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TESTING  
CNAS L2291



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# TEST REPORT

**Product Name** : Solar Hybrid Inverter  
**Model Number** : HES4865S100-H, HES4860S100-H,  
HES4855S100-H, HES4850S100-H,  
HES4840S100-H, HES4830S100-H,  
HES4850U100-H, HES4840U100-H,  
HES4835U100-H, HESP4865S100-H,  
HESP4860S100-H, HESP4855S100-H,  
HESP4850S100-H, HESP4850U100-H,  
HESP4840U100-H, HESP4835U100-H

**Prepared for** : SRNE Solar Co.,Ltd  
**Address** : 4-5F, Building13A, Taihua Wutong Industrial Park, Gushu  
Development Zone, Hangcheng Street, Baoan, Shenzhen,  
China PR

**Prepared by** : EMTEK (SHENZHEN) CO., LTD.  
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**Report Number** : ENS2207050119E00301R  
**Date(s) of Tests** : July 06, 2022 to August 26, 2022  
**Date of issue** : August 26, 2022



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## TEST REPORT DESCRIPTION

Applicant : SRNE Solar Co.,Ltd  
Manufacturer : SRNE SOLAR CO.,LTD Dongguan Branch  
Trade Mark : SRNE  
EUT : Solar Hybrid Inverter  
Model No. : HES4865S100-H, HES4860S100-H, HES4855S100-H,  
HES4850S100-H, HES4840S100-H, HES4830S100-H,  
HES4850U100-H, HES4840U100-H, HES4835U100-H,  
HESP4865S100-H, HESP4860S100-H, HESP4855S100-H,  
HESP4850S100-H, HESP4850U100-H, HESP4840U100-H,  
HESP4835U100-H  
Power Supply : AC Input: AC 170~280V, 50/60Hz  
Battery Input: DC 40~60V  
AC Output: AC 230V±5%, 5500W  
PV Charge: DC 120~500V

### Measurement Procedure Used:

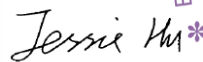
FCC CFR Title 47, Part 15, Subpart B  
ANSI C63.4-2014


The device described above is tested by EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (SHENZHEN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (SHENZHEN) CO., LTD.

Date of Test : July 06, 2022 to August 26, 2022

Prepared by :   
Kangtao Zhang/Editor

Reviewer :   
Jessie Hu/Supervisor

Approved & Authorized Signer :   
Lisa Wang/Manager

## Modified Information

Version	Report No.	Revision Data	Summary
Ver.1.0	ENS2207050119E00301R	/	Original Version



## 1. SUMMARY OF TEST RESULTS

<b>EMISSION</b>		
Description of Test Item	Standard & Limits	Results
Conducted Emission at Mains Terminals	FCC CFR Title 47, Part 15, Subpart B, Class B ANSI C63.4-2014	Pass
Radiated Emission	FCC CFR Title 47, Part 15, Subpart B, Class B ANSI C63.4-2014	Pass



## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

EUT	: Solar Hybrid Inverter
Model Number	: HES4865S100-H, HES4860S100-H, HES4855S100-H, HES4850S100-H, HES4840S100-H, HES4830S100-H, HES4850U100-H, HES4840U100-H, HES4835U100-H, HESP4865S100-H, HESP4860S100-H, HESP4855S100-H, HESP4850S100-H, HESP4850U100-H, HESP4840U100-H, HESP4835U100-H (Note: These models are identical in circuitry and electrical, mechanical, and physical structure; The only differences are trade name, model number, rated voltage and power. The purpose of the transaction. We prepare the test for HES4855S100-H.)
Sample number	: 1#
Applicant	: SRNE Solar Co.,Ltd
Address	: 4-5F, Building13A, Taihua Wutong Industrial Park, Gushu Development Zone, Hangcheng Street, Baoan, Shenzhen, China PR
Manufacturer	: SRNE SOLAR CO.,LTD Dongguan Branch
Address	: Room 301, Building 5th, Fuxing Rd No.36, Chang'an Town, Dongguan City, Guangdong Province, China PR
Factory	: SRNE SOLAR CO.,LTD Dongguan Branch
Address	: Room 301, Building 5th, Fuxing Rd No.36, Chang'an Town, Dongguan City, Guangdong Province, China PR
Date of Received	: July 06, 2022
Date of Test	: July 06, 2022 to August 26, 2022

### 2.2. Independent Operation Modes

- A. On
  - 1. Charging (AC in)
  - 2. PV in
  - 3. Discharging

### 2.3. Test Manner

Test Items	Test Voltage	Operation Modes	Worst case
Conducted Emission	AC 230V/50Hz	Mode A.1	Mode A.1
Radiated emissions (Up to 1 GHz)	AC 230V/50Hz DC 400V DC 48V	Mode A	Mode A.3 (DC 48V)

### 2.4. Description of Test Facility

Site Description

EMC Lab.

: **Accredited by CNAS**

The Certificate Registration Number is L2291.

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01 (identical to ISO/IEC 17025:2017)

**Accredited by FCC**

Designation Number: CN1204

Test Firm Registration Number: 882943

**Accredited by A2LA**

The Certificate Number is 4321.01.

**Accredited by Industry Canada**

The Conformity Assessment Body Identifier is CN0008

Name of Firm

: EMTEK (SHENZHEN) CO., LTD.

