CE-EMC TEST REPORT

Applicant	:	Hubei Flextech Ltd.
Address of Applicant	:	Building E3, Optica Valley United Technology City, Xingang Notrth Road, Huangzhou District, Huanggang City, Hubei Province, China
Manufacturer	:	Hubei Flextech Ltd.
Address of Manufacturer	:	Building E3, Optica Valley United Technology City, Xingang Notrth Road, Huangzhou District, Huanggang City, Hubei Province, China
Equipment under Test	:	Solar panel
Model No.	:	Please refer to model list on section 2.4
Test Standard(s)	:	EN 61000-6-1:2007 EN IEC 61000-6-1:2019 EN 61000-6-3:2007 EN IEC 61000-6-3:2021
Report No.	:	DDT-RE24051307-1E01
Issue Date	:	2024/05/25
Issued By	:	Guangdong Dongdian Testing Service Co., Ltd. Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

Table of Contents

Test Report Declare

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Manufacturer	:	Hubei Flextech Ltd.
Address	:	Building E3, Optica Valley United Technology City, Xingang Notrth Road, Huangzhou District, Huanggang City, Hubei Province, China

Test Standard Used:
EN 61000-6-1:2007,
EN IEC 61000-6-1:2019,
EN 61000-6-3:2007,
EN IEC 61000-6-3:2021

We Declare:
The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Report No.:	DDT-RE24051307-1E01		
Date of Receipt:	2024/05/17	**Date of Test:**	2024/05/17--2024/05/24

Prepared By:

Caesar Peng

Caesar Peng/Engineer

Approved By:

Damon Hu

Certificate and Report Seal
检验检测专用章

Damon Hu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	2024/05/25	

1. Summary of Test Results

EMISSION (EMI)			
Description of Test Item	**Standard**	**Result**	**Memo**
DC Power Port Conducted Emission	EN IEC 61000-6-3:2021	**N/A**	DC cable long than 3m
Radiated Emissions	EN 61000-6-3:2007,EN IEC 61000-6-3:2021	**PASS**	/
IMMUNITY (EMS)			
Description of Test Item	**Standard**	**Result**	**Memo**
Electrostatic Discharge Test	EN 61000-6-1:2007,EN IEC 61000-6-1:2019	**PASS**	/
Continuous Radio Frequency Disturbances	EN 61000-6-1:2007,EN IEC 61000-6-1:2019	**PASS**	/
Electrical fast transients(EFT) test	EN IEC 61000-6-1:2019	**N/A**	Applicable to AC power port. For analogue/digital data ports and DC network power ports, applicable only to ports which, according to the manufacturer's specification, support cable lengths greater than 3 m.
Surge	EN IEC 61000-6-1:2019	**N/A**	
Continuous conducted disturbances test	EN IEC 61000-6-1:2019	**N/A**	
Voltage dips and interruptions	EN IEC 61000-6-1:2019	**N/A**	Only for AC power port
Power-Frequency Magnetic Fields	EN IEC 61000-6-1:2019	**N/A**	Applicable only to equipment containing devices intrinsically susceptible to magnetic fields

Note 1: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device or no need to test according to standard.

Note 2: For the EMI measurements have made the EUT operated in a mode producing the highest emission level, and attempted to vary the configuration of the EUT radiated the highest emission. For the EMS measurements have made the EUT operated in the most sensitive mode.

2. General Test Information

2.1. Description of EUT

EUT* Name	:	Solar panel
Model Number	:	Please refer to model list on section 2.4
Difference of model number	:	All models are identical except the appearance and model number, therefore the test performed on the model FS-OF060.
EUT Function Description	:	Please reference user manual of this device
Power Supply	:	Power by solar
EUT Class (Only For EMI)	:	Class B
Maximum Work Frequency	:	<108 MHz
Sample Number	:	S24051307-001

Note 1: EUT is the abbreviation of equipment under test.
Note 2: "☒" means to be chosen or applicable; "☐" means don't to be chosen or not applicable; This note applies to entire report.

2.2. Primary function of EUT

Function	Description
☒/	/

2.3. Port of EUT

Port	Description
☒/	/

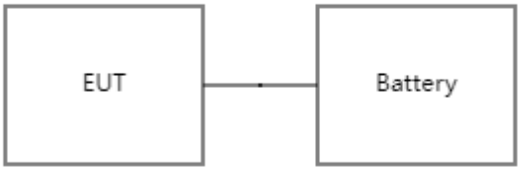
2.4. Model list

FS-OF060, A5552, FLC-P1-211050-1, FLC-P1-412100-1, FLC-P1-424200-1, FLC-P1-424250-1, FLC-P1-424300-1, FS-OF010, FS-OF011, FS-OF012, FS-OF013, FS-OF014, FS-OF015, FS-OF016, FS-OF018, FS-OF020, FS-OF021, FS-OF022, FS-OF024, FS-OF025, FS-OF026, FS-OF027, FS-OF028, FS-OF030, FS-OF032, FS-OF033, FS-OF034, FS-OF035, FS-OF036, FS-OF038, FS-OF039, FS-OF040, FS-OF042, FS-OF044, FS-OF045, FS-OF046, FS-OF048, FS-OF049, FS-OF050, FS-OF051, FS-OF052, FS-OF054, FS-OF055, FS-OF056, FS-OF057, FS-OF063, FS-OF064, FS-OF065, FS-OF066, FS-OF068, FS-OF069, FS-OF070, FS-OF072, FS-OF075, FS-OF076, FS-OF077, FS-OF078, FS-OF080, FS-OF084, FS-OF088, FS-OF090, FS-OF092, FS-OF096, FS-OF099, FS-OF100, FS-OF102, FS-OF104, FS-OF108, FS-OF110, FS-OF112, FS-OF120, FS-OF126, FS-OF128, FS-OF130, FS-OF132

2.5. Accessories of EUT

Accessories	Manufacturer	Model number	Description
/	/	/	/

2.6. Block diagram EUT configuration for test

Mode No	Mode	Configuration diagram
Mode 1	Working mode	

2.7. Decision of final test mode

Emission	Radiated Emissions	Mode 1: Working mode
Immunity	Electrostatic Discharge Test	Mode 1: Working mode
	Continuous Radio Frequency Disturbances	Mode 1: Working mode

2.8. Deviations of test standard

No deviation.

2.9. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	20-25℃
Humidity range:	40-75%
Pressure range:	86-106 kPa

Note: The specific temperature and humidity information of each test item refers to the temperature and humidity record in the corresponding test data.

2.10. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add.: Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808.

