

FCC Part 15, Subpart B, Class B(sDoC)

TEST REPORT

Shenzhen Sonoff Technologies Co.,Ltd.

433MHz Remote Control

Test Model: RM433

Prepared for	: Shenzhen Sonoff Technologies Co.,Ltd.
Address	: Building 8, Room 1001, Lianhua industrial park, Longyuan Road, Hualian community, Longhua St, Longhua dist, Shenzhen, Guangdong, China.
Prepared by	: Shenzhen LCS Compliance Testing Laboratory Ltd.
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Date of receipt of test sample	: January 03, 2019
Number of tested samples	: 1
Serial number	: Prototype
Date of Test	: January 03, 2019 ~ January 15, 2019
Date of Report	: January 21, 2019



FCC TEST REPORT

FCC Part 15, Subpart B, Class B(sDoC)

Report Reference No. : LCS181207091AE

Date Of Issue : January 21, 2019

Testing Laboratory Name..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Address..... : Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China

Testing Location/ Procedure..... : Full application of Harmonised standards ☒
 Partial application of Harmonised standards ☐
 Other standard testing method ☐

Applicant's Name : Shenzhen Sonoff Technologies Co.,Ltd.

Address..... : Building 8, Room 1001, Lianhua industrial park, Longyuan Road, Hualian community, Longhua St, Longhua dist, Shenzhen, Guangdong, China.

Test Specification

Standard..... : FCC Part 15, Subpart B, Class B(sDoC), ANSI C63.4 -2014

Test Report Form No...... : LCSEMC-1.0

TRF Originator : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF..... : Dated 2011-03

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Test Item Description..... : 433MHz Remote Control

Trade Mark : 

Test Model..... : RM433

Ratings..... : DC 12V (by one dry battery)

Result : Positive

Compiled by:

Lilian Li

Lilian Li / File administrators

Supervised by:

Warlen Song

Warlen Song / Technique principal

Approved by:



Gavin Liang / Manager

FCC -- TEST REPORT

Test Report No. : LCS181207091AEJanuary 21, 2019

Date of issue

Test Model..... : RM433

EUT..... : 433MHz Remote Control

Applicant..... : Shenzhen Sonoff Technologies Co.,Ltd.

Address..... : Building 8, Room 1001, Lianhua industrial park, Longyuan Road, Hualian community, Longhua St, Longhua dist, Shenzhen, Guangdong, China.

Telephone..... : /

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Manufacturer..... : Shenzhen Sonoff Technologies Co.,Ltd.

Address..... : Building 8, Room 1001, Lianhua industrial park, Longyuan Road, Hualian community, Longhua St, Longhua dist, Shenzhen, Guangdong, China.

Telephone..... : /

Fax..... : /

Factory..... : Shenzhen Sonoff Technologies Co.,Ltd.

Address..... : Building 8, Room 1001, Lianhua industrial park, Longyuan Road, Hualian community, Longhua St, Longhua dist, Shenzhen, Guangdong, China.

Telephone..... : /

Fax..... : /

Test Result according to the standards on page 6: **Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	January 21, 2019	Initial Issue	Gavin Liang

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1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	FCC Part 15, Subpart B, Class B(sDoC), ANSI C63.4 -2014	Class B	N/A
Radiated disturbance	FCC Part 15, Subpart B, Class B(sDoC), ANSI C63.4 -2014	Class B	PASS
N/A is an abbreviation for Not Applicable.			

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : 433MHz Remote Control

Trade Mark : 

Test Model : RM433

Power Supply : DC 12V (by one dry battery)

EUT Clock Frequency : $\leq 108\text{MHz}$

2.2. Description of Test Facility

Site Description

EMC Lab. : FCC Registration Number. is 254912.

Industry Canada Registration Number. is 9642A-1.

ESMD Registration Number. is ARCB0108.

UL Registration Number. is 100571-492.

TUV SUD Registration Number. is SCN1081.

TUV RH Registration Number. is UA 50296516-001

NVLAP Registration Code is 600167-0.