Site Location

: Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

### 2.5. Test Software

Item

Software

Conducted

: EMTEK(Ver.CON-03A1)-Shenzhen

Emission

Radiated Emission : EMTEK(Ver.RA-03A1)-Shenzhen

### 2.6. Description of Support Device

N/A

## 2.7. Measurement Uncertainty

Test Item	Uncertainty
Conducted Emission Uncertainty	: 3.16dB (9k~150kHz Conduction 2#) 2.90dB (150k~30MHz Conduction 2#)
Radiated Emission Uncertainty (3m 3# Chamber)	: 4.40dB (30M~1GHz Polarize: H) 5.04dB (30M~1GHz Polarize: V)
Uncertainty for test site temperature and humidity	: 0.6°C 4%





### 3. MEASURING DEVICE AND TEST EQUIPMENT

#### 3.1. For Conducted Emission Measurement

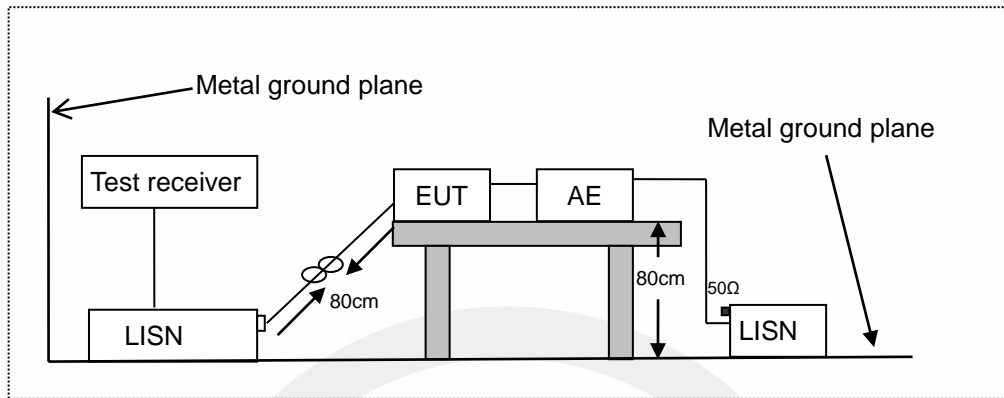
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	EMI Test Receiver	Rohde & Schwarz	ESCI	101045	May 14, 2022	1 Year
<input checked="" type="checkbox"/>	PULSE LIMITER	Rohde & Schwarz	ESH3-Z2	100107	May 14, 2022	1 Year
<input checked="" type="checkbox"/>	AMN	Schwarzbeck	NNLK 8129	8129203	May 15, 2022	1 Year

#### 3.2. For Radiated Emission Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
<input checked="" type="checkbox"/>	EMI Test Receiver	Rohde & Schwarz	ESU 26	100154	May 14, 2022	1 Year
<input checked="" type="checkbox"/>	Pre-Amplifier	Lunar EM	LNA30M3G-25	J10100000070	May 14, 2022	1 Year
<input checked="" type="checkbox"/>	Bilog Antenna	Schwarzbeck	VULB9163	659	Aug. 22, 2021	2 Year

## 4. POWER LINE CONDUCTED EMISSION MEASUREMENT

### 4.1. Block Diagram of Test Setup



LISN: Line Impedance Stabilization Network  
 AE: Associated equipment  
 EUT: Equipment under test

### 4.2. Limits

FCC Part 15, Subpart B, Class B

Frequency (MHz)	Limit (dB $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.  
 NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

### 4.3. Test Procedure

The EUT was placed on a table 0.8 m height from the metal ground plane and 0.4 m from the conducting wall of the shielding room and it was kept at least 0.8 m from any other grounded conducting surface.

All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

Connect EUT to the power mains through a artificial mains network (AMN). Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

All the support units are connecting to the other LISN.

The LISN provides 50 ohm coupling impedance for the measuring instrument.

Both sides of AC line were checked for maximum conducted interference.

The frequency range from 150 kHz to 30 MHz was sweep.

Set the test-receiver system to quasi peak detect function and average detect function, and to measure the conducted emissions values.

Test results were obtained from the following equation:

Emission Level (dB $\mu$ V) = LISN Factor (dB) + Cable Loss (dB) + Reading (dB $\mu$ V)

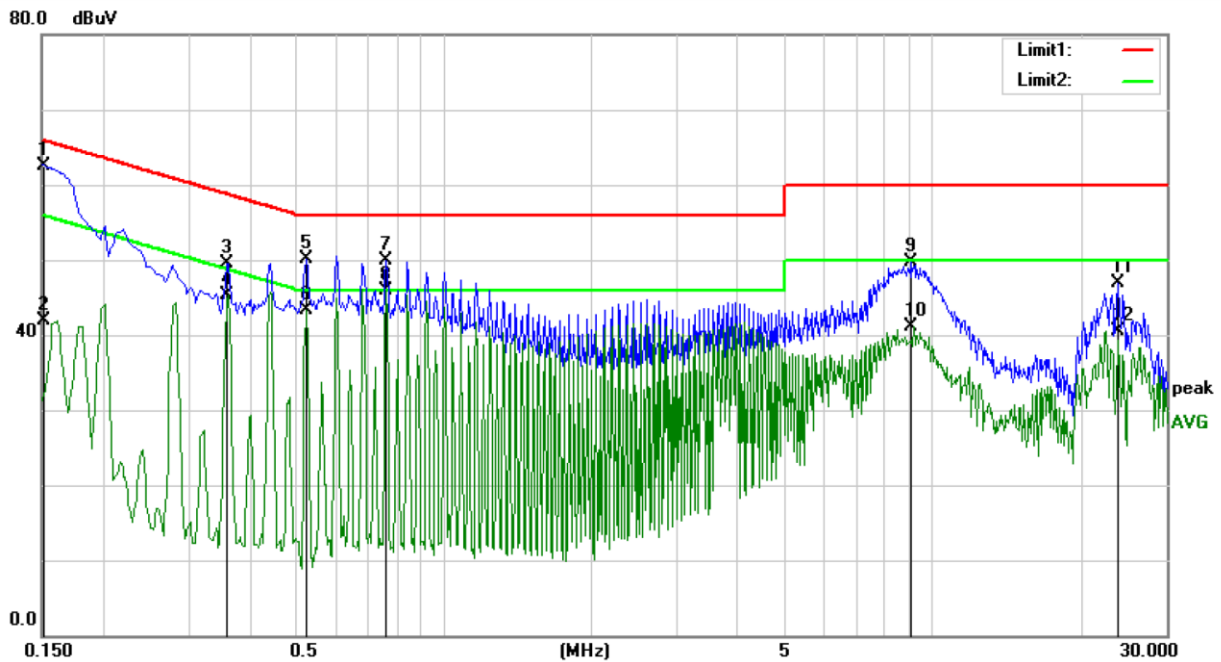
Margin (dB) = Emission Level (dB $\mu$ V) - Limit (dB $\mu$ V)

