



# FCC Radio Test Report

## FCC ID: 2BCGWER706W4G

This report concerns: **Class II Permissive Change**

**Project No.** : 2412G020  
**Equipment** : 4G+ Cat6 AX3000 Gigabit VPN Gateway  
**Brand Name** : tp-link  
**Test Model** : ER706W-4G  
**Series Model** : N/A  
**Applicant** : TP-LINK CORPORATION PTE. LTD.  
**Address** : 7 Temasek Boulevard #29-03 Suntec Tower One, Singapore 038987  
**Manufacturer** : TP-LINK CORPORATION PTE. LTD.  
**Address** : 7 Temasek Boulevard #29-03 Suntec Tower One, Singapore 038987  
**Date of Receipt** : Dec. 10, 2024  
**Date of Test** : Dec. 12, 2024 ~ Jan. 11, 2025  
**Issued Date** : Jan. 22, 2025  
**Report Version** : R00  
**Test Sample** : Engineering Sample No.: DG2024121090  
**Standard(s)** : FCC CFR Title 47, Part 15, Subpart E

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Prepared by

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**Declaration**

**BTL** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

**BTL's** reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. BTL assumes no responsibility for the data provided by the customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by BTL.

The report must not be used by the client to claim product certification, approval, or endorsement by A2LA or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

**BTL's** laboratory quality assurance procedures are in compliance with the ISO/IEC17025:2017 requirements, and accredited by the conformity assessment authorities listed in this test report.

**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

**Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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### REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-2-2412G020	R00	Original Report.	Jan. 22, 2025	Valid

## 1. APPLICABLE STANDARDS

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of A2LA:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart E				
Standard(s) Section	Test Item	Test Result	Judgment	Remark
15.407(b) 15.205(a) 15.209(a)	Radiated Emissions -Above 1000MHz	APPENDIX A	PASS	-----

Note:

(1) "N/A" denotes test is not applicable in this test report.

(2) The radiated Emissions-Above 1GHz have been re-evaluated by sample of FCC ID: 2BCGWER706W4G, model name: ER706W-4G. It is found that the new data are the worse, so the test data are reissue from the FCC ID: 2BCGWER706W4G, model name: ER706W-4G.

Model difference(s):

a. Changed the product name.

b. Changed the manufacturer of the network port transformer.

(3) The other test records and results please refer to the test report number: 2308TW0109-U3, issued date is Sep. 27, 2023, and issued by:

Test Laboratory: MRT Technology (Taiwan) Co., Ltd.

Address: No 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).

This report is only valid conjunction with the above referenced test report.

## 2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of 1-2/F, 4/F, Building A, 1-2/F, Building B, 3/F, Building C, No.3, Jinshagang 1st Road, Dalang Town, Dongguan City, Guangdong People's Republic of China.

BTL's Registration Number for FCC: 747969

BTL's Designation Number for FCC: CN1377

## 2.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

The BTL measurement uncertainty as below table:

### A. Radiated emissions test:

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB18 (3m)	CISPR	1GHz ~ 6GHz	4.48
		6GHz ~ 18GHz	3.88
Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB03 (1m)	CISPR	18 ~ 26.5 GHz	3.36
		26.5 ~ 40 GHz	3.58


Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

## 2.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By	Test Date
Radiated Emissions-Above 1000 MHz	20°C	39%	AC 120V/60Hz	Calvin Wen	Jan. 07, 2025
	20°C	39%	AC 120V/60Hz	Drew Tan	Jan. 08, 2025

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	4G+ Cat6 AX3000 Gigabit VPN Gateway
Brand Name	tp-link
Test Model	ER706W-4G
Series Model	N/A
Model Difference(s)	N/A
Power Source	DC Voltage supplied from AC adapter. Model: T120200-2B1
Power Rating	I/P: 100-240V ~ 50/60Hz 0.8A      O/P: 12V  2.0A
Operation Frequency Band(s)	UNII-1: 5150 MHz ~ 5250 MHz UNII-2A: 5250 MHz ~ 5350 MHz UNII-2C: 5470 MHz ~ 5725 MHz UNII-3: 5725 MHz ~ 5850 MHz
Modulation Type	IEEE 802.11a/n/ac: OFDM IEEE 802.11ax: OFDMA
Bit Rate of Transmitter	IEEE 802.11a: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 450 Mbps IEEE 802.11ac: up to 2340 Mbps IEEE 802.11ax: up to 3603 Mbps

Note:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

#### 2. Channel List:

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20) IEEE 802.11ax(HE20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40) IEEE 802.11ax(HE40)		IEEE 802.11ac(VHT80) IEEE 802.11ax(HE80)	
UNII-1		UNII-1		UNII-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20) IEEE 802.11ax(HE20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40) IEEE 802.11ax(HE40)		IEEE 802.11ac(VHT80) IEEE 802.11ax(HE80)	
UNII-2A		UNII-2A		UNII-2A	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20) IEEE 802.11ax(HE20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40) IEEE 802.11ax(HE40)		IEEE 802.11ac(VHT80) IEEE 802.11ax(HE80)	
UNII-2C		UNII-2C		UNII-2C	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510	106	5530
104	5520	110	5550	122	5610
108	5540	118	5590		
112	5560	126	5630		
116	5580	134	5670		
120	5600				
124	5620				
128	5640				
132	5660				
136	5680				
140	5700				

