TEST REPORT

Reference No.	:	WTX21X03023977W-1
Manufacturer	:	Shenzhen Sunricher Technology Limited
Address	:	3F & 5F, Building E, Qihang Innovation Industrial Park, No. 1008 Songbai Road, Nanshan District, Shenzhen, Guangdong 518055 China
Product	:	Controllers
Test Model	:	SR-ZV9101SAC-HP-Switch-B
Standards	:	**ETSI EN 300 220-1 V3.1.1 (2017-02)** **ETSI EN 300 220-2 V3.1.1 (2017-02)**
Date of Receipt sample	:	Mar.24, 2021
Date of Test	:	Mar.24, 2021 to Apr.13, 2021
Date of Issue	:	Apr.13, 2021
Test Result	:	**Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

Tel.: +86-755-33663308

Fax.: +86-755-33663309

Tested by:	Reviewed By:	Approved & Authorized By:
Jack Huang	Lion Cai	Silin Chen
Jack Huang / Project Engineer	Lion Cai / RF Manager	Silin Chen / Manager

TABLE OF CONTENTS

Report version

Version No.	Date of issue	Description
Rev.00	Apr.13, 2021	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Manufacturer: Shenzhen Sunricher Technology Limited

Address of manufacturer: 3F & 5F, Building E, Qihang Innovation Industrial Park, No. 1008 Songbai Road, Nanshan District, Shenzhen, Guangdong 518055 China

General Description of EUT	
Product Name:	Controllers
Trade Name:	/
Model No.:	SR-ZV9101SAC-HP-Switch-B
Adding Model(s):	SR-ZG9101SAC-HP-Switch-B, SR-SB9101SAC-HP-Switch-B, SR-BL9101SAC-HP-Switch-B, SR-9101SAC-HP-Switch-B, SR-ZV9080A, SR-ZG9080A, SR-SB9080A, SR-BL9080A, SR-9080A
Rated Voltage:	Inout: AC 100-240 V Output: AC 100-240 V Output Current: 16A max.
Power Adaptor Model:	/
Software Version:	V1.0
Hardware Version:	V1.0
Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model SR-ZV9101SAC-HP-Switch-B, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Frequency Range:	868.42MHz
RF Output Power:	/
Type of Modulation:	FSK
Type of Antenna:	Internal Antenna
Antenna Gain:	0dBi
Receiver Categories:	2

Receiver category	Description
1	Category 1 is a high performance level of receiver. In particular to be used where the operation of a SRD may have inherent safety of human life implications.
1.5	Category 1.5 is an improved performance level of receiver
2	Category 2 is standard performance level of receiver.
3	Category 3 is a low performance level of receiver. Manufacturers have to be aware that category 3 receivers are not able to work properly in case of coexistence with some services such as a mobile radio service in adjacent bands. The manufacturer shall provide another mean to overcome the weakness of the radio link or accept the failure.

1.2 Test Standards

The tests were performed according to following standards:

ETSI EN 300 220-1 V3.1.1 (2017-02): Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz;Part 1: Technical characteristics and methods of measurement.
ETSI EN 300 220-2 V3.1.1 (2017-02): Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz;Part 2: Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU for non specific radio equipment.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 220-1, ETSI EN 300 220-2
The equipment under test (EUT) was configured to measure its highest possible emission level. For more detail refer to the Operating Instructions.

1.4 Test Facility

FCC – Registration No.: 125990
Waltek Testing Group (Shenzhen) Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A
The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The equipment under test (EUT) was configured to measure its highest possible emission/immunity level. The test modes were adapted according to the operation manual for use, the EUT was operated in the continuous transmitting mode that was for the purpose of the measurements, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Receiving	868.42MHz

Test Conditions					
	Normal	LTLV	LTHV	HTHV	HTLV
Temperature (℃)	20	/	/	/	/
Voltage (V)	230	/	/	/	/
Relative Humidity:	48 %.				
ATM Pressure:	1019 mbar				

