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 — Project Engineer

Approved by: 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

NVLAP TESTING NVLAP LAB CODE 600335-0

ilac-MRA

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5. The information marked "#" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

Revision History

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

Contents

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

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: qa@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 Description of Measurement

2.1 Test Configuration

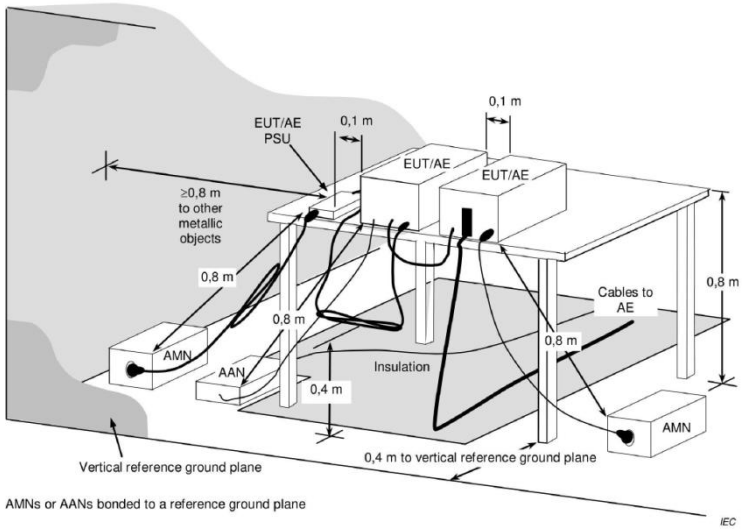
Test Mode:	
Mode 1:	working
Note: For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report	

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

2.3 Test Setup

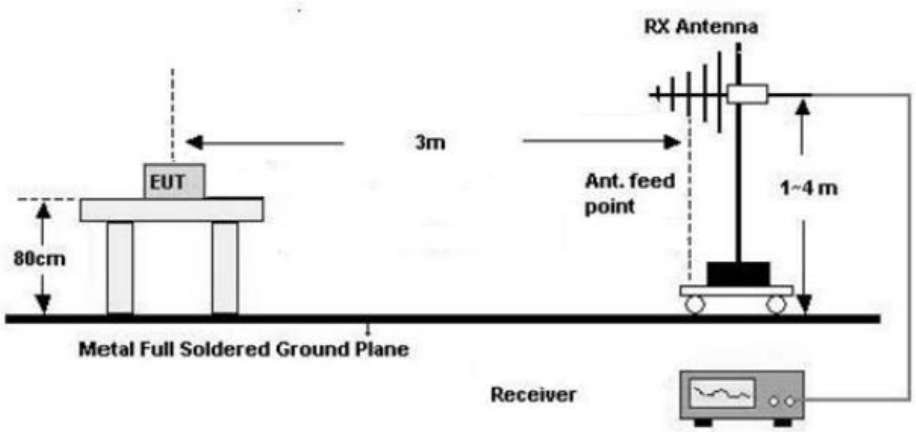
1) Conducted emission measurement:



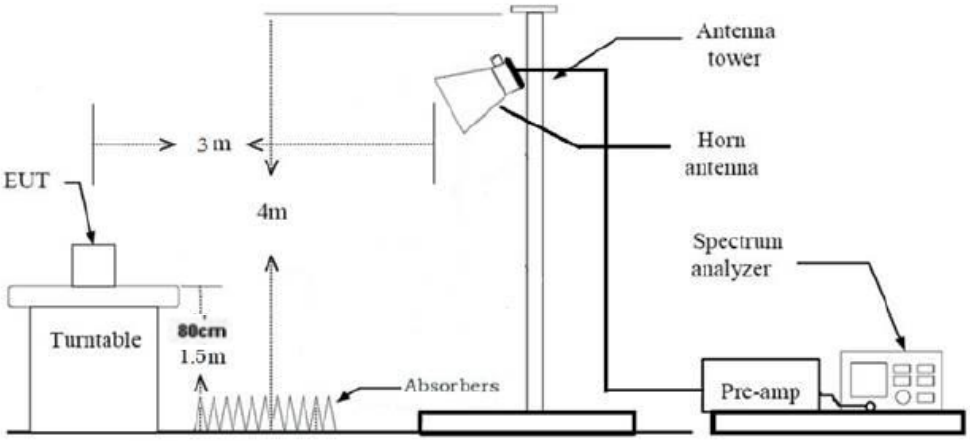
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

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

<table>
<tr><th>Test items</th><th>Limit</th></tr>
<tr><td>AC Line Conducted Emissions</td><td>
<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.
Note 2: The more stringent limit applies at transition frequencies.</td></tr>
</table>
</td></tr>
<tr><td>Radiated emission</td><td>
<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>
</td></tr>
</table>