Tel.: +86-0769-38826678, http://www.dgddt.com, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

2.11. Measurement uncertainty

Test Item	Uncertainty
Conducted disturbance at mains terminals	1#: 3.72dB (9 kHz to 150 kHz), 3.34dB (150 kHz to 30 MHz)
	2#: 3.75dB (9 kHz to 150 kHz), 3.39dB (150 kHz to 30 MHz)
	3#: 3.78dB (9 kHz to 150 kHz), 3.37dB (150 kHz to 30 MHz)
Uncertainty for radiation emission test (30 MHz-1 GHz)	1#: 4.94 dB (Antenna Polarize: V) 4.68 dB (Antenna Polarize: H)
	2#: 4.94 dB (Antenna Polarize: V) 4.68 dB (Antenna Polarize: H)
	3#: 4.96 dB (Antenna Polarize: V) 4.98 dB (Antenna Polarize: H)
	10m: 4.48 dB (Antenna Polarize: V) 4.64 dB (Antenna Polarize: H)
Uncertainty for radiation disturbance test (1 GHz to 6 GHz)	1#: 4.10 dB (1-6 GHz)
	3#: 4.54 dB (1-6 GHz)
Uncertainty for Electrostatic discharge	Rise time: 4% Peak current: 3.1% Current at 30 ns: 3.1% Current at 60 ns: 3.1%
Uncertainty for Surge	Peak of the open-circuit voltage impulse: 3% Front time of the open-circuit voltage impulse: 5% Width of the open-circuit voltage impulse: 5% Peak of the short-circuit current impulse: 2.7% Front time of the short-circuit current impulse: 5% Duration of the short-circuit current impulse: 3%
Uncertainty for Electrical fast transients	Voltage rise time: 3.7% Peak voltage value: 3.4% Voltage pulse width: 3.7%
Uncertainty for Continuous conducted disturbances	0.25dB
Uncertainty for Continuous radio frequency disturbances	1.12dB
Uncertainty for Power-frequency magnetic fields	10%
Uncertainty for Voltage dips and interruptions	3.7%
Temperature	0.4 ℃
Humidity	2%
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Radiated Emissions

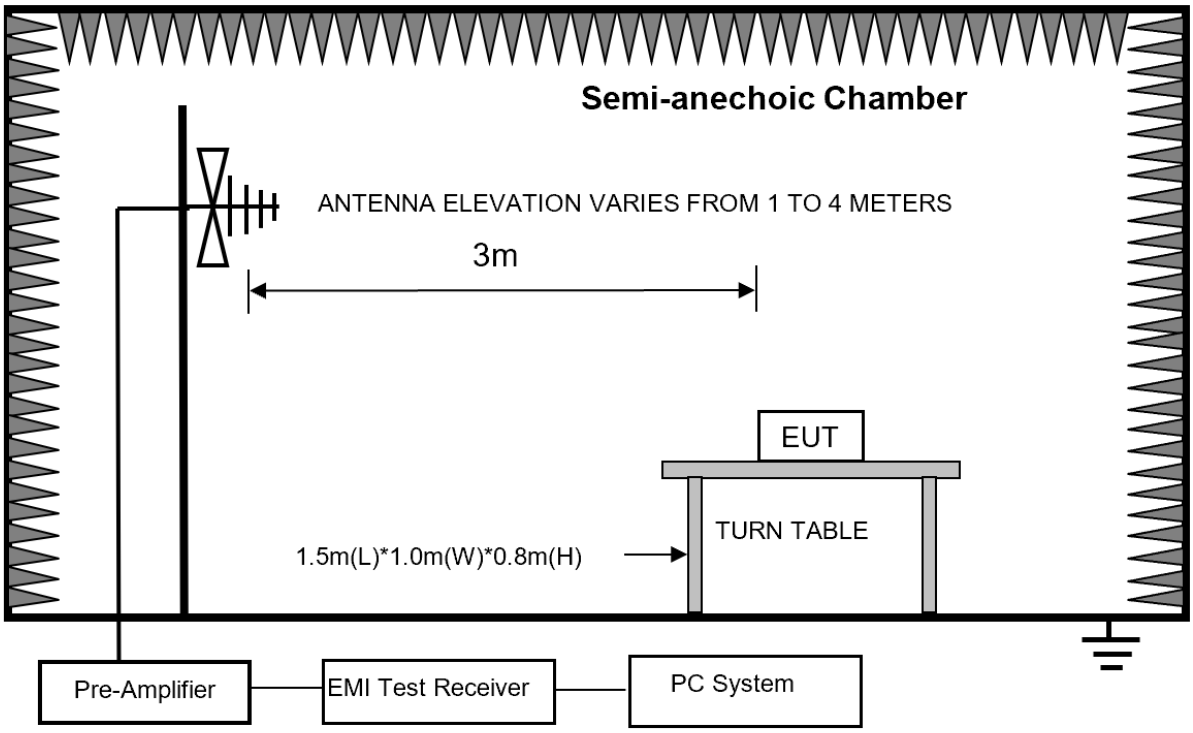
3.1. Test equipment

Equipment	Manufacturer	Model No.	Equipment No.	Cal Due To
EMI Test Receiver	R&S	ESCI	DDT-ZC01972	2025/04/01
Active Loop Antenna	Schwarzbeck	FMZB1519	DDT-ZC00524	2025/09/11
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	DDT-ZC00246	2024/07/12
RF Cable	H&S	RG214-11	DDT-ZC01497	2025/04/01
EMI Test Software	Audix/TW	e3	DDT-ZC01252	/
Horn Antenna	SCHWARZBECK	BBHA9120 D	DDT-ZC01218	2025/08/27
Preamplifier	COM-POWER	PAM-118A	DDT-ZC01489	2024/07/15
Spectrum Analyzer	Agilent	E4440A	DDT-ZC01445	2025/04/01
RF cable	Zhongke Junchuang	JCTB810-NJ-NJ-7M	DDT-ZC02759	2024/07/15

