Shenzhen CTL Testing Technology Co., Ltd.
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TEST REPORT

FCC CFR 47 PART 18

Report Reference No..... :	**CTL2203256011-WF**
Compiled by (position+printed name+signature)	Happy Guo (File administrators)
Supervised by (position+printed name+signature)	Cary Gao (Test Engineer)
Approved by (position+printed name+signature)	Ivan Xie (Manager)

Applicant's name ..... :	**Shenzhen Xindeneng Technology Co., Ltd.**
Address of applicant..... :	201, Building 7, Dalang Tongfuyu Industrial Zone, Longhua District, Shenzhen, P.R. China
Test Firm..... :	**Shenzhen CTL Testing Technology Co., Ltd.**
Address..... :	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification ..... :	
Standard ..... :	FCC CFR 47 PART 18
Master TRF..... :	Dated 2011-01
Test item description .....:	Portable Solar Charger
FCC ID..... :	2A5Z9-DN49
Trade Mark..... :	N/A
Model/Type reference ..... :	DN49
Transmit Frequency ..... :	115~205KHz
Antenna type..... :	Loop antenna
Date of receipt of test item ..... :	Mar. 28, 2022
Date of Test Date..... :	Mar. 28, 2022–May. 06, 2022
Date of Issue..... :	May. 07, 2022
Result..... :	**Pass**

TEST REPORT

Test Report No. :	CTL2203256011-WF	May. 07, 2022 Date of issue

Equipment under Test	:	Portable Solar Charger
Sample No	:	CTL220325601-1-S001
Type / Model(s)	:	DN49
Applicant	:	**Shenzhen Xindeneng Technology Co., Ltd.**
Address	:	201, Building 7, Dalang Tongfuyu Industrial Zone, Longhua District, Shenzhen, P.R. China
Manufacturer	:	**Shenzhen Xindeneng Technology Co., Ltd.**
Address	:	201, Building 7, Dalang Tongfuyu Industrial Zone, Longhua District, Shenzhen, P.R. China

Test result	Pass *

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

Contents

TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 18.

ANSI C63.4-2014

1 SUMMARY

1.1. General Remarks

Date of receipt of test sample	:	Mar. 28, 2022
Testing commenced on	:	Mar. 28, 2022
Testing concluded on	:	May. 09, 2022

1.2. Equipment Under Test

Power supply system utilised

Power supply voltage	:	Input: 5V ⎓3A, 5V ⎓2A Output: 5V ⎓3A, 5V ⎓2A Solar Panel: 5V/300mA Wireless Charging: 5W

1.3. Short description of the Equipment under Test (EUT)

Portable Solar Charger work frequency range 115-205 KHz.

For more details, refer to the user's manual of the EUT.

Serial number: DN49

EUT operation mode

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

Test Mode 1:	**AC full load mode**
Test Mode 2:	**DC load mode**

1.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer
○ - supplied by the lab

●	Wireless charging simulates the load	Manufacturer :	Shenzhen Xindeneng Technology Co., Ltd.
		Model No. :	N/A
○	Adapter	Manufacturer :	Shenzhen Huntkey Chiyuan Electric Co., Ltd.
		Model No. :	HW-100200C00

1.5. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2A5Z9-DN49 fileing to comply with FCC CFR 47 PART 18.

1.6. Modifications

No modifications were implemented to meet testing criteria.

1.7. Summary of Test Results

The EUT is Portable Solar Charger with wireless charger, The test summary of the EUT listed as below:

	Test Standards	Test Result
Radiated Emission	FCC Part 18 (Section18.305)	PASS
Conducted Emissions	FCC Part 18 (Section18.307)	PASS

Remark: The measurement uncertainty is not included in the test result.

2 TEST ENVIRONMENT

2.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

2.2 Test Facility

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

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B on Jan. 22, 2019.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory 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. Registration 399832, December 08, 2017.

2.3 Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

2.4 Statement of the 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 acc. 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 Shenzhen CTL Testing Technology Co., Ltd. quality system acc. 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 CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MH	4.10dB	(1)
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.5 Equipments Used during the Test

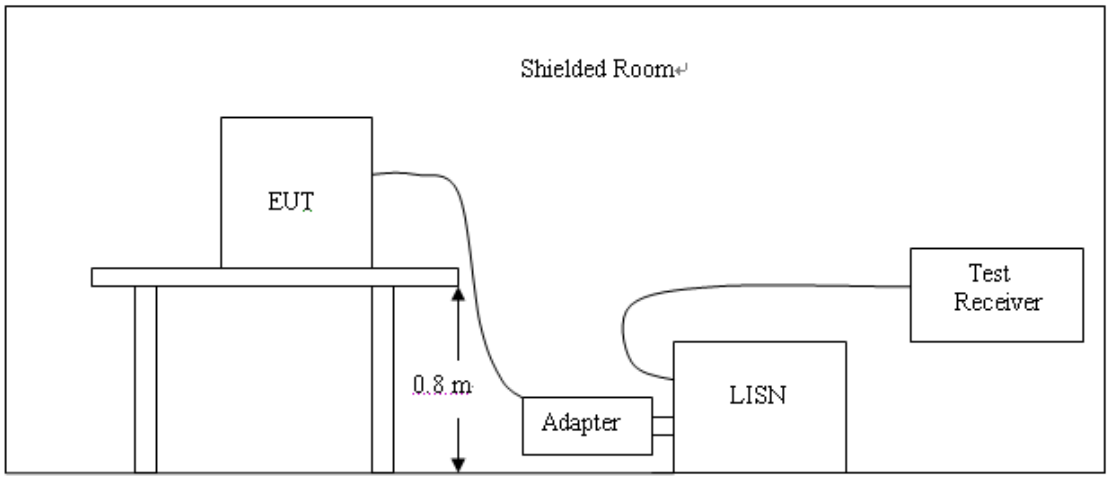
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ESH2-Z5	860014/010	2021/05/10	2022/05/09
LISN	R&S	ENV216	3560.6550.12	2021/05/10	2022/05/09
Double cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2021/05/10	2022/05/09
EMI Test Receiver	R&S	ESCI	1166.5950.03	2021/05/10	2022/05/09
Spectrum Analyzer	Agilent	N9020A	US46220290	2021/05/14	2022/05/13
Spectrum Analyzer	Keysight	N9020A	MY53420874	2021/05/14	2022/05/13
Controller	EM Electronics	EM 1000	060859	2021/05/14	2022/05/13
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2021/05/20	2024/05/19
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/20	2022/05/19
Amplifier	Agilent	8449B	3008A02306	2021/05/10	2022/05/09
Amplifier	Agilent	8447D	2944A10176	2021/05/10	2022/05/09
Temperature/Humidity Meter	Gangxing	CTH-608	02	2021/05/11	2022/05/10
Spectrum Analyzer	RS	FSP	1164.4391.38	2021/05/14	2022/05/13

The calibration interval was one year

3 TEST CONDITIONS AND RESULTS

3.1 AC Power Conducted Emission

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 EUT received DC5V power from the adapter, 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.
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

AC Power Conducted Emission Limit

According to §18.307 (b): For all other part 18 consumer devices which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

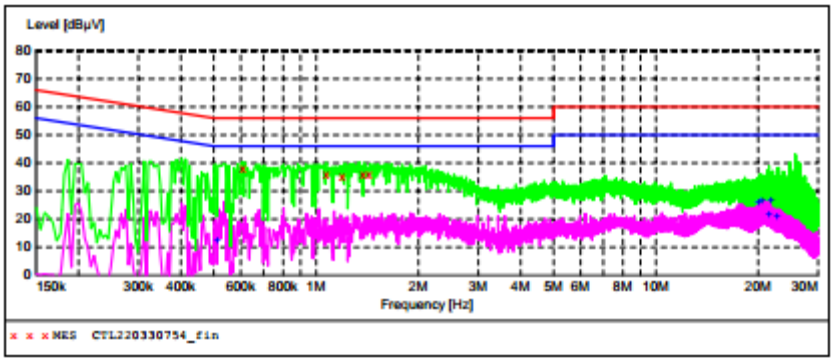
* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

Line:	L

Test Mode 1

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL220330754_fin"

3/31/2022 12:25AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.609000	38.10	11.2	56	17.9	QP	L1	GND
1.072500	36.00	11.2	56	20.0	QP	L1	GND
1.194000	35.60	11.2	56	20.4	QP	L1	GND
1.374000	36.00	11.2	56	20.0	QP	L1	GND
1.432500	35.90	11.2	56	20.1	QP	L1	GND

