

FCC Test Report

Report No.: 2405S71445EE

Applicant: Sendum Wireless Corp.

Address: 4500 Beedie Street, Burnaby, BC, V5J 5L2, Canada

Product Name: Smart Probe

Product Model: BT100

Multiple Models: N/A

Trade Mark: SENDUM ■■■

FCC ID: TS5BT100

Standards: FCC CFR Title 47 Part 15B

Test Date: 2024-04-23 to 2024-04-26

Test Result: Complied

Report Date: 2024-05-09

Reviewed by:

Frank Yin

Approved by:

Jacob Kong

Frank Yin
Project Engineer

Jacob Kong
Manager

Prepared by:

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen,
Guangdong, People's Republic of China



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Revision History

Version No.	Issued Date	Description
00	2024-05-09	Original

Contents

1	General Information	4
1.1	Client Information	4
1.2	Product Description of EUT	4
1.3	Related Submittal(s)/Grant(s).....	4
1.4	Measurement Uncertainty	4
1.5	Laboratory Location.....	5
1.6	Test Methodology	5
2	Description of Measurement.....	6
2.1	Test Configuration.....	6
2.2	Test Auxiliary Equipment	6
2.3	Test Setup.....	6
2.4	Test Procedure	7
2.5	Measurement Method.....	8
2.6	Measurement Equipment	9
3	Test Results	10
3.1	Test Summary.....	10
3.2	Limit	10
3.3	AC Line Conducted Emissions Test Data.....	11
3.4	Radiated emission Test Data.....	12
4	Test Setup Photo.....	16
5	E.U.T Photo	17

1 General Information

1.1 Client Information

Applicant:	Sendum Wireless Corp.
Address:	4500 Beedie Street, Burnaby, BC, V5J 5L2, Canada
Manufacturer:	Sendum Wireless Corp.
Address:	4500 Beedie Street, Burnaby, BC, V5J 5L2, Canada

1.2 Product Description of EUT

The EUT is Smart Probe that contains BLE radio, this report covers the full testing of the digital apparatus/circuitry (non-radio portion).

Sample Serial Number	2K75-1 for RE test(assigned by WATC)
Sample Received Date	2024-04-22
Sample Status	Good Condition
Highest Operating Frequency [#]	2480MHz
Power Supply	DC 3V
Operating temperature [#]	-20 deg.C to +65 deg.C
Adapter Information	N/A
Modification	Sample No Modification by the test lab

1.3 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart C, Equipment Class: DTS, FCC ID: TS5BT100
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1.4 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions		±3.14dB
Radiated emission	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Note 1: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. Note 2: The Decision Rule is based on simple acceptance with ISO Guide 98-4:2012 Clause 8.2 (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)		

1.5 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: ga@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

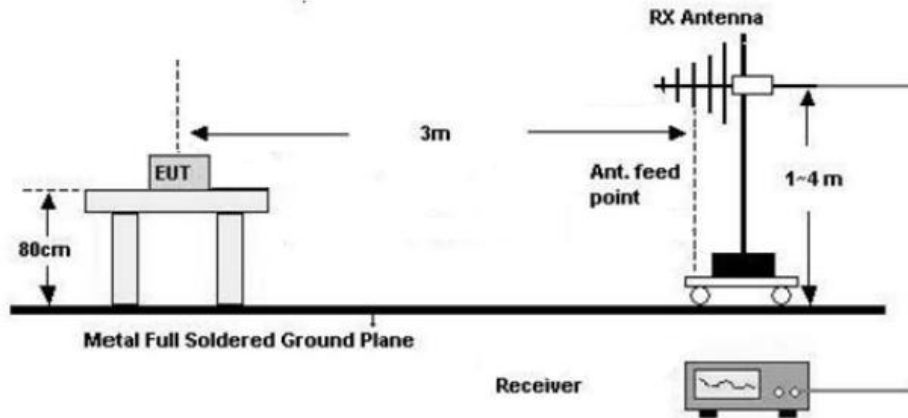
1.6 Test Methodology

FCC CFR 47 Part 15

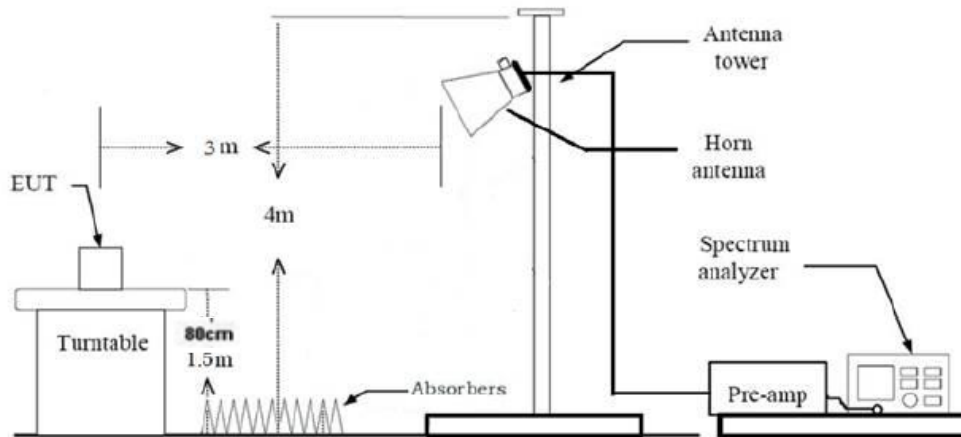
ANSI C63.4-2014

2) Radiated emission measurement:

30MHz-1GHz (3m SAC)



Above 1GHz(3m FAC)

**2.4 Test Procedure****Conducted emission:**

1. The E.U.T is placed on a non-conducting table 40cm from the vertical ground plane and 80cm above the horizontal ground plane (Please refer to the block diagram of the test setup and photographs).
2. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.
3. Line conducted data is recorded for both Line and Neutral

Radiated Emission Procedure:**a) For 30MHz-1GHz:**

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.

