Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

TEST REPORT

Ordinance Article 2 paragraph 1 item (19)

Report Reference No......:	**CTA26052600401**
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Date of issue.....:	Jun, 26, 2026
Testing Laboratory Name .....:	**Shenzhen CTA Testing Technology Co., Ltd.**
Address .....:	Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name.....:	**DOSHISHA CORPORATION**
Address .....:	1-5-5 Higashi-Shinsaibashi, Chuo-ku, Osaka 542-8525, Japan
Test specification .....:	
Standard .....:	**Ordinance Article 2 paragraph 1 item (19)**

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Test item description .....:	**SmartBadge**
Trade Mark .....:	Doshisha
Manufacturer .....:	Avatronics Corporation Limited
Model/Type reference.....:	EB181TSW
Listed Models .....:	EB181TSB,EB181TSP,SB181TSW,SB181TSB,SB181TSP, DB181TSW,DB181TSB,DB181TSP,WB181TSW,WB181TSB, WB181TSP,XB181TSW,XB181TSB,XB181TSP,YB181TSW, YB181TSB,YB181TSP,ZB181TSW,ZB181TSB,ZB181TSP
Modulation .....:	GFSK
Frequency.....:	From 2402MHz-2480MHz
Ratings .....:	Input: DC 5V Battery: 3.85V 730mAh 2.8105Wh
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	SmartBadge
Model /Type	:	EB181TSW
Listed Models	:	EB181TSB,EB181TSP,SB181TSW,SB181TSB,SB181TSP, DB181TSW,DB181TSB,DB181TSP,WB181TSW,WB181TSB, WB181TSP,XB181TSW,XB181TSB,XB181TSP,YB181TSW, YB181TSB,YB181TSP,ZB181TSW,ZB181TSB,ZB181TSP
Model difference	:	The PCB board, circuit, structure and internal of these models are the same, only model number and colour are different for these model. So the tests were performed on model EB181TSW and the test results for the main test model can cover the listed models.
Applicant	:	**DOSHISHA CORPORATION**
Address	:	1-5-5 Higashi-Shinsaibashi, Chuo-ku, Osaka 542-8525, Japan
Manufacturer	:	**Avatronics Corporation Limited**
Address	:	Unit 704,Building 4D,Shenzhen Software Industrial Base,Yuehai Street,Nanshan District,Shenzhen City,Guangdong Province,China

Test Result:	**PASS**

The 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.

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1 SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

ARIB STD-T66: Second-Generation Low-Power Data Communication System/Wireless LAN System
MIC Notice No.88 Appendix No. 43: 2.4 GHz band wide-band low-power data communication system

1.2 Test Description

ARIB STD-T66		
CLAUSE	Description of Test (Transmitter Parameters)	Result
3.2 (2)	Antenna Power	Complies
3.2 (3)	Tolerances for Antenna Power	Complies
3.2 (4)	Frequency Tolerance	Complies
3.2 (5)	Transmission Rate	Complies
3.2 (7)	Occupied Frequency Bandwidth	Complies
3.2 (8)	Spread Bandwidth	Complies
3.2 (11)	Dwell Time	N/A
3.2 (6)	Spurious Emissions	Complies
3.6	Transmission Antenna Gain (EIRP Antenna Power)	N/A
3.6	Transmission Radiated Angle Width (3dB Beam width)	N/A
/	Interference prevention function	Complies
/	Carrier Sensing function	N/A
Receiver Parameters		
3.3 (1)	Secondary Radiated Emissions	Complies
Note: (1) N/A is an abbreviation for Not Applicable. *(2) N/T means this test item is not tested.*		

Note: 1: "N/A" denotes test is not applicable in this Test Report
2: MIC Public Notice 88:2004, annex 1 and annex 43
3: MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20
4: Referenced in the standard ARIB STD-T66

1.3 TEST ENVIRONMENT

1.3.1 Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community,Fuhai Street, Bao'an District, Shenzhen, China

1.3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

1.4 Measurement Uncertainty

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR100028-1 [2] and shall correspond to an expansion factor (coverage factor) K=1.96 or K=2 (which provide confidence levels of respectively 95% and 95.5% in the case where the distributions characterizing the actual measurement uncertainties are normal.

Parameter	Uncertainty
Frequency error / 99%&90% bandwidth	$\pm 1.62*10^{-6}$
Total RF power, conducted	±0.8dB
Spurious emissions, conducted	±0.8dB
DC and low frequency voltages	±0.05%
Humidity	±5%
Temperature	±1℃

2 GENERAL INFORMATION

2.1 General Remarks

Date of receipt of test sample	:	May 26, 2026
Testing commenced on	:	May 26, 2026
Testing concluded on	:	Jun, 26, 2026

2.2 Environmental conditions

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

Voltage	Normal Voltage	DC 3.85V
	High Voltage	DC 4.20V
	Low Voltage	DC 3.40V
Other	Normal Temperature	25°C
	Relative Humidity	55 %
	Air Pressure	989 hPa

Note: As the EUT was powered by DC 3.85V from battery, and with the voltage stabilizing circuit used, the chip voltage received floating not exceed ±1% of nominal condition when working on extreme voltage, so all test performed at nominal voltage only.

2.3 General Description of EUT

Product Name:	SmartBadge
Model/Type reference:	EB181TSW
Power supply:	Input: DC 5V Battery: 3.85V 730mAh 2.8105Wh
Hardware version:	V1.0
Software version:	V1.0
Testing sample:	CTA260526004-1# (Engineer sample) CTA260526004-2# (Normal sample)
Bluetooth BLE	
Supported type:	Bluetooth for low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2 MHz
Rated power	2.00 mW
Antenna type:	PCB Antenna
Antenna gain:	-0.51dBi

Note: For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.4 Description of Test Modes

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Operation Frequency List BLE:

Channel	Frequency (MHz)
00	2402
01	2404
02	2406
⋮	⋮
19	2440
⋮	⋮
37	2476
38	2478
39	2480

Note: Test performed at the lowest/middle/highest frequencies selected in the list above for EUT supported while working on specified mode.