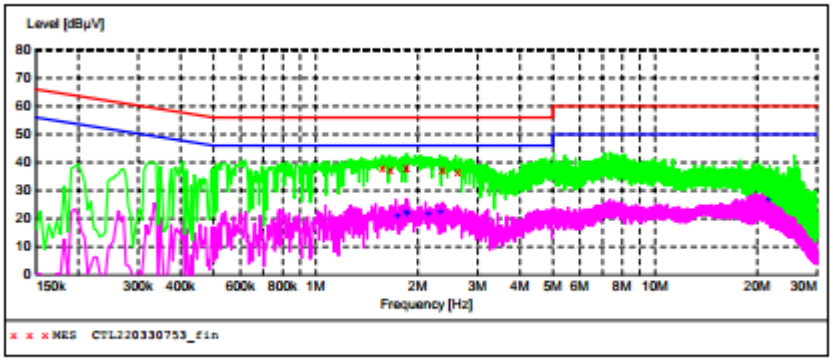
MEASUREMENT RESULT: "CTL220330754_fin2"

3/31/2022 12:25AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.510000	12.40	11.2	46	33.6	AV	L1	GND
20.044500	26.00	11.3	50	24.0	AV	L1	GND
20.494500	26.80	11.3	50	23.2	AV	L1	GND
21.502500	21.60	11.3	50	28.4	AV	L1	GND
21.826500	26.80	11.3	50	23.2	AV	L1	GND
22.704000	21.00	11.3	50	29.0	AV	L1	GND

Line:	N
Test Mode 1	

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL220330753_fin"

3/31/2022 12:22AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.572000	38.00	11.2	56	18.0	QP	N	GND
1.662000	37.20	11.2	56	18.8	QP	N	GND
1.851000	38.00	11.2	56	18.0	QP	N	GND
1.855500	38.00	11.2	56	18.0	QP	N	GND
2.368500	37.10	11.3	56	18.9	QP	N	GND
2.629500	36.40	11.3	56	19.6	QP	N	GND

MEASUREMENT RESULT: "CTL220330753_fin2"

3/31/2022 12:22AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.743000	21.30	11.2	46	24.7	AV	N	GND
1.846500	22.10	11.2	46	23.9	AV	N	GND
1.855500	21.70	11.2	46	24.3	AV	N	GND
2.143500	21.80	11.3	46	24.2	AV	N	GND
2.328000	22.10	11.3	46	23.9	AV	N	GND
21.601500	26.80	11.3	50	23.2	AV	N	GND

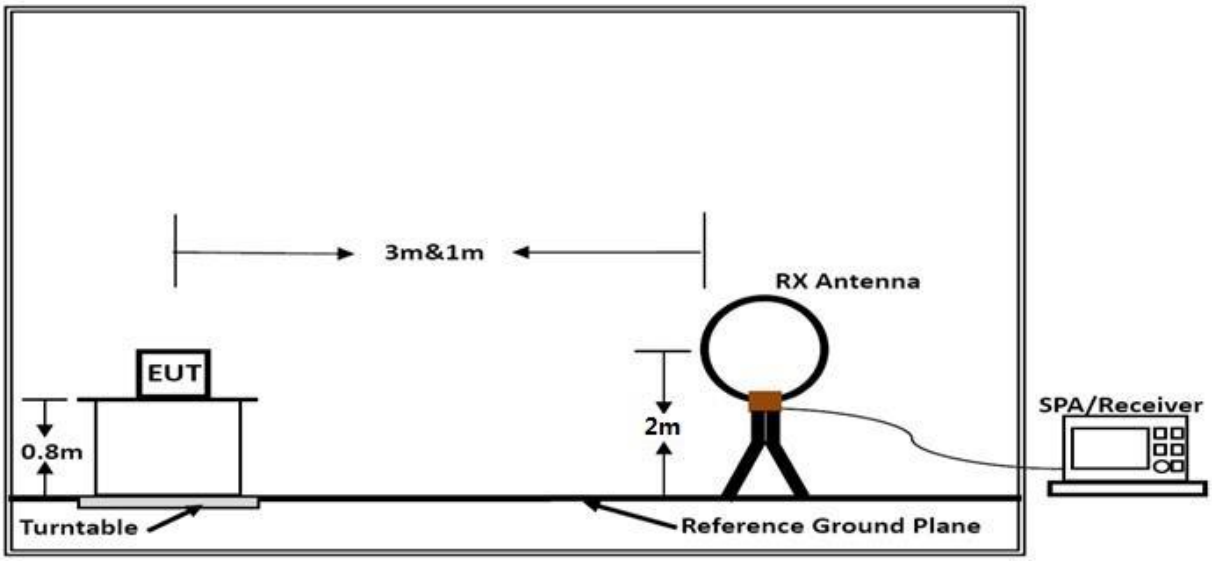
3.2 Radiated Emission

Limit

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25 × SQRT(power/500)	300 [1]300
	Any non-ISM frequency	Below 500 500 or more	15 15 × SQRT(power/500)	300 [1]300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 ([2])	1,600 ([2])
Medical diathermy	Any ISM frequency Any non-ISM frequency	Any Any	25 15	300 300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz) 2,400/F(kHz) × SQRT (power/500)	300 [3]300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	24,000/F(kHz) 15	30 30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1,500 300	[4]30 [4]30

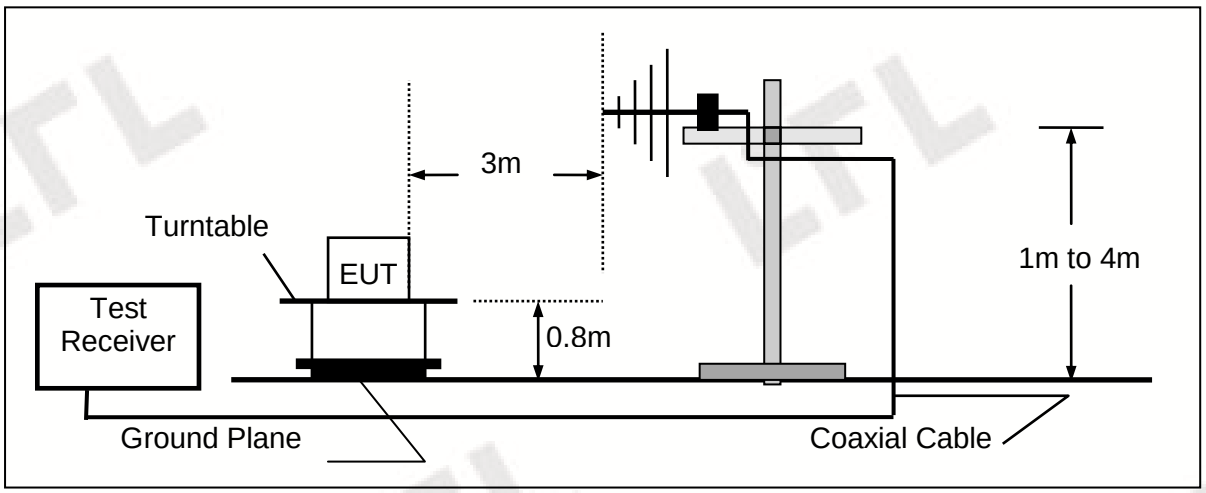
TEST CONFIGURATION

Radiated Emission Test Set-Up
Frequency range 9KHz – 30MHz



Below 30MHz

Frequency range 30MHz – 1000MHz



Frequency range of measurements

(a) For field strength measurements:

Frequency band in which device operates (MHz)	Range of frequency measurements	
	Lowest frequency	Highest frequency
Below 1.705	Lowest frequency generated in the device, but not lower than 9 kHz	30 MHz.
1.705 to 30	Lowest frequency generated in the device, but not lower than 9 kHz	400 MHz.
30 to 500	Lowest frequency generated in the device or 25 MHz, whichever is lower	Tenth harmonic or 1,000 MHz, whichever is higher.
500 to 1,000	Lowest frequency generated in the device or 100 MHz, whichever is lower	Tenth harmonic.
Above 1,000	.....do	Tenth harmonic or highest detectable emission.

TEST PROCEDURE

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 and FCC/OST MP–5 on radiated emission measurement.