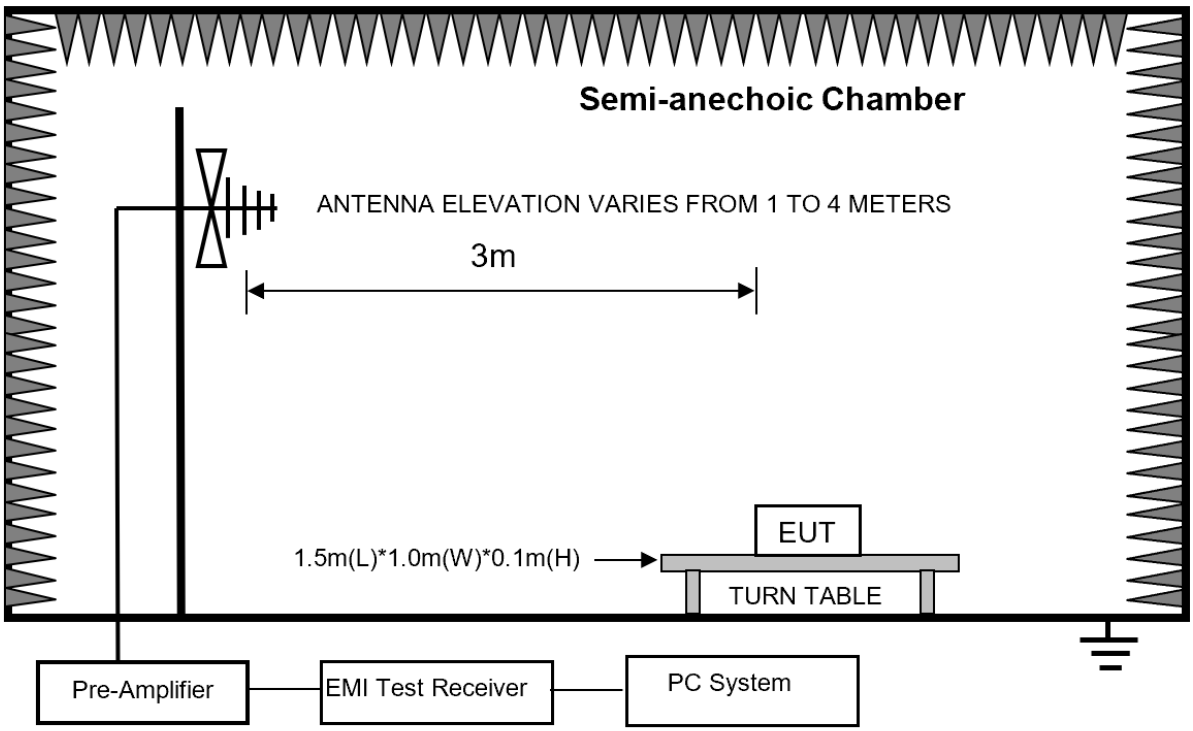
3.2. Block diagram of test setup

Below 1 GHz

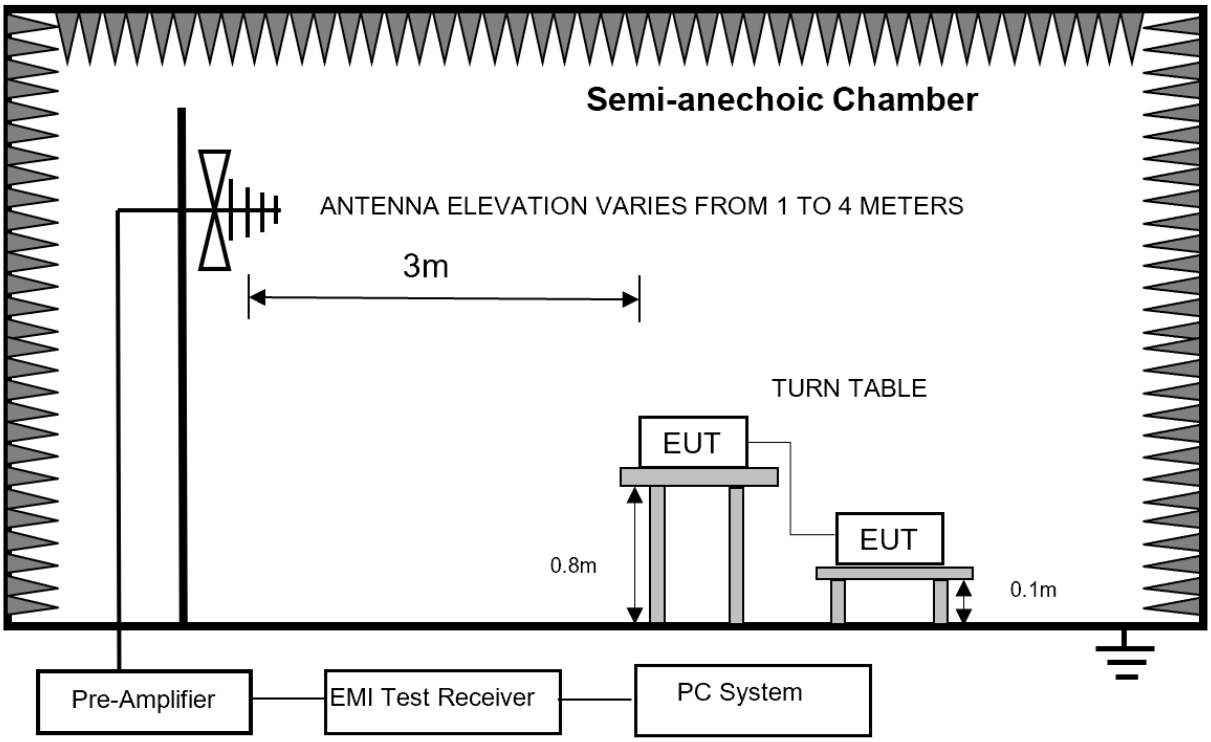
For table-top equipment



For floor standing equipment

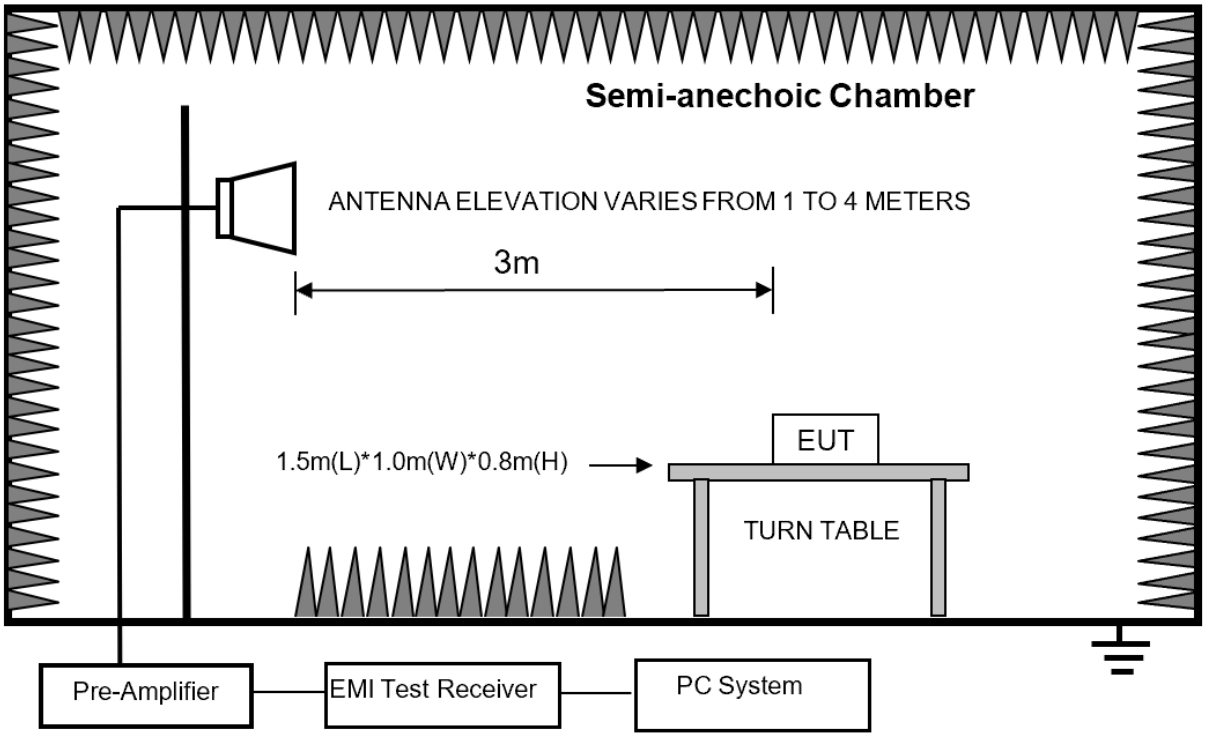


For combinations equipment

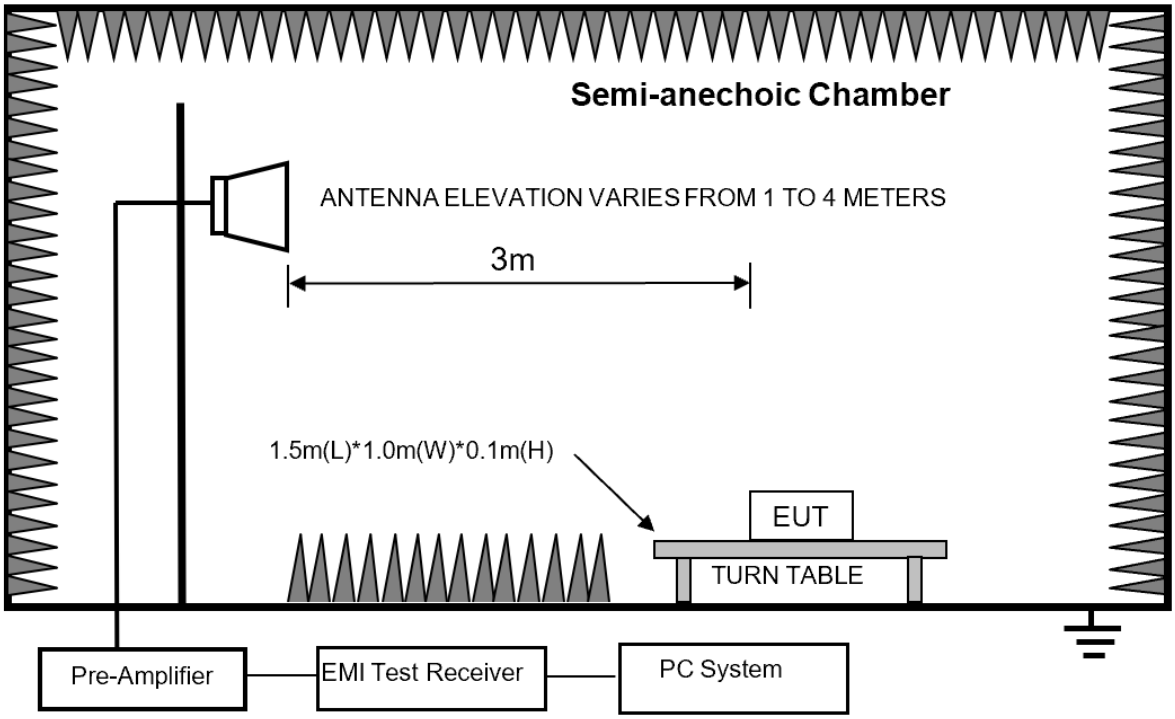


Above 1 GHz

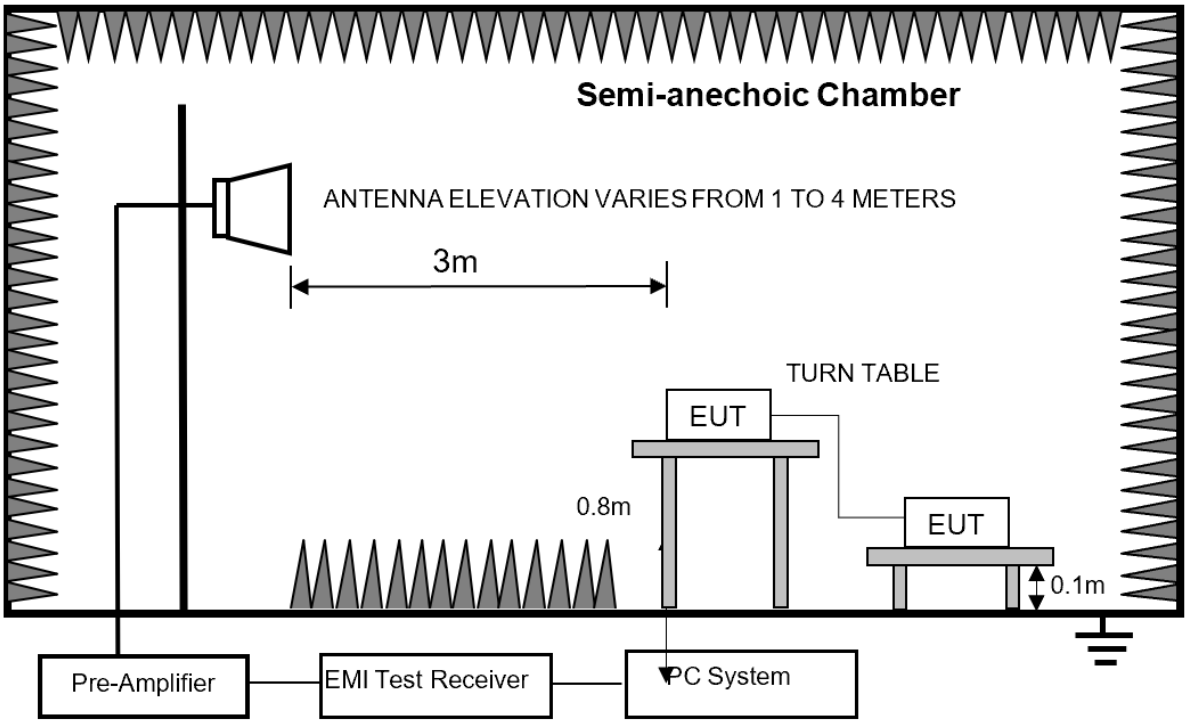
For table-top equipment



For floor standing equipment



For combinations equipment



3.3. Limits

Frequency	Field Strengths Limits at 10m measuring distance dB(μV)/m	Field Strengths Limits at 3m measuring distance dB(μV)/m
30 MHz to 230 MHz	30	40
230 MHz to 1 GHz	37	47
1 GHz to 3 GHz	/	Average:50; Peak:70
3 GHz to 6 GHz	/	Average:54; Peak:74
30 MHz to 1 GHz	Fundamental 50	Fundamental 60
30 MHz to 300 MHz	Harmonics 42	Harmonics 52
300 MHz to 1 GHz	Harmonics 46	Harmonics 56
Note: (1) The smaller limit shall apply at the cross point between two frequency bands. (2) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.		