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
AC Cable	1.0	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Battery DC12V	/	/	/
light bulb	/	/	/
Lamp holder	/	/	/
Mobile phone	HUAWEI	VOG-AL00	/
Gateway	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Uncertainty	Note
Radio frequency	±0.4 ppm	(1)
RF power, conducted	±0.42dB	(1)
Occupied BandWidth	±1.5%	(1)
Conducted Spurious Emission	±2.17dB	(1)
Adjacent Channel Power	±0.88dB	(1)
RF level uncertainty for a given BER	±1.2dB	(1)
Radiated Spurious Emissions	30-200MHz ±4.52dB	(1)
	0.2-1GHz ±5.56dB	(1)
	1-6GHz ±3.84dB	(1)
	6-18GHz ±3.92dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

1.7 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2020-04-28	2021-04-27
Spectrum Analyzer	Agilent	N9020A	US47140102	2020-04-28	2021-04-27
Signal Generator	Agilent	83752A	3610A01453	2020-04-28	2021-04-27
Power Divider	Weinschel	1506A	PM204	2020-04-28	2021-04-27
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2020-04-28	2021-04-27
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2020-04-28	2021-04-27
Amplifier	Agilent	8447F	3113A06717	2020-04-28	2021-04-27
Amplifier	C&D	PAP-1G18	2002	2020-04-28	2021-04-27
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2019-05-05	2021-05-04
Horn Antenna	ETS	3117	00086197	2019-05-05	2021-05-04
DC Power Supply	LW	APR-3003	N/A	2020-04-28	2021-04-27
Signal Generator	HP	8648A	3642U01277	2020-04-28	2021-04-27
Cell Site Test Set	HP	8921A	3524A02414	2020-04-28	2021-04-27

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing

2. SUMMARY OF TEST RESULTS

Standards	Reference	Description of Test Item	Result
EN 300220-2 V3.1.1	4.2.1	Operating frequency	Pass
	4.2.2	Unwanted emissions in the spurious domain	Pass
	4.3.1	Effective Radiated Power	N/A
	4.3.3	Duty cycle	N/A
	4.3.4	Occupied bandwidth	N/A
	4.3.5	Tx out of band emissions	N/A
	4.3.6	Transient Power	N/A
	4.3.7	TX Adjacent channel power	N/A
	4.3.8	TX behaviour under low voltage conditions	N/A
	4.4.2	RX Blocking	Pass

Pass: The EUT complies with the essential requirements in the standard
Fail: The EUT does not comply with the essential requirements in the standard
N/A: not applicable

3. OPERATING FREQUENCY

3.1 Standard Applicable

According to EN 300220-1 section 5.1, the nominal Operating Frequency is the centre of a channel of width OCW.

3.2 Test Procedure

Reference to ETSI EN 300 220-1 V3.1.1 clause 5.1.2

3.3 Summary of Test Results/Plots

Item	Value
Operational Frequency band or bands	867.6MHz-868.8MHz
Nominal Operating Frequency or Frequencies	868.42 MHz
Operating Channel width(s) - OCW	15kHz
Note: Declared by the manufacturer	

4. UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

4.1 Limit of Spurious Emissions

According to EN 300220-1 section 5.9, the power of any unwanted emission in the spurious domain shall not exceed the values given in the following table.

Table 19: Spurious domain emission limits

Frequency / State	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz	Other frequencies below 1 000 MHz	Frequencies above 1 000 MHz
TX mode	-54 dBm	-36 dBm	-30 dBm
RX and all other modes	-57 dBm	-57 dBm	-47 dBm