The bandwidth of the EMI test receiver is set at 120kHz, 300kHz.

The frequency range from 9kHz to 1000MHz is checked.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL – AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

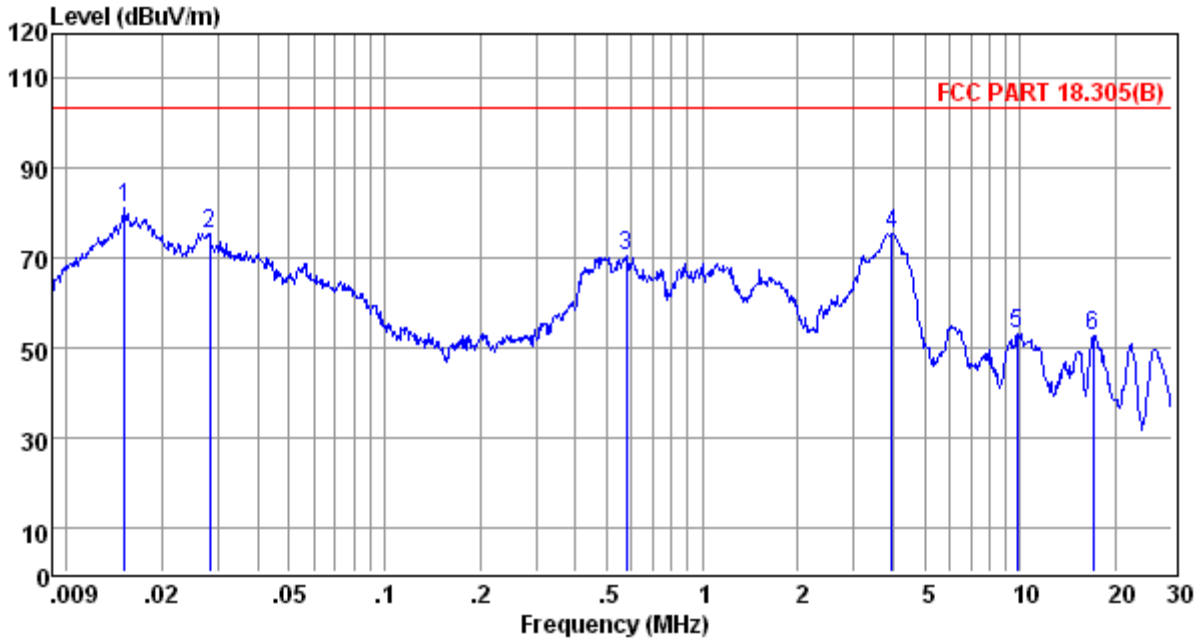
For example

Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

TEST RESULTS

WORST-CASE RADIATED EMISSION BELOW 30 MHz
Test Mode 1

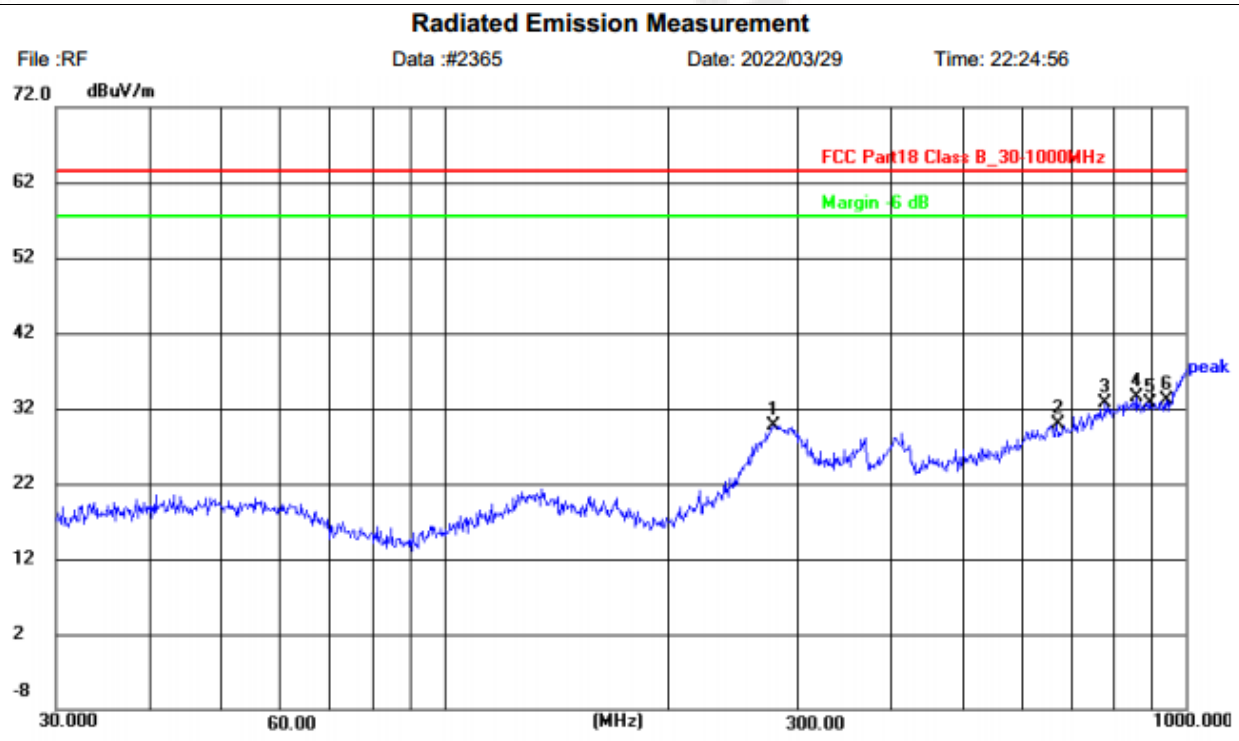


Frequency (MHz)	Meter Reading @3m (dBuV/m)	Polarity	Antenna Factor (dB/m)	Cable loss (dB)	Emission Levels @3m (dBuV/m)	Limit @3m (dBuV/m)	Detector Mode (QP)	Test Result
0.02	60.21	Horizontal	20.60	0.30	81.11	103.50	QP	Pass
0.03	54.38	Horizontal	20.70	0.30	75.38	103.50	QP	Pass
0.58	49.55	Horizontal	20.47	0.30	70.32	103.50	QP	Pass
3.95	54.81	Horizontal	20.30	0.30	75.41	103.50	QP	Pass
9.79	32.35	Horizontal	20.25	0.30	52.90	103.50	QP	Pass
17.0	32.52	Horizontal	20.02	0.30	52.84	103.50	QP	Pass

Note:
1.Both Mode 1 and Mode 2 were tested and only the worst mode was recorded as Mode 1 in the report.
2. Emission level dBμV/m for 0.009~30MHz = 20log (15) + 40log (300/3) dBμV/m;

Radiated Emission Test Data 30-1000MHz:

