

EMC Test Report

Report No.: AGC07090181201EE01

PRODUCT DESIGNATION : Power bank
BRAND NAME : N/A
MODEL NAME : F5
CLIENT :
DATE OF ISSUE : Dec.28, 2018
STANDARD(S) : EN 55032:2015/AC:2016
EN 55035:2017
REPORT VERSION : V1.0

Attestation of Global Compliance(Shenzhen) Co., Ltd

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec.28, 2018	Valid	Initial release

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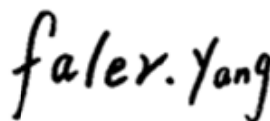
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1. VERIFICATION OF CONFORMITY

Applicant	
Address	
Manufacturer	
Address	
Factory	
Address	
Product Designation	Power bank
Brand Name	N/A
Test Model	F5
Date of test	Dec.25, 2018 to Dec.27, 2018
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-EC-IT/AC(2013-03-01)

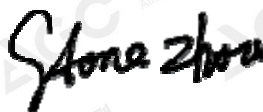
The above equipment was tested by Attestation of Global Compliance(Shenzhen) Co., Ltd. for compliance with the requirements set forth in the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements. The test results of this report relate only to the tested sample identified in this report.

Tested By



Faler Yang(Yang Feiyue) Dec.28, 2018

Reviewed By



Stone Zhou(Zhou Dong) Dec.28, 2018

Approved By



 Forrest Lei(Lei Yonggang)
 Authorized Officer Dec.28, 2018

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2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	TEST MODE DESCRIPTION	WORST
1	Discharging	V
2	Charging	--
Note: 1. V means EMI worst mode. 2. Only worst mode data recorded in the test report.		

3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by ISO.

- Uncertainty of Radiated Emission, $U_c = \pm 3.9\text{dB}$

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4. PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DC 5V 2A
EUT Output Rating	DC 5V 2A

I/O Port Information (☒ Applicable ☐ Not Applicable)

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
USB	1	--	1
Micro B	1	0.3m Unshielded	1

Note:

1. All the above "--" means that EUT has no cable.
2. All the cables were provided by AGC Lab.

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5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Resistor	--	--	--	--	0.8m unshielded
Multimeter	FLUKE	15B+	40011565WS		0.9m unshielded
Adapter	WEI XUN	XLY-003	--	--	0.8m unshielded

Note:

1 All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

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6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.12, 2018	Jun.11, 2019
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2019

TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Simulator	Schaffner	NSG 438	782	Oct.25, 2018	Oct.24, 2019

TEST EQUIPMENT OF SURGE/EFT/DIPSTEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
EFT、Surge Generator	Schaffner	Modula 6150	34437	Aug.28, 2018	Aug.27, 2019

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TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
SIGNAL GENERATOR	R&S	E4421B	MY43351603	May.15, 2018	May.14, 2019
ANTENNA	SCHWARZBCK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2019
POWER SENSOR	R&S	URV5-Z4	100124	May.15, 2018	May.14, 2019
POWER METER	R&S	NRVD	8323781027	May.15, 2018	May.14, 2019
POWER AMPLIFIER	KALMUS	7100LC	04-02/17-06-001	Jun.12, 2018	Jun.11, 2019
RF AMPLIFIER	Milmega	AS0104-55_55	1004793	Jun.12, 2018	Jun.11, 2019
HORN ANTENNA	ETS LINDGREN	3117	00034609	May.26, 2018	May.25, 2019
Power Amplifier	rflight	NTWPA-2560100	17063183	Oct.18, 2018	Oct.17, 2019
Broadband High Gain Horn Antenna	SCHWARZBEC K	BBHA 9120 J	00073	Mar.19, 2018	Mar.18, 2019

TEST EQUIPMENT OF CS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power Amplifier	AR	75A250	18464	Jun.12, 2018	Jun.11, 2019
CDN	ZHINAN	ZN3751	15004	Aug.28, 2018	Aug.27, 2019
6dB attenuator	ZHINAN	E-002	N/A	Aug.28, 2018	Aug.27, 2019
Electromagnetic Injection Clamp	Luthi	EM101	35773	Aug.28, 2018	Aug.27,2019
Power Sensor	R&S	URV5-Z4	100124	May.15, 2018	May.14, 2019
Power Meter	R&S	NRVD	8323781027	May.15, 2018	May.14, 2019
SIGNAL GENERATOR	R&S	E4421B	MY43351603	May.15, 2018	May.14, 2019

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7. TEST ITEMS AND THE RESULTS

Test item	Test Requirement	Test Method	Class/Severity	Result
CONDUCTED EMISSION	EN 55032	EN 55032	Class B	N/A
RADIATED EMISSION	EN 55032	EN 55032	Class B	Pass
Harmonic current emission	EN 61000-3-2	EN 61000-3-2	Class A	N/A
Voltage fluctuations & flicker	EN 61000-3-3	EN 61000-3-3	§5 of EN 61000-3-3	N/A
Electrostatic Discharge Immunity	EN 55035	EN 61000-4-2	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)	Pass
Radiated RF Electromagnetic	EN 55035	EN 61000-4-3	3V/m with 80% AM. 1kHz Modulation.	Pass
Electrical fast transient/burst Immunity	EN 55035	EN 61000-4-4	+/- 1kV for Power Supply Lines	Pass
SURGE IMMUNITY	EN 55035	EN 61000-4-5	+/- 1kV (Line to Line) +/- 2kV (Line to Ground)	N/A
Immunity to Conducted Disturbances Induced by RF fields	EN 55035	EN 61000-4-6	3V(0.15MHz-10MHz) 3V-1V(10MHz-30MHz) 1V(30MHz-80MHz) with 80% AM. 1 kHz Modulation	Pass
Power frequency magnetic field	EN 55035	EN 61000-4-8	1A/m 50Hz or 60Hz	N/A
Voltage dips and short interruptions immunity	EN 55035	EN 61000-4-11	0degrees	N/A

Note : N/A means not applicable.