IEEE 802.11a IEEE 802.11n(HT20) IEEE 802.11ac(VHT20) IEEE 802.11ax(HE20)		IEEE 802.11n(HT40) IEEE 802.11ac(VHT40) IEEE 802.11ax(HE40)		IEEE 802.11ac(VHT80) IEEE 802.11ax(HE80)	
UNII-3		UNII-3		UNII-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

IEEE 802.11ac(VHT160) IEEE 802.11ax(HE160)	
Channel	Frequency (MHz)
50	5250
114	5570



### 3.2 TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

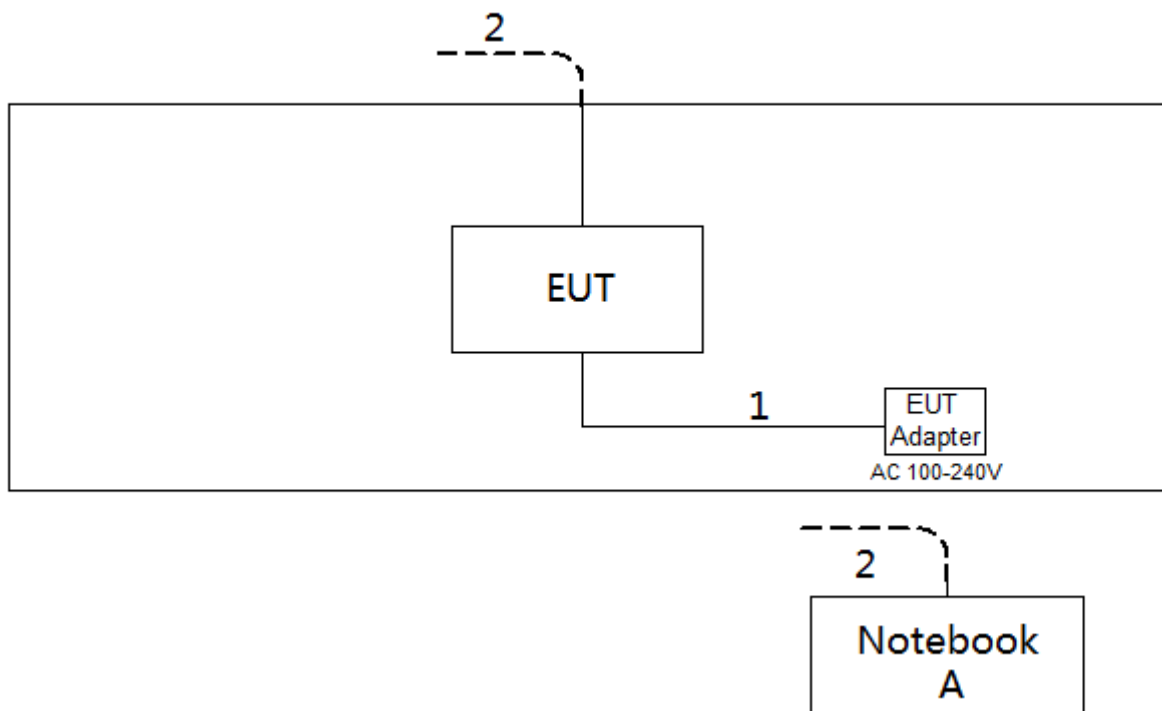
Pretest Mode	Description
Mode 1	TX A Mode Channel 44 (UNII-1)
Mode 2	TX AX(HE80) Mode Channel 106 (UNII-2C)

Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

Radiated Emissions Test -1GHz-18GHz	
Final Test Mode	Description
Mode 1	TX A Mode Channel 44 (UNII-1)
Mode 2	TX AX(HE80) Mode Channel 106 (UNII-2C)

Radiated Emissions Test - Above 18GHz	
Final Test Mode	Description
Mode 1	TX A Mode Channel 44 (UNII-1)

### 3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



### 3.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
A	Notebook	Honor	14SER5 3500	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m
2	RJ45 Cable	NO	NO	10m

### 3.5 CUSTOMER INFORMATION DESCRIPTION

- 1) The antenna gain is provided by the manufacturer.

## 4. RADIATED EMISSIONS

### 4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

#### LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS (Above 1000 MHz)

Frequency (MHz)	EIRP Limit (dBm/MHz)	Band edge at 3m (dBμV/m)	Harmonic at 1m (dBμV/m)
5150-5250	-27	68.2	77.7 (Note 3)
5250-5350	-27	68.2	77.7 (Note 3)
5470-5725	-27	68.2	77.7 (Note 3)
5725-5850 NOTE (2)	-27	68.2	77.7 (Note 3)
	10	105.2	114.7 (Note 3)
	15.6	110.8	120.3 (Note 3)
	27	122.2	131.7 (Note 3)

NOTE:

(1) The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$

(2) According to 15.407(b)(4)(i), all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(3)

$$FS_{\text{limit}} = FS_{\text{max}} - 20 \log \left( \frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

$20 \log (d_{\text{limit}}/d_{\text{measure}}) = 20 \log (3/1) = 9.5 \text{ dB}$ .