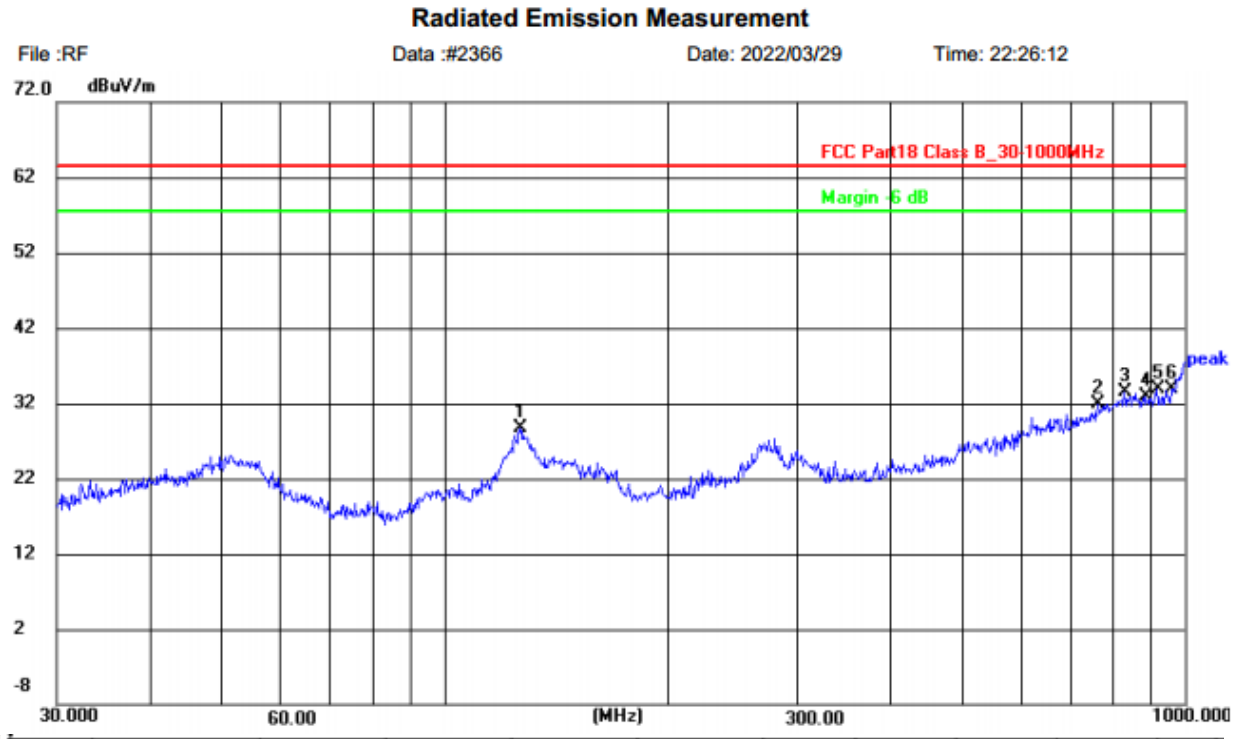
Horizontal
Test Mode 1



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F
1	278.0668	15.91	13.80	29.71	63.50	33.79	peak	100	58	P
2	670.4892	7.73	22.15	29.88	63.50	33.62	peak	100	131	P
3	779.6067	8.01	24.77	32.78	63.50	30.72	peak	100	340	P
4	857.0246	7.54	25.92	33.46	63.50	30.04	peak	100	234	P
5	893.8566	6.79	25.98	32.77	63.50	30.73	peak	100	54	P
6	942.1304	6.55	26.50	33.05	63.50	30.45	peak	100	161	P

Vertical

Test Mode 1



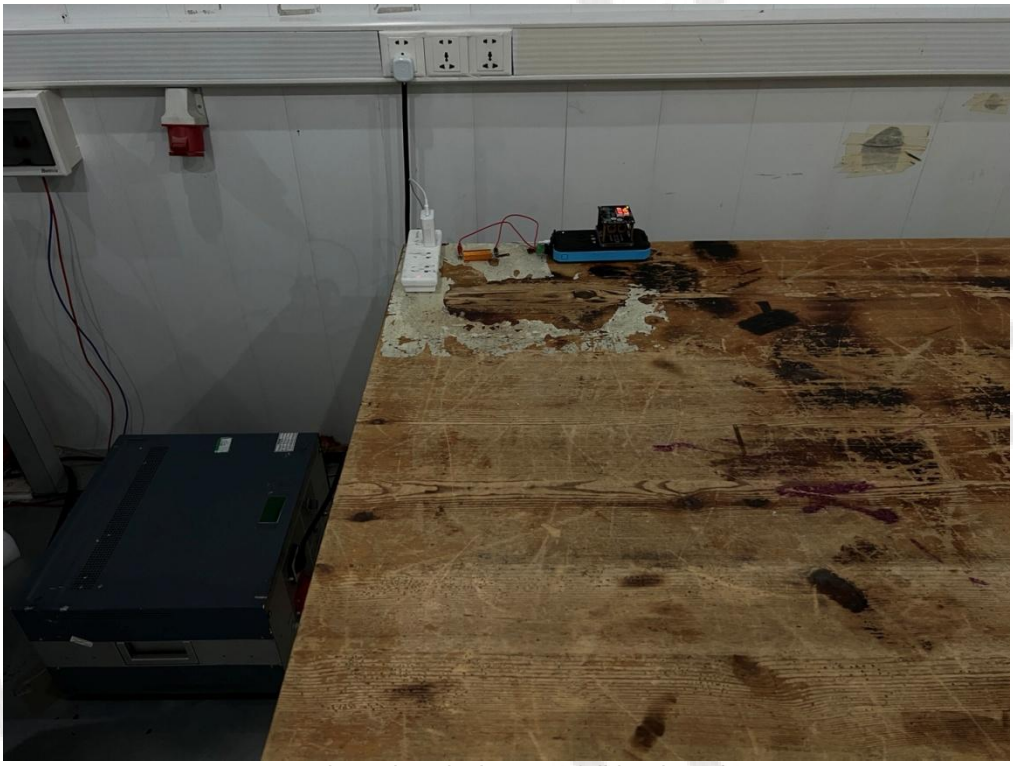
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F
1	126.7723	15.49	13.23	28.72	63.50	34.78	peak	100	289	P
2	763.3757	7.53	24.46	31.99	63.50	31.51	peak	100	66	P
3	827.4934	7.84	25.65	33.49	63.50	30.01	peak	100	66	P
4	884.5029	7.17	25.67	32.84	63.50	30.66	peak	100	0	P
5	916.0687	7.50	26.31	33.81	63.50	29.69	peak	100	93	P
6	958.7943	6.63	27.20	33.83	63.50	29.67	peak	100	353	P

Note:

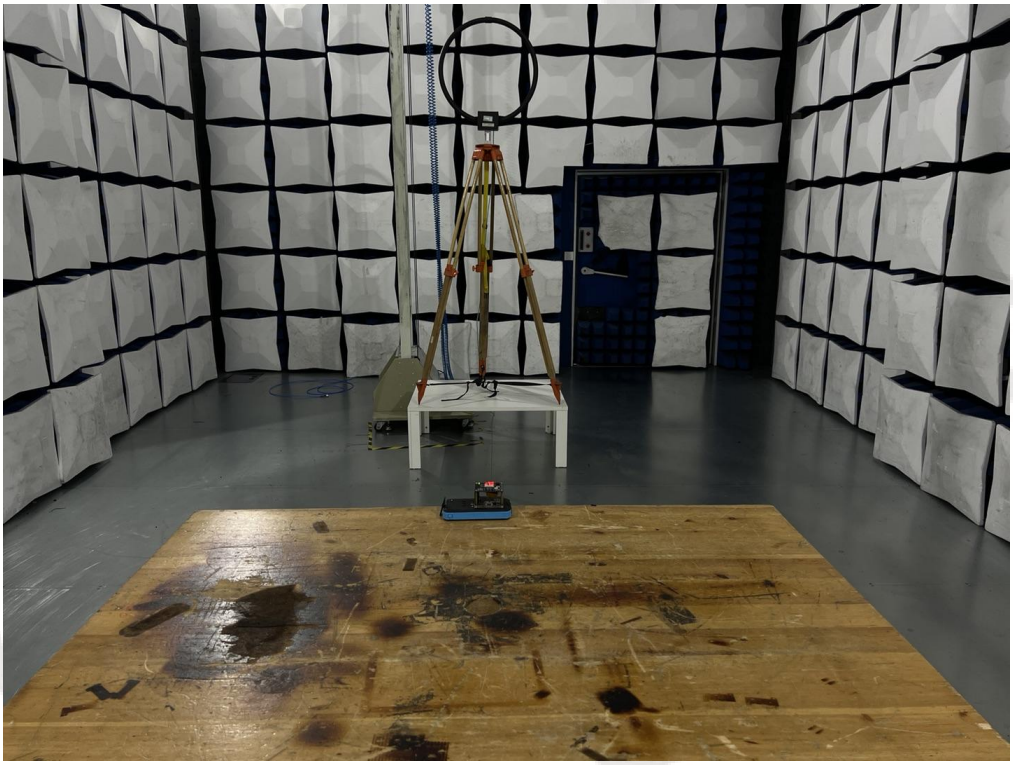
1.Both Mode 1 and Mode 2 were tested and only the worst mode was recorded as Mode 1 in the report.

