

EMC Test Report

Report No.: AGC01978190302EE01

PRODUCT DESIGNATION : portfolio with 4000mAh powerbank
BRAND NAME : N/A
MODEL NAME : MO8840-07
CLIENT : Mid Ocean Brands B.V
DATE OF ISSUE : Apr.10, 2019
STANDARD(S) : EN 55032:2015/AC:2016
: EN 55035:2017
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

CAUTION:

This report shall not be reproduced except in full without the written permission of the test laboratory and shall not be quoted out of context.



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Apr.10, 2019	Valid	Initial release

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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	10
8. EN 55032 RADIATED EMISSION TEST	11
8.1. LIMITS OF RADIATED DISTURBANCES	11
8.2. BLOCK DIAGRAM OF TEST SETUP	11
8.3. PROCEDURE OF RADIATED EMISSION TEST	12
8.4. TEST RESULT OF RADIATED EMISSION TEST	13
9. EN 61000-4-2 ESD IMMUNITY TEST	15
9.1. BLOCK DIAGRAM OF TEST SETUP	15
9.2. TEST PROCEDURE	16
9.3. PERFORMANCE & RESULT	17
10. EN 61000-4-3 RS IMMUNITY TEST	18
10.1. BLOCK DIAGRAM OF TEST SETUP	18
10.2. TEST PROCEDURE	19
10.3. PERFORMANCE & RESULT	19
11. EN 61000-4-4 EFT IMMUNITY TEST	20
11.1. BLOCK DIAGRAM OF TEST SETUP	20
11.2. TEST PROCEDURE	21
11.3. PERFORMANCE & RESULT	21
12. EN 61000-4-6 CS IMMUNITY TEST	22
12.1. BLOCK DIAGRAM OF TEST SETUP	22
12.2. TEST PROCEDURE	23
12.3. PERFORMANCE & RESULT	23
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	24
APPENDIX B: PHOTOGRAPHS OF EUT	27

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

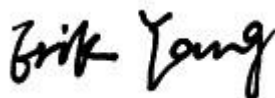
1. VERIFICATION OF CONFORMITY

Applicant	Mid Ocean Brands B.V
Address	Wellensiekstraat 2 6718 XZ Ede The Netherlands
Manufacturer	
Address	
Factory	
Address	
Product Designation	portfolio with 4000mAh powerbank
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	MO8840-07
Date of test	Apr.04, 2019 to Apr.09, 2019
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)

Apr.10, 2019

Reviewed By



Stone Zhou(Zhou Dong)

Apr.10, 2019

Approved By



 Forrest Lei(Lei Yonggang)
 Authorized Officer

Apr.10, 2019

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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 the data of the worst mode would be recorded in this 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, $U_c = \pm 3.9\text{dB}$

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

4. PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DC 5V 1A
EUT Output Rating	DC 5V 2.1A

I/O Port Information ☒ Applicable ☐ Not Applicable

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
USB	1	0.1m 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.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Resistor	--	--	--	--	0.8m unshielded
Multimeter	VICTOR	VC9808	--	--	0.9m unshielded
Multimeter	FLUKE	15B+	40011565WS		0.9m unshielded

Note:

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

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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 EFT TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ELECTRICAL FAST TRANSIENT BURST GENERATOR	LIONCEL	EFT-404B	EFT044 01011	Jul.13, 2018	Jul.12, 2019

TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
SIGNAL GENERATOR	R&S	E4421B	MY433516 03	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	832378102 7	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, 2020

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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	832378102 7	May.15, 2018	May.14, 2019
SIGNAL GENERATOR	R&S	E4421B	MY4335160 3	May.15, 2018	May.14, 2019

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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	+/- 0.5kV for DC Power port	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.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

8. EN 55032 RADIATED EMISSION TEST

8.1. 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

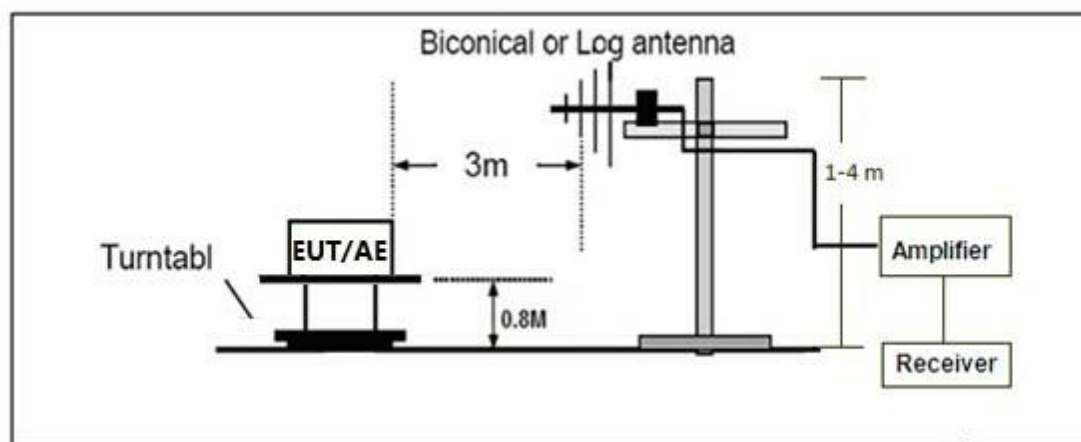
AT 3M DISTANCES

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.

