

EMC TEST REPORT

For

Shenzhen Sonoff Technologies Co., Ltd.

433MHz RF Bridge

Test Model: RF Bridge

Additional Model No.: /

Prepared for : Shenzhen Sonoff Technologies Co., Ltd.
Address : 1001, BLDG8, Lianhua Industrial Park, shenzhen, GD, China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
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Date of receipt of test sample : March 13, 2020
Number of tested samples : 1
Serial number : Prototype
Date of Test : March 13, 2020 ~ March 23, 2020
Date of Report : March 26, 2020



EMC TEST REPORT

ETSI EN 301 489-3 V2.1.1 (2019-03) & ETSI EN 301 489-17 V3.1.1(2017-02) & EN 55032: 2015+A1: 2016 & EN 55035: 2017

Report Reference No. : LCS200116005AEA

Sample No..... : 200116005A

Date Of Issue..... : March 26, 2020

Testing Laboratory Name : Shenzhen LCS Compliance Testing Laboratory Ltd.

Address..... : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, 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..... : 1001, BLDG8, Lianhua Industrial Park, shenzhen, GD, China

Test Specification

Standard..... : ETSI EN 301 489-1 V2.2.3 (2019-11)
 ETSI EN 301 489-3 V2.1.1 (2019-03)
 ETSI EN 301 489-17 V3.1.1(2017-02)
 EN 55032: 2015+A1: 2016
 EN 55035: 2017

Test Report Form No. : LCSEMC-1.0

TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF : Dated 2017-06

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Test Item Description..... : 433MHz RF Bridge

Trade Mark..... : 

Test Model : RF Bridge

Ratings : Input: 5V=1A

Result : Positive

Compiled by:

Vera Deng

Supervised by:

Jin Wang

Approved by:



Vera Deng / Administrators

Jin Wang/ Administrators

Gavin Liang/ Manager

EMC -- TEST REPORT

Test Report No. : LCS200116005AEA	<u>March 26, 2020</u> Date of issue
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Test Model.....	: RF Bridge
EUT.....	: 433MHz RF Bridge

Applicant.....	: Shenzhen Sonoff Technologies Co., Ltd.
Address.....	: 1001, BLDG8, Lianhua Industrial Park, shenzhen, GD, China
Telephone.....	: /
Fax.....	: /

Manufacturer.....	: Shenzhen Sonoff Technologies Co., Ltd.
Address.....	: 1001, BLDG8, Lianhua Industrial Park, shenzhen, GD, China
Telephone.....	: /
Fax.....	: /

Factory.....	: /
Address.....	: /
Telephone.....	: /
Fax.....	: /

Test Result	Positive
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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

Report Version	Issue Date	Revisions	Revised By
000	March 26, 2020	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION.....	6
1.1. PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	6
1.2. OBJECTIVE	7
1.3. RELATED SUBMITTAL(S)/GRANT(S).....	7
1.4. TEST METHODOLOGY	7
1.5. DESCRIPTION OF TEST FACILITY	7
1.6. SUPPORT EQUIPMENT LIST	7
1.7. EXTERNAL I/O	7
1.8. MEASUREMENT UNCERTAINTY	8
1.9. DESCRIPTION OF TEST MODES	8
2. SUMMARY OF TEST RESULTS	9
3. TEST RESULTS.....	10
3.1. LINE CONDUCTED EMISSION	10
3.2. RADIATED DISTURBANCE	14
3.3. HARMONIC CURRENT EMISSIONS.....	21
3.4. VOLTAGE FLUCTUATION AND FLICKER.....	22
3.5. RF ELECTROMAGNETIC FIELD (80 MHZ - 6000 MHZ).....	23
3.6. ELECTROSTATIC DISCHARGE	26
3.7. ELECTRICAL FAST TRANSIENT IMMUNITY	29
3.8. RF COMMON MODE.....	31
3.9. SURGES, LINE TO LINE AND LINE TO GROUND.....	34
3.10. VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST	36
4. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST.....	38
4.1. PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO TRANSMITTER (CT).....	38
4.2. PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO TRANSMITTER (TT).....	38
4.3. PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO RECEIVER (CR)	38
4.4. PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO RECEIVER (TR)	38
5. LIST OF MEASURING EQUIPMENT	41
6. PHOTOGRAPHS OF TEST SETUP.....	43
7. PHOTOGRAPHS OF THE EUT	48

1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	: 433MHz RF Bridge
Test Model	: RF Bridge
List Model No.	: /
Model Declaration	: /
Power Supply	: Input: 5V=1A
Hardware Version	: 433RFBRIGE R2 V1.0
Software Version	: FWRF-BG85-BRIDGE-8285-V2.7.0
WIFI(2.4G Band)	:
Frequency Range	: 2412MHz ~ 2472MHz
Channel Spacing	: 5MHz
Channel Number	: 13 Channel for 20MHz bandwidth(2412~2472MHz)
Modulation Type	: 802.11b: DSSS; 802.11g/n: OFDM
Antenna Description	: PCB Antenna, 1.0dBi(Max.)
SRD	:
Frequency Range	: 433.92MHz
Channel Number	: 1
Modulation Type	: GFSK
Antenna Description	: Internal Antenna, 2.0dBi(Max.)

1.2. Objective

ETSI EN 301 489-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
ETSI EN 301 489-3	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
ETSI EN 301 489-17	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
EN 55032	Electromagnetic compatibility of multimedia equipment — Emission Requirements
EN 55035	Electromagnetic compatibility of multimedia equipment – Immunity requirements

The objective is to determine compliance with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-3 V2.1.1 (2019-03), ETSI EN 301 489-17 V3.1.1(2017-02), EN 55032:2015+A1: 2016 and EN 55035: 2017.

1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-3 V2.1.1 (2019-03), ETSI EN 301 489-17 V3.1.1(2017-02), EN 55032:2015+A1: 2016 and EN 55035: 2017.

1.5. Description of Test Facility

FCC Registration Number is 254912.
 Industry Canada Registration Number is 9642A.
 EMSD 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 Accreditation Code is 600167-0.
 FCC Designation Number is CN5024.
 CAB identifier: CN0071.

1.6. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
BESTGK	Power Adapter	K-T10B0501000E	---	CE

1.7. External I/O

I/O Port Description	Quantity	Cable
Micro USB Port	1	N/A

1.8. Measurement Uncertainty

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	0.01ppm	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2°C	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

1.9. Description of Test Modes

There was 3 test Modes. TM1 to TM3 were shown below:

- TM1** : Operate in 2.4G WIFI Link mode;
- TM2** : Operate in SRD mode;
- TM3** : Idle mode

***Note: All test modes were tested, but we only recorded the worst case in this report.

2. SUMMARY OF TEST RESULTS

Rule	Description of Test Items	Result
§7.1	Reference to clause 8.4 of ETSI EN 301 489-1 Conducted Emission (AC mains input/output port)	Compliant
§7.1	Reference to clause 8.3 of ETSI EN 301 489-1 Conducted Emission (DC power input/output port)	N/A*
§7.1	Reference to clause 8.7 of ETSI EN 301 489-1 Conducted Emission (Wired network port)	N/A*
§7.1	Reference to clause 8.2 of ETSI EN 301 489-1 Radiated Emission (Enclosure of ancillary equipment)	Compliant
§7.1	Reference to clause 8.5 of ETSI EN 301 489-1 Harmonic current emissions (AC mains input port)	N/A*
§7.1	Reference to clause 8.6 of ETSI EN 301 489-1 Voltage fluctuations and flicker (AC mains input port)	Compliant
§7.2	Reference to clause 9.3 of ETSI EN 301 489-1 Electrostatic discharge (Enclosure port) (EN 61000-4-2)	Compliant
§7.2	Reference to clause 9.2 of ETSI EN 301 489-1 RF electromagnetic field (80MHz to 6000MHz) (Enclosure port) (EN 61000-4-3)	Compliant
§7.2	Reference to clause 9.4 of ETSI EN 301 489-1 Fast transients common mode (signal, wired network and control ports, DC and AC power ports) (EN 61000-4-4)	Compliant
§7.2	Reference to clause 9.8 of ETSI EN 301 489-1 Surges, line to line and line to ground (AC mains power input ports, wired network ports) (EN 61000-4-5)	Compliant
§7.2	Reference to clause 9.5 of ETSI EN 301 489-1 RF common mode 0.15MHz to 80MHz (signal, wired network and control ports, DC and AC power ports) (EN 61000-4-6)	Compliant
§7.2	Reference to clause 9.6 of ETSI EN 301 489-1 Transients and surges in the vehicular environment (ISO 7637-2)	N/A*
§7.2	Reference to clause 9.7 of ETSI EN 301 489-1 Voltage dips and interruptions (AC mains power input ports) (EN 61000-4-11)	Compliant

3. TEST RESULTS

3.1. Line Conducted Emission

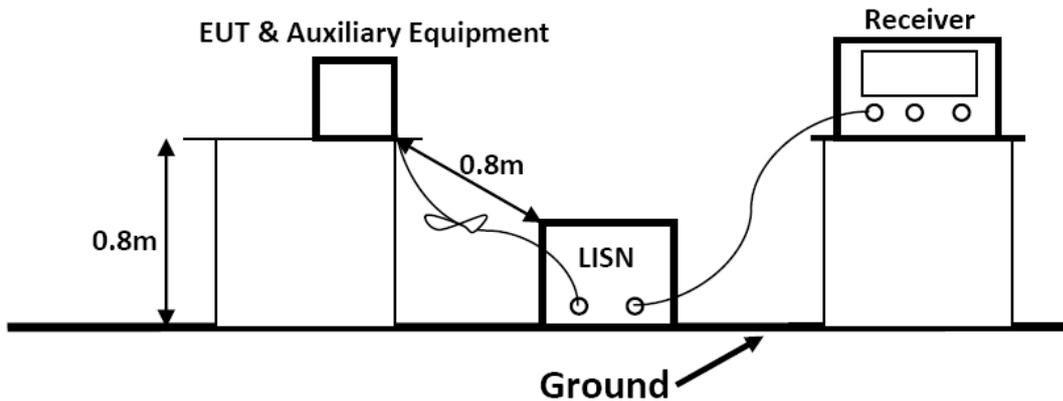
3.1.1 Conducted Emission Limit

Relevant Standard(s): ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 55032: 2015+A1: 2016 Class B

Limits for Line Conducted Emission		
Frequency (MHz)	Limit (dB μ 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.

3.1.2 Test Configuration



The setup of EUT is according with per ETSI EN 301 489-1 measurement procedure. The specification used was with the ETSI EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The EUT received charging power from the charger which received power through a LISN supplying power of AC 230V/50Hz.

3.1.3 EMI Test Receiver Setup

During the conducted emission test, the EMI test receiver was set with the following configurations:

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	150KHz ~ 30MHz
(IF)RBW	9kHz

All data was recorded in the Quasi-peak and average detection mode.

3.1.4 Test Procedure

Power on the EUT, the EUT begins to work. Make sure the EUT operates normally during the test.