2.5 Measurement Instruments List

Item	Test Equipment	Manufacturer	Model No.	Equipment No.	Cal. Institution	Calibration Date	Calibration Due Date
1	Spectrum Analyzer	Agilent	N9020A	CTA-301	LISAI	2025/07/30	2026/07/29
2	Vector Signal generator	Agilent	N5182A	CTA-305	LISAI	2025/07/30	2026/07/29
3	Spectrum analyzer	R&S	FSV40-N	CTA-344	LISAI	2026/05/16	2027/05/15
4	Power Meter	R&S	NRVS	CTA-354	LISAI	2025/07/30	2026/07/29
5	DC Power Supply	LongWei	LW-K3010D	CTA-033	LISAI	2025/07/30	2026/07/29
6	Oscilloscope	Tektronix	TDS3052	CTA-010	LISAI	2025/07/30	2026/07/29
7	Automatic control unit	Tonscend	JS0806-2	CTA-351	LISAI	2025/07/30	2026/07/29

Cal. Institution: LiSai-Guangzhou LiSai Calibration and Testing Co.,LTD.
Calibration by the calibration agencies listed in the table correspond to paragraph 4 (ii) (c) of Article 24-2 in the Radio Law".
☐(a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18-1 of the Radio Act.
☐(b) Calibration conducted based on the regulations of Article 135 or 144 of the Measurement Act.
☒(c) Calibration conducted in foreign countries, which is equivalent to calibration conducted by the NICT or a designated calibration agency under Article 102-18-1 of the Radio Act.
☐(d) Calibration, etc. conducted by using measuring instruments and other facilities listed at the bottom of appended table 3 of the Radio Act, which is to have been calibrated as described in (a) through (c) above.

2.6 Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters:

Test Software Version	FCC_assist_1.0.2.2		
Frequency	2402MHz	2440MHz	2480MHz
Bluetooth	Default	Default	Default

2.7 Description of Test Modes

Tested channel, Frequency and Modulation Information		
CH0	2402MHz	GFSK(1Mbps)
CH19	2440MHz	GFSK(1Mbps)
CH39	2480MHz	GFSK(1Mbps)
Note: According exploratory test, EUT has maximum output power for GFSK modulation, All the test modes were tested, but only the worst case was recorded in this report.		

2.8 Test Voltage

POWER SUPPLY VOLTAGE FLUCTUATION TEST

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
Input To EUT	DC 3.85V	DC 4.20V	DC 3.40V
Output To RF Module	DC 3.30V	DC 3.30V	DC 3.30V
Voltage Variation (%)	--	--	--

Note:
Voltage Variation (%)
= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100
During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.
The sample power supply was confirmed that input voltage variation at the radio unit in the radio equipment to be tested is less than +1% against a variation of +10% at the input voltage from the external power supply to the radio equipment, and the radio equipment was designed so as to be operated in a specified voltage variation limit within +10%, Radio can only tested at rated voltage.

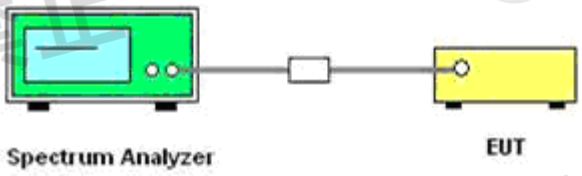
3 Test conditions and Results

3.1 Frequency Error

LIMIT

Tolerance of frequency shall be ±50x10^{-6}.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyser and antenna output port as show in the block diagram as TEST CONFIGURATION shows.
EUT Condition: non-modulation
Spectrum Condition:
Frequency: test frequency
Span: 300 KHz
RBW: 10 KHz
VBW: 10 KHz
Sweep time: Auto
Detector mode: Positive peak
Indication mode: max hold

TEST RESULTS

Please refer to the Appendix RF Test Data for BLE

3.2 Antenna Output Power and Output Power Tolerance

LIMIT

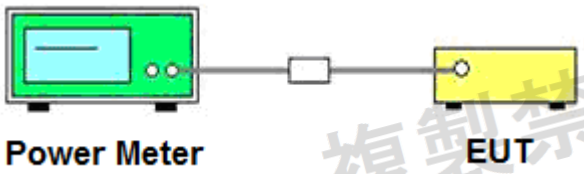
- ≤ 3 mW /MHz(FHSS from 2402-2480 MHz)
- ≤ 10 mW/MHz (OFDM, DSSS from 2400-2483.5 MHz)
- ≤ 10 mW (other from 2400-2483.5 MHz)

The Output Power Tolerance must be within +20%.
E.i.r.p:

- ≤12.14dBm(other from 2400-2483.5 MHz)

Note: E.I.R.P will not be applied to the transmission antenna which has a gain of 2.14dBi or less.

TEST CONFIGURATION



TEST PROCEDURE

a. EUT have transmitted continuous maximum power
b. Antenna Power Error is definition that actual measure antenna power tolerance within +20% power range that base on manufacturer declare the conducted power density.

TEST RESULTS

Conducted Antenna Power

Mode	Channel (MHz)	Average burst power (dBm)	Output power (mW)	Limit (mW)	Rated output power (mW)	Tolerance (%)	Limit	Result
GFSK (1 Mbps)	2402	1.97	1.5740	10	2.00	-21.30%	20%	Pass
	2440	2.04	1.5996	10	2.00	-20.02%		
	2480	1.88	1.5417	10	2.00	-22.92%		

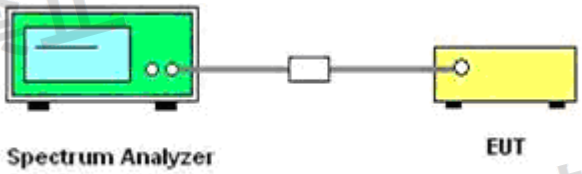
Note:
1). Test Result: Pass.
2). EIRP = Antenna conducted power + Antenna gain

3.3 Occupied Bandwidth and Spreading Bandwidth

LIMIT

• Occupied bandwidth: FH ≤ 83.5 MHz; OFDM ≤ 40 MHz, DS ≤ 26 MHz; Others ≤ 26 MHz
• Spread Bandwidth: ≥ 500 kHz (FH, DS)
• Spread factor >5.

