



CTC Laboratories, Inc.

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Maximum Permissible Exposure Evaluation

FCC ID: 2APN5-T5

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b).

EUT Specification

Applicant	Shenzhen Sonoff Technologies Co.,Ltd.
Address	3F & 6F, Bldg A, No. 663, Bulong Rd, Shenzhen, Guangdong, China
Product Name:	Smart Touch Wall Switch
Trade Mark:	Sonoff
Model/Type Reference:	T5-3C-120
Listed Model(s):	T5-2C-120, T5-1C-120
Model Differences:	All these models are identical in the same PCB, layout, electrical circuit. The difference is the number of output terminal blocks and the number of relays. Model: T5-1C-120, the product contains one relay and three terminal blocks on power supply board, but the rest are the same. Model: T5-2C-120, the product contains two relays and four terminal blocks on power supply board, but the rest are the same. Model: T5-3C-120, the product contains three relays and five terminal blocks on power supply board, but the rest are the same.
Frequency Band (Operating)	BLE: 2402~2480MHz WiFi: 2412-2462MHz
Device Category	<input type="checkbox"/> Portable (<5mm separation) <input type="checkbox"/> Mobile (>20cm separation) <input checked="" type="checkbox"/> Fixed (>20cm separation) <input type="checkbox"/> Others _____
Exposure Classification	<input type="checkbox"/> Occupational/Controlled exposure (S=5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna Diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Antenna Gain (Max)	2.82dBi
Evaluation Applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

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**Limits for Maximum Permissible Exposure (MPE)**

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposure				
300-1500	--	--	F/300	<6
1500-100000	--	--	5	<6
(B) Limits for General Population/Uncontrolled Exposure				
300-1500	--	--	F/1500	<30
1500-100000	--	--	1	<30

Calculation Method

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where:

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d limit of MPE is 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

Mode	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Tune Up Tolerance (dB)	Max. Tune Up Power (dBm)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
BLE	2402	2.82	3.061	±1	4.00	0.0010	1
802.11b	2412	2.82	18.73	±1	19.50	0.0339	1

The BLE and WiFi can transmit simultaneously.

Mode	Frequency (MHz)	Antenna Gain (dBi)	Power Density at 20cm (mW/cm ²)	Total Power density at 20cm (mW/cm ²)	Limit (mW/cm ²)
BLE	2402	2.82	0.0010	0.0349	1
802.11b	2412	2.82	0.0339		

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Note:

1. Calculate in the worst-case mode.
2. Max. Tune Up Power is declared by manufacturer, and used to calculate.
3. For a more detailed features description, please refer to the RF Test Report.

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

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