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8. EN 55032 RADIATED EMISSION TEST

8.1. LIMITS OF RADIATED DISTURBANCES

Limits for radiated disturbance 30M to1 GHz at a measurement distance of 3 m

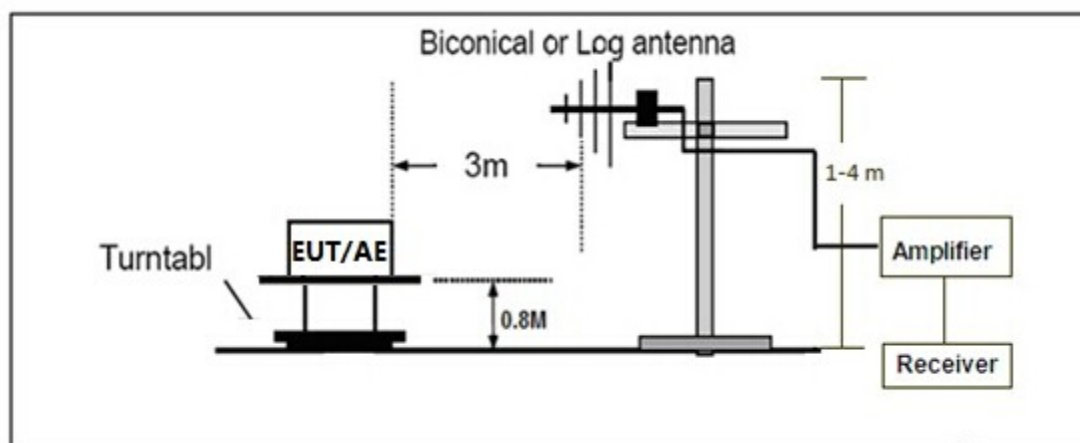
Frequency range (MHz)	Quasi peak limits(dBuV/m), for Class B ITE, at 3m measurement distance
30 - 230	40
230 - 1000	47

Notes:

1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

8.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



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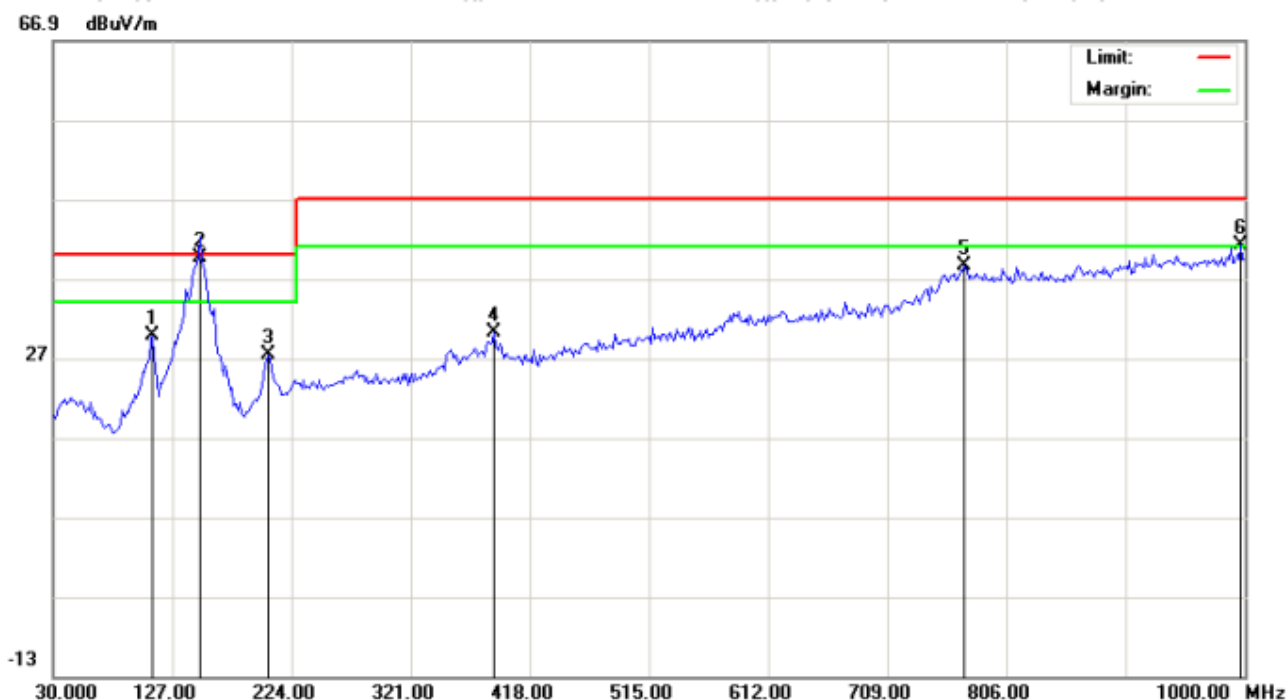
8.3. PROCEDURE OF RADIATED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN 55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN 55032.
- (4) The EUT was discharged from resistor.
- (5) The antenna was placed at 3 meter away from the EUT as stated in EN 55032. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

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8.4. TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission Test at 3m Distance-Horizontal