$FS_{\text{limit}}$ : Harmonic at 3m Peak and Average limit.

$FS_{\text{max}}$ : Harmonic at 1m Peak and Average Maximum value.

$d_{\text{limit}}$ : Harmonic at 3m test distance.

$d_{\text{measure}}$ : Harmonic Actual test distance.

## 4.2 TEST PROCEDURE

- a. The measuring distance of 3 m or 1m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- b. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- c. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- d. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- e. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- f. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1 GHz)
- g. For the actual test configuration, please refer to the related Item –EUT Test Photos.

The following table is the setting of the receiver:

Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic or 40 GHz, whichever is lower
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

Receiver Parameters	Setting
Start ~ Stop Frequency	1 GHz~40 GHz for PK/AVG detector

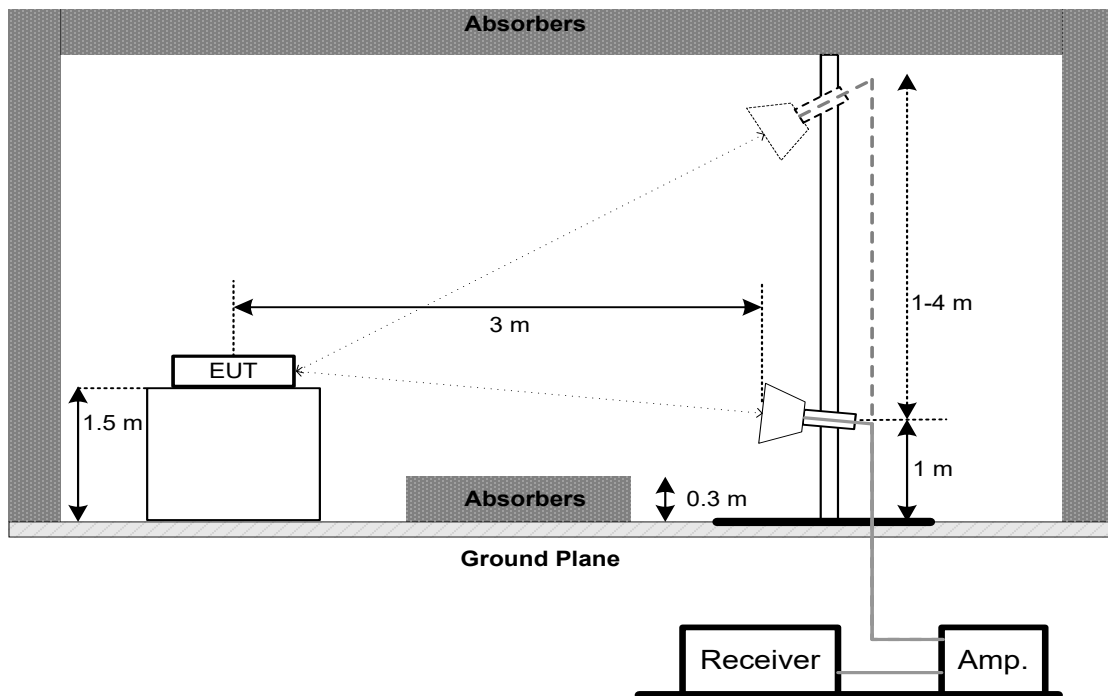
## 4.3 DEVIATION FROM TEST STANDARD

No deviation.

