

---

# EMC Test Report

---

Report No.: AGC01628200314EE01

**PRODUCT DESIGNATION** : Sealed lead acid battery  
**BRAND NAME** : DESA  
**MODEL NAME** : DS 12V-7AH, DSseries  
**APPLICANT** : DESA GLOBAL END. U. ITH. IHR. SAN. TIC LTD STI  
**DATE OF ISSUE** : Mar. 27, 2020  
**STANDARD(S)** : EN 61000-6-3:2007/A1:2011/AC:2012  
: EN 61000-6-1:2007  
**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.



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

### REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Mar. 27, 2020	Valid	Initial release



## TABLE OF CONTENTS

<b>1 VERIFICATION OF CONFORMITY .....</b>	<b>4</b>
<b>2 SYSTEM DESCRIPTION .....</b>	<b>5</b>
<b>3 MEASUREMENT UNCERTAINTY.....</b>	<b>5</b>
<b>4 PRODUCT INFORMATION.....</b>	<b>6</b>
<b>5 SUPPORT EQUIPMENT .....</b>	<b>7</b>
<b>6 TEST FACILITY.....</b>	<b>8</b>
<b>7 TEST EQUIPMENT LIST .....</b>	<b>8</b>
<b>8 TEST SUMMARY LIST .....</b>	<b>9</b>
<b>9 EN 61000-6-3 RADIATED EMISSION TEST.....</b>	<b>10</b>
9.1 LIMITS OF RADIATED DISTURBANCES.....	10
9.2 BLOCK DIAGRAM OF TEST SETUP.....	10
9.3 PROCEDURE OF RADIATED EMISSION TEST .....	11
9.4 TEST RESULT OF RADIATED EMISSION TEST.....	12
<b>10 EN 61000-4-2 ESD IMMUNITY TEST.....</b>	<b>14</b>
10.1 BLOCK DIAGRAM OF TEST SETUP.....	14
10.2 TEST PROCEDURE .....	15
10.3 PERFORMANCE & RESULT .....	16
<b>11 EN 61000-4-3 RS IMMUNITY TEST .....</b>	<b>17</b>
11.1 BLOCK DIAGRAM OF TEST SETUP.....	17
11.2 TEST PROCEDURE .....	18
11.3 PERFORMANCE & RESULT.....	20
<b>APPENDIX A: PHOTOGRAPHS OF TEST SETUP .....</b>	<b>21</b>
<b>APPENDIX B: PHOTOGRAPHS OF EUT .....</b>	<b>23</b>

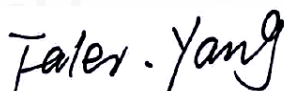
# 1 VERIFICATION OF CONFORMITY

<b>Applicant</b>	DESA GLOBAL END. U. ITH. IHR. SAN. TIC LTD STI
<b>Address</b>	Melih gokcek bulvarı 138-22 ivedik - yenimahalle- ankara TURKEY
<b>Manufacturer</b>	DESA GLOBAL END. U. ITH. IHR. SAN. TIC LTD STI
<b>Address</b>	Melih gokcek bulvarı 138-22 ivedik - yenimahalle- ankara TURKEY
<b>Factory</b>	DESA GLOBAL END. U. ITH. IHR. SAN. TIC LTD STI
<b>Address</b>	Melih gokcek bulvarı 138-22 ivedik - yenimahalle- ankara TURKEY
<b>Product Designation</b>	Sealed lead acid battery
<b>Brand Name</b>	DESA
<b>Test Model</b>	DS 12V-7AH
<b>Series Model</b>	DSseries
<b>Difference description</b>	All the same, except for the model name. The test model is DS 12V-7AH.
<b>Date of test</b>	Mar. 19, 2020 to Mar. 27, 2020
<b>Deviation</b>	The sample has no any deviation to the method of standard mentioned on page 1
<b>Condition of Test Sample</b>	Normal
<b>Test Result</b>	Pass

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.

Prepared By



Faler Yang(Yang Feiyue)  
Project Engineer

Mar. 27, 2020

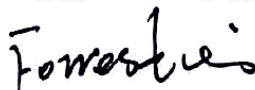
Reviewed By



Erik Yang(Yang Jianmin)  
Reviewer

Mar. 27, 2020

Approved By



Forrest Lei(Lei Yonggang)  
Authorized Officer

Mar. 27, 2020



## 2 SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	TEST MODE DESCRIPTION	WORST
1	Discharging	V
Note: 1. V means EMI worst mode		

## 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 Below 1GHz,  $U_c = \pm 4.0\text{dB}$

#### 4 PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DS 12V-7AH

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

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
DC	1	--	1



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

## 5 SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Resistor	--	--	--	--	0.8m unshielded
Multimeter	--	--	--	--	0.8m unshielded



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

## 6 TEST FACILITY

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

## 7 TEST EQUIPMENT LIST

### TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	Jun.12, 2019	Jun. 11, 2020
Antenna	SCHWARZBEC K	VULB9168	494	Sep. 20, 2019	Sep. 19, 2021
Test software	FARA	EZ EMC (Ver.RA-03A)	N/A	N/A	N/A

### TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Simulator	EM Test	dito	P1527160053	Oct. 24, 2019	Oct. 23, 2020

### TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Signal Generator	R&S	E4421B	MY4335160 3	Jun. 12, 2019	Jun. 11, 2020
Power Sensor	R&S	URV5-Z4	100124	May 17, 2019	May 16, 2020
Power Meter	R&S	NRVD	8323781027	May 17, 2019	May 16, 2020
Power Amplifier	KALMUS	7100LC	04-02/17-06 -001	Jun.12, 2019	Jun.11, 2020
Power Amplifier	Milmega	AS0104-55_5 5	1004793	Jun.12, 2019	Jun.11, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
Antenna	SCHWARZBECK	VULB9168	D69250	Jan. 09, 2019	Jan. 08, 2021



## 8 TEST SUMMARY LIST

Test item	Test Requirement	Test Method	Class/Severity	Result
CONDUCTED EMISSION	EN 61000-6-3	EN 61000-6-3	Class B	N/A
RADIATED EMISSION	EN 61000-6-3	EN 61000-6-3	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	EN61000-6-1	EN 61000-4-2	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)	Pass
Radiated RF Electromagnetic	EN61000-6-1	EN 61000-4-3	3V/mwith80% AM. 1kHz Modulation at 80-1000MHz 3V/mwith80% AM. 1kHz Modulation at 1400-2000MHz 1V/m with 80% AM. 1kHz Modulation at 2000-2700MHz	Pass
Electrical fast transient/burst Immunity	EN61000-6-1	EN 61000-4-4	+/- 1kV for Power Supply Lines	N/A
SURGE IMMUNITY	EN61000-6-1	EN 61000-4-5	+/- 1kV (Line to Line) +/- 2kV (Line to Ground)	N/A
Immunity to Conducted Disturbances Induced by RF fields	EN61000-6-1	EN 61000-4-6	3V with 80% AM. 1 kHz Modulation	N/A
Power frequency magnetic field	EN61000-6-1	EN61000-4-8	50/60Hz 3A/m	N/A
Voltage dips and short interruptions immunity	EN61000-6-1	EN 61000-4-11	PHASE ANGLE 0 degrees	N/A

