ETSI EN 300 440

RADIO SPECTRUM REPORT (GPS)

Product： Sonoff GSM/GPRS Smart Switch

Trademark： SONOFF

Model Name： Sonoff G1
Sonoff G2, Sonoff G12, Sonoff G14,
Sonoff G16, Sonoff G18, Sonoff G22, Sonoff G24,
Sonoff G26, Sonoff G28

Report No.： BCTC-FY170603852-3E

Prepared for

ITEAD Intelligent Systems Co., Ltd

5F, Building A, Yuxing Multiple-use Building, Huaya Industrial Park, Jihua Road., Longhua Dist, Shenzhen, GD, 518000, China

Prepared by

Shenzhen BCTC Testing Co., Ltd.

BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China

Tel: 400-788-9558,0755-33019988

Web: Http//www.bctc-lab.com.cn

TEST RESULT CERTIFICATION

Applicant's name ..... :		**ITEAD Intelligent Systems Co., Ltd**
Address	:	5F, Building A, Yuxing Multiple-use Building, Huaya Industrial Park, Jihua Road., Longhua Dist, Shenzhen, GD, 518000, China
Manufacture's Name..... :		**ITEAD Intelligent Systems Co., Ltd**
Address	:	5F, Building A, Yuxing Multiple-use Building, Huaya Industrial Park, Jihua Road., Longhua Dist, Shenzhen, GD, 518000, China

Product description

Product name	:	Sonoff GSM/GPRS Smart Switch
Trademark	:	SONOFF
Model and/or type reference . :		Sonoff G1 Sonoff G2, Sonoff G12, Sonoff G14, Sonoff G16, Sonoff G18, Sonoff G22, Sonoff G24, Sonoff G26, Sonoff G28
Standards	:	ETSI EN 300 440 V2.1.1 (2017-03)

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Art.3.1(b) requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of BCTC, this document may be altered or revised by BCTC, personal only, and shall be noted in the revision of the document.

Date of Test :

Date (s) of performance of tests	:	Jul. 14 - Jul. 19, 2017
Date of Issue	:	Jul. 19, 2017
Test Result	:	**Pass**

Prepared by(Engineer):	Sky Huang	Sky Huang
Reviewer(Supervisor):	Jade Yang	Jade Yang
Approved(Manager):	Carson Zhang	Carson Zhang

BCTC APPROVED SHENZHEN BCTC TESTING CO., LTD

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen BCTC Testing Co., Ltd.

Contents

2 Test Summary

Radio Spectrum Matter (RSM) Part of Transmitter					
Test item	**Test Requirement**	**Test method**	**Limit/Severity**	**Uncertainty**	**Result**
Equivalent isotropically radiated power	EN 300 440-2	EN 300 440-1	Table 4	± 3dB	N/A
Permitted Range of Operating Frequencies	EN 300 440-2	EN 300 440-1	Table 4	± 10-7	N/A
Duty cycle	EN 300 440-2	EN 300 440-1	Table 6	NA	N/A
Transmitter spurious emissions	EN 300 440-2	EN 300 440-1	Table 5	± 6 dB	N/A
Radio Spectrum Matter (RSM) Part of Receiver					
Receiver spurious emissions	EN 300 440-2	EN 300 440-1	<2nW <1GHz, <20nW >1GHz	± 6dB	Pass

Pass: The EUT complies with the essential requirements in the standard.

3 General Information

3.1 General Description of EUT

Product Name:	Sonoff GSM/GPRS Smart Switch
Model No.:	Sonoff G1 Sonoff G2, Sonoff G12, Sonoff G14, Sonoff G16, Sonoff G18, Sonoff G22, Sonoff G24, Sonoff G26, Sonoff G28
Operation Frequency:	1.57542GHz
Power supply:	90V~250V AC 50Hz-60Hz 3000W 16A

3.2 Test mode

Receive mode	Keep the EUT in receiving mode.

3.3 Description of Support Units

The EUT has been tested as an independent unit.

3.4 Deviation from Standards

None.

3.5 Abnormalities from Standard Conditions

None.