2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

b) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

2.5 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	ANSI C63.4-2014 Section 7
Radiated emission	ANSI C63.4-2014 Section 8

2.6 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2023/7/3	2024/7/2
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2023/7/3	2024/7/2
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2023/7/12	2024/7/11
COM-POWER	preamplifier	PAM-118A	18040152	2023/8/21	2024/8/20
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2024/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2024/7/5
Oulitong	Band Reject Filter	OBSF-2400-248 3.5-50N	OE02103119	2023/9/15	2024/9/14
N/A	Coaxial Cable	N/A	NO.9	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.10	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.11	2023/8/8	2024/8/7
Audix	Test Software	E3	191218 V9	/	/

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

FCC Rules	Description of Test	Result
FCC §15.107	AC Line Conducted Emissions	N/A
FCC §15.109	Radiated emission	Compliance

3.2 Limit

Test items	Limit																																																					
AC Line Conducted Emissions	<table><tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Class A Limit (dBµV)</th><th colspan="2">Class B Limit (dBµV)</th></tr><tr><th>Quasi-Peak</th><th>Average</th><th>Quasi-Peak</th><th>Average</th></tr><tr><td>0.15 – 0.5</td><td>79</td><td>66</td><td>66 to 56 ^{Note 1}</td><td>56 to 46 ^{Note 1}</td></tr><tr><td>0.5 – 5</td><td>73</td><td>60</td><td>56</td><td>46</td></tr><tr><td>5 – 30</td><td>73</td><td>60</td><td>60</td><td>50</td></tr><tr><td colspan="5">Note 1: The limit level in dBµV decreases linearly with the logarithm of frequency.</td></tr><tr><td colspan="5">Note 2: The more stringent limit applies at transition frequencies.</td></tr></table>	Frequency (MHz)	Class A Limit (dBµV)		Class B Limit (dBµV)		Quasi-Peak	Average	Quasi-Peak	Average	0.15 – 0.5	79	66	66 to 56 ^{Note 1}	56 to 46 ^{Note 1}	0.5 – 5	73	60	56	46	5 – 30	73	60	60	50	Note 1: The limit level in dBµV decreases linearly with the logarithm of frequency.					Note 2: The more stringent limit applies at transition frequencies.																							
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Radiated emission	<table><tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Class A Limit (dBµV/m)</th><th colspan="2">Class B Limit (dBµV/m)</th></tr><tr><th>Quasi-Peak @ 3m</th><th>Quasi-Peak @ 10m</th><th>Quasi-Peak @ 3m</th><th>Quasi-Peak @ 10m</th></tr><tr><td>30 – 88</td><td>49.0</td><td>39.0</td><td>40.0</td><td>30.0</td></tr><tr><td>88 – 216</td><td>53.5</td><td>43.5</td><td>43.5</td><td>33.5</td></tr><tr><td>216 – 960</td><td>56.0</td><td>46.0</td><td>46.0</td><td>36.0</td></tr><tr><td>960 – 1000</td><td>60.0</td><td>50.0</td><td>54.0</td><td>44.0</td></tr><tr><td colspan="5">Note: The more stringent limit applies at transition frequencies.</td></tr><tr><th rowspan="2">Frequency</th><th colspan="2">Class A Limit (dBµV/m) @ 3m</th><th colspan="2">Class B Limit (dBµV/m) @ 3m</th></tr><tr><th>Average</th><th>Peake</th><th>Average</th><th>Peake</th></tr><tr><td>Above 1 GHz</td><td>60.0</td><td>80.0</td><td>54.0</td><td>74.0</td></tr><tr><td colspan="5">Note: The measurement bandwidth shall be 1 MHz or greater.</td></tr></table>	Frequency (MHz)	Class A Limit (dBµV/m)		Class B Limit (dBµV/m)		Quasi-Peak @ 3m	Quasi-Peak @ 10m	Quasi-Peak @ 3m	Quasi-Peak @ 10m	30 – 88	49.0	39.0	40.0	30.0	88 – 216	53.5	43.5	43.5	33.5	216 – 960	56.0	46.0	46.0	36.0	960 – 1000	60.0	50.0	54.0	44.0	Note: The more stringent limit applies at transition frequencies.					Frequency	Class A Limit (dBµV/m) @ 3m		Class B Limit (dBµV/m) @ 3m		Average	Peake	Average	Peake	Above 1 GHz	60.0	80.0	54.0	74.0	Note: The measurement bandwidth shall be 1 MHz or greater.				
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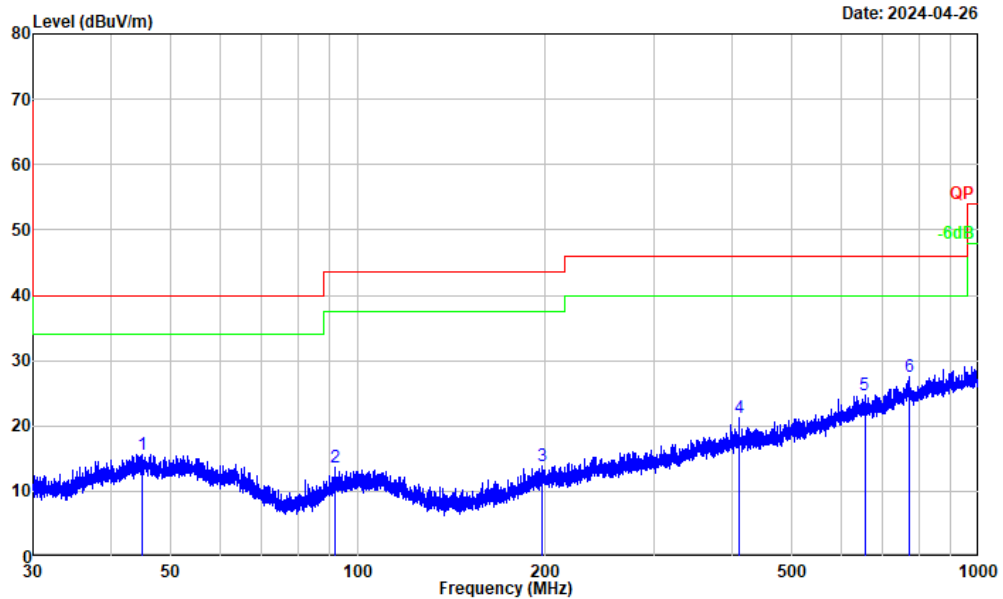
3.3 AC Line Conducted Emissions Test Data

