TEST REPORT

Report No.	CISRR250410093
Project No.	CISR250410093
FCC ID	2BOV2-M502SM
Applicant	Dongguan Pengxuan E-commerce Co.,Ltd.
Address	Room 202-03, Building 1, No. 16 Lucituo Xinfu Street, Wanjiang Subdistrict, Dongguan City, Guangdong Province, China
Manufacturer	Dongguan Nanxuan E-commerce Co.,Ltd.
Address	Room1106,11thFloor,ZhongshengBusinessBuilding,No.108HongfuRoad,Nancheng District, Dongguan City, Guangdong Province, China
Product Name	M502SM
Trademark	NPET
Model/Type reference	M502SM
Listed Model(s)	N/A
Standard	47 CFR Part 15.247
Test date	April 12, 2025 to April 15, 2025
Issue date	April 17, 2025
Test result	**Complied**

Lucas Huang

Prepared by: Lucas Huang

GenryLong

Approved by: Genry Long

The test results relate only to the tested samples.
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1. REPORT VERSION

Version No.	Issue date	Description
00	April 17, 2025	Original

2. TEST DESCRIPTION

No.	Test Item	Standard Requirement	Result
1	Antenna Requirement	47 CFR 15.203	Pass
2	Conducted Emission at AC power line	47 CFR 15.207(a)	Pass
3	6dB Bandwidth	47 CFR 15.247(a)(2)	Pass
4	Maximum Conducted Output Power	47 CFR 15.247(b)(3)	Pass
5	Power Spectral Density	47 CFR 15.247(e)	Pass
6	Conducted band edge and spurious emission	47 CFR 15.247(d), 15.209, 15.205	Pass
7	Radiated band edge emission	47 CFR 15.247(d), 15.209, 15.205	Pass
8	Radiated Spurious Emission (below 1GHz)	47 CFR 15.247(d), 15.209, 15.205	Pass
9	Radiated Spurious Emission (Above 1GHz)	47 CFR 15.247(d), 15.209, 15.205	Pass

Note:

– The measurement uncertainty is not included in the test result.

3. SUMMARY

3.1. Product Description *

Main unit information:	
Product Name:	M502SM
Trade Mark:	NPET
Model No.:	M502SM
Listed Model(s):	N/A
Model difference:	N/A
Power supply:	Input: DC 5V
Hardware version:	N/A
Software version:	N/A
Accessory unit (AU) information:	
Battery information:	DC 3.7V

3.2. Radio Specification Description *

Modulation type:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	PCB Antenna
Antenna gain:	2.08dBi

Note:

1) *: Since the above information is provided by the applicant relevant results or conclusions of this report are only made for these information , Bangce is not responsible for the authenticity, integrity and results of the information and/or the validity of the conclusion.

3.3. Modification of EUT

No modifications are made to the EUT during all test items.

3.4. Deviation from standards

None

3.5. Testing Site

Laboratory Name	Shenzhen Bangce Testing Technology Co., Ltd.
Laboratory Location	101, building 10, Yunli Intelligent Park, Shutianpu community, Matian Street, Guangming District, Shenzhen，Guangdong, China
Contact information	Tel: 86-755-2319 6848, email: service@cis-cn.net Website: http://www.cis-cn.net/
FCC registration number	736346
FCC designation number	CN1372

4. TEST CONFIGURATION

4.1. Test frequency list

Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
2402	2440	2480

4.2. Descriptions of test mode

No	Test mode	Description
TM1	TX mode	Keep the EUT in continuously transmitting mode with GFSK modulation at lowest, middle and highest channel.
TM2	Link mode	Keep the EUT in Bluetooth linking mode with AE.

4.3. Support unit used in test configuration

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Item	Equipment name	Trade Name	Model No.
1	Adapter	Guangdong Sangu Technology Co. ltd	SG-0501000AU
2	PC	Lenovo	ThinkPad

4.4. Test sample information

Type	Sample No.
Engineer sample	CISR250410093-S01
Normal sample	CISR250410093-S02

4.5. Environmental conditions

Type	Requirement
Temperature:	15~35°C
Relative Humidity:	25~75%
Air Pressure:	860~1060mbar

4.6. Statement of the measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	1.63dB
2	Peak Output Power	1.34dB
3	Power Spectral Density	1.34dB
4	6dB Bandwidth	0.002%
5	Duty cycle	-
6	Conducted Band Edge and Spurious Emission	1.93dB
7	Radiated Band Edge Emission	3.76dB for 30MHz-1GHz 3.80dB for above 1GHz
8	Radiated Spurious Emission	3.76dB for 30MHz-1GHz 3.80dB for above 1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.7. Equipment Used during the Test

Conducted Emission at AC power line

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI7	100853	2025-01-08	2026-01-07
2	Artificial power network	Schwarzbeck	NSLK8127	8127-01096	2025-01-08	2026-01-07
3	8-wire Impedance Stabilization Network	Schwarzbeck	NTFM 8158	8158-00337	2025-01-08	2026-01-07
4	Artificial power network	Schwarzbeck	ENV216	/	2025-01-08	2026-01-07

6dB Bandwidth
Maximum Conducted Output Power
Power Spectral Density
Emissions in non-restricted frequency bands

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	MXG RF Signal Generator	Agilent	N5181A	MY50145362	2025-01-08	2026-01-07
2	Spectrum analyzer	R&S	FSV-40N	102130	2025-01-08	2026-01-07
3	Vector Signal Generator	Agilent	N5182A	MY50142364	2025-01-08	2026-01-07
4	Power Meter	WCS	WCS-PM	WCSPM230405A	2025-01-08	2026-01-07

Emissions in frequency bands (below 1GHz)

Emissions in frequency bands (above 1GHz) Band edge emissions (Radiated)						
Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI7	100853	2025-01-08	2026-01-07
2	Amplifier	Tonscend	TAP9K3G40	AP23A8060270	2025-01-08	2026-01-07
3	Prime amplifier	Tonscend	TAP01018050	AP23A8060280	2025-01-08	2026-01-07
4	9*6*6 anechoic chamber	SKET	9.3*6.3*6	N/A	2024-09-02	2027-09-01
5	Spectrum analyzer	Agilent	N9020A	MY50530263	2025-01-08	2026-01-07
6	Spectrum analyzer	R&S	FSV-40N	102130	2025-01-08	2026-01-07
7	Bilog Antenna	Schwarzbeck	VULB 9163	1463	2023-01-09	2026-01-08
8	Horn Antenna	SCHWARZBECK	BBHA 9120 D	2487	2023-01-09	2026-01-08
9	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	2023-01-09	2026-01-08
10	RF Cable	Tonscend	Cable 1	/	2025-01-08	2026-01-07
11	RF Cable	Tonscend	Cable 2	/	2025-01-08	2026-01-07
12	RF Cable	SKET	Cable 3	/	2025-01-08	2026-01-07
13	L.I.S.N.#1	Schwarzbeck	NSLK8127	/	2025-01-08	2026-01-07
14	L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	2025-01-08	2026-01-07
15	Horn Antenna	SCHWARZBECK	BBHA9170	1130	2023-01-09	2026-01-08
16	Preamplifier	Tonscend	TAP18040048	AP21C806126	2025-01-08	2026-01-07
17	Variable-frequency power source	Pinhong	PH1110	/	2025-01-08	2026-01-07
18	6dB Attenuator	SKET	DC-6G	/	2025-01-08	2026-01-07
19	Antenna tower	SKT	Bk-4AT-BS	AT2021040101-V1	2025-01-08	2026-01-07

5. TEST RESULTS

5.1. Evaluation Results (Evaluation)

5.1.1. Antenna Requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

5.1.1.1. Test Result

Pass

5.1.1.2. Conclusion:

The EUT antenna is PCB Antenna(2.08dBi), the directional gain of the antenna less than 6dBi. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.Antenna structure please refer to the EUT internal photographs antenna photo.

5.2. Radio Spectrum Matter Test Results (RF)

5.2.1. Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

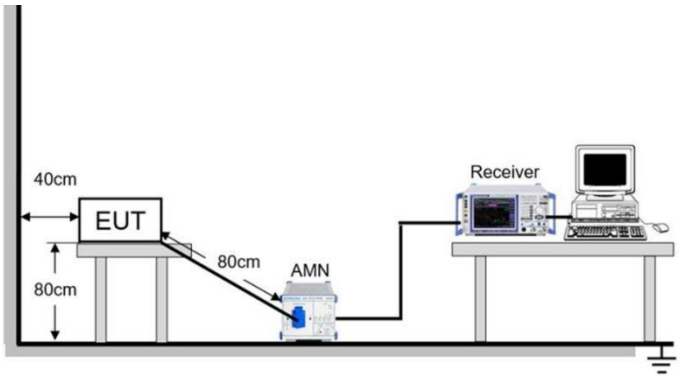
*Decreases with the logarithm of the frequency.

Test Method:	ANSI C63.10-2020 section 6.2
Procedure:	1. The EUT was setup according to ANSI C63.10 requirements. 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. 3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. 4. The peripheral devices are also connected to the main power through a LISN. (Refer to the block diagram of the test setup and photographs) 5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. 6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. 7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz. 8. During the above scans, the emissions were maximized by cable manipulation.