4.2 Test Procedure

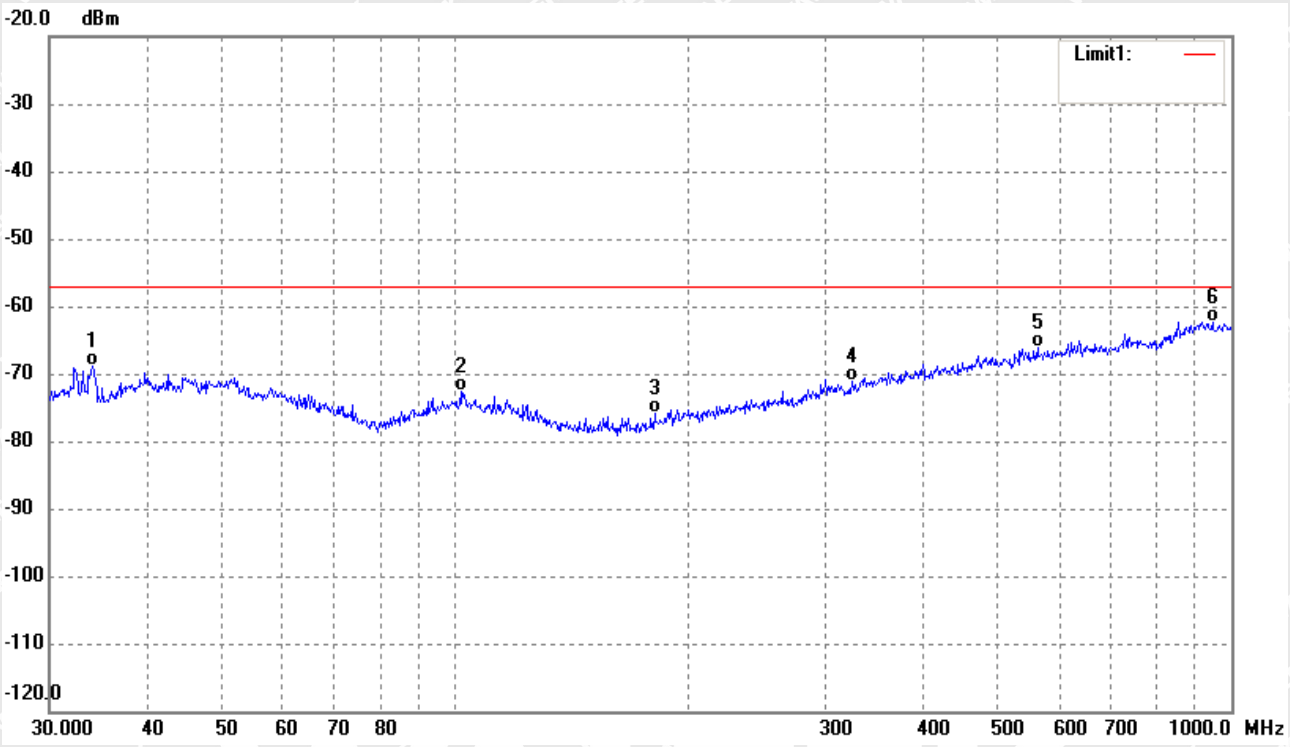
Tx was placed on a nonmetal table which is 1.5 meter above the grounded reference plane and set to work in normal operation mode. Details refer to EN 300220-1 subclause 5.9.

The EUT was operating at normal to represent worst case during final qualification test.