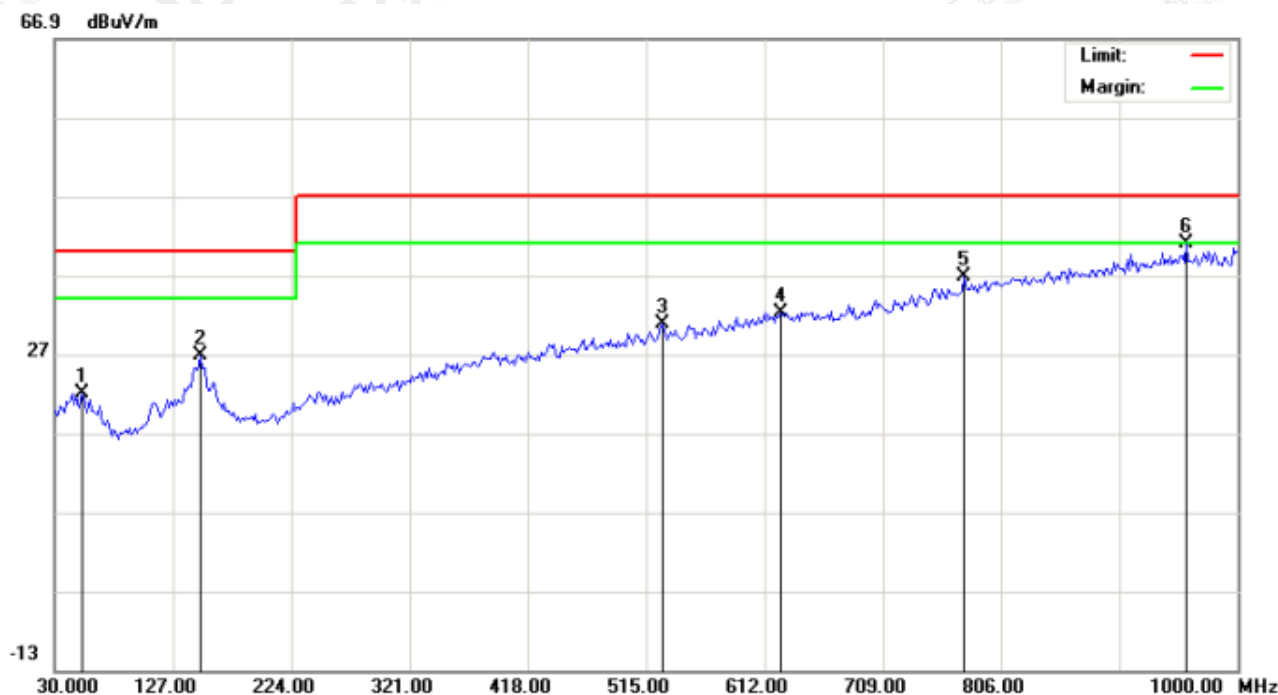


No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		110.8333	11.55	18.19	29.74	40.00	-10.26	peak
2	*	149.5283	19.27	20.37	39.64	40.00	-0.36	QP
3		204.6000	9.60	17.83	27.43	40.00	-12.57	peak
4		388.9000	5.15	25.03	30.18	47.00	-16.82	peak
5		772.0500	5.28	33.36	38.64	47.00	-8.36	peak
6	!	996.7667	4.07	37.11	41.18	47.00	-5.82	peak

RESULT: PASS

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Radiated Emission Test at 3m Distance-Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		52.6333	1.89	20.14	22.03	40.00	-17.97	peak
2		149.6333	6.39	20.37	26.76	40.00	-13.24	peak
3		527.9333	2.73	28.14	30.87	47.00	-16.13	peak
4		624.9333	2.07	30.21	32.28	47.00	-14.72	peak
5		775.2833	3.33	33.45	36.78	47.00	-10.22	peak
6	*	957.9667	4.44	36.63	41.07	47.00	-5.93	peak

RESULT: PASS

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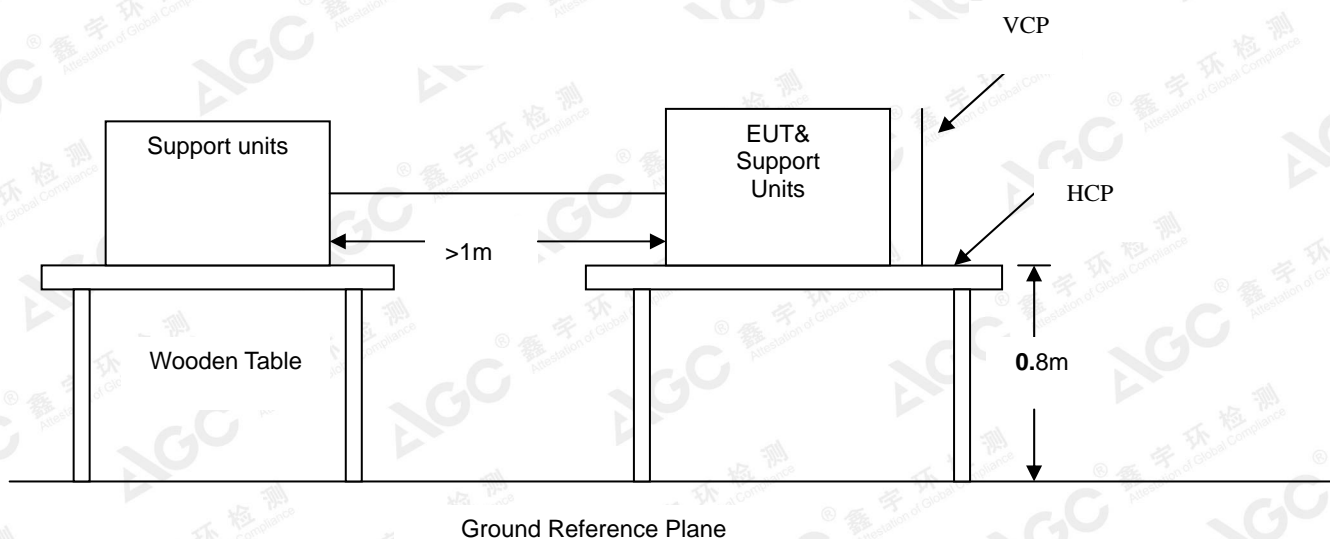
9. EN 61000-4-2 ESD IMMUNITY TEST

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-2
Test Level	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)
Standard require	B
Tester	Faler
Temperature	20°C
Humidity	50%

9.1. BLOCK DIAGRAM OF TEST SETUP

(The 470 k ohm resistors are installed per standard requirement)



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9.2. TEST PROCEDURE

The test procedure shall be in accordance with EN 61000-4-2:2008. Electrostatic discharges shall be applied only to points and surfaces of the EUT which are expected to be touched during normal operation, including user access operations specified in the user manual, for example cleaning or adding consumables when the EUT is powered. The application of discharges to the contacts of open connectors is not required.