5.2.1.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.9 °C	Humidity:	55.7 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM2				
Final test mode:	TM2				

5.2.1.2. Test Setup Diagram

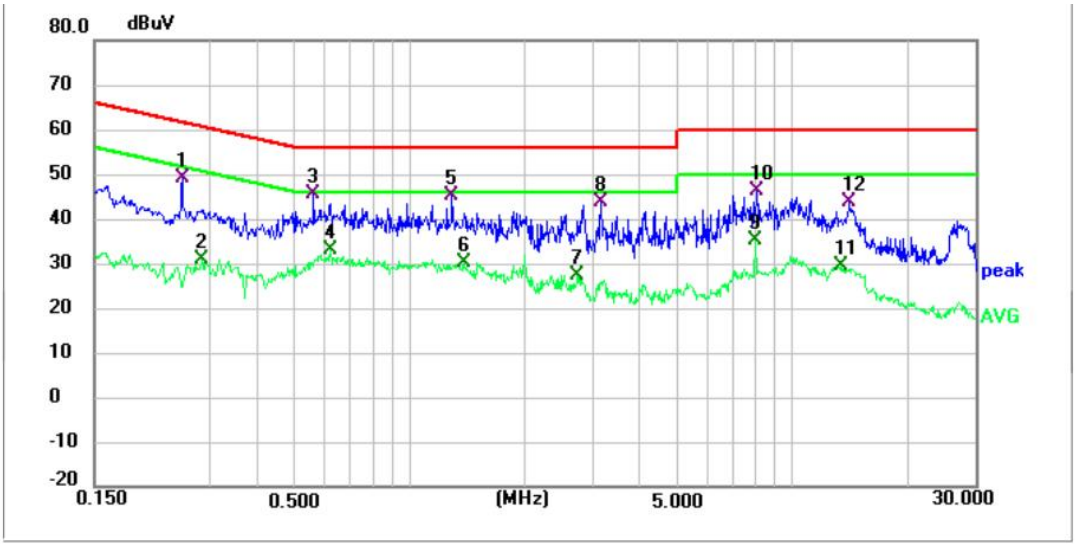


5.2.1.3. Test Result

Pass

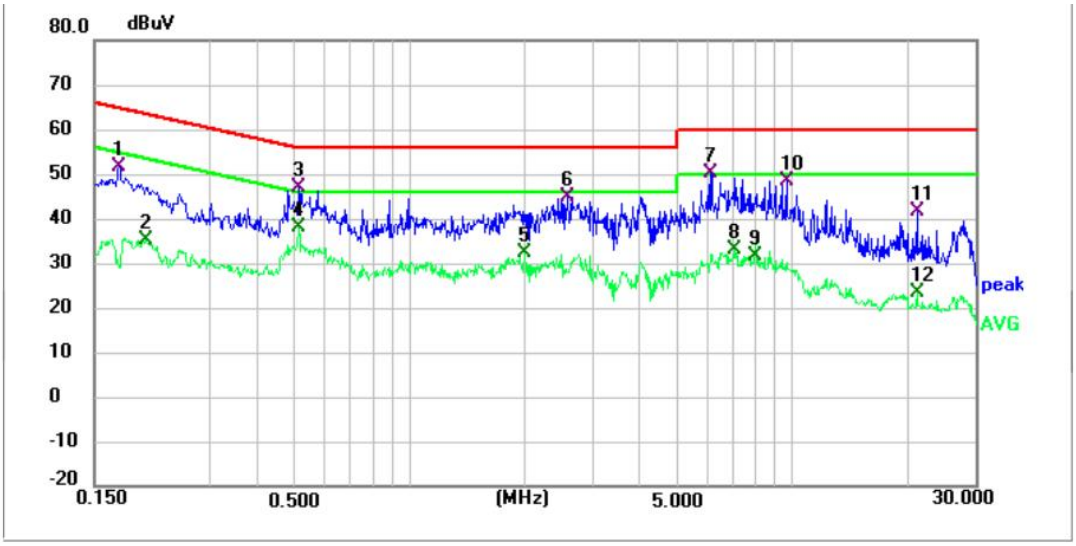
5.2.1.4. Test Data

Mode2 / Line: Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.254	38.68	10.33	49.01	61.63	-12.62	QP
2	0.286	20.50	10.34	30.84	50.64	-19.80	AVG
3 *	0.562	35.32	10.39	45.71	56.00	-10.29	QP
4	0.622	22.49	10.40	32.89	46.00	-13.11	AVG
5	1.294	34.75	10.51	45.26	56.00	-10.74	QP
6	1.382	19.76	10.54	30.30	46.00	-15.70	AVG
7	2.746	16.38	10.91	27.29	46.00	-18.71	AVG
8	3.166	32.84	11.04	43.88	56.00	-12.12	QP
9	8.002	21.98	13.04	35.02	50.00	-14.98	AVG
10	8.086	33.19	13.06	46.25	60.00	-13.75	QP
11	13.458	14.10	15.42	29.52	50.00	-20.48	AVG
12	14.106	28.02	15.76	43.78	60.00	-16.22	QP

Mode2 / Line: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.174	41.41	10.32	51.73	64.77	-13.04	QP
2	0.204	24.86	10.32	35.18	53.45	-18.27	AVG
3	0.514	36.52	10.38	46.90	56.00	-9.10	QP
4 *	0.514	27.65	10.38	38.03	46.00	-7.97	AVG
5	2.002	21.71	10.71	32.42	46.00	-13.58	AVG
6	2.586	33.87	10.87	44.74	56.00	-11.26	QP
7	6.150	37.73	12.36	50.09	60.00	-9.91	QP
8	7.090	20.31	12.80	33.11	50.00	-16.89	AVG
9	8.002	18.44	13.06	31.50	50.00	-18.50	AVG
10	9.662	35.05	13.52	48.57	60.00	-11.43	QP
11	21.246	25.79	15.81	41.60	60.00	-18.40	QP
12	21.246	7.65	15.81	23.46	50.00	-26.54	AVG

Note:
1). Result = Reading +Correct (Insertion Loss + Cable Loss + Attenuator Factor)
2). Margin = Result - Limit

5.2.2. 6dB Bandwidth

Test Requirement:	47 CFR 15.247(a)(2)
Test Limit:	Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	ANSI C63.10-2020, section 11.8
Procedure:	11.8.1 Option 1 The steps for the first option are as follows: a) Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz. b) Set the VBW ≥ [3 × RBW]. c) Detector = peak. d) Trace mode = max-hold. e) Sweep = No faster than coupled (auto) time. f) Allow the trace to stabilize. g) Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “−6 dB down amplitude”. If a marker is below this “−6 dB down amplitude” value, then it shall be as close as possible to this value. 11.8.2 Option 2 The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

5.2.2.1. E.U.T. Operation

Operating Environment:					
Temperature:	23 °C	Humidity:	55.3 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

5.2.2.2. Test Setup Diagram

5.2.2.3. Test Result

Pass

5.2.2.4. Test Data

Please Refer to Appendix for Details.

5.2.3. Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(3)
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	ANSI C63.10-2020 section 11.9.1
Procedure:	ANSI C63.10-2020, section 11.9.1 Maximum peak conducted output power

5.2.3.1. E.U.T. Operation

Operating Environment:					
Temperature:	23 °C	Humidity:	55.3 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

5.2.3.2. Test Setup Diagram

5.2.3.3. Test Result

Pass

5.2.3.4. Test Data

Please Refer to Appendix for Details.

5.2.4. Power Spectral Density

Test Requirement:	47 CFR 15.247(e)
Test Limit:	Refer to 47 CFR 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	ANSI C63.10-2020, section 11.10
Procedure:	ANSI C63.10-2020, section 11.10, Maximum power spectral density level in the fundamental emission

5.2.4.1. E.U.T. Operation

Operating Environment:					
Temperature:	23 °C	Humidity:	55.3 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

5.2.4.2. Test Setup Diagram

5.2.4.3. Test Result

Pass

5.2.4.4. Test Data

Please Refer to Appendix for Details.

5.2.5. Conducted band edge and spurious emission

Test Requirement:	47 CFR 15.247(d), 15.209, 15.205
Test Limit:	Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Test Method:	ANSI C63.10-2020 section 11.11
Procedure:	ANSI C63.10-2020 Section 11.11.1, Section 11.11.2, Section 11.11.3

5.2.5.1. E.U.T. Operation

Operating Environment:					
Temperature:	23 °C	Humidity:	55.3 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

5.2.5.2. Test Setup Diagram

5.2.5.3. Test Result

Pass

5.2.5.4. Test Data

Please Refer to Appendix for Details.

