EMC Test Report

Report No.: AGC09609220501EE01

PRODUCT DESIGNATION	:	Battery
BRAND NAME	:	GivEnergy
MODEL NAME	:	Giv-Bat9.5
APPLICANT	:	Shenzhen GivEnergy Technology Co., Ltd
DATE OF ISSUE	:	May 10, 2022
STANDARD(S)	:	EN IEC 61000-6-3:2021 EN IEC 61000-6-1:2019
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 10, 2022	Valid	Initial release

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1 VERIFICATION OF CONFORMITY

Applicant	Shenzhen GivEnergy Technology Co., Ltd
Address	Room 502, Building A, No.94, Guangtian Road, Yanchuan Community, Yanluo Street, Baoan District, Shenzhen，Guangdong, China
Manufacturer	Shenzhen GivEnergy Technology Co., Ltd
Address	Room 502, Building A, No.94, Guangtian Road, Yanchuan Community, Yanluo Street, Baoan District, Shenzhen，Guangdong, China
Factory	Shenzhen GivEnergy Technology Co., Ltd
Address	Room 502, Building A, No.94, Guangtian Road, Yanchuan Community, Yanluo Street, Baoan District, Shenzhen，Guangdong, China
Product Designation	Battery
Brand Name	GivEnergy
Test Model	Giv-Bat9.5
Date of test	May 09, 2022 to May 10, 2022
Deviation	The sample has no any deviation to the method of standard mentioned on page 1
Condition of Test Sample	Normal
Test Result	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	Jack Gui (Project Engineer)	May 10, 2022
Reviewed By	Calvin Liu (Reviewer)	May 10, 2022
Approved By	Forrest Lei (Authorized Officer)	May 10, 2022

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 Below 1GHz, Uc = ±3.8dB

4 PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DC 51.2V 186Ah
EUT Output Rating	DC 51.2V 186Ah
Hardware Version	N/A
Software Version	N/A

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

I/O Port of EUT			
I/O Port Type	**Number**	**Cable Description**	**Tested With**
DC IN/ DC OUT	2	--	2

5 SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Resistance box	--	--	--	--	--

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

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

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	Mar. 28, 2022	Mar. 27, 2023
Antenna	SCHWARZBECK	VULB9168	494	Jan. 08, 2021	Jan. 07, 2023
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	Jan. 08, 2022	Jan. 07, 2023

TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Signal Generator	R&S	E4421B	MY43351603	Mar. 04, 2022	Mar. 03, 2023
Power Sensor	R&S	URV5-Z4	100124	Apr. 26, 2021	Apr. 25, 2023
Power Meter	R&S	NRVD	8323781027	Apr. 26, 2021	Apr. 25, 2023
Power Amplifier	KALMUS	7100LC	04-02/17-06-001	N/A	N/A
Power Amplifier	Milmega	AS0104-55_55	1004793	N/A	N/A
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Antenna	SCHWARZBECK	VULB9168	D69250	Apr. 28, 2021	Apr. 27, 2023

8 TEST SUMMARY LIST

Test item	Test Requirement	Test Method	Class/Severity	Result
CONDUCTED EMISSION	EN IEC 61000-6-3	EN IEC 61000-6-3	EN IEC 61000-6-3	N/A
RADIATED EMISSION	EN IEC 61000-6-3	EN IEC 61000-6-3	EN IEC 61000-6-3	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 IEC 61000-6-1	EN 61000-4-2	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)	Pass
Radiated RF Electromagnetic	EN IEC 61000-6-1	EN 61000-4-3	3V/mwith80% AM. 1kHz Modulation at 80-1000MHz 3V/mwith80% AM. 1kHz Modulation at 1400-6000MHz	Pass
Electrical fast transient/burst Immunity	EN IEC 61000-6-1	EN 61000-4-4	+/- 1kV for Power Supply Lines	N/A
SURGE IMMUNITY	EN IEC 61000-6-1	EN 61000-4-5	+/- 1kV (Line to Line) +/- 2kV (Line to Ground)	N/A
Immunity to Conducted Disturbances Induced by RF fields	EN IEC 61000-6-1	EN 61000-4-6	3V with 80% AM. 1 kHz Modulation	N/A
Power frequency magnetic field	EN IEC 61000-6-1	EN 61000-4-8	50/60Hz 3A/m	N/A
Voltage dips and short interruptions immunity	EN IEC 61000-6-1	EN 61000-4-11	PHASE ANGLE 0 degrees	N/A

Note：N/A means not applicable.