**Note :** N/A means not applicable.

## 9 EN 61000-6-3 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

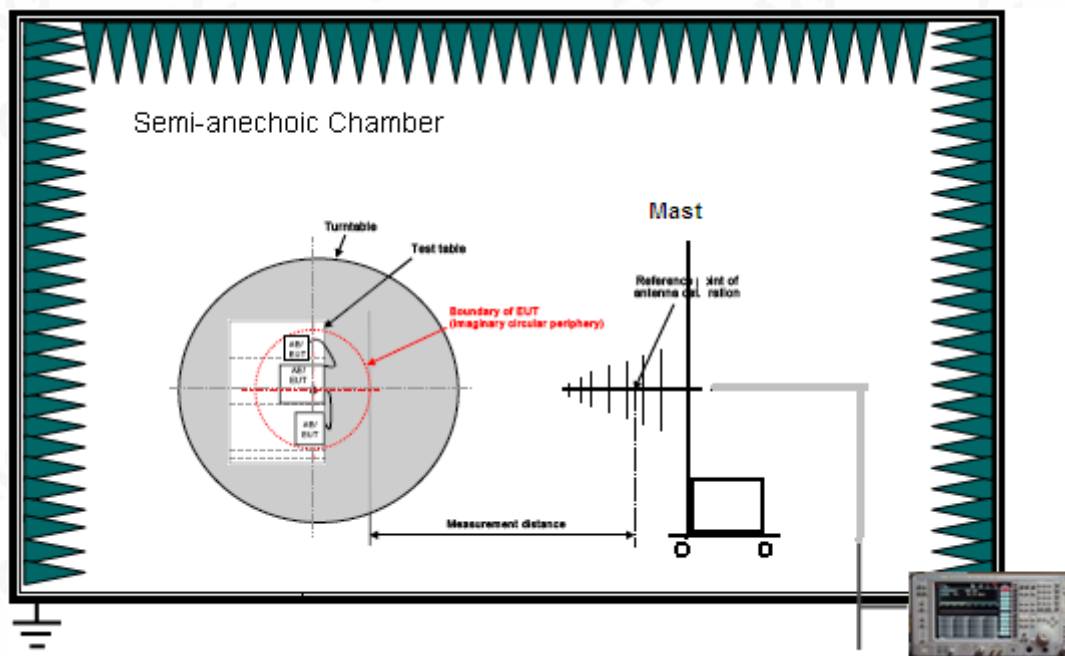
#### AT 3M DISTANCES

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



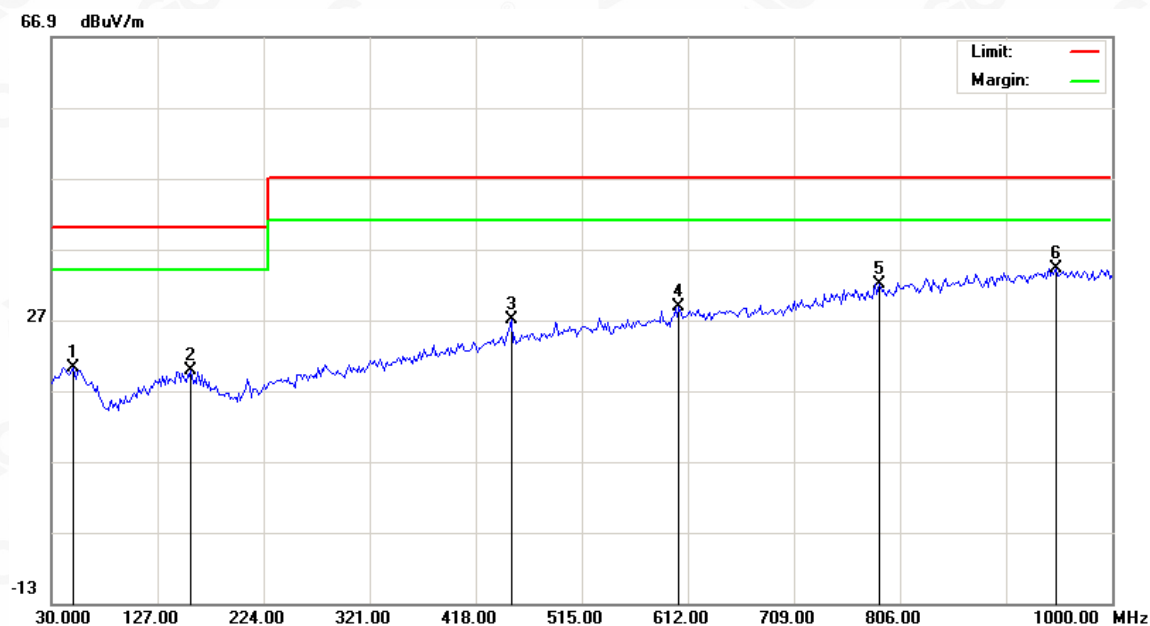
### 9.3 PROCEDURE OF RADIATED EMISSION TEST

- (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 61000-6-3 (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 10cm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN 61000-6-3.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN 61000-6-3.
- (4) The EUT was discharged to resistor.
- (5) The antenna was placed at 3 meter away from the EUT as stated in EN 61000-6-3. 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.



## 9.4 TEST RESULT OF RADIATED EMISSION TEST

### Radiated Emission Test at 3m Distance-Horizontal

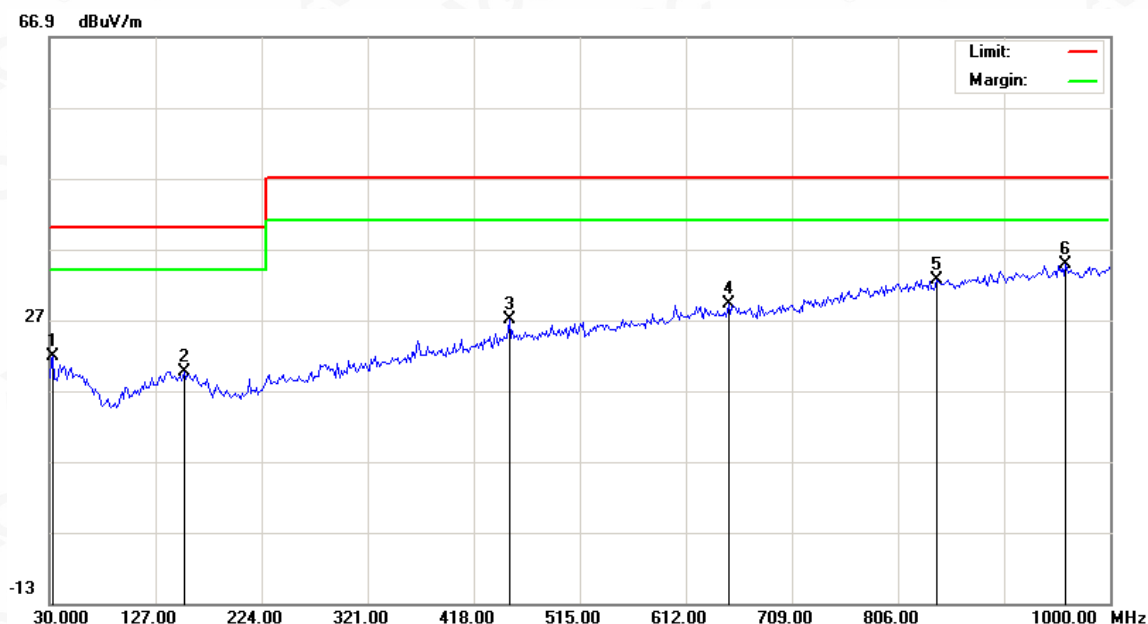


No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		49.4000	0.37	19.75	20.12	40.00	-19.88	peak			
2		157.7167	0.70	19.19	19.89	40.00	-20.11	peak			
3		450.3333	2.92	23.99	26.91	47.00	-20.09	peak			
4		603.9167	1.81	27.00	28.81	47.00	-18.19	peak			
5		786.6000	1.99	30.11	32.10	47.00	-14.90	peak			
6	*	948.2667	2.12	32.12	34.24	47.00	-12.76	peak			