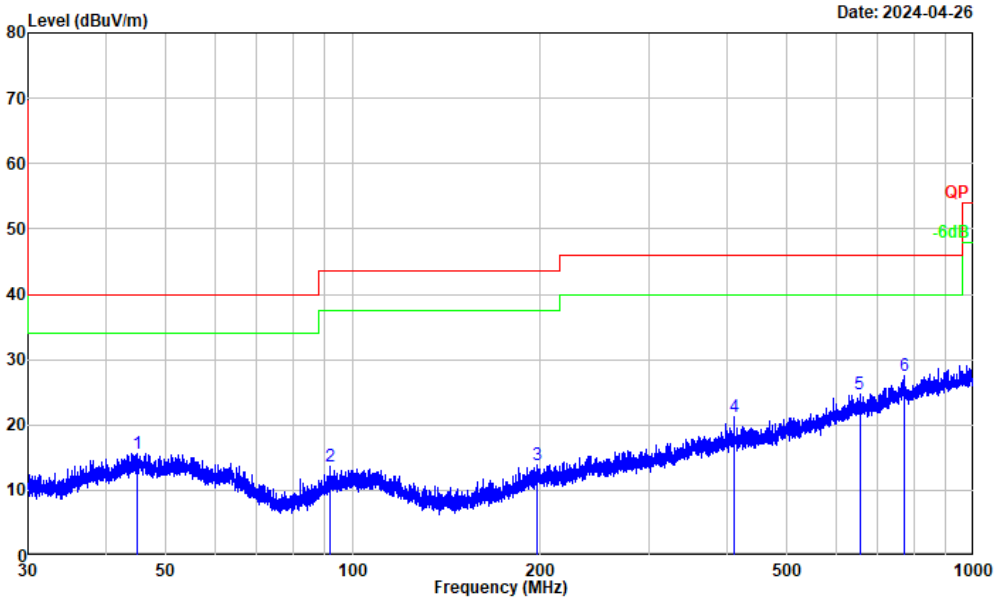
3.3 AC Line Conducted Emissions Test Data

Not applicable, the device only powered by battery

3.4 Radiated emission Test Data

30MHz-1GHz:

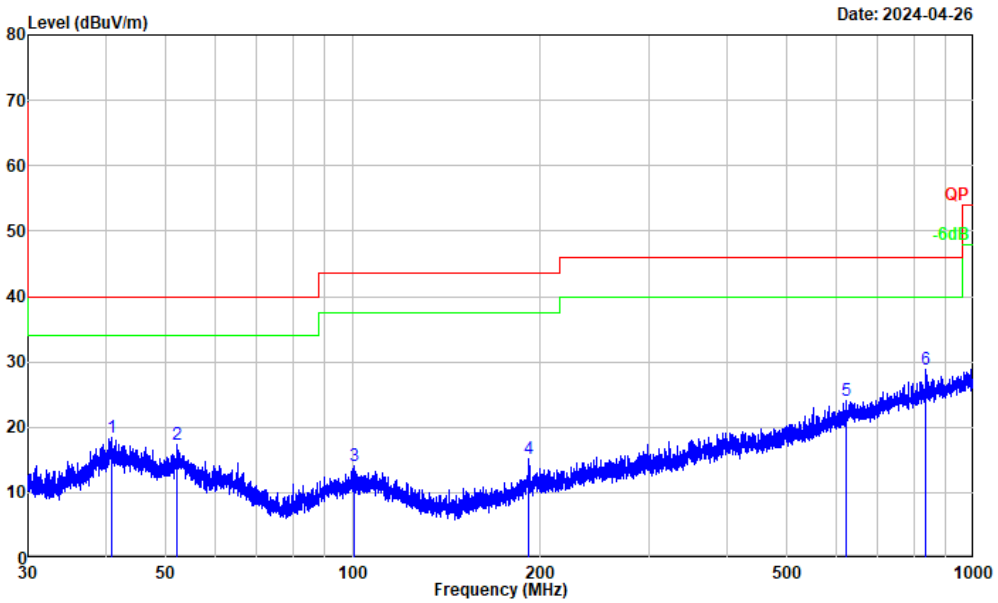
Test Date:	2024-04-26	**Test By:**	Bard Huang
Environment condition:	Temperature: 23.3°C; Relative Humidity:71%; ATM Pressure: 100.0kPa		



Project No. : 2405S71445E
Test Mode : Working
Test Voltage : Power by battery
Environment : 23.3℃/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℃/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:

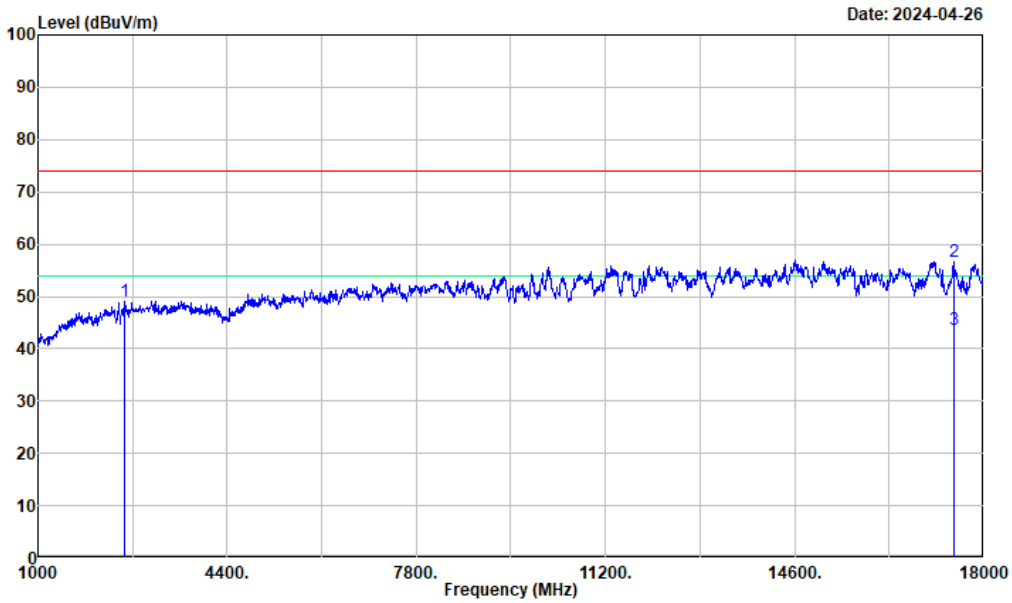
Result = Reading + Factor

Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Result – Limit

Above 1GHz:

