

TEST REPORT

Product Name : Underwater thruster

Brand Name : N/A

Model : TD6E

Series Model : TD7 pro

FCC ID : 2BPWK-TD6E

Applicant : **Shenzhen Diamond Dynamics Technology Co., Ltd**
215, Qunli Second Road Folk Culture Industrial Park, Xingdong

Address : community, Xin'an street, Bao'an District, Shenzhen Guangdong, China

Manufacturer : **Shenzhen Diamond Dynamics Technology Co., Ltd**
215, Qunli Second Road Folk Culture Industrial Park, Xingdong

Address : community, Xin'an street, Bao'an District, Shenzhen Guangdong, China

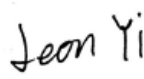
Standard(s) : FCC CFR Title 47 Part 15 Subpart C Section 15.231


Date of Receipt : May 13, 2025

Date of Test : May 14, 2025~ May 21, 2025

Issued Date : May 21, 2025

Issued By: **Guangdong Asia Hongke Test Technology Limited**
B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street,
Bao'an District, Shenzhen, Guangdong, China
Tel.: +86 0755-230967639 Fax.: +86 0755-230967639

Reviewed by: 
Leon.yi

Approved by: 
Sean She



Note: This device has been tested and found to comply with the standard(s) listed, this test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory. This report shall not be reproduced except in full, without the written approval of Guangdong Asia Hongke Test Technology Limited. If there is a need to alter or revise this document, the right belongs to Guangdong Asia Hongke Test Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.



Report Revise Record

Report Version	Issued Date	Notes
M1	May 21, 2025	Initial Release

Contents

1	TEST SUMMARY.....	4
1.1	TEST STANDARDS	4
1.2	TEST SUMMARY	4
1.3	TEST FACILITY	5
1.4	MEASUREMENT UNCERTAINTY	5
2	GENGENERAL INFORMATION.....	6
2.1	ENVIRONMENTAL CONDITIONS.....	6
2.2	GENERAL DESCRIPTION OF EUT	6
2.4	SPECIAL ACCESSORIES	7
2.5	EQUIPMENT LIST FOR THE TEST.....	7
3	TEST CONDITIONS AND RESULTS.....	9
3.1	CONDUCTED EMISSIONS TEST.....	9
3.2	RADIATED EMISSIONS AND BAND EDGE	11
3.3	20dB BANDWIDTH	19
3.4	DEACTIVATION TIME.....	20
3.5	ANTENNA REQUIREMENT.....	21
4	TEST SETUP PHOTOGRAPHS OF EUT	22
5	PHOTOS OF EUT	23

1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.231](#): Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

[ANSI C63.10: 2013](#): American National Standard for Testing Unlicensed Wireless Devices

1.2 Test Summary

FCC Requirements		
FCC Part 15.207	Conducted Emission	N/A
FCC Part 15.231(a)(2)	Automatically Deactivate	PASS
FCC Part 15.231(b)	Electric Field Strength of Fundamental Emission	PASS
FCC Part 15.205 & 15.209 & 15.231(b)	Electric Field Strength of Spurious Emission	PASS
FCC Part 15.231(c)	-20dB bandwidth	PASS

1.3 Test Facility

Test Laboratory:

Guangdong Asia Hongke Test Technology Limited

B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified or accredited by the following organizations:

FCC-Registration No.: 251906 Designation Number: CN1376

Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165

The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01

Guangdong Asia Hongke Test Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.4 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Guangdong Asia Hongke Test Technology Limited's quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Asia Hongke laboratory is reported:

Test	Measurement Uncertainty	Notes
Power Line Conducted Emission	9KHz~30MHz ± 1.20 dB	(1)
Radiated Emission	9KHz~30MHz ± 3.10 dB	(1)
Radiated Emission	30MHz~1GHz ± 3.75 dB	(1)
Radiated Emission	1GHz~18GHz ± 3.88 dB	(1)
Radiated Emission	18GHz~40GHz ± 3.88 dB	(1)
RF power, conducted	30MHz~6GHz ± 0.16 dB	(1)
RF power density, conducted	± 0.24 dB	(1)
Spurious emissions, conducted	± 0.21 dB	(1)
Temperature	$\pm 1^{\circ}\text{C}$	(1)
Humidity	$\pm 3\%$	(1)
DC and low frequency voltages	$\pm 1.5\%$	(1)
Time	$\pm 2\%$	(1)
Duty cycle	$\pm 2\%$	(1)

The report uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

2 GENGGENERAL INFORMATION

2.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	Underwater thruster
Model/Type reference:	TD6E
Serial Model:	TD7 pro
Power Supply:	Underwater thruster: DC 24V Remote control: DC 3.0V from battery
Hardware Version:	N/A
Software Version:	N/A
Sample(s) Status:	AiTSZ-250604039-1(Normal sample) AiTSZ-250604039-2(Engineer sample)
SRD :	
Operation frequency:	433.92MHz
Modulation:	ASK
Channel number:	1
Antenna type:	PCB antenna
Antenna gain:	0dBi
Remark: The above DUT's information was declared by manufacturer. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual..	

