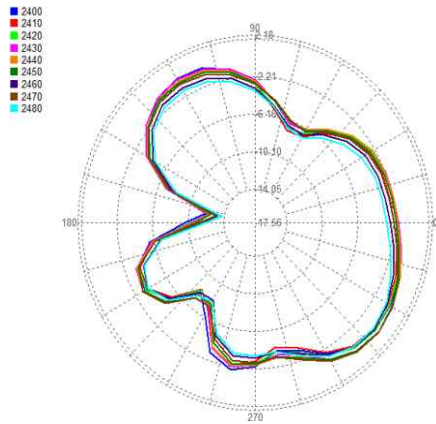
Vertical



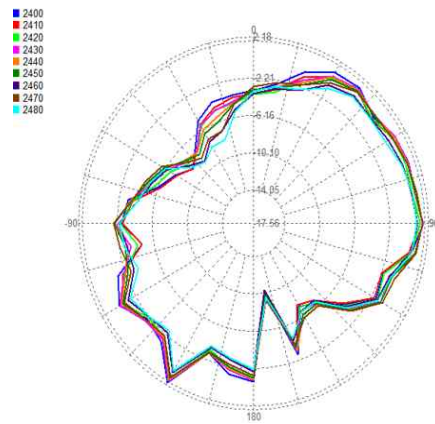
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Test Antenna YZ plane

Horizontal



Vertical

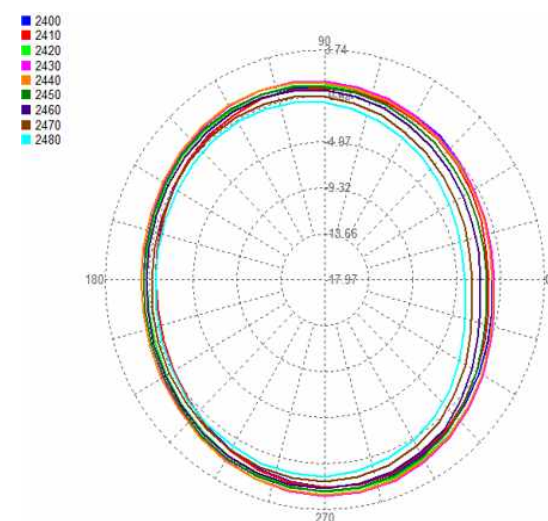


2. BT Antenna

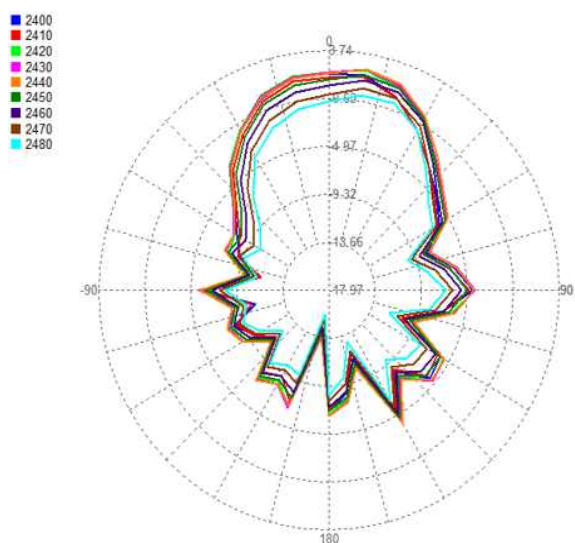
Frequency	Avg. Gain	Efficiency	Peak Value			Null Value		
			θ [Deg]	Φ [Deg]	Value[dBi]	θ [Deg]	Φ [Deg]	Value[dBi]
2400	-3.044	49.615	150	240	2.173	40	190	-17.375
2410	-3.413	45.569	150	240	1.797	40	190	-16.86
2420	-3.315	46.611	150	240	1.769	40	190	-16.392
2430	-3.01	50.008	150	240	2.06	40	190	-16.176
2440	-3.053	49.505	150	240	1.868	40	190	-16.085
2450	-3.153	48.38	150	240	1.762	40	190	-16.578
2460	-3.727	42.389	90	310	1.152	40	190	-17.558
2470	-3.188	47.999	90	310	1.646	40	190	-16.46
2480	-3.846	41.252	90	310	0.969	40	190	-16.75