Not applicable, the device only powered by battery

3.4 Radiated emission Test Data

30MHz-1GHz:

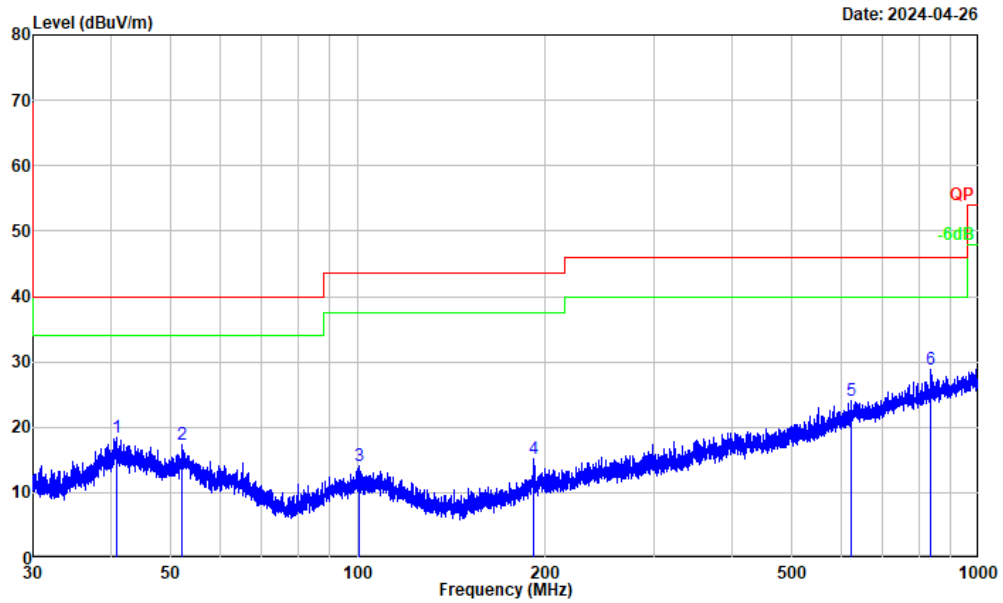
Test Date:	2024-04-26	Test By:	Bard Huang
Environment condition:	Temperature: 23.3°C; Relative Humidity:71%; ATM Pressure: 100.0kPa		



Project No. : 2405S71445E
 Test Mode : Working
 Test Voltage : Power by battery
 Environment : 23.3°C/71%R.H./100.0kPa
 Tested by : Bard Huang
 Polarization : horizontal
 Remark : /

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	44.962	27.83	-12.20	15.63	40.00	-24.37	Peak
2	91.789	29.00	-15.33	13.67	43.50	-29.83	Peak
3	198.026	27.68	-13.91	13.77	43.50	-29.73	Peak
4	411.598	29.60	-8.44	21.16	46.00	-24.84	Peak
5	655.058	28.78	-4.04	24.74	46.00	-21.26	Peak
6	774.134	29.81	-2.26	27.55	46.00	-18.45	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : 2405S71445E
 Test Mode : Working
 Test Voltage : Power by battery
 Environment : 23.3°C/71%R.H./100.0kPa
 Tested by : Bard Huang
 Polarization : vertical
 Remark : /

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector

1	40.864	31.37	-12.85	18.52	40.00	-21.48	Peak
2	52.212	29.58	-12.28	17.30	40.00	-22.70	Peak
3	100.596	28.20	-14.19	14.01	43.50	-29.49	Peak
4	192.379	29.57	-14.40	15.17	43.50	-28.33	Peak
5	623.126	28.54	-4.54	24.00	46.00	-22.00	Peak
6	835.127	30.31	-1.52	28.79	46.00	-17.21	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Remark:

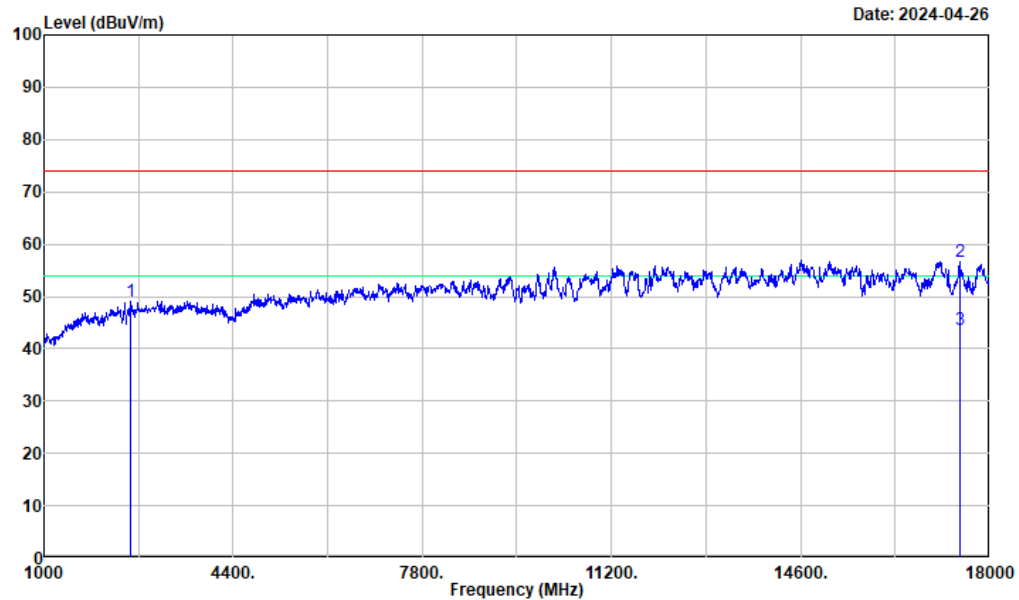
Result = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Result – Limit

Above 1GHz:

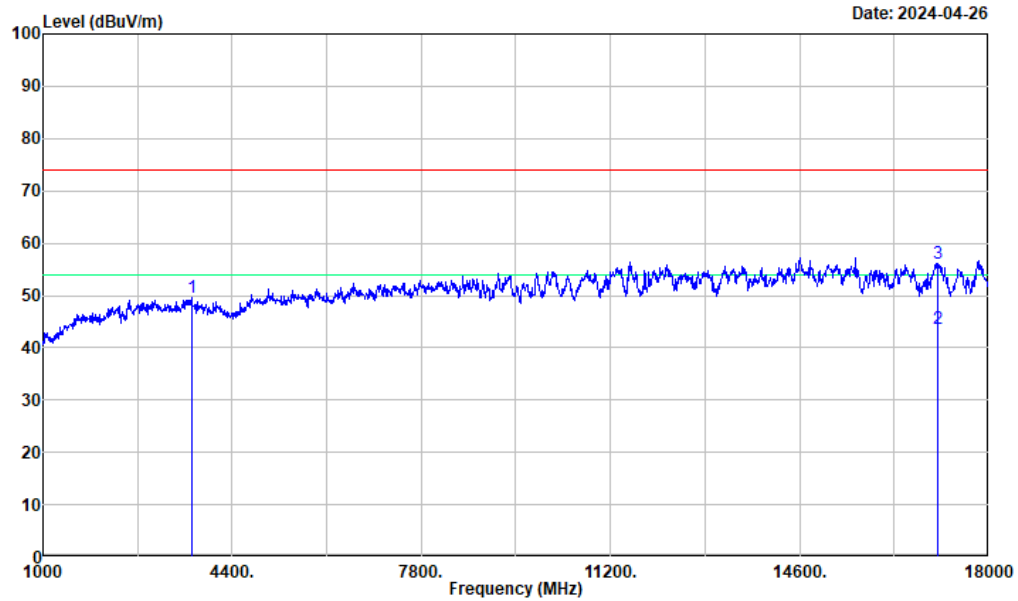
Test Date:	2024-04-26	Test By:	Bard Huang
Environment condition:	Temperature: 23.3°C; Relative Humidity:71%; ATM Pressure: 100.0kPa		



Project No. : 2405S71445E
 Test Mode : Working
 Test Voltage : Power By Battery
 Environment : 23.3°C/71%R.H./100.0kPa
 Tested by : Bard Huang
 Polarization : horizontal
 Remark : /

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	2564.782	50.84	-1.76	49.08	74.00	-24.92	Peak
2	17455.730	49.14	7.44	56.58	74.00	-17.42	Peak
3	17455.730	36.25	7.44	43.69	54.00	-10.31	Average

Remarks: Factor = Antenna factor + Cable loss - Preamp gain



Project No. : 2405S71445E
 Test Mode : Working
 Test Voltage : Power By Battery
 Environment : 23.3℃/71%R.H./100.0kPa
 Tested by : Bard Huang
 Polarization : vertical
 Remark : /

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	3670.335	51.20	-1.57	49.63	74.00	-24.37	Peak
2	17090.040	36.33	7.43	43.76	54.00	-10.24	Average
3	17090.040	48.79	7.43	56.22	74.00	-17.78	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain

Remark:

Result = Reading + Factor

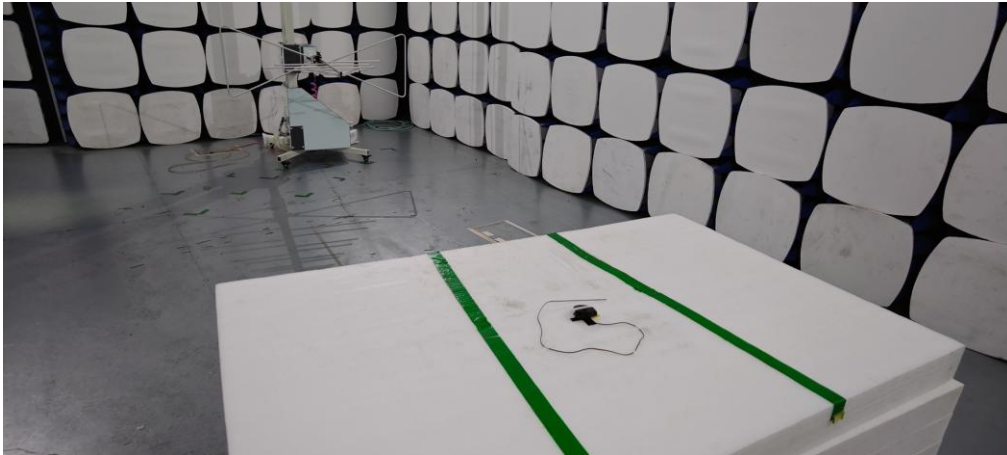
Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Result – Limit

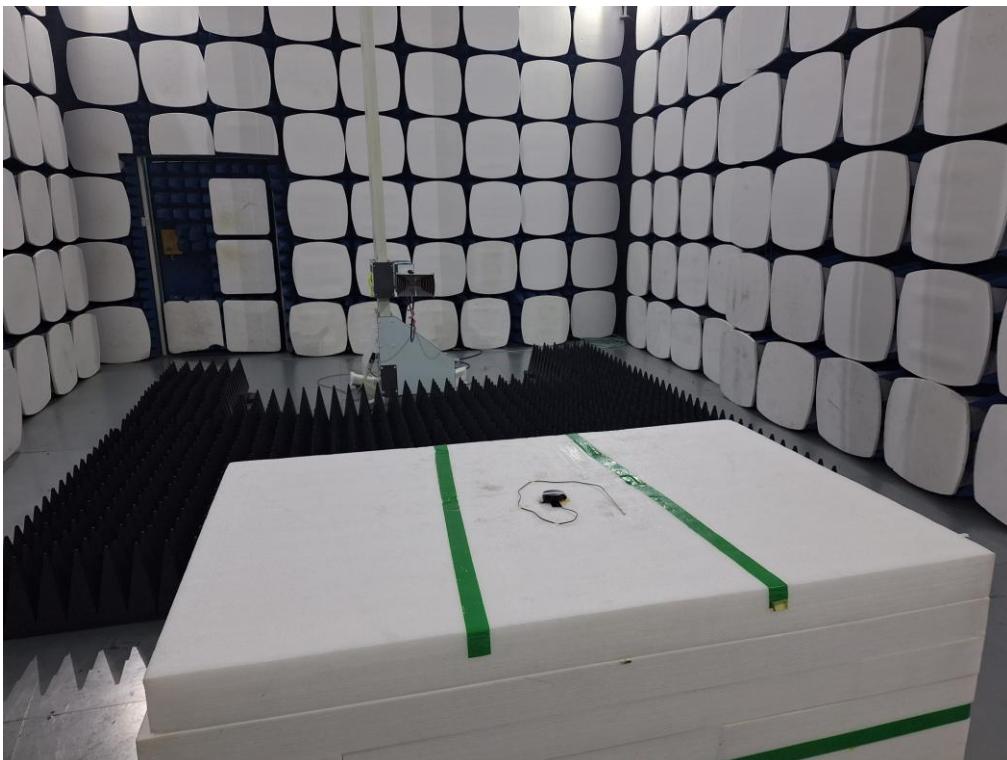
The emission levels of other frequencies that were lower than the limit 20dB not show in test report.

