TCT 通测检测
TESTING CENTRE TECHNOLOGY

TEST REPORT

FCC ID. ..... :	2BCUY-CMW
Test Report No..... :	TCT230817E016
Date of issue..... :	Aug. 25, 2023
Testing laboratory ..... :	SHENZHEN TONGCE TESTING LAB
Testing location/ address:	2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China
Applicant's name..... :	Shen Zhen Shi Chao Mai Ke Ji You Xian Gong Si
Address..... :	Room 10F-A-10A, Shenmao Business Center, 59 Xinwen Road, Meiling Community, Lianhua Street, Futian District, Shenzhen, 518000 China
Manufacturer's name ... :	Dong guan Utopia-Originality Technology Co., Ltd
Address..... :	NO.2, moushan Road, Chan'an Town, Dongguan City, Guangdong Province, China
Standard(s) ..... :	FCC CFR Title 47 Part 15 Subpart C
Product Name..... :	Portable Charger
Trade Mark ..... :	charmast
Model/Type reference..... :	CMW
Rating(s)..... :	Type-C Input: DC 5V, 1.0A Rechargeable Li-ion Battery DC 3.7V
Date of receipt of test item ..... :	Aug. 17, 2023
Date (s) of performance of test..... :	Aug. 17, 2023 - Aug. 25, 2023
Tested by (+signature) ... :	Onnado YE
Check by (+signature).... :	Beryl ZHAO
Approved by (+signature):	Tomsin

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1. General Product Information

1.1. EUT description

Product Name.....:	Portable Charger
Model/Type reference.....:	CMW
Sample Number.....:	TCT230817E016-0101
Operation Frequency .....:	326.20kHz – 339.42kHz
Modulation Technology .....:	Load modulation
Max. Wireless Output Power:	2.5W
Antenna Type.....:	Inductive loop coil Antenna
Rating(s).....:	Type-C Input: DC 5V, 1.0A Rechargeable Li-ion Battery DC 3.7V

1.2. Model(s) list

None.

2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Spurious Emission	§15.209(a)(f)	PASS

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

3. General Information

3.1. Test environment and mode

Operating Environment:		
Condition	Conducted Emission	Radiated Emission
Temperature:	24.6 °C	25.3 °C
Humidity:	51 % RH	56 % RH
Atmospheric Pressure:	1010 mbar	1010 mbar
Test Mode:		
AC mode	Keep the EUT in three different wireless output modes (99% load, 50% load,1% load).	
Internal Battery Mode	Keep the EUT in three different wireless output modes (99% load, 50% load,1% load).	
The sample was placed 0.8m for the measurement below above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case(Z axis) are shown in Test Results of the following pages.		

3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Apple Watch	A1757	/	/	/
Adapter	WC065A11JH	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4. Facilities and Accreditations

4.1. Facilities

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

- FCC - Registration No.: 645098
  SHENZHEN TONGCE TESTING LAB
  Designation Number: CN1205
  The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.
- IC - Registration No.: 10668A-1
  SHENZHEN TONGCE TESTING LAB
  CAB identifier: CN0031
  The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

4.2. Location

SHENZHEN TONGCE TESTING LAB
Address: 2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China
TEL: +86-755-27673339

4.3. Measurement Uncertainty

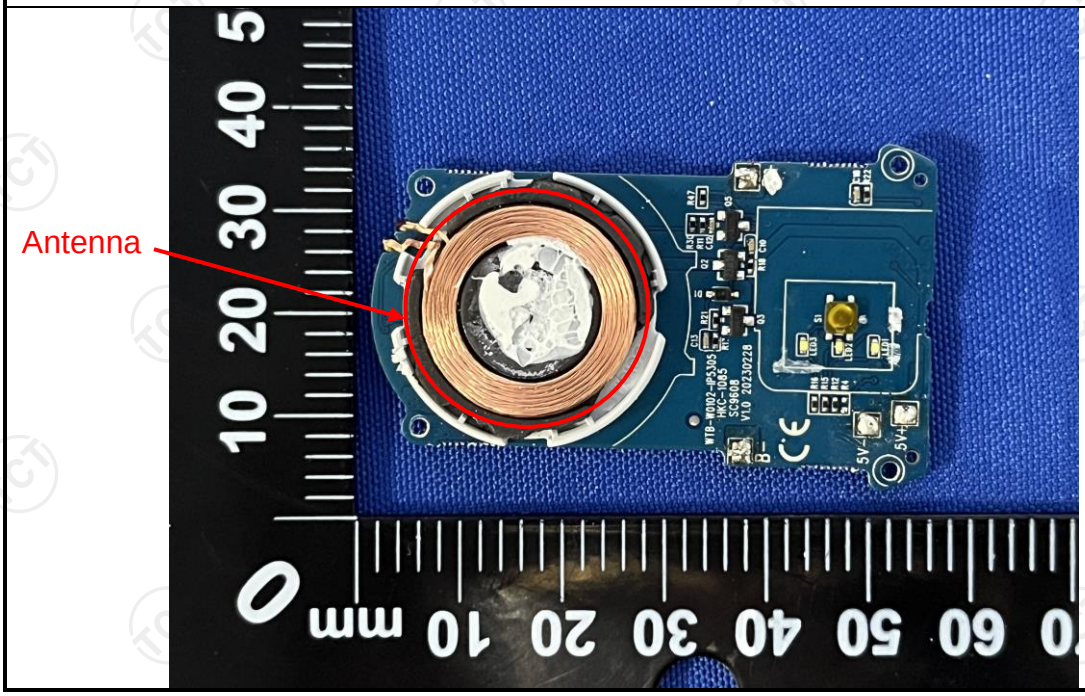
The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	± 3.10 dB
2	RF power, conducted	± 0.12 dB
3	Spurious emissions, conducted	± 0.11 dB
4	All emissions, radiated(<1 GHz)	± 4.56 dB
5	All emissions, radiated(1 GHz - 18 GHz)	± 4.22 dB
6	All emissions, radiated(18 GHz- 40 GHz)	± 4.36 dB

5. Test Results and Measurement Data

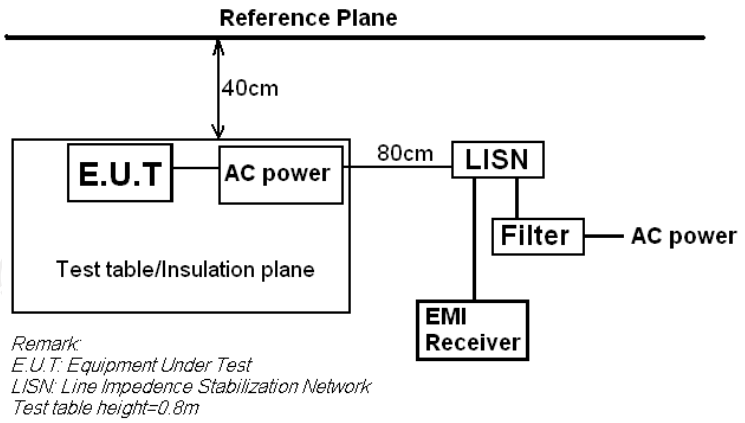
5.1. Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: 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.	
E.U.T Antenna:	
The antennas are inductive loop coil antenna which permanently attached.	