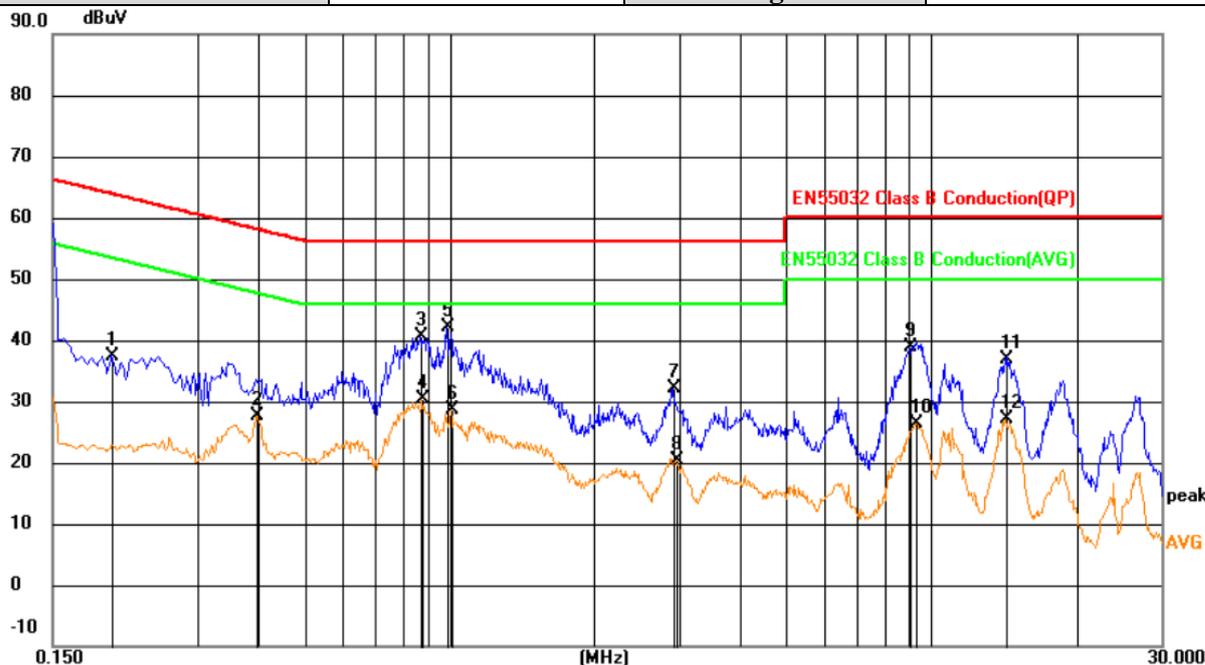
Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

3.1.5 Test Data

***Note: For pre-scan, the worst case is TM1, and the test data was shown as follow:

Model No.	RF Bridge	Test Mode	TM1
Environmental Conditions	22.2°C, 52.2% RH	Test Engineer	David Luo
Pol.	Line	Test Voltage	AC 230V/50Hz



Site LAB

Phase: L1

Temperature: 22.2

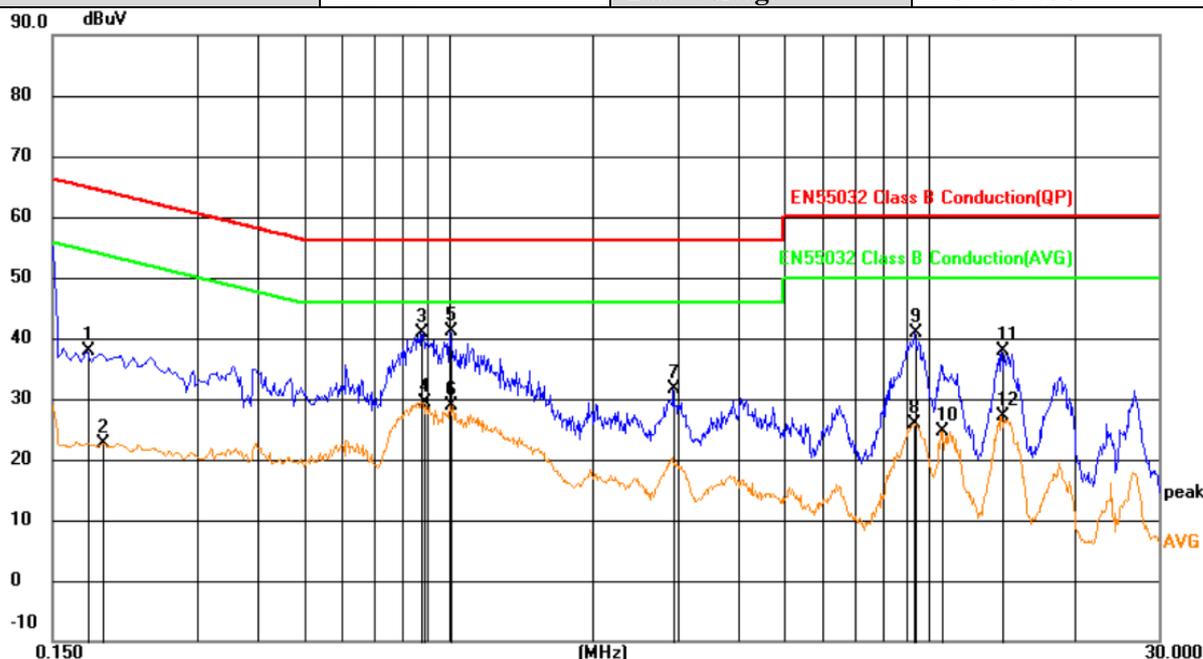
Limit: EN55032 Class B Conduction(QP)

Power: AC 230V/50Hz

Humidity: 52.2 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1995	18.32	19.18	37.50	63.63	-26.13	QP	
2		0.3975	8.23	19.31	27.54	47.91	-20.37	AVG	
3		0.8700	21.32	19.29	40.61	56.00	-15.39	QP	
4		0.8790	11.12	19.29	30.41	46.00	-15.59	AVG	
5	*	0.9870	22.94	19.26	42.20	56.00	-13.80	QP	
6		1.0095	9.34	19.25	28.59	46.00	-17.41	AVG	
7		2.9040	12.76	19.46	32.22	56.00	-23.78	QP	
8		2.9490	0.95	19.46	20.41	46.00	-25.59	AVG	
9		9.0420	19.31	19.66	38.97	60.00	-21.03	QP	
10		9.2715	6.67	19.67	26.34	50.00	-23.66	AVG	
11		14.2170	16.83	20.06	36.89	60.00	-23.11	QP	
12		14.2170	7.14	20.06	27.20	50.00	-22.80	AVG	

Model No.	RF Bridge	Test Mode	TM1
Environmental Conditions	22.2°C, 52.2% RH	Test Engineer	David Luo
Pol.	Neutral	Test Voltage	AC 230V/50Hz



Site LAB Phase: **N** Temperature: 22.2
 Limit: EN55032 Class B Conduction(QP) Power: AC 230V/50Hz Humidity: 52.2 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1770	18.73	19.17	37.90	64.63	-26.73	QP	
2		0.1905	3.57	19.17	22.74	54.01	-31.27	AVG	
3		0.8790	21.57	19.29	40.86	56.00	-15.14	QP	
4		0.8880	10.13	19.29	29.42	46.00	-16.58	AVG	
5	*	1.0050	21.98	19.25	41.23	56.00	-14.77	QP	
6		1.0050	9.54	19.25	28.79	46.00	-17.21	AVG	
7		2.9355	12.27	19.46	31.73	56.00	-24.27	QP	
8		9.2805	6.22	19.67	25.89	50.00	-24.11	AVG	
9		9.3120	21.26	19.67	40.93	60.00	-19.07	QP	
10		10.5990	4.97	19.74	24.71	50.00	-25.29	AVG	
11		14.1945	17.82	20.06	37.88	60.00	-22.12	QP	
12		14.1945	7.14	20.06	27.20	50.00	-22.80	AVG	

Note: 1. For conducted emission and radiated emission test, a power supply of 230VAC and 120VAC was used for testing respectively, and only recorded the worst case of 230VAC.

2. Measurement= Factor + Read Level .

3. Margin= Measurement-Limit

3.2. Radiated Disturbance

3.2.1 Radiated Emission Limit

Relevant Standard(s): ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 55032: 2015+A1: 2016 Class B

Limits for Radiated Disturbance Below 1GHz			
Frequency (MHz)	Facility	Distance (Meters)	Field Strengths Limit (dB μ V/m)
30 ~ 230	FAR	3	42-35
230 ~ 1000	FAR	3	42
***Note:			
(1) The smaller limit shall apply at the combination point between two frequency bands.			
(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.			
Limits for Radiated Disturbance Above 1GHz			
Frequency (MHz)	Distance (Meters)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
1000 ~ 3000	3	70	50
3000 ~ 6000	3	74	54
***Note: The lower limit applies at the transition frequency.			

Limits for Radiated Disturbance Below 1GHz (For FM Receivers)			
Frequency (MHz)	Distance (Meters)	Class B Limit (dB μ V/m)	
		Fundamental	Harmonics
30 ~ 230	3	60	52
230 ~ 300	3		52
300 ~ 1000	3		56
***Note: These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO.			
Signals at all other frequencies shall be compliant with the limits given in above Table.			
Limits for Radiated Disturbance Above 1GHz (For FM Receivers)			
Frequency (MHz)	Distance (Meters)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
1000 ~ 3000	3	70	50
3000 ~ 6000	3	74	54
***Note: The lower limit applies at the transition frequency.			

3.2.2 Test Configuration

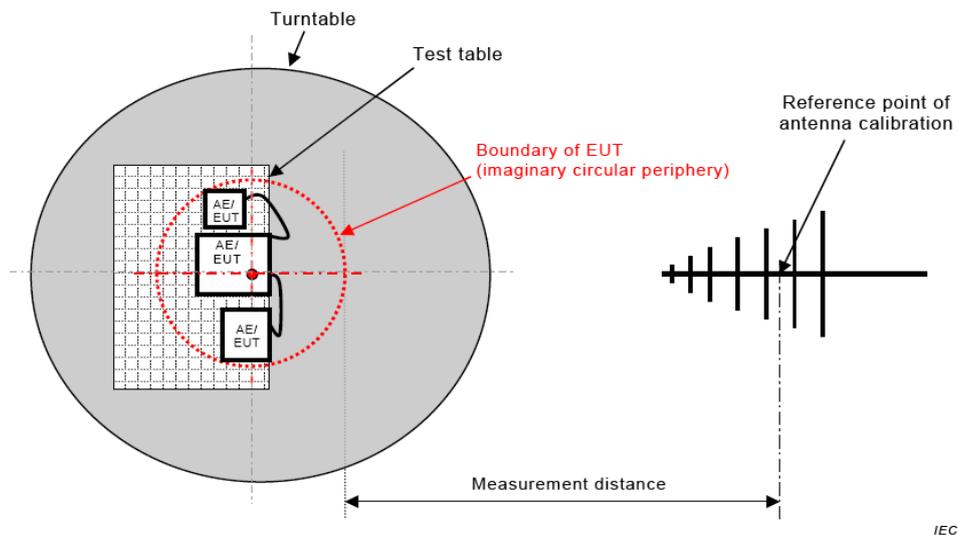
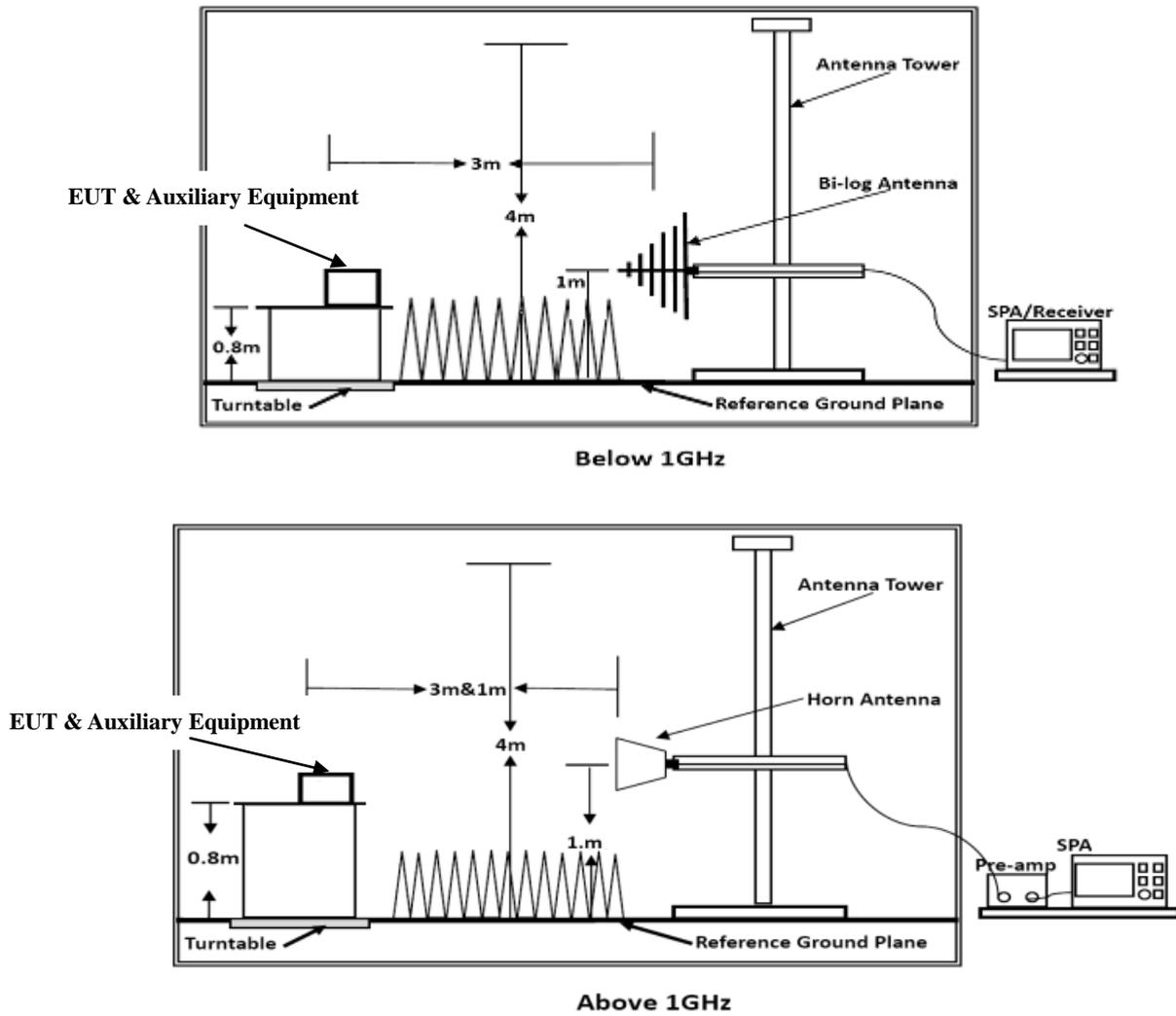