4 Test Instruments list

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Bilog Antenna	TESEQ	CBL6111D	31216	Aug. 24, 2017
2	Test Cable	N/A	R-01	N/A	Aug. 24, 2017
3	Test Cable	N/A	R-02	N/A	Aug. 24, 2017
4	EMI Test Receiver	R&S	ESCI-7	101318	Aug. 24, 2017
5	Antenna Mast	EM	SC1001	N/A	N/A
6	Turn Table	EM	SC100	060531	N/A
7	50Ω Switch	Anritsu Corp	MP59B	6200983705	Aug. 24, 2017
8	Spectrum Analyzer	Aglient	E4407B	MY45108040	Aug. 24, 2017
9	Horn Antenna	EM	EM-AH-10180	2011071402	Aug. 24, 2017
10	Amplifier	EM	EM-30180	060538	Aug. 24, 2017
11	EMI Test Receiver	Rohde&Schwarz	ESU26	101156	Aug. 24, 2017
12	Universal radio communication tester	Rohde & Schwarz	CMU200	3215420	Aug. 24, 2017
13	D.C. Power Supply	Changhai	CH053	010964729	Aug. 24, 2017

5 Radio Technical Specification in ETSI EN 300 440-2

5.1 Receiver requirement

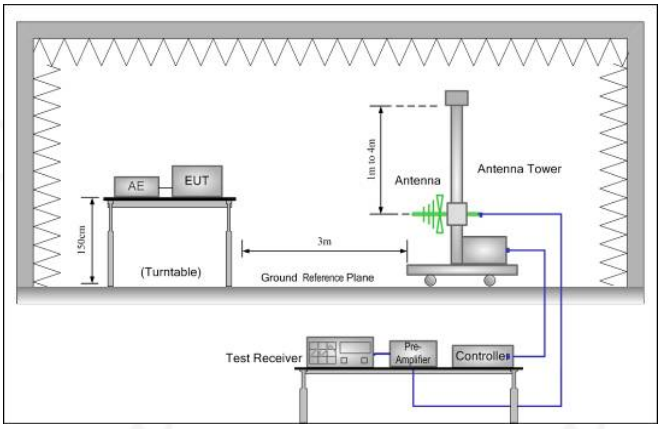
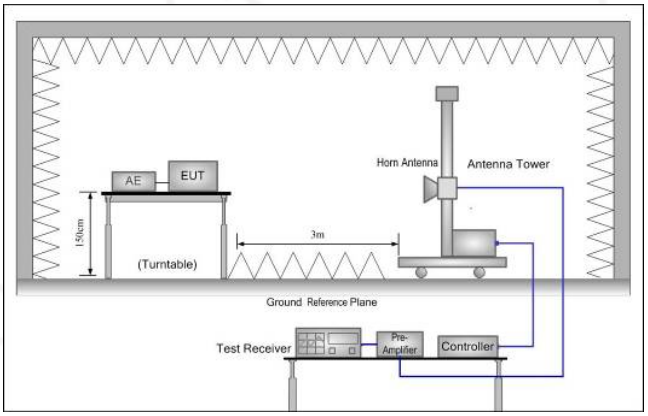
5.1.1 Receiver Classification

Table 2 of ETSI EN 300 440-1.

Category	Relevant Clauses	Risk assessment of Reveiver performance
1	8.1, 8.2, and 8.3	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person).
2	8.2, and 8.3	Medium reliable SRD communication media e.g. causing inconvenience to persons, which cannot simply be overcome by other means.
3	8.3	Standard reliable SRD communication media e.g. Inconvenience to persons, which can simply be overcome by other means (e.g. manual).

The EUT (Receiver part) belong to Class 3

5.1.2 Spurious emissions

Test Requirement:	ETSI EN 300 440-2 clause 4.2.2.3
Test Method:	ETSI EN 300 440-1 clause 8.3.3
Test Frequency range:	25MHz to 16GHz
Receiver setup:	RBW=100KHz, VBW=300KHz, Detector= peak
Limit:	See table below
Test setup:	Below 1GHz  Above 1GHz 

Frequency	Limit(narrowband)	Limit(wideband)
30MHz to 1000 MHz	2nW(-57dBm)	-107dBm/Hz
1GHz to 12.75GHz	20nW(-47dBm)	-97dBm/Hz