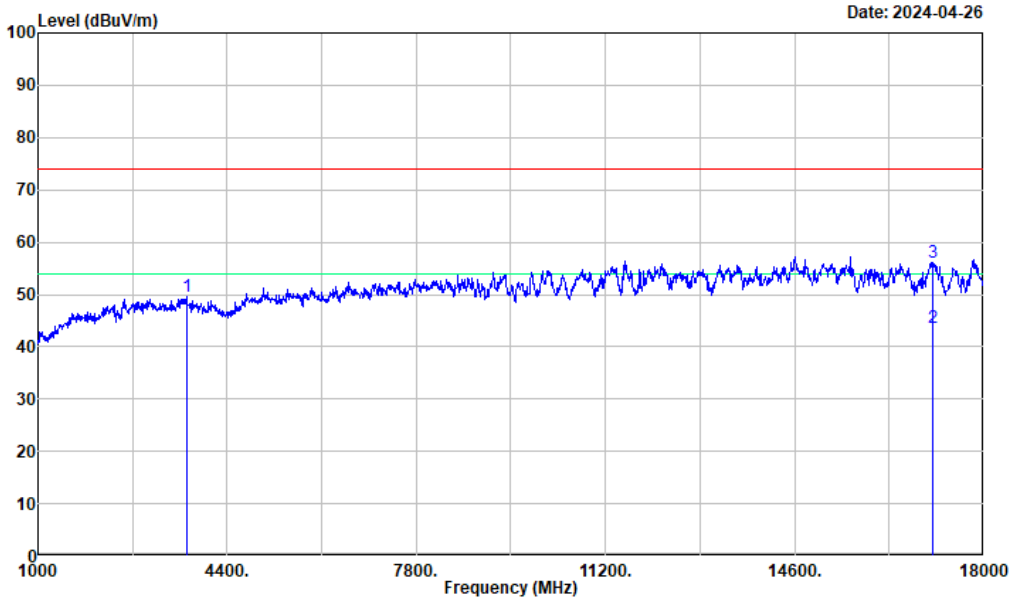
Test Date:	2024-04-26	Test By:	*Bard Huang*
Environment condition:	Temperature: 23.3°C; Relative Humidity:71%; ATM Pressure: 100.0kPa		



Project No. : 2405S71445E
Test Mode : Working
Test Voltage : Power By Battery
Environment : 23.3℃/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

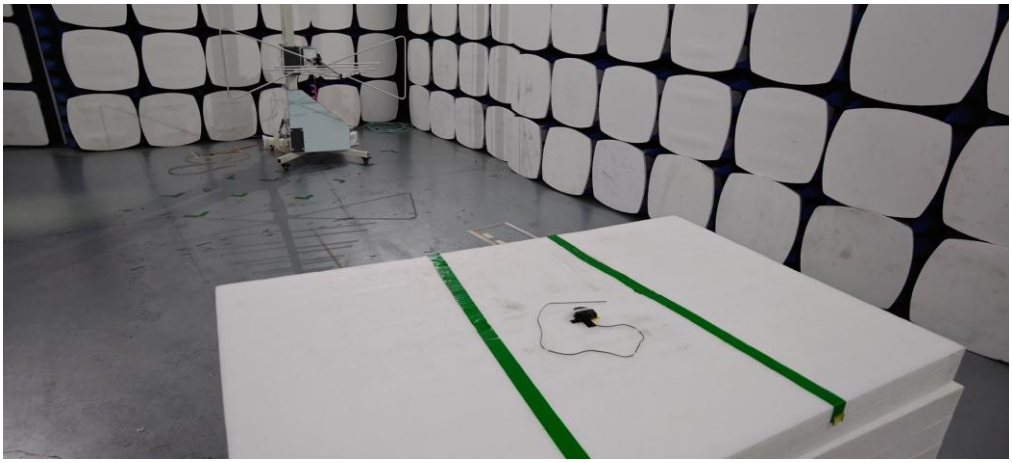
Factor = Antenna factor + Cable loss – Amplifier gain