Figure C.1 – Measurement distance

Test Setup for FM Receiver

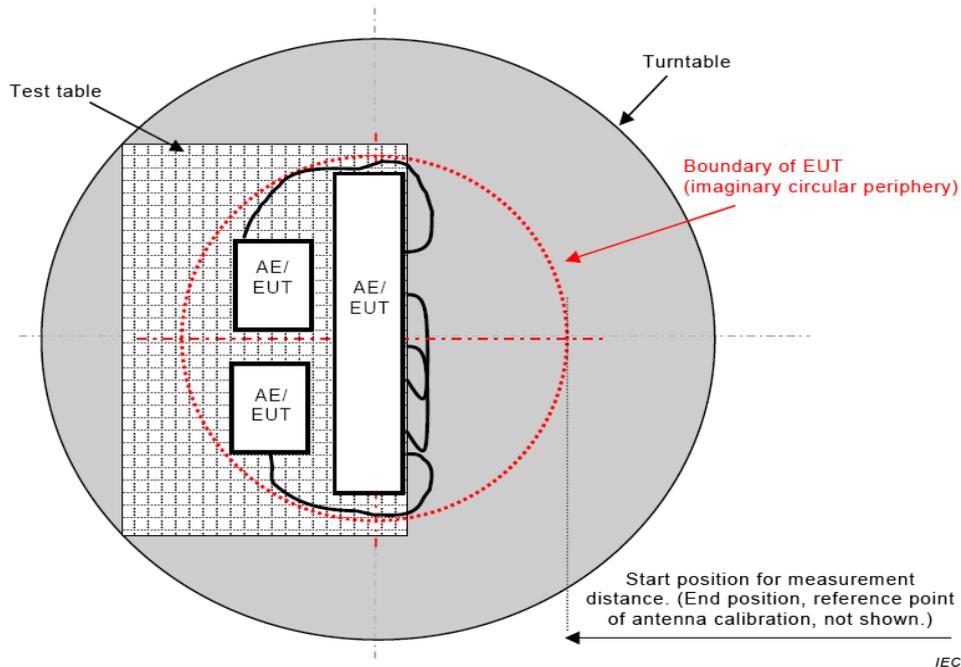


Figure C.2 – Boundary of EUT, Local AE and associated cabling

Test Setup for FM Receiver

3.2.3 Test Procedure

1) Sequence of testing 30 MHz to 1 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Pre-measurement:

- The turntable rotates from 0 ° to 315 ° using 45 ° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 4 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre-measurement with marked maximum final measurements and the limit will be stored.

2) Sequence of testing 1 GHz to 6 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Pre-measurement:

- The turntable rotates from 0 ° to 315 ° using 45 ° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 4 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of pre-measurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre-measurement with marked maximum final measurements and the limit will be stored.

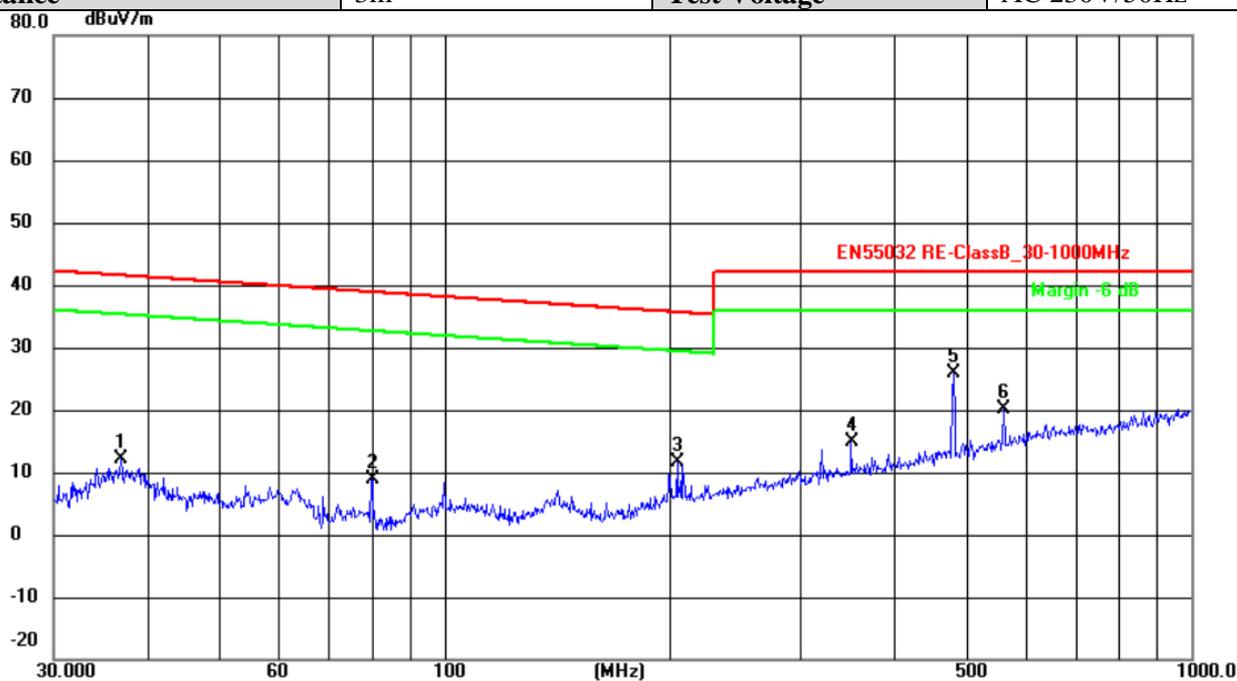
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	30MHz~1000MHz / RBW 100kHz for QP

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	6000 MHz
RBW / VBW	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

3.2.4 Test Data

The worst test mode of the EUT was TM1, and its test data was showed as the follow:

Model No.	RF Bridge	Test Mode	TM1
Environmental Conditions	23.9°C, 53.0% RH	Test Engineer	David Luo
Pol.	Vertical	Detector Function	Quasi-peak
Distance	3m	Test Voltage	AC 230V/50Hz



Site 966 chamber #1

Polarization: **Vertical**

Temperature: 23.9 (C)

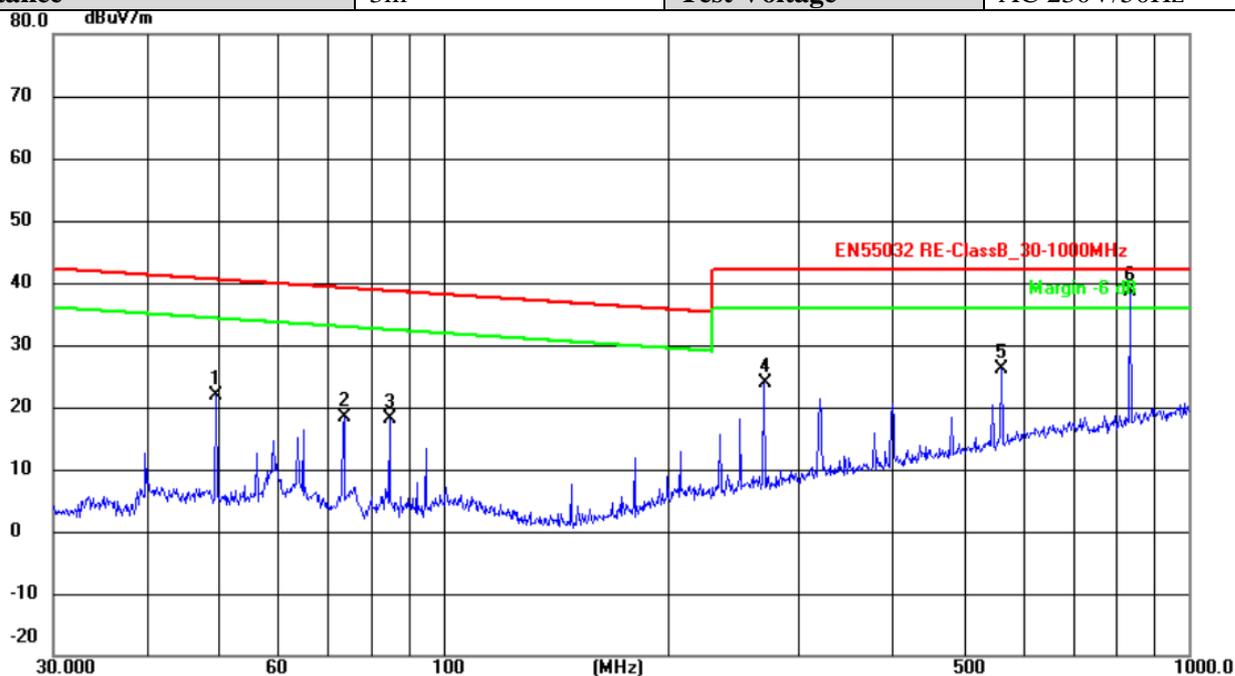
Limit: EN55032 RE-ClassB_30-1000MHz

Power: AC 230V/50Hz

Humidity: 53.0 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	36.8953	30.56	-18.40	12.16	41.29	-29.13	QP
2	79.8003	31.07	-22.22	8.85	38.64	-29.79	QP
3	204.9551	29.63	-17.99	11.64	35.40	-23.76	QP
4	350.4768	29.17	-14.40	14.77	42.00	-27.23	QP
5	480.5276	37.85	-11.86	25.99	42.00	-16.01	QP
6	560.6928	30.21	-10.11	20.10	42.00	-21.90	QP

Model No.	RF Bridge	Test Mode	TM1
Environmental Conditions	23.9°C, 53.0% RH	Test Engineer	David Luo
Pol.	Horizontal	Detector Function	Quasi-peak
Distance	3m	Test Voltage	AC 230V/50Hz



Site 966 chamber #1

Polarization: **Horizontal**

Temperature: 23.9 (C)

Limit: EN55032 RE-ClassB_30-1000MHz

Power: AC 230V/50Hz

Humidity: 53.0 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	49.5328	38.20	-16.40	21.80	40.28	-18.48	QP
2	73.6170	39.44	-21.13	18.31	38.92	-20.61	QP
3	84.7019	39.31	-21.18	18.13	38.43	-20.30	QP
4	269.4284	40.24	-16.26	23.98	42.00	-18.02	QP
5	560.6928	36.36	-10.11	26.25	42.00	-15.75	QP
6	833.3171	45.20	-6.59	38.61	42.00	-3.39	QP

Test Mode: TM1 (Above 1GHz)				Tested by: David Luo			
Test Voltage: AC 230V/50Hz				Test Distance: 3m			
Detector Function: Peak + AV				Test Results: Passed			
Polarization	Frequency (MHz)	Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)	
Horizontal	1187.47	51.48	37.32	70.00	50.00	-18.52	-12.68
	1663.05	60.13	30.31	70.00	50.00	-9.87	-19.69
	2879.87	51.92	38.56	70.00	50.00	-18.08	-11.44
	3010.04	45.88	34.37	74.00	54.00	-28.12	-19.63
	4590.35	49.75	35.21	74.00	54.00	-24.25	-18.79
	5006.93	46.89	34.42	74.00	54.00	-27.11	-19.58
Vertical	1389.70	60.22	30.92	70.00	50.00	-9.78	-19.08
	1515.76	49.16	36.17	70.00	50.00	-20.84	-13.83
	2012.27	59.68	30.80	70.00	50.00	-10.32	-19.20
	3946.61	58.34	35.84	74.00	54.00	-15.66	-18.16
	4568.69	58.72	32.43	74.00	54.00	-15.28	-21.57
	5033.24	56.53	40.53	74.00	54.00	-17.47	-13.47

1. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

2. Measurements above show only up to 6 maximum emissions noted.

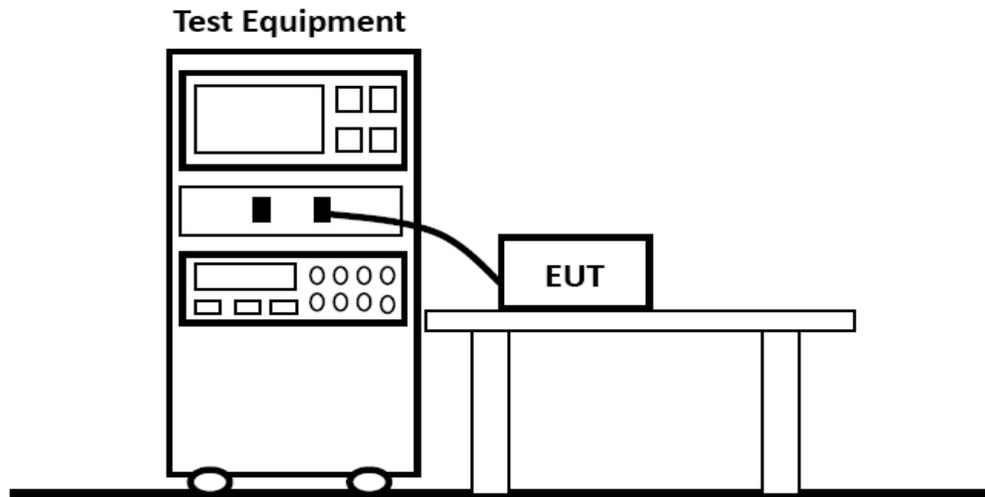
3. Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4.Level=Reading-Factor .