8.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

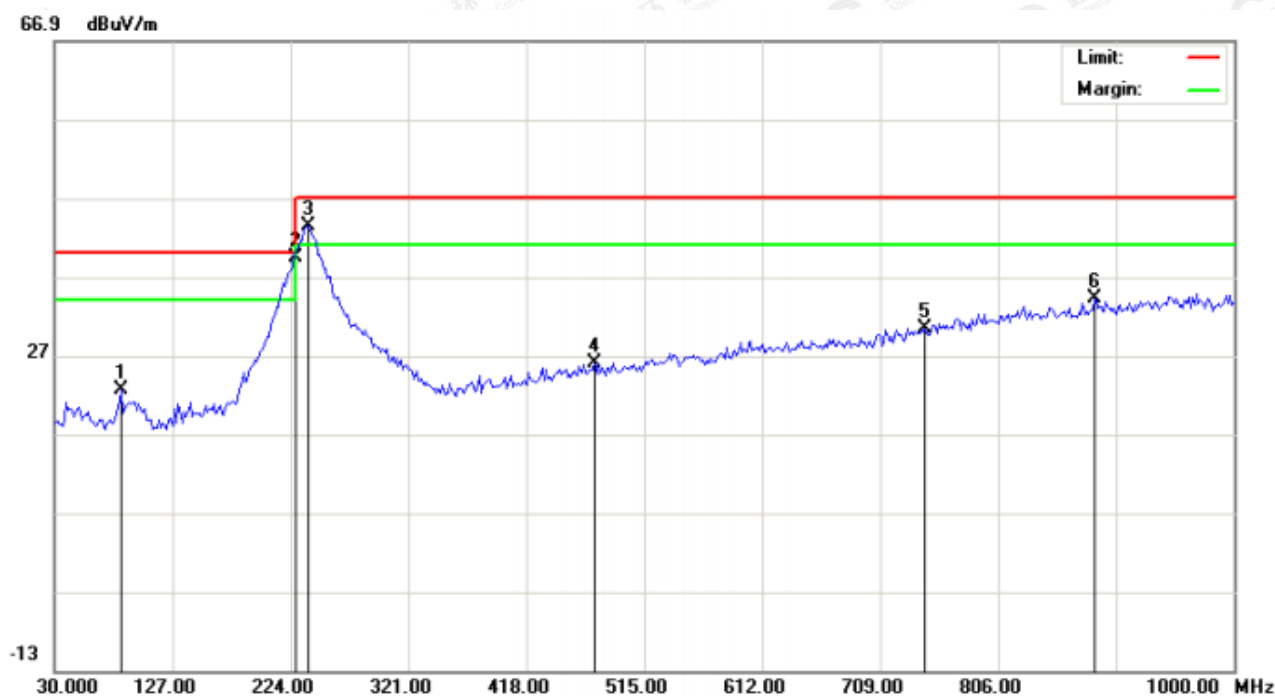
8.3. PROCEDURE OF RADIATED EMISSION TEST

- (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. All support equipments received AC230V/50Hz power from socket under the turntable, if any.
- (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.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