Test Antenna XY plane

Horizontal



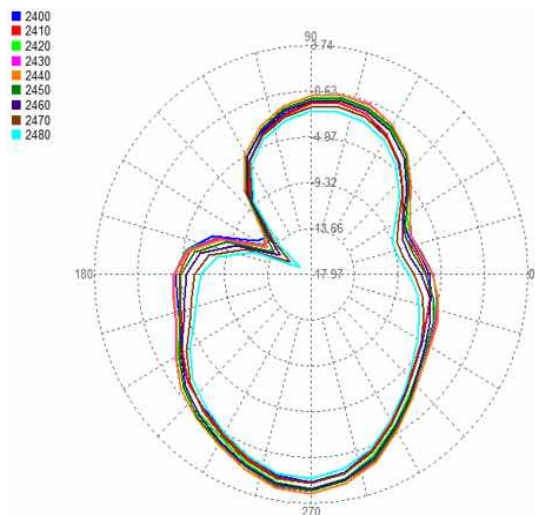
Vertical



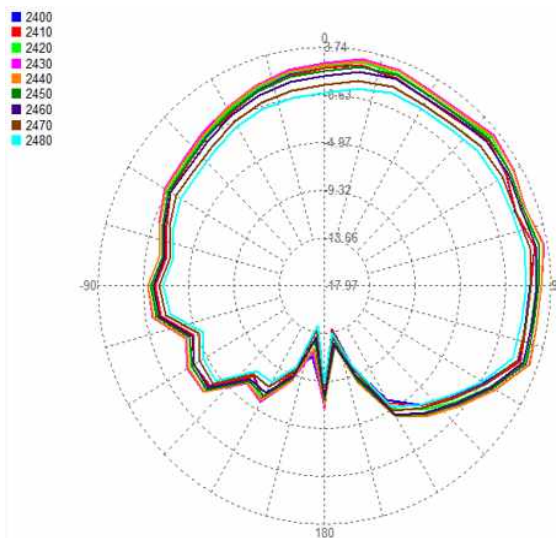
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Test Antenna XZ plane

Horizontal

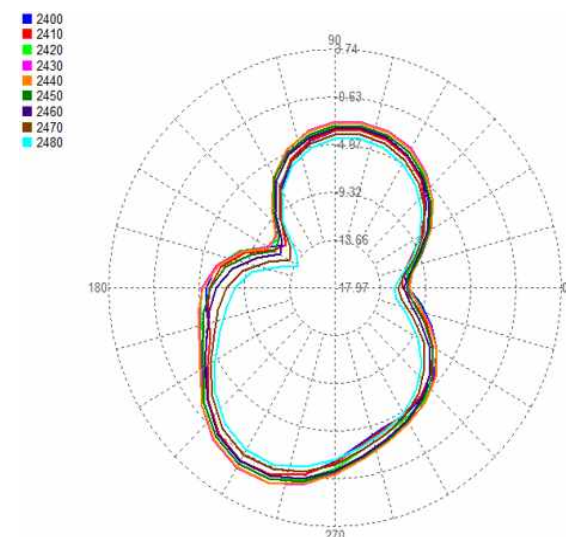


Vertical

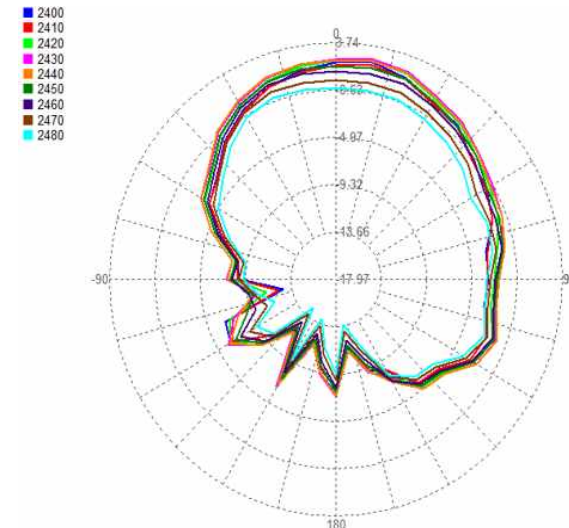


Test Antenna YZ plane

Horizontal



Vertical



2.3. SUMMARY

Antenna	Frequency (MHz)	Max Gain (dBi)	Theta (θ)	Phi (φ)
WiFi	2430	3.734	110°	260°
Bluetooth	2430	2.06	150°	240°

• All gains measured radiated, no additional simulation.