5.Margin= Level-Limit.

3.3. Harmonic Current Emissions

3.3.1 Test Configuration



3.3.2 Test Standard

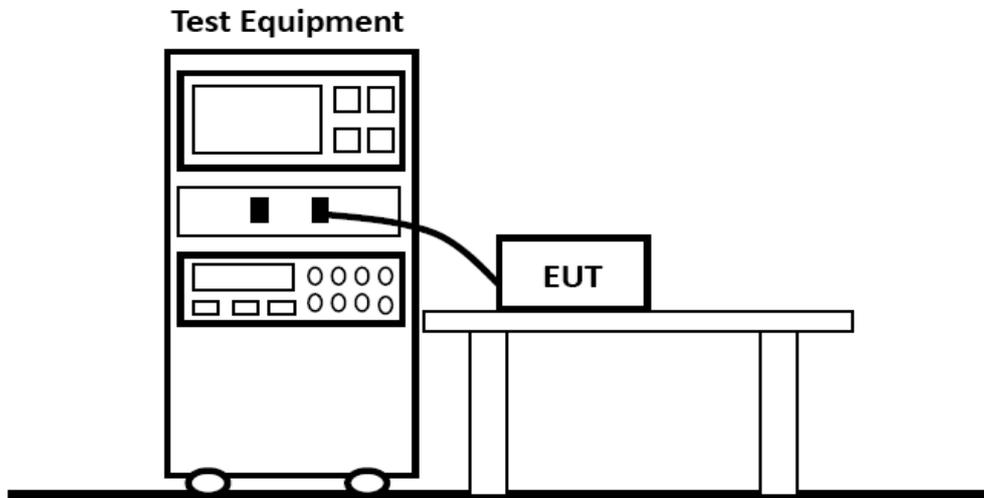
According to ETSI EN 301 489-1 V2.2.3 (2019-11) & EN 61000-3-2: 2014

3.3.3 Test Data

Because power of EUT less than 75W, According standard EN 61000-3-2, Harmonic current unnecessary to test.

3.4. Voltage Fluctuation and Flicker

3.4.1 Test Configuration



3.4.2 Test Standard

According to ETSI EN 301 489-1 V2.2.3 (2019-11) & EN 61000-3-3: 2013

3.4.3 Test Data

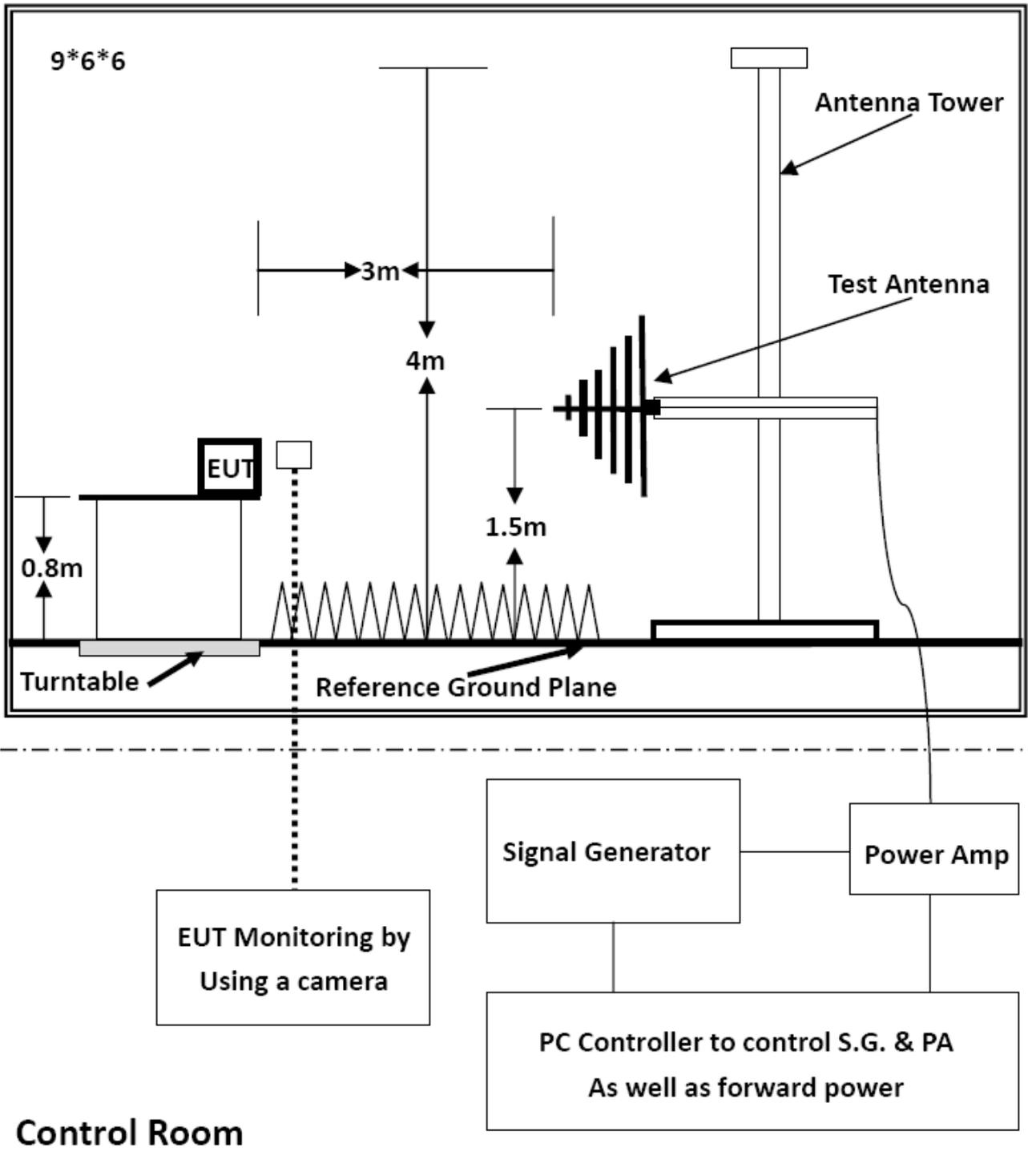
Test Model	RF Bridge	Test Engineer	David Luo
Environmental Conditions	24.8°C, 52.9% RH	Test Voltage	AC 230V/50Hz

Type of Test: Flickermeter Test - Table (EN61000-3-3:2013)	
Power Analyzer: Voltech PM6000 SN: 200006700523 Firmware Version: v1.21.07RC2	
Channel(s):	
1. SN: 090015502053, 28 Adjusted Date: 22 JUN 2011. 2. SN:None Adjusted Date:None	
3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
Shunt(s):	
1. SN: 091024301916, 4 Adjusted Date: 23 JUN 2011. 2. SN:None Adjusted Date:None	
3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
AC Source:	Mains / Manual Source
Overall Result:	Notes:
PASS	Measurement method - Voltage

	Pst	dc (%)	dmax (%)	Tmax(> 3.3%)(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.089	0.008	0.182	0

3.5. RF Electromagnetic Field (80 MHz - 6000 MHz)

3.5.1 Test Configuration



3.5.2 Test Standard

ETSI EN 301 489-1, ETSI EN 301 489-3, ETSI EN 301 489-17 / (EN 61000-4-3: 2006+A2: 2010)

Test level 2 at 3V/m.

3.5.3 Severity Level

Level	Field Strength (V/m)
1	1
2	3
3	10
X	Special
Performance Criterion: A	

3.5.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

Condition of Test	Remark
Fielded Strength	3 V/m (Severity Level 2)
Radiated Signal	Unmodulated
Scanning Frequency	80-6000MHz
Dwell time of radiated	0.0015 decade/s
Waiting Time	3 Sec.

3.5.5 Test Result

Test Model	RF Bridge	Test Engineer	David Luo
Environmental Conditions	24.1 °C, 52.8% RH	Test Voltage	AC 230V/50Hz

2.4G WIFI Test Result:

EUT Working Mode	Antenna Polarity	Frequency (MHz)	Fielded Strength (V/m)	Observation	Position	Conclusion
Operating Mode	Vertical	80-6000	3	CT, CR	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	CT, CR	Front, Right, Left, Back	Pass
Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass

SRD Test Result:

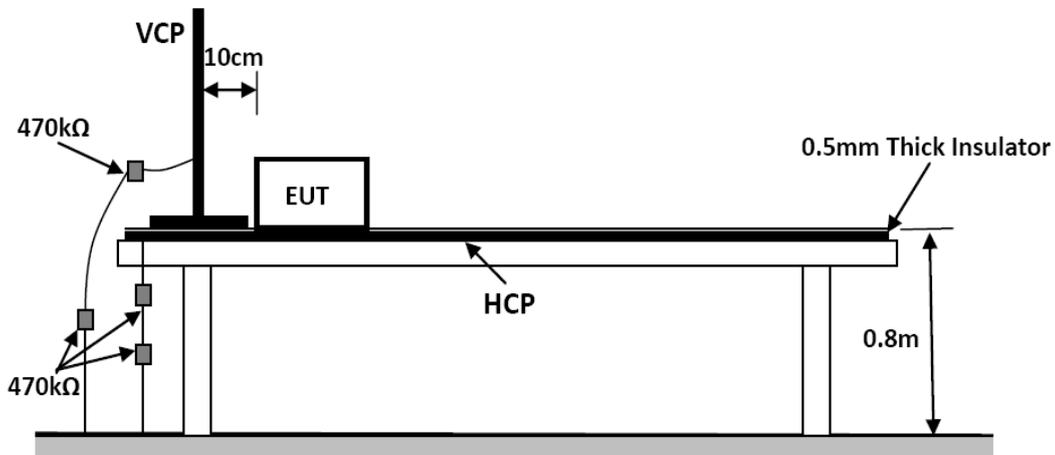
EUT Working Mode	Antenna Polarity	Frequency (MHz)	Fielded Strength (V/m)	Observation	Position	Conclusion
Operating Mode	Vertical	80-6000	3	CT, CR	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	CT, CR	Front, Right, Left, Back	Pass
Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass

TM3 Test Result:

EUT Working Mode	Antenna Polarity	Frequency (MHz)	Fielded Strength (V/m)	Observation	Position	Conclusion
Operating Mode	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass
Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass

3.6. Electrostatic Discharge

3.6.1 Test Configuration



EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.5 by 1.0-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

3.6.2 Test Procedure

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-2: 2009

Test level 3 for Air Discharge at ± 8 kV

Test level 2 for Contact Discharge at ± 4 kV

3.6.2.1 Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

3.6.2.2 Contact Discharge

All the procedure shall be same as Section 3.6.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

3.6.2.3 Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

3.6.2.4 Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

3.6.3 Test Data

PASS.