#### 4.4. Measuring Results

**PASS.**

Please reference to the following pages.

Temperature	:	25.1°C
Humidity	:	45%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YXL
Test Date	:	2022-08-05



Site Conduction #2

Phase: **L1**

Temperature: 25.1

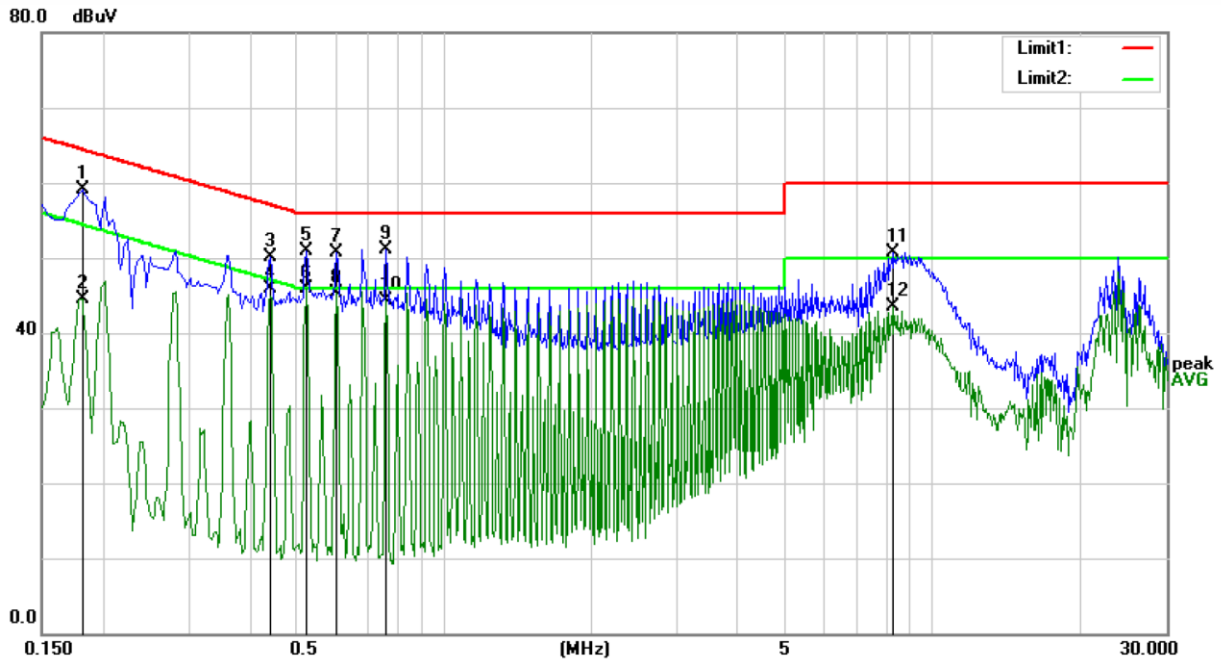
Limit: (CE)FCC PART 15 class B\_QP  
Mode: charging (AC in)

Power: AC 230V/50Hz

Humidity: 45 %

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1516	52.35	10.25	62.60	65.91	-3.31	QP	
2		0.1516	31.65	10.25	41.90	55.91	-14.01	AVG	
3		0.3580	39.39	10.21	49.60	58.77	-9.17	QP	
4		0.3580	35.13	10.21	45.34	48.77	-3.43	AVG	
5		0.5220	39.89	10.22	50.11	56.00	-5.89	QP	
6		0.5220	33.03	10.22	43.25	46.00	-2.75	AVG	
7		0.7620	39.73	10.18	49.91	56.00	-6.09	QP	
8	*	0.7620	35.64	10.18	45.82	46.00	-0.18	AVG	
9		9.0460	39.22	10.41	49.63	60.00	-10.37	QP	
10		9.0460	30.66	10.41	41.07	50.00	-8.93	AVG	
11		23.8460	36.23	10.65	46.88	60.00	-13.12	QP	
12		23.8460	29.76	10.65	40.41	50.00	-9.59	AVG	



