



EMC TEST REPORT

Product : Power Bank
Trade mark :
Model/Type reference : P50/P50L/PBS-10003
Serial Number : N/A
Ratings : Input: 5V 2000MA
Output: 5V 2400MA
Report Number : EED32J001025
Date : Jul. 13, 2017
Regulations : See below

Test Standards	Results
<input checked="" type="checkbox"/> EN 55032: 2012	PASS
<input checked="" type="checkbox"/> EN 55024: 2010	PASS

Prepared for:

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(Note: N/A means not applicable)

1. GENERAL INFORMATION

Applicant:

Manufacturer:

EMC Directive: 2014/30/EU

Product: Power Bank

Trade mark: HAME

Model/Type reference: P50/P50L/PBS-10003

Serial Number: N/A

Report Number: EED32J001025

Sample Received Date: May 25, 2017

Sample tested Date: May 25, 2017 to Jul. 06, 2017

The tested sample(s) and the sample information are provided by the client.

2. TEST SUMMARY

The Product has been tested according to the following specifications:

EMISSION		
Standard	Test Item	Test
EN 55032	Conducted disturbance	N/A ¹
EN 55032	Radiated disturbance	Yes

IMMUNITY (EN 55024)		
Standard	Test Item	Test
IEC 61000-4-2	Electrostatic discharge (ESD)	Yes
IEC 61000-4-3	Radio-frequency electromagnetic field Immunity	Yes
IEC 61000-4-4	Electrical fast transients (EFT)	N/A ¹
IEC 61000-4-5	Surges	N/A ¹
IEC 61000-4-6	Radio-frequency continuous conducted Immunity	N/A ¹
IEC 61000-4-8	Power-frequency magnetic fields Immunity	N/A ¹
IEC 61000-4-11	Voltage dips and interruptions	N/A ¹

Remark 1: The Product is powered by DC 5V.

3. TEST UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Value (dB)
Radiated disturbance (30MHz to 1GHz)	5.3

4. PRODUCT INFORMATION AND TEST SETUP

4.1 PRODUCT INFORMATION

Ratings: Input: 5V 2000MA
Output: 5V 2400MA

The highest frequency of the internal sources of the EUT is less than 108 MHz: ☒ less than 108 MHz, the measurement shall only be made up to 1 GHz.
☐ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
☐ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.
☐ above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

Model difference: All types of internal structure, PCB line is same, just different signs. The test model is P50 and the test results are applicable to the others.

Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Specification	Note
1.	USB	one	CTI	0.75	Shielded	--

4.2 TEST SETUP CONFIGURATION

See test photographs attached in Appendix 1 for the actual connections between Product and support equipment.

4.3 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	Provider	Power Cord
1.	Multimeter	FLUKE	15B	---	CTI	---
2.	Adapter	HUAWEI	HW-050100C2W	H431BF4H12850	CTI	---

Notes:

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.

5. FACILITIES AND ACCREDITATIONS

5.1 TEST FACILITY

All test facilities used to collect the test data are located at Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards.

5.2 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipments used at CTI for testing.

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

Equipment used during the tests:

3M Semi-anechoic Chamber (1)- Radiated disturbance Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	06/04/2019
Spectrum Analyzer	Agilent	E4443A	MY45300910	12/15/2017
Receiver	R&S	ESCI	100009	06/15/2018
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	484	05/22/2018
Multi device Controller	ETS-LINGREN	2090	00057230	N/A

Shielding Room No. 3 - Electrostatic discharge Test (IEC 61000-4-2)				
Equipment	Manufacturer	Model	Serial No.	Due Date
ESD Simulator	TESEQ	NSG437	478	10/11/2017

3M Full-anechoic Chamber - Radio-frequency electromagnetic field Test (IEC 61000-4-3)				
Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	06/04/2019
ESG Vector signal generators	Agilent	E4433B	MY43350417	10/11/2017
Power Amplifier	AR	150W1000	0322288	N/A
Power Amplifier	AR	25S1G4A	0321112	N/A
Stacked double Log.-Per. Antenna	schwarzbeck	STLP 9128 E special	9128ES-110	N/A
Horn Antenna	AR	ATH800M5GA	0342530	N/A