3.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

3.5. Test procedure

(1) The EUT was placed on a non-metallic table, 0.8m (table-top device)/0.1m (floor-stand device) above the ground plane inside a semi-anechoic chamber.

(2) Test antenna center was located 3m or 10m from the EUT and assistant equipment boundary (imaginary circular periphery) on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to CISPR 16-1-1 on radiated emission test.

(3) Spectrum frequency from 30 MHz to ☒1 GHz/☐6 GHz was investigated.

(4) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to CISPR 16-1-1 on Radiated Emission test.

(5) For emissions from 30 MHz to 1 GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 kHz.

(6) For emissions above 1 GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz VBW is set at 3 MHz.

3.6. Test result

PASS. (See below detailed test result)

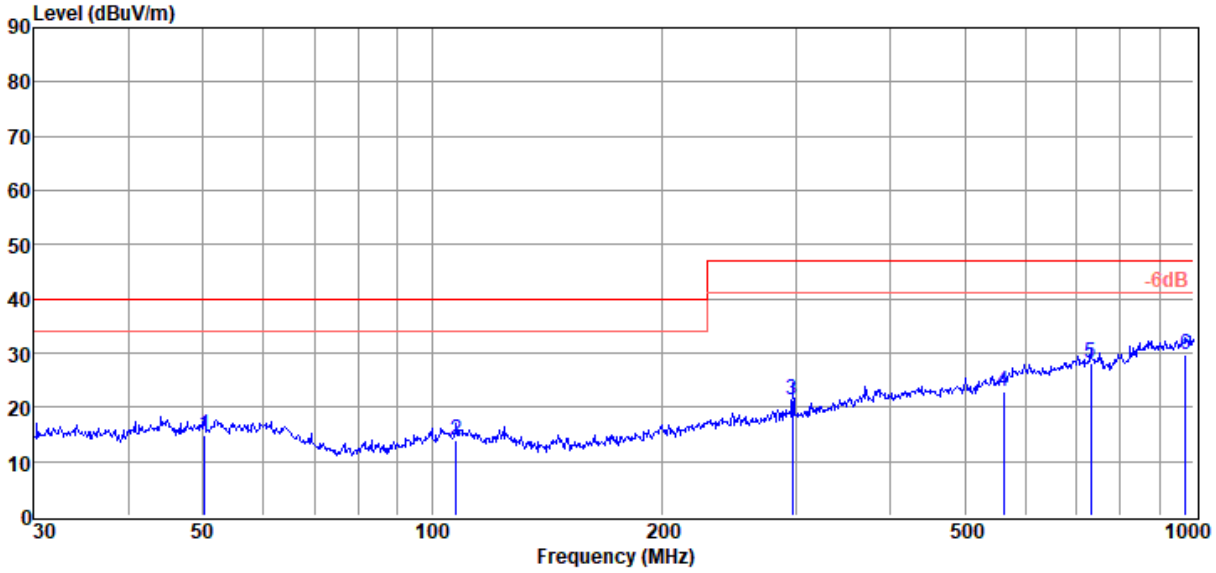
Note 1: All emissions not reported below are too low against the prescribed limits.
Note 2: "-----" means Peak detection.

3.7. Test data

TR-4-E-009 Radiated Emission Test Result

Test Site	:	DDT 3m Chamber 2#	D:\2024 RE2# Report Data\Q24051307-1E\RE.EM6		
Test Date	:	2024-05-17	**Tested By**	:	Liaowanrong
EUT	:	Solar panel	**Model Number**	:	FS-OF060
Power Supply	:	Power by solar	**Test Mode**	:	Working mode
Condition	:	Temp:22.5°C,Humi:60.2%	**Antenna/Distance**	:	2023 VULB9163 2#/3m/VERTICAL
Memo	:	S24051307-001			

Data: 1



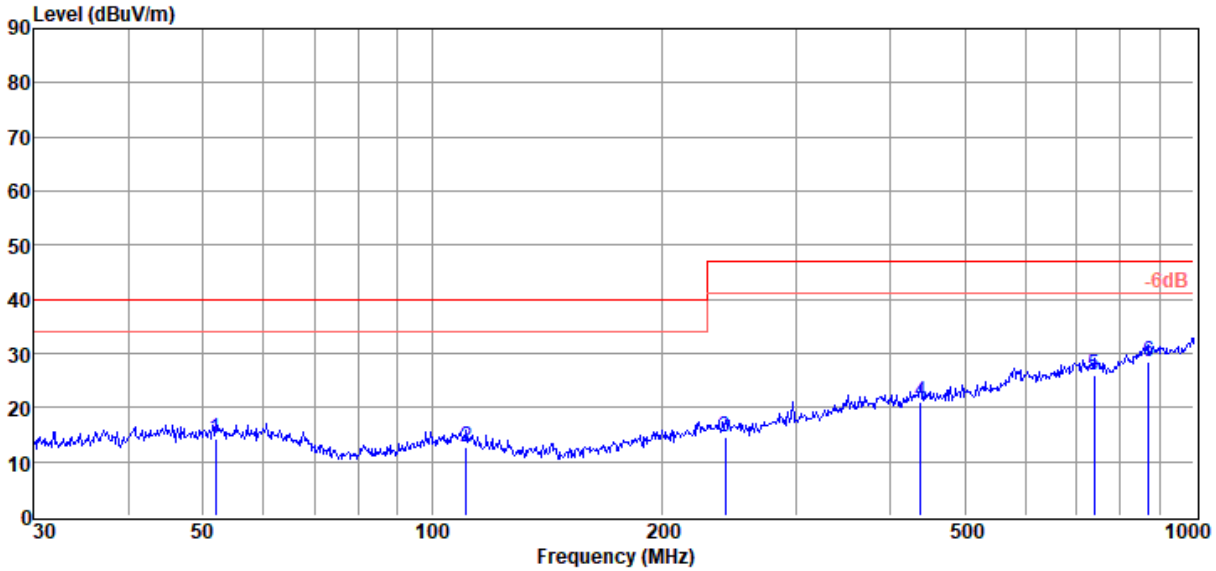
Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	50.23	-2.51	13.27	4.18	14.94	40.00	-25.06	QP	VERTICAL
2	107.51	-2.24	11.65	4.62	14.03	40.00	-25.97	QP	VERTICAL
3	297.22	2.36	13.20	5.81	21.37	47.00	-25.63	QP	VERTICAL
4	562.66	-2.14	17.86	7.22	22.94	47.00	-24.06	QP	VERTICAL
5	731.92	0.26	20.09	7.71	28.06	47.00	-18.94	QP	VERTICAL
6	975.75	-1.32	22.45	8.62	29.75	47.00	-17.25	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site	: DDT 3m Chamber 2#	D:\2024 RE2# Report Data\Q24051307-1E\RE.EM6	
Test Date	: 2024-05-17	**Tested By**	: Liaowanrong
EUT	: Solar panel	**Model Number**	: FS-OF060
Power Supply	: Power by solar	**Test Mode**	: Working mode
Condition	: Temp:22.5°C,Humi:60.2%	**Antenna/Distance**	: 2023 VULB9163 2#/3m/HORIZONTAL
Memo	: S24051307-001		