2.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.4. Measurement Uncertainty

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Power disturbance	Level accuracy (30MHz to 300MHz)	± 2.90 dB	± 4.5 dB
Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	± 3.60 dB	± 3.3 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB
Mains Harmonic	Voltage	$\pm 0.510\%$	N/A
Voltage Fluctuations & Flicker	Voltage	$\pm 0.510\%$	N/A
EMF		$\pm 21.59\%$	N/A

- (1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.
- (2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

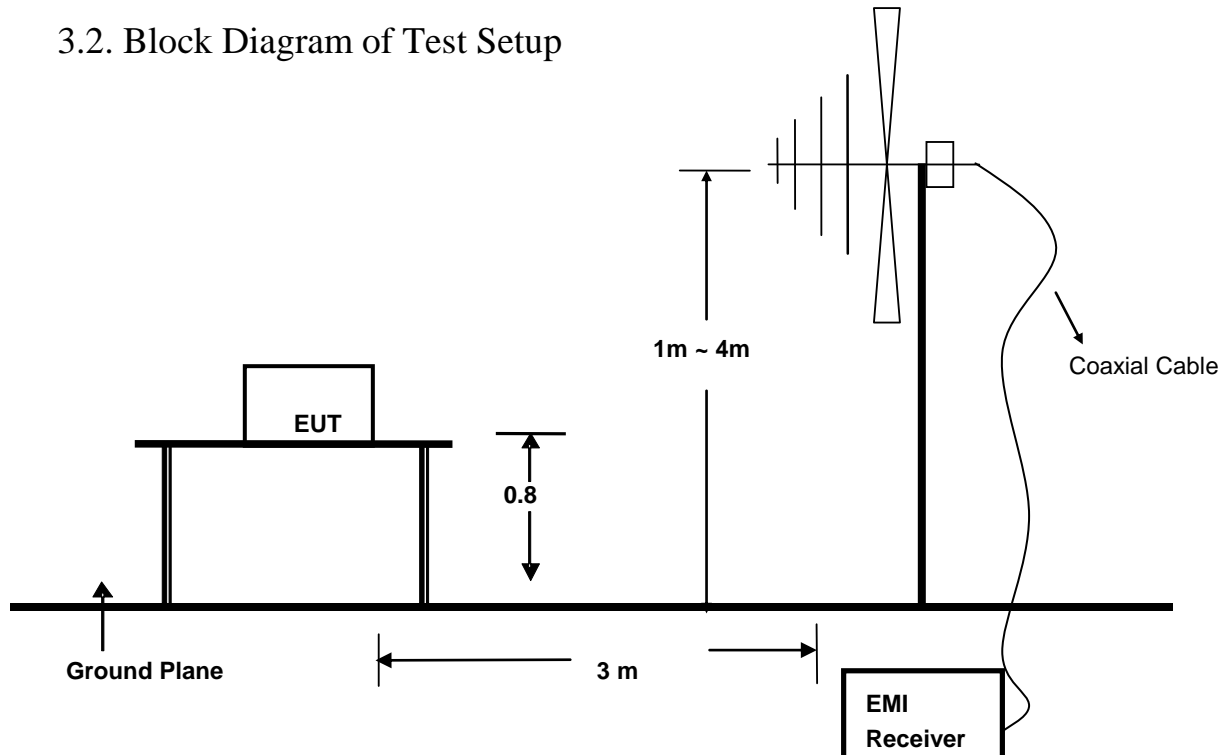
3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Software	AUDIX	E3	/	2018-06-16
2	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2018-06-16
3	Positioning Controller	MF	MF-7082	/	2018-06-16
4	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2018-07-26
5	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2018-07-02
6	EMI Test Receiver	R&S	ESR 7	101181	2018-06-16
7	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2018-11-15
8	AMPLIFIER	QuieTek	QTK	CHM/0809065	2018-11-15
9	RF Cable-R03m	Jye Bao	RG142	CB021	2018-06-16
10	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2018-06-16

3.2. Block Diagram of Test Setup



3.3. Radiated Emission Limit (Class B)

Limits for radiated disturbance Blow 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46
960 ~ 1000	3	500	54
Remark: (1) Emission level $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$ (2) The smaller limit shall apply at the cross point between two frequency bands. (3) 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. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.5. Operating Condition of EUT

3.5.1. Setup the EUT as shown in Section 3.2.

3.5.2. Let the EUT work in test mode (Working) and measure it.

3.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2009 on radiated emission measurement.

The bandwidth of the EMI test receiver is set at 120kHz, 1000kHz.