5.2. Conducted Emission

5.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
</td></tr>
<tr><td>Test Setup:</td><td>


</td></tr>
<tr><td>Test Mode:</td><td>AC mode(The battery of the Apple watch is less than 1%)</td></tr>
<tr><td>Test Procedure:</td><td>1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. 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 C63.10: 2013 on conducted measurement.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

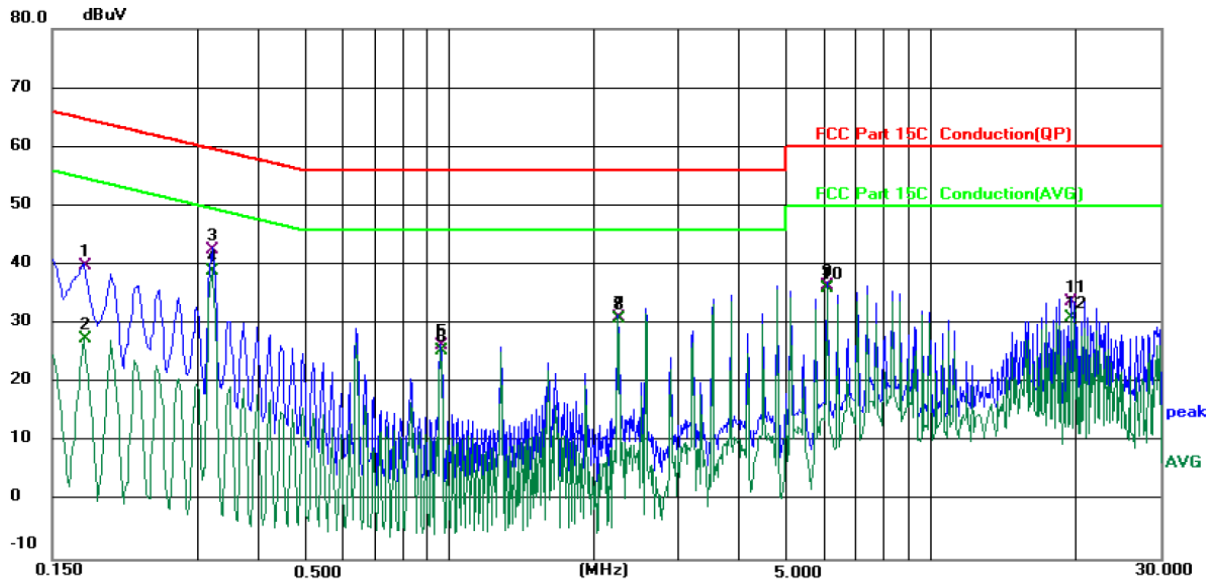
5.2.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI3	100898	Jun. 29, 2024
Line Impedance Stabilisation Newtork(LISN)	Schwarzbeck	NSLK 8126	8126453	Feb. 20, 2024
Line-5	TCT	CE-05	/	Jul. 03, 2024
EMI Test Software	Shurple Technology	EZ-EMC	/	/

5.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Site 844 Shielding Room | Phase: *L1* | Temperature: 24.6 (℃) | Humidity: 51 %

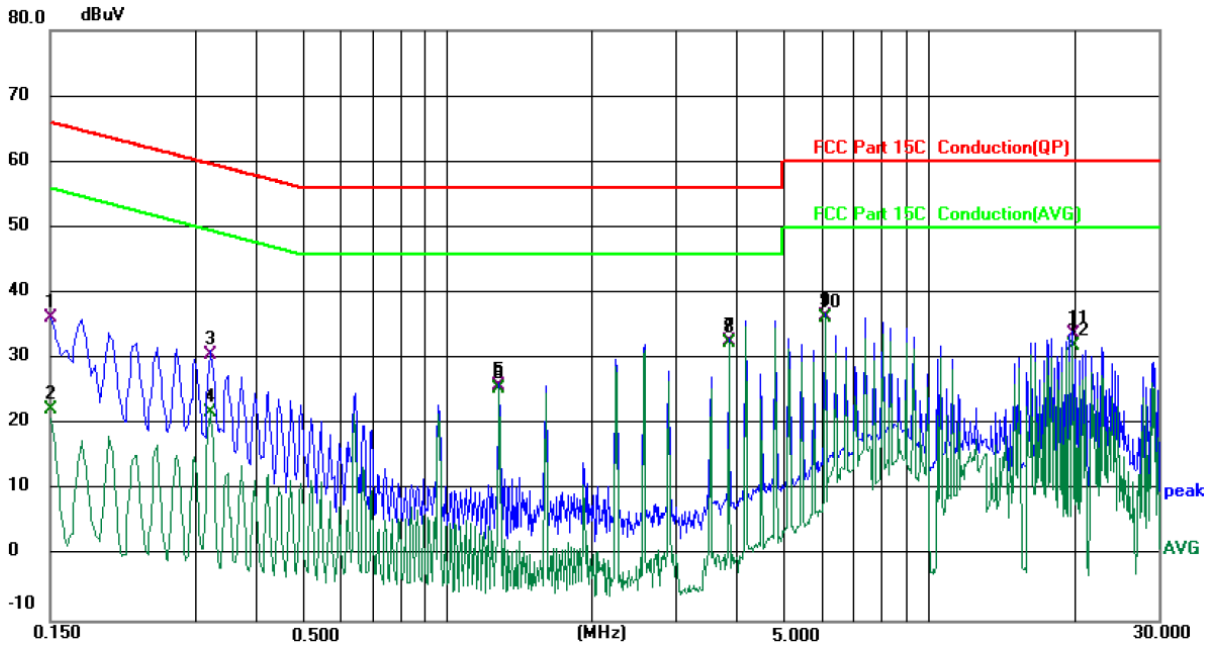
Limit: FCC Part 15C Conduction(QP) | Power: DC 5 V(Adapter Input AC 120 V/60 Hz)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1739	29.62	10.13	39.75	64.77	-25.02	QP	
2		0.1739	17.31	10.13	27.44	54.77	-27.33	AVG	
3		0.3220	32.58	9.95	42.53	59.66	-17.13	QP	
4	*	0.3220	28.97	9.95	38.92	49.66	-10.74	AVG	
5		0.9619	17.26	9.02	26.28	56.00	-29.72	QP	
6		0.9619	16.34	9.02	25.36	46.00	-20.64	AVG	
7		2.2459	20.95	10.01	30.96	56.00	-25.04	QP	
8		2.2459	20.84	10.01	30.85	46.00	-15.15	AVG	
9		6.0979	26.32	10.11	36.43	60.00	-23.57	QP	
10		6.0979	25.94	10.11	36.05	50.00	-13.95	AVG	
11		19.5740	23.58	10.23	33.81	60.00	-26.19	QP	
12		19.5740	20.83	10.23	31.06	50.00	-18.94	AVG	

Note:

Freq. = Emission frequency in MHz
Reading level (dBµV) = Receiver reading
Corr. Factor (dB) = LISN factor + Cable loss
Measurement (dBµV) = Reading level (dBµV) + Corr. Factor (dB)
Limit (dBµV) = Limit stated in standard
Margin (dB) = Measurement (dBµV) – Limits (dBµV)
Q.P. =Quasi-Peak
AVG =average
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz*

Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site 844 Shielding Room | Phase: N | Temperature: 24.6 (℃) | Humidity: 51 %

Limit: FCC Part 15C Conduction(QP) | Power: DC 5 V(Adapter Input AC 120 V/60 Hz)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	26.19	10.09	36.28	66.00	-29.72	QP	
2		0.1500	12.22	10.09	22.31	56.00	-33.69	AVG	
3		0.3220	21.02	9.62	30.64	59.66	-29.02	QP	
4		0.3220	12.29	9.62	21.91	49.66	-27.75	AVG	
5		1.2860	15.87	10.01	25.88	56.00	-30.12	QP	
6		1.2860	15.34	10.01	25.35	46.00	-20.65	AVG	
7		3.8540	22.53	10.08	32.61	56.00	-23.39	QP	
8	*	3.8540	22.26	10.08	32.34	46.00	-13.66	AVG	
9		6.1020	26.32	10.13	36.45	60.00	-23.55	QP	
10		6.1020	26.15	10.13	36.28	50.00	-13.72	AVG	
11		19.9060	23.40	10.35	33.75	60.00	-26.25	QP	
12		19.9060	21.55	10.35	31.90	50.00	-18.10	AVG	

Note:

Freq. = Emission frequency in MHz
Reading level (dBµV) = Receiver reading
Corr. Factor (dB) = LISN factor + Cable loss
Measurement (dBµV) = Reading level (dBµV) + Corr. Factor (dB)
Limit (dBµV) = Limit stated in standard
Margin (dB) = Measurement (dBµV) – Limits (dBµV)
Q.P. =Quasi-Peak AVG =average
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz*

5.3. Radiated Spurious Emission Measurement

5.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10: 2013
Frequency Range:	9 kHz to 25 GHz
Measurement Distance:	3 m
Antenna Polarization:	Horizontal & Vertical
Operation mode:	Refer to item 3.1
Receiver Setup:	