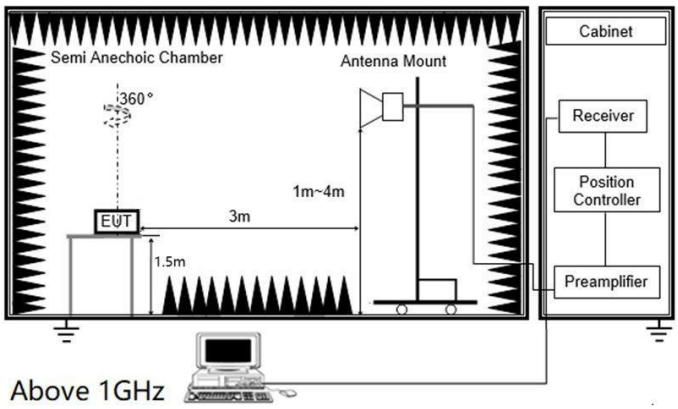
5.2.6. Radiated band edge emission

<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 section 6.10</td></tr>
<tr><td>Procedure:</td><td>1. EUT was setup and tested according to ANSI C63.10 .
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. Thisis repeated for both horizontal and vertical polarization of the antenna. In order to find themaximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
5. Use the following spectrum analyzer settings:
a) Span shall wide enough to fully capture the emission being measured
b) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement
For average measurement: use duty cycle correction factor method (DCCF), Averager level = Peak level + DCCF</td></tr>
</table>

5.2.6.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.1 °C	Humidity:	56.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1				
Final test mode:	TM1				

5.2.6.2. Test Setup Diagram

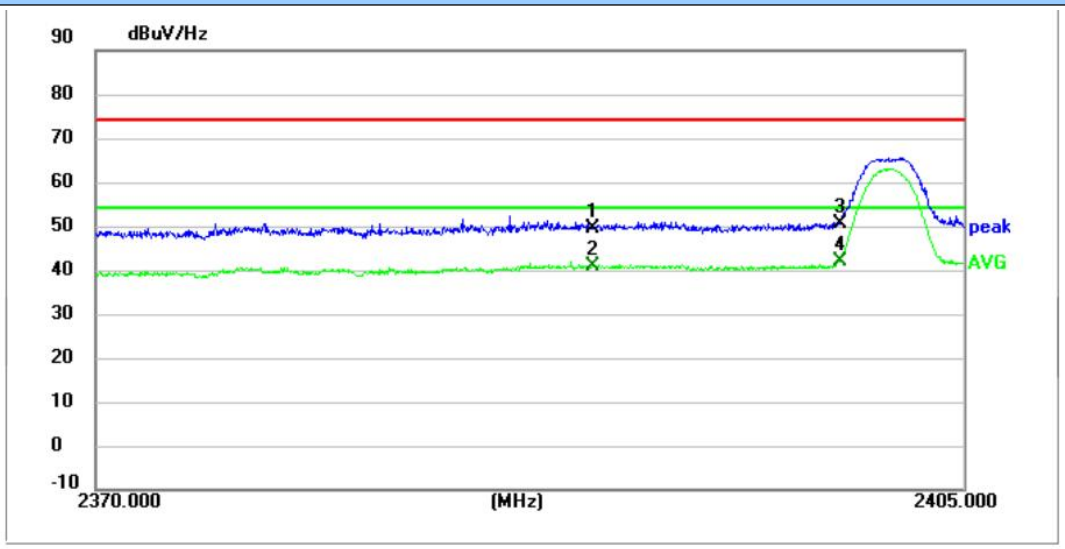


5.2.6.3. Test Result

Pass

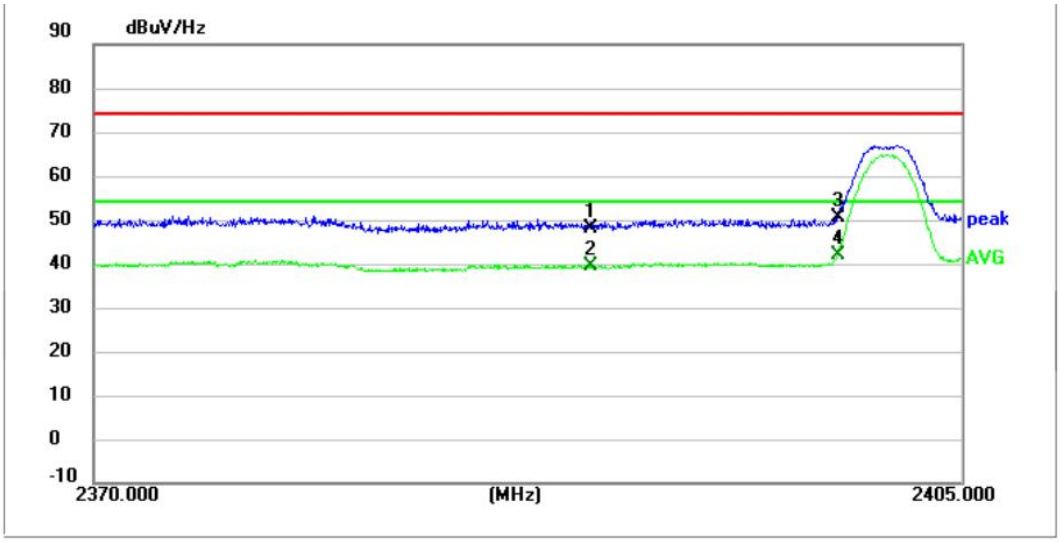
5.2.6.4. Test Data

Mode1 / Polarization: Horizontal / CH: L



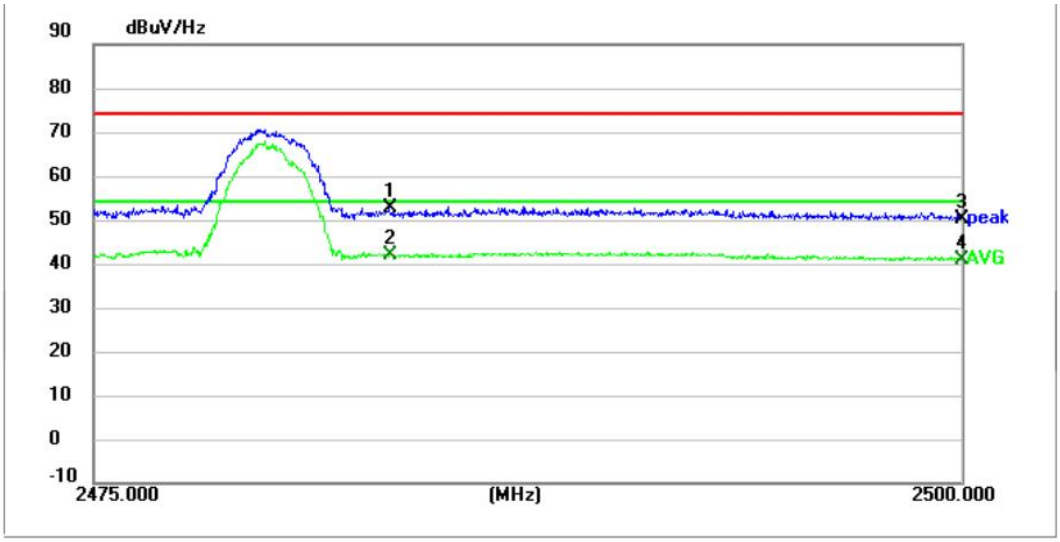
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2390.000	47.08	2.34	49.42	74.00	-24.58	peak
2	2390.000	38.64	2.34	40.98	54.00	-13.02	AVG
3	2400.000	48.10	2.38	50.48	74.00	-23.52	peak
4 *	2400.000	39.65	2.38	42.03	54.00	-11.97	AVG

Mode1 / Polarization: Vertical / CH: L



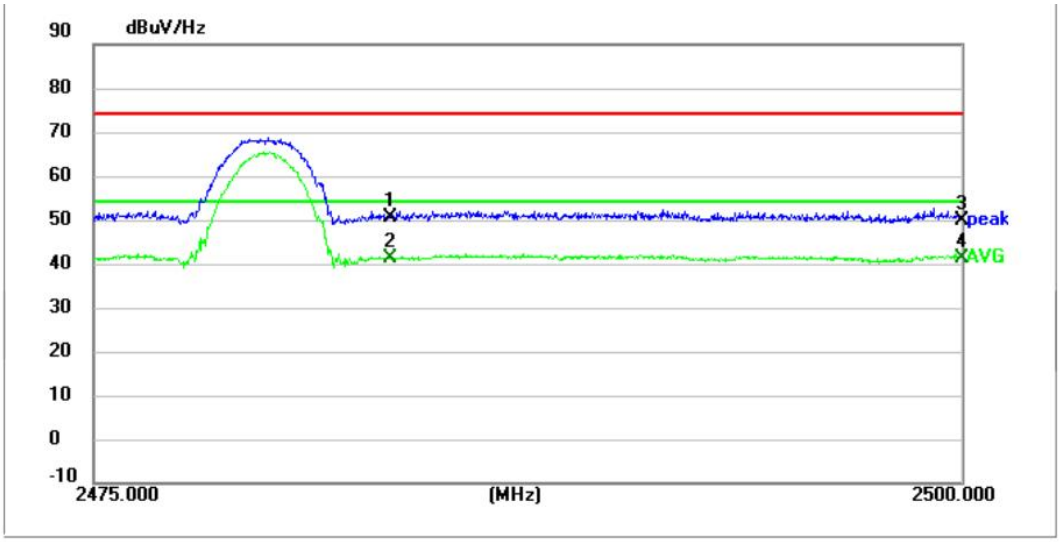
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2390.000	45.76	2.34	48.10	74.00	-25.90	peak
2	2390.000	37.04	2.34	39.38	54.00	-14.62	AVG
3	2400.000	48.02	2.38	50.40	74.00	-23.60	peak
4 *	2400.000	39.67	2.38	42.05	54.00	-11.95	AVG

Mode1 / Polarization: Horizontal / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2483.500	49.87	2.66	52.53	74.00	-21.47	peak
2 *	2483.500	39.21	2.66	41.87	54.00	-12.13	AVG
3	2500.000	47.34	2.80	50.14	74.00	-23.86	peak
4	2500.000	37.95	2.80	40.75	54.00	-13.25	AVG

Mode1 / Polarization: Vertical / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2483.500	47.87	2.66	50.53	74.00	-23.47	peak
2	2483.500	38.54	2.66	41.20	54.00	-12.80	AVG
3	2500.000	47.10	2.80	49.90	74.00	-24.10	peak
4 *	2500.000	38.59	2.80	41.39	54.00	-12.61	AVG