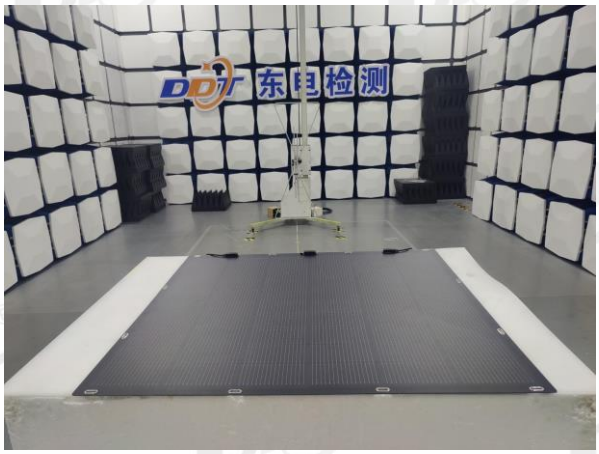
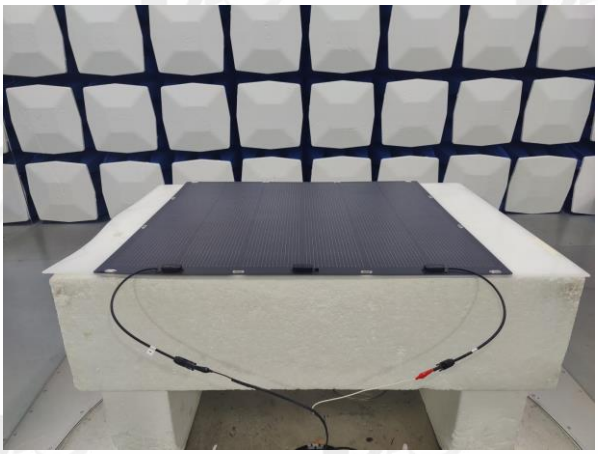
Data: 2



Item (Mark)	Freq. (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	52.03	-3.17	13.11	4.21	14.15	40.00	-25.85	QP	HORIZONTAL
2	110.96	-3.41	11.52	4.61	12.72	40.00	-27.28	QP	HORIZONTAL
3	242.53	-2.52	11.55	5.52	14.55	47.00	-32.45	QP	HORIZONTAL
4	437.12	-1.72	15.93	6.90	21.11	47.00	-25.89	QP	HORIZONTAL
5	739.66	-2.00	20.31	7.74	26.05	47.00	-20.95	QP	HORIZONTAL
6	872.18	-1.66	21.77	8.29	28.40	47.00	-18.60	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

3.8. Test photo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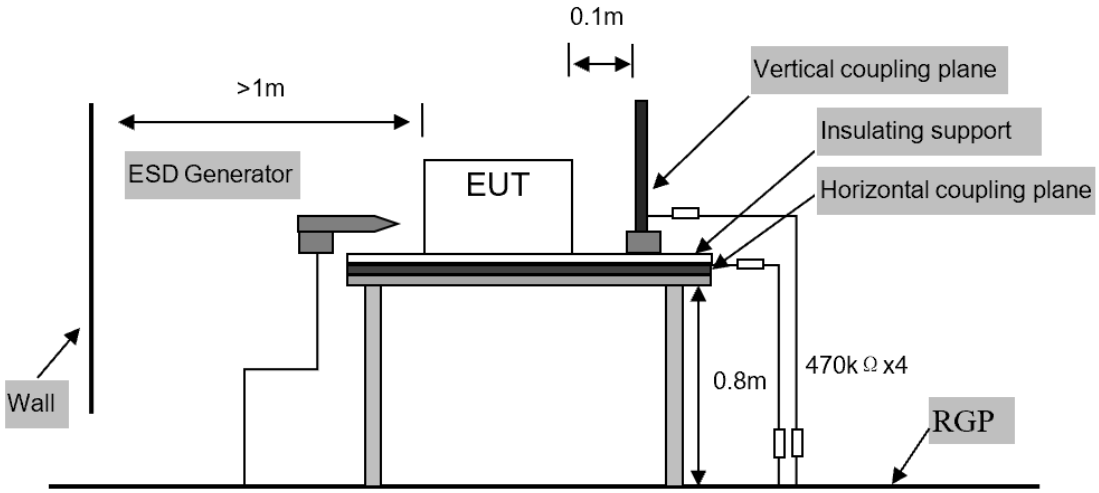
4. Electrostatic Discharge Test

4.1. Test equipment

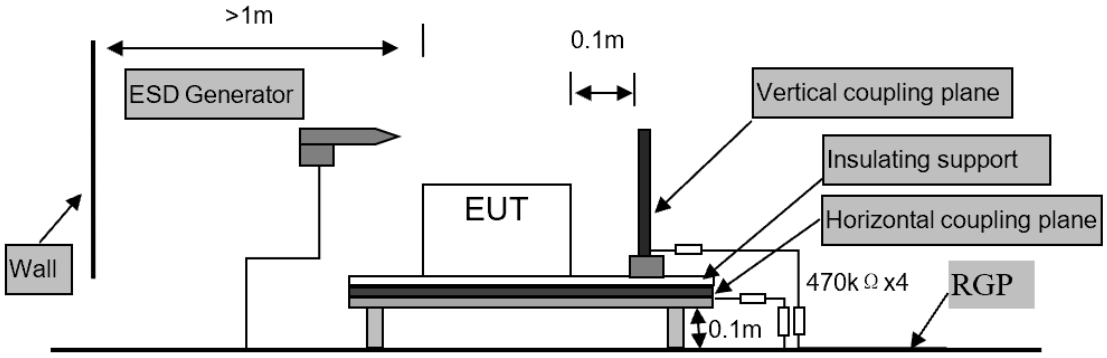
Equipment	Manufacturer	Model No.	Equipment No.	Cal. Due to
ESD Generator	TESEQ	NSG 437	DDT-ZC01820	2025/04/02

4.2. Block diagram of test setup

Table-top equipment



Floor-standing equipment



4.3. Test levels and performance criterion

Test Level		Performance Criteria
Air Discharge	±2kV, ±4kV and ±8kV	B
Contact Discharge	±4kV	
Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the		

test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.

4.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

4.5. Test procedure

Air Discharge:
The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed.