TEST CONFIGURATION



TEST PROCEDURE

Setting of SA is following as follow:
RBW: 300 kHz
VBW: 300 kHz
Sweep time: Auto
Sweep Mode: Continuous sweep
Detector mode mode: Positive peak
Trace mode: Max hold
EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 99% of occupied bandwidth to measure occupied bandwidth.
EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 90% of occupied bandwidth to measure spread bandwidth.

TEST RESULTS

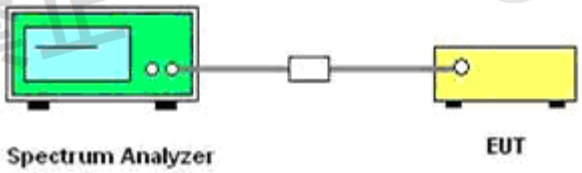
Please refer to the Appendix RF Test Data for BLE

3.4 Unwanted Emission Strength

LIMIT

Permissible mean power of spurious emission of each frequency supplied to a feeder, that is, mean power of spurious emission in the 1 MHz bandwidth at frequency f other than frequency band used shall be as follows:
a. 2,387MHz ≤ f ≤ 2,400MHz and 2,483.5MHz < f ≤ 2,496.5MHz 25 μW or less
b. 2,387MHz > f and 2,496.5MHz < f 2.5 μW or less

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyser and antenna output port as show in the block diagram as TEST CONFIGURATION shows.
EUT Condition: modulation
Spectrum Condition:
Frequency: 30MHz-12.5GHz
RBW: 1 MHz (30MHz-1GHz), 1 MHz (1GHz-12.5GHz)
VBW: 1 MHz (30MHz-1GHz), 1 MHz (1GHz-12.5GHz)
Sweep time: Auto
Detector mode: Positive peak
Indication mode: max hold

TEST RESULTS

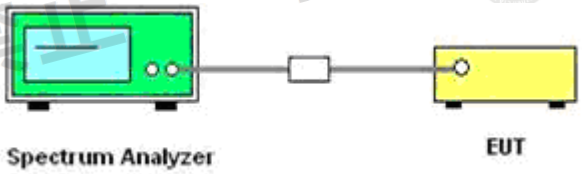
Please refer to the Appendix RF Test Data for BLE

3.5 Secondary Radiated Emission Strength

LIMIT

The limit on secondary emissions radiated from the receiving equipment within which the function of other radio equipment will not be impaired shall be, in terms of the power of a dummy antenna circuit that has the same electrical constant as the receiving antenna, 4nW or less at a frequency below 1 GHz and 20 nW or less at a frequency of 1 GHz or higher as measured using the circuit.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyser and antenna output port as show in the block diagram as TEST CONFIGURATION shows.
EUT Condition: modulation
Spectrum Condition:
Frequency: 30MHz-12.5GHz
RBW: 100 KHz (30MHz-1GHz), 1MHz (1GHz-12.5GHz)
VBW: 100 KHz (30MHz-1GHz), 1MHz (1GHz-12.5GHz)
Sweep time: Auto
Detector mode: Positive peak
Indication mode: max hold

TEST RESULTS

Please refer to the Appendix RF Test Data for BLE

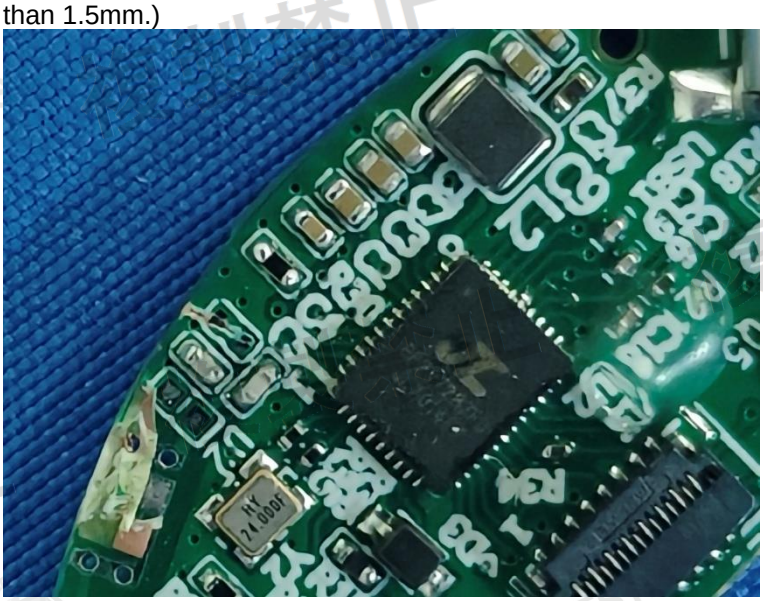
3.6 Construction Protection Method

REQUIREMENT

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

CONFIRMATION METHOD

Our products apply for RF certification in Japan. The high frequency part and modulation part use SMT technology, which is not easy to change. (The chip has more than 12 chip pins, and the pin distance is less than 1.5mm.)



3.7 Interference Prevention Function

REQUIREMENT

Clarify the one automatically to transmit and to receive identification code with the wireless equipment of the wireless station used in the same premises.