**RESULT: PASS**



### Radiated Emission Test at 3m Distance-Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		33.2333	3.51	18.27	21.78	40.00	-18.22	peak			
2		152.8667	0.33	19.20	19.53	40.00	-20.47	peak			
3		450.3333	2.96	23.99	26.95	47.00	-20.05	peak			
4		650.8000	1.63	27.56	29.19	47.00	-17.81	peak			
5		841.5667	1.72	30.95	32.67	47.00	-14.33	peak			
6	*	959.5833	2.56	32.21	34.77	47.00	-12.23	peak			

**RESULT: PASS**



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

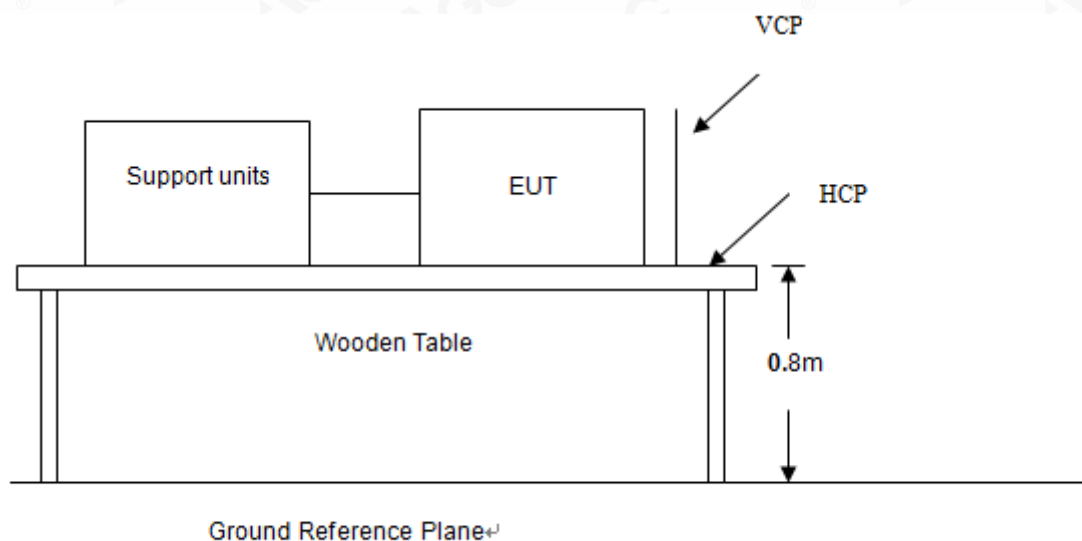
## 10 EN 61000-4-2 ESD IMMUNITY TEST

### 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	Faler
Temperature	23.8°C
Humidity	57.7%

#### 10.1 BLOCK DIAGRAM OF TEST SETUP

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



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

## 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 61000-4-2; applying direct contact discharge at the sides other than front of EUT at minimum 20 discharges (10 positive and 10 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.

Putting a mark on EUT to show tested points. The following test condition was followed during the tests.

**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 (Back)	No function loss	A
±4kV	Indirect Discharge HCP (Left)	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 (Back)	No function loss	A
±4kV	Indirect Discharge VCP (Left)	No function loss	A
±4kV	Indirect Discharge VCP (Right)	No function loss	A
±8kV	Air Discharge	No function loss	A



### 10.3 PERFORMANCE & RESULT

<b>Criteria A:</b>	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.
<b>Criteria B:</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.
<b>Criteria C:</b>	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**