Over Limit = Result – Limit

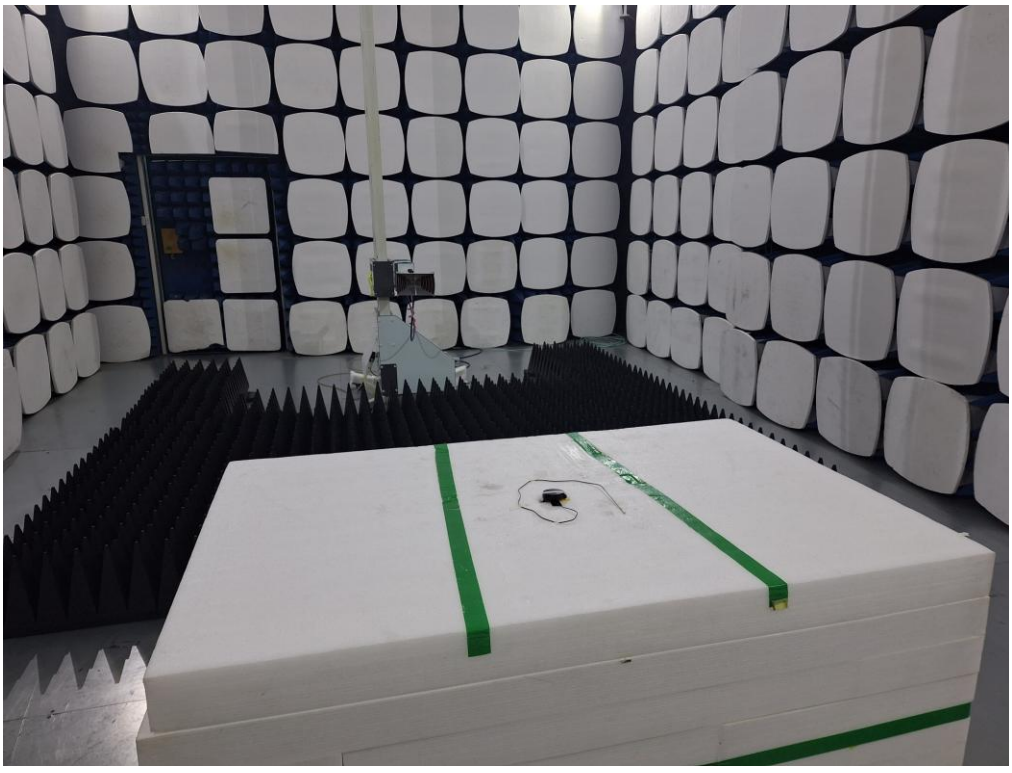
The emission levels of other frequencies that were lower than the limit 20dB not show in test report.

4 Test Setup Photo

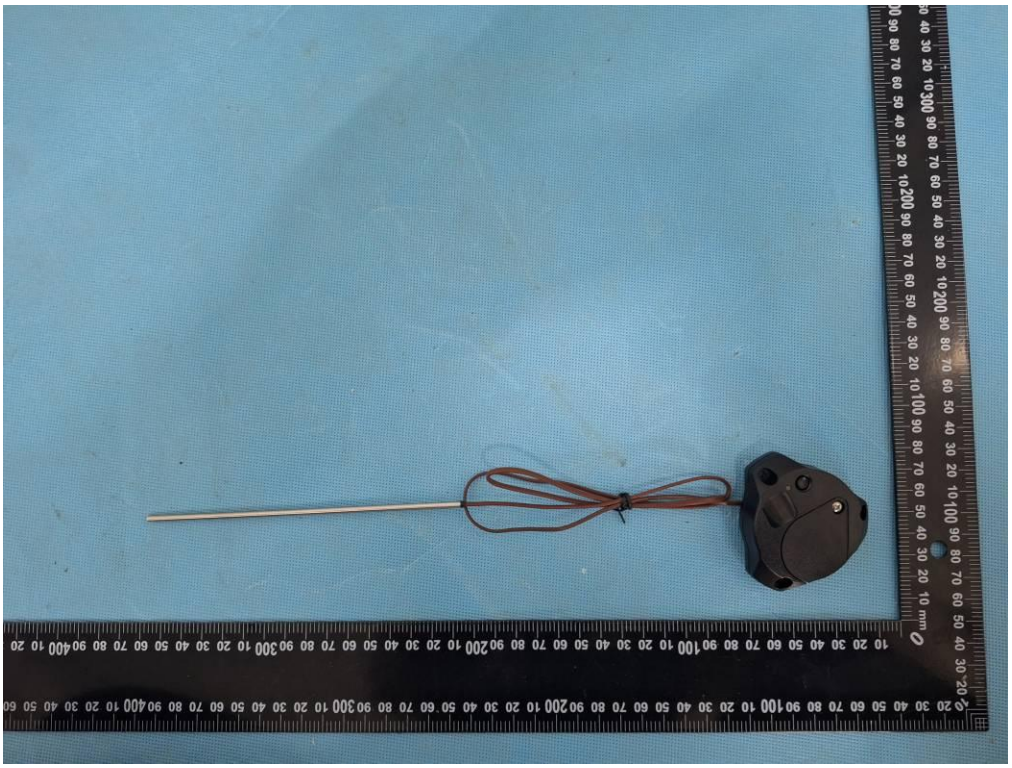
Radiated Emission(Below 1GHz)