9 EN IEC 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

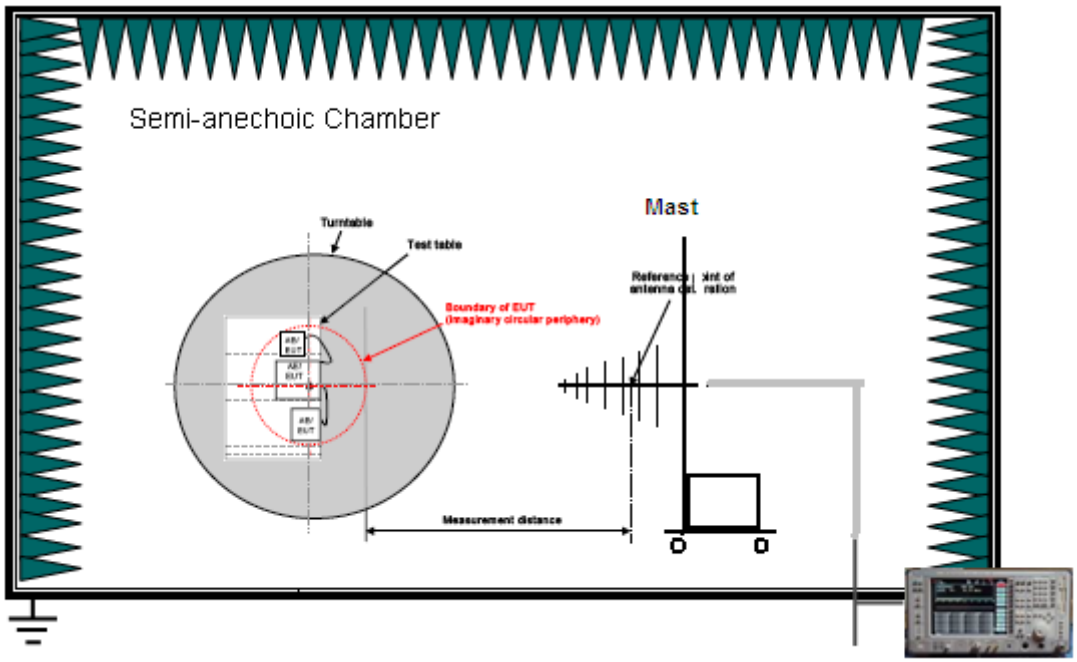
AT 3M DISTANCES

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

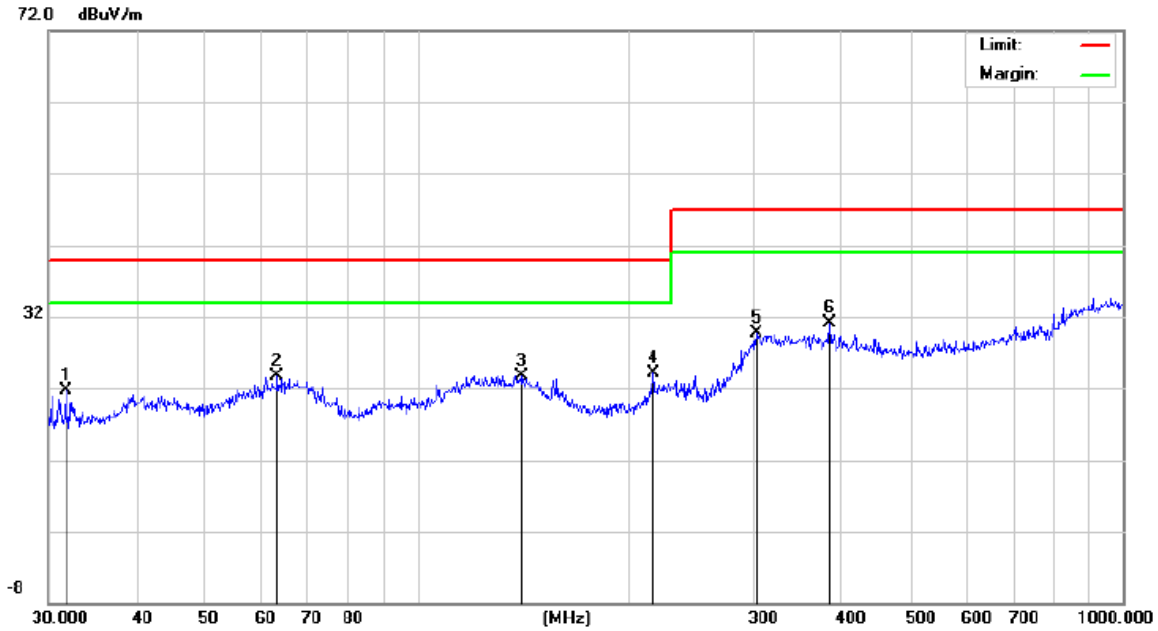


9.3 PROCEDURE OF RADIATED EMISSION TEST

(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 IEC 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 IEC 61000-6-3.
(3) All I/O cables were positioned to simulate typical actual usage as per EN IEC 61000-6-3.
(4) The EUT connected to resistance box discharging.
(5) The antenna was placed at 3 meter away from the EUT as stated in EN IEC 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