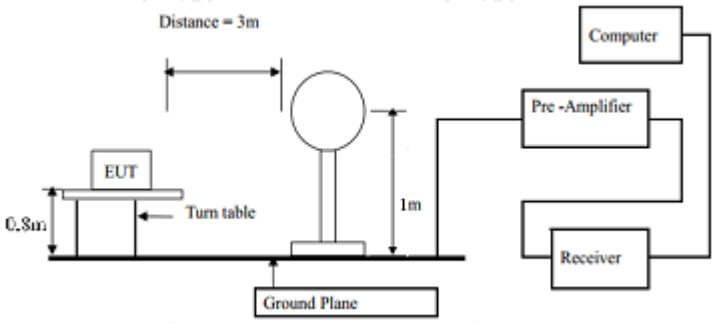
Frequency	Detector	RBW	VBW	Remark
9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value

Limit:

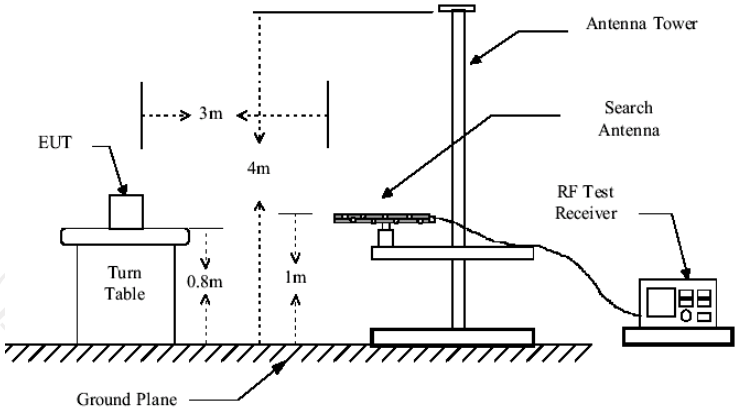
Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test setup:

For radiated emissions below 30MHz



30MHz to 1GHz



Test Procedure:

1. For the radiated emission test below 1GHz:
   The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. 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.
   For the radiated emission test above 1GHz:
   Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
2. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
3. For measurement below 1GHz, 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.
4. Use the following spectrum analyzer settings:

	(1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=120 kHz for f < 1 GHz; VBW ≥RBW; Sweep = auto; Detector function = peak; Trace = max hold; (3) Set RBW = 1 MHz, VBW= 3MHz for f 1 GHz for peak measurement. For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Test mode:	Refer to section 3.1 for details
Test results:	PASS

5.3.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESIB7	100197	Jun. 29, 2024
Spectrum Analyzer	R&S	FSQ40	200061	Jun. 29, 2024
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	Feb. 20, 2024
Pre-amplifier	SKET	LNPA_1840G-50	SK202109203500	Feb. 20, 2024
Pre-amplifier	HP	8447D	2727A05017	Jun. 27, 2024
Loop antenna	Schwarzbeck	FMZB1519B	00191	Jul. 02, 2024
Broadband Antenna	Schwarzbeck	VULB9163	340	Jul. 01, 2024
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Jul. 01, 2024
Horn Antenna	Schwarzbeck	BBHA 9170	00956	Feb. 24, 2024
Antenna Mast	Keleto	RE-AM	/	/
Coaxial cable	SKET	RC-18G-N-M	/	Feb. 24, 2024
Coaxial cable	SKET	RC_40G-K-M	/	Feb. 24, 2024
EMI Test Software	Shurple Technology	EZ-EMC	/	/

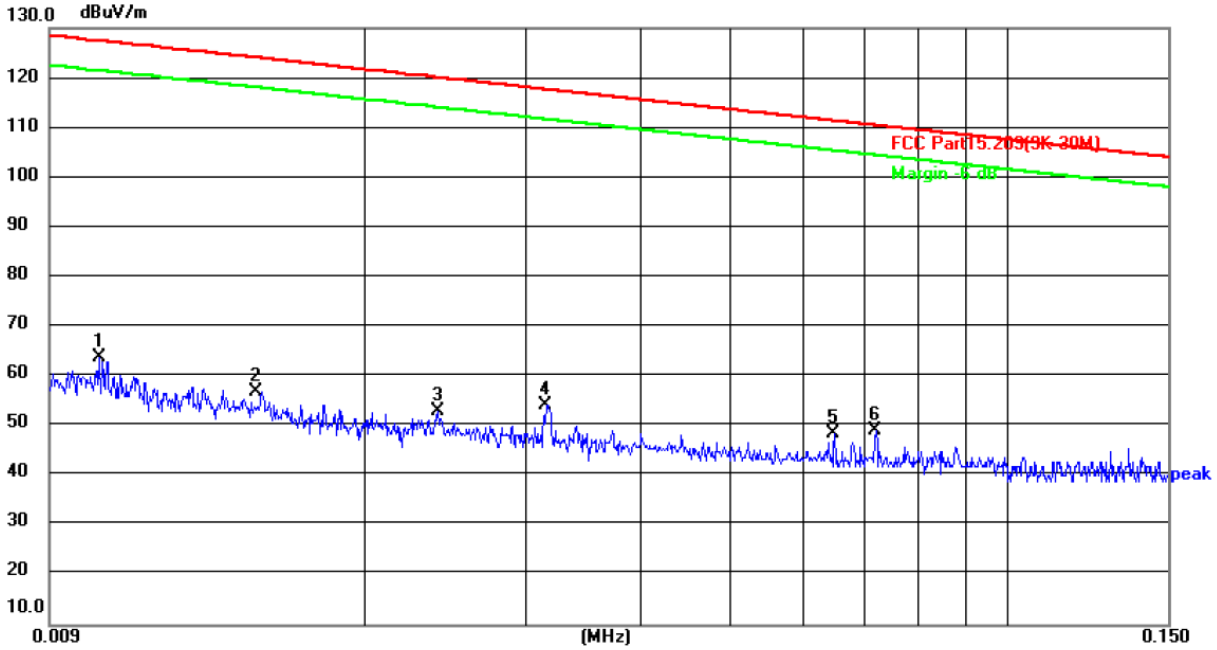
5.3.3. Test Data

Please refer to following diagram for individual

9KHz-30MHz

9KHz-150KHz:

coaxial

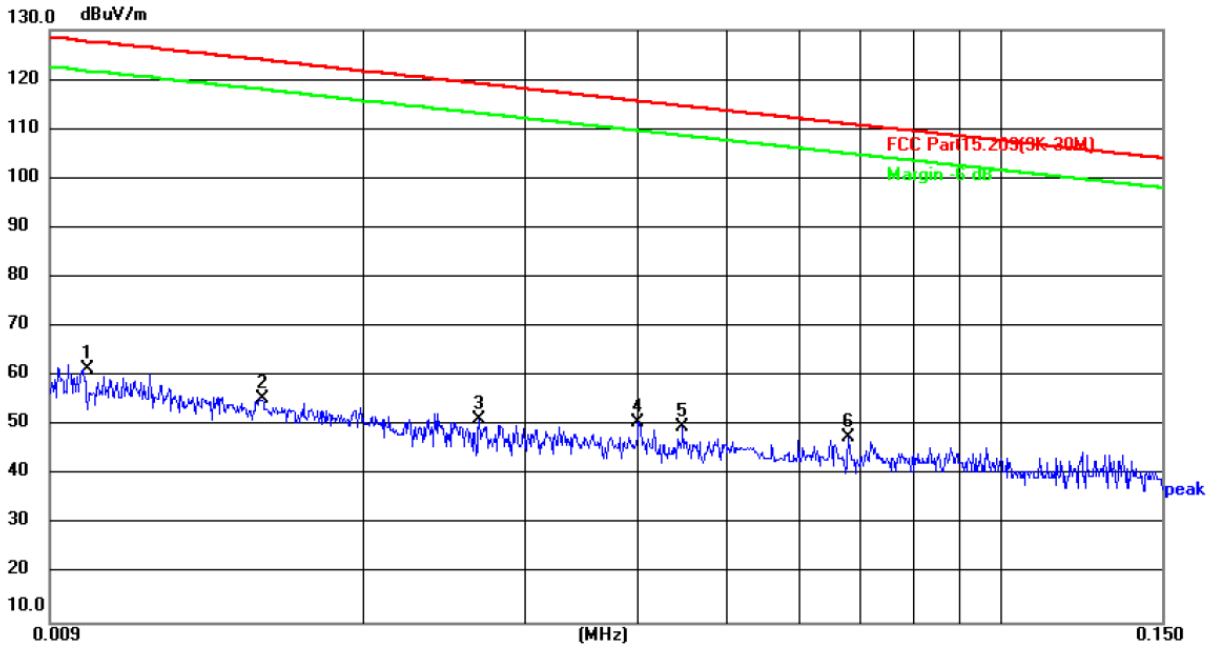


Site: #3 3m Anechoic Chamber Polarization: ***Coaxial*** Temperature: 25.3(℃) Humidity: 50 %