The number of test points is EUT dependent. Sub clause 8.3.1 and Clause A.5 of EN 61000-4-2:2008 shall be taken into consideration when selecting test points, paying particular attention to keyboards, dialling pads, power switches, mice, drive slots, card slots, the areas around communication ports, etc. When applying direct discharges to a portable or handheld battery-powered EUT with a display screen, it may not be possible to observe the screen for a given EUT orientation. If observation of the screen is necessary during this test, the EUT may be mounted vertically using non-metallic supports.

Note: As per the A2 to EN 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.

The electrostatic discharges were applied as follows:

Voltage	Coupling	Test Performance	Result
±4kV	Contact Discharge	No function loss	A
±4kV	Indirect Discharge HCP (Front)	No function loss	A
±4kV	Indirect Discharge HCP (Left)	No function loss	A
±4kV	Indirect Discharge HCP (Back)	No function loss	A
±4kV	Indirect Discharge HCP (Right)	No function loss	A
±4kV	Indirect Discharge VCP (Front)	No function loss	A
±4kV	Indirect Discharge VCP (Left)	No function loss	A
±4kV	Indirect Discharge VCP (Back)	No function loss	A
±4kV	Indirect Discharge VCP (Right)	No function loss	A
±8kV	Air Discharge	No function loss	A

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9.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**

☐ **FAIL**

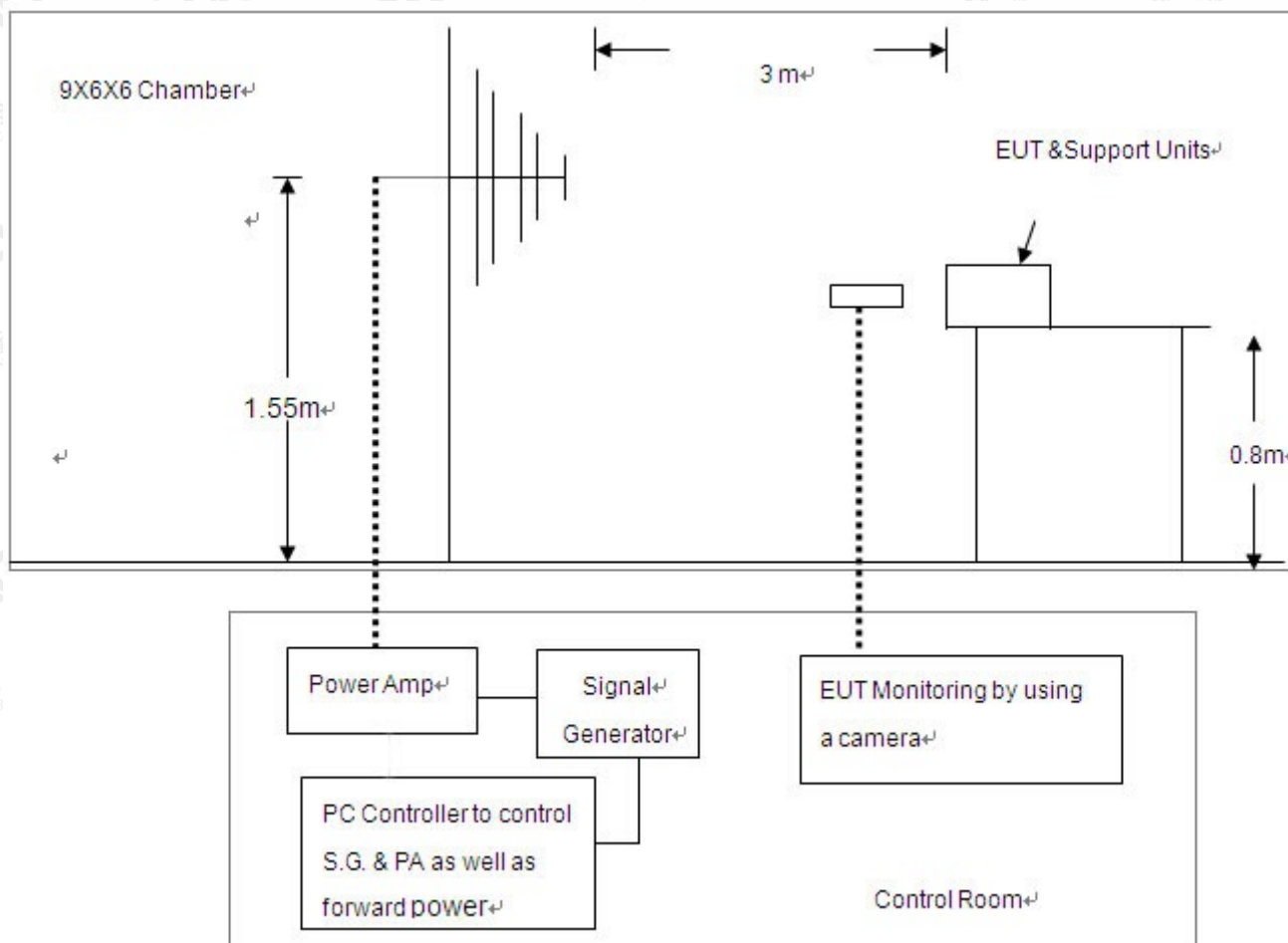
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10. EN 61000-4-3 RS IMMUNITY TEST

RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-3
Test Level:	3V/m with 80% AM. 1kHz Modulation.
Standard require	A
Tester	Faler
Temperature	25°C
Humidity	55%

10.1. BLOCK DIAGRAM OF TEST SETUP



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10.2. TEST PROCEDURE

The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per EN 61000-4-3.

