

RF TEST REPORT

Report Number : 4840320329801B Date of Issue: February 17, 2022

Model : LLS Bxy/zG, LLS BLxy/zG, LLS Bxy/zC, LLS BLxy/zC, (x=250-600,An integer multiple of 10; y=NULL,i,B;z=Y,B,G)

Product Type : Robotic lawnmower,powered by battery

Applicant : SUMEC Hardware & Tools Co., Ltd.

Address : No.1 Xinghuo Road Jiangbei New Area 210061 Nanjing, Jiangsu
PEOPLE'S REPUBLIC OF CHINA

Factory : SUMEC Manufacturing Venture Co., Ltd.

Address : 1# Gaoke Eighth Road,Nanjing High-Tech Zone,Pukou District, Nanjing,
Jiangsu Jiangsu PEOPLE'S REPUBLIC OF CHINA

Test Result : Positive Negative

Total pages including Appendices : 21



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Table of Content

1	General Information.....	3
1.1	Report Modification Record.....	3
1.2	Notes.....	3
1.3	General Remarks.....	3
1.4	Testing Laboratory.....	4
1.5	Details of Applicant.....	4
1.6	Application Details.....	4
1.7	Test Item.....	4
1.8	Applied Standard.....	5
1.9	Test Summary.....	5
2	Equipment Specification.....	6
2.1	General Description.....	6
2.2	Technical Data.....	6
2.3	Auxiliary Equipment Used during Test.....	7
2.4	Lists of Test Instruments.....	7
2.5	Type of Equipment.....	8
2.6	Frequency range.....	8
2.7	Antennas type.....	8
2.8	Temperature range.....	9
3	Measurements Result.....	10
3.1	Operating Frequency Range (OFR).....	10
3.2	Transmitter H-field requirements.....	10
3.3	Transmitter spurious emissions.....	10
3.4	Transmitter out of band (OOB) emissions.....	10
3.5	Receiver Spurious Emissions.....	11
3.6	Receiver Baseline Sensitivity.....	16
3.7	Receiver Baseline Resilience.....	16
4	Estimation of Exposure of Human to Electromagnetic Fields.....	16
5	Test set up.....	17
6	Photographs of EUT.....	18

1 General Information

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	28/01/2022

NOTICE: This report is a SUPPLEMENT OF PROJECT 4840320329800A. So the report is not valid without the report of 4840320329800A.

This report is issued due to update the standard version, from ETSI EN 303 447 V1.2.0 (2020-07) to ETSI EN 303 447 V1.3.0 (2021-09), the new requirement which Receiver Spurious Emissions test was performed.

1.2 Notes

TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab issued reports.

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1.3 General Remarks

Due to the fact that all the models have the same docking station/ charging station, so all the tests were performed on the docking station.

Prepared by
EMC Project Engineer

2022-02-17
Date

Zhilan Xue
Name



Signature

Approved by
EMC Project Manager

2022-02-17
Date

Jun Bao
Name



Signature



1.4 Testing Laboratory

Test Laboratory:

TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab
Address: 10# Huaxia Road (M), Dongting, Wuxi, 214100
P. R. China

Phone: +86 510 8820 3737

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1.5 Details of Applicant

Client: Sumece Hardware & Tools Co., Ltd.

Address: No.1 Xinghuo Road Jiangbei New Area 210061 Nanjing, Jiangsu PEOPLE'S REPUBLIC OF CHINA

Product Description: Robotic lawnmower, powered by battery

Manufacturer's Model No.:

**LLS Bxy/zG, LLS BLxy/zG, LLS Bxy/zC, LLS BLxy/zC, (x=250-600, An integer multiple of 10;
y=NULL,i,B;z=Y,B,G)**

1.6 Application Details

Sample Received Date: 09 11, 2020

Testing Start Date: 09 14, 2020

Testing End Date: 12 16, 2021

1.7 Test Item

Refer to table 1 and 2

1.8 Applied Standard

APPLIED PRODUCT STANDARD

ETSI EN 303 447 V1.3.0 (2021-09)

TEST METHODS

ETSI EN 303 447 V1.3.0 (2021-09)