Limit: FCC Part15.209(9K-30M) Power:DC 3.7 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.0102	43.22	20.73	63.95	127.43	-63.48	peak	P	
2	0.0151	36.18	20.67	56.85	124.03	-67.18	peak	P	
3	0.0239	32.45	20.54	52.99	120.04	-67.05	peak	P	
4	0.0313	33.80	20.48	54.28	117.69	-63.41	peak	P	
5	0.0646	27.63	20.93	48.56	111.40	-62.84	peak	P	
6 *	0.0719	28.19	21.05	49.24	110.47	-61.23	peak	P	

Coplanar



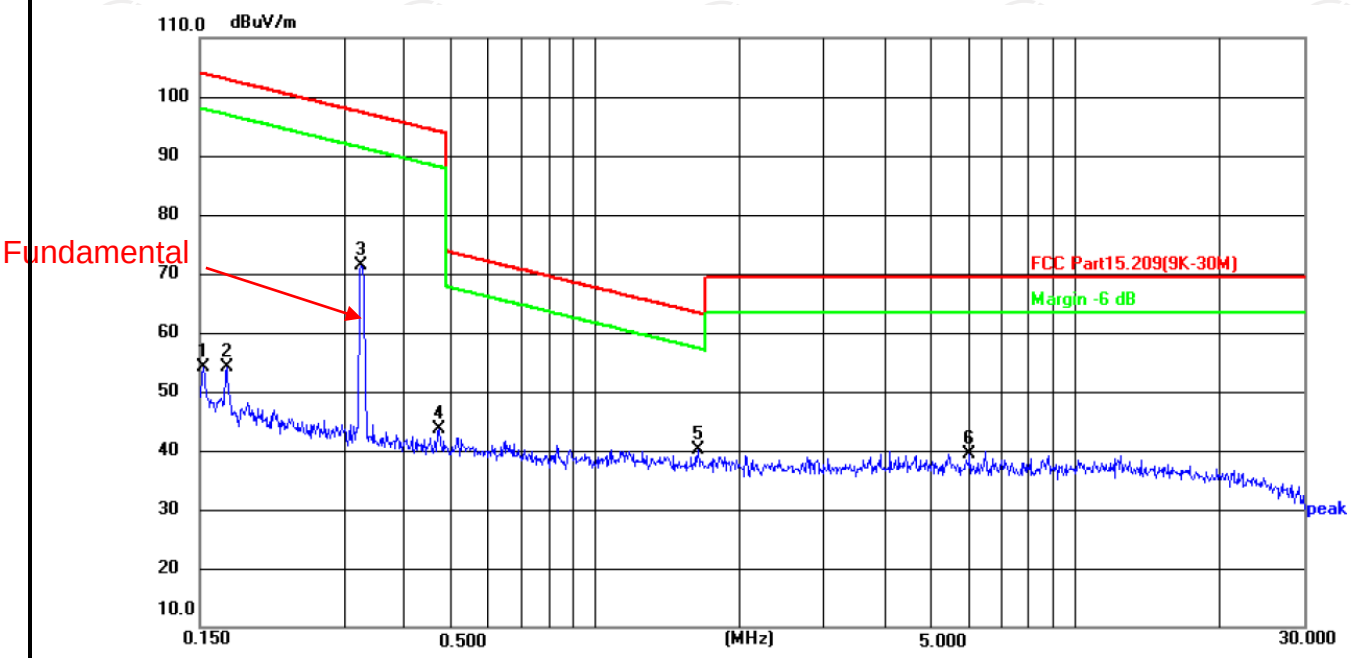
Site: #3 3m Anechoic Chamber Polarization: ***Conplanar*** Temperature: 25.3(℃) Humidity: 50 %

Limit: FCC Part15.209(9K-30M) Power:DC 3.7 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.0098	40.80	20.76	61.56	127.78	-66.22	peak	P	
2	0.0153	34.82	20.67	55.49	123.91	-68.42	peak	P	
3	0.0267	30.72	20.52	51.24	119.07	-67.83	peak	P	
4	0.0400	30.05	20.54	50.59	115.56	-64.97	peak	P	
5	0.0446	29.07	20.56	49.63	114.62	-64.99	peak	P	
6 *	0.0680	26.53	21.02	47.55	110.95	-63.40	peak	P	

150KHz-30MHz:

coaxial

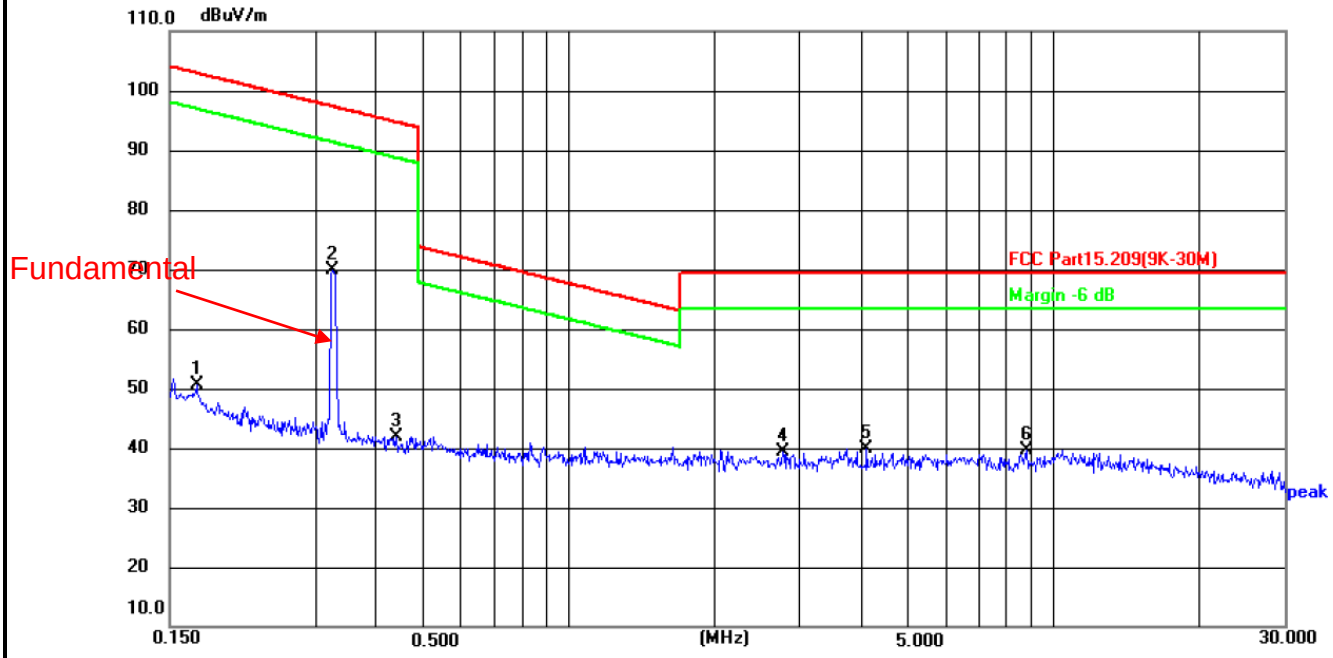


Site: #3 3m Anechoic Chamber Polarization: ***Coaxial*** Temperature: 25.3(℃) Humidity: 50 %

Limit: FCC Part15.209(9K-30M) Power:DC 3.7 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.1529	33.42	20.72	54.14	103.92	-49.78	peak	P	
2	0.1706	33.35	20.77	54.12	102.96	-48.84	peak	P	
3	0.3266	50.28	21.14	71.42	97.32	-25.90	peak	P	
4	0.4731	22.27	21.47	43.74	94.10	-50.36	peak	P	
5 *	1.6406	16.13	23.98	40.11	63.33	-23.22	peak	P	
6	6.0274	6.80	32.60	39.40	69.50	-30.10	peak	P	

coplanar



Site: #3 3m Anechoic Chamber Polarization: ***Conplanar*** Temperature: 25.3(℃) Humidity: 50 %