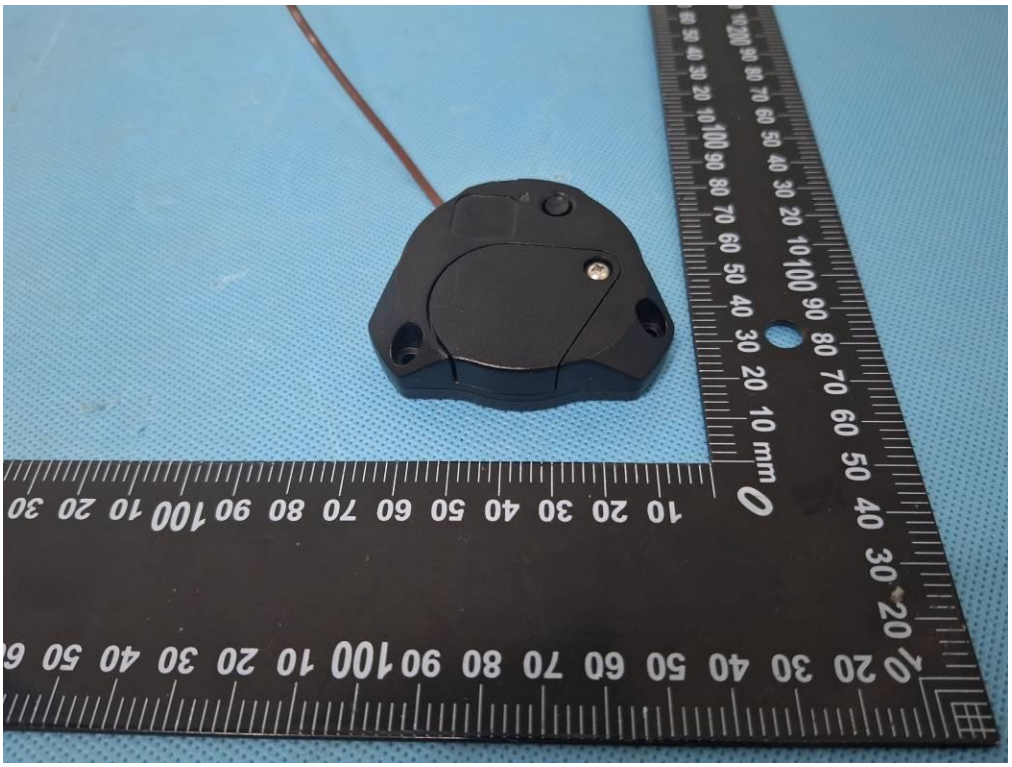


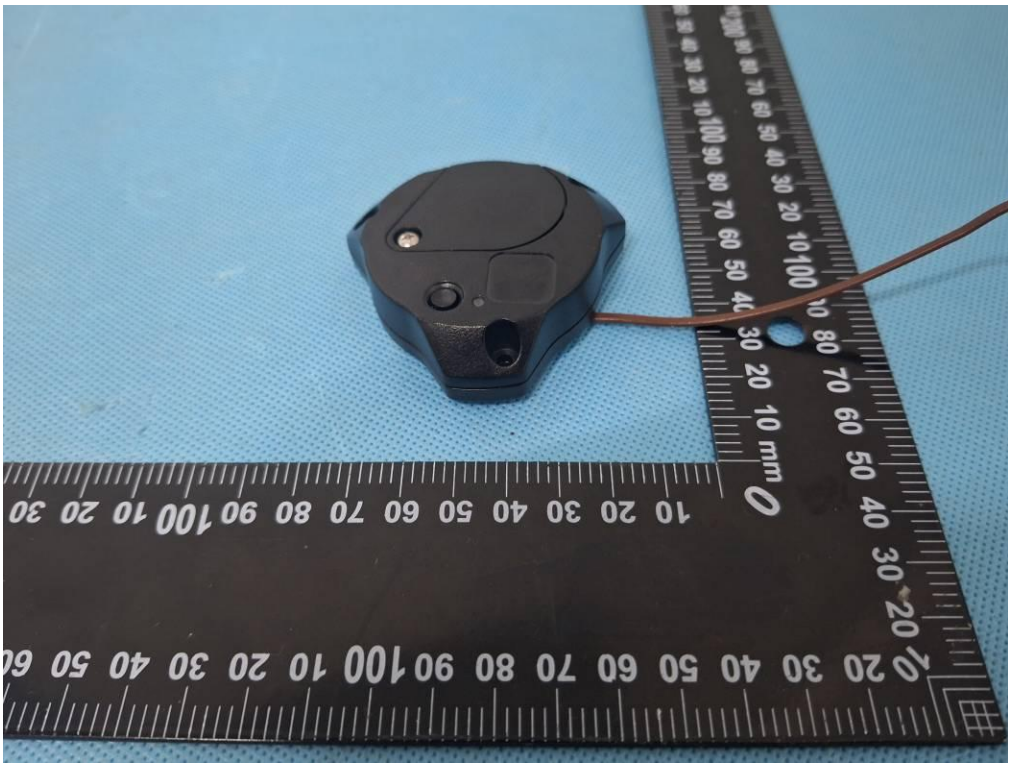
Radiated Emission (Above 1GHz)

