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Maximum Permissible Exposure Evaluation

FCC ID: 2ATUP-Q660500

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

EUT	Eragon 660
Frequency band (Operating)	☒ BT: 2.402GHz ~ 2.480GHz ☒ BLE: 2.402GHz ~ 2.480GHz ☒ WLAN: 2.412GHz ~ 2.462GHz ☒ RLAN: 5.20GHz ~ 5.22GHz ☒ RLAN: 5.745GHz ~ 5825GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☒ fixed (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S=5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Antenna gain (Max)	1.5dBi
Evaluation applied	☒ MPE Evaluation ☐ 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 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	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

π = 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

BT							
Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
GFSK	2402	10.72	10±1	11	1.5	0.00354	1
	2441	9.92	9±1	10	1.5	0.00281	1
	2480	10.37	10±1	11	1.5	0.00354	1

BLE/4.0							
Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
GFSK	2402	0.63	0±1	1	1.5	0.00035	1
	2440	-0.80	0±1	1	1.5	0.00035	1
	2480	0.39	0±1	1	1.5	0.00035	1

BLE/5.0							
Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
GFSK	2402	0.71	0±1	1	1.5	0.00035	1
	2440	-0.73	0±1	1	1.5	0.00035	1
	2480	0.41	0±1	1	1.5	0.00035	1



2.4G WIFI							
Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm ²)	Power density Limits (mW/cm ²)
802.11b	2412	15.58	15±1	16	1.5	0.01119	1
	2437	15.92	15±1	16	1.5	0.01119	1
	2462	16.80	16±1	17	1.5	0.01408	1

5G WIFI U-NII-1							
Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm ²)	Power density Limits (mW/cm ²)
802.11a	5200	8.47	8±1	9	1.5	0.00223	1
	5220	8.70	8±1	9	1.5	0.00223	1

5G WIFI U-NII-3							
Type	Channel frequency (MHz)	Max. Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm ²)	Power density Limits (mW/cm ²)
802.11a	5745	8.57	8±1	9	1.5	0.00223	1
	5785	8.43	8±1	9	1.5	0.00223	1
802.11 ac20	5825	9.45	9±1	10	1.5	0.00281	1

The WLAN or Bluetooth can transmit simultaneously

WLAN Power density at 20cm (mW/cm ²)	BT Power density at 20cm (mW/cm ²)	Total Power density at 20cm (mW/cm ²)	Power density Limits (mW/cm ²)
0.01408	0.00354	0.01762	1

Note

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

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

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