Site Conduction #2

Phase: **N**

Temperature: 25.1

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 230V/50Hz

Humidity: 45 %

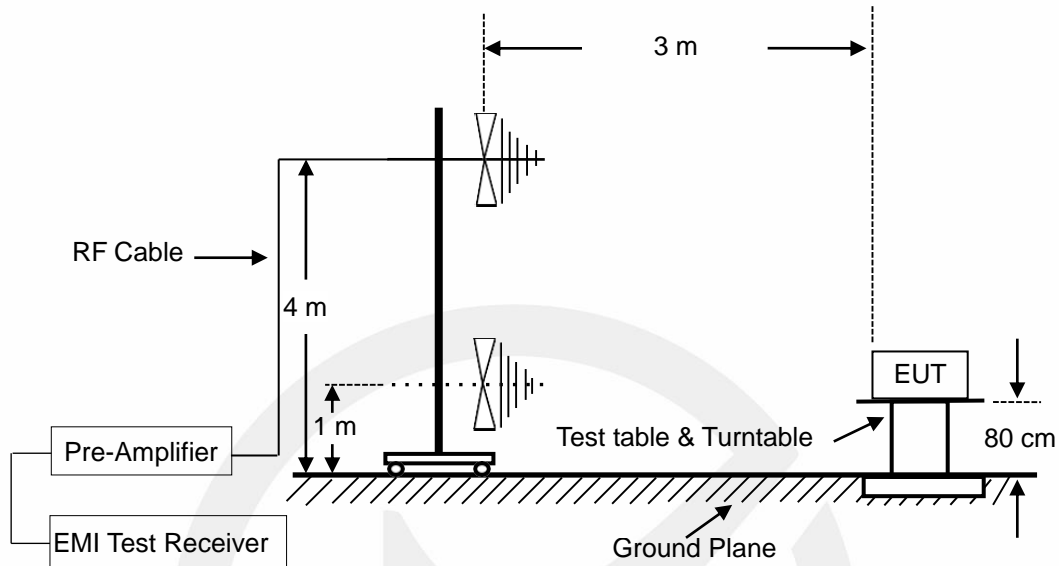
Mode: charging (AC in)

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1820	48.82	10.32	59.14	64.39	-5.25	QP	
2		0.1820	34.27	10.32	44.59	54.39	-9.80	AVG	
3		0.4420	39.83	10.24	50.07	57.02	-6.95	QP	
4		0.4420	35.65	10.24	45.89	47.02	-1.13	AVG	
5		0.5220	40.65	10.22	50.87	56.00	-5.13	QP	
6	*	0.5220	35.70	10.22	45.92	46.00	-0.08	AVG	
7		0.6020	40.48	10.20	50.68	56.00	-5.32	QP	
8		0.6020	35.10	10.20	45.30	46.00	-0.70	AVG	
9		0.7620	40.92	10.18	51.10	56.00	-4.90	QP	
10		0.7620	34.04	10.18	44.22	46.00	-1.78	AVG	
11		8.2820	40.27	10.40	50.67	60.00	-9.33	QP	
12		8.2820	33.04	10.40	43.44	50.00	-6.56	AVG	

## 5. RADIATED EMISSION MEASUREMENT(UP TO 1GHz)

### 5.1. Block Diagram of Test Setup



### 5.2. Radiated Limit

FCC Part 15, Subpart B, Class B

Frequency MHz	Distance Meters	Field Strengths Limit	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0

### 5.3. Test Procedure

The EUT was placed on a non-conductive table whose total height equaled 80cm. All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

The EUT was set 3 meters (or 10 meters) away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

The bandwidth of the Receiver is set at 120 kHz.

Test results were obtained from the following equation:

Emission level (dB $\mu$ V/m) = Antenna Factor - Amp Factor + Cable Loss + Reading

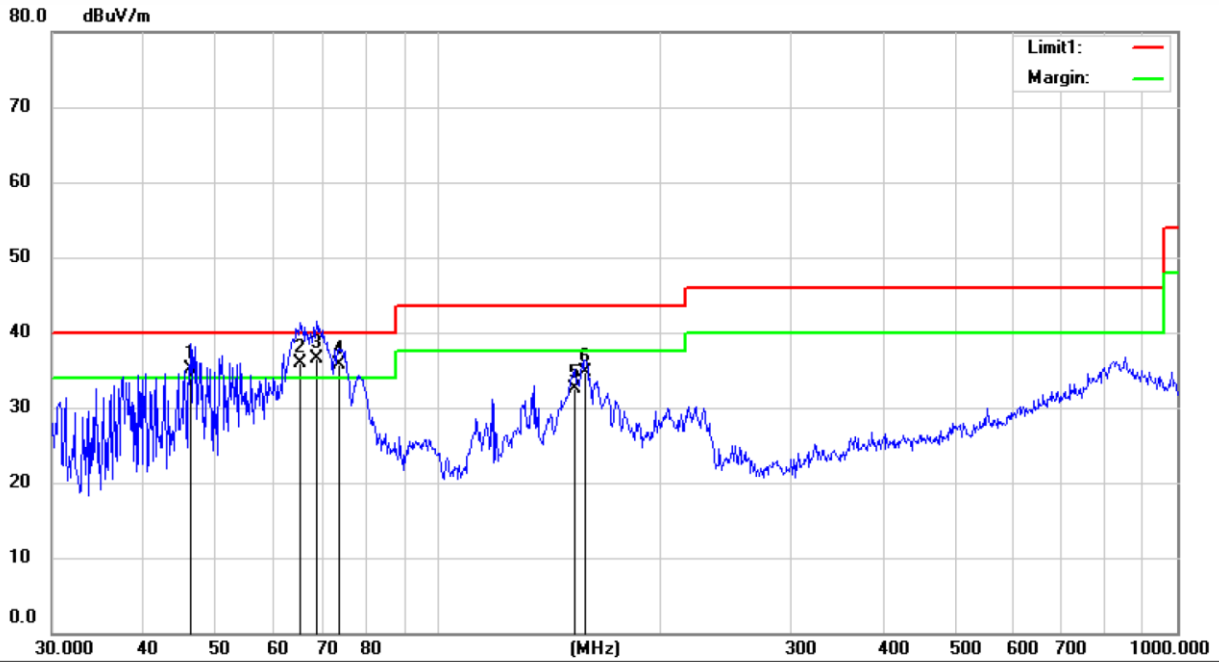
Margin (dB) = Emission Level (dB $\mu$ V/m) - Limit (dB $\mu$ V/m)

## 5.4. Measuring Results

**PASS.**

All the modes were tested and the data of the worst modes are attached the following pages.