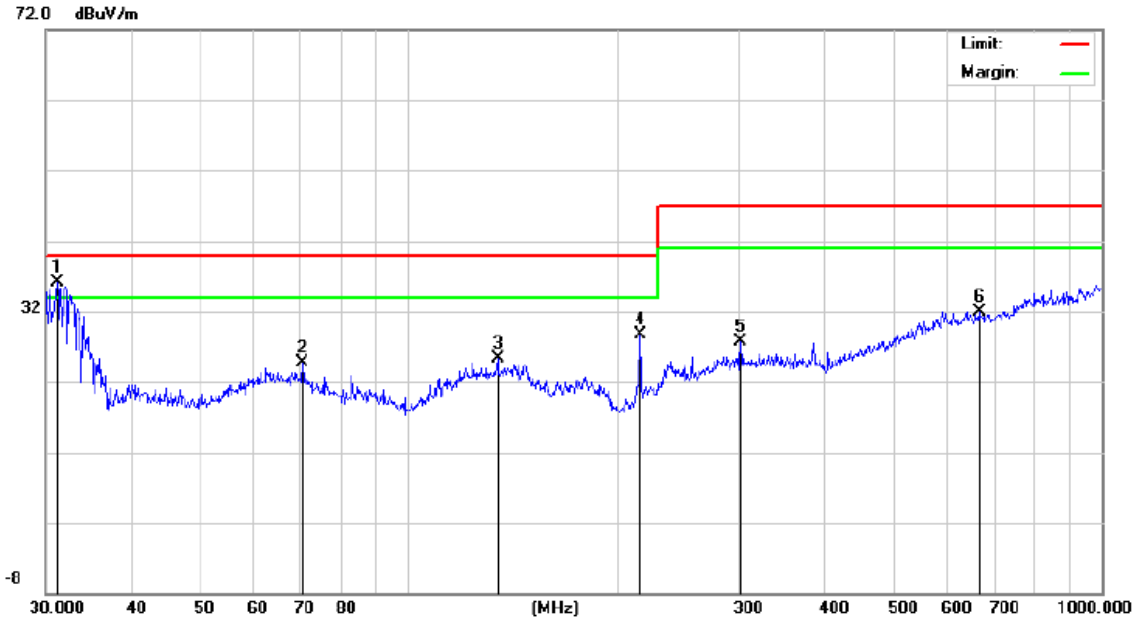
Radiated Emission Test at 3m Distance-Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		31.7313	8.46	13.22	21.68	40.00	-18.32	peak
2		63.3132	5.94	17.69	23.63	40.00	-16.37	peak
3		140.8351	5.18	18.58	23.76	40.00	-16.24	peak
4		216.0240	6.48	17.61	24.09	40.00	-15.91	peak
5		302.4812	5.21	24.42	29.63	47.00	-17.37	peak
6	*	383.9318	7.33	23.80	31.13	47.00	-15.87	peak

RESULT: PASS

Radiated Emission Test at 3m Distance-Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	31.1798	22.85	13.21	36.06	40.00	-3.94	peak
2		70.3365	6.64	18.04	24.68	40.00	-15.32	peak
3		134.5592	6.14	19.16	25.30	40.00	-14.70	peak
4		216.0240	12.88	15.81	28.69	40.00	-11.31	peak
5		301.4224	7.16	20.46	27.62	47.00	-19.38	peak
6		665.8035	5.85	26.08	31.93	47.00	-15.07	peak