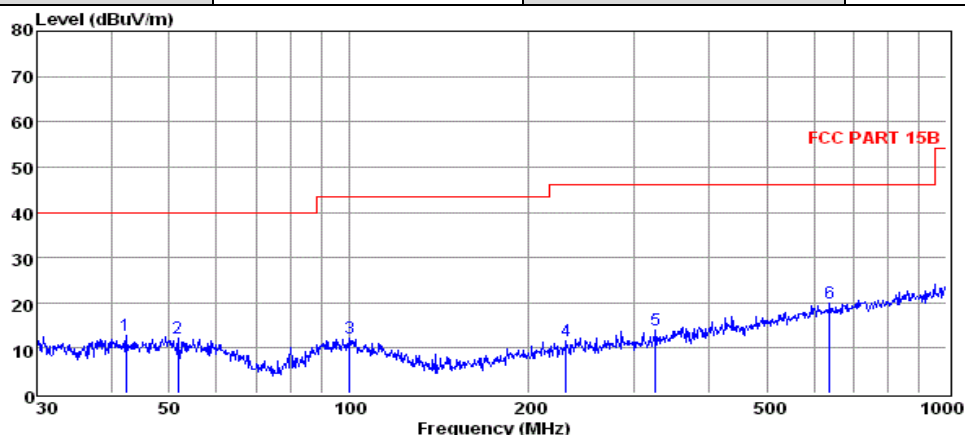
The frequency range from 30MHz to 1000MHz is checked.

3.7. Radiated Emission Noise Measurement Result

PASS.

The scanning waveforms please refer to the next page.

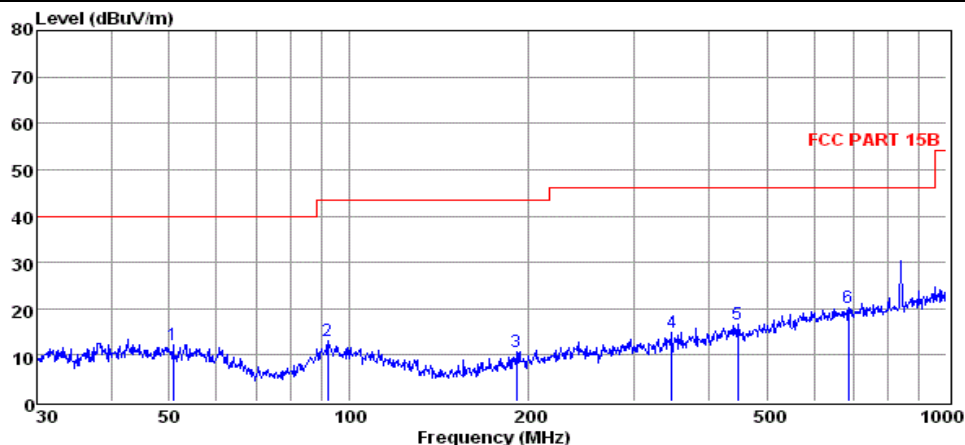
Test Model	RM433	Test Mode	Working
Environmental Conditions	24.3°C, 53.7% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	Daiwei Dai		



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	42.30	-1.28	0.50	13.57	12.79	40.00	-27.21	QP
2	51.66	-1.44	0.54	13.17	12.27	40.00	-27.73	QP
3	100.23	-1.68	0.60	13.14	12.06	43.50	-31.44	QP
4	230.91	-1.08	0.98	11.69	11.59	46.00	-34.41	QP
5	325.60	-0.73	1.04	13.55	13.86	46.00	-32.14	QP
6	638.37	-0.34	1.56	18.59	19.81	46.00	-26.19	QP

Note: 1. All readings are Quasi-peak values.
 2. Measured= Reading + Antenna Factor + Cable Loss
 3. The emission that are 20db below the official limit are not reported

Test Model	RM433	Test Mode	Working
Environmental Conditions	24.3°C, 53.7% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	Daiwei Dai		



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	50.76	-1.43	0.54	13.21	12.32	40.00	-27.68	QP
2	92.14	0.27	0.56	12.30	13.13	43.50	-30.37	QP
3	190.41	-0.65	0.86	10.56	10.77	43.50	-32.73	QP
4	346.81	-0.39	1.13	14.23	14.97	46.00	-31.03	QP
5	447.98	-0.27	1.27	15.57	16.57	46.00	-29.43	QP
6	684.75	-0.08	1.60	18.76	20.28	46.00	-25.72	QP

Note: 1. All readings are Quasi-peak values.
 2. Measured= Reading + Antenna Factor + Cable Loss
 3. The emission that are 20db below the official limit are not reported