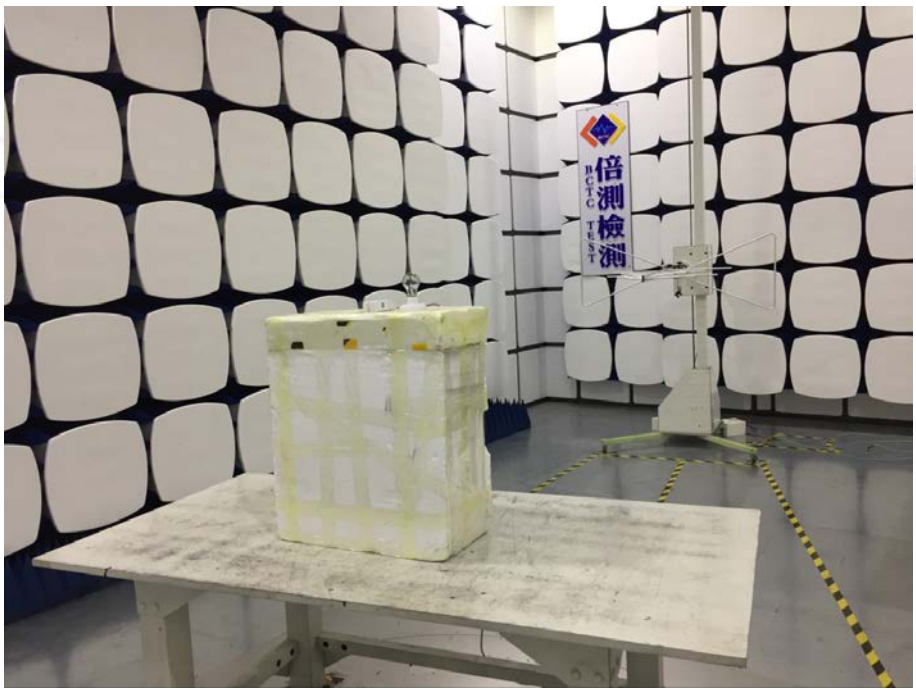
Test procedure:	Substitution method was performed to determine the actual ERP emission levels of the EUT. The following test procedure as below: ■ **Below 1GHz test procedure** 1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider. 2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground. 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd) where: Pg is the generator output power into the substitution antenna. ■ **Above 1GHz test procedure:** Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber, and the test antenna do not need to raise from 1 to 4m, just test in 1.5m height.

Measurement Record:	Uncertainty: ± 6dB
Test Instruments:	Refer to section 6.0
Test mode:	Transmitting mode
Result:	Pass

Measurement Data

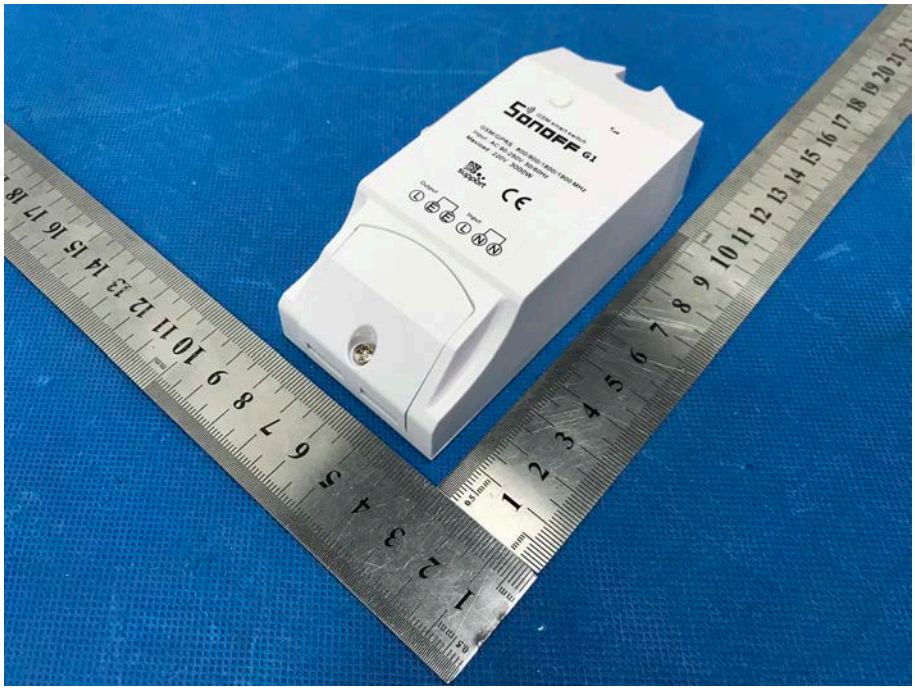
Frequency (MHz)	Spurious Emission		Limit (dBm)	Test Result
	polarization	Level(dBm)		
49.37	Vertical	-76.24	2nW/ -57dBm below 1GHz, 20nW/ -47dBm above 1GHz.	Pass
313.28	V	-75.62		
3139.00	V	-57.32		
4490.46	V	-58.99		
6546.50	V	-55.63		
12010.00	V	-53.95		
45.64	Horizontal	-78.68		
313.38	H	-73.54		
3139.00	H	-57.84		
4490.46	H	-56.69		
6546.50	H	-57.72		
12010.00	H	-52.85		