Item	Limits
Identification code	≧ 48 bits

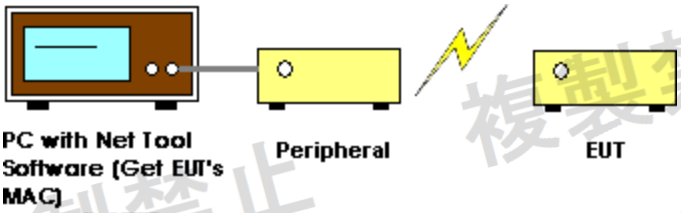
CONFIRMATION METHOD

A communication link was made where the ID code is correct (Identical).

TEST PROCEDURE

1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes from EUT. b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code: a. Transmit the predetermined identification codes from the counterpart. b. Check if communication is normal. c. Transmit the other signals than predetermined ID codes from the counterpart. d. check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

TEST CONFIGURATION



TEST RESULTS

PASS

MAC: A2: C6: 4E: DA: B1: 4C

3.8 Carrier Sensing Function

LIMIT

Item	Limits
Carrier Sense	Good – EUT stop RF transmission signal after carrier inject to EUT. (On 22.79+Gr-20*log (f)[dBm] (Gr: dBi; f: MHz) or 100mV/m)

INSTRUMENTS SETTING

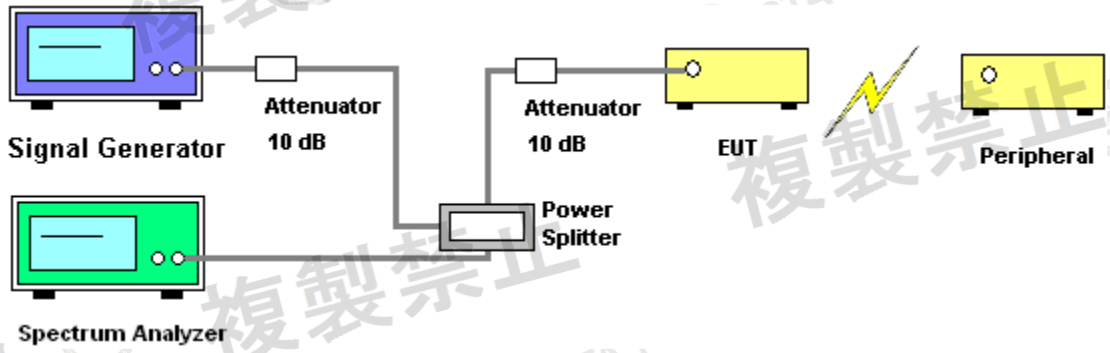
The following table is the setting of spectrum analyser and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Span	0 MHz
Sweep	Continuous
Detector	Peak
Trigger mode	Video

TEST PROCEDURE

1. SSG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SSG and power level is (On 22.79+Gr-20*log (f) [dBm] (Gr: dBi; f: MHz). Then turn off the RF signal of SSG.
2. EUT have transmitted the maximum modulation signal and fixed channelize.
3. Setting of SA is following as: RB: 1MHz / VB: 1MHz / SPAN: 50MHz / AT: 10dB /Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detector mode: Positive peak.
4. SSG RF Signal On.
5. EUT shall be stop the transmitted any signal and SSG RF Signal Off. Then EUT will be continuous transmitted signal.