5.3 LABORATORY ACCREDITATIONS AND LISTINGS

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

6. RADIATED DISTURBANCE (RE)

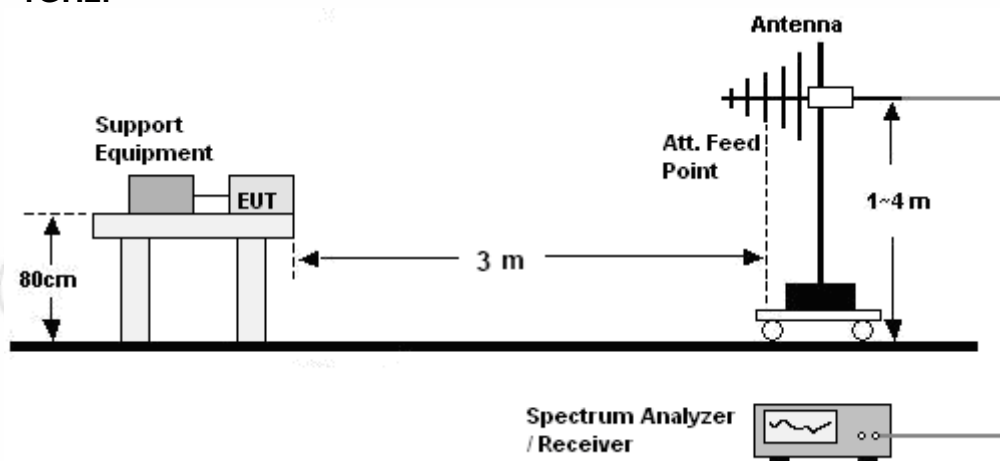
6.1 LIMITS

Frequency (MHz)	Quasi-peak limits at 3m dB(μ V/m)
30-230	40
230-1000	47

NOTE: The lower limit shall apply at the transition frequencies.

6.2 BLOCK DIAGRAM OF TEST SETUP

30MHz ~ 1GHz:



6.3 TEST PROCEDURE

30MHz ~ 1GHz:

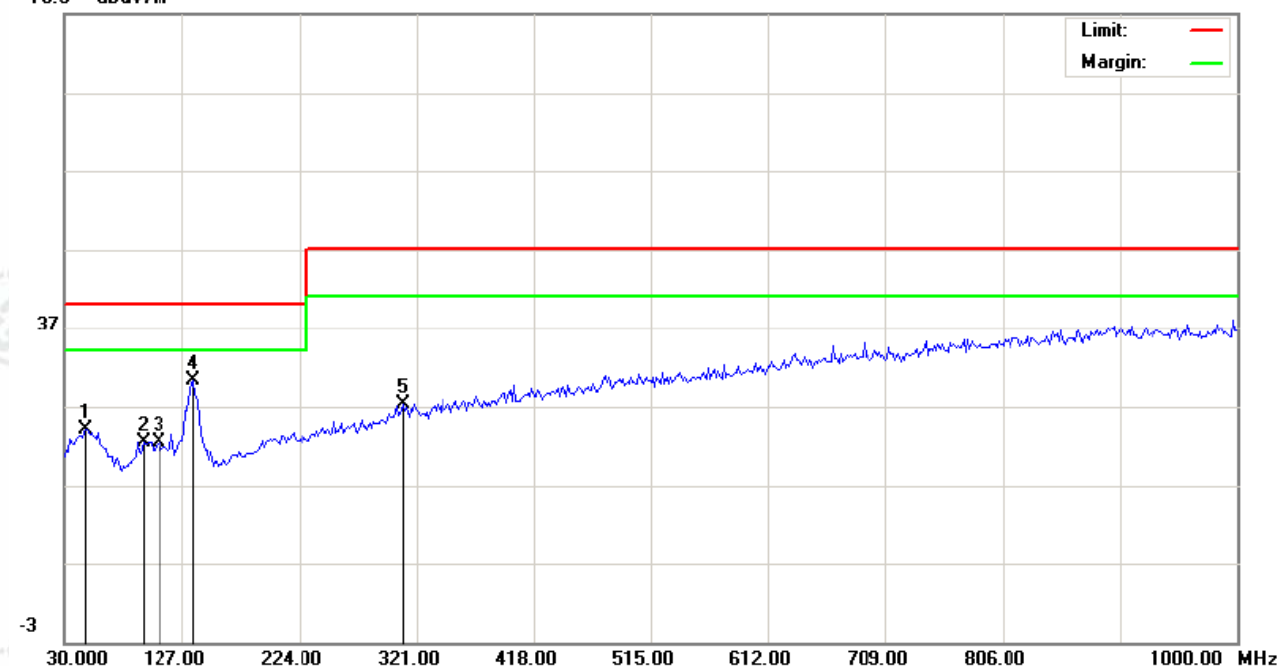
- The Product was placed on the non-conductive turntable 0.8m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

