HEALTH TEST REPORT

EN IEC 62311: 2020

Report Reference No.	:	**POCE211019033ERW**
Applicant's Name	:	**Shenzhen Netplus Technology Co., Ltd**
Address of Applicant	:	2 / F, building C, Yilai Industrial Zone, No. 18, Shuitian Road, Shuitian community, Shiyan street, Bao'an District, Shenzhen, Guangdong
Test Firm	:	Shenzhen POCE Technology Co., Ltd.
Address of Test Firm	:	101-102 Building H5 & 1/F., Building H, Hongfa Science & Technology Park, Tangtou, Shiyan, Bao'an District, Shenzhen, Guangdong, China
Test Specification Standard	:	**EN IEC 62311: 2020**
Product Name	:	Switch module
Model/ Type Reference	:	**SH-WiFi-SW01-10A**
Listed Models	:	See page 6 General Description of EUT
Date of Receipt	:	Oct. 09, 2021
Date of Test	:	Oct. 09, 2021 - Oct. 19, 2021
Data of Issue	:	Oct. 19, 2021
Result	:	**PASS**

Compiled by:	Supervised by:	Approved by:
Amy Huang/ File administrators	Stone Yin/ Technique principal	Bill Yuan/ Manager

Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	POCE211019033ERW	Oct. 19, 2021

NOTE1:
The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EU Directives.

NOTE2:
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Contents

1. TEST SUMMARY

1.1 TEST STANDARDS

EN IEC 62311: Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)

Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0Hz to 300GHz) (Official Journal L 197 of 30 July 1999).

2.1 TEST LAB INFORMATION

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 32/EN 55032 requirements.

VCCI Membership No.: 3941
The 3m Semi-anechoic chamber of Shenzhen POCE Technology Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.:R-3941. Date of Registration: Oct. 22, 2018.

2. GENERAL INFORMATION

2.1 CLIENT INFORMATION

Applicant : **Shenzhen Netplus Technology Co., Ltd**

Address : 2 / F, building C, Yilai Industrial Zone, No. 18, Shuitian Road, Shuitian community, Shiyan street, Bao'an District, Shenzhen, Guangdong

Manufacturer : **Shenzhen Netplus Technology Co., Ltd**

Address : 2 / F, building C, Yilai Industrial Zone, No. 18, Shuitian Road, Shuitian community, Shiyan street, Bao'an District, Shenzhen, Guangdong

2.2 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	15°C -35°C
Relative Humidity	35%-55 %
Air Pressure	101KPa

2.3 PRODUCT DESCRIPTION

Equipment	Switch module
Trade Mark	N/A
Model Name	SH-WiFi-SW01
Series model	SH-Zigbee-SW01-10A, SH-BT-SW01-10A, SH-WiFi-SW02, SH-WiFi-SW02-PM, SH-Zigbee-SW02, SH-BT-SW02, SH-WiFi-S03, SH-WiFi-S03-PM, SH-Zigbee-SW03, SH-Zigbee-SW03-PM, SH-BT-SW03, SH-WiFi-SW04, SH-WiFi-SW04-PM, SH-Zigbee-SW04, SH-Zigbee-SW04-PM, SH-BT-SW04, SH-WiFi-SW01-16A, S H-WiFi-SW01-16A-PM, SH-Zigbee-SW01-16A, SH-Zigbee-SW01-16A-PM, SH-WiFi-CS01-1C, SH-Zigbee-CS01-1C, SH-BT-CS01-1C, SH-WiFi-CS01-2C, SH-Zigbee-CS01-2C, SH-BT-CS01-2C, SH-WiFi-DIM01, SH-Zigbee-DIM01, SH-BT-DIM01, SH-WiFi-DIM02, SH-Zigbee-DIM02, SH-BT-DIM02, SH-Zigbee-SW01-L, SH-Zigbee-SW02-L, SH-Zigbee-SW03-L
Model Difference	There are several models of this product. The circuit principle and internal structure of each product are the same. Only the naming method and appearance color are a little different, so the main test model is: SH-Zigbee-SW01
Power Source	AC 230V 50/60Hz
Zigeee	
Supported type	IEEE 802.15.4
Operation frequency	IEEE 802.15.4: 2405-2480
Modulation Type	IEEE 802.15.4: DSSS
Number of Channels	IEEE 802.15.4:16
Channels Separation	5MHz
Antenna type	PCB Antenna
Antenna gain	3.09 dBi
BLE	
Supported type	BLE
Frequency Range	2402MHz -- 2480MHz
Number of Channels	40
Channels Separation	2MHz
Modulation Type	GFSK
Antenna type:	PCB Antenna
Antenna gain:	2.5 dBi
2.4G WIFI	
Supported type	IEEE 802.11b/802.11g/802.11n(H20)
Operation frequency	IEEE 802.11b/g/n20: 2412-2472MHz
Modulation Type	IEEE 802.11b/g/n(HT20): CCK/DSSS
Number of Channels	IEEE 802.11b/802.11g/802.11n(HT20): 13
Channels Separation	5MHz
Antenna type	PCB Antenna
Antenna gain	2.3 dBi