☐ **FAIL**



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

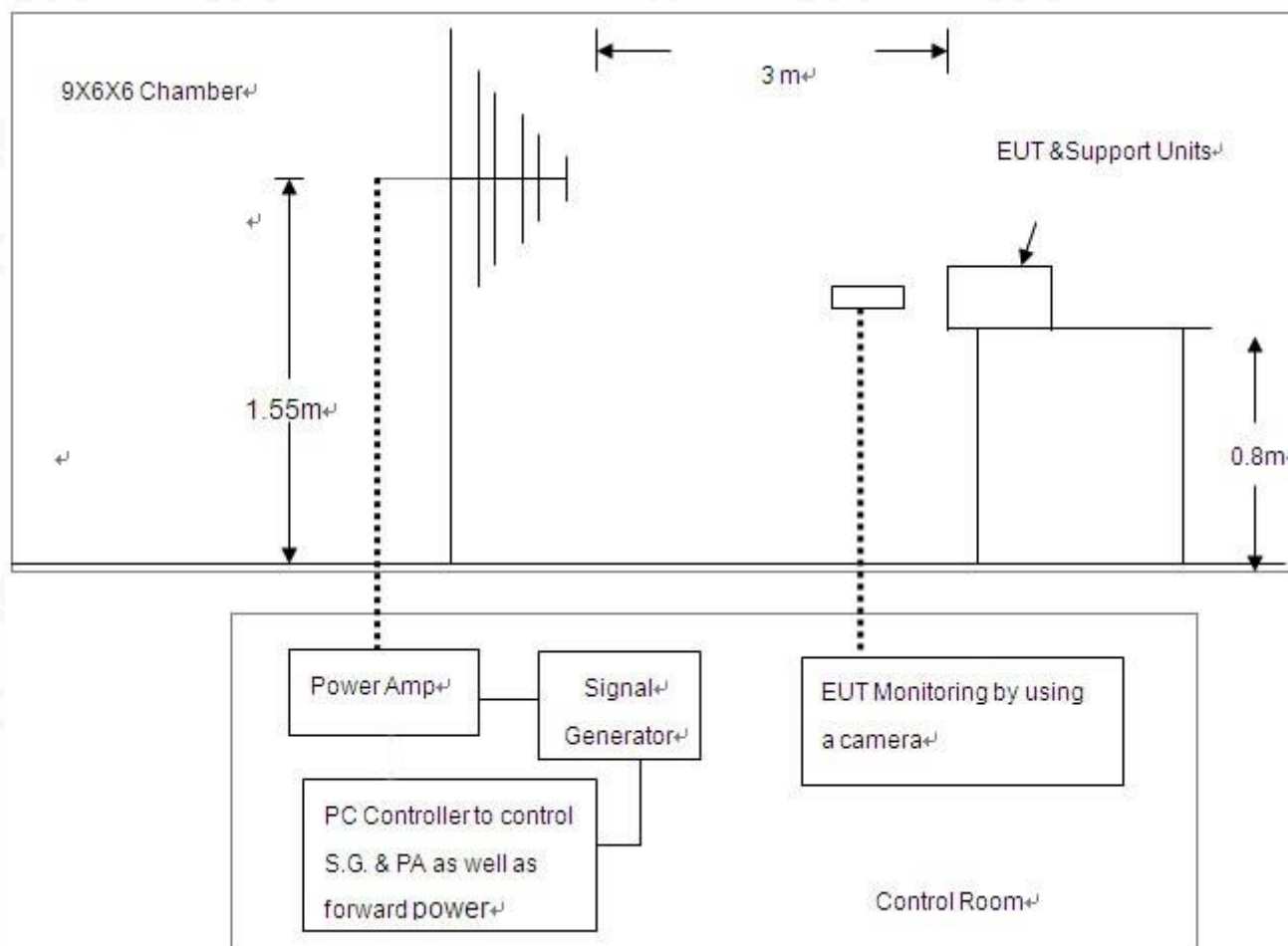


## 11 EN 61000-4-3 RS IMMUNITY TEST

### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-3
Test Level	3V/m with 80% AM. 1kHz Modulation at 80-1000MHz 3V/m with 80% AM. 1kHz Modulation at 1400-2000MHz 1V/m with 80% AM. 1kHz Modulation at 2000-2700MHz
Standard require	A
Tester	Faler
Temperature	23.4°C
Humidity	58.0%

#### 11.1 BLOCK DIAGRAM OF TEST SETUP



## 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.

From the result of pre-test in step 5, choose the worst side of EUT for final test from 80 MHz to 1000 MHz and 1400MHz to 2700MHz at 1% steps.

Recording the test result in following table.

### Test Conditions:

Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result
80-1000	3V/m	AM	H	Front	A
80-1000	3V/m	AM	H	Left	A
80-1000	3V/m	AM	H	Back	A
80-1000	3V/m	AM	H	Right	A
80-1000	3V/m	AM	V	Front	A
80-1000	3V/m	AM	V	Left	A
80-1000	3V/m	AM	V	Back	A
80-1000	3V/m	AM	V	Right	A



Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result
1400-2000	3V/m	AM	H	Front	A
1400-2000	3V/m	AM	H	Left	A
1400-2000	3V/m	AM	H	Back	A
1400-2000	3V/m	AM	H	Right	A
1400-2000	3V/m	AM	V	Front	A
1400-2000	3V/m	AM	V	Left	A
1400-2000	3V/m	AM	V	Back	A
1400-2000	3V/m	AM	V	Right	A

Test level: 1V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result
2000-2700	1V/m	AM	H	Front	A
2000-2700	1V/m	AM	H	Left	A
2000-2700	1V/m	AM	H	Back	A
2000-2700	1V/m	AM	H	Right	A
2000-2700	1V/m	AM	V	Front	A
2000-2700	1V/m	AM	V	Left	A
2000-2700	1V/m	AM	V	Back	A
2000-2700	1V/m	AM	V	Right	A