4.3 Summary of Test Results/Plots

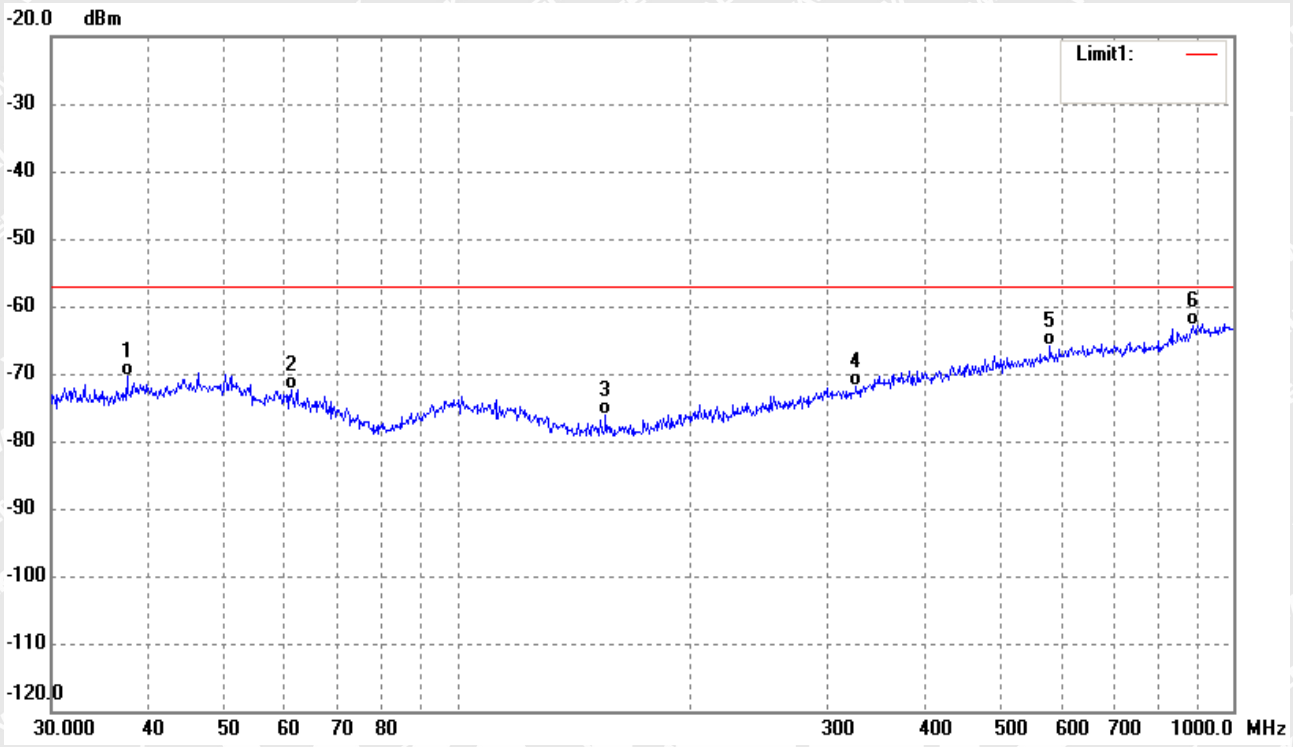
➢ Rx Spurious Emission From 30MHz To 1GHz

Test Channel:	/	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	34.1561	-66.65	-2.12	-68.77	-57.00	-11.77	ERP
2	101.6443	-71.20	-1.52	-72.72	-57.00	-15.72	ERP
3	180.6488	-73.36	-2.44	-75.80	-57.00	-18.80	ERP
4	324.4561	-74.01	2.85	-71.16	-57.00	-14.16	ERP
5	562.6624	-74.84	8.63	-66.21	-57.00	-9.21	ERP
6	945.4399	-75.62	13.25	-62.37	-57.00	-5.37	ERP

Test Channel:	/	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	37.5479	-69.16	-1.11	-70.27	-57.00	-13.27	ERP
2	61.1316	-71.02	-1.40	-72.42	-57.00	-15.42	ERP
3	155.3644	-72.46	-3.70	-76.16	-57.00	-19.16	ERP
4	326.7395	-74.69	2.94	-71.75	-57.00	-14.75	ERP
5	580.7026	-75.15	9.38	-65.77	-57.00	-8.77	ERP
6	887.6099	-75.83	12.85	-62.98	-57.00	-5.98	ERP

➢ Rx Spurious Emission From Above 1GHz

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
1736.840	-67.59	0.80	-66.79	-47.00	-19.79	H
2605.260	-67.57	2.65	-64.92	-47.00	-17.92	H
3473.680	-66.78	4.52	-62.26	-47.00	-15.26	H
1736.840	-66.97	0.80	-66.17	-47.00	-19.17	V
2605.260	-67.87	2.65	-65.22	-47.00	-18.22	V
3473.680	-66.60	4.52	-62.08	-47.00	-15.08	V

Note: 1.Testing is carried out with frequency rang 30MHz to 10th Harmonics frequency, which above 1GHz are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

2. This EUT was tested in 3 orthogonal positions and the worst case position data was reported.

5. BLOCKING

5.1 Standard Applicable

According to EN 300220-1 section 5.18, blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels or bands,

The blocking level shall not be less than the values given in the following table, except at frequencies on which spurious responses are found.