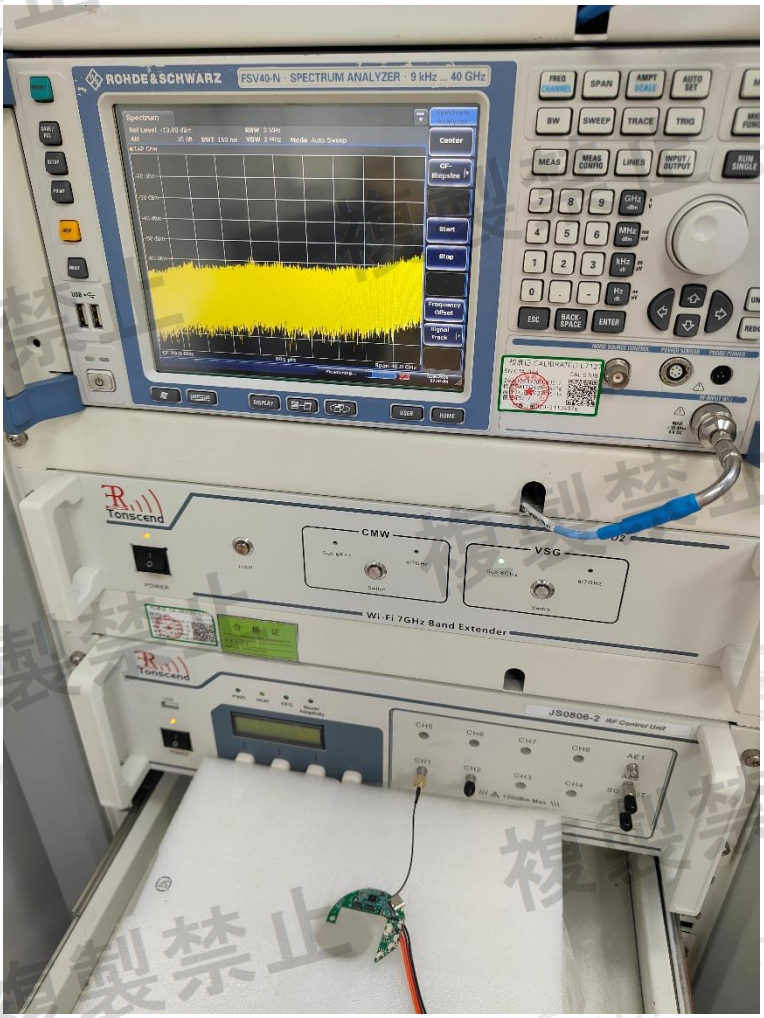
TEST CONFIGURATION



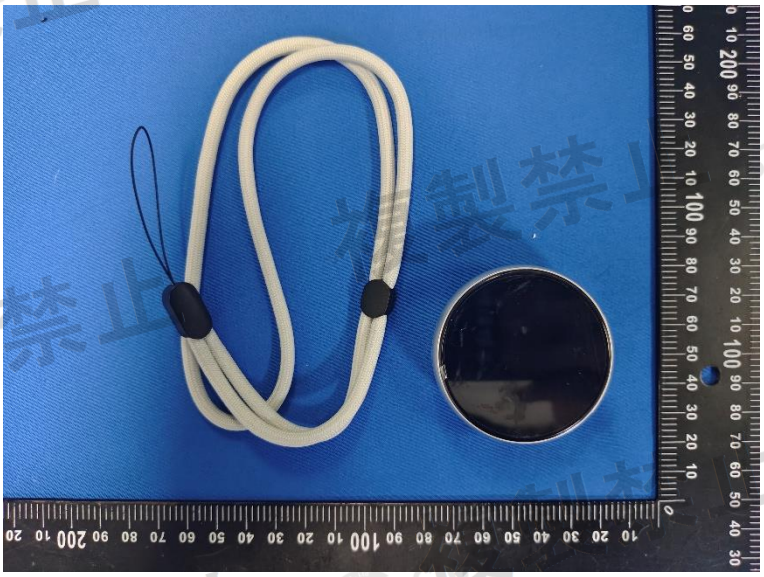
TEST RESULTS

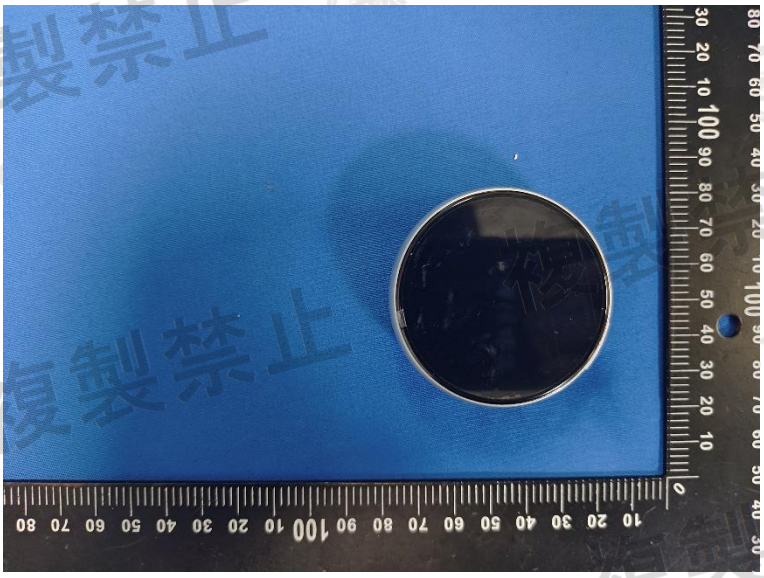
Not Applicable.

