

EMC Test Report

Report No.: AGC10385170602EE01

PRODUCT DESIGNATION : Notos 2.200 mAh solar charger
BRAND NAME : N/A
MODEL NAME : P323.833
CLIENT : Xindao B.V.
DATE OF ISSUE : Jun.16, 2017
STANDARD(S) : EN 55032:2015/AC:2016
: EN 55024:2010/A1:2015
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	/	Jun.16, 2017	Valid	Original Report

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TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY	4
2. SYSTEM DESCRIPTION	5
3. MEASUREMENT UNCERTAINTY	5
4. PRODUCT INFORMATION	6
5. SUPPORT EQUIPMENT	7
6. TEST FACILITY	8
7. TEST ITEMS AND THE RESULTS	9
8. EN 55032 LINE CONDUCTED EMISSION TEST	10
8.1. LIMITS OF LINE CONDUCTED EMISSION TEST	10
8.2. BLOCK DIAGRAM OF TEST SETUP	10
8.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST	11
8.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST	12
9. EN 55032 RADIATED EMISSION TEST	14
9.1. LIMITS OF RADIATED DISTURBANCES	14
9.2. BLOCK DIAGRAM OF TEST SETUP	14
9.3. PROCEDURE OF RADIATED EMISSION TEST	15
9.4. TEST RESULT OF RADIATED EMISSION TEST	16
10. EN 61000-4-2 ESD IMMUNITY TEST	18
10.1. BLOCK DIAGRAM OF TEST SETUP	18
10.2. TEST PROCEDURE	19
10.3. PERFORMANCE & RESULT	20
11. EN 61000-4-3 RS IMMUNITY TEST	21
11.1. BLOCK DIAGRAM OF TEST SETUP	21
11.2. TEST PROCEDURE	22
11.3. PERFORMANCE & RESULT	22
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	23
APPENDIX B: PHOTOGRAPHS OF EUT	25

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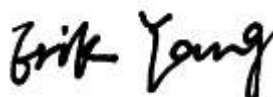
1. VERIFICATION OF CONFORMITY

Manufacturer	Xindao B.V.
Address	P.O. Box 3082, 2280 GB, Rijswijk, The Netherlands
Factory	Xindao B.V.
Address	P.O. Box 3082, 2280 GB, Rijswijk, The Netherlands
Product Designation	Notos 2.200 mAh solar charger
Remark	The highest frequency of the internal sources of the EUT is less than 108 MHz, The measurement shall only be made up to 1 GHz.
Brand Name	N/A
Test Model	P323.833
Date of test	Jun.13, 2017 to Jun.15, 2017
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-EC-IT/DC(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



Erik Yang(Yang Jianmin)

Jun.16, 2017

Reviewed By



Stone Zhou(Zhou Dong)

Jun.16, 2017

Approved By



Forrest Lei(Lei Yonggang)
Authorized Officer

Jun.16, 2017

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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 Conducted Emission, $U_c = \pm 2.75\text{dB}$
- Uncertainty of Radiated Emission, $U_c = \pm 3.2\text{dB}$

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4. PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DC 5V by adapter & DC 5V by battery
EUT Output Rating	DC 5V 1A

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

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
USB	1	0.5m unshielded	1
Micro B	1	--	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
Adapter	Apple Inc.	--	--	--	--
Resistor	--	--	--	--	0.8m unshielded
Multimeter	VICTOR	VC9808	--	--	0.9m unshielded

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6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	B112-B113, Building 12, Baoan Building Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen, Guangdong, P.R.China

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	2016.07.02	2017.07.01
LISN	R&S	ESH2-Z5	100086	2016.08.25	2017.08.24

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	2016.07.02	2017.07.01
ANTENNA	SCHWARZBECK	VULB9168	D69250	2016.03.01	2018.02.28

TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Simulator	Schaffner	NSG 438	782	2016.10.10	2017.10.09

TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
SIGNAL GENERATOR	R&S	E4421B	MY43351603	2016.07.02	2017.07.01
ANTENNA	SCHWARZBECK	VULB9168	D69250	2016.03.01	2018.02.28
POWER SENSOR	R&S	URV5-Z4	100124	2016.07.04	2017.07.03
POWER METER	R&S	NRVD	832378/027	2016.07.04	2017.07.03
POWER AMPLIFIER	KALMUS	7100LC	04-02/17-06-001	2016.07.02	2017.07.01
RF AMPLIFIER	Milmega	AS01004-55_55	1004793	2016.07.02	2017.07.01
HORN ANTENNA	ETS LINDGREN	3117	00034609	2016.03.01	2018.02.28

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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	Pass
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 55024	EN 61000-4-2	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)	Pass
Radiated RF Electromagnetic	EN 55024	EN 61000-4-3	3V/m with 80% AM. 1kHz Modulation.	Pass
Electrical fast transient/burst Immunity	EN 55024	EN 61000-4-4	+/- 1kV for Power Supply Lines	N/A
SURGE IMMUNITY	EN 55024	EN 61000-4-5	+/- 1kV (Line to Line) +/- 2kV (Line to Ground)	N/A
Immunity to Conducted Disturbances Induced by RF fields	EN 55024	EN 61000-4-6	3V with 80% AM. 1 kHz Modulation	N/A
Voltage dips and short interruptions immunity	EN 55024	EN 61000-4-11	0 degrees	N/A

Note : N/A means not applicable.