2.4 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Serial No.	Provided by	Other
/	/	/	/	/	/
/	/	/	/	/	/

2.5 Equipment List for the Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	EMI Measuring Receiver	R&S	ESR	101160	2024.09.25	2025.09.24
2	Spectrum Analyzer	R&S	FSV40	101470	2024.09.23	2025.09.22
3	Low Noise Pre Amplifier	SCHWARZBECK	BBV 9745	00282	2024.09.25	2025.09.24
4	Low Noise Pre Amplifier	CESHENG	CSKJLNA23101 6A	CSKJLNA231016 A	2024.09.25	2025.09.24
5	Passive Loop	ETS	6512	00165355	2024.08.29	2027.08.28
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9168	01434	2024.08.29	2027.08.28
7	Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	452	2024.08.29	2027.08.28
8	Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367	2024.08.28	2027.08.27
9	6dB Attenuator	JFW	50FPE-006	4360846-949-1	2024.09.24	2025.09.23
10	EMI Test Receiver	R&S	ESPI	100771	2024.09.25	2025.09.24
11	LISN	R&S	NNLK 8129	8130179	2024.09.24	2025.09.23
12	LISN	R&S	ESH3-Z5	892785/016	2024.09.23	2025.09.22
13	Pulse Limiter	R&S	ESH3-Z2	102789	2024.09.24	2025.09.23
14	RF Automatic Test system	TST	TSTPASS	21033016	2024.09.25	2025.09.24
15	Vector Signal Generator	Agilent	N5182A	MY50143009	2024.09.25	2025.09.24
16	Analog signal generator	Agilent	E8257	MY51554256	2024.09.25	2025.09.24
17	Spectrum Analyzer	Agilent	N9020A	MY51289843	2024.09.25	2025.09.24
18	Spectrum Analyzer	Agilent	N9020A	MY53421570	2024.09.25	2025.09.24
19	Power Sensor	Agilent	8481A	MY41097697	2024.09.25	2025.09.24
20	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2024.09.24	2025.09.23
21	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	2024.09.24	2025.09.23
22	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
23	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A

3 TEST CONDITIONS AND RESULTS

3.1 Conducted Emissions Test

LIMIT

Frequency range (MHz)	Limit (dBuV)	
	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 CONFIGURATION



TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

Not applicable for device which is battery supply.

3.2 Radiated Emissions and Band Edge

Limit

For intentional device, according to 15.209(a) the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table.

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

In addition to the provisions of 15.231 (b) and RSS 210-A1. 1. 2, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

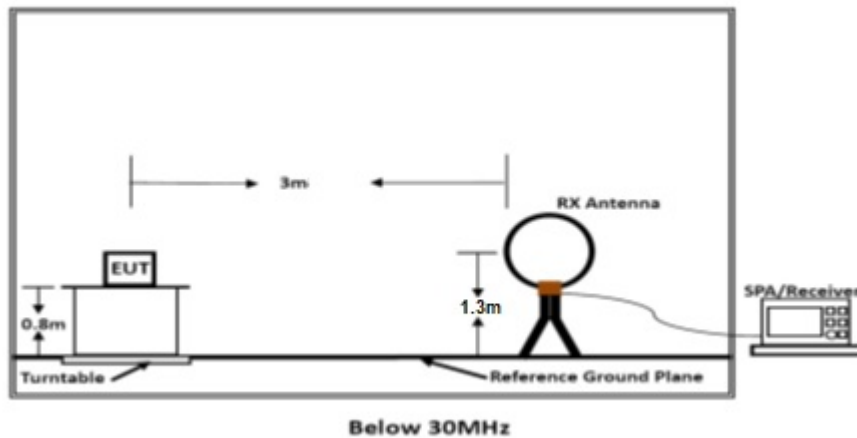
Funda- mental fre- quency (MHz)	Field strength of funda- mental (microvolts/ meter)	Field strength of spurious emissions (microvolts/meter)
40.66– 40.70.	2,250	225
70–130	1,250	125
130–174	¹ 1,250 to 3,750	¹ 125 to 375
174–260	3,750	375
260–470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹ Linear interpolations.

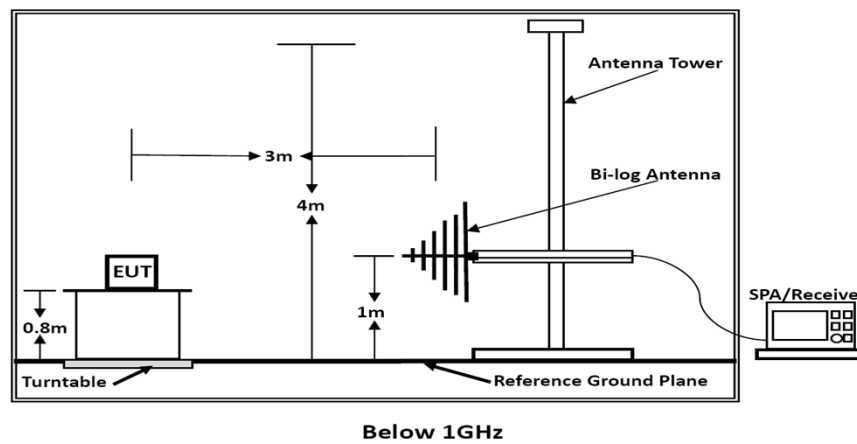
[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 260-470 MHz, μ V/m at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