Note: For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3. Method of measurement

Limit

Basic restriction for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

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

Notes:
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 1cm2 perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by $\sqrt{2}$(=1.414). For pulses of duration t_p the equivalent frequency to apply in the basic restrictions should be calculated as=1/ ($2t_p$)
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 recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.
8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/($2t_p$). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz,unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (uT)	Equivalent plane wave power density S_{eq}(W/m^2)
0-1Hz	--	3.2×10^4	4×10^4	--
1-8Hz	10000	$3.2\times10^4/f^2$	$4\times10^4/f^2$	--
8-25Hz	10000	4000/f	5000/f	--
0.025-0.8KHz	250/f	4/f	5/f	--
0.8-3KHz	250/f	5	6.25	--
3-150KHz	87	5	6.25	--
0.15-1MHz	87	0.73/f	0.92/f	--
1-10MHz	$87/f^{1/2}$	0.73/f	0.92/f	--
10-400MHz	28	0.073	0.092	2
400-2000MHz	$1.375f^{1/2}$	$0.0037f^{1/2}$	$0.0046f^{1/2}$	f/200
2-300GHz	61	0.16	0.20	10

Notes: 1. As indicated in the frequency range column.

2. For frequencies between 100kHz and 10GHz, S_{eq}, E^2, H^2 and B^2 are to be averaged over any six-minute period.

3. For frequencies exceeding 10GHz, S_{eq}, E^2, H^2 and B^2 are to be averaged over any $68/f^{1.05}$-minute period (.in GHz).

4. No E-field value is provided for frequencies <1Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 20kV/m. Spark discharges causing stress or annoyance should be avoided.

EMF Assessment Model

Predication of EMF limit at a given distance
Equation from page 26 of EN 62311, Edition 2008

$$E=\eta_0 H=\frac{\sqrt{30PG(\theta,\phi)}}{r}$$

Where:
E: E-field strength (V/m)
P: power input to antenna (Watt)
G: is the antenna gain relative to an isotropic antenna;
θ,ϕ: are elevation and azimuth angles to point of investigation;
r: is the distance from observation point to the antenna;
η_0: is the characteristic impedance of free space.

Test Result

Note: Please refer to the report NO.: POCE211019034TRW, POCE211022031BRW and POCE211022032JRW

Zigbee

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (W)	Antenna Gain (Nemeric)	E-field strength Limit (V/m)	E-field strength At 20 cm (V/m)
2405	20	-2.59	0.0006	2.0370	61	0.9173
2440	20	-2.25	0.0006	2.0370	61	0.9540
2480	20	-2.28	0.0006	2.0370	61	0.9507

BLE

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (W)	Antenna Gain (Nemeric)	E-field strength Limit (V/m)	E-field strength At 20 cm (V/m)
2402	20	4.47	0.0028	1.7783	61	1.9321
2440	20	4.32	0.0027	1.7783	61	1.8990
2480	20	4.11	0.0026	1.7783	61	1.8537

2.4GWIFI11b

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (W)	Antenna Gain (Nemeric)	E-field strength Limit (V/m)	E-field strength At 20 cm (V/m)
2412	20	18.06	0.0640	1.6982	61	9.0267
2442	20	17.47	0.0558	1.6982	61	8.4339
2472	20	17.56	0.0570	1.6982	61	8.5218

2.4GWIFI11g

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (W)	Antenna Gain (Nemeric)	E-field strength Limit (V/m)	E-field strength At 20 cm (V/m)
2412	20	18.35	0.0684	1.6982	61	9.3332
2442	20	17.77	0.0598	1.6982	61	8.7303
2472	20	17.97	0.0627	1.6982	61	8.9337

2.4GWIFI11n(H20)

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Output Power (W)	Antenna Gain (Nemeric)	E-field strength Limit (V/m)	E-field strength At 20 cm (V/m)
2412	20	17.38	0.0547	1.6982	61	8.3470
2442	20	16.51	0.0448	1.6982	61	7.5515
2472	20	16.71	0.0469	1.6982	61	7.7274

**************************THE END**************************