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

4. PHOTOGRAPH

4.1. Photo of Radiated Measurement



5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

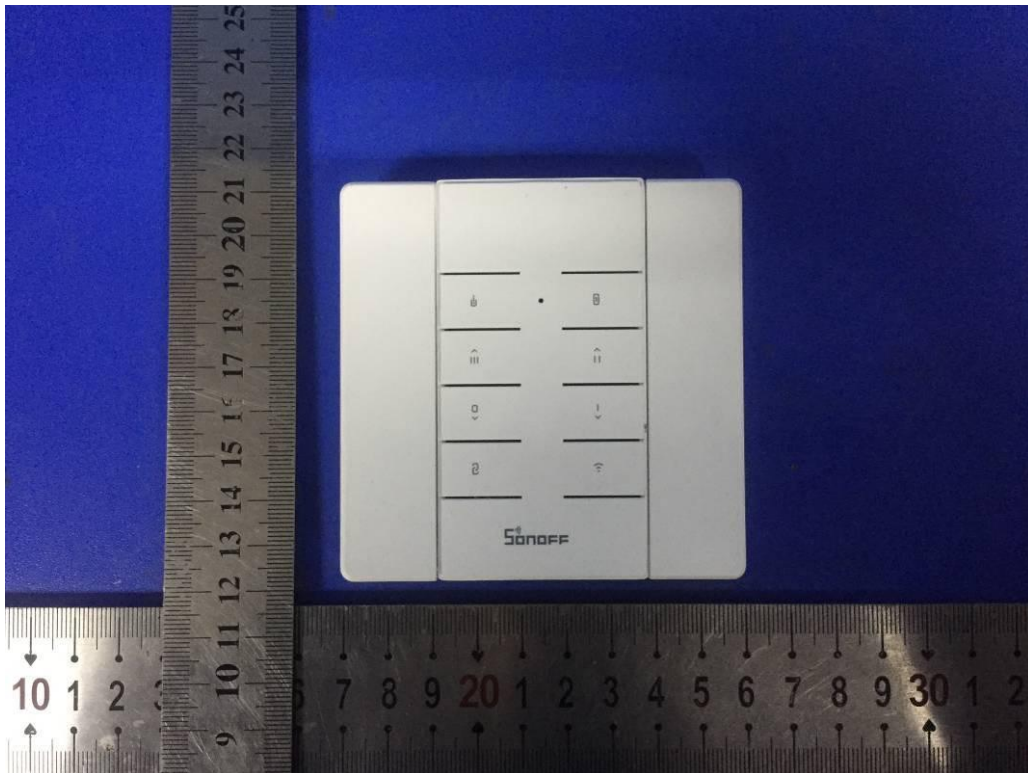


Fig. 1

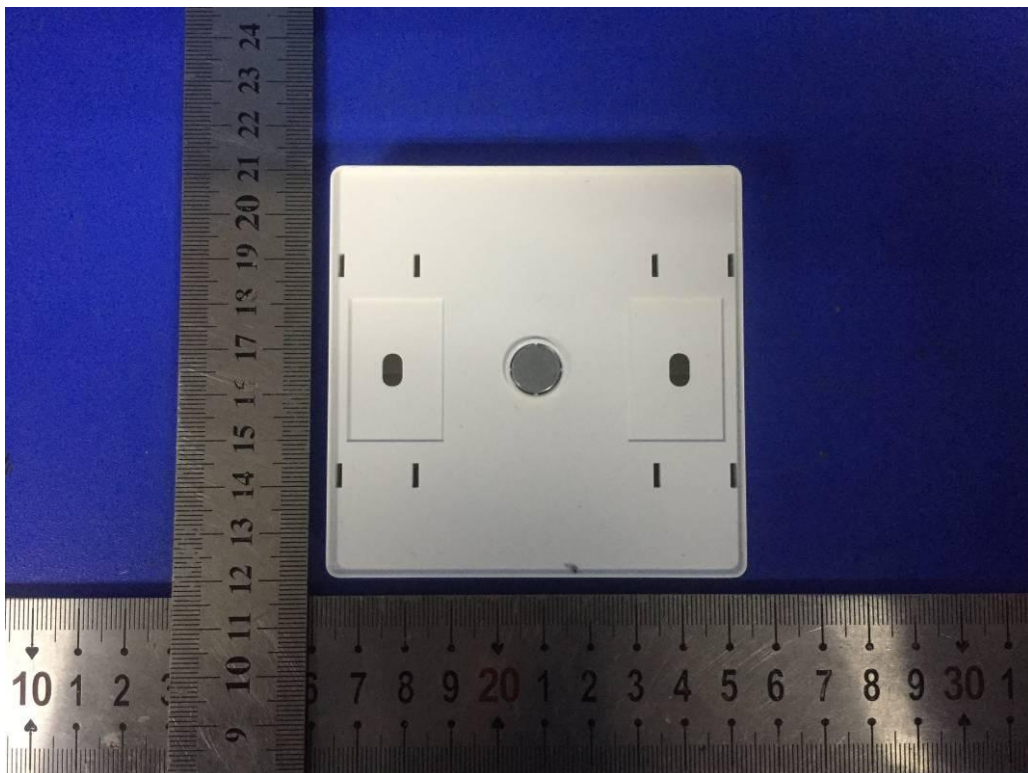


Fig. 2

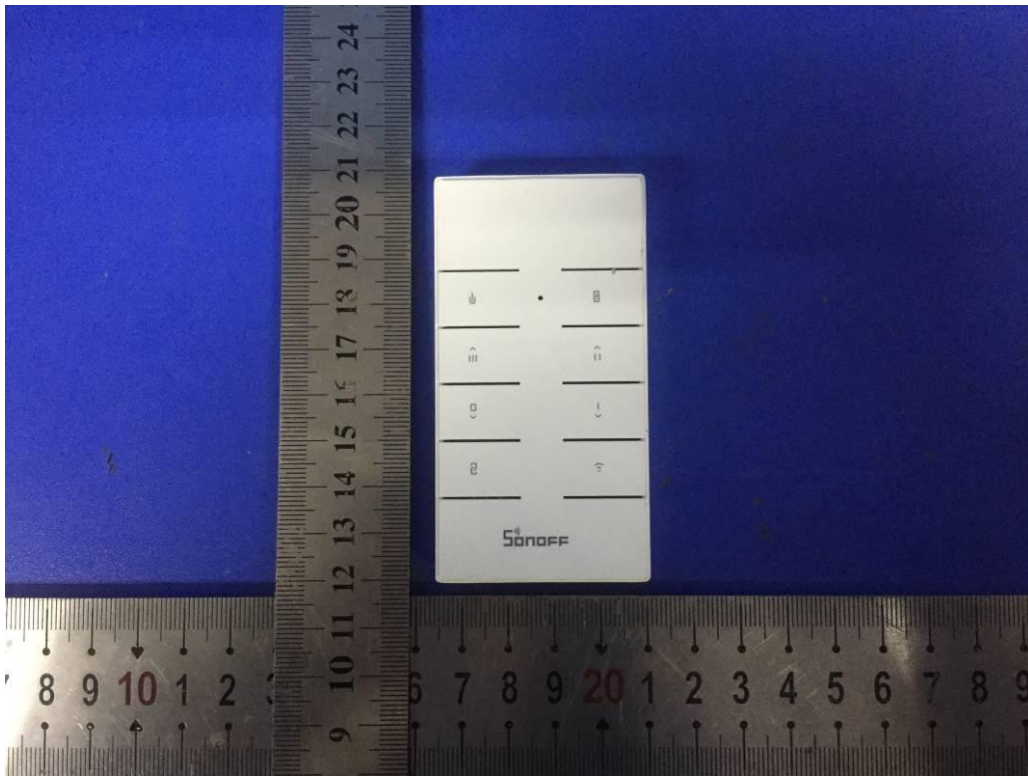


Fig. 3