Table 1: Receiver categories

Receiver category	Description
1	Category 1 is a high performance level of receiver. In particular to be used where the operation of a SRD may have inherent safety of human life implications.
1.5	Category 1.5 is an improved performance level of receiver category 2.
2	Category 2 is standard performance level of receiver.
3	Category 3 is a low performance level of receiver. Manufacturers have to be aware that category 3 receivers are not able to work properly in case of coexistence with some services such as a mobile radio service in adjacent bands. The manufacturer shall provide another mean to overcome the weakness of the radio link or accept the failure.

Table 40: Blocking level parameters for RX category 3

Requirement	Limits
	Receiver category 3
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -80 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -60 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -60 dBm

Table 41: Blocking level parameters for RX category 2

Requirement	Limits
	Receiver category 2
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -69 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -44 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -44 dBm

Table 42: Blocking level parameters for RX category 1.5

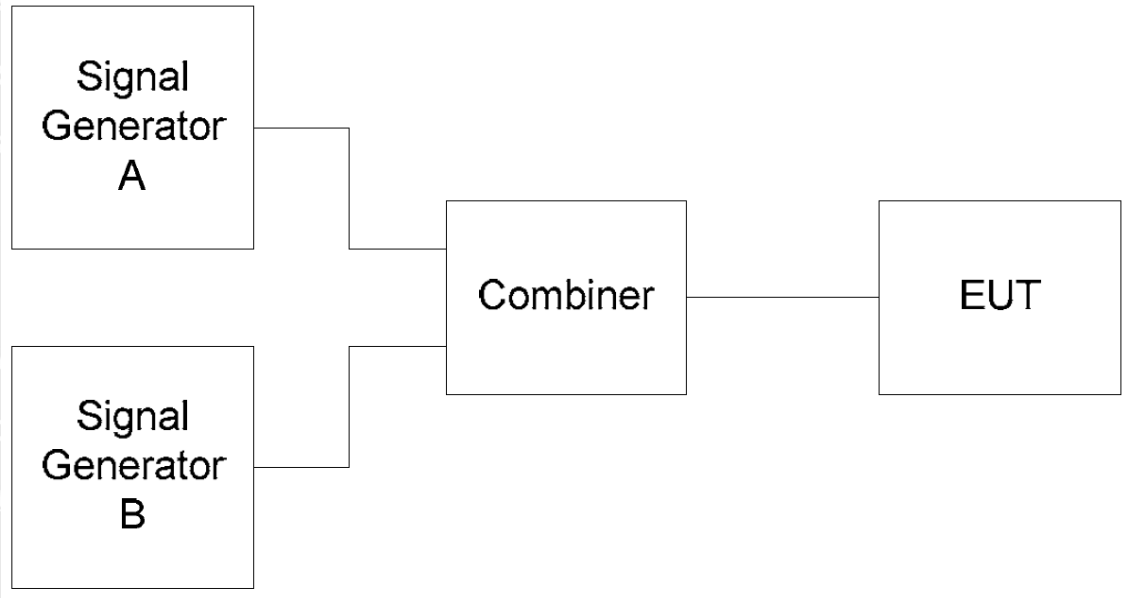
Requirement	Limits
	Receiver category 1.5
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -43 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -33 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -33 dBm

Table 42: Blocking level parameters for RX category 1

Requirement	Limits
	Receiver category 1
Blocking at ±2 MHz from Centre Frequency	≥ -20 dBm
Blocking at ±10 MHz from Centre Frequency	≥ -20 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -20 dBm

5.2 Test Procedure

The following test set-up shall be used for conducted measurements.



Two signal generators A and B shall be connected to the receiver via a combining network to the receiver antenna connector.

For equipment with integral antenna the connection to the equipment is made either to a temporary antenna connector or via a validated test fixture.

Signal generator A shall be at the nominal frequency of the receiver, with normal modulation of the wanted signal.

Signal generator B shall be unmodulated.

Measurements shall be carried out at frequencies of the unwanted signal at approximately ±2 MHz and ±10 MHz, avoiding those frequencies at which spurious responses occur.

Initially signal generator B shall be switched off and using signal generator A the level which still gives sufficient response shall be established, however, the level at the receiver input shall not be adjusted below the sensitivity limit given in clause 8.1.4. The output level of generator A shall then be increased by 3 dB.