EUT worked with resistance load, and make sure EUT worked normally.

Setting the testing parameters of RS test software per EN 61000-4-3.

Performing the test at each side of with specified level (3V/m) at 1% steps and test frequency from 80MHz to 1000MHz

Recording the test result in following table.

EN 61000-4-3 Final test conditions:

Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Test Performance	Result
80-1000	3V/m	AM	H/V	Front	No function loss	A
80-1000	3V/m	AM	H/V	Left	No function loss	A
80-1000	3V/m	AM	H/V	Back	No function loss	A
80-1000	3V/m	AM	H/V	Right	No function loss	A
1800,2600,3500,5000	3V/m	AM	H/V	Front	No function loss	A
1800,2600,3500,5000	3V/m	AM	H/V	Left	No function loss	A
1800,2600,3500,5000	3V/m	AM	H/V	Back	No function loss	A
1800,2600,3500,5000	3V/m	AM	H/V	Right	No function loss	A

Frequency ($\pm 1\%$) for Spot test.

10.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

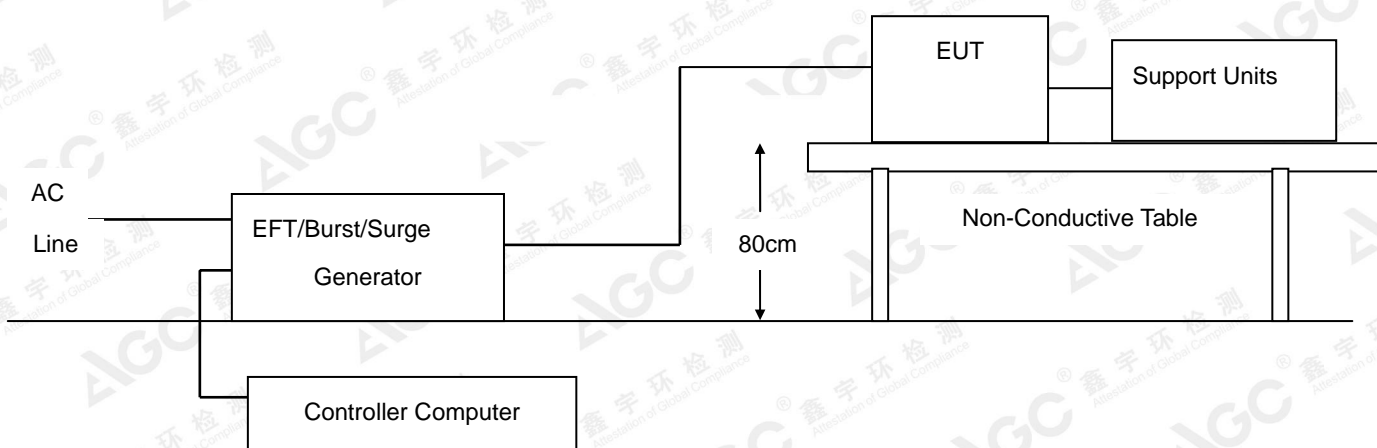
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11. EN 61000-4-4 EFT IMMUNITY TEST

ELECTRICAL FAST TRANSIENTS/BURST IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-4
Test Level	+/- 1kV for Power Supply Lines
Standard require	B
Tester	Faler
Temperature	25°C
Humidity	55%

11.1. BLOCK DIAGRAM OF TEST SETUP



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11.2. TEST PROCEDURE

The EUT and support units were located on a wooden table 0.8m away from ground reference plane.
 A 1.0 meter long power cord was attached to EUT during the test.

The length of communication cable between communication port and clamp was keeping within 1 meter.

EUT worked with resistance load, and make sure EUT worked normally.

Related peripherals work during the test.

Recording the test result as shown in following table.

Test conditions:

Impulse Frequency: 5kHz

Tr/Th: 5/50ns

Burst Duration: 15ms

Burst Period: 300ms

Inject Line	Voltage kV	Inject Method	Test Performance	Result
L+N	+/- 1	Direct	No function loss	A

11.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

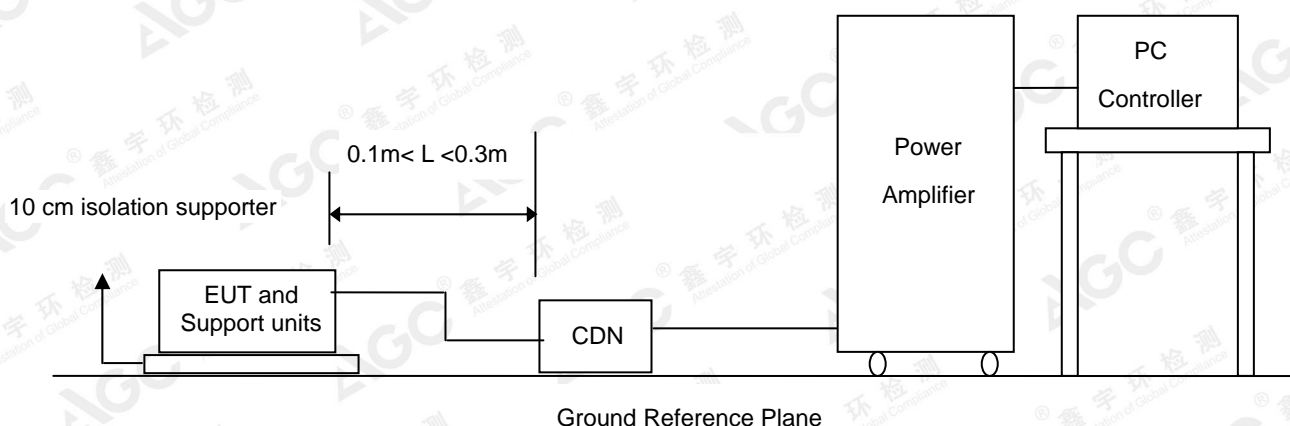
<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL
--