6.4 GRAPHS AND DATA

Product : Power Bank
Mode : Discharging
Power : DC 5V 2400MA
Polarization : Vertical

Model/Type reference : P50
Temperature : 24℃
Humidity : 50%

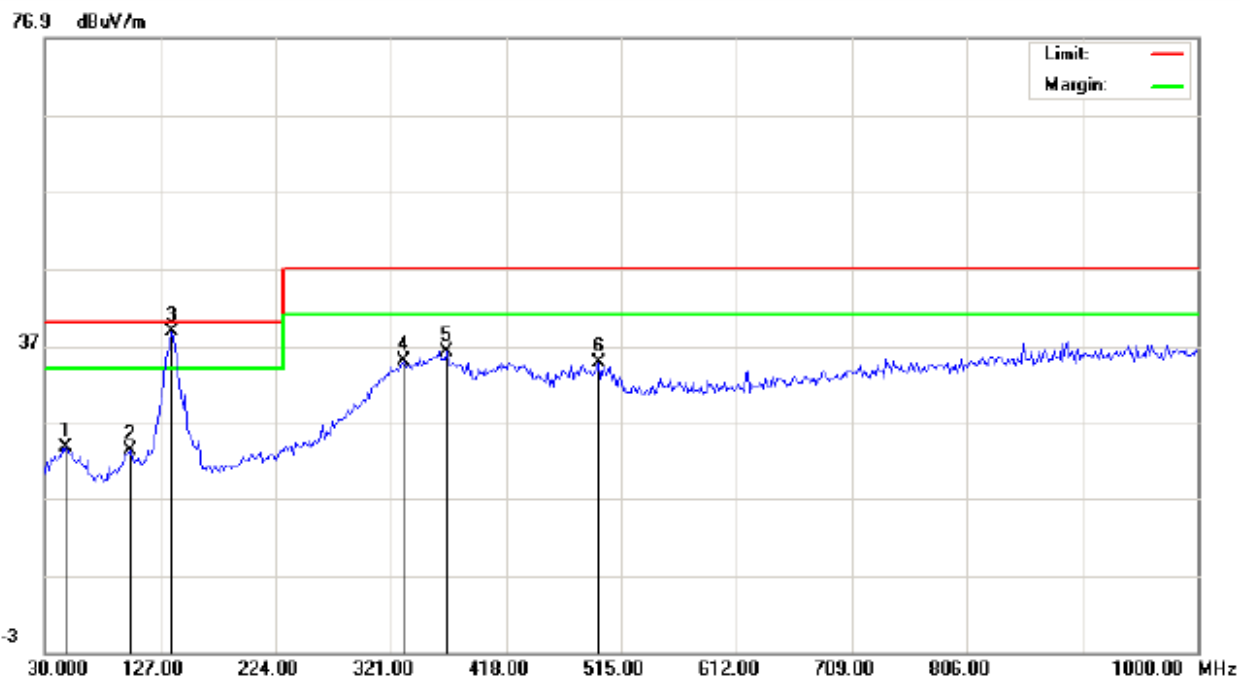
76.9 dBuV/m



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	47.7833	8.50			15.60	24.10			40.00		-15.90		P	
2	94.6667	9.23			13.19	22.42			40.00		-17.58		P	
3	107.6000	8.87			13.63	22.50			40.00		-17.50		P	
4	136.7000	18.36			11.82	30.18			40.00		-9.82		P	
5	309.6833	10.58			16.65	27.23			47.00		-19.77		P	

Product : Power Bank
Mode : Discharging
Power : DC 5V 2400MA
Polarization : Horizontal