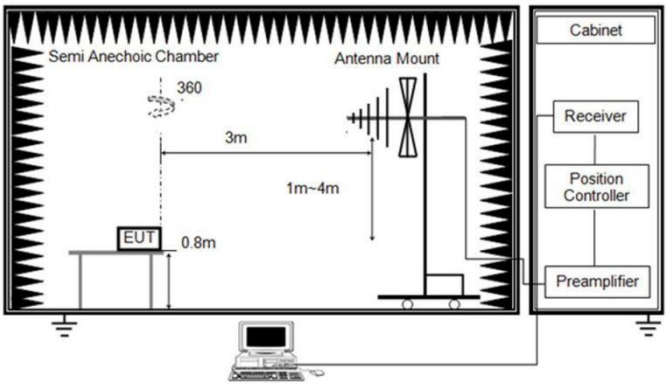
5.2.7. Radiated Spurious Emission (below 1GHz)

<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 section 6.6.4</td></tr>
<tr><td>Procedure:</td><td>1. The EUT was setup and tested according to ANSI C63.10.
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
a) Span shall wide enough to fully capture the emission being measured;
b) RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</td></tr>
</table>

5.2.7.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.1 °C	Humidity:	56.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2				
Final test mode:	TM1, TM2				

5.2.7.2. Test Setup Diagram



Below 1 GHz and above 30 MHz

5.2.7.3. Test Result

Pass

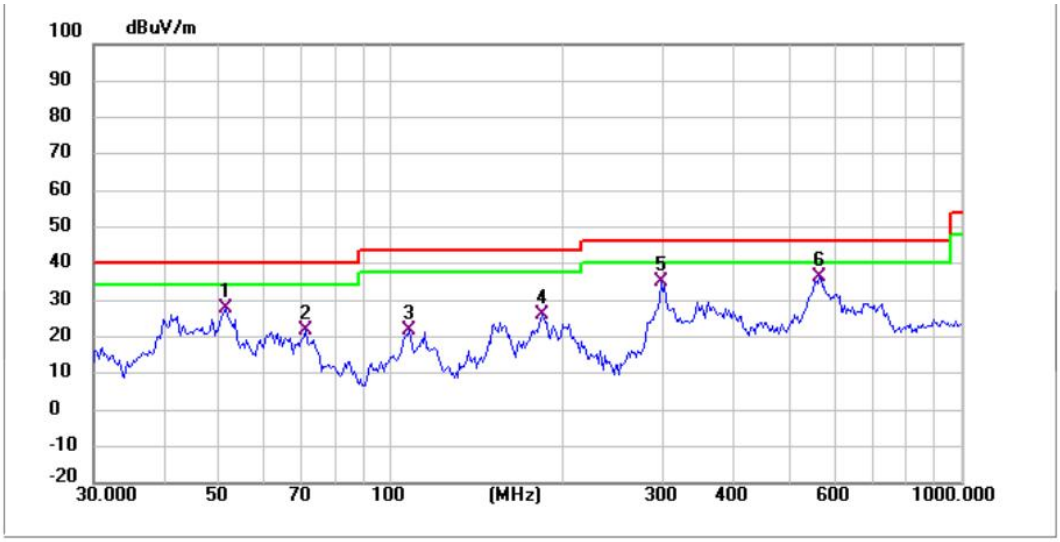
5.2.7.4. Test Data

Have pre-scan all test channel, found Mode 1 which it was worst case, so only show the worst case's data on this report.

Mode1 / Polarization: Horizontal / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	73.617	57.69	-33.66	24.03	40.00	-15.97	QP
2	114.515	61.22	-31.42	29.80	43.50	-13.70	QP
3	229.293	63.48	-29.06	34.42	46.00	-11.58	QP
4	301.422	61.05	-27.05	34.00	46.00	-12.00	QP
5	372.005	58.45	-25.48	32.97	46.00	-13.03	QP
6 *	766.057	51.75	-17.09	34.66	46.00	-11.34	QP

Mode1 / Polarization: Vertical / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	51.121	57.19	-29.37	27.82	40.00	-12.18	QP
2	70.584	54.74	-33.16	21.58	40.00	-18.42	QP
3	107.510	52.33	-30.64	21.69	43.50	-21.81	QP
4	184.490	57.23	-31.14	26.09	43.50	-17.41	QP
5	297.224	62.02	-27.14	34.88	46.00	-11.12	QP
6 *	562.662	56.48	-20.25	36.23	46.00	-9.77	QP

Note:
1) For 9 kHz ~ 30 MHz Measurement
The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.
2) Level= Reading + Factor; Factor =Antenna Factor+ Cable Loss- Preamp Factor
3) Margin = Limit – Level

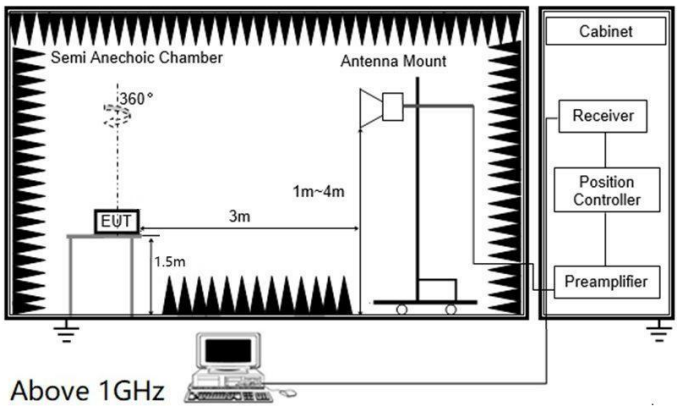
5.2.8. Radiated Spurious Emission (Above 1GHz)

<table>
<tr><td>Test Requirement:</td><td>In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 section 6.6.4</td></tr>
<tr><td>Procedure:</td><td>1. The EUT was setup and tested according to ANSI C63.10.
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
a) Span shall wide enough to fully capture the emission being measured;
b) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement
For average measurement: use duty cycle correction factor method (DCCF)Averager level = Peak level + DCCF</td></tr>
</table>

5.2.8.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.1 °C	Humidity:	56.2 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2				
Final test mode:	TM1, TM2				

5.2.8.2. Test Setup Diagram



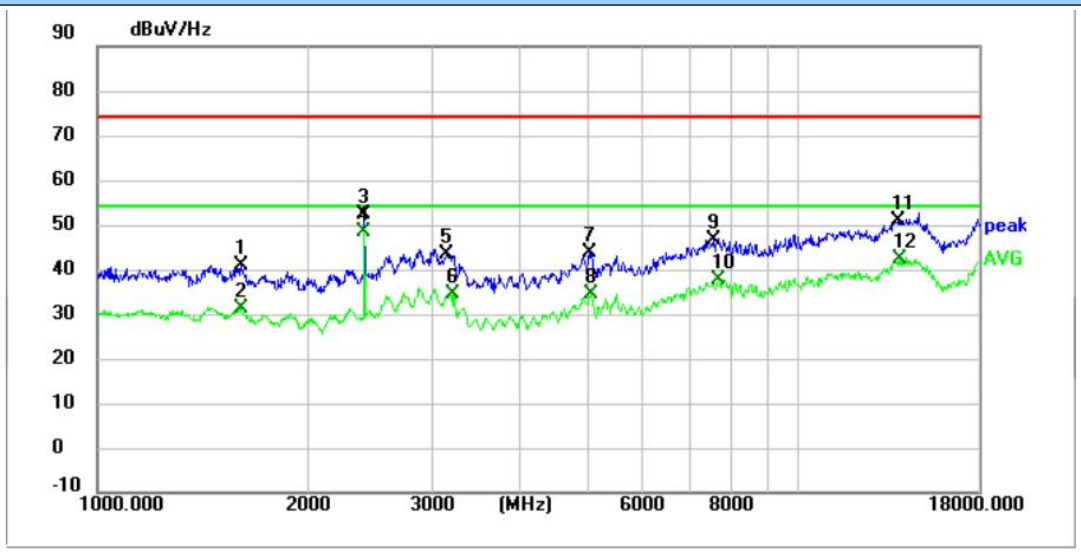
5.2.8.3. Test Result

Pass

5.2.8.4. Test Data

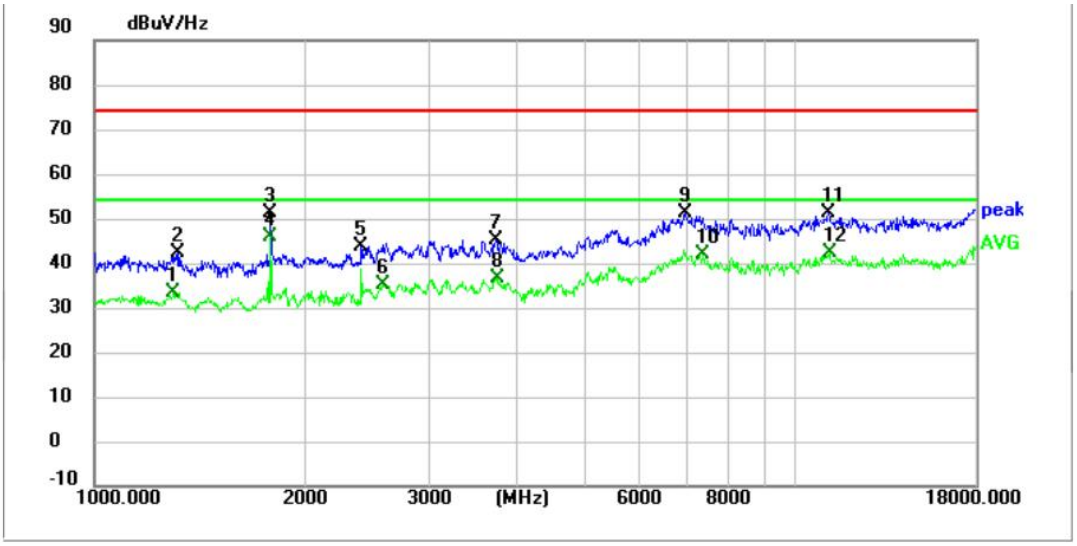
Have pre-scan all test channel, found Mode1 which it was worst case, so only show the worst case's data on this report.