Limit: FCC Part15.209(9K-30M) Power:DC 3.7 V

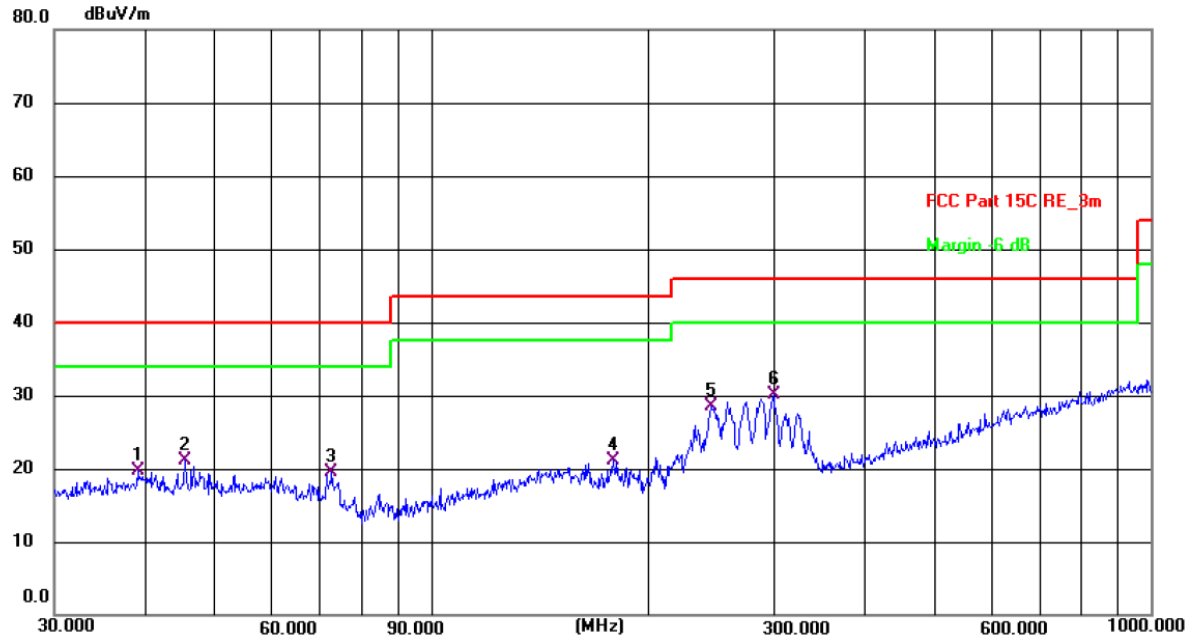
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.1706	29.85	20.77	50.62	102.96	-52.34	peak	P	
2 *	0.3266	48.78	21.14	69.92	97.32	-27.40	peak	P	
3	0.4415	20.43	21.40	41.83	94.71	-52.88	peak	P	
4	2.7713	12.94	26.32	39.26	69.50	-30.24	peak	P	
5	4.1180	10.82	28.94	39.76	69.50	-29.74	peak	P	
6	8.8246	1.36	38.21	39.57	69.50	-29.93	peak	P	

Note:

1. Both AC mode and Internal Battery Mode have been tested, only the worse mode (Internal Battery Mode which is the battery of the Apple watch is less than 1%) reported.

30MHz-1GHz

Horizontal:

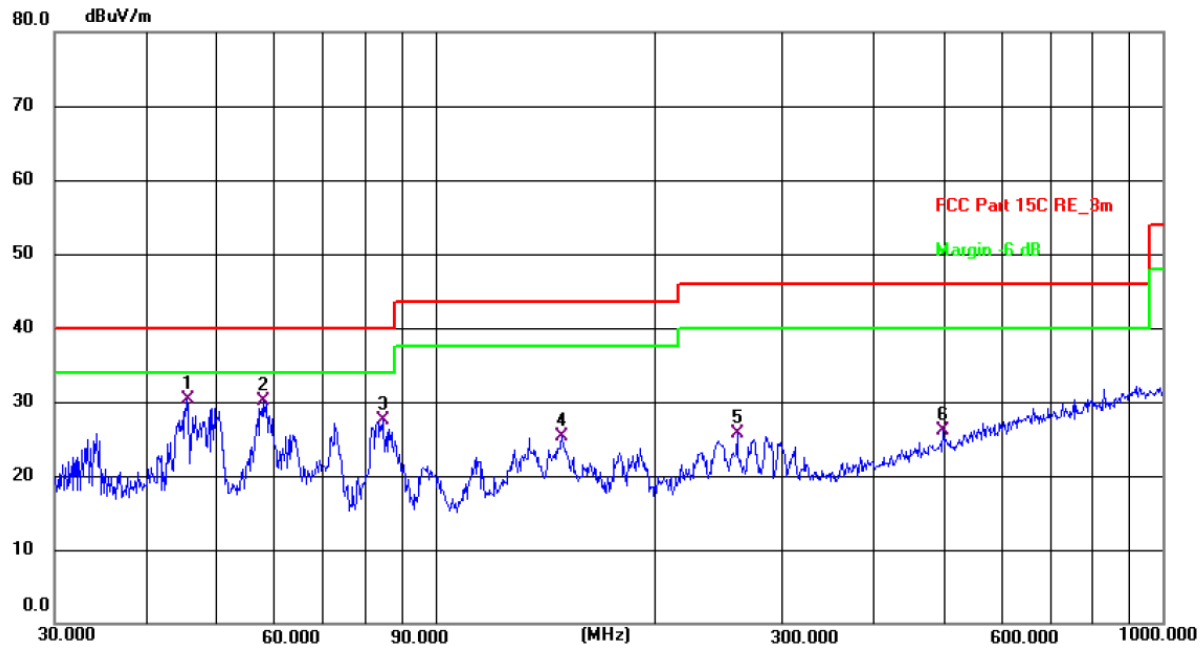


Site #2 3m Anechoic Chamber Polarization: ***Horizontal*** Temperature: 25.3(C) Humidity: 56 %

Limit: FCC Part 15C RE_3m Power: DC 5 V(Adapter Input AC 120 V/60 Hz)

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	39.1613	5.32	14.34	19.66	40.00	-20.34	QP	P	
2	45.5347	7.27	13.81	21.08	40.00	-18.92	QP	P	
3	72.8465	8.56	10.89	19.45	40.00	-20.55	QP	P	
4	179.3863	8.45	12.60	21.05	43.50	-22.45	QP	P	
5	245.0900	15.56	12.96	28.52	46.00	-17.48	QP	P	
6 *	299.3158	15.46	14.66	30.12	46.00	-15.88	QP	P	

Vertical:



Site #2 3m Anechoic Chamber Polarization: ***Vertical*** Temperature: 25.3(C) Humidity: 56 %

Limit: FCC Part 15C RE_3m Power: DC 5 V(Adapter Input AC 120 V/60 Hz)

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	45.5348	16.55	13.81	30.36	40.00	-9.64	QP	P	
2	57.9993	16.79	13.32	30.11	40.00	-9.89	QP	P	
3	84.7018	17.37	10.04	27.41	40.00	-12.59	QP	P	
4	149.4857	10.51	14.88	25.39	43.50	-18.11	QP	P	
5	260.1444	12.45	13.31	25.76	46.00	-20.24	QP	P	
6	499.4245	6.81	19.29	26.10	46.00	-19.90	QP	P	