6 Test setup photo

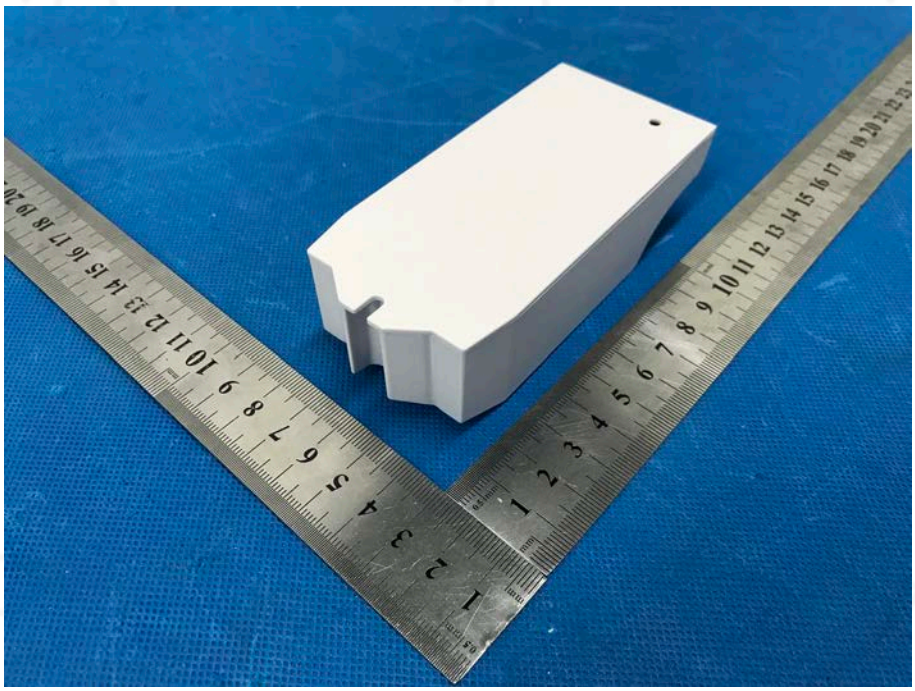


7 PHOTOS OF THE EUT

EUT Photo 1



EUT Photo 2

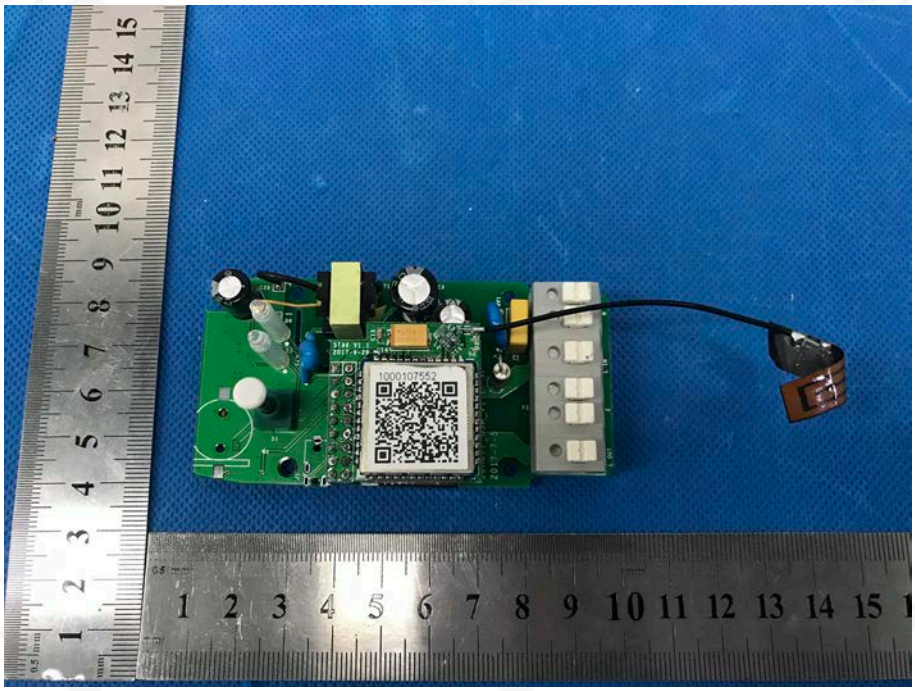


EUT Photo 3