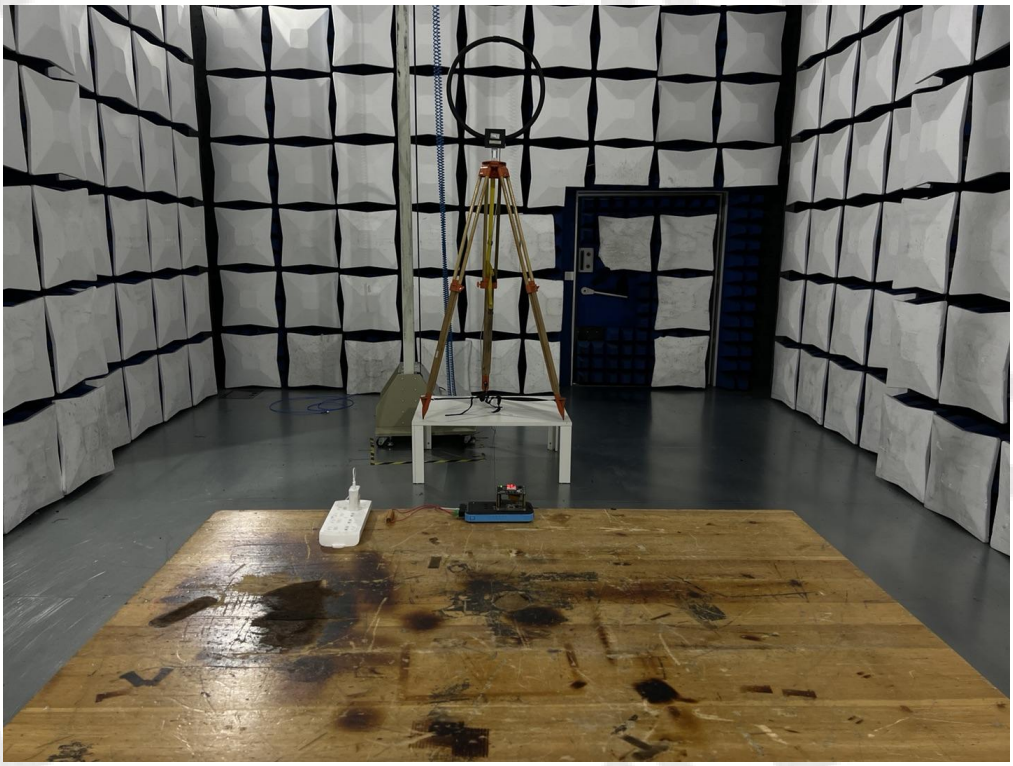
2. Emission level dBμV/m for 30MHz~1G = 20log (15) + 20log (300/3) dBμV/m;