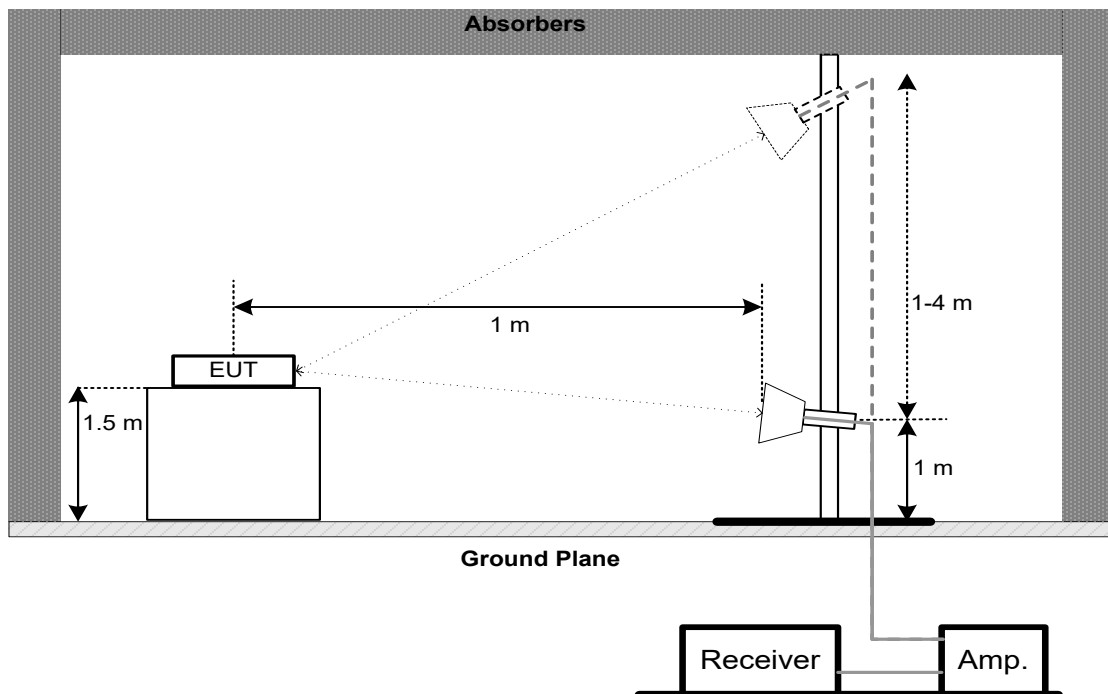
## 4.4 TEST SETUP

Above 1 GHz

Band edge & Harmonic (1 GHz to 18 GHz)



Harmonic (18 GHz to 40 GHz)



#### **4.5 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### **4.6 TEST RESULTS - ABOVE 1000 MHZ**

Please refer to the APPENDIX A.

Remark:

- (1) No limit: This is fundamental signal, the judgment is not applicable.  
For fundamental signal judgment was referred to Peak output test.

## 5. MEASUREMENT INSTRUMENTS LIST

Radiated Emissions - 1GHz-18GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Keysight	N9010A	MY55150209	Aug. 20, 2025
2	Preamplifier	EMC INSTRUMENT	EMC118A45SE	980878	Nov.25,2025
3	Double Ridged Guide Antenna	ETS	3115	75789	Jun. 15, 2025
4	Cable	RegalWay	RWLP50-4.0A-SMSM-12.5M	N/A	Jul. 03, 2025
5	Cable	RegalWay	RWLP50-4.0A-NMRA SM-2.5M	N/A	Jul. 03, 2025
6	Cable	RegalWay	RWLP50-4.0A-NMRA SMRA-0.8M	N/A	Jul. 03, 2025
7	966 Chamber room	CM	9*6*6	N/A	May 19,2025
8	Attenuator	Talent Microwave	TA10A2-S-18	N/A	N/A
9	Filter	STI	STI15-9969	N/A	May. 31, 2025
10	Positioning Controller	MF	MF-7802	N/A	N/A
11	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emissions - Above 18GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	MXA Signal Analyzer	KEYSIGHT	N9020B	MY63380204	Oct. 29, 2025
2	Preamplifier	EMC INSTRUMENT	EMC184045SE	980905	Oct. 29, 2025
3	Cable	RegalWay	RWLP50-2.6A-2.92M 2.92M-1.1M	N/A	Jul. 25, 2025
4	Cable	Tonscend	HF160-KMKM-3M	N/A	Jul. 25, 2025
5	Broad-Band Horn Antenna	Schwarzbeck	BBHA9170(3m)	9170-319	Jun. 16, 2025
6	966 Chamber room	CM	9*6*6	N/A	May 19, 2025
7	Positioning Controller	MF	MF-7802	N/A	N/A
8	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