Mode1 / Polarization: Horizontal / CH: L



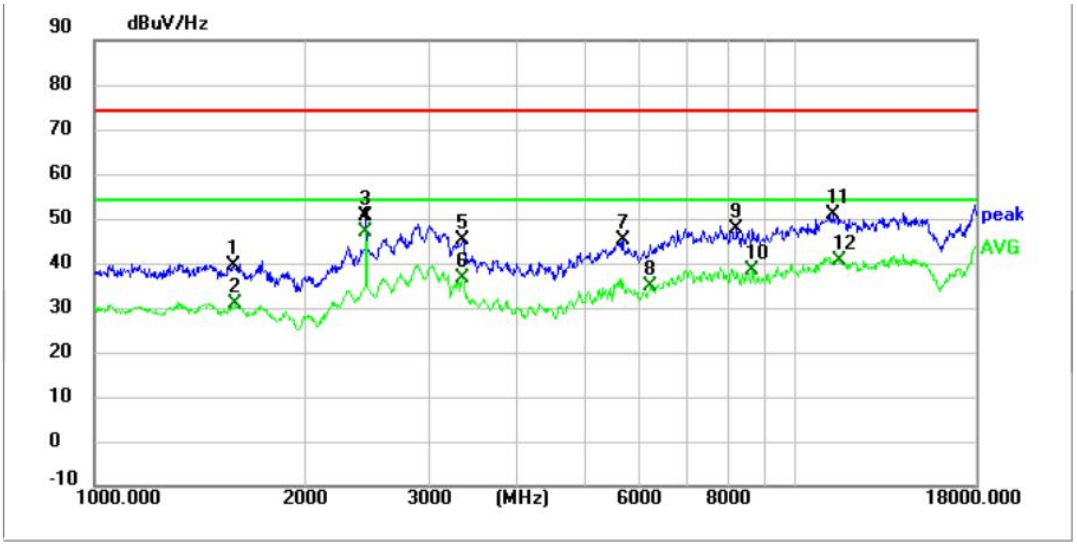
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1605.200	41.93	-1.21	40.72	74.00	-33.28	peak
2	1605.200	32.62	-1.21	31.41	54.00	-22.59	AVG
3	2404.200	49.77	2.38	52.15	74.00	-21.85	peak
4 *	2404.200	46.10	2.38	48.48	54.00	-5.52	AVG
5	3153.900	37.04	6.38	43.42	74.00	-30.58	peak
6	3215.100	27.87	6.59	34.46	54.00	-19.54	AVG
7	5029.000	30.85	12.75	43.60	74.00	-30.40	peak
8	5056.200	21.27	13.03	34.30	54.00	-19.70	AVG
9	7556.900	23.93	22.71	46.64	74.00	-27.36	peak
10	7672.500	15.16	22.67	37.83	54.00	-16.17	AVG
11	13797.600	62.15	-11.16	50.99	74.00	-23.01	peak
12	13908.100	53.34	-10.96	42.38	54.00	-11.62	AVG

Mode1 / Polarization: Vertical / CH: L



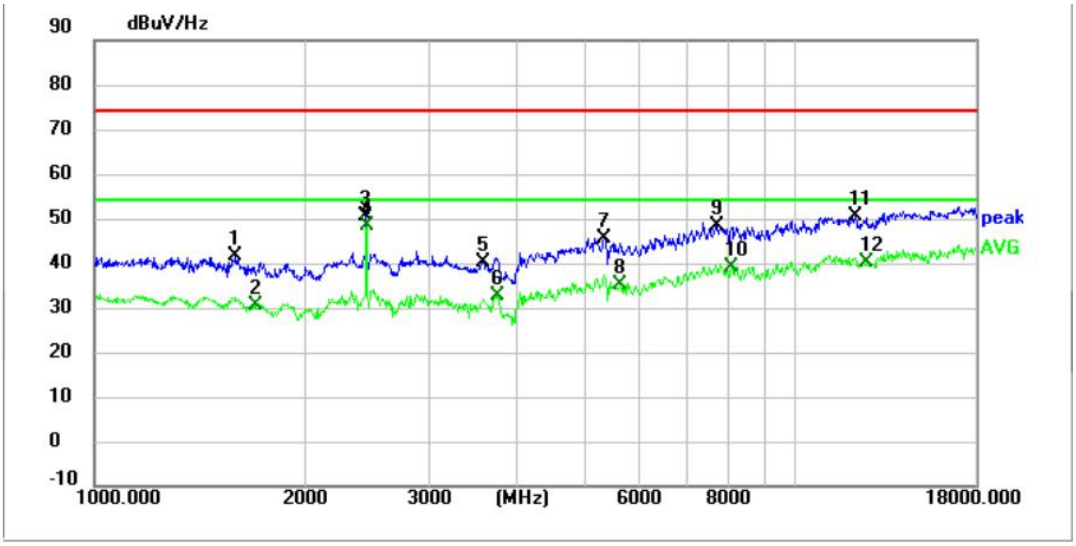
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1299.200	35.00	-1.61	33.39	54.00	-20.61	AVG
2	1316.200	43.85	-1.62	42.23	74.00	-31.77	peak
3	1785.400	51.39	-0.27	51.12	74.00	-22.88	peak
4 *	1785.400	46.05	-0.27	45.78	54.00	-8.22	AVG
5	2404.200	41.31	2.38	43.69	74.00	-30.31	peak
6	2574.200	31.50	3.69	35.19	54.00	-18.81	AVG
7	3735.300	38.56	6.79	45.35	74.00	-28.65	peak
8	3748.900	29.67	6.80	36.47	54.00	-17.53	AVG
9	6961.900	30.24	21.03	51.27	74.00	-22.73	peak
10	7375.000	19.94	22.12	42.06	54.00	-11.94	AVG
11	11133.700	23.26	28.09	51.35	74.00	-22.65	peak
12	11152.400	14.13	28.12	42.25	54.00	-11.75	AVG

Mode1 / Polarization: Horizontal / CH: M



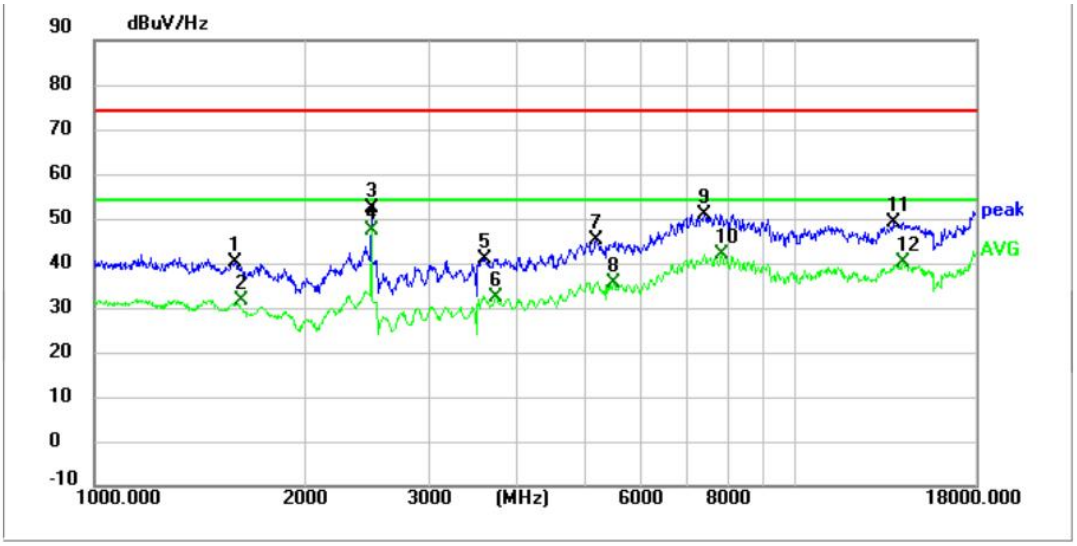
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1579.700	40.76	-1.29	39.47	74.00	-34.53	peak
2	1591.600	32.01	-1.25	30.76	54.00	-23.24	AVG
3	2441.600	48.12	2.39	50.51	74.00	-23.49	peak
4 *	2441.600	44.69	2.39	47.08	54.00	-6.92	AVG
5	3344.300	38.83	6.44	45.27	74.00	-28.73	peak
6	3344.300	30.14	6.44	36.58	54.00	-17.42	AVG
7	5675.000	30.05	15.04	45.09	74.00	-28.91	peak
8	6198.600	18.26	16.54	34.80	54.00	-19.20	AVG
9	8228.400	24.79	22.74	47.53	74.00	-26.47	peak
10	8680.600	15.64	22.67	38.31	54.00	-15.69	AVG
11	11271.400	22.64	28.16	50.80	74.00	-23.20	peak
12	11545.100	12.54	28.13	40.67	54.00	-13.33	AVG