Fig. 4

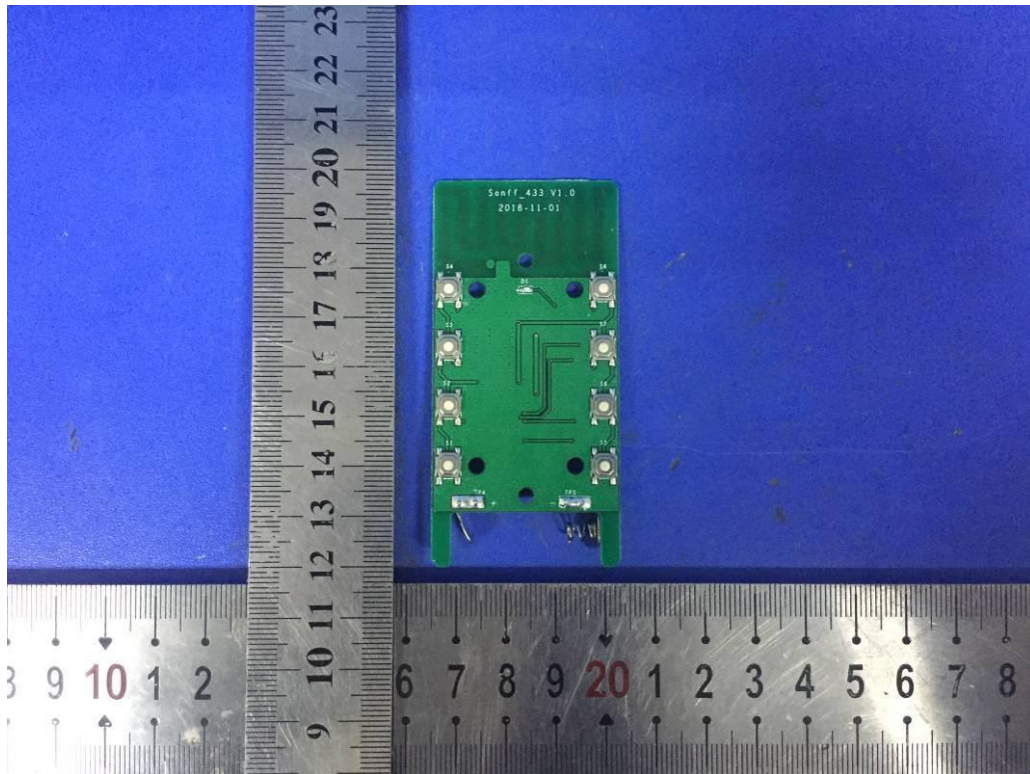


Fig. 5

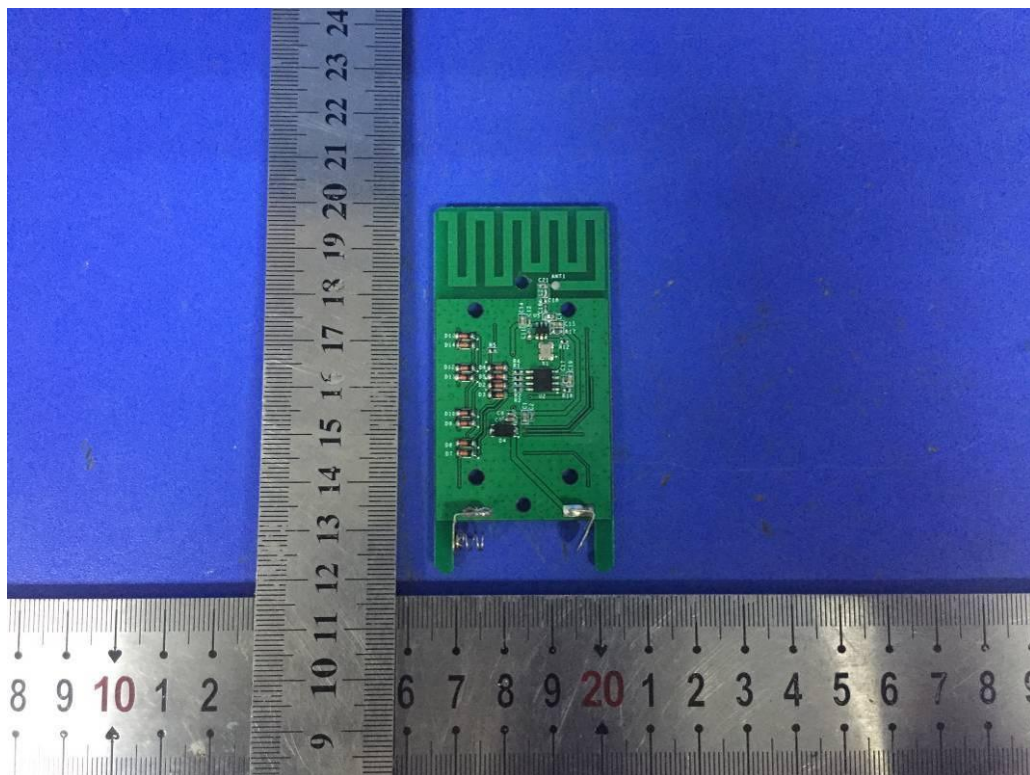


Fig. 6

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