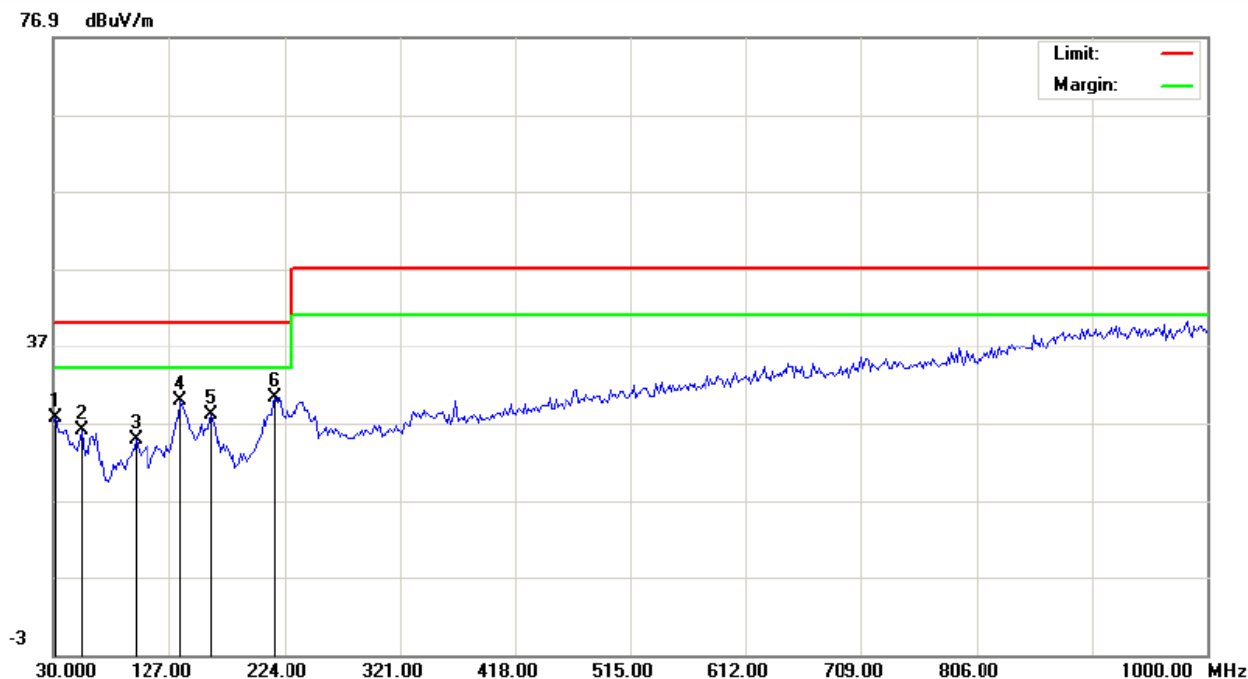
Model/Type reference : P50
Temperature : 24℃
Humidity : 50%



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor			Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG				peak	QP	AVG	QP	AVG	QP	AVG		
1	47.7833	8.28					15.60	23.88			40.00		-16.12		P	
2	101.1333	9.28					14.03	23.31			40.00		-16.69		P	
3	136.7000	27.04	23.79				11.82	38.86	35.61		40.00		-4.39		P	
4	332.3167	17.69					17.24	34.93			47.00		-12.07		P	
5	367.8833	18.09					18.16	36.25			47.00		-10.75		P	
6	495.6000	13.76					21.08	34.84			47.00		-12.16		P	

Product : Power Bank
Mode : Charging
Power : AC 230V/50Hz
Polarization : Horizontal