1.9 Test Summary

Table 1. Summary of results

Conformance requirement according to ETSI EN 303 447 V1.3.0 (2021-09)		Result
Essential parameter	Corresponding technical requirements	
Transmitter requirements	4.3.1 Operating Frequency Range (OFR)	N/A
	4.3.2 Transmitter H-field requirements	N/A
	4.3.3 Transmitter spurious emissions	N/A
	4.3.4 Transmitter out of band (OOB) emissions	N/A
Receiver requirements	4.4.2 Receiver Spurious Emissions	PASS
	4.4.3 Receiver Baseline Sensitivity	N/A
	4.4.4 Receiver Baseline Resilience	N/A

Table 2. Overview of Conformance tests

Essential requirements	Conformance tests	Test setup and procedure	
		Boundary loop and (dependent) guidance loop	Integral antenna
OFR, clause 4.3.1	6.2.1	Clauses B.1.2 and B.1.3	B.2
H-field, clause 4.3.2	6.2.2	Clauses B.1.2 and B.1.3	B.2
Transmitter unwanted emission (spurious and out of band emissions), clauses 4.3.3 and 4.3.4	6.2.3	for $f < 30$ MHz: see clauses B.1.2, B.1.3 and B.1.4 for $30 \text{ MHz} < f < 1 \text{ GHz}$: not applicable (see note)	B.2
Receiver Spurious Emissions, clause 4.4.2	6.3.1		B.2
Receiver Baseline Sensitivity, clause 4.4.3	6.3.2		
Receiver Baseline Resilience, clause 4.4.4	6.3.3	Figure 7, Figure 8 and Figure 9	Figure 7, Figure 8 and Figure 9

Note: Artificial antenna is only specified for the frequency range below 30 MHz. In a real scenario a large boundary loop is low pass filter and therefore radiates no TX unwanted emissions above 30 MHz. In addition the harmonics of the fundamental will not be present above 30 MHz (e.g. at 30 MHz it would be the 202nd harmonic of the highest fundamental frequency).

2 Equipment Specification

2.1 General Description

The EUT is a Robotic lawnmower, powered by battery with Inductive loop system(RMI), and it's powered by battery.

2.2 Technical Data

Description: Robotic lawnmower, powered by battery
 LLS Bxy/zG, LLS BLxy/zG, LLS Bxy/zC, LLS BLxy/zC, (x=250-600, An integer multiple of 10; y=NULL,i,B; z=Y,B,G)
 Docking station
 Output Rated Voltage: 24VDC
 Output Rated current: 1.5A(Charging), 200mA(Normal working mode)

Table 2. RMI functional mode

Mode	Comments
Operational Mode	Operational mode is the working mode of the RMI. During this mode the Robotic lawnmower, powered by battery is cutting the grass inside the working area and it shall not be possible for the Robotic lawnmower, powered by battery to cross the boundary by a distance of more than one full length of the Robotic lawnmower, powered by battery .
Safe Mode	Safe mode: after a loss of signal, the RMI shall not travel more than 1 m and the cutting means shall stop within 5 s. It is not possible to start the Robotic lawnmower, powered by battery in automatic mode.



Figure 1. Docking station Appearance

2.3 Auxiliary Equipment Used during Test

Table 3. Auxiliary Equipment Used during Test

Name	Model	Manufacturer	S/N	Specification
Adaptor	FY2401500S1	SUMEC Hardware&Tools Co.,Ltd.		Input: AC 100-240V 50/60Hz Output:DC 24V, CC1.5A
Adaptor	FY2401500S2	SUMEC Hardware&Tools Co.,Ltd.		Input: AC 100-240V 50/60Hz Output:DC 24V, CC1.5A
Adaptor	FY2401500S3	SUMEC Hardware&Tools Co.,Ltd.		Input: AC 100-240V 50/60Hz Output:DC 24V, CC1.5A

2.4 Lists of Test Instruments

Lists of Test Instruments

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	487/641405	2022.05.06
Loop Antenna	R&S	HFH2-Z2	487/621028	2020.12.01
Artificial antenna	Sumec Intelligence	SR303 447	SR143-001124	2022.05.29
Broadband Antenna	Schwarzbeck	VULB9168	487/621840	2022.07.23

Note: 1 The artificial antenna is manufactured by SUMEC according to ETSI EN303 447 Annex C.

2 The artificial antenna is verified to meet the requirements of ETSI EN303 447 Annex C. The calibration No. is 00738865-003.