8.4. TEST RESULT OF RADIATED EMISSION TEST

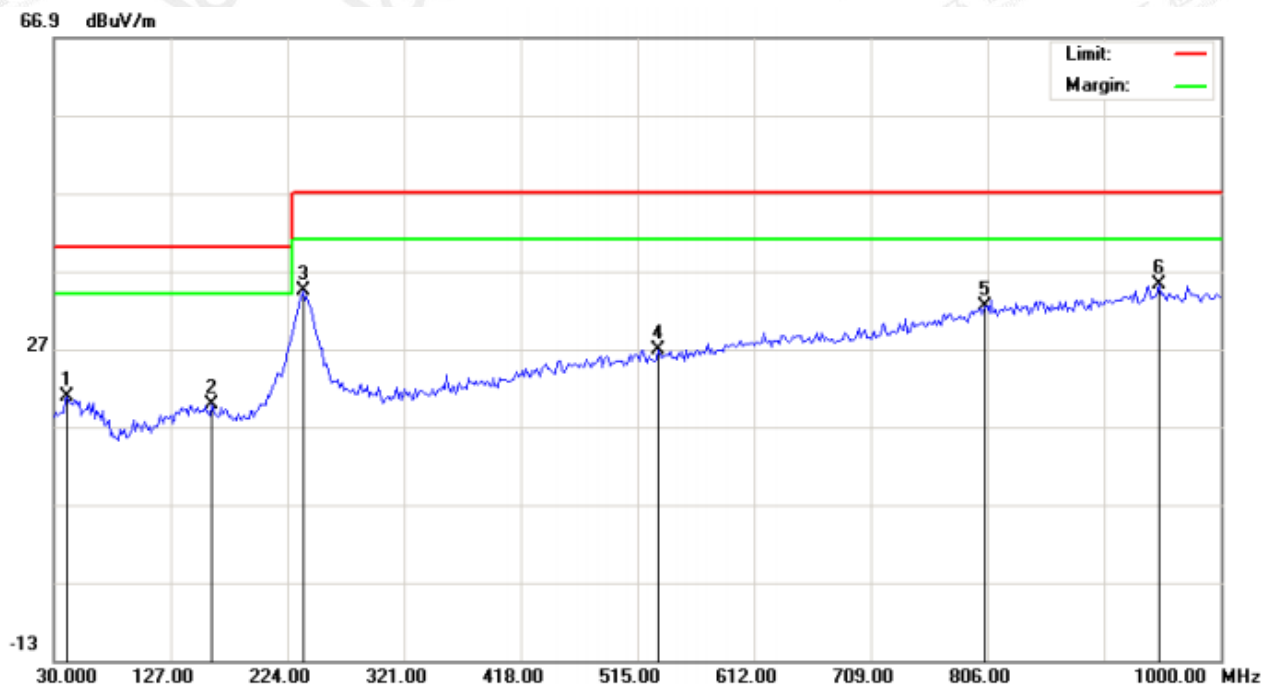
Radiated Emission Test at 3m Distance-Horizontal



RESULT: PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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		41.3167	0.81	20.04	20.85	40.00	-19.15	peak
2		160.9500	0.63	19.09	19.72	40.00	-20.28	peak
3		236.9333	16.04	18.44	34.48	47.00	-12.52	peak
4		532.7833	1.26	25.63	26.89	47.00	-20.11	peak
5		804.3833	1.98	30.47	32.45	47.00	-14.55	peak
6	*	948.2667	3.16	32.12	35.28	47.00	-11.72	peak

RESULT: PASS

Note :

Measurement(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Factor(dB/m)=Antenna Factor(dB/m)+Cable loss(dB)+Attenuation(dB)for Attenuator

Over= Measurement –Limit

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

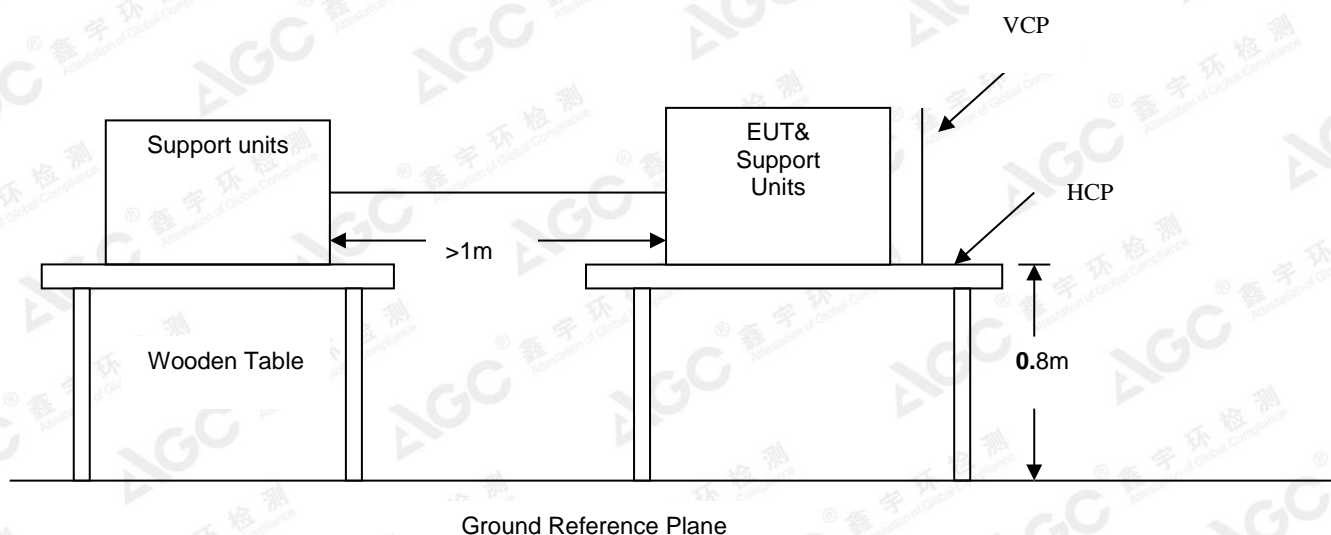
9. EN 61000-4-2 ESD IMMUNITY TEST

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	Erik
Temperature	20°C
Humidity	50%