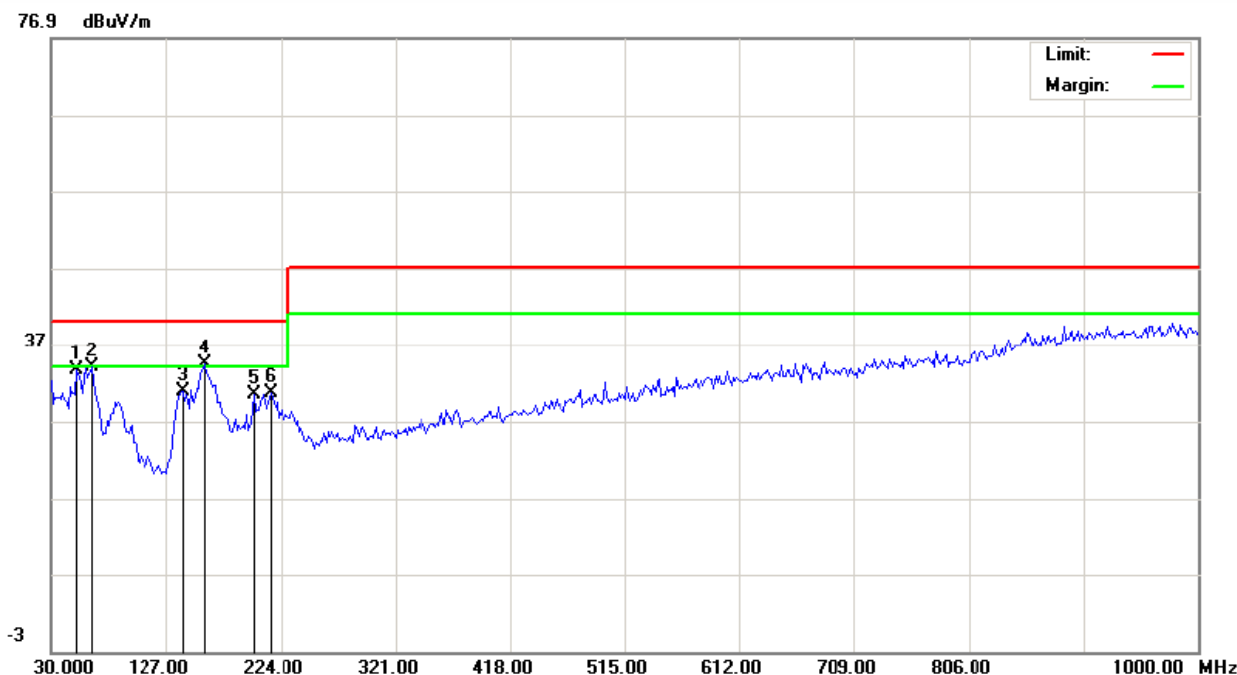
Model/Type reference : P50
Temperature : 24°C
Humidity : 50%



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	31.6167	14.32			13.22	27.54			40.00		-12.46		P	
2	54.2500	10.87			15.16	26.03			40.00		-13.97		P	
3	99.5167	10.79			14.02	24.81			40.00		-15.19		P	
4	136.7000	18.14			11.60	29.74			40.00		-10.26		P	
5	162.5667	16.58			11.48	28.06			40.00		-11.94		P	
6	215.9167	15.95			14.31	30.26			40.00		-9.74		P	

Product : Power Bank
Mode : Charging
Power : AC 230V/50Hz
Polarization : Vertical

Model/Type reference : P50
Temperature : 24℃
Humidity : 50%



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	51.0167	17.93			15.65	33.58			40.00		-6.42		P	
2	63.9500	20.68			13.27	33.95			40.00		-6.05		P	
3	141.5500	19.59			11.27	30.86			40.00		-9.14		P	
4	159.3333	23.10			11.28	34.38			40.00		-5.62		P	
5	201.3667	16.57			13.84	30.41			40.00		-9.59		P	
6	215.9167	16.34			14.31	30.65			40.00		-9.35		P	

7. IMMUNITY TEST

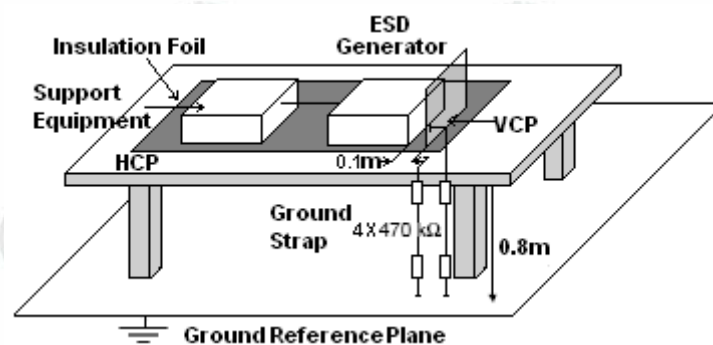
General Performance Criteria	
Product Standard	EN 55024:2010
CRITERION A	During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.
CRITERION B	<p>After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.</p> <p>If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.</p>
CRITERION C	During and after testing, a temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

7.1 ELECTROSTATIC DISCHARGE (ESD)

7.1.1 TEST SPECIFICATION

Basic Standard	: EN 55024 & IEC 61000-4-2
Test Port	: Enclosure port
Discharge Impedance	: 330 ohm / 150 pF
Discharge Mode	: Single Discharge
Discharge Period	: one second between each discharge

7.1.2 BLOCK DIAGRAM OF TEST SETUP



7.1.3 TEST PROCEDURE

ESD shall be applied only to those points and surfaces of the Product which are expected to be touched during usual operation, including user access, as specified in the user manual.