### 11.3 PERFORMANCE & RESULT

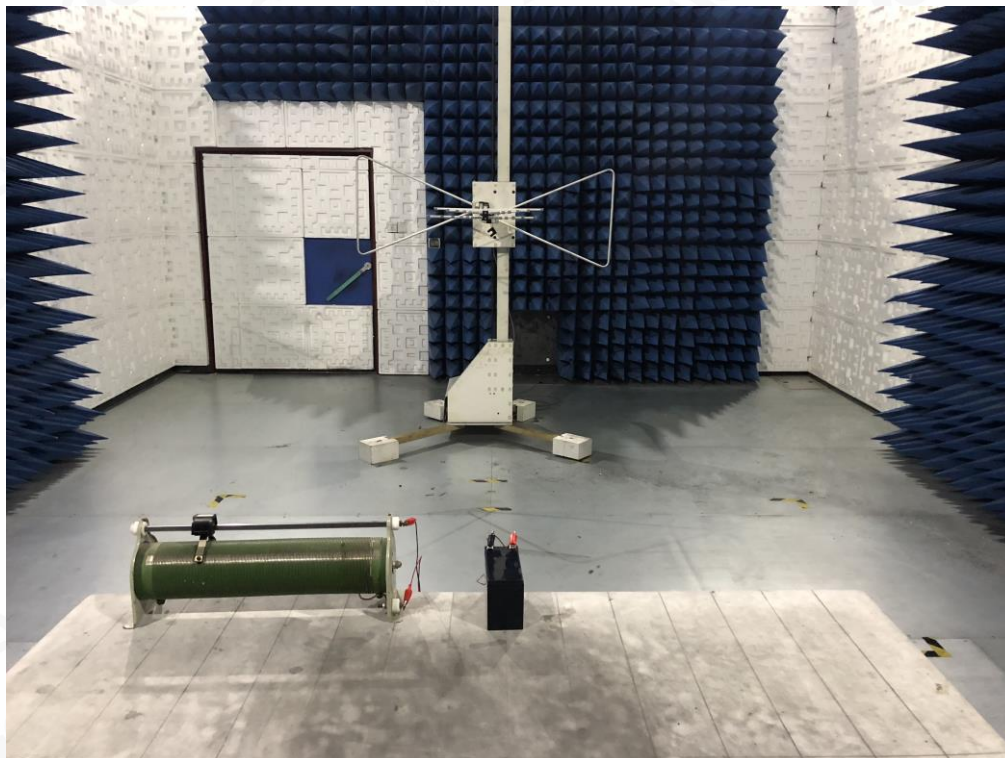
<b>Criteria A:</b>	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of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