Mode1 / Polarization: Vertical / CH: M



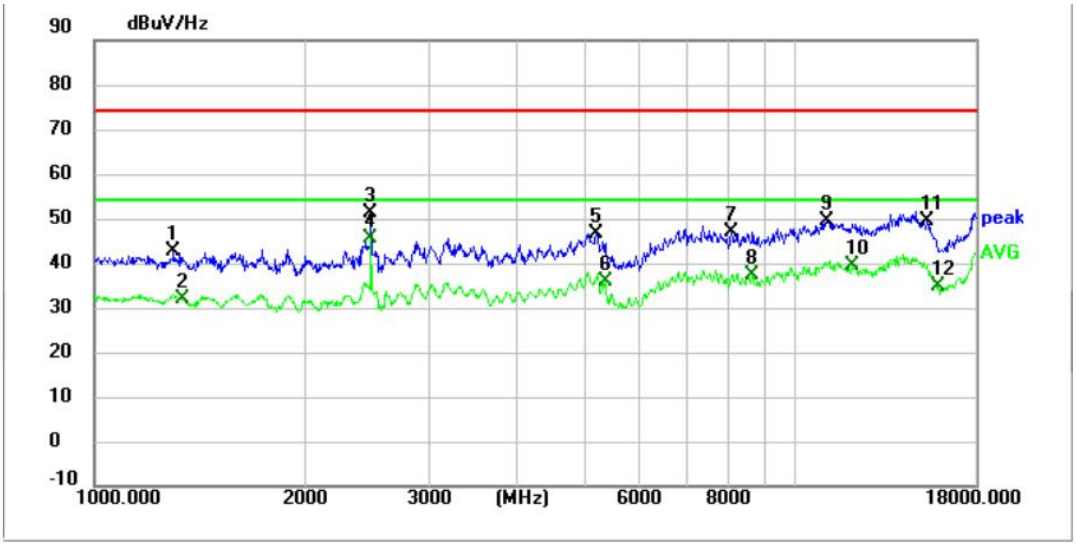
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1591.600	42.86	-1.25	41.61	74.00	-32.39	peak
2	1698.700	31.54	-0.90	30.64	54.00	-23.36	AVG
3	2441.600	48.24	2.39	50.63	74.00	-23.37	peak
4 *	2443.300	46.08	2.39	48.47	54.00	-5.53	AVG
5	3590.800	33.95	6.34	40.29	74.00	-33.71	peak
6	3760.800	25.90	6.80	32.70	54.00	-21.30	AVG
7	5329.900	31.86	13.65	45.51	74.00	-28.49	peak
8	5629.100	20.37	14.83	35.20	54.00	-18.80	AVG
9	7720.100	25.83	22.50	48.33	74.00	-25.67	peak
10	8106.000	16.31	22.77	39.08	54.00	-14.92	AVG
11	12146.900	22.69	27.81	50.50	74.00	-23.50	peak
12	12621.200	52.33	-12.24	40.09	54.00	-13.91	AVG

Mode1 / Polarization: Horizontal / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1584.120	41.54	-1.27	40.27	74.00	-33.73	peak
2	1621.214	32.78	-1.19	31.59	54.00	-22.41	AVG
3	2480.562	49.54	2.64	52.18	74.00	-21.82	peak
4 *	2480.562	44.65	2.64	47.29	54.00	-6.71	AVG
5	3592.409	34.59	6.34	40.93	74.00	-33.07	peak
6	3740.910	25.53	6.80	32.33	54.00	-21.67	AVG
7	5187.583	31.81	13.25	45.06	74.00	-28.94	peak
8	5496.618	20.87	14.81	35.68	54.00	-18.32	AVG
9	7404.881	28.65	22.14	50.79	74.00	-23.21	peak
10	7823.339	19.85	22.22	42.07	54.00	-11.93	AVG
11	13793.416	60.36	-11.17	49.19	74.00	-24.81	peak
12	14198.325	50.85	-10.52	40.33	54.00	-13.67	AVG

Mode1 / Polarization: Vertical / CH: H

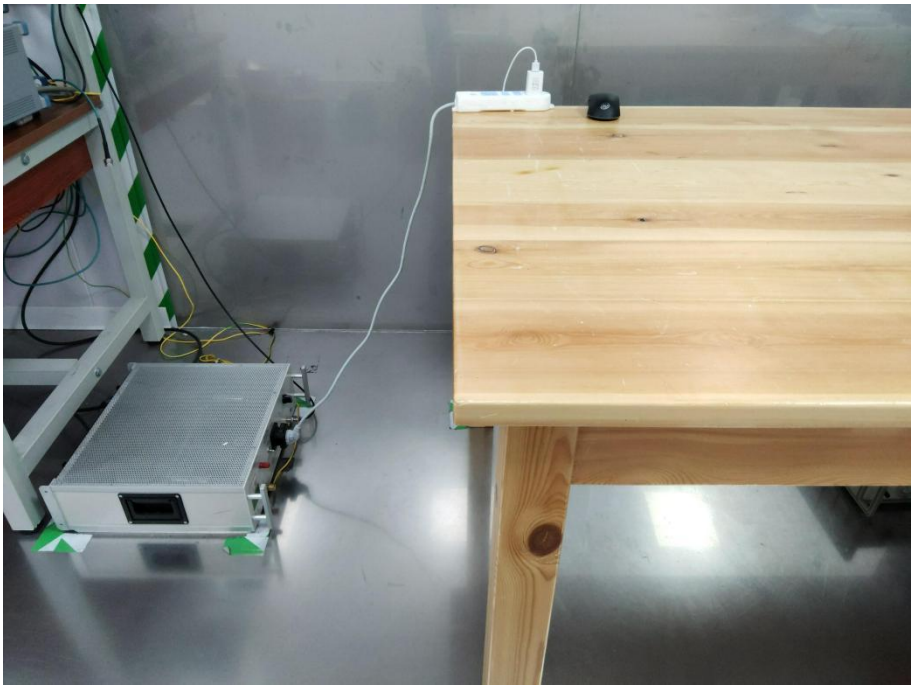


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1299.200	44.39	-1.61	42.78	74.00	-31.22	peak
2	1340.000	33.58	-1.64	31.94	54.00	-22.06	AVG
3	2482.400	48.61	2.66	51.27	74.00	-22.73	peak
4 *	2482.400	42.94	2.66	45.60	54.00	-8.40	AVG
5	5185.400	33.48	13.23	46.71	74.00	-27.29	peak
6	5346.900	22.46	13.59	36.05	54.00	-17.95	AVG
7	8106.000	24.15	22.77	46.92	74.00	-27.08	peak
8	8685.700	14.63	22.67	37.30	54.00	-16.70	AVG
9	11070.800	21.42	28.06	49.48	74.00	-24.52	peak
10	12063.600	11.73	27.73	39.46	54.00	-14.54	AVG
11	15354.800	61.05	-11.56	49.49	74.00	-24.51	peak
12	15943.000	48.63	-13.76	34.87	54.00	-19.13	AVG

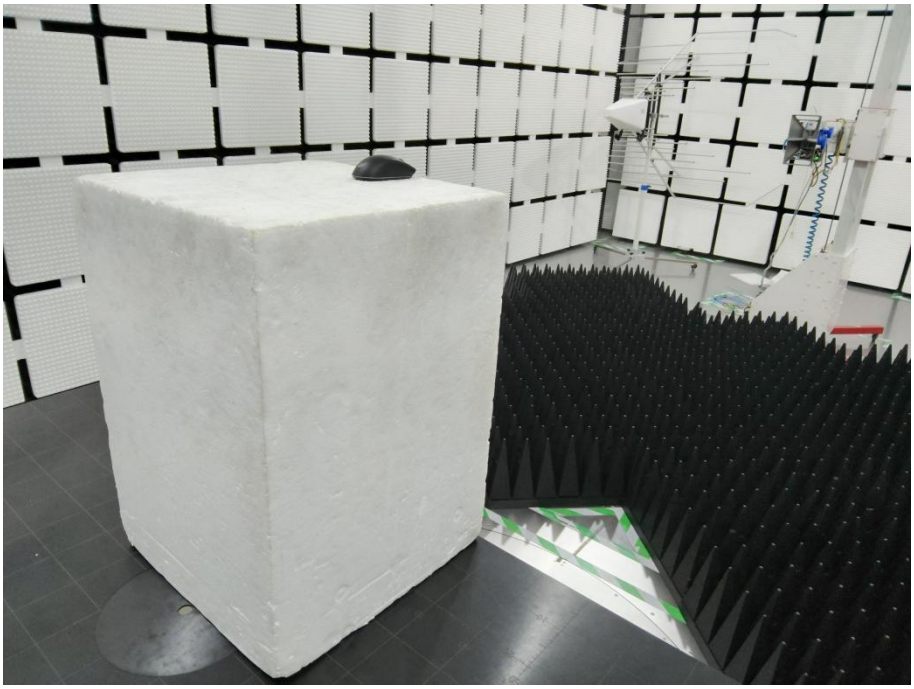
Note:
1) Level= Reading + Factor; Factor =Antenna Factor+ Cable Loss- Preamp Factor
2) Margin = Limit – Level
3) Average measurement was not performed if peak level is lower than average limit (54dBuV/m) for above 1GHz.