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8. EN 55032 LINE CONDUCTED EMISSION TEST

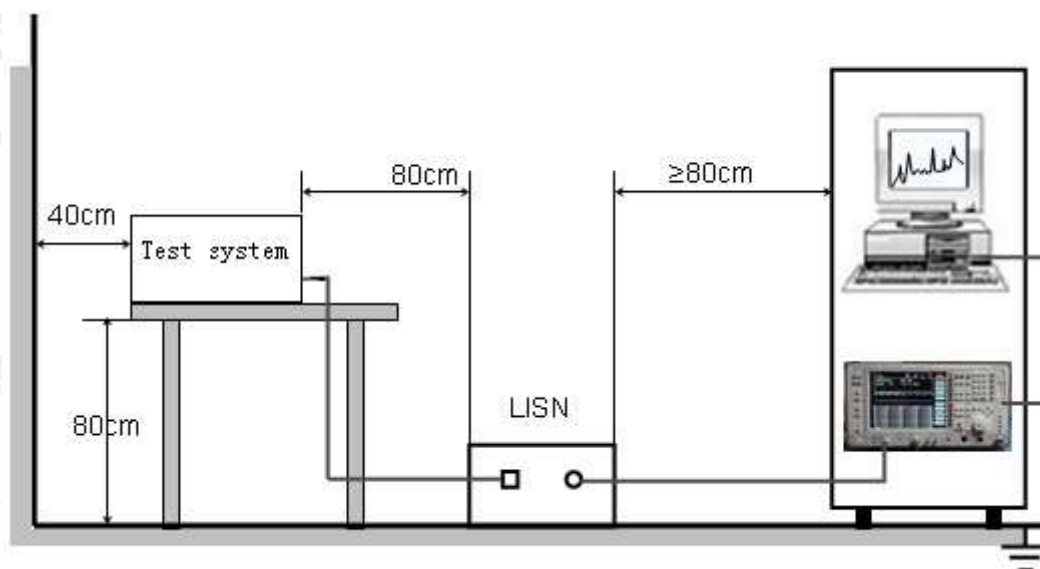
8.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

8.2. BLOCK DIAGRAM OF TEST SETUP



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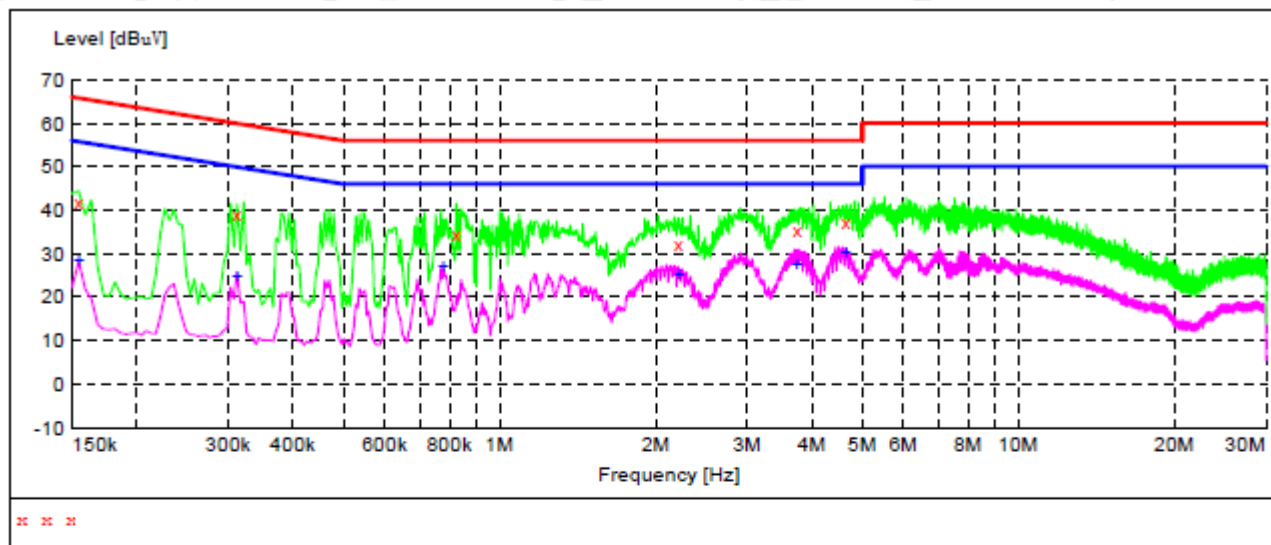
8.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