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

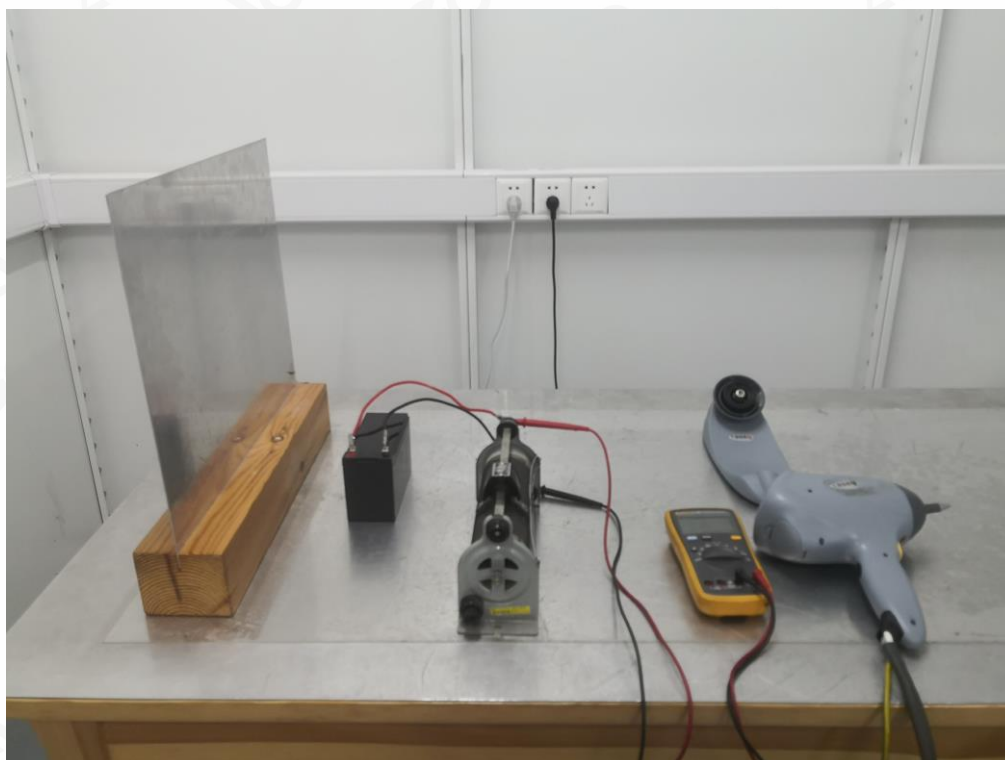


## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

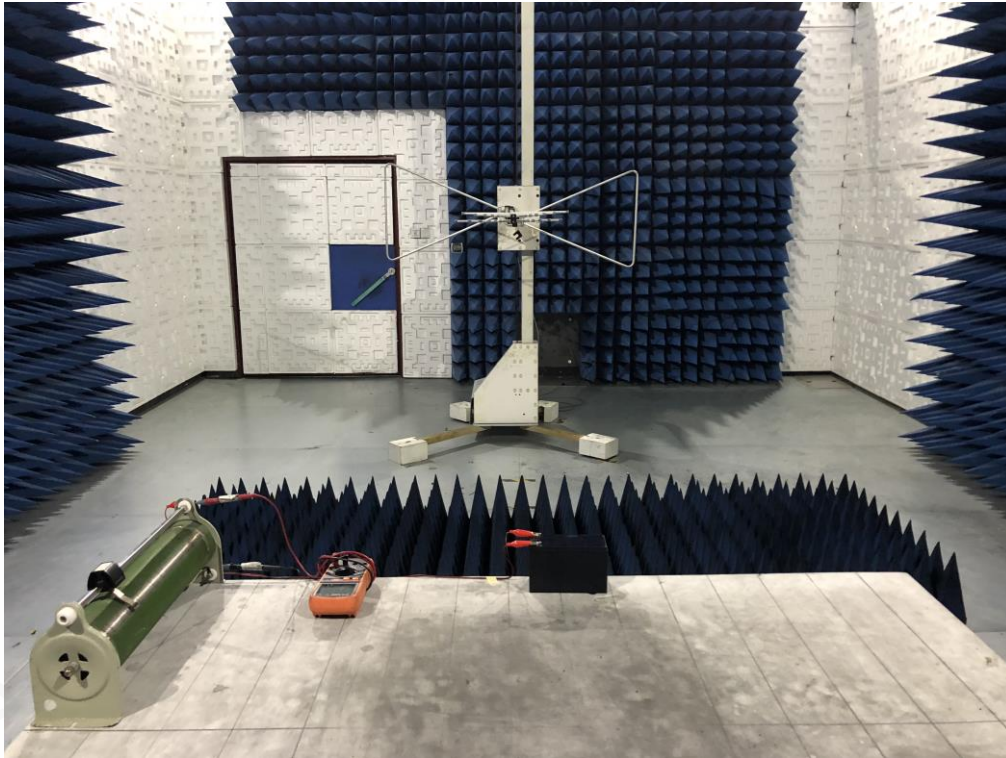
### EN 61000-6-3 RADIATED EMISSION TEST SETUP



