EN62311:2008

Test Report

FOR

Wi-Fi Smart Wall Switch

Model No.: T0US1C, T0US2C, T0US3C, T2US1C, T2US2C, T2US3C, T3US1C, T3US2C, T3US3C

Trademark:

Report No.: ES190328974W02

Issue Date: April 18, 2019

Prepared for

Shenzhen Sonoff Technologies Co.,Ltd.

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Prepared by

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TEST REPORT DESCRIPTION

Applicant	:	Shenzhen Sonoff Technologies Co.,Ltd. Room 1001, 10F, Building 8, Lianhua Industrial Park, Longyuan Road, Longhua District, Shenzhen, GD, China
Manufacturer	:	Shenzhen Sonoff Technologies Co.,Ltd. Room 1001, 10F, Building 8, Lianhua Industrial Park, Longyuan Road, Longhua District, Shenzhen, GD, China
EUT	:	Wi-Fi Smart Wall Switch
Model	:	T0US1C, T0US2C, T0US3C, T2US1C, T2US2C, T2US3C, T3US1C, T3US2C, T3US3C
Trademark	:	SONOFF

Test Procedure Used:
EN62311: 2008

The device described above is tested by EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report shows the EUT to be technically compliant with the EN62311: 2008 requirements. The test results are contained in this report and EMTEK (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests.

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

Date of Test : April 1, 2019 to April 17, 2019

Prepared by : Yaping Shen

Yaping Shen/Editor

Reviewer : Joe Xia

Joe Xia/Supervisor

EMTEK (SHENZHEN) CO., LTD. TESTING

Approve & Authorized Signer :

Lisa Wang/Manager

Modified History

Rev.	Summary	Date of Rev.	Report No.
V1.0	Original Report	/	ES190328974W02

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

Product	Wi-Fi Smart Wall Switch	
Model Number	T0US1C, T0US2C, T0US3C, T2US1C, T2US2C, T2US3C, T3US1C, T3US2C, T3US3C (These models are identical in circuitry and electrical, mechanical and physical construction; the only difference is the model no, for trading purpose. We choose T2US3C as the final test prototype)	
Power Supply	Input: AC 100-240V 50/60Hz 6A Max Output: AC 100-240V 50/60Hz 2A /Gang 6A/Total Max	
Wifi Type	☒Wifi2.4G with 2412MHz -2472MHz Band ☐Wifi2.4G with 2422MHz -2462MHz Band	
WLAN Supported	☒802.11b(20MHz channel bandwidth) ☒802.11g(20MHz channel bandwidth) ☒802.11n(20MHz channel bandwidth) ☐802.11n(40MHz channel bandwidth)	
Data Rate	☒802.11b:1, 2, 5.5, 11Mbps; ☒802.11g:6, 9, 12, 18, 24, 36, 48, 54Mbps; ☒802.11n(HT20): MCS0-MCS23; ☐802.11n(HT40): MCS0-MCS23;	
Modulation	☒DSSS with DBPSK/DQPSK/CCK for 802.11b; ☒OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;	
Frequency Range	☒2412-2472MHz for 802.11b; ☒2412-2472MHz for 802.11g;	☒2412-2472MHz for 802.11n(HT20); ☐2422-2462MHz for 802.11n(HT40);
Number of Channels	☒13 Channels for 802.11b; ☒13 Channels for 802.11g; ☒13 Channels for 802.11n(HT20); ☐9 Channels for 802.11n(HT40);	
Transmit Power (Max)	13.86dBm	
Antenna Gain:	1dBi	
Antenna	PCB antenna	
Smart system	☒SISO for 802.11a/b/g/n(HT20); ☐MIMO for 802.11n(HT20)/802.11n(HT40)	
Temperature Extreme Range	-10°C ~ +40°C	

Note: *for more details, please refer to the User's manual of the EUT.*

1.2 Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2016.10.24
The certificate is valid until 2022.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen 2016.05.19
The Laboratory has been assessed according to the requirements ISO/IEC 17025.

Accredited by FCC, August 06, 2018
Designation Number: CN1204
Test Firm Registration Number: 882943
Accredited by A2LA, August 31, 2020
The Certificate Registration Number is 4321.01.