Electrostatic Discharge Test Results

Standard	<input type="checkbox"/> IEC 61000-4-2 <input checked="" type="checkbox"/> EN 61000-4-2		
Applicant	Shenzhen Sonoff Technologies Co., Ltd.		
EUT	433MHz RF Bridge	Temperature	22.7°C
M/N	RF Bridge	Humidity	53.7%
Criterion	B	Pressure	1021mbar
Test Mode	TM1-TM3	Test Engineer	David Luo

TEST RESULT OF WIFI & SRD

Test Voltage	Coupling	Observation	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	CT, CR	Pass
±2KV, ±4kV, ±8kV	Air Discharge	CT, CR	Pass
±2KV, ±4kV	Indirect Discharge HCP	CT, CR	Pass
±2KV, ±4kV	Indirect Discharge VCP	CT, CR	Pass

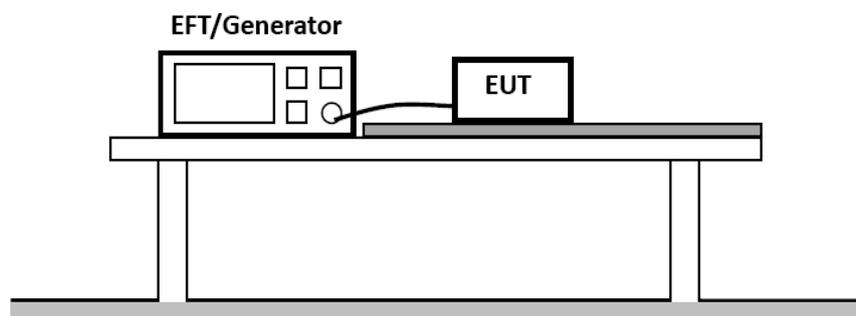
TEST RESULT OF TM3

Test Voltage	Coupling	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	Pass
±2KV, ±4kV, ±8kV	Air Discharge	Pass
±2KV, ±4kV	Indirect Discharge HCP	Pass
±2KV, ±4kV	Indirect Discharge VCP	Pass

Note: The EUT performance complied with performance criteria for CT&CR to MS Function and there is no any degradation of performance and function.

3.7. Electrical Fast Transient Immunity

3.7.1 Test Configuration



3.7.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN61000-4-4: 2012
Test level 2 at 1 kV

Test Level		
Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance Criterion: B

3.7.3 Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

3.7.3.1 For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

3.7.3.2 For signal lines and control lines ports: No I/O ports. It's unnecessary to test.

3.7.3.3 For DC output line ports: It's unnecessary to test.

3.7.4 Test Data

PASS.

Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Standard	<input type="checkbox"/> IEC 61000-4-4 <input checked="" type="checkbox"/> EN 61000-4-4		
Applicant	Shenzhen Sonoff Technologies Co., Ltd.		
EUT	433MHz RF Bridge	Temperature	22.4°C
M/N	RF Bridge	Humidity	53.8%
Test Mode	TM1-TM3	Criterion	B
Test Engineer	David Luo		

TEST RESULT OF WIFI & SRD

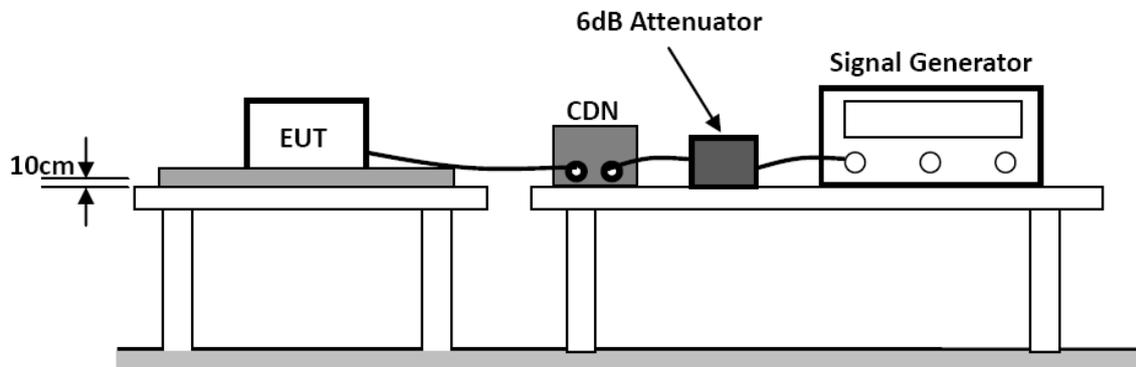
Line	Test Voltage	Polarity	Observation	Result (Pass/Fail)
L	1KV	+/-	CT, CR	Pass
N	1KV	+/-	CT, CR	Pass
L-N	1KV	+/-	CT, CR	Pass

TEST RESULT OF TM3

Line	Test Voltage	Polarity	Result (Pass/Fail)
L	1KV	+/-	Pass
N	1KV	+/-	Pass
L-N	1KV	+/-	Pass

3.8. RF Common Mode

3.8.1 Test Configuration



3.8.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN 61000-4-6: 2014

Test level: 3V (r.m.s.) for 0.15MHz ~ 10MHz; 3V (r.m.s.) to 1V (r.m.s.) for 10MHz ~ 30MHz;
1V (r.m.s.) for 30MHz ~ 80MHz

Modulation type: AM

Modulation depth: 80%

Modulation signal: 1 kHz

Test Level	
Level	Voltage Level (r.m.s.) (V)
1	1
2	3
3	10
X	Special
Performance Criterion: A	

3.8.3 Test Procedure

3.8.3.1 Let the EUT work in test mode and test it.

3.8.3.2 The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible).

3.8.3.3 The disturbance signal described below is injected to EUT through CDN.

3.8.3.4 The EUT operates within its operational mode(s) under intended climatic conditions after power on.

3.8.3.5 The frequency range is swept from 150kHz to 10MHz using 3V signal level, 10MHz to 30MHz using 3V to 1V signal level, 30MHz to 80MHz using 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

3.8.3.6 The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

3.8.3.7 Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

3.8.4 Test Data

PASS.

Please refer to the following page.

Injected Currents Susceptibility Test Results

Standard	<input type="checkbox"/> IEC 61000-4-6 <input checked="" type="checkbox"/> EN 61000-4-6		
Applicant	Shenzhen Sonoff Technologies Co., Ltd.		
EUT	433MHz RF Bridge	Temperature	22.4℃
M/N	RF Bridge	Humidity	54.4%
Test Mode	TM1-TM3	Criterion	A
Test Engineer	David Luo		

TEST RESULT OF WIFI & SRD

Frequency Range (MHz)	Strength (Unmodulated)	Injected Position	Observation	Result (Pass/Fail)
0.15 ~ 10	3V	AC Mains	CT, CR	Pass
10 ~ 30	3V to 1V			
30 ~ 80	1V			

TEST RESULT OF TM3

Frequency Range (MHz)	Strength (Unmodulated)	Injected Position	Result (Pass/Fail)
0.15 ~ 10	3V	AC Mains	Pass
10 ~ 30	3V to 1V		
30 ~ 80	1V		

Remark:

1. Modulation Signal: 1kHz 80% AM

2. Measurement Equipment :

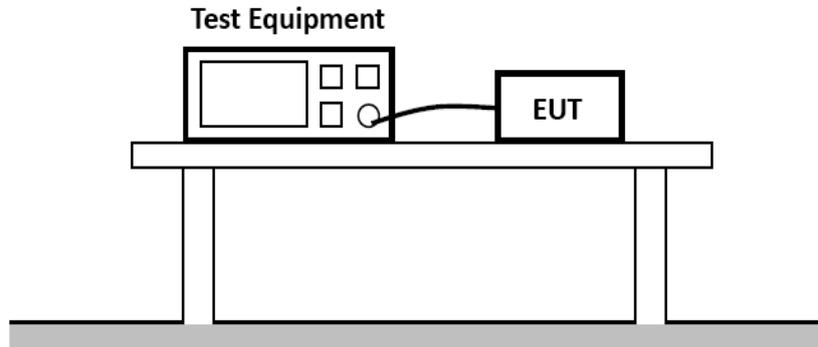
Simulator: CIT-10 (FRANKONIA)

CDN : CDN-M2 (FRANKONIA)

CDN-M3 (FRANKONIA)

3.9. Surges, Line to Line and Line to Ground

3.9.1 Test Configuration



3.9.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-5: 2014

L-N: Test level 2 at 1 kV

L-PE, N-PE Test Level 3 at 2kV

Test Level		
Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special
Performance Criterion: B		

3.9.3 Test Procedure

- 3.9.3.1 For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).
- 3.9.3.2 At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 3.9.3.3 Different phase angles are done individually.
- 3.9.3.4 Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

3.9.4 Test Data

Surge Immunity Test Result			
Standard	<input type="checkbox"/> IEC 61000-4-5 <input checked="" type="checkbox"/> EN 61000-4-5		
Applicant	Shenzhen Sonoff Technologies Co., Ltd.		
EUT	433MHz RF Bridge	Temperature	22.4°C
M/N	RF Bridge	Humidity	53.8%
Test Mode	TM1-TM3	Criterion	B
Test Engineer	David Luo		

TEST RESULT OF MS & WIFI & SRD						
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Observation	Result (Pass/Fail)
L-N	+	0°, 90°, 180°, 270°	5	1.0	CT, CR	Pass
	-	0°, 90°, 180°, 270°	5	1.0	CT, CR	Pass

TEST RESULT OF TM3					
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Result (Pass/Fail)
L-N	+	0°, 90°, 180°, 270°	5	1.0	Pass
	-	0°, 90°, 180°, 270°	5	1.0	Pass

3.10. Voltage Dips/Interruptions Immunity Test

3.10.1 Test Configuration

3.10.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN 61000-4-11: 2004+A1:2017
Test levels and Performance Criterion

Test Level		
Voltage Reduction % U _T	Voltage Dips % U _T	Duration (in Period)
100	0	0.5
100	0	1
30	70	5
Voltage Reduction % U _T	Voltage Dips % U _T	Duration (in Period)
100	0	250
Performance Criterion: B&C		

3.10.3 Test Procedure

3.10.3.1 The interruption is introduced at selected phase angles with specified duration.

3.10.3.2 Record any degradation of performance.

3.10.4 Test Data

Voltage Dips And Interruptions Test Results

Standard	<input type="checkbox"/> IEC 61000-4-11 <input checked="" type="checkbox"/> EN 61000-4-11		
Applicant	Shenzhen Sonoff Technologies Co., Ltd.		
EUT	433MHz RF Bridge	Temperature	24.8°C
M/N	RF Bridge	Humidity	52.9%
Test Mode	TM1-TM3	Criterion	B&C
Test Engineer	David Luo		

TEST RESULT OF WIFI & SRD

Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in periods)	Observation	Result (Pass/Fail)
0	100	0.5P	CT, CR	Pass
0	100	1P	CT, CR	Pass
70	30	25P	CT, CR	Pass
0	100	250P	CT, CR	Pass

TEST RESULT OF TM3

Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in periods)	Result (Pass/Fail)
0	100	0.5P	Pass
0	100	1P	Pass
70	30	25P	Pass
0	100	250P	Pass

4. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

4.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

4.2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

4.3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

4.4. Performance criteria for Transient phenomena applied to Receiver (TR)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

Performance criteria for ETSI EN 301 489-3 V2.1.1 (2019-03)

In the table below:

- performance criterion A applies for immunity tests with phenomena of a continuous nature;
- performance criterion B applies for immunity tests with phenomena of a transient nature.

NOTE: Whether a phenomenon is considered transient, continuous or otherwise is indicated in the test procedures for the phenomenon in ETSI EN 301 489-1 [1], clause 9.

Table 2: Performance Requirements

Criterion	During test	After test
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May show loss of function No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions

Where "operate as intended" or "no loss of function" is specified, the EUT shall demonstrate correct functioning as described in clause 5

Where the EUT has more than one mode of operation (see clause 4.5.2), an unplanned transition from one mode to another is considered as an unintentional response. The EUT shall be tested in sufficient modes to confirm there are no such unintentional responses.