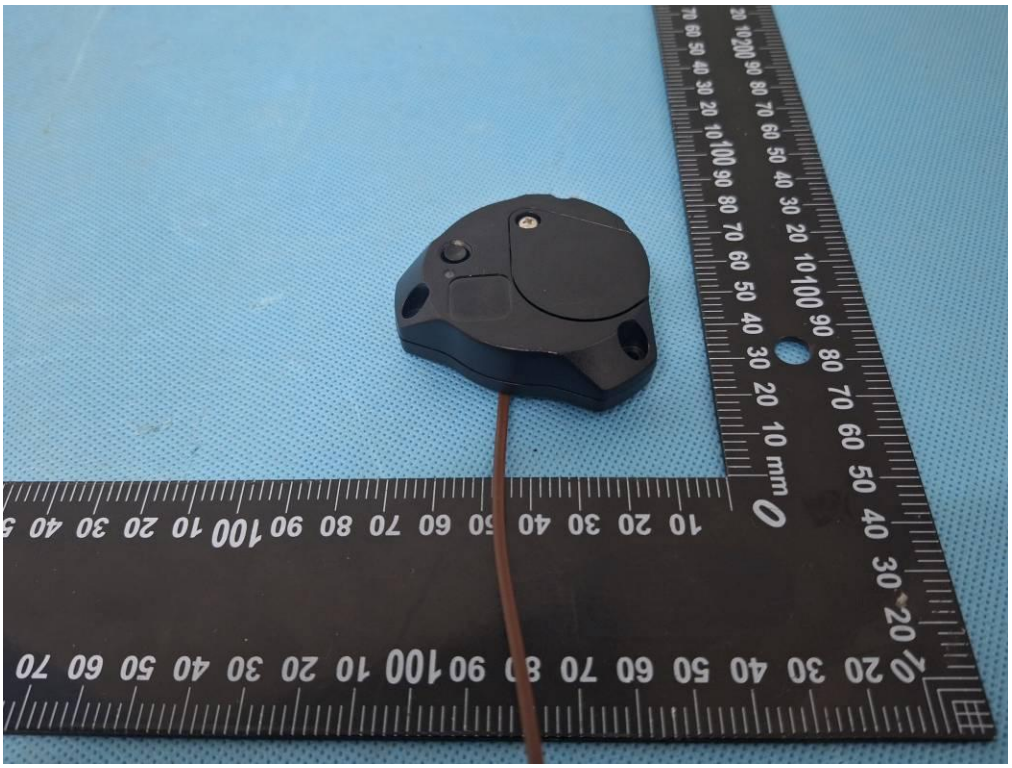


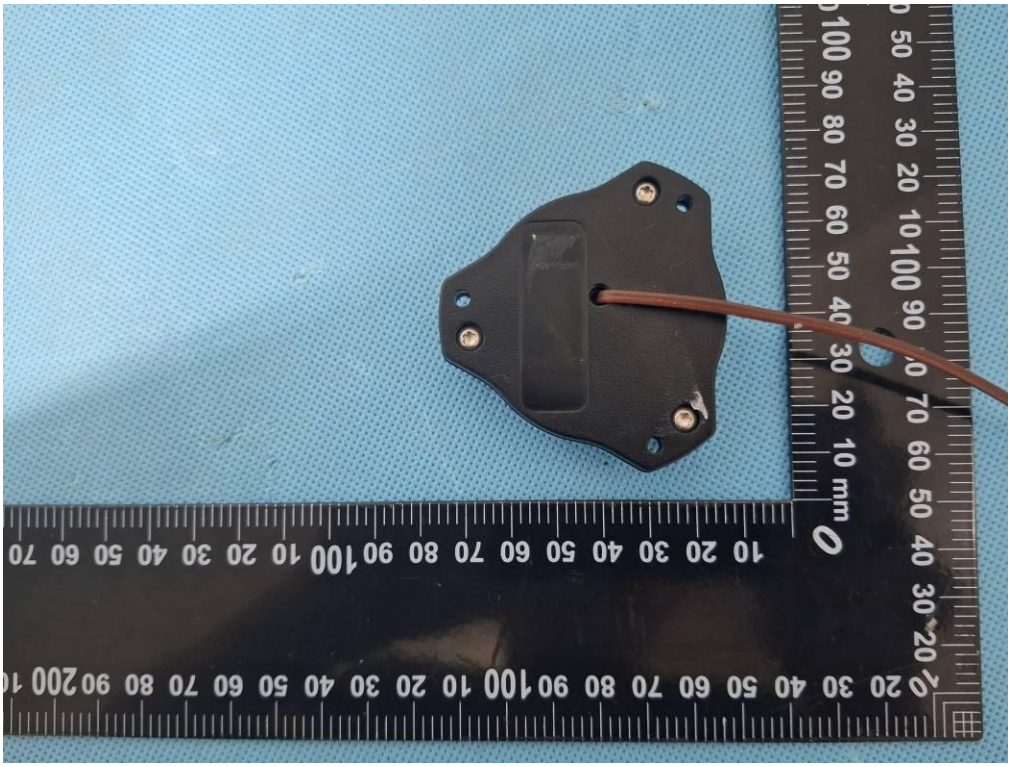
5 E.U.T Photo

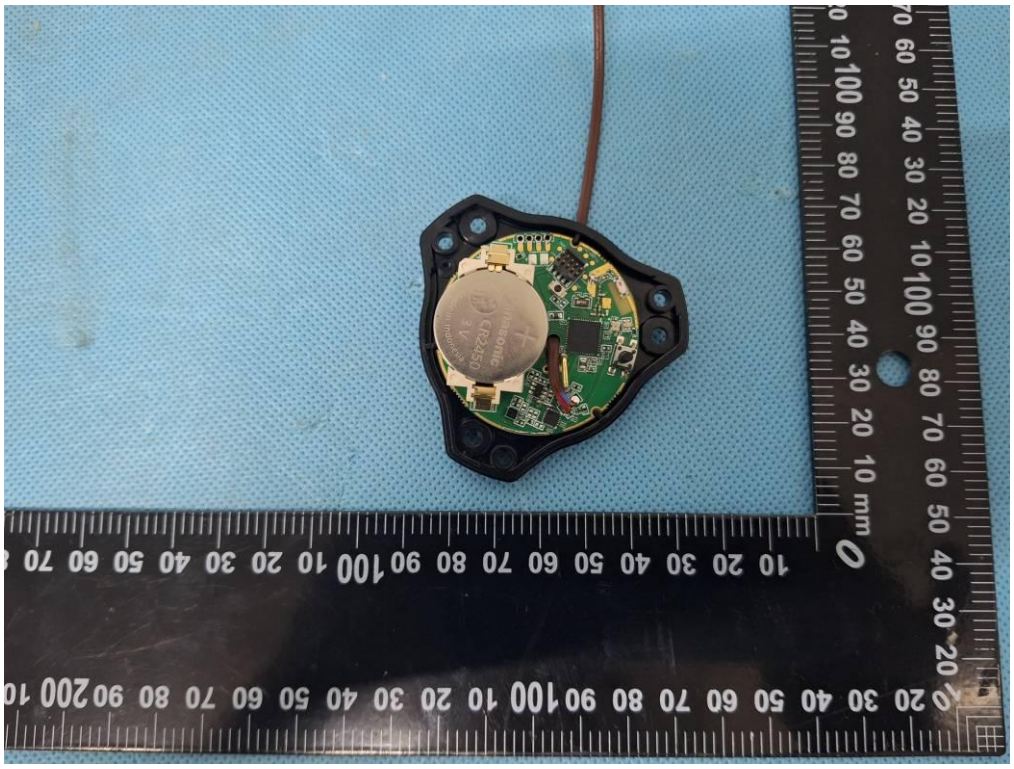