4 Test Setup Photos of the EUT

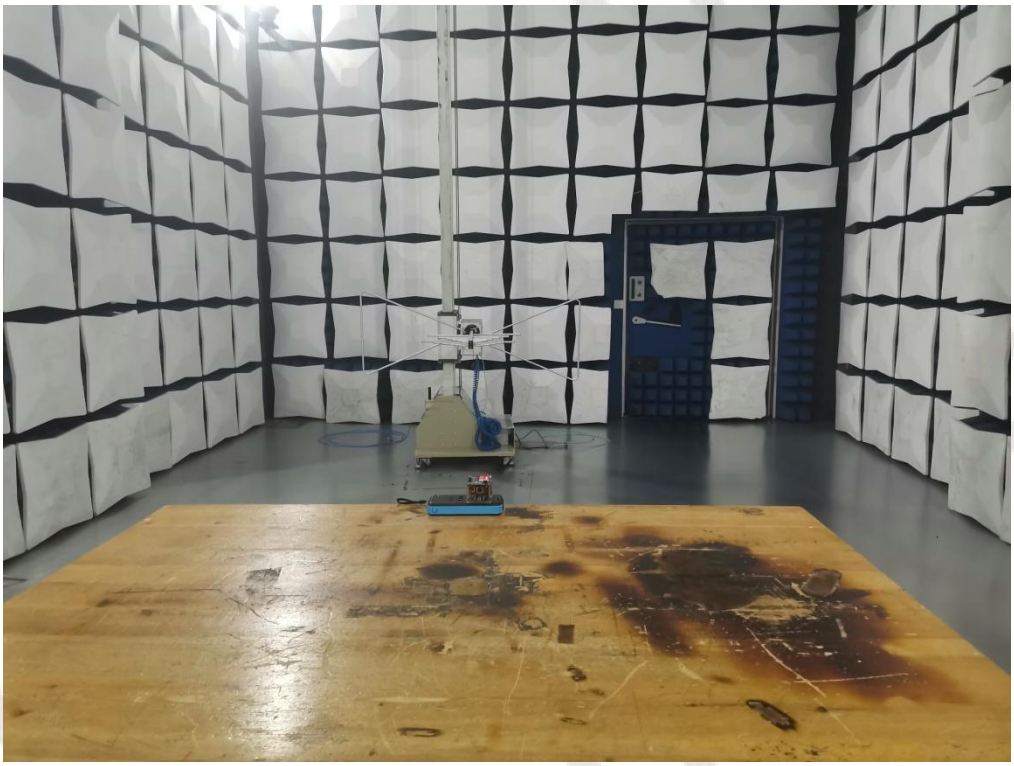


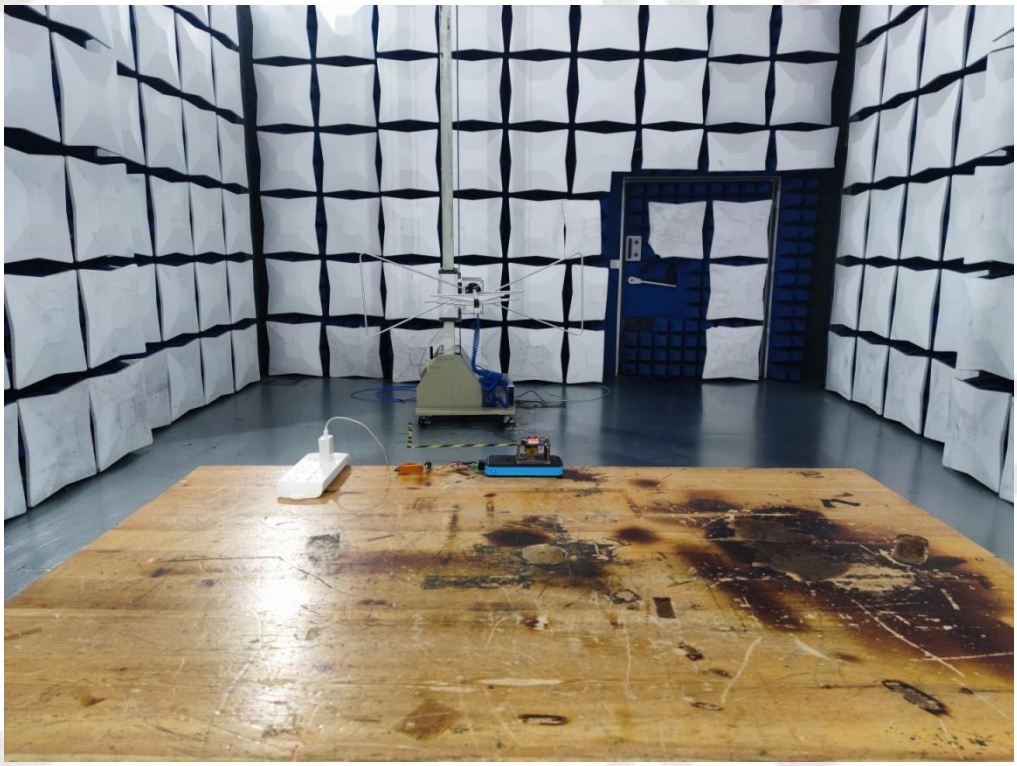
Conducted Emission- AC full load mode





Radiated Emission below 30MHz- AC full load mode

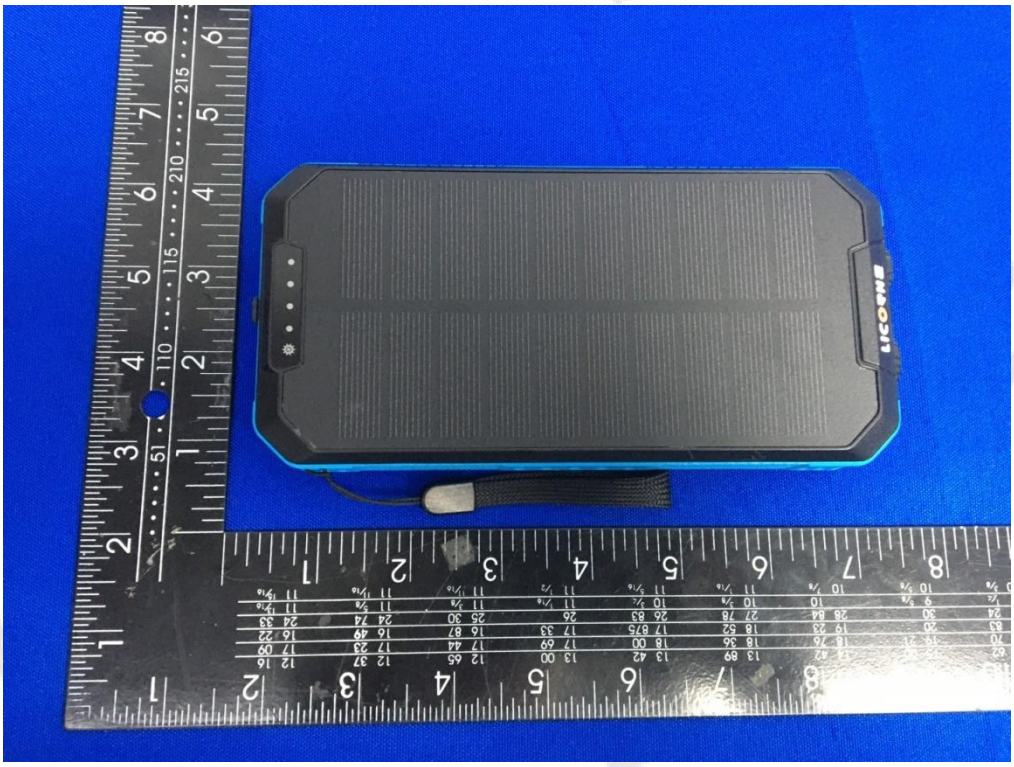