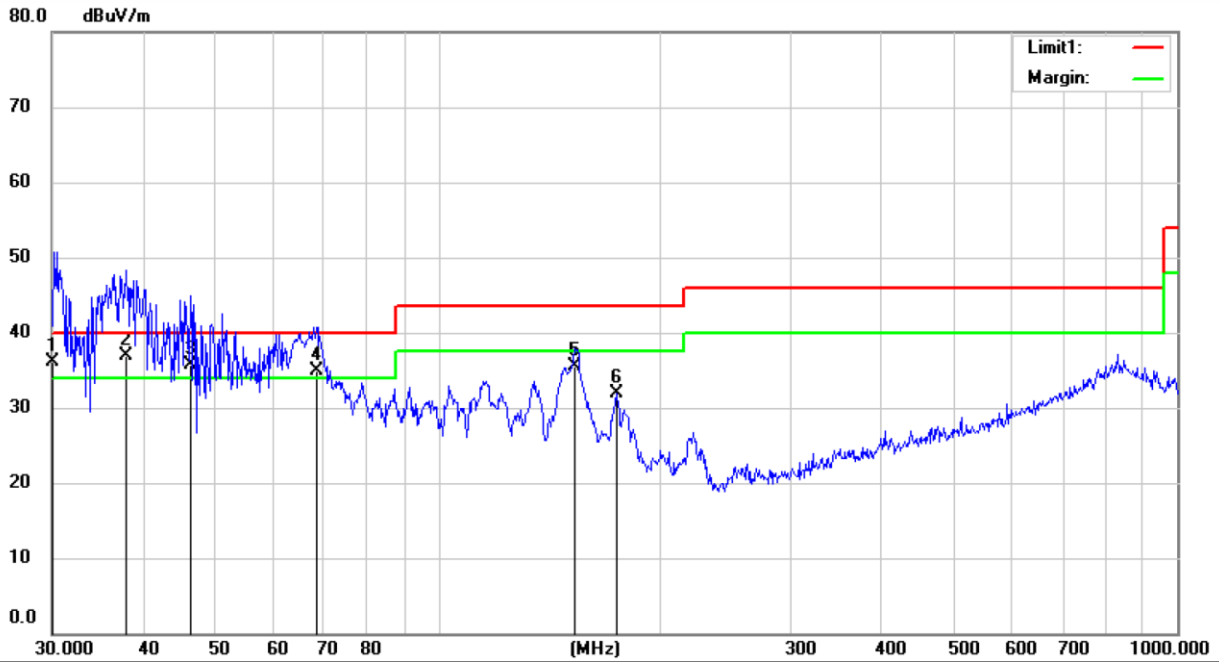
Temperature	:	25.7°C
Humidity	:	55%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YXL
Test Date	:	2022-08-05



Site 3m Chamber #3 Polarization: **Horizontal** Temperature: 25.7 C  
 Limit: (RE)FCC PART 15 CLASS B Power: DC 48V Humidity: 55 %  
 Mode: Discharging  
 Note:

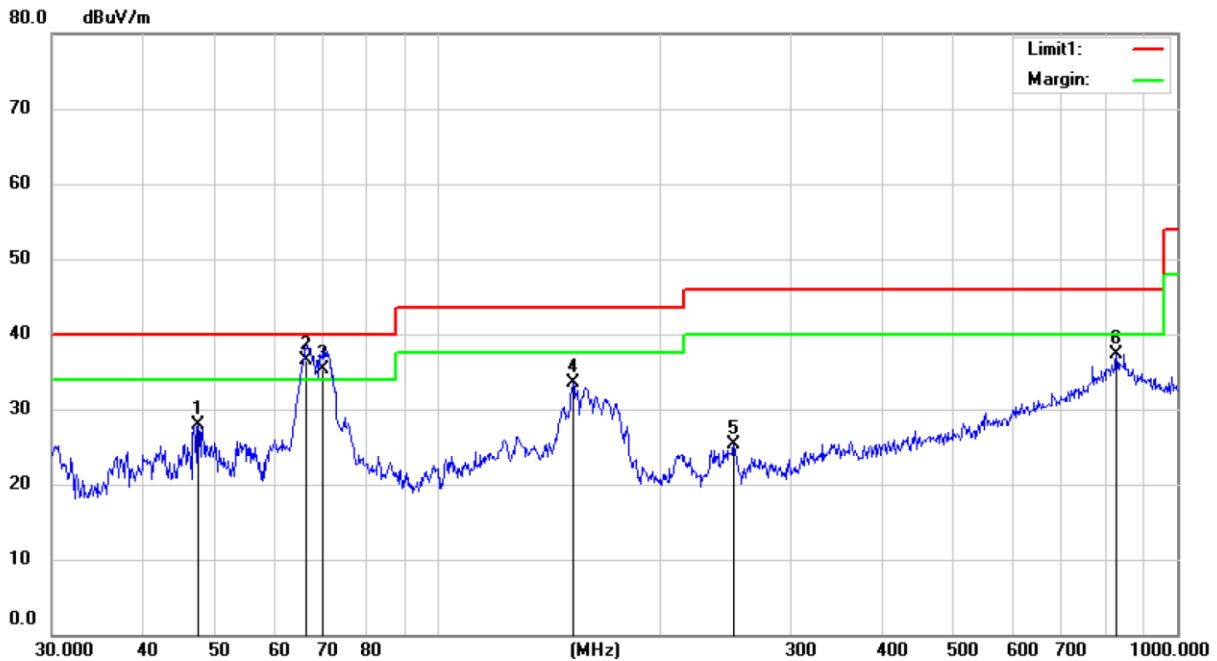
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1	!	46.2753	44.33	-9.13	35.20	40.00	-4.80	QP		
2	!	65.2745	44.72	-8.82	35.90	40.00	-4.10	QP		
3	*	68.5107	46.02	-9.52	36.50	40.00	-3.50	QP		
4	!	73.4620	46.39	-10.59	35.80	40.00	-4.20	QP		
5		153.0392	43.79	-11.29	32.50	43.50	-11.00	QP		
6		158.1678	46.04	-11.34	34.70	43.50	-8.80	QP		





