



CTC Laboratories, Inc.

1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Tel: +86-755- 27521059 Fax: +86-755- 27521011 Http://www.sz-ctc.org.cn

Maximum Permissible Exposure Evaluation

FCC ID: 2A22Z-C224

IC: 27673-C224

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:	Botslab Indoor Cam 3C Pro
Trade Mark:	Botslab
Model/Type reference:	C224
Listed Model(s):	/
Frequency band (Operating)	BLE: 2402MHz ~ 2480MHz WLAN: 2412MHz ~ 2462MHz
Device category	☐ Portable (<5mm separation) ☐ Mobile (>20cm separation) ☒ Fixed (>20cm separation) ☐ Others ____
Exposure classification	☐ Occupational/Controlled exposure (S=5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Antenna gain (Max)	1.8dBi
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

CTC Laboratories, Inc.

1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Tel.: (86)755-27521059

Fax: (86)755-27521011

Http://www.sz-ctc.org.cn



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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)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	30
1500-100000	--	--	1	30

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

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 the limit of MPE 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.

RF exposure evaluation Limits for IC

RSS-102 Section 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

FCC Measurement Result

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Verdict
BLE	2480	1.8	0.89	1±1	2	0.00048	1	PASS
802.11b	2462	1.8	16.21	16±1	17	0.01509	1	PASS
802.11g	2462	1.8	15.93	16±1	17	0.01509	1	PASS
802.11n(HT20)	2462	1.8	15.96	16±1	17	0.01509	1	PASS
802.11ax(HE20)	2462	1.8	15.97	16±1	17	0.01509	1	PASS



The WLAN and BLE can transmit simultaneously

WLAN Power density at 20cm (mW/cm ²)	BLE Power density at 20cm (mW/cm ²)	Total Power density at 20cm(mW/cm ²)	Limit (mW/cm ²)	Verdict
0.01509	0.00048	0.01557	1	PASS

IC Measurement Result

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	E.I.R.P (mW) 20cm	Limit (W)	Verdict
BLE	2480	1.8	0.89	1±1	2	2.40	2.67	PASS
802.11b	2462	1.8	16.21	16±1	17	75.86	2.67	PASS
802.11g	2462	1.8	15.93	16±1	17	75.86	2.67	PASS
802.11n(HT20)	2462	1.8	15.96	16±1	17	75.86	2.67	PASS
802.11ax(HE20)	2462	1.8	15.97	16±1	17	75.86	2.67	PASS

The WLAN and BLE can transmit simultaneously

WLAN Power density at 20cm (mW)	BLE Power density at 20cm (mW)	Total Power density at 20cm(mW)	Limit (W)	Verdict
75.86	2.40	78.26	2.67	PASS

Note:

- For a more detailed features description, Please refer to the RF Test Report.

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