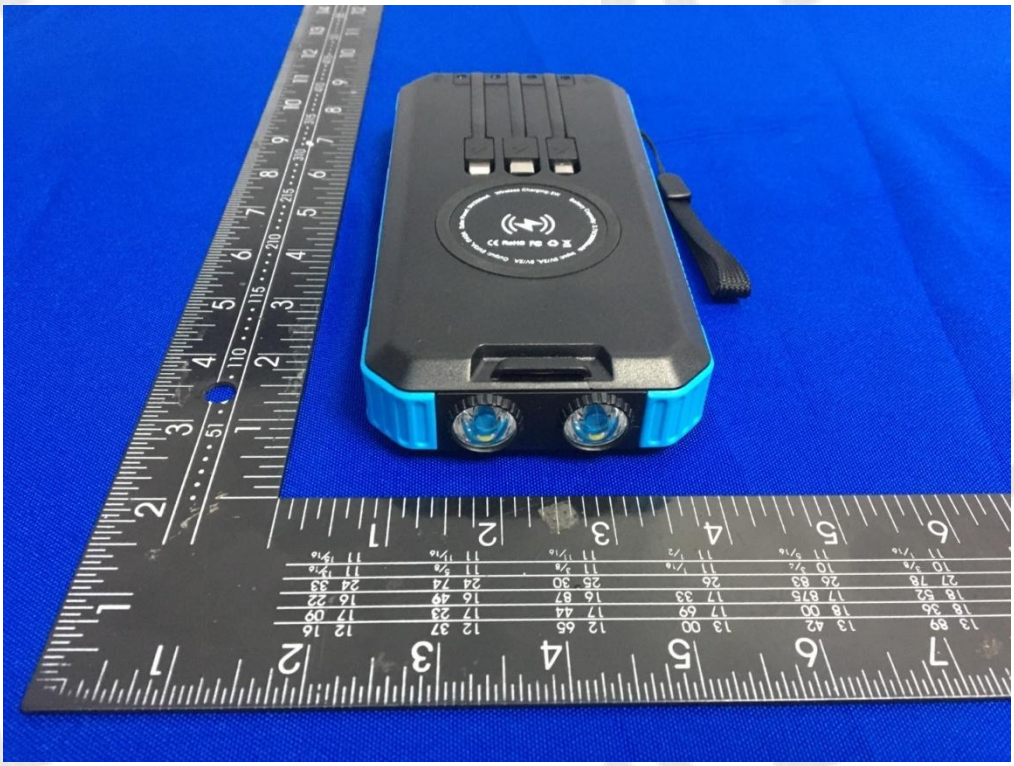


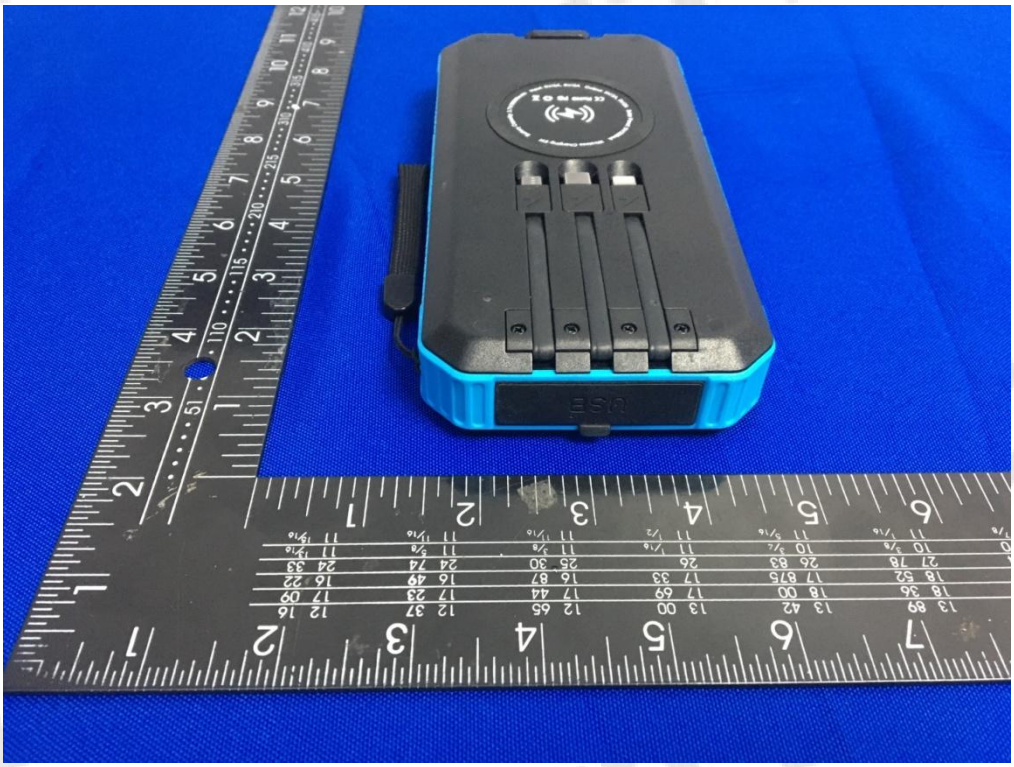
Radiated Emission below 1GHz- AC full load mode

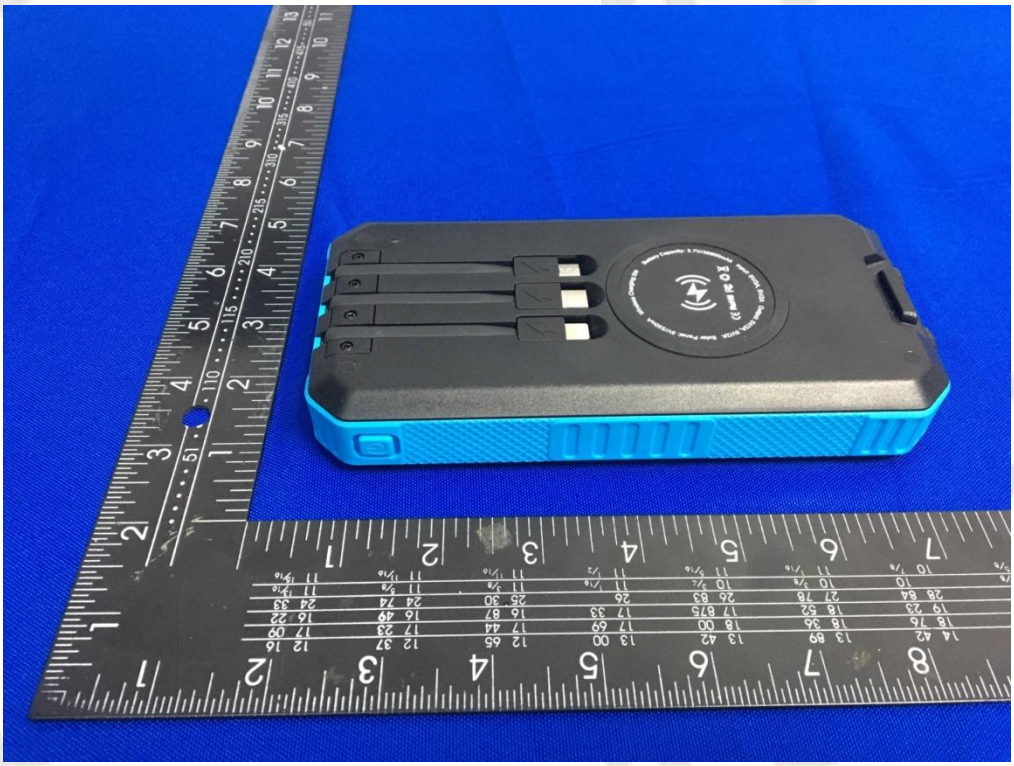
5 External and Internal Photos of the EUT