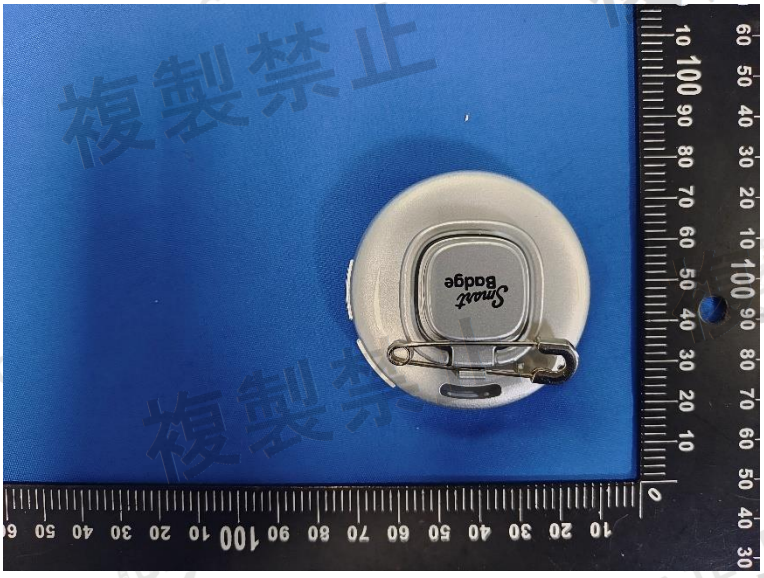
4 Test Setup Photos of the EUT

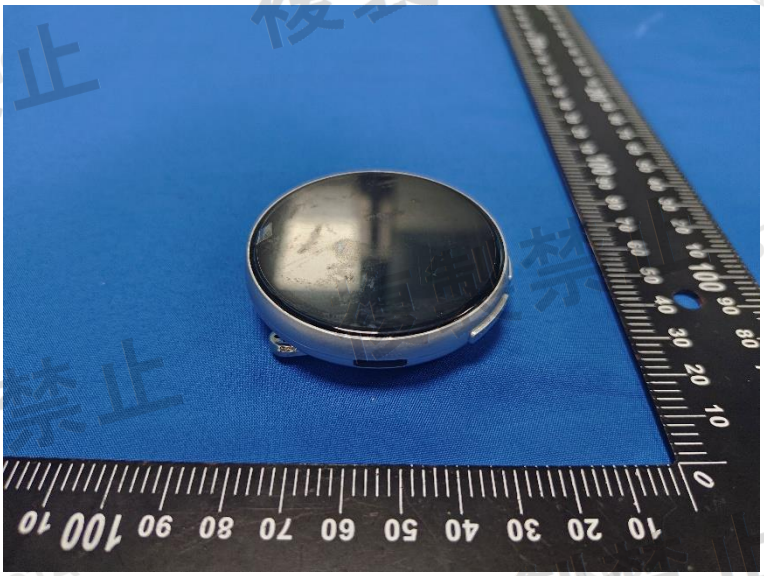


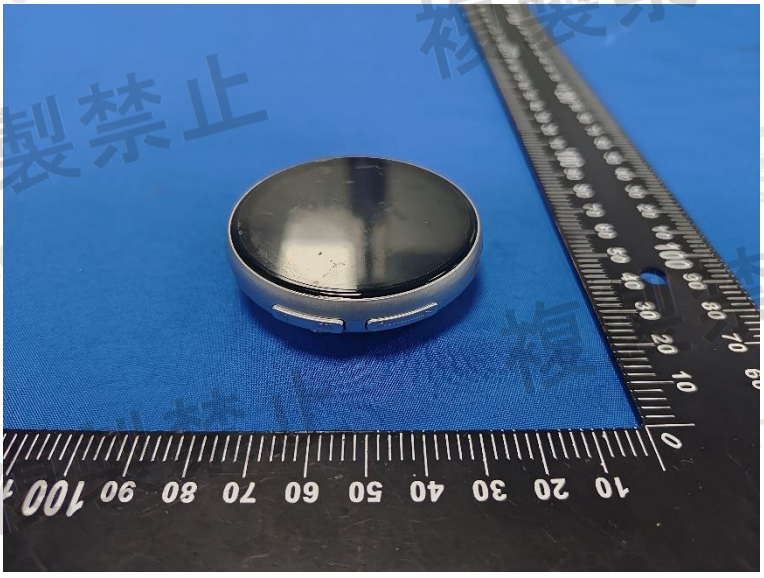
5 Photos of the EUT

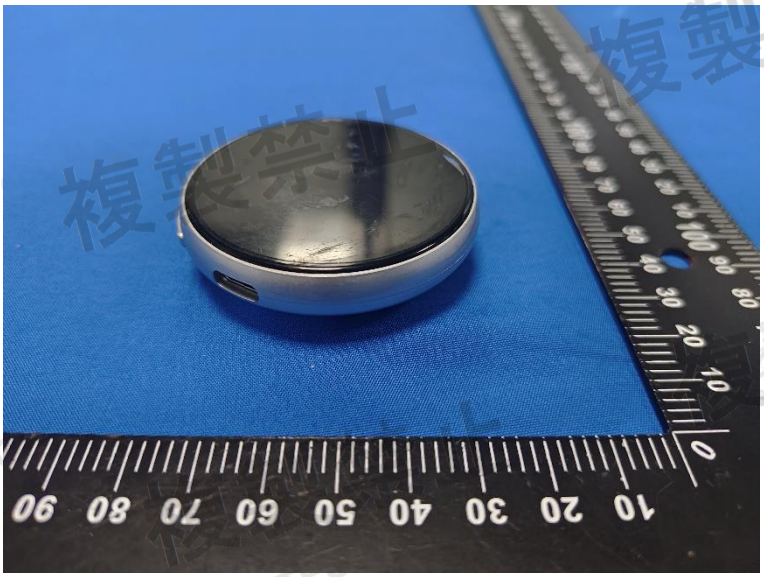


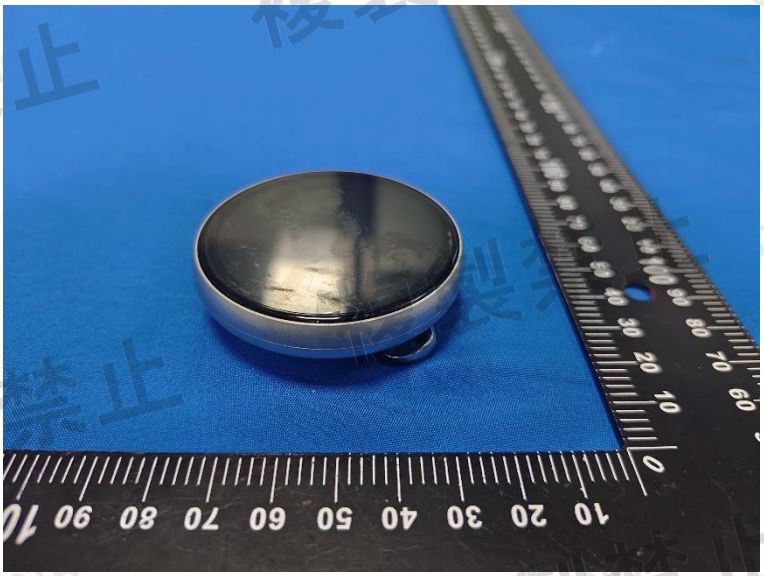