9.1. BLOCK DIAGRAM OF TEST SETUP

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



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

9.2. TEST PROCEDURE

The test procedure shall be in accordance with EN 61000-4-2:2009. 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 61000-4-2:2009 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

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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**

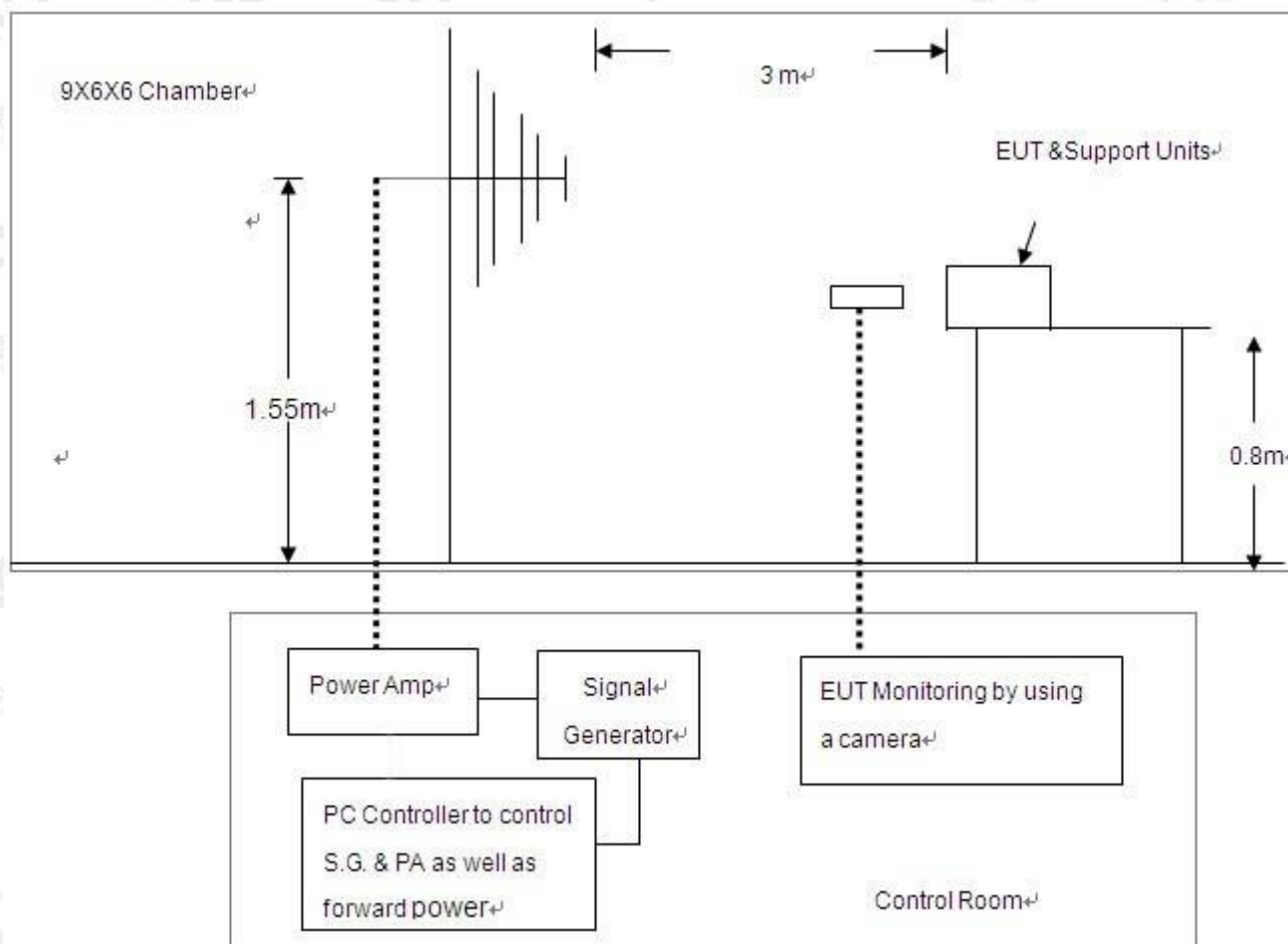
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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	Erik
Temperature	25°C
Humidity	55%

10.1. BLOCK DIAGRAM OF TEST SETUP



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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 EN61000-4-3.