RESULT: PASS

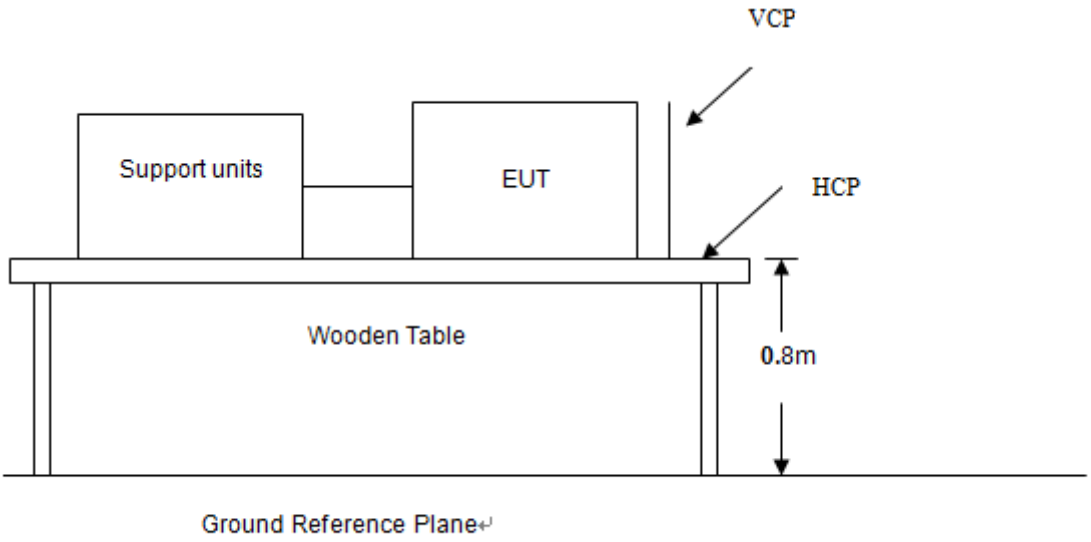
10 EN 61000-4-2 ESD IMMUNITY TEST

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
Temperature	24.7°C
Humidity	54.3% RH

10.1 BLOCK DIAGRAM OF TEST SETUP

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



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

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.