TEST CONFIGURATION

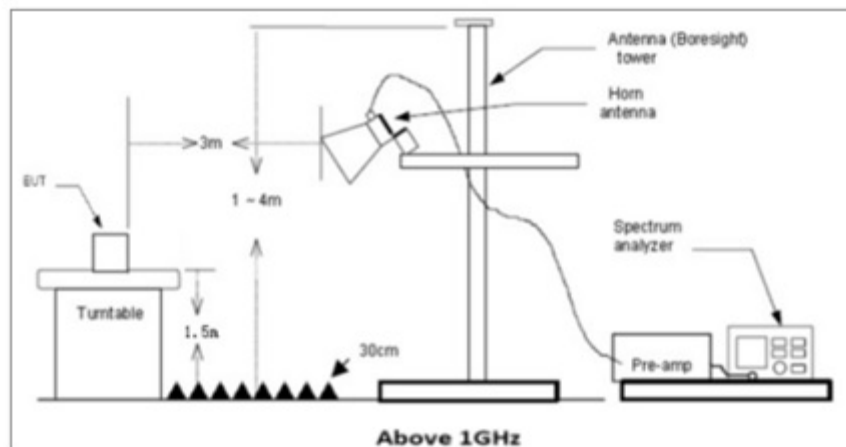
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

- Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
- Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Repeat above procedures until all frequency measurements have been completed.
- Radiated emission test frequency band from 9KHz to 5GHz.
- The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

- Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto	Peak

Calculation of Average Factor

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span.

Averaging factor in dB = $20 \log(\text{duty cycle})$

The duty cycle is simply the on-time divided by the period

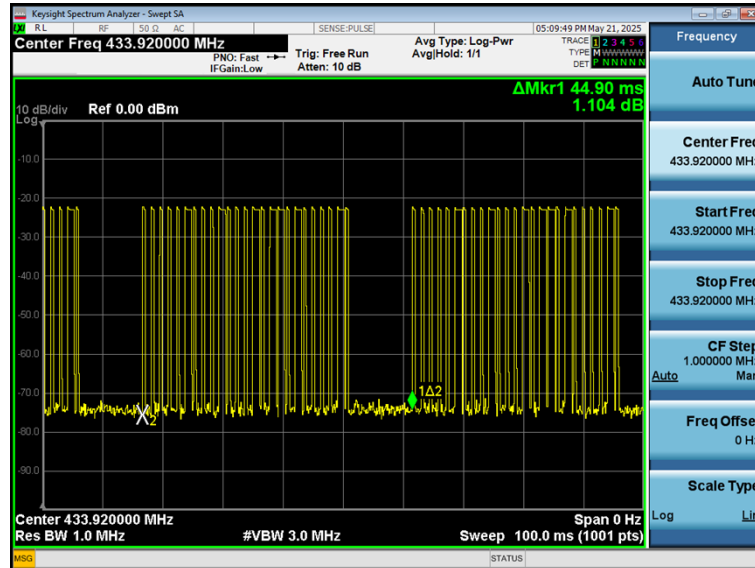
In a transmit cycle 44.90ms period found 1.120ms burst 7pcs, 0.430ms burst 18pcs, the Duty Cycle can calculate as below:

Duty Cycle = $(1.120 * 7 + 0.430 * 18) / 44.90 = 0.347$

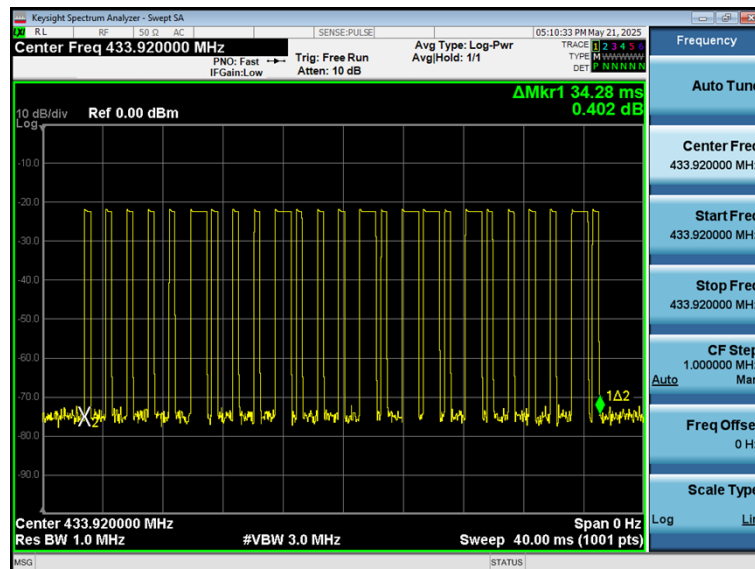
Therefore, the AV Factor is found by $20 * \log(0.347) = -9.19\text{dB}$

Please see the plots below:

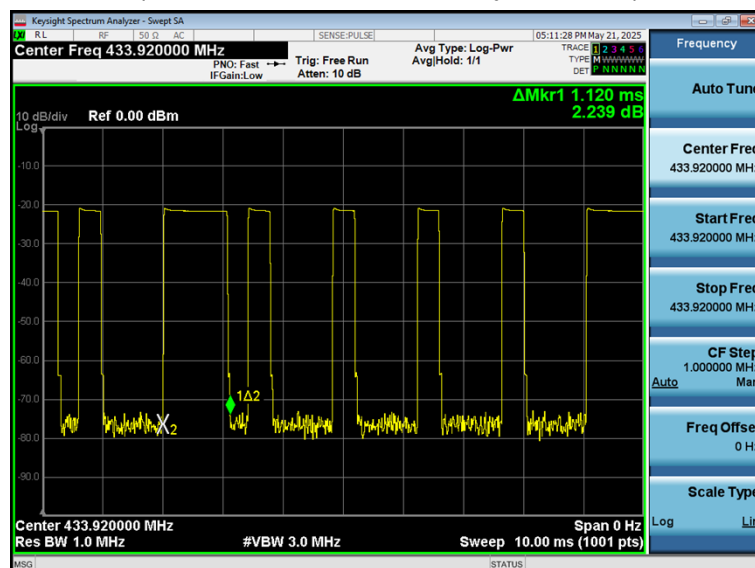
The plot of Duty Cycle



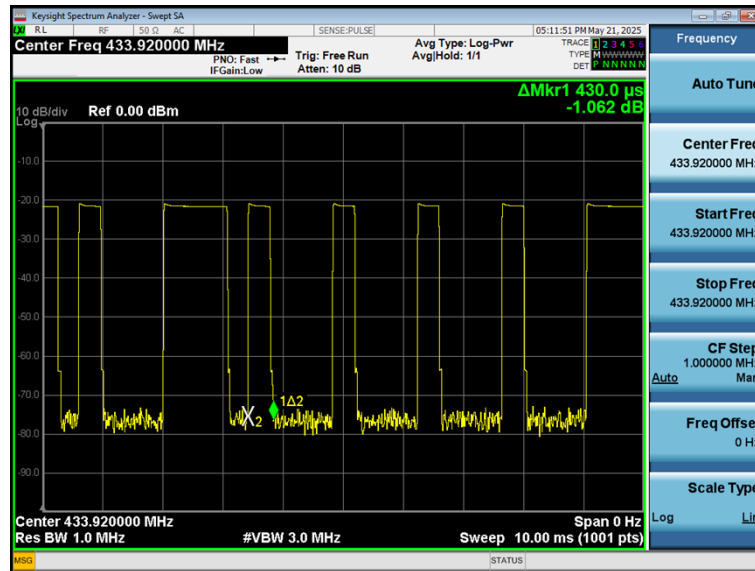
(Transmit cycle 44.90ms)



(Total Bursts in a transmit cycle 25pcs)



(1.120 ms burst 7pcs)



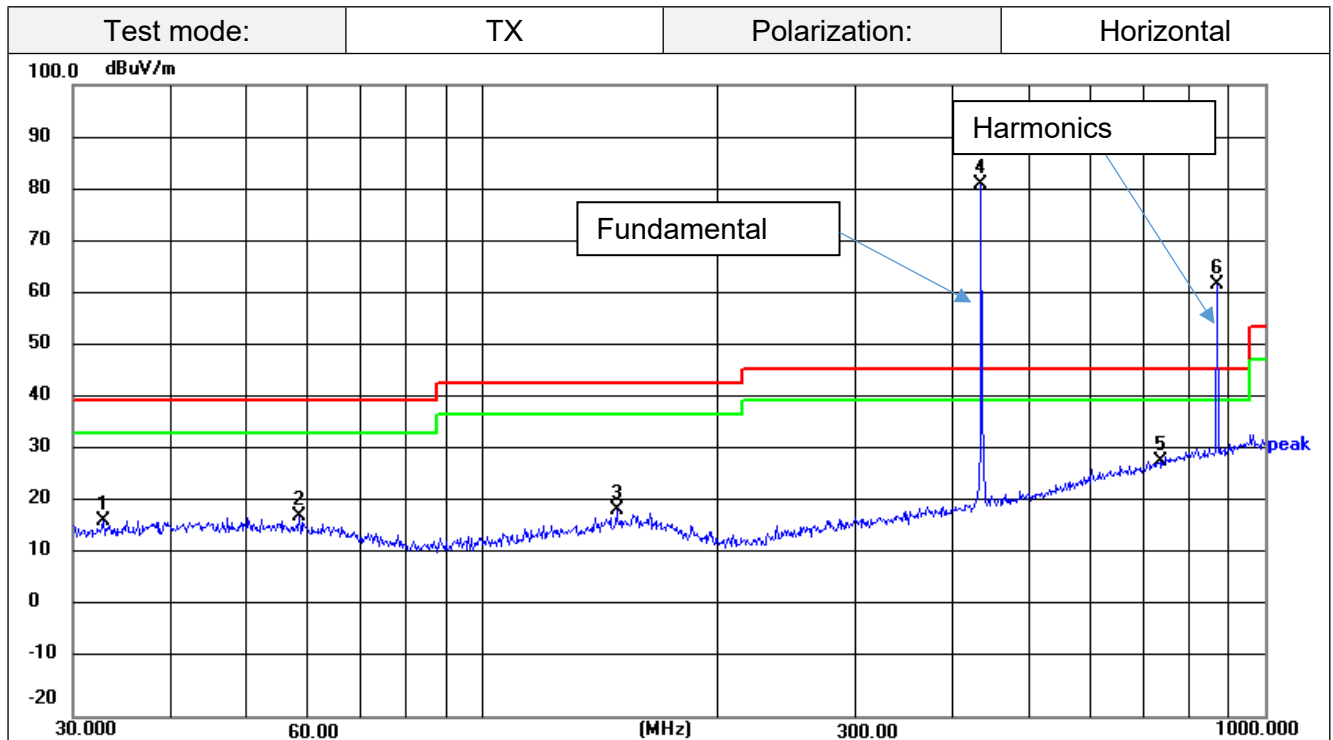
(0.430ms burst 18pcs)