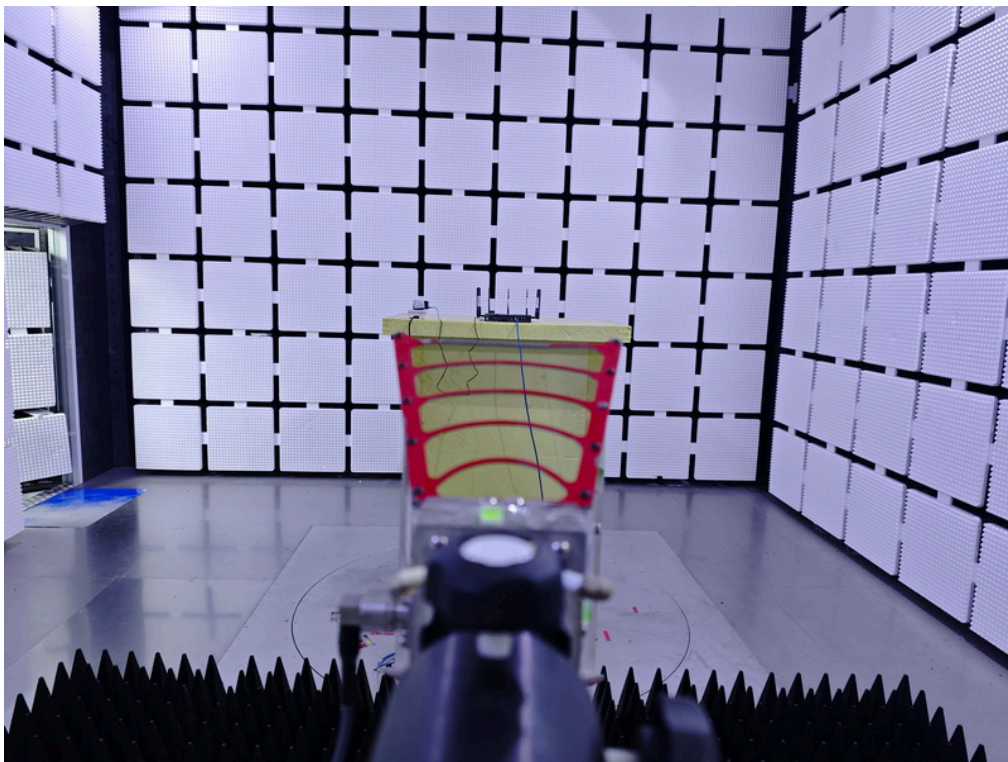
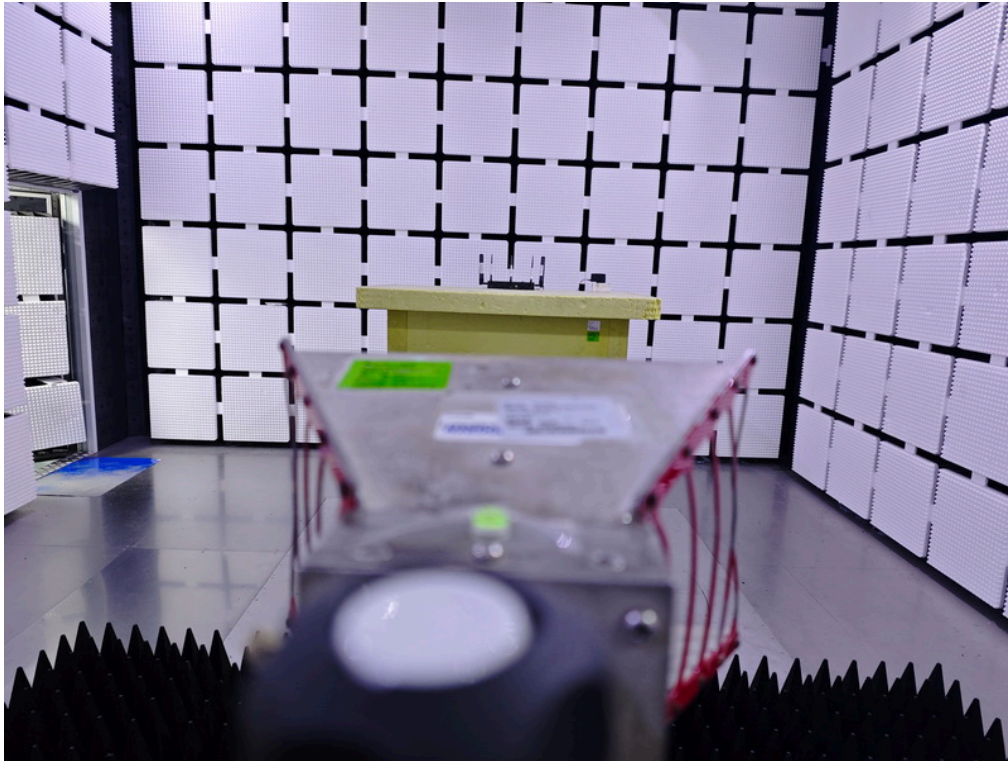
Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.