6. TEST SETUP PHOTOS

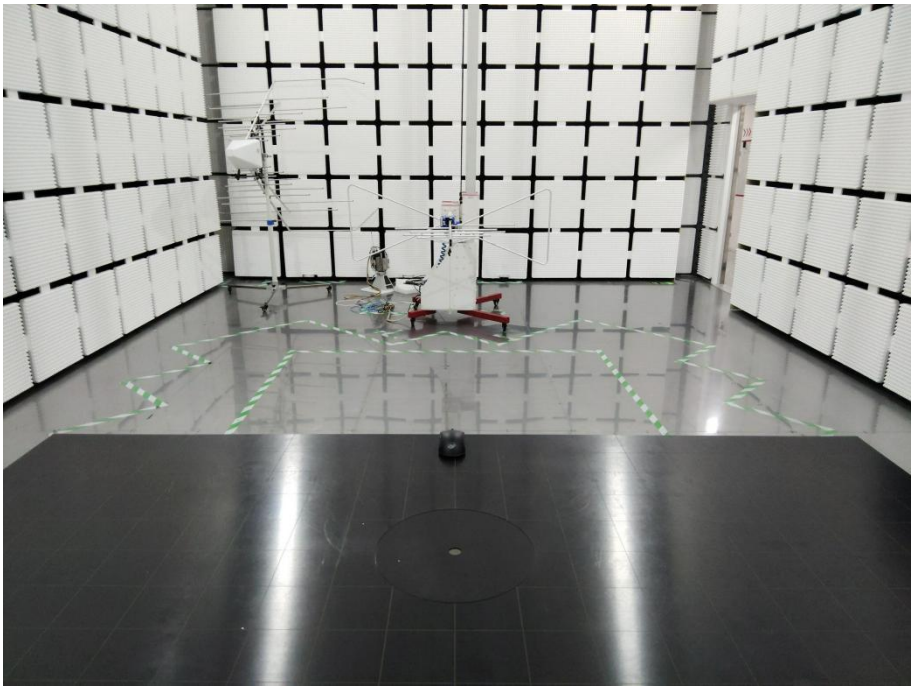
Conducted Emission at AC power line



Radiated band edge emission
Radiated Spurious Emission (Above 1GHz)

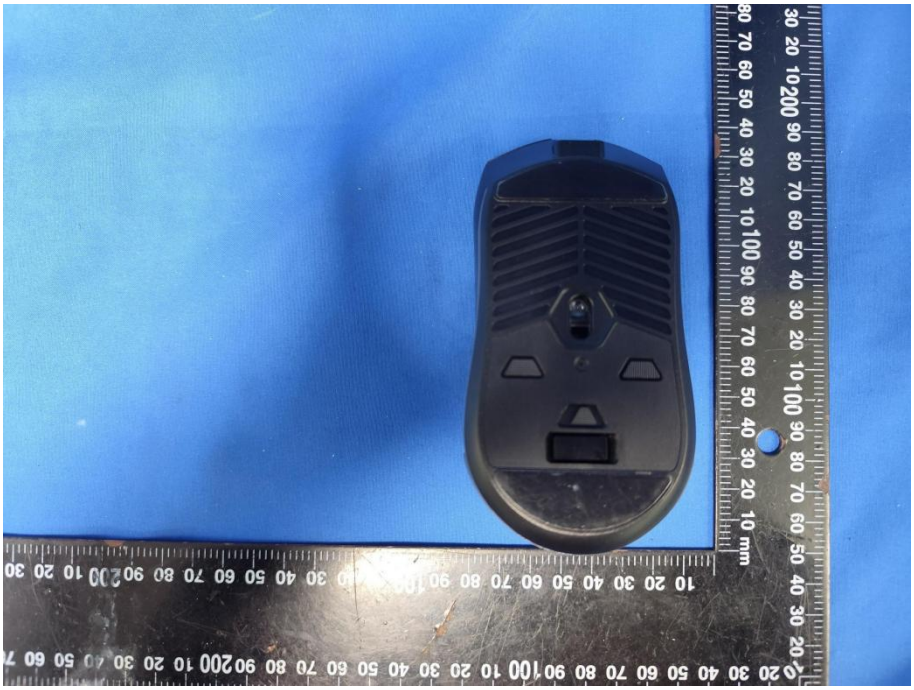


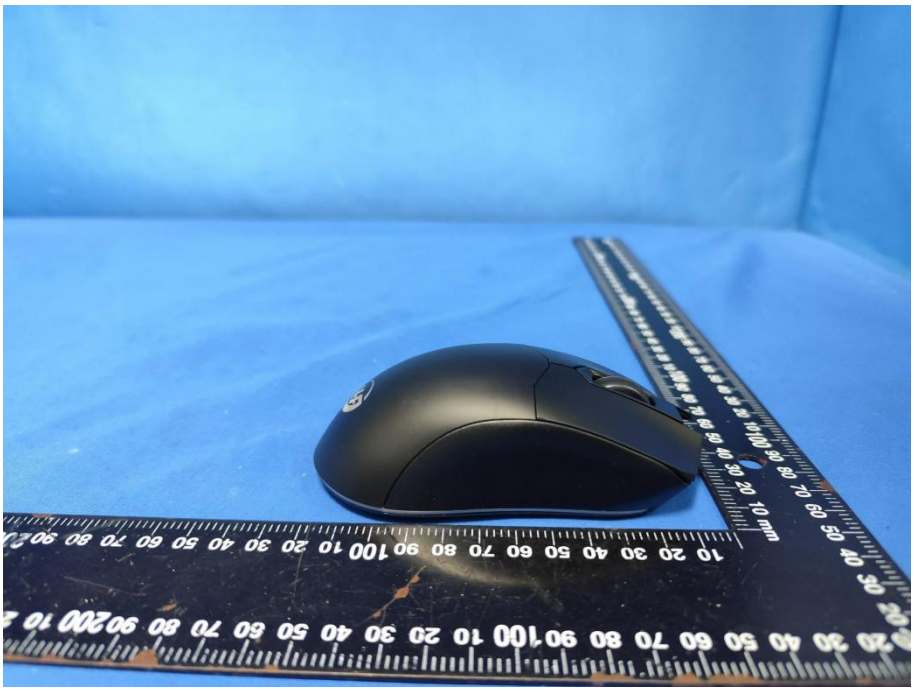
Radiated Spurious Emission (below 1GHz)