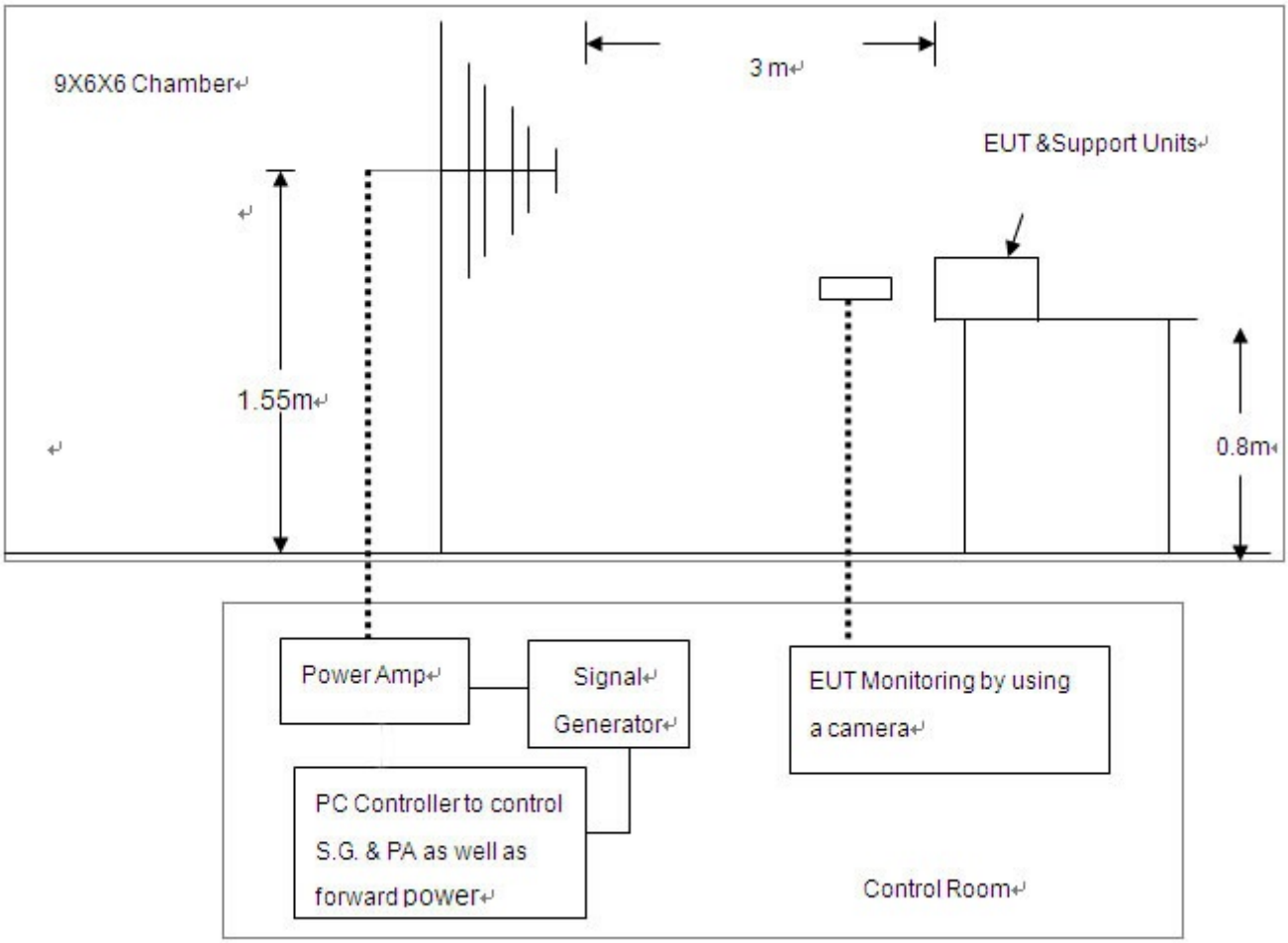
☒***PASS*** ☐***FAIL***

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 1400-6000MHz
Standard require	A
Temperature	25.6°C
Humidity	56.5% RH

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 6000MHz at 1% steps.

Recording the test result in following table.

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
1400-6000	3V/m	AM	H	Front	A
1400-6000	3V/m	AM	H	Left	A
1400-6000	3V/m	AM	H	Back	A
1400-6000	3V/m	AM	H	Right	A
1400-6000	3V/m	AM	V	Front	A
1400-6000	3V/m	AM	V	Left	A
1400-6000	3V/m	AM	V	Back	A
1400-6000	3V/m	AM	V	Right	A