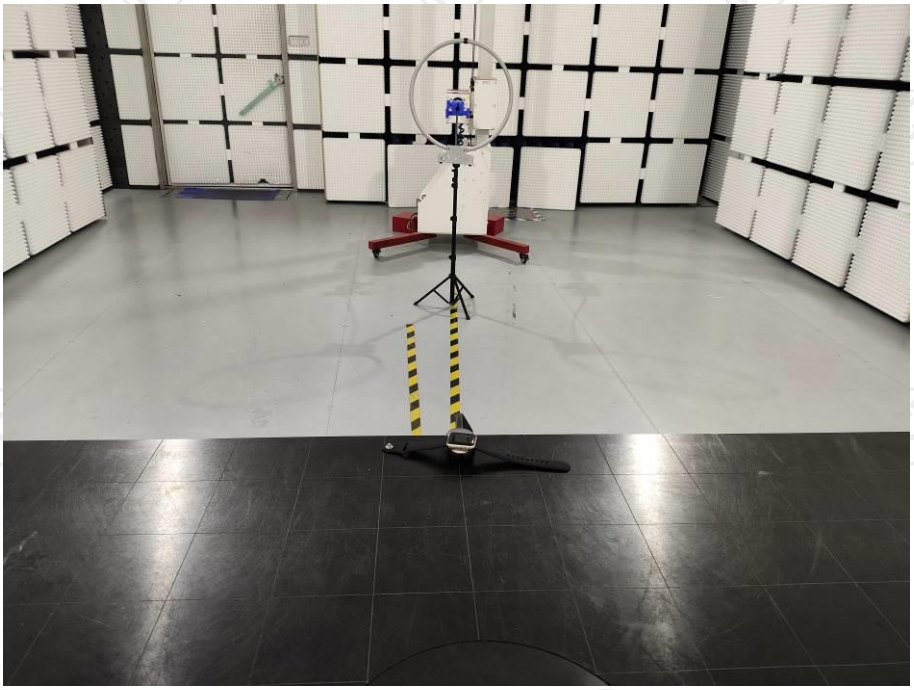
Note:

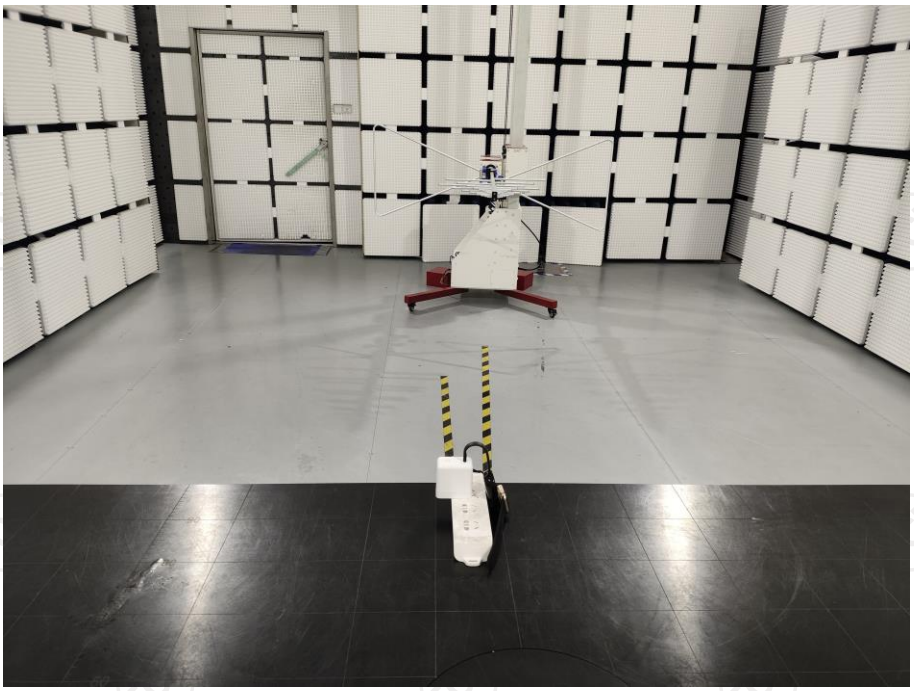
1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

2. Both AC mode and Internal Battery Mode have been tested, only the worse mode (AC mode which is the battery of the Apple watch is less than 1%) reported.