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**

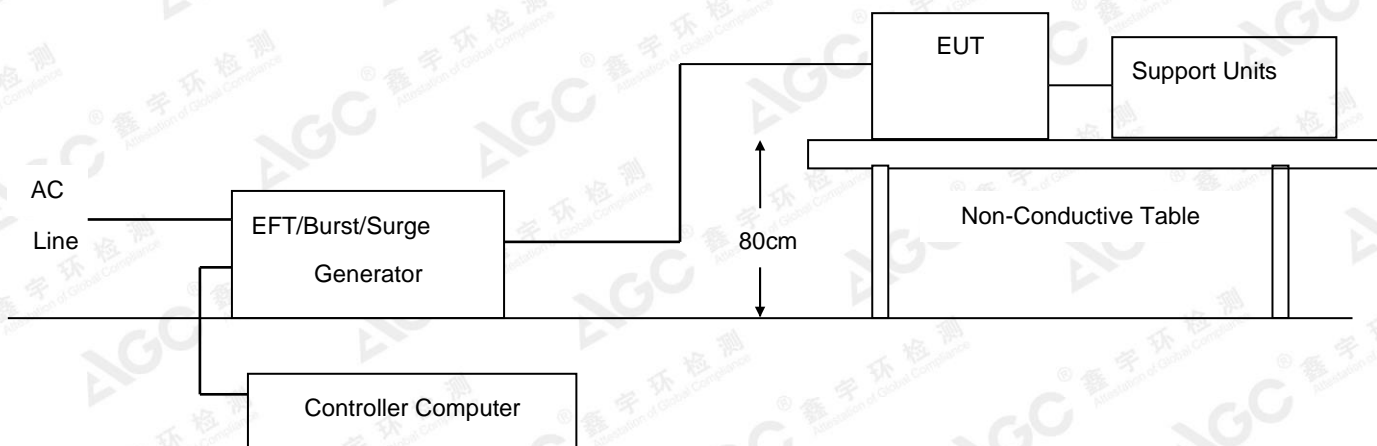
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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	+/- 0.5kV for DC Power port
Standard require	B
Tester	Erik
Temperature	25°C
Humidity	55%

11.1. BLOCK DIAGRAM OF TEST SETUP



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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
N+P	+/- 0.5	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.

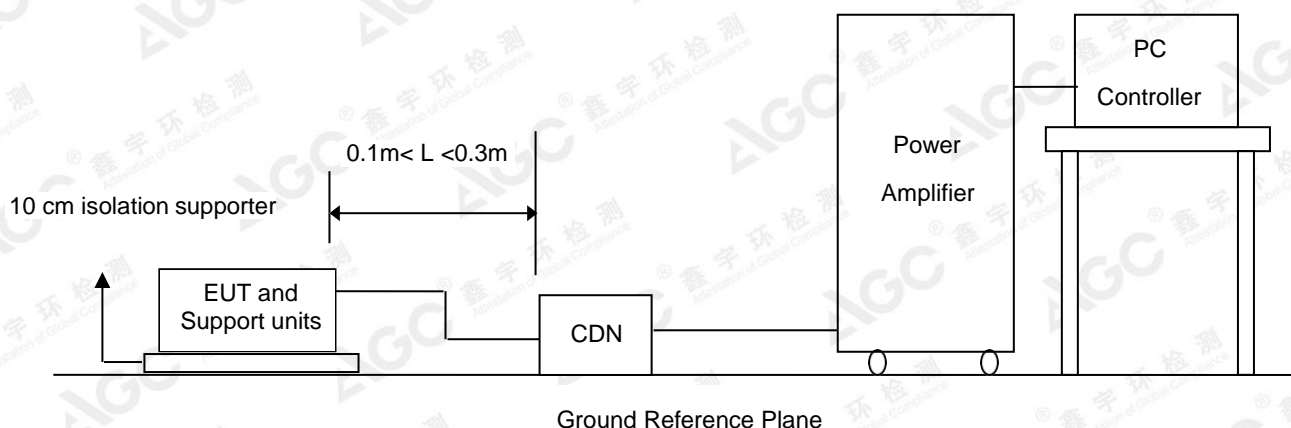
☒ **PASS**
☐ **Pass**

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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	Erik
Temperature	25°C
Humidity	55%