- (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 table with a height of 0.8 meters is used and is placed on the ground plane as per EN55032 (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 EN55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN55032.
- (4) The EUT received DC5V power from adapter which received AC230V/50Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- (5) All support equipments received power from a second LISN supplying power of AC 230V/50Hz, 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 30 MHz for emissions in each of the test modes.
- (8) During the above scans, the emissions were maximized by cable manipulation.
- (9) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- (10) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

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8.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L1



MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line
0.154500	42.00	10.3	66	23.8	QP	L1
0.312000	39.00	10.3	60	20.9	QP	L1
0.825000	34.70	10.3	56	21.3	QP	L1
2.215500	32.10	10.5	56	23.9	QP	L1
3.745500	35.60	10.5	56	20.4	QP	L1
4.654500	37.00	10.6	56	19.0	QP	L1

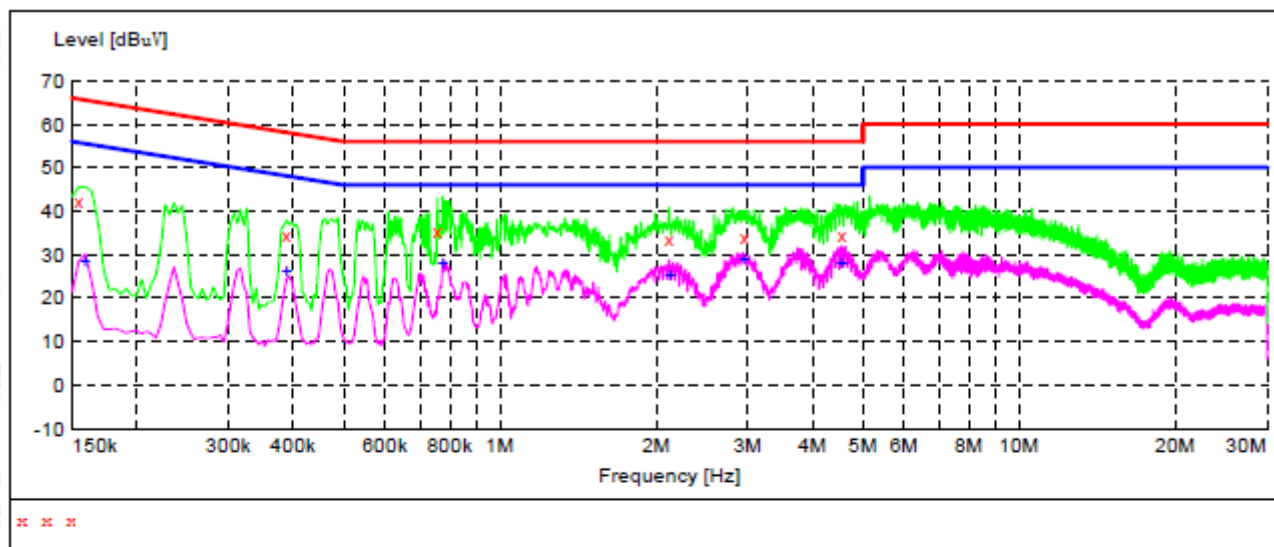
MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line
0.154500	28.40	10.3	56	27.4	AV	L1
0.312000	24.70	10.3	50	25.2	AV	L1
0.780000	27.00	10.3	46	19.0	AV	L1
2.215500	25.30	10.5	46	20.7	AV	L1
3.745500	27.60	10.5	46	18.4	AV	L1
4.650000	30.50	10.6	46	15.5	AV	L1

RESULT: PASS

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LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line
0.154500	42.40	10.3	66	23.4	QP	N
0.388500	34.60	10.3	58	23.5	QP	N
0.757500	35.50	10.3	56	20.5	QP	N
2.116500	33.60	10.5	56	22.4	QP	N
2.962500	34.10	10.5	56	21.9	QP	N
4.555500	34.30	10.5	56	21.7	QP	N

MEASUREMENT RESULT:

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line
0.159000	28.50	10.3	56	27.0	AV	N
0.388500	26.00	10.3	48	22.1	AV	N
0.775500	28.00	10.3	46	18.0	AV	N
2.125500	25.20	10.5	46	20.8	AV	N
2.949000	29.10	10.5	46	16.9	AV	N
4.555500	28.00	10.5	46	18.0	AV	N

RESULT: PASS

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9. EN 55032 RADIATED EMISSION TEST

9.1. LIMITS OF RADIATED DISTURBANCES

AT 10M DISTANCES

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m Q.P.)
30-230	10	30.00
230-1000	10	37.00