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2.5 Type of Equipment

TYPE OF EQUIPMENT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined equipment
<input type="checkbox"/>	Plug-in radio
<input type="checkbox"/>	Other

2.6 Frequency range

Operating Frequency Range	
Transmitter Frequency Range	
[0 Hz to 148,5 kHz]	
<input type="checkbox"/>	Other - (include frequency ranges supported):
Receiver Frequency Range	
[0 Hz to 148,5 kHz]	
<input type="checkbox"/>	Other - (include frequency ranges supported):

2.7 Antennas type

TYPE OF ANTENNAS	
<input checked="" type="checkbox"/>	User defined antennas
<input type="checkbox"/>	Factory defined antennas



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2.8 Temperature range

EXTREME TEMPERATURE RANGE over which equipment is to be type tested		
<input type="checkbox"/>	Extreme Temperature Range	-20°C to +55°C [outdoor and indoor usage]
<input type="checkbox"/>	Extreme Temperature Range	0°C to +35°C [indoor usage only]
<input checked="" type="checkbox"/>	Extreme Temperature Range	0°C to +45°C [declared by manufacturer]
<input type="checkbox"/>	Normal Temperature Range	15°C to +35°C

3 Measurements Result

3.1 Operating Frequency Range (OFR)

Test data should be referred to the report of 4840320329800B.

3.2 Transmitter H-field requirements

Test data should be referred to the report of 4840320329800B.

3.3 Transmitter spurious emissions

Test data should be referred to the report of 4840320329800B.

3.4 Transmitter out of band (OOB) emissions

Test data should be referred to the report of 4840320329800B.

3.5 Receiver Spurious Emissions

3.5.1 Test Procedure and limit

- 1) For the receiver spurious emissions, the Robotic lawnmower, powered by battery shall be set to the receive only mode (or sleep/idle mode). To reach the receive only mode the same set-up and steps for the receiver baseline sensitivity shall be used. After step 4 of clause 6.3.2.2 the boundary signal shall be switched off. Now the mover is in receive only mode and the receiver spurious can be measured.
- 2) RX spurious emissions

State	$100 \text{ Hz} \leq f < 4,78 \text{ MHz}$	$4,78 \text{ MHz} \leq f < 30 \text{ MHz}$	$30 \text{ MHz} \leq f < 1 \text{ GHz}$
Receiving	5.5 dB μ A/m at 100 Hz descending 3 dB/oct	-22 dB μ A/m	-57 dBm

3.5.2 Test condition

Date of testing:	2021.11.24
Ambient temperature:	23.3 °C
Relative humidity:	55.6 %