Contact Discharge:
All the procedure was same as air discharge. Except that the generator was re-triggered for a new single discharge. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

Indirect discharge for horizontal coupling plane:
At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane:
At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

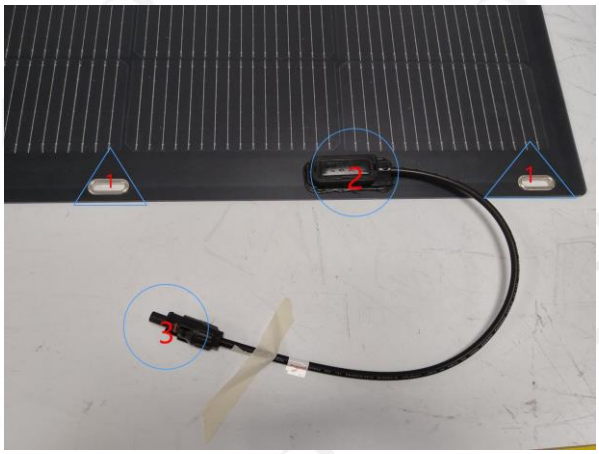
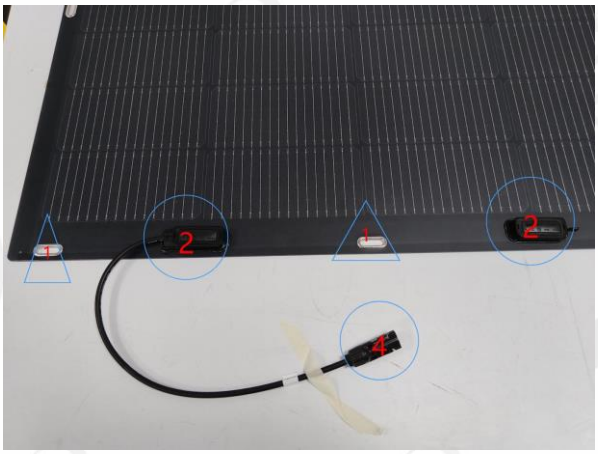
4.6. Test result

Test Site: 7#EMC Shield Room	Test Date: 2024/05/22--2024/05/22
Condition: 22°C,46%,101kPa	Test Engineer: Elosky Liu
Memo: /	

EUT Name: Solar panel	EUT Model: FS-OF060
Sample No.: S24051307-001	Test Mode: Working mode
Power supply: Power by solar	Memo:/

Measure parameters	20 times at each point for contact discharge; 20 times at each point for air discharge. 1 seconds interval for each discharge.				
Type of discharge	**Test Level**	**Test Point**	**Required**	**Observation**	**Result**
Contact to EUT	±4kV	1	B	A	Pass
Contact to Coupling Planes	±4kV	Coupling Planes	B	A	Pass
Air	±2 kV /±4 kV /±8kV	2,3,4	B	A	Pass
Observation Description: A: Normal performance within limits specified by the manufacturer requestor or purchaser.					

4.7. ESD test points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4.8. Test photo

	/
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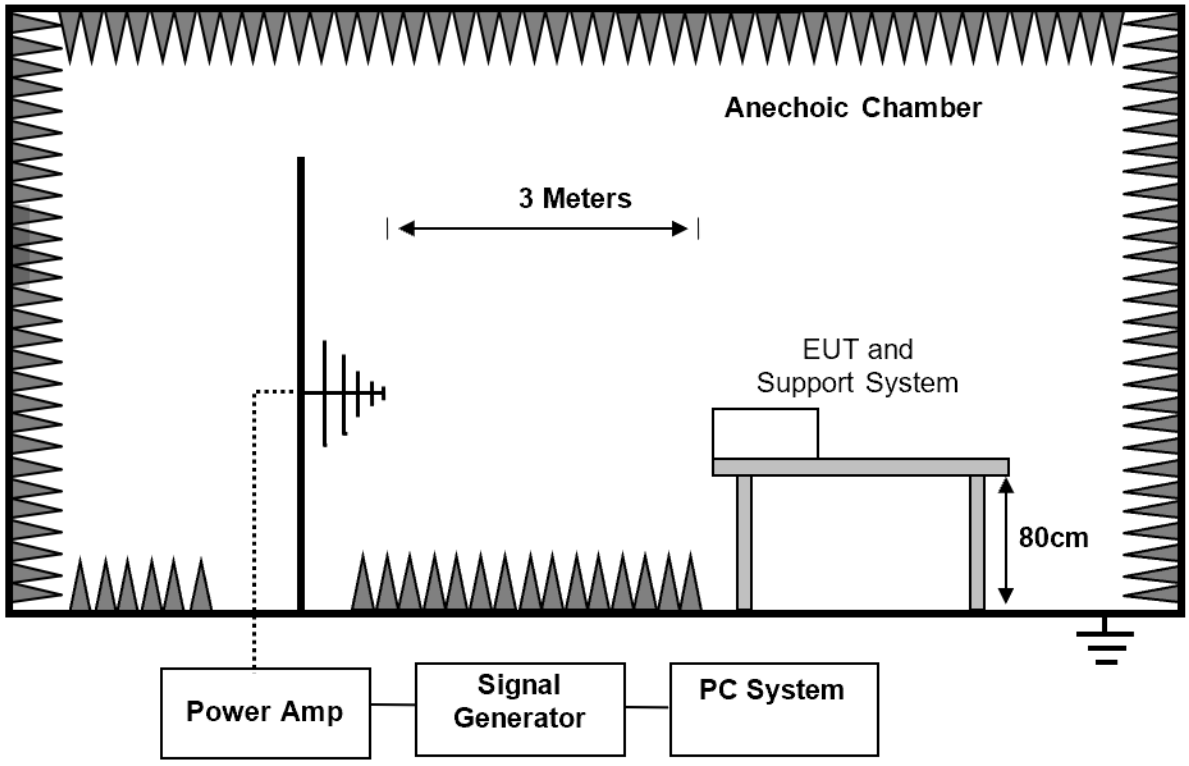
5. Continuous Radio Frequency Disturbances