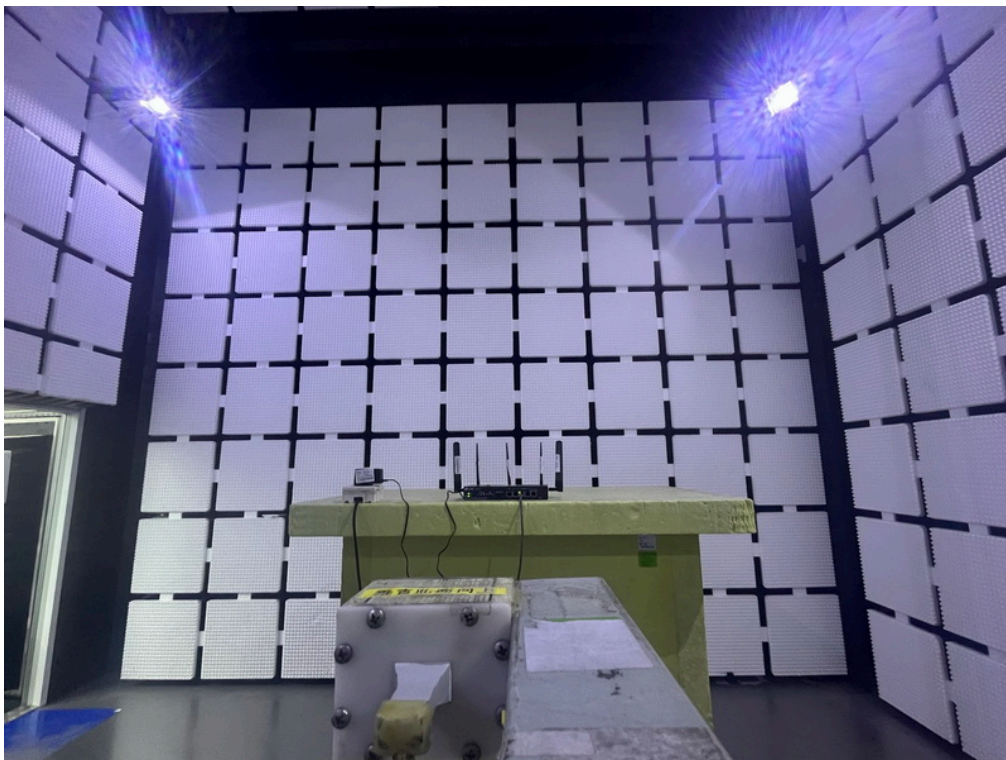
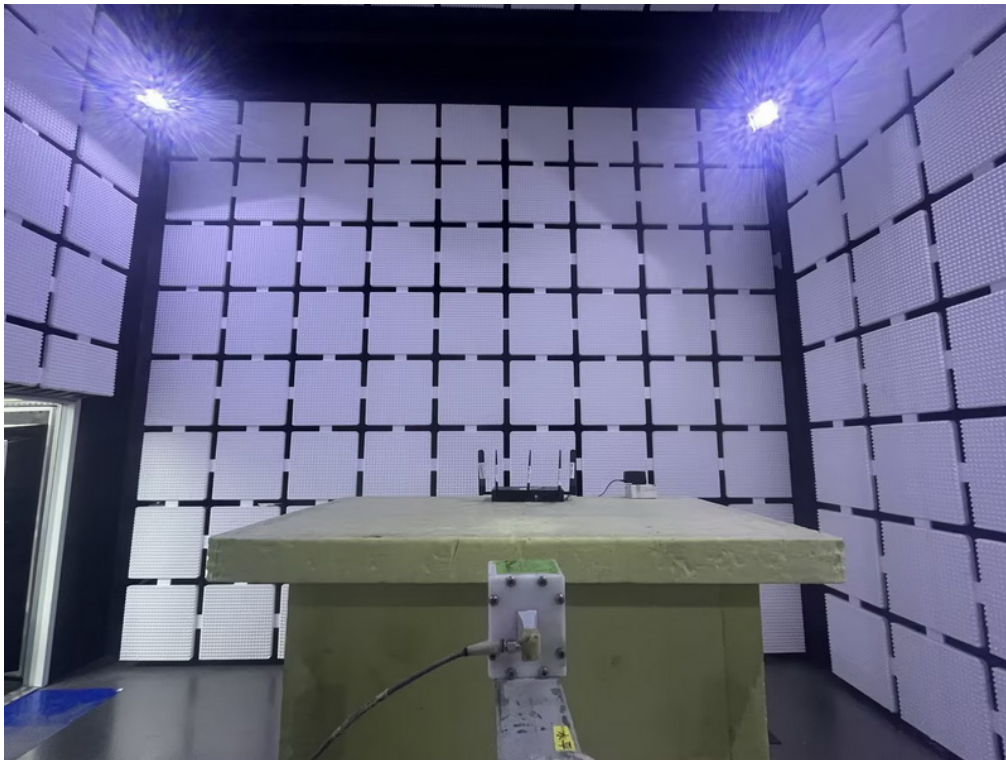
## 6. EUT TEST PHOTOS

### Radiated Emissions Test Photos

Above 1 GHz\_Band edge & Harmonic(1 GHz to 18 GHz)