Compliance Statement

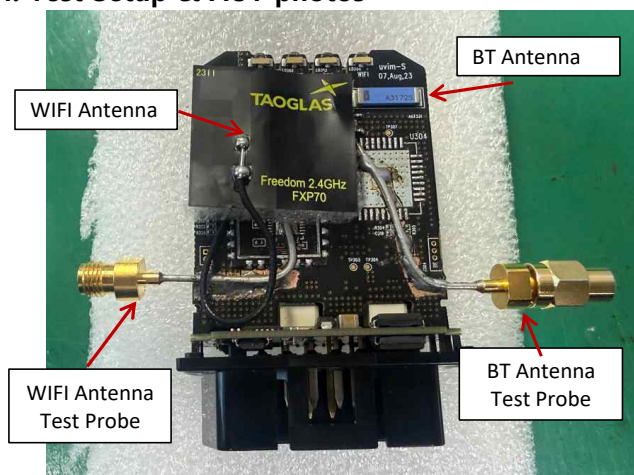
- All antenna measurements were conducted using radiated methods in accordance with FCC Part 15.
- No numerical simulation data were used for certification measurements.
- Maximum gain values and VSWR are within expected parameters.
- The test report provides all required data per KDB 353028 and KDB 662911 guidelines.

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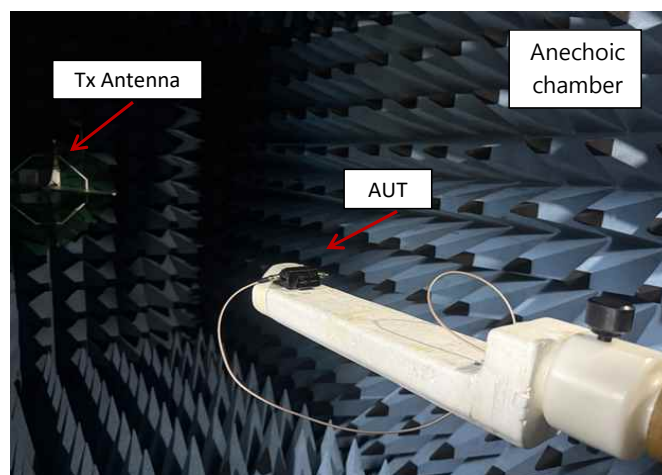
3. List of Equipment

Equipment Summary Sheet				
Equipment Description	Manufacturer / Model	Identification No.	Current Calibration Date	Next Calibration Date
Network Analyzer	Keysight E5071C	MY46527571	11/2024	11/2025
Network Analyzer - Calibration kit	Keysight 85033E (3.5mm)	MY53400185	06/2021	06/2027
Calibration Horn Antenna	SCHWARZBECK BBHA 9120 LFA (0.7~6.0GHz)	D69250	02/2022	02/2026
Software	KTM-Antenna Measurement System	Version 8.0.0	N/A	N/A

4. Test Setup & AUT photos



AUT Passive Test Condition
(Antenna Test Probe)



AUT Passive Test Condition
(Test Chamber)



AUT Passive Test Condition
(Case Assembly, Final)

WIFI & Bluetooth Antenna Test Probe

- Antenna Passive Test Setup – Probe Measurement, mounted on non-conductive fixture, 3 m distance to Tx antenna

Antenna Test Chamber

- AUT positioned at 1.4 m height on rotating turntable, chamber calibration applied. Chamber Size (5.0 m × 2.8 m × 2.8 m)
- View of transmitting standard horn antenna during AUT characterization process, calibrated using BBHA 9120 LFA

AUT Passive Test Condition (Case Assembly, Final)

- Final Assembly Verification – Passive Condition Test with completed WiFi and Bluetooth antenna integrated inside DUT housing