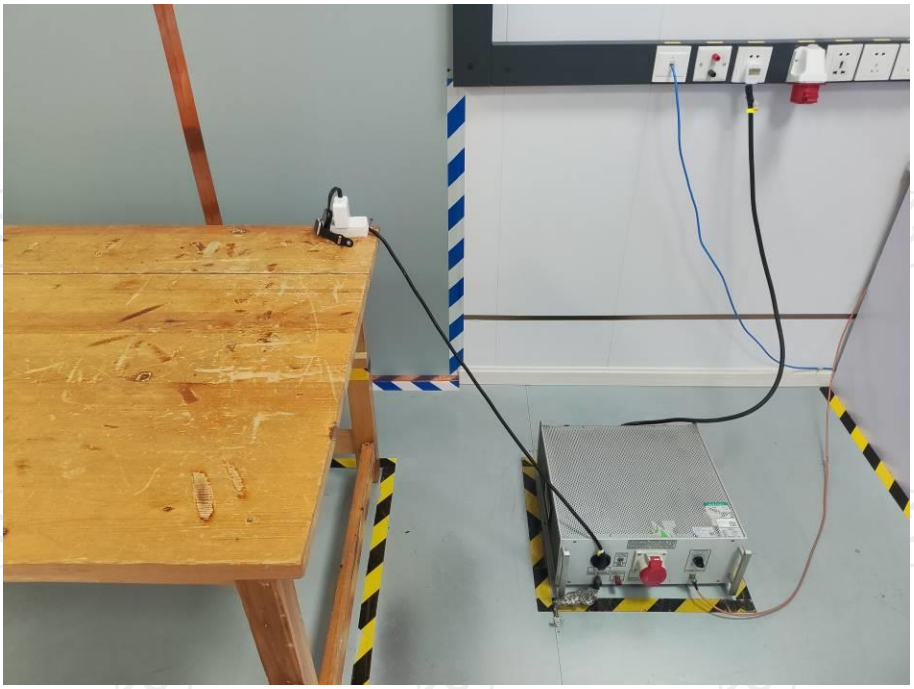
Appendix A: Photographs of Test Setup

Product: Portable Charger
Model: CMW
Radiated Emission





Conducted Emission

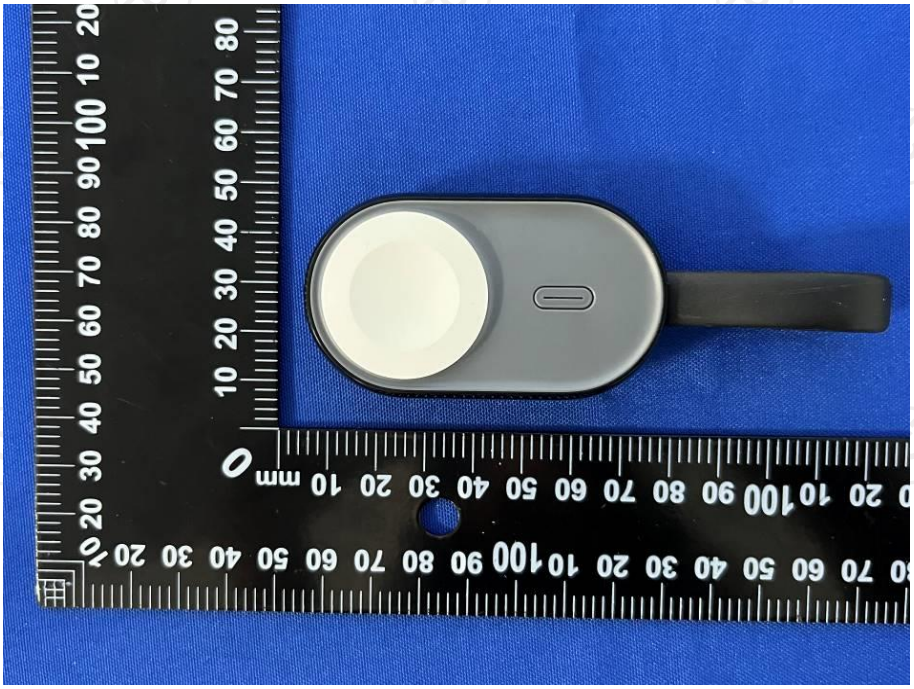


Appendix B: Photographs of EUT

Product: Portable Charger

Model: CMW

External Photos



charmast

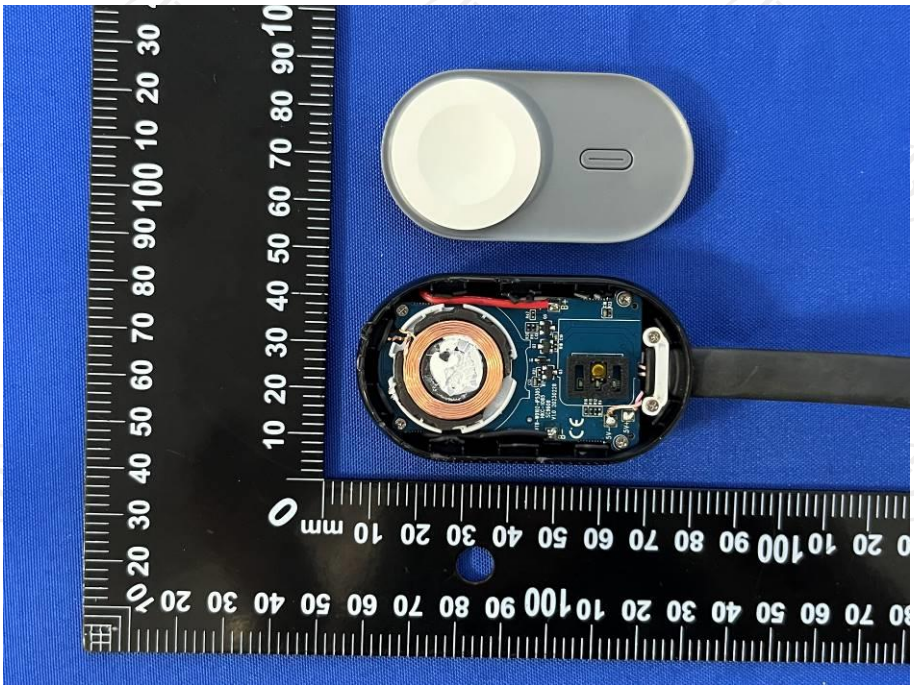
charmast

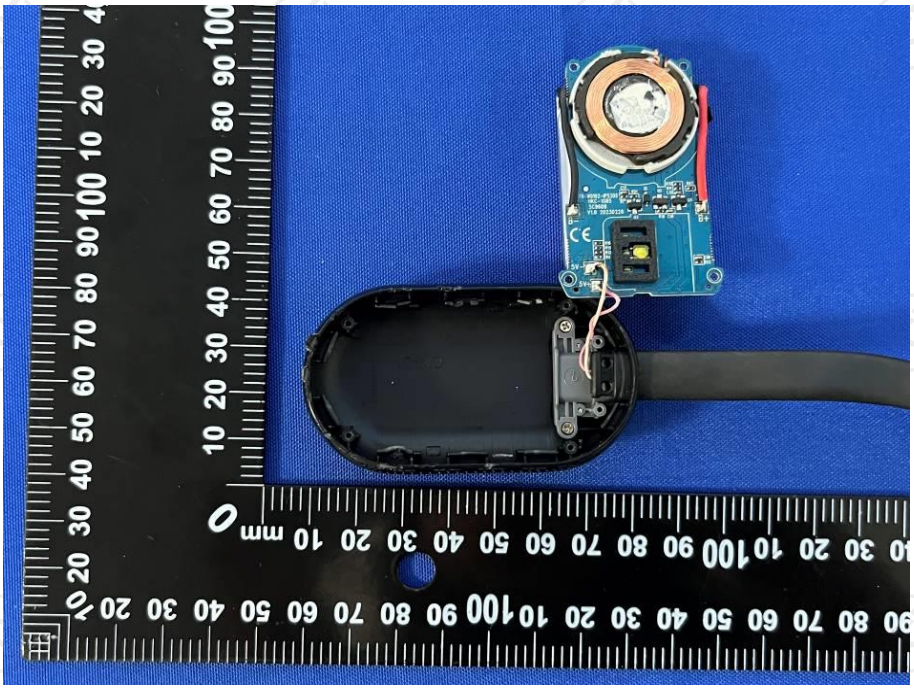
charmast

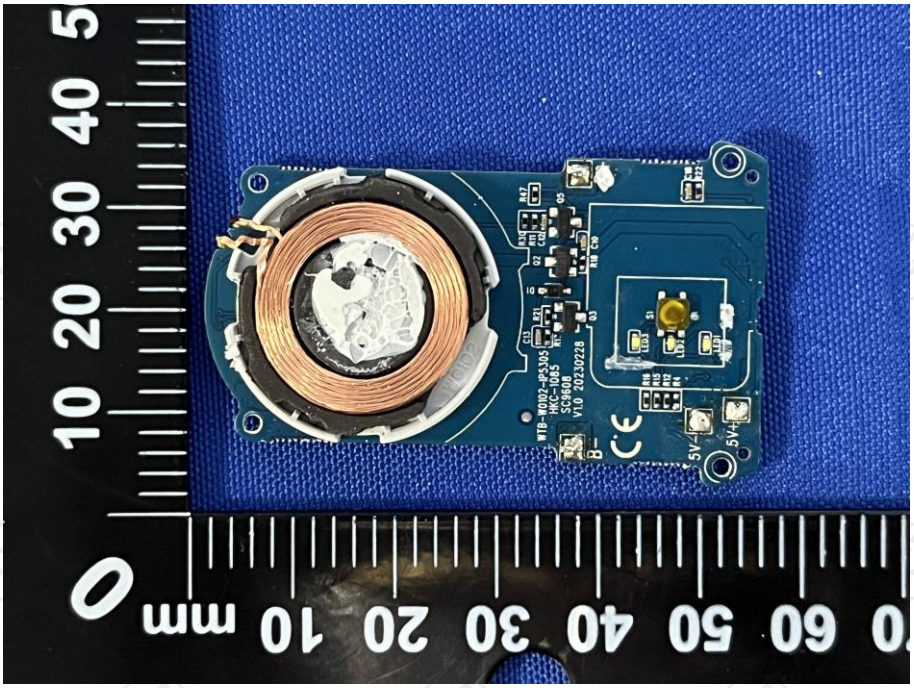
charmast

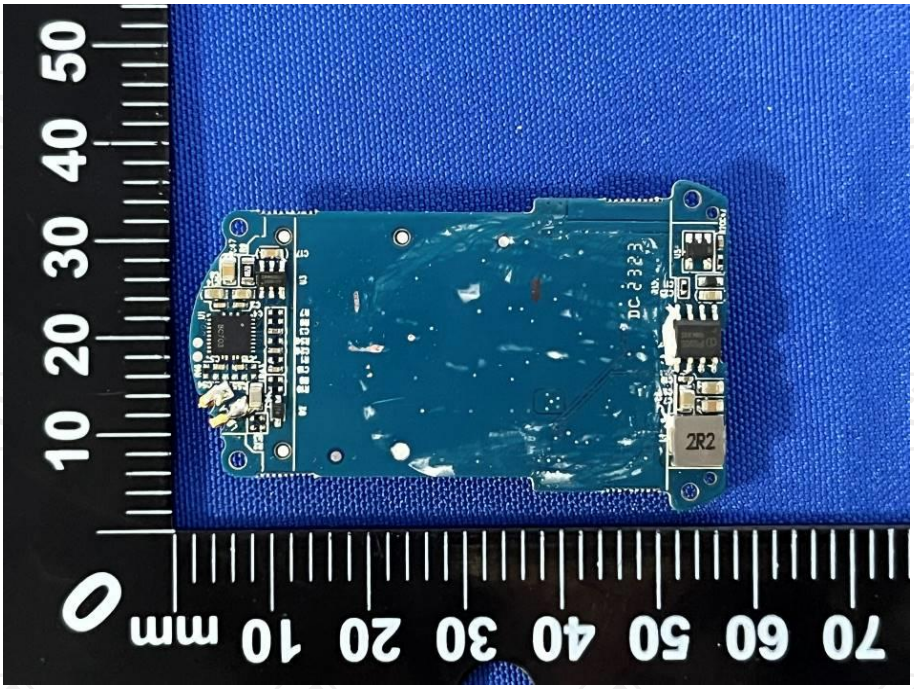
charmast
Model: CMW
Capacity: 1200mAh 3.7V/4.44Wh
Type-C Input: 5V⎓1.0A
For Apple Watch Output: 2.5W
Total Output: 2.5W
Made in China