12.1. BLOCK DIAGRAM OF TEST SETUP



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

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

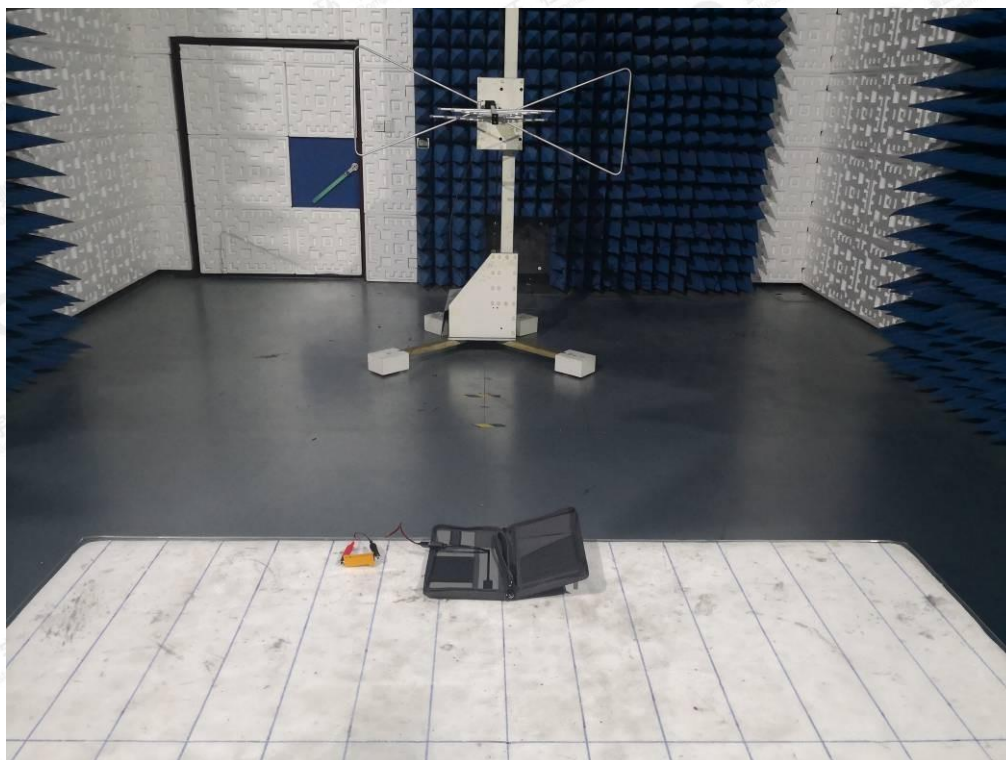
Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
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**
☐ **Pass**