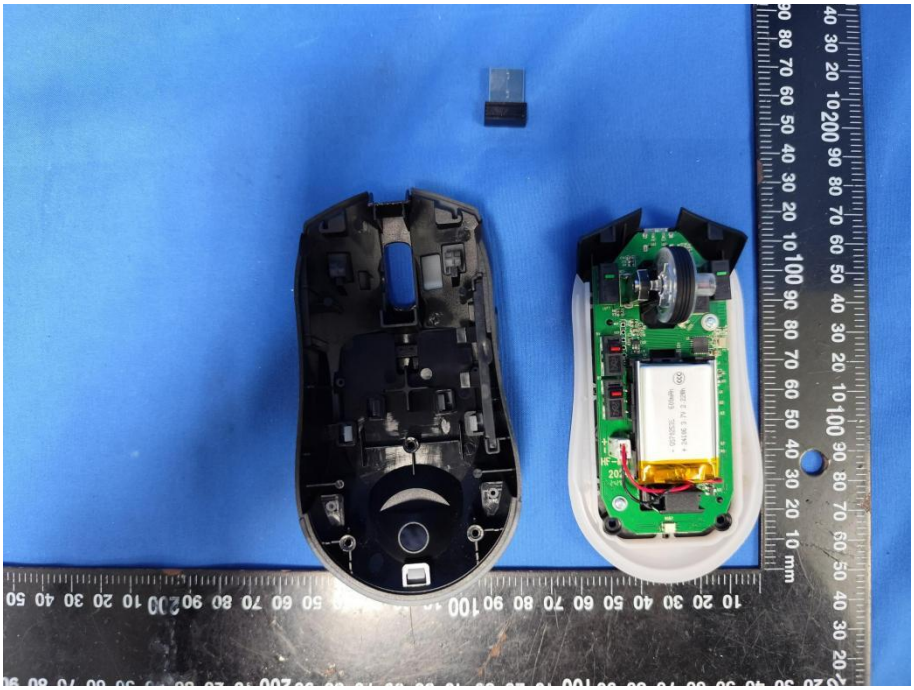
7. EXTERNAL AND INTERNAL PHOTOS

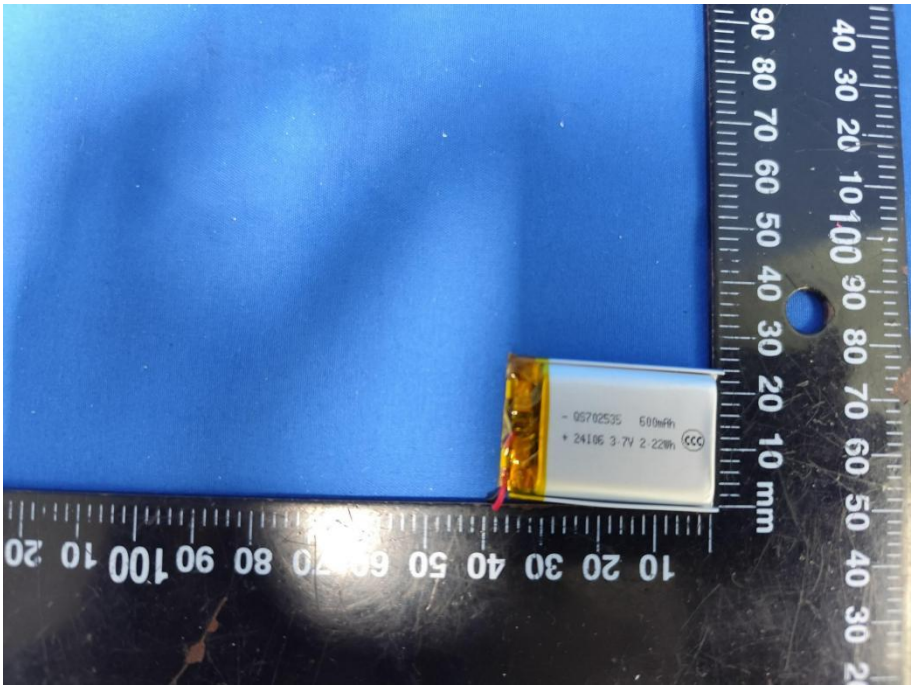
7.1. External Photos

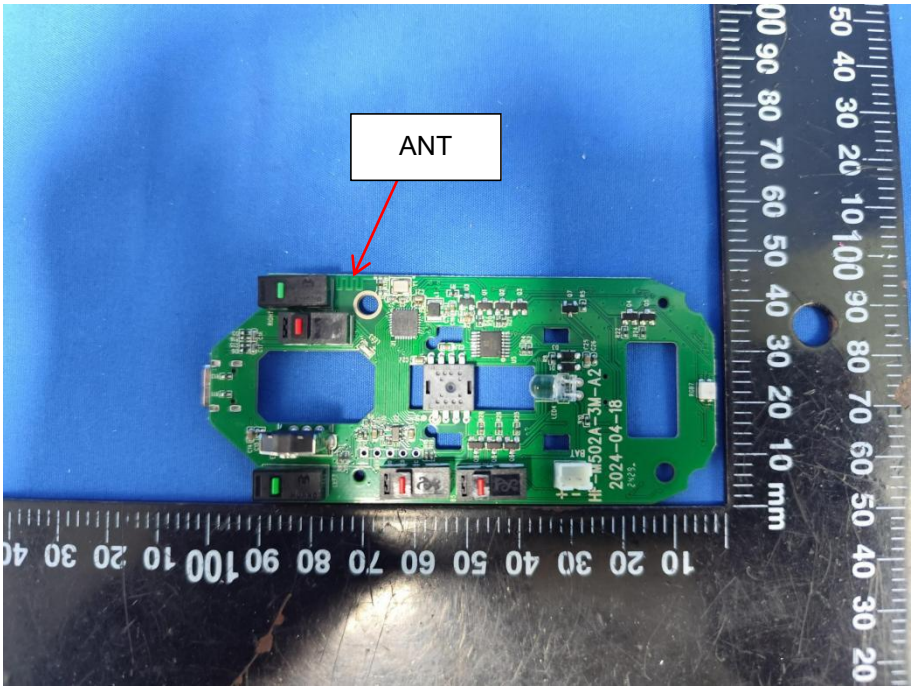




7.2. Internal Photos



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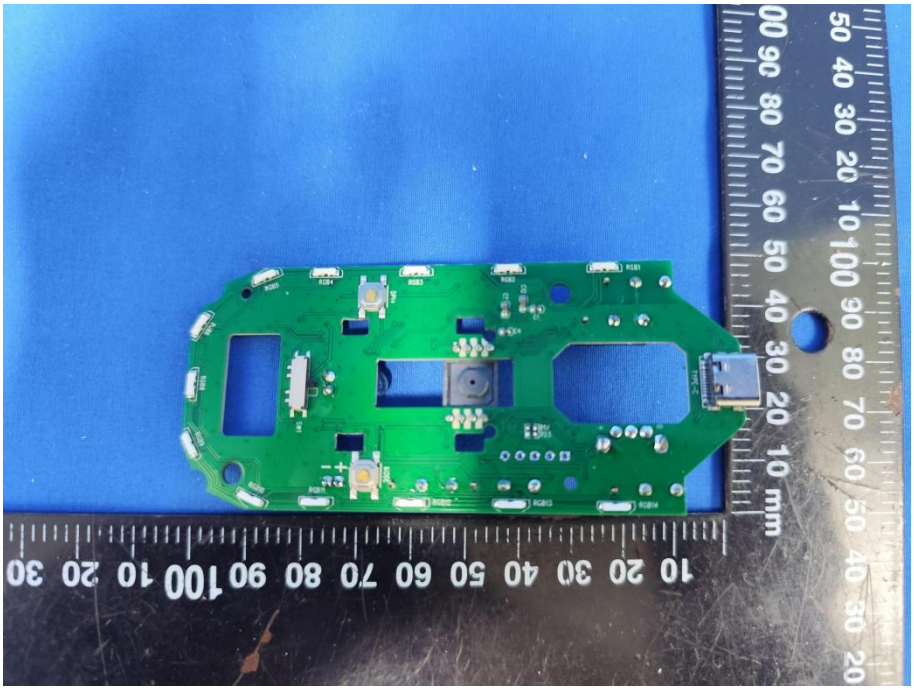
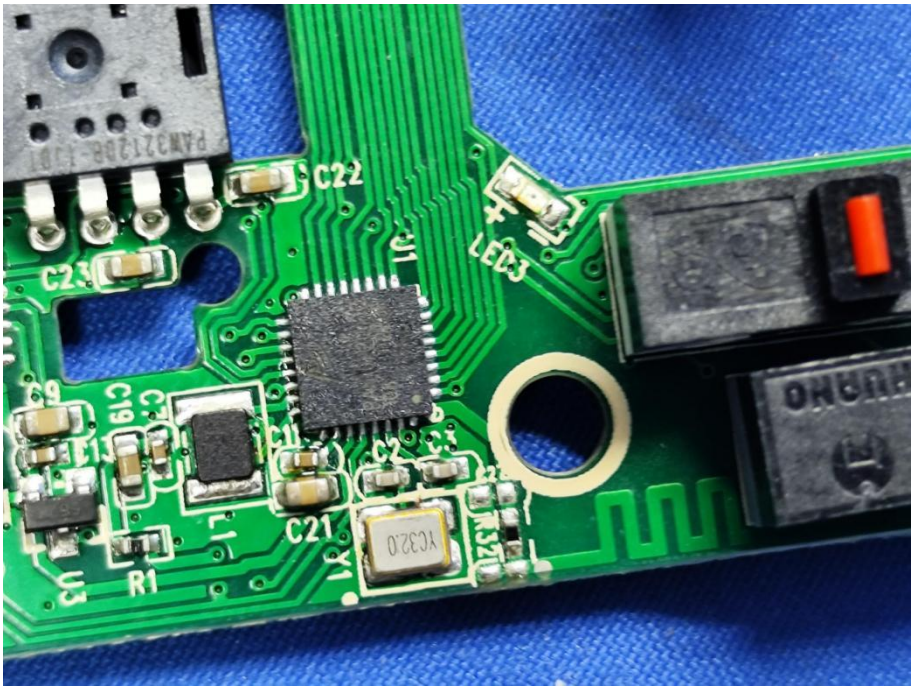
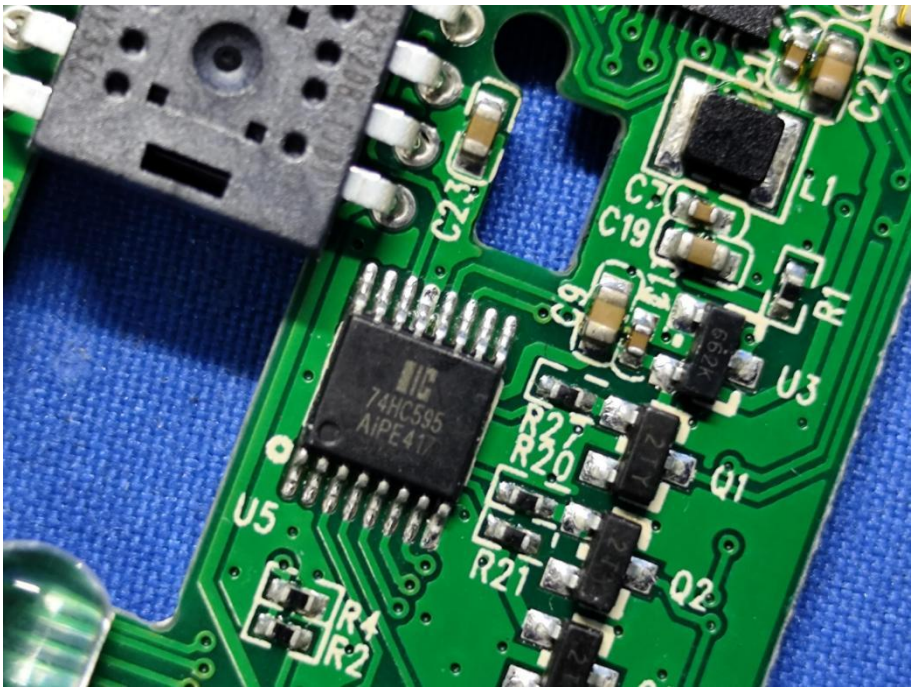



C22
C23
U1
LED3
C19
C21
R1
U3
YC32.0


C21
L1
C23
C19
R1
C9
U3
74HC595
AiPE417
R27
R20
Q1
U5
R21
Q2
R4
R2