4 Test Setup Photo

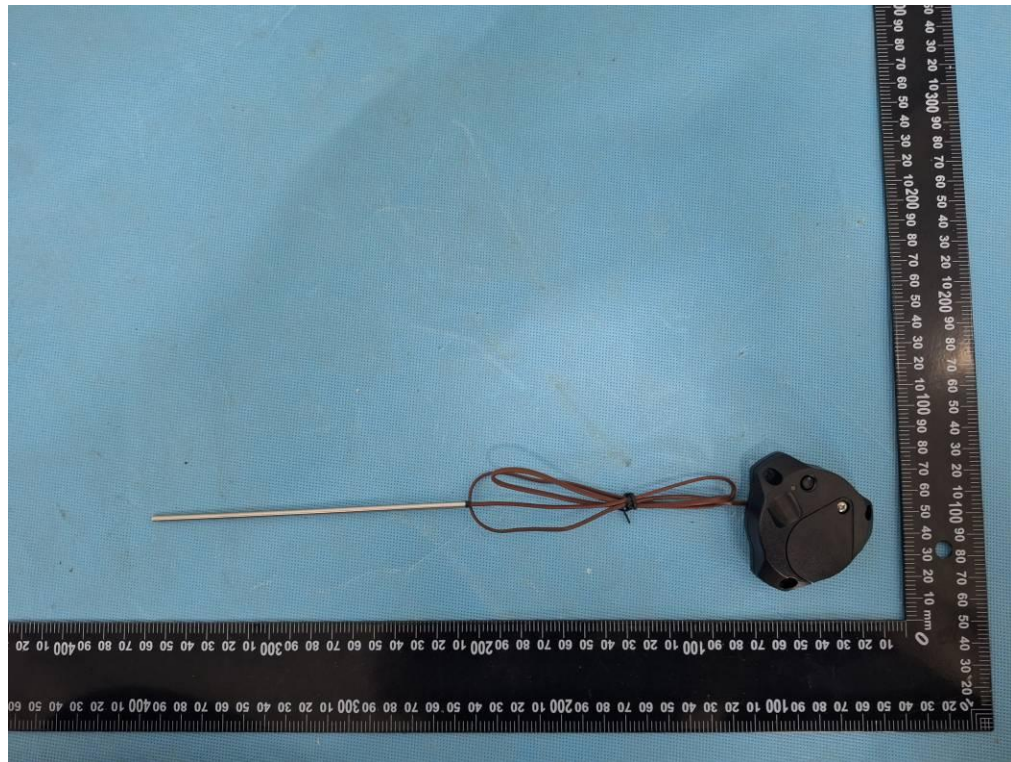
Radiated Emission(Below 1GHz)