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

EN 55032 RADIATED EMISSION TEST SETUP

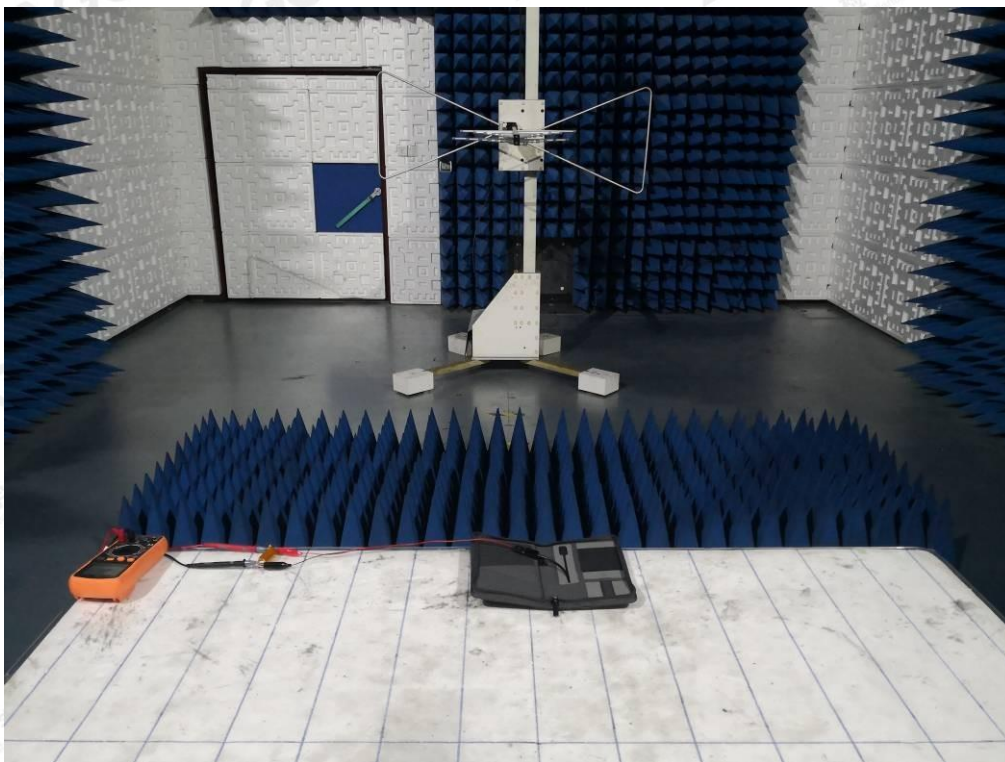


EN 61000-4-2 ESD IMMUNITY TEST SETUP



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

EN 61000-4-3 RS IMMUNITY TEST SETUP



EN 61000-4-4 EFT IMMUNITY TEST SETUP



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

EN 61000-4-6 CS IMMUNITY TEST SETUP



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT



BOTTOM VIEW OF EUT



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

FRONT VIEW OF EUT