### EN 61000-4-2 ESD IMMUNITY TEST SETUP



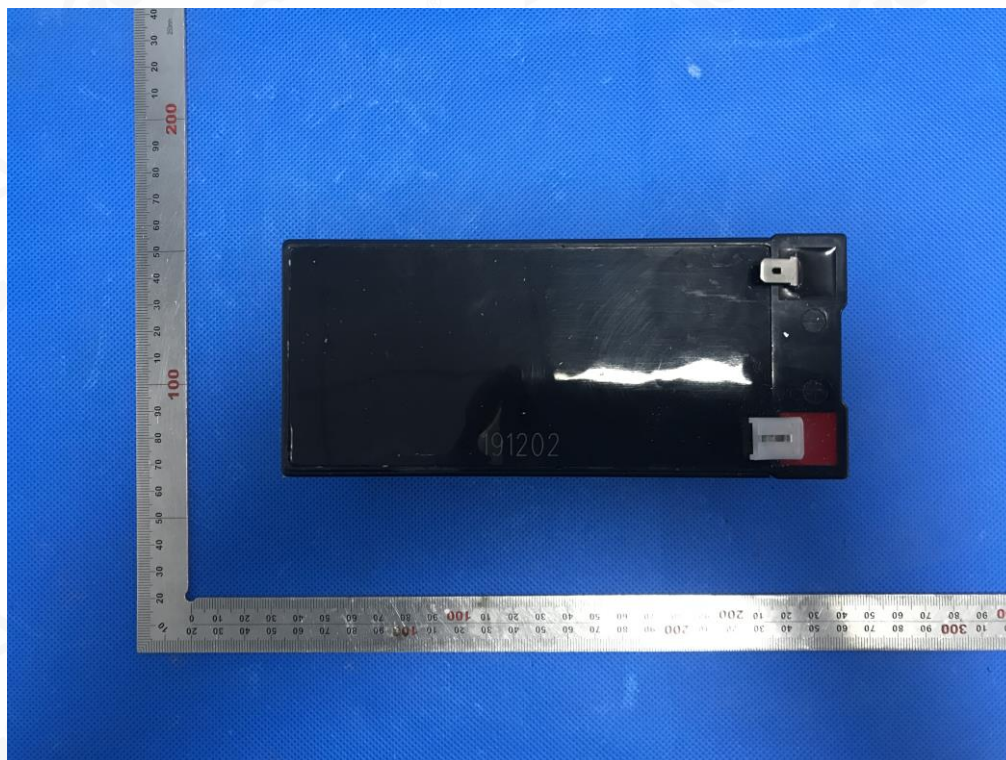
EN 61000-4-3 RS IMMUNITY TEST SETUP



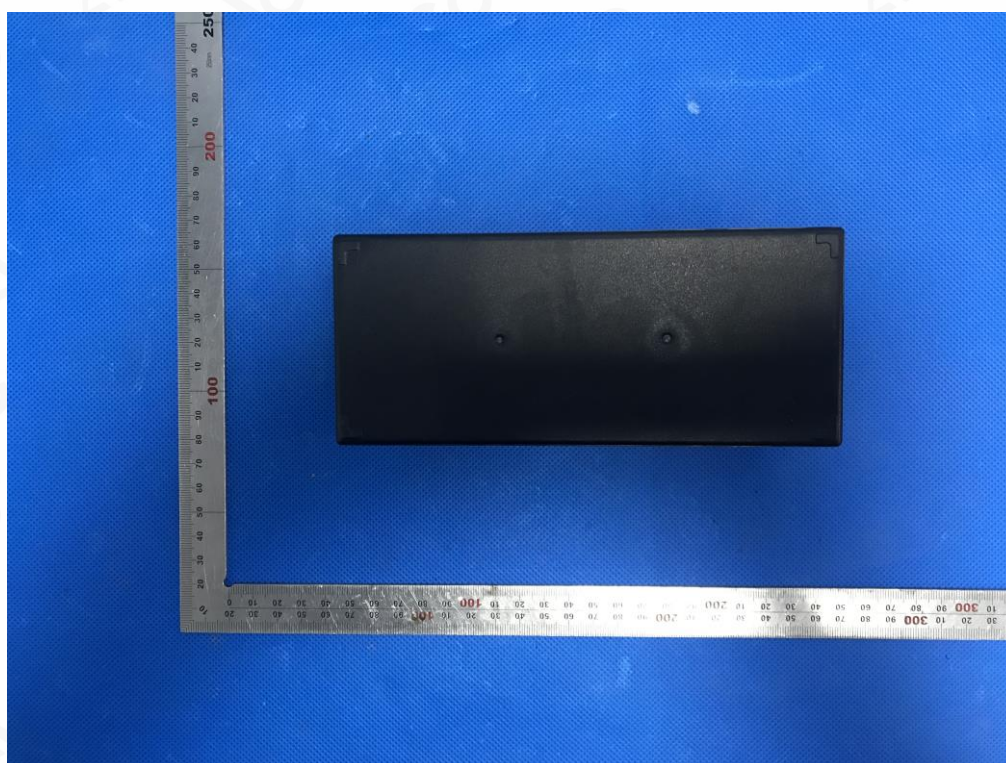


## APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT



BOTTOM VIEW OF EUT





FRONT VIEW OF EUT

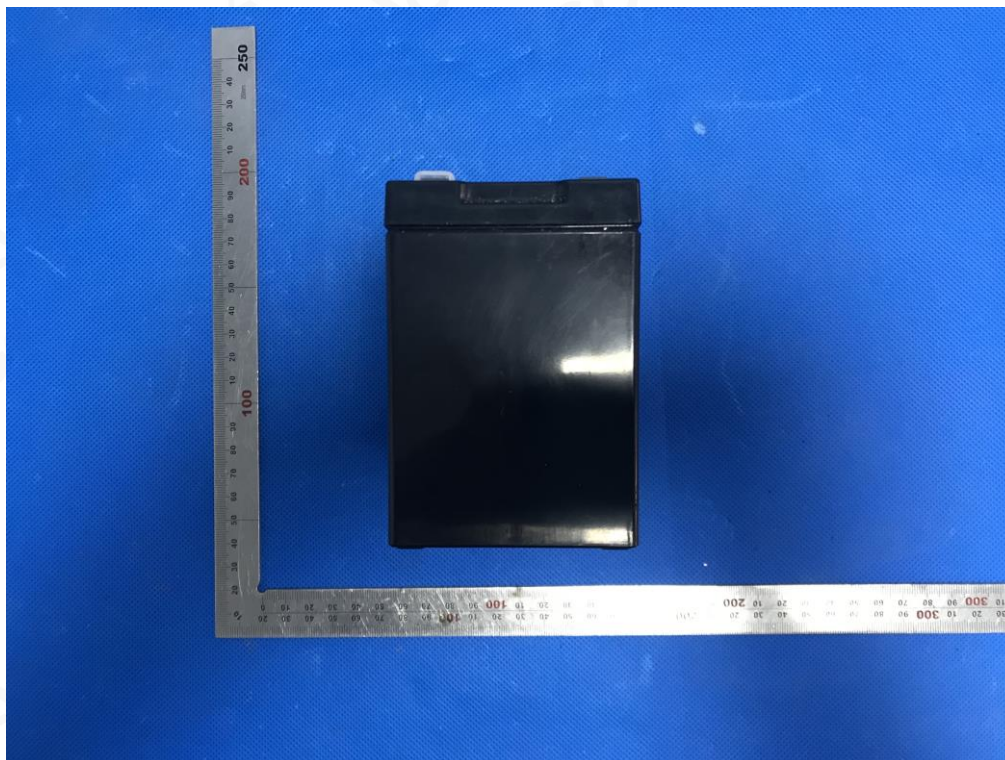


BACK VIEW OF EUT





LEFT VIEW OF EUT



RIGHT VIEW OF EUT



----END OF REPORT----