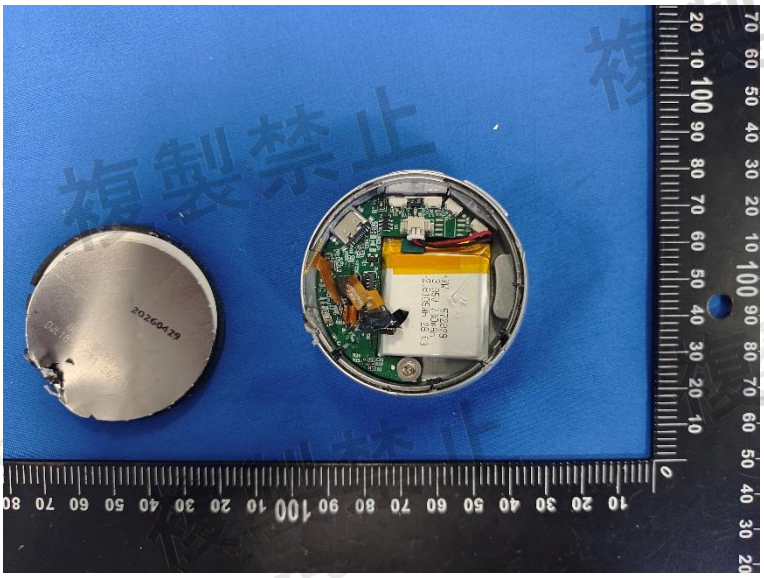




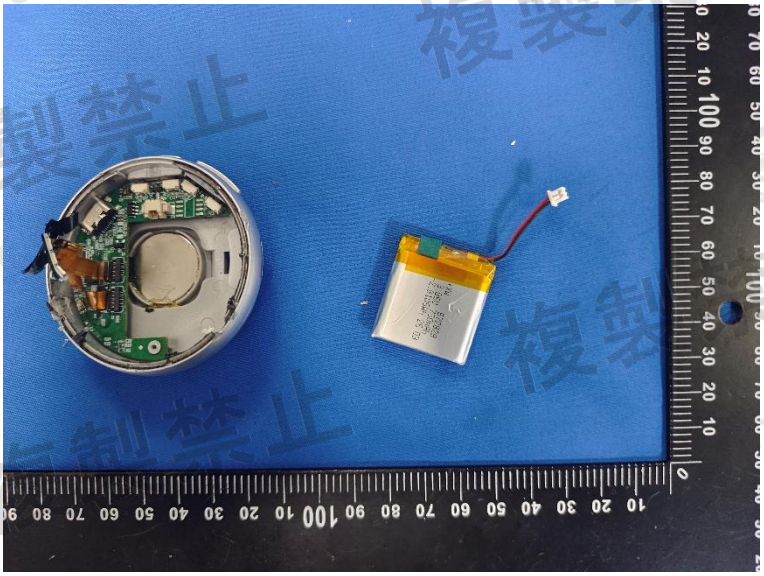


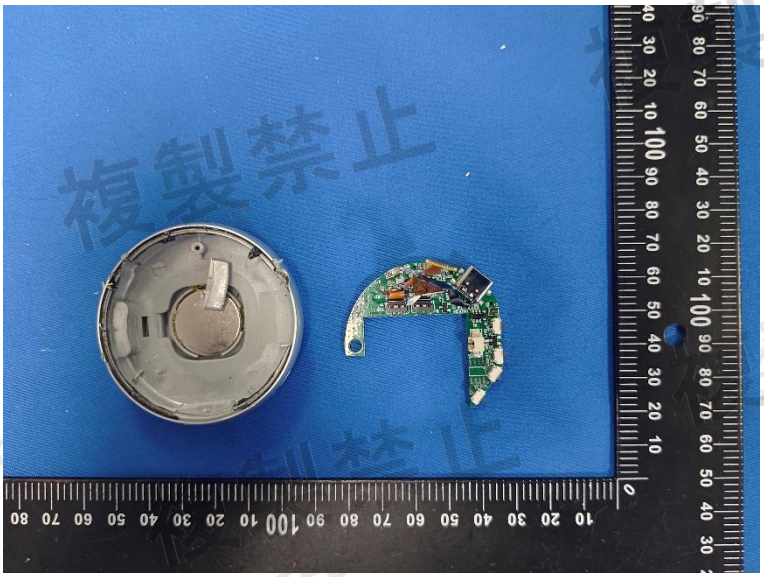


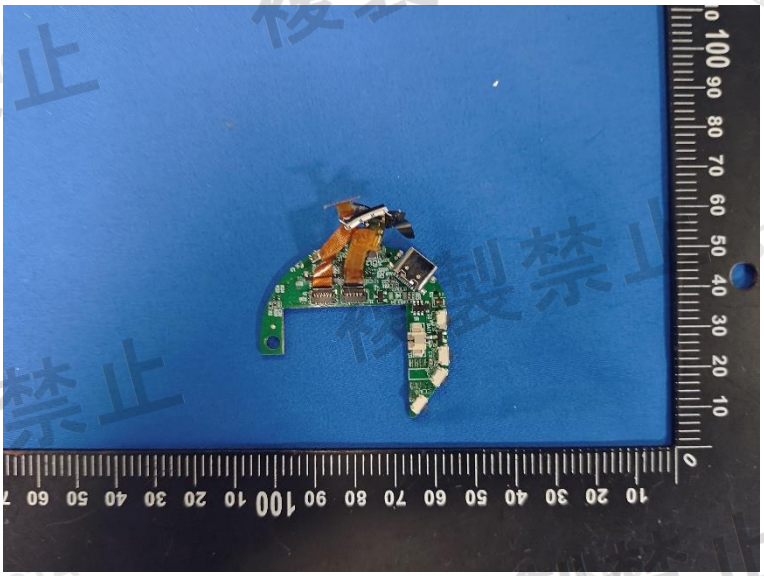


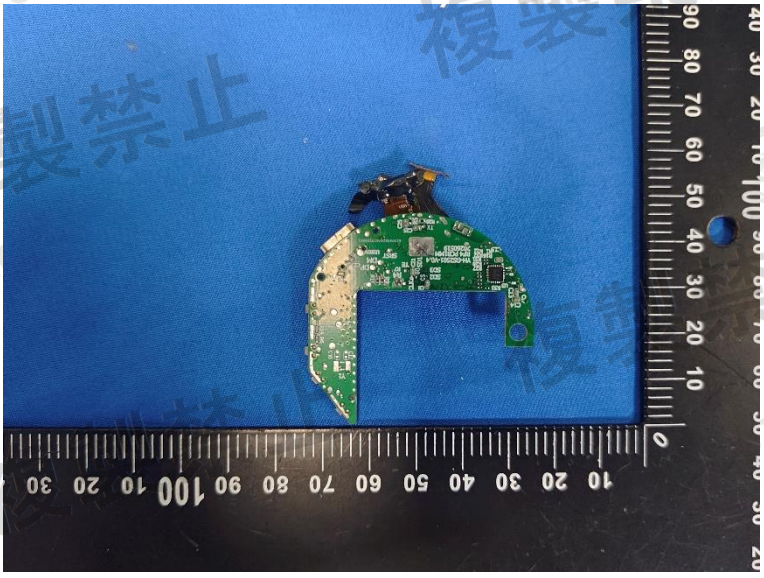