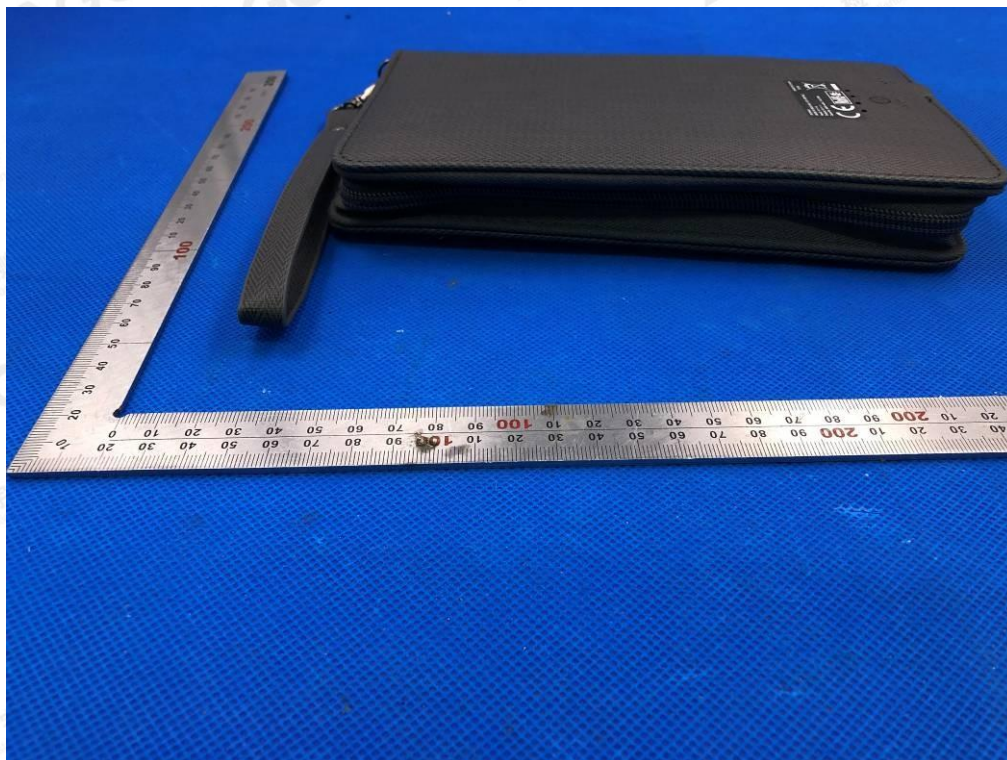


BACK VIEW OF EUT



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

LEFT VIEW OF EUT



RIGHT VIEW OF EUT

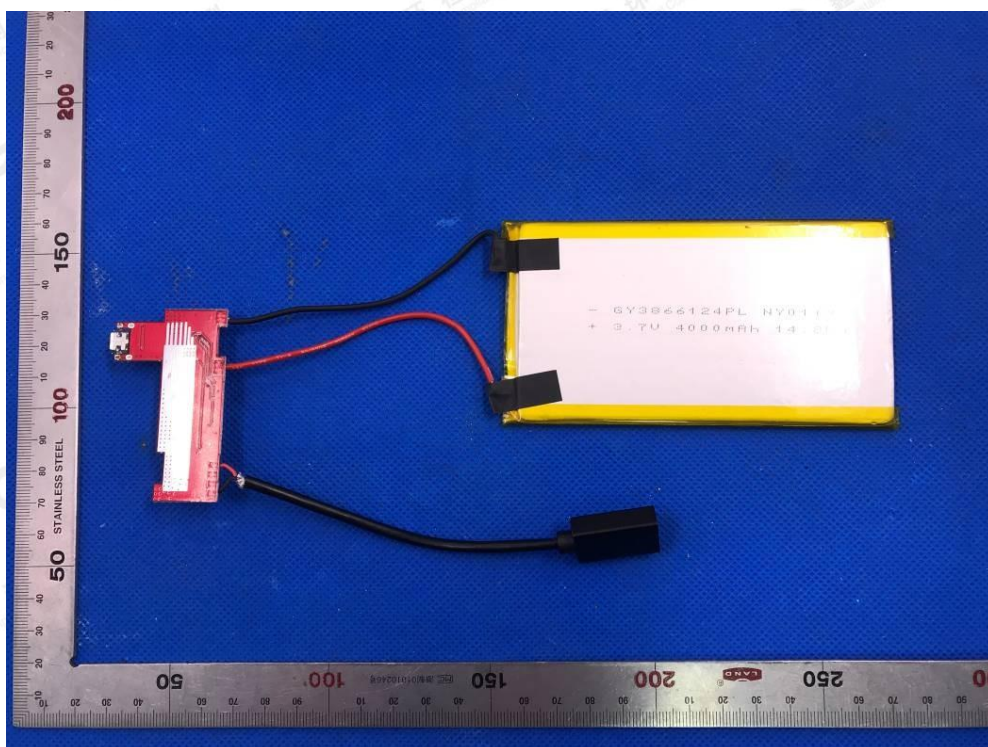


The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

OPEN VIEW OF EUT-1

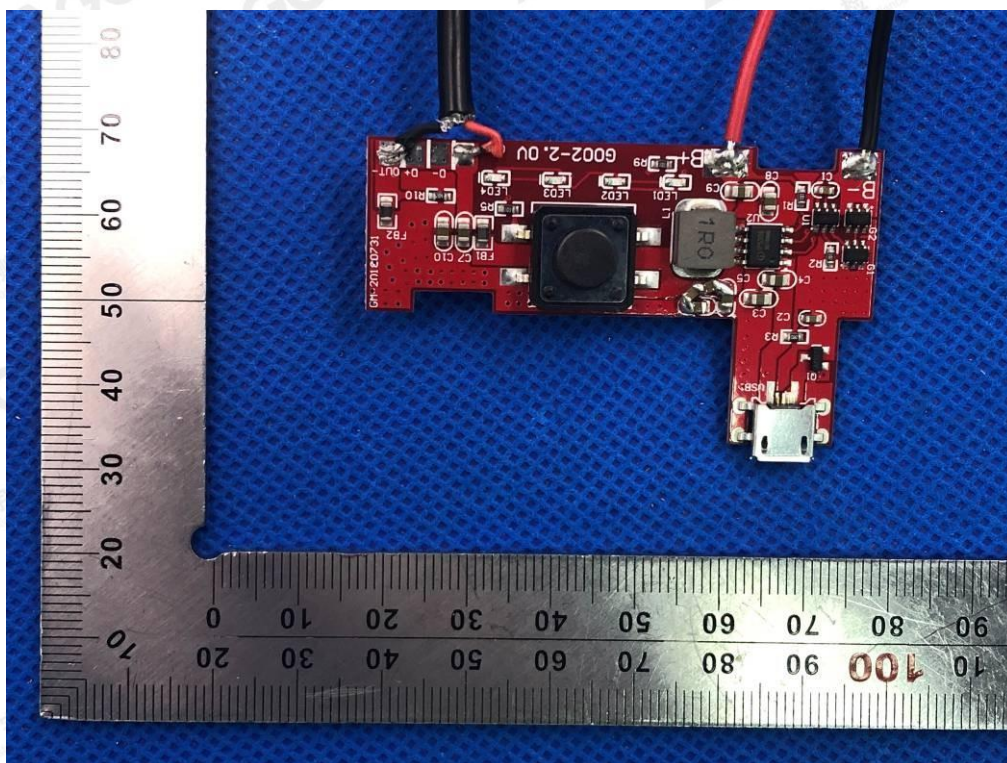


OPEN VIEW OF EUT-2

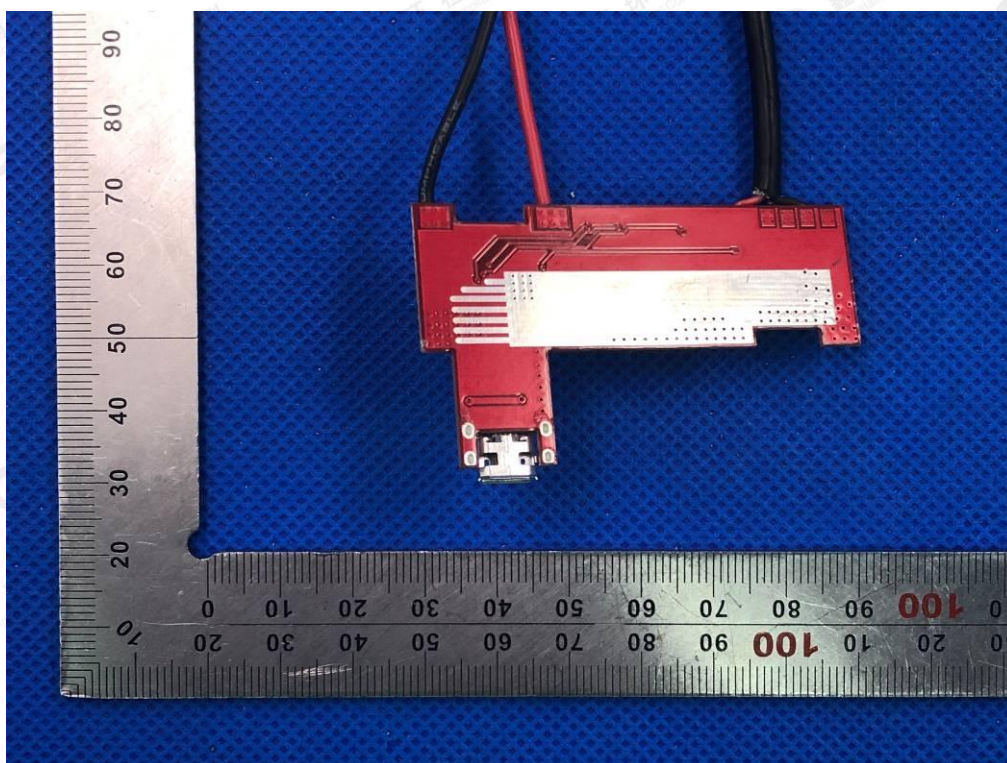


The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.

INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by AGC, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.agc-cert.com>.