Performance criteria for ETSI EN 301 489-17 V3.1.1(2017-02)

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

5. LIST OF MEASURING EQUIPMENT

LINE CONDUCTED EMISSION

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	AUDIX	E3	/	N/A	N/A
2	EMI Test Receiver	R&S	ESPI	101840	2019-06-11	2020-06-10
3	Artificial Mains	R&S	ENV216	101288	2019-06-12	2020-06-11
4	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2019-06-11	2020-06-10
5	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

RADIATED DISTURBANCE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	AUDIX	E3	/	N/A	N/A
2	3m Full Anechoic Chamber	MRDIANZI	FAC-3M	MR009	2019-09-27	2020-09-26
3	Positioning Controller	MF	MF-7082	/	2019-06-12	2020-06-11
4	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2019-07-25	2020-07-24
5	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2019-07-01	2020-06-30
6	EMI Test Receiver	R&S	ESR 7	101181	2019-06-12	2020-06-11
7	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2019-11-14	2020-11-13
8	Broadband Preampfier	phx	BP-01M18G	P190501	2019-07-01	2020-06-30
9	RF Cable-R03m	Jye Bao	RG142	CB021	2019-06-12	2020-06-11
10	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2019-06-12	2020-06-11
11	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

VOLTAGE FLUCTUATION AND FLICKER/HARMONIC CURRENT EMISSIONS

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Analyzer Test System	Voltech	PM6000	200006700523	2019-06-12	2020-06-11
2	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

RF ELECTROMAGNETIC FIELD

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	RS Test Software	Tonscend	/	/	N/A	N/A
2	ESG Vector Signal Generator	Agilent	E4438C	MY42081396	2019-11-14	2020-11-13
3	3m Full Anechoic Chamber	MRDIANZI	FAC-3M	MR009	2019-09-27	2020-09-26
4	RF POWER AMPLIFIER	OPHIR	5225R	1052	NCR	NCR
5	RF POWER AMPLIFIER	OPHIR	5273F	1019	NCR	NCR
6	RF POWER AMPLIFIER	SKET	HAP_0306G-50W	--	NCR	NCR
7	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	NCR	NCR
8	Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-484	NCR	NCR
9	Electric field probe	Narda S.TS./PMM	EP601	611WX80208	2019-03-25	2020-03-24
10	Sound Level meter	BK Precision	735	73500873100100 20	2019-06-12	2020-06-11
11	Audio Analyzer	R&S	UPV	1146.2003K02-1 01721-UW	2019-11-27	2020-11-26
12	Mouse Simulation	Bruel & Kjaer	4227	A0304216	2019-06-12	2020-06-11
13	Ear Simulation and supply	Bruel & Kjaer	2669.4182.5935	A0305284	2019-06-12	2020-06-11
14	Acoustical Calibrators	Bruel & Kjaer	4231	A0304215	2019-06-12	2020-06-11
15	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

ELECTROSTATIC DISCHARGE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	ESD Simulator	SCHLODER	SESD 230	604035	2019-06-13	2020-06-12
2	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

ELECTRICAL FAST TRANSIENT IMMUNITY

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500 M4	0101-34	2019-06-11	2020-06-10
2	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

RF COMMON MODE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Simulator	FRANKONIA	CIT-10/75	A126A1195	2019-06-11	2020-06-10
2	CDN	FRANKONIA	CDN-M2+M3	A2210177	2019-06-11	2020-06-10
3	6dB Attenuator	FRANKONIA	DAM25W	1172040	2019-06-11	2020-06-10
4	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

SURGES, LINE TO LINE AND LINE TO GROUND

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500 M4	0101-34	2019-06-11	2020-06-10
2	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

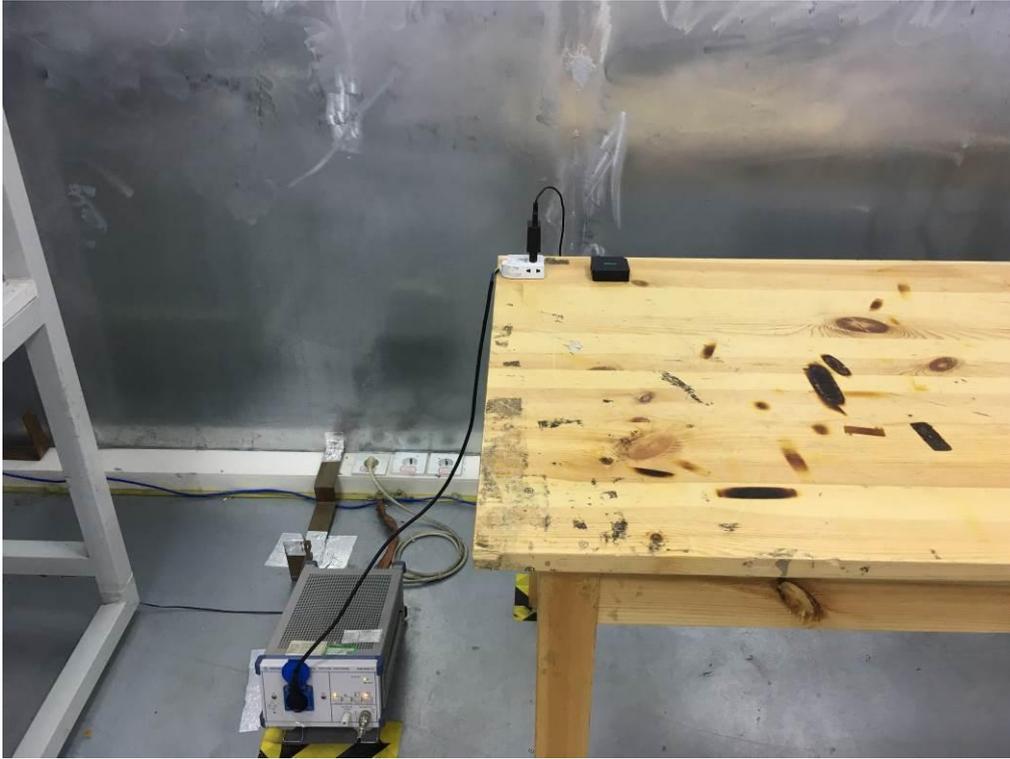
VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2019-06-11	2020-06-10
2	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2019-06-11	2020-06-10

Note: All equipment is calibrated through CHINA CEPREI LABORATORY and GUANGZHOU LISAI CALIBRATION AND TEST CO., LTD.

NCR --- No calibration requirement.

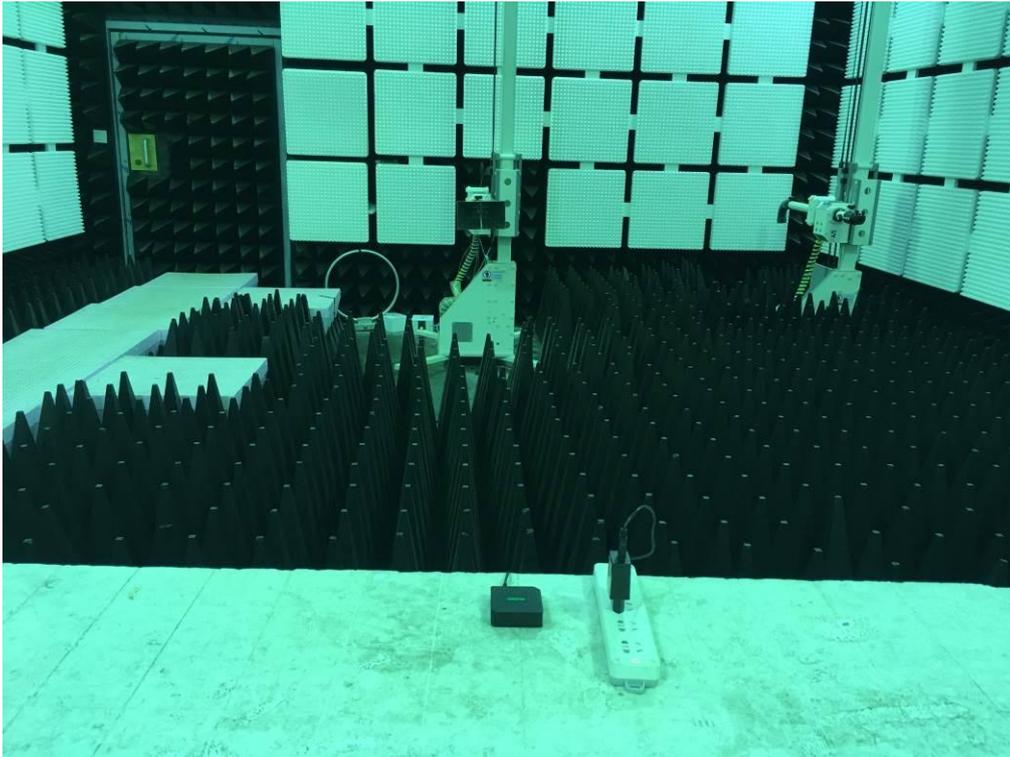
6. PHOTOGRAPHS OF TEST SETUP



Power Line Conducted Emission



Radiated Emission Below 1 GHz



Radiated Emission Above 1 GHz



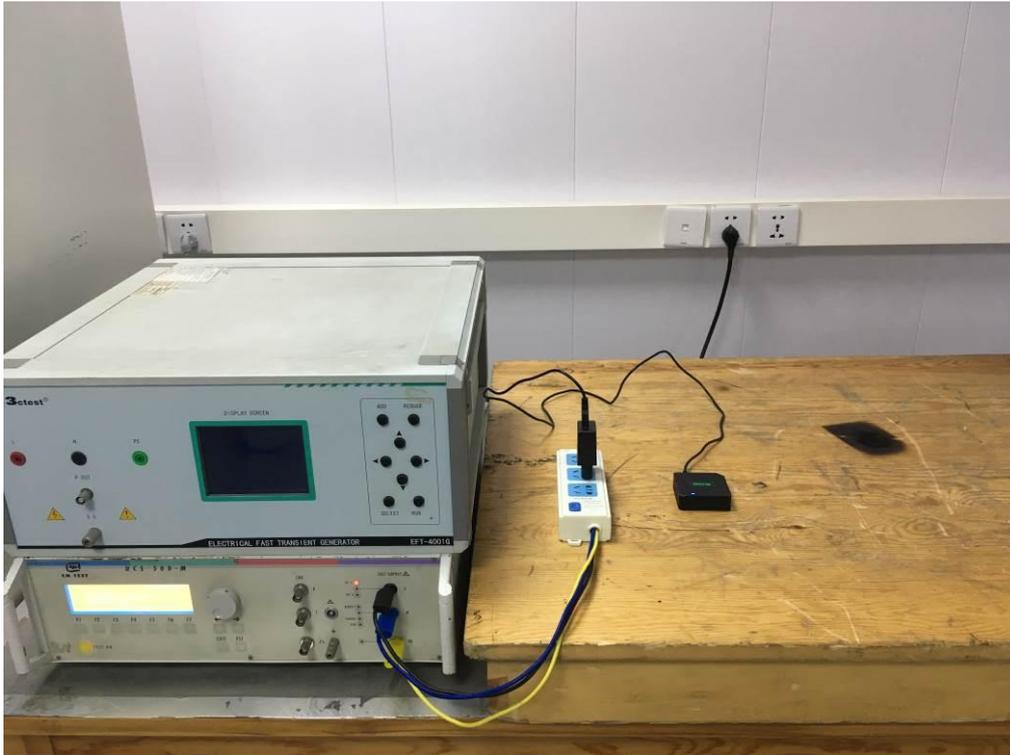
Voltage Fluctuations and Flicker



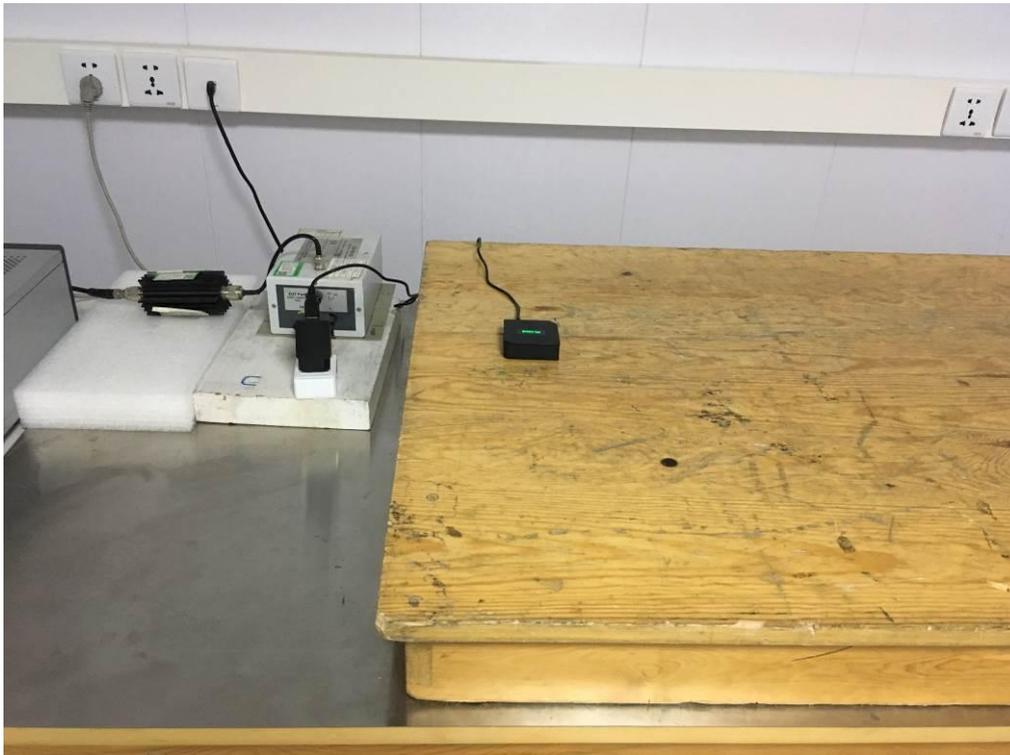
Electrostatic Discharge



RF Electromagnetic Field (80MHz to 6 000MHz)