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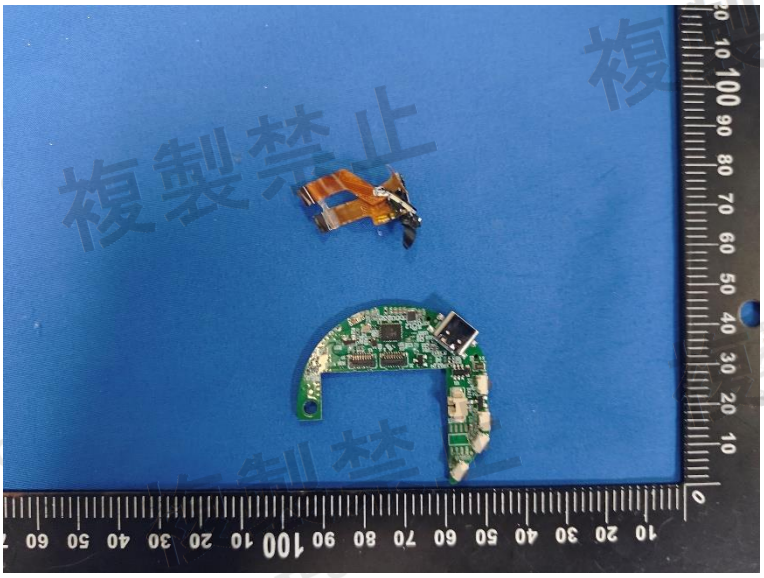


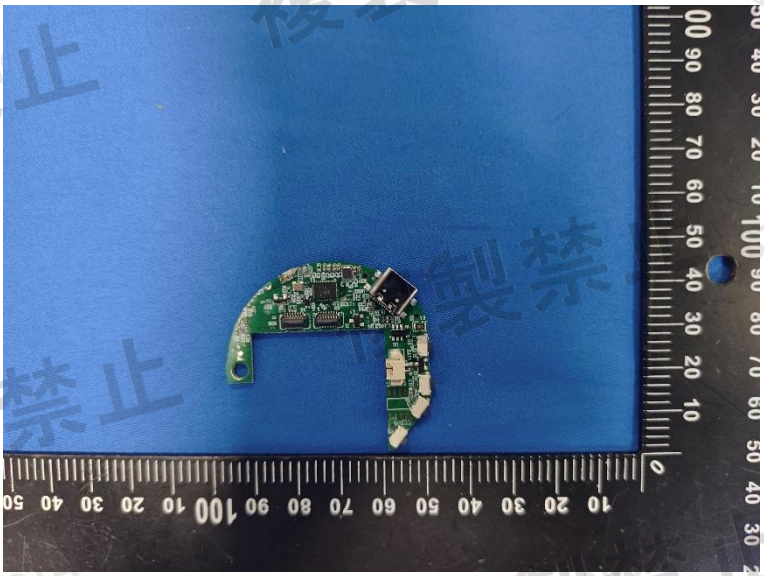


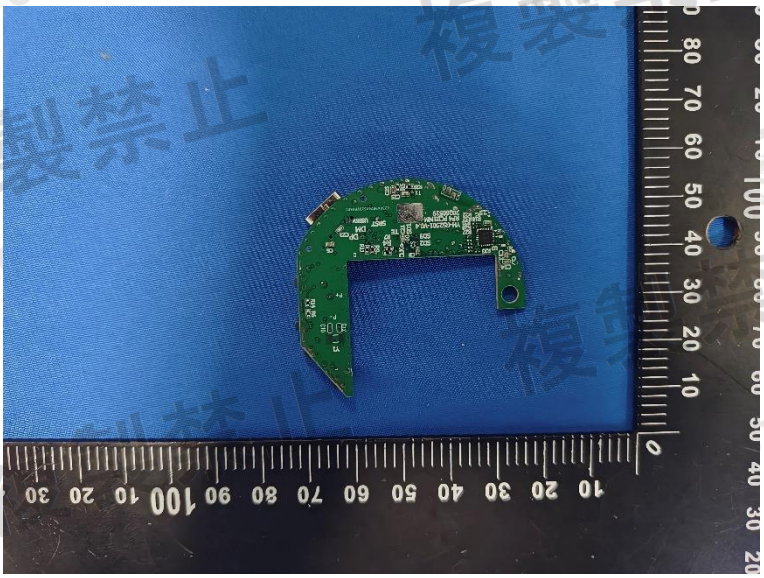




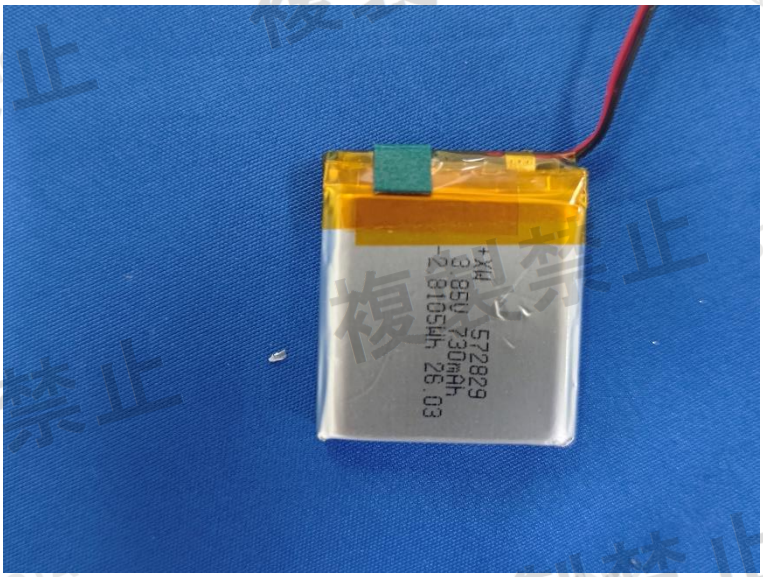












********** End of Report **********