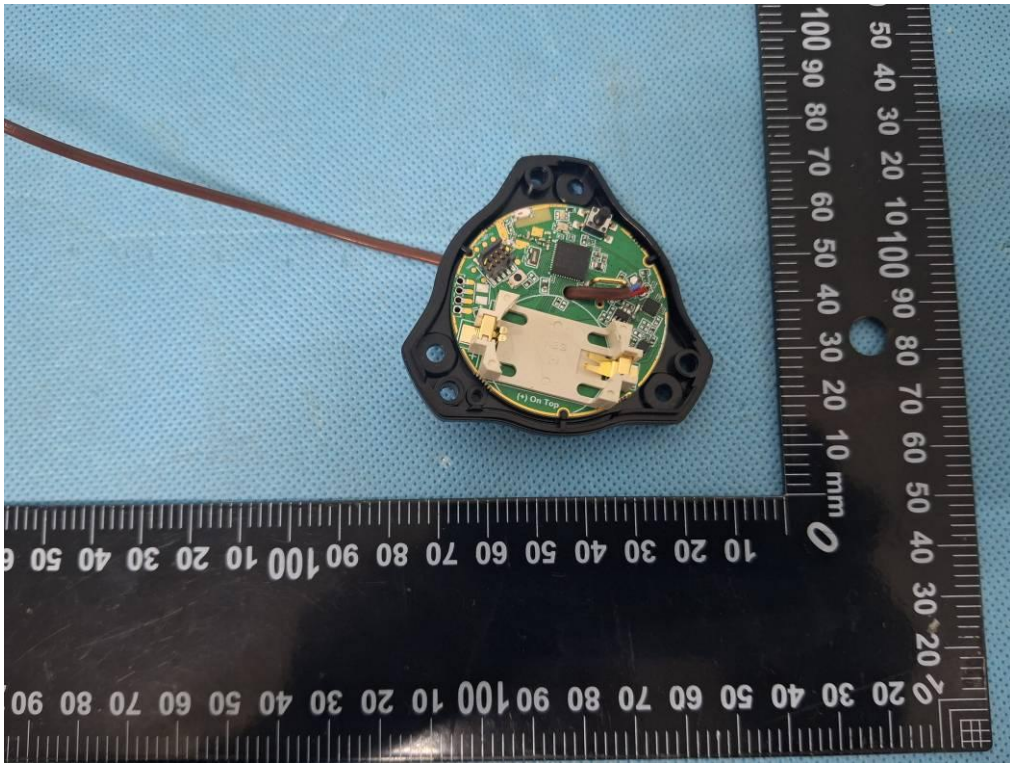




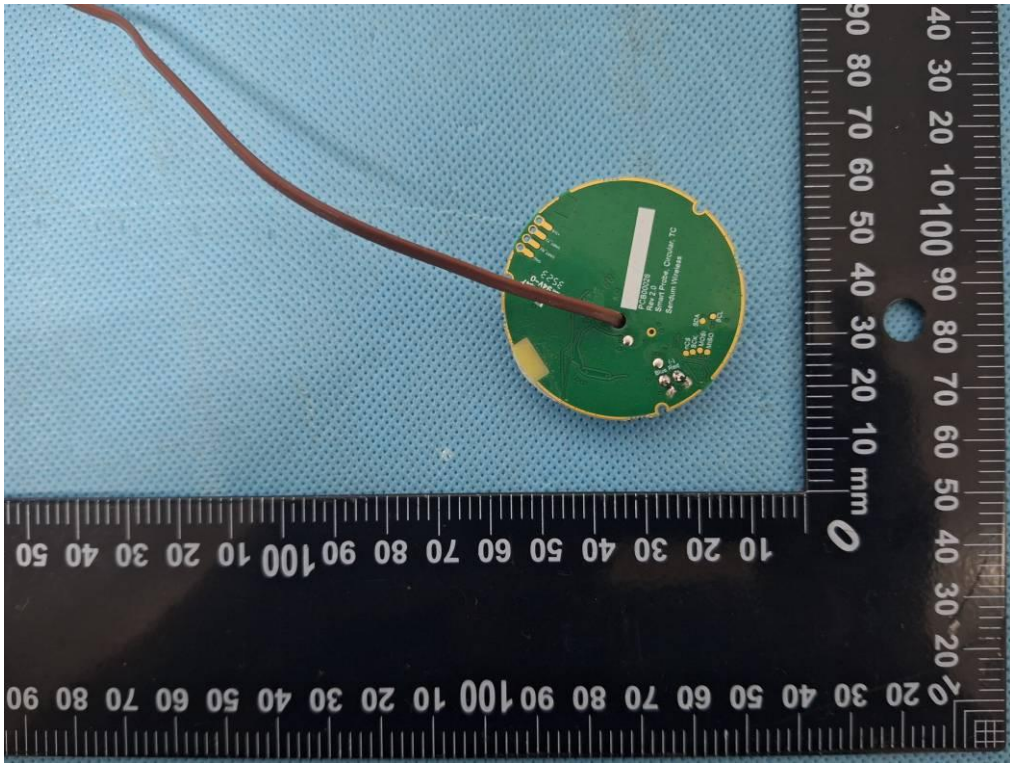


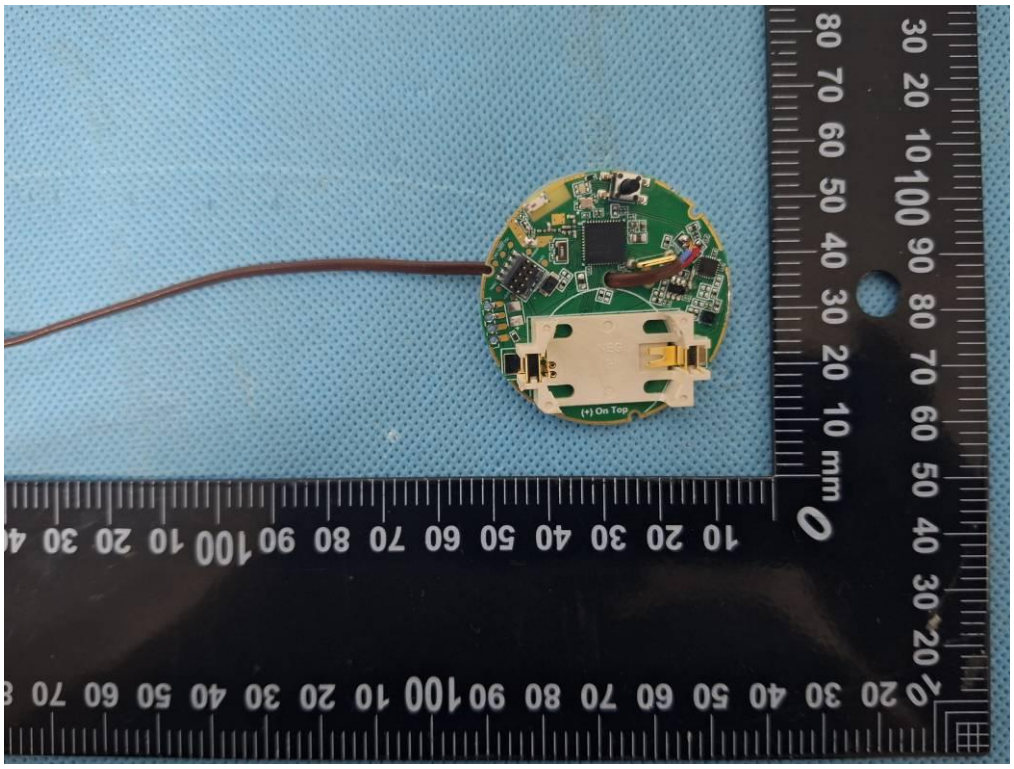