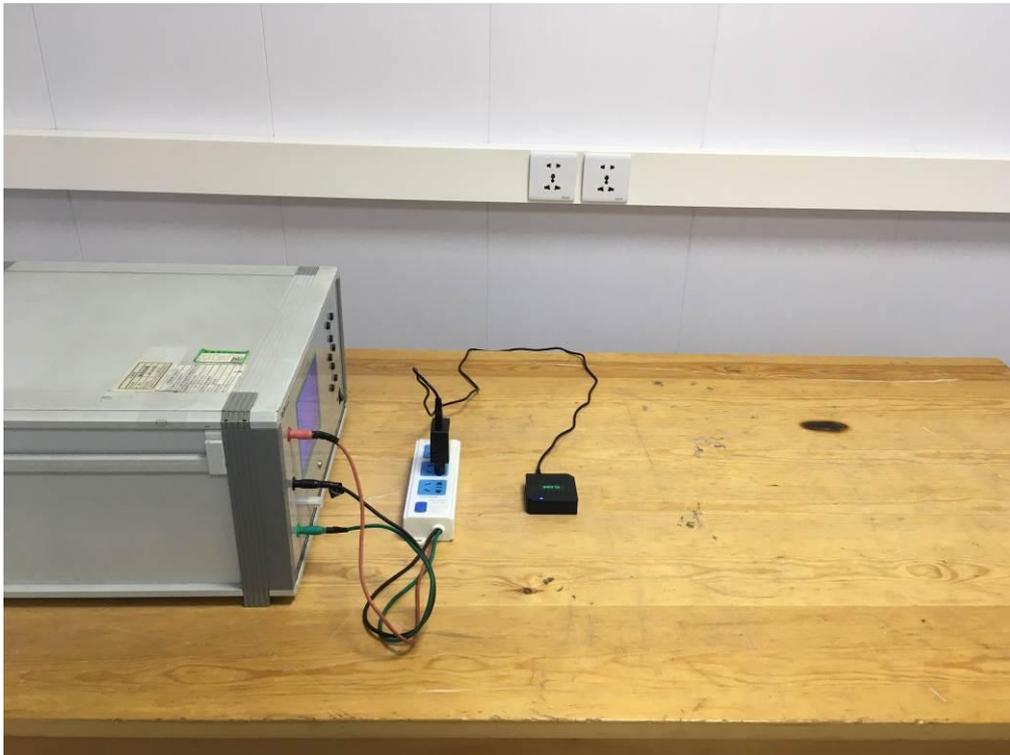
Fast Transients Common Mode



RF Common Mode (0.15 MHz to 80MHz)