Accredited by Industry Canada, November 09, 2018
The Conformity Assessment Body Identifier is CN0008

Name of Firm : SHENZHEN EMTEK CO., LTD

Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

2. GENERAL PRODUCT INFORMATION

2.1 Basic Restriction

The essential requirements of Directive 99/5/EC in the article 3.1(a) and the limits must be taken from Council Recommendation 99/5/EC for General Population or form the ICNIRP Guidelines for Occupational Exposure. EN 62479:2010 Generic standard to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields. The average power of EUT is less than 20mW then comply with basic restriction (1999/5/EC) without test.

Council Recommendation 99/5/EC Annex II
Basic restrictions for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz)

Frequency range	Magnetic flux density (mT)	Current density (mA/m^2) (rms)	Whole body average SAR (W/kg)	Localized SAR (head and trunk) (W/kg)	Localized SAR (limbs) (W/kg)	Power density, S (W/m^2)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1–4Hz	-	8/f	-	-	-	-
4Hz–1000Hz	-	2	-	-	-	-
1000Hz–100kHz	-	f/500	-	-	-	-
100kHz–10MHz	-	f/500	0.08	2	4	-
10MHz–10GHz	-	-	0.08	2	4	-
10GHz–300GHz	-	-	-	-	-	10

Note:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1 cm2 perpendicular to the current direction.
4. For frequencies up to 100kHz, AV current density values can be obtained by multiplying the rms value by√2 (=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as-1/(2tp).
5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging Mass is any 10g of contiguous tissue; the maximum SAR so

obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognized that this concept can be used in computational dissymmetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dissymmetric quantities have conservative values relative to the exposure guidelines.

8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated an=1/(2tp). Additionally, for pulsed exposures, in the frequency rage 0.3 to 10GHz and for localized exposure of the head, in order to limit and avoid auditory effects caused by thermoplastic expansion, an additional basic restriction is recommended. This is that the SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

2.2 Table for Filed Antenna

Ant.	Antenna Type	Gain (dBi)
1.	Integral antenna	1

3. TEST RESULT

3.1. EMF Exposure Measurement

3.1.1 Limit

Reference Levels

Council Recommendation 99/519/EC Annex III
Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300GHz)

