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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 | <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/cm2) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm2) |
| 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) | 1.8dBi |
| 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) | 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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

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 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 |

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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:

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

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