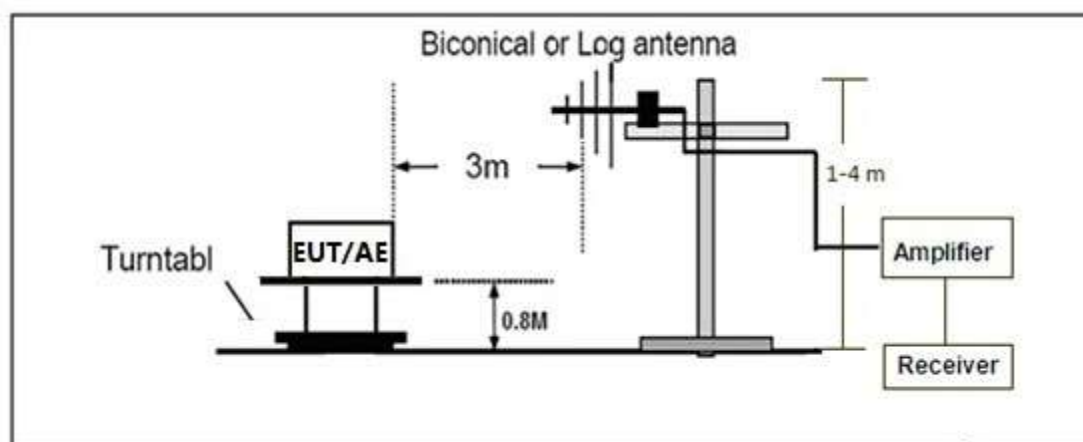
AT 3M DISTANCES

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m Q.P.)
30-230	3	40.00
230-1000	3	47.00

Note: The lower limit shall apply at the transition frequency.

9.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



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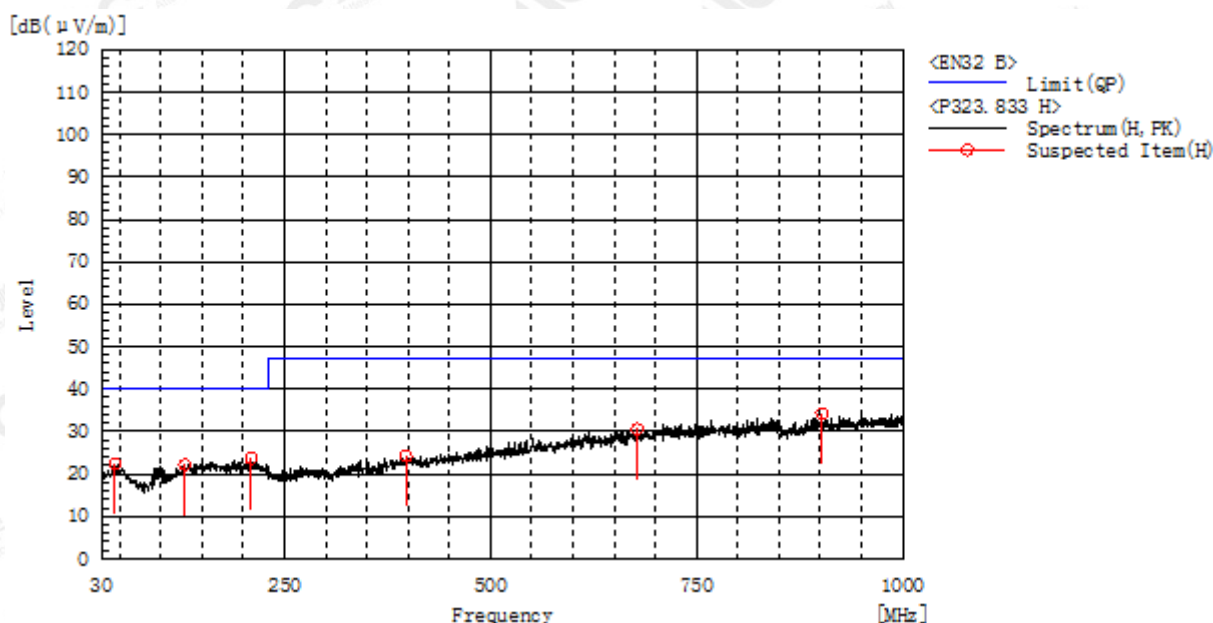
9.3. PROCEDURE OF RADIATED EMISSION TEST

- (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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9.4. TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission Test at 3m Distance-Horizontal