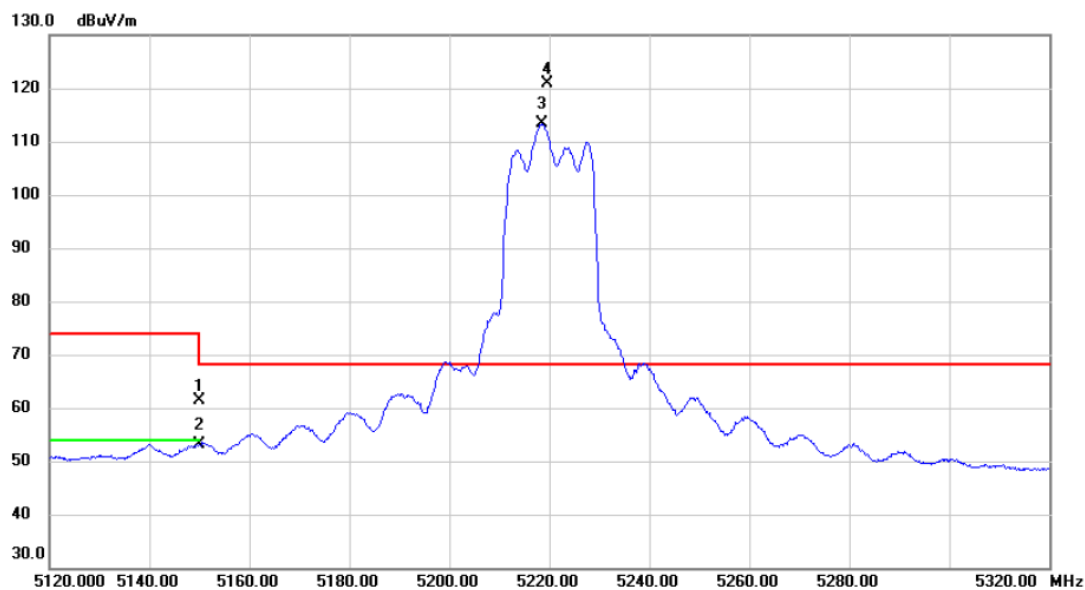




**Radiated Emissions Test Photos****Above 1 GHz\_Harmonic(18 GHz to 26.5 GHz)**

## **APPENDIX A - RADIATED EMISSION - ABOVE 1000 MHZ**

Test Mode	UNII-1_TX A Mode 5220 MHz	Polarization	Vertical
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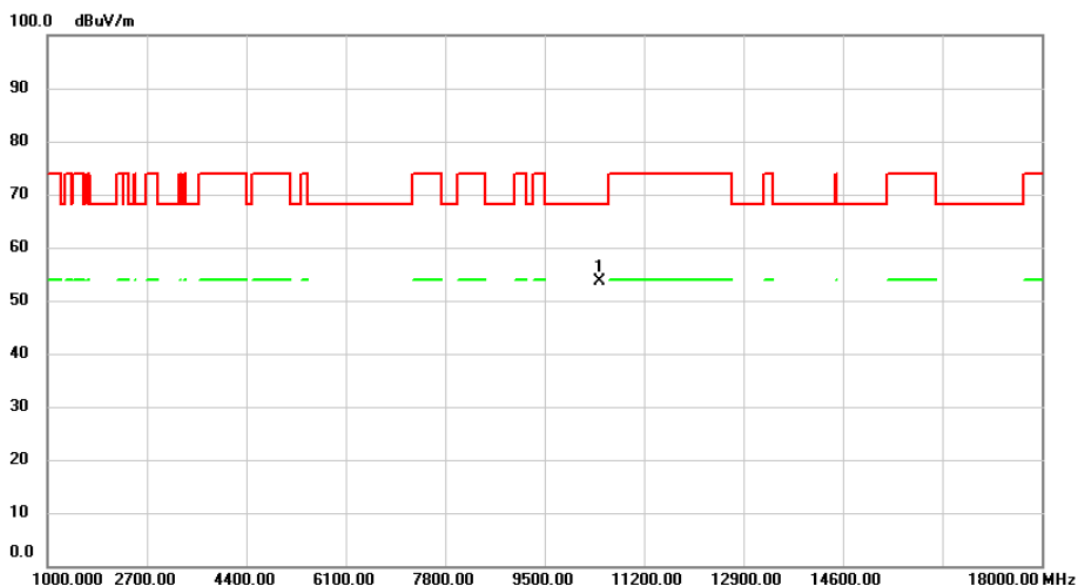
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		5150.000	46.12	15.30	61.42	74.00	-12.58	peak	
2		5150.000	37.84	15.30	53.14	54.00	-0.86	AVG	
3	X	5218.600	97.82	15.45	113.27	68.20	45.07	AVG	No Limit
4	*	5219.500	105.44	15.45	120.89	68.20	52.69	peak	No Limit

## REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	UNII-1_TX A Mode 5220 MHz	Polarization	Vertical
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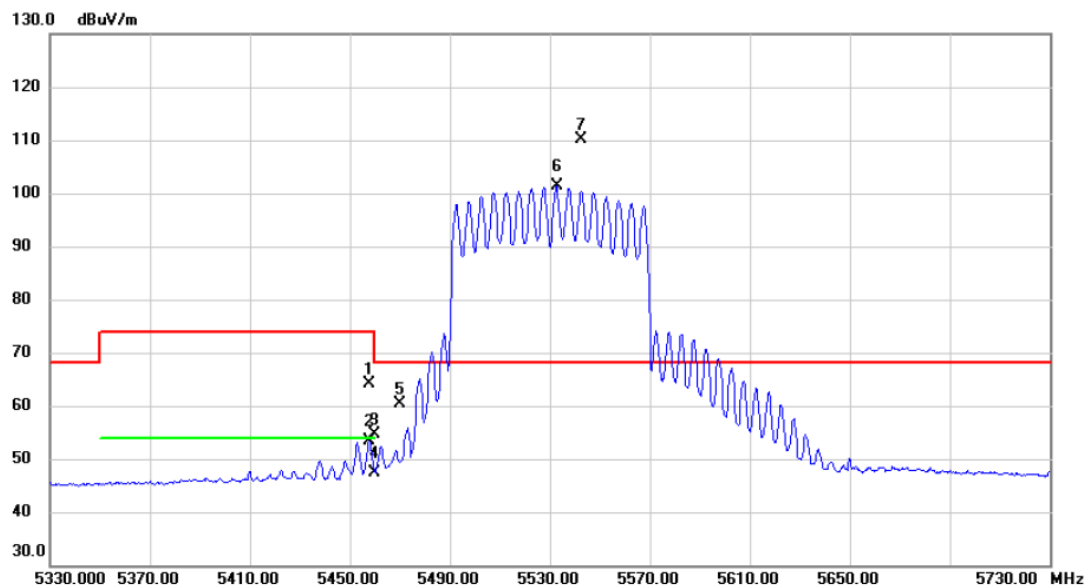


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	10441.200	42.75	10.79	53.54	68.20	-14.66	peak	

## REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	UNII-2C_TX AX(HE80) Mode 5530 MHz	Polarization	Vertical
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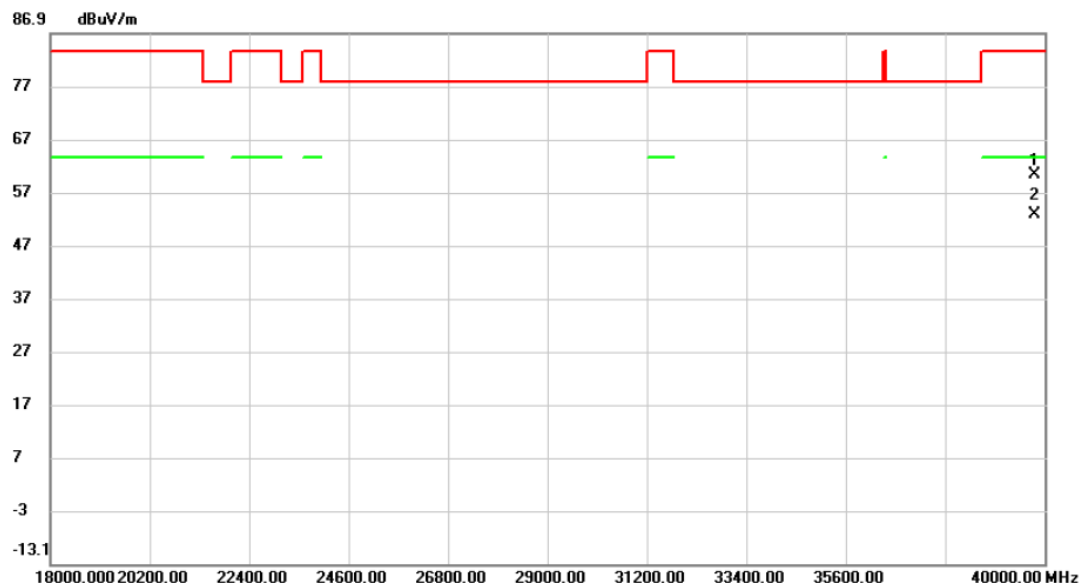


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		5457.800	48.27	15.95	64.22	74.00	-9.78	peak	
2		5457.800	37.54	15.95	53.49	54.00	-0.51	AVG	
3		5460.000	38.73	15.96	54.69	74.00	-19.31	peak	
4		5460.000	31.45	15.96	47.41	54.00	-6.59	AVG	
5		5470.000	44.50	15.98	60.48	68.20	-7.72	peak	
6	X	5532.800	85.15	16.15	101.30	68.20	33.10	AVG	No Limit
7	*	5542.600	93.90	16.18	110.08	68.20	41.88	peak	No Limit

## REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	UNII-1_TX A Mode 5220 MHz	Polarization	Vertical
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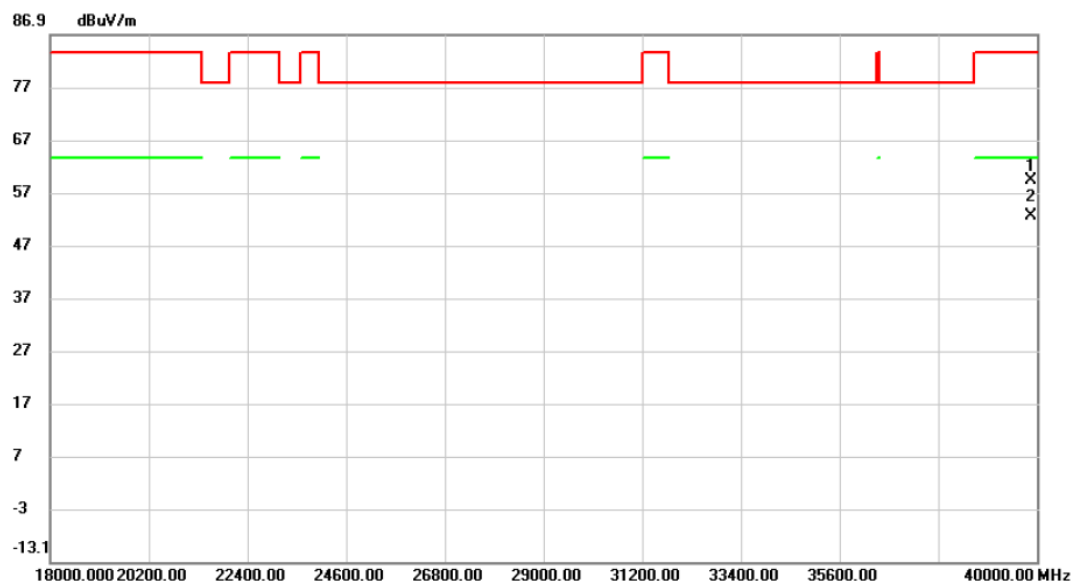


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		39791.000	49.45	10.88	60.33	83.50	-23.17	peak	
2	*	39791.000	41.82	10.88	52.70	63.50	-10.80	AVG	

## REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	UNII-1_TX A Mode 5220 MHz	Polarization	Horizontal
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No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	39868.000	48.44	10.90	59.34	83.50	-24.16	peak	
2 *	39868.000	41.52	10.90	52.42	63.50	-11.08	AVG	

## REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

**End of Test Report**