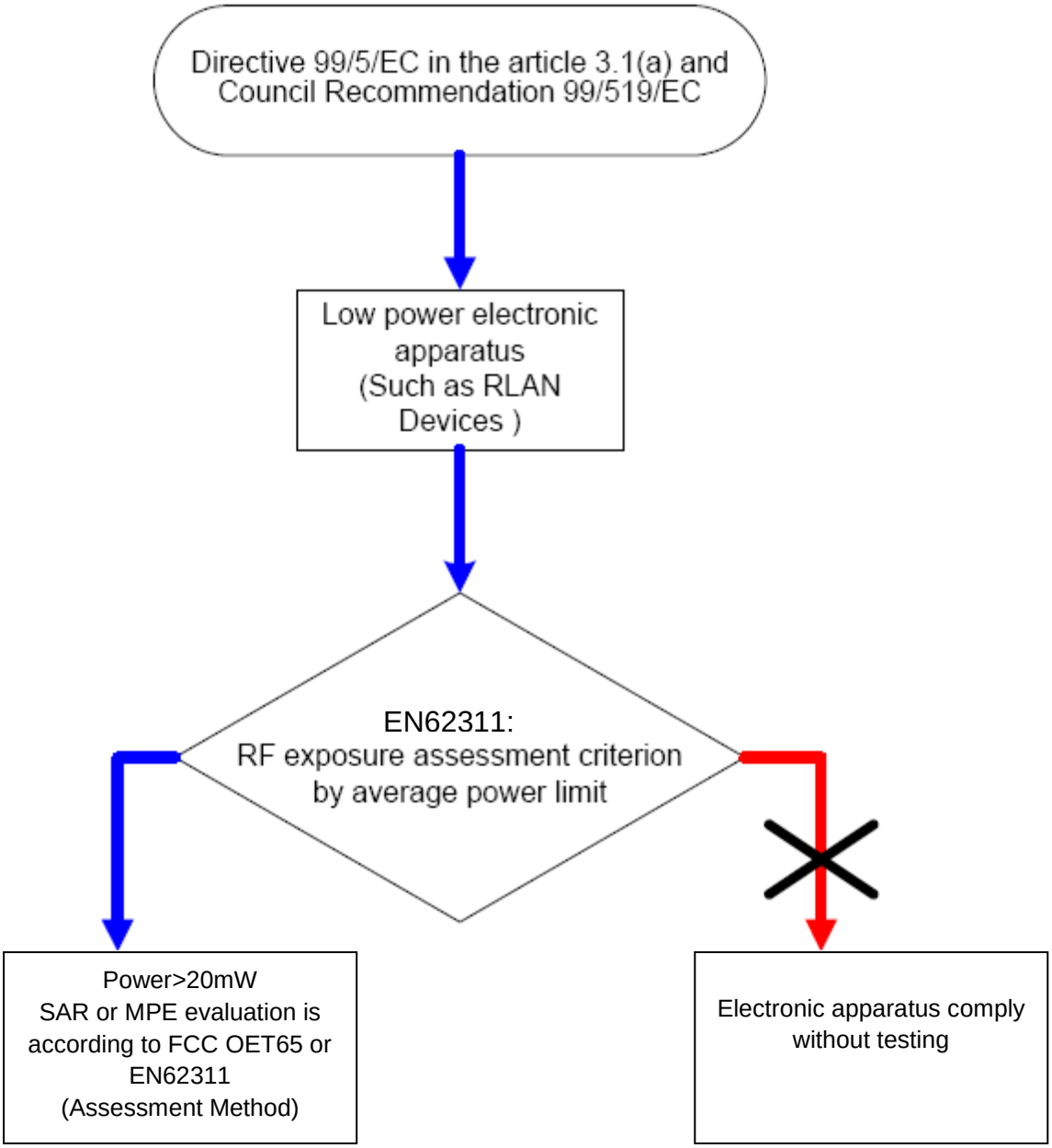
Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1 Hz	-	3.2×10^4	4×10^4	-
1-8 Hz	10000	$3.2\times10^4/f^2$	$4\times10^4/f^2$	-
8-25 Hz	10000	4000/f	5000/f	-
0.025-0.8 kHz	250/f	4/f	5/f	-
0.8-3 kHz	250/f	5	6.25	-
3-150 kHz	87	5	6.25	-
0.15-1 MHz	87	0.73/f	0.92/f	-
1-10 MHz	$87/f^{1/2}$	0.73/f	0.92/f	-
10-400 MHz	28	0.073	0.095	2
400-2000 MHz	$1.375\ f^{1/2}$	$0.0037\ f^{1/2}$	$0.0046\ f^{1/2}$	f/200
2-300 GHz	61	0.16	0.2	10

Notes:

1. As indicated in the frequency range column.
2. For frequencies between 100kHz and 10 GHz, Seq, E2, H2 and B2 are to averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, Seq, E2, H2, and B2 are averaged over any 68/1.05-minute period(in GHz).
4. No E-field value is provided for frequencies<1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

3.1.2. Evaluation Routine

Low Power Electronic Apparatus for RF exposure evaluation routine



3.1.3. EMF Exposure Levels Calculated

3.2 Detailed results

3.2.1 Summary of Results

Frequency Band	Limit (W/ m²)	Result (W/ m²)	Verdict
WIFI	10	0.06	passed

3.2.2 Measurement of RF conducted Power

Band	Max EIRP (dBm)
WIFI 2.4GHz	13.86 dBm

3.2.3 MPE Evaluation13.86

$S = EIRP/ 4\pi R^2$
R = distance to the center of radiation of antenna (in meter) = 0.20 m
Note:
1) EIRP=P*G* Duty factor
2) P (Watts)=(10 ^ (dBm /10))/1000
3) G (Antenna gain in numeric) = 10^ (Antenna gain in dBi /10)
4) Duty factor

Mode	Duty factor
WIFI	1

5) π=3.142

1) The maximum power density at a distance of 0.2 m for WIFI is shown as below:

Antenna Gain(dBi)	Antenna Gain (numeric)	AV Output Power (dBm)	AV Output Power (W)	Duty factor	Calculated RF Exposure (W/ m²)	Limit (W/ m²)
2	1.26	13.86	0.024	1	0.06	10

3.2.4 Measurement Uncertainty

Extended Uncertainty (k=2) 95% 0.5dB

-------END OF REPORT-----