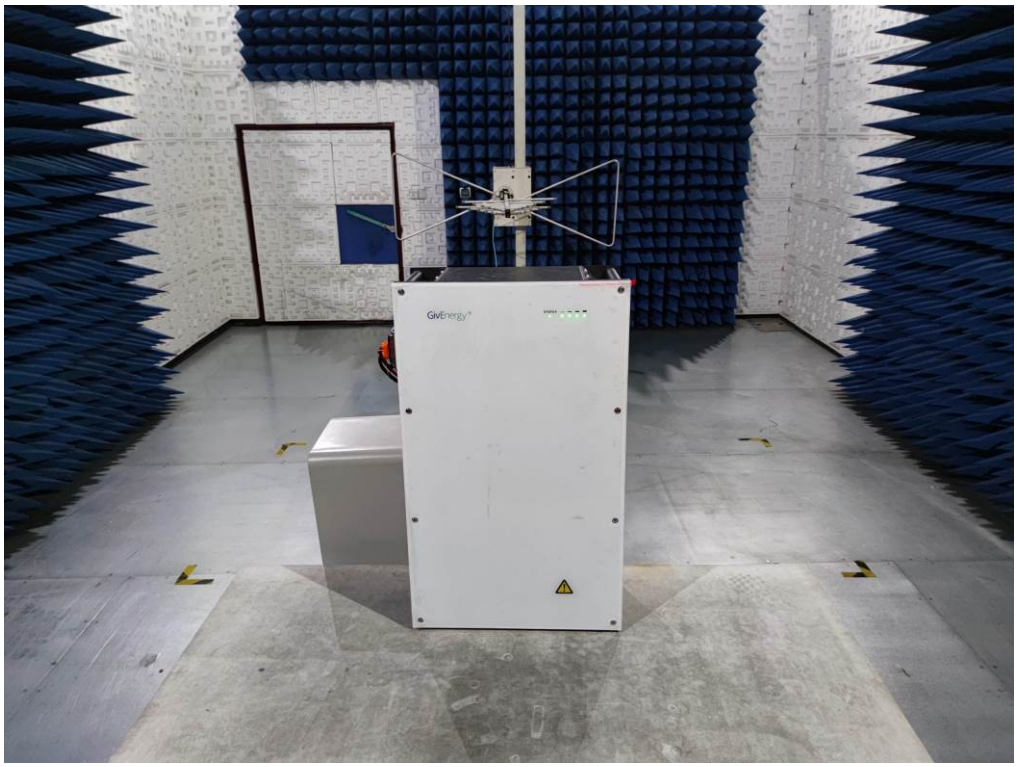
11.3 PERFORMANCE & RESULT

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***

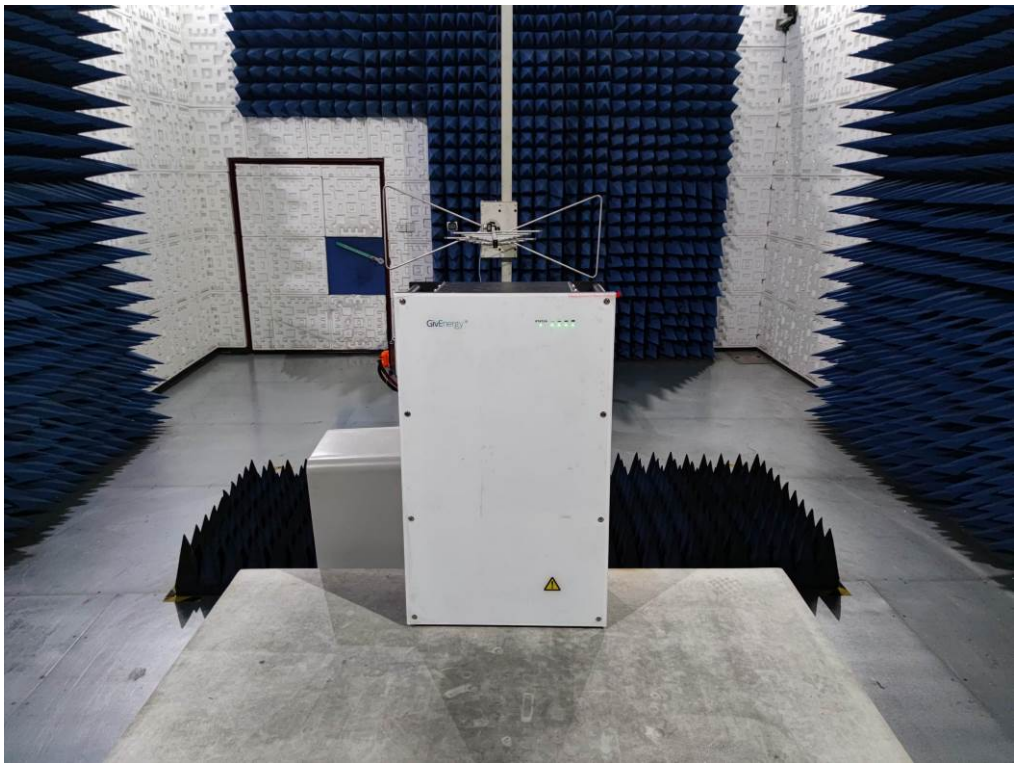
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