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12. EN 61000-4-6 CS IMMUNITY TEST

Port	On Power Supply Lines
Basic Standard	EN 61000-4-6
Requirements	3V(0.15MHz-10MHz) 3V-1V(10MHz-30MHz) 1V(30MHz-80MHz) with 80% AM. 1 kHz Modulation
Standard require	A
Tester	Faler
Temperature	25°C
Humidity	55%

12.1. BLOCK DIAGRAM OF TEST SETUP



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12.2. TEST PROCEDURE

The EUT and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.

EUT worked with resistance load, and make sure EUT worked normally.

Related peripherals work during the test.

Setting the testing parameters of CS test software per EN 61000-4-6.

Recording the test result in following table.

Test conditions:

Frequency Range	0.15MHz-80MHz
Frequency Step	1% of fundamental
Dwell Time	3 sec

Range (MHz)	Strength	Modulation	Result
0.15-10	3V	AM	A
10-30	3V-1V	AM	A
30-80	1V	AM	A

12.3. PERFORMANCE & RESULT

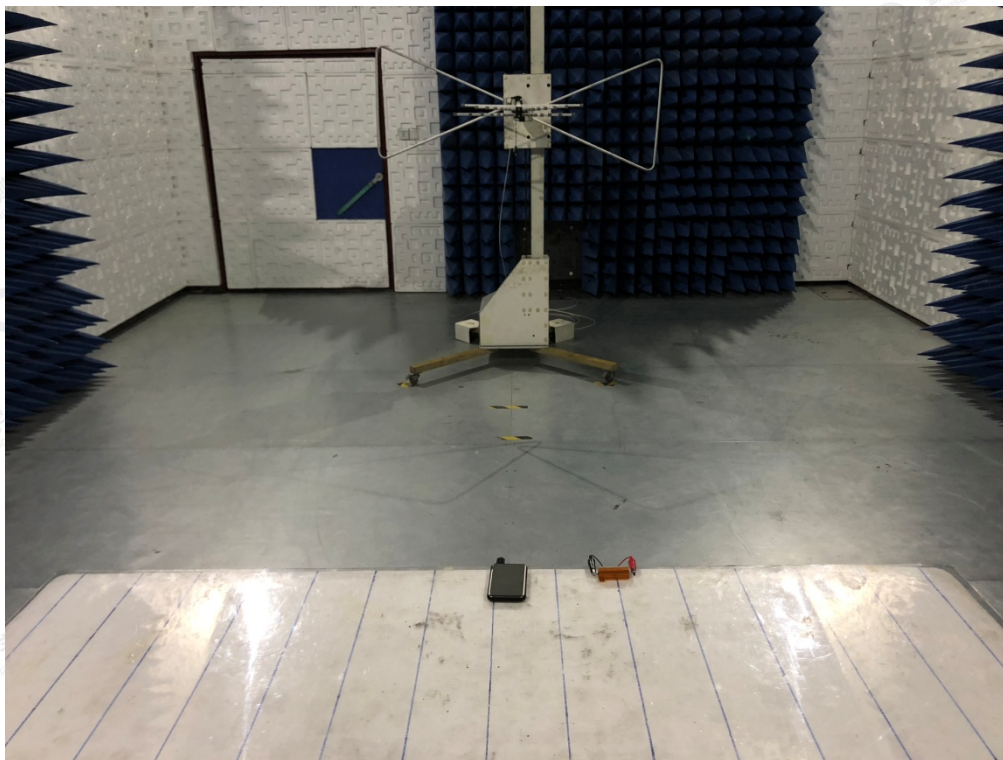
Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