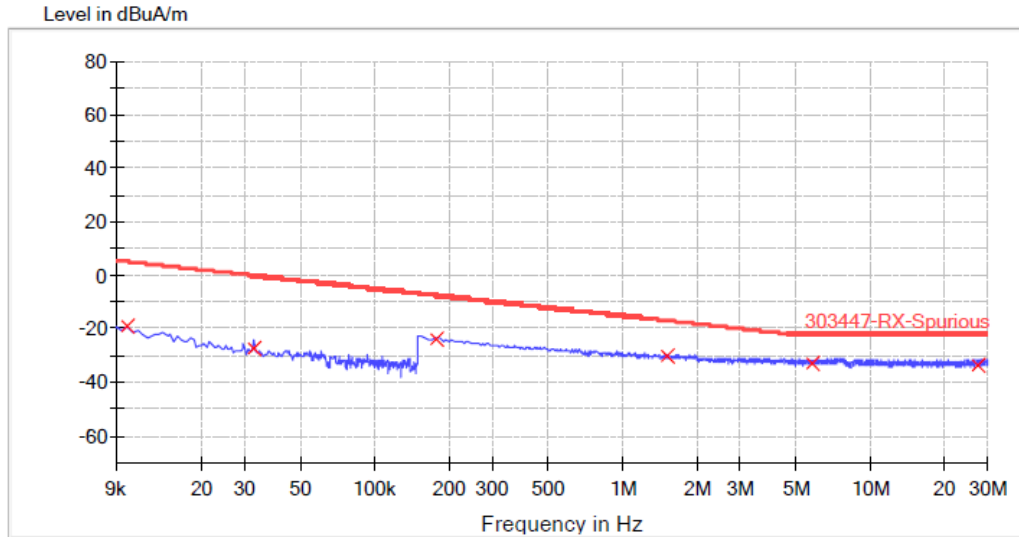
3.5.3 Test Result

3.5.3.1 Test result for Receiver



9K-30MHz Receiver Spurious Emission

X- AXIS

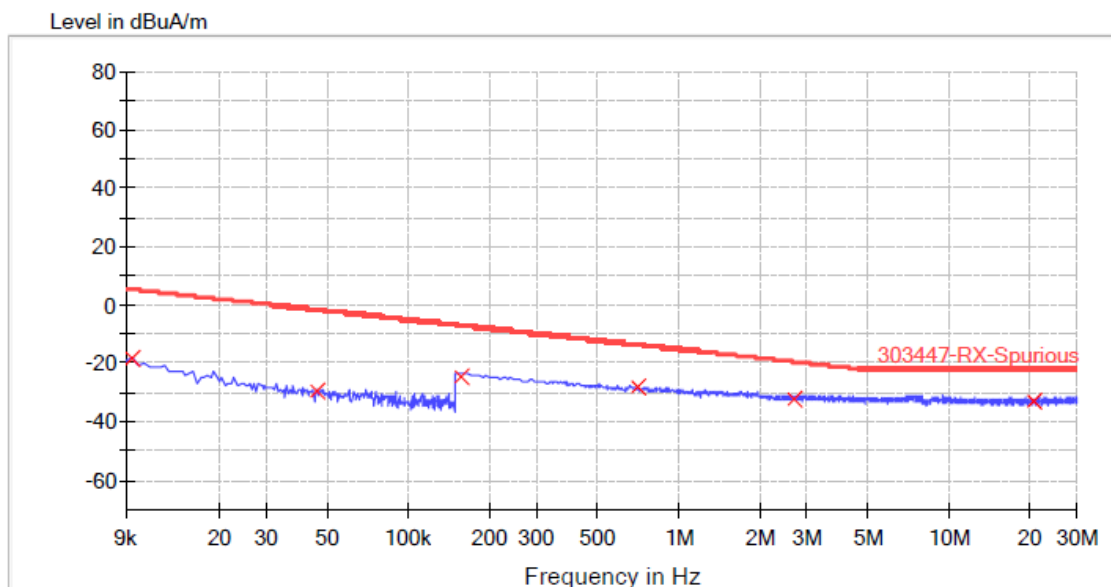


RX-Spurious

Frequency (MHz)	RMS (dBuA/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Corr. (dB/m)	Margin - RMS (dB)	Limit - RMS (dBuA/m)
0.009960	-19.3	1000.0	1.000	150.0	X	-31.0	24.4	5.1
0.032520	-27.2	1000.0	1.000	150.0	X	-32.1	27.1	-0.1
0.178000	-24.3	1000.0	10.000	150.0	X	-32.3	16.7	-7.6
1.530000	-30.5	1000.0	10.000	150.0	X	-32.3	13.5	-17.0
5.918000	-33.3	1000.0	10.000	150.0	X	-32.3	11.3	-22.0
27.274000	-34.0	1000.0	10.000	150.0	X	-32.9	12.0	-22.0