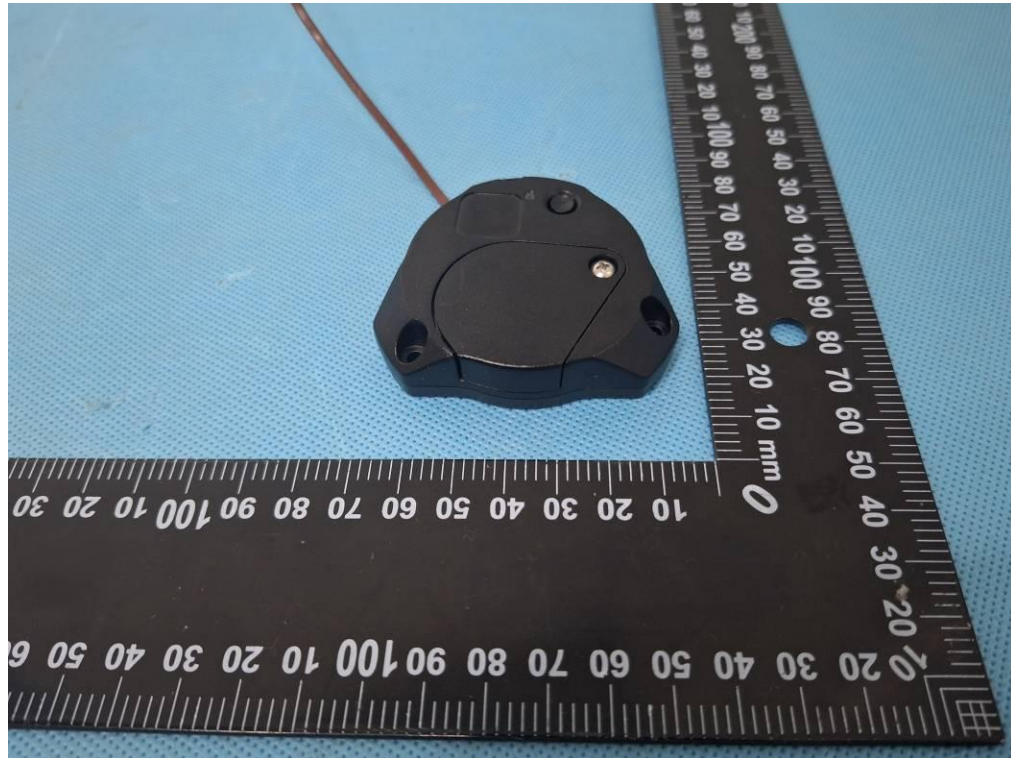


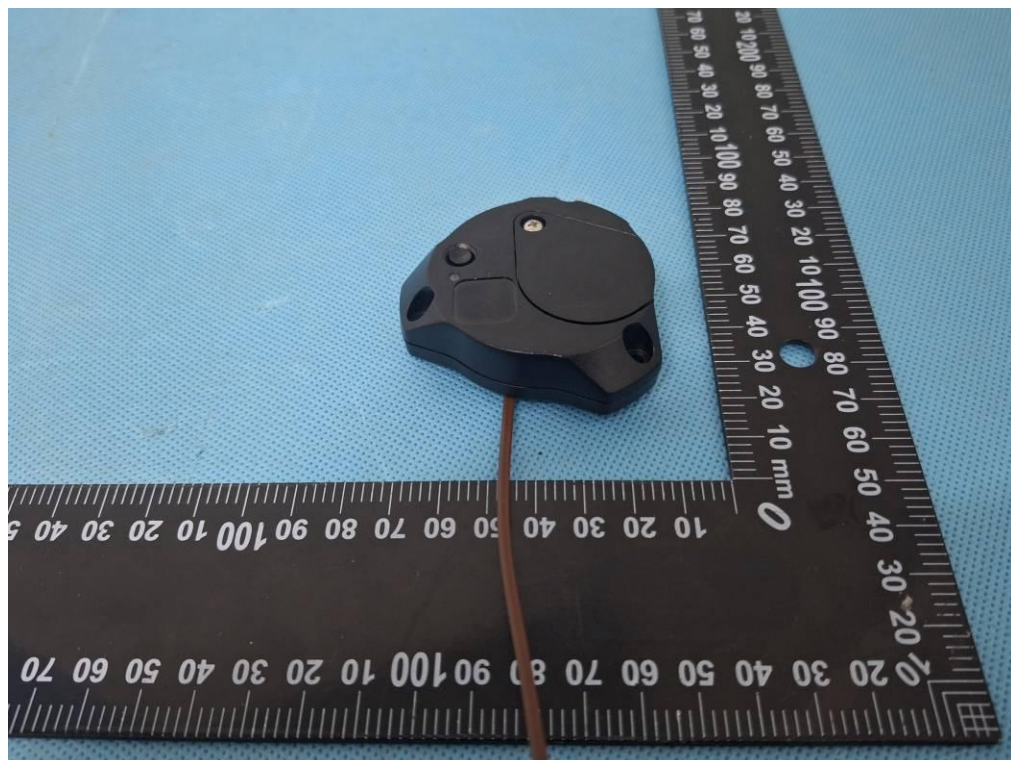
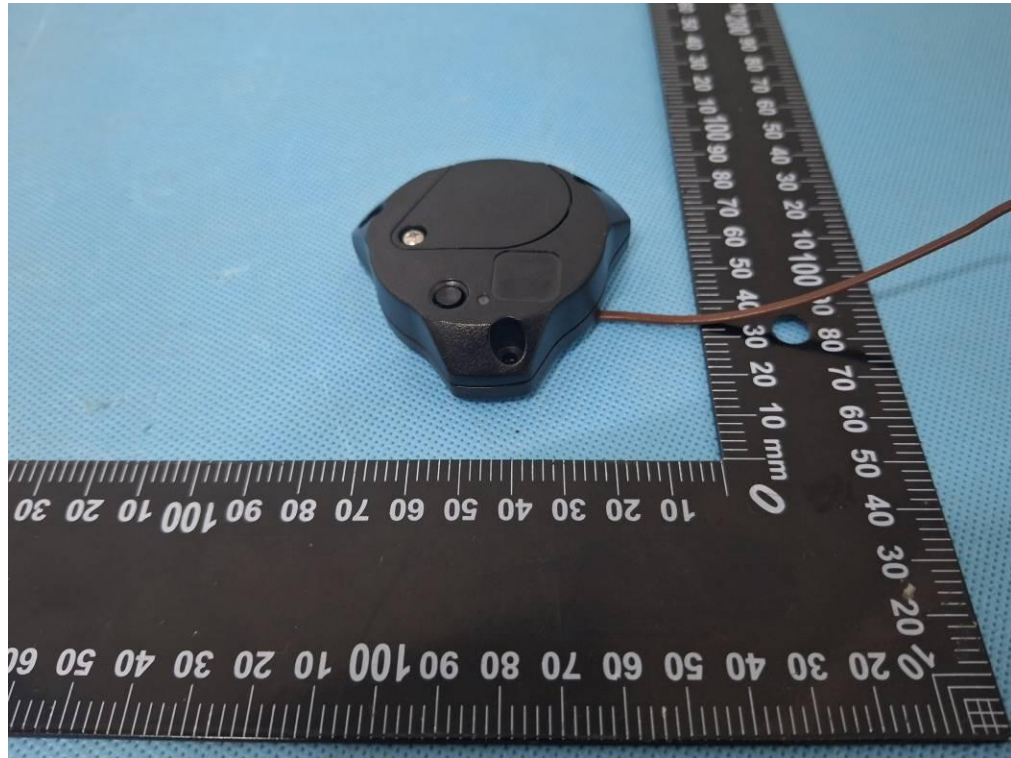
Radiated Emission (Above 1GHz)