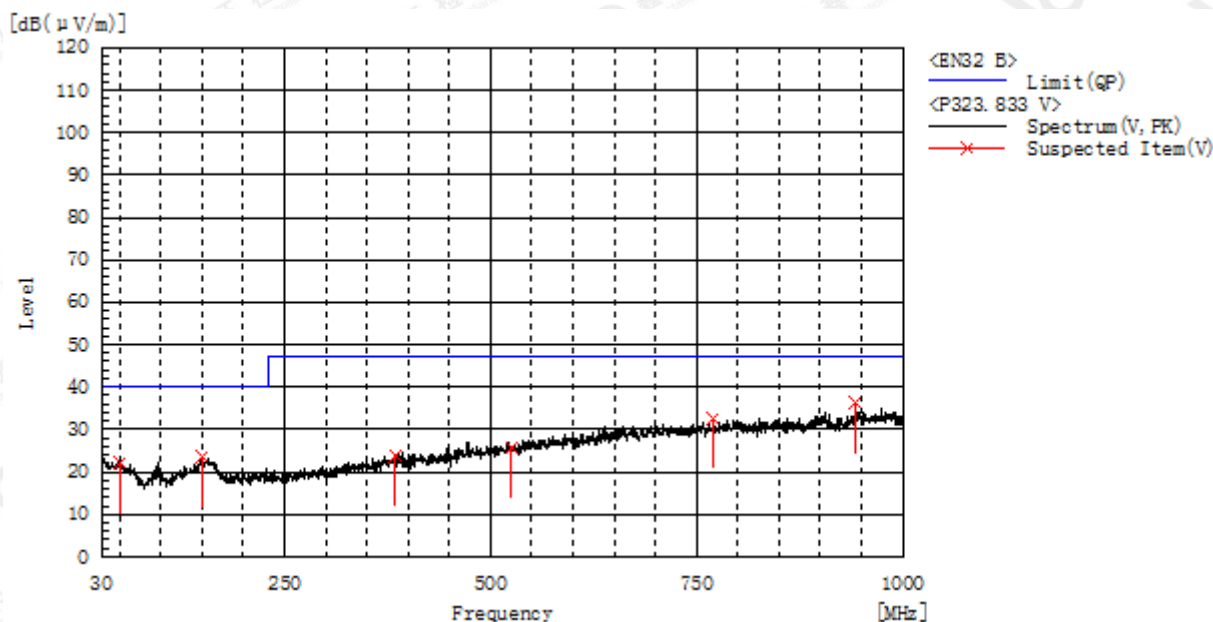


Frequency MHz	Polarization	Reading dB(μV)	Factor dB (1/m)	Level dB(μV/m) PK	Limit dB(μV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
44.550	H	6.3	16.1	22.4	40.0	17.6	Pass	200.0	104.0
129.425	H	6.3	15.9	22.2	40.0	17.8	Pass	200.0	31.9
209.935	H	9.8	13.9	23.7	40.0	16.3	Pass	200.0	282.6
397.630	H	5.2	19.0	24.2	47.0	22.8	Pass	150.0	146.9
677.960	H	6.2	24.4	30.6	47.0	16.4	Pass	150.0	219.6
902.030	H	6.5	27.7	34.2	47.0	12.8	Pass	150.0	73.7

RESULT: PASS

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Radiated Emission Test at 3m Distance-Vertical



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
150.765	V	5.8	17.8	23.6	40.0	16.4	Pass	200.0	37.5
941.800	V	8.2	28.3	36.5	47.0	10.5	Pass	200.0	289.5
50.370	V	5.6	16.6	22.2	40.0	17.8	Pass	150.0	145.7
384.535	V	5.2	18.5	23.7	47.0	23.3	Pass	100.0	285.2
525.670	V	4.4	21.4	25.8	47.0	21.2	Pass	200.0	182.4
770.110	V	6.3	26.4	32.7	47.0	14.3	Pass	150.0	3.6

RESULT: PASS

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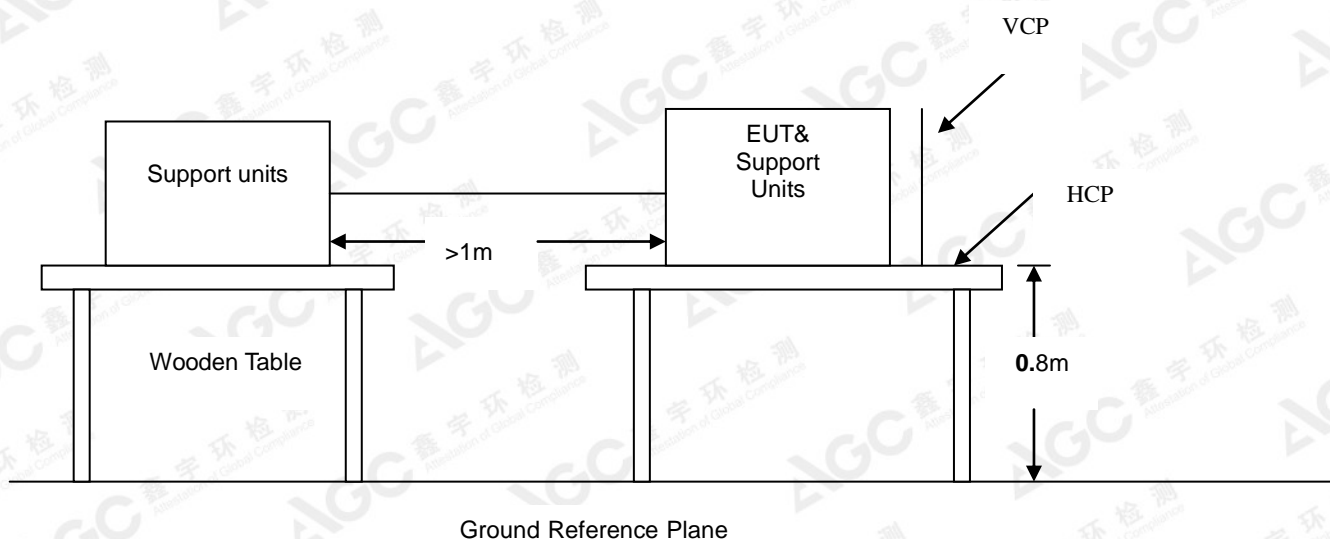
10. EN 61000-4-2 ESD IMMUNITY TEST