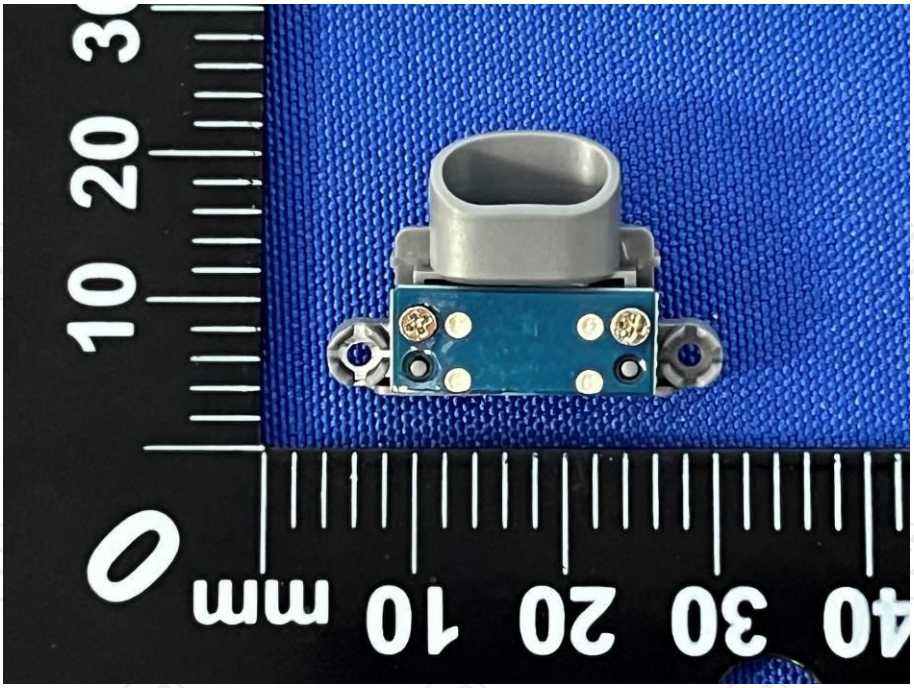
Product: Portable Charger
Model: CMW
Internal Photos

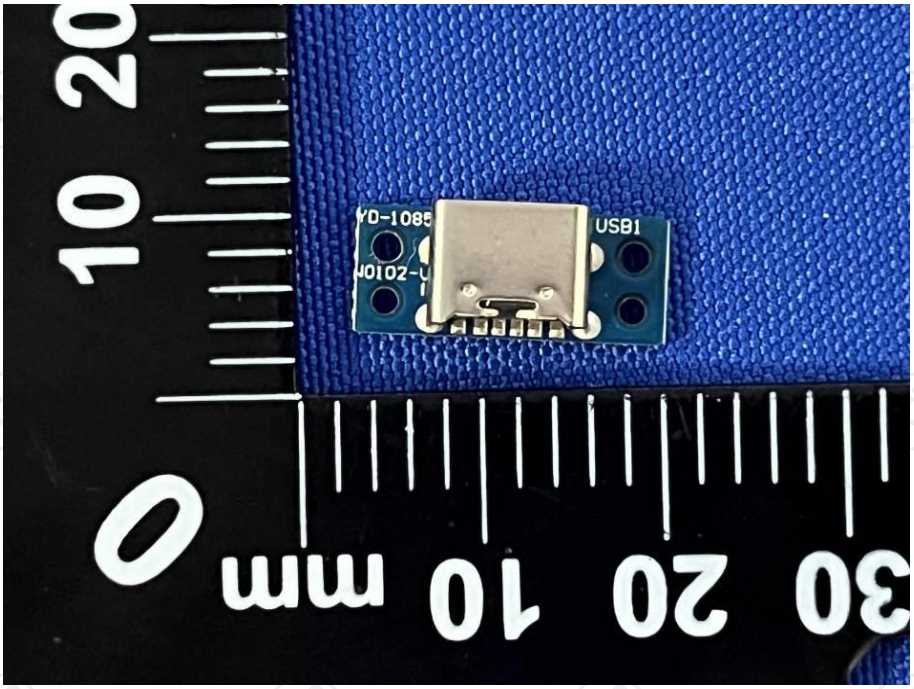


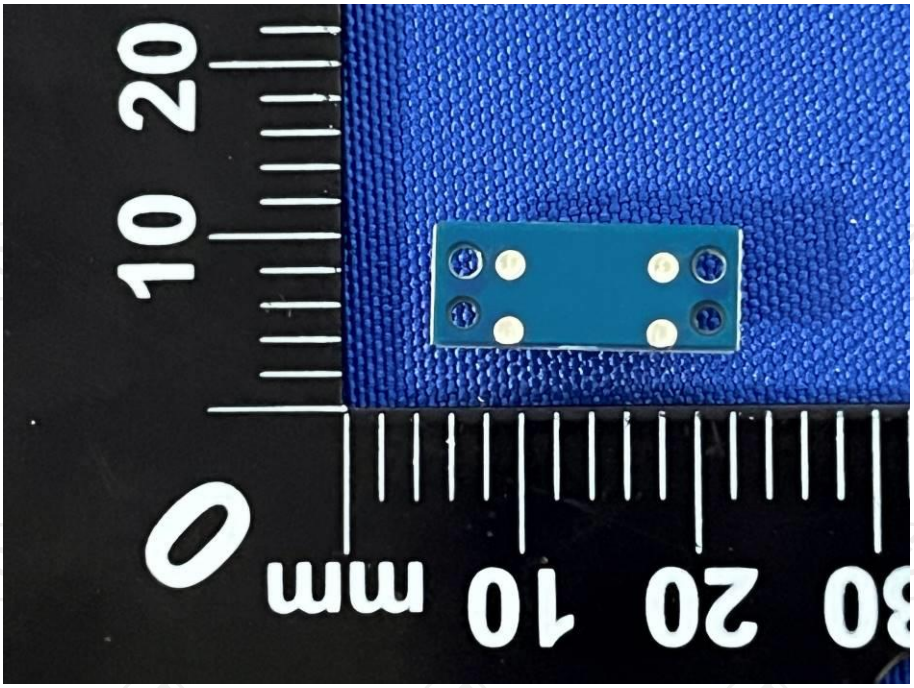


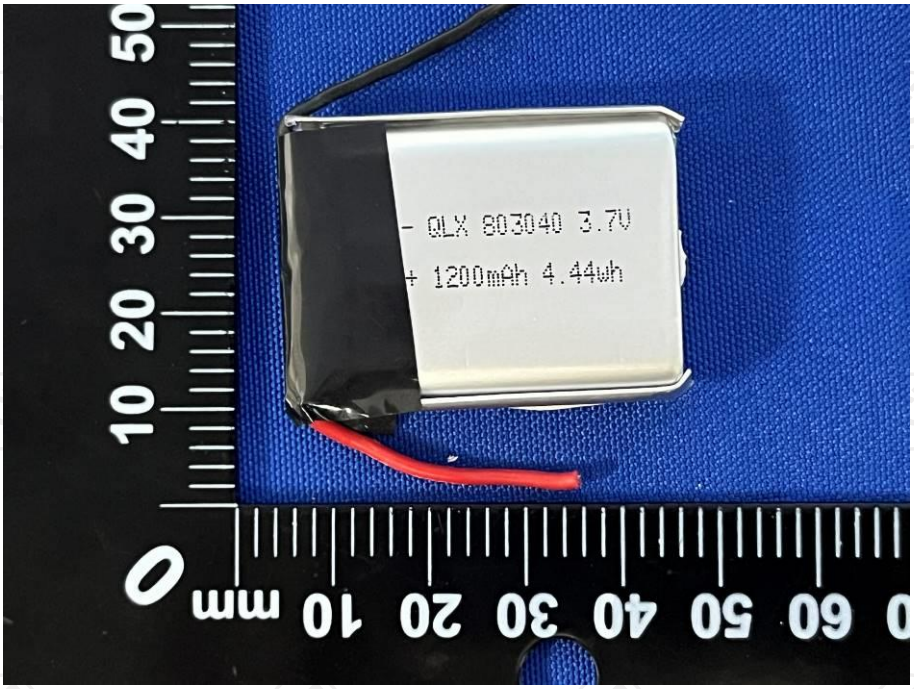

5V-
5V+
V1.0 20230228
SC9608
mm


2R2
mm


mm
0
10
20
30
40


mm
0
10
20
30
USB1





********END OF REPORT********