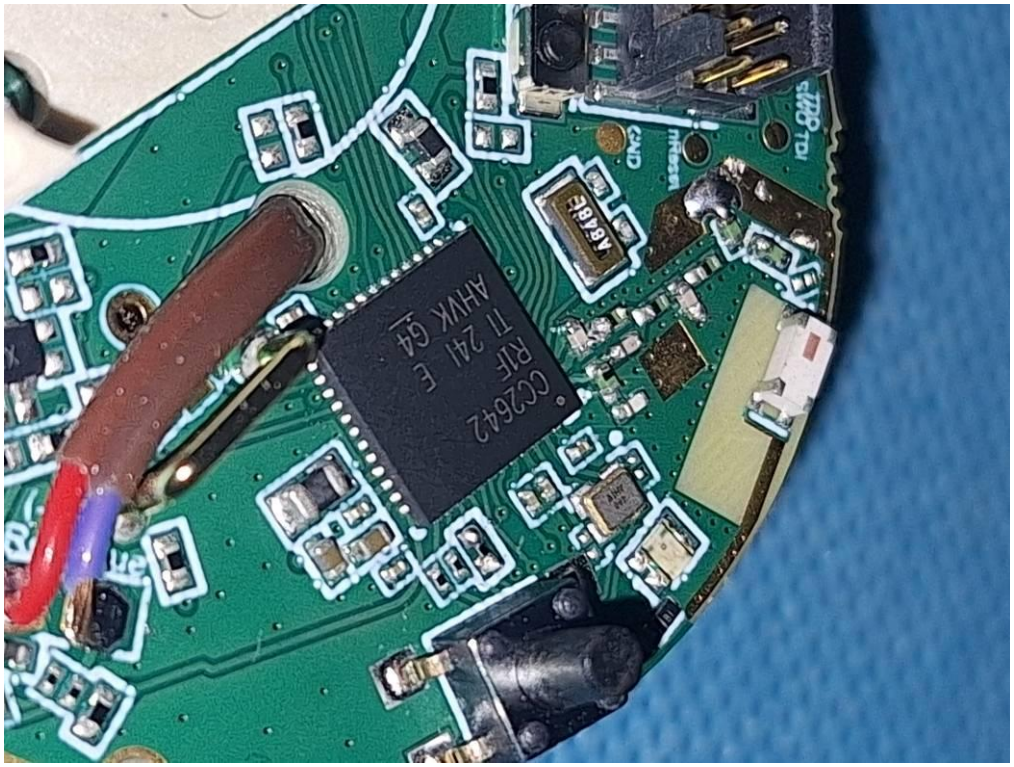





Panasonic
CR2450
3 V
Made in Indonesia







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