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	Erik
Temperature	20°C
Humidity	50%

10.1. BLOCK DIAGRAM OF TEST SETUP

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



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10.2. TEST PROCEDURE

The EUT was located 0.1 m minimum from all side of the HCP.

The support units were located 1 m minimum away from the EUT.

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

Active the communication function if the EUT with such port(s).

As per the requirement of EN 55024; applying direct contact discharge at the sides other than front of EUT at minimum 50 discharges (25 positive and 25 negative) if applicable, can't be applied direct contact discharge side of EUT then the indirect discharge shall be applied. One of the test points shall be subjected to at least 50 indirect discharge (contact) to the front edge of horizontal coupling plane.

Other parts of EUT where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.

The application of ESD to the contact of open connectors is not required.

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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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**

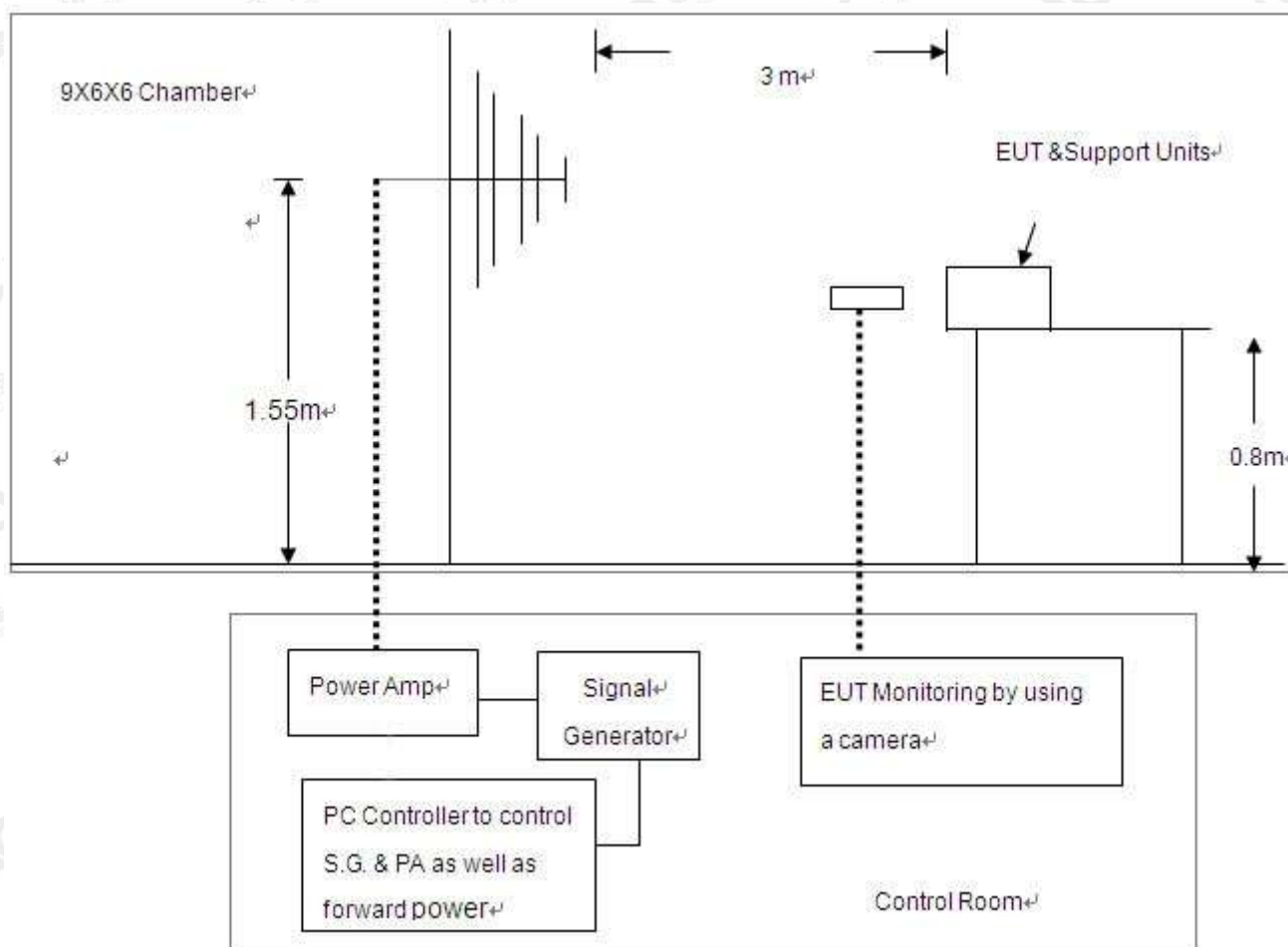
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11. EN 61000-4-3 RS IMMUNITY TEST