Surges



Voltage Dips and Interruptions

7. PHOTOGRAPHS OF THE EUT



Fig.1

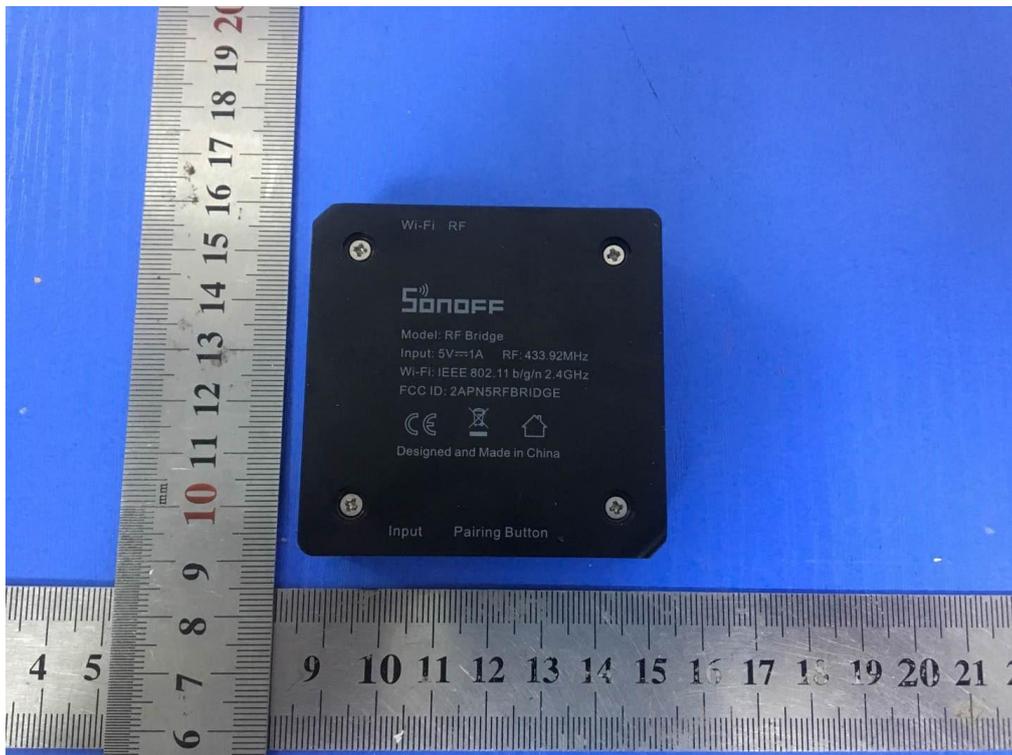


Fig.2

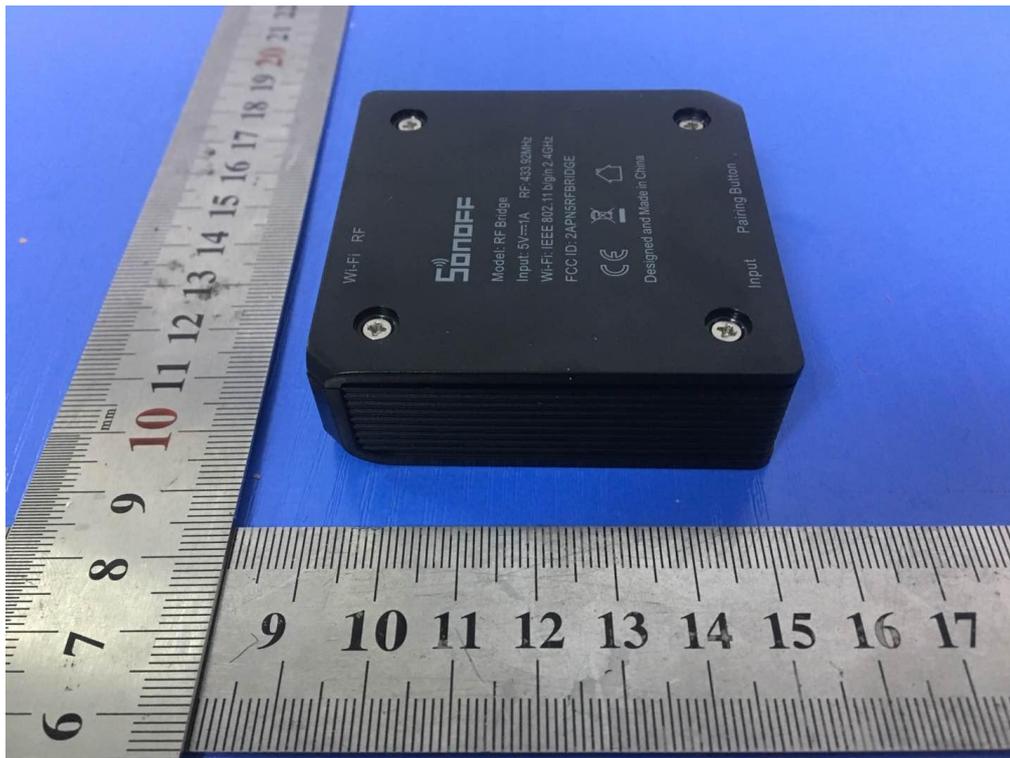


Fig.3



Fig.4

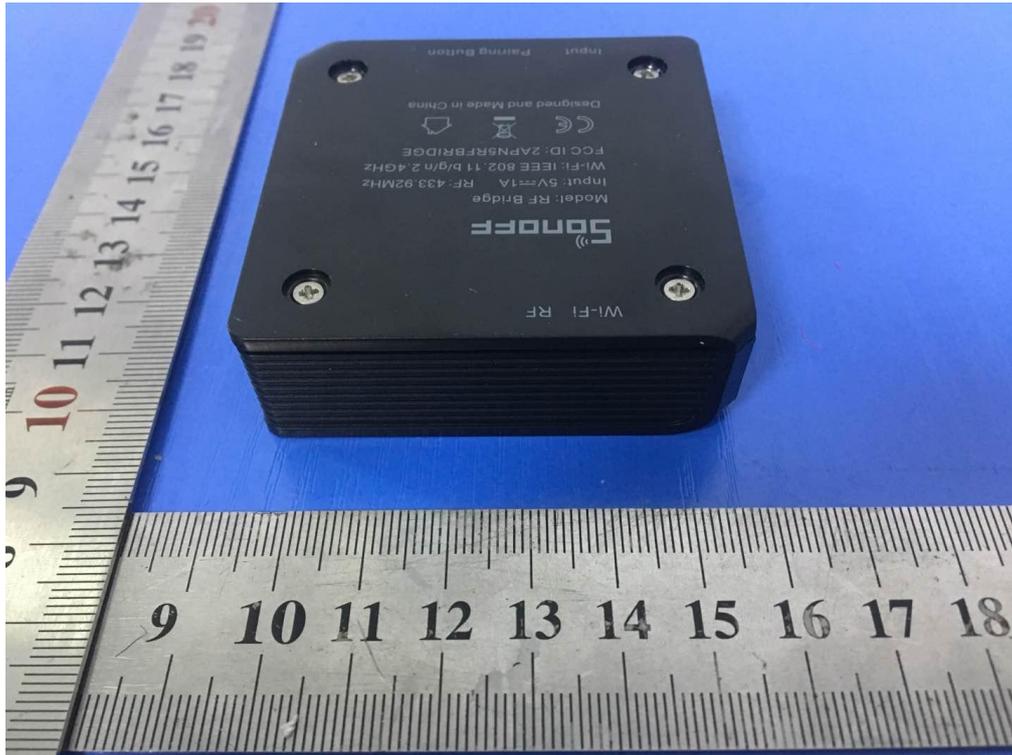


Fig.5

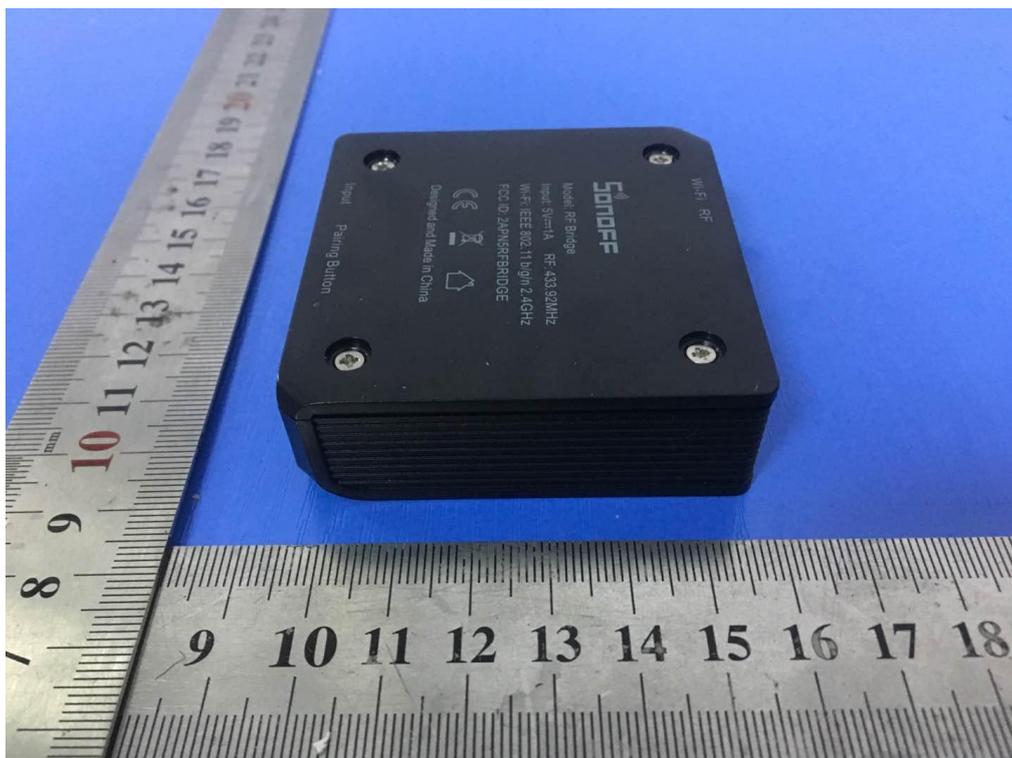


Fig.6

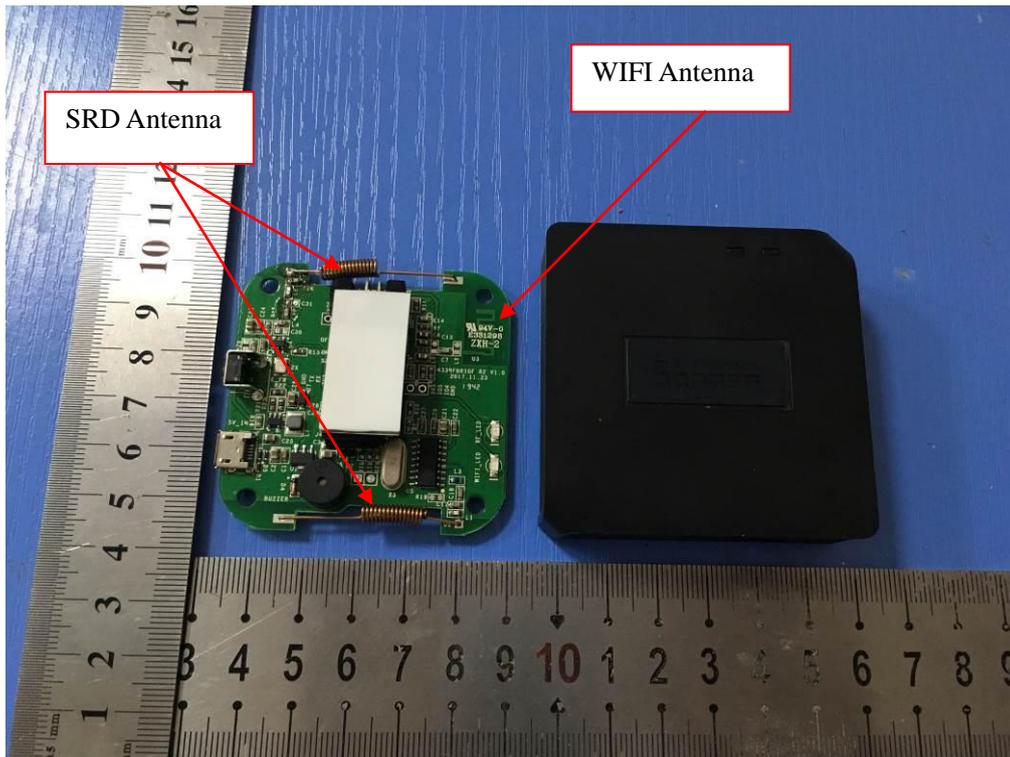


Fig.7

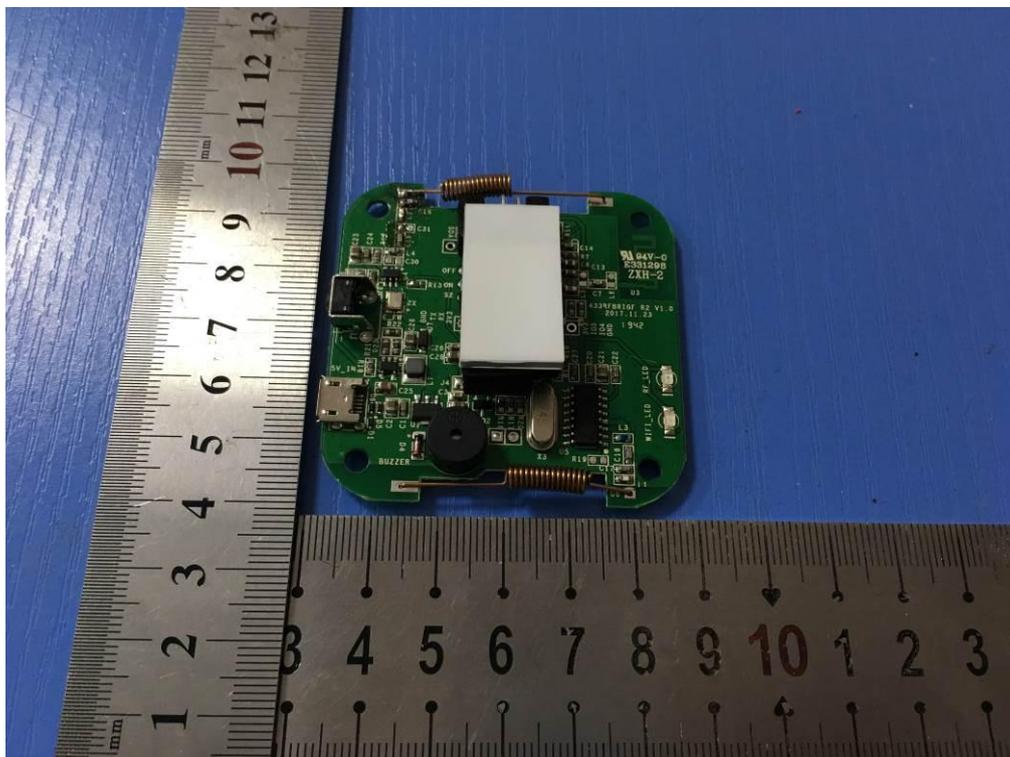


Fig.8

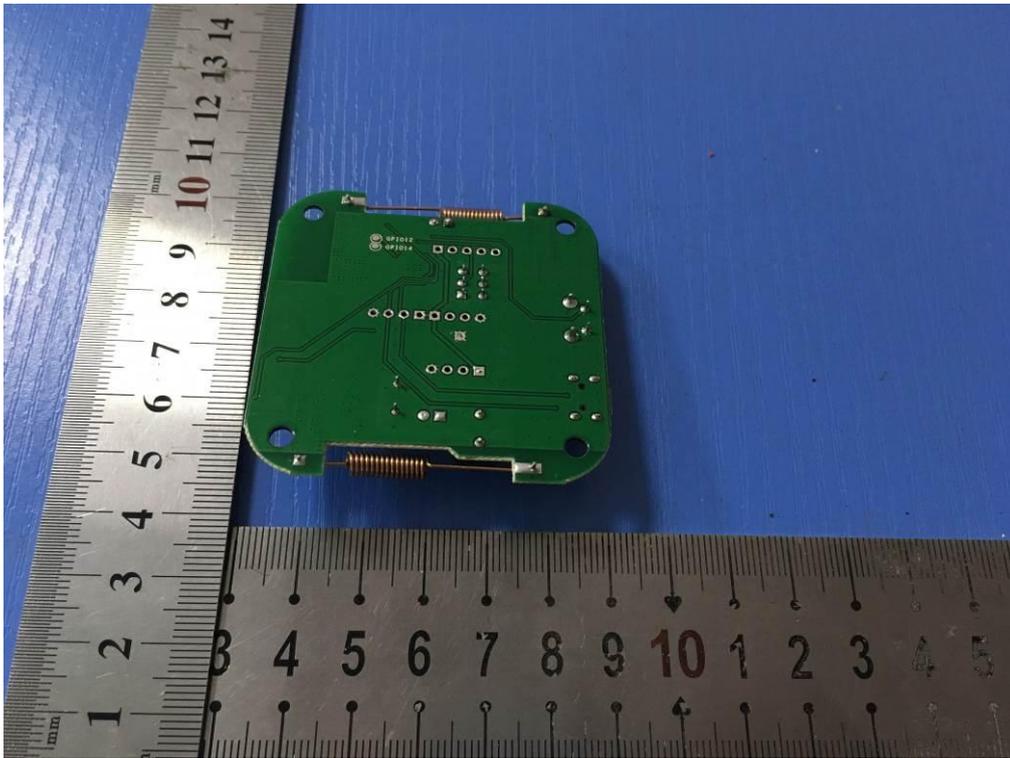


Fig.9

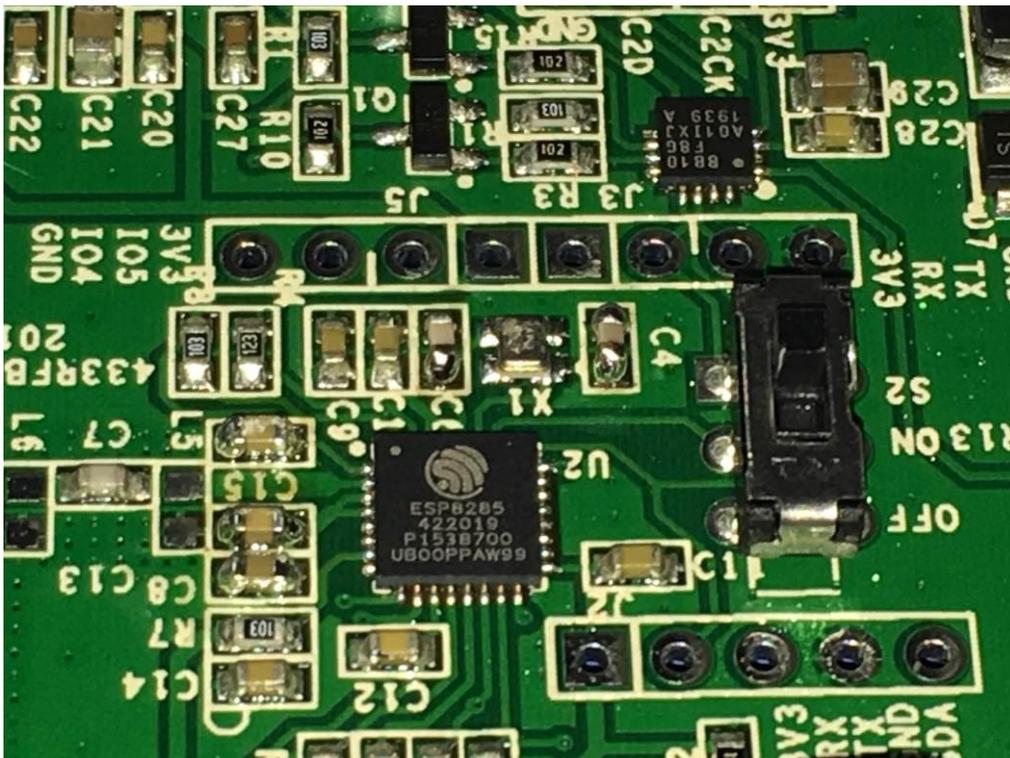


Fig.10

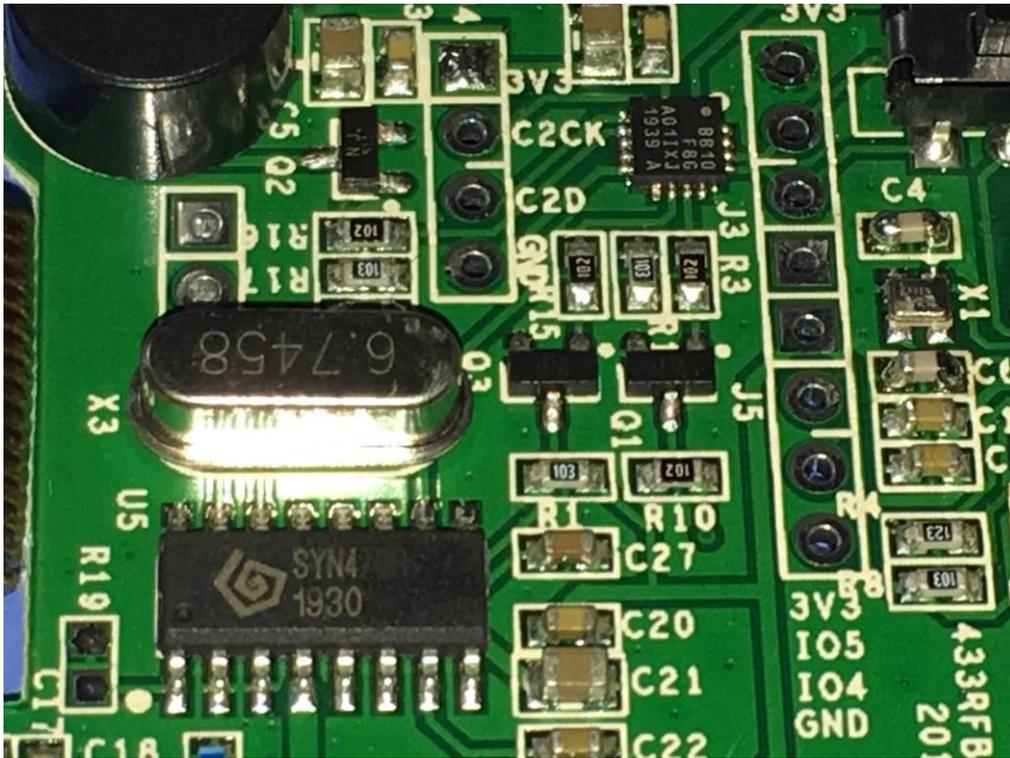


Fig.11

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