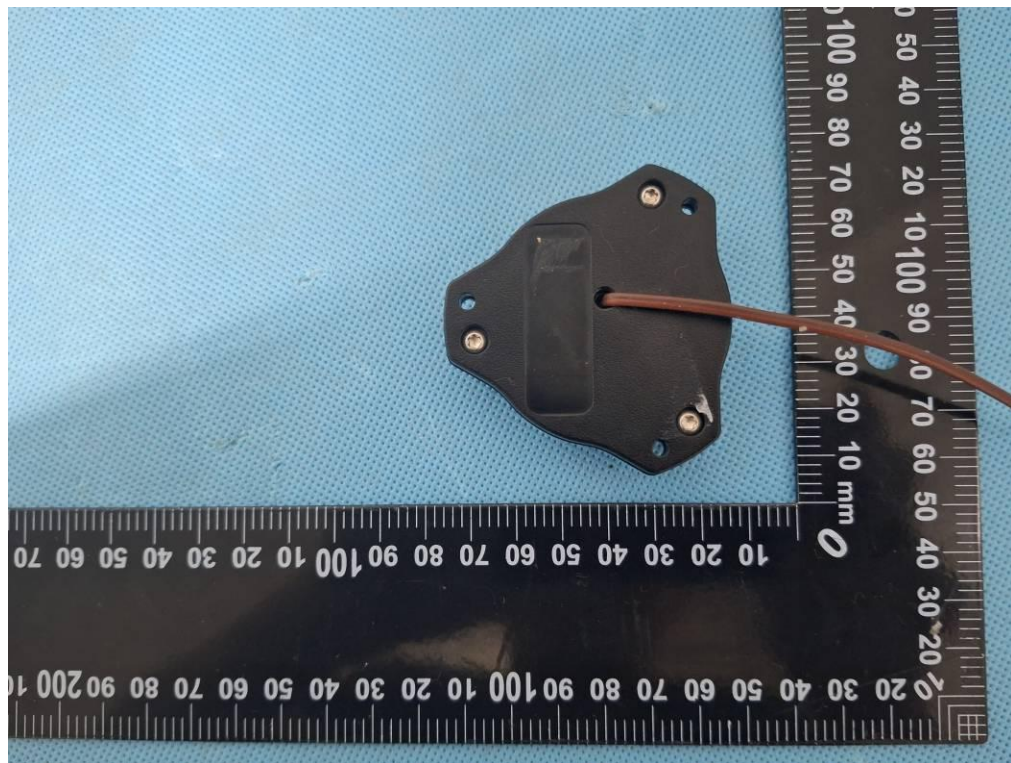


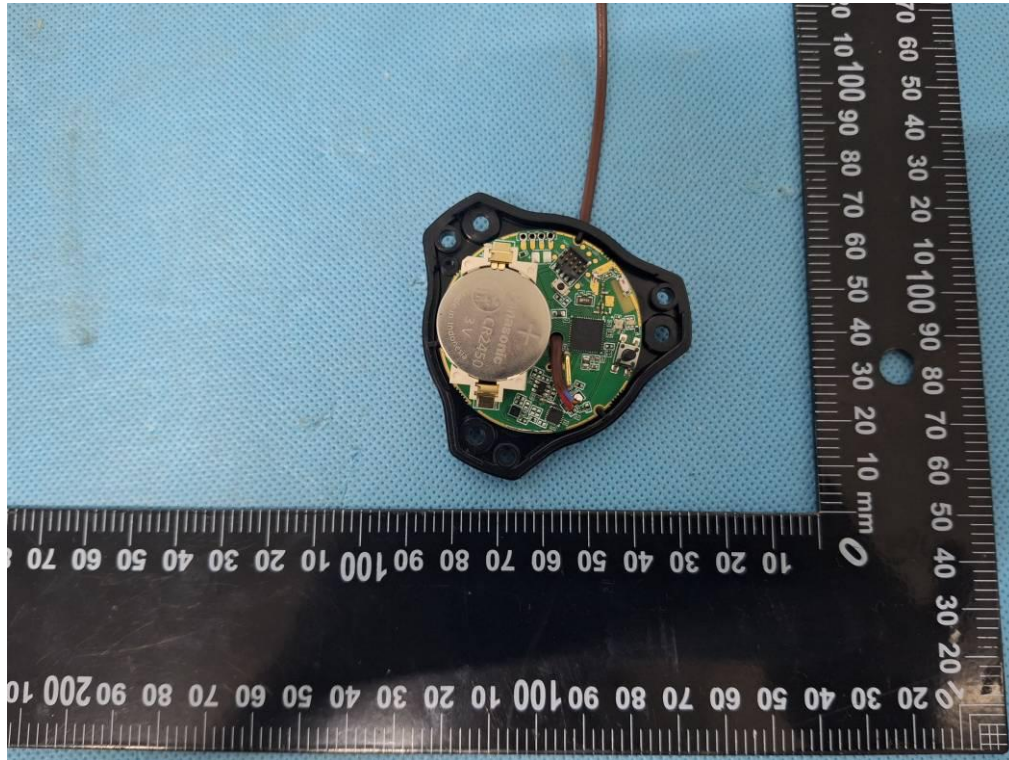
5 E.U.T Photo

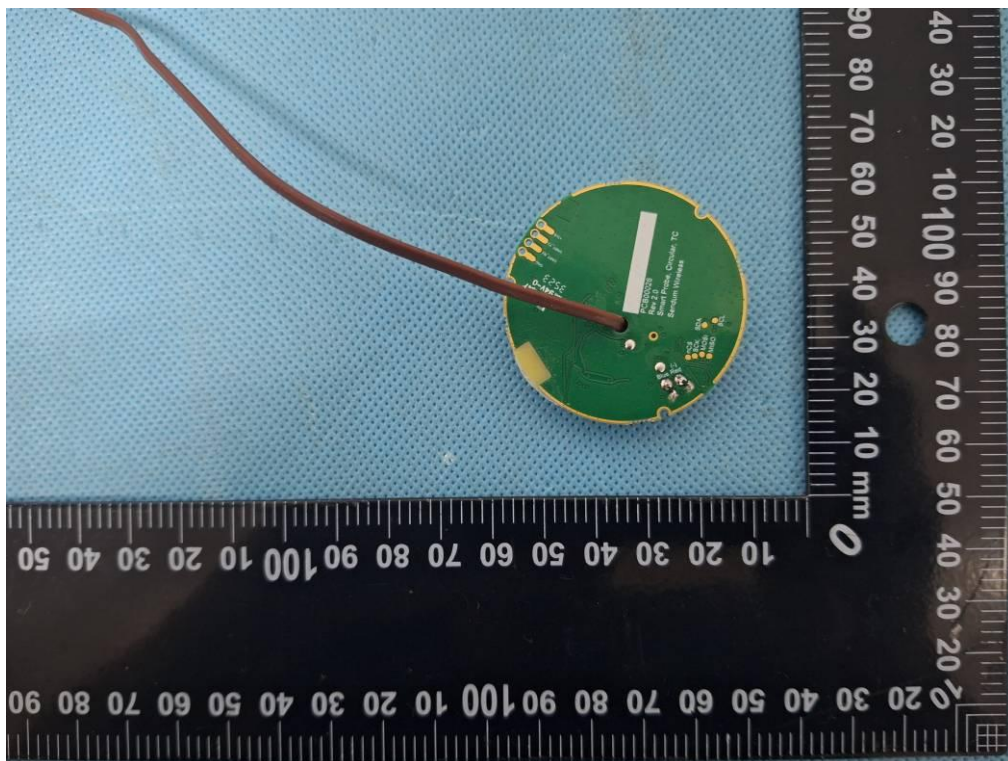