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	Erik
Temperature	25°C
Humidity	55%

11.1. BLOCK DIAGRAM OF TEST SETUP



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11.2. 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	Front	No function loss	A
80-1000	3V/m	AM	H	Left	No function loss	A
80-1000	3V/m	AM	H	Back	No function loss	A
80-1000	3V/m	AM	H	Right	No function loss	A
80-1000	3V/m	AM	V	Front	No function loss	A
80-1000	3V/m	AM	V	Left	No function loss	A
80-1000	3V/m	AM	V	Back	No function loss	A
80-1000	3V/m	AM	V	Right	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.

☒ **PASS**
☐ **FAIL**

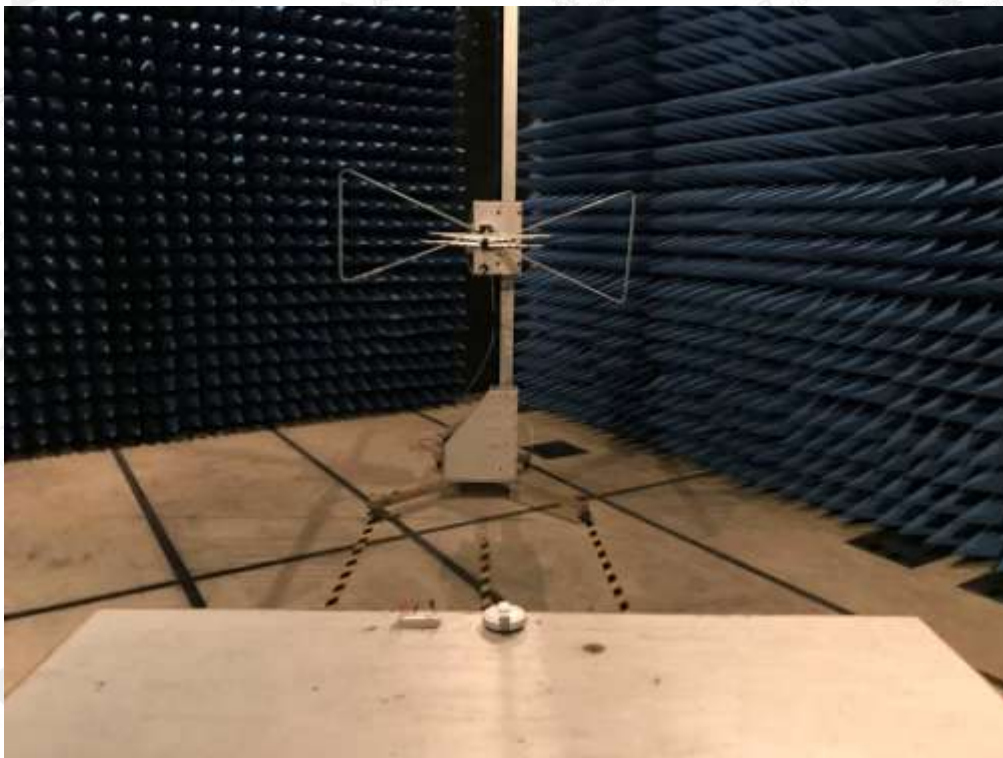
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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

EN 55032 CONDUCTED EMISSION TEST SETUP



EN 55032 RADIATED EMISSION TEST SETUP



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EN 61000-4-2 ESD IMMUNITY TEST SETUP