TEST RESULTS

Remark:

1. The field strength of radiation emission was measured 9KHz-5GHz with following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Z axis.
2. The emission levels from 9kHz to 30MHz are attenuated 20dB below the limit and not recorded in report.

For 30MHz-1GHz



Remark:

Emission Level = Reading + Factor;

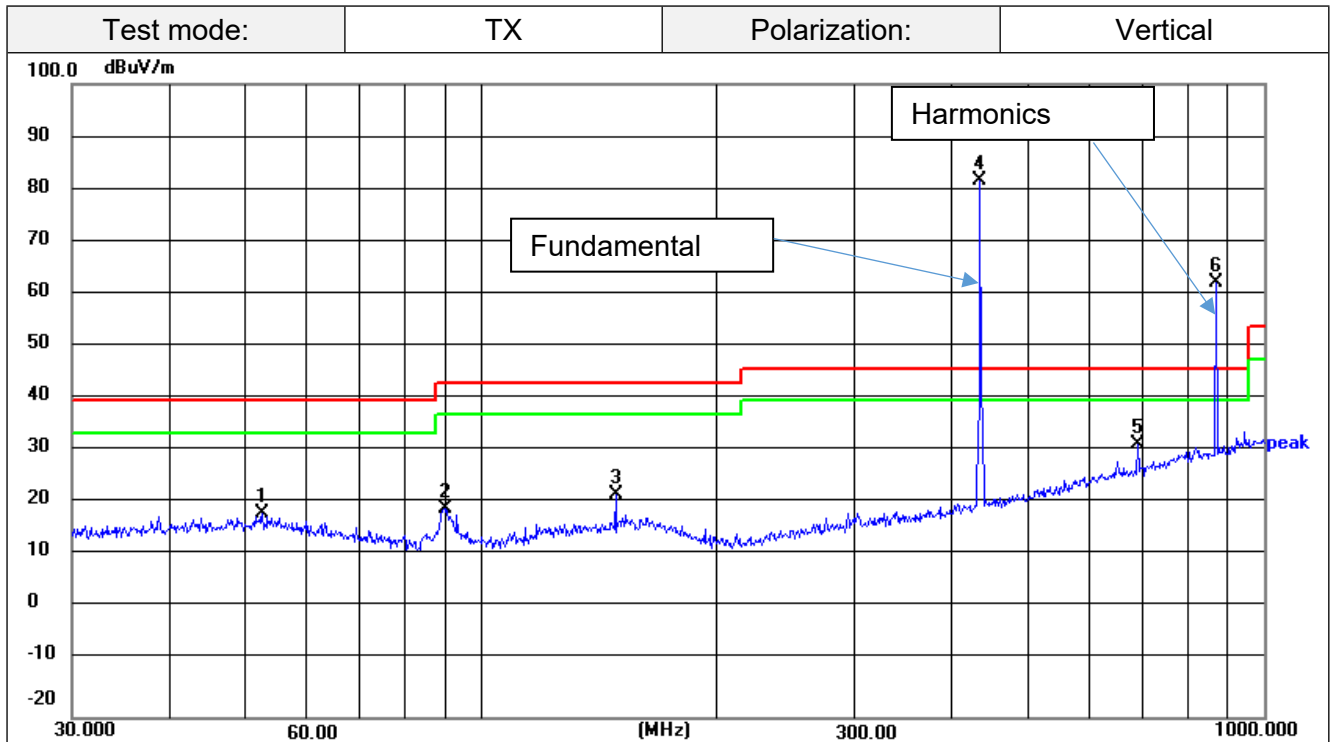
Factor = Antenna Factor + Cable Loss – Pre-amplifier;

AV Emission Level = PK Emission Level +AV Factor;

Margin= Emission Level - Limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	32.7486	34.68	-17.38	17.30	40.00	-22.7	Peak
2	58.4074	35.22	-17.18	18.04	40.00	-21.96	Peak
3	148.4410	35.97	-16.63	19.34	43.50	-24.16	Peak
4	434.0651	94.93	-13.66	81.27	100.82	-19.55	Peak
5	734.4913	35.86	-7.30	28.56	46.00	-17.44	Peak
6	869.1302	67.26	-5.18	62.08	80.82	-18.74	Peak