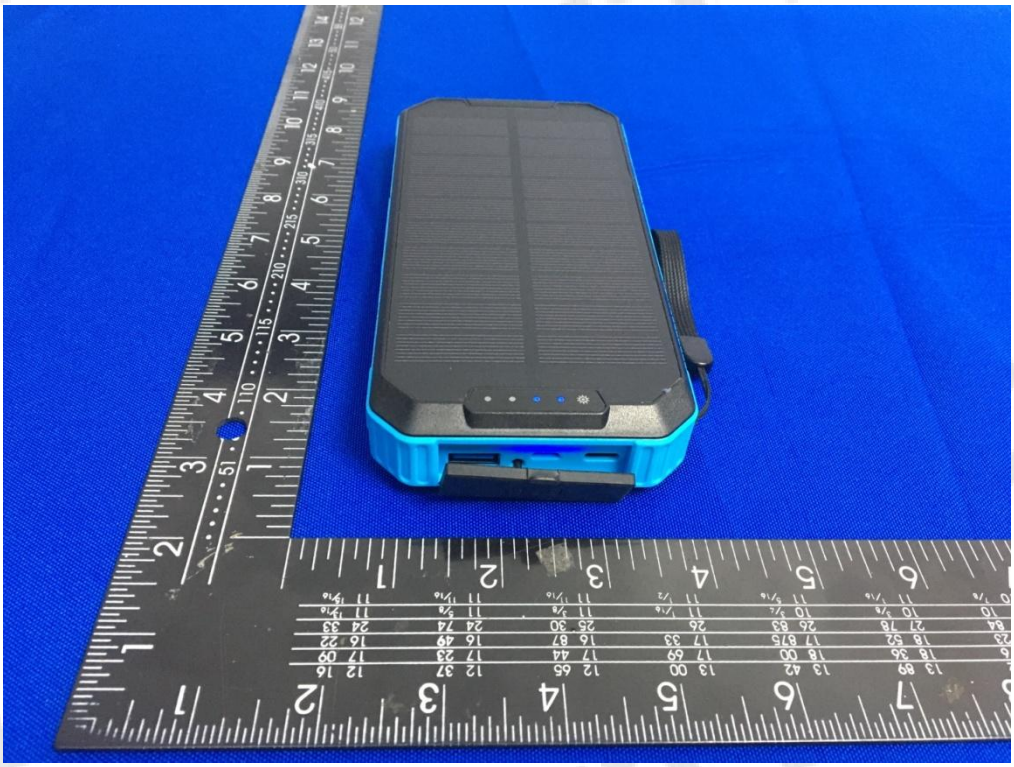
External photos



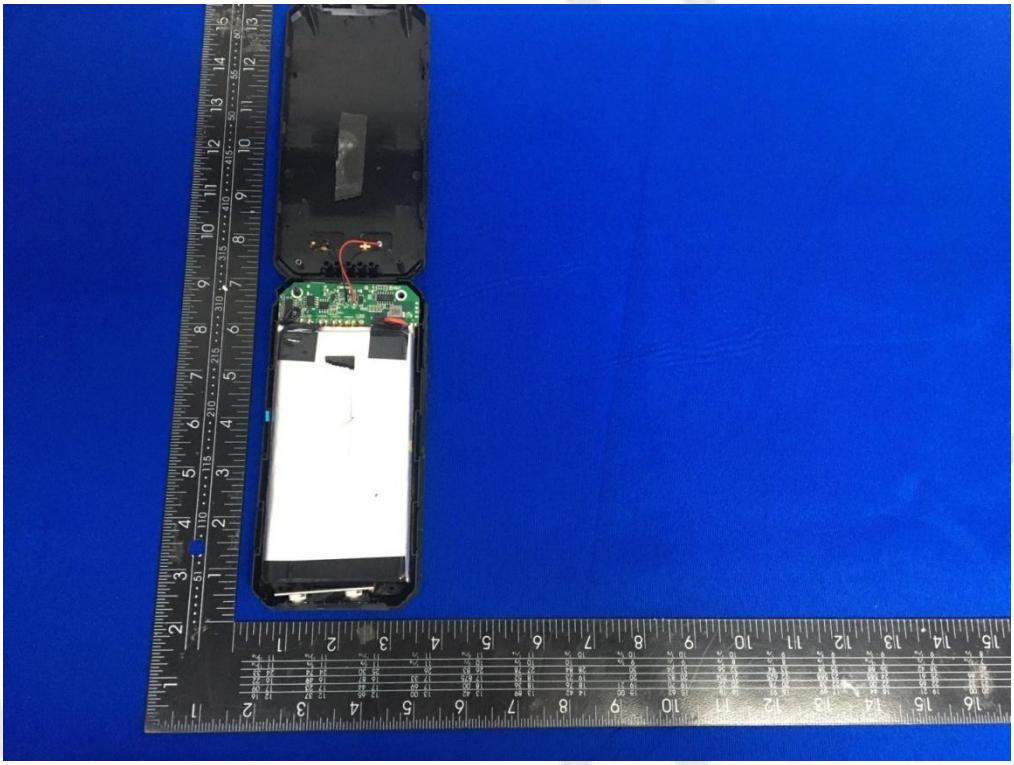


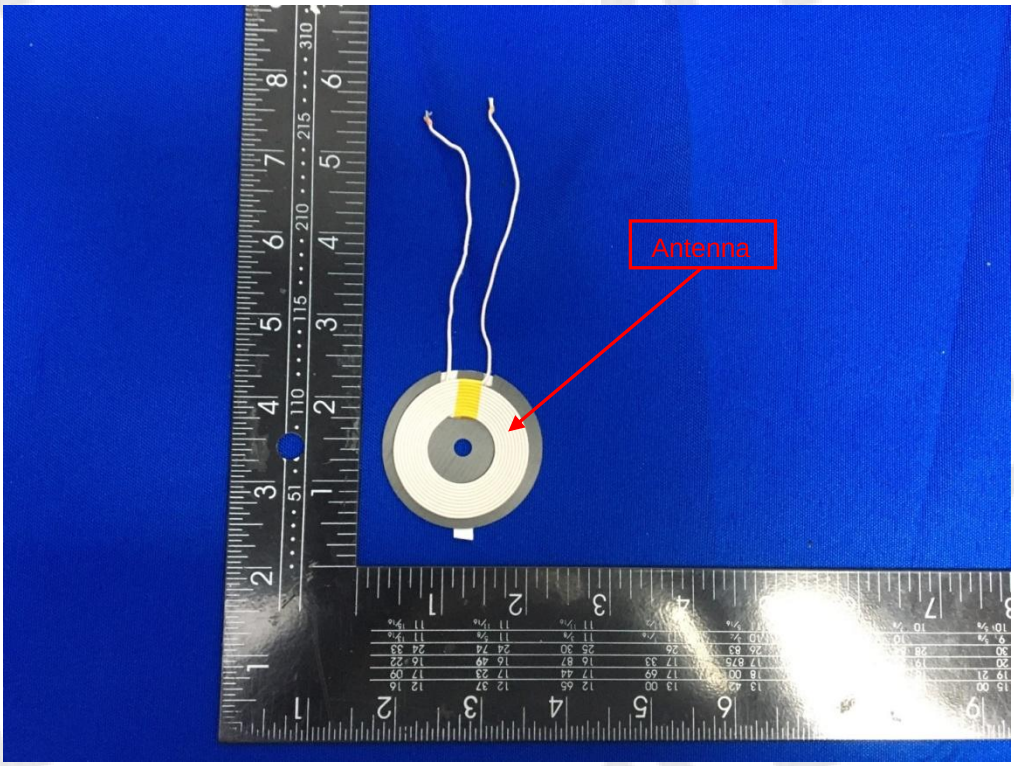






Internal photos

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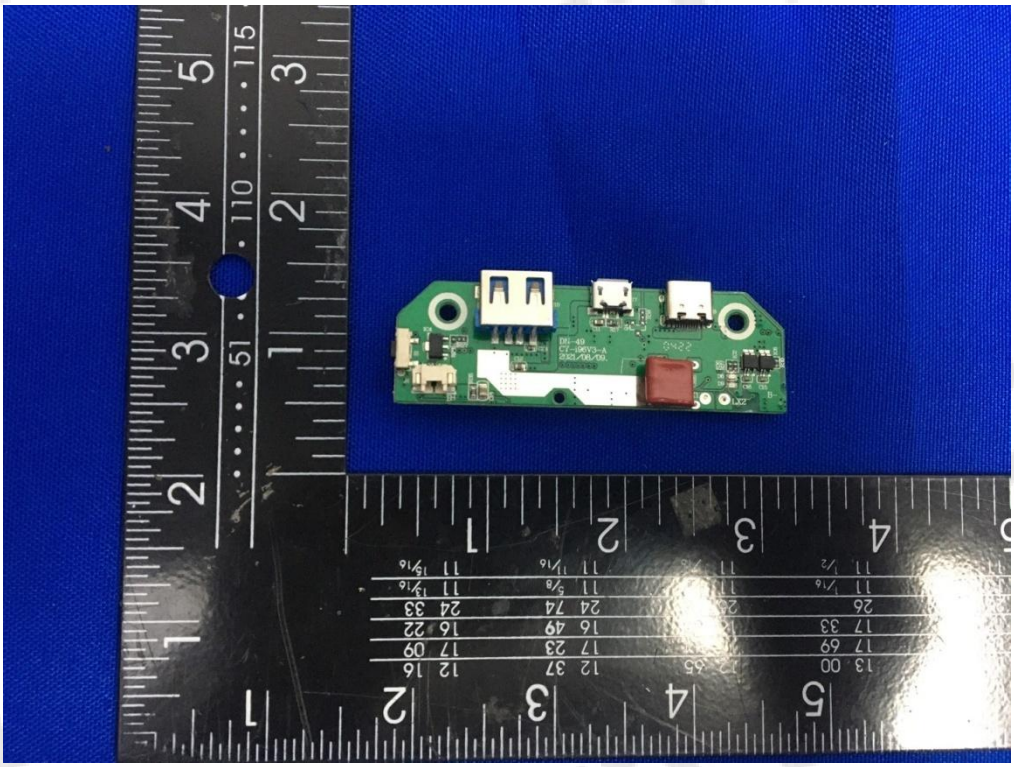

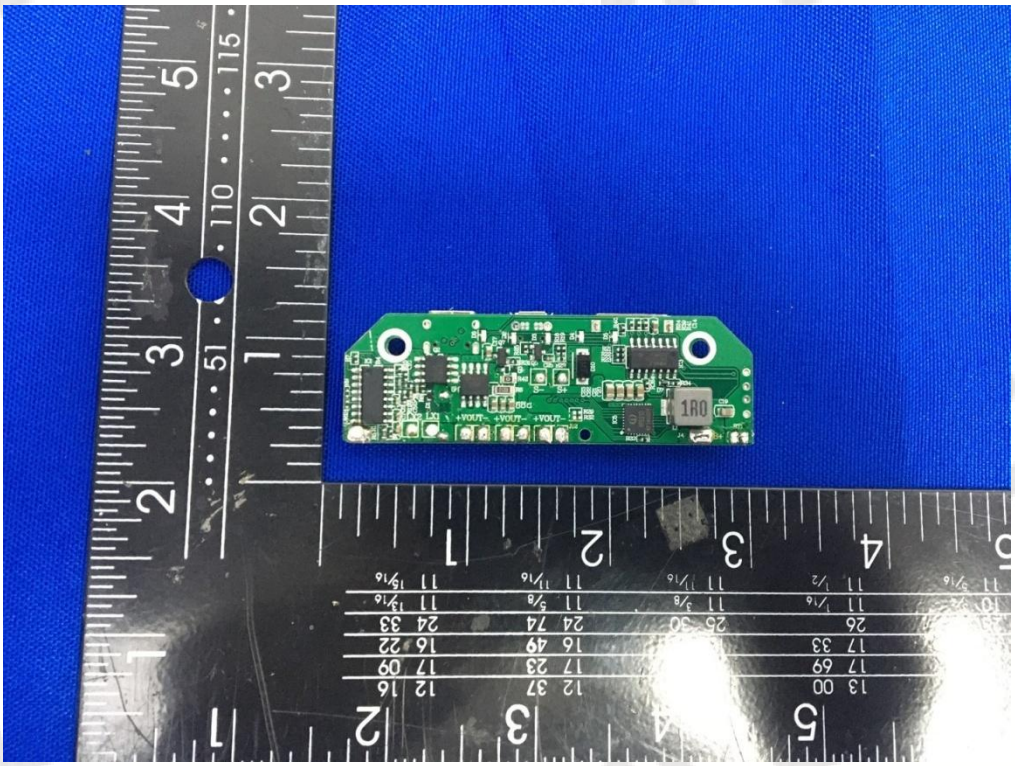

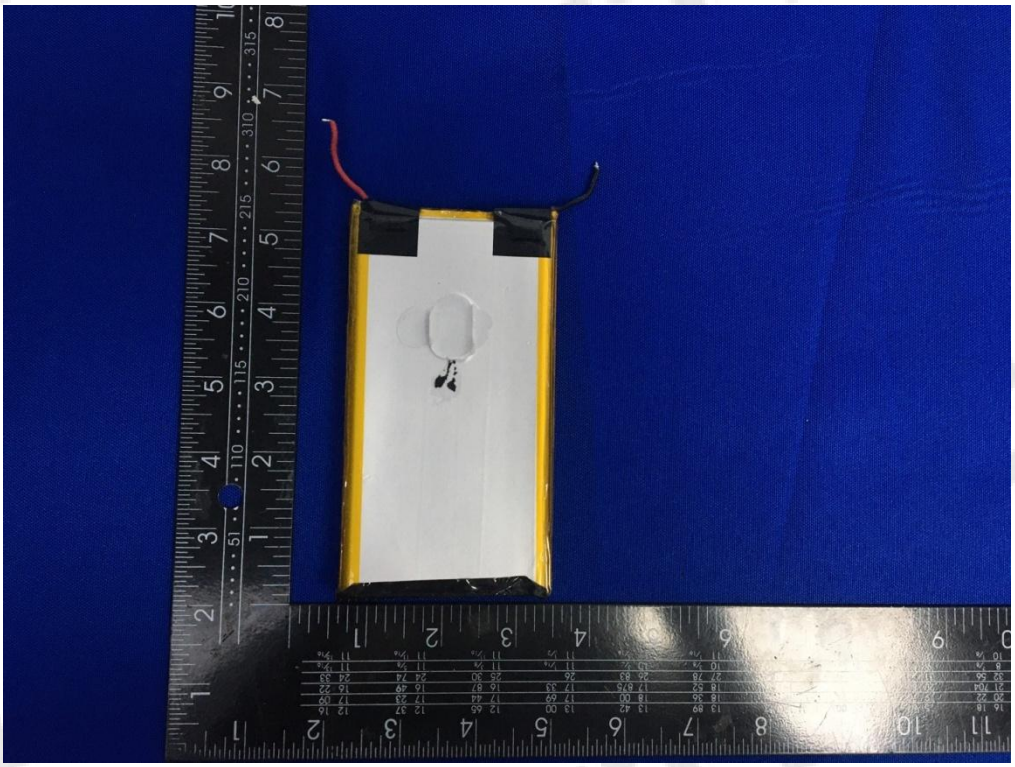

********** End of Report **********