Signal generator B is then switched on and adjusted until the wanted criteria (see clause 8.1.1) is just exceeded. With signal generator B settings unchanged the power into the receiver is measured by replacing the receiver with a power meter or spectrum analyzer. This level shall be recorded.

For equipment using LBT (which can be Receiver category 1 or 2) the above measurements shall be repeated with signal generator A level adjusted +13 dB higher than in the measurements above (this is equal to a level of +16 dB above the sensitivity).

Additionally, for category 1 receivers it is necessary to determine the receiver saturation by repeating the above measurements with a +40 dB increased level for signal generator A.

Alternatively, equipment having a dedicated or integral antenna may use a radiated measurement setup. For this, a test site from clause A.1 shall be selected and the requirements from clauses A.2 and A.3 apply.

Signal generators A and B together with a combiner shall be placed outside the anechoic chamber and a TX test antenna shall be placed with the EUT's antenna polarisation. The EUT shall be placed at the location of the turntable at the orientation of the most sensitive position. Generator A shall be set in order to reach the EUT sensitivity limit +3 dB.

The procedure shall be the same as for the conducted measurement. Bloking is the difference between signal generator B and signal generator A levels.

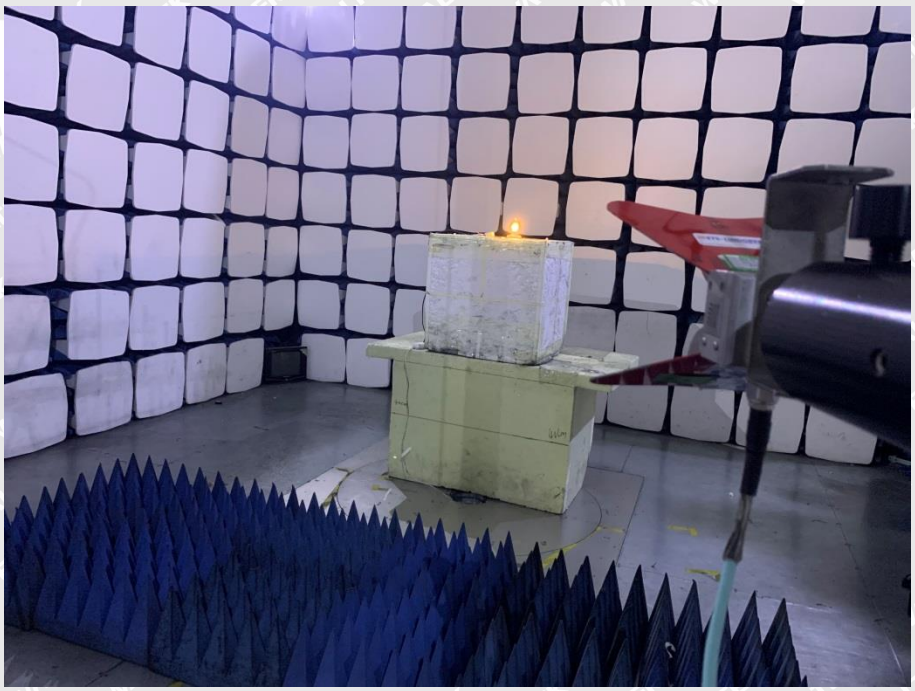
5.3 Test Result/Plots

Test Frequency (MHz)	Displacements of the unwanted test signal	SG B (dBm)	Limit dBm	Result
868.42	-5% of Centre Frequency or 15MHz	-32	≥-44	Pass
	-10MHz form f_{low}	-37	≥-44	Pass
	-2MHz form f_{low}	-51	≥-69	Pass
	+2MHz form F_{high}	-52	≥-69	Pass
	+10MHz form F_{high}	-36	≥-44	Pass
	+5% of Centre Frequency or 15MHz	-31	≥-44	Pass

EXHIBIT 1 - EUT PHOTOGRAPHS

Please refer to "ANNEX".

EXHIBIT 2 - TEST SETUP PHOTOGRAPHS

Spurious Emission Test Setup/E.R.P. Test Setup (Below 1GHz)	
Spurious Emission Test Setup/E.R.P. Test Setup (Above 1GHz)	

******* END OF REPORT *******