9K-30MHz Receiver Spurious Emission
Y- AXIS

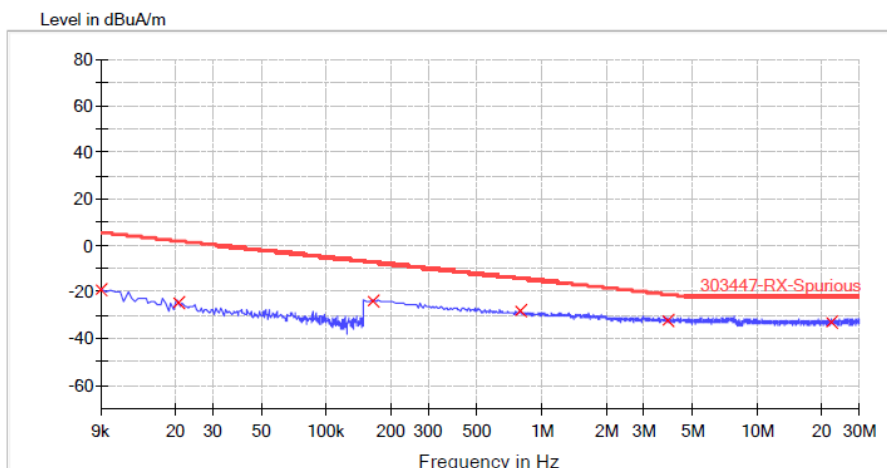


RX-Spurious

Frequency (MHz)	RMS (dBuA/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Corr. (dB/m)	Margin - RMS (dB)	Limit - RMS (dBuA/m)
0.009480	-18.7	1000.0	1.000	150.0	Y	-31.0	23.9	5.3
0.045960	-29.8	1000.0	1.000	150.0	Y	-32.1	28.1	-1.6
0.158000	-24.8	1000.0	10.000	150.0	Y	-32.3	17.7	-7.1
0.714000	-28.4	1000.0	10.000	150.0	Y	-32.3	14.8	-13.7
2.718000	-32.1	1000.0	10.000	150.0	Y	-32.3	12.6	-19.5
21.010000	-33.2	1000.0	10.000	150.0	Y	-32.7	11.2	-22.0



9K-30MHz Receiver Spurious Emission Z- AXIS

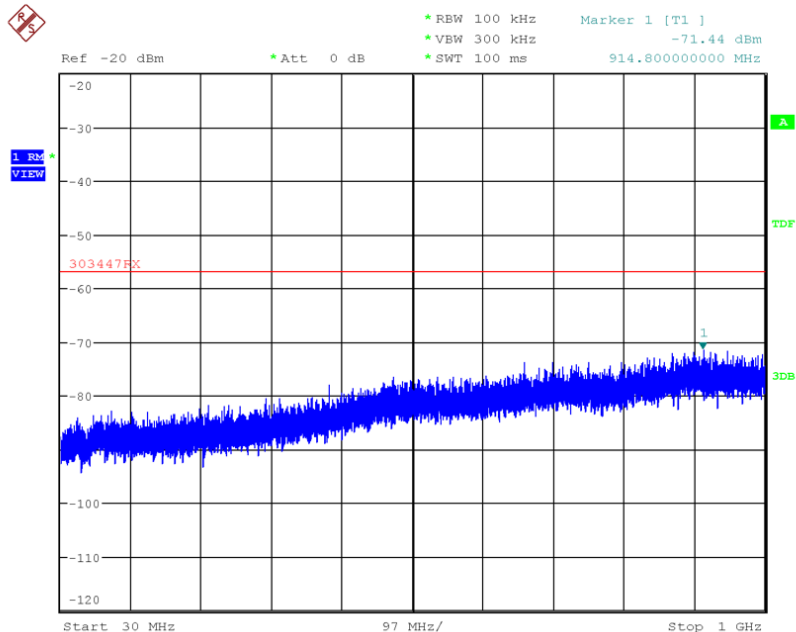


RX-Spurious

Frequency (MHz)	RMS (dBuA/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Poi	Corr. (dB/m)	Margin - RMS (dB)	Limit - RMS (dBuA/m)
0.009000	-19.4	1000.0	1.000	150.0	Z	-31.0	24.9	5.5
0.020520	-25.0	1000.0	1.000	150.0	Z	-31.6	26.8	1.9
0.166000	-24.0	1000.0	10.000	150.0	Z	-32.3	16.8	-7.3
0.798000	-28.4	1000.0	10.000	150.0	Z	-32.3	14.3	-14.2
3.894000	-32.3	1000.0	10.000	150.0	Z	-32.3	11.2	-21.1
22.486000	-33.1	1000.0	10.000	150.0	Z	-32.7	11.1	-22.0

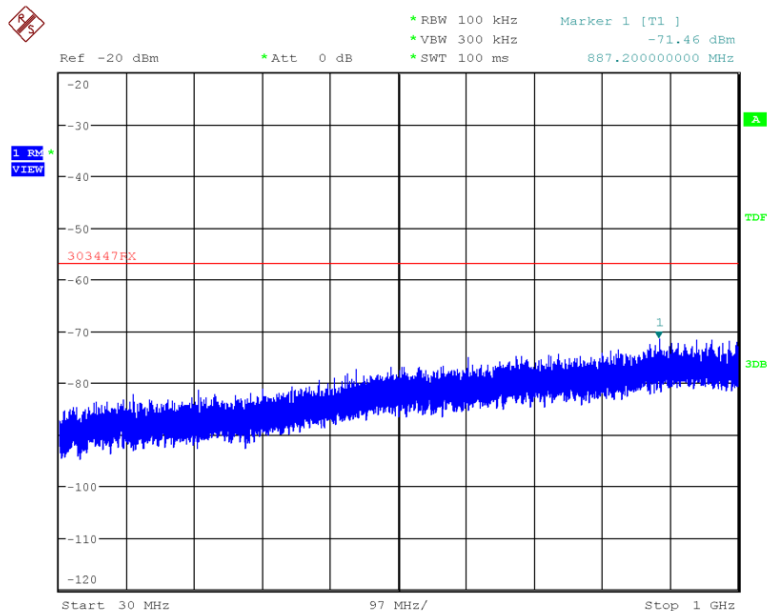
9K-30MHz Receiver Spurious Emission

Horizontal



Date: 15.DEC.2021 21:34:36

Vertical



3.5.4 Result

The equipment met the requirement of this clause.

