




Maximum Permissible Exposure Evaluation

FCC ID: 2APN5ZBM5120W

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

Product Name:	Zigbee Smart Wall Switch
Trade Mark:	 , Sonoff
Model/Type Reference:	ZBM5-3C-120W
Listed Model(s):	ZBM5-2C-120W, ZBM5-1C-120W, ZBM5-3C-120, ZBM5-2C-120, ZBM5-1C-120
Model Differences:	All these models are identical in the same PCB, layout, electrical circuit. The difference is the number of output terminals, the number of relays, and the color of the shell.
Frequency Band (Operating)	Zigbee: 2405~2480MHz
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)	2.07dBi
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: $Pd=(P_{out} * G)/(4 * \pi * R^2)$

Where:

Pd= Power density in mW/cm²

P_{out}= output power to antenna in mW

G= gain of antenna in linear scale

Pi= 3.1416

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

Pd 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)	Target Power (dBm)	Tune Up Tolerance (dB)	Max. Tune Up Power (dBm)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
Zigbee	2405	2.07	6.01	6	± 1	7	0.0016	1

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*****