Emission Styles	Frequency (MHz)	PK Emission Level (dBuV/m)	AV Factor (dB/m)	AV Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Fundamental	434.0651	81.27	-9.19	72.08	80.82	-8.74
Harmonics	869.1302	62.08	-9.19	52.89	60.82	-7.93



Remark:

Emission Level = Reading + Factor;
Factor = Antenna Factor + Cable Loss – Pre-amplifier;
AV Emission Level = PK Emission Level +AV Factor;
Margin= Emission Level - Limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	52.5753	35.46	-16.83	18.63	40.00	-21.37	Peak
2	89.9046	40.74	-20.99	19.75	43.50	-23.75	Peak
3	148.4410	39.04	-16.63	22.41	43.50	-21.09	Peak
4	434.0650	95.48	-13.66	81.82	100.82	-19.00	Peak
5	689.5644	40.12	-8.39	31.73	46.00	-14.27	Peak
6	869.1300	67.60	-5.18	62.42	80.82	-18.40	Peak

Emission Styles	Frequency (MHz)	PK Emission Level (dBuV/m)	AV Factor (dB/m)	AV Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Fundamental	434.0650	81.82	-9.19	72.63	80.82	-8.19
Harmonics	869.1300	62.42	-9.19	53.23	60.82	-7.59

For 1GHz to 5GHz

Emission Styles	Frequency (MHz)	Meter Reading (dBμV)	Factor (dB/m)	PK Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Direction (H/V)
Harmonics	1301.96	80.48	-16.24	64.24	80.82	-16.58	PEAK	H
Harmonics	1735.13	77.78	-16.03	61.75	80.82	-19.07	PEAK	H
Harmonics	2169.60	71.00	-14.02	56.98	80.82	-23.84	PEAK	H
--	--	--	--	--	--	--	--	H
Harmonics	1301.96	80.82	-16.24	64.58	80.82	-16.24	PEAK	V
Harmonics	1735.13	78.21	-16.03	62.18	80.82	-18.64	PEAK	V
Harmonics	2169.60	71.50	-14.02	57.48	80.82	-23.34	PEAK	V
--	--	--	--	--	--	--	--	V

Emission Styles	Frequency (MHz)	PK Emission Level (dBμV/m)	AV Factor (dB/m)	AV Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Direction (H/V)
Harmonics	1301.96	64.24	-9.19	55.05	60.82	-5.77	H
Harmonics	1735.13	61.75	-9.19	52.56	60.82	-8.26	H
Harmonics	2169.60	56.98	-9.19	47.79	60.82	-13.03	H
--	--	--	--	--	--	--	H
Harmonics	1301.96	64.58	-9.19	55.39	60.82	-5.43	V
Harmonics	1735.13	62.18	-9.19	52.99	60.82	-7.83	V
Harmonics	2169.60	57.48	-9.19	48.29	60.82	-12.53	V
--	--	--	--	--	--	--	V

Note:

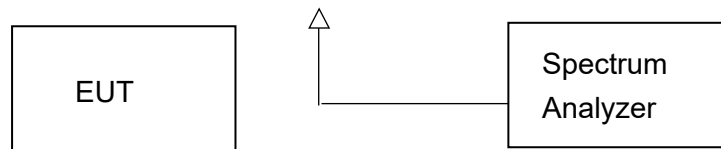
1. AV Emission Level (dBμV/m)= PK Emission Level (dBμV/m)+ AV Factor(dB)
2. Margin (dB)= Emission Level (dBμV/m) – Limit
3. --Other emission levels are attenuated 20dB below the limit and not recorded in report.

3.3 20dB Bandwidth

Limit

According to 47 CFR 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

Test Configuration



Test Procedure

The 20dB bandwidth and 99% bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

