



# CTC Laboratories, Inc.

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## Maximum Permissible Exposure Evaluation

FCC ID: 2AR24-AIBOX30UXS

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:	LED Multimedia Processor
Trade Mark:	/
Model/Type reference:	Ai Box3.0 UXS
Listed Model(s):	/
Model Difference:	/
Frequency band (Operating)	<input checked="" type="checkbox"/> BT: 2.402GHz ~ 2.480GHz <input checked="" type="checkbox"/> BLE: 2.402GHz ~ 2.480GHz <input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input checked="" type="checkbox"/> RLAN: 5.150GHz ~ 5.250GHz <input checked="" type="checkbox"/> RLAN: 5.725GHz ~ 5.850GHz <input type="checkbox"/> Others _____
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 type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antenna <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Antenna gain (Max)	5dBi
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

### Limits for Maximum Permissible Exposure (MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm <sup>2</sup> )	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	6
1500-100000	--	--	1	30

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

Where

$P_d$  = Power density in  $mW/cm^2$

$P_{out}$  = 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

$P_d$  the limit of MPE  $1mW/cm^2$ . 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

*Only show the value of the worst antenna*

BLE - Worst case						
Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm ( $mW/cm^2$ )	Power density Limits ( $mW/cm^2$ )
GFSK	2402	-4.54	-4	5	0.00025	1

EDR - Worst case						
Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm ( $mW/cm^2$ )	Power density Limits ( $mW/cm^2$ )
GFSK	2441	5.15	6	5	0.00250	1

Type	Channel frequency (MHz)	Antenna	Max. Measured Power (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm ( $mW/cm^2$ )	Power density Limits ( $mW/cm^2$ )
802.11g	2412	Ant1	24.52	25	5	0.19895	1



5G WIFI U-NII-1(5150-5250MHz) - Worst case								
Type	Antenna	Channel frequency (MHz)	Max. Measured Power (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm <sup>2</sup> )	Total Power density at 20cm (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
802.11 n40	Ant1	5190	14.22	15	5	0.01989	0.03244	1
	Ant2	5190	12.69	13	5	0.01255		1

5G WIFI U-NII-3(5745-5850MHz) - Worst case								
Type	Antenna	Channel frequency (MHz)	Max. Measured Power (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm <sup>2</sup> )	Total Power density at 20cm (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
802.11 n40	Ant1	5755	14.39	15	5	0.01989	0.03569	1
	Ant2	5755	13.30	14	5	0.01580		1

The WiFi and BT can transmit simultaneously.

Worst case					
Type	Frequency (MHz)	Antenna Gain (dBi)	Power density at 20cm (mW/cm <sup>2</sup> )	BT+WIFI Power density at 20cm (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
GFSK	2441	5	0.00250	0.03819	1
802.11 n40	5755	5	0.03569		

Note:

1. Calculate by Worst-case mode
2. Max. Tune Up Power by Manufacturer's Declaration, and Max. Tune Up Power is used to calculate.
3. For a more detailed features description, please refer to the RF Test Report.
4. RF Modules RTL8822BU and ZK-7632A cannot transmit simultaneously.

\*\*\*\*\*THE END\*\*\*\*\*