MPE CALCULATION

BLNFN100001, FCC ID: 2APW6BLN-FN-1-00001
BT BLE module, FCC ID: QOQBGM111

RF Exposure Requirements:	47 CFR §1.1307(b)
RF Radiation Exposure Limits:	47 CFR §1.1310
RF Radiation Exposure Guidelines:	FCC OST/OET Bulletin Number 65
EUT Frequency Band:	2412-2462 MHz, 2402-2480 MHz, 5180- 5320MHz, 5500-5720MHz, 5745-5825MHz 5210-5290MHz, 5530-5610MHz, 5690-5775MHz
Limits for General Population/Uncontrolled Exposure in the band of:	
Power Density Limit:	1 mW / cm^2

Equation: $S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

Where, S = Power Density

P = Power Input to Antenna

G = Antenna Gain

R = distance to the center of radiated antenna

EUT: Raspberry Compute Module 3 Lite , Model No.: Balena Fin

1) External Omni Antenna :

Prediction distance 20cm

(BT): Power = 0.31 dBm, Antenna Gain = 2 dBi, Power density = 0.0003 mW/cm^2

(BLE): Power = 1.65 dBm, Antenna Gain = 2 dBi, Power density = 0.0005 mW/cm^2

(WLan 2.4GHz): Power = 15.9 dBm, Antenna Gain = 2 dBi, Power density = 0.0122 mW/cm^2

(WLan 5GHz): Power = 11.7 dBm, Antenna Gain = 2 dBi, Power density = 0.0046 mW/cm^2

Type	CH Freq (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Directional Gain (dBi)	Tune-Up Tolerance	Tolerance Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/ Fail
BT	2441	0.31	2	1	±1dB	1.31	20	0.0003	1	Pass
BLE	2440	1.65	2	1	±1dB	2.65	20	0.0005	1	Pass
WLAN 2.4GHz	2437	15.9	2	1	±1dB	16.9	20	0.0122	1	Pass
WLAN 5GHz	5775	11.7	2	1	±1dB	12.7	20	0.0046	1	Pass

2) Embedded Chip Antenna :

Prediction distance 20cm

(BT): Power = 0.31 dBm, Antenna Gain = 1 dBi, Power density = 0.0002 mW/cm^2

(BLE): Power = 1.65 dBm, Antenna Gain = 1 dBi, Power density = 0.0003 mW/cm^2

(WLan 2.4GHz): Power = 15.9 dBm, Antenna Gain = 1 dBi, Power density = 0.0098 mW/cm^2

(WLan 5GHz): Power = 11.7 dBm, Antenna Gain = 1 dBi, Power density = 0.0037 mW/cm^2

Type	CH Freq (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Directional Gain (dBi)	Tune-Up Tolerance	Tolerance Max Power (dBm)	Measurement Distance (cm)	Calculated MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Pass/ Fail
BT	2441	0.31	1	0	±1dB	1.31	20	0.0002	1	Pass
BLE	2440	1.65	1	0	±1dB	2.65	20	0.0003	1	Pass
WLAN 2.4GHz	2437	15.9	1	0	±1dB	16.9	20	0.0098	1	Pass
WLAN 5GHz	5775	11.7	1	0	±1dB	12.7	20	0.0037	1	Pass

3) WiFi , BT, and BLE Co-location MPE

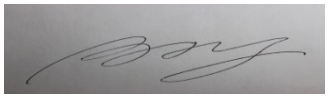
Note 1 : BT radio , BLE radio , and WiFi radio are co-located, and transmit simultaneously.
Note 2 : External antenna and embedded antenna do not work simultaneously.
Note 3 : WiFi 2.4 GHZ and 5GHz radio do not transmit simultaneously.
Note 4 : Worst-Case Co-location MPE is 2.4GHz Wi-Fi , BT, and BLE transmitting via external antenna simultaneously.

WiFi, BT, and BLE Co-location MPE Calculation :

BT = (0.0003/1) x 100 = 0.03%
BLE = (0.0005/1)x100 = 0.05%
2.4GHz WLAN = (0.0122/1) x 100 = 1.22%

Total MPE Percentage = (0.03+ 0.05 + 1.22) % = 1.3% < 100%

The Above Result had shown that the Device complied with MPE requirement at 20 cm measurement distance.



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