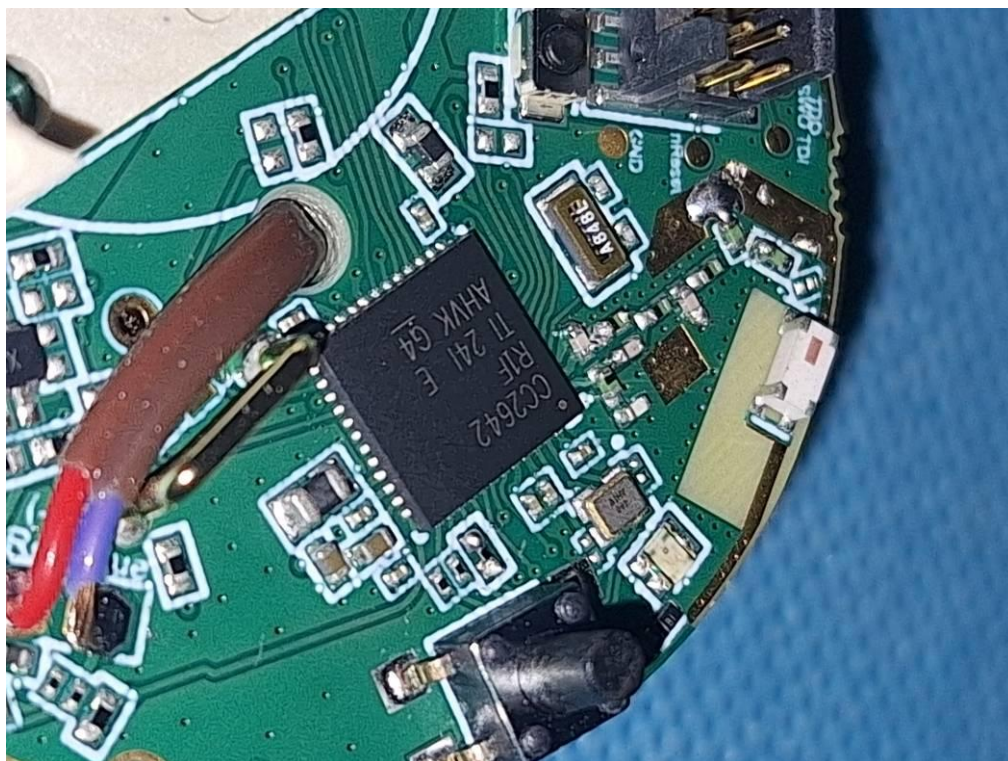
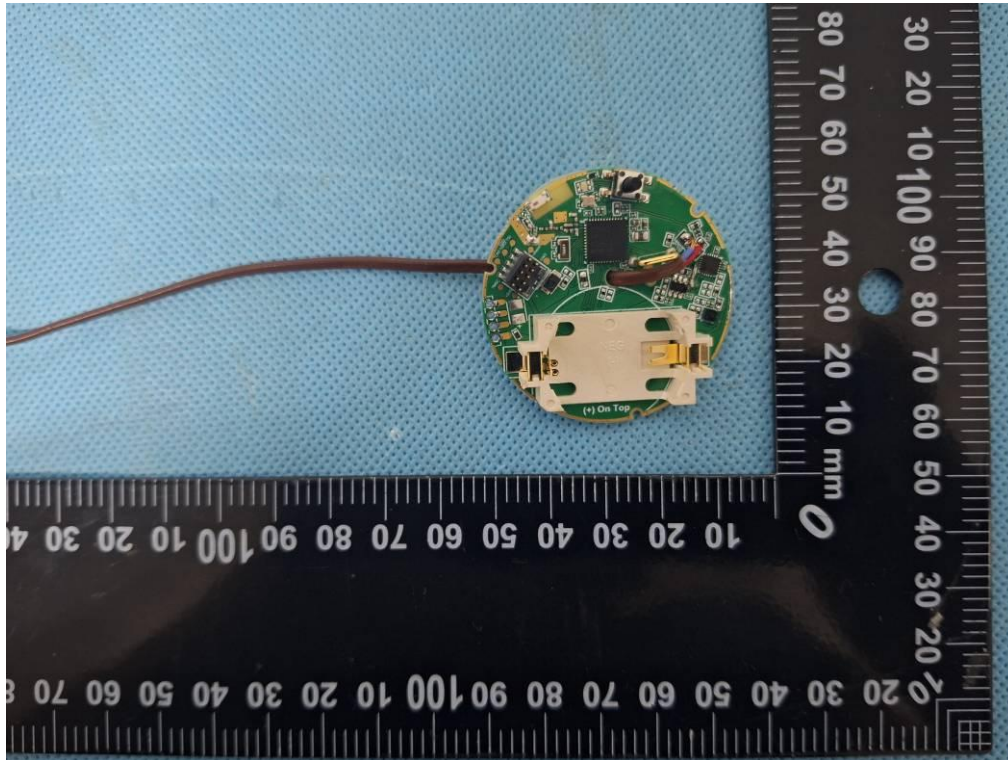












---End of Report---