Site 3m Chamber #3 Polarization: **Vertical** Temperature: 25.7 C  
 Limit: (RE)FCC PART 15 CLASS B Power: DC 48V Humidity: 55 %  
 Mode: Discharging  
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	!	30.1054	47.27	-11.07	36.20	40.00	-3.80			QP
2	*	37.8918	46.82	-9.92	36.90	40.00	-3.10			QP
3	!	46.2915	44.83	-9.13	35.70	40.00	-4.30			QP
4	!	68.5830	44.44	-9.54	34.90	40.00	-5.10			QP
5		153.2004	46.90	-11.30	35.60	43.50	-7.90			QP
6		174.4852	43.15	-11.33	31.82	43.50	-11.68			QP



Site 3m Chamber #3

Polarization: **Horizontal**

Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B

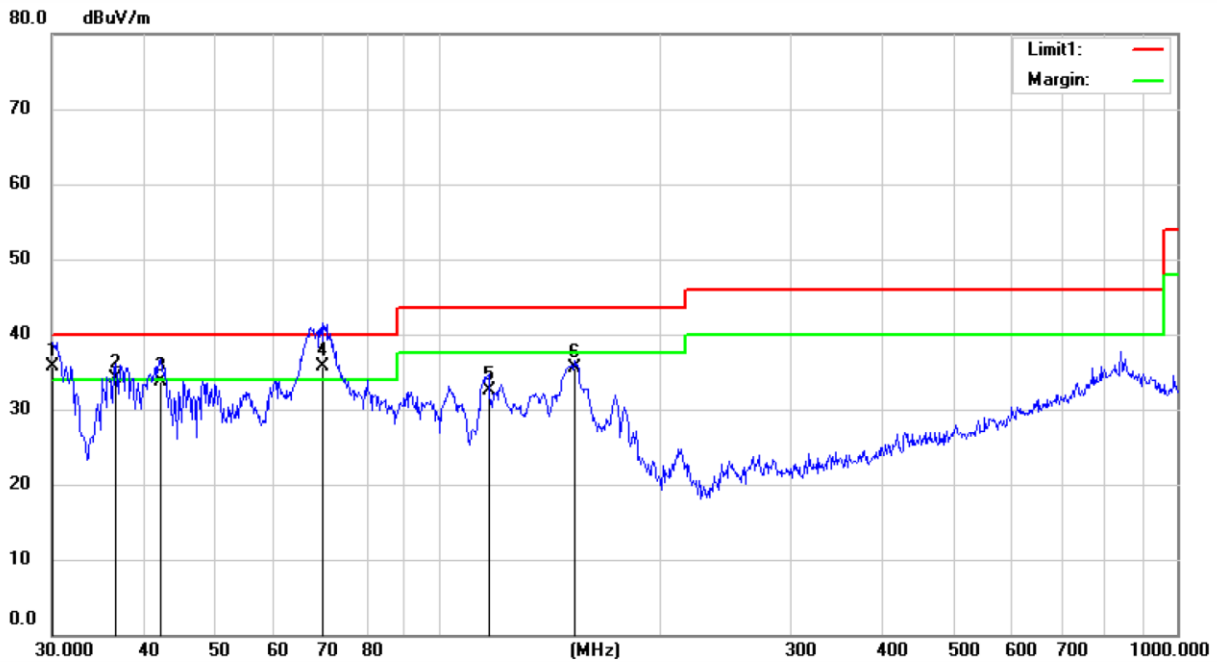
Power: AC 230V/50HZ

Humidity: 55 %

Mode: charging(AC IN)

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		47.4252	37.19	-9.19	28.00	40.00	-12.00	QP			
2	*	66.2894	45.53	-9.03	36.50	40.00	-3.50	QP			
3	!	70.0412	45.25	-9.85	35.40	40.00	-4.60	QP			
4		152.5036	44.72	-11.27	33.45	43.50	-10.05	QP			
5		251.7094	34.22	-8.88	25.34	46.00	-20.66	QP			
6		830.1090	29.99	7.24	37.23	46.00	-8.77	QP			



Site 3m Chamber #3 Polarization: **Vertical** Temperature: 25.7 C  
 Limit: (RE)FCC PART 15 CLASS B Power: AC 230V/50HZ Humidity: 55 %  
 Mode:charging(AC IN)  
 Note:

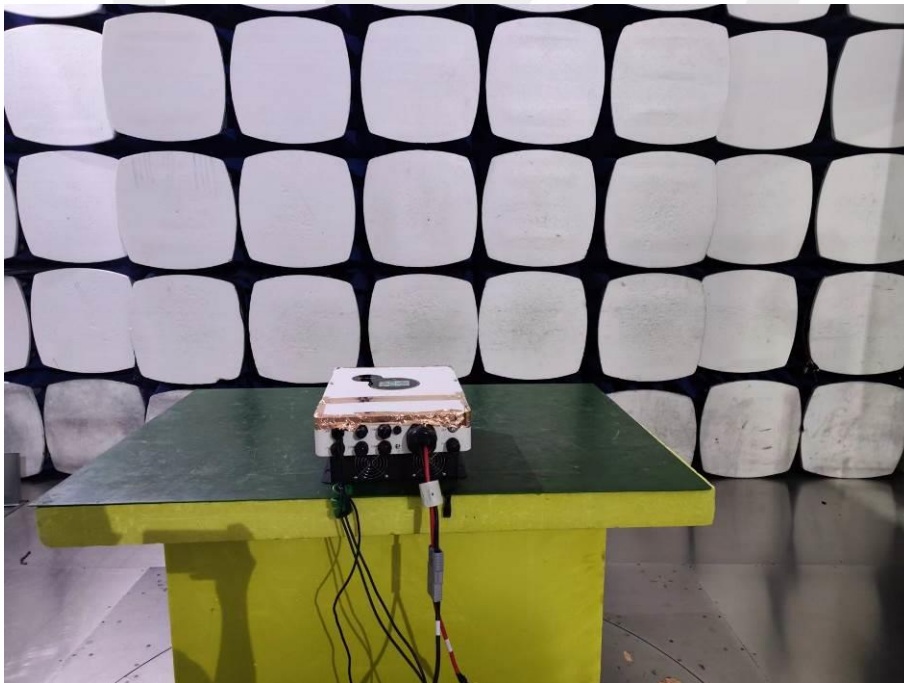
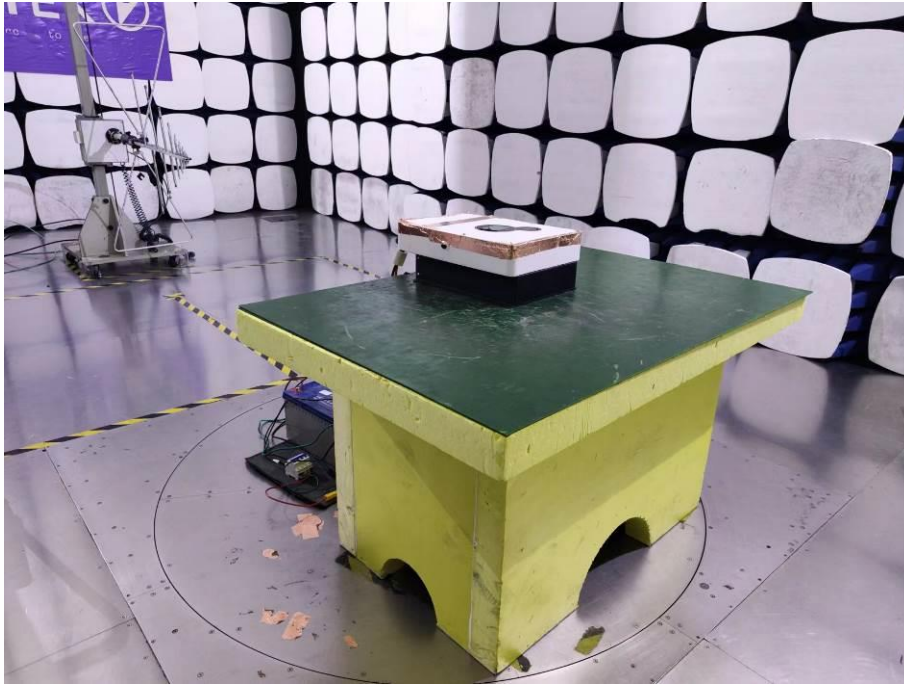
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	!	30.0105	46.77	-11.07	35.70	40.00	-4.30	QP		
2	!	36.5861	44.16	-10.06	34.10	40.00	-5.90	QP		
3		42.1542	43.20	-9.50	33.70	40.00	-6.30	QP		
4	*	69.9675	45.63	-9.83	35.80	40.00	-4.20	QP		
5		116.9492	43.91	-11.41	32.50	43.50	-11.00	QP		
6		153.5231	46.91	-11.31	35.60	43.50	-7.90	QP		

## 6. PHOTOGRAPHS

### 6.1. Photos of Conducted Emission Measurement



## 6.2. Photos of Radiation Emission Measurement





## APPENDIX A: Label Requirements

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under part 73 of this chapter, land mobile operation under part 90 of this chapter, etc., shall bear the following statement in a conspicuous location on the device:

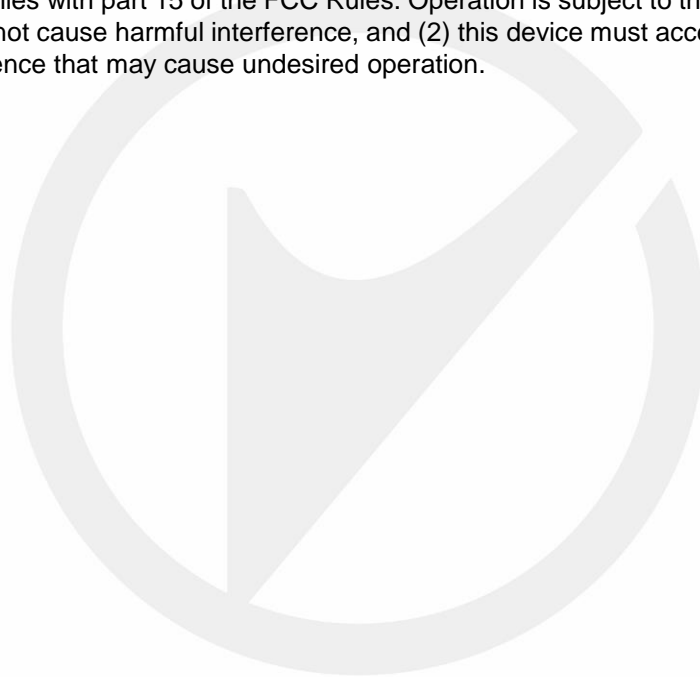
This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



## APPENDIX B: Warning Statement

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

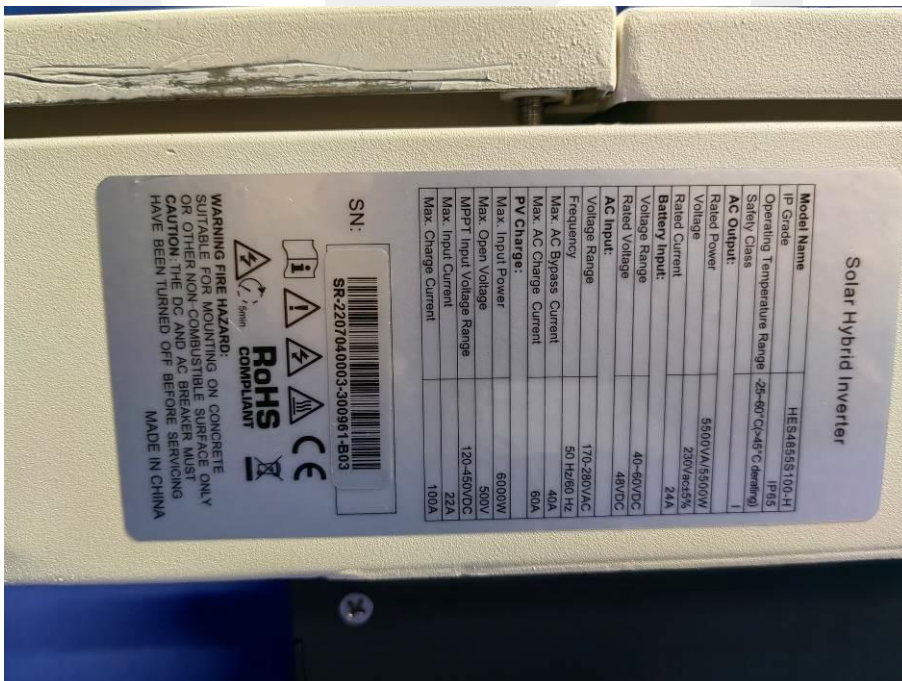
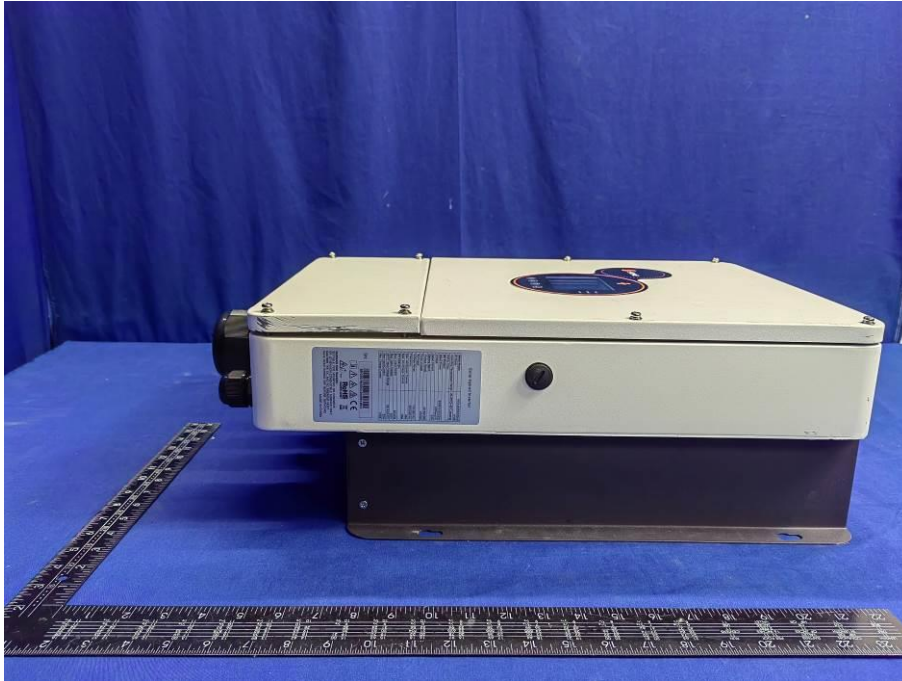
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## APPENDIX C: Photos of EUT







\*\*\* End of Report \*\*\*

## Statement

- 1 . This report is invalid without the signature of the authorized approver and "special seal for testing".
- 2 . This report shall not be copied partly without authorization.
- 3 . The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.
- 4 . The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.
- 5 . The test results or observations are provided in accordance with measured value, without taking risks caused by uncertainty into account. Without explicit stipulation in special agreements, standards or regulations, EMTEK shall not assume any responsibility.
- 6 . Objections shall be raised within 20 days from the date receiving the report.