EN 55032 RADIATED EMISSION TEST SETUP

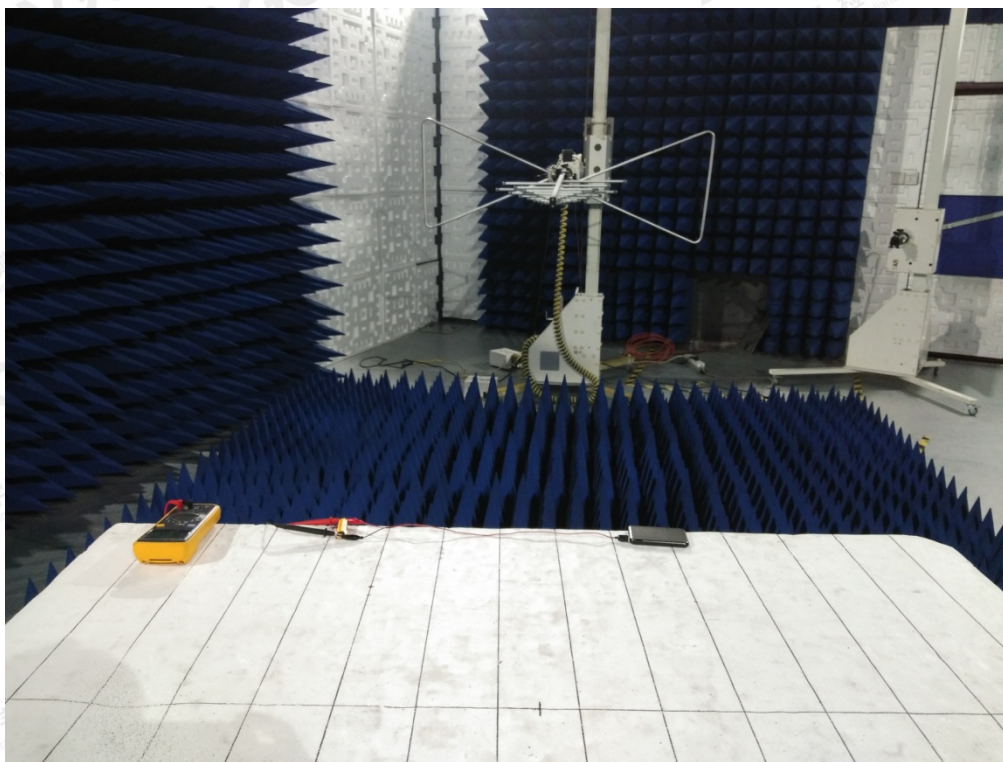


EN 61000-4-2 ESD IMMUNITY TEST SETUP



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EN 61000-4-3 RS IMMUNITY TEST SETUP



EN 61000-4-4 EFT IMMUNITY TEST SETUP



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EN 61000-4-6 CS IMMUNITY TEST SETUP



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APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT



TOP VIEW OF EUT



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BOTTOM VIEW OF EUT



FRONT VIEW OF EUT

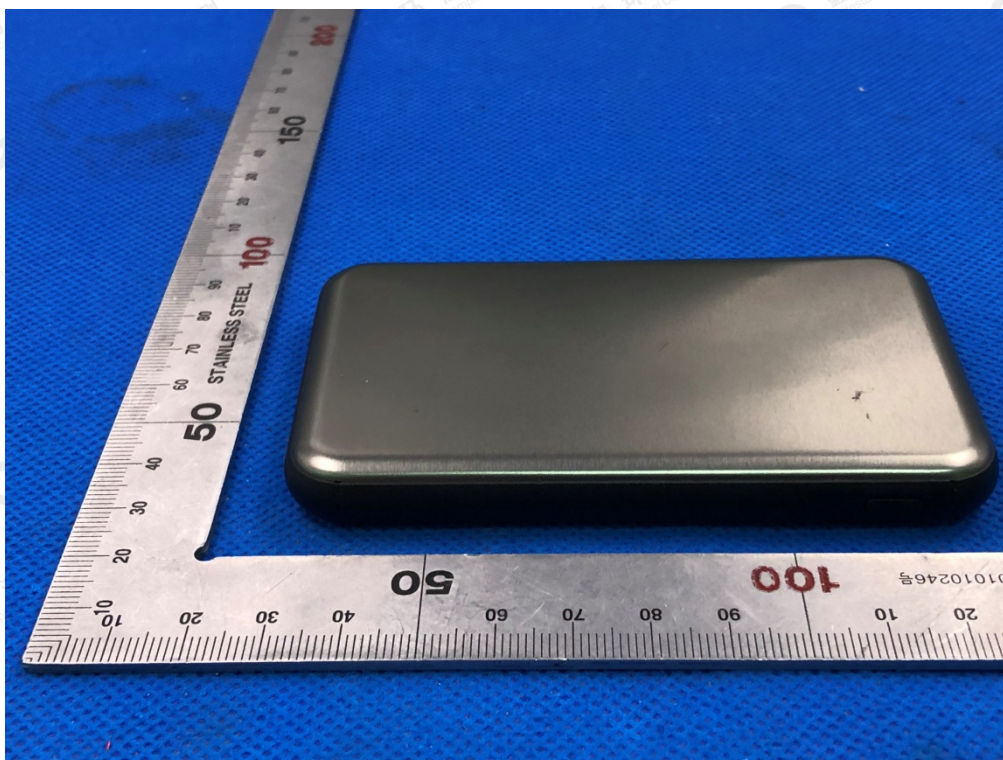


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BACK VIEW OF EUT



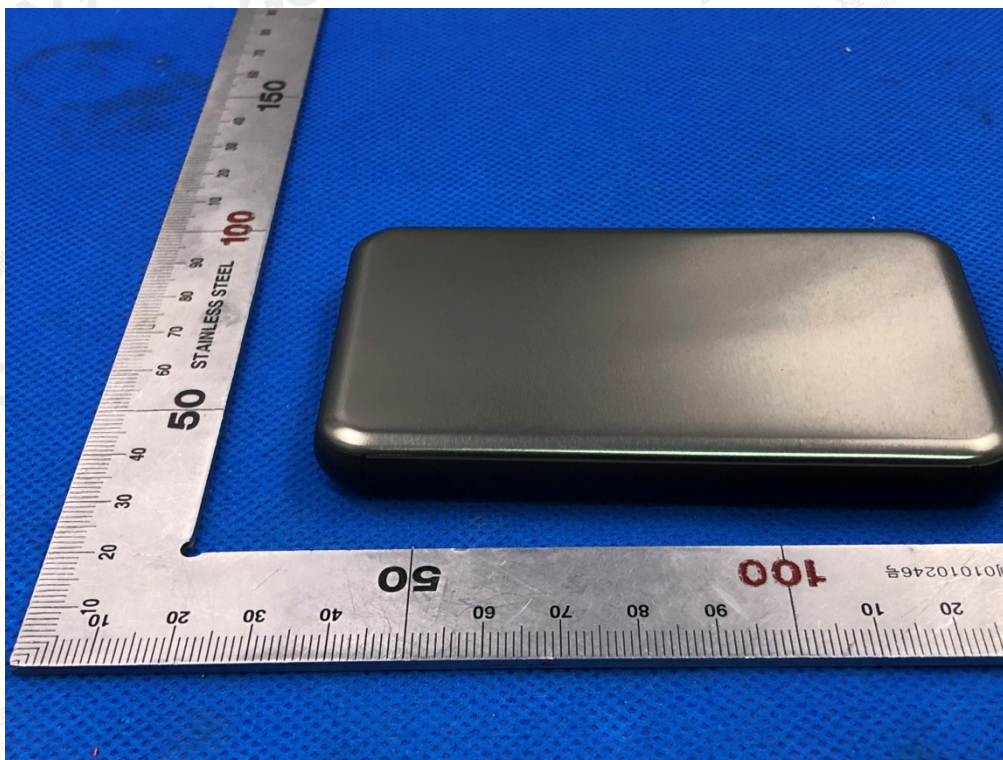
LEFT VIEW OF EUT



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RIGHT VIEW OF EUT

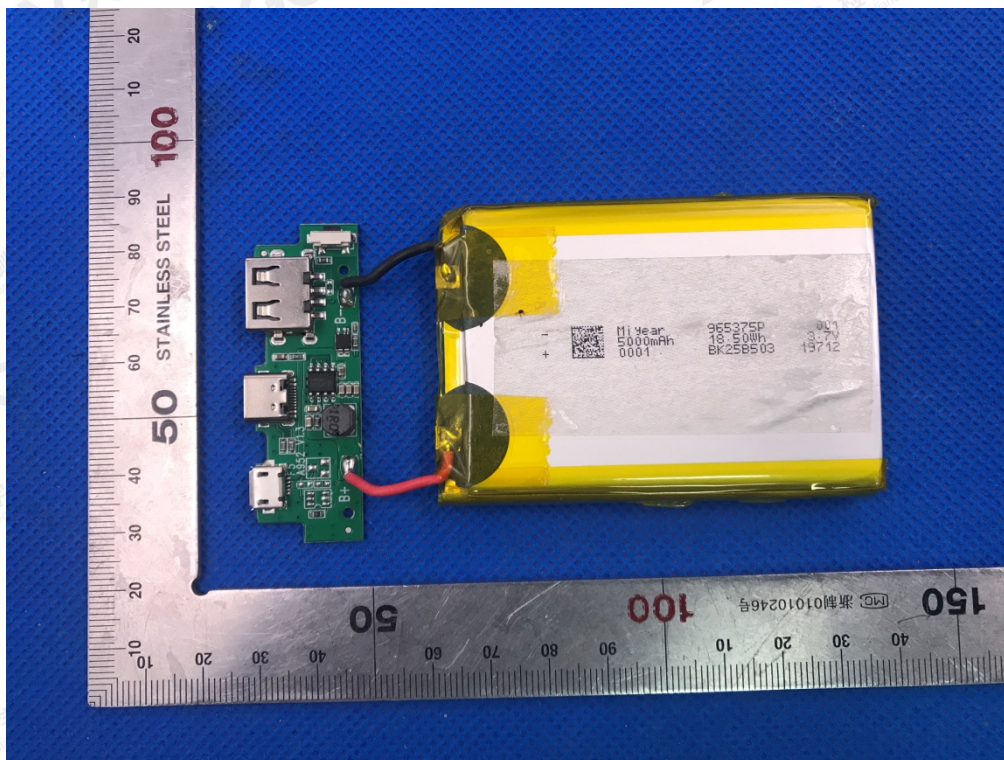


OPEN VIEW OF EUT

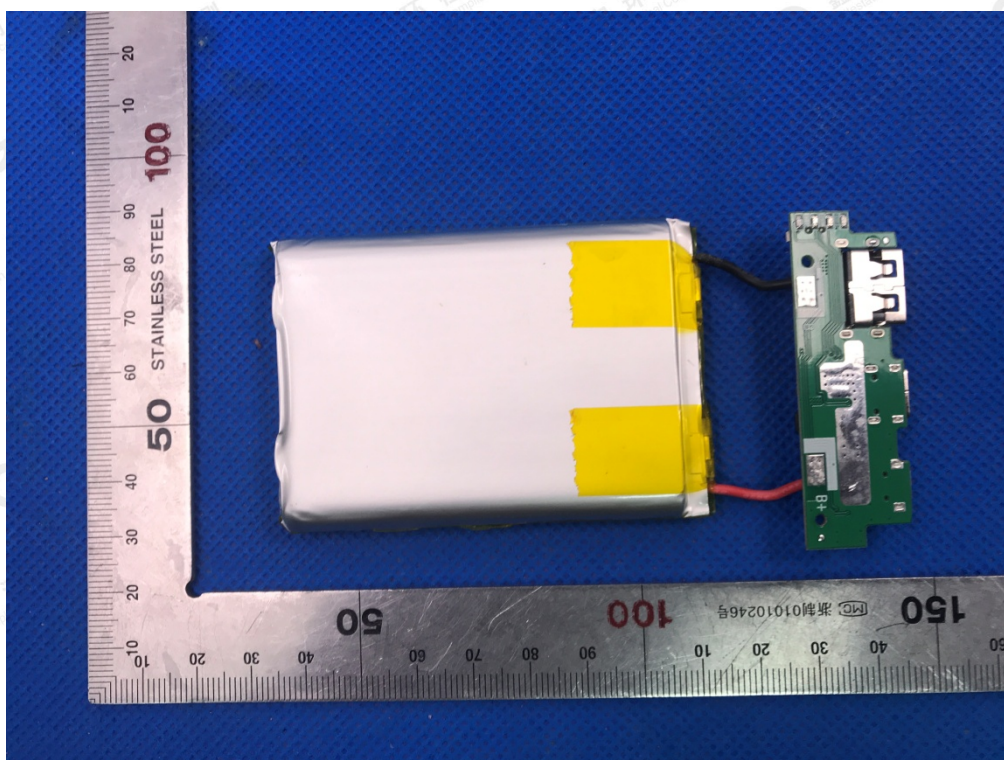


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INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----

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