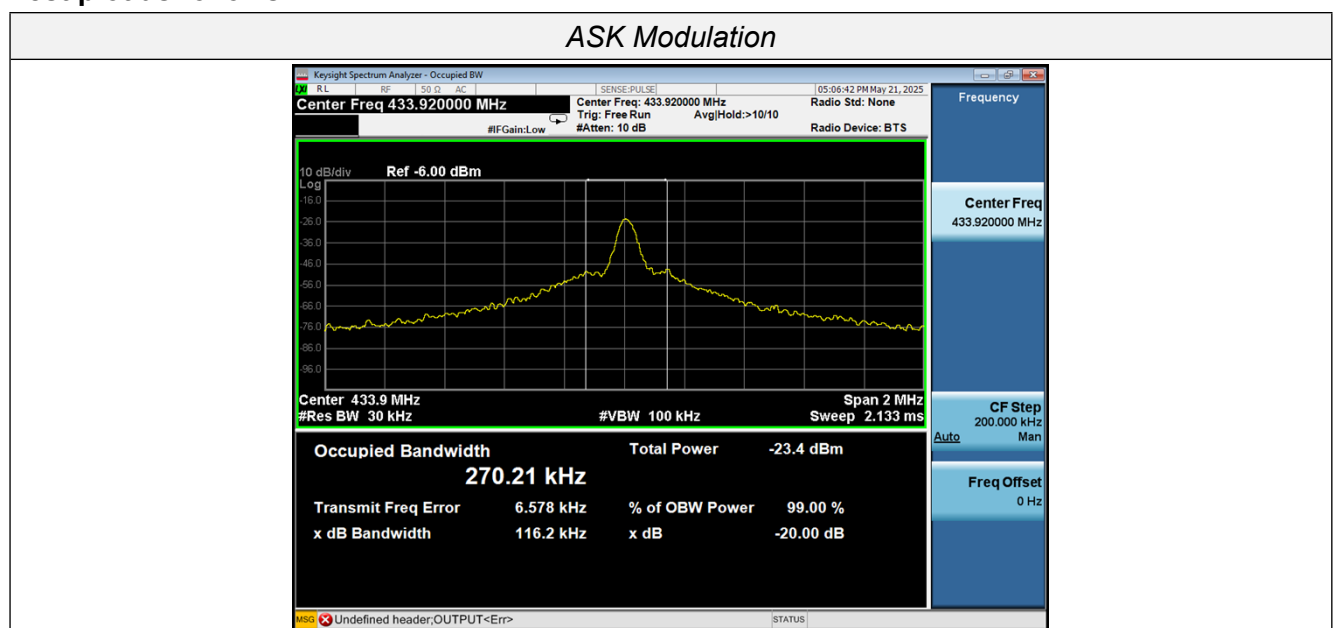
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The occupied bandwidth (OBW), that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Test Results

Modulation	Channel Frequency (MHz)	20dB bandwidth (KHz)	Limit (KHz)	Result
ASK	433.92	116.2	$0.25\% \times 433.92 = 1084.8$	Pass

Test plot as follows:

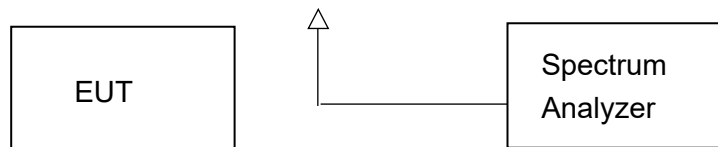


3.4 Deactivation Time

Limit

According to FCC §15.231(a)(2), A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Test Configuration



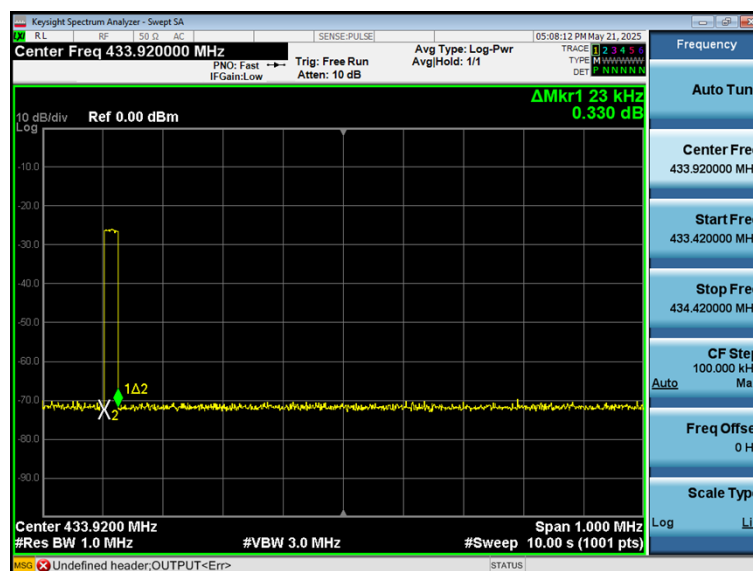
Test Procedure

1. The EUT was placed on a wooded table which is 0.8m height and close to receiver antenna of spectrum analyzer.
2. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was set to 1 MHz to encompass all significant spectral components during the test. The spectrum analyzer was operated in linear scale and zero span mode after tuning to the transmitter carrier frequency.

TEST RESULTS

Note: The transmitter was automatically activated, and the carrier frequency 433.92MHz:

Frequency (MHz)	One transmission time (S)	Limit(S)	Result
433.92	0.22	5	Pass



3.5 Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

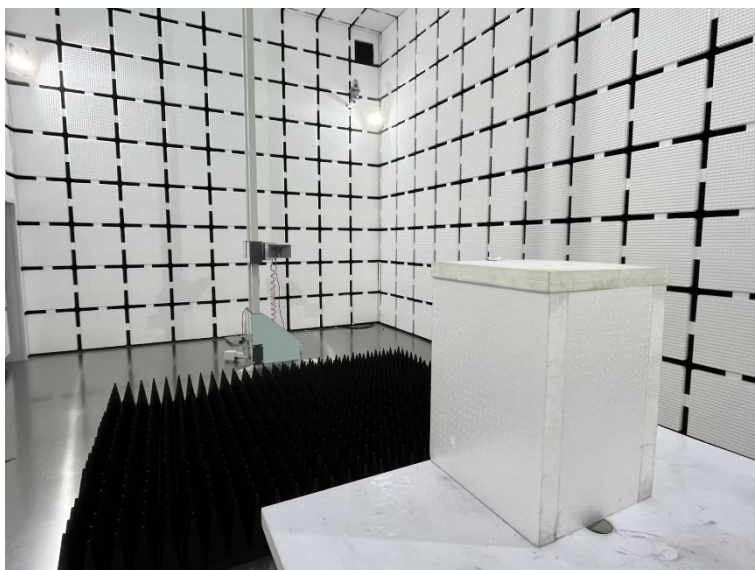
FCC CFR Title 47 Part 15 Subpart C Section 15.247(b) (4):

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Result

The maximum gain of antenna was 0dBi with impedance 50Ω .