Title: ETSI EN303 447 Test report
 Revision: 02
 Effective: 2019-04-08

ID-Number: EMC_WUX_F_25.45E
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3.6 Receiver Baseline Sensitivity

Test data should be referred to the report of 4840320329800B.

3.7 Receiver Baseline Resilience

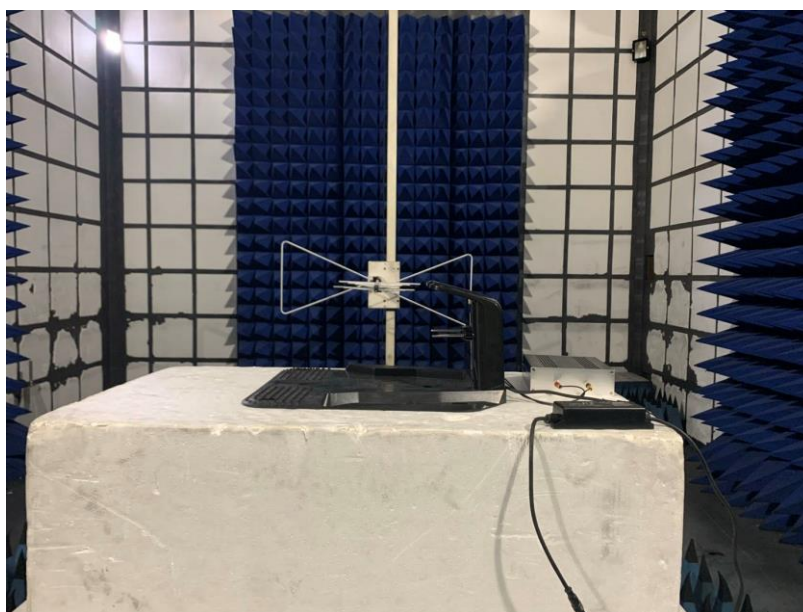
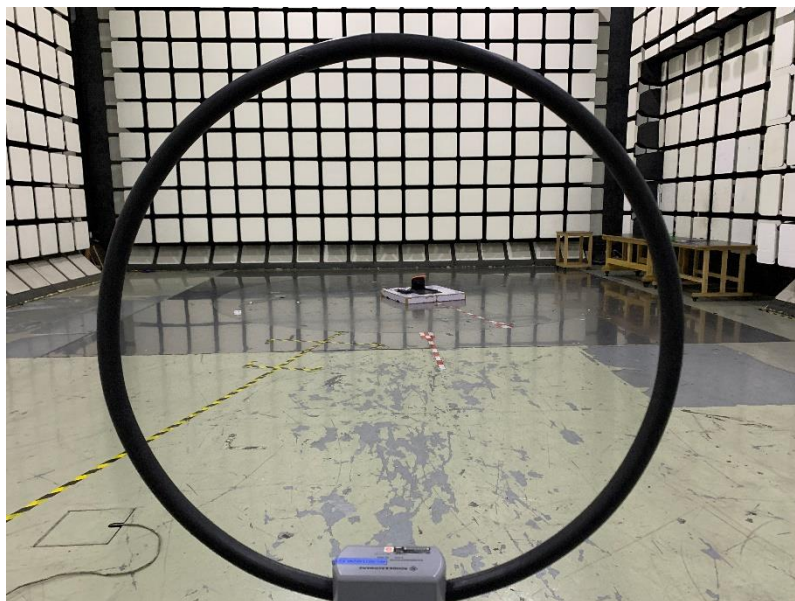
Test data should be referred to the report of 4840320329800B.

4 Estimation of Exposure of Human to Electromagnetic Fields

Test data should be referred to the report of 4840320329800B.

5 Test set up

Receiver Spurious Emission measurements



6 Photographs of EUT

Docking station