5.1. Test equipment

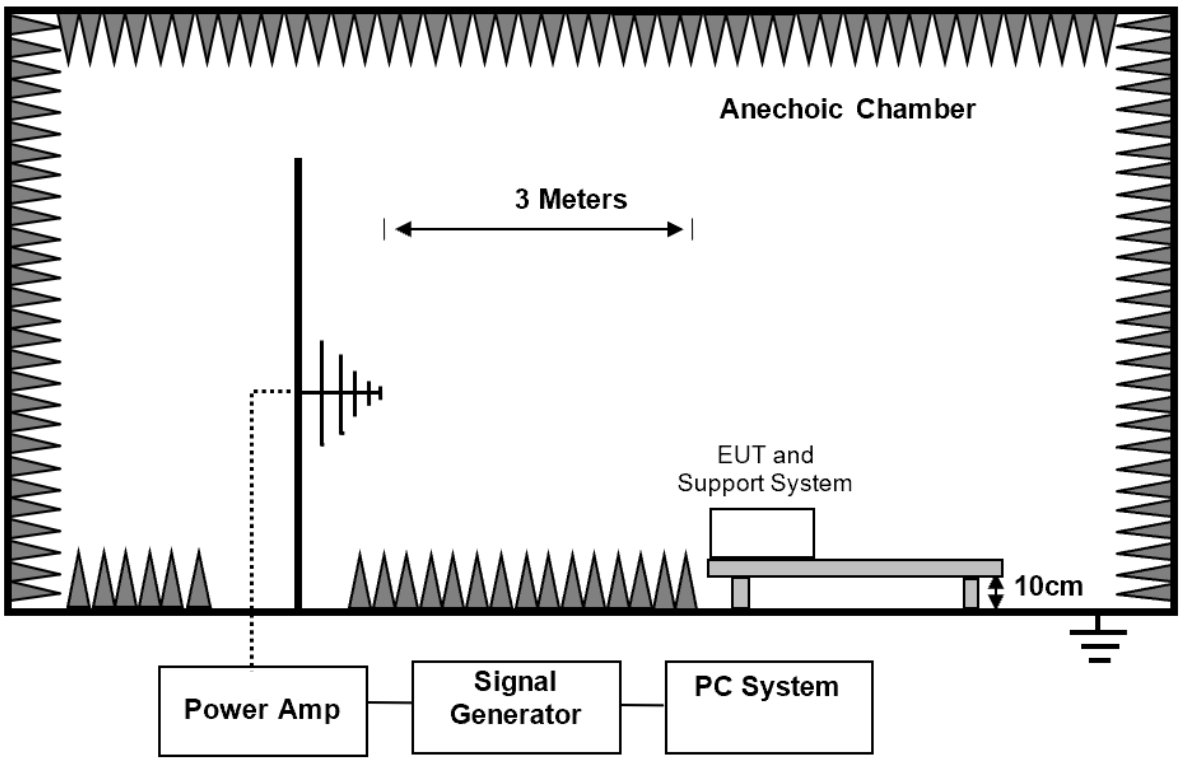
Equipment	Manufacturer	Model No.	Equipment No.	Cal. Due to
Mess-Elektronik	SCHWARZBECK	STLP 9128 D	DDT-ZC02769	2025/07/12
Log-Periodic Antenna	schwarzbeck	STLP 9149	DDT-ZC00945	2025/07/12
Power meter	Agilent	E4417A	DDT-ZC00934	2024/07/12
Power sensor	Agilent	E9323A	DDT-ZC00938	2024/09/06
Power sensor	Agilent	E9323A	DDT-ZC00939	2024/09/06
Electric Field Sensors	DARE Instruments	CTR1001S	DDT-ZC02865	2024/10/16
Power Amplifier	Wonder	HPA80M1000M500	DDT-ZC00940	2024/07/12
Power Amplifier	Wonder	HPA1000M2500M300	DDT-ZC00941	2024/07/12
Power Amplifier	Wonder	HPA2500M6000M200	DDT-ZC00942	2024/07/12
MXG Vector Signal Generator	Agilent	N5182A	DDT-ZC00239	2024/07/15
Audio Analyzer	R&S	UPL	DDT-ZC04520	2024/12/21

5.2. Block diagram of test setup

Table-top device



Floor-standing device



5.3. Test levels and performance criterion

Swept frequency test		Performance Criteria
Frequency (MHz)	80 to 1000; 1400 to 6000	**A**
Field Strength	3V/m rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of ☒1 kHz	
Step Size	1% increments	
Dwell time	1 Sec.	
Performance criteria A description for other devices: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.		

5.4. Assistant equipment used for test

Assistant equipment	Manufacturer	Model number	Description	other
/	/	/	/	/

5.5. Test procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator‘s output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3

meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator's output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

5.6. Test result

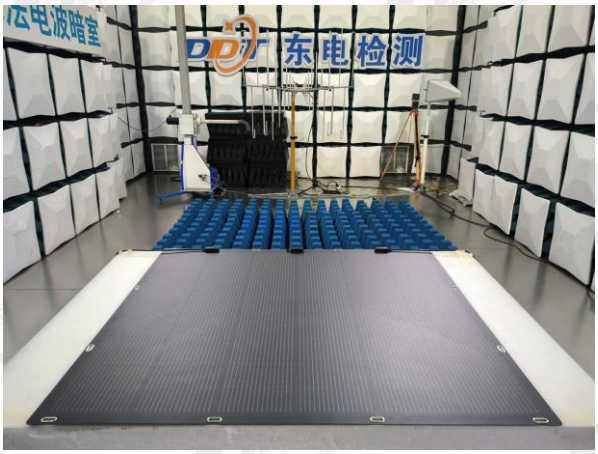
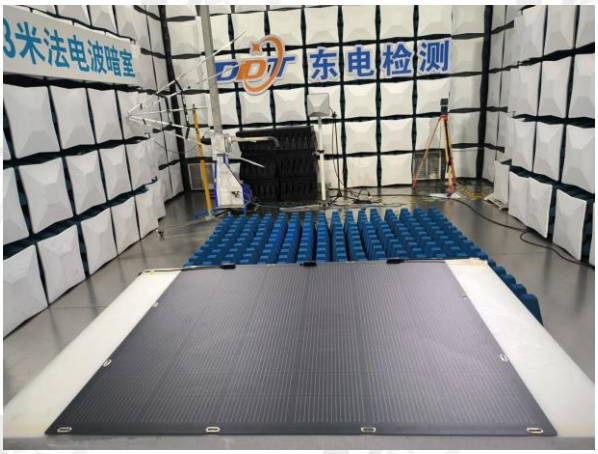
Test Site: 1#3m chamber	Test Date: 2024/05/24--2024/05/24
Condition: 24°C,65%	Test Engineer: Telamon Chen
Memo: /	

EUT Name: Solar panel	EUT Model: FS-OF060
Sample No.: S24051307-001	Test Mode: Working mode
Power supply: Power by solar	Memo:/

Test wave parameters	Level	EUT Position	Antenna Polarization	Required	Observation	Result
Swept test 80MHz to 1GHz Steps: 1% Dwell time 1s 1kHz 80% AM	3V/m	Front	H	A	A	PASS
			V	A	A	PASS
		Left	H	A	A	PASS
			V	A	A	PASS
		Rear	H	A	A	PASS
			V	A	A	PASS
		Right	H	A	A	PASS
			V	A	A	PASS
Swept test 1.4 GHz to 6GHz Steps: 1% Dwell time 1s 1kHz 80% AM	3V/m	Front	H	A	A	PASS
			V	A	A	PASS
		Left	H	A	A	PASS
			V	A	A	PASS
		Rear	H	A	A	PASS
			V	A	A	PASS
		Right	H	A	A	PASS
			V	A	A	PASS

Observation Description:
A: Normal performance within limits specified by the manufacturer requestor or purchaser.

5.7. Test photo

6. Sample photos

Please refer to DDT-Q24051307-1E appendix I.

----------End Report----------