4 Test Setup Photographs of EUT



5 Photos of EUT

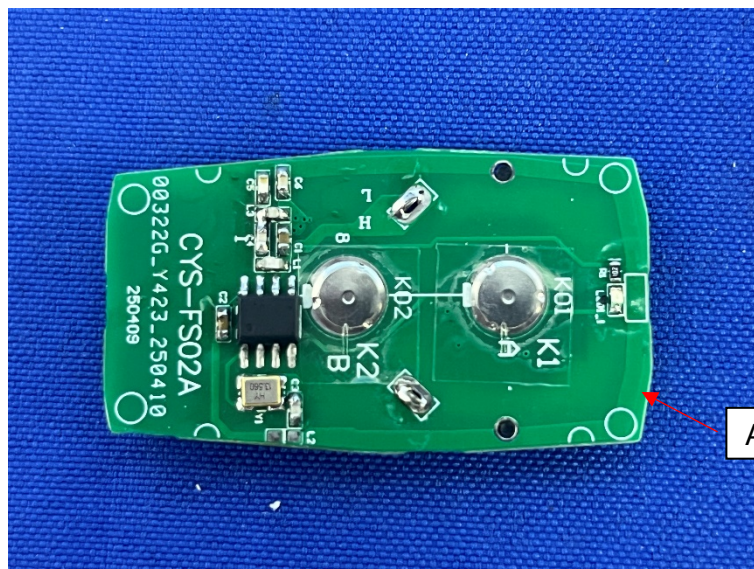
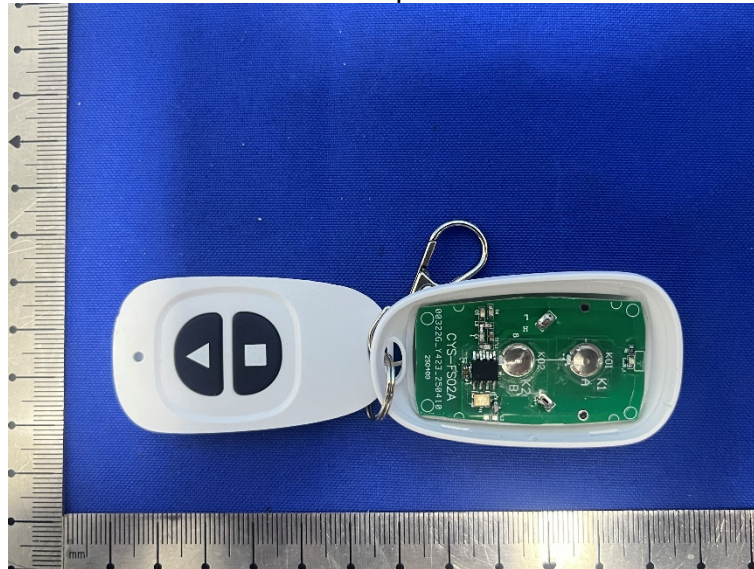
External photos



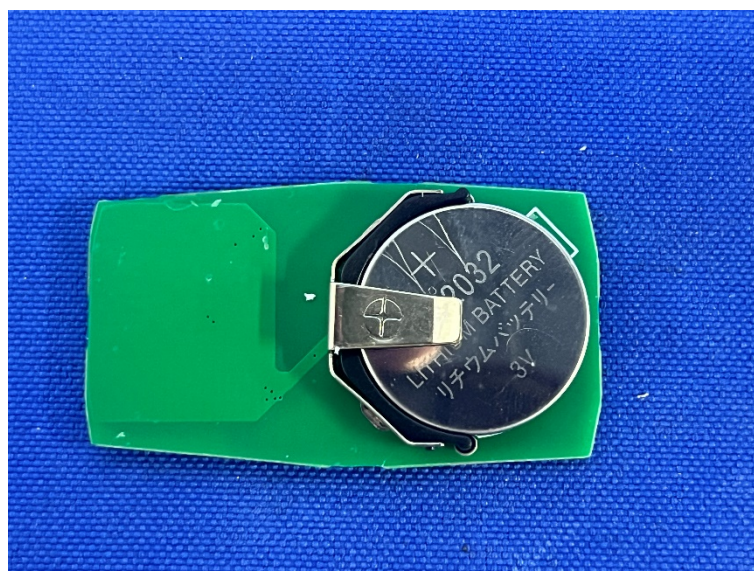




Internal photos



Antenna





***** End of Report *****