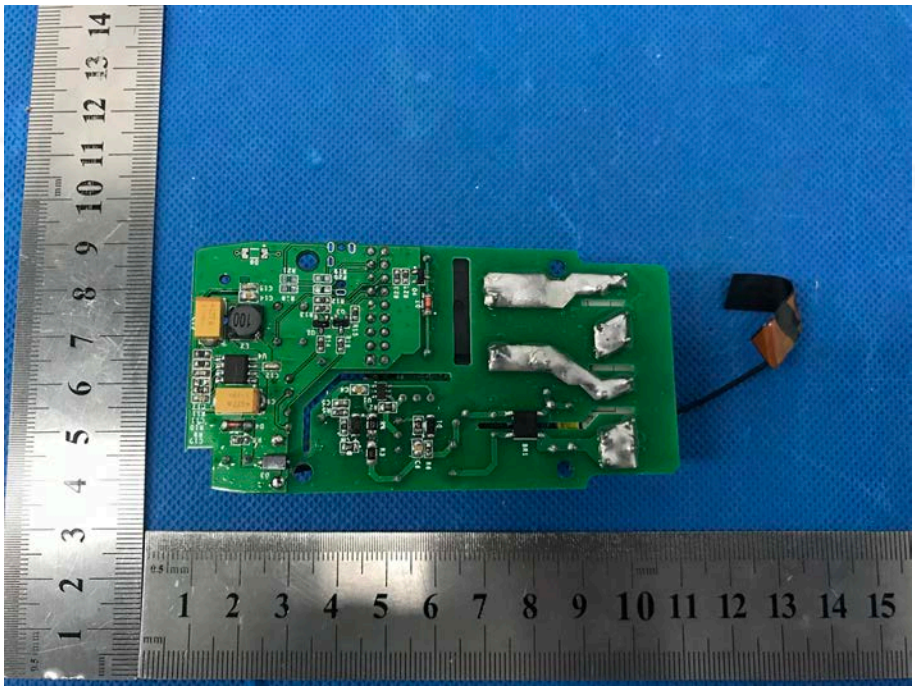
EUT Photo 4

EUT Photo 5

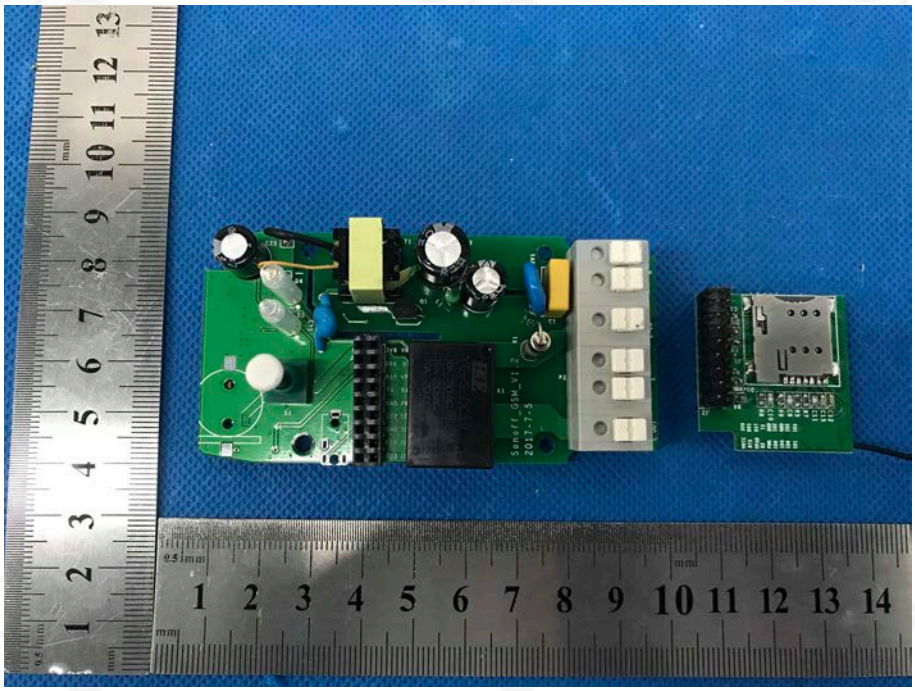
EUT Photo 6



EUT Photo 7



EUT Photo 8



------End------