EN IEC 61000-6-3 RADIATED EMISSION TEST SETUP



EN 61000-4-2 ESD IMMUNITY TEST SETUP

EN 61000-4-3 RS IMMUNITY TEST SETUP

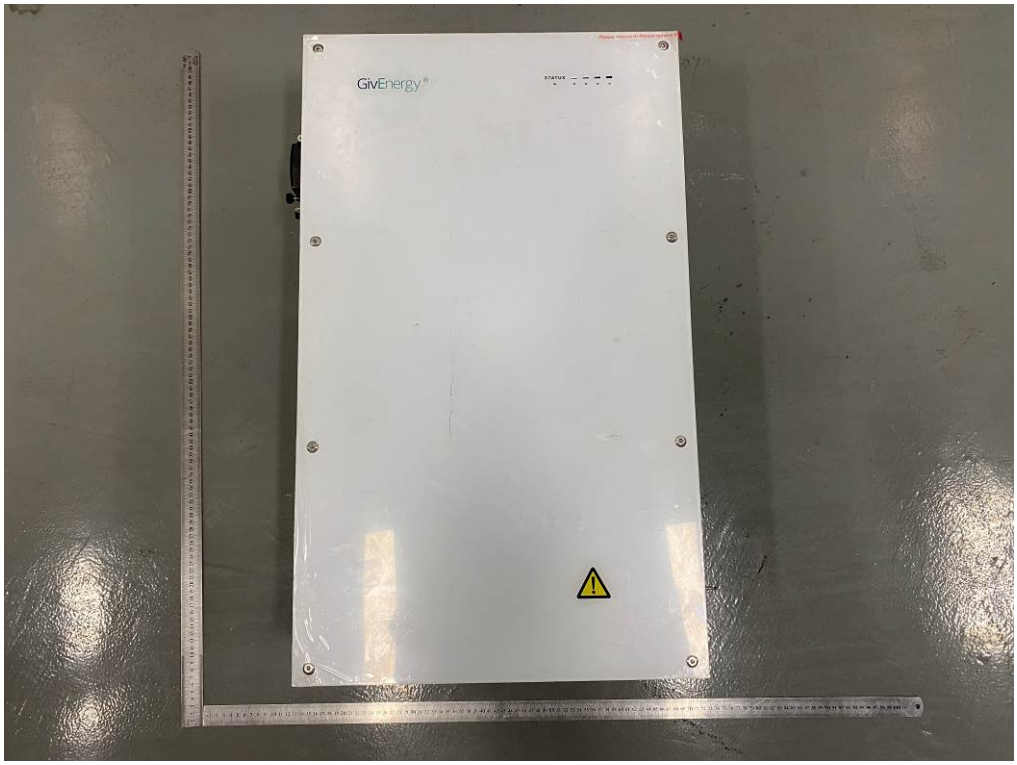


APPENDIX B: PHOTOGRAPHS OF EUT

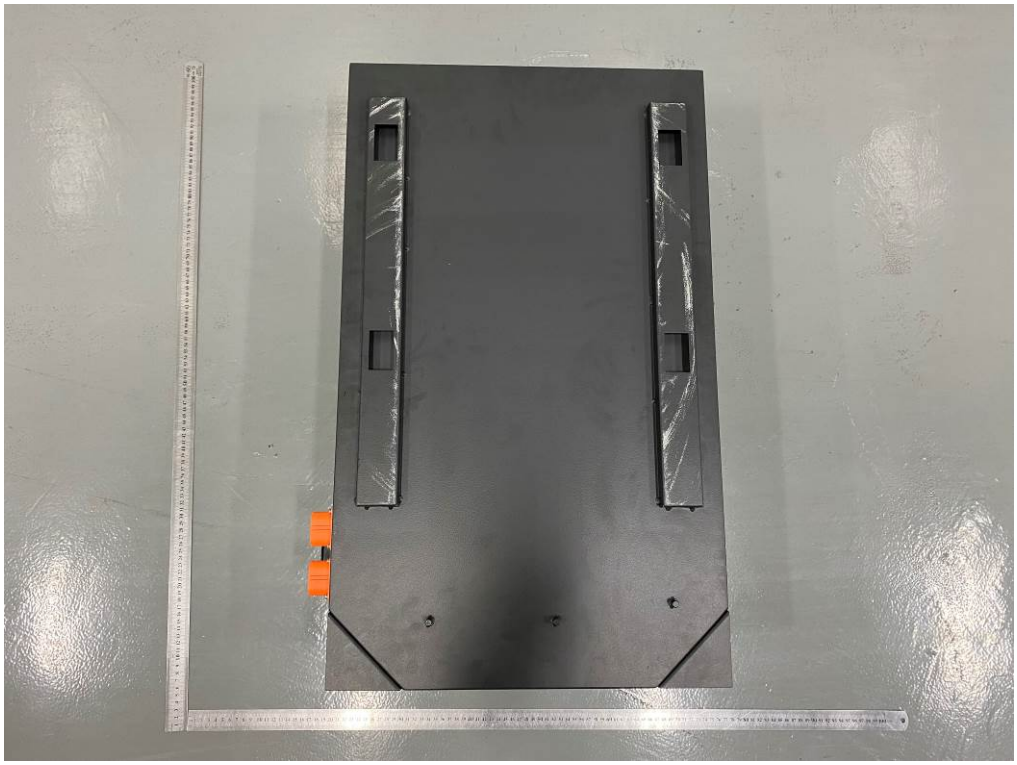
TOP VIEW OF EUT