The discharges shall be applied in two ways:

a. Contact discharges to the conductive surfaces and to coupling planes (VCP):

The Product shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points (a minimum of 50 discharges at each point). One of the test points shall be subjected to at least 50 indirect discharges (contact) to the centre of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct discharges. Tests shall be performed at a maximum repetition rate of one discharge per second.

b. Air discharge at slots and apertures, and insulating surfaces:

On those parts of the Product where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

7.1.4 RESULTS & PERFORMANCE

Product : Power Bank **Model/Type reference** : P50
Mode : Discharging & Charging **Temperature** : 24℃
Power : DC 5V & AC 230V/50Hz **Humidity** : 50%

Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Required Level	Performance Criterion
Contact Discharge	Conductive Surfaces	4	25	B	A
	Indirect Discharge HCP	4	25	B	A
	Indirect Discharge VCP	4	25	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	A

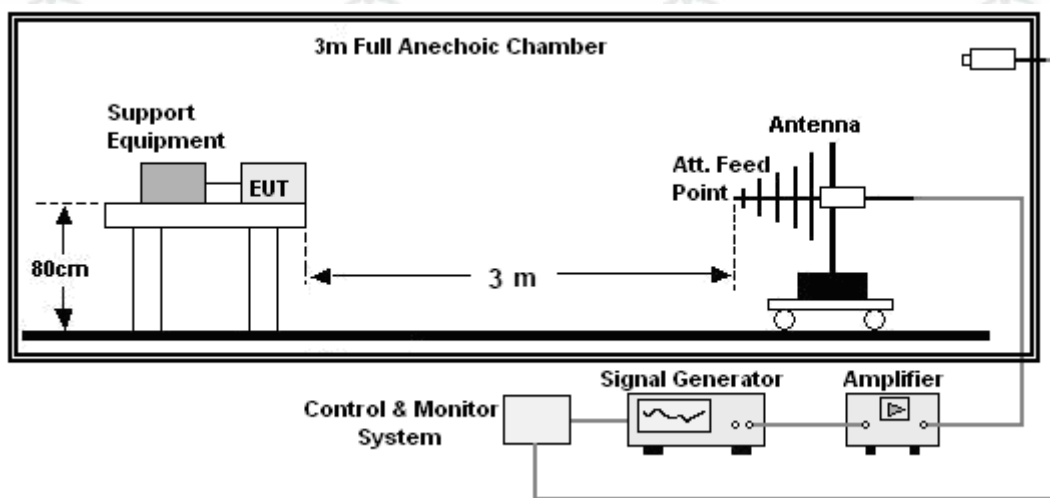
☒ There was no observable degradation in performance.

7.2 RADIO-FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY

7.2.1 TEST SPECIFICATION

Basic Standard	: EN 55024 & IEC 61000-4-3
Test Port	: Enclosure port
Step Size	: 1%
Modulation	: 1kHz, 80% AM
Dwell Time	: 1 second
Polarization	: Horizontal & Vertical