EN 61000-4-3 RS 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

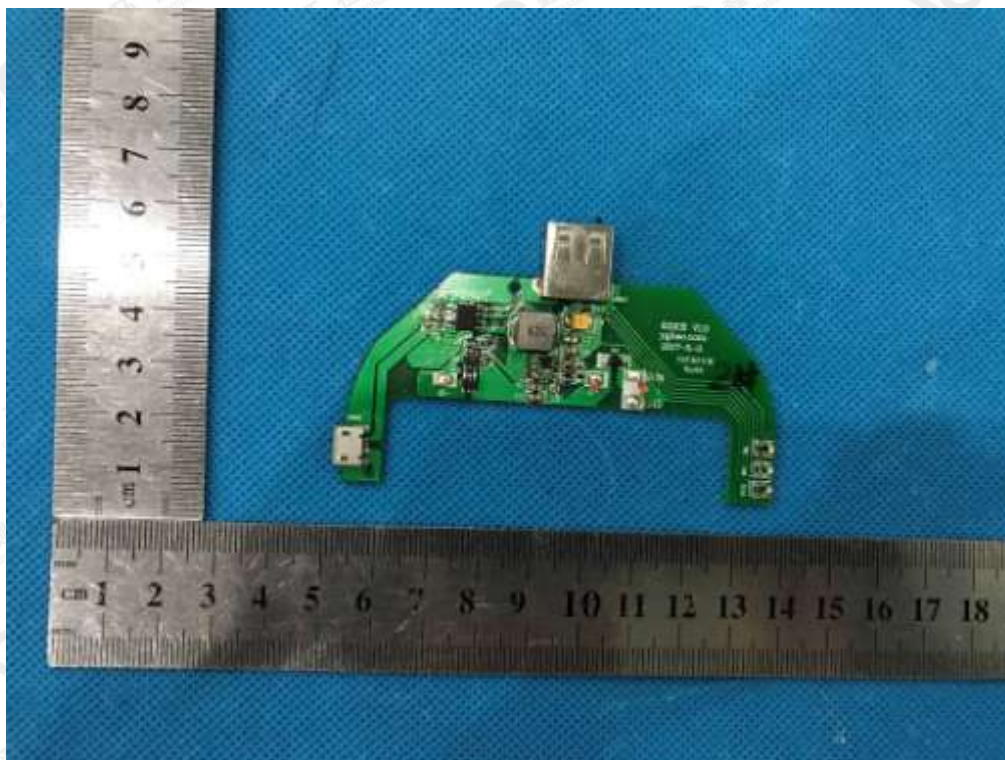


OPEN VIEW OF EUT

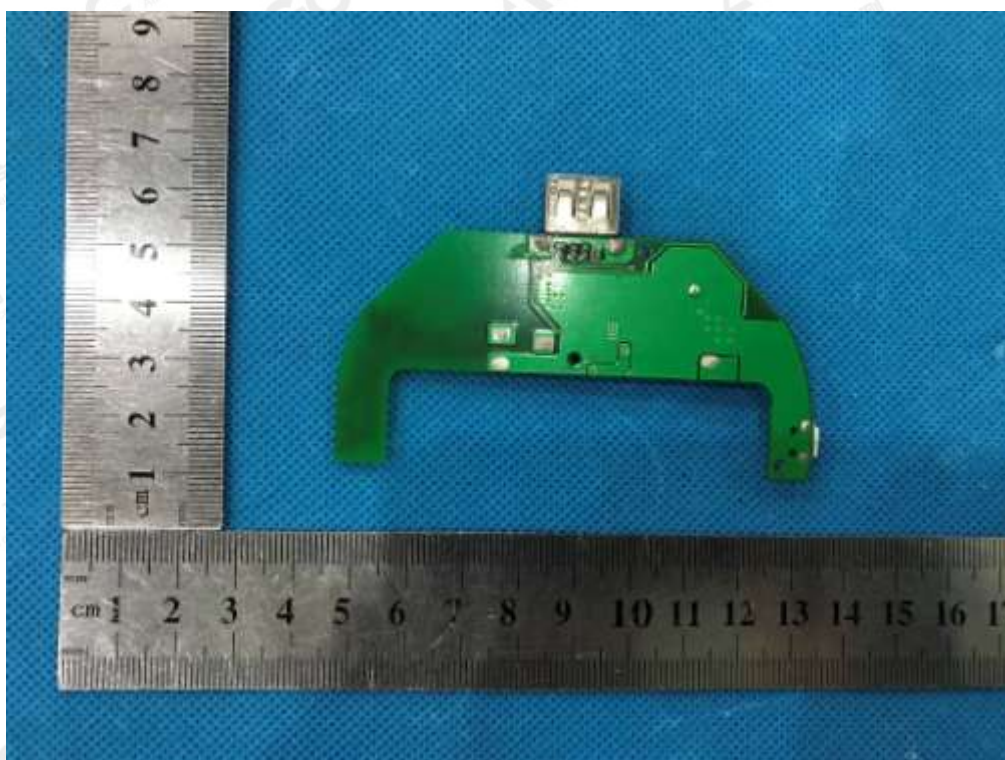


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INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----

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