BOTTOM VIEW OF EUT

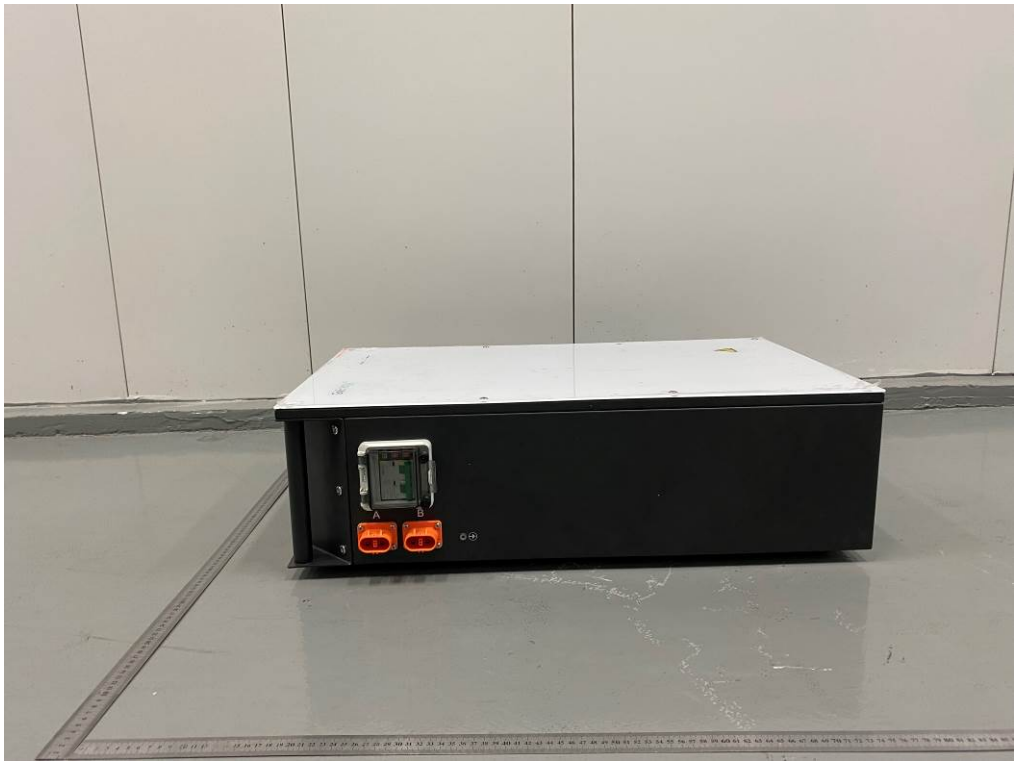
FRONT VIEW OF EUT



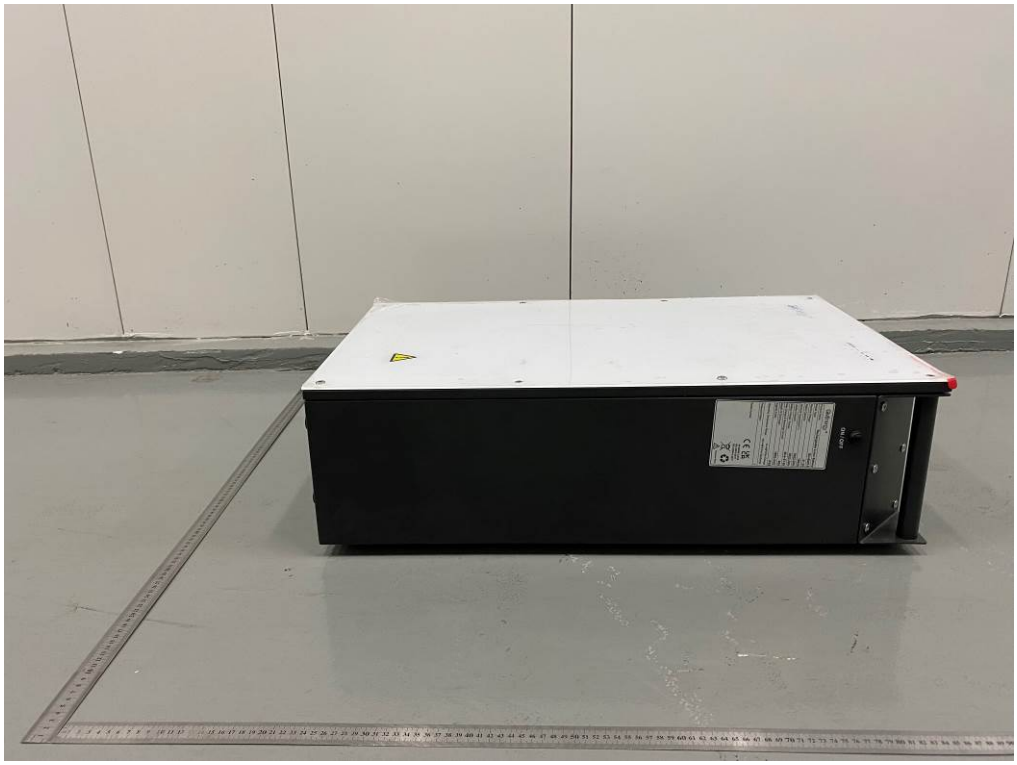
BACK VIEW OF EUT



LEFT VIEW OF EUT



RIGHT VIEW OF EUT



----END OF REPORT----

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.