7.2.2 BLOCK DIAGRAM OF TEST SETUP



7.2.3 TEST PROCEDURE

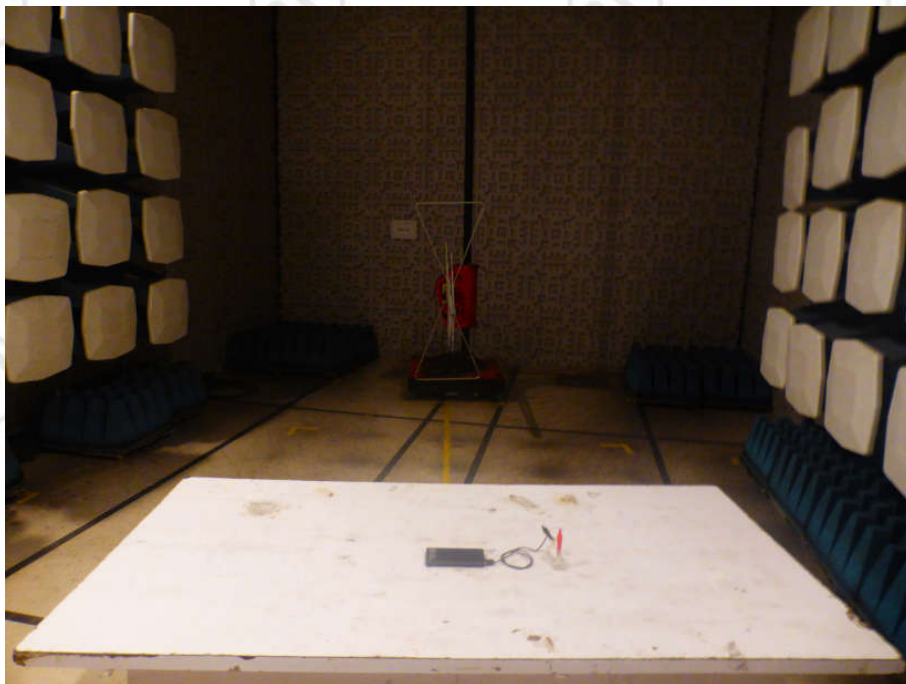
- The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the Product.
- The frequency range is swept from 80MHz to 1000MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1%.
- The test was performed with the Product exposed to both vertically and horizontally polarized fields on each of the four sides.

7.2.4 RESULTS & PERFORMANCE

Product : Power Bank **Model/Type reference** : P50
Mode : Discharging & Charging **Temperature** : 24℃
Power : DC 5V & AC 230V/50Hz **Humidity** : 50%

Frequency (MHz)	Position	Field Strength (V/m)	Required Level	Performance Criterion
80 - 1000	Front, Right, Back, Left	3	A	A

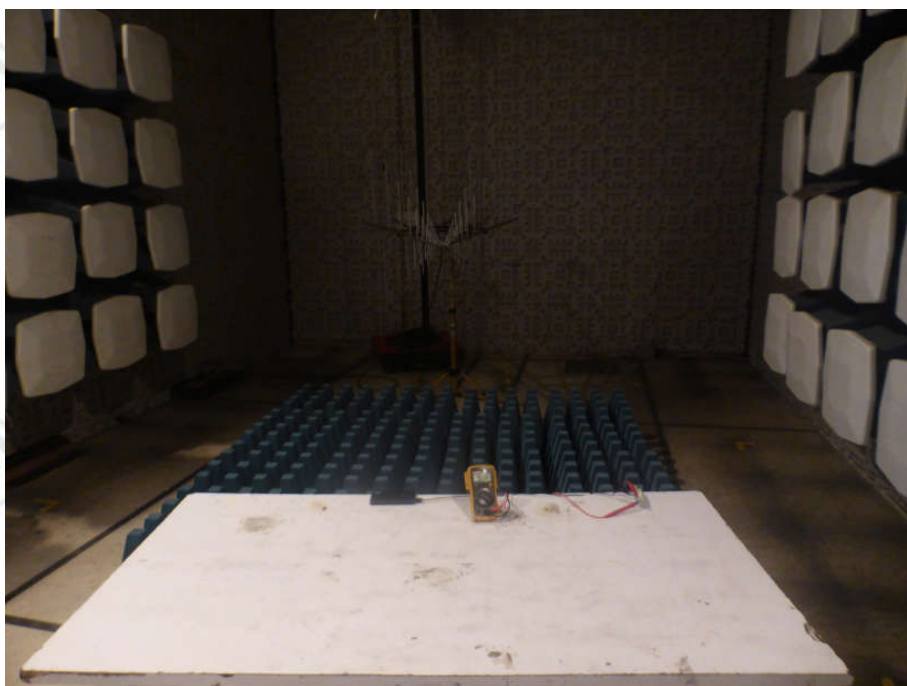
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP



RADIATED DISTURBANCE TEST SETUP



ELECTROSTATIC DISCHARGE TEST SETUP



RADIO-FREQUENCY ELECTROMAGNETIC FIELD TEST SETUP

APPENDIX 2 PHOTOGRAPHS OF PRODUCT



View of Product-1



View of Product-2



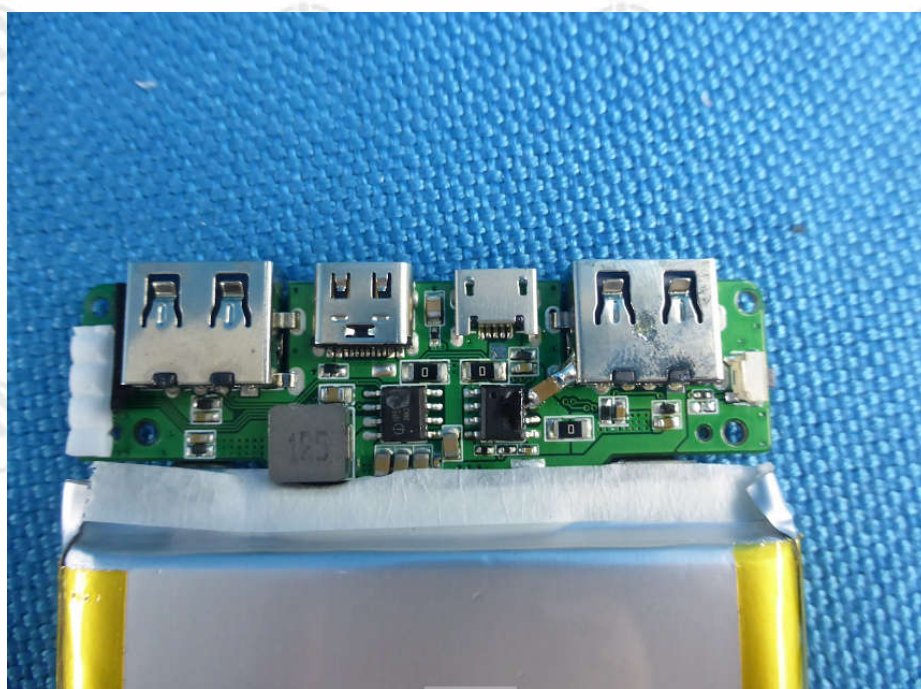
View of Product-3



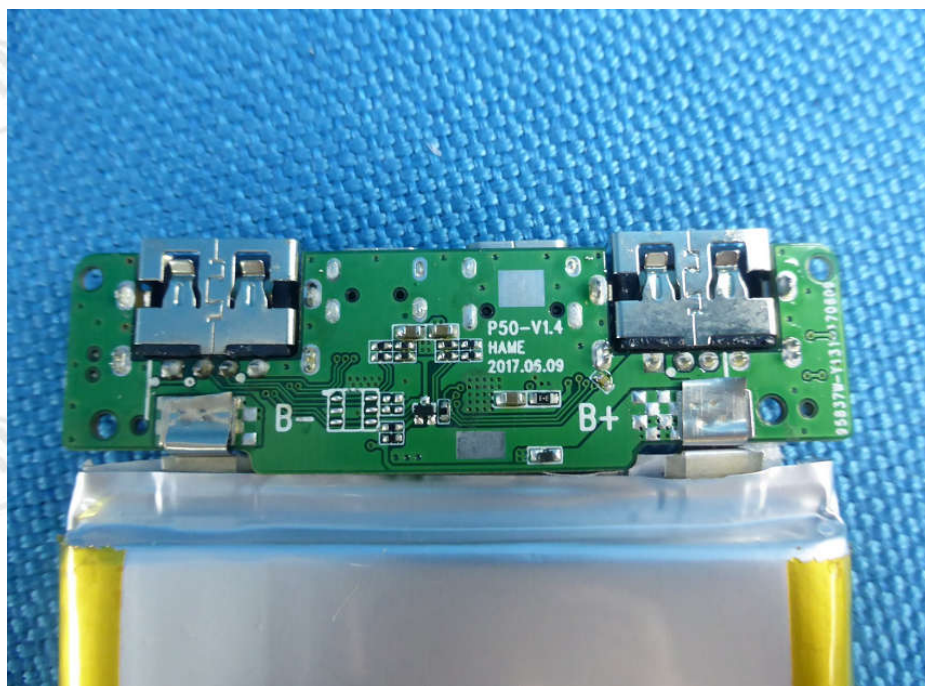
View of